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PhD Dissertation:

“Finance, Income Distribution and Unemployment”

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Rethymno, May 2010

Acknowledgements

This thesis is the result of a five-year study. During these years I have collaborated with a great number of people whose valuable contributions have helped me reach the final result. It is a pleasure to express my gratitude to them all in my humble acknowledgements.

In the first place, I am sincerely thankful to my supervisor Athanasios Papadopoulos- Professor of Economics at the University of Crete, for his great assistance. His generous interest, offered me the opportunity to develop both research and teaching experience.

I would also like to express my appreciation to George Argitis- Associate Professor of Economics at the University of Athens, for his constant availability, his illuminative feedback and invaluable suggestions. His constructive help throughout this thesis enabled me to develop a deep understanding of the subject and encouraged to conduct further individual research.

Special thanks are given to Anastasios Xepapadeas and Dimitris Milonakis- Heads of the Postgraduate Program at the Department of Economics at the University of Crete and the rest of the Academic Staff for their generous assistance and provided scholarships. In addition, I would like to thank the Secretary and the Technical Staff of the Department of Economics at the University of Crete for the enjoyable and harmonic coexistence they provided.

Part of this work would not have been carried out without the feedback and supportive comments by Stella Michopoulou; therefore I would like to express my gratitude for her contribution at econometrics throughout this research. Moreover, I would like to thank Minoas Koukouritakis- Lecturer of the Department of Economics at the University of Crete, for his creative comments and suggestions at econometrics. Furthermore, I would like to thank Andreas Yiannopoulos-Retired Fellow of the Department of Economics at the University of Crete, for his helpful comments and advices as well as Natassa Xerogiannaki for her suggestions in the writing of this thesis. I am also grateful to my colleagues and friends: Nick Dridakis, Nikolaos Giannellis and Vasiliki Fourmouzi for sharing their beneficial suggestions as well as their moral support throughout the thesis.

Above all I am heartily grateful to my parents and my sister, for their carry and support in all aspects of my life. This endeavour would have not been completed without their emotionally encouragement and financial support.

Lastly, I would like to thank all of those who supported me in any respect during the completion of this thesis.

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Περίληψη

Είναι γενικά αποδεκτό ότι το κοινό γνώρισμα των περισσότερων οικονομιών τις τελευταίες δεκαετίες, είναι αυτό της ανεργίας. Τα υψηλά ποσοστά και οι αρνητικές επιπτώσεις σε κοινωνικοοικονομικό επίπεδο επιτρέπουν τον χαρακτηρισμό και την αντιμετώπιση της, σαν πρόβλημα. Επιπλέον, η διόγκωση της ανεργίας σε συνδυασμό με την αυξανόμενη αλληλεξάρτηση των οικονομιών και την επικράτηση του χρηματοπιστωτικού συστήματος στον πραγματικό τομέα της οικονομίας, κάνουν επιτακτικότερη την ανάγκη επίλυσης της. Όλα αυτά καταδεικνύουν την αδυναμία των σχεδιαστών οικονομικής πολιτικής για πιθανούς πειραματισμούς ή και λανθασμένες αποφάσεις πολιτικής.

Ωστόσο, η προσκόλληση των οικονομολόγων και των σχεδιαστών οικονομικής πολιτικής στις επικρατούσες προσεγγίσεις (mainstream economics) και κυρίως η ευρεία χρήση του Φυσικού Ποσοστού Ανεργίας που δεν Επιταχύνει τον Πληθωρισμό (NAIRU) ως το βασικό εργαλείο για την λήψη οικονομικών αποφάσεων, επιτρέπει την απλοποίηση της σχέσης μεταξύ ανεργίας και πληθωρισμού. Όλα αυτά συνεπάγονται την ύπαρξη μιας αντίστροφης σχέσης, ανάμεσα στους ρυθμούς μεταβολής των τιμών (πληθωρισμός) και της οικονομικής ανάπτυξης (ανεργία), η χρήση της οποίας επιτρέπει την επίτευξη των στόχων που υιοθετούνται. Ως εκ τούτου, η χρήση του εργαλείου του NAIRU είναι συνυφασμένη με την προσήλωση της οικονομικής πολιτικής στην μείωση και σταθεροποίηση των τιμών και την μεταχείριση της ανεργίας, ως έναν δομικό (structural) στοιχείο για την μελλοντική συμπεριφορά του πληθωρισμού.

Άμεση συνέπεια αυτού είναι η αντιμετώπιση της ανεργίας ως ένα υποδεέστερο πρόβλημα, γεγονός που αντικατοπτρίζεται στο ότι οι πολιτικές που συνήθως υιοθετούνται, στοχεύουν στον χαμηλό πληθωρισμό (άμεσο αποτέλεσμα) και μέσω αυτού στην δημιουργία ενός φιλικού περιβάλλοντος για την απασχόληση (έμμεσο αποτέλεσμα). Έτσι, αν και θεωρητικά η υιοθέτηση αντιπληθωριστικών πολιτικών συνεπάγεται την επέκταση της οικονομικής δραστηριότητας, στην πράξη δημιουργεί μια σειρά προβλημάτων που σχετίζονται με την ανισότητα στην διανομή του εισοδήματος και την αύξηση του ρυθμού της φτώχειας.

Όμως, η εκ των προτέρων αποδοχή της ισότητας του NAIURU με το πραγματικό ποσοστό ανεργίας καθώς και με τα επίπεδα πλήρους απασχόλησης (full employment) και παραγωγικής ικανότητας (full capacity utilization) κάνουν δυσκολότερη την αντιμετώπιση της ανεργίας. Από την άλλη, τα υψηλά αποθέματα κεφαλαίου (capital stock) σε συνδυασμό με την υπερβάλλουσα παραγωγική ικανότητα (excess capacity utilization) που χαρακτηρίζουν τις οικονομίες, φανερώνουν την ακαταλληλότητα των πολιτικών απασχόλησης που απορρέουν από το πλαίσιο ανάλυσης του NAIURU. Όλα αυτά σε συνδυασμό με την ανικανότητα πρόβλεψης των πιθανών προβλημάτων που δημιουργούνται από την υιοθέτηση του μακροοικονομικού εργαλείου του NAIURU, ως το βασικό συστατικό της οικονομικής πολιτικής, ωθούν την οικονομία σε έναν φαύλο κύκλο.

Παρόλα τα μειονεκτήματα του πλαισίου ανάλυσης του NAIURU, την αδυναμία του να αντικατοπτρίσει την πραγματικότητα, αλλά και την αναποτελεσματικότητα του στο να δημιουργήσει συνθήκες οικονομικής ευμάρειας, το καθολικό ρεύμα της οικονομικής προσέγγισης δεν αφήνει περιθώρια για περαιτέρω εξέταση των σημείων

του. Το γεγονός αυτό οδηγεί στην απαξίωση της καταλληλότητας οποιασδήποτε άλλης οικονομικής προσέγγισης. Ωστόσο, η επίλυση των όποιων οικονομικών προβλημάτων απαιτεί την επικέντρωση της προσοχής στην πραγματική πλευρά της οικονομίας και στην αντιμετώπιση των μακροοικονομικών μεγεθών αυτά καθ' αυτά.

Λαμβάνοντας υπόψη την ανικανότητα της υπάρχουσας προσέγγισης (πλευρά προσφοράς) στο να προάγει το επίπεδο της απασχόλησης, η παρούσα διατριβή στοχεύει στο να επαληθεύσει την ικανότητα της συνολικής ζήτησης να προστατεύει τις οικονομίες από καταστάσεις συνεχόμενων υφέσεων. Έτσι, θέτοντας στο επίκεντρο της ανάλυσης μας το μέγεθος της ανεργίας και έχοντας μια κριτική διάθεση, η συγκεκριμένη διατριβή προσπαθεί να εξετάσει την συνάφεια των κανόνων και θεσμών της αγοράς εργασίας ως την βάση των τρεχουσών μακροοικονομικών πολιτικών. Απόρροια της προσπάθειας αυτής είναι η εισαγωγή και η υιοθέτηση μιας πιο ρεαλιστικής προσέγγισης (πλευρά ζήτησης) σχετικά με την αντιμετώπιση της ανεργίας.

Ειδικότερα, ο στόχος της παρούσας διατριβής είναι διττός. Από την μια, να παρουσιάσει την εξέλιξη των θεωρητικών θεμελίων της μακροοικονομικής ανάλυσης που σχετίζονται με την ανεργία έως την επικράτηση του πλαισίου ανάλυσης του NAIRU, έτσι ώστε να αξιολογήσει την ορθότητα του εργαλείου αυτού για την λήψη αποφάσεων. Από την άλλη να παρουσιάσει τα βασικά χαρακτηριστικά της Μετά Κεϋνσιανής – Καλετσκιανής (Post Keynesian- Kaleckian) προσέγγισης, προκειμένου να εξεταστεί από πλευράς ζήτησης η σχέση που χαρακτηρίζει τους νομισματικούς παράγοντες (χρέος και επιτόκιο) με την ανεργία (άμεση) και την διανομή εισοδήματος (έμμεση). Ο τρόπος με τον οποίο διαμορφώνονται οι παραπάνω σχέσεις

εξετάζεται τόσο όταν δεν υπάρχει κυβερνητική παρέμβαση, όσο και όταν η οικονομική δραστηριότητα πραγματοποιείται υπό την παρουσία της, κυρίως μέσω της επιβολής εισοδηματικής φορολόγησης. Η υιοθέτηση του πλαισίου αυτού, επιτρέπει την δημιουργία ενός μακροοικονομικού υποδείγματος αλλά και την παρουσίαση μιας σειράς οικονομετρικών αποτελεσμάτων.

Βάση όλων αυτών μπορούμε να θεωρήσουμε, ότι η κύρια συμβολή της παρούσας διατριβής έγκειται από την μια στην τεκμηρίωση της κριτικής που αφορά τόσο τα ‘τεχνικά’ ζητήματα ως προς τον τρόπο εκτίμησης και χρήσης του NAIRU όσο και τις υποθέσεις που πλαισιώνουν το μέγεθος αυτό και θεωρούνται δεδομένες. Παράλληλα η δημιουργία του θεωρητικού υποδείγματος βασιζόμενο στο Μετά Κεϋνσιανό-Καλετσκιανό πλαίσιο ανάλυσης, αλλά και οι οικονομετρικές εκτιμήσεις αποδεικνύουν ότι ο κατάλληλος χειρισμός της εισοδηματικής πολιτικής και η αξιοποίηση της συνολικής ζήτησης μπορούν να βελτιώσουν την οικονομική δραστηριότητα.

Λαμβάνοντας όλα αυτά υπόψη, η παρούσα διατριβή δομείται ως εξής:

Η κύρια πρόθεση του Πρώτου Κεφαλαίου είναι η βιβλιογραφική ανασκόπηση των σημαντικότερων εξελίξεων της μακροοικονομικής θεωρίας που σχετίζονται με την ανάλυση της ανεργίας. Ξεκινώντας από την Κεϋνσιανή Καμπύλη Phillips (Phillips curve), το κεφάλαιο αυτό εξετάζει την διαδικασία προσαρμογής της καμπύλης αυτής στις αλλαγές της μεταπολεμικής μακροοικονομικής σκέψης. Έτσι, αν και η σταθερότητα της Κεϋνσιανής Καμπύλης Phillips τόσο βραχυχρόνια όσο και μακροχρόνια φαινόταν κατάλληλη για την αύξηση της οικονομικής δραστηριότητας,

ο δυναμικός χαρακτήρας των οικονομιών σε συνδυασμό με την επικράτηση της νεοκλασικής προσέγγισης, οδήγησαν στον εμπλουτισμό της Κεϋνσιανής καμπύλης Phillips με μικροοικονομικά στοιχεία (microeconomic foundations). Αποτέλεσμα της αλλαγής αυτής ήταν ο καθορισμός του Φυσικού Ποσοστού Ανεργίας (Natural Unemployment Rate) (Friedman, 1968; Phelps, 1967, 1968).

Η ανάγκη για περαιτέρω βελτίωση του μεγέθους αυτού, επέφερε τον συνδυασμό του Φυσικού Ποσοστού Ανεργίας με τις Ορθολογικές Προσδοκίες και τον προσδιορισμό της Επαυξημένης με Ορθολογικές Προσδοκίες καμπύλη Phillips (Rational-Expectations Phillips curve), ως την βάση για την λήψη αποφάσεων οικονομικής πολιτικής (Lucas, 1972; Sargent and Wallace, 1975, 1976). Άμεση συνέπεια αυτής της διαδικασίας ήταν η αντικατάσταση των Κεϋνσιανών πολιτικών διάκρισης (discretionary policies) με συγκεκριμένους κανόνες νομισματικής πολιτικής (monetary policy rules), θεωρώντας ότι με τον τρόπο αυτό αυξανόταν ο βαθμός αξιοπιστίας των νομισματικών αρχών και άρα και η δυνατότητα επίτευξης των στόχων οικονομικής πολιτικής (Sargent and Wallace, 1975, 1976; Barro and Gordon, 1983a, 1983b).

Όμως, η διατήρηση της ανεργίας και του πληθωρισμού σε υψηλά επίπεδα και η αδυναμία των ιθυνόντων οικονομικής πολιτικής (policymakers) να καταλάβουν τις πραγματικές ανάγκες των οικονομιών, οδήγησαν στην ‘γέννηση’ των Νέων Κεϋνσιανών Οικονομικών (New Keynesian economics). Η προσέγγιση αυτή, αντικατοπτρίζεται κατά κύριο λόγο στην δημιουργία του μακροχρόνιου σημείου ισορροπίας, γνωστό ως NAIRU, και είναι ουσιαστικά ο συνδυασμός του Φυσικού

Ποσοστού Ανεργίας με την υπόθεση της επιτάχυνσης (accelerating hypothesis) και τις πολιτικές ζήτησης (Modiglianni and Papademos, 1975; Tobin, 1980).

Η διαδικασία μεταβίβασης από το αμιγές Κεϋνσιανό (πλευρά ζήτησης) στο νεοκλασικό (πλευρά προσφοράς) πλαίσιο ανάλυσης και ο μετέπειτα συνδυασμός τους στα Νέα Κεϋνσιανά οικονομικά, επέφερε αλλαγές τόσο στο θεωρητικό, όσο και στο εμπειρικό επίπεδο οικονομικής ανάλυσης και σκέψης. Σε αντίθεση με τις προσδοκίες που δημιούργησε η προσέγγιση αυτή, η θέσπιση του NAIRU ως το κύριο εργαλείο οικονομικής ανάλυσης και πολιτικής και κυρίως η εξάρτηση του στους θεσμούς και κανόνες των αγορών εργασίας, θέτουν υπό αμφισβήτηση την πιθανότητα αντιμετώπισης της ανεργίας. Και αυτό γιατί η γνώση που αφορά τα θεωρητικά υποδείγματα του NAIRU που χρησιμοποιούνται για την λήψη οικονομικών αποφάσεων είναι συνήθως ελλιπής. Η παραδοχή αυτή, προσδιορίζει ως βασικό στόχο του Δεύτερου Κεφαλαίου την ανάδειξη των ακαμψιών (ονομαστικών και πραγματικών) στην αγορά εργασίας που αφορούν τις τιμές και κυρίως τον καθορισμό των μισθών και άρα και της απασχόλησης, ακολουθώντας μια κριτική ανασκόπηση της Νέας Κεϋνσιανής βιβλιογραφίας σχετικά με το NAIRU.

Ειδικότερα, σύμφωνα με τις υποθέσεις του Νέου Κεϋνσιανού πλαισίου ανάλυσης το επίπεδο του μισθού είναι αυτό που καθορίζει το επίπεδο της απασχόλησης στην οικονομία, ενώ η σχέση μεταξύ του επιπέδου του μισθού και αυτού της ανεργίας είναι θετική. Το κοινό γνώρισμα των υποδειγμάτων (*υπόδειγμα αποτελεσματικού μισθού* (efficiency wage model), *υπόδειγμα διαπραγμάτευσης μισθού* (bargaining model), *υπόδειγμα υστέρησης* (hysteresis model)) που βασίζονται στην υπόθεση αυτή, είναι η υποτίμηση του ανθρώπινου και φυσικού κεφαλαίου και κατά συνέπεια η μείωση της

αποτελεσματικότητας και παραγωγικότητας των ανέργων. Αυτό έχει ως αποτέλεσμα την απομάκρυνση των οικονομιών από το επίπεδο της μακροχρόνιας ισορροπίας και την διόγκωση της ανεργίας (Layard and Nickell, 1986, 1987; Blanchard and Summers, 1987).

Οι διαστάσεις της ανεργίας γίνονται δραματικότερες εξαιτίας των πολιτικών που διαμορφώνονται μέσα στην Νέα Κεϋνσιανή προσέγγιση και στοχεύουν είτε στην *εξασφάλιση των ανέργων* (benefit or unemployment insurance system) είτε στην *εκπαίδευση των εργαζομένων* (workers' training) είτε ακόμα και στον προσδιορισμό ενός *κατώτατου επιπέδου μισθού* (reservation wage). Επιπλέον, ακριβώς επειδή οι προτάσεις απορρέουν από την υιοθέτηση αντιπληθωριστικών πολιτικών, μόνο επιφανειακές και πρόσκαιρες λύσεις προσφέρουν στην οικονομική δραστηριότητα (Solow, 1998; Ball and Mankiw, 2002). Έτσι, δημιουργείται μια σειρά ερωτημάτων σχετικά με την αποτελεσματικότητα και την ορθότητα της χρήσης του NAIRU, σαν το καταλληλότερο εργαλείο για την λήψη οικονομικών πολιτικών.

Συγκεκριμένα, οι αμφιβολίες μέσα στο Νέο Κεϋνσιανό πλαίσιο ανάλυσης σχετικά με το NAIRU έχουν να κάνουν με τον βαθμό ευαισθησίας των εκτιμήσεων του τόσο σε σχέση με την μεταβλητότητα των υποθέσεων που χαρακτηρίζουν το πλαίσιο στο οποίο πραγματοποιούνται αυτές, όσο και με τα χαρακτηριστικά της χρονικής περιόδου και των μεταβλητών που χρησιμοποιούνται για την εκτίμηση του NAIRU (Staiger et al., 1997a, 1997b; Stiglitz, 1997; Galbraith, 1997, κ.α.). Η ουσία όλων αυτών αντικατοπτρίζεται στο γεγονός ότι τα Νέα Κεϋνσιανά οικονομικά χαρακτηρίζονται από την χρήση κανόνων νομισματικής πολιτικής που βασίζονται στο *υπόδειγμα της επιτάχυνσης* (acceleration model). Σε κάθε περίπτωση οι ιθύνοντες

για τον σχεδιασμό της οικονομικής πολιτικής πρέπει να είναι γνώστες των μηχανισμών που χαρακτηρίζουν το NAIRU, των μεθόδων καθώς και των χαρακτηριστικών των χρονικών περιόδων που υιοθετούνται για την πραγματοποίηση εκτιμήσεων του.

Σε συνέχεια της 'εσωτερικής' κριτικής των Νέων Κεϋνσιανών οικονομικών σχετικά με το NAIRU, η βασική επιδίωξη του Τρίτου Κεφαλαίου είναι να αναδείξει και να αντικρούσει τα 'αδύναμα' σημεία του μακροοικονομικού αυτού εργαλείου από πλευρά της συνολικής ζήτησης. Η προσπάθεια αυτή θα μας επιτρέψει στο να εισάγουμε ένα πιο ρεαλιστικό και αποτελεσματικό πλαίσιο ανάλυσης. Έτσι, η υιοθέτηση της Μετά Κεϋνσιανής προσέγγισης αποδεικνύει ότι η ασυνέπεια μεταξύ οικονομικής θεωρίας και πραγματικότητας οφείλεται στην αποδοχή ενός συνόλου μη-ρεαλιστικών υποθέσεων.

Ειδικότερα, το γεγονός ότι η ύπαρξη μακροχρόνιας ισορροπίας είναι συνδεδεμένη με την καθετότητα της καμπύλης Phillips, ανεξάρτητα από το αν αυτό ισχύει ή όχι, δημιουργεί ερωτήματα για το κατά πόσο τελικά είναι ικανή η ύπαρξη της, όταν η υπόθεση αυτή αμφισβητηθεί (Atesoglu and Smithin, 2006, Eisner, 1995, 1996; Sawyer, 1987). Οι όποιες αμφιβολίες που αφορούν στην τοποθέτηση του NAIRU στο επίκεντρο του σχεδιασμού οικονομικής πολιτικής, ενισχύονται εξαιτίας της υπόθεσης σχετικά με την εκ των προτέρων αποδοχή της ουδετερότητας τόσο του χρήματος όσο και της παραγωγικής ικανότητας. Και αυτό γιατί η υπόθεση περί ουδετερότητας συνεπάγεται την αποδοχή μιας σταθερής και δίκαιης διανομής εισοδήματος, ανίκανης να επηρεάσει το επίπεδο της απασχόλησης και γενικότερα την οικονομική δραστηριότητα (Arestis and Sawyer, 2003; Sawyer, 1998, 2001, 2002, 2004).

Επιπρόσθετα ερωτήματα σχετικά με την καταλληλότητα του NAIRU, δημιουργούνται από την υπόθεση σχετικά με τη μεταβλητότητα του αποθέματος κεφαλαίου μόνο κατά την διάρκεια της μακροχρόνιας περιόδου και άρα την αποδοχή για την ύπαρξη μοναδιαίας ελαστικότητας αντικατάστασης μεταξύ του κεφαλαίου και της εργασίας. Αποτέλεσμα της υπόθεσης αυτής είναι η εξασφάλιση της ουδετερότητας της παραγωγικής ικανότητας και η δυνατότητα επίτευξης της μακροχρόνιας ισορροπίας, χωρίς να αμφισβητείται η ερμηνεία της ανεργίας μέσω των ακαμυγιών στην αγορά εργασίας (Arestis et al., 2007; Arestis and Mariscal, 1997, 1998; Sawyer, 1998, 2001). Ωστόσο η χρησιμοποίηση του ‘ενεργού’ αποθέματος κεφαλαίου σε σχέση με τα επίπεδα της ανεργίας, μπορεί να οδηγήσει σε οικονομική άνθηση χωρίς να επιφέρει πληθωριστικές πιέσεις (Sawyer, 1998, 2002; Rowthorn, 1999; Atesoglu and Smithin, 2006; Palacio Vera et al., 2006).

Σε όλα τα παραπάνω πρέπει να προστεθεί και η υπόθεση σχετικά με την εκ των προτέρων ισότητα ανάμεσα στο NAIRU και στα επίπεδα πλήρους απασχόλησης και παραγωγικής ικανότητας σε κάθε σημείο της οικονομίας (Sawyer, 2001, 2002, Setterfield, 1996). Η υπόθεση αυτή σε συνδυασμό με το γεγονός ότι οι πολιτικές που σχεδιάζονται με βάση το NAIRU στοχεύουν στο χαμηλό πληθωρισμό, υποδηλώνει ότι η πραγματική οικονομία ωθείται προς ένα προκαθορισμένο επίπεδο NAIRU και όχι το αντίθετο που είναι και το επιθυμητό (Sawyer, 2001, 2002; Galbraith, 1997).

Είναι φανερό ότι υιοθέτηση των παραπάνω μη-ρεαλιστικών υποθέσεων, εξυπηρετεί την επίτευξη της μακροχρόνιας ισορροπίας και των αποτελεσμάτων που αυτή συνεπάγεται σε όρους οικονομικής πολιτικής. Επιπλέον το γεγονός ότι αναγνωρίζεται μόνο ‘παθητικός’ ρόλος για την συνολική ζήτηση, συνεπάγεται την απόρριψη

οποιασδήποτε μορφής επεκτατικών πολιτικών ζήτησης, οι οποίες μόνο θετικά μπορούν να επηρεάσουν την οικονομική δραστηριότητα. Ωστόσο, η υιοθέτηση ενός πλαισίου όπου αναγνωρίζεται ενεργός ρόλος για την πλευρά της ζήτησης, είναι ικανό να καταστείλει τις αρνητικότητες που προκαλούνται από την υιοθέτηση του καθεστώτος χαμηλού πληθωρισμού και να επηρεάσει θετικά την παραγωγική δραστηριότητα. Και αυτό γιατί σε ένα τέτοιο πλαίσιο, κάθε σημείο της παραγωγικής διαδικασίας ανταποκρίνεται σε συγκεκριμένο σημείο της συνολικής ζήτησης (Arestis and Sawyer, 2004a; Sawyer, 2001, 2002, 1997a).

Δεδομένης λοιπόν της θετικής σχέσης που διέπει την συνολική ζήτηση και το επίπεδο της οικονομικής δραστηριότητας, το Τέταρτο Κεφάλαιο παρουσιάζει τις κύριες υποθέσεις του Μετα Κεϋνσιανού - Καλετσκιανού πλαισίου ανάλυσης που υιοθετεί η παρούσα διατριβή. Εξάλλου, εξετάζοντας την σημαντικότητα της συνολικής ζήτησης στον προσδιορισμό της οικονομικής δραστηριότητας και στην πορεία της απασχόλησης τα Μετα Κεϋνσιανά υποδείγματα μεγέθυνσης αποδεικνύουν εύκολα την αναποτελεσματικότητα του NAIRU. Επιπλέον, η αυξανόμενη εξάρτηση της οικονομικής δραστηριότητας στο χρηματοπιστωτικό τομέα και ο ενδογενώς προσδιορισμένος χαρακτήρας της οικονομίας κάνουν επιτακτικότερη την ανάγκη για την υιοθέτηση ενός ρεαλιστικότερου πλαισίου για την λήψη οικονομικών αποφάσεων.

Έτσι, το βασικό χαρακτηριστικό της Μετα Κεϋνσιανής - Καλετσκιανής προσέγγισης που υιοθετούμε είναι η αναγνώριση της συνολικής ζήτησης, ως την κινητήρια δύναμη της οικονομικής δραστηριότητας. Ειδικότερα, σύμφωνα με την υπόθεση του «Αντίστροφου Νόμου του Say» (Say's Law in reserve) η ζήτηση είναι αυτή που

προσδιορίζει το απαιτούμενο επίπεδο της προσφοράς, προκειμένου η οικονομία να ισορροπήσει (Setterfield, 2003; Lavoie, 2003). Εξάλλου, κατά τους Kalecki (1933) και Keynes (1936) τα χαμηλά επίπεδα οικονομικής δραστηριότητας που χαρακτήριζαν τις οικονομίες στις αρχές του 1930 οφείλονταν στα ανεπαρκή επίπεδα της συνολικής ζήτησης.

Επιπλέον, η υπόθεση ότι οι οικονομίες λειτουργούν σε περιβάλλον ατελούς ανταγωνισμού, όπου οι κεφαλαιούχοι (capitalists) καθορίζουν το επίπεδο της τιμής του προϊόντος τους (mark up) προκειμένου να καλύψουν όλες τις μεταβαλλόμενες δαπάνες που αντιμετωπίζουν κατά την παραγωγική διαδικασία, προσδίδει στην διανομή του συνολικού εθνικού εισοδήματος έναν δυναμικό χαρακτήρα (Kalecki, 1954). Αλλά και η υπόθεση περί ενδογενούς δημιουργίας του χρήματος μέσω του τραπεζικού δανεισμού ή του υπάρχοντος αποθέματος χρήματος, επιβεβαιώνει τον ενεργό ρόλο της συνολικής ζήτησης και της διανομής του εισοδήματος στην διαμόρφωση της οικονομικής δραστηριότητας (π.χ. Arestis and Sawyer, 2003; Sawyer, 2002, 2007α, 2007β; Hein, 2006β, 2007, κ.α). Ως εκ τούτου, στην Μετά Κεϋνσιανή - Καλετσκιανή προσέγγιση, ο προσδιορισμός του πληθωρισμού μέσα από την «*Θεωρία Διαμάχης του Πληθωρισμού*» (Conflict Income Theory) αποδεικνύει την ύπαρξη θετικής σχέσης ανάμεσα στην απασχόληση και τη διανομή του εισοδήματος (Rowthorn, 1977). Η παραδοχή της σχέσης αυτής σε συνδυασμό με την συνύπαρξη της πλεονάζουσας παραγωγικής ικανότητας και της ανεργίας υποδηλώνει, ότι η μείωση του πληθωρισμού μπορεί να επιτευχθεί περιορίζοντας τα περιθώρια κέρδους για τις επιχειρήσεις και διευρύνοντας ταυτόχρονα τα περιθώρια της απασχόλησης (π.χ. Rowthorn, 1977, 1999; Sawyer, 2002).

Κάτω από αυτές τις συνθήκες, η υιοθέτηση επεκτατικών πολιτικών ζήτησης είναι ικανές να επιταχύνουν την οικονομική δραστηριότητα· κάτι τέτοιο μπορεί πολύ εύκολα να επιτευχθεί μέσα από την επένδυση, που θεωρείται ο σημαντικότερος παράγοντας της οικονομίας (Kalecki, 1937a; Bhaduri and Marglin, 1990, 1991; Rowthorn, 1981; Dutt, 1984, 1987; Taylor, 1985). Εξάλλου, η θετική σχέση που υπάρχει ανάμεσα στα επίπεδα κερδοφορίας των κεφαλαιούχων και σε αυτά της επένδυσης, αποδεικνύει την σημαντικότητα της διανομής του εισοδήματος, της παραγωγικής ικανότητας (πλευρά ζήτησης) και της κερδοφορίας (πλευρά προσφοράς) στον προσδιορισμό της οικονομικής δραστηριότητας. Σε όλα αυτά, εξίσου σημαντικό ρόλο παίζει το γεγονός ότι τα επίπεδα των οριακών τάσεων για αποταμίευση και κατανάλωση διαμορφώνονται ανάλογα με το επίπεδο του εισοδήματος κάθε εισοδηματικής τάξης (Kalecki, 1937a).

Ωστόσο, η αυξανόμενη αλληλεπίδραση των οικονομιών σε συνδυασμό με την υιοθέτηση αυστηρών αντιπληθωριστικών πολιτικών και τη γενικότερη αβεβαιότητα που χαρακτηρίζει την οικονομική δραστηριότητα, οδηγούν στην μείωση της κερδοφορίας των επενδυτικών δραστηριοτήτων και στην περαιτέρω συρρίκνωση του μεγέθους των επενδύσεων (Rowthorn, 1995, 1999; Sawyer, 1992a, 1998b). Αυτό συνεπάγεται από την μια την μείωση της οικονομικής δραστηριότητας και από την άλλη την αύξηση της ανάγκης των κεφαλαιούχων (capitalists) για δανεισμό, προκειμένου να πραγματοποιήσουν τα επενδυτικά τους σχέδια. Μια τέτοια απόφαση από πλευράς κεφαλαιούχων, οδηγεί στην ανάληψη ενός επιπρόσθετου κόστους παραγωγής, αυτού της υποχρέωσης για αποπληρωμή επιτοκίων στο μέλλον, αλλά και στην δημιουργία μια νέας εισοδηματικής τάξης αυτής των εισοδηματιών από αποπληρωμή χρέους (rentiers). Αν και η παρουσία της εισοδηματικής τάξης των

εισοδηματιών από αποπληρωμή χρέους εξασφαλίζει την αρχική χρηματοδότηση της παραγωγικής διαδικασίας, συγχρόνως περιπλέκει τις σχέσεις που δημιουργούνται μέσα σε αυτήν (Dutt, 1992).

Θα πρέπει να σημειωθεί ότι η όποια απόφαση για εξωτερικό δανεισμό, σύμφωνα με την “*Αρχή του Αυξανόμενου Ρίσκου*” (*principle of increasing risk*), εξαρτάται από το επίπεδο του κεφαλαίου που χαρακτηρίζει τον κεφαλαιούχο και από το επίπεδο των μη-διανεμηθέντων κερδών (*retained earnings*) που έχει στην διάθεση του και πρόκειται να χρησιμοποιήσει για την πραγματοποίηση των επενδυτικών του σχεδίων (Kalecki, 1937a). Η υιοθέτηση της αρχής αυτής, συνεπάγεται τη δημιουργία μιας θετικής σχέσης ανάμεσα στην εσωτερική και εξωτερική χρηματοδότηση της επένδυσης και μιας αρνητικής ανάμεσα στο επιτόκιο και στο λόγο χρέους-κεφαλαίου.

Συνεπώς, η όποια απόφαση των κεφαλαιούχων για εξωτερικό δανεισμό είναι συνδεδεμένη τόσο με την συμπεριφορά του επιτοκίου όσο και με τις συνθήκες σταθερότητας ή αστάθειας που επικρατούν στην οικονομία. Έτσι, στην παρούσα διατριβή υιοθετώντας την «*Οριζόντια Προσέγγιση*» (*Horizontalism*), το επίπεδο και η συμπεριφορά του επιτοκίου προσδιορίζονται εξωγενώς από τις νομισματικές αρχές (Lavoie, 1995; Hein, 1999; Hein and Ochs, 2003). Συνεπώς, ανεξαρτήτως της πηγής δανεισμού θα πρέπει να εξετάσουμε προσεκτικά το κόστος του κεφαλαίου, δηλαδή την συμπεριφορά των επιτοκίων, αλλά και την ποιότητα του κόστους αυτού.

Από την άλλη, η σταθερότητα ή αστάθεια της ισορροπίας και τα αποτελέσματα στα οποία οδηγούν, συνδέονται άμεσα με την «*Υπόθεση της Χρηματοοικονομικής/ Οικονομικής Ευθραυστότητας*» (*Financial Instability Hypothesis*) του Minsky (1975).

Η υπόθεση αυτή, υποδηλώνει την σημαντικότητα των χρηματοδοτικών αποφάσεων στον τομέα παραγωγής, ενώ σύμφωνα με τον Minsky (1975) ο συνδυασμός της με τα επίπεδα σταθερότητας ή αστάθειας της ισορροπίας κάνουν πιθανό σε περιόδους οικονομικής άνθησης, οι οικονομίες να χαρακτηρίζονται από την συνύπαρξη υψηλών επιπέδων του λόγου χρέους-κεφαλαίου και μεγάλης συσσώρευσης κεφαλαίου και άρα επιτάχυνση της δραστηριότητας τους.

Όμως τα εμπόδια που συνεπάγεται η αυξανόμενη δύναμη των εισοδηματιών από αποπληρωμή χρέους, σε συνδυασμό με την συνύπαρξη υπερβάλλουσας παραγωγικής ικανότητας και υψηλών επιπέδων ανεργίας που συνήθως χαρακτηρίζει τις οικονομίες, κάνει αναγκαία την εισαγωγή της δημοσιονομικής πολιτικής σε όρους φορολόγησης και δημοσιονομικών δαπανών. Και αυτό γιατί, η εισαγωγή ενός καλά διαρθρωμένου και προοδευτικού φορολογικού συστήματος είναι ικανό να επηρεάσει τη διανομή του εισοδήματος με τέτοιο τρόπο ώστε να επέλθει οικονομική άνθηση (Mott and Slattery, 1994; Damaris and Mair, 1992). Όλα αυτά σε συνδυασμό με την υπόθεση ότι οι δημόσιες δαπάνες έχουν την σωστή κατεύθυνση και οι εισπράξεις από την επιβολή των φόρων χρησιμοποιούνται κατάλληλα, είναι ικανά να οδηγήσουν την οικονομία σε μια νέα φάση οικονομικής δραστηριότητας.

Έχοντας αναλύσει τις βασικότερες υποθέσεις του Μετά Κεϋνσιανού - Καλετσκιανού πλαισίου ανάλυσης που υιοθετούμε, στο Πέμπτο Κεφάλαιο της παρούσας διατριβής αναπτύσσεται ένα θεωρητικό μακροοικονομικό υπόδειγμα με σκοπό να αναδείξει την άμεση σχέση ανάμεσα στους νομισματικούς παράγοντες και στην απασχόληση, τόσο βραχυχρόνια όσο και μακροχρόνια. Το υπόδειγμα αναφέρεται σε μια κλειστή οικονομία, όπου η παραγωγική διαδικασία απαρτίζεται από τρεις εισοδηματικές

τάξεις: τους κεφαλαιούχους (capitalists), τους εργαζόμενους (workers) και τους εισοδηματίες από αποπληρωμή χρέους (rentiers). Θα πρέπει να σημειωθεί ότι η εισαγωγή της τρίτης εισοδηματικής τάξης αντικατοπτρίζει τους νομισματικούς παράγοντες (χρέος και επιτόκιο). Επιπλέον, υποθέτουμε ότι στην διάρκεια της παραγωγικής διαδικασίας θεωρούνται δεδομένες οι τεχνικές και τεχνολογικές συνθήκες. Αυτό συνεπάγεται την παραγωγή ενός και μόνο προϊόντος στην οικονομία, χωρίς την ύπαρξη υπερβάλλουσας απασχόλησης (no overhead labour and cons) και απόσβεσης κεφαλαίου (no capital depreciation)¹.

Και ενώ στο αρχικό (βασικό) υπόδειγμα αναπτύσσεται χωρίς την παρουσία κυβερνητικής παρέμβασης (φορολογία και κυβερνητικές δαπάνες), στη συνέχεια χαλαρώνοντας τις υποθέσεις εισάγουμε την προοδευτική φορολόγηση του εισοδήματος και την παρουσία σταθερών κυβερνητικών δαπανών. Η επιλογή της φορολόγησης του εισοδήματος οφείλεται στην δυνατότητα που αυτή έχει στο να διαφοροποιεί ουσιαστικά την οικονομική δραστηριότητα. Ειδικότερα, θεωρείται ότι όσο υψηλότερος ο βαθμός προοδευτικότητας της εισοδηματικής φορολόγησης, τόσο υψηλότερη η πιθανότητα για σταθεροποίηση της οικονομίας και επίτευξη ισότητας της διανομής του εισοδήματος (Sawyer, 2007a, 2007b; Mott and Slattery, 1994). Σε όλα τα παραπάνω, προσθέτουμε την υπόθεση για την ύπαρξη ενός μη εξισορροπημένου αλλά όχι συνεχόμενα ελλειμματικού προϋπολογισμού, έτσι ώστε σε συνδυασμό με την ανεπάρκεια της ζήτησης η ισορροπία της οικονομικής δραστηριότητας να επέλθει διαφοροποιώντας την διάρθρωση και όχι το επίπεδο στον φόρο εισοδήματος.

¹Οι βασικές εξισώσεις του θεωρητικού υποδείγματος, αποτελούν συνδυασμό και επέκταση των υποδειγμάτων των Asimakopoulos (1975), Blecker (2002) και Arestis and Sawyer (2003), ενώ η μεθοδολογία ανάλυσης που υιοθετείται είναι σύμφωνη με αυτή των Lavoie (1995) και Hein (2006b).

Ωστόσο, η ανάλυση του υποδείγματος γίνεται ακόμα πιο ενδιαφέρουσα, χαλαρώνοντας την υπόθεση περί μηδενικής οριακής ροπής προς αποταμίευση των εργαζομένων και θεωρώντας ότι οι εργαζόμενοι χρησιμοποιούν το σύνολο των αποταμιεύσεων τους για την χρηματοδότηση των επενδυτικών σχεδίων των κεφαλαιούχων. Σε αυτήν την περίπτωση, το συνολικό ποσό του χρέους που αντιμετωπίζουν οι κεφαλαιούχοι διασπάται σε αυτό των εισοδηματιών από αποπληρωμή χρέους και σε αυτό των εργαζομένων, ενώ ταυτόχρονα τα εισοδήματα των εργαζομένων αυξάνονται κατά το ποσό αποπληρωμής του χρέους που καλούνται οι κεφαλαιούχοι να τους καταβάλλουν.

Τα συμπεράσματα τα οποία εξάγονται, φανερώνουν ότι βραχυχρόνια η συμπεριφορά των πραγματικών μεγεθών της οικονομίας προσδιορίζεται από τη συμπεριφορά του ενδογενώς καθοριζόμενου επιπέδου της παραγωγικής ικανότητας. Επιπλέον, θα πρέπει να λάβουμε υπόψη μας ότι οι επιπτώσεις από τις μεταβολές των επιτοκίων στα υπό εξέταση μακροοικονομικά μεγέθη προσδιορίζεται από: (α) την σχέση ανισότητας που χαρακτηρίζει τις οριακές ροπές για αποταμίευση των κεφαλαιούχων και των εισοδηματιών από την αποπληρωμή χρέους και (β) την επίδραση του μέγεθος των εσωτερικών κεφαλαίων (internal funds) που αντικατοπτρίζει τις επιπτώσεις στην διανομή του εισοδήματος εξαιτίας της παρουσίας του εξωτερικού δανεισμού. Επιπλέον, εξαιτίας της υπόθεσης ότι το επίπεδο της απασχόλησης προσδιορίζεται άμεσα από το ενδογενώς προσδιοριζόμενο επίπεδο της παραγωγικής ικανότητας, η ανάλυση δεν διαφοροποιείται.

Μεγαλύτερο ενδιαφέρον αποκτά η μακροχρόνια ανάλυση του υποδείγματος εξαιτίας της υπόθεσης του ενδογενούς χαρακτήρα του αποθέματος του κεφαλαίου και του

μεγέθους του χρέους. Ειδικότερα, αν και στη μακροχρόνια περίοδο η σχέση των οριακών ροπών προς αποταμίευση των κεφαλαιούχων και των εισοδηματιών από αποπληρωμή χρέους, αλλά και η επίδραση του εξωτερικού δανεισμού πάνω στην επένδυση επηρεάζει την ισορροπία, ο προσδιορισμός της οικονομικής δραστηριότητας εξαρτάται άμεσα από την αντίδραση του ενδογενώς καθοριζόμενου επιπέδου του λόγου χρέους-κεφαλαίου στις μεταβολές των επιτοκίων. Ειδικότερα, η συμπεριφορά του χρέους στις μεταβολές του επιτοκίου και άρα και η επιρροή του στην οικονομική δραστηριότητα, καθορίζεται από το σημείο που βρίσκεται το μακροχρόνιο επίπεδο του χρέους σε σχέση με το επίπεδο ισορροπίας του.

Το γενικό συμπέρασμα που προκύπτει είναι ότι η επίδραση των μεταβολών των επιτοκίων καθενός από τα ενδογενώς προσδιοριζόμενα μακροοικονομικά μεγέθη εξαρτώνται από τον τρόπο που η διανομή του εισοδήματος επηρεάζεται από τον εξωτερικό δανεισμό καθώς και από την σχέση ανισότητας που χαρακτηρίζει τις οριακές ροπές προς αποταμίευση των κεφαλαιούχων και των εισοδηματιών από αποπληρωμή χρέους. Το συμπέρασμα αυτό ισχύει τόσο για συνθήκες σταθερότητας όσο και για συνθήκες αστάθειας.

Στην περίπτωση εισαγωγής της κυβερνητικής παρέμβασης μέσω της φορολόγησης του εισοδήματος και των δημοσίων δαπανών, αν και μεταβάλλονται ορισμένες από τις εξισώσεις του υποδείγματος εξαιτίας της διατήρησης του κορμού των βασικών υποθέσεων, τα συμπεράσματα που προκύπτουν δεν διαφοροποιούνται σε σχέση με αυτά του βασικού υποδείγματος. Αυτό που θα πρέπει να προσέξουμε είναι ότι εξαιτίας της φορολόγησης του εισοδήματος, το συνολικά διαθέσιμο εισόδημα είναι χαμηλότερο σε σχέση με αυτό του βασικού υποδείγματος. Επιπλέον, θα πρέπει να

σημειώσουμε ότι η σχέση ανάμεσα στον εξωτερικό δανεισμό και στις κυβερνητικές δαπάνες καθώς και ο βαθμός της προοδευτικότητας της φορολόγησης είναι αυτά που καθορίζουν το κατά πόσο τελικά θα επηρεαστεί το επίπεδο της οικονομικής δραστηριότητας.

Τα παραπάνω αποτελέσματα μεταβάλλονται ακόμα περισσότερο, στην περίπτωση όπου οι εργαζόμενοι χαρακτηρίζονται από θετική οριακή ροπή προς αποταμίευση και αποφασίζουν να χρησιμοποιήσουν το σύνολο των αποταμιεύσεων τους για την χρηματοδότηση των επενδυτικών σχεδίων των κεφαλαιούχων. Η απόφαση αυτή συνεπάγεται την αύξηση του εισοδήματος τους κατά το ποσό αποπληρωμής που λαμβάνουν από τους κεφαλαιούχους, ενώ προσδίδει έναν πιο ουσιώδη χαρακτήρα στην παρουσία τους στην παραγωγική διαδικασία χωρίς να ακυρώνεται ο ρόλος των εισοδηματιών από αποπληρωμή χρέους σε αυτήν.

Επιπλέον, εξαιτίας της διάσπασης του συνολικού χρέους σε αυτό των εισοδηματιών από αποπληρωμή χρέους και σε αυτό των εργαζομένων, τα τελικά αποτελέσματα τόσο στην βραχυχρόνια όσο και στην μακροχρόνια περίπτωση εξαρτώνται από τον βαθμό ευαισθησίας της οικονομίας σε καθένα από αυτά, αλλά και την αντίδραση καθενός από αυτά στις αλλαγές των επιτοκίων. Επίσης, σε σχέση με τις προηγούμενες περιπτώσεις του υποδείγματος θα πρέπει να ληφθεί υπόψη τόσο η περίπτωση όπου τα δύο μέρη του συνολικού χρέους (αυτού των εισοδηματιών από αποπληρωμή επιτοκίων και εργαζομένων) κινούνται προς την ίδια κατεύθυνση σε μια μεταβολή του επιτοκίου, όσο και η περίπτωση όπου καθένα από αυτά αντιδρά με διαφορετικό τρόπο στις μεταβολές των επιτοκίων.

Σε σχέση με τις προηγούμενες δύο περιπτώσεις του υποδείγματος, η διαφοροποίηση της μακροχρόνια ανάλυσης της περίπτωσης αυτής του υποδείγματος έγκειται στο ότι συνθήκες μακροχρόνιας ισορροπίας μπορούν να επέλθουν μόνο συναρτήσει του χρέους των εισοδηματιών από αποπληρωμή χρέους. Και αυτό γιατί όπως αποδεικνύεται, συναρτήσει του χρέους των εργαζομένων, η παρουσία συνθηκών μακροχρόνιας αστάθειας συνεπάγεται την παραβίαση μιας σειράς βασικών υποθέσεων που χαρακτηρίζουν τα Μετα Κευνσινά- Καλετσκιανά οικονομικά. Με άλλα λόγια, οι προθέσεις των εργαζομένων να χρησιμοποιήσουν τις αποταμιεύσεις τους, για να χρηματοδοτήσουν τα επενδυτικά σχέδια των κεφαλαιούχων, μετριάζουν τις αρνητικές συνέπειες που προέρχονται από τον εξωτερικό δανεισμό, μειώνοντας την 'κυριαρχία' των εισοδηματιών από αποπληρωμή χρέους.

Σε καθεμία από τις τρεις παραπάνω περιπτώσεις το γεγονός ότι η απασχόληση καθορίζεται άμεσα από την συμπεριφορά της ενδογενώς καθοριζόμενης παραγωγικής ικανότητας της οικονομίας, συνεπάγεται την ομοιότητα της συμπεριφοράς της. Σε γενικές γραμμές τα αποτελέσματα του θεωρητικού υποδείγματος, υποδηλώνουν ότι η διάρθρωση και η συμπεριφορά της οικονομικής δραστηριότητας καθορίζονται άμεσα από τις προτεραιότητες καθεμιάς από τις εισοδηματικές τάξεις και τις μεταξύ τους σχέσεις. Επίσης, γίνεται εύκολα αντιληπτό ότι ο βαθμός επίδρασης του εξωτερικού δανεισμού στο επίπεδο της παραγωγικής ικανότητας, στη διανομή του εισοδήματος και άρα και στις αποφάσεις καθεμιάς από τις εισοδηματικές ομάδες επηρεάζει άμεσα το επίπεδο της απασχόλησης. Με άλλα λόγια και στις τρεις περιπτώσεις του υποδείγματος, ο βαθμός ευαισθησίας κάθε εισοδηματικής τάξης και της οικονομικής δραστηριότητας γενικότερα στην παρουσία του εξωτερικού δανεισμού, επηρεάζει το επίπεδο της απασχόλησης μέσω της διανομής του εισοδήματος.

Λαμβάνοντας υπόψη τα βασικά συμπεράσματα του θεωρητικού μακροοικονομικού υποδείγματος που αναλύεται στο Πέμπτο Κεφάλαιο, στο Έκτο Κεφαλαίο επιχειρείται η οικονομετρική διερεύνηση των βασικών υποθέσεων του υποδείγματος σε όρους μεταβολών του ποσοστού ανεργίας. Ειδικότερα, οι υποθέσεις που λαμβάνουμε υπόψη μας αφορούν: Πρώτον, την πιθανότητα υψηλά επίπεδα του εισοδήματος των εισοδηματιών από αποπληρωμή χρέους να συνδέονται θετικά με μεταβολές στα ποσοστά της ανεργίας και ως εκ τούτου επιδρούν αρνητικά στις αποφάσεις των κεφαλαιούχων για επένδυση. Δεύτερον, την ύπαρξη ή μη αρνητικής σχέσης ανάμεσα στους μισθούς των εργαζομένων και στα επίπεδα της ανεργίας. Τρίτον, την ύπαρξη αρνητικής σχέσης ανάμεσα στο επίπεδο της συνολικής ζήτησης και σε αυτό της ανεργίας. Τέλος, την πιθανότητα η κυβερνητική παρέμβαση υπό την μορφή προοδευτικής φορολόγησης του εισοδήματος και δημοσίων δαπανών να οδηγεί σε μείωση της ανεργίας.

Οι παραπάνω υποθέσεις, ελέγχονται αξιοποιώντας την μέθοδο των διαστρωματικών δεδομένων (panel data) όπου και εξασφαλίζεται η δυνατότητα να εξετάσουμε τις πραγματικές επιπτώσεις από πιθανή διαφοροποίηση παραμέτρων χωρίς να πρέπει να υιοθετήσουμε συγκεκριμένους περιορισμούς (π.χ. Baltagi, 2005; Verbeek, 2007). Έτσι, χρησιμοποιώντας στοιχεία για οχτώ από τις δώδεκα βασικές οικονομίες- μέλη της Οικονομικής Νομισματικής Ενοποίησης (ONE) (Αυστρία, Βέλγιο, Φιλανδία, Γαλλία, Ισπανία, Πορτογαλία, Ιταλία, Γερμανία) για την περίοδο 1993-2005 και τις μεταβλητές του ποσοστού ανεργίας και του NAIRU σαν εξαρτημένες μεταβλητές, εξετάζουμε τις επιπτώσεις που οι ανεξάρτητες μεταβλητές της διανομής εισοδήματος (εισοδήματα από μισθούς και από αποπληρωμή χρέους) και της συνολικής ζήτησης

(χωρίς την δημόσια κατανάλωση και συμπεριλαμβανομένης αυτής) έχουν πάνω σε αυτές.

Εξασφαλίζοντας την ορθότητα των εκτιμήσεων μέσα από μια σειρά ελέγχων που πραγματοποιούνται, προκύπτει ότι τόσο η ορθή χρήση των πολιτικών ζήτησης όσο και αυτή της διανομής εισοδήματος μπορούν να αντιμετωπίσουν, αν όχι να επιλύσουν, το πρόβλημα της ανεργίας. Συγκεκριμένα τα αποτελέσματα που προκύπτουν επαληθεύουν το γεγονός ότι ο ρυθμός μεταβολής της συνολικής ζήτησης για μια κλειστή οικονομία ακόμα και όταν λαμβάνεται υπόψη η δημόσια παρέμβαση, οδηγεί σε μείωση του ποσοστού της ανεργίας και του επιπέδου του NAIRU. Επιπλέον, τα αποτελέσματα που προκύπτουν επιβεβαιώνουν τις θετικές επιπτώσεις που η διανομή του εισοδήματος προς όφελος των εργαζομένων μπορεί να έχει πάνω στο επίπεδο της ανεργίας. Και αυτό γιατί σύμφωνα με την εμπειρική ανάλυση, μια μεταβολή στο επίπεδο των εισοδημάτων των εργαζομένων οδηγεί σε μείωση της ανεργίας και του NAIRU, ενώ από την άλλη μια μεταβολή στο επίπεδο των εισοδημάτων των εισοδηματιών από αποπληρωμή χρέους συνδέεται θετικά με την ανεργία, απορρίπτοντας οποιαδήποτε πιθανότητα για οικονομική άνθηση.

Συνεπώς, αν και σύμφωνα με τις τρέχουσες (ορθόδοξες) πολιτικές που υιοθετούνται, το επίπεδο της ανεργίας θα έπρεπε να έχει μειωθεί, σύμφωνα με την εμπειρική ανάλυση αποδεικνύεται το αντίθετο. Από την άλλη τα επίπεδα της απασχόλησης και άρα και του παραγόμενου προϊόντος μπορούν να αυξάνονται, εφόσον επιβεβαιώνεται η συνεχής αύξηση της ζήτησης μέσω της παραγωγικής επένδυσης και της αύξησης των επιπέδων των μισθών από την μια, και από την άλλη η μείωση του χρηματοπιστωτικού τομέα στην παραγωγή.

Συμπέρασμα

Λαμβάνοντας υπόψη μας τα αποτελέσματα που προκύπτουν από τα θεωρητικά υποδείγματα και την εμπειρική ανάλυση που πραγματοποιείται, επιβεβαιώνεται η δυνατότητα αύξησης της απασχόλησης χωρίς να προκύπτουν αρνητικές επιπτώσεις στον πληθωρισμό. Κάτι τέτοιο πραγματοποιείται λαμβάνοντας υπόψη την πλευρά της συνολικής ζήτησης. Έτσι, θεωρώντας, ότι οι οικονομίες λειτουργούν σε συνθήκες υπερβάλλουσας παραγωγικής ικανότητας, γίνεται αντιληπτή η δυνατότητα βελτίωσης της οικονομικής δραστηριότητας ανεξάρτητα της παρουσίας του χρηματοπιστωτικού τομέα της οικονομίας.

Σύμφωνα με τα αποτελέσματα του θεωρητικού υποδείγματος και θέτοντας σαν κύριο στόχο τη μείωση της δύναμης των εισοδηματιών από αποπληρωμή επιτοκίων στην παραγωγική διαδικασία, αποδεικνύεται λογική η υιοθέτηση μιας πολιτικής που συνδυάζει την αύξηση στα επίπεδα των εισοδημάτων των κεφαλαιούχων και των εργαζομένων. Κάτι τέτοιο θα μπορούσε να πραγματοποιηθεί μέσω μιας εισοδηματικής πολιτικής που να στοχεύει στην αναδιανομή του εισοδήματος υπέρ των εργαζομένων, έτσι ώστε να αυξηθεί η κατανάλωση του παραγομένου προϊόντος και άρα και η απασχόληση. Επιπλέον, μια πολιτική χαμηλών επιτοκίων που θα εξάλειφε την όποια πιθανότητα διακυμάνσεως του επιτοκίου ή επιδείνωσης του χρέους, θα έπειθε τους κεφαλαιούχους να αναλάβουν νέες επενδυτικές δραστηριότητες, να ωθήσουν την παραγωγική δραστηριότητα και άρα να μειώσουν τα επίπεδα της ανεργίας. Εξάλλου, δεδομένης της διαθεσιμότητας των πηγών παραγωγικής δραστηριότητας και κεφαλαίου των οικονομιών, τα υψηλά επίπεδα ζήτησης θα μπορούσαν να ικανοποιηθούν μέσω των ιδίων των πηγών της οικονομίας.

Σε αυτές τις συνθήκες, η παρουσία της κυβερνητικής παρέμβασης μέσω της φορολογίας και των επενδύσεων, θετικά παρά αρνητικά θα μπορούσε να επηρεάσει την οικονομική δραστηριότητα. Κάτι τέτοιο ωστόσο, απαιτεί οι όποιες κυβερνητικές αποφάσεις να λαμβάνονται υπόψη με βάση τις πραγματικές συνθήκες της οικονομίας και να στρέφοντας προς τις σωστές κατευθύνσεις.

Η ουσία των παραπάνω προτάσεων γίνεται εμφανέστερη από την στιγμή που ο κύριος στόχος μας είναι η δημιουργία ενός ασφαλούς οικονομικού περιβάλλοντος και η ανάγκη για μεγαλύτερη δραστηριοποίηση των εισοδηματικών τάξεων. Ωστόσο στην πράξη, το γεγονός ότι ο χρηματοπιστωτικός τομέας κυριαρχεί στην παραγωγική δραστηριότητα, αυξάνει την πιθανότητα για την παρουσία συνθηκών μακροοικονομικής αστάθειας και άρα την πιθανότητα για ύπαρξη ανισότητας στη διανομή του εισοδήματος και υψηλών επιπέδων ανεργίας. Σε όλα αυτά, η παρουσία εξισορροπημένων ή μη προϋπολογισμών επιδρά στο επίπεδο της επένδυσης, το οποίο προσδιορίζει σε σημαντικό βαθμό το επίπεδο της συνολικής ζήτησης.

Όλα τα παραπάνω κάνουν φανερό το γεγονός ότι η όποια μακροοικονομική πολιτική υιοθετείται θα πρέπει να επιβεβαιώνει την επέκταση της ζήτησης είτε μέσω αυξήσεων της παραγωγικής ικανότητας ή της εισαγωγής μιας πιο δίκαιης διανομής εισοδήματος, ώστε να συρρικνωθεί ο βαθμός του εξωτερικού δανεισμού και να δημιουργηθεί ένα περιβάλλον ασφαλές στην κατανάλωση.

Συμπερασματικά, η παρούσα διατριβή κάνει ξεκάθαρη την ανάγκη για επαναπροσδιορισμό των οικονομικών προτεραιοτήτων τόσο καθεμιάς από τις εισοδηματικές τάξεις όσο και του συνόλου της οικονομίας σχετικά με τους στόχους

που υιοθετούνται αλλά και τις αποφάσεις για επένδυση, αποταμίευση, χρηματοδότηση. Η προσήλωση σε πολιτικές που αφορούν αποκλειστικά στη μείωση του πληθωρισμού θα πρέπει να αντικατασταθούν από ένα ‘σχέδιο πολιτικής’ το οποίο να στοχεύει αποκλειστικά στην σταθερότητα της ανάπτυξης. Εξάλλου, η υιοθέτηση νομισματικών και εισοδηματικών πολιτικών θα πρέπει να αφορά την επίτευξη μιας δικαιότερης διανομής εισοδήματος καθώς και τη δημιουργία ενός περιβάλλοντος σταθερότητας τιμών, έτσι ώστε σε συνδυασμό με τις κατάλληλες πολιτικές προϋπολογισμού να επηρεάζεται όχι μόνο το επίπεδο αλλά και η διάρθρωση της απασχόλησης. Με άλλα λόγια, η ‘αναζωογόνηση’ της οικονομικής δραστηριότητας απαιτεί την πραγματοποίηση διαρθρωτικών αλλαγών στις οικονομικές πολιτικές, ώστε να επιτραπεί η χρησιμοποίηση των υπαρχουσών οικονομικών πηγών.

Όμως όλες αυτές οι προτάσεις και σκέψεις αποτελούν μόνο το έναυσμα για περαιτέρω έρευνα και βελτίωση των αποτελεσμάτων.

Introduction

It is beyond any doubt that unemployment is the most crucial economic problem over the last decades; its persistently high levels and consistency with harmful side effects, i.e. income inequality, increasing degrees of poverty and stagnation of economic activity, raise questions about the correctness of current policy suggestions. In conditions of increasing globalization and financialization there is no room for policy experiments or errors; it is simply required to focus on the real side of economies and the core of macroeconomic magnitudes themselves.

Nowadays the dominance of NAIRU framework as the most appropriate policy guidepost by means of inverse relation between inflation and growth levels, sets inflation targeting as a first priority and unemployment as a structural factor. In addition, the concentration on labour market institutions and policies is supposed to create a friendly environment for employment and price stability. However, the ad hoc equality between NAIRU and actual unemployment as well as with full employment and capacity utilization levels in conjunction with its assumed consistency with passive aggregate demand imposes constraints against the solution of unemployment and also causes additional problems the dimensions of which cannot a priori be predicted.

On the contrary, the fact that economies are usually characterised by unused capital stock and excess capacity suggests the presence of an alternative, more realistic approach to face unemployment. However, the adherence to mainstream economics and the characterisation of any alternative as heterodox restricts economists from

acquiring the knowledge of core political economy and understanding the actual problems and necessities of economies. As a result, economists determine their thought with respect to ideal rather than actual economic conditions.

Considering the inappropriateness of supply side approach in limiting unemployment, the current thesis is an action taken in order to confirm the significance of demand side in preventing economies from being pushed into a vicious circle of continuous recessions. Thus, by setting the magnitude of unemployment at the centre of analysis, this thesis has a fourfold aim: firstly, the presentation of the developments of theoretical macroeconomic foundations and economic thought that are closely related with unemployment until the currently dominant framework of NAIRU; secondly, to evaluate the use of this framework as an appropriate policy guidepost and the degree of its accuracy for making policy decisions. Thirdly, it aims at setting the fundamental characteristics of post Keynesian-Kaleckian economics, so as to examine through a demand-led approach the relation of monetary factors (debt and interest rate) with unemployment (directly) and income distribution (indirectly) as well as the possible changes that may arise in the view of income taxation; and last but not least to develop a macroeconomic model and provide econometric evidences. In brief the main purpose of this thesis is to document in both theoretical and empirical grounds the adverse effects of currently adopted supply side framework and macroeconomic policies for solving unemployment while signifying the correctness of demand side approach.

To be more specific, the main intention of Chapter One is to review the development of the most significant macroeconomic frameworks that concern the magnitude of

unemployment and the way that is being treated. The fact that usually the assumptions and implications of adopted theoretical approaches are regarded as indisputable facts seems to be the main reason for economists' inability to understand and distinguish the structure and the behaviour of each magnitude. Hence, by setting the Keynesian Phillips curve, which simplifies the relation between unemployment and (wage initially and later price later) inflation, as a starting point we will examine the continuous changes in its form and implications across time. In particular, we will examine the rearrangement of Phillips curve with the introduction of adaptive expectations and the determination of the Natural Unemployment Rate and its combination with rational expectations. Further we will examine the development of new Keynesian economics and the appearance of augmented expectational Phillips curve, upon which NAIRU rests. Moreover, due to the usual correlation between Natural Unemployment Rate and NAIRU, we will attempt to present their similarities and primarily their differences.

Although, the dominance of new Keynesian approach on economic thought and the wide acceptance of NAIRU as a policy guidepost were expected to expand economy, in practice their use is proved to be unsubstantiated. As a result, the objective of Chapter Two will be to critically review the new Keynesian literature by focusing on labour market rigidities (nominal and real) so as to signify the main theoretical and empirical points according to which policy suggestions about employment are determined. Further, the significance of monetary economics within new Keynesian framework and the adoption of specific policy rules (interest rate) as a sequence of new classical monetary rules for stabilising economy along with the way that NAIRU is being estimated, raise an 'insight' criticism. Given that, we will attempt to mark out

the main points of this criticism, in order to find out if this framework can be disputed.

In our view, the questions about the appropriateness of the new Keynesian NAIRU framework for sustaining economic activity and indirectly unemployment stem from its purely supply side character; this is opposed to the suggested combination of purely demand Keynesian approach with supply side factors. Hence, the purpose of Chapter Three will be to examine the relevance of assumptions upon which NAIRU rests and to outline the fundamental ideas and arguments that have been developed into Post Keynesian tradition. In this manner we are going to contradict the ‘weak’ points of NAIRU with the characteristics of a path dependent economy, in an attempt to prove the realistic and satisfactory way to face the persistently high unemployment levels.

Notwithstanding the ignorance about the essence of demand led economics and their ability to face economic problems adequately, Chapter Four intends to signify the main assumptions and characteristics of Post Keynesian-Kaleckian framework. More precisely, by considering the increasing dominance of financialization and the endogenously determined character of economy, we will attempt to indicate the ways that employment and economic growth in general can be affected by external finance, as well as the possible effects on this relation when government intervenes through income taxation. Moreover, in the wake of external finance, we will attempt to incorporate at least theoretically the financial variables in the spirit of Kalecki’s (1937) “*principle of increasing risk*” and Minsky’s (1975) implications of ‘*financial instability hypothesis*’, even when fiscal policy is introduced. In particular, the aim of

this Chapter is to ensure the necessity for a new basis in economic thought and thereby to validate the accuracy and realism of this ‘alternative-heterodox’ framework.

Following, Chapter Five will go a step beyond in order to develop a macroeconomic model into a demand led framework that focuses exclusively on the relation between monetary factors and employment. The theoretical model will concern a closed economy, wherein there is no governmental intervention and economic process consists of three income classes: capitalists, workers and rentiers. Our intention is to extend the implied results by assuming that: a) government intervenes through progressive income taxation and b) workers gain a more active role by assuming that they decide to use their savings for financing investment plans. In the wake of external finance, there is no doubt that economic process and equilibrium values of capacity utilization, capital accumulation, profit rate and employment will be affected by its behaviour. As a result, we will examine the sensitivity of short and long run equilibrium to increases in capitalists’ debt-to-capital ratio and interest rate variations in both stability and instability cases, so as to find out the possibilities of accumulating economic activity and thereby employment. Evidently the purpose of this chapter is to cast any doubt off the appropriateness of unemployment solutions into demand led environment without harming economic activity or even the process of its growth.

Finally with respect to the adoption of the post Keynesian- Kaleckian framework, the purpose of Chapter Six is to evaluate empirically the theoretical suggestions about the positive relation between aggregate demand and its components with economic

activity. More precisely, by using data about the core economies of European Monetary Unification (EMU), and by utilizing the econometric method of panel data so that not to cancel out the specific characteristics of each economy, we will attempt to enforce the adoption of demand side against the preference on inflation targeting policies. Thus, we initially employ the required tests in order to ensure the accuracy of our estimated regressions and after we continue with the econometric estimations. In other words, the purpose of this chapter is to ensure, even in empirical grounds the correctness of Post Keynesian-Kaleckian approach against the current inflation targeting policies.

To sum up, the main concern of this thesis is to understand the relevance of current macroeconomic policies and introduce a realistic framework in terms of demand side economics about employment treatment by examining critically the various aspects of labour market institutions and laws. In our view, the main contribution of this thesis is reflected on the criticism about ‘technical’ issues of NAIRU estimations and the core assumptions upon which these estimations are based that reveal its weakness as a policy guidepost. We additionally believe that the developed theoretical model and the empirical estimations within post Keynesian-Kaleckian grounds recognise the inequality and demand shortages as the main causes for stagnating economic activity, which can also be considered as the prime mover for refreshing economic activity.

Chapter 1

Macroeconomic Theory, the Phillips Curve and the NAIRU

1.1. Introduction

In the last few decades, significant developments have taken place within macroeconomic theory in relation to the analysis of unemployment. The most significant among them is the replacement of the orthodox Keynesian Phillips curve as a framework to examine unemployment with the supply side framework of NAIRU. This development signifies theoretical changes, but also crucial policy implications. However, contemporary macroeconomic analysis rarely focuses on the assumptions underlying theoretical frameworks, which to a great extent determine their realism and applicability in the analysis of real world economies.

In this respect, the aim of this Chapter is to review the macro-literature about the Phillips curve since the 1950s, in order to pinpoint the developments in the theoretical foundations of the currently dominant NAIRU analytical framework of unemployment. More specifically, Section 1.2 provides a brief analysis of the orthodox Keynesian thought that underpins the development of the original Phillips curve. Section 1.3 outlines the core assumptions of the new classical school, while Section 1.4 points out the way the new classical school views the unemployment and inflation problems, by enriching the original Phillips curve with microeconomic

foundations and the concept of the Natural Unemployment Rate. Section 1.5 examines the implications from the introduction of rational expectations on Phillips curve and the Natural Unemployment, focusing on the replacement of interventionist demand management policies with specific policy rules. Section 1.6 examines the new Keynesian paradigm and the transformation of the Natural Unemployment Rate to NAIRU. Section 1.7 attempts a comparison between the concept of the natural unemployment rate and the NAIRU, while Section 1.8 concludes and summarises this literature review.

1. 2. The Phillips Curve: Theoretical Foundations and Policy Implications

Pre-Keynesian macroeconomics was dominated by the classical theory. In this doctrine, continuous market clearing was the required condition for households and firms to optimize. The “*Invisible Hand*” offers the necessary coordination to markets, while government intervention is seen as a factor that disturbs the efficient operation of capitalist economies. The economic scene changed in 1930s, when Keynes (1936) introduced his “*General Theory*”. Keynes’s main intention was to provide satisfactory explanations for the high unemployment levels during the period of the Great Depression. Most of the Keynesian literature (see Snowden and Vane, 2005) rejects the positive relation between unemployment and wage gap and, contrary to classical economics, treats unemployment as involuntary in the sense that despite workers’ willingness to work at the going or even lower wage there are no available jobs. In Keynesian economics, unemployment is attributed to demand shortages.

Hence in Keynesian demand-, contrary to classical supply-, constrained economies’ attention is paid on the appropriate treatment of fiscal and more generally demand

management policies in order for economic activity to be upward shifted; suggestions enriched with the assumption about the presence of involuntary unemployment at the equilibrium level (Mankiw, 1990)². Alternatively, it can be said that a Keynesian type economic expansion is related with the adoption of policies that provide adequate ways so that the behaviour of investment and government expenditures shifts aggregate demand upward and fuel economic activity. This is the main reason for why economic destabilisation is usually attributed to the possible negative effects of demand shocks on marginal efficiency of investment and thereby on the level of investment confidence, as reflected on Keynes's "*animal spirits*".

All these suggestions imply that from the Keynesian perspective monetary policy is being treated as incapable of pushing economy towards its full employment levels via reductions in money wages and prices, unless it causes demand increases through Keynes's effect; it is argued that the effects of fiscal policy on economies are more direct than those of monetary policy (Snowdon and Vane, 2005). Thus Keynesian economies can be stabilised only through short run conventional government policies that, as we examine below, are determined by considering a non-linear trade off between unemployment and inflation, without pretending to apply long run growth and development issues (Romer, 1993; Mankiw, 1990).

In particular the Keynesian approach was believed to be reflected on the IS-LM model which defines the intersection between product and money markets as the necessary condition for determining equilibrium levels of interest and income rates

²The adoption of Keynesian perspectives does not cancel the adoption of other policies or even their combination with fiscal policies, as long as the aim is economic expansion. In any case in Keynesian grounds only demand policies can lead economy towards permanent price stability and full employment conditions (Snowdon and Vane, 2005; Mankiw, 1990).

consistent with both of these markets and the assumptions about wage and price stickiness³. Given these suggestions, disequilibrium in terms of IS-LM leads to under unemployment levels because of money wages and interest rate rigidities. Likewise, assuming that fixed money wage and price levels are consistent with their money market equilibrium, unemployment is attributed to excess labour supply without the equilibrium price affecting money wages (Snowdon and Vane, 2005; Solow, 1979a). Clearly, Keynesian implications are opposed to those of the classical framework where wage and price full flexibility allows economy to be self equilibrating at full employment, while the role of “Keynes’s effect” is essential (Tobin, 1980)⁴.

Despite the importance of the Keynesian IS-LM system, its implications were characterised as incomplete due to the absence of any reference to price level; an incompleteness that was filled with the development of the Phillips curve that introduced the variable of wage (and later price) inflation rates and provided supporting empirical evidence on Keynes’s beliefs about the downward stickiness of nominal wage rates. More specifically, Phillips (1958) by using data about the British economy during the period 1861-1957⁵, examined the hypothesis of whether rates of

³ The determination of equilibrium through the IS-LM system is affected by the factors that determine the elasticity of each curve (respectively to whether economies are closed or open) and its degree essentially. More specifically, the slope of IS curve is assumed to be affected by interest elasticity of investment expenditures and the value of multiplier, whereas the slope of the LM curve is assumed to be affected by income and interest elasticities of money demand (closed economy). In case of open economies, the effects from exchange rates and net imports should also be considered. Generally, the significance of the slopes of IS-LM curves is determined directly by the fact that their responsiveness to fiscal and monetary policies determines the final impacts from the adopted policies on economic activity (Snowdon and Vane, 2005; Romer, 1993).

⁴It should be mentioned that Keynes’s effect reflects the indirect impact of falling money wages on spending level.

⁵Although Phillips (1958) is regarded as the generator of Phillips curve and its implied inverse relation, it is believed that Irving Fischer (1926) initially provided evidences about an inverse relation between prices and employment. More specifically, Fischer (1926) by using data for the American economy during the period 1915-1925, he reached a statistically significant correlation of 90% between changes in price level and employment rate. In accordance with this relation, deflation would be achieved in the presence of unemployment expansion, whereas inflation would be accelerated owing to high levels of trade and therefore employment. Besides, according to Fischer (1926) a positive correlation between

changes in money wages could be explained through unemployment levels or the rate of its changes; it should be mentioned that the adopted time period did not include the years that were in the wake of periods of rapid rise in import prices and their consequences on the cost of living⁶. It is believed that the results reached by Phillips (1958), were essentially affected by the specific characteristics of each of the distinguished sub-periods and mainly by changes in import prices on retail prices and thus on the cost of living of workers in terms of real wages. However, the fundamental characteristic of the adopted sample period was the association of low unemployment rates with rapid wage increases and respectively in cases of high unemployment rates. In any case the strength of unemployment rate in relation to wage changes seemed to depend on the unemployment rate itself.

In general the Keynesian Phillips curve implies an inverse but non-linear relation between the rates of changes of money wages (growth level of money wages) and unemployment levels (rates of changes of unemployment level)⁷. Both the structure and the direction of this relation are determined by the intersection between demand and supply for labour and thereby the actual levels of employment and unemployment. As a result, in cases where labour demand exceeds its supply there are increases in money wages that in turn raise firms' willingness to hire more employees, given the higher level of nominal and thereby lower real wages. It is thereby

the volume of trade and changes in price level and not the price level itself could be captured with the introduction of two time lags was implied.

⁶The introduction of the variable of cost living allowed Phillips (1958) to reach an inverse relation between levels of unemployment and inflation rates, though it is believed that this variable led him to provide a close relation between its levels and the behaviour of money wages (Espinosa-Vega and Russell, 1997).

⁷In the same sense with Phillips curve is defined the Beveridge curve that implies a negative relation between unemployment and vacancies levels.

suggested a distinction between demand and supply for labour, which determines the power of employers and employees in labour market (Phillips, 1958).

Indeed, according to Phillips curve implications and the specific characteristics of each period used for estimation the dependence of unemployment relative to wage changes on unemployment rate itself can be suggested (Phillips, 1958). However the strength of Phillips curve implications is proved by the fact that its results that cover the period during 1948-1957 are closely fitted to data results of the early period of 1816-1913. In particular Phillips curve implications are reflected on the equation that yields:

$$(1) \dot{W} = -0.9 + 9.638(U)^{-1.394}$$

where \dot{W} : the variables of changes in the wage rates

U : the variable of unemployment rate

Thus, the well fitted data and Phillips curve outcomes are regarded as being responsible for forcing many Keynesians to consider the possibility, in both theoretical and empirical grounds, for long run stability of the relation between changes in wage rates or changes in wage inflation and unemployment levels. The core of this thought was the intention to provide a long run relation between unemployment and wage inflation on relatively low levels (Espinosa-Vega and Russell, 1997; Snowden and Vane, 2005). Moreover, the co-existence of a stable long run Phillips curve and the Keynesian IS-LM system during 1960s was viewed as the most appropriate instrument for making policy decisions. In other words, price stability would arise in cases where economies lay at levels below full employment so

that real income and employment would be affected by shifts in aggregate demand. Such a policy suggestion would be inappropriate in cases where the economy was found at levels above its full employment, since fixed money wages could not respond to aggregate demand shifts. These conditions implied the relation between the Keynesian theory of output and employment with a theory of wage (and later price) inflation (Dixon, 1995).

Although the assumed long run stability of downward Phillips curve provided to policymakers the opportunity to control both inflation and unemployment levels via the appropriate use of ‘aggressive’ demand management policies and governmental intervention, its adoption coincides with a number of questions with respect to specific labour market characteristics (Espinosa-Vega and Russell, 1997). However it was exactly the assumption about Phillips curve long run stability, which placed the dilemma about the appropriate weight that should be adopted for each of the included variables for the Phillips curve to be shifted to the left and economic activity to be expanded; a suggestion that was opposed to the advantages of Phillips curve stability (Espinosa-Vega and Russell, 1997).

But the Phillips curve was also criticised because of its inability to reflect conditions of other economies, apart from the British economy (see Friedman, 1968). According to Samuelson and Solow (1960), who examined both the American and British Phillips curves, differences in estimations and their results stemmed from differences in institutional and structural characteristics, included in variables and transmission mechanisms of each of these economies. Additionally, Lipsey (1960) declared that Phillips’ (1958) assumption about the relation between changes of money wages and

unemployment, which is compatible with the assumption about price stability, raises difficulties in estimating coefficients.

Considering this, Lipsey (1960) re-estimated the Phillips curve and observed that Phillips's (1958) analysis of the relation between growth of money wages and unemployment involved many demand but not supply side elements of inflation. All these in conjunction with the negligence of cost push elements in the Phillips curve, led Lipsey (1960) to reject the appropriateness of long run stable Phillips curve as a policy guide. His decision was based on the thought that the relation between money wages and unemployment could not be stable and negatively downward in the long run and thereby unable to reflect actual economic conditions.

An additional criticism about the Phillips curve that led to its further development concerned the inclusion of nominal wages, with respect to which workers were supposed to determine their decisions between working and leisure (Friedman, 1968). However, the choice of money instead of real wages is explained by Phillips' (1958) Keynesian beliefs regarding the determination of the power and social position of each worker via the nominal wage, as well as the determination of labour costs and therefore of firms' labour demand through nominal and not real wages. Besides, in Keynesian theory the determination of money, contrary to that of real wages, is assumed to be affected by labour and not by product market conditions (Snowdon and Vane, 2005; Romer, 1993). Furthermore, by determining wage inflation Phillips (1958) had no intention of measuring real wages or examining their statistic relation with unemployment; his intention was to test the possible changes that would arise in

expected nominal wages, although the statistical evidences included changes in nominal wages (Tobin, 1995)⁸.

Relative to this was also the criticism about the preference on the use of money wages instead of price inflation in the determination of Phillips curve relation (Friedman, 1968). The dilemma between these two forms of inflation is explained by the concentration of Keynesian economics on aggregate demand mainly and secondly on the supply side without distinguishing the costs that arise from each side. As a result, in accordance with Lipsey's (1960) suggestions about the absence of supply side elements of inflation in Phillips curve, Samuelson and Solow (1960) defined two forms of inflation: a) the cost push and b) the demand pull inflation and determined their effects on wage and price levels regardless of whether economy lies on its full employment level or below it⁹. According to this distinction, Samuelson and Solow (1960) redefined the Phillips curve relation in terms of unemployment and price inflation rates.

The degree of aggressiveness of all these critical issues and the inability to provide

⁸The concentration of classical and new classical economics on real wages rests upon the assumption that the negotiations between employees and employers for determining employment levels are made in real wage terms. Besides, according to monetarism and new classical frameworks there is an inverse relation between real wages and unemployment as well as between fully flexible wages and prices; assumptions that are opposed to Phillips curve assumption about price rigidity (Friedman, 1977).

⁹It is widely recognised policymakers' inability to distinguish inflation sources and thereby to provide satisfactorily explanations about the behaviour of each of the effects with respect to time that are being examined and not relative to the way that their behaviour is connecting with the actual conditions and the behaviour of the rest of included variables. Given these suggestions as well as the fact that usually inflation is being explained inappropriately, by considering the differences in the assumptions of new classical (quantity theory and money) and Keynesian (demand side) schools of economic thought about the way that inflation should be treated, Samuelson and Solow (1960) distinguished between demand (demand pull) and supply side (cost push) inflation. In general cost push inflation stands when money wages rise faster than price levels, although in accordance with the proper view wages rise faster than productivity in the presence of excess demand inflation. However, the importance of distinguishing between demand pull and cost push inflation, proves the overcoming of problems such as the presence of a specific standard from which the price level can be measured or the presence of identification problem that characterises data or even more the independency in a closed economy among the markets.

satisfactory arguments against it, mainly stem from the absence of a strong theoretical framework about Phillips curve (Galbraith, 1997). Although usually criticism leads to improvements, in the case of Keynesian Phillips curve they raised unanswerable evidences about its use as the most representative instrument for stabilising economies through demand side policies. Besides, it was the assumption about long run stability of Phillips curve that led policymakers to think in terms of trade off between unemployment and inflation by assuming zero costs for inflationary motivations. However, the inability of long run stability of Phillips curve to face stagnation conditions and reflect the dynamic form of economy, led to the abandonment of Keynesian thought and the tendency to use monetary policies during 1970s. The necessity for changes in Phillips curve framework and its policy implications was evident since the relatively high levels of both unemployment and inflation at early 1970s could not be cured with the use of the stable Phillips curve.

1.3. The Fall of the Orthodox Keynesianism and the Rise of the New-Classical Economics

The gap in both theoretical and policy grounds that appeared with the abandonment of Keynesian economics and the policy implications of a stable long run Phillips curve at early 1970s, as well as the absence of microeconomic foundations into the purely macroeconomic framework, was filled with the development of the new classical school and its ramifications¹⁰. The core assumptions of new classical economics are consistent with those of the classical approach; economies are assumed to operate into a Walrasian (perfect competitive) framework and thus are self correcting through the

¹⁰ The most significant and widely known among them is that of monetarism which is related with Friedman.

appropriate price and nominal wage adjustments. Moreover, economic individuals (households and firms) are assumed to make their decisions in order to maximize their utility or profit levels. The achievement of their targets becomes easier with the introduction of rational expectations and thereby the perfect information of economic agents that in turn lead to the absence of any relation between money and real variables as well as of money illusion. However, these suggestions are opposed to Lucas's (1972) empirical findings about positive correlation between real GDP and nominal price levels but a negative one between price inflation and unemployment.

The fundamental assumption of new classical school concerns the replacement of adaptive or backward expectations with those defined as rational¹¹. Although the whole idea of rational expectations is usually attributed to Lucas (1972), the first who introduced them in microeconomic fields was Muth (1961). Muth's main intention was to use rational expectations to prove that economic agents form their decisions irrationally, despite their knowledge about the way that can maximize their utility and thereby form rationally expectations. However, Muth's (1961) approach was referring to agents that were asked to face relatively high costs because of their systematically incorrect expectations; costs that could be reduced by considering their independency from past values of used variables (McCallum, 1980). In other words according to Muth (1961), expectations follow a specific distribution, whereas economic individuals form them with respect to the received information so as to avoid systematic errors. On the other hand, Lucas (1972) examined rational expectations by

¹¹The introduction of rational expectations was used for modelling endogenous expectations in accordance with Keynes's animal spirits; their present represented macroeconomic instability and exogenous modelling. Besides the implications from the introduction of rational expectations are opposed to Keynesian adaptive or backward expectations that rely upon past values of variables and require stability until variable's prediction is reached, despite the possibility of information errors (Blinder, 1997).

accounting the systematic relation between the rate of change in nominal prices and the level of real output, or simply the Phillips curve. In his (Lucas, 1972) view, the Phillips curve relation would stand only in the absence of “money illusion” since in this case prices clear markets and allow agents to form their expectations optimally.

It is obvious that the presence of rational expectations in a continuous equilibrium framework and thereby the absence of any systematic error, shifts the structure of economic thought (Blinder, 1997). We should however distinguish between two forms of rational expectations, the specific characteristics of which lead to different implications: a) the “*weak form*”, according to which agents form their expectations in the best possible way by using the publicly available tools and information of the used variables in their estimations and b) the “*strong form*” that stems from Muth’s (1961) study and is adopted by Lucas (1972) and the new classicals which claims the coincidence of each agent’s subjective expectations with true or objective mathematical conditional expectations of those variables (Snowdon and Vane, 2005). Furthermore as long as economic agents can avoid systematic errors and learn from them, Lucas (1972) defines rational expectations as:

$$(2) \dot{P}_t^e = \dot{P}_t + \varepsilon_t$$

where \dot{P}_t^e : expected inflation from the period from t to $t + 1$

\dot{P}_t : actual inflation rate from period t

ε_t : random errors term that has a zero mean and is assumed to be uncorrelated with the information set available at the time during which expectations

are formed¹². In other words, during the formulation of rational expectations these are uncorrelated with the information from previous periods and hence it has the lowest possible variance relative to other forecasting methods¹³.

In no case does the adoption of rational expectations imply the accuracy of agents' predictions about the future. Besides, the information that agents receive is possible to be incomplete or incorrect, intentionally or not, and to provide incorrect forecasts. Furthermore, the adoption of rational expectations initially leads economies to optimization and then to their equilibrium point without ensuring its optimality for economic activity.

An equally significant assumption for new classical grounds that provides adequate conditions for stabilising economies into the Walrasian framework, suggests the full flexibility of wages and prices so that their levels are appropriately adjusted to aggregate supply, primarily, or demand changes in the competitive market. This is simply the definition of the well known “*Say's Law*”, according to which supply creates its own demand level and markets during both short and long run terms are continuously clearing and lying on their equilibrium levels. In other words, economic agents are assumed to have perfect knowledge of all the available information and behave as price takers, whose intention is the maximization of their utilities and profits under the presence of continuous price and wage adjustment. It is easily

¹² The mathematical form of rational expectations is completely different from that of backward Keynesian expectations determined with respect to past information: $\dot{P}_t^e = E(\dot{P}_t / \Omega_{t-1})$ where the term $E(\dot{P}_t / \Omega_{t-1})$ represents rational expectations formed subject to Ω_{t-1} information test of $t - 1$ period.

¹³ According to McCallum (1980) the level of past errors is determined by the degree of constancy of the used information.

understood that under these conditions, a possible disequilibrium is implicitly attributed to agent's imperfect information (Snowdon and Vane, 2005).

The third and possibly the most substantial of core assumptions of new classical economics about the determination of employment, is known as "*Lucas' aggregate supply*", which can be approached in two ways. In the former, workers and firms' rational decisions are related with the optimization of their behaviour, in the sense that firms determine their labour demand with respect to their marginal productivity and workers determine the level of their labour supply relative to their attempt of maximizing their utility. As a result, labour suppliers react to either anticipated or permanent changes in real wages, while their choices between labour and leisure are positively affected by the distinction between actual and equilibrium rate of real wage and the deviation between price levels from their perceived normal trend¹⁴. The consistency of labour supply with the observed wage inelasticity of labour supply in the long run and with elastic labour supply in the short run is thereby suggested (Lucas and Rapping, 1969).

An alternative way to explain *Lucas' aggregate supply* derives from the introduction of imperfect information, which prevents suppliers from distinguishing whether market signals refer to changes in general price level or in their relative prices. Such confusion is explained by assuming that both firms and workers determine their demand and supply for labour with respect to their available information about the

¹⁴It should be mentioned that workers' decision between leisure and labour is possible to refer to a multi-period, without causing any problem (Lucas and Rapping, 1969). Moreover as for the assumption about workers' rational behaviour is concerned, it stems from the assumption that workers who already hold or find a job as a result of searching, overestimate the level of real wages. As a result, workers by following myopic behaviour are being constrained from making correct decisions and accepting possible changes in the levels of their wages. Thus, the level of their wealth is affecting by money illusion (Tobin, 1972).

level of their own relative prices; besides information about the general price levels is assumed to be received with a time lag (Lucas, 1972, 1973). Hence a firm might react to a change in general price level either by shifting (correctly) its price level or by adjusting (incorrectly) its output level, if with respect to the signal it receives it considers that such price shift concerns its own price level. It is clear thereby that imperfect information leads to incorrect decisions that in turn worsen economic conditions. Besides, the higher the variance of general price level, the harder the understanding of the correct signal for firms (Lucas, 1973). It is then the degree of correctness of information signal and the way it is interpreted by firms and workers which determines how either of them responds to it¹⁵.

It is obvious that new classical suggestions about involuntary unemployment at equilibrium are opposed to Keynesian, since according to Lucas and Rapping:

“there will be a part of labour supply that will be forthcoming at perceived normal wages and prices” (1969, p.748).

In other words, those who are ‘voluntary’ unemployed make their choice by considering that wage appreciation persuaded them that temporarily their wages are relatively low so as to prefer to wait or search for a job with better wage conditions. The presence of ‘voluntary’ unemployment however, does not imply that high unemployment level is not socially costly, while this approach is also known as *“intertemporal substitution”* (Lucas and Rapping, 1969).

¹⁵The incorrect response of firms to changes because of their inability to distinguish changes between relative and general price levels is defined as *“signal extraction problem”* (Lucas, 1973, 1975).

1.4. The 'New' Phillips Curve: Microeconomic Foundations and the Natural Unemployment Rate

The purely Keynesian Phillips curve, the implications of which rest upon the assumption about anticipated inflation (zero inflationary expectations), was enriched into new classical and monetarism grounds. It is argued that the necessity for such a change was implied by the relatively high cost in terms of inflation that was required for unemployment to be settled down, as well as by the harmful constraints that were imposed against economic expansion because of the assumed Phillips curve stability even in the long run (Phelps, 1967, 1968).

Given the inappropriateness of the traditional Phillips curve in solving economic activity problems in terms of inflation and unemployment, the introduction of unanticipated and unexpected inflation rate gave a more dynamic form to it (Phelps, 1967, 1968; Friedman, 1968). More specifically, the use of inflation and unemployment steady state paths, the constraints against capacity utilization and investment levels as well as the mechanisms for price behaviour for equilibrium to be determined, led to a more dynamic form and behaviour of economies (Phelps, 1967, 1968). As a result, the downward sloping Phillips curve would lie on a specific unemployment level on the horizontal axis of unemployment at which the equality between expected and actual inflation was ensured so as the former to be unchanged. Also by considering the case where actual unemployment rate was below its equilibrium level, there would be an inflation acceleration and thereby further employment expansions and adequately for the other side of the inequality. But in this case, the implied relation between unemployment levels and inflation rates sets the

behaviour of the former a good approximation for the behaviour of wages (Phelps, 1967, 1968).

The extension of Phillips curve with microeconomic foundations into monetarism grounds was completed with the determination of long run equilibrium level of unemployment, which according to Friedman (1968) would result from the intersection of the vertical, due to the fulfillment of expectations, long run Phillips curve with the horizontal axis of unemployment. This long run equilibrium level of unemployment is well known as the “*natural rate of unemployment*”. According to Friedman (1968) the *natural rate of unemployment*:

“it would be ground out by the Walrasian system of general equilibrium equations, provided there is imbedded in them the actual structural characteristics of the labour and commodity markets, including market imperfections, stochastic variability in demands and supplies, the cost of gathering information about job vacancies and labour availabilities, the cost of mobility and so on”, (Friedman, 1968, p. 8).

The definition of the natural unemployment rate suggests, in accordance with the Wicksellian definition of the natural interest rate¹⁶, that any decision to keep unemployment below its natural levels is consistent with the adoption of inflationary policies (Friedman, 1968)¹⁷. Hence, low unemployment rates can be achieved only in

¹⁶According to Wicksellian approach the natural interest rate, which is directly depended on the actual inflation level, is defined as the distinction between market and natural level of interest rate. Moreover as long as interest rate rests on its natural level, the equality of interest rate in capital markets with the return on physical capital as well as the equality between actual and natural unemployment rate is implied; besides, at equilibrium money is neutral and both labour and capital markets are balanced with respect to ‘real’ market conditions. Thus, when natural level of interest rate is above its market level, economy is characterised by inflation and respectively for the other side of the inequality (Snowdon and Vane, 2005).

¹⁷ In this case, inflation arises once its anticipations become known.

the presence of rapid inflation acceleration. Besides, the dependence of the '*natural unemployment rate*' on specific characteristics, rigidities and imperfections of labour and commodity markets in conjunction with the introduction of price and wage expectations, do not constrain the constancy of natural rate as long as it is assumed to be affected by real factors.

All these implications about the presence of microeconomic foundations on Phillips curve are summarised by Friedman (1977) into a relation between real wages and unexpected inflation¹⁸. To be more specific, in the view of unanticipated inflationary expansions the Phillips curve and hence the natural unemployment rate are shifted to new equilibrium points that stand until individuals adjust their behaviour and expectations to these conditions. In other words only temporarily can monetary authorities achieve their targets, since equilibrium comes up at the time when individuals become aware of them and respond to these changes.

It is apparent that this new dynamic form of Phillips curve cancels out the stability of long run trade-off between inflation and unemployment, because of the distinction is caused between the short and long run effects of unanticipated changes in nominal aggregate demand. As a consequence, workers do not suffer from complete money illusion since they form their expectations rationally¹⁹. Furthermore, as a result of Friedman' (1968) and Phelps' (1967, 1968) implications about the introduction of price expectations, the Phillips curve equation can be rewritten as:

¹⁸Due to Friedman's (1968) concentration on quantity theory of money, inflation is attributed to money supply expansions.

¹⁹According to Friedman's (1968) historical evidences, the duration of money illusion period because of unanticipated inflation persists between two to five years, whereas the adjustment of employment rate to new inflation rates is similar to that of interest rates.

$$(4) \dot{W} = f(U) + \dot{P}^e$$

where \dot{W} : the rate of money wages

$f(U)$: a component determined by the state of excess demand and simply a proxy for the level of unemployment

\dot{P}^e : the expected rate of inflation

The introduction of expected inflation as the variable that determines excess demand and thereby the levels of changes in nominal wage rates, cancels the uniqueness of a stable Phillips curve and suggests a ‘family’ of Phillips curves that are determined relative to the expected inflation and its consequences on the other two variables. According to Phelps (1967), individuals and policymakers form their expectations and behaviour, after the choice of optimal Phillips curve with respect to actual conditions. For instance when unemployment is below or above its equilibrium, gradual upward or downward, respectively, shifts of the Phillips curve are expected to be equal to the full amount of the newly expected and previously actual inflation rate. This process holds until the achievement of new equilibrium point between actual and expected inflation; such shifts cause what is known as the “*wage-price spiral*” that usually result in hyperinflation.

However, after a long period of price stability the possible constraints against economic expansions arise from workers’ illusion about price levels, whereas the adjustment of their behaviour to new conditions pushes economy back to its natural unemployment rate. Although at the level of natural unemployment rate workers realise a fall in real wages, because of nominal wages increases, they require further

increases in order the Phillips curve to be shifted upward. The final outcome of this process is an increase of real wages to which firms respond through reductions in the number of employees. Indeed, the final outcome sets economy upon its natural equilibrium level for which inflation has been fully anticipated.

Thus once actual inflation is fully anticipated in the long run, there is no trade off between inflation and unemployment, while in the absence of excess demand any shift in money wage, mainly upward, equals to the level of expected inflation rate. In other words, the absence of any trade off during the long run sets the verticality of Phillips curve. Besides, the general intention of Friedman (1968) with the introduction of natural unemployment rate was the suggestion about equality between changes in money wages and price levels in order inflation to be fully anticipated. In empirical grounds, the *augmented adaptive-expectational Phillips curve equation* is defined as:

$$(5) \dot{W} = f(U) + \beta \dot{P}^e$$

that requires $\beta = 1$, so that no trade off to characterise the long run. Moreover, when $0 < \beta < 1$, the presence of a long run trade off that is less favourable compared to short run, is implied. Finally it should be mentioned that for estimations where $\beta = 0$ the Keynesian suggestion for a stable trade off is ensured.

However the fact that the concept of natural unemployment rate assumes the consistency of the natural unemployment rate itself with stable inflation, declares that only unanticipated monetary expansion can push actual unemployment below it. In this case, economies will be characterised by inflationary pressures. Thus, the

presence of a vertical Phillips curve requires money neutrality²⁰, whereas the procedure behind the possibility of reducing unemployment below its natural unemployment rate is defined as “*accelerationist hypothesis*”²¹. According to Friedman (1968), the fact that the natural unemployment rate is determined with respect to the specific characteristics, adopted targets and instruments of each economy, raises the necessity for specific policy decisions. In particular, the introduction of natural unemployment rate and its framework intends to provide the appropriate way of distinguishing between a monetary and a real economy.

Hence, short run trade-off implies the temporarily appropriateness of activist demand policies since an upward demand shift, according to the usual slope of Phillips curve, pushes actual unemployment below its predetermined natural level. Under these conditions, the short run Phillips curve would be shifted up by taking the equality between expected and actual inflation rate for granted. Such trade off declares inflation expansion and thereby increases the inflationary expectations. In general, the adoption of Friedman’s (1968) and Phelps’s (1968) framework sets monetary policy as the most appropriate tool for stabilising economy; besides as long as the natural unemployment rate is affected by labour markets’ structural characteristics but not by the aggregate demand level, the whole process of trade off cannot be affected by fiscal policy.

²⁰Under long run neutrality and therefore Phillips curve verticality only changes in real magnitudes affect economic activity, whereas due to short run non-neutrality economic activity is temporarily affected by changes in monetary magnitudes until the full adjustment of inflationary expectations (Friedman, 1968; Phelps, 1967, 1968). This is opposed to adaptive expectations that are formed by considering the knowledge and experience of past inflation rates, independently of the possible errors, so once expected inflation has been fully anticipated economy returns to its natural equilibrium level that is coincided with higher wage and price levels (Espinosa-Vega and Russell, 1997).

²¹According to accelerating hypothesis any attempt to push unemployment below its natural level is followed by permanent inflation acceleration that is possible to lead to hyperinflation; respectively for cases where unemployment is above its natural rate. In general monetary expansions are required in order to validate continuous increases of inflation rate (Phelps, 1967).

Evidently the introduction of inflationary expectations, regardless of their form, raises the dependence of inflation on unemployment and expected inflation levels. It should also be mentioned that the fulfillment of expectations can be achieved only under the equality between actual and natural unemployment rate. Furthermore, the distinction between short and long run period implies that only during the short run can the distinction between actual and natural unemployment rate (unemployment gap) affect economic activity, since during the long run inflation behaviour allows these magnitudes to be equal. All these resulted in treating the long run Phillips curve as vertical and stable at the natural unemployment rate.

1.5. Rational Expectations and the Natural Unemployment Rate

The introduction of microeconomic foundations into the Phillips curve (Phelps, 1967, 1968; Friedman, 1968) has made policy decisions relatively difficult. Lucas (1975) has argued that these difficulties could be successfully solved by distinguishing between real and money economy. Furthermore, it is argued that policy decisions would become more accurate by combining rational expectations with the natural unemployment rate within a Walrasian framework, where continuous market clearing and fully flexible price and wages prevail.

Besides, in Lucas' (1975) view the impact of Keynesian business cycle approach on equilibrium is determined by considering GDP fluctuations as a disequilibrium phenomenon due to market rigidities. Lucas also notes the possibility for a positive serial correlation between movements of trend and actual output level, which cannot be explained through changes in the production function during the business cycle. Under these conditions, he claims that only unanticipated changes in money supply,

which in turn lead to unanticipated demand shocks, can be defined as competitive equilibria that affect the economic system and cause errors in rational expectations about prices. Thus, the combination of unanticipated shocks and incorrect expectations, due to incomplete information, is considered to be responsible for the distinction between actual employment and output levels from their long run equilibrium (natural) and thereby from full employment levels.

Further according to Lucas (1975), non-neutralities that are caused by imperfect information allow for a temporarily positive trade off in the presence of some time lags are defined as “*misperceptions theory*”. By considering this definition and the assumptions about rational expectations and money neutrality, Lucas (1975) determined the behaviour of economic agents in both labour and product market in terms of supply that equals to:

$$(6) Y_t = Y_N + a(P_t - E(P_t / \Omega_{t-1})), \quad a > 0$$

where Y_t : actual output

Y_N : natural output level

P_t : actual price level

$E(P_t / \Omega_{t-1})$: expected price level

Equation (6) shows the dependence of actual and expected output levels gap on the deviation between actual and expected price levels so as unexpected increases of actual price to affect actual output level positively. Given this equation, the introduction of the natural output rate suggests alternatively the dependence of the

distinction between actual and natural output level on the deviation between actual and inflation level, which equals to:

$$(7) Y_t = Y_N + a[\dot{P}_t - E(\dot{P}_t / \Omega_{t-1})] + \varepsilon_t$$

where ε_t : a random error process

$E(\dot{P}_t / \Omega_{t-1})$: rational expected inflation that is based on the available information set from preceding period.

But according to Lucas (1973) the problem of persistence as reflected in equation (7) can be solved with the introduction of lags in the term of output deviation ($Y_{t-1} - Y_{N-1}$), so as the supply function to be equal to:

$$(8) Y_t = Y_N + a[\dot{P}_t - E(\dot{P}_t / \Omega_{t-1})] + \beta(Y_{t-1} - Y_{N-1}) + \varepsilon_t$$

However, the introduction of Okun's Law (see Okun, 1962) that suggests a stable inverse relation between unemployment and GDP allows for redefining Lucas' (1973) equation of aggregate supply. As a result of this the *rational-expectations augmented Phillips curve* equation equals to:

$$(9) \dot{P}_t^e = E(\dot{P}_t / \Omega_{t-1}) - \phi(U_t - U_N), \phi > 0$$

where U_t : actual unemployment rate

U_N : natural unemployment rate

It should also be mentioned that equation (9) can be rearranged so as unemployment to be expressed relative to surprise price change. As a result of that the final form of *rational-expectations augmented Phillips curve* equation, yields to:

$$(10) U_t = U_{N_t} - 1/\phi [\dot{P}_t - E(\dot{P}_t / \Omega_{t-1})]$$

According to equation (10) it is signaled that a temporary reduction of unemployment below its natural level, results only from ‘unanticipated’ or surprise inflation changes. Furthermore, the coexistence of both real and nominal variables in equation (10) break down the classical dichotomy between real and nominal variables, since the introduction of rational expectations in Phillips curve allows only for unanticipated changes of money growth. Besides the relation between unemployment levels and inflation rates stands in the absence of any form of “*money illusion*”, in the sense that prices clear markets and allow agents to form their expectations optimally (Lucas, 1972, 1973, 1975).

Nevertheless, the adoption of new classical view and its implications about natural unemployment rate implies the appropriate response of nominal interest rate to unexpected inflation shocks. However, in cases where inflation changes are once and for all, long run interest rate remains unchanged since in the short run interest rates level falls and causes output increases. All these do not concern the case of vertical Phillips curve, since any unexpected inflation shift (usually upward) does instantaneously affect the nominal interest rate (Sargent, 1972; Sargent et al., 1973). In addition, the introduction of rational expectations in Phillips curve equation, suggests the randomly and unpredictability of short run trade off since the predictable and unpredictable components of unemployment are serially correlated with the

unpredictable part of the error term, which is explained by indirectly observed variables (Lucas, 1972; Sargent, 1972). However, only if interest rate changes are fixed can real economic magnitudes influence the behaviour of Phillips curve and therefore real economic conditions (Sargent, 1972; Sargent et al., 1973). Hence, the final outcome of rational-augmented Phillips curve depends on the form of expectations and the size of interest rates elasticities, while the natural unemployment rate can be shifted only by random disturbances.

All these simply describe the differences between Friedman's (1968) and Lucas' (1975) approaches about the factors that prevent the achievement of equilibrium levels. More specifically, according to Friedman (1968) non-neutralities arise from asymmetries between workers and firms' received information, whereas in Lucas' (1975) view both firms and workers form their expectations rationally by receiving the same degree of information about the price rate, despite the possibility for being incomplete. Additionally Lucas (1975) regards the possible monetary shocks as the main source for economic instability; on the other hand the possibility for a long-run trade off is attributed to economic agents' inability to distinguish whether price changes refer to relative or general price level because of their incomplete information. In other words, the ability to distinguish between anticipated and unanticipated changes derives from the adoption of rational expectations²².

But even under rational expectations, economic agents' decisions can ex post be characterised by non-optimality so that only monetary disturbances (random shocks) to affect real variables in economies where price stability is the normal condition and

²² The mathematical analysis is provided in Snowdon and Vane (2005).

agents use the variable of inflation to influence the behaviour of real variables (Lucas, 1973, 1975). Hence, the difference between Friedman (1968) and Phelps (1967, 1968) with Lucas (1972, 1973), or generally between monetarists and new classical approaches is the adopted form of expectations. However, the adoption of adaptive expectations in monetarist analysis claims that money illusion allows for some trade off during the short run. Contrary to this, the adoption of rational expectations by new classicals attributes any possibility of trade off to unanticipated inflation changes.

It should also be declared that the inclusion of adaptive expectations in natural rate hypothesis suggests that policy ineffectiveness stands in the long run, whereas the adoption of rational expectations implies policy ineffectiveness in the short run as well. Likewise in new classical economics, money illusion is attributed to incomplete information, while economy turns back to its natural rate as soon as workers complete their information; in monetarism the return to equilibrium requires some time to happen. In other words, the Friedman-Phelps' approach suggests that monetary authorities can keep unemployment rate below its natural rate permanently, only by perpetually unexpected inflation increases. As a consequence, if people's expectations about inflation are slowly adjusted then ever-accelerating inflation is required; implication that is opposed to Lucas (1972) and Sargent and Wallace (1976) studies according to which inflationary expectations are fully rational.

Despite their differences, in both of these approaches Phillips curve's verticality determines the natural unemployment rate. More precisely in Friedman's (1977) view, Phillips curve's verticality is attributed to the inclusion of anticipated only inflation rates and thereby the absence of any dependence of unemployment on the natural

unemployment rate. Besides under verticality the consistency of equilibrium unemployment level with initial steady state inflation and thereby the inclusion of a range of prices that can be freely adjusted without contract indexing is suggested. As a result, there is no possibility for any relatively high or low inflation level to be anticipated. However the uncertainty about political and institutional conditions is possible to constrain the understanding of the final adjustment of prices and thereby the inflation rise that comes up (Friedman, 1977).

But even a variation of anticipated or actual inflation, shifts upward the natural unemployment rate through increases in the degree of volatility that stem from the high duration of adjustment periods. It should additionally be noted that among time periods, markets are characterised by high degrees of effectiveness and uncertainty. As a result, economy's degree of efficiency is positively affected while the presence of high average rigidities is one way to meet the increased rigidity and uncertainty. Essential for all these is the fact that each economy faces different situations, conditions and institutions (Snowdon and Vane, 2005; Espinosa-Vega and Russell, 1997).

Indeed, by accepting that both monetarism and new classical school treat inflation as a purely monetary phenomenon, which is always present, its possible reductions can be achieved only through the appropriate reductions in growth rates of money supply (Friedman, 1970). The implicit consequences of such a reduction are reflected on unemployment increases that in policy terms are explained by monetary authorities' preferences and the way that Phillips curve has been used. As a result, the treatment of inflation as a monetary phenomenon is followed by increases in costs to achieve

high employment levels, whereas the consequences change by treating inflation reductions through gradual adjustments. Therefore monetary authorities have the opportunity to decide a dramatic reduction of the rate of monetary expansion that is equivalent with a dramatic rise of unemployment rate, or alternatively to do this gradually so as the transition to new equilibrium unemployment rate to be smooth. In particular the distinction in policy structures about inflation or unemployment changes and their consequences are highly depended on the way that each of the variables, and mainly inflation, is being defined and treated as well as on the way that monetary authorities make their policy decisions.

But the form of inflation policies is also affected by the way that its possible changes take place and are being approximated by each economic approach. More specifically, in orthodox Keynesian theory where inflation shifts are assumed to be of a fixed rate policymakers can attribute unemployment to the attempt for inflation reduction. On the other hand, monetarists by considering that workers' price expectations can be fooled by inflation surprises, suggest that persistent price increases and thereby lower unemployment can be achieved when workers' labour supply curve is located to the right of its non-surprises position (Friedman, 1968; Phelps, 1967, 1968). As a matter of fact, higher inflation would shift the curve further than lower inflation does and would thus produce lower levels of unemployment. According to Friedman:

“the only way unemployment can be kept below the natural rate is by an ever accelerating inflation, which always keeps current inflation ahead of anticipated inflation” (Friedman, 1976, p. 227).

Besides, the Keynesian Phillips curve is assumed to be flat so as high unemployment rates to be solved through small increases in inflation, contrary to Monetarist Phillips curve that is assumed to be steep enough in order to prove that expansionary demand policies cannot reduce unemployment levels through increases of inflation rates (Espinosa-Vega and Russell, 1997).

In other words, the distinction between original Phillips curve and its further developments derives from the distinction between Keynesian demand policies and monetarism's view about inflation and its inverse relation with aggregate demand, employment and output. Hence in accordance with Keynesian perspectives, economic markets and mainly labour market cannot always be cleared via price and wage adjustments since institutional rigidities prevent the continuous adjustment of prices and wages. However, Friedman (1968, 1977) declares that the use of nominal wages requires the equivalency between changes of current nominal wages with changes of expected future real wages; an assumption that is accepted only by regarding the constancy of expectations or workers' denial to accept reductions in their real wages because of inflation and not reductions in their nominal wages. The combination of these two assumptions leads to a stable trade off between inflation and unemployment, which is being used from monetary authorities as a guide for their policy decisions.

All these in conjunction with the way that new classicals adopt and use the natural unemployment rates as well as the presence of rational expectations, change the policy form and raise questions about the appropriateness of discretionary policy under these assumptions. In addition the introduction of inflationary expectations,

regardless of their form, set the dependence of inflation on unemployment and expected inflation levels. Moreover, the distinction between short and long run period implies that only during the short run can the gap between actual and natural unemployment rate affects economic activity, while in the long run inflation behaviour allows the equality of these magnitudes. All these resulted in viewing the long run Phillips curve to be vertical and stable at the natural unemployment rate.

1.5.1. Discretionary Policy Versus Policy Rules

The augmented Phillips curve, according to which only unanticipated inflationary changes affect real economies, raised questions about the appropriateness of discretionary policies. In addition, Lucas' (1976) critique about the use of large scaled Keynesian models for policy decisions, the introduction of rational expectations into them as well as the belief that economy's instability stems from supply side shocks, enriched the thoughts against the appropriateness discretionary policy. Given these suggestions, the adoption of the augmented expectational Phillips curve and the determination of natural unemployment rate seemed to be the most accurate solution for the achievement of policy targets at the lowest possible costs (Lucas, 1976).

The core of '*policy ineffectiveness*' and its implications derived from the fact that both employment and output levels were fully anticipated, due to the rational form of expectations and thereby there was no money illusion (Sargent and Wallace, 1975, 1976). Thus the implications of this proposition are reflected on a number of ambiguities that concern the correctness of using intervention policy into a Walrasian framework in order to control the relatively high levels of unemployment and inflation. For instance McCallum (1980) used a variant of Sargent and Wallace's

(1975) model and new classical assumptions to provide estimations according to which the dynamic behaviour and time paths of policy variables differ relative to those of statistical estimations. However, the possible dependence between parameters of systematic and unsystematic components in policy equation persuades economists about the absence of any importance of policy ineffectiveness proposition²³.

Moreover the assumption about money neutrality, which is included in policy inappropriateness proposition, is believed to be unable to reflect actual necessities of economies. In other words, none of the adopted policy rules concentrates on achieving extremely low or high persistent employment levels. However, in the view of supporters of proposition of policy ineffectiveness the dependency between the behaviour of each intermediate instrument and the adopted policy rule is accepted, whereas the absence of neutralities can affect the level of capacity or the full-employment output level (Snowdon and Vane, 2005; McCallum, 1980).

Besides, the belief that the adoption of discretionary policies was related with the ignorance about the presence of natural unemployment rate, resulted from the fear of accelerating inflation and the possibility of destabilising economic activity since the required long time lags raise additional questions (Snowdon and Vane, 2005). According to natural unemployment rate however, employment and output expansions can be achieved through the adoption of supply rather than demand

²³The gap between systematic and unsystematic components of policy equation can be explained by splitting the term of inflation into: the predictable part with respect to the availability of past information and the random part that is unpredictable. Given this distinction, the consideration of natural unemployment rate hypothesis permits the random part of the log of the price level to affect unemployment, but denies that the systematic part of inflation can affect unemployment. In empirical grounds, the results that Sargent et al. (1973) reached, enriched those of Lucas (1973) according to which the surprise and not the systematic component affect the unemployment level.

management policies; the basic intention of supply policies was the improvement of the structure and functioning of labour rather than output market. Under these circumstances the adoption of supply side policies, simply shifted upward workers' incentives that could reduce income taxed effects and the degree of wage flexibility, the power of trade unions or even the mobility of labour and the degree of markets' efficiency (McCallum, 1980).

Among all the above, the most significant disadvantage of the adoption of intervention/discretionary policy on economic activity is monetary authorities' '*time inconsistency*'. According to that, monetary authorities have the opportunity to take advantage of their available (superior) information and achieve their policy targets by misleading public through unanticipated changes (Kydland and Prescott, 1977). The advantages of such a decision stand for the period is required so that the public becomes aware of new conditions and adjusts its behaviour, though they are also followed by harmful costs in terms of economic activity. In addition, the ineffectiveness of discretionary policy is determined by the absence of two additional characteristics that monetary authorities should have: a) the degree of their credibility and independency and b) their dynamic consistency (Barro and Gordon, 1983a); characteristics that monetary authorities have when their policy decisions are based on policy rules.

Despite the advantages of using discretionary policies, such as the ability to cover government expenditures by printing money, the conjunction of the above conflicting implications with the development of the natural unemployment rate and the problem

of time inconsistency, implied that the adoption of specific policy rules which in turn provide more persuasive policy suggestions.

The first proposed monetary policy rule was developed by Friedman (1968) and implied the constancy of long run Phillips curve verticality via the adoption of constant money growth rate that would push economic activity upward. The form of this rule is explained by the fact that in Friedman's (1968) view, inflation was a purely monetary phenomenon due to excessive monetary growth²⁴. Moreover, an economy could be set along the long run Phillips curve, unless monetary authorities would expand money supply at a steady rate over time²⁵. However the adoption of Friedman's rule is rejected in new classical grounds because it reflects the non-dynamic form of economies and thereby provides sub optimal results²⁶. Furthermore, by assuming rational expectations and imperfect information, social objective functions subject to Phillips curve equation can be achieved at relatively low if not zero inflation rate (Kydland and Prescott, 1977).

Hence resulting from the relation between Phillips curve and real desires of societies, the above suggestion raises the inconsistency between the adoption of a constant policy selection with the achievement of price stability and relatively low unemployment levels (the optimal equilibrium level). Besides, even when Friedman's

²⁴This is opposed to Keynesian perspectives wherein sacrifice ratio determines the amount of the output lost is required in order inflation to be reduced. It should however be declared that the level of sacrifice ratio, which is being used for determining monetary authorities' credibility and reputation, tends to be relatively high because of price and wage rigidities that prevent immediate adjustments towards demand changes (Snowdon and Vane, 2005).

²⁵Barro (1976) by extending Lucas' (1973) study, which suggests that only surprised inflation pushes actual unemployment level below its natural at least temporarily, enriched results by using a policy rule about money supply for the American economy.

²⁶The distinction between new classical economists and Friedman derives from their differences in approaching information. According to new classical economists information constraints refer to the number of included lags, the degree of uncertainty and the influence that fiscal and monetary policies may have on real variables; factors that are not considered by Friedman (Barro and Gordon, 1983b).

policy rule is combined with the assumption about unemployment dependence on demand side, it is possible for the derived equilibrium to be sub-optimal in the sense that constraints may be imposed against the consideration of possible change in policy's parameters as a response to price changes (McCallum, 1980). But even by introducing uncertainty in a model of rational expectations, the optimal policy is only randomly reached (Taylor and Phelps, 1977).

However, the compatibility of the adopted policy rules with the target of price stability provides to monetary authorities the opportunity of eliminating ex ante any potential surprise in order not to violate price stability. In particular, the possible advantages of the adoption of policy rules become clearer when monetary authorities are well aware of the benefits and costs that their use implies (Barro and Gordon, 1983a). Thus, by considering the distinction between actual and unexpected inflation rate, we can determine any possible benefit or cost that derives from policy rules and changes real economic activity in order actual unemployment to rest on levels below its natural (Barro and Gordon, 1983a). Besides, the intention of monetary authorities, after considering the distinction between expected and actual values of benefits and costs, is to determine whether to surprise public with unexpected inflation by using their available information on purpose²⁷ or adopting a policy rule that provides equality between expected and actual inflation. Obviously, the difference in adopting policy rules or discretionary policy is that under specific commitments inflation constancy can be ensured, at least for the predetermined duration of commitment. Nonetheless, the adoption of the same commitment for a long period of time gives a

²⁷ In this case policymakers simply adopt discretionary policies by regarding expectations as given.

high degree of credibility that can be used through inflation surprises (Barro and Gordon, 1983a, 1983b).

On the other hand, when monetary authorities set inflation at levels similar to those under discretion by using the degree of their credibility, the inflation level is expected to be below the costs derived from the adoption of optimal policy that implies a zero inflation level. In this case, the cost gap between discretionary and policy rules regimes is defined as “*temptation of cheating*”. Additionally, when monetary authorities are persuaded to adopt policy rules in order to regain public’s liability, the cost that arises equals to “*temptation cost*”, whereas the decision to adopt discretionary policy is defined as “*enforcement*”. In any respect the final decision about whether discretionary or policy rule is preferred is determined by comparing enforcement and temptation costs.

It should additionally be mentioned that a comparison among the costs from discretionary, temptation and enforcement, suggests that even if discretion is worse than rule, the latter is the second best solution since cheating costs are lower. Besides, the incentive to cheat, which is determined by the length of punishment period (fixed or time varying), is more preferable than policy rules (Barro and Gordon, 1983a; Barro, 1986)²⁸. It is however argued that economic individuals form their expectations by being well aware of whether monetary authorities have significant motivations to cheat or to behave in accordance with a specific policy rule (Barro and Gordon, 1983a, 1983b).

²⁸It should be mentioned that the adoption of a credible rule is thought to be followed by some enforcement power for cheating that is directly determined by the mechanism through which public forms its expectations (Barro and Gordon, 1983a).

All these make clear that monetary authorities can take advantage of their superior information and mislead economic individuals even by adopting policy rules. But once monetary authorities and public's information is distinct, can real macroeconomic magnitudes and economic activity be affected at least temporarily (Sargent and Wallace, 1975, 1976). In any case the final outcome is essentially influenced by economy's specific characteristics, the form of the adopted policies as well as the economic regime and the elements of the behaviour that inflation finance includes (Sargent and Wallace, 1976; Barro, 1983). Particularly the fact that policymakers' behaviour reflects their intention to minimize the level of inflation, determines the way that public sets its expectations and implies a positive relation between its levels and unemployment (Barro and Gordon, 1983b)²⁹.

It can thereby be argued that the final effects of the adopted policies are determined by the way that the trade off between unemployment and inflation is being treated in terms of disinflation policies. For instance if policy choice suggests inflation changes to be taken once and for all, then given the dependency and equality between actual and expected inflation, the distinction between actual and natural unemployment rate is assumed to be invariant with the information upon which expectations based; such result is reached despite the assurance about the one-to-one movement of inflationary expectations with changes in actual inflation. This is opposed to the Keynesian approach that interprets sharp inflation reductions in significant losses in real terms and relatively high level of sacrifice ratio that appears with a time lag (Snowdon and Vane, 2005).

²⁹Such a positive relation arises under discretionary policy (Barro and Gordon, 1983b), whereas Barro (1977, 1978) provides evidences about a positive relation between the variables of money growth and unemployment.

Generally it becomes clear that the reason, for which policy rules are more preferable than discretionary policies, although the latter can affect economic activity substantially, is mainly because of the shift in economic structure from the introduction of expectations on Phillips curve equation.

1.6. New Keynesian Economics: The Synthesis of Orthodox Keynesianism with the New-Classical Economics

The combination of orthodox Keynesian ideas with new classical assumptions has created the new Keynesian analytical framework. Considering as the starting point of new Keynesian assumptions the distinction between short and long run period due to market rigidities and prices or/and wages imperfections that allow only for gradual adjustment, it is undoubtedly that an economy cannot be continuously cleared (Gordon, 1990; Romer, 1990)³⁰. In other words, these imperfections imply short run money illusion and the absence of any trade off during the long run since economy rests upon its equilibrium. As a consequence, it is implied the consistency of new Keynesian economics with the orthodox Keynesian perspective in the short run, due to market imperfections³¹, and with new classical implications in the long run as long as economy reaches its equilibrium due to money neutrality.

Contrary to Keynesian thoughts, the new Keynesian approach also assumes price flexibility whereas the achievement of equilibrium because of nominal wage rigidities

³⁰It should be mentioned that imperfections that result from the absence of instantaneous price adjustments are attributed to the fact that the responses of aggregate price level to aggregate demand shifts are less than proportional (Gordon, 1990).

³¹During 1970s the assumptions about the presence of wage and price rigidities on Walrasian system was regarded as the main reason for explaining Keynesian disequilibrium models. Besides, both Keynesian and monetarist models accept a priori rigidities without examining or explaining them and focus on providing empirical and not theoretical grounds for analysis (Snowdon and Vane, 2005).

determines the level of involuntary unemployment in economy. In addition the preference of new Keynesian economics on monetary policies, although they do not have a clear view about the role and implications of fiscal policy on economic activity, distinguishes them from purely Keynesian perspectives (Romer, 1990; Mankiw, 1990). But even when fiscal policies are being used, their adoption is required to be dominated by new classical considerations. Closely to the dilemma about the appropriateness of monetary or fiscal policy, are also the thoughts about whether discretionary/ activist policies or specific policy rules can stabilise economies at the lowest possible costs (Phelps, 1995). However the current literature of new Keynesian economics is characterised by the adoption of specific policy rules that reflect the dynamic character of economies (Snowdon and Vane, 2005).

Among others the key characteristic of new Keynesian economics is their intention to improve the supply side of pure Keynesian models. This is represented by the introduction of *Say's Law* and the enrichment of purely Keynesian grounds with the role of supply side. It should be mentioned that the implications of this law, raise no constraint against new Keynesians' belief that both demand and supply disturbances can destabilise economic activity across the business cycle³². Moreover, in spite of new Keynesian assumptions that economic agents form their expectations in their attempt to maximize their utility or profit function, it is not taken for granted that expectations are rational.

³²This proves the impact on new Keynesian economies from both Keynesian and new classical approaches, whereas according to Blanchard and Quah's (1989) estimations demand side disturbances can only temporarily affect unemployment and output levels. Contrary to this, supply side's disturbances can affect only output either because of the dynamic character of the variables that are included or the characteristics of the adopted transmission mechanism.

According to Fischer (1988b) a basic disadvantage of rational expectations is that in aggregate level there are too many agents, who form their expectations rationally with respect to their personal beliefs, their economic background and thereby the way that understand economic conditions. As a result the combination of all 'rational' agents, it is possible to create problems that can be solved only by assuming the correctness of each agent expectations. Moreover, the fact that all economic agents form their rational expectations with respect to a model can lead to incorrect solutions if this model turns out to be incorrect or other agents use an improved model that provides better solutions. But the most significant disadvantage of adopting rational expectations concerns the required time and money for collecting public information and forming expectations rationally (Mankiw, 1990; McCallum, 1980).

Provided that the adoption of rational expectations assumes the reappearance of conditions over time, or the fact that each event is *ergodic*, a reduction in the degree of costs and uncertainty comes up so that expectational errors to become limited. Indeed, the argument among new Keynesian economists about the appropriateness or not of rational expectations is explained by the difficulties deriving from their adoption in both theoretical and empirical grounds; thereby it appears the possibility for the existence of multiple equilibria (Blinder, 1987).

Another crucial feature of new Keynesian economics concerns the distinction between price and wage setting in highly heterogeneous product and labour markets respectively (Greenwald et al., 1988). The disadvantages of these rigidities can be overcome through the adoption of optimal indexation that refers to consumer price, regardless of whether this is full or not (Gordon, 1990). Besides, with respect to

Gray's (1976) suggestions the use of indexation to a mix of price indexes is more preferable compared to the absence of any indexation. The adoption of full indexation of wage rate to nominal GNP is also possible, since in Fischer's (1977) view price indexation is usually incomplete because of the costs that characterise contracts for instance. In any respect the introduction of microeconomic foundations in macroeconomic analysis and not the use of IS-LM model, which presumes fixed nominal wages and prices in order for rigidities to be approximated, solves significantly these rigidities (Snowdon and Vane, 2005).

Additionally, the generally accepted assumption in new Keynesian grounds, i.e. Gordon (1990), Romer (1990), Mankiw (1990), despite its purely new classical characteristics, concerns imperfect competitive markets. Contrary to new classical suggestions, the assumed imperfect competitiveness sets firms as output takers, whose price levels are affected by the degree of uncertainty for their product demand³³. As a result, a way to face such an uncertainty is to set prices as a mark-up over firms' unit labour cost. Moreover, the introduction of general equilibrium among heterogeneous markets raises the interdependence among markets in order each of them to reach only a partial equilibrium point without affecting the general equilibrium level (Gordon, 1990). As for workers, whose position and flexibility on labour supply curve is determined by their relative leisure in each economy, it is suggested that they can be moved upward or downward along their own labour supply curve. In other words, workers behave in accordance with new classical suggestions and are able to choose between more working or leisure hours; as a result in equilibrium the unemployment turns to be involuntary (Gordon, 1990; Snowdon and Vane, 2005).

³³According to Tobin (1993) the adoption of imperfect competition into new Keynesian framework requires price to be treated as decision variables so as firms to be price setters and not price takers.

In particular there are many doubts whether new Keynesian economics is the process of the Keynesian approach because of the differences between these two frameworks. Indeed contrary to Keynesian and similarly with new classical theory, new Keynesian economies are characterised by high persistent levels of voluntary unemployment since shifts in economic activities during the short run are attributed to aggregate demand fluctuations (Romer, 1990). More specifically, voluntary unemployment, contrary to pure Keynesian perspectives, stems from the fact that new Keynesian labour markets operate into a Walrasian system where demand shifts affect real economic activities through real interest rates in the presence of price and/or wage rigidities. In addition, the new Keynesian framework rejects the assumption of continuous market clearing because of the distinction between supply and demand sides and hence the welfare influence between social and individual levels. But the presence of all nominal frictions causes inefficiently high volatility so as governmental stabilisation policies to become more desirable. It is obvious that the knowledge of the assumptions of each framework can easily account for differences in their behaviour.

1.7. The Natural Unemployment Rate and the New Keynesian NAIRU

Framework

The adoption of new Keynesian framework imposed constraints against the use of augmented expectational Philips curve, which concentrated on squeezing unemployment at levels below its threshold natural unemployment rate, in the presence of accelerating inflation. In other words, a combination of the natural unemployment rate and the accelerating hypothesis with the adoption of demand management policies was attempted within the new Keynesian framework. Besides,

according to Modigliani and Papademos:

“...the existence of NIRU, the non inflationary rate of unemployment, is implied by both the “vertical” and “non vertical” schools of Phillips curve”, (1975, p. 242).

Hence NIRU (Non-Inflationary Rate of Unemployment) is included in the horizontal axis of unemployment level and the vertical axis of inflation rate and is simply defined as the unemployment rate at which the downward Keynesian Phillips curve intersects the vertical Friedman's natural unemployment rate. Although in the view of some economists, NIRU is simply an alternative expression for the natural unemployment rate, it can easily be understood that its concept is opposed to monetarists and new classicals' rejection of the possibility for a trade off between unemployment and inflation. Given this distinction Modigliani and Papademos (1975) interpreted NIRU as a constraint in policymakers' ability to exploit the trade off between unemployment and inflation in the long run but as an ability to be used during the short run. As a consequence the stagnation problem of that period could be solved by attempting to reach a specific unemployment level consistent with a steady inflation level.

In addition according to NIRU magnitude implications, the achievement of low unemployment would be likely to cause wage pressures and result in a generalized wage increase. Moreover, by assuming that firms could pass such a cost rise to consumers in the form of higher prices, an unemployment fall would be associated with an inflation increase. In the same sense an unemployment increase should be coincided with an inflation fall. Hence, there is such a level of unemployment that

inflation could be expected to remain constant; this level is simply defined by Modigliani and Papademos (1975) as the NIRU level. Hence, the NIRU level was determined so as to reflect an unemployment rate:

“such that, as long as unemployment is above it, inflation can be expected to decline”
(p. 142).

In other words, with respect to the adopted definitions a gradual unemployment reduction in a specific time period is implied so that economy to rest upon its predetermined natural unemployment rate, which was re-defined as the non inflationary unemployment rate or simply NIRU. Furthermore the combination of Keynesian and new classical assumptions about natural unemployment rate in new Keynesian framework led to the belief that the development of NIRU should be treated as the best possible conjunction of these two frameworks. Regarding all these, Modigliani and Papademos (1975) suggested that the use of NIRU reflects the relationship between inflation and unemployment implied by a downward sloping Phillips curve in the short run, and a vertical Phillips curve in the long run. As far as the intermediate positions of Phillips curve are concerned, a relatively flat Phillips curve for high unemployment rates and an approximately vertical for low unemployment levels were assumed (Espinosa-Vega and Russell, 1997). In general the philosophy of this new Keynesian concept suggests that any unemployment level below the predetermined NIRU should be followed by inflation reductions and *vice versa*.

However the required conditions for Phillips curve verticality and its achievement are determined by the implications of the adopted approach. Hence, as we have already observed, for monetarist and new classical schools a vertical Phillips curve implies that unexpected changes in price levels reduce real unemployment rates that are above NIRU regardless of their initial level. On the other hand, a change in the Keynesian downward sloping Phillips curve pushes economy towards a new Phillips curve with respect to the distinction between current and initial inflation levels. The most essential problem about the use of NIRU is the determination of its level and the ways through which its use can stabilise economies.

Evidently the transformation of the natural unemployment rate to NIRU changed the form of monetary policies, in the sense that current stance of monetary policy can be determined by observing unemployment directly and comparing it with its predetermined natural rate. Additionally actual unemployment level is being used as a good approximate for the behaviour of future inflation, as long as low levels of current unemployment are related with future inflation rises in the short run and inflation acceleration in the long run. Thus, as Tobin mentions:

“According to the standard “augmented Phillips curve” view, rates of price and wage increase depend partly on their recent trends, partly on expectations of their future movements and partly on the tightness...of markets for products and labour. Variations in aggregate monetary demand whether the consequences of policies or other events, affect the course of prices and output and wages and employment, by altering the tightness of labour and product markets and in no other way”; he continues by observing that: *“inflation accelerates at high employment rates because*

tight markets systematically and repeatedly generate wage and price increases... At the Phelps-Friedman “natural rate of unemployment”, the degrees of resource utilization and market tightness generate no net wage and price pressure up or down and are consistent with accustomed and expected paths, whether stable process or any other inflation rate. The consensus viewed accepted the notion of a non-accelerating inflation rate of unemployment (NAIRU)³⁴ as a practical constraint on policy” (1980, p. 23).

The way that NAIRU is defined and used in the relevant literature rarely differs from Tobin’s (1980) implications. For example, according to Tobin (1980) the comparison of actual unemployment levels with their natural rates reflects monetary policies’ conditions during the short run and the structure of future inflation³⁵. Furthermore, the adoption of the new Keynesian NAIRU concept implies that for cases where unemployment is below its natural rate, inflation acceleration in the future is possible. The question that arises concerns the absence of any specific proposition about the way that policymakers should use such a trade off; in practice each policymaker uses this relation with respect to his economic background and beliefs.

Nonetheless, the use of the NAIRU concept is regarded as the most useful instrument for making monetary policy decisions. This is the reason why it is usually referred to as monetary policy’s guidepost. Although its use seems to be simple, it requires policymakers’ knowledge of the mechanisms that are behind it so that its policy implications are easily explained. For instance, the inflationary pressures that arise

³⁴ Tobin (1980) instead of using the term NIRU, he uses the widely known nowadays term of NAIRU (Non-Accelerating Inflation Rate of Unemployment), without changing its core assumptions.

³⁵ According to Galbraith (1997) the use of unemployment and output levels for representing short run economic conditions, provide evidences about whether economies use efficiently their sources and hence their productivity abilities.

when actual unemployment are below NAIRU, are coincided with workers' pressures who demand higher real wages relative to that provided by firms. The distinction between provided and demanded real wages, which causes a spiral of price setting that is passed to wages and prices and in turn to increases in inflationary expectations and workers' request for higher real wages is defined by Stiglitz (1997) as "*inside effects*". The final outcome of this process, suggests the return of unemployment to its natural level with inflation acceleration, while according to the "*wage-price spiral*" a gap between expected and actual levels arises so that neither firms nor workers receive their desired level for prices or wages. For this reason, actual inflation is lower than its expected level and firms attempt to pass their costs to price level (Blanchard, 1986).

Additionally, as long as the use of NAIRU concept assumes the adjustment of real wages on both prices and wages, it is implied that in cases where unemployment is below the determined (via intersection between wages and prices) NAIRU level, wages rise faster than the level of expected prices in the wage equation, whereas in the price equation the level of price grows faster than expected wages (Sawyer, 2001). Both of these cases are characterised by upward inflation shifts, the effects of which are reflected on the level of real wages. It should be mentioned that the magnitude of these effects depends on the relative size of wage and price inflation and possibly on the responsiveness of wages and prices to unemployment and capacity utilization respectively and on the expectational form.

Despite that the long run equilibrium that is the NAIRU level rests on assumptions about money neutrality, the absence of any trade off and the presence of a linear

relation between unemployment and inflation, raise some doubts about their correctness, even among new Keynesian economists (i.e. Ball and Mankiw, 2002). These doubts stem from the fact that long-term labour contracts, costs for price adjustments or generally labour market's imperfections cancel out the assumption about neutrality. As a result, it is suggested that any attempt to test the natural unemployment rate requires a tight specification for the determination of unemployment's equilibrium (Perasan and Smithin, 1995; Osberg, 1996a).

In particular, the general form of Phillips curve equation that is being used in current literature for estimating NAIRU is the *augmented Phillips curve* equation that equals to:

$$(11) \pi_t = \pi_t^e + \beta(L)(u_t - \bar{u}_t) + \delta'z_t + \varepsilon_t$$

where π_t : inflation rate from $t - 1$ to t

π_t^e : inflation rate expected at $t - 1$

u_t : unemployment rate at time t

\bar{u}_t : natural rate of unemployment at time t , which could be a constant but

could shift with structural changes in the economy

z_t : a vector of variables such as supply shocks, which have zero ex ante

expectations³⁶

ε_t : an unspecified disturbance term

³⁶ The introduction of the vector z_t of the supply side variables is attributed to new classical since until then Keynesians concentrated their attention on aggregate demand side and recognised only a limited role for supply side effects on economic activity.

In empirical grounds the above equation is estimated under the assumption that inflation is measured as a distributed lag on past inflation and other variables, while it is additionally assumed that the variable of inflation rate is integrated of order one, in order the difference between actual and expected inflation to be stationary. Equation (11) can be therefore equally rewritten as:

$$(12) \Delta\pi_t = \beta(L)(u_t - \bar{u}_t) + \gamma(L)\Delta\pi_{t-1} + \delta'z_t + \varepsilon_t$$

where $\Delta\pi_t$ denotes the differences between inflation rates of current and past period.

In this case NAIRU is represented by the term \bar{u}_t that can be represented either as a constant, a random walk, a linear transformation of some step function or spline process (Staiger et al., 1997b). But since NAIRU is the guidepost for monetary policy, the adopted policies should be determined relative to the unemployment gap between actual unemployment and NAIRU levels³⁷; besides, such a distinction is being used as an indicator for future inflation³⁸. In any case, the form of augmented Phillips curve that is being used for policy decisions includes the “*accelerationist hypothesis*” since unemployment can be below NAIRU level, only in the presence of a price acceleration without any limit.

Further, the argument that NAIRU is determined by supply side factors suggests that its level can be affected only through them, while according to new Keynesian

³⁷According to Ball and Mankiw (2002), the level of output gap is the key determinant of inflation behaviour under the assumption that all the factors that impress inflation are reflected on lagged values of inflation and variables of the z_t vector.

³⁸According to McDonald (1995), the natural rate theory prevents the use of the size of inflation as an indicator for whether economy lays on its equilibrium level or not. However, the relation between actual and natural unemployment can be used as an indicator for future inflation behaviour; besides economy rests on its equilibrium only when its inflation level is constant.

literature the unemployment gap can be eliminated (except in the case where actual unemployment is close to NAIRU) by changes in labour market; some of these are represented by softening minimum wage restrictions, taxes on labour and restrictions on hiring and discriminatory or other impediments to hire either by reducing or eliminating unemployment benefits by upgrading education and training of workers and perhaps by offering subsidies to new hiring that will be examined below.

1.7.1. Similarities and Differences between the Natural Unemployment Rate and the NAIRU

Although among economists the synonymy of natural unemployment rate and NAIRU terms is prevalently argued, in practice there is a distinction between them not only in the assumptions and frameworks onto which they are based but also in their implications.

The most important of the differences between these two magnitudes is the fact that the natural unemployment rate assumes that economies operate according to a Walrasian process that refers to perfect competitive conditions, whereas NAIRU allows for imperfect competition. Both of them however are determined by supply side factors (Jekinson, 1987)³⁹. The importance of imperfect competition is reflected on short run downward Phillips curve that allows demand management policies and government intervention to affect the trade off between inflation and unemployment. Moreover, given the assumption about imperfect flexibility of both price and wage levels in the short run the possible effects from changes in nominal demand influence

³⁹The importance of supply side factors in determining both of these magnitudes is understood only after the fulfilment of economic agents' expectations.

economic activity only temporarily. In other words, in NAIRU concept the effects of aggregate demand on economy are determined relative to its equilibrium level and not the equilibrium unemployment level itself (Jekinson, 1987; Sawyer, 2001). However, the fact that the term of natural unemployment rate is being used equivalently to the definition of natural interest rate is only a structural parameter that is included in economy's function (Friedman, 1977). Thus, the natural rate corresponds to a unique level (or path) if real wages and economy behave as if markets were determining real (relative) prices all the time (Tobin, 1995).

Further, the adoption of the natural unemployment hypothesis, contrary to NAIRU, signifies economy's ability to return to its equilibrium natural unemployment level without any inflationary pressure (Galbraith, 1996). This suggestion is in accordance with 'strict naturalists' (those who are in favor of the natural unemployment rate) who suggest that economy always returns to its natural rate, whereas 'NAIRUvians' accept the presence of persistently unemployment level above the predetermined NAIRU as a result of markets' failure to be cleared (Tobin, 1995). It cannot be ignored that the natural unemployment rate is a theoretical magnitude towards which actual unemployment is assumed to move, though it cannot be estimated. On the other side, NAIRU is assumed to be indirectly determined and easily estimated under specific assumptions (Karanassou and Snower, 1997).

However, these two instruments differ even in the way that unemployment is being understood and treated. To be more specific in terms of natural hypothesis, unemployment is treated as search (voluntary) unemployment whose level is not equal to natural and reflects people's decisions about the way they spend their time

between leisure and working hours. On the other hand, in NAIRU framework unemployment, which stems from the distinction between bargaining wage demanded for workers and feasible wage provided by employers, is defined as involuntary (Layard et al., 1991). Further, in accordance with implications of NAIRU concept, the equilibrium unemployment rate is determined by the characteristics of labour market and its level is being used for holding inflation under control. In other words, the NAIRU level depends on the equilibrium price and wages that are determined via the intersection between labour demand and wage setting curves, whereas equilibrium unemployment is the distinction between labour supply and equilibrium employment (Karanassou and Snower, 1997).

Among the differences between natural unemployment rate and NAIRU, the fact that the former can be explained as a microeconomic phenomenon since it can be thought to lie implicitly onto individual's decisions and behaviour is also of vital importance. On the other hand, NAIRU includes both macroeconomic and microeconomic foundations that concern price and wage behaviour so as inflation to be constant. Hence, NAIRU level itself does not affect individuals' decisions. Besides in monetarism the introduction of natural unemployment rests on the assumption about the competitiveness of labour and product markets, so that high unemployment levels are faced by setting inflation under control and markets are cleared. Contrary to this, in imperfect competitive new Keynesian markets the presence of persistently high unemployment is attributed to markets' failure (Tobin, 1995). In any case, both natural unemployment and NAIRU magnitudes can only be observed and estimated indirectly.

Regardless of the differences between the two magnitudes, it is widely accepted that the new Keynesian NAIRU theory is simply the reformulation of monetarist natural unemployment theory that includes the qualification of Keynesian theories of Phillips curve and implications. The usefulness of Phillips curve as a guide to monetary (or fiscal) policy is thereby implied (Espinosa-Vega and Russell, 1997). But the use of natural unemployment rate as a reference point for policy decision requires the absence of any variation in long run stability as well as the absence of expectational errors about wages and prices; suggestions that make empirical estimations easier but are not always consistent with theoretical grounds (Karanassou and Snower, 1997).

However in monetarist perspectives NAIRU is simply a synonym or another form of natural unemployment rate hypothesis, which proves the ineffectiveness of demand management activist policies; this thought is compatible with Friedman's (1968) view about the destabilisation properties of activist monetary policies in the short run. This differs from new Keynesian framework where NAIRU is the long run equilibrium that determines an unemployment level consistent with a constant inflation rate. As a result, when economy is on equilibrium there is equality between actual and expected inflation rate and thereby between actual and natural unemployment level, so that the behaviour between wage and price-setters to be compatible. Finally, the belief that NAIRU and natural unemployment rates are just synonyms suggests either the presence of a vertical long run Phillips curve or the inclusion in NAIRU definitions of the lagged inflation coefficients (Solow, 1986).

In particular we should always consider that Friedman's and Phelps' natural unemployment rate is defined as the equilibrium level whose value is determined by

the characteristics of labour market, whereas NAIRU is simply an empirical rather than an equilibrium value. Moreover, the theory of the NAIRU implies that low unemployment may cause inflation to increase independently of the causes of low unemployment and in particular of the monetary policy; implications that are not in accordance with Friedman and Phelps's theory of natural rate.

Considering all these differences between the two definitions it is evident that the choice of any of these is related with alternative policy implications, whose importance is reflected on the intention to reduce the temptation to ascribe optimality properties to the natural rate as one might automatically do with a Walrasian concept (Solow, 1986).

1.8. Conclusions

The wide acceptance of the implied relation between unemployment and inflation as reflected on the Phillips curve has led to its use as the most appropriate instrument over time for policy decisions. However, the continuous changes in economic environment in conjunction with the increasing dependency among economies and their dynamic behaviour raise the necessity for the appropriate adjustment in Phillips curve. Hence the simple inverse relation between wage inflation and unemployment in Keynesian grounds was turned into a relation between unemployment and price inflation that was then used as the basis for the determination of natural unemployment rate. The necessity for stabilising economy through monetary policy in conjunction with rational expectations, led to the replacement of the Keynesian type discretionary policies with specific monetary policy rules, which increase the degree

of credibility of monetary authorities and thereby the accuracy of their policy decisions.

However, the persistence in high levels of both unemployment and inflation levels and the inability of policymakers to consider the actual necessities of real economies, led to the development of new Keynesian economics. According to the implications of this framework, which is a mix of the orthodox Keynesian and the new classical perspectives, the reappearance of Phillips curve and the change of natural unemployment rate into NAIRU seemed to be and still is regarded as the most reasonable way for fuelling economic expansion. Besides, the differences in the assumptions of the adopted frameworks provided no space room for disputing about their properties.

The most important point of the transition process from purely Keynesian demand management to new classical supply side factors and their combination in new Keynesian grounds is the new era for economic thought in both theoretical and empirical ground. But the implied dependence of NAIRU on labour market, the suggestion to represent actual economic conditions as well as the concentration on the supply side factors, since their introduction was assumed to enrich the purely Keynesian demand framework, raise a number of questions about its possibility to solve the problem of unemployment. Additionally, considering that the policy implications of NAIRU are directly determined by the economic environment into which it is set, the intentions of each policymaker and mainly the persistently high unemployment, suggest that a more informative examination of the constraints that are opposed to NAIRU concept is required.

Chapter 2

NAIRU: Critical Points and Policy Implications

2.1. Introduction

The last few years, inflation-targeting central banks conduct monetary policy within the NAIRU framework, considering unemployment as an indicator of future inflation. Unfortunately the adoption of disinflationary policies leads economies to a circle of continuous recessions and unemployment expansions. Hence, downward inflation pressures are opposed to NAIRU implications and do not provide the promised prosperity. Such results, as we have already mentioned in the previous Chapter, directly stem from the incomplete knowledge about theoretical models and their inconsistency with actual economic conditions. As a result, the appropriateness of the NAIRU concept for making policy decisions is questioned even by new Keynesian economists, who challenge the way that NAIRU is being estimated, treated and exclusively related with disinflationary policies.

In what follows we attempt to critically review the new Keynesian literature on NAIRU so as to point out its importance for the economic policy-making at theoretical and empirical levels. More specifically, Section 2.2 examines some of the fundamental labour market rigidities (nominal and real) that refer to price and mainly

to wage settings. Section 2.3 examines briefly the factors that are likely to shift the NAIRU. Section 2.4 considers the role of monetary policy within the new Keynesian paradigm and the employment implications (Section 2.5). Section, 2.6 presents some of the questions and disputes over the appropriateness of the NAIRU concept as the monetary policy guide in the new Keynesian school of thought. Further, Section 2.7 reviews some of the empirical literature and finally Section 2.8 concludes.

2.2. Labour Market Rigidities and the NAIRU

A major difference between the new Keynesian economics and the new classical economics concerns the assumption about the existence of market rigidities and imperfections that prevent economy from being continuously cleared. Additionally, the fact that the new Keynesians concentrate on real wages and assume their stability over the business cycle makes clear that price and wage rigidities become more crucial since NAIRU is assumed to be determined by their intersection. In other words, the presence of microeconomic foundations allows NAIRU level to be related with wage determination and its impact on employment and output level (Blachflower and Oswald, 1995).

However, it should be mentioned that the impact of rigidities on economic activity is directly determined by their form since they can either be nominal or real, as well as by their interaction with actual economic conditions⁴⁰. Despite the specific characteristics of labour markets as well as the possible institutions and rigidities, their behaviour is usually regarded as given and similar to other markets (Solow,

⁴⁰Besides, real market rigidities are determined by the combination of real and small frictions of nominal adjustments (Snowdon and Vane, 2005).

1980; Stiglitz, 1997; Blanchard and Katz, 1997; Blanchard and Wolfers, 2000). We now turn now to examine the most important nominal and real rigidities within the new Keynesian theory.

2.2.1. Nominal Rigidities

Nominal rigidities mainly refer to price levels. Besides, in imperfect competitive economies where firms behave as output takers, prices are assumed to be set as mark-up over the unit costs that firms face. In particular the mark-up levels are affected by the degree of market competition and demand elasticity as well as by the relative power of bargaining participants (labour unions and firms) during the bargaining process (Nickell, 1990) and interest rate levels (Phelps, 1995)⁴¹. As a result, mark-up is assumed to be inversely depended on the demand elasticity and the number of firms that participate the bargain process but positively on firms' bargaining power of owners and the conjectural variations parameter (Nickell, 1990). However the fact that the mark-up level protects firms from the uncertainty they face, proves that firms meet their output demand after setting their prices (Ball et. al., 1988)⁴².

The main source of price rigidities is reflected on the term "*level or Phillips curve effect*", which raises the possibility of equality between long run and actual output over the business circle, unless the natural hypothesis rate is adopted. But price rigidities can also arise from "*inertia effects*" that reflect the correlation between

⁴¹Although, Nickell (1990) provides empirical evidence about the negative effects on mark-ups by the degree of competition, there is no clear evidence about the sign of interest rate effect because of its dependence on specific assumptions about elasticities; suggestions that are also confirmed in post Keynesian literature such as for instance in Sen and Dutt (1995).

⁴²As long as any marginal price change affects the sales level and pushes the revenue of per unit sale to the opposite direction, firms face a range of profit levels. In other words, the trade off results between prices and sales is less attractive (see also Gordon, 1990).

previous and current levels of prices or wages and which usually, even in the presence of a policy feedback rule, reflect the influence of inflation on nominal GNP growth. In addition, price rigidity can also be attributed to “*hysteresis phenomenon*” according to which the effects of variables come up with a time lag (Gordon, 1990). Hence, the incorrect use as well as the ignorance or the partly inclusion of these sources of price rigidities in new Keynesian analysis lead to incomplete results.

Generally the costs that prevent firms from adjusting their prices in new Keynesian grounds are known as “*PAYM insight effect*”, named by the studies of Parkin (1986), Akerlof and Yellen (1985a, 1985b) and Mankiw (1985). According to its implications, the costs that private individual firms face in their attempt to adjust prices are lower relative to the costs that arise when such adjustment takes place at aggregate macroeconomic activity⁴³. Alternatively, a firm’s decision to change its price or not is determined by the level of the adjustment costs it faces, since the impact on revenues from such a decision differs between individual (private agents, firms) and aggregate (social, aggregate economy) standards. Usually, the distinction between social and private losses and revenues is ‘violent’ for societies (relatively high cost levels) as long as firms only face only losses of second order (Mankiw, 1985; Parkin, 1986; Akerlof and Yellen, 1985a). In addition, the coexistence of nominal rigidities, imperfect competition and firm’s behaviour as price takers set the

⁴³The most widely known term that arises from these studies is that of ‘*menu costs*’, whose roots are the known s, S models that refer to monopolistic markets with a stochastic additive shift in demand curve and inflation being treated as a random walk process with no drift. Although initially ‘menu costs’ reflected a number of costs that should be considered before firms adjust their prices, in recent new Keynesian literature these costs concern only price adjustment and include all the required costs for renewing the catalogues after a change in the price level, for observing and collecting information about price changes and thus renegotiating in order to adjust prices and inform both suppliers and customers (Mankiw, 1985). Their significance in new Keynesian grounds is attributed to the implied rapid changes of prices with rare or full absence of price decreases, whereas their reference to predetermined bounds (up and down bound) is possible to change prices through opportunity costs and thereby firms’ decisions (Gordon, 1990).

process of price adjustment in time intervals of specific length and frequency (Ball et al., 1988). Hence given the levels of adjustment costs and the degree of economy's heterogeneity, the decision of each firm to change its own price or not is directly determined by its priorities, adopted targets and incentives that are determined after comparing the possible revenues and marginal costs pre and after changing prices (Romer, 1993; Gordon, 1990).

One of the fundamental sources of nominal rigidities into new Keynesian framework is the adoption of long-run contracts that raise the degree of policy ineffectiveness by considering the gradual process of price adjustment (Romer, 1993)⁴⁴. The most representative models of long run contracts are those of Fischer (1977) and Taylor (1980), which intend to protect each of the contracting groups (firms and workers), especially workers, by providing the opportunity of anticipating their money supply fully. More specifically, it is assumed that workers become aware of the received nominal wage level at the beginning of each period of contract, one-time period in Fischer's (1977) and n – periods of contracting in Taylor's (1980) model, and determine their behaviour accordingly. In these conditions the definite advantages of wage determination in new Keynesian grounds are in accordance with the new classical approach and thereby affect employment, output and income levels directly. As a result, the inverse relation between employment and wages can also be attributed to region characteristics of each economy (Blanchflower and Oswald, 1995). But the high degree of unrealism that characterises the assumptions upon which these models are based in conjunction with the high degree of heterogeneity across economies, cancel any possibility of any of these advantages coming up.

⁴⁴The adoption of long run nominal wages contracts represents new Keynesians' attempt to fill the theoretical lack of assumptions about price and wage sluggishness (Romer, 1993).

Besides, contrary to the adopted framework, in real economies the relative power of each bargain side affects the level of real wages essentially (Gordon, 1990; Romer, 1993). However, by reexamining Taylor's model and assuming wage flexibility, De Long and Summers (1986) reached economic stability, given the assumption that the rest of the variables move proportionately. On the other hand, Solow (1979b) mentions that in the view of Hahn (1976) and Negishi (1974) wage stickiness stemming from contracts can be explained by the differences in the degree of risk that employers and employees take. Furthermore, in long run contracting models where nominal wages are predetermined, a price reduction is attributed to negative demand shocks that in turn push real wages and thereby the level of labour demand quantity downward. Hence according to this theoretical procedure, aggregate demand and real wage fluctuations are countercyclical, although in practice the behaviour of real wages is cyclical (Mankiw, 1990; Snowdon and Vane, 2005). In general it is argued that the adoption of long run contracts pushes economy away from its equilibrium, despite employees' preference on these contracts during periods of high unemployment rates.

In practice employers usually prefer labour contracts because of the insurance that is provided on their profitability levels, despite the possibility of harming their productivity (Solow, 1979a). On the other hand, in Keynesian grounds workers' resistance against nominal wage reductions, under conditions of excess labour supply, is explained by their concern about their position in society and the relative power of unions (Summers et al., 1986). It is then possible to prefer unemployment than a job with a wage below the going minimum wage.

Another prospective source of wage rigidity is the collective bargaining in the unionized sector, as well as the institutions for dividing the return to specific capital in the idiosyncratic exchange rate (Hall et al., 1975). The presence of many sectors in economies cannot explain rigidity of the overall wage level or unemployment persistence, without considering that wage rigidity is transmitted from one sector to another. As a result, the assumption about nominal wage contracts cannot be explained by using microeconomic principles, while the use of these contracts are incapable of explaining the way predetermined wage levels determine employment (Mankiw, 1990). In any case, the willingness and intention to trade for lower real wage so as employment to rise, should not be taken as a readiness to reduce real wages (Hahn, 1980). Besides nowadays, even workers tend to spend the whole period of their working life under a specific contract of predetermined wage, which can be unequal to the marginal product of their labour but ensures their employment.

It is therefore suggested that no continuous price adjustment and equilibrium can be ensured in an imperfect competitive environment where nominal rigidities stand. However with respect to these rigidities, the output and employment equilibrium levels that are reached are less than optimal. Despite the importance of implications about nominal wages and their impacts on economic activity, their presence and their effects are usually ignored.

2.2.2. Real Rigidities

Despite the importance of nominal rigidities, new Keynesian framework focuses on real rigidities that stem from firms' inability to understand money supply shifts and react appropriately in order for equilibrium to be reached. It is argued that the greater

the reduction in demand elasticity at the going price as output falls, the lower the firms' incentives to reduce their prices. As a result, the presence of real rigidities are defined as small responses of real wages and prices to demand changes that increase non neutralities via small nominal frictions without restraining full flexibility, (Ball et al., 1988; Romer, 1993). Alternatively real rigidities explain the persistence of real effects on economic activity that stem from nominal shocks.

The main sources of real rigidities are considered to be the specific characteristics of each market as well as the high degree of interdependency among markets and economies because of capital imperfections on firms' decisions (Snowdon and Vane, 2005; Gordon, 1990)⁴⁵. Moreover the behaviour of investment in capital markets is affected by real interest rates and firms' credibility, whereas its fluctuations are determined by capital costs that cancel out any possibility of inventories during recessions (Greenwald and Stiglitz, 1987). In particular there is a close relation between labour and capital markets' imperfections that is determined by the adopted mechanism and the way that firms set their asset portfolio⁴⁶.

A way to explain capital effects and labour stickiness in labour markets derives from the "*canonical model*" of monopolistic competition, developed by Blanchard and Kiyotaki (1987). According to that model, the representative worker is assumed to set

⁴⁵A general distinction among markets suggests the presence of "thick externalities", "customers" and "auction" markets, whose behaviour depends on their specific characteristics and workers' behaviour (Snowdon and Vane, 2005; Gordon, 1990).

⁴⁶The increasing dependence of investment decisions on the financial sector as well as each firms' availability for credit and the imperfect information between potential investors and firms because of capital markets' imperfections is defined as 'equity rationing'. However firms' final decisions about investment, production and employment levels are determined with respect to the risk they are willing to take and their ability to borrow from capital markets (Greenwald and Stiglitz, 1987).

his relative price at the level that lies along his voluntary labour supply curve so as to maximize its marginal disutility of work.

However, the fact that in recent literature NAIRU is determined via the intersection between wages and prices, concentrates attention on the way that wages are being determined; while a direct relation between wages and unemployment levels that is reflected on wage curve is also suggested. Although for many economists such a wage curve is related with Phillips curve or with the curve of labour supply function, according to Card (1995) neither of these is reflected on wage equation. Besides there can be no consistency between wage and Phillips curve, since the latter implies a negative relation between the rates of unemployment change and the contemporaneous unemployment rates. But even if the wage curve is an inverted labour supply function, either actual or notional employment/ unemployment should explain variations in wages better than unemployment rates themselves.

Indeed, new Keynesian economics are characterised by three alternative ways of determining wage: (a) *efficiency wage models*; (b) *bargaining models*; (c) *hysteresis models*; the common characteristic of which is the implied positive relation between unemployment and wage levels that is being used as the determinant of unemployment levels (Blanchard and Katz, 1997).

Hence according to the framework of *bargain models*, it is assumed that wages are determined within a bargaining process where firms set wages in order to maximize their profits, whereas workers require the highest possible wage so as to maximize

their utility⁴⁷. The main characteristic of ‘*bargain models*’ is the degree of power of both firms and workers as well as the way used during wage and employment determination process. Although in this process workers are usually regarded as a unilateral decision of management, we should consider two extreme cases: either firms having all the power determining either employment and wage levels or labour unions calling up all the power determining wage levels so that firms specifying employment levels (Fischer, 1988a, 1988b). It should be mentioned that the power of labour unions, especially in European economies, is enriched by the presence of ‘hiring and firing’ costs that are closely related with labour markets’ restrictions and mainly the level of reservation wages (Elmeskov, 1993; Nickell, 1997, 1998).

However it is proved that contracting between labour unions and firms depends on the adopted assumptions and the behaviour of real wage over the circle (McDonald and Solow, 1981). Additionally the fact that labour markets are usually characterised by continuous unemployment pool, raises the possibility of the introduction of new firms attracting workers by providing lower wages with respect to the level of reservation. In these conditions unemployment is set down, while firms enrich the degree of their bargain power against workers’ demand for higher wages, whereas workers ensure their jobs due to the relative high hiring and firing costs that firms face (Blanchard, 1991).

In any case the specific conditions of bargaining process are determined with respect to the response of labour demand and/or wage levels to unemployment changes (Siebert, 1997). As a result, attention should be paid on the degree of effectiveness of

⁴⁷The fundamental point in these models is that wage bargaining process concerns firms and workers, not firms and the whole labour force (Blanchard, 1991).

wage constraints on creating new jobs, as well as on the possible changes in the degree of trade unions towards effective wage changes. In either case, the reactions are directly depended on the specific characteristics of labour markets, their regional disparities, the way they respond to unemployment changes as well as the degree of wage elasticities (Siebert, 1997; Karanassou et al., 2003a; Bande and Karanassou, 2007)⁴⁸. Further the degree of wage adjustment to market shocks by firms is determined by considering the cost function they face as well as the degree of risk they are willing to take, given the assumption that labour is the only input of their short run production function (Greenwald and Stiglitz, 1995).

The overall outcome of bargaining process is also determined by the adopted income policies and mainly the degree of centralisation that is alternatively reflected on the degree of unionisation and coordination (Sawyer, 2001; Nickell, 1997; Siebert, 1997)⁴⁹. But it is highly possible for wages to be determined in a centralized manner and real wages to be set as the key determinant of employment and capacity levels⁵⁰. As a result, we should also consider the relation between the degree of centralization and employment⁵¹, which is later adjusted to co-ordination in wage bargaining by unions and employers (Sackice, 1990), as well as the influence on employment decisions from labour unions, when economy is characterised by either relatively high or low unemployment levels (Siebert, 1997; Nickell, 1997). In spite of the high degree of co-ordination of bargaining that seems to push wage setting further from the

⁴⁸These differences are reflected on the speed of adjustment towards changes in employment and more specifically on the adjustment of employment itself to institutional shocks (Siebert, 1997).

⁴⁹It should be mentioned that the intention of unions' corporation to determine a higher wage level does not mean centralization that typically implies governmental presence in wage bargain process (Nickell, 1997).

⁵⁰Despite the possibility of both nominal and real wages being determined within the bargaining process, it is also possible for nominal wages to be predetermined so as firms, given the level of nominal wages, to set their prices in order economy to reach its equilibrium (Nickell, 1997).

⁵¹Many mainstream economists, such as Calmfors and Driffil (1988) conclude to the presence of a U-shape of the centralization.

competitive ideal, it is possible to internalise the externalities that stem from wage pressure (Clamfors and Drifil, 1988; Sockice, 1990). Particularly, the higher the level of centralisation, the more inelastic the demand for labour which exerts upward pressure on wages, while in cases of complete centralisation unemployment is extremely high (Nickell, 1990).

It is widely argued that the degree of corporatism in each economy depends on the satisfaction of four alternative criteria: the level at which bargain takes place; the degree of power that characterises each labour union vis-à-vis their members and more generally labour organizations; the extent to which employers belong to organizations and finally the autonomy that characterise local economies in making their decisions. In other words the degree of corporatism is determined by the way that each economy responds to shocks or changes in economic conditions (Bean, 1994a). In practice, the importance of wage bargain centralisation/coordination is reflected on the fact that possible changes in its degree, directly affect the levels of wage and labour costs across sectors' bargaining process⁵², so that less employment arises during boom or becomes burdening during recessions (Bande and Karanassou, 2007). Further, it is proved that corporatist economies tend to exhibit not only higher elasticities for their real wages to unemployment but also smaller effects of the tax and import price wedges, although these economies seem to adjust their wages faster than they respond to shocks (Bean et al., 1986).

But the form and the structure of wage negotiations, the degree of union coverage and wage unionisation or decentralisation is also affected by the degree of heterogeneity

⁵²It should be mentioned that changes in labour costs across industries or regions depend on the degree of their dynamic presence in bargaining process.

across economies. Such heterogeneity is assumed to be directly reflected on the different labour institutions and laws that characterise each economy and are determined with respect to actual conditions (Blanchard and Wolfers, 2001). Moreover the significance of institutional variables is represented on their aim to capture the specific aspects of labour markets, such as the process of collective wage setting (e.g. union strength) or individual labour supply conditions (e.g. labour market policy).

Hence, by considering European countries Siebert (1997) declares as the most significant change in wage negotiations, their movement outside the market during 1980s, in the sense that bargain procedure concerned specific firms or industries and not the whole economy. Besides, the high degrees of European unionization proclaimed the collective nature of bargaining process since a more centralized bargaining would reflect high unionization and thereby a possible convergence so that wage formation to move away from market solution. Indeed, the degree of wage flexibility is suggested to be a key determinant for labour unions' power that determines the degree of centralization, in the sense that allows for inverse trade off between quantity and price level (Hall et al., 1975), whereas it is believed that high wage sectors are characterised by stronger unionization (Summers et al., 1986). In general, the presence of unemployment insurance incomes is affected by the behaviour of labour market, and more specifically by the adopted wage mechanisms (Solow, 1980).

The most representative form of bargaining models is known as the “*matching model*” that refers to complexity and difficulties of transaction between the two bargain

groups (firms and workers). The form and the way that the matching model is represented, depends on the adopted variables and assumptions, whereas the final outcome is determined by the interaction between workers' and firms' expectations and not by the going conditions of economic process as expected (Rogerson, 1997). But the most widely used form of this model that seems to provide convincing explanations about unemployment is the 'mismatching' between labour demand and supply (Bean, 1994a; Nickell, 1998). Such a 'mismatch' raises the necessity of presenting job structure in order for a chaos of insufficient mismatching and payments to be limited or even avoided (Galbraith, 1996).

Although mismatching models do not guarantee the solution of unemployment problem their significance is a priori accepted; for instance Elmeskov (1993) attributes the persistently high unemployment levels in most of OECD economies to them as well as to a distinction between growth rates of wages and vacancies opportunities. In addition, Bean (1994a) explains European unemployment by considering the mismatching that stems from changes in the structure of labour demand as well as the gap between real technology needs and those used in heavy manufacturing industries. Nowadays such a mismatching is converted into unskilled workers' inability to be matched with high technology requirements. According to Jackman and Roper (1987), when mismatching hypothesis is correct, unemployment should be defined by considering a specific occupational group or region and vacancies that are concentrated on other occupational groups, regions and so forth. Obviously, this hypothesis determines the duration of unemployment and the differences between potential workers and job offers crucially (Elmeskov, 1993).

Among these factors, the most essential for determining wage levels concerns the power of labour unions that is usually represented by the “*insiders-outsiders*” model, which assumes the consistency between real rigidities and unemployment persistence over the business cycle. The dominance of these models in new Keynesian grounds is apparent, because of their use in explaining unemployment persistence during 1980s and 1990s that stems from 1970s OPEC oil shocks (Ball and Mankiw, 2002; Bean, 1994a, 1994b). Usually, these oil shocks are regarded as responsible for reducing labour demand and forcing insiders by using contracts to set their wages at extremely high levels so as to maximize their welfare and contemporaneously discourage employment. It is clear that the fundamental characteristic of this model is the distinction between insiders (incumbent) who are employed and connected with a variety of turnover costs and unemployed (outsiders) who attempt to find a job⁵³. As a consequence, the relatively high levels of insiders’ turnover costs that affect wage and employment levels without regarding the possibility of reducing unemployment (outsiders), sets unemployment persistence by enriching insiders’ power to determine higher reservation wages (Ball, 1990)⁵⁴. Moreover, the presence of involuntary unemployment, since outsiders are willing to work is attributed to firms’ rejection to accept additional workers even if they are willing to work at lower than the going wages (Ball, 1990; Ball and Mankiw, 2002).

⁵³Usually turnover costs concern costs of technology knowledge, training new workers, union’s agreements for labour as well as costs that result from governmental regulation. Among these costs the most essential arise from insiders’ refusal to cooperate with outsiders since in this case a reduction in turnover costs relative to firms’ equity conditions would be implied. As a consequence, the possibility of hiring new workers and reducing outsiders would be raised (Lindbeck and Snower, 1988).

⁵⁴As long as the level of reservation wages reflects the marginal utility of leisure as divided by the marginal utility of consumption, the real values of unemployment benefit and leisure in consumption unit should be included. In this case reservation wage shifts are in accordance with shifts in the levels of per capital consumption and hence the productivity level (Bean, 1994a).

The paradox from the adoption of these models provides insiders the opportunity of raising firms' effective costs for employed workers and therefore adjusting their employment levels; this stands by considering the legislation and the structure of labour markets, regardless of unions' intentions to protect their members from uncertainty, discrimination and so forth (Nickell, 1997). This derives from outsiders' inability to influence wage determination, though insiders set wages at the level of equality between the number of expected workers and the number of firms that determine their labour demand by considering this wage level as given (Blanchard and Summers, 1987). Another possible way of reducing insiders' power is by constraining firms to provide low initial wages; an argument that is rejected by Lindbeck and Snower (1988), who argue that workers, because of liquidity constraints and the fear of being fired, are willing to accept jobs regardless of the level of wages.

The negative effects of insiders' power, except the determination of unemployment and wage levels, also concern the duration of unemployment that is being extended when economy operates at the level of reservation wage. Thus, in cases where unemployment persistency is determined by wage rigidity because of unions' power it is defined as "*idiosyncratic exchange*" (Hall et al., 1975). Moreover, in current literature it is widely argued that insiders' membership dynamic on unemployment duration (persistence) is determined by the specific characteristics of wage setting process as well as the degree of wage adjustment across economies. Further, among heterogeneous sectors wage rigidity or unemployment persistence cannot be explained without suggesting that wage rigidity is transmitted from one sector to another, although this is usually ad hoc assumed (Lilien, 1982). However, Barro (1988) noted the paradox lack of evidence of the positive effects on the degree of

unionisation and the size of government on unemployment persistence, especially for economies where there is no centralized wage bargaining process. Generally, the duration of unemployment is strongly related with employers' costs of recruiting and workers' cost of finding new jobs, whereas its length depends on the institutional and structural characteristics of each labour market as well as the power of labour unions (Hall et al., 1975).

An alternative way to determine wages is via *efficiency wage models*, according to which there is a positive relation between productivity and wage levels that ensures firms about the achievement of the desired productivity level by providing real wages at levels higher than those when economies are cleared. However, the required condition for providing efficiency wages is the unity elasticity of effort (Yellen, 1984; Akerlof and Yellen, 1988). In these conditions, it is possible for a firm that provides efficiency wage to expand employment by reducing the level of its labour demand and not the level of real wages (Yellen, 1984; Summers, 1988). Thus, those who are already employed due to their specific abilities in the production process are also possible to receive higher wages (Ball, 1990). Besides as long as there is a close relation between a firm's productivity and profitability, it seems doubtful for firms to cut down their wages.

Given the arguments about efficiency wages, the dependence of firms' productivity and thereby of provided wage level on the attractiveness of opportunities for workers outside the firm and not on the level of their productivity is also assumed. On the other hand, outsiders' opportunities depend on wage that other firms provide and on the level of aggregate unemployment. As a result, the presence of excess labour

supply turns to be consistent with the maximizing behaviour of both firms and workers. Although the approach of efficiency wages explains involuntary unemployment satisfactorily, it cannot explain classical dichotomy probably owing to the emphasis on real imperfections (Ball, 1990; Summers, 1988). In other words the adoption of efficiency wage models is generally accepted, regardless of the sociological factors upon which are based and their form, because of the inclusion of microeconomic foundations that adequately explain the relation between wages and employment⁵⁵.

Although the introduction of microeconomic foundations reflected on efficiency wage models explains unemployment, their use is characterised by a number of disadvantages. To be more specific, the fact that labour markets are being treated in the same way as all the other markets because of the negligence of whether human or non human elements are employed in the production function raises many problems (Akerlof, 1982). Furthermore, the use of efficiency wage models is incapable of explaining the reasons why wages are being compressed, although firms do not accept to cut them down. Moreover, the use of these models cannot predict either the positive correlation between industry wages and profits or the correlation between industry

⁵⁵The most widely known form of these models is the '*shirking model*' wherein firms are assumed to pay workers at wage levels above its equilibrium in order to prevent them from shirking during the production process. Closely related to this is the '*agent-principal*' model that assumes the dependence of agents (or firms) on principals' (or workers) decisions about their welfare and results in workers' effort increases, since this is the only way for upward changes in their wage and therefore consumption decisions without affecting the level of their productivity (Stiglitz and Shapiro, 1984). Another form of efficiency wage model is the '*adverse selection*', according to which more skilled workers are attracted by higher wages in the sense that workers' characteristics are reflected on the level of their wages (Yellen, 1984). There are also '*labour turnover*' models where the presence of high wage levels cancel out the possibility of turnover costs, whereas the '*fairness model*' claims that each worker is paid accordingly to his/her effort. However, Solow (1979a) observes that the effort of low paid workers depends on the wage gap without this affecting high wage paid workers. In this case the final outcome set low paid workers as the optimal choice, while the analysis is completed when assumptions about skilled and unskilled workers are introduced (Solow, 1979a; Yellen, 1984).

wages and wages premia across occupations or even more the inverse relation between unemployment and the degree of skills (Akerlof, 1982).

Generally, the use of efficiency wage and bargain models, relative to models that imply markets continuous clearing, allows for involuntary unemployment which is usually taken for granted in the determination of monetary policies within the NAIRU framework⁵⁶. However after considering a variant of efficiency wages approach and setting the dependence of effort on the relative real wage and the unemployment rate, Summers (1988) suggests that real wages regain their flexibility partly and thus become inversely dependent on unemployment rate. Consequently, efficiency wages model leads to involuntary unemployment and implies the squeezing of unemployment via the adoption of well determined rules in labour contracts.

It is evident that wage determination through efficiency wage or bargain models implicitly creates a number of rigidities that prevents economies from reaching their NAIRU level. Most of these stem from the adopted new Keynesian labour market policies that intend to smooth unemployment without accelerating more inflation or affecting NAIRU itself. Because of involuntary unemployment the usual form of labour market rigidity is known as “*benefit or unemployment insurance system*”; this is supposed to provide alternative income sources to the unemployed during their unemployment period so as to secure them against the uncertainty of that period⁵⁷.

Contrary to the intentions of the benefit system, its presence usually accelerates

⁵⁶According to Bean (1994a) except the efficiency wage models and the models that are based on bilateral bargain wages, there are also the models of conventional labour supply wherein the return of working equals workers' opportunity costs.

⁵⁷Usually there are two measurement forms of unemployment benefits: the replacement rate and the duration of benefits, which seem to affect the behaviour of unemployment considerably (Baker et al., 2004).

unemployment either by reducing workers' search intention or by affecting bargained wage for a given level of unemployment (Blanchard and Wolfers, 2000).

Besides, it is widely argued that despite labour markets' intention to cancel out high unemployment benefits via high degree of participation in labour markets, the more generous the alternative incomes, the higher workers' willingness to participate in them (Nickell, 1997, 1998; Siebert, 1997)⁵⁸. Also it is believed that the enforcement of these social programs lies on the entrance of women and the youth in the labour force, as well as to workers' intention to become members. However, it is a priori known that the levels of unemployment insurance incomes are directly affected by the behaviour of wage mechanisms and the general behaviour of economy (Solow, 1980).

In no case should the uniqueness of the insurance system across heterogeneous economies be considered, in the sense that the comparison and convergence of unemployment benefits across countries will become complicated. Further, each economy is characterised by its own labour market laws and institutions that determine the actual unemployment levels and their forms. For example, it is believed that the European insurance systems are more protective relative to the American (Bean, 1994a), although there is evidence that during 1980s the Canadian economy was characterised by the coexistence of the high unemployment levels along with the relative and comparatively high levels of insurance benefits (Ossama et al., 2005). However, the complicated benefit system across economies can be easily cancelled by using the replacement rate that represents the share of income (Nickell, 1997).

⁵⁸More specifically, Nickell (1997) declares that a generous unemployment benefit system affects unemployment by reducing the fear of unemployment either by causing upward pressures on wages from employees or by reducing the effectiveness of unemployed as potential workers and allow them to spend more time in choosing a job.

The importance of the unemployment benefit system in determining unemployment is proved either in microeconomic grounds that concern the effect of benefits on unemployed search behaviour, or through macroeconomic studies of wage and Phillips curve equations. Bean (1994a) claims that the common element in both cases is their power to determine unemployment duration after considering the relation between unemployment benefits and productivity. On the other hand, Osberg (1996b) mentions that the advantage of microeconometric data allows capturing and providing evidence about the structure of unemployment insurance incentives and disincentives, whereas macroeconometric time series data is characterised by the advantage that examines the effects of unemployment benefits on unemployment relative to the NAIRU level. Additionally, Blanchflower and Oswald (1995) claim that Phillips curve would turn out to be incorrect, if microeconomic data is used for its estimation. Particularly, the results that come up from the inclusion of benefit systems in models and regressions about unemployment can be improved with the introduction of variables about aggregate demand that are usually ignored; a suggestion that is in contrast with the mainstream analytical framework.

Despite the combination of efficiency wages as well as insiders' and labour unions' power, the degree of unionisation across sectors and the presence of a generous unemployment insurance system lead to a relatively high level of reservation wage (Hall et al., 1975; Summers, 1988). It is thereby possible for workers to lose their opportunity of becoming employed since they reject any job which provided wage is below than the reservation wage. Thus, constraints are imposed against labour unions' intention to require higher wages, since they do not consider the costs from the disproportionately negative effects of wage and productivity movements on

unemployment (Nickell, 1990, 1997; Siebert, 1997). In addition, it is believed that the coexistence of high reservation wages and long unemployment periods is the floor for an upward pressure on real wages and hence changes in earnings distribution with respect to specific conditions and institutions in labour markets (Blanchard, 1991; Blanchard and Wolfers, 2000)⁵⁹.

Furthermore, Siebert (1997) observes that wage differentiation, which is usually determined in the long run, changes both income inequality and trade trend of economies, such as in the case of European economies. Besides, unemployment affects both social groups and countries disproportionately, while it is possible for its presence to be related with the specific characteristics of each group (Elmeskov, 1993). In other words, neither the spread speed nor the frequency of unemployment is the same for all groups of workers and incomes. But as long as real wages are a major determinant of the unemployment level of skilled and unskilled workers, there is no doubt that workers' wish to spend more time in training education does not limit the uncertainty of not finding job (Galbraith, 1996). Hence, although governmental programs focus on technological development and its adoption, in practice only skilled and employed workers are those who enjoy these advantages in terms of wages. It is generally believed that wage differentiations can provide evidence about differences in unemployment of each group as well as about the specific characteristics for each job (Siebert, 1997; Nickell 1997, 1998).

It should also be mentioned that the distinction between workers' productivity and their wage expectations is defined by Stiglitz (1997) as "*wage-aspiration effect*",

⁵⁹According to Bean (1994a), the adoption of a specific level of reservation wage affects the process of wage distribution even for higher paid workers who attempt to enrich their different skills relative to low paid workers.

which suggests that workers form their wage expectations with respect to their previous experience that allows for faster wage than productivity growth⁶⁰. The result of this process is a temporary rise of both unemployment and NAIRU levels that stands until workers adjust their wage expectations to actual productivity fluctuations. According to Blanchard and Katz (1997) however, in cases where real wage aspirations do not fully adjust to productivity conditions, it is possible for the effects of capital accumulation and technical progress to be offsetting and for the unemployment rate to be upward shifted with a trend for some time. However, the conditions for productivity neutrality during the long run are accepted only in theoretical grounds.

In practice the adoption of reservation wage policies is common in European countries, especially during 1970s and 1980s. Although their introduction was treated as a rescue from persistently high unemployment levels, they have finally affected unemployment duration, human capital and thereby workers' skills depreciation positively; conditions that are believed to characterise European economies even nowadays (Ball, 1990). The consequences of these policies become harmful during unemployment periods wherein the unemployed lose their power and face the possibility to re-introduce their employment only under the presence of sufficient demand since the costs of hiring are low (Ball, 1990).

Except for income policies, the form and the structure of taxation policies also determine employment because of their negative impact on firms' decisions to raise their employment level, due to labour costs expansions (Nickell, 1998). Their

⁶⁰In recent years, especially in European economies, there is a productivity slowdown that is attributed to the speed growth of wages; while their distinction is regarded as being responsible for unemployment rise (Bean, 1994a; Elmeskov, 1993).

introduction is usually treated as a route for increases in the wedge between own-product labour costs and the real consumption wage (Bean, 1994a). According to Nickell (1997) the adoption of income tax policies seems to explain European unemployment during 1980s and 1990s convincingly, through its impact on workers' behaviour and mainly on their consumption decisions; besides the higher the level of tax wages and union density, the lower the level of employment rates by statistically significant margins (Baker et al., 2004; Glyn et al., 2003). Moreover, in spite of unemployment expansions during the short run terms because of taxes, there are some doubts about their effects in the long run because of their relation with after tax consumption decisions (Elmeskov, 1993). In empirical grounds, the correctness of these suggestions is determined by the importance of the specific characteristics of tax policies and the used variables (Baker et al., 2004). According to Bean (1994a) and opposing to the belief that taxes are responsible for unemployment expansion, there are many difficulties in taxing the persistently high unemployment levels and determining their behaviour over time.

All these effects usually dwell over time and their significance becomes more convincing because of the higher degree of trade openness and the increasing degree of dependency among economies. But it is not always certain that 'open' economies are positively affected by their new conditions, in the sense that significant market rigidities also stem from import prices and exchange rate levels that are determined by the trade terms and domestic output and employment levels (Elmeskov, 1993). However, Bean (1994a) signifies that a permanent change in tax-import prices wedge is neutral in the long run, whereas its possible temporal change can have much larger effects in the sense that the leisure which is driven by permanent income remains

unaffected. Regardless of the degree of competitiveness and the level of relative prices, Bean (1994a) concludes that trade terms are determined by both the domestic and international characteristics and the conditions of economies.

Consequently, the above analysis attempted to present some of the fundamental market rigidities that prevent economies from reaching their long run equilibrium as well as the consequences that derive from this failure. The degree of their significance increases by considering that the expected unemployment reduction is achieved by the adopted policies. Besides, it should be considered that the way each rigidity come up, its duration and its effects depend on the specific characteristics of each market and its ability to prevent or to allow it. Although all these problems would be easily solved through the appropriate changes in institutions, such a process seems to be inflexible and limited (Blanchard and Wolfer, 2000; Nickell, 1997). However, in recent literature the most important rigidity that prevents economy from moving towards its equilibrium is known as the '*hysteresis phenomenon*', which is examined below.

2.2.3. NAIRU and Hysteresis

Hysteresis is conceptualised as the most significant real rigidity that affects the NAIRU⁶¹. More specifically, the presence of the "*hysteresis phenomenon*" implies the persistence of unemployment that gradually pushes upward the natural unemployment rate by reducing available jobs and job-search skills of both employed and

⁶¹Although until recently the phenomenon of hysteresis was regarded as a purely European phenomenon, in recent years there is significant evidence of its presence in Canada. For example, by using data for the period 1957-1990, Fortin (1989) concludes that Canada was affected by a negative hysteresis for the period 1957-1972 and a positive one for the period 1973-1990, whereas there are economists who reject the presence of hysteresis or non linear Phillips curve. In any case, the presence of hysteresis shifts NAIRU at levels above its expected that in turn result in the rejection of unique natural unemployment rate.

unemployed routes (Blanchard and Summers, 1987). In other words according to the hysteresis phenomenon, unemployment (usually permanently) is attributed to levels that have resulted from previous labour market shocks (Karanassou and Snower, 2000). However, the adoption of such a strict definition of hysteresis would imply the path dependence of steady state equilibrium of unemployment (Blanchard and Summers, 1987).

It should be mentioned that the term '*hysteresis*' was initially introduced by Phelps (1972) in his attempt to provide evidence about the effects of unemployment history on the determination of natural rate. Indeed, according to Phelps unemployment persistence is defined as the slow adjustment of unemployment towards its unique equilibrium level (Phelps, 1995). Although the distinction between persistence and hysteresis is important, it was ignored in most macroeconomic models during 1980s⁶². However, there are always exceptions of this rule that can be understood by observing the range of alternative ways that hysteresis can be defined (Phelps, 1995; Cross, 1995).

Hence, due to the strict and thereby impractical use of hysteresis definition, Layard et al. (1991) introduced the term of partial hysteresis, which lies somewhere between hysteresis and persistence, in empirical grounds that reflects cases where the sum of significant coefficients in autoregressive process is below unity. Such an assumption

⁶²Usually in new Keynesian literature the presence of unemployment persistence is attributed to the adoption of monetary disinflation policies, while given imperfect information unemployment can also be explained by the slow adjustment of workers to new conditions. These suggestions are opposed to Keynesian grounds where unemployment persistence stems from the sluggishness of economies to be adjusted towards new wage levels and receive information as well as to classical economics that attribute unemployment persistence to its relation with real wages under the assumption of steeply short run Phillips curve. This new classical suggestion is accepted because of the inadequacy of data to explain the wage sluggishness and its impact on unemployment; this is the reason why economists focus on atomistic labour markets (Hall et al., 1975).

cancels out the presence of hysteresis that will be examined below. Moreover, Phelps (1995) defines unemployment persistence as the equilibrium path of unemployment that approaches the natural rate only asymptotically, whereas unemployment hysteresis is defined as the effect of unemployment history on the natural unemployment rate. Fortin's (1996) suggestions are set somewhere in the middle, since shifts of natural unemployment rates are only temporarily followed by increases of actual unemployment rate.

Amable et al. (1995) introduce two alternative forms of hysteresis. On the one hand, the *weak form* requires the knowledge of the history of each economic system because of the local multiplicity of output equilibria⁶³. According to the implied definition the presence of weak hysteresis includes the permanent effect that sets the limits into which variable shifts can take place, given the assumption of independency between remanence effects and the magnitude of output change. On the other hand, the *strong form* of hysteresis is defined as the aggregation of a large number of heterogeneous elements and their dependence on past factors that still affect current values. In any case the coexistence of hysteresis with the knowledge of past behaviour of economies raises a number of constraints against the achievement of unique equilibrium unemployment rate (Cross, 1995).

It can thereby be said that an economy characterised by hysteresis is simply an economy of multiple equilibria, whose unemployment is slowly adjusted towards its equilibrium level. A simple way to determine whether unemployment is characterised by persistence or hysteresis is by examining whether an economy is determined by a

⁶³Besides, the inclusion of historical knowledge is considered as a good basis for the future. However by assuming that history is determined period by period, hysteresis is possible to disappear (Cross, 1995).

linear transformation of unemployment time series independently of the possible presence of measuring unemployment persistence errors (Barro, 1988; Ossama et al., 2005). Despite the negative effects of the presence of either unemployment hysteresis or persistence on economic activity, the significance of these magnitudes is reflected on the fact that the hysteresis phenomenon stands at the center of deflationary policies. Additionally, the implications of this phenomenon are opposed to the use of linear Phillips curve so that questions are raised about the correctness of NAIRU estimations in empirical grounds (Cross, 1995)⁶⁴.

A more general way to distinguish persistence from hysteresis is by making specific assumptions about the coefficients of lagged unemployment variables. Given this, according to Gordon (1989) NAIRU is defined as:

$$(1) \pi_t = a\pi_{t-1} + \beta(U_t - U_t^*)$$

where π : the inflation rate

U : actual unemployment rate

U_t^* : natural unemployment rate that exists when $\pi_t = \pi_{t-1}$

He introduced hysteresis by assuming that NAIRU can be written as:

$$(2) U_t^* = \eta U_{t-1} + \gamma Z_t$$

⁶⁴The presence of hysteresis or alternatively the effect from past on present into a post Keynesian framework that is characterised by high degrees of uncertainty is regarded as something amended for understanding the process of economic activity. However, Davis (1998) implies that hysteresis displays the persistent effects beyond the occasion of their initial causes and therefore violates the physical processes and reverses its results.

so as

$$(3) \pi_t = a\pi_{t-1} + \beta(1-\eta)U_t + \beta\eta\Delta U_t - \beta\gamma Z_t$$

where Z_t : a set of structural variables

$\eta = 1$, when there is full hysteresis and

$\eta < 1$, when there is persistence

Thus, the use of equation (3), allows Gordon (1989) to suggest that full hysteresis stands when the coefficient of lagged unemployment equals unity, whereas economy is characterised by unemployment persistence when this coefficient is below unit.

The phenomenon of hysteresis can also be explained by considering policymakers' tendency to adopt disinflation policies for a long time; a common characteristic for European and OECD countries during the 1980s (see Ball, 1994). Thus, it can be said that the upward shift of NAIRU between the 1980s and the 1990s in these countries is explained by the combination of long run disinflation policies and a generous unemployment system, although there is no empirical evidence to suggest the existence of hysteresis. These suggestions are enforced by the fact that hysteresis is usually attributed to the political responses of unemployment changes through the adoption of social governments programs and insurance programs about the unemployed (Ball, 1994; Blanchard and Summers, 1987).

Under these suggestions, it is clear that hysteresis effects on unemployment confuse economists who attribute unemployment expansions to negative shocks (Amable et

al., 1995). As a result in conjunction with the hysteresis definition in the determination of policy decisions, there is a gap between its short and long run effects. Furthermore, although hysteresis effects are reflected on short run equilibrium they are not included in the unique long run NAIRU level. In these conditions, the presence of hysteresis makes the distinction among the non-natural rates in the medium term and thereby their consistency with convergence to a long run natural unemployment rates difficult (Layard at al., 1991). As a result, it is raised the possibility for the determination of a unique equilibrium level that would behave with respect to the structural characteristics of labour markets and the presence of hysteresis (Cross, 1995).

But the most essential problem during the process of equilibrium determination concerns the difficulty in distinguishing whether hysteresis in equilibrium is consistent with the natural rate hypothesis (Cross, 1995). An answer to this problem would be to consider the presence of hysteresis in NAIRU models as a form of persistence of deviations from natural unemployment path rather than hysteresis (Cross, 1995; Phelps 1995). However, it should be mentioned that all these problems stem from the unrealistic assumptions about the presence of representative agents and linearity in NAIRU models; assumptions that are opposed to hysteresis which is a property of non-linear models with heterogeneous agents and workers, although in linear systems hysteresis arises in cases where there is a unit root. Besides, in the view of many economists the phenomenon of hysteresis is attributed to the adoption of

expectational-augmented Phillips curve for determining NAIRU estimations that includes expectation and inertia terms about price and/or wage⁶⁵.

It should be mentioned that one of the fundamental characteristics of hysteresis is its property to depreciate human and physical capital at levels that cannot possibly be regained by workers; as a result the duration of unemployment period is extended (Ball et al., 1999; Ball and Mankiw, 2002). These suggestions can easily be explained by adopting the insiders-outsiders models and examining the way that the former use their power and constrain employment expansion. Hence, the increase of unemployment period due to hysteresis sets the unemployed less preferable for a job because of their skill depreciation. In addition, it is also possible for the long run unemployed to give up job searching and simply adjust their decisions according to the received unemployment benefits (Layard and Nickell, 1986; Blanchard and Summers, 1987). It can alternatively be said that hysteresis affects workers' "effective" labour force and skill deterioration as well as hiring costs and wage setting negatively.

In particular the presence of hysteresis is attributed to economists' tendency to regard actual unemployment as the equilibrium unemployment rate, while its harmful consequences on employment are widely recognised. In other words, the persistent

⁶⁵According to Bean (1994a) wage inertia stems from the adoption of implicit contracts, while inflation inertia derives from the slow adjustment of unemployment as a response to price changes. In any case the presence of wage or price inertia affects slopes of price-employment and wage-setting schedules; a thought that characterises the European unemployment, whose degree of wage inertia is relatively high to generate increases in unemployment from a given level of disinflation. However in Cross' (1995) view, inertia arises from the way that hysteresis is identified; besides in the absence of hysteresis prices and wages are determined by their structural characteristics. It is generally believed that the degree of price inertia provides information about the sensitivity in the way that price equation is specified as well as the sample period that will be implied. However, by analyzing European unemployment, it is observed that price relative to wage inertia has been underemphasized (Bean, 1994a). All these suggestions are also empirically supported (Nickell, 1990).

effects of hysteresis on unemployment levels and economic activity are opposed to Friedman's (1968) intention of the instantaneous adjustment of real wages in the view of excess labour supply, so as economy to always rest upon its long run equilibrium level. Regardless of the source of hysteresis and the way it is explained, its presence results in long run unemployment, human capital decummulation and in explosion of unemployment and NAIRU levels.

2.3. Is the NAIRU Constant?

Although the analysis about new Keynesian rigidities explains the constraints for the achievement of equilibrium in the short run satisfactorily, according to the fundamental new Keynesian assumptions economy reaches equilibrium in the long run. This equilibrium is the well known NAIRU level, which is regarded as the reference point of monetary policy decisions and is assumed to be only indirectly observed and estimated.

However, a possible NAIRU shift is assumed to be achieved via changes either in demographic compositions or in technological and hence productivity level. More precisely, Friedman (1968) initially and many other economists claimed that changes in demographic composition shift NAIRU level. This resulted from the suggestion that a possible change in labour composition, shifts Phillips curve and therefore the natural unemployment level (Phelps, 1968). Although in the view of many economists (e.g. Stiglitz, 1997) these changes should be straightforward, according to others (e.g. Ball and Mankiw, 2002) their presence is explained by increases in youth and female participation in labour composition force. However, Fortin (1989) and Juhn et al. (1991) explain NAIRU and unemployment level changes by taking into account male

employment, which is believed to be relatively stable⁶⁶. From another point of view, Ball and Mankiw (2002) declare the presence of disability and incarceration followed by specific governmental policies in their attempt to persuade people to leave the labour market as a possible reason for shifts in labour composition and hence NAIRU level. However, Gordon (1997) in contrast to these arguments rejects any possible impact on NAIRU levels by demographic changes due to the absence of stochastic tests to prove this relation. In his view the NAIRU changes result from the introduction of new workers' in labour force.

Another factor that shifts NAIRU is perceived to be workers' reallocation to different jobs or more generally the mobility of their reallocation across sectors, markets or even across worker groups, which changes labour market decomposition and labour reallocation among sectors (Lilien, 1982). But there is only limited evidence that ensures the upward NAIRU trend because of labour force changes, while a possible unemployment shift stems from changes in the number of workers who become unemployed rather than those who enter the labour force for the first time (Summers et al., 1986). On the other hand, it is believed that changes in labour market fundamentals push the natural unemployment level upward because of the joblessness over time (Murphy and Topel, 1997). However the presence of disproportional unemployment can be explained by changes among groups; usually such changes are in favour of educated workers (Blanchard and Wolfers, 2000).

⁶⁶These demographic changes in unemployment rate can be explained by using "*Perry's weighted unemployment measure*" (Perry, 1970), which is a weighted average unemployment rate for different demographic groups with fixed weights. Contrary to the measurement of usual aggregate unemployment rate that uses equal weights for labour-force shares, "*Perry's weighted unemployment measure*" varies over time. Moreover, this method assumes that demographics affect labour shares but not the unemployment rates of individual groups, while according to Galbraith (1997) the abandonment of this approach has not been filled by another measurement method that provides more satisfactory estimations.

However Ball and Mankiw (2002) and Gordon and Stock (1998) determine the introduction of the “new economy” as the key source of NAIRU change in recent decades. This refers to speedy development of new technologies, openness of the competition and trade among countries as well as the increase of the productivity growth rate. Besides, it is widely believed that the factors of new economy and generally the introduction of new technology in the production process are also responsible for speedy productivity growth and high technology products since in NAIRU concept long run neutrality is required. The main advantage of the introduction of technology incentives in product market is reflected on the reduction of prices, although this is not the rule (Gordon and Stock, 1998). Indeed the most essential technical progress that characterises international economy, in the mid-1990s is the general tendency for the wide use of computers in the production progress and the technological knowledge that workers receive (Ball and Mankiw, 2002).

As long as there is no short run Phillips curve, the above arguments are worthless since there is no reason to examine the sources that prevent economies from reaching equilibrium⁶⁷. In practice the coexistence of short run Phillips curve and price reduction cannot be regarded as responsible for NAIRU reductions (Gordon, 1998). Under these conditions, NAIRU downward shifts are explained by considering the relation between wages and prices or by suggesting that there is no direct relation between wages and prices or even by attributing this decline to prices behaviour. More specifically, Gordon (1998) concluded that during 1990s the contribution to American economy of new supply shocks that concerned government expenditures

⁶⁷This thought is opposed to the general suggestion about the preference of short run Phillips curve to make policy decisions.

for the social system, the introduction of computers and the measurement methodology depended on the behaviour of NAIRU level itself.

In addition, changes in technological, employment and output levels that are reflected on NAIRU and refer to different workers' groups are highly possible to be biased, because of the coexistence of skilled and unskilled workers whose wage is determined by their levels of reservation wages and productivity. Hence, a relatively high demand for more skilled workers cannot be thought as the main source of persistently high unemployment levels, although technological changes are in favor of skilled workers whose real wages are continuously rising (Blanchard and Katz, 1997)⁶⁸.

We note that in the new Keynesian framework, the long run equilibrium level of NAIRU can be shifted only through changes in technology and labour compositions; the consequences are reflected on wage levels and thereby the distinction among workers with respect to their skills and wages, which in turn determines the structural characteristics of unemployment.

2.4. New Keynesian Economics, NAIRU and Monetary Policy

A common characteristic of new classical and new Keynesian frameworks is their concentration on monetary policies. But the concentration of new Keynesians' recent literature on monetary policy is directed by their adherence to the supply side concept of NAIRU, whose use as a reference point intends to expand economic activity by balancing the dangers of inflation (Solow, 1998; Ball and Mankiw, 2002). This argument is consistent with Friedman's (1968) suggestion about the treatment of

⁶⁸The degree of wage differences also reflects differences between less and more advanced economies.

monetary policy as the most appropriate instrument for stabilising economies. As a result, new Keynesians recognise the significance of inflation in determining economic activity by setting NAIRU at the centre of their analysis (Solow, 1998)⁶⁹. The consequences of concentration on inflation in conjunction with the high degree of uncertainty that characterises monetary authorities, not only restricts economic expansion but it also raises questions about the appropriateness of NAIRU in determining economic activity (Solow, 1998; Taylor, 1998).

Nevertheless, new Keynesians' preference on monetary policy stems from the fact that its reactions on economic activity are faster relative to those of fiscal policy, the effects of which are usually characterised by time lag and sluggishness (Solow, 1998; Ball and Mankiw, 2002). Moreover the increasing financial expansions and pressures, the high independency and imbalanced budget of economies as well as the coincidence of monetary policy with the natural unemployment rate and acceleration hypothesis, set the use of NAIRU as the most appropriate instrument for balancing economies in new Keynesian grounds. In particular, the adoption of monetary targets intends to provide the adequate weighting balance on unemployment and inflation so as economic activity to be improved. For that reason, monetary policies become more convincing in balancing total supply and demand in terms of unemployment, as well as the dangers that arise from the coexistence of high unemployment and inflation levels (Solow, 1998; Ball and Mankiw, 2002). In any case, the distinction in the strength of monetary and fiscal policies is relative to the distinction between the real and nominal side of economy that lies upon the natural rate hypothesis.

⁶⁹ As a result they become consistent with monetarism implications.

A significant issue that stems from new Keynesian's concentration on monetary policies refers to their form, since there is no unique preference on discretionary or policy rules. To be more specific, in new Keynesian grounds activist governmental policies are thought to be appropriate during recessions in order to face high unemployment levels, whereas monetary policies are preferable during inflationary boom periods due to the presence of coordination problems and real rigidities (Tobin, 1980; McCallum, 1984, 1985)⁷⁰. In particular the determination of policy form depends on policymakers' intentions, the targets that are set as well as the available instruments to achieve them. In current literature though, new Keynesian policies are related with inflation targeting policy rules, which require high degrees of tie consistency as well as monetary authorities' credibility and independency so as to choose appropriate, easily observable and controllable, instruments to achieve their dynamic targets (McCallum, 1984; Bernaske and Mishkin, 1997)⁷¹. Despite the required unrealistic characteristic of monetary authorities, their presence solves the problems that stem from imperfect information adequately, by accounting forecasts about variables or by determining intermediate target rules that are directly observed (Clarida et al., 1999).

Apparently, the main reason for new Keynesian concentration on monetary policy rules is the assumption about the absence of any long run trade off between unemployment and inflation (Taylor, 1998). In other words, monetary authorities have the opportunity, at least in the short run, to use active governmental policies and achieve their targets through effective demand. In these conditions, the usual form of

⁷⁰A distinction between discretionary and policy rules does not imply a distinction between activist and non-activist policy, since it is highly possible for a policy rule to include discretionary characteristics (McCallum, 1984, 1985).

⁷¹The consistence of monetary authorities' characteristics with new classical implications becomes clear in Kydland and Prescott, (1977), Barro and Sargent, (1983a).

new Keynesian policies is feedback rule that includes expected, current and past periods' values on both instrument and target variables (Clarida et al., 1999). The intention of these policy rules is to set inflation target at levels below actual inflation through tightening monetary policy so as inflation to gradually reach its optimal-target level.

Thus the preference on inflation targeting commitments (policy rules) is explained by the consistency of new Keynesian and new classical considerations about the treatment of inflation as a purely monetary phenomenon and the fact that usually monetary authorities (central banks) adjust output levels in response to inflation shifts (Clarida et al., 1999)⁷². In addition, the fact that the use of these rules suggests a publicly announced inflation target (Bernaske and Mishkin, 1997)⁷³ and the achievement of price stability at costs lower than those of discretionary policies (Kydland and Prescott, 1977; Barro and Sargent, 1983a)⁷⁴, raise the degree of inflation rules appropriation. Needless to say that monetary authorities are required to have knowledge of the actual economic conditions and the margins of used variables; in addition, policy targets should not be based on policymakers' individual intentions though their own point of view and beliefs affect the form of policy rules (McCallum, 1984, 1985).

⁷²The absence of such a constraint raises the necessity of output adjustment in response to inflation adjustment (Clarida et al., 1999).

⁷³ Usually inflation targets fluctuate between 1-3% and prove economy's requirement for price stability (Bernaske and Mishkin, 1997; Taylor, 1998; Clarida et al., 1999).

⁷⁴ Regardless of whether inflation targeting is of discretionary or policy rule form, it provides the opportunity to monetary authorities: a) of including future values for the variables of output and output gap, so as to provide inflation estimations for both current and future economic activity as well as b) of being time consistent, unless they face constraints in choosing the same policy for a number of periods, which in practice implies the adoption of discretionary policy (Clarida et al., 1999, 2000). Hence, the shorter the period that policy target is set, the higher its credibility and hence the possibility of being achieved (Tobin, 1995).

Nevertheless, new Keynesians' concentration on inflation targeting rules is also possible to lead economies to a transitory period, during which current inflation rates move towards targeted inflation and thereby output stabilisation (Bernaske and Mishkin, 1997). Although, it is possible for inflation itself to be affected by unemployment shocks (Mankiw, 2001)⁷⁵, policy targets can be achieved without causing additional problems by regarding the uniqueness of inflation targeting framework (Taylor, 1993; Clarida et al., 1999). Besides, the assumptions about money neutrality and Phillips curve verticality in the long run, increase the degree of independency of the adopted NAIRU level from inflation behaviour (Solow, 1998; Tobin, 1995). Thus, attention should concentrate on possible unanticipated shocks that can be settled and at the same time provide forecasts about price level at long horizons that will vary under inflation targeting regime (Bernaske and Mishkin, 1997). In practice monetary authorities tend partially to compensate for missed targets, particularly in shorter time horizons, although there is a reduction in the role of intermediate targets such as money growth and exchange rate (Tobin, 1995).

In addition, the possibility of inflation targeting policies adoption to cause discretionary effects on economic process should also be considered. Although such effects are sometimes inspired by monetary authorities, their presence is opposed to the tendency of adopting unconstrained rather than constrained policy commitment because of high degrees of complexity (Bernaske and Mishkin, 1997; Clarida et al., 1999). In no case however can their adoption approximate the same optimal policy that can be implemented under discretion, although they include a degree of discretion (Clarida et al., 1999; Solow, 1998). Regardless of the appropriateness of inflation

⁷⁵This refers to long run term during which unemployment shocks stem from monetary authorities' refraining from being forward looking and responding to inflationary pressures even before inflation arises (Mankiw, 2001).

targeting rule or not, its adoption requires changes in laws and institutions (Blanchard and Wolfers, 2000)⁷⁶; something that is restrained by the high degree of economies' inflexibility, although the structure and the degree of financial openness that characterises each economy should be regarded.

In practice, the achievement of inflation targets is related with the appropriate treatment of short run nominal interest rates (Solow, 1998; Galbraith, 1997). According to Friedman's (1968) definition of natural unemployment rate, the distinction between nominal and real interest rates equals the inflation level, whereas upward shifts of short term interest rates intend to provoke economic slowdown and feed inflation reductions through tight money policies. Further, it is widely recognised that short interest rate reductions cause recessions that are expected to be temporary and stem either from short run nominal wage or price rigidity or even from inertia of inflationary expectations. But in a longer time horizon, the achievement of equilibrium levels of wages and expectations and thereby of full employment would be consistent with a lower inflation level (Smithin, 1996). It is generally argued that policymakers' intentions about disinflationary policies are not always confirmed by the final results and impacts on economic activity (Blinder, 1997).

Besides, it is believed that the interest rate itself is pre-eminently a real phenomenon, determined only by supply and demand forces on capital markets wherein savings are embodied in heterogeneous concrete physical commodities (Smithin, 1996)⁷⁷. Additionally it is argued that its determination in capital markets is a concept that

⁷⁶Such changes are possible to concern the way that monetary authorities behave, the degree of their credibility or even the degree of their independence (Solow, 1998; Blanchard and Wolfers, 2000).

⁷⁷In principle this process in capital markets lies on the absence of intervention of money banks or other financial intermediaries.

takes place only in theoretical grounds since it does not take into account the historical evolution of monetary market economy or the internal logic of the system (Greenwald and Stiglitz, 1987). Thus with respect to the increasingly dependence of economic activity on the financial sector, a more reasonable concept would be the determination of real interest rate in the financial sector so that the rates of returns to be adjusted into these standards, rather than vice versa (Romer, 1993; Greenwald and Stiglitz, 1995)⁷⁸.

An alternative view of the process of real interest rates in Keynesian theory is that of “*liquidity preference*”, according to which interest rates are determined by the relative demand for a given quantity of money and the existing stock of alternative financial assets. In Keynes’s (1936) view, however, interest rates are being treated as a simple monetary phenomenon determined in money markets, while the direction of causality between the monetary and real economy is explicitly reversed. Under these suggestions, it is evident that monetary authorities should be aware of the behaviour of nominal interest rate that is being used as the key instrument for determining monetary policy rules (Taylor, 1999).

Regardless of the way that interest rates are being determined the relation between high interest rates and disinflationary policies and thereby the presence of recessions and output reductions turn to be disputable in theoretical grounds. However, in the view of some economists the absence of any predictable relation between changes in real interest rates and real investment expenditures implies the absence of any

⁷⁸As a result, in the case of economies that are characterised by regimes of free interest rates adjustments and determine the level of their activity by considering the financial sector, it is believed that low inflation would arise by the use of a positive but relatively low financial interest rate (Smithin, 1996).

predictable relationship between interest rates and output. On the other hand, it is believed that the use of supply-side models based on intertemporal substitution of actual labour supply suggests a negative relation between interest rate and output in the sense that high interest rates are required for stimulating work effort (Smithin, 1996). In practice the inverse relation between interest rates, employment and output, based on recent historical experience and specifically on the monetary policy, are reflected on the recessions that have occurred in Canada (e.g. Smithin, 1996) and Europe (e.g. Bean, 1994b) over the past 20 years.

In current mainstream literature, the most widely used and known mechanism through which interest rate affects inflation and economic activity is related with the adoption of an interest rate rule that is known as Taylor's (1993) rule⁷⁹. According to Taylor's rule, the use of short-run nominal interest rate stabilises inflation via its relation with the behaviour of real GDP and money growth. In other words nominal interest rates are being treated so that expected nominal income rests at a level close to its target. The general form of Taylor's rule equals:

$$(4) \quad r = p + 5y + 5(p - 2) + 2$$

where r : the federal funds rate

p : the rate of inflation over the previous four quarters

y : the percent deviation of real GDP from a target, that is,

$y = 100(Y - Y^*)/Y^*$ with Y the real GDP and Y^* the trend of real GDP

⁷⁹In particular, the use of Taylor's rule reflects economic activity of many economies from 1987 onwards (Clarida et al., 2000).

The feature of this rule is that federal funds rise when inflation is above the adopted target, which in Taylor's (1993) view equals 2%, or when real GDP rises above its trend. If both inflation and real GDP levels rest on their target, then the federal funds rate would be equal to 4% or 2% in real terms. On the other hand, in cases where monetary authorities use the short run nominal interest rate, their targets and thereby the paths to achieve them should be set with regard to actual economic conditions. In other words the use of Taylor's rule and its implications suggest a positive weight on both the price and real output levels.

Despite the general recognition of Taylor's rule, according to Clarida et al. (1999) the fact that this rule usually includes output gaps that represent the distinction between their natural and targeted rates while there is no term to reflect wage or price frictions raise some questions about the correctness of its use. Moreover the fact that the adopted inflation target is set relative to the adopted trade off raises the degree of its inappropriateness, although such a trade stands only during the short run and in the presence of inflation cost push. Besides in practice when interest rates are being adjusted so as output gap to become zero, inflation and output/employment targets can be satisfactorily treated. It is thereby implied that the adopted rule should consider the actual economic conditions and set their targets accordingly them, not in relation to the expected levels (Clarida et al., 1999). As a result of all these disadvantages, Clarida et al. (2000) provide a forward looking version of Taylor's rule that equals:

$$(5) r_t^* = r^* + \beta(E(\pi_{t,k} / \Omega_t) - \pi^*) + \gamma E(x_{t,q} / \Omega_t)$$

where $\pi_{t,k}$: the percentage change in the price level between periods t , $t + k$

$x_{t,q}$: a measure of the average output gap between period t , $t + q$ with the output gap being defined as the prevent deviation between actual and corresponding GDP target

π^* : inflation target for period t

Ω_t : information set at the time the interest rate is set

r^* : the desired nominal rate when both inflation and output are at their targets levels.

Apparently, the introduction of expected and not lagged inflation terms allows monetary policies to respond to expected and not lagged inflation values that are consistent with Taylor's rule implications. Although in practice monetary authorities are concerned with interest rate smoothing, this version does not capture it because of the absence of data serial correlation. As a result Clarida et al. (2000) introduce the adjustment of interest rate that equals:

$$(6) r_t = \rho(L)r_{t-1} + (1 - \rho)r_t^*$$

where $\rho(L) = \rho_1 + \rho_2 L + \dots + \rho_n L^{n-1}$ or alternatively the parameter measures the degree of interest rate smoothing.

Additionally, it should be mentioned that monetary authorities' decision to adopt interest rate policy rules is also related with the uncertainty about the correctness of their decisions (Taylor, 1998). This uncertainty stems from the possibility of monetary authorities not being implicitly aware of interest rates' future behaviour and thereby of growth rate of GDP, since both of them are directly determined by actual

conditions⁸⁰. As a result, Solow (1998) suggests the presence of two forms of monetary policies that authorities should regard in their decisions: the first one is known as “*long-lag response*” according to which monetary authorities have to account counter-inflation action, in the sense that it is better to follow policies that aim at reducing high inflation levels before the presence of accelerating inflation levels. Besides even monetary authorities actions come up with some time lag, it is preferable to anticipate some negative conditions so as to take advantage of these cases. The second policy form is known as “*genie-and-the-bottle response*”. It suggests the adoption of policies whose results are unexpected because of their inability to control the non linear relation between inflation and unemployment levels, when the former is relatively high. As a result, it is believed that policymakers should have the ability to limit their uncertainty and their actions be characterised by freedom if their intervention is required (Solow, 1998).

In any case we should take into account that the behaviour of interest rate policy rules depends on the adopted monetary regime (Taylor, 1995, 1999; McCallum, 1984)⁸¹. This argument is expected since the development of policy rules is supposed to be consistent with the degree of economy’s openness and competitiveness among economies (Taylor, 1995). Further, Clarida et al. (2000) by estimating their version of Taylor’s rule for pre-Volcker (1960:1-79:2) and the Volcker-Greenspan (1979:3-96:4) periods⁸², claimed that the performance and estimated coefficients of the inflation gap

⁸⁰ The introduction of uncertainty responds to Post Keynesian analysis.

⁸¹ Even in the case where exchange rates are being used as a key instrument for stabilizing economy, the specific characteristics of each monetary regime should be considered. Hence with respect to real economic conditions, satisfactory results about economic performance can be reached by using either exchange rates or money stock as instruments as long as these variables satisfy all the required conditions for the adoption of a policy rule (McCallum, 1984). However in current economies in particular, there is no dependency between exchange and interest rates, so as economic activity to be constrained by them (Taylor, 1999).

⁸² The difference that characterises these two periods is the presence of different monetary regimes and

are consistent with priorities and intentions of American monetary authorities. Thus with respect to the used data sample, it can be easily proved that the Federal Reserve had different behaviour during the two periods of the inflation.

Despite the possible improvements that may require the adopted new Keynesian monetary policy rules, their preference in conjunction with the behaviour of interest rates are regarded as the main instruments for making policy decisions. Besides, the presence of a restrictive monetary mainstream environment under which most economies operate nowadays is a fact that can hardly be changed. A possible change of this situation and the introduction of more flexible monetary conditions that would be friendly to unemployment and not only inflation reductions can be achieved only if there is a change in economic priorities and in the available routes to improve economic activity.

2.5. A New Keynesian Critique to NAIRU

The criticism and disadvantages that are believed to characterise NAIRU are determined by the adopted framework and the way that policy suggestions and implications are being used in new Keynesian grounds. In an attempt to improve the NAIRU concept and its consequences, recent literature, including new Keynesian perspectives, has been concentrated on the examination of some critical points.

The fundamental source of new Keynesian criticism is considered to be the indirect observation of NAIRU level through estimations about the long run unemployment equilibrium point. In other words, there is no constraint in methodologies, variables

therefore the different degree of disinflation persistence.

and approaches that are being used for NAIRU estimations. Besides, it is widely argued that NAIRU estimations are sensitive not only to the assumptions of the adopted framework but also to the employed specifications, the sample period and data as well as the included variables and estimation method. For instance there are many new Keynesian economists such as Staiger et al. (1997b), Stiglitz (1997), Rogerson (1997) who recognise the direct effects of the included number of lags on the variable of unemployment as well as the presence or not of contemporaneous unemployment values on NAIRU estimations, although they are not preferable because of their exogenous character.

More precisely, it is believed that the number of included lags is essential, since it reflects the degree and the form of included information; the lower their number the closer to actual economic conditions NAIRU estimations turn out to be (Galbraith, 1997; Gordon, 1997). Hence when lags refer to the variable of inflation or economies are characterised by favourable supply side shocks, inflation deceleration is possible to come up; in both cases inflation decelerates even when actual unemployment is below its natural level. On the other hand when lags concern the variable of unemployment, the presence of more complicated dynamics that ensure the association of a current unemployment reduction with decelerating inflation is implied (Estrella and Mishkin, 1999). In any case the number of lags for included variables reduces the degree of standard errors and affects the estimated coefficients importantly (Fair, 1997).

Moreover, the form of included expectations in the augmented-expectational Phillips curve affects NAIRU estimations as well as the degree of policymakers' confidence

about the adopted targets definitely. Further, the fact that new Keynesians have no unique view of the form of included expectations, allows expectations to have an outstanding role in determining policy decisions. More precisely, in recent literature there is a tendency to contradict the acceptance of rational expectations and express a preference on adaptive expectations in the sense that they perform sufficiently and their implications are similar to those of rational expectations (Ball and Mankiw, 2002). Besides, in Keynes's (1936) view expectations are essentially affected by social conventions, whereas according to Lucas (1972) rational expectations provide the opportunity to workers to decide upon their working hours; in general both the inflation and unemployment policies are directly determined by the way that expectations are formed.

Nevertheless, attention should also be paid to the way that expectations finally affect the assessment of future inflationary pressures, since in cases of more forward looking expectations, NAIRU estimations are determined by backward looking (adaptive) expectations in the sense that their presence is anchored by the experience of lower and more stable inflation. Under these suggestions, it is possible for estimations to be misleading and biased⁸³. In any case this form of expectations in Phillips curve equation requires the introduction of lagged inflation term, whereas in the presence of rational expectations inflation is represented as a random walk process (Ball and Mankiw, 2002)⁸⁴. Although the introduction of adaptive expectations in Phillips curve seems to be adequate in providing a perfect fit for the stylized facts of monetary macroeconomics so as monetary shocks to affect unemployment, it is also possible for

⁸³This is explained by the high degree of included inertia, which slows down NAIRU adjustment towards new conditions of economy.

⁸⁴The advantage of adaptive expectations is the ability to treat the natural unemployment rate as the NAIRU level so that inflation between two periods to be stable and no supply shocks to stand (Ball and Mankiw, 2002).

the effects of these shocks to be reflected on inflation with some delay (Mankiw, 2001). Despite the 'dilemma' about the included form of expectations in NAIRU estimations, there are still doubts about the effectiveness of this concept; its solution arises from the economic regime that characterises each economy.

But NAIRU estimations are also affected by the adopted method of inflation and unemployment measuring (Staiger et al., 1997b; Ball and Mankiw, 2002). Apart from the unemployment and output gap that are widely used as indicators of future inflation, there is a range of alternative and possibly more appropriate measures (Nickell, 1990; Estrella and Mishkin, 1999). For example after examining alternative ways of inflation forecasting, Stock and Watchon (1999) concluded that inflation estimates with respect to Phillips curve are more accurate relative to others. Thus, when inflation forecasts are reflected on measures of real aggregate activity their performance is improved compared to those based on the indicator of unemployment. Besides, it has been found that the use of unemployment as an indicator of inflation predictions is characterised about its impropriety, while the alternative ways of measuring it reduce the degree of uncertainty in forecasts (Gordon, 1988). Hence the fact that the unemployment gap belongs to a range of variables that can be used as inflation indicators raises the possibility of using other variables that would provide more adequate inflation forecasts and thereby better policy suggestions.

Additionally Stock and Watchon (1996) signify the presence of, at least, 69 alternative indicators that can be used for inflation prediction, such as output and sales, labour markets and so forth, which are expressed in either nominal or real terms and provide different information and thus inflation predictions. Moreover the

absence of any proper inflation measure is verified by the fact that in Phillips curve literature gross domestic product is widely used as an indicator of 'core inflation' by excluding prices of foods and energy goods (Staiger et al., 1997a). However in practice, there is no qualitative information about both inflation and unemployment across economies.

In particular the way that NAIRU is defined, the form of included variables, the degree of information and the included form of expectations are directly determined by each researcher's intention; a suggestion that casts doubts on the appropriateness of the concept of NAIRU itself, as well as the correctness of policy suggestions it determines. In these grounds, the way that unemployment is being treated is also essential. To be more specific, in Keynesian grounds due to the presence of inflexible wage elasticity for labour market, unemployment is defined as involuntary and even at the equilibrium level stands. On the other hand, Friedman (1968) suggests that full employment is constrained by the coexistence of involuntary unemployment and natural unemployment rate. Further, the introduction of intertemporal substitutions in classical grounds, suggests that economy includes only voluntary unemployment, whereas equilibrium includes no unemployment at all as long as markets are cleared (Dixon, 1995; Coen et al., 1987). This suggestion contradicts Keynesian perspectives, according to which voluntary unemployment is the level of persistent unemployment that cannot be reduced through the appropriate treatment of a demand expansion without causing inflationary pressures⁸⁵. Moreover in Lucas's (1978) view, the inclusion of involuntary unemployment can explain the high levels of total fluctuations.

⁸⁵In other words, classical unemployment would be offset by augmenting aggregate demand, while inflationary pressures would be downward if a demand stimulus was accompanied by actions to sustain profits at acceptable levels (Coen et al., 1987).

Given these assumptions, it is argued that Keynes's (1936) suggestions would be in accordance with the development of natural unemployment rate if this was defined as the level that responds to full employment via the appropriate adjustments of aggregate demand levels (Sawyer, 2001). Moreover the treatment of NAIRU in accordance to Keynes's view, would suggest the consistence of NAIRU policy instrument with low unemployment rates. This would however contradict Friedman's thought according to which natural hypothesis posed against full employment policies. Indeed Keynes's consideration of natural unemployment rate is implicitly opposed to new Keynesian NAIRU framework and the implied conservative policies.

However, in recent literature NAIRU is defined in accordance with Friedman's (1948) definition of natural unemployment rate that is determined by both market and non market factors and by the labour market factors nowadays. Alternative, NAIRU is the macroeconomic outcome of labour market that distinguished excess demand markets and inflation decreasing pressures from excess supply markets. It is clear that the distinction between NAIRU and natural unemployment rate concerns the environment into which the two magnitudes operate. More specifically, NAIRU is developed into a purely new classical aspect, whereas the natural unemployment rate reflects the feature of a Walrasian market clearing general equilibrium (Perasan and Smithin, 1995; Tobin, 1999).

Moreover the treatment of unemployment as a function of real wages that acts on the marginal physical productivity of labour and on marginal disutility of work, suggests that in cases where unemployment is below its natural rate there are upward real wages movements because of increases in nominal prices. This process is purely

classical and is possible to be characterised by asymmetries between the behaviour of prices and nominal wages so that wage bargaining to be irrelative to real wages and constraints to be imposed. In addition, the fact that in practice NAIRU suggestions are not always consistent with non accelerating inflation rate, cannot dispute the dominance of NAIRU concept in theoretical models. Despite the presence of this inconsistency, there are some economists i.e. Solow (1998), Taylor (1998), Collington, (2003), Gordon (1997), Karanassou and Snower (1997), who are in favor of the NAIRU concept and its disinflationary implications in the sense that continuous unemployment expansions cannot be attributed to expectational errors or incorrect adjustment dynamics for reaching equilibrium.

Considering all these and contrary to the purely mainstream view, it is argued that unemployment acceleration over the last decades is affected by permanent shocks that concern capital deceleration, interest rate rises and disparities of unemployment level across economies (Karanassou et al., 2003a; Bande and Karanassou, 2007; Bean, 1994a)⁸⁶. The '*Chain Reaction Theory*' goes a step beyond the hysteresis theory and implies that the treatment of unemployment as the dynamic response to a sequence of labour market changes and shocks as well as unemployment adjustment and its persistence cannot be fully attributed to labour market imperfections, since unemployment is influenced by capital stock in both short and long run term (Karanassou and Snower, 2000)⁸⁷. In other words, post Keynesian thoughts are partly recognised.

⁸⁶By considering the length of the shock in labour markets one can capture for actual unemployment to reach its long run equilibrium levels, but also the level of labour resources that remain unused after the shock (Karanassou and Snower, 2000).

⁸⁷In general the *Chain Reaction Theory* rests on the estimation of dynamic structural multi-equation systems and assumes that the unemployment rate is driven by the interaction between lagged adjustment processes and spillover effects (Karanassou and Snower, 2000).

Consequently, Solow's (1986) notion that different assumptions and specifications have different implications on the natural unemployment hypothesis is affirmed. Generally, the way that unemployment and its long run equilibrium are approached in new Keynesian grounds, is explained by their adherence to Say's Law and supply side factors. In addition, the fact that Say's Law allows economy to correspond to its full employment and capacity utilization, provides the opportunity to contemplate the way that supply can be compared with demand⁸⁸. Moreover the use of models of bargaining power, efficiency wages and insiders-outsiders and the implied rigidities and imperfections in labour markets for explaining unemployment, turn out to be incorrect. However the assumed uniqueness of supply side NAIRU and neutrality conditions set the dominance of new classical implications despite its incorrectness⁸⁹.

Another issue that is considered responsible for the degree of NAIRU inappropriateness as a policy guidepost concerns its treatment as constant or time varying. In general, recent literature implies the treatment of NAIRU as a time variant. For example, although the American NAIRU level was believed to be constant around the level of 6%, it is now admitted that its levels can be considered as time varying. Thus in a number of estimations, NAIRU ranged around 3.5% in mid-1960s, reached its peak during 1980s at the level of 7.25% and fell at the level of 5.75%, while in the recession of 1990s NAIRU estimations set it around 6% (Staiger et al., 1997a, 1997b; Rogerson, 1997; Gordon, 1997; Stiglitz, 1997; Galbraith, 1997). In our days both American and European time varying NAIRU levels are set close to

⁸⁸A possible way to do this is to consider the value of marginal propensity to spend that requires its equality to unity in order for Say's Law to hold without the presence of any problem (Sawyer, 2001).

⁸⁹Usually this equality is accepted regardless of whether or not economists are aware of the factors that determine the marginal product or the differences between theoretical and empirical grounds (Sawyer, 1998).

5.5-6% or even lower, despite the incorrectness that is included in NAIRU forecasts even under its time variance (Staiger et al., 1997a).

A way to examine the behaviour of NAIRU is provided by Gordon's (1997) "triangle model" that is comprised of the two following equations:

$$(7) \pi_t = a(L)\pi_{t-1} + b(L)(U_t - U_t^N) + c(L)z_t + e_t$$

$$(8) U_t^N = U_{t-1}^N + \varepsilon_t$$

where equation (7) is simply the equation of expectational augmented Phillips curve consistent with equation (11) of the previous chapter. The difference between these equations is reflected on the fact that equation (7) includes the inflation rate of the previous period (π_{t-1}) instead of expected inflation (π_t^e). As far as equation (8) is concerned, its use determines the NAIRU level by assuming the error term to have zero mean and a variance σ_ε , whose values determine whether NAIRU is constant or time varying $\varepsilon_t \rightarrow (0, \sigma_\varepsilon)$.

In accordance with the above model, in cases where the variance of error terms equals zero the magnitude of NAIRU is constant; whereas in cases of positive variance, NAIRU becomes time-varying. In the latter case the presence or not of any kind of limitations is essential, since it would allow NAIRU to jump up and down and soak up all the residuals variation in the inflation equation. In general Staiger et al. (1997b), imply that NAIRU can be presented as a constant or spline or even as a break procedure or as being determined simply by its previous levels.

When assuming the constancy or variance of NAIRU, the most significant consequence refers to the degree of correctness of implied policy suggestions. Thus, the treatment of NAIRU as constant or time-variant raises additional difficulties for monetary authorities, in the sense that policy decisions with respect to its level require its a priori determination (Collington, 2003). Although, by assuming a time variant NAIRU, the policy suggestions are difficult to be made because they absorb actual conditions, their correctness is proved; the insurance of policy suggestions correctness the length of the period to which observed data and estimations refer are required to be taken into account (Galbraith, 1997; Gordon, 1997). In addition and opposing to the complexity of time variant NAIRU, its estimations are supposed to provide the adequate conditions for the adoption of techniques, reduce the degree of uncertainty and imply the consistency between estimations and the adopted form of Phillips curve specification (Clark and Laxton, 1997). In no case, should the adoption of a time varying NAIRU and its shifts be considered as changes in actual unemployment level; in this case NAIRU shifts should be specifically guided (Blinder, 1997).

Due to the absence of any guidance on NAIRU behaviour and the incomplete knowledge of its implications, in mainstream grounds it is possible to assume the slow adjustment of NAIRU to changes (Staiger et al., 1997a, 1997b). Besides, policy decisions rest upon NAIRU constancy and its equality with actual unemployment level so as policy decisions about inflation to provide the expected results. In any case, in the process of policy determination monetary authorities should consider whether the average rate of unemployment, that is usually adopted, is affected by monetary policies. If this stands, the natural rate cannot be posited as completely exogenous and the neutrality hypothesis would not apply even in the long run

(Collington, 2003). In other words, the essence of any monetary policies suggestions is cancelled out.

But the dependence of NAIRU estimations upon the adopted assumptions, data and models is fully reflected on the different evidence that is provided in empirical studies. For example by using three alternative time series for NAIRU and three specific values for standard deviations, Gordon (1997) observes that their appropriateness depends on the adopted NAIRU definition as well as on the degree of uncertainty that characterises each of the used time series. Moreover, although Gordon (1988, 1997) accepts that NAIRU is relative constant at 6%, he attributes this stability to the lack of any “outward shift” in the relation between inflation and unemployment over time, which can be captured by using a dummy variable. On the other hand, by introducing a different number of lags in Gordon’s model, Solow (1998) reaches different conclusions about the trade off between unemployment and inflation, as well as the way and speed of each variable response to changes. Furthermore, having considered uncertainty as given Staiger et al. (1997a) point out that the suggestions about NAIRU constancy or time variance are determined by whether the assumption about linearity is included or not in the adopted assumption set; results that are opposed to Gordon’s (1997) outcomes. Despite the bias of these results due to the included variables and their lags, they were apt to lead Staiger et al. (1997a) to the rejection of NAIRU constancy and examine the correctness of these estimations into specific interval confidence.

Closely related with the tendency to treat NAIRU as a time varying, is the assumption about its uniqueness; an issue that concerns the degree of NAIRU correctness in new

Keynesian grounds. More specifically, the information that is provided by the NAIRU variance over time is cancelled out by assuming its long run uniqueness (Staiger et al., 1997a). However in new Keynesian theory there is no reference about the possibility of NAIRU concept to be characterised by multiple equilibria, although this is directly implied by considering the ‘usual’ phenomenon of hysteresis (Ball, 1997). The assumption about NAIRU uniqueness stems from the suggested consistence of natural unemployment rate with market clearing and the inverse relation between unemployment and real wages.

In general, the fact that new Keynesian economics consist of a range of models and thereby theoretical implications, makes the existence of multiple rather than unique equilibrium more convincing (Sawyer, 1998, 2001). In this case, policymakers’ decisions about unemployment become relatively difficult due to its unpredictable behaviour and the fact that equilibrium jumps from one point to another without realising its actual point. Besides, it is the combination of the assumptions about multiple equilibria and hysteresis that distinguishes new classical from new Keynesian economics, although the latter rest upon a range of new classical assumptions (Sawyer, 2001). But even under conditions of multiple equilibria, it is incorrect to reject the possibility of equilibrium uniqueness since additional problems will arise not only about NAIRU estimations but also about the levels of economic and political costs. Indeed the assumption about a unique employment and output equilibrium level is relatively strict, while such equilibrium is possible to be biased because of the specific assumptions upon which it lies (Dixon, 1995).

Additionally the determination of natural unemployment level in accordance with Wicksellian natural interest rate, so as equilibrium to be simultaneously determined in both labour and capital markets, enriches the dynamic adjustment that raises the possibility of multiple natural equilibria (Dixon, 1995). As a consequence, the suggestions against NAIRU uniqueness cast doubts on its use as a benchmark for monetary policy and as the appropriate instrument for achieving price stability. Regardless of the uniqueness or not of NAIRU, it should be considered that the implied equilibrium is neither competitive nor Pareto optimal and thereby cannot reflect real abilities of economy (Dixon, 1995). Besides, its presence becomes inconsistent at high unemployment rates for which multiple equilibria are highly possible (McDonald, 1995). Obviously, the way that unemployment is defined as well as the suggestion about whether its estimations include a whole set of unemployment levels each of which is associated with different values, affects the presence or absence of unique equilibrium definitely (Bean, 1994a).

All these are essential for the conduct of monetary policies, given that in new Keynesian grounds policy decisions are determined with respect to interest rate rules and implicitly by the acceleration model (NAIRU). Further the inability to separate among the structural characteristics of unemployment and simply treat NAIRU as the magnitude that reflects actual unemployment, makes the absence of any policy solution about the unemployment problems reasonable. Thus by regarding a specific value for NAIRU, it is certain that the achievement of policy targets will affect economies mischievously, regardless of the uncertainty about the correctness of these policies.

The implied uncertainty that characterises NAIRU in conjunction with the doubts that characterise its concept and generally its estimating process, enforce the thought of solving high unemployment and inflation levels by using short run Phillips curve (Demertzis and Hallett, 1995; Dixon, 1995). Besides, historically there is no explicit NAIRU level that characterises economies, whereas the dependence on labour market conditions and specifications is widely accepted, although there are few empirical studies that prove its existence in real economies (Tobin, 1980). Moreover, the use of short instead of long run Phillips curve to make policy decisions seems to reflect actual economic conditions perfectly, while its implications raise the possibility of improving economy's performance and providing Pareto optimal results. Such a consideration is enriched by the possibility of many economies not being characterised by an explicit long run relation between inflation and unemployment. In addition, the fact that the concentration on long run equilibrium level and the use of unemployment gap can provide limited useful policy suggestions should be also considered (Estrella and Mishkin, 1999).

In any case policymakers are called to be well aware of the mechanisms that characterise NAIRU, namely the adopted methods for its estimations as well as the included variables in order for policy suggestions to reflect real economies (Solow, 1998). Thus, the thought that NAIRU sets the consistency between inflation reductions and economic growth suggests that unemployment reductions can be achieved through changes in structural and cyclical characteristics of labour market due to changes in the participation level and the required skills that should characterise workers or even demand weaknesses (Summers et al., 1986).

Nevertheless, the achievement of full employment cannot be ensured by considering the equality of real wages at their natural levels (Hall et al., 1975).

Despite the ‘insight’ of new Keynesian criticism about the correctness of NAIRU supply side framework that mainly concerns its inability to reflect real economies, this framework is still considered by economists and policymakers as the theoretical benchmark for stabilising monetary policies. However the questions raised above, concern not only the correctness of NAIRU estimations but also the correctness of policies that stem from its use, which are proved to provide only sub-optimal suggestions. The problem of these policies is not to persuade the public about their advantages but to provide evidence against its imprudent consequences on economic activity. Besides, what is really required is the adoption of policies that reflect actual necessities of economies so as the targets of price stability and full employment to be reached without harmful consequences in economic activity. It thereby seems accurate to adopt an alternative and more realistic framework which would be recognised an active role for aggregate demand. In other words, the adoption of a framework that would account for all the problems stemming from NAIRU concept in order for promoting employment and economic expansion, seems to be reasonable. In any case, the adoption of an alternative NAIRU framework should be easily understood and widely accepted.

2.6. Empirical Evidence

The wide acceptance of NAIRU as the most appropriate concept to explain economic activity as well as its connection with disinflation policies are examined in empirical grounds. It should be mentioned that despite the general acceptance of NAIRU

concept in economic theory, its implications are not always the expected. This is the reason why empirical results are equivocally.

The preference of monetary authorities on inflation is explained by their attempt to 'cure' the costs in terms of sacrifice ratio reductions that stem from inflation increases. Such an outcome during disinflation process is ad hoc determined by the adopted assumptions and the actual conditions that characterise economies, whereas these results are not always the expected. Hence, by using data about Africa, Asia and Latin American for a 25-year period (1965-1990) Fischer (1993) provides evidence for a positive correlation between price stability and economic growth through which appears a low and sustained inflation and stable growth. On the other hand, Romer and Romer (1999) prove that American economy in the long run has been characterised by low inflation levels and macroeconomic stability that are related with less rapid growth of average income and higher income inequality for 25 years. According to Easterly and Fischer's (2001) evidence these results are confirmed, whereas the effects of high inflation levels become harmful in poor societies. Additionally, Ball and Sheridan (2003) consider two country samples: one of low inflation targeting and one of non-inflation targeting for both pre-inflation and post-inflation targeting periods. Their results imply that the uncertainty of disinflationary policies and thereby the possibility for both low inflation and non-inflation targeting economies to share common characteristics appeared after improving their economic performance in terms of inflation output growth and interest rate.

Furthermore, having used cross section inflation data during the period 1969-1989 for a sample of the 17 most industrialized countries, Fortin (1996) attributes the absence

of any correlation between inflation and unemployment or of their growth rates to the heterogeneity of characteristics across sample economies. In addition, by regarding historical data about Canadian economy for the period 1963-79, Fortin (1996) shows that each percentage of inflation increase is followed by permanent reduction of the annual growth rate of labour productivity. The common element of all these studies is the assumption about the endogeneity of both unemployment and inflation variables, which are suggested to lead to the desirable results without always being sure that these results will be reached.

In other words, there are many other constraints except for inflation that prevent economies from improving their performance, while monetary authorities should be independent and well aware of actual economic conditions. Besides, there is always the possibility of incorrect policy choice since the adopted disinflationary policy can be different from real necessities and therefore affect economic activity in terms of employment incorrectly (Solow, 1998). But even if the consequences of disinflation policies are *ex ante* recognised, attention should be paid on the qualitative characteristics of economies so that to provide evidence about their significant impact on economic performance (Fortin, 1996). In general, we cannot reject the possibility of a fully credible disinflation causing an economic boom (Ball, 1997). In this case by suggesting that disinflation booms are announced and credible firms respond by reducing their prices, a rise in money balance that will cause a rise in output but an unemployment reduction is possible (Mankiw, 2001).

In an environment of continuous globalized economies, unemployment is essentially affected by the behaviour of interest rates and mainly by upward shocks of

international real interest rate that increase the natural unemployment rate and at the same time affect employment level and capital markets negatively (Phelps, 1995). Generally the consequences of disinflation policies are determined in relation to the equilibrium natural unemployment rate as well as the degree of validity and uncertainty included in the behaviour of inflation.

Additionally Fitoussi et al. (2000) examine the effects of monetary policy on unemployment in OECD countries from 1970s to 1990s. The use of the real interest rate as the most representative monetary policy variable, led them to conclude that monetary policies are only partly responsible for the persistent high unemployment levels across economies. These results are confirmed by Phelps and Zoera (1998) and Bean et al., (1986) for the period between 1980s and early 1990s. Moreover Newell and Symons (1987) suggest that a rise in interest rate, pressures the rate of hiring for a given wage level downward because of increases in training costs and its transmission on prices. Besides, shifts in interest rates or more generally in employment equilibrium, are not symmetrical across countries. As a result, their estimations imply that European firms responded to dollar appreciation during 1982-1986 by raising their profit margins rather the level of their output production, whereas American firms did the opposite. The disadvantage of this study is the absence of any explanation about the asymmetry between European and non-European economies as well as between Europe and Japan.

It therefore seems reasonable to attribute unemployment persistency to investment reductions, after considering the relation between interest rates and unemployment (Nickell, 1998; Bean, 1994a). In other words, capital shortages constrain employment

expansions, which are usually explained by considering the low mobility of workers across economies (Bean, 1994b). This suggestion derives from the relation between investment and interest rates, whose levels turned from positive in 1960s into sharply negative in the second half of the 1980s and very high and positive in the 1980s and 1990s. Such interest rate can easily provide evidence about the employment reaction to their changes shifts because of their inverse relation with inflation (Blanchard and Wolfers, 2000).

There is also evidence about the impact of the introduction of taxation and income policies on unemployment levels (see Bean et al., 1986). According to these, it is proved that the introduction of payroll and income taxes affect productivity and employment levels negatively. It is widely argued that taxation always affects the determination of unemployment (e.g. Nickell, 1997; Blanchard and Wolfers, 2000; Baker et al., 2004). Also the results that are reached when considering the welfare system spending of each economy and the decisions to improve educational composition in the labour force are similar. However the degree of significance of empirical results about the effects of labour market rigidities on unemployment levels are usually mixed (see e.g. Nickell, 1997; Fittoussi et al., 2000; Blanchard and Wolfers, 2000; Baker et al., 2004; Glyn et al., 2003).

Thus Phelps and Zoera (1998) support the essential influence of energy prices on unemployment during the 1970s, although they do not provide supportive evidence about the duration of its persistence so as to explain high unemployment levels. In contrast Bean et al. (1986) and Nickell (1998) suggest that unemployment is also affected by the length of its duration and the level of benefit system. However with

respect to their final outcome, it is proved that in the same period NAIRU could be shifted by both aggregate demand and real wages, with the decline in aggregate demand relative to its potential level having a significant effect on European unemployment. Indeed it is clear that supply side factors and differences in institutions and social characteristics of each market have played an important role.

The relation between unemployment expansion and workers' mobility across economies should also be considered. According to Juhn et al. (1991) it is proved that at least in the case of American economy during 1967-1989, the increase in actual and natural unemployment level results from the high volatility of unemployment and its distribution across groups of workers. This result is also affected by workers' participation and labour markets' tendency to demand more skilled workers with the flexibility of wages to be depending on the characteristics of each group. However, unemployment persistence is usually explained by its long duration that arises due to low growth levels of job creation (Siebert, 1997). Further, according to Bean (1994b) unemployment can be explained by considering the idiosyncratic increases in the replacement ratios of workers; the higher the frequency of movements in unemployment, the higher the unemployment correlation across economies, while the behaviour differs at low frequencies ascribed to different degrees of persistence.

In general, unemployment has been positively affected by the increase of skilled workers against unskilled workers in both demand and supply, whereas working hours reductions and pressures on workers to bring their retirement forward is regarded an alternative route for unemployment reduction (Nickell, 1997; Siebert, 1997). Moreover by using data from OECD countries, Nickell (1998) reaches an inverse

relation between unemployment levels and labour unions' power and thereby wage pressures that affect the level of unemployment significantly. Moreover, according to Nickell (1997), Baker et al. (2004), Glyn et al. (2003) bargaining coordination, seems to reduce unemployment at least for OECD countries.

By considering that wage flexibility is a significant factor in determining its inverse relation with unemployment Nickell (1998) and Juhn et al. (1991) provide convincing evidence about the relation between low wages and less skilled and educated workers, whereas Murphy and Topel (1997) imply that unemployment changes are similar across identifiable groups. According to these results, it is possible for workers to be pushed towards spending more time in education and changing their educational program so as to gain more skills and knowledge about technology (Galbraith, 1997). As a result, unemployment 'hits' workers' groups disproportionately; those who are made layoff face higher unemployment relative to those who are job leavers (Juhn et al., 1991). Generally, there is a significant increase in the unemployment of re-entering the work force, while a part of unemployment increase is attributed to its inverse relation with human capital deterioration. This outcome can easily be explained by considering that heterogeneity in workers' characteristics, skills and education can be partly attributed to the adoption of efficiency wages and insiders-outsiders models that are reflected on the signal of their relative wages.

It can thereby be said that wage dispersion also has an essential role in determining employment level⁹⁰. According to Bande and Karanassou (2007) workers move from high to low unemployment regions in search of better labour market prospects, while

⁹⁰Such dispersion can for example concern beginners and workers who have spent much time in the same type of job and which can be faced with many alternatives (Hall, 1988).

firms move to high unemployment regions to benefit from lower labour costs (at least in the case of Spain during the period 1980-1995). However, in Siebert's (1997) view differentiated wages are relevant to economies where there are structural changes in the trade terms. Moreover after estimating a cross country unemployment model for 20 OECD countries covering the period 1956-1992, Bean (1994b) implies that real wages are not as much responsible for high unemployment level as believed to be. This result lies on the fact that wage adjustments are closely depended on the characteristics of each labour market. Besides, in the case of British economy Phelps and Zoera (1998) find the coexistence of less likely accelerating wages inflation when unemployment reaches high levels, though the positive sign in employment changes implies their rapid recovery as the possibility for the presence of inflation rises. All this empirical evidence proves the robustness of the beliefs about the constraints that arise from labour market rigidities and the consequences that stem from the adoption of disinflation policies.

Among the above, the most representative example of new Keynesian adhesion on inflation targeting policies, despite the specific necessities of each economy separately which results in persistently high unemployment levels, is the case of European economies. More specifically the concentration of monetary authorities across Europe on low inflation targeting in conjunction with the adoption of labour market policies and its deregulation, led to the development of a positive wage gap and disproportional shifts between wages and productivity (Bean, 1994a; Solow, 1998; Blanchard and Wolfers, 2000). In addition, the effects of supply side developments, supply side shocks as well as the fact that during the 1970s unemployment was associated with a rise rather than fall, proves the dominance of

inflation targeting. Despite the heterogeneity of inflation levels across regions at the beginning of the 1980s, the disinflation process during that decade was associated with a much greater unemployment rise in European and many other economies (Bean, 1994a).

Contrary to American, the fundamental characteristic of European unemployment is that its levels did not return to its initial levels once the inflation was stabilised at low levels and thus resulting in a NAIRU rise. In Ball's (1997) view, who used data from 20 OECD countries except Turkey for the period during 1980 and 1990, such an upward NAIRU movement is only partly explained by inflation shifts, since it is also affected by actual economic conditions, employed data and methods. But even by considering the extent of disinflation as given, the effects of NAIRU increases last for a long time. Despite the purely supply side character of NAIRU, it should be mentioned that it is also affected by demand side factors, while the degree of its impact is determined by economy's actual conditions.

In the majority of current literature however the persistently high unemployment levels are not associated with the effects of contractionary demand policies, neither is believed that the productivity slowdown with workers' aspirations, changes in tax and import price nor higher commodity prices, especially of oil, explain unemployment adequately. On the contrary, unemployment is usually associated with labour market rigidities namely increases in the union power, the mismatch between the demand and supply of labour, the effects of increasingly generous unemployment benefits, rising the reservation wage as well as increases in the mark up that stem from the especially high interest rates, and demographic developments.

However in the last few years, it is widely argued that in addition to the above the persistently high unemployment level is explained by employing institutional characteristics of labour markets and the power of factors, the differences of conditions across economies as well as macroeconomic shocks that create an unfriendly employment environment, although there are some institutions that lead to employment expansion (Blanchard and Wolfers, 2000; Baker et al., 2004; Glyn et al., 2003; Nickell, 1997, 1998). In a number of empirical studies, i.e. Nickell, 1997, 1998; Fitoussi et al., 2000; Siebert, 1997; Phelps and Zoera, 1998; Baker et al., 2004; Glyn et al., 2003; Bean, 1994a; Layard et al., 1991) after contrasting European with American unemployment, unemployment persistence is proved to be determined by minimum wage, unemployment benefit system, relatively high firing and hiring restrictions, welfare system, unemployment protection system, directly. In general, it is argued that labour market policies set an unfriendly environment for workers regardless of whether there is an unemployment protection system or not.

Furthermore, the significance of labour market rigidities on economic activity is determined by whether economies face macroeconomic shocks as well as whether these are observable or not. Thus, when shocks in labour markets are unobservable then all rigidities are significant, whereas in cases of observable shocks that concern the total productivity growth rate, only real interest rate and labour demand shifts, affect economic activity essentially (Blanchard and Wolfers, 2000). Generally the difference in the degree of significance of labour market rigidities in explaining unemployment are attributed to differences in the form and the structure of domestic shocks that characterise each economy and thereby its response to them (Phelps and Zoera, 1998) as well as to regional unemployment disparities (Bande and Karanassou,

2007).

In practice, it is argued that the levels of minimum wages and unemployment benefits are those that directly determine workers' intention to work or not as well as labour mobility, especially in European economies. Although these usually take the form of employment protection and general labour policies, they ultimately opposed to employment expansion and turn out to be responsible for unemployment expansions. Among unfriendly employment market institutions there are also 'good' institutions (i.e. coordination variable, active labour market policy) that reduce unemployment and create the appropriate conditions for employment and economic expansion, although the level of the coefficients of these variables is not always plausible. Besides, the thought that labour market deregulation is possibly the best route to raise employment rates is prevailing.

As a result of the above analysis, it becomes clear that the evidence which attributes unemployment to labour market rigidities and institutions is quite mixed. The differences among empirical studies concern not only the impact of labour market institutions on unemployment which is generally argued to exist, or the sign of the impact but also the degree of their significance in explaining them. This is explained by the fact that researchers use different measurement and estimation methods as well as different data about the used variables. Although there is no direct linkage among labour market institutions and macroeconomic shocks with actual unemployment levels, with respect to heterogeneity of each economy their presence appears to explain the persistently high unemployment levels across economies adequately. More generally, the significant effect on the determination of unemployment is not

related with macroeconomic institution themselves but mainly with the interaction among institutions and with respect to actual economic conditions.

It can therefore be said that the explanation of persistently high unemployment levels is in many cases problematic. Although many of these studies provide significant evidence about the relation between labour market institutions and unemployment, they also leave little use for policy purposes even when the measured effects are found to be statistically significant. Consequently the necessity that arises from empirical evidence, concerns the appropriateness of mix labour market institutions and laws that will actually protect employment and not constrain economic expansion. This right mix might not be the same for all economies but could be determined with respect to their actual needs and conditions.

2.7. Conclusions

In new Keynesian economics the NAIRU is regarded as one of the most important frameworks to conduct economic policy and in particular monetary policy. The use of interest rate rules aims at reducing the inflation so as unemployment to be reduced indirectly.

However, these theoretical suggestions rarely represent actual economic conditions. The use of the NAIRU framework to deal with the problems of inflation and unemployment seems to be inadequate at least in the case of the latter. This is due to the fact that all new Keynesian policy suggestions intend to smooth unemployment without harming inflation. Indeed, by considering unemployment as a problem of secondary importance and using it as the best possible variable indicator for inflation

levels, the adoption of reservation wages, unemployment benefit systems as well as unemployment insurance systems provide only temporary solutions of employment and economic activity.

Thus, a number of questions arise about the appropriateness of the NAIRU framework to deal with actual economic problems. The new Keynesian ‘insight’ criticism of NAIRU provides enough room to rethink about the way it is used, but does not seem to have the power to improve it. This is because it concerns the ‘technical’ side of the NAIRU framework and not the core of the assumptions upon which it lies and that turns out to be incomplete.

Chapter 3

The NAIRU: A Post Keynesian Approach

3.1. Introduction

The high unemployment rates that many economies have experienced since the 1980s refute the central message of the conventional literature about NAIRU and especially the policy implications concerning targeting supply side factors, labour market rigidities and imperfections.

Our aim in this Chapter is to outline the fundamental ideas, arguments and propositions that have been developed by the Post Keynesian tradition regarding NAIRU. More specifically, Section 3.2 introduces the importance of aggregate demand and capital stock in the Post Keynesian analysis of NAIRU. Section 3.3 questions the unemployment result of inflation-targeting and in general stabilisation policies associated with NAIRU. Section 3.4 reviews New and Post Keynesian empirical studies pinpointing the significance of aggregate demand and capital stock in determining economic activity and employment. Finally, Section 3.5 summarises and concludes.

3.2. Aggregate Demand, Capital Stock and NAIRU: A Post Keynesian Analysis

The use of the NAIRU concept as a policy guidepost may be a factor that has affected current economic affairs. In contrast to claims made by policymakers that have adopted NAIRU as a policy guideline, real world economies have experienced high rates of unemployment and low rates of growth.

Post Keynesians attribute this inconsistency between economic theory and economic reality to the low degree of realism that characterises the NAIRU framework. It is argued that policy decisions are usually adjusted to a hypothetical economy described by the NAIRU ideal, and not to the actual conditions of real world economies. For instance, the implementation of a stabilisation policy is determined by the degree of Phillips curve convexity and linearity regardless of whether these categories reflect actual economic conditions or not.

More precisely, in conventional literature the NAIRU mechanism, which is related with the general form of augmented expectational Phillips curve equation, raises a number of questions. This form of Phillips curve implies that the relation between inflation and unemployment cannot be determined by suggesting that inflationary expectations are single valued. As a result, the general form of NAIRU equation is equal to⁹¹:

$$(1) \pi_t = b_1\pi_{t-1} + b_2(U - NAIRU) + \varepsilon_t$$

where π_t , π_{t-1} : inflation and lagged inflation or an average of past inflation rates

⁹¹ See Eisner (1996).

U : unemployment

ε_t : error term that includes other factors that might affect the inflation rate

b_2 : a parameter whose value is expected to be below zero ($b_2 < 0$)

b_1 : the coefficient for the value of lagged inflation rates that in new Keynesian literature is assumed to be equal to unity ($b_1 = 1$)

Moreover by assuming the equality $b_1 = 1$ (given that $b_2 < 0$) and ignoring all the other factors that possibly affect inflation, equation (1) can be rewritten as:

$$(2) \Delta\pi = b_2(U - NAIRU)$$

According to equation (2), economies are characterised by constant inflation rate ($\Delta\pi = 0$) when there is an equality between levels of actual unemployment and NAIRU ($(U - NAIRU) = 0$); whereas by considering the inverse relation between inflation and unemployment, high unemployment rates are assumed to be consistent with inflation reduction and vice versa⁹².

⁹² An alternative widely used form of the augmented Phillips curve equation is:

$$\pi_t = \pi_t^e + \beta(L)(u_t - \bar{u}_t) + \delta z_t + \varepsilon_t$$

where π_t : inflation rate from $t-1$ to t

π_t^e : inflation rate expected at $t-1$

u_t : unemployment rate at time t

\bar{u}_t : natural rate of unemployment at time t , which can either be constant or shift with structural changes in the economy

z_t : a vector of variables such as supply shocks, which have zero ex ante expectations

ε_t : an unspecified disturbance term

However in empirical grounds NAIRU estimations lie on the assumption that expected inflation is measured as a distributed lag on past inflation and other variables, while inflation is integrated of order one so as the difference between actual and expected inflation to be stationary. Under these conditions, the general form of Phillips curve equation is written as: $\Delta\pi_t = \beta(L)(u_t - \bar{u}_t) + \gamma(L)\Delta\pi_{t-1} + \delta z_t + \varepsilon_t$

where $\Delta\pi_t$: the differences between inflation rates of current and past period

\bar{u}_t : NAIRU and since it is being used as the guidepost of monetary policies, its determination should be relative to the gap between actual unemployment and NAIRU levels.

Equations (1) and (2) make clear that the NAIRU mechanism relies on the following assumptions: (a) both current and past inflation at equilibrium generate equality between future and actual inflation; and (b) the presence of a particular non-accelerating inflation rate of unemployment at any time generates equilibrium (see Eisner, 2003). In other words, the consistency between non-accelerating unemployment with unchanged inflation is ensured by the presence of a unity coefficient of the variable of lagged inflation and the behaviour of any inflation level as somehow self-perpetuating (Jekinson, 1987; Eisner, 1995, 1996)⁹³. Furthermore, it is argued that the treatment of inflation as self-perpetuating is responsible for the automatic adjustment of expected inflation towards some weighted average level of past inflation at the presence of rational expectations that allow it to fluctuate (Eisner, 1995, 1996).

In these conditions, the use of NAIRU as a policy guidepost suggests a specific level of long run equilibrium at which economy rests in order for disinflationary pressures to arise when actual unemployment is above NAIRU or alternatively below potential output. In case of the other side inequality, fiscal and monetary policies are employed against employment so as inflation to be restrained. Further the fact that the simplified mechanism of NAIRU represents only the supply side of economy sets ‘unemployment cure’ either by preventing economy from operating into perfect competitive conditions or by pressuring downward the level of real wages. These attempts are reflected on policies that are related with labour institutions and laws as well as policies such as softening minimum wages, taxes on labour and general restrictions, discrimination or other impediments on hiring, limitations of

⁹³In cases where the augmented expectational Phillips curve includes terms of lagged unemployment, the coefficient of lagged inflation term is required to be significantly negative (Jekinson, 1987).

unemployment benefits by upgrading education and training of workers or even by offering subsidies to new hiring. The common characteristic of these policies is their ability to push economies towards the predetermined NAIRU level that is assumed to reflect full employment and capacity levels. In any case, the main intention of monetary authorities is the achievement of a non-accelerating inflation rate of unemployment. Post Keynesians claim that these policies can only affect the economic activity and employment temporarily⁹⁴.

The rejection of the assumption about the unity coefficient of lagged inflation implies the rejection of the hypothesised long run verticality of Phillips curve and therefore NAIRU. In Post Keynesian tradition there are many arguments that dispute whether Phillips curve verticality stands or not, especially if we take into consideration the demand side of the economy. There are many empirical studies that reject this unity coefficient. For instance, Smithin (2002) hardly ensures the verticality of long run Phillips curve even by employing data of productive capacity, also Atesoglu and Smithin (2006) raise questions even about the short run trade off between GDP growth and inflation. Moreover Eisner (1995, 1996) and Palacio-Vera (2005) claim the presence of a horizontal long run Phillips curve that stems from the fact that policy suggestions are made without considering the responses of economy to potential or nominal output or capacity utilization levels. Kriesler and Lavoie (2005) suggest an upward long run Phillips curve, when capacity is employed instead of unemployment data. In this case, it is argued that the short run expectational augmented Phillips curve is flat for a certain range, while given the absence of any

⁹⁴The fact that Friedman (1968) provided no information about whether the natural unemployment rate and thereby its later transformation to NAIRU refers to a sequence of short run periods or to a unique long run period, raises questions about the length of these periods. However as long as rational agents are assumed to make their decisions according to these suggestions, it seems reasonable to limit the duration of short run period at the minimum possible length (Eisner, 1995, 1996).

change in actual inflation over that range, inflationary expectations remain unchanged and the inflation target plays a key role.

There are also questions about the ad hoc assumptions of linearity (long run) and convexity (short run) degree that characterise the relation between inflation and unemployment (Sawyer, 1987; Eisner, 1995). It is argued that such linearity can be achieved by including observations about unemployment that are set above their natural rates, so as inflation to be reduced; the presence of high unemployment levels causes additional competition for limited markets and vice versa (Sawyer, 1987; Eisner, 1995).

Furthermore, Eisner (2003) distinguishes between low and high level of unemployment and shows that core inflation is usually higher when unemployment is above NAIRU and lower when it is below it. As a result, unemployment increases above NAIRU coincide with rapid inflation reductions, whereas unemployment reductions are followed by slow and relatively low inflation acceleration. Such asymmetry is also enhanced by the fact that NAIRU implications are related with the behaviour of actual unemployment and not with the actual behaviour of other variables when unemployment lies at relatively low levels (Sawyer, 1987).

However, despite being highly realistic, the suggestion of non-linearity between inflation and unemployment would raise the degree of difficulty in estimating NAIRU. The rejection of linearity also turns to be compatible with a concave trade off that is common in monopolistic competitive markets into which producers can freely adjust their prices (Eisner, 1995). In these conditions, the achievement of expected

results becomes hard since the concave Phillips curve would become flatter when unemployment was below NAIRU and steeper otherwise (Tobin, 1995). Contrary to failure in reaching the 'desired' results, the introduction of these conditions provide the opportunity to monetary authorities to adjust their reaction with respect to the character and the form of each shock and even more to counteract emerging inflation pressures before their expansion. In these conditions, economic stabilisation would arise without harmful side effects.

But the inability or even more the ignorance of policymakers in capturing actual non-linearities of economies because of the used form of Phillips curve in capturing actual conditions raises the degree of bias estimations and incorrect policy suggestions (Fair, 1997, 1999)⁹⁵. Generally the quantitative and qualitative difference between linear and non-linear as well as convex and concave conditions is determined with respect to the estimated parameters of Phillips curves and therefore the measures of excess demand and inflation expectations, their impact on unemployment gap as well as on the employed estimation methodology. In any case, attention should be paid on the consequences that derive from the combination of these factors in making forward assessments of NAIRU implications about inflation development. Additionally, the impact of structural changes in NAIRU as well as the possibility for improving the quality of NAIRU estimates and thereby in policy suggestions should also be considered (Jekinson, 1987; Sawyer, 1987; Arestis and Sawyer, 2007). On the other hand, the treatment of non-linear, non-vertical and convex Phillips curve should not be treated as a taboo, since the adopted assumptions are not an inviolable law, especially in new Keynesian grounds where macro models explain the relation

⁹⁵In practice there is little observation about low unemployment rates among the functional forms, although for a variety of these forms linearity is adopted and leads implications to non-representative for real economies (Fair, 1997, 1999).

between inflation and unemployment in a number of alternative ways (Tobin, 1999; Smithin, 2002).

Another fundamental assumption of the NAIRU framework concerns the neutrality of money and productivity in the long run. Money neutrality holds when price or wage changes equal to their expected levels⁹⁶. On the other hand, productivity neutrality is ensured through the parallelism between money wage shifts and changes in prices plus productivity; its presence in order for inflation deceleration or acceleration to be prevented and constancy of income distribution between wage (workers) and profit (capitalists) shares to be achieved, is required (Arestis and Sawyer, 2003; Sawyer, 1998, 2001, 2002, 2004).

Contrary to these theoretical suggestions, in practice economies are characterised by inconsistency between production and wage evolution. Besides, according to Keynes neutrality conditions characterise only non-monetary economies wherein the absence of uncertainty allows policymakers to correct price forecasting and expectations to be satisfied so that perfect substitution to stand. Furthermore, Keynes notes that the presence of neutrality in entrepreneur or monetary economies seems to be rather unacceptable; this is the reason why these economies are characterised by high degree of uncertainty and the absence of any signal about the future (Davidson, 1998).

In addition, as Sawyer (1998, 2001, 2002) has noticed, the absence of any reference to income distribution in the new Keynesian literature serves the desirable ways to face

⁹⁶Despite the necessity of neutrality conditions in order for NAIRU magnitude to stand, there is no mechanism in Phillips curve equation for correcting automatically any possible expectation error and thereby ensuring neutrality (Jekinson, 1987; Sawyer, 1987; Arestis and Sawyer, 2007). It is then possible for NAIRU estimations to be characterised by expectational errors that are corrected only after their consequences become evident on economic activity.

unemployment. More specifically the consequence of income stability on aggregate national income, is the reason why the level of profit shares is usually higher relative that of wage shares. Moreover given the constancy of income distribution, NAIRU estimations are made by assuming the consistency of their behaviour with that of actual unemployment. As a result, unemployment can be attributed to labour market imperfections or to unemployment benefits that are determined by the bargaining strength of at least one part of the conflict over income distribution or even more by the manner in which the conflict over income distribution is resolved (Sawyer, 1997a). In other words, the assumption about a fairly stable income distribution implies that NAIRU level itself should not be considered just as a portrayed level (Setterfield et al., 1992).

In line with Post Keynesian arguments, the key reason for low explanatory power of NAIRU is set by the assumptions made about the dependence of the short run output level on the variable level of labour, considering the capital stock as given; conditions that change in the long run where equilibrium is achieved by considering the variation of both capital stock and labour as well as their adjustment to economic conditions⁹⁷.

Further the preference in mainstream literature (i.e. Layard et al., 1991) of a Cobb-Douglas production function and the insurance of productivity neutrality so as efficiency wage to remain unchanged, implicitly claims the absence of any relation between employment and capital stock (Arestis et al., 2007; Arestis and Mariscal, 1997, 1998). However, equilibrium unemployment and economic activity are directly affected by the capital stock through the impact of aggregate demand on the

⁹⁷ As a result NAIRU models are known as short run models.

behaviour of wage and price setting. The effect has persuaded new Keynesian economists (e.g. Blanchard, 1990) to consider the creation of unemployment because of inadequate capital as a short run phenomenon.

However an 'active' role of capital stock in the production process requires appropriate shifts in the capital-output ratio, as long as its upward shifts affect long run equilibrium; a higher level of capital stock, relative to levels of output or labour, is converted into higher labour productivity that in turn mitigates inflationary pressures. In this process, changes in capital-output ratio⁹⁸ distinguish productivity from wage growth rates⁹⁹ so that neutrality assumptions to be cancelled, whereas employment is accelerated without the creation of harmful inflationary pressures as in new Keynesian grounds (Sawyer, 1998, 2002; Rowthorn, 1999; Atesoglu and Smithin, 2006; Palacio Vera et al., 2006). It can thereby be said that the appropriate use of capital stock on equilibrium unemployment levels is consistent with economic expansion and unemployment reductions without causing harmful inflationary pressures.

Rowthorn (1999) and Sawyer (1998, 2001) have also disputed the unity elasticity of substitution between capital and labour. The adoption of this assumption implies that only long run economic activity is affected by changes in the capital-output ratio, without moving labour market rigidities and imperfections from the center of the analysis, although they explain unemployment only partly (Layard et al., 1991; Nickell, 1997, 1998; Siebert, 1997). Besides, it is recognised that the unity elasticity

⁹⁸According to Palacio-Vera et al. (2006), changes in capital-labour ratio derive either from changes in technology or price of labour as well as the rental price of capital levels, or even from changes in the path of investment in physical capital for other reasons.

⁹⁹In mainstream grounds, with respect to neutrality conditions, productivity changes are reflected on real wages that ensure the absence of any inflation change (Blanchard and Katz, 1997).

of substitution is driven by the ignorance about labour unions' ability to adjust their behaviour during the bargaining process with respect to their force, the level of participation on labour supply, as well as their intention to ensure that additional workers will be absorbed in employment level without changing the level of unemployment rate (Rowthorn, 1999; Sawyer, 1998)¹⁰⁰.

As a result, demand side (capital and labour demand) and variations of aggregate labour supply or technical progress variations have no power in affecting the determination of equilibrium unemployment levels and profit shares; conditions that stand when elasticity of substitution is below unity (Rowthorn, 1999)¹⁰¹. A below unity elasticity of substitution provides space for capital investment to create additional employment and thereby accelerating the growth levels of labour supply and/or technical progress, even when benefits are indexed to wages. Alternatively, a below unity elasticity of substitution would imply upward profit pressures and faster capital accumulation relative to unemployment reductions in cases where actual unemployment was above the predetermined NAIRU¹⁰². In the opposite case, profit levels would be reduced, whereas capital accumulation shifts would be reflected on higher unemployment and therefore on the adoption of more labour-intensive techniques, than would have otherwise been used.

¹⁰⁰In mainstream economics these considerations simply reflect the insiders-outsiders model.

¹⁰¹According to Rowthorn (1999) there are 33 econometric studies, according to which in practice the elasticity of substitution between labour and capital can hardly be equal to or above unity.

¹⁰²It should be mentioned that in mainstream grounds, an elasticity of substitution below unity would arise either because of: (a) shifts in distribution of rents or (b) technological changes or even more (c) plausible mark up increases due to changes in the labour markets or to a possible decline in the labour hoarding or other policies that concern the labour market and which mainly characterise continental countries. Besides, the possibility of technological shifts reflects changes in the relation between prices and quantities due to the adoption of new technology that affects workers' skills and knowledge unequally. Furthermore mark-up increases derive from excess capacity in economy while workers are employed up to the point where the product of the last worker was below his or her wage. However, the weakening of the labour unions power, would allow firms to reduce their excess employment, the level of their wage and thus increase their marginal product relative to the wage. This simply causes a mark-up increase (Blanchard, 1997).

It can thereby be argued that the introduction of these Post Keynesian insights in the new Keynesian framework implies a positive interrelation between capital stock and economic activity in the sense that employment and output levels would be prevailed through the appropriate adjustment of capital stock without harming inflation levels. Considering the positive relation between employment and capital stock, it seems reasonable for policymakers to take into account the behaviour of trade unions and the stimulating role of capital investment whose positive effect on economic activity creates new jobs. However, such an inverse relation between capital stock and unemployment stands only when capital investment concerns both physical and human capital (Rowthorn, 1995, 1999; Sawyer, 2001).

Post Keynesians' criticisms against the supply side NAIRU is enriched by questioning the ex ante equality between NAIRU and the full employment and capacity utilization levels at any point (Sawyer, 2001, 2002; Setterfield, 1996)¹⁰³. As a result of this equality, unemployment is allowed to be treated via supply side and labour market policies, although policymakers are restricted in comprehending the levels of actual unemployment and their specific characteristics. In other words, the possibility of facing unemployment via the adoption of expansionary demand policies without causing harmful consequences is put forward.

¹⁰³The definition of full employment depends on whether the supply or the demand side of the economy is being adopted. Thus, although both Friedman (1968) and Keynes (1936) recognised the possibility of a non-zero and frictional unemployment at the level of full employment, Keynes defines full employment within a 'classical' equilibrium framework that concerns the aggregate labour market and is the volume of employment at which the real wage level of marginal product equals the marginal disutility of work. Moreover, in Keynes's view the presence of unemployment at the equilibrium is defined as involuntary and is assumed to be raised in demand constrained regimes. On the other hand, Friedman (1968) sets the consistency of full employment with markets' continuous clearing into Walrasian grounds. Besides, Friedman contrary to Keynes does not imply the consistency between full employment and natural unemployment rate, although the adoption of NAIRU and the assumption about its uniqueness have different implications about full employment. This difference derives from the assumption about the symmetric relation between output and inflation (Tobin, 1972). It is obvious that whatever the level of actual unemployment, it can be regarded as the level of natural or full employment (Tobin, 1998).

Further the ad hoc equality between full capacity utilization and predetermined NAIRU levels declares the absence of any assumption about the compatibility between changes in capacity and constant inflation, so as unemployment to be reduced through appropriate demand shifts (Sawyer, 2002; Setterfield, 1996). Contrary to this, in real world economies any change in capacity utilization coincides with proportional changes in levels of capital stock, aggregate demand, unemployment and therefore NAIRU. Besides, in practice economies operate under excess productive capacity that results in persistently high unemployment levels, whereas investment in new productive capacity affects real wages and creates new jobs to a great extent (Arestis and Mariscal, 2000)¹⁰⁴. Moreover in the presence of excess capacity, firms are constrained in raising their prices while by considering unemployment as a discipline device workers are constrained in pushing their wages upward (Sawyer, 2002; Rowthorn, 1999).

As a result, additional productive capacity reduces inflationary conflict over income distribution by preventing firms from raising profit margins and thus reducing wage share (Rowthorn, 1995, 1999; Arestis and Sawyer, 2004a, 2004b, 2004c). Thus investment in new capital is compatible with the behaviour of wages and thereby with employment losses on the existing equipment that can offset the extra jobs created on new equipment (Rowthorn, 1999). In addition in cases where actual real wages were below their equilibrium levels, employment would be constrained by labour supply and economy would reach its full employment levels, unless labour suppliers found

¹⁰⁴In the case where economies are characterised by low capacity that depresses investment and increases capital stocks, firms are allowed to push upward their profit margins which are transmitted into inflation reductions and provide the adequate conditions in order the behaviour of NAIRU to be consistent with actual unemployment rate. As a consequence, there is a demand reduction that is assumed to have only short run effects. However, as a response to conditions of capacity utilization reductions and capital scrapping actual unemployment and NAIRU levels are increased (Arestis and Mariscal, 2000).

themselves on their curve. But it is exactly the conjunction of these assumptions that leads to the treatment of NAIRU as an aggregate macroeconomic phenomenon that concentrates on constant inflation and pays little attention to the differences across regions (Sawyer, 2004).

Particularly the incorrectness of ex ante equality between the NAIRU and full employment and capacity is explained by the assumption that real balance effect does not permit the restoration of full employment through higher levels of aggregate demand (Sawyer, 2001)¹⁰⁵. Thus the positive impact on the real value of money stock from the adoption of a lower price level, which is reflected on individuals' decisions, is assumed to be responsible for stimulating demand at relative high levels. However the 'static' effects of a lower price that is determined by moving from a specific price level to another do not require a price reduction; these effects differ from those which arise by simply considering a lower price level (Arestis and Sawyer, 2007). Although the effects of price reductions on inflationary expectations allow for higher demand through the real balance effect on the value of "outside" money (money that has been created outside the private economy), they do also influence the degree of investment confidence and the general stability of the system¹⁰⁶. Indeed, the role of aggregate demand on economic activity is determined by the effects of economic policies on it¹⁰⁷.

¹⁰⁵This is explained by the time required in order to come up. But current literature assumes the dependency of Phillips curve on the adjustment process that usually relies on the real balance effects since demand depends on the real value of money stock; as inflation stands the real value of money stock changes until the level of demand is compatible with the supply side equilibrium. However, the intermediate instrument that is being used as well as whether money is assumed to be endogenous or not, has an essential role in the determination of the whole process (Arestis and Sawyer, 2007).

¹⁰⁶According to Sawyer (2002) the way that the variables of aggregate demand are measured depends on the determination of money as exogenous or endogenous.

¹⁰⁷The behaviour of real balance effects is explained via Say's Law.

It should also be mentioned that even under this equality, economic activity will not be harmed as long as changes in actual unemployment and therefore in the NAIRU are related with changes in real wages (Sawyer, 2002). According to Arestis and Sawyer (2004b), the difficulty with the adjustment process of real wages arises either from the position of unemployment relative to the available level of capacity utilization in economies or from the influence on economic activity from shifts in prices or nominal wage levels. Thus, in cases where unemployment is low and capacity utilization level high, it is possible for both wages and prices to be adjusted without any guarantee about the speed or the actual level of their adjustment. An alternative way for this adjustment is through governmental policies that usually concern the adjustment of nominal interest rates as a respond to inflationary pressure so as inflation to be controlled and aggregate demand to be pushed towards the NAIRU level (Arestis and Sawyer, 2007).

However the rejection of ad hoc equality between full employment and capacity utilization levels with NAIRU raises the necessity to determine new conditions of income spending, in order for NAIRU level itself to be used as more than just a reference point (Sawyer, 1998; Arestis and Sawyer, 2004b). Further, the introduction of income distribution within NAIRU framework implies possible inflation, real wages and profit reductions simultaneously with interest rate increases that would in turn lead to economic activity and employment expansions (Atesoglu and Smithin, 2006). In addition, the appropriate treatment of capacity utilization level into a demand regime can smooth inflationary pressures via investment stimulation and thereby push employment and economic activity at relatively high levels.

Thus the introduction of aggregate demand and capacity utilization within the NAIRU framework is compatible with the fact that each level of capacity utilization does not respond to the predetermined NAIRU level but to levels that are determined during the process. Hence, the variance of NAIRU over time and across regions is proved (Sawyer, 1997a, 2001, 2002). In other words, each level of capacity utilization corresponds to specific levels of aggregate demand, output and employment (Arestis and Sawyer, 2004a). Additionally, the level of productive capacity that is being used by each firm is relevant to the decisions about the levels of capacity utilization and employment that each firm is willing to use, since these are not exogenously given (Arestis and Mariscal, 2000; Sawyer, 2001, 2002). However the concentration on capacity utilization as a demand measurement for unemployment represents only the short run abilities of an economy, since its shift is related with non-inflationary pressures. Besides over medium and long run term, the determination of the sustainable pace of non-inflationary output and employment growth is assumed. Moreover, capacity utilization performs well unless actual unemployment is determined by the level of labour demand; something that is rarely presented in new Keynesian economics as has been pointed out by Sawyer (1987).

In no case, can it be claimed that the problem of unemployment is easily solved, as long as effective demand policies fill in the lack of capacity utilization assumptions. However the degree of these effects implicitly depends on the degree of capital-output increases and the level at which additional capacity determines the degree at which the NAIRU corresponds to full employment (Sawyer, 2002). It is then widely argued

that when economies are characterised by excess and not full capacity conditions for economic expansion are created without causing harmful inflationary pressures¹⁰⁸.

3.3. NAIRU and Disinflation: A Post Keynesian Appraisal

The NAIRU has been the basis for policymakers and New Keynesian macroeconomists to suggest disinflationary policies as the most appropriate management to expand economic activity. More specifically, inflation-targeting has been proposed as the necessary monetary policy regime to tame inflation and inflationary expectations and to keep economies at the natural rate of unemployment. Discipline, accountability, transparency, credibility, flexibility and legitimacy are the most often proposed advantages of this monetary strategy. Further, inflation targeting is thought to be able to solve the problem of time inconsistency and the ability for inflation variability until output stabilisation is reached (see Bernanke and Mishkin, 1997; Debelle, 1997). However the most important advantage of inflation targeting is the achievement of low inflation and thereby high growth levels even during the expansionary phase of the economic cycle (Debelle, 1997)¹⁰⁹.

From a Post Keynesian standpoint, there are certain doubts about the inflation targeting regime, especially about the use of the short term interest rate as the most

¹⁰⁸In this case inflationary pressures arise when capacity utilization is close to its full levels, whereas the trade off between inflation and unemployment stands when economy is characterised by very low or very high levels of capacity utilization (Kriesler and Lavoie, 2005). Besides the suggestion about the relation of the behaviour of inflationary pressures with that of capacity utilization and the way that wages are being determined, proves that in practice their treatment is much more complicated than this implied by the adoption of NAIRU framework (Sawyer, 2002, 2004).

¹⁰⁹In these conditions it is possible for policymakers' targets to concern both low inflation and high stabilized output levels, despite the constraints that can be raised from the downward rigidities of either wages or prices and thereby further price adjustment (Debelle, 1997).

appropriate (intermediate) instrument to tame inflation (Arestis, 2005)¹¹⁰. First of all, the fact that decisions about inflation are made with respect to nominal interest rates implies that monetary authorities use ex ante real interest rates and adjust their nominal levels accordingly so as economies to be protected against recessions (Arestis, 2005; Palacio-Vera, 2005). However, higher real interest rates create a deflationary bias in monetary policy.

Furthermore, Post Keynesians consider the fact that NAIRU is treated as a strong indicator and thereby as an additional flaw of the inflation targeting regime. As a result, actual unemployment is being pushed towards the predetermined NAIRU level (Galbraith, 1997; Sawyer, 2001, 2002)¹¹¹. This incorrect treatment of NAIRU is explained by the suggestion that both NAIRU and actual unemployment shift contemporaneously and their effects come up instantaneously (Galbraith, 1997; Sawyer, 2001). However, the implied NAIRU disinflationary policies only partly explain unemployment, so that the treatment of NAIRU to be more preferable as a weak rather than as a strong attractor¹¹². But whether NAIRU is considered as a strong or weak attractor depends on the way that unemployment is being defined as

¹¹⁰According to Mitchell and Bill (2004), the preference of interest rate policies into inflation targeting regimes is explained by the fact that inflation is treated as a nominal anchor so as the deviation between actual and targeted inflation to determine the adjustment of interest rates

¹¹¹According to Sawyer (2002) there are two adjustment mechanisms that are raised and concern changes in wage (the difference between the adjustment of money wage and the adjustment of price level) and aggregate demand that concerns the private sector and comes up through the real balance effect, given the inverse relation between shifts in price and aggregate demand. The alternative adjustment way is through governmental policies, which in our days concern the adjustment of nominal interest rate as a response to inflationary pressure so as inflation to be controlled.

¹¹²According to Fortin (1996) there are four reasons why the natural unemployment rate moves towards its actual level. These concern either the existence of prolonged recessions that decelerate capital and in turn increase the level of marginal costs, or the existence of a possible reduction in the demand for labour that raises unemployment, unless people accept a wage cut. Another reason for which the natural unemployment rate is possible to follow the behaviour of its actual level is the presence of insiders that decide the level of unemployed independently, whereas the actual unemployment level and hence its natural level can be increased as a result of a generous benefit insurance system.

well as the speed adjustment of unemployment towards its natural unemployment rate and the characteristics of each labour market (Sawyer, 2001).

The adoption of disinflationary policies and thereby of non-accelerating unemployment levels, suggests implicitly that economies will suffer from high unemployment levels, unless people are prepared to accept an accelerating inflation during the short run and taste its stimulating effects (Sawyer, 1998). As a result, it is more preferable for economies to be recession-free rather than strictly disinflationary. But it is the aggressiveness of each policy target and the ways adopted in order to be achieved that determine the effects on economic process (Osberg, 1996a). Besides the effectiveness of NAIRU concept, though its inability to reduce and sustain actual unemployment below it, raises questions about the desirability of policymakers and government to set unemployment as their main priority because of the implied costs in terms of inflation (Sawyer, 1998).

In any case the effects of disinflationary policies are determined with respect to the specific characteristics of the adopted framework and actual economic conditions. Moreover the general view that all these harmful effects stem from the passive role of demand management and income distribution policies raises questions about the factors that are finally considered in determining economic policies.

Obviously, the introduction of demand side factors in NAIRU can affect the general economic activity positively if not dampening the negativities stemming from inflation targeting regimes. Besides, within the NAIRU framework the coexistence of price stabilisation and full employment in terms of disinflationary policies is reflected

on tight fiscal policies and thereby reductions in equilibrium output level (Mitchell and Bill, 2004). Therefore, it is time to understand that sustainable economic growth with low inflation requires a mix of fiscal, monetary and income policies¹¹³. Although, such changes do not guarantee the introduction of an unproblematic basis for making policy decisions, it certainly provides more realistic suggestions unless the changed framework is well defined (Sawyer, 1998; Galbraith, 1997). Generally, the key characteristic from the introduction of aggregate demand into supply side NAIRU framework is the attempt to push economies away from the process of continuous recessions.

3.4. Empirical Evidence

Contrary to the general belief that changes in labour market institutions and legislations affect the level of unemployment essentially, in practice there is no unique view about their property. Besides, the final results and the degree of the robustness of these estimations are directly determined by the adopted variables, period and country sample as well as the method that the labour market institutions, regulations and policies or even the degree of labour market flexibility are being measured (i.e. Baker et al., 2004). In general, their outcome suggests the absence of any relationship between labour market deregulation and NAIRU shifts; results that are confirmed by the expansion of unemployment during 1970s and 1980s and its continuation until nowadays which is not only associated with changes in the degree of labour market inflexibility and institutional changes.

¹¹³The fact that economies are characterised by the coexistence of classical and Keynesian assumptions, raise the necessity for adopting a mixed of wage and generally strictly monetary, labour market and demand policies in order unemployment to be controlled (Coen et al., 1987).

Bearing in mind the post Keynesian criticism about supply side NAIRU, it is argued that the introduction of aggregate demand can essentially affect economic activity. But the preconditions for a positive relation between aggregate demand and unemployment suggest that economy operates at levels below full employment and that there is room for capital investment to affect economic activity. Additionally, there is no presumption that the rise of capital stock at a specific level pushes economy at full capacity and employment levels, since the behaviour of investment is endogenously determined by the conditions of each economy. Hence according to Dixon:

“...the increase in the real interest rate and the decline in the investment ratio are partly to blame for the high unemployment rate in the OECD countries” (1998, p. 781).

Besides recent new Keynesian literature is apparently characterised by the tendency to recognise the significance of capital stock and demand side in explaining unemployment. For example in a number of empirical studies, such as for example Bean (1989, 1994a, 1994b), Phelps (1995), Gordon (1998), Dreze and Bean (1990) there is significant evidence that explains unemployment through low levels of investment and capital shortages, while suggesting a positive relation between profit rate at full capacity utilization and investment as well as investment and the rate of capacity utilization. Moreover, Dreze and Bean (1990) attribute the persistent unemployment in European countries during 1970s to the dependence of non-declining employment on sustained output growth, which is set in the wage formation process. In their view, such dependence becomes more significant in small economies

because of the requirement for exchange rate adjustments and world's demand competitiveness. But even in this case, the adoption of demand side policies so as distributional equity to take place more efficiently seems to be convincing. Thus, Dreze and Bean claim that:

“the incorporation of measured productivity gains into real wages...wages of productivity gains following from capital deepening is entirely desirable when an economy is at full employment, but the resulting substitution of capital for labour becomes wasteful in the presence of unemployment” (1990, p. 61).

Considering the importance of hysteresis in explaining unemployment in mainstream demand side grounds, its presence is attributed to low demand levels. Hence the phenomenon of hysteresis is possible to raise an inverse relation between work and aggregate demand expansions and cause long run unemployment decreases (Ball, et al., 1999). Besides, the fact that the adjustment of aggregate demand is relatively slow with respect to monetary policies raises the possibility of having long lasting effects on unemployment levels that are reflected on unemployment benefits. Contrary to Keynesian grounds, hysteresis is perceived by distinguishing between short and long run unemployment under the assumption that the latter can pressure neither wages nor inflation (Ball et al., 1999).

Moreover Nickell (1998) explains the persistent high unemployment by considering the relation between unemployment and aggregate demand and wage levels separately. Further, in his view the presence of long run relation between unemployment and wages and its consequences on economic activity are attributed on

the elasticity of unemployment as well as whether fiscal or monetary policies and shocks have permanent influence on economic activity; whereas he considered the effects of inflation on unemployment. On the other hand, Gordon (1998) recognises that the results of disinflationary policies depend not only on wage and price changes but also on the actual capacity utilization levels the appropriate treatment of which can reduce unemployment without harming economic activity.

According to Lindberk and Snower (1998) however, the effect of demand policies on determining employment levels depends on the adopted form of transmission mechanisms. Besides in their view there are three possible transmission effects: the governmental investment policies that affect the marginal product of labour and in turn employment level, the entrance of new firms into economy that raise the employment level and finally the case of rising the marginal product of capital by increasing the rate of capital utilization. In the latter case, the levels of capital utilization that characterise each firm determines the level at which can operate with increasing capital level. The common outcome in all these transmission mechanisms is the increase in the employment level.

In particular the argument in all of these new Keynesian studies declares that unemployment levels can be faced not only through the adoption of labour market policies but also through the appropriate treatment of demand side policies. This simply implies the adoption of passive or even strict policies that focus on a target without taking into account its effects. As a result of these, unemployment persistence is almost certain to lead to persistent unemployment and thus NAIRU increases whose

stabilisation becomes impossible through the adoption of pure labour market's policies (Ball et al., 1999).

Additionally, Karanassou and Snower (2004) with respect to their criticism about the '*unemployment invariance hypothesis*' that suggests the independence of long run unemployment on the size of capital stock, productivity and labour force, conclude that the growth path of capital stock, at least in the case of the UK, affects the long run unemployment rate essentially whereas unemployment trend is not explained exclusively by labour market policies. Further, Fitoussi et al. (2000) provide supportive evidence for a number of OECD countries about the role of the cost of capital and stock market valuations in explaining the persistently high unemployment levels. According to their empirical results, long run unemployment rate can be affected by trendless transformations of the capital stock, a conclusion that is supported in a number of post Keynesian studies.

Moreover, by employing time series for Germany, Japan and the UK Malley and Moutos (2001) suggest that in an international manner the behaviour of unemployment in a specific economy is essentially affected by the evolution not only of its own capital stock but also by the evolution of capital stock across economies. More precisely:

“an increase in the domestic capital stock relative to the foreign capital stock allows domestic firms to compete more effectively and to capture market share at the expense of foreign firms. Equivalently increases in the domestic and foreign capital stock essentially move both countries but the unemployment rate in the very long term is

unaffected. However, if the domestic country accumulates capital at a slower pace than the foreign country, it will suffer ceteris-paribus- higher unemployment rates than the foreign country for prolonged periods of time. This may eventually induce downward shift of the short –to- medium-term upwards sloping wage setting schedule, thereby preventing a continuous upward movement of the unemployment rate” (Malley and Moutos, 2001, p. 24).

But the significance of aggregate demand on economic activity and more specifically on employment is proved even by employing game theory. Thus by using a dynamic monopolistic union model and focusing on wage determination, Miaouli (2001) supports the significance of the relation between unemployment and capital stock. More precisely by adopting a discrete time analysis and a Stackelberg's leader game in the case of France, Greece, Italy, Portugal and Spain during the period 1954-1995 as samples, she concludes that unemployment persistence is related with sluggishness in the adjustment of capital stock, despite the positive relationship between capital stock and employment. On the other hand, Miaouli (2001) concludes that governmental consumption cancels out private employment investment and that accumulated investment and employment can be positively affected only by private investment.

There is much empirical evidence on purely demand side where the positive and direct relation between demand level as reflected on capacity utilization and capital stock on employment levels, is widely recognised. Usually these studies concern European and OECD countries, wherein the persistent unemployment problem seems to be stiff even with changes in labour market institutions. Further it is argued that capital stock shifts and their responses to prolonged shocks, as for example the oil

price shocks in 1970s and 1980s, are those that raised the necessity for additional investment so as unemployment to be reduced through the creation of new jobs (Rowthorn, 1995; Arestis and Mariscal, 1997, 1998, 2000).

Given these suggestions having used data for 10 OECD countries during the period 1960-1992, Rowthorn (1995) concludes that for most of these countries capital slowdown was accompanied with employment reductions and a substantial squeeze in levels of investment profitability and thereby investment decisions. More specifically these shocks induced inflationary pressures that led to unemployment rises as a response to capacity utilization decline and in turn to capital scrap. In other words, Rowthorn proves that:

“...the problem of unemployment is ultimately one of investment” (1995, p. 38).

Furthermore after examining the behaviour of unemployment in Canada, the USA, the UK, France and Germany, Sawyer (2004) implies that in the case of Canada the concentration on demand side policies and the appropriate treatment of capital stock and capacity utilization led to unemployment reductions without harmful inflationary pressures; a view that is opposed to the European tendency to focus on purely labour market practices. Moreover for a number of European (France, the UK, and Germany), USA and Canadian economies, Arestis and Sawyer (2003) signal the combination of high, relative to those of 1960s, unemployment increases during 1980s and 1990s with excess productive capacity. In their view these conditions are driven by capital shortages and the failure of economies to reach their full employment levels. As a result economies faced increasing inflation, while the growth

rate of capital stock and investment turned out to be the conditions for substantial reduction of unemployment levels.

In the same sense in a sequence of studies about the British economy and having considered socio-economic elements, Arestis and Mariscal (1997, 1998) conclude that investment matters on economic activity. Thus by using time series data VAR cointegrated method for the period 1966-1994, they concluded that British unemployment and thereby the NAIRU levels stem from capital shortages, whereas the conjunction of high interest rates with low investment profitability are regarded as the appropriate conditions for employment expansion. After an extension of the sample country with the introduction of data about German economy, Arestis and Mariscal (2000) suggest that despite the differences between the two economies in both of them employment and investment were affected by adverse demand shocks during 1980s and 1990s. It should however be mentioned that the empirical evidences of the relation between capacity utilization and profit margins and more generally between market power and the business fluctuations is mixed. The persistence of these shocks in conjunction with the capital shortages that were created led to relatively high unemployment levels. As a result of this Arestis and Mariscal declare that:

“Capacity is not fixed and investment depends on the expected profitability and the expected long run interest rate”, (1998, p. 191).

Additionally by using data about the US economy during the period 1964-2003 and employing the cointegrated VAR specification, Palacio Vera et al. (2006) provide

evidence about the relation between demand side and NAIRU determination. More precisely, they suggest that upward shifts in capital-ratio and capacity utilization on one hand and decreases in the real price of imports on the other are associated with significant decreases in the NAIRU level. However, the fact that changes in technical progress and thereby in long term unemployment affect NAIRU during the same period cannot be rejected. Contrary to the conventional view about the impact of real interest rates on NAIRU, Palacio-Vera et al. (2006) conclude that a policy of short run interest rates that intends to control inflation also reduces demand and supply levels and pushes economy to inflationary problems, without this implying the rejection of these forms of policies. It then seems more convincing that unemployment reductions result from demand expansions.

The role of aggregate demand and mainly of capital stock, capacity utilization and investment in explaining unemployment and more generally the persistently high NAIRU levels is also supported by Stockhammer (2004a). More specifically, he explains European unemployment in the cases of Germany, Italy, France, and the UK as well as the USA unemployment, via NAIRU and the Keynesian approach by using time series covering the period 1960-1995. He concludes that NAIRU specification explains unemployment through wage pushes, whereas the slowdown of capital accumulation turns out to be a significant determinant of employment growth for all the countries. As far as the simple NAIRU specification is concerned, his empirical tests do not address the potential effects of technical changes and changes in the aggregate capital-output ratio on the NAIRU theory, whereas he raises the possibility of the combination of the two approaches by observing that:

“...tax wedge having positive effects on unemployment as predicted. As to the Keynesian approach, the role of capital accumulation was confirmed, whereas capital accumulation is robust to the specification and can be pooled across countries, the tax wedge is not. In the Keynesian specification the tax wedge has the incorrect sign; however replacement ratios are significant with the predicted sign” (Stockhammer, 2004a, p. 21).

Furthermore Stockhammer and Onaran (2004) prove the significance of demand environment in determining unemployment levels by employing time series in order to use the structural vector autoregression (VAR) approach for the economies of UK (available data 1970-1997), USA (1966-1997) and France (1972-1997). Considering their results, Stockhammer and Onaran (2004) support the significance of demand led labour market and more precisely of capacity utilization and capital accumulation on employment levels. On the other hand, they imply the absence of any role of income distribution in determining outcome in goods market, possibly because of offsetting effects of profitability and demand. In particular it is proved that capital accumulation affects the level of capacity utilization significantly and both of them affect the unemployment level; contrary to neoclassical consideration the real wage affects unemployment insignificantly and the substitution of capital for labour in response to higher wage shares is not verified empirically.

The most interesting issue is that the above results that cancel out the usual labour market considerations are directly affirmed and prove the incorrectness of existing policies by considering a sample of European countries. More specifically, by employing ARDL (autoregressive distributed lag) approach and setting the

dependence of employment level on its own time lag, the growth rate of capital stock, Alexiou (2000) provides a strong positive relation between capital stock and employment about the UK, Germany and France for a period of 30 years (1966-1995). The common characteristic that these three economies share is that for all of them the long run elasticity of employment with respect to capital is positive with that of Germany resting above unity. Also it should be mentioned that the negative sign of coefficient of the included dummy variable in the case of the UK reflects the incorrectness of adopted neoliberal policies, whereas the insignificantly statistical coefficient of the dummy variable in the case of Germany proves that German unification had no impact on the relationship between employment and capital stock.

These conclusions are also affirmed by Alexiou (2001), Alexiou and Pitelis (2003) who by using data for the period 1961-1998, extend the country sample in thirteen and twelve economies of European Union (EU) respectively. In both of these studies the choice of period is significant because a number of changes took place in Europe that concerned the economic regime, the adoption of disinflation policies and decisions about a common union, whereas the common characteristic is the reduction in the growth rate of capital, except 1980s. Considering the empirical evidence from these studies by employing the econometric method of panel data, it is proved that both fiscal and monetary policies significantly affect the level of unemployment through increases in capital stock and investment as well as through the appropriate treatment of capacity utilization and shifts of income distribution in favour of wages. Given these conditions and with the inclusion of dummy variable for the presence of Maastricht Treaty, it turns out that the dominance of deflationary policies after the reunification of the Maastricht Treaty only exerts additional pressure on European

economies and does not solve the problem of unemployment. In particular it can be said that the appropriate use of capital stock as well as a combination of both demand and supply side policies and variables that reflect regimes and policies can capture the upward shifts of unemployment levels.

In accordance with the above studies, there are also the results provided by Alexiou and Argitis (2005) who recognise the essential role of monetary and fiscal policies in reducing the persistent unemployment in European Union of 15 (EU-15). More specifically by using data for the period 1961-2000, they deduce a negative impact of European Union's growth on unemployment as well as the adverse effects on unemployment of the emergence of European's new policy consensus. In other words, a potential factor behind the persistently high unemployment is the insufficient growth of capital stock, which urgently requires the stimulation of productive investment so as to help unemployment reductions.

Arestis et al. (2007) support the inverse relation between unemployment, capital accumulation and capacity utilization by employing a country sample of nine European Monetary Union (EMU) countries (Austria, Belgium, Finland, France, Germany, Italy, Ireland, the Netherlands and Spain) and using both time series and panel data estimation methods. The advantage from the use of the panel data method stems from the opportunity to conclude whether the euro area countries can be treated as a homogenous whole or not. More precisely they conclude with a positive relation between capacity scrapping and unemployment for all the countries and suggest that:

“...capital and labour are complementary inputs rather than substitutes and is consistent with earlier findings” (Arestis et al., 2007, p.144).

It should be mentioned that the common and fundamental factor of these results is the below unity elasticity of substitution. Thus, Arestis et al. (2007) estimations confirm the hypothesis about the relation between efficiency wages and unemployment for all the countries, whereas for each of them there is a significant positive association between capital stock and wages while a significant negative association between wages and unemployment. In particular evidence that explains unemployment through capacity utilization scrapping is provided.

In addition, after analyzing a sample of 16 OECD economies, Alexiou and Argitis (2003) suggest the presence of a statistically significant relation between unemployment and demand side and the belief that unemployment and general economic promotion in OECD countries can be reduced with demand side policies. These results are also affirmed by Sarantis (1993), who by using a sample of 10 OECD countries for the period 1960-1989, signifies that unemployment is significantly affected by using both fiscal and monetary policies.

As a result of the above analysis, it is obvious that capital stock shortages, inadequate capacity utilization and thereby low investment levels explain unemployment essentially. It should be mentioned that given the institutions of each economy, the generally positive relation between demand side factors and economic activity cannot be rejected, even though the adopted country, the time sample and the employed estimation method affect the degree of statistical significance of the outcomes. Such a

suggestion is opposed to mainstream empirical studies, the results of which are directly affected by measurement and estimation methods as well as different data about the used variables. There is therefore no doubt that the problem of persistently high unemployment levels can be solved via the appropriate combination of demand policies, which would identify demand with economic expansion; a thought that gains grounds even in new Keynesian context.

3.5. Conclusions

So far we have argued that Post Keynesian literature raises serious doubts about the appropriateness of NAIRU as a guidepost of macroeconomic policy. The exclusion of aggregate demand and capital stock from NAIRU framework constrains its capacity to deal with the problem of unemployment. Further, it does not appear to be the appropriate benchmark for implementing inflation targeting policies. The econometric evidence presented makes clear that aggregate demand and capital stock are among the factors that influence the path of unemployment. However, Post Keynesian literature links the importance of both factors in influencing unemployment with the role that monetary and financial forces have in contemporary economies. We turn to investigate the nature of these links in the following Chapter.

Chapter 4

Finance, Growth and Employment: A Post Keynesian-Kaleckian Analysis

4.1. Introduction

The wide use of NAIRU (Non Accelerating Inflation Rate of Unemployment), of new Keynesian and New Consensus models by economists and policy-practitioners has converted inflation targeting into the overriding objective of monetary policy. However, the concentration on NAIRU and inflation targeting regimes in the sense that sustained economic growth requires low inflation rates, sets unemployment as a simple indicator of future inflation, whereas the problem of persistently high unemployment levels across economies attracts less attention. Furthermore the combination of inflation targeting monetary policy and labour market policies is considered appropriate to set a friendly employment environment. What we experience is that economies usually face the opposite results and are pushed into a vicious circle wherein unemployment can be reduced only via its inverse relation with inflation or simply by using Phillips curve implications.

The inability and inappropriateness of NAIRU as a policy framework that can stabilise 'real' economies has been pointed out by Post Keynesian growth models that set out the essential role of aggregate demand in determining economic activity and

the course of employment¹¹⁴. During 1980s and 1990s Post Keynesians turned their attention to Keynes's program of '*monetary theory of production*'¹¹⁵ and developed models that usually assume - explicitly or implicitly- a credit economy where money is endogenously determined, and also examine the effects of changes in the interest rates on income distribution, aggregate demand and growth (see e.g. Amadeo, 1986a, 1986b, 1987; Dutt, 1984, 1987, 1989, 1992; Dutt and Amadeo, 1991; Hein, 1999, 2006b, 2007; Lavoie, 1992, 1995; Lavoie et al., 2004; Rowthorn, 1981; Taylor, 1985). These models were developed in the tradition of Kaldor (1956, 1957) and Robinson (1962) on the one hand, and Kalecki (1954) as well as Steindl (1952) on the other (Rowthorn, 1981)¹¹⁶. They suggest the endogeneity of capacity utilization and its determination during the accumulation process given the propensities to save out of profits and wages.

The importance of monetary factors, i.e. interest rates and debt-to-capital ratio, the increasing dependence of economic activity on them as well as the endogenously determined interrelations among these factors with the productive process, make clear the necessity for a new basis about the implied relations. In what follows we point out some of the fundamental features and assumptions of the Post Keynesian-Kaleckian tradition that constitute the framework into which we are going to develop our theoretical model in the following chapter. More specifically, Section 4.2 presents the main assumptions that characterise the relation between finance, investment and

¹¹⁴The term 'post Keynesians' is used as an inclusive definition in line with Lavoie's (1992) suggestions, which explicitly includes the Kaleckian thought. Particularly post Keynesians are viewed as the fundamentalists that are inspired by Keynes's original texts that are opposed to classical and generally mainstream implications (Cottrell, 1994).

¹¹⁵In Roger's (1989) view, the development of this theory allows to characterise Keynes as the founding father of monetary analysis (Hein, 2006b).

¹¹⁶An exception to this tradition was Pasinetti (1974), whose model implied a positive relation between normal rates of profits and interest rates, provided that the level of the latter is below than that of the former (Hein, 1999, 2006b, 2007).

growth into post Keynesian-Kaleckian grounds, while Section 4.2.1 sets the theoretical grounds of the relation between external finance and capital accumulation. Considering the presence of fiscal policy, mainly taxation, and its possible effects on the relation between monetary factors and economic activity, Section 4.3 attempts to introduce the key points of fiscal policy into post Keynesian-Kaleckian grounds, whereas Section 4.4 concludes and summarises the essence of the adopted framework.

4.2. Finance, Investment and Growth: A Post Keynesian-Kaleckian Framework

In the Post Keynesian-Kaleckian tradition aggregate demand is a major determinant of economic activity in the sense that Say's Law is valid in reverse, since shifts in aggregate demand affect the availability and productivity of factor inputs. Aggregate supply appears therefore to adjust appropriately to demand growth (Setterfield, 2003; Lavoie, 2003)¹¹⁷. The long run demand-led growth is seen as an ongoing process and not as a predetermined position towards which economy should be moved, without this meaning the neglect of supply side and its effects.

It is clear therefore that the major implication of the Post Keynesian-Kaleckian approach concerns the issue of establishing high levels of demand in order to ensure high employment that may, but not necessarily, develop full employment. Besides as Kalecki mentions:

¹¹⁷More specifically Keynes's rejection of Say's Law lies on the argument that income increases are followed by proportional growth of saving, while in the absence of such an automatic adjustment mechanism its increase is insufficient and cannot generate the appropriate level of demand that ensures full employment level (Wilkinson, 1997).

“...under a regime of permanent full employment, the ‘sack’ would cease to play its role as a disciplinary measure” (1943, p.3)

Moreover in Kalecki’s (1933) view demand shortages are regarded as being responsible for low employment and economic activity levels¹¹⁸. Kalecki (1933) continues to determine a demand explosion through the appropriate treatment of its components and specifically investment and consumer expenditures as well as governmental expenditures and taxation (when governmental intervention is allowed) (Sawyer, 2007a). However, for the achievement of full employment conditions, Kalecki (1943) notices in “*Political Aspects of Full Employment*” that attention should be paid to the social and political aspects of each economy. More specifically, Kalecki argues that full employment could be achieved only to the point where working class would erode work discipline and therefore destabilise the capitalist system. Furthermore, he (Kalecki, 1943) remarks that much of the resulting wage pressure would cause inflation and income distribution rather than immediate wage increases¹¹⁹; an argument that sets the direct dependence of income distribution on actual unemployment level¹²⁰. Given the suggestions for the development of a new income class that would reflect the increased power of working class he claims that:

“...If capitalism can adjust itself to full employment, a fundamental reform will have been incorporated in it” (Kalecki, 1943, p.5).

¹¹⁸It can be said that Kalecki (1933) prior to Keynes (1936) focuses on the lack of aggregate demand and its consequences on economic activity (see among others Sawyer, 2007a).

¹¹⁹Even in Keynes’s (1936) view there is a direct relation between income distribution and inflation, since he attributes income distribution to unanticipated inflation changes that are usually in favour of debtors. As a result of that, he (Keynes, 1936) recommends the adoption of alternative ways for income distribution, which in no way harm any income class, especially workers, and allow for investment, employment and generally economic activity expansion (Zannoni and McKenna, 2007).

¹²⁰These arguments are related with the significance of capital stock in leading economic activity to relatively high levels.

These suggestions raise some similarities between Marxian and Kaleckian theories of income distribution and these in turn with the reserve army and new Keynesian bargaining models. As a result of this Pollin notes that:

“Marx and Kalecki also share a common conclusion with the natural rate proponents, in that they would all agree that positive unemployment rates are the outgrowth of class struggle over distribution of income and political power” and continues by noticing that *“Of course, Friedman and the New Classicals reach this conclusion via analytic and political perspectives that are diametrically opposite to those of Marx and Kalecki. To put it in a nutshell, mass unemployment results in the Friedmanite/New Classical view when workers demand more than they deserve, while for Marx and Kalecki, capitalists use the weapon of unemployment to prevent workers from getting they just due”* (Pollin, 1998, p. 5)¹²¹.

Kalecki (1971) also notes that capitalist economies operate in an imperfect competitive environment, where capitalists’ (firms) decisions concern price, output and employment levels as defined by capacity and demand conditions. Particularly in Kaleckian grounds, prices are set by mark-up levels that are determined relative to the degree of monopoly power, as well as the relative strength of labour unions in goods market and demand elasticity¹²². More specifically, in a closed economy model the

¹²¹According to Pollin (1998) the core of these similarities is Kalecki’s adoption of Marxist unemployment theory, wherein unemployment is defined as a function of capitalism that raises the possibility of a rapidly growing capitalist’s economy to be followed by a reduction in labour reserve army as well as the use of workers’ increased bargaining power in raising wages. Thus, a corresponding squeeze of profits, although changes in capitalists’ animal spirits affect negatively investment spending and thereby economic activity, is possible.

¹²²Although mark-up and thereby prices are assumed to be constant up to full utilization capacity output, according to Arestis (2005) their levels can be changed through substitution effect of price changes, the market entry effects, the threat of administrative price controls and the strength of unions in their attempt to respond to price changes by increasing their nominal wages. Generally in a closed economy, a rising (falling) mark up implies a rising (falling) profit share and a contemporaneous

mark-up level is set so as capitalists to cover all the average direct (material and manual labour) costs they face and thereby to achieve their targeted profits and assure their relative degree of strength among income classes (e.g. Sen and Dutt, 1995; Blecker, 2002; Mott, 2002; Hein, 2006b, 2007)¹²³. Alternatively, the mark-up level can be approached as an indicator of firm's capacity level that is possible to enforce a certain claim on profits against labourers and competitors¹²⁴. In other words, Kalecki (1954) sets the mark-up level as the factor that determines income distribution or 'income pie' corresponding to the income classes of the economy.

It should be mentioned that Kalecki's (1943) pricing theory is being distinguished between cost and demand determined prices, although in the view of some economists, notably Robinson's (1977), this development is regarded as being contemporaneous with flex-price/fix-price, a distinction made by Hicks, Okun and others. Generally these two approaches are characterised by many differences. Evidently, the adoption of Kalecki's mark-up pricing theory affects income distribution implicitly when economy is characterised by imperfect competition and operates under excess capacity utilization, which allows capitalists to set their prices relative to their targets (Dutt, 1984).

increase (fall) of the relationship between unit material costs and unit labour costs.

¹²³ Moreover the determination of mark-up reflects the introduction of monetary factors into analysis relative to the liability position of each included income class (Winnet, 1992).

¹²⁴ As long as, mark-up is set so that firm eliminates its excess capacity, it is implied that firm's price and output levels fall on demand curve and are associated with zero excess demand. In these conditions, the effects of demand variations are represented by shifts in the expected price that cannot be distinguished from changes in firm's relative price. As a result, a positive relation between real wages and capacity utilization as well as between capital accumulation and profits is implied (e.g. Rowthorn, 1981; Dutt, 1984, 1987; Amadeo 1986a, 1986b; Bhaduri and Marglin, 1990). In addition, in purely Keynesian grounds, demand determined unemployment influences the level of wages and not the opposite.

All the above allow us to argue that the starting point of Kalecki's income distribution theory is the microeconomic theory of firm that is reflected on price theory (e.g. Asimakopoulos, 1975; Sawyer, 1992). As a consequence, the price level is set by considering the uncertainty with respect to both immediate and longer term consequences of capitalists' decisions as well as their future behaviour. Regardless of the form and the way that mark-up is set, its core suggests the pursuit of profits and a loose form of profit maximization as firms' objective. For that reason some economists such as Sawyer (1992), combine Kalecki's pricing approach with the neo-classical in the sense that it retains profit maximisation and affects profitability determination considerably; this thought is the basis of the neo-classical approach to industrial economics. Hence, contrary to classical suggestions about firms' theory, in post Keynesian grounds capitalists' (firms) target concerns both profit maximization and further growth of their firms, in addition to the expansion of their market share exerting power over workers or suppliers and so on. Generally, the significance of the adopted goals depends on the specific institutional settings of firm and more generally of economy (Stockhammer, 2007b).

Another fundamental feature of the post Keynesian-Kaleckian approach is money endogeneity, in the sense of Keynes's suggestion that '*money plays a part of its own and affects motivates and decisions*' during both the short and the long run. More precisely in Post Keynesian models money is assumed to be endogenously created within the private sectors through either bank loans or stock of money (see e.g. Arestis and Sawyer, 2003; Sawyer, 2002, 2007b; Hein, 2006b, 2007). Thus an expansion of stock of money and thereby of bank deposits takes place, so that their

levels to be met by the banking sector¹²⁵. This assumption attributes a significant role to money in economic activity, which affects not only monetary but also real magnitudes in both the short and the long run (e.g. Moore, 1989). Besides as long as ‘*money matters*’, we cannot distinguish between the real side of economy and implications of monetary theory (Cottrell, 1994); a suggestion that is opposed to orthodox NAIRU models where money is neutral and exogenously determined, while the equilibrium unemployment is reached through price adjustments.

Further, under the assumption of money endogeneity monetary authorities (Central Banks) set the interest rate at the level that provides base money (M0) to the banking system. In other words, monetary authorities can only control the stock of money indirectly in the sense that “*the accommodation of the private-sector demand for money, at an interest rate of the authorities’ choosing, is not a political choice but a structural necessity in a modern credit money-system*” (Cottrell, 1994, p. 597). Thus, changes in the level of money stock are implicitly determined by the private sector loan demand to which monetary authorities respond and commercial banks that accommodate and create the money deposits according to going conditions. This emphasises the dependence of endogenous money on its stock and thereby on income shares that in turn affect inflation directly. As a result, inflation itself loses its purely monetary character and becomes dependent on the level of money stock, whereas monetary policy turns out to be incapable of facing inflationary pressures (Arestis and Sawyer, 2003).

¹²⁵In post Keynesian grounds two are the approaches about the assumption of money endogeneity: the New Consensus School and the Keynesian endogenous approach. Both of them treat money as a residual (stock of money) that stems from its demand level, whilst the Keynesian approach additionally recognises an essential role for banks in creating and destructing money. Among the differences of these approaches, their common characteristic is the suggestion that monetary policy, considering the used instruments, is usually reflected on interest rate policies (Arestis and Sawyer, 2004a).

It is thereby implied that inflation in Post Keynesian monetary theory is conceptualised not as a monetary magnitude, in the sense of quantity theory of money, but as a real magnitude that is explicitly affected by the struggle for income shares. Further in the notion that changes in the growth rate of cost and in particular the wage inflation are associated with functional income distribution conflict, inflation is being treated as a purely cost push phenomenon. In these conditions the assumption about income distribution neutrality is not valid and inflation is explained through a '*conflict inflation theory*' (Rowthorn, 1977). Briefly the general suggestions of this approach attribute inflation to distributional conflict between wage (workers) and profit (employers/capitalists) incomes that can be overcome through income policies. Thus, the distinction between actual and targeted incomes determines the inflation level that can be approached via the inconsistency of aggregate income claims with aggregate available income. As a consequence, additional productive capacity reduces inflationary conflict over income distribution via the constraints that prevent firms from raising their prices and thus profit margins by reducing the wage share.

Relative to this Davidson notes that: "*the distribution of income is both a cause and a consequence of inflationary processes*" (1972, p. 347, quoted in Lavoie, 1992), while the intention of policies to fight proves to be another significant reason for inflation presence¹²⁶. Alternatively the adoption of a conflict inflationary theory cancels out

¹²⁶A more informative explanation about post Keynesian approach of inflation is mainly provided by Rowthorn (1977), as well as by Arestis and Sawyer (2003), Sawyer (2002, 2007b), Stockhammer, (2007a, 2007b), Cassetti, (2002), Lavoie, (1992). However in post Keynesian grounds there are income conflict theories that attribute the determination of inflation to wage rigidities or to upward tendencies of mark up rigidities that affect prices (e.g. Mott, 2002). Furthermore, according to Lavoie (1992) inflation in post Keynesian grounds can be explained either through collective bargaining between workers and employers or through administered prices that exist instead of market prices or finally via the adoption of full employment governmental policy.

any income constancy and thereby any possibility for equality among consumption and savings propensities.

Consequently there is an outstanding relation between income equality and inequality with employment levels (Rowthorn, 1977, 1995, 1999; Sawyer, 1997a, 1997b; Sarantis, 1993)¹²⁷. To be more specific, there is a positive relation between employment and income distribution; while a demand level is consistent with a constant inflation rate so as deflationary policies to have contractionary rather than expansionary effects on economic activity¹²⁸. Besides it is generally accepted (e.g. Rowthorn, 1977; Davidson, 1998; Stockhammer, 2004a, 2004b; Arestis and Sawyer, 2003 and so forth) that wage and price setting is related with demand conditions in the particular market, while under these conditions unemployment operates as a disciplinary device that allows workers to push up wage. However, firms that operate at excess capacity are constrained to increase the level of their prices. In other words in terms of national income, inflation can be represented as the level of income claims of labour and capital that exceed national income.

Provided that income claims are closely related with the respective power position of each of the included income classes, which is determined by a number of exogenous factors and demand level; so a relative low demand level is related with high unemployment for workers and low capacity utilization for firms (Stockhammer, 2007a). Thus, the adoption of conflict income theory for approaching inflation in post

¹²⁷In these conditions inflationary pressures stem from the assumed constancy in average direct costs that each enterprise faces and that are assumed to be a positive function of capacity level. So actual inflationary pressures are determined with respect to the actual employment and capacity utilization levels that characterise each economy (Arestis and Sawyer, 2003).

¹²⁸This arises from the independency of post Keynesian unemployment from labour market rigidities and equilibrium wage levels.

Keynesian grounds and therefore its dependence on distributional conflict and not on the excessive growth of money supply, suggests that inflation can be cured only through the adoption of appropriate income policies (e.g. Stockhammer, 2004c)¹²⁹. Considering therefore the impact of income distribution on inflation and unemployment as well as the fact that inflation changes are followed by changes in the equilibrium output and employment level, inflation is only partially explained (Setterfield, 2006).

This led Kalecki (1954) to attribute inflation to the distinction between demand and productive capacity, since there is neither any presumption about specific levels of employment and capacity utilization that are consistent with their full levels, nor any automatic mechanism that pushes economies towards their full employment levels (see e.g. Arestis and Sawyer, 2003)¹³⁰. This implication lies on the endogenously determined character of capacity utilization and the assumption about inequality in the propensities to save out of profits and wages.

Excess capacity is responsible for the presence of income redistribution in favour of wages so as economic activity to be expanded; otherwise such redistribution would be

¹²⁹It should however be mentioned that the success of these policies depends on the degree of their consistency with the existing distribution in the society and the way that socio-political economic exercise takes place (Setterfield and Lima, 2008).

¹³⁰According to Sawyer (1997a, 1997b, 2002) the absence of any automatic mechanism that pushes economy towards its full employment levels can be attributed to capitalists' unwillingness provide the level of real wage that is consistent with full employment because of the persistently high unemployment. In his view, the inconsistency of actual capacity with full employment can also be attributed to the case where wage equation is asymptotic to full employment, as for example in Stiglitz and Shapiro's (1984) shirking model, or even to the response of the adopted wage equation to shifts in real wage-employment relation that in turn require appropriate adjustment of real wage towards wage equation shifts. However, in Kalecki's (1971) view the distinction between realised and full utilization levels stems from either the long run accumulation path that is simply the average of past cyclical fluctuations or because full capacity utilization is achieved only in the boom of the business cycle.

impossible¹³¹. Moreover, the presence of excess capacity allows the use of microeconomic justifications that can affect it positively through depressing costs or providing a margin of safety against a sudden upswing on sales by maintaining barriers to entry or keeping up overhead capital (Taylor, 1985). All these make clear that the combination of excess capacity conditions with elastic (below unity) substitution between labour and capital, sets the dependence of unemployment on capacity utilization, demand elasticity and the costs that each capitalist faces during the production process¹³². In other words the post Keynesian equilibrium levels are not regarded as a priori given, but are endogenously determined by inside actual economic conditions. This argument contradicts the orthodox suggestion wherein output and employment levels are ultimately determined by labour supply and productivity considerations, while real wages are set at the level of equality between marginal disutility and marginal productivity of labour (Setterfield, 2003; Sawyer, 2002; Arestis and Sawyer, 2003).

Besides, a common characteristic in most of the recent post Keynesian-Kaleckian studies (see Amadeo, 1986a, 1986b; Dutt, 1984, 1987; Rowthorn, 1981; Blecker, 2002; Hein, 2006a, 2006b; Sawyer, 2002; Arestis and Sawyer, 2003; Hein and Vogel, 2007; Setterfield, 2003) is the adoption of the assumption about excess capacity as well as the suggestion that capitalists face constant average direct costs so that further expansion is undertaken without costs rises. In this case, the suggestion for price consistency with the level of costs requires a specific demand level; besides, in

¹³¹In these conditions, capacity shortages and thereby income redistribution are responsible for inflationary problems, for example in cases where demand runs ahead capacity levels or in the presence of inadequate capacity level to support full employment.

¹³²Moreover demand level variations affect the levels of fixed and physical capital and thereby the potential output of the economy directly (Palacio-Vera et al., 2006).

Sawyer's (1982) view there is some evidence that supports the relation between price changes and demand.

Despite the important implications of excess capacity assumption, its adoption is questionable in the sense that its presence is related with undesirable levels that affect capitalists' decisions negatively and create unsatisfactory conditions for promoting economic activity (e.g. Park, 1997). On the other hand, it is also possible for excess capacity to provide desirable conditions for protecting capitalists' power or even ensuring them against demand fluctuations. All these postulate that excess capacity does not generate pressures to lower prices relative to costs as well as that there would be no tendency for price reductions relative to costs at the particular output level. In no case, should excess capacity be related with disequilibrium conditions as long as price and output decisions are related with the possible presence of forces that reduce the extent of excess capacity (Sawyer, 1992). Besides even by suggesting that full employment and capacity conditions are more appropriate for economic analysis, in short run stagnationist models (e.g. Taylor, 1985) the equilibrium levels of capacity utilization and therefore output and employment, would never imply their consistency with full employment of labour or available capital equipment. This argument, according to Robinson's (1962) can be characterised as one of the main stylised facts of modern capitalist economies¹³³.

Indeed, the coexistence of excess capacity and unemployment operates as a device for reducing inflationary income conflict via firms' constraints to raise their profit

¹³³The possibility of rejecting levels of full employment and capacity utilization arises by suggesting the relatively free entry of unskilled labour in most of economies (Taylor, 1985). Also in many post Keynesians studies (e.g. Marglin, 1984), similar conditions can be also reached by assuming full capacity utilization.

margins and allow for employment increases. Further the combination of excess capacity with excess savings imposes constraints in economic expansion (Rowthorn, 1981).

We note that even in Post Keynesian framework the desired equilibrium employment level is determined by the intersection between prices and nominal wages as they are defined in the bargaining process. Thus in accordance with effective demand law, output equilibrium corresponds to the level where realised profits are maximized, given the autonomous demand condition, whereas in order to be sustained appropriate adjustments of all the other variables are required. Moreover the absence of any automatic mechanism for equilibrating supply and demand implies that real wages have no role in determining demand for labour, a behaviour that can be explained through effective demand. Besides, contrary to mainstream suggestions, the Post Keynesian framework is characterised by a positive relation between real wage and labour demand and therefore the dependence of output on income distribution. Additionally Post Keynesian economics are consistent with the relative independence of unemployment and real wages and provide the opportunity of shifting the sectoral composition of employment over the business cycle (Lavoie, 1996). In other words, given income distribution, the levels of real income and employment are determined by effective demand during the short run; in the long run effective demand is employed for determining prices relative to wages that in turn are reflected on income distribution and capacity utilization levels.

Nonetheless, in Sawyer (2002, 2007a), Arestis and Sawyer (2003) and Stockhammer (2007b) the equilibrium level is defined as the *'inflation barrier'* that was developed

by Robinson (1937, 1962) and suggests the path dependence of employment and more generally of economic activity in both the short and the long run. It is additionally argued that Robinson's definition can be regarded as an earlier version of NAIRU. According to Robinson's definition:

“in any given conditions of the labour market there is a certain more or less define level of employment at which money wages will rise”, (Robinson, 1937, p. 4, quoted by Stockhammer, 2004a).

Despite the possible similarities between NAIRU and inflation barrier, there are also many differences among them¹³⁴. The most essential of them concerns the fact that inflation barrier, contrary to NAIRU, is defined in terms of endogenously determined capacity, and not in terms of labour markets and institutions, and allows for an active demand (e.g. Davidson, 1998; Sawyer, 2001, 2002; Stockhammer, 2004b). In addition, inflation barrier depends not only on aggregate demand but also on changes in the degree of labour markets' flexibility in terms of wage differentials (such as changes in the power of trade union). As a consequence, unemployment (involuntary) could be limited through downward adjustments of (real) wages in excess supply markets that are slower than upward adjustments in excess demand market. Moreover, contrary to NAIRU, the adoption of inflation barrier implies neither full capacity and employment conditions nor its treatment as a strong, or weak in some cases, indicator of actual economy; it assumes the dependency between demand and supply side levels

¹³⁴According to Palacio Vera et al. (2006) the equality between rates of wage and price growth with those of productivity is required for ensuring the constancy of capital-output ratio and therefore the presence of wage aspiration. Further, in new Keynesian literature, i.e. Layard et al. (1991), changes in productivity are assumed to be fully reflected on changes in wage and price levels, so that capital-output shifts to leave economic activity ineffective.

so as both to lead to an effective production process¹³⁵. It can therefore be said that the adoption of inflation targeting as an intermediate policy that regards the adverse effects of the pursuit of low inflation on real output, is inconsistent with demand determined environment. Although its adoption may be approached as supply side equilibrium, it is highly possible to behave more like a plateau or even be pitched somewhat above the ‘upper end’ (Sawyer, 2007a, 2007b).

In Post Keynesian economics, investment which is determined independently from savings¹³⁶ is the most prominent determinant of aggregate demand¹³⁷. The notability of this factor in determining economic activity is emphasised by its effects on aggregate demand, employment and produced output level as well as by the long run capital investment, which determines labour productivity, wage income and economic prosperity. But the significance of investment in determining steady state equilibrium arises from its endogenous character, which is determined by the distinction between realised and normal profits or alternatively by the distinction between realised and target rate of capacity utilization; a characteristic that differentiates Post Keynesian from mainstream models¹³⁸. Further, the steady state of accumulation is determined by the rate of return on capital and the propensity to save, which during the

¹³⁵Usually in post Keynesian studies such as Sawyer, Arestis and Sawyer (2003), Stockhammer (2004a, 2004b), Hein (2006a, 2006b), the equilibrium of unemployment is treated as a weak indicator. This confrontation between mainstream and post Keynesian studies possibly arises from the fact that the latter considers the specific characteristics of workers.

¹³⁶The independency of investment from savings is consistent with Keynes (1936) who views savings as the amount of income that is not consumed rather than as net assets, while when savings are spent, the wealth of individuals rise.

¹³⁷Although the significance of investment is also recognised by mainstream economies (e.g. Layard et al 1991; Blanchard, 1990; Bean, 1989), their attention is concentrated on human capital investment in the sense that it is more productive and thereby more profitable relative to that of physical capital. It is generally argued that the treatment of investment in mainstream grounds is not satisfactory because of the ignorance, even in empirical grounds, of the factors that affect it. In particular the positive effects of human capital on economic activity arise only when its level is combined with fixed capital investment so as increases in labour productivity to be equal to wage increase and economic activity to be upward pushed (Arestis and Mariscal, 1998; Rowthorn, 1995, 1999).

¹³⁸This describes the distinction of post Keynesian from mainstream economics, wherein growth levels depend on the growth rate of population and labour augmenting technical process.

production process is considered as exogenous, as well as by consumers' preferences that are determined relative to their income. Even the influence of monetary policies on investment affects the capital stock and economic growth especially in the long run¹³⁹. In particular, the essence of investment is proved by considering either that firms operate into imperfect competitive environment which also determines their priorities, or that the behaviour of investment explains unemployment implicitly (Sawyer, 1982; Rowthorn, 1981)¹⁴⁰.

The essence of these conditions is reflected on post Keynesians' attempt to reduce unemployment through investment expansion and thereby upward output shifts and an improvement in the use of excess capacity without causing aggressive inflationary pressures. There is no doubt about the contradiction of these suggestions with mainstream economics, since in accordance with the latter unemployment would be faced through price variations, labour cost reductions and improvements of labour market rigidities. Besides, investment expansions under the umbrella of neo-liberal policies are derived from higher savings in the sense that they provide the required funds for expanding investment (Gordon, 1995a).

¹³⁹By considering that economy reaches its full employment level through investment stimulation only when interest rate, income taxation is continuously reduced or subsidies to investment continuously increased, Kalecki (1937a) questions the significance of investment effects on economic activity. This stems from the thought that a high level of investment would lead to a rising level of capital-to-output ratio and simultaneously to a declining level of profit (Sawyer, 2007a, 2007b).

¹⁴⁰It is also possible for firms (capitalists) that operate into imperfect competitive environment, to use their discretionary power to set their profit margins above the production costs they face and therefore against profit wages (Cassetti, 2002).

Following Kalecki (1937a, 1954), in recent studies by Bhaduri and Marglin (1991), Rowthorn (1981), Dutt (1984, 1987) investment is defined as a positive function of profitability, capacity utilization and capitalists' animal spirits that equals¹⁴¹:

$$(1) \quad I = b_0 + b_1\Pi + b_2cu \quad \text{where } I : \text{aggregate investment}$$

$$b_i > 0, \text{ with } i = 0,1,2$$

b_0 : Keynesian animal spirits or simply the state of capitalists' confidence about the investment plan they take on

Π : profitability or profit rate

cu : capacity utilization that economies operate at levels below full capacity.

Particularly the coefficient of capacity utilization is defined as the accelerator effect whereas the coefficient of profitability as the profit effect. According to the general post Keynesian-Kaleckian implications of equation (1), the higher the level of real wages (paradox of costs) or the lower the propensity to save (paradox of thrift), the higher the levels of profit and accumulation rates; suggestions that are widely accepted in demand approaches (e.g. Lavoie, 2002, 2003; Setterfield, 2003; Rowthorn, 1981). More precisely, the adoption of this investment function sets the dependence of income distribution and capital accumulation on actual economic

¹⁴¹Despite the wide acceptance of this form of Kaleckian investment function, Steindl (1952) mentions that Kalecki has proposed three versions of investment function each of which is set relative to the effects of profits, demand and available finance on investment decisions, while in his late work focuses on the role of technological progress in investment. According to Steindl (1952), the appropriateness of the above form of investment function is reflected on the fact that in cases of economies that operate under excess capacity, capitalists (firms) because of demand fluctuations or specific expectations about growth demand are assumed to have a certain target level of excess capacity. In these conditions, given the available capital equipment, capitalists will be able to raise their profits for present value and build their productivity ahead of demand (Lavoie, 1992).

activity. Further, according to Kalecki (1971), Bhaduri and Marglin (1990, 1991), Blecker (2002) and Stockhammer (2004a, 2004b) the effects of income distribution on aggregate demand and economic activity, in general, are highly depended on the degree of investment as well as on the sensitivity of savings on wage and profit changes. In other words the effects of income distribution on the general economic activity are determined by the response of each income class to possible income redistribution¹⁴².

But in an imperfect competitive environment that operates under excess capacity conditions, shifts in consumption and investment affect the level of economic activity and hence capitalists' and workers' priorities and decisions inversely. More precisely, the determination of economic activity as wage- or profit-led concerns the source of economic development. As a result, aggregate demand can be expanded either through private consumption that requires relatively high levels of wages or through private investment, the stimulation of which at high levels requires the 'strong' response of investment towards upward profit shifts. Both of these magnitudes are closely related with workers' and capitalists' income shares or rates (wage and profit respectively)¹⁴³.

The distinction between wage- and profit-led regimes allows for the characterisation of economies as stagnationist or exhilarationist (Bhaduri and Marglin, 1991). Thus, an economy can be characterised as an exhilarationist when higher profit mark up or

¹⁴² See Blecker (1999) for an open economy analysis.

¹⁴³ Although wages are treated as a production cost, the case of wage-led economies reflects a main source of economic activity expansion since if demand is high enough, the capacity utilization level will be high enough to cover the needs of both workers and capitalists. In addition, if the behaviour of demand is parallel with that of capacity utilization, as it is usually assumed, there will be a greater demand expansion and thus a higher profit rate but lower profit shares and a space for wage increases and economic expansion through consumption (Bhaduri and Marglin, 1990).

profit share can stimulate both aggregate demand and capacity utilization at relatively high levels. In other words, exhilarationism occurs when there is a strongly positive response of investment demand to profit rates¹⁴⁴. On the other hand, an economy is characterised as stagnationist when higher real wages are followed by capacity utilization and employment expansion, whereas consumption and profit levels are simultaneously reduced; besides, a profit squeeze that results from higher real wages is the essence of an underconsumptionist regime. It is widely argued (e.g. Hein and Kramer, 1997; Naastepard and Storm, 2006) that most of capitalist economies were characterised as wage-led during 1960s and 1980s, while most of them are strongly characterised as profit led and demand constrained since 1980s.

Moreover Hein and Vogel (2007) have empirically proved that larger but less open economies tend to be wage-led, whereas small and closed economies are proved to be profit-led. These results are only partially confirmed by Bhaduri and Marglin's (1990) theoretical conclusion about the degree of feasibility of wage-led growth when the effects of distribution on foreign trade are taken into account¹⁴⁵. In addition, Hein and Tarassow (2008) claim that medium sized but open economies are characterised as profit-led, whilst small open economies usually tend to be profit-led; results that are generally accepted in post Keynesian grounds, i.e. Bowles and Boyer (1995), Gordon (1995a,1995b), Naastepad and Storm (2006).

¹⁴⁴In the case of open economies, exhilarationism regime is attributed to international price competition as long as a wage reduction redistributes income towards profits and improves the degree of external competitiveness. Hence, if the resulting positive effect on the trade balance is large enough, it is possible for aggregate demand and economic growth to be increased, even if domestic expenditures are depressed (Blecker, 1989; Bhaduri and Marglin, 1990).

¹⁴⁵According to Stockhammer (2004a,2004b) profit-led economies are inconsistent with NAIRU in the sense that unemployment can be reduced through increasing flexibility of wages and reductions in workers' bargaining power, although the equilibrium level of unemployment rate depends on aggregate demand. On the other hand wage-led demand conditions in conjunction with the inverse real balance effects imply an unstable equilibrium, since increases in wage and employment growth improve workers' labour position so that the possible deviation from equilibrium is self fulfilling. As a result, Kalecki's view that the long run is only a recession of short run equilibrium is proved.

Nowadays however, with increasing globalization, openness and integrated markets, income distribution is usually in favour of profits though in these conditions international competitiveness and rising net exports is supposed to encourage the development of aggregate demand. According to Taylor (1996) it is proved that industrialized economies are usually profit-led economies, whereas developing economies turn out to be wage-led; suggestions that are opposed to Hein and Kramer (1997) who denote that advanced capitalists' economies are usually wage-led. In particular the differences among these results and implications are directly affected by investigation periods, data and estimation methods.

Kaleckian models such as for example those of Rowthorn (1981), Dutt (1984, 1987), Amadeo (1986a, 1986b, 1987), Blecker (2002), which attempt to represent real economies in the best possible way provide underconsumptionist conditions that are reflected on conditions of low wages and high profit shares that depress investment and thereby aggregate demand. Besides, it is believed that low profitability affects investment and therefore economic activity negatively. Nevertheless, even Marx recognises the need for private consumption expenditure through a policy of wage increases in an underconsumptionist environment, while Keynes recognises that investment (especially public) stimulation can provide the adequate conditions for aggregate demand, output and employment expansion. In other words, the underconsumptionist case suggests that the outcome of any income distribution from profits to wages accelerates consumption and respectively squeezes savings (relative to the values of their propensities as well as to their priorities) and in turn expands aggregate demand and economic activity.

Despite the simplicity of the form of investment function, its adoption implies that the included variables allow demand (capacity utilization) and supply (profitability) side effects on investment to be separated. The combination of these two variables may indirectly determine the rate of savings so as to capture the dual effects of real wage variations, since the stability of equilibrium usually requires savings to be more responsive than investment to capacity utilization shifts. This result rests on the differences among capitalists' and workers' propensities to consume and to save; the former focuses on profits and the latter on consumption (Kalecki, 1937a). In these conditions, the implied distinction of income shares (wages and profits) seems to perform better than others suggested by alternative theoretical approaches (Lavoie et al., 2004).

It should also be mentioned that in accordance with Kaleckian suggestions, the inclusion of capacity utilization into investment function reflects the actual economic levels. Further, by considering the dependence of real wages on capacity utilization and thereby a relation between capacity and employment, Lavoie (1992) proves the implicit presence of Okun's law in post Keynesian- Kaleckian grounds. Although Kalecki usually assumes that unemployment is determined by effective demand, he rarely included it in his models, much like other post Keynesians. Notwithstanding the introduction of this law, in post Keynesian economics differs from mainstream, since it stems from a possible combination of utilization theory with a constant marginal physical product of variable labour (Lavoie, 1992). In any case, it is argued that its use is essential because it provides a route for linking goods and labour markets under the assumption of a positive relation between unemployment and profit share (Stockhammer, 2004b).

The positive impact of capacity utilization on investment can be seen as a strong accelerator condition since it is the depressed effect of the reduction in utilization that dominates the stimulating effects of a rise in the profit share (Blecker, 2002; Bhaduri and Marglin, 1990). Therefore, the significance of income distribution behaviour in determining investment decisions and more generally employment and economic activity levels becomes obvious. In other words, given the positive relation between profit rates and investment as well as their dependence on the level of capacity utilization, from a Kaleckian point of view investment decelerates under conditions of invariant income distribution that reduce profit and national income reductions and in turn excess capacity. Besides firms' realised profits are only one source of financing future investment plans, in the sense that expected profits are assumed to be positively related to current profit rate, which allows firms to validate existing debt and attract new loans.

Thus investment is determined as a function of both past realised profits (internal savings)¹⁴⁶ and changes in factors that influence the rate of profit. However, increased profits do not coincide with automatic higher investment, although Keynesians have long maintained that investment is about expectations rather than actual profits and Kalecki pointed out that the causation may be inverse so that investment causing profit rather than vice versa (e.g. Stockhammer et. al., 2007). Besides, in Kalecki's view expectations over future profits is the factor that determines current investment expenditures. More specifically:

¹⁴⁶Fazzari and Mott (1986) provide evidence about the impact of retained earnings on investment function. However, Mott (1989) mentions that the creation of debt is raised by savers' claim on part of total profits, although there is no presumption about the direct relation between the flow of savings and the level of debt or about the way that savings can affect interest rates.

“Profits are the key variable for real growth and for the financial dynamics of the economy, because their determination and distribution are crucial both in settling investment demand and in validating debt and capital asset prices” (Bellofiore and Ferri, 2001, pp. 11-12).

Clearly, the adoption of demand side economics and the endogenous character of economic activity provide an alternative, more realistic character of economic process and the way it should be treated. Hence, given the levels of productive capacity and investment that characterise each economy, any level of demand beyond that of productive capacity causes inflationary pressures not as harmful though as those which stem from NAIRU (Sawyer, 2004). Further opposing to mainstream economics, although the equilibrium unemployment is affected by both demand and supply side factors, its variations are explained by shifts in capacity utilization levels (Arestis and Sawyer, 2003; Sawyer, 2004). Besides, full employment is implicitly determined by the sufficient level of aggregate demand and capacity utilization but not by labour market flexibility (Sawyer, 2004). All these prove that each investment level is related with a specific level of capital stock and aggregate demand, whereas the achievement of full employment in demand conditions is consistent with the sufficient level of aggregate demand and distribution of productive capacity in actual economic conditions (Dutt, 1984; Sawyer, 2002).

At this point it is worth highlighting the important role that the coefficient values in saving and consumption functions play in the determination of investment, since the effects of income distribution on aggregate demand are determined by the sensitivity degree of investment and savings to changes of wages and profitability. The importance of profitability in investment and capital accumulation is widely argued in

both mainstream and post Keynesian studies such as for example Bean (1989), Blanchard (1990), Rowthorn (1995, 1999), Sawyer (2002), Arestis and Sawyer (2003) since its reduction during 1970s led to capital decumulation.

The relation between capital accumulation and investment decisions is therefore obvious, wherein the level and behaviour of the former is highly depended on expected rate of profits and on a range of other factors, such as the optimism of entrepreneurs or the availability of credit. In any case, we should consider that the identification and specification of capital accumulation process depends on the conditions of the specific economy examined as well as on the historical and empirical analysis conducted each time.

4.2.1. External Finance and Capital Accumulation

Nowadays, the depression on profitability as a result of increasing globalization and the implementation of deflationary policies raise the necessity for firms to use external finance¹⁴⁷ through borrowing, for the materialization of their investment plans. This necessity brings monetary factors at the centre of the Post Keynesian research agenda.

Kalecki and neo-Kaleckians offer valuable insights to the relation between external finance and capital accumulation. More specifically, Kalecki distinguishes between entrepreneurs' and rentiers' capital, the former of which is the capital owned by the firm while the latter is the capital that a firm tries to borrow. Kalecki (1954) argues

¹⁴⁷Alternative sources of finance are usually considered to be: retained profits, bank borrowing and the creation of new shares and bonds. In this study attention will be paid to retained earnings and bank borrowing.

that firms' ability to borrow depends on the profits they can generate; this is Kalecki's known '*principle of increasing risk*'. Moreover, Kalecki recognises the importance of the relation between investment and banking system. To understand Kalecki's argumentation, it is important to refer to the works of Mott (2002), Hein (2006b, 2007) and Dutt (1984, 1992), which place emphasis on capitalists' ability to meet future interest payments. Current investment decisions are highly affected by current payment commitments that arise from the accumulated debt. The willingness of banks and financial institutions to provide funds to capitalists in order to achieve their investment plans rests upon their past performance, the ability to generate capacity profits as well as on the possibilities of investment plans to become realised (Lavoie, 1992; Sawyer, 1982; Setterfield, 2003). As a result, the wish and ability of a firm to borrow new funds is only a limited amount that is closely related to its previous accumulated internal funds and is reflected on Kalecki's (1937a) '*principle of increasing risk*'¹⁴⁸. In other words, the ability of a firm to borrow new funds depends on the relation between profits and interest payments and hence on the levels of interest rate and debt-to-capital ratio. Indeed, there is a maximum degree of indebtedness that banks are willing to tolerate in order to minimize borrowers' risk.

Hence the higher the amount of capitalists own capital, the higher the amount of the debt capital that can be obtained for investment. However Kalecki (1954), contrary to his earlier argument asserts capitalists' willingness to pay higher interest rates, which

¹⁴⁸According to Kalecki (1937a) the main sources of the *principle of increasing risk* are implied by the fact that higher investment leads to higher exposure of the probability for failure or bankruptcy, as well as the fact that there is an illiquidity problem that could arise as the scale of output expands gives rise to high "sunk" costs. However, outstanding role in Kalecki's *principle of increasing risk* also plays the Marxian problem of the realisation of surplus-value, since as the capital accumulation proceeds, the volume of profits encounter barriers in terms of the increased demand for money required to finance investment in order to realise future profits. Thus, an over-accumulation crisis emerges as markets are saturated. As a result, Kaleckian theory of profits rejects the conventional neoclassical view that savings limit investment and suggests that capital accumulation is limited by internal financing which reflects the level of firm's reserves (Lavoie, 1992).

cannot compensate for a lack of internal funds or (capitalists) entrepreneurial capital. As a result, firms (capitalists) are willing to pay higher interest rate rather reinforce creditors' skepticism with regard to the credit worthiness of the potential debtor. Kalecki (1937a, 1971) has provided a definition of moral hazard that lies on the necessity of retained earnings and the harmlessness of interest rate as a market mechanism into an uncertain environment. Needless to say, that since interest rate and debt-to-capital ratio are adversely related with internal means of finance, they affect investment negatively. But relative to capitalists' decisions to finance their investment plans, the degree of volatility in financial markets should also be considered¹⁴⁹.

Post Keynesians pinpoint that the increasing use of external finance is likely to have led to the development of a third income-social class in capitalist economies that is known as rentiers. According to Dutt (1992) the major characteristic of this class is that its income is mainly derived from interest payments while its presence entails an income transfer from real to financial sector thereby the triggering of capital accumulation, wage squeeze and possible stagnation as well as increases in income and wealth inequality (Palley, 2007). A growing empirical literature (i.e. Epstein and Power, 2003; Palley, 2007), provides evidence on the consistency between dramatic growth of rentiers' income class and dramatic relaxation of constraints for external finance and thereby changes in the propensities and priorities of each income class, since 1970s¹⁵⁰. In particular the development and the increasing strengthening of rentiers' income class are reflected on the term of financialization that concerns:

¹⁴⁹Obviously the adoption of a new investment into a highly volatile and unstable financial environment, suggests that capitalists are called to face uncertainty and risks for firms. This is due to the concentration of authorities on interest rate policies in order to control inflation and not on adequate conditions for higher investment, although finance decisions depend on banks' behaviour.

¹⁵⁰The rise of rentiers can also be attributed to factors such as the collapse of the fixed exchange rate system and the regulatory mechanism of Bretton Woods, the adoption of restrictive monetary policies,

“the increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operation of the economy and its governing institutions, both at the national and international level “, (Epstein, 2002, p.1).

Hence, the finance-led regime is assumed to create the appropriate conditions for economic growth when investment plans are taken on and set consumption expenditures as the driving force of growth, when workers improve their gains and their credit positions (Stockhammer, 2007b). These suggestions contradict the majority of post Keynesian literature (e.g. Hein, 2006b) that treats finance-led regime as the fundamental source of capital decumulation and economic instability.

Smithin (1996) argues that the conditions of 1980s and 1990s can be described rhetorically as the ‘revenge of rentiers’. In this way Smithin (1996) considers the way through which neoliberal policies (e.g. inflation targeting, independency of monetary authorities, free capital movements, fiscal and monetary austerity, labour market flexibility) led to the rise of rentiers and more generally to the rise of financial institutions. What seems reasonable for one to argue is that higher interest rates are likely to redistribute income in favour of rentiers and change therefore capitalists’ intentions of expanding production and employment through its impact on workers’ wages and capitalists’ profits. Such changes in income distribution among the three income classes (rentiers, capitalists and workers), signify their impact on aggregate demand (Argitis and Pitelis, 2006). Mott (1989) however notices that the routes through which rentiers can affect interest rate levels are either direct through their

and the introduction of highly liberalized financial markets (see Argitis and Pitelis, 2001, 2006; Stockhammer, 2007b).

decisions to shift funds out of lending or indirect through their ability to influence monetary policy.

The increasing power of rentiers is likely to restrict demand and employment expansions, whereas the necessity for external finance increases interest payments that might affect both realised and expected capitalists' profits negatively¹⁵¹. Hence, the inverse relation between internal funds and interest payments as well as the combination of high levels of both debt accumulation and interest rates is possible to affect capital accumulation either through rises in interest rates payment or via reductions in capitalists' profit rate negatively. In both of these cases, profit is redistributed towards rentiers that change the whole process of economic activity.

Thus in Kaleckian models, different regimes of accumulation range from the usually expected adverse effects of interest rate variations on capital accumulation, capacity utilization and the profit rate to positive effects throughout the equilibrium values of the system (e.g. Lavoie, 1992, 1995; Hein, 1999; Hein and Oschen, 2003). Moreover Dutt (1992) mentions that contrary to the argument that high levels of accumulation are followed by higher inflationary pressures in Kaleckian models, higher rates of growth are possible to induce lower inflationary pressures. Likewise, the assumption of exogenously determined interest rate that allows monetary authorities (central banks) to behave as monopoly suppliers of legal tender is followed by a number of important macro analytical and policy implications. A higher exogenous rate of interest induces a lower overall propensity to save that may imply higher profit and output growth rates (see Dutt and Amadeo, 1991). All these enhance monetary theory,

¹⁵¹This is the main reason why Keynes (1936) suggests the 'euthanasia of rentiers' (Mott, 1989).

since output levels and income distribution depend on monetary factors and therefore there is no dichotomy between money and real monetary forces.

It is worth indicating that the effects of interest rate changes on equilibrium depend on the relative parameter values in accumulation and savings process. This makes clear that interest rate variations affect the equilibrium position of investment and consumption expenditures as well as capitalists' and rentiers' income shares via income distribution. In addition, equilibrium points are indirectly affected by the impact of shifts in interest rates on capacity utilization and therefore capital accumulation and profits¹⁵². Thus, there is no general valid statement about the consequences that changes in interest rates may have on capacity utilization, accumulation and the profit rate. In general the effects of the introduction of monetary factors depend on the assumptions about the response of aggregate demand to changes in profit share, as well as on whether investment, consumption and saving decisions respond strongly or not to shifts in profit shares.

However we should keep in mind that the higher level of interest rates induces a gradual increase in the debt-to-capital ratio of firms accompanied by higher rates of accumulation, until its new long run equilibrium is reached. Hence, opposite to the expectations that higher interest rates lead to higher debt-to-capital ratios, a shift leading to higher accumulation rates is not expected. But the stability or instability of the equilibrium level in combination with Minsky's (1975) assumption about

¹⁵²In general Epstein (2002) suggests three alternative regimes deriving from interest rate shifts: the one that concentrates on interest rates effects on capitalists and rentiers and is opposed to workers, the one where the labour class would split against a united front of rentiers and entrepreneurs and finally that regime into which capitalists and workers collude against rentiers. For each of these regimes the effects of interest rate changes on accumulation process, capacity utilization and employment differ since they depend on the specific assumptions about the relative coefficients in investment and savings functions and therefore on the effects that arise from income distribution shifts.

*'financial instability'*¹⁵³ imply that during periods of boom when high debt-to-capital ratio (leverage ratio) is accompanied by higher capital accumulation rates, it is possible to raise economic activity levels. Besides, he occasionally recognised that *'the improvement of realised profits partially frustrates the planned debt-financing of investments of firms'* (Minsky, 1975, p. 114, quoted in Lavoie, 1995) but the targets that are set by individual firms are also possible to be systematically missed due to macroeconomic reasons.

Nevertheless the degree of external finance and therefore the degree of sensitivity of economy to financial fragility depends on the level of capacity utilization that determines investment and capitalists' internal funds regarding the actual profit levels. Furthermore, in Minsky's (1975) view the starting point of financial instability is that *"stability is ...destabilizing"* (Minsky, 1975, p. 12, quoted in Arestis and De Antoni, 2007), and finally considers that *"the fundamental instability is upward"* (Minsky, 1975, p. 165, quoted by Arestis and De Antoni, 2007). In other words, the degree of external finance and thereby the possibility of Minskian financial instability is closely related with Kalecki's (1937a) *'principle of increasing risk'*. External finance might therefore increase the possibility of macroeconomic instability and financial fragility, which depends on the stability or instability of the financial sector.

Consequently the effects of the introduction of monetary factors and retained earnings on growth and distribution are assumed to be reflected on changes in the forms of both investment and savings functions. Lavoie (1995) defines investment decisions as

¹⁵³The main source of financial instability is capitalists' decisions to take on large and expensive long term investment plans that are debt-financed, without ensuring that these plans will generate profits greater than that of debt commitments. As a result an economy is characterised by financial instability when the circuit of money from oligopolistic firms tends to diminish as investment is reduced after the presence of a boom so that it becomes more difficult to pay out past debts (Minsky, 1992).

the difference between the rate of profit and the interest rate, whereas he (Lavoie, 1993) forms an investment function that incorporates the effects of distribution and production costs in the interest rate. Furthermore, Lavoie (1992) views capacity utilization as being integrated so that the impact of interest rate on equilibrium is not unique. Likewise, Dutt and Amadeo (1991) assume that investment decisions depend solely on interest and capacity utilization rates, whereas Dutt (1992) implies that the level of capacity utilization and the distinction between the rates of profits and interest rate influence investment. Taylor (1985) introduces monetary factors into his underconsumptionist model, so that investment decisions become depended on the gap between the profit rate and the interest rate as well as on the accelerator term. Regarding savings, most of the Post Keynesian models estimate the importance of retained earnings and the distributional impact of interest payments, while they distinguish between the saving propensities of workers and capitalists (see Lavoie, 1992; Hein, 2006b, 2007). In any case the introduction of monetary factors in analysis is related with changes in macroeconomic levels, which are usually reflected on tepid growth in real economic terms that is followed by a slowing downward movement.

4.3. Fiscal Policy and External Finance

The increasing power of rentiers' income class and the constraints imposed by the concentration of monetary authorities on supply side policies seem to be the reasons that discourage capitalists (firms) from taking on new investment plans if not at least extending the existing capital. In addition, the coexistence of excess capacity with persistent unemployment and underemployment levels that usually characterise economies, allows for the introduction of fiscal policy (in terms of taxation and government expenditures). Besides in post Keynesian-Kaleckian context, there is a

consistency between fiscal and demand rather than interest rate policies with actual economic fluctuations (Arestis and Sawyer, 2004c).

Although it is widely argued that the adoption of fiscal policy within post Keynesian-Kaleckian grounds can offset possible imbalances (usually deficits as long as demand level is below the target level of economic activity) and unemployment expansions, there is a distinction between Keynes's (1936) and Kalecki's (1937b) approach. Hence, although Kalecki recognises the presence of imbalanced budgets, he does not regard them as the precondition of investment in new capital¹⁵⁴; a suggestion that contradicts Keynes and the dominated tendency of 1920s and 1930s¹⁵⁵. However, the realism of imbalanced budgets is reflected on the absence of a priori equality between savings and investment and its compatibility with the intention of achieving the highest possible or even full output level.

In addition, Kaleckian fiscal approach concentrates on the macroeconomic consequences of fiscal-induced changes in functional income as well as on the revenue stance of government budget, while it requires the constancy of the macroeconomic effects of equal-yield substitutions between taxes and government expenditure holding (Mott and Slattery, 1994; Laramie, 1991). As a result, Kalecki (1944a) suggests that for sustained full employment to be achieved it should be based: *“either on a long run budget deficit policy or on the redistribution of income”* (Kalecki, 1944a, p. 135, quoted in Arestis and Sawyer 2004c).

¹⁵⁴However, in his study Kalecki (1937b) assumes a balance budget economy in accordance with the general tendency whereas Keynes (1936) focuses on long run balanced budgets since this was the only way economies could be protected against recessions (Brown-Collier and Collier, 1995).

¹⁵⁵The presence of balanced or imbalanced budgets depends on the form of adopted policies, the level of adopted employment target and mainly government's ability to provide continuous and accurate forecasts about the effects of its adopted policies (Laramie, 1991).

On the other hand, by focusing on the expenditure stance of government budget Keynes (1936) defends fiscal deficits in the view that such spending would crowd out private spending as long as public spending is not being used as a given pool of savings (Lamarie, 1991; Mott and Slattery, 1994). Moreover according to Keynes, budget deficits have a cyclical component that arises only as a symptom of insufficient spending and represents recessions during which tax revenues are squeezed and government spending expands (e.g. unemployment insurance). In other words, budget deficits do not seem to provide a reliable solution (Galbraith, 2005). Nevertheless, in accordance with the conventional view of fiscal deficits (for both closed and open economies) and targets of sustained economic growth the short run rigidity of budget deficits is usually suggested. In particular the duration of fiscal deficits is related with the degree of economy's sustainability, which should be considered on purpose in order that the effects of public expenditure to be incurred (Lamarie and Mair, 2003a, 2003b; Arestis and Sawyer, 2007).

Nowadays, the regular performance of economic activity is reflected on imbalanced budgets (deficits during slowdowns and surpluses during upswings). Hence as long as monetary authorities are prevented from taking advantage of financial flexibility, any obsession with balanced budgets is likely to squeeze down economic growth and increase the degree of financial instability (Hein and Truger, 2006)¹⁵⁶.

¹⁵⁶It is generally argued that deficits usually derive from monetary authorities' concentration on inflation targeting and their attempt to restore public finance by orientating it on productive investment and not from the adoption of Keynesian fiscal policies (Hein and Truger, 2006). Moreover, the coexistence of large budget deficits with expansionary monetary policies affect economic activity negatively, especially when economies are open, since instead of concentrating on production economies prefer to import capital. In this case, economies can be stimulated when there is import acceleration and hence trade deficit (Eisner, 2003).

But the factor that crucially determines the process of economic activity, even in the presence of fiscal policy, is the degree of financial fragility of each economy. Regarding the sensitivity of economies to Minsky's *Financial Instability Hypothesis*, fiscal policy is required to underpin and stabilise aggregate demand, income and employment as well as to protect the robustness of the financial system in 'unstable' economies against financial crises, debt deflations and deep depressions. In these conditions, any intention to cancel the possibility for the presence of crisis through governmental intervention represents Keynesian economics (Arestis and De Antoni, 2007)¹⁵⁷. Besides, the behaviour of government intervention through fiscal policy is closely related with its effects on real macroeconomic magnitudes. As a result, the necessity for active fiscal policy is directed by the dominance of financial sector and the increasing interdependence among economies that constrains employment expansion. Further, as Crotty (1986) notes, in Minsky's (1986) view full employment is a transitory rather than a natural point that overheats economic activity and increases the degree of its financial fragility.

However, Minsky's obsession with fiscal policy is also reflected on his claims that the use of "*monetary policy to constrain undue expansion and inflation operates by way of disrupting financing markets and asset values. Monetary policy to induce expansion operates by interest rates and the availability of credit, which do not yield increased investment if current and anticipated profits are low*" (Minsky, 1986, p. 303-4; quoted by Arestis and De Antoni, 2007, p. 10). Moreover for inflation targeting economies wherein the financial sector gains an increasing percentage of income pie, Minsky advocated that "*fiscal policies are more powerful economic*

¹⁵⁷ Its appropriateness becomes clearer when we assume open economies.

control weapons than monetary manipulations” (Minsky, 1986, p. 304, quoted by Arestis and De Antoni, p. 11). However the introduction of budget deficits and thereby fiscal policy is required in order to change the use of monetary policy as the mechanism that guarantees the desired level of economic activity.

Hence given the degrees of economy’s financial fragility and sensitivity on government intervention, it is argued that there is a positive relation between governmental expenditures and time path economies, as long as their introduction does not constrain the growth rate of private investment (Arestis and Sawyer, 2004c, 2007)¹⁵⁸. But even under these suggestions, policy decisions concern the behaviour of private investment, despite its instability, in the sense that it is the factor that ensures the sufficiency of aggregate demand. According to Kalecki:

“a solid of majority of economists is now of the opinion that in a capitalist economy, full employment may be secured by a government spending program, provided there is in existence adequate plan to employ all existing labour power, and provided adequate supplies of necessary foreign raw-materials may be obtained in exchange for exports” (Kalecki, CWI, p. 347, quoted in Sawyer, 2007a, p. 3).

Further, according to Kaleckian fiscal stance, private investment should not be regarded as the factor that insures full employment of labour but as the provision of consumption goods in means of production. Thus, except from the ability of

¹⁵⁸In cases where government expenditures prevent private investment, regardless of the endogeneity or not of money, it is possible investment to be crowded out (reduced) via squeezing the activity of the private sector either through interest rate fluctuations (Fazzari, 1993). But investment reductions can be also achieved either by considering the impacts of fiscal policy on savings as a result of the Ricardian equivalence theorem or when economy attains the desired supply side equilibrium level (and thereby assures sustain inflation), at which aggregate demand through fiscal policy should respond in order economy not to be drawn away from its equilibrium (Arestis and Sawyer, 2003, 2004a, 2004b).

investment to stabilise economic activity and constrain deficits resulting from recessions and expenditures, it should assure the consistency of economic activity with full employment level of effective demand (Galbraith, 2005). More specifically:

“...the gap to be covered (to stimulate aggregate demand to reach full employment) may be so large that public investment will soon become entirely, or at least nearly, useless. In such a case it would be absurd to restrict the government spending program to public investment when a higher standard of living can be achieved by devoting a part of this spending to increasing consumption, The general principle must be that social priorities decide the nature of the government’s spending program” (Kalecki, CW I, p. 368, quoted by Sawyer, 2007a, p. 4).

But economic activity can also be positively affected by introducing the appropriate form and progressiveness of taxation system. Regarding the form and structure of the adopted taxation system, taxation levels and the way that the implied revenues will be finally used, there is no doubt about the changes caused in income distribution among all income classes and thereby economic activity (Mott and Slattery, 1994; Damaria and Mair, 1992)¹⁵⁹. More specifically the final effects of taxation on income distribution and thereby on real macroeconomic magnitudes (real production and financial section) are captured on saving, consuming and financing decisions with respect to after-tax income of each income class and the degree of balanced or imbalanced budgets. However, Mair et al. (2008) and Lamarie and Mair (2003a) mark

¹⁵⁹Provided that the source of these conditions is the assumption that economy operates at levels below full employment and capacity utilization, it is clear that this view contradicts neoclassical economics where tax incidence concentrates on its relative effects on output and prices. Moreover in neoclassical grounds, wherein economies are assumed to operate at full employment levels, the instruments of macroeconomic policy shift the level of aggregate private incomes, whereas tax policies are assumed to be used for changing the distribution of a given level of private income (Mott and Slattery, 1994; Damaria and Mair, 1992).

out that both the level and the strength of these effects are determined by concentrating on the structure and the form of adopted taxation policies.

But attention should be paid to the relative marginal propensities to save and to consume out of wages and profits (before and after tax) as well as to the extent at which a tax change is shifted through changes in business mark-ups in addition to the possibility for compensating changes exist in government expenditures. In other words, it is the level of after tax aggregate national income, capitalist' investment decisions (direct effect) and the share of employment incomes (indirect effects) that set a new basis for economy¹⁶⁰. Anyhow, the final effects of taxation policies are determined by the adopted assumptions about demand and supply elasticities as well as the factors of substitutability and intensities (Mott and Slattery, 1994).

The significance of taxation policies is represented in Kalecki's (1937b,) study "*A Theory of Commodity, Income and Capital Taxation*", which represents a closed economy that operates under balanced budgets, excess labour supply and capacity and workers' intention of consuming all of their income¹⁶¹. Based on these assumptions Kalecki examines "*the effects of commodity, income and capital taxation on employment, national income and its distribution*" (Kalecki, 1937b, p.444)¹⁶². The

¹⁶⁰Although taxation is thought to be responsible for investment depreciation in the sense that its structure shifts the relative after tax profitability of existing or/and new plant and equipment, it is also possible for the combination of profit taxation and continuous developed technology to reduce investment profitability generated by older plant and equipment relative to new plant and equipment, accelerating the obsolescence of the former and encouraging investment in the latter. However, the effects of taxation on profit rate, can arise either through their impact on government budget position or through their effects on income distribution. Besides, it is widely argued that fiscal policy in Kaleckian grounds stimulates innovation (Mair et al, 2008).

¹⁶¹It should be mentioned that in the presence of excess capacity and excess demand inflation, the desirability of tax policies is possible to change (Mott and Slattery, 1994).

¹⁶²The main consideration upon which Kalecki's (1937b) taxation analysis lies is the recognition that Keynesian theory provides the inquiry into the taxation problem and that the General Theory requires a whole new approach to the study of taxation.

essence of the way that taxation affects economic activity is reflected on the fact that different types of taxation lead to “...quite unexpected results, which may be of practical importance” (Kalecki, 1937b, p. 444)¹⁶³. It is therefore claimed that in the presence of taxation the behaviour of each income class is adjusted to its after-tax income.

Despite the importance of Kalecki’s (1937b) assertions and contributions on taxation policy, they are usually ignored probably because post Keynesian approach about fiscal policy revives Lerner’s (1943) functional finance approach that proxies fiscal policy through its real effects and not ex post results on economy (Lamarie and Mair, 2003a, 2003b; Mair et al., 2008). However Kalecki’s (1937b) study has been widely examined and extended in a number of studies, i.e. Asimakopoulos and Burbidge (1974), Asimakopoulos (1975), Mott and Slattery (1994), while a more dynamic aspect of this study is presented by Laramie and Mair (1996, 2003a, 2003b), Damaria and Mair (1992), Lamarie and Mair (1996, 2003a)¹⁶⁴.

All these make clear that post Keynesian-Kaleckian fiscal policy approach contradicts mainstream considerations about the use of interest rates as automatic stabilisers that ensure equality between savings and investment. More specifically in the general post Keynesian-Kaleckian environment, the equality between savings and investment can be achieved through the appropriate adjustment of income via the multiple effects, whereas interest rate is being used to equate demand for money with the available

¹⁶³This result is implied by the fact that in his analysis Kalecki (1937b) introduces consumption and (workers and capitalists) income taxes as well as a tax levied on every type of owned capital, although he believes that capital taxation is possible to provide the same stimulus as debt financing regardless of the political impossibility of such a tax within capitalism.

¹⁶⁴The dynamic form of Kaleckian taxation theory is achieved by examining the effects of state, taxation, income distribution and determination, investment, employment, growth and mainly business circle on economic activity (Mair et al., 2008).

stock of money. So, a reduction in investment level is not coincided with interest rate decreases in order for full employment to be preserved, but is consistent with reductions in both income and saving levels via the multiplier effect.

The absence of an automatic stabiliser for economic activity as well as the increasing financial sensitivity of economies, the inability to guarantee ‘rentiers’ euthanasia’ and the necessity to protect economies against bad conditions, set fiscal policy the most persuasive instrument of stimulating employment at relative high levels. Regardless of the form of government intervention either through taxation or consumption expenditures, its adoption in demand framework certainly affects real economic magnitudes through its impact on income distribution (Kalecki’s microeconomic theory) and economic growth levels (Kalecki’s macroeconomic theory). What is only required in order for financial economies to be positively affected by fiscal policies is the consistency of their forms with actual conditions so as the relation between governmental and private sector to be in balance. Besides, under conditions of imbalanced budgets, fiscal policy attempts to mop up over private investment, provided that imbalances are well measured and budget imbalances are not bequest (Arestis and Sawyer, 2003, 2006, 2007; Sawyer, 2007b).

Consequently the use of fiscal policy from the perspective of post Keynesian-Kaleckian stabilises economy in terms of capacity and demand growth rates without causing additional problems in economic activity (Sawyer, 2007a, 2007b)¹⁶⁵. In any case the actual conditions of each economy, the wealth conditions of each income class as well as the available policy instruments, its intentions and priorities,

¹⁶⁵Considering that capacity utilization and employment levels reflect actual and not ideal economic conditions, government expenditures are expected to be positive.

determine the final effects of fiscal policy that usually coincides with government intervention¹⁶⁶. Evidently, economic activity is positively affected by the introduction of fiscal policy unless it cancels out the use and implications of monetary policy. Besides, only the correct coordination of price stability and employment growth targets can ensure and impel economic growth without causing additional inflation problems.

4.4. Conclusion

Considering the importance of monetary factors in determining economic activity in globalized and unstable economic conditions, the adoption of post Keynesian-Kaleckian framework seems to be highly realistic. Besides, the assumptions about economies that operate at levels below full employment and capacity utilization, the consideration of macroeconomic magnitudes as path dependent and the concentration on external finance, make clear that even under the dominance of rentiers, unemployment can be solved in more adequate ways relative to those of mainstream economics. In addition to this, the introduction of fiscal policy and mainly taxation raises the ability to face macroeconomic problems without any side effects.

Further, the introduction of Kalecki's (1937a) '*principle of increasing risk*' and its conjunction with Minsky's (1975) hypothesis about '*financial fragility*', seems to reflect actual economic processes implicitly and to leave no room for questions against the appropriateness of the developed theoretical framework. The essence of all these assumptions and the generally developed framework can only be confirmed by

¹⁶⁶Hence in accordance with national income identity in the case of a closed economy, when government 'runs' for instance surpluses (i.e. be a saver), the private sector is required to 'run' sustained deficits (i.e. be a borrower), (Sawyer, 2007a, 2007 b; Lamarie, 1991).

considering specific policy suggestions. This is our intention in the following Chapter wherein a theoretical model is developed within the post Keynesian-Kaleckian framework.

Chapter 5

Finance, Income Distribution and Employment:

A Macroeconomic Model

5.1. Introduction

Bearing in mind the fundamental features and assumptions of the Post Keynesian-Kaleckian tradition concerning the relations between finance, capital accumulation and employment, we proceed to develop a macroeconomic model. Although Post Keynesian models implicitly introduce monetary factors and consider the relation between accumulation and finance, little attention has been paid to the possible changes on the equilibrium employment levels. Thus, setting at the center of our analysis the unemployment problem, our aim in this chapter is to extend the Post Keynesian literature by paying attention explicitly to the relation between monetary factors and employment.

Our intention is therefore to develop a Post Keynesian-Kaleckian model so as to mark out the relation between monetary forces, income distribution, aggregate demand, taxation, expenditures and employment in capitalist economies. A distinctive feature of our model is that it places emphasis on the importance of external finance in capitalists' investment decisions and in turn in equilibrium levels of capacity utilization, capital accumulation, profit rate and employment. In doing this, we

introduce a third income class (rentiers) and we consider the sensitivity of short and long run equilibrium levels of employment to firm's debt burden and interest rate variations. It is worth pointing out that in our short run analysis emphasis is placed on capitalists' decisions about the degree of external finance as well as on the relation between capitalists and rentiers' propensities to save out of their incomes. In our long run analysis we explore the way that economic activity can be affected by the endogenously determined growth rates of debt-to-capital ratio and capital accumulation.

The structure of this chapter is as follows: Section 5.2 introduces the general framework and the basic equations of a closed economy model where there is no government intervention. By assuming the constancy of the debt-to-capital ratio, subsection 5.2.1 presents the short run equilibrium that is extended by relaxing the assumption about workers' propensity to save; whereas subsection 5.2.2 provides the long run equilibrium for both cases where workers consume the whole of their income and have some propensity to save by assuming the endogenous determination of debt-to-capital ratio. Section 5.3 goes a step beyond and allows government to intervene mainly through income taxation; in these conditions subsections 5.3.1 and 5.3.2 provide the short and long run equilibrium values respectively, while the results that consider a positive propensity to save for workers are also presented. In accordance with the adopted theoretical grounds and implications of the previous sections, Section 5.4 presents the changes in the theoretical model by assuming that except from rentiers even workers finance investment via their savings; thus subsections 5.4.1 and 5.4.2 display the short and long run equilibrium values as well as a simplification of the analysis by using an alternative expression of workers' debt-to-

capital ratio. Finally, Section 5.5 discusses the policy implications of the adopted model and concludes.

5.2. Finance and Employment: A Post Keynesian-Kaleckian Model¹⁶⁷

We assume a closed economy model with no governmental intervention. In addition we assume technological and production conditions as given in order to prevent any possible investment depreciation. Further, the economy produces only one type of commodity in the presence of constant relations between employed volumes of labour (L) and real output level (Y) and between capital (K) and real output (Y)¹⁶⁸. A fundamental feature of our model is that it introduces a rentier income class, whose income is derived from recipients of interest payments, dividends and rents. Although this income class plays no role in the production process, it is assumed to provide the initial finance to start the business and receive part of the surplus as distributed profits.

Following the Post Keynesian price theory, we assume that firms set their prices by a mark-up that depends on the degree of price competition in goods market and the relative power of capital and labour in labour markets. The price setting is a distributive variable, since it affects the functional income distribution among the social classes in question. Moreover in the presence of different propensities to save and consume, changes in prices are likely to affect income distribution and thus the aggregate levels of savings, consumption and aggregate demand. Thus by considering that the mark-up level is set so as to cover the variable 'prime costs' (labour and raw

¹⁶⁷ The structure of our model is a variation and extension of the models developed by Asimakopoulos (1975), Blecker (2002) and Arestis and Sawyer (2003).

¹⁶⁸ For simplicity reasons we exclude overhead labour costs and capital depreciation.

materials) and by abstracting from raw materials, for simplicity reasons, the price equation for a representative firm equals to:

$$(1) p = \phi aw$$

where p : price level

ϕ : mark up (or alternatively $(1 + \phi)$ the price cost margin), with $\phi > 1$ so as to ensure the presence of imperfect competition

a : labour coefficient that is given by the employment-to-real output ratio L/Y that is assumed to be given

w : nominal wages

The way we define mark-up price, reveals the independence between its level and that of investment, output and employment that ensures the constancy of income profit shares in cases of drastic changes in economic conditions. As a result, shifts in income distribution and output are likely to be triggered as a response to investment level changes (see Crotty, 1986).

From equation (1) we define the profit share of value added (h) in the following way:

$$(2) h = (p - aw) / p = 1 - 1/\phi = (\phi - 1) / \phi$$

We define the profit rate (r) as the ratio of aggregate profit to capital stock that depends on the profit share and the endogenously determined rate of capacity utilization:

$$(3) r = (p - aw)Y / K = [(\phi - 1) / \phi]cu = hcu$$

where Y : real output

K : capital stock

$cu = Y / K$: capacity utilization¹⁶⁹

Since our model falls within the Kaleckian tradition we assume excess capacity, which implies that $Y < K$ and thus $cu < 1$; the higher the level of capacity utilization, the lower the level of employment and therefore the higher the possibility of fuelling economic activity. Moreover the usual assumption about excess capacity at which firms operate subject to constant (approximate) average direct costs, constrains any possible future capacity expansion from being followed by increase in costs and presumably prices (Sawyer, 2002; Arestis and Sawyer, 2003).

Furthermore, we adopt the Post Keynesian ‘horizontalist’ view, according to which interest rate that is assumed to be controlled by monetary authorities, is being treated as an exogenous variable for production and accumulation, whereas the quantities of credit and money are treated as endogenous variables for production and accumulation determined by the accumulation process¹⁷⁰. Following Hein (2006a, 2006b, 2007) and Hein and Vogel (2007), we assume that central banks make their policy decisions by considering the equality of real interest rate to its nominal level corrected by the inflation rate. As a result, there are no feedback effects from capital

¹⁶⁹The definition of capacity utilization is given by $cu = (Y / Y^*) (Y^* / K) = cu \frac{1}{v}$, where (Y / Y^*) is the ratio of actual to potential output level that reflects the true utilization rate and the inverse ratio of potential output to capital stock (Y^* / K) is defined as $\frac{1}{v}$. But provided the conditions of technology, we can exclude the latter term, since its introduction does not change essentially the outcomes (Blecker, 2002).

¹⁷⁰See also Lavoie (1992, 1996) and Moore (1989).

accumulation process on interest rate, while the magnitude of real interest rate corresponds to different monetary regimes.

As far as the accumulation process is concerned, it is assumed to be independently determined by savings since they precede income and hence savings but fundamentally depended on capitalists' investment decisions (Kalecki, 1937a, 1971). Thus, we assume that investment plans are financed partly by retained earnings and partly by rentiers, without making any explicit distinction between creditors receiving interest income and shareholders receiving dividend income. Even under these simplifications, the introduction of monetary factors that are reflected on interest payments raise the necessity for splitting aggregate (gross) profits into capitalists' profits after interest payments are paid, and rentiers' profits that equal to interest payments relative to stock of capitalists debt (D) and the long term exogenously given interest rate (i).

For the representative firm, which sets prices as a mark-up and faces labour and debt costs¹⁷¹, the short run profit equation is given by:

$$(4) \Pi^c = p(Y, z)Y - wL - iD$$

where p : the price charged by firm

Y : real output that is defined as a function of labour and capital $Y = f(l, k)$ Z

and is assumed $f_l > 0$ (partial derivative with respect to l) and $f_{ll} < 0$

wL : labour costs

¹⁷¹Other studies have explicitly considered interest payments as a factor that affects the price-cost margin (Moore, 1989; Argitis, 2001). In this study we abstain from such a consideration.

iD : debt costs

It can thereby be said that shifts in interest payments that arise either from changes in interest rates or debt levels, affect the structure of capitalists' profits and investment essentially. Moreover, since the mark-up indicates that a part of 'income pie' belongs to rentiers, profit shares (directly) and profit rates (indirectly) are affected by interest rates and should therefore respond to their variations.

On the other hand, under the assumption that there is no other source of rentiers' income except interest payments they receive from lending, their income is equal to:

$$(5) \Pi^r = iD$$

where D : the stock of capitalists' debt

i : the interest rate

As a result from the above profit distinction, total profits in a closed economy equal to the sum of capitalists and rentiers' profits:

$$(6) \Pi = \Pi^c + \Pi^r = \Pi^c + iD$$

Workers' aggregate money income is equal to nominal wages (w) times the level of employed labour (L)

$$(7) W = wL$$

Following Blecker (2002) we assume that employment equals to:

$$(8) L = acuK$$

where $cu = Y / K$: capacity utilization

K : capital stock

$a = L / Y$: labour-to-real output ratio

Respectively the unemployment level is represented by the equality $U = (L_f - L) / L_f$, with L_f the full employment level and U the unemployment level. The definition of employment and unemployment levels are helpful not only in determining their equilibrium, but also because during the bargaining process labour unions (workers) consider the level of unemployment as a factor that influences their power in the labour market as well as the level of the nominal wage at which targeted negatively.

Hence the aggregate national income equals to:

$$(9) pY = W + \Pi^c + \Pi^r$$

where pY : nominal aggregate national income

Π^c : capitalists' profits

Π^r : rentiers' profits

W : workers' aggregate money income

The presence of three social classes raises the degree of complexity of income distribution relations and their impact on economic activity. In our model however the important factor is rentiers' income and the way it influences economic activity and employment.

Equation (10) specifies an investment demand or the rate of capital accumulation made possible by realised investment as $g^i = I / K$.

$$(10) \quad g^i = \frac{\Delta K}{K} = \frac{I}{K} = b_0 + b_1(r - id) + b_2cu$$

where $b_i > 0$, with $i = 0,1,2$

I : aggregate investment

b_0 : Keynesian animal spirits or simply the state of capitalists' confidence about the investment plan they take on

r : profit rate

d : the ratio of aggregate capitalists' debt-to- capital stock ($= D / K$)

cu : capacity utilization that is assumed to be below its full levels $cu < 1$

or equivalently

$$(10') \quad g^i = b_0 + b_1(hcu - id) + b_2cu$$

This form of accumulation process is consistent with Kalecki's (1954) analysis according to which capital accumulation is affected positively by expected sales (capacity utilization level) and retained earnings (the distinction between capitalists'

profit rate and the debt-to-capital ratio times the interest rate). Further the adoption of the above function of capital accumulation is in line with the relevant Post Keynesian literature (see e.g. Bhaduri and Marglin, 1990, 1991; Rowthorn, 1981; Dutt, 1984, 1987; Taylor, 1985; Blecker, 2002). More specifically, investment is defined as a positive function of: a) b_0 the degree of capitalists' confidence to accumulate relative to the general economic conditions; b) b_1 the weight of internal funds that are affected by income distribution and monetary variables. We should mention that monetary factors in the form of interest rates and debt-to-capital ratio affect capitalists' profit rate and therefore their internal funds negatively. Besides, higher interest rates and/or debt ratios trigger Kalecki's 'principle of increasing risk' and are likely to constrain capitalists' ability to turn toward external funds; c) b_2 the degree of influence on investment from changes in the demand side (capacity utilization) of the economy.

The introduction of rentiers' income changes the savings function as well. More precisely, the aggregate level of savings in economy equals to the sum of the propensity to save out of wages (s_w) times total income of workers; plus the propensity to save out of capitalist profits (s_c) times capitalists profits; plus the propensity to save out of rentiers' profits (s_r) times their total income:

$$(11) S = s_w W + s_c \Pi^c + s_r \Pi^r$$

Following Kalecki's (1937a) argumentation that '*the capitalists get what they spend, the workers spend what they get*' we assume that workers have a zero propensity to save out of their income ($s_w = 0$), and therefore workers consume all of their income

or alternatively their propensity to consume equals to unity ($c_w = 1$). As a consequence, the inequalities that should be taken into account suggest that capitalists and rentiers' propensities to save are higher than that of workers. This simply means:

$$(12) s_c, s_r \succ s_w, \text{ where } s_w = 0 \text{ and } 0 \prec s_c, s_r \prec 1.$$

Equation (12) implies that the aggregate average propensity to save from a given level of income depends upon the income distribution between capitalists and workers. However, even if we assume that workers save out of their wages, their saving propensity rests at levels below those of capitalists and rentiers $s_c, s_r \succ s_w$ ¹⁷². A redistribution of a given income level from wages to profits reduces the level of consumption expenditure. Conversely, a rise in the wage share at the expense of the profit share raises the level of consumption expenditure generated by a given level of aggregate income. Under these conditions, equation (11) can then be re-written as:

$$(13) S = s_c \Pi^c + s_r \Pi^r = s_c (\Pi - iD) + s_r \Pi^r$$

Provided that capitalists save a part of their retained profits and that distributed retained profits can be saved or consumed relative to rentiers' propensities, we define the rate of accumulation made by realised savings as a ratio of aggregate savings to capital stock $g^s = S / K$, which equals to:

$$(14) g^s = \frac{S}{K} = \frac{[s_c (\Pi - iD) + s_r \Pi^r]}{K}$$

¹⁷²Even when workers have a positive savings propensity ($s_w \succ 0$), the results hardly change as long as the Keynesian theory of distribution is obtained and the inequality between wages and profits savings is satisfied.

that is equivalently written as:

$$(14') \quad g^s = s_c(hcu - id) + s_r id$$

Finally equation (15) is the well known Keynesian investment-savings macroeconomic equilibrium. In accordance with it, aggregate demand determines the level of aggregate supply or alternatively investment determines saving by changing the level of national income and the distribution as in Kaldor (1956) and in post Keynesian literature (see Kregel, 1979).

$$(15) \quad g_i = g_s$$

5.2.1. Short Run Equilibrium

The determination of short run equilibrium requires the adjustment of production and capacity utilization to the demand level of goods market. In other words, short run equilibrium is determined by considering the Keynesian investment-savings equality and implies the adjustment of aggregate supply towards the aggregate demand level or alternatively that investment determines savings through the appropriate adjustments to income distribution.

After substituting equations (10') and (14') into equation (15), the equilibrium values of capacity utilization, capital accumulation and profit rate are respectively:

$$(16) \quad cu^* = \frac{id(s_c - s_r - b_1) + b_0}{h(s_c - b_1) - b_2}$$

$$(17) \quad g_i^* = b_0 + (b_1 h + b_2) \frac{id(s_c - s_r - b_1) + b_0}{h(s_c - b_1) - b_2} - b_1 id$$

$$(18) \quad r^* = \frac{id(s_c - s_r - b_1) + b_0}{h(s_c - b_1) - b_2} h$$

The short run stability depends on the behaviour of the parameters of rentiers relative to capitalists' propensity to save, as well as on the degree of elasticity of the parameter that represents the impact of debt and interest rate on capitalists' investment plans. Hence, short run stability conditions require the induced increase in investment as capacity utilization level increases to be less than the induced increase in savings. This ensures the positive sign of denominator $h(s_c - b_1) - b_2 > 0$ and thereby $h(s_c - b_1) > b_2$ that explicitly requires $s_c > b_1$. In other words, the suggestion that savings are more sensitive than investment to capacity utilization changes turns to be the standard guarantee of the stability of equilibrium.

Under stability conditions, the level of capacity utilization is positive when $(s_c - s_r - b_1) > 0$ and thus rentiers' propensity to save is less than that of capitalists ($s_c > s_r$); a result that is expected since otherwise external finance would be constrained.

We proceed and use equilibrium capacity utilization level to determine the equilibrium value of employment. After the appropriate substitutions, the equilibrium level of employment is equal to:

$$(19) L^* = aK \frac{id(s_r - s_c - b_1) + b_0}{h(s_c - b_1) - b_2}$$

Considering the assumption about the constancy of capital stock and labour-to-output ratio in the short run, we note the endogenous character of employment in the sense that it is directly determined by capacity utilization.

In what follows we calculate the partial derivatives for each of the equilibrium levels of capacity utilization, capital accumulation, profit rate and employment with respect to rentiers' income that is equal to interest payments to capital stock ratio (id).

$$(20) \partial cu / \partial id = \frac{s_c - s_r - b_1}{h(s_c - b_1) - b_2}$$

$$(21) \partial g_i / \partial id = \frac{(hb_1 + b_2)(s_c - s_r - b_1) - b_1}{h(s_c - b_1) - b_2}$$

$$(22) \partial r / \partial id = \frac{(s_c - s_r - b_1)h}{h(s_c - b_1) - b_2}$$

$$(23) \partial L / \partial id = \frac{aK(s_c - s_r - b_1)}{h(s_c - b_1) - b_2}$$

We can also calculate the reactions of each of these equilibrium magnitudes to interest rate changes by considering a constant debt-to-capital ratio ($d = \bar{d} > 0$):

$$(24) \quad \partial cu / \partial i = \frac{d(s_c - s_r - b_1)}{h(s_c - b_1) - b_2}$$

$$(25) \quad \partial g_i / \partial i = \frac{d(hb_1 + b_2)(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} - b_1 d$$

$$(26) \quad \partial r / \partial i = \frac{(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} h$$

$$(27) \quad \partial L / \partial i = aK \frac{d(s_c - s_r - b_1)}{h(s_c - b_1) - b_2}$$

In the case of a change in short run level of capital stock, the effect on equilibrium labour level is:

$$(28) \quad \partial L^* / \partial K = a \frac{di(s_c - s_r + b_1)}{h(s_c - b_1) - b_2}$$

All possible results are illustrated in the following *Table 5.1*:

Table 5.1.

<i>Responses of capacity utilization, capital accumulation, profit rate and employment rate to interest rate variation</i>	
<i>Short-Run Stability</i>	$\partial cu / \partial i > 0$, if $(s_c - s_r - b_1) > 0$
<i>Condition:</i>	$\partial g_i / \partial i > 0$, if $(hb_1 + b_2)(s_c - s_r - b_1) > 0$
$h(s_c - b_1) > b_2$	$\partial r / \partial i > 0$, if $(s_c - s_r - b_1) > 0$
	$\partial L / \partial i > 0$, if $aK(s_c - s_r - b_1) > 0$

The reaction of each magnitude to rentiers' income as well as to interest rate variations depends on: (a) the relations between capitalists and rentiers' propensities to save out of their profit incomes respectively and (b) the level of weight of internal funds b_1 that captures the distributional effect of external finance. Moreover, the fact that the mark-up is assumed to be rigid, implies that the level of debt-to-capital ratio can affect only the extent of change since the lower its level, the smaller the effects from interest rate changes are going to be.

Considering that the values of both capitalists' and rentiers' saving propensities are positive but lower than unity ($0 < s_c, s_r < 1$), interest rate increases affect the level of capacity utilization and growth positively when: capitalists' propensity to save is higher than that of rentiers ($s_c > s_r$) and investment is not affected by the distributional effect of external finance, i.e. when the level of debt and the elasticity of

investment with respect to internal funds (b_1) are relatively low. This is the ‘*puzzling case*’¹⁷³. On the other hand, real interest rate increases affect the level of capacity utilization, growth and so forth negatively, when: capitalists’ propensity to save out of their profit income rests below that of rentiers ($s_c < s_r$), while the level of debt as well as the elasticity of investment with respect to internal funds (b_1) is relatively high. According to Lavoie (1995) these conditions reflect the ‘*normal case*’. Obviously in the *puzzling case*, the level of capacity utilization determines significantly the level of investment whereas its role is negligible in the normal case. The same results are also reached when capitalists face a rising inflation that reduces the real debt-to-capital ratio and/or lower interest rates.

Similar arguments can be made in the case of employment, since its level is directly affected by capacity utilization. Thus, when capitalists are characterised by higher propensity to save than rentiers ($s_c > s_r$) then rising interest rates affect capacity utilization and therefore employment positively (the *puzzling case*), whereas in the opposite case ($s_c < s_r$) increasing real interest payments and indebtedness influence the level of capacity utilization and thus employment negatively (the *normal case*)¹⁷⁴.

In general, our analysis is consistent with the relevant Post Keynesian literature in the sense that aggregate demand has an essential role in determining economic activity and employment. Our argument pinpoints the important role the saving behaviour of

¹⁷³In practice the *puzzling case* is less likely to occur, since it requires a relative high negative signed coefficient of b_1 that reflects the impacts from profitability on investment. Alternatively, capitalists cannot be expected to make their investment decisions by considering negative profitability so that $\partial g_i / \partial id < 0$.

¹⁷⁴Note that short run results rest upon the assumptions of a given labour productivity and labour supply function.

the social groups in question and the external finance play in macroeconomic performance.

5.2.1.1. Short Run Equilibrium when workers save ($s_w > 0$ but $s_c, s_r > s_w$)

A fundamental characteristic of the basic structure of our model is the Kaleckian assumption that workers consume all of their aggregate income. Nowadays it seems to be more realistic to assume that workers have a propensity to save but at a level below that of capitalists and rentiers. Considering as given equations (1)-(10) and assuming a positive saving propensity for workers, equation (12) is rewritten as:

$$(12') \quad s_c, s_r > s_w, \text{ where } s_w > 0 \text{ and } 0 < s_c, s_w, s_r < 1$$

According to equation (12') the aggregate average propensity to save from aggregate national income now depends upon income distribution among all income classes in question. Moreover, a possible redistribution of the unchanged aggregate national income in favour of profits (capitalists or rentiers) pressures down consumption expenditures, since workers' propensity to consume is higher. Conversely, an increase in wage share at the expense of the profit share will raise the level of consumption expenditure generated by a given level of aggregate income.

But workers' decision to save a part of their incomes rearranges the identity of aggregate savings (eq. (11)) to:

$$(11') \quad S = s_c \Pi^c + s_w W + s_r \Pi^r = s_c (\Pi - iD) + s_w wL + s_r \Pi^r$$

By calculating the realised saving that is simply the saving-to-nominal capital stock ratio, it turns out that:

$$(14'') \quad g_s = s_c(hcu - id) + s_w wl + s_r id$$

where $l = L/K$

After substituting in Keynesian investment-savings macroeconomic equilibrium (eq. (15)) equations (10') and (14''), the new short run equilibrium values for capacity utilization, capital accumulation, profit rate and employment are respectively equal to:

$$(16') \quad cu^* = \frac{b_0 + id(s_c - s_r - b_1) - s_w wl}{(s_c - b_1)h - b_2}$$

$$(17') \quad g_i^* = b_0 + (b_1 h + b_2) \frac{b_0 - s_w wl + id(s_c - s_r - b_1)}{(s_c - b_1)h - b_2} - b_1 id$$

$$(18') \quad r^* = h \frac{b_0 - s_w wl + id(s_c - s_r - b_1)}{(s_c - b_1)h - b_2}$$

$$(19') \quad L^* = aK \frac{b_0 - s_w wl + id(s_c - s_r - id)}{(s_c - b_1)h - b_2}$$

It is obvious that even when workers save, short run stability conditions are determined by the relation between capitalists and rentiers' propensity to save (s_c, s_r) as well as by the degree of elasticity of the parameter that reflects the impact of debt and interest rate on capitalists' investment plans (b_1). In other words, the required

conditions for stability remain unchanged. We conclude that the way that monetary factors affect real macroeconomic magnitudes is the same, regardless of whether workers are characterised by a zero or a positive saving propensity.

5.2.2. Long Run Equilibrium¹⁷⁵

One of the fundamental assumptions in short run Kaleckian analysis suggests the constancy of capital stock ($K = \bar{K} > 0$) and debt-to-capital ratio ($d = \bar{d} > 0$) levels; assumptions that shall be relaxed when we proceed in the long run analysis. Thus, capital stock is assumed to vary over time, while there is a simultaneous effect on capacity utilization, capital accumulation, employment and the general economic activity from variations in the levels of endogenously determined debt-to-capital ratio. The debt-to-capital ratio as defined in section 5.2.1 is equal to:

$$d = \frac{D}{K}$$

where d : debt-to-capital ratio

D : level of debt

K : level of capital stock

Furthermore, by assuming away the presence of inflation (as it is reflected on possible mark-up responses to interest rate changes), the growth rate of debt-to-capital ratio is defined by regarding the logarithm derivative of this ratio, which equals to:

¹⁷⁵The long run analysis rests upon Lavoie's (1995) and Hein's (2006b) methodological analysis.

$$(29) \hat{d} = \hat{D} - \hat{K} = \hat{D} - g_i^*$$

where \hat{d} : growth rate of debt-to-capital ratio

\hat{D} : growth rate of debt level

\hat{K} : growth rate of capital stock level, which is equal to the short run equilibrium value of capital accumulation g_i^*

Given the assumptions of short run analysis, it is implied that the additional amount of financing investment is granted in each period by rentiers' savings (ΔD). However, it should be mentioned that the adoption of this assumption does not set rentiers' savings as a precondition for credit and investment, although both rentiers' savings and capitalists' retained profits arise from capitalists' investment plans that are initially financed by short term credit. As a result the additional long run credit granted in each period equals to:

$$(30) \Delta D = s_r i D$$

while the growth rate of debt according to all the above equals to:

$$(31) \hat{D} = \frac{\Delta D}{D} = \frac{s_r i D}{D} = s_r i$$

Moreover, in order to define the long run equilibrium of the endogenously determined debt-to-capital ratio we regard its constancy, i.e. $\hat{d} = 0$. Integrating this condition into equation (29) and using equations (17) and (31), the long run equilibrium level of debt-to-capital ratio equals to:

$$(32) d^* = \frac{s_r i(h(s_c - b_1) - b_2) - b_0 s_c h}{i[(b_1 h + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2)]}$$

whilst the growth rate of debt-to-capital ratio respectively equals to:

$$(33) \hat{d} = \frac{s_r i(h(s_c - b_1) - b_2) - b_0 s_c h - id[(b_1 h + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2)]}{h(s_c - b_1) - b_2}$$

Following Lavoie (1995) we define long run stability conditions by using the growth rate of debt-to-capital ratio equilibrium and suggesting that changes in debt-to-capital ratio affect it negatively, i.e. $\frac{\partial \hat{d}}{\partial d} < 0$ (Lavoie, 1995, p.168). Hence provided that short run equilibrium goods market is characterised by stability ($h(s_c - b_1) > b_2$), we calculate the partial derivative of equation (33) with respect to debt-to-capital changes that yields:

$$(34) \frac{\partial \hat{d}}{\partial d} = - \frac{i[(b_1 h + b_2)(s_c - s_r - b_1) - b_1((s_c - b_1)h - b_2)]}{h(s_c - b_1) - b_2}$$

According to this equation, long run stability $\left(\frac{\partial \hat{d}}{\partial d} < 0\right)$ stands when its numerator is positively signed:

$$(35) (b_1 h + b_2)(s_c - s_r - b_1) - b_1((s_c - b_1)h - b_2) > 0$$

that is equivalently written as:

$$(35') \quad (b_1 h + b_2)(s_c - s_r - b_1) > b_1((s_c - b_1)h - b_2)$$

In the same sense with short run analysis, the long run stability conditions are determined via the relation between capitalists' and rentiers' propensity to save out of their incomes, as well as the elasticity degree of the parameters of: a) the impact of debt and interest rate (b_1) and b) the impact of the capacity utilization (b_2) on capitalists' investment plans. Hence, long run stability requires rentiers to be characterised by lower propensity to save relative to that of capitalists ($s_r < s_c$) and capitalists' investment decisions to be very elastic with respect to capacity utilization changes (b_2 relative high) but very inelastic with respect to debt (internal funds) shifts (b_1 relative low). According to Lavoie (1995), *long run stability* corresponds to the *short run puzzling case* and therefore interest rate increases affect capacity utilization, capital accumulation, profit rate and employment positively.

On the other hand, long run instability arises when the growth rate of debt-to-capital ratio is positively affected by changes in the debt-to-capital ratio level itself, i.e. $\frac{\partial \hat{d}}{\partial d} > 0$. As a result, the numerator of partial derivative is required to be negatively signed ($((b_1 h + b_2)(s_c - s_r - b_1) - b_1((s_c - b_1)h - b_2)) < 0$). In order for these conditions to be achieved, rentiers should be characterised by higher propensity to save relative to that of capitalists ($s_r > s_c$), while capitalists' investment decisions should be affected essentially by changes in debt and debt payments (internal funds) but not by changes in demand levels (capacity utilization). Therefore high values for the coefficients of debt and thereby relative elastic b_1 but relative low values for the coefficient of

capacity and therefore relative inelastic b_2 are necessary. In these conditions, deviations of debt-to-capital ratio from its equilibrium are possible to generate a long run debt-to-capital ratio of either unity or zero. According to Lavoie (1995), conditions of *long run equilibrium instability* turn out to be consistent with *short run normal case* that suggests the negative impact on capacity utilization, capital accumulation, profit rate and employment levels by interest rate increases.

Further, the effects of interest rate variations on endogenously determined long run equilibrium of debt-to-capital ratio are determined by calculating the partial derivative of equation (32) with respect to interest rate changes. This yields that:

$$(36) \frac{\partial d^*}{\partial i} = \frac{s_r(h(s_c - b_1) - b_2) - d[(hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2)]}{i[(hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2)]}$$

that is re-written as:

$$(36') \frac{\partial d^*}{\partial i} = \frac{1}{i} \left[\frac{s_r(h(s_c - b_1) - b_2)}{(hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2)} - d \right]$$

It should be mentioned that these effects rest upon the assumption about an interest-inelastic (rigid) mark-up. As a consequence, it is implied the inability of interest rate variations to influence mark-up as well as the inability of variations of the endogenously determined long run debt-to-capital ratio level to affect either interest rates or mark-up levels. In accordance with these suggestions, income can be redistributed between rentiers and capitalists through changes in debt-to-capital ratio and not through interest rate variations. However, it is argued that the debt-to-capital

ratio does not affect the direction of change of the equilibrium values, but affects the extent of such a change. Hence for conditions of short and long run stability, the use of equation (36') allows us to examine the relation between the initial level of debt-to-capital ratio and interest rate variations. For that reason we distinguish the following three cases¹⁷⁶:

In the former, increasing interest rates affect the long run debt-to-capital ratio negatively when its initial equilibrium is relatively high. As a result, the levels of capital accumulation, employment and the general economic activity can be expanded. More specifically:

$$(37) \text{ If } d > \frac{s_r(h(s_c - b_1) - b_2)}{((hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2))}, \text{ then } \frac{\partial d}{\partial i} < 0$$

On the other hand, if interest rates increase when the initial equilibrium debt-to-capital ratio is still low, then debt-to-capital ratio increases and in turn constrains economic expansion:

$$(38) \text{ If } d < \frac{s_r(h(s_c - b_1) - b_2)}{((hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2))}, \text{ then } \frac{\partial d}{\partial i} > 0$$

Finally when the debt-to-capital ratio rests upon its initial equilibrium, interest rate variations have no impact on it, so as the general economic activity to be affected neither positively nor negatively:

¹⁷⁶The necessity for examining the responses of debt-to-capital ratio to interest rate changes stems from the assumption about the endogenous character of long run debt-to-capital that implicitly affects the way that the rest of real macroeconomic magnitudes respond to interest rate changes.

$$(39) \text{ If } d = \frac{s_r(h(s_c - b_1) - b_2)}{((hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2))}, \text{ then } \frac{\partial d}{\partial i} = 0$$

Evidently, the relation between interest rate and the equilibrium debt-to-capital ratio, provided that long run stability stands, depends not only on the parameters of the saving and investment function, but also on the initial conditions of long run debt-to-capital ratio and the level from which interest rates start to change.

The presence of rentiers' income class raises the possibility of instability conditions during the long run, though the short run analysis is characterised by stability conditions. By using equation (36') and considering that instability arises when $\frac{\partial \hat{d}}{\partial d} > 0$, the negative impact on debt-to-capital ratio from interest rate changes is

implicitly proved when:

$$(36') \frac{\partial d^*}{\partial i} = \frac{1}{i} \left[\frac{s_r(h(s_c - b_1) - b_2)}{(hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2)} - d \right] < 0$$

Indeed, in accordance with the analysis of the case of unstable long run equilibrium, interest rate increases trigger debt-to-capital ratio downward and create the appropriate conditions for economic expansion. According to Lavoie (1995), even under instability conditions the initial equilibrium of debt-to-capital ratio plays an essential role when interest rate increases. More specifically, Lavoie claimed that in cases where initial equilibrium values of debt-to-capital ratio are relatively high and economy is characterised by disequilibrium, it is possible for monetary authorities to reduce the level of real interest rates in an attempt to push economy and debt-to-

capital ratio towards equilibrium. Although such a decision depresses debt-to-capital ratio, the level of its reduction is possible not to be exactly compatible with economic expansion because of the initially high level of debt-to-capital ratio. The implications of such policy suggest that economy is prepared to face the co-existence of continuous deterioration of capital accumulation and continuous increases of debt-to-capital ratio, at least over the period until the level of debt-to-capital ratio equals to unity. According to Lavoie (1995) and Hein (2006b) this is defined as the “*paradox of debt*”.

Moreover, when the initial equilibrium levels of debt-to-capital ratio are relatively low, interest rate reductions are associated with continuous increases in accumulation rate and a fall in the level of debt-to-capital ratio. However according to Lavoie (1995), it is highly possible for economy to reduce further interest rates since: “*there are no inexorable forces that propel up real interest rates whenever accumulation is speeded up*” (Lavoie, 1992, pp. 197-203). This suggestion rests upon the causality running from investment to savings as well as on money endogeneity but rejects the suggestion that rising accumulation is necessarily associated with rising interest rates and therefore debt burden. Further, according to Lavoie’s suggestions about the unstable long run equilibrium “*..the model features characteristics that one has been trained to expect. Excessively high real rates of interest have unfavorable consequences on the actual leverage ratio, effective demand and the rate of accumulation*”, (Lavoie, 1995, p. 170). In particular if long run equilibrium tends to be unstable then rising interest rates always imply the reduction of the debt-to-capital ratio levels.

Additionally, we determine the effects from interest rate changes on the rest of the real magnitudes by estimating the partial derivatives of each of them to interest rate changes, given stability conditions for both short and long run. So, given the constancy of long run debt-to-capital ratio ($d = \bar{d} > 0$), we determine the responses of capacity utilization, capital accumulation and profit rate to long run interest rate variations are respectively equal to:

$$(40) \frac{\partial cu}{\partial i} = \frac{\left(d + i \frac{\partial d}{\partial i}\right)(s_c - s_r - b_1)}{h(s_c - b_1) - b_2}$$

$$(41) \frac{\partial g}{\partial i} = \frac{\left(d + i \frac{\partial d}{\partial i}\right)[(b_1 h + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2)]}{h(s_c - b_1) - b_2}$$

$$(42) \frac{\partial r}{\partial i} = \frac{\left(d + i \frac{\partial d}{\partial i}\right)(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} h$$

Moreover, the responses of endogenously determined variables of capacity utilization, capital accumulation and profit rate to debt-to-capital ratio, given the constancy but positive levels of interest rate ($i = \bar{i} > 0$), yield that:

$$(43) \frac{\partial cu}{\partial d} = \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2}$$

$$(44) \frac{\partial g_i}{\partial d} = (b_1 h + b_2) \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} - b_1 i$$

$$(45) \quad \frac{\partial r}{\partial d} = \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} h$$

The signs of responses of each of these magnitudes to interest rate and to long run debt-to-capital ratio changes, given the assumption about short run stability and a constant but positive interest rate, are included in *Table 5.2.*:

Table 5.2.

<i>Responses of capacity utilization, capital accumulation profit rate and employment to interest rate and long run equilibrium level debt-capital ratio shifts when equilibrium is stable</i>	
Short run stability condition: $h(s_c - b_1) > b_2$	$\frac{\partial cu}{\partial i}; \frac{\partial cu}{\partial d} > 0$, if $s_c - s_r - b_1 > 0$
Long run stability condition: $(b_1 h + b_2)(s_c - s_r - b_1) - b_1((s_c - b_1)h - b_2) > 0$ and constancy of:	$\frac{\partial cu}{\partial i}; \frac{\partial g_i}{\partial d} > 0$, if $(b_1 h + b_2)(s_c - s_r - b_1) > 0$
(a) debt-to-capital ratio ($d = \bar{d} > 0$)	$\frac{\partial r}{\partial i}; \frac{\partial r}{\partial d} > 0$, if $h(s_c - s_r - b_1) > 0$
(b) interest rate constancy ($i = \bar{i} > 0$)	

Nevertheless the way that each of the endogenously long run equilibrium magnitudes responds to debt payments and interest rate shifts, is implicitly determined by the way that long run equilibrium value of debt-to-capital ratio responds to interest rate changes (eq. (37)-(39)) as well as by whether economy tends towards stable or unstable conditions.

By considering that the response of capital accumulation to interest rate changes represents the reaction of the whole economic activity, we calculate the partial derivative of capital accumulation with respect to interest rate changes. After integrating equation (36') into (40), we obtain that:

$$(40') \quad \frac{\partial g}{\partial i} = s_r > 0$$

Upward interest rates shifts, always affect the equilibrium rate of capital accumulation positively. In no case however, do these results suggest the dependence of long run equilibrium level of debt-to-capital ratio on the value of the interest rate. Besides, Lavoie mentions that:

“...higher interest rate induces a gradual increase in the leverage ratio of firms, accompanied by a higher rate of accumulation, until the new long run equilibrium leverage ratio is reached. Therefore, while higher real interest rates lead to higher leverage ratios, a result one would expect, they also lead to higher rates of accumulation, a result that is rather unexpected. Stability in the long run sense must therefore be associated with puzzling effective demand results” (Lavoie, 1995, pp. 169-170)¹⁷⁷.

But even in conditions of long run instability, the conjunction of equation (36') and (30) imply the positive effect from interest rate variations on capital accumulation

¹⁷⁷As leverage ratio Lavoie (1995) defines the ratio of the amount of loans contracted by the firms over the replacement value of capital.

$\frac{\partial g}{\partial i} = s_r > 0$. These results can easily be reached with regard to the constancy of long run debt-to-capital ratio ($\hat{d} = 0$).

It is widely accepted that the consequences of the above conditions reflect the main characteristics of most economies since 1980s, in the sense that economies have increased their debt accumulation independently their actual conditions. This in conjunction with the implementation of restrictive monetary policies has led them to extremely high interest rates. The most significant consequence of this tendency is the 'bequest' to economies of many problems that are implicitly reflected on persistently high unemployment levels. Besides, high levels of interest rates induce gradual increases in capitalists' debt-to-capital ratio. Regardless of whether stability or instability conditions stand, it is possible for debt-to-capital ratio to be accompanied by relatively high capital accumulation rates and the targets set by individual firms to be systematically missed because of macroeconomic reasons.

The arguments that can be made about the behaviour of employment with respect to changes in debt-to-capital ratio and interest rates are similar. The difference in long run analysis is that the employment level equals the product of the endogenously determined capacity utilization level and the growth rate of capital stock. As a result, equation (8) is rearranged for the long run analysis and is equivalently written as:

$$(8') L = acug_i^*$$

where $cu = Y / K$: capacity utilization

$a = L / Y$: labour-to-real output ratio

g_i^* : growth rate of capital accumulation (given by equation (17))

After the appropriate substitutions, the long run employment equilibrium is equal to:

$$(46) \quad L^* = a \frac{b_0^2 s_c h + id^2 [(s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r)] + id [b_0 s_c h (s_c - s_r - b_1) + b_0 (b_2 s_c - (b_1 h + b_2) s_r)]}{(h(s_c - b_1) - b_2)^2}$$

The use of equation (46) allows us to calculate the effects on long run equilibrium employment levels of changes in: a) interest payments (id); b) interest rate (i) given the constancy of long run debt-to-capital ratio ($d = \bar{d} > 0$) and c) changes in debt-to-capital ratio (d) given the constancy of interest rate levels ($i = \bar{i} > 0$). The results are respectively equal to:

$$(47) \quad \frac{\partial L}{\partial id} = a \frac{(b_0 s_c h (s_c - s_r - b_1) + b_0 (b_2 s_c - (b_1 h + b_2) s_r)) + (2id (s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r))}{(h(s_c - b_1) - b_2)^2}$$

$$(48) \quad \frac{\partial L}{\partial i} = a \frac{\left(d + i \frac{\partial d}{\partial i}\right) [b_0 s_c h (s_c - s_r - b_1) + b_0 (b_2 s_c - (b_1 h + b_2) s_r)] + 2 \left(d + i \frac{\partial d}{\partial i}\right) ((s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r))}{(h(s_c - b_1) - b_2)^2}$$

$$(49) \quad \frac{\partial L}{\partial d} = a \frac{2id ((s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r)) + i (b_0 s_c h (s_c - s_r - b_1) + b_0 (b_2 s_c - (b_1 h + b_2) s_r))}{(h(s_c - b_1) - b_2)^2}$$

It is obvious that the partial derivatives of employment include both the terms of long run interest rate and debt-to-capital ratio that implicitly influence employment responses to: a) interest rate; b) debt-to-capital ratio and c) interest payment changes.

Considering the effects of monetary factors on employment as well as the three

distinct ways that debt-to-capital ratio responds to interest rate changes when stability stands (eq. (37)-(39)) and the negative impact from interest rate variations on long run debt-to-capital ratio under instability (eq. (36'')), we conclude that the response of employment on upwards interest rate changes affect equals:

$$(48') \quad \frac{\partial L}{\partial i} = a \frac{s_r [(b_0 s_c h(s_c - s_r - b_1) + b_0 (b_2 s_c - (b_1 h + b_2) s_r)) + 2((s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r))]}{[(h b_1 + b_2)(s_c - s_r - b_1) - (b_1 (h(s_c - b_1) - b_2))] [h(s_c - b_1) - b_2]}$$

It becomes clear that the long run employment levels are positively affected by interest rate increases $\left(\frac{\partial L}{\partial i} > 0\right)$, when capitalists' saving propensity is above that of rentiers' and their investment decisions are mainly affected by changes in capacity utilization (relatively high b_2) yet thinly by changes in external finance (low levels of b_1). This result is expected as long as employment is directly determined by capacity utilization. Additionally, an implicit relation between capital accumulation and thus economic growth and employment level is proved and is confirmed even in this model.

In particular, regardless of whether stability or instability conditions characterise economies, rentiers are required to have lower propensity to save relative to that of capitalists and simultaneously capitalists' investment decisions to be very responsive to capacity utilization changes but irresponsive to changes in the degree of external finance. These results reflect even the long run equilibrium level of employment, which signifies the role of capitalists' interest payment obligations in determining it. However, contrary to assumed constancy of capital stock in the short run, its variance during the long run equals short run equilibrium level of capital accumulation. As a

result of the constancy of capacity utilization and labour-to-output ratio, the growth rate of employment is equal to the growth rate of capital stock.

Additionally the behaviour of debt-to-capital ratio and its implications for long run stability or instability conditions has a significant role in determining the whole economic process and its growth levels in terms of employment and accumulation. The general outcomes and the effects of interest rate and debt-to-capital ratio changes on capital accumulation and employment in both short and long run analysis are presented in *Table 1. in Appendix A.*

Our results extend the analysis done by Lavoie (1995) and Hein (2006b) in the sense that not only do we consider the endogenously determined capacity utilization and its active role in investment functions, but also we allow both capitalists and rentiers through their investment, savings and finance decisions to determine actively economic process. Furthermore, there is no doubt that the factors that determine the final effects of debt-to-capital ratio on economic activity are represented by the parameters of rentiers and capitalists saving propensities as well as the sensitivity of investment decisions from shifts in external finance and capacity utilization and the initial equilibrium conditions of debt-to-capital ratio.

5.2.2.1. Long Run Equilibrium when workers save ($s_w > 0$ but $s_c, s_r > s_w$)

By considering the constancy of growth rate of debt-to-capital ratio ($\hat{d} = 0$) and by substituting equations (17') and (31) into equation (29), the long run equilibrium debt-

to-capital ratio when workers are characterised by a positive propensity to save out of their incomes, is:

$$(32') \quad d^* = \frac{s_r i (h(s_c - b_1) - b_2) - b_0 s_c h - s_w w l (b_1 h + b_2)}{i [(b_1 h + b_2)(s_c - s_r - b_1) - b_1 (h(s_c - b_1) - b_2)]}$$

while the growth rate of debt-to- capital ratio is respectively equal to:

$$(33') \quad \hat{d} = \frac{s_r i (h(s_c - b_1) - b_2) - b_0 s_c h - s_w w l - id [(b_1 h + b_2)(s_c - s_r - b_1) - b_1 (h(s_c - b_1) - b_2)]}{h(s_c - b_1) - b_2}$$

Apparently the introduction of workers' propensity, changes only the constant term and since it is not included in the definition of debt-to-capital ratio, the analysis remains unchanged.

Finally, by substituting in equation (8'), equations (16') and (17') the long run equilibrium employment level when workers save, yields:

$$(46') \quad L^* = a \frac{(b_0 - s_w w l)(b_0 s_c h - s_w w l (b_1 h + b_2)) + id((b_0 - s_w w l)(b_2 s_c - s_r (b_1 h + b_2))) + (id)^2 ((s_c - s_r - b_1)(b_2 s_c - s_r (b_2 - b_1 h)))}{(h(s_c - b_1) - b_2)^2}$$

By using equation (46') we can estimate the effects on long run employment levels from changes in: a) interest payments (id); b) interest rate (i) given the constancy of long run debt-to-capital ratio ($d = \bar{d} > 0$) and c) changes in debt-to-capital ratio (d) given the assumption about constancy of the interest rate levels ($i = \bar{i} > 0$). The implied changes are respectively equal to:

$$(47') \quad \frac{\partial L}{\partial id} = a \frac{((b_0 - s_w wl)(b_2 s_c - s_r (b_1 h + b_2))) + 2id((s_c - s_r - b_1)(b_2 s_c - s_r (b_2 - b_1 h)))}{(h(s_c - b_1) - b_2)^2}$$

$$(48') \quad \frac{\partial L}{\partial i} = a \frac{\left(d + i \frac{\partial d}{\partial i}\right)(b_0 - s_w wl)(b_2 s_c - s_r (b_1 h + b_2)) + 2\left(d + i \frac{\partial d}{\partial i}\right)((s_c - s_r - b_1)(b_2 s_c - s_r (b_2 - b_1 h)))}{(h(s_c - b_1) - b_2)^2}$$

$$(49') \quad \frac{\partial L}{\partial d} = a \frac{d((b_0 - s_w wl)(b_2 s_c - s_r (b_1 h + b_2))) + 2id((s_c - s_r - b_1)(b_2 s_c - s_r (b_2 - b_1 h)))}{(h(s_c - b_1) - b_2)^2}$$

Hence, under short and long run stability conditions, when workers save, employment responds positively to variations of monetary factors:

$$(48'') \quad \frac{\partial L}{\partial i} = a \frac{s_r((b_0 - s_w wl)(b_2 s_c - s_r (b_1 h + b_2))) + 2s_r((s_c - s_r - b_1)(b_2 s_c - s_r (b_2 - b_1 h)))}{(h(s_c - b_1) - b_2)((hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2))} > 0$$

In the long run, an increase in the interest rates has a negative influence on the debt-to-capital ratio and hence positively the employment level $\frac{\partial L}{\partial i} > 0$.

According to the above analysis, workers' decision to save out of their incomes affects the level of the long run equilibrium of employment directly. This is expected since its level is determined by endogenously determined levels of capacity utilization and capital stock.

5.3. Finance and Employment in a Closed Economy Model with Government Intervention¹⁷⁸

According to the implications of our core model, external finance affects economic activity essentially. Bearing in mind that sustained and maintained economic growth can be reached through the appropriate treatment of fiscal policy, in this section we extend the core model by allowing government to intervene through income taxation and government expenditures. Besides, it is believed that the appropriate treatment of income taxation policies is possible to create a chain of income expenditures on the whole economic activity, through changes in saving, consumption, investment and finance decisions of each income class (Blecker, 2002).

Considering equations (1)-(9) of the core model as given and assuming the introduction of a constant level of government expenditures and progressive income taxation, we rearrange equations of capital accumulation (eq. (10)) and realised savings (eq. (13))¹⁷⁹. It should be mentioned that the degree of taxation progressiveness is translated into a higher tax level on capitalists' income compared to that of workers ($t_c > t_w$) and an inequality between the levels of capitalists and rentiers on their incomes ($t_c > / < t_r$) that is determined by the actual economic conditions and policy targets. As far as our intention is to accelerate aggregate demand, employment and economic activity levels, it seems convenient to find ways

¹⁷⁸The core equations of our model in this section are a variation and extension of the models developed by Kalecki (1937b), Asiminakopoulos and Burbidge (1974); Damaria and Mair (1992) and Blecker (2002).

¹⁷⁹The degree of progressivity or regressivity of income taxation is an essential factor for determining the effects of taxation on economic activity. As a result, the higher the degree of income taxation progressivity; the higher are the possibilities for enhancing stabilization properties on grounds of equity and income distribution (Mott and Slattery, 1994; Sawyer, 2007a, 2007b). In any case, with respect to levels of external finance and government expenditures, the positive effects of progressive income taxation on economic activity are determined by the way they are finally used.

to squeeze down the role of rentiers so as capitalists to ‘release’ their investment plans from external finance as much as it is possible. For that reason, we decide to levy rentiers’ higher income tax relative to that of capitalists’ ($t_r > t_c$)¹⁸⁰.

We additionally assume the presence of imbalanced but not continuous deficit budgets, so as both budget deficits and demand shortages to be controlled through changes in the structure but not in the levels of income taxation. Besides, according to the Keynesian approach the presence of fiscal deficits in economies that operate at excess capacity can stimulate economic activity. Further the presence of balanced budgets, except for being unrealistic turns out to be inconsistent with actual economic conditions, in the sense that changes in taxation structures should coincide with proportional and in the same direction changes in government expenditures.

For the purpose of the analysis and in accordance with the adoption of interest-inelastic mark up, we assume a tax-inelastic mark-up, which restrains capitalists from passing the additional cost of income tax on consumers’ prices. So we pay attention only to income taxation (Kalecki, 1937b). In other words, the final effects on economic activity with respect to after tax incomes are essentially determined by whether capitalists have the ability to adjust their mark-ups to taxation changes or not; an ability that is determined by the degree of capitalists’ monopoly power in goods market (Laramie, 1991). However, the assumption of an interest inelastic mark-up implies that income taxation is treated as an additional production cost that triggers capitalists’ profits and thereby their investing, lending and borrowing decisions that

¹⁸⁰In cases where capitalists are characterised by a saving propensity above that of rentiers and workers, in order for economic activity to be enforced we introduce an income taxation where rentiers face lower income taxes relative to that of capitalists ($t_w < t_r < t_c$), since the sum of capitalists and rentiers’ savings can be a possible source of external finance of investment.

are made with respect to after tax liquidity preferences¹⁸¹. Besides in Kalecki's (1937b) view, taxation on capitalists' profits should be faced as a part of gross profits and not as a prime cost that prevents capitalists from maximizing their after tax profits.

Indeed, Kalecki's theory about the degree of monopoly and therefore of income distribution occupies a crucial role in his (Kalecki, 1937b) taxation theory because of the interdependence between distribution of national income among income classes and the determination of employment levels. This is an issue that was never appreciated by Keynes adequately. For that reason, it is believed that Kalecki's taxation approach is more preferable relative to that of Keynes (Lamarie and Mair, 1996).

Under these assumptions, we define the accumulation of realised taxation receipts as a ratio of taxation revenues to capital stock $g_t = T / K$ that equals:

$$(50) T / K = t_c(hcu - id) + t_r id + t_w wl \quad ^{182}$$

where T / K : ratio of aggregate taxes to capital stock

t_c : level of tax on capitalists' incomes ($hcu - id$)

t_r : level of tax on rentiers' incomes (id)

¹⁸¹ According to Kalecki (1937b) there is no change in liquidity preferences in order to ensure that a possible rise in income tax increases the level of interest rates, since otherwise the net reward of lending would be dismissed.

¹⁸² The form of taxation function is determined by taking into account the corporate income tax that is fully integrated into the personal income tax revenue. However, we could determine the level of taxation revenue by following explicitly Asimakopulos and Burdridge (1974), who embody the "double taxation" of income. In this case the form of equation (50) would be $T / K = t_c(hcu - id) + t_r(1 - t_c)id + t_w(wl)$, where rentiers' income double taxed is explained by the fact that their income profits comprise a part of capitalists' incomes.

t_w : level of tax on workers' incomes (wL)

But the presence of governmental intervention is completed with the introduction of government expenditures that, by following Blecker's (2002) analysis, are assumed to be constant. Thus the accumulation of realised governmental spending is defined as the ratio of government expenditures to capital stock $g_g = G/K$ that equals:

$$(51) G/K = c_g$$

where G/K : ratio of aggregate government expenditures to capital stock

c_g : constant level of governmental expenditures

Regardless of whether economy is characterised by balanced budgets or not¹⁸³, it is clear that the final effects of income taxation on macroeconomic magnitudes are determined by the way that each income class responds to shifts in taxation structure¹⁸⁴. This means that both equations of capital and savings accumulation have to be rearranged. Needless to say that changes in the structure of taxes or their introduction once and for all cannot easily be achieved. In addition, any possible shift in structure of taxes should not be in favour or against employment or profits incomes so as to prevent any possibility of burdening the problem of unemployment, income distribution and economic expansion.

¹⁸³Contrary to neoclassical approach wherein investment is stimulated by reducing marginal costs (user costs) and thereby new investment, in post Keynesian-Kaleckian framework given the possible technical and technological changes, the way that the structure of taxation affects average incomes and investment is significant (Lamarie and Lamarie, 2003a, 2003b).

¹⁸⁴Due to the assumption about workers' intention to spend the whole of their income, it is suggested that income taxation triggers their consumption decisions directly.

As a consequence, the rearranged equation of capital accumulation process that is defined as the proportion of after tax investment to capital stock $g_i = I / K$ equals:

$$(52) \quad g_i = \frac{\Delta K}{K} = \frac{I}{K} = b_0 + b_1(1-t_c)(r-id) + b_2cu$$

where $b_i > 0$, with $i = 0,1,2$

b_0 : Keynesian animal spirits or simply the state of capitalists' confidence about the investment plan they take on

r : profit rate

d : the ratio of aggregate capitalists' debt-to- capital stock ($= D / K$)

cu : capacity utilization that is assumed to be below its full levels $cu < 1$

$(1-t_c)$: level of taxation on capitalists' incomes

$(1-t_c)(r-id)$: capitalists' after tax profit income

or equivalently

$$(52') \quad g_i = b_0 + b_1(1-t_c)(hcu-id) + b_2cu$$

Correspondingly, the equation of realised after tax savings process that is defined as the proportion of aggregate savings to capital stock $g^s = S / K$ is equal to:

$$(53) \quad g^s = \frac{S}{pK} = \frac{[s_c(1-t_c)(\Pi - iD) + (1-t_r)s_r\Pi_r]}{pK}$$

that can be also rewritten as:

$$(53') \quad g_s = s_c(1-t_c)(hcu - id) + s_r(1-t_r)id$$

The short run equilibrium is achieved by considering the equality between the sum of private savings and net taxes with the sum of private investment and government purchases. In this case any shift (upward/downward) in savings must be accompanied by the appropriate shift (upward/downward) in investment level so as the equilibrium to be appropriately determined (fiscal deficit/surplus). The short run macroeconomic equilibrium identity is defined by considering the ratios of each magnitude to capital stock and is obtained by:

$$(54) \quad g_s + g_t = g_i + g_g$$

where $g_t = T/K$: realised income taxation receipts as a ratio to capital stock

$g_g = G/K$: realised governmental expenditures as a ratio to capital stock

$g_i = I/K$: capital accumulation process

$g_s = S/K$: realised saving process as a ratio to capital stock

5.3.1. Short Run Equilibrium

After integrating equations (52') and (53') into equation (54), the equilibrium values for capacity utilization, capital accumulation and profit rate are respectively equal to:

$$(55) \quad cu^* = \frac{b_0 + c_g - t_w wL + id[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

$$(56) \quad g_i^* = b_0 + (b_1(1-t_c)h + b_2) \frac{b_0 + c_g - t_w wL + id[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)} - idb_1(1-t_c)$$

$$(57) \quad r^* = h \frac{b_0 + c_g - t_w wL + id[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

Further, by substituting equation (55) into equation (8) the new short run equilibrium level of employment that is implicitly affected by the endogenously determined level of capacity utilization equals:

$$(58) \quad L^* = aK \frac{b_0 + c_g - t_w wL + id[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

In accordance with the short run analysis of the core model, the equilibrium stability depends on the relation between capitalists' and rentiers' propensities to save out of their after tax incomes as well as on the elasticity degree of the parameter that reflects the impact from monetary factors (debt and interest rate) on capitalists' after tax investment plans (b_1). Hence given the effects of taxation on income distribution, the short run equilibrium stability requires the induced increase in after tax investment to be less than the induced increase in after tax savings as capacity utilization level increases. This suggestion ensures the positive sign of denominator $[h((s_c - b_1)(1-t_c) + t_c) - b_2] > 0$ and thereby $s_c > b_1$, as long as it is a priori known that $t_c, b_2 > 0$ and $(1-t_c) > 0$. Clearly, the progressiveness of income taxation system hardly changes the required inequalities that ensure stability conditions when there is no government intervention.

Furthermore the endogenously determined level of capacity utilization and thereby all other factors are positively affected by changes in monetary forces, when its numerator is positively signed i.e. $((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) > 0$ and equivalently $((s_c - b_1)(1 - t_c) - s_r(1 - t_r)) > (t_r - t_c)$. Alternatively, a positive level of capacity utilization is derived when capitalists' after-tax saving propensity is higher than that of rentiers $(s_c(1 - t_c) > s_r(1 - t_r))$. This result is similar to that of the core model, though the progressiveness of income taxation changes available income and saving propensity of each income class.

We now continue our analysis by calculating the partial derivatives for each of the equilibrium levels of capacity utilization, capital accumulation, profit rate, employment with respect to rentiers' income (id). These responses are respectively equal to:

$$(59) \quad \partial cu^* / \partial id = \frac{(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(60) \quad \partial g_i^* / \partial id = (b_1(1 - t_c)h + b_2) \frac{(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)} - b_1(1 - t_c)$$

$$(61) \quad \partial r^* / \partial id = h \frac{(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(62) \quad \partial L^* / \partial id = aK \frac{(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

Also the reactions of each of these equilibrium magnitudes to interest rate changes (i) provided that the debt-to-capital ratio is constant ($d = \bar{d}$) during the short run period, equal:

$$(63) \quad \partial cu^* / \partial i = \frac{d[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(64) \quad \partial g_i^* / \partial i = (b_1(1 - t_c)h + b_2) \frac{d[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)} - db_1(1 - t_c)$$

$$(65) \quad \partial r^* / \partial i = h \frac{d[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

$$(66) \quad \partial L^* / \partial i = aK \frac{d[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

Finally in the case of changes in the short run level of capital stock, the effect on equilibrium labour level is:

$$(67) \quad \partial L^* / \partial K = a \frac{b_0 + c_g + id[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)}$$

All the results can be included in the following *Table 5.3*:

Table 5.3.

<i>Responses of capacity utilization, capital accumulation, profit rate and employment rate to interest rate variation</i>	
<i>Short run stability condition:</i> $h((s_c - b_1)(1 - t_c) + t_c) > b_2$	$\partial cu / \partial i > 0$, if $[(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)] > 0$
	$\partial g^i / \partial i > 0$, if $[(b_1(1 - t_c)h + b_2)((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))] > 0$
	$\partial r / \partial i > 0$, if $[h((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))] > 0$
	$\partial L / \partial i > 0$, if $[aK((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))] > 0$

In accordance with the core model and given stability conditions, the reactions of each magnitude to rentiers' income (*id*) and interest rate variations (*i*) are determined by:

a) the relative relations between capitalists' and rentiers' propensities to save out of their after tax incomes and b) the weight of internal funds (b_1) that captures the distributional effect of external finance relative to the level of capitalists' after tax savings propensity (s_c). Thus the additional factor that is now considered refers to the effects of income taxation on decisions of each income class.

Similarly with the implications of the core model, when capitalists are characterised by higher after-tax propensity to save relative to that of rentiers ($s_c(1 - t_c) > s_r(1 - t_r)$) and investment is negligibly affected by the distributional effect of external finance (b_1 relatively inelastic) and its value is less than that of capitalists' propensity, then higher interest rates affect capacity utilization and growth levels positively. This result

reflects the ‘*puzzling case*’. On the other hand, when capitalists’ after-tax saving propensity is lower than that of rentiers ($s_c(1-t_c) < s_r(1-t_r)$) and the level of debt is relatively high (relative elastic b_1), then higher real interest rates and interest payments affect the levels of capacity utilization, growth and so forth negatively. These conditions simply represent the short run ‘*normal case*’. The only difference of these conditions with those of the core model, concerns the reduction of the aggregate national income. Further, as long as employment is directly determined by the level of capacity utilization, the suggestions that can be made about it are similar.

Thus, when an economy operates at excess capacity and below full employment, income distribution and short run equilibrium values are affected by the behaviour of monetary factors as well as by the degree and structure of governmental intervention. These results rest upon the inequality of saving and consumption propensities of each income class, which are determined by the way their incomes adjust to governmental intervention. Besides, the most important factors in this process are the form, the structure and the degree of progressivity or regressivity of adopted taxation system as well as the actual conditions of each economy.

However, the presence of the other side inequality of income taxation with respect to the degree of its progressiveness is possible; so capitalists would face higher income taxation than that of rentiers ($t_c > t_r$), whereas workers would not be affected as long as they are ad hoc assumed to face the lowest possible income taxation compared to all income classes in economy ($t_c > t_r > t_w$). In our view, such inequality can characterise economies, whose process is mainly determined by capitalists’ activity as well as capitalists’ preference to increase the level of their saving propensity instead

of taking new investment plans. Moreover by assuming that rentiers' funds stem from workers' savings, it is clear that sustained economic expansion can be achieved without economy being characterised by finance-led regime. Such a regime would be raised as long as capitalists decide to increase the level of their internal funds. Although in these conditions, capitalists' profits that are converted into investment actions are downward pressured, the gap of economic process can be filled in by workers whose incomes are not affected by income taxes significantly.

We should additionally consider the possibility of rentiers changing (upward) their interest payments in the presence of income taxation; such a decision affects the incidence of taxation explicitly (Asimakopoulos and Burbidge, 1974). This reaction represents rentiers' intention to secure their dominance in economic process and assert the dependence of capitalists' investment decisions on their presence. In this case, a possible income distribution would be in favour of the financial sector.

Regardless of the degree of progressiveness or regressiveness of income taxation system and the reaction of rentiers and capitalists to income taxation, the fact that workers' incomes remain almost ineffective creates the appropriate conditions for expanding aggregate demand. Besides, in Kalecki's (1937b) view, income redistribution via wage earning taxation within wage earning class would not be very interesting; whereas taxing wages for redistributing towards profit earners could be analysed simply by introducing a tax below zero. In other words, the sustainability of economic activity cannot be reached only by improving the deterioration of capitalists and rentiers' income taxation conditions, precisely because of its dependence on the

degree of government intervention and the level of each income class savings and investing propensities with respect to their after tax incomes (wages and profits).

It can therefore be said that high levels of profit taxes can retard investment and in turn the whole economic expansion of most of financed constrained capitalist economies. Moreover by assuming that capitalists are usually characterised by high debt-to-capital ratios and low profit levels, a shift in the structure of income taxation is possible to be followed by new investment attempts without the necessity for new government packages in favour of economic expansion. But a change in taxation structure can be helpful for economic activity, as long as it is neither aggressive nor permanent; otherwise the results that come up are opposed to the expected.

More specifically, the effects of the introduction of government intervention are determined by the behaviour of marginal propensities to save and spend out of wages (workers) and profits (capitalists and rentiers) as well as of the possible equality or inequality between the levels of government expenditures and tax receipts. Thus, the level of balanced or imbalanced fiscal budgets as well as the degree at which each income class decides to take advantage from income distribution through government intervention determines employment essentially. Nevertheless the final outcomes from government intervention also depend on the way that tax recipients are decided to be used, the levels of adopted targets about employment and capital accumulation as well as the sensitivity of economy on external finance¹⁸⁵. As long as economy is assumed to be path dependent, it is implied that governmental expenditures through taxation revenue coincide with a rise in output and therefore employment levels with

¹⁸⁵ According to Kalecki (1937b) the analysis becomes more interesting by introducing consumption and capital taxation, in the sense that capital tax is not a production cost.

respect to the new after tax incomes. In any case, the interaction of the way that each income class adjusts its propensities and priorities to after tax incomes represents the structure of economic process.

However, what happens along any particular adjustment path during the short run cannot affect the long run levels of investment, output and employment growth. Besides, the final outcome from governmental intervention on economic activity cannot be reflected on a single period analysis, but requires the consideration of each income class expectations about future taxation. Generally, changes in monetary factors and income taxation structure are proved to be able to affect income distribution and in turn the behaviour of economic activity.

5.3.1. Short Run Equilibrium when workers save ($s_w > 0$ but $s_c, s_r > s_w$).

We now turn to consider the short run equilibrium when workers save. Under this assumption ($s_w > 0$ but $s_c, s_r > s_w$) and given equations (1)-(9) and (50)-(52), we rearrange equation (53') to:

$$(53'') \quad g_s = s_c(1-t_c)(hcu - id) + s_w(1-t_w)wl + s_r(1-t_r)id$$

After substituting equations (50), (51), (52') and (53'') into equation (54), the short run equilibrium values of capacity accumulation, capital accumulation, profit rate and employment levels are given by the following formations respectively:

$$(55') \quad cu^* = \frac{b_0 + c_g - t_w wL - s_w(1-t_w)wl + id[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

$$(56') \quad g_i^* = b_0 + (b_1(1-t_c)h + b_2) \frac{b_0 + c_g - t_w wL - s_w(1-t_w)wl + id[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)} - idh(1-t_c)$$

$$(57') \quad r^* = h \frac{b_0 + c_g - t_w wL - s_w(1-t_w)wl + id[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

$$(58') \quad L^* = aK \frac{b_0 + c_g - t_w wL + id[(s_c - b_1)(1-t_c) - s_r(1-t_r) - (t_r - t_c)]}{(h((s_c - b_1)(1-t_c) + t_c) - b_2)}$$

The assumption about workers' positive propensity to save does not affect the conditions required to ensure short run stability. As a result, even in this case the relation between rentiers' and capitalists' savings as well as the sensitivity of investment to capacity utilization and external finance are responsible for stability conditions. Further, owing to the absence of any change in the level of debt-to-capital ratio when workers save, the response of each of the equilibrium values to monetary factor changes can be represented by considering the case where workers consume all of their income. As a result, the partial derivatives of each of the short run equilibrium magnitudes with respect to changes in a) interest rate payments (id) and b) interest rate (i) remain similar to those arise when workers have no propensity to save out of their incomes (eq. (59)-(62)).

5.3.2. Long Run Equilibrium

In accordance with the analysis of Section 5.2.2 and the equations (29)-(31), we define the long run equilibrium level of debt-to-capital ratio when government intervenes, provided that short run stability holds. By considering the assumption

about the constancy of growth rate of debt ($\hat{d} = 0$) and substituting equations (56) and (31) into equation (29), the long run equilibrium level of debt-to-capital ratio when government intervenes equals:

$$(68) \quad d^* = \frac{s_r i (h((1-t_c)(s_c - b_1) + t_c) - b_2) - b_0 h(s_c(1-t_c) + t_c) - (c_g - t_w w l)(b_1(1-t_c)h + b_2)}{i[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h(1-t_c)((1-t_r)s_r + t_r)]}$$

and equivalently the growth rate of debt-to-capital ratio:

$$(69) \quad \hat{d} = \frac{s_r i (h((1-t_c)(s_c - b_1) + t_c) - b_2) - b_0 h(s_c(1-t_c) + t_c) - (c_g - t_w w l)(b_1(1-t_c)h + b_2)}{[(h((1-t_c)(s_c - b_1) + t_c) - b_2)]} \\ - \frac{id[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)((1-t_r)s_r + t_r))]}{[(h((1-t_c)(s_c - b_1) + t_c) - b_2)]}$$

Following Lavoie (1995), the conditions that ensure long run equilibrium stability suggest the negative response of growth rate of debt-to-capital ratio to changes in long run debt-to-capital ratio ($\frac{\partial \hat{d}}{\partial d} < 0$). Taking the partial derivatives of equation (69):

$$(70) \quad \partial \hat{d} / \partial d = - \frac{i[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)(t_r + (1-t_r)s_r))]}{[(h((1-t_c)(s_c - b_1) + t_c) - b_2)]}$$

In other words, long run stability stands when its numerator is positively signed:

$$(71) \quad [b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)(t_r + (1-t_r)s_r))] > 0$$

that is equally written as:

$$(71') \quad b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) > b_1 h((1-t_c)(t_r + (1-t_r)s_r))$$

Similarly with the core model, in the long run the hypothesised economy tends towards stability when capitalists' propensity to save out of their after tax incomes is higher than that of rentiers $((1-t_c)s_c > (1-t_r)s_r)$ ¹⁸⁶, while their after tax investment decisions are very elastic with respect to capacity utilization changes (high values of b_2) but inelastic with respect to debt shifts (low values of b_1). In other words, the *long run stability* corresponds to *short run puzzling* case, where interest rate increases affect capacity utilization, capital accumulation and employment levels positively. Further, when rentiers' after tax saving propensity rests at a level above that of capitalists' $((1-t_r)s_r > (1-t_c)s_c)$ and is combined with relatively inelastic investment decisions with respect to demand (capacity utilization) changes (b_2 inelastic) but very elastic with respect to debt (b_1 elastic), economy tends to be characterised by long run instability $\left(\frac{\partial \hat{d}}{\partial d} > 0\right)$. Alternatively, the *long run instability* conditions correspond to *short run normal case* where interest rate upward shifts reduce capacity utilization, capital accumulation, profit rate and employment. In this case, possible deviations from equilibrium generate a long run debt-to-capital ratio of either unity or zero.

We now turn to estimate the partial derivative of long run debt-to-capital ratio with respect to interest rate variations:

$$(72) \quad \frac{\partial d^*}{\partial i} = \frac{1}{i} \left[\frac{s_r(h((1-t_c)(s_c - b_1) + t_c) - b_2) - d(b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)(t_r + (1-t_r)s_r)))}{(b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)(t_r + (1-t_r)s_r)))} \right]$$

¹⁸⁶It is simply proved the appropriateness of progressive income taxation for ensuring long run stability.

that is equally written as:

$$(72') \quad \frac{\partial d^*}{\partial i} = \frac{1}{i} \left[\frac{s_r (h((1-t_c)(s_c - b_1) + t_c) - b_2)}{(b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)(t_r + (1-t_r)s_r)))} - d \right]$$

Considering an interest-inelastic mark-up and therefore the inability of interest rate variations to affect income distribution directly, the effects of interest rate changes on debt-to-capital ratio and income distribution (indirectly) are determined by distinguishing in the following three cases:

Firstly, when the initial equilibrium level of debt-to-capital ratio is relatively high, it is negatively affected by increases in the interest rate and thus economic expansion can follow. Hence:

$$(73) \text{ If } d^* > \frac{s_r (h((1-t_c)(s_c - b_1) + t_c) - b_2)}{i[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)((1-t_r)s_r + t_r))]}, \text{ then } \frac{\partial d}{\partial i} < 0$$

Moreover, interest rate increases affect the debt-to-capital ratio positively, when the initial equilibrium level of debt-to-capital ratio is relatively low. As a result, any possibility for economic expansion is cancelled:

$$(74) \text{ If } d^* < \frac{s_r (h((1-t_c)(s_c - b_1) + t_c) - b_2)}{i[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)((1-t_r)s_r + t_r))]}, \text{ then } \frac{\partial d}{\partial i} > 0$$

Finally when the long run debt-to-capital ratio rests on its initial equilibrium, interest rate increases have neutral effects on it and the general economic activity remains unaffected:

$$(75) \text{ if } d^* = \frac{s_r(h((1-t_c)(s_c-b_1)+t_c)-b_2)}{i[b_2(s_c(1-t_c)-s_r(1-t_r)-(t_r-t_c))-b_1h(1-t_c)((1-t_r)s_r+t_r)]}, \text{ then } \frac{\partial d}{\partial i} = 0$$

As a result, in the case of a long run stable equilibrium under governmental intervention, the relation between interest rate and debt-to-capital ratio depends on: a) the parameters of the saving and the investment functions; b) the initial equilibrium conditions of debt-to-capital ratio and c) the level from which interest rates start to change.

On the other hand, when long run instability stands $\left(\frac{\partial \hat{d}}{\partial d} > 0\right)$, the use of equation

(72') proves that the long run debt-to-capital ratio is negatively influenced by interest rate changes. As a result:

$$(72') \frac{\partial d^*}{\partial i} = \frac{1}{i} \left[\frac{s_r(h((1-t_c)(s_c-b_1)+t_c)-b_2)}{(b_2(s_c(1-t_c)-s_r(1-t_r)-(t_r-t_c))-b_1h((1-t_c)(t_r+(1-t_r)s_r)))} - d \right] < 0$$

It is thereby proved that in unstable conditions, interest rate increases always trigger down the debt-to-capital ratio.

Additionally, we calculate the partial derivatives of capacity utilization, capital accumulation and profit rate with respect to interest rate changes, given the stability conditions and the constancy of debt-to-capital ratio ($d = \bar{d} > 0$).

$$(76) \frac{\partial cu^*}{\partial i} = \frac{\left(d + i \frac{\partial d}{\partial i}\right) \left((s_c - b_1)(1 - t_c) - s_r(1 - t_r) + (t_c - t_r) \right)}{h \left((s_c - b_1) - t_c(s_c - b_1 - 1) \right) - b_2}$$

$$(77) \frac{\partial g^*}{\partial i} = \frac{\left(d + i \frac{\partial d}{\partial i}\right) \left[b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h \left((1 - t_c)(t_r + (1 - t_r)s_r) \right) \right]}{h \left((s_c - b_1) - t_c(s_c - b_1 - 1) \right) - b_2}$$

$$(78) \frac{\partial r^*}{\partial i} = h \frac{\left(d + i \frac{\partial d}{\partial i}\right) \left((s_c - b_1)(1 - t_c) - s_r(1 - t_r) + (t_c - t_r) \right)}{h \left((s_c - b_1) - t_c(s_c - b_1 - 1) \right) - b_2}$$

Moreover given the assumptions about interest and tax inelastic mark-ups as well as the fact that changes in the degree of debt-to-capital ratio redistribute after tax income between rentiers and capitalists, the introduction of progressive income taxation is supposed to ‘balance’ income redistribution. In these conditions, we calculate the responses of each of the real macroeconomic magnitudes to changes in the endogenously determined variable of debt-to-capital ratio. Assuming a constant but positive interest rate ($i = \bar{i} > 0$) the partial derivatives of capital accumulation, capacity utilization and interest rates with respect to shifts in debt-to-capital ratio equals:

$$(79) \frac{\partial cu^*}{\partial d} = \frac{i \left((s_c - b_1)(1 - t_c) - s_r(1 - t_r) + (t_c - t_r) \right)}{h \left((1 - t_c)(s_c - b_1) + t_c \right) - b_2}$$

$$(80) \frac{\partial g_i^*}{\partial d} = \frac{i[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1h((1-t_c)(t_r + (1-t_r)s_r))]}{[h((1-t_c)(s_c - b_1) + t_c) - b_2]}$$

$$(81) \frac{\partial r^*}{\partial d} = \frac{i((s_c - b_1)(1-t_c) - s_r(1-t_r) + (t_c - t_r))h}{h((s_c - b_1) - t_c(s_c - b_1 - 1)) - b_2}$$

All the effects of changes in monetary factors (interest rate and debt-to-capital ratio) are presented in *Table 5. 4*.

Table 5.4.

<i>Responses of capacity utilization, capital accumulation profit rate and employment to variations in interest rates and the long run equilibrium debt-capital ratio when equilibrium is stable</i>	
Short run stability condition $h(s_c - b_1) > b_2$	$\frac{\partial cu}{\partial i}; \frac{\partial cu}{\partial d} > 0$, if $(s_c - b_1)(1-t_c) - s_r(1-t_r) + (t_c - t_r) > 0$
Long run stability condition: $[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1h((1-t_c)(t_r + (1-t_r)s_r)) > 0$	$\frac{\partial g_i}{\partial i}; \frac{\partial g_i}{\partial d} > 0$, if $b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1h((1-t_c)(t_r + (1-t_r)s_r)) > 0$
and constancy of :	
(a) debt-to-capital $d = \bar{d} > 0$	$\frac{\partial r}{\partial i}; \frac{\partial r}{\partial d} > 0$, if
(b) interest rate constancy $i = \bar{i} > 0$	$((s_c - b_1)(1-t_c) - s_r(1-t_r) + (t_c - t_r))h > 0$

Clearly, the response of each of the above magnitudes to changes in monetary factors are determined by the relation between rentiers' and capitalists' propensity to save out of their after tax incomes and the direction of income taxation. Indeed, the conditions of stability or instability are responsible for determining the responses of each

macroeconomic magnitude on monetary factors changes; suggestions that are consistent with the implications of the core model.

In particular the final effects of interest rate changes on economic activity can be determined by regarding their influence on the level of capital accumulation. So, for both conditions of long run stability and instability, the substitution of equation (72') into (77) verifies that upward interest rate shifts affect the growth rate of capital stock positively $\frac{\partial g}{\partial i} = s_r > 0$. These results can also be reached by assuming the constancy of the growth rate of debt to-capital ratio ($\hat{d} = 0$), without implying the dependency of long run equilibrium level of debt-to- capital ratio on the value of the interest rate.

Insofar as the assumption about government intervention does not modify the core assumptions of the adopted framework, then neither the term of debt-to-capital ratio nor the equilibrium values change substantially. But the introduction of progressive taxation affects negatively the available incomes of each income class and thereby compels them to adjust their investment, savings and financing decisions. Despite the instability, owing to rentiers' presence, interest rate changes affect capital accumulation and therefore employment and the general economic activity positively.

As far as the long run behaviour of employment is concerned, by integrating equations (55) and (56) into (8') we obtain:

(82)

$$L = \frac{a}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2} \left[\begin{array}{l} (b_0 + c_g - t_w w l)(b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w w l)(b_1(1 - t_c)h + b_2)) \\ \left. \begin{array}{l} (b_0 + c_g - t_w w l)(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)) \\ (b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w w l)(b_1(1 - t_c)h + b_2)) \\ ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \end{array} \right\} + id \\ + (id)^2 \left[\begin{array}{l} ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ (b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)) \end{array} \right] \end{array} \right]$$

The partial derivatives of equation (82) with respect to shifts in interest payments (*id*) and interest rates (*i*) by considering the constancy of debt-to-capital ratio ($d = \bar{d} > 0$) respectively:

$$(83) \quad \frac{\partial L}{\partial id} = \frac{a}{(h((s_c - b_1) - t_c(s_c - b_1 - 1)) - b_2)^2} \left[\begin{array}{l} (b_0 + c_g - t_w w l)(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)) \\ + (b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w w l)(b_1(1 - t_c)h + b_2))((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ + 2id \{ [(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)] [b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))] \} \end{array} \right]$$

$$(84) \quad \frac{\partial L}{\partial i} = \frac{a \left(d + i \frac{\partial d}{\partial i} \right)}{(h((s_c - b_1) - t_c(s_c - b_1 - 1)) - b_2)^2} \left[\begin{array}{l} [(b_0 + c_g - t_w w l)(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))] \\ + [(b_0 s_x h(s_c(1 - t_c) + t_c) + (c_g - t_w w l)(b_1(1 - t_c)h + b_2))((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))] \\ + 2 \{ [(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)] [b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))] \} \end{array} \right]$$

We also calculate the responses of long run employment to changes in the endogenously determined debt-to-capital ratio, given the constancy of interest rate ($i = \bar{i} > 0$):

$$(85) \quad \frac{\partial L}{\partial d} = a \frac{i}{(h((s_c - b_1) - t_c(s_c - b_1 - 1)) - b_2)^2} \left[\begin{aligned} & ((b_0 + c_g)(s_c - b_1)(1 - t_c) - s_r(1 - t_r) + (t_c - t_r)) \\ & + ((b_0 s_c h(s_c(1 - t_c) + t_c) + c_g(b_1(1 - t_c)h + b_2))(b_2(s_c(1 - t_c) - s_r(1 - t_r) + (t_c - t_r)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))) \\ & + 2id((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))) \end{aligned} \right]$$

As long as employment is directly determined by capacity utilization, their behaviour is expected to be parallel. Hence, for both conditions of long run stability or instability, given short run stability, the substitution of equation (72') into (85) yields that:

$$(85') \quad \frac{\partial L}{\partial i} = \frac{as_r}{(h((s_c - b_1) - t_c(s_c - b_1 - 1)) - b_2)^2} \left[\begin{aligned} & ((b_0 + c_g - t_w wl)(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_c)s_r))) \\ & + ((b_0 s_c h(s_c(1 - t_c) + t_c) + (c_g - t_w wl)(b_1(1 - t_c)h + b_2))(s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ & + 2(((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))(b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r))) \end{aligned} \right]$$

Regardless of stability or instability conditions and provided that income taxation is used in favour of economic expansion, upward changes in interest rates are supposed to affect long run equilibrium level of employment positively ($\frac{\partial L}{\partial i} > 0$) under specific conditions. Thus, such a response requires capitalists' savings propensity to be above than that of rentiers and consequently their investment decisions to be significantly affected by changes in capacity utilization but thinly by changes in external finance. All short and long run results are provided in *Table 2. in Appendix A.*

The above analysis makes clear that the active role of income taxation, hardly affects the general implications that were reached in the long run analysis of the core model. But the introduction of income taxation and government expenditures and mainly their interrelation as well as whether their balance or imbalance is converted to long run terms, affects aggregate national income certainly.

5.3.2.1 Long Run Equilibrium when workers save ($s_w > 0$ but $s_c, s_r > s_w$)

In order to examine the possible changes in the previous analysis when workers are hypothesised to save, we estimate the long run equilibrium level of debt-to-capital ratio by considering its constancy ($\hat{d} = 0$) and substituting equations (56') and (31) into (29). As a result, the long run equilibrium level of debt-to-capital ratio when government intervenes and workers have a positive propensity to save equals:

$$(68') \quad d^* = \frac{s_r i (h((1-t_c)(s_c - b_1) + t_c) - b_2) - b_0 h(s_c(1-t_c) + t_c) - (c_g - t_w w l - s_w(1-t_w) w l)(b_1(1-t_c)h + b_2)}{i[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h(1-t_c)((1-t_r)s_r + t_r)]}$$

equivalently the growth rate of debt-to-capital ratio is equal to:

$$(69') \quad \hat{d} = \frac{s_r i (h((1-t_c)(s_c - b_1) + t_c) - b_2) - b_0 h(s_c(1-t_c) + t_c) - (c_g - t_w w l - s_w(1-t_w) w l)(b_1(1-t_c)h + b_2)}{h((1-t_c)(s_c - b_1) + t_c) - b_2} - \frac{id[b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)((1-t_r)s_r + t_r))]}{(h((1-t_c)(s_c - b_1) + t_c) - b_2)}$$

According to equation (69'), the introduction of workers' positive saving propensity implies the reduction of aggregate level of debt-to-capital ratio. This is the only change to occur since neither the conditions that ensure long run stability nor the

responses of long run equilibrium magnitudes when long run interest rates and debt-to-capital ratios are affected (eq. 76-81).

As far as the long run employment when workers save is concerned, after substituting equations (55') and (56') into equation (8), its level equals:

(82')

$$L = \frac{a}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2} + id \left[\begin{array}{l} \left(\begin{array}{l} (b_0 + c_g - t_w wl - s_w(1 - t_w wl)) \\ ((b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w wl - s_w(1 - t_w)wl)(b_1(1 - t_c)h + b_2))) \end{array} \right) \\ \left(\begin{array}{l} (b_0 + c_g - t_w wl - s_w wl) \\ (b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))) \\ + ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ (b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w wl - s_w(1 - t_w)wl)(b_1(1 - t_c)h + b_2)) \end{array} \right) \\ + (id)^2 \left(\begin{array}{l} ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ ((b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))) \end{array} \right) \end{array} \right]$$

Equation (82'), allows the estimation of the responses of employment to shifts in a) interest payments (id) and b) interest rates (i), given the constancy of debt-to-capital ratio ($d = \bar{d} > 0$) as well as c) the debt-to-capital ratio (d), given the constancy of long run interest rate ($i = \bar{i} > 0$). As a result the partial derivatives of long run employment levels with respect to each of the above changes are respectively equal to:

(83')

$$\frac{\partial L}{\partial id} = \frac{a}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2} \left[\begin{array}{l} (b_0 + c_g - t_w wl - s_w wl) \\ (b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))) \\ + ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ (b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w wl - s_w(1 - t_w)wl)(b_1(1 - t_c)h + b_2)) \\ + 2(id) \left(\begin{array}{l} ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ ((b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))) \end{array} \right) \end{array} \right]$$

$$(84') \frac{\partial L}{\partial i} = \frac{\left(d + i \frac{\partial d}{\partial i} \right)}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2} \left[\begin{array}{l} (b_0 + c_g - t_w wl - s_w wl) \\ (b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))) \\ + ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ (b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w wl - s_w(1 - t_w)wl)(b_1(1 - t_c)h + b_2)) \\ + 2 \left(\begin{array}{l} ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ ((b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))) \end{array} \right) \end{array} \right]$$

and

$$(85') \frac{\partial L}{\partial d} = \frac{ai}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2} \left[\begin{array}{l} d \left(\begin{array}{l} (b_0 + c_g - t_w wl - s_w wl) \\ (b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))) \\ + ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ (b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w wl - s_w(1 - t_w)wl)(b_1(1 - t_c)h + b_2)) \end{array} \right) \\ + 2id^2 \left(\begin{array}{l} ((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) \\ ((b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))) \end{array} \right) \end{array} \right]$$

Furthermore, the appropriate substitutions in equation (85') suggest that the response of employment to interest rate changes is equal to:

$$(85'') \frac{\partial L}{\partial i} = \frac{s_r [b_0 + c_g - t_w wl - s_w wl + 2((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))]}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)} + \frac{((s_c - b_1)(1 - t_c) - s_r(1 - t_r) - (t_r - t_c))(b_0 h(s_c(1 - t_c) + t_c) + (c_g - t_w wl - s_w(1 - t_w)wl)(b_1(1 - t_c)h + b_2))}{(h((s_c - b_1)(1 - t_c) + t_c) - b_2)^2 (b_2(s_c(1 - t_c) - s_r(1 - t_r) - (t_r - t_c)) - b_1 h((1 - t_c)(t_r + (1 - t_r)s_r)))} > 0$$

The response of employment to interest rate changes is positive as long as rentiers' after tax saving propensity is below that of capitalists' and capitalists' investment plans are essentially affected by changes in capacity utilization. Besides, workers' saving propensity affects neither the structure of debt-to-capital ratio nor the degree of the impact of investment plans from capacity utilization and the degree of the impact of external finance.

5.4. Finance and Employment in a Closed Economy Model When Rentiers and Workers Lend Capitalists

The results in the previous two sections signify the effects of rentiers' presence in economy and the effects from financing capitalists' investment plans on income distribution, capital accumulation and employment levels. These results rest upon the fundamental Kaleckian assumption that workers have no intention to save ($s_w = 0$). So far we have also argued that even if we relax this assumption the results hardly change.

However in recent literature there are conflicting views about whether workers should have positive savings propensity or not. For example Poterba's (1987) empirical investigation suggests positive but unequal saving propensities for all included income classes. According to Blecker (2002) the suggestion for workers' positive saving propensity, raises the possibility of an exhilarationism regime and the likelihood of a profit led growth, even when the adopted investment function implies stagnationism. On the other hand, according to Mott and Slattery (1994), when workers decide to save, economy is characterised by exhilarationism regime that redistributed income towards labour. Furthermore Bhaduri and Marglin (1991) are in

favour of a strong relation between private savings with wages and profits, whereas Mott (1989) notes that workers' propensity to save is compatible with a paradox since workers are wage earners as well as recipients of rentiers' income.

It is obvious that the intention of workers to save change the priorities of the rest of income classes and therefore the equilibrium values. Besides in Kaleckian manner the assumption about workers' positive saving propensity is equivalent with increases in aggregate savings and reductions in equilibrium levels of capital accumulation and aggregate demand on the other hand (Lavoie, 2002). Further, the assumption about investment endogeneity, cancels any possibility of inverse relation between capital accumulation and saving propensity with the level of real wages (Lavoie, 2003).

Our aim in this section is to extend the implications of the core model by assuming that workers save a part of their wage income ($s_w > 0$, but $s_c, s_r > s_w$) and use it in order to increase their aggregate income; that is workers are assumed to behave as rentiers by providing their savings for financing capitalists' investment and entailing interest payments. As a result, capitalists' sources of external finance arise from both rentiers and workers, where the former treat interest payments as the only source of their income, whereas workers treat their interest payments as an additional income.

We now move to restructuring our basic model. Given equations (1)-(3) of section 5.3 the aggregate level of external finance is equal to:

$$(86) \quad D = D_r + D_w$$

where D : aggregate debt

$D_r (= \Pi^r)$: rentiers' debt

$D_w (= s_w W)$: workers' debt

Moreover, workers' aggregate incomes which consist of the sum of their nominal wages and the interest payments they receive from capitalists, equals:

$$(87) Y^w = W + \Pi^w$$

where: Y^w : workers' aggregate income

$W = wL$: workers' nominal wage incomes (equation (6))

$\Pi^w (= iD_w)$: workers' profits from capitalists' interest payments

All these redistribute income among the three income classes so as the new level of aggregate profits (instead of eq. (6)) to be equal to:

$$(88) \Pi = \Pi^c + \Pi^r + \Pi^w = \Pi^c + i(D_r + D_w)$$

that is equally written as:

$$(88') \Pi = \Pi^c + i(D_r + D_w) = \Pi^c + i(D_r + s_w W)$$

where $\Pi^r (= iD_r)$: rentiers' total income

As a consequence of the active role of all the included classes (capitalists, workers and rentiers) in determining economic activity, the equation of aggregate income in economy (instead of eq. (9)) is now rewritten as:

$$(89) \quad pY = Y^w + \Pi^c + \Pi^r$$

where pY : nominal aggregate national income

Π^c : capitalists' profits as defined in eq. (4) and (4')

Π^r : rentiers' profits (= iD_r)

Π^w : workers' profits (= iD_w)

W : workers' aggregate money income (W)

The fact that capitalists' external finance (debt) derives from both rentiers and workers' income classes raises the necessity for the new short run capitalists' profit equation to be rearranged in the following equation:

$$(90) \quad \Pi^c = p(Y, z) - wL - i(D_r + D_w)$$

where p : the price charged by firm, which is set as a mark up and thus is defined as a real output function and a vector of variables that affect the demand level that a firm faces

Y : real output that is defined as a function of labour and capital $Y = f(l, k)$ Z

and is assumed $f_l > 0$ (partial derivative with respect to l) and $f_{ll} < 0$

wL : labour costs

$i(D_r + D_w)$: debt costs¹⁸⁷

In the new context both equations of capital accumulation and realised savings change. The capital accumulation equation is given by:

$$(91) \quad g_i = \frac{\Delta K}{K} = b_0 + b_1(r - i(d_r + d_w)) + b_2 cu$$

or equivalently

$$(91') \quad g_i = \frac{\Delta K}{K} = \frac{I}{K} = b_0 + b_1(hcu - i(d_r + d_w)) + b_2 cu$$

where $b_i > 0$, with $i = 0,1,2$

I : aggregate investment

b_0 : Keynesian animal spirits or simply the state of capitalists' confidence

cu : capacity utilization that economies operate at levels below full capacity.

$d_r = (D_r / K)$: the ratio of rentiers' debt-to-capital stock

$d_w = (D_w / K)$: the ratio of workers' debt-to-capital stock that is respectively

equal to $d_w = s_w wl$

$i(d_w + d_r)$: capitalists' aggregate interest payments

Hence, capital accumulation is a positive function of capitalists' animal spirits, the level of their profitability net from interest payments and the level of capacity utilization.

¹⁸⁷For simplicity reasons we assume a unique interest rate for both rentiers and workers.

As far as the realised savings equation is concerned, it is implied that because of the assumption that all income classes save the aggregate level of savings equals the sum of workers' propensity to save out of wages (s_w) times their total income, plus capitalists' propensity to save out of capitalist profits (s_c) times their profits, plus rentiers' propensity to save out of rentiers' profits (s_r) times their total income. Thus, the realised savings equation is given by the following expression:

$$(92) \quad g_s = \frac{S}{K} = \frac{[s_c(\Pi - iD) + s_w W + s_r \Pi^r]}{K}$$

that can be re-written as:

$$(92') \quad g_s = s_c(hcu - i(d_r + d_w)) + s_r id_r + s_w wl$$

where $0 < s_w < 1$ and $s_w < s_c$

The short run equilibrium requires the Keynesian investment-savings equality that is simply the equation:

$$(15) \quad g_i = g_s$$

5.4.1. Short Run Equilibrium

After substituting equations (92') and (91') into equation (15), the short run equilibrium values for capacity utilization, capital accumulation and profit rate are respectively equal to:

$$(93) \quad cu^* = \frac{b_0 - s_w wl + id_r(s_c - s_r - b_1) + id_w(s_c - b_1)}{h(s_c - b_1) - b_2}$$

$$(94) \quad g_i^* = b_0 + (b_1 h + b_2) \frac{b_0 - s_w wl + id_r(s_c - s_r - b_1) + id_w(s_c - b_1)}{h(s_c - b_1) - b_2} - b_1 i(d_w + d_r)$$

$$(95) \quad r^* = h \frac{b_0 - s_w wl + id_r(s_c - s_r - b_1) + id_w(s_c - b_1)}{h(s_c - b_1) - b_2}$$

Similarly with the previous sections, the short run stability is determined by the relation between capitalists' and rentiers' propensity to save out of their incomes and the degree of the elasticity of capitalists' investment to debt and interest rate. Thus, short run stability requires the induced increase in investment as the level of capacity utilization increases to be less than the induced increase in savings. This is reflected on the positively signed denominator $h(s_c - b_1) - b_2 > 0$ and thereby $h(s_c - b_1) > b_2$ that in turn requires $s_c > b_1$. Hence, the levels of capacity utilization as well as the rest of the magnitudes in question are positive when both terms of $(s_c - s_r - b_1)$ and $(s_c - b_1)$ stand. In other words, a positive level of capacity utilization requires the level of capitalists' savings propensity to be higher than that of rentiers ($s_c > s_r$) and consequently above the elasticity level of the parameter that reflects the impact of debt and interest rate on capitalists' investment ($s_c > b_1$). It is clear that the conditions that affirm stability are the same as those implied in the core model.

As for the short run equilibrium level of employment, after substituting equation (93) into equation (8), it is given by:

$$(96) L^* = aK \frac{b_0 - s_w w l + id_r (s_c - s_r - b_1) + id_w (s_c - b_1)}{(s_c - b_1)h - b_2}$$

We proceed to estimate the reactions of capacity utilization, capital accumulation, profit rate and employment magnitudes to changes in a) rentiers' interest payments (id_r) and b) workers' interest payments (id_w). Taking the partial derivatives we obtain:

$$(97a) \partial cu^* / \partial id_r = \frac{s_c - s_r - b_1}{h(s_c - b_1) - b_2} \quad \text{and} \quad (97b) \partial cu^* / \partial id_w = \frac{s_c - b_1}{h(s_c - b_1) - b_2}$$

$$(98a) \partial g_i^* / \partial id_r = \frac{(b_1 h + b_2)(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} - b_1 \quad \text{and} \quad (98b) \partial g_i^* / \partial id_w = \frac{(b_1 h + b_2)(s_c - b_1)}{h(s_c - b_1) - b_2} - b_1$$

$$(99a) \partial r / \partial id_r = \frac{h(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} \quad \text{and} \quad (99b) \partial r / \partial id_w = \frac{h(s_c - b_1)}{h(s_c - b_1) - b_2}$$

$$(100a) \partial L / \partial id_r = aK \frac{(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} \quad \text{and} \quad (100b) \partial L / \partial id_w = aK \frac{(s_c - b_1)}{h(s_c - b_1) - b_2}$$

Regarding employment,

$$(100a') \partial L / \partial id_r = aK \frac{(s_c - s_r - b_1)}{h(s_c - b_1) - b_2 - as_w w} \quad \text{and}$$

$$(100b') \partial L / \partial id_w = aK \frac{(s_c - b_1)}{h(s_c - b_1) - b_2 - as_w w}$$

Additionally, by assuming the constancy of the short run aggregate debt-to-capital ratio ($d_r = \bar{d}_r$ and $d_w = \bar{d}_w$) we estimate the partial derivatives with respect to interest rate (i). For simplicity reasons interest rate is considered to be unique for both rentiers' and workers' interest payments. In these conditions, the estimated responses equal:

$$(101) \quad \partial cu / \partial i = \frac{d_r(s_c - s_r - b_1) + d_w(s_c - b_1)}{(s_c - b_1)h - b_2}$$

$$(102) \quad \partial g_i^* / \partial i = (b_1 h + b_2) \frac{d_r(s_c - s_r - b_1) + d_w(s_c - b_1)}{(s_c - b_1)h - b_2} - b_1(d_w + d_r)$$

$$(103) \quad \partial r / \partial i = h \frac{d_r(s_c - s_r - b_1) + d_w(s_c - b_1)}{(s_c - b_1)h - b_2}$$

$$(104) \quad \partial L / \partial i = aK \frac{d_r(s_c - s_r - b_1) + d_w(s_c - b_1)}{(s_c - b_1)h - b_2}$$

Finally regarding the capital stock:

$$(105) \quad \partial L / \partial K = \frac{a[b_0 - s_w w l + i d_r(s_c - s_r - b_1) + i d_w(s_c - b_1)]}{(s_c - b_1)h - b_2}$$

All the results are illustrated in the following *Table 5.5*:

Table 5.5.

<i>Responses of capacity utilization, capital accumulation, profit rate and employment rate to interest rate variation</i>	
Short –run stability condition:	$\partial cu / \partial i > 0$, if $(s_c - s_r - b_1) + (s_c - b_1) > 0$
$h(s_c - b_1) > b_2$	$\partial g^i / \partial i > 0$, if $(hb_1 + b_2)[(s_c - s_r - b_1) + (s_c - b_1)] > 0$
(given the constancy of debt-to-capital ratio	$\partial r / \partial i > 0$, if $(s_c - s_r - b_1) + (s_c - b_1) > 0$
$(d_r = \bar{d}_r$ and $d_w = \bar{d}_w$).	$\partial L / \partial i > 0$, if $aK[(s_c - s_r - b_1) + (s_c - b_1)] > 0$

We note that the reaction of each magnitude to rentiers' and workers' interest payments and interest rate variations depends on the relative relations between capitalists' and rentiers' savings propensities and the level of weight of internal funds. Due to the distinction of aggregate debt-to-capital ratio between workers and rentiers, the response of short run equilibrium to monetary factors changes is determined by the effects of both of these sources of external finance.

Thus capacity utilization is affected positively by interest rates when the numerator is positively signed, i.e. $(s_c - s_r - b_1) > 0$ (rentiers' debt) and $(s_c - b_1) > 0$ (workers' debt). Alternatively, it is required: a) with respect to *rentiers' debt-to-capital ratio*: capitalists to be characterised by a higher saving propensity relative to that of rentiers

$(s_c \succ s_r)$ ¹⁸⁸ and simultaneously their investment plans to remain unaffected by the distributional impact of external finance (b_1 relative inelastic); b) with respect to *workers' debt-to-capital ratio*: capitalists' savings to be relatively high and their investment plans to be hardly affected by external finance (b_1 relative inelastic). In a sequence, the coefficient of capitalists' saving should rest at a higher level relative to that of the coefficient that reflects the degree of investment elasticity on external funds ($s_c \succ b_1$). Under these conditions, interest rate increases affect capacity utilization level and the rest of macroeconomic magnitudes positively and then short run equilibrium reflects the '*puzzling case*'.

On the other hand, increases in levels of real interest rate and payments affect the equilibrium levels of capacity utilization and in general economic growth negatively, when: a) with respect to *rentiers' debt-to-capital ratio*: capitalists' savings propensity is below that of rentiers ($s_c \prec s_r$) and the level of debt is relatively high as well as the value of b_1 (b_1 elastic); whereas b) with respect to *workers' debt-to-capital ratio*: capitalists' saving is relatively low but investment is affected significantly by external funds so that the coefficient that captures the impact from external finance on investment to be higher than the value of capitalists' propensity to save ($s_c \prec b_1$). This is simply the '*normal case*'.

However the fact that aggregate debt-to-capital ratio constitutes by the sum of rentiers' and workers' debt, raises the possibility each one of them to move in the opposite direction. For instance, with respect to *rentiers' debt-to-capital ratio* (given

¹⁸⁸An assumption that is accepted as long as in the core model with respect to inequality in savings propensities of each income class, we simply assume that $s_c, s_r \succ s_w$.

workers' debt-to-capital ratio) interest rate increases affect the level of each of macroeconomic magnitudes positively ($s_c \succ s_r$) and simultaneously with respect to workers' debt-to-capital ratio (given rentiers' debt-to-capital ratio) interest rate upward shifts affect macroeconomic magnitudes negatively ($s_c \prec b_1$). Apparently, in this case the short run equilibrium is characterised partly by puzzling (rentiers' debt) and partly by normal (workers' debt) conditions. The results that can be reached when economy is characterised by short run puzzling conditions with respect to workers' debt-to-capital ratio but normal conditions with respect to rentiers' debt-to-capital ratio are also similar.

We believe that in this case, the effects of monetary factors variations on economic activity are determined directly by the degree of economy's sensitivity to normal and puzzling conditions as well as by the degree of rentiers' dominance on economic process. As a consequence, we define this case as a '*complicated case*'. These arguments can also be made about the effects of interest rate changes on employment levels.

Concluding, it is easily understood that the effects of monetary factors on the general economic process depend on the degree at which each one of workers' and rentiers' debt-to-capital ratio finances investment as well as on the sensitivity of economic process. Besides workers' decision to use their savings to finance investment, cancels neither the role of rentiers in economic activity nor the influence that monetary factors may have on it. Furthermore, workers gain a more active role in economic activity since through the enrichment of their incomes with interest payments, they readjust their decisions, mainly those about consumption, so that economic activity to be

fuelled. Under these conditions, capitalists have the opportunity to be ‘released’ from rentiers’ cramp and economic process to be determined by the most productive and vital part of real economies, workers. It is therefore clear that our argument pinpoints the important role that the saving behaviour of the income class in question and external finance play in macroeconomic performance.

5.4.1.1. Short-run equilibrium: A simplified analysis

Our aim in this section is to simplify the previous analysis, by using the equality of workers’ debt-to-capital ratio in our calculations. Our assumption suggests that workers’ funds for financing capitalists’ investment plans are simply the level of their savings, i.e. $D_w = s_w wL$, which as a ratio to capital stock equals $D/K = d_w = s_w wl$. Given this definition, and after the appropriate rearrangements, the capital accumulation and realised savings accumulation equations are written as:

$$(91'') \quad g_i = \frac{\Delta K}{K} = b_0 + b_1(hcu - i(d_r + s_w wl)) + b_2 cu$$

$$(92'') \quad g_s = s_c(hcu - i(d_r + s_w wl)) + s_r id_r + s_w wl$$

The short run equilibrium values of capacity utilization, capital accumulation and profit rate are:

$$(93') \quad cu^* = \frac{b_0 + id_r(s_c - s_r - b_1) + s_w wl(i(s_c - b_1) - 1)}{(s_c - b_1)h - b_2}$$

$$(94') \quad g_i^* = \frac{b_0 s_c h + id_r (b_2 s_c - (b_1 h + b_2) s_r) + s_w w l (i b_2 s_c - (b_1 h + b_2))}{(s_c - b_1) h - b_2}$$

$$(95') \quad r^* = \frac{b_0 + id_r (s_c - s_r - b_1) + s_w w l (i (s_c - b_1) - 1)}{(s_c - b_1) h - b_2} h$$

It is easily understood that the short run stability/instability conditions hardly change.

Moreover, the short run equilibrium level of employment is:

$$(96') \quad L^* = \frac{aK [b_0 + id_r (s_c - s_r - b_1)]}{(s_c - b_1) h - b_2 - s_w w (1 + i (s_c - b_1))}$$

Regarding the short run equilibrium of unemployment, it should be noticed that the conditions that ensure stability and thereby the positive sign of the denominator suggest that $[(s_c - b_1) h - b_2 - s_w w (1 + i (s_c - b_1))] > 0$ and then $(s_c - b_1) h > b_2 + s_w w (1 + i (s_c - b_1))$.

Consequently by using equation (93'), the short run stability that ensures the positive sign of denominator $[(s_c - b_1) h - s_w w (i (s_c - b_1) - 1) - b_2] > 0$ and thereby $(s_c - b_1) h > s_w w l (i (s_c - b_1) - 1) + b_2$, suggests that capitalists' saving propensity is above the coefficient that reflects the degree of impact of external finance on investment decisions, i.e. $s_c > b_1$. Hence given stability conditions, we estimate the responses of each of these short run equilibrium values to a) interest payment changes (id_r) and b) interest rate changes (i). These estimations are determined by calculating

the partial derivatives of capacity utilization, capital accumulation, profit rates and employment levels respectively that equal:

$$(97') \partial cu^* / \partial id_r = \frac{s_c - s_r - b_1}{(s_c - b_1)h - b_2}$$

$$(98') \partial g_i^* / \partial id_r = \frac{(b_1 h + b_2)(s_c - s_r - b_1)}{(s_c - b_1)h - b_2} - b_1$$

$$(99') \partial r / \partial id_r = \frac{h(s_c - s_r - b_1)}{(s_c - b_1)h - b_2}$$

$$(100') \partial L / \partial id_r = aK \frac{(s_c - s_r - b_1)}{(s_c - b_1)h - b_2 - s_w w(1 + i(s_c - b_1))}$$

We note that the responses of each of these magnitudes are similar to the core model, where the only source of external finance is rentiers' income. Moreover, by assuming that rentiers' debt-to-capital ratio is constant in the short run ($d_r = \bar{d}_r$), the responses of each of short run equilibrium values to variations in the interest rate are given by:

$$(101') \partial cu / \partial i = \frac{d_r(s_c - s_r - b_1) + s_w w l(s_c - b_1)}{(s_c - b_1)h - b_2}$$

$$(102') \partial g_i^* / \partial i = \frac{b_2 s_c s_w w l - (b_2 s_c - (b_1 h + b_2) s_r)}{(s_c - b_1)h - b_2}$$

$$(103') \partial r / \partial i = h \frac{d_r(s_c - s_r - b_1) + s_w w l(s_c - b_1)}{(s_c - b_1)h - b_2}$$

$$(104') \partial L / \partial i = aK \frac{d_r(s_c - s_r - b_1)[(s_c - b_1)h - b_2 - s_w w l(1 + i(s_c - b_1))] + s_w w l(s_c - b_1)(b_0 + i d_r(s_c - s_r - b_1))}{[(s_c - b_1)h - b_2 - s_w w l(1 + i(s_c - b_1))]^2}$$

Obviously, the level of workers' propensity to save affects the way that each of the real magnitudes responds to interest rate changes considerably. Besides, in this case all the included income classes affect economic activity directly.

5.5.2. Long run Equilibrium

The aggregate debt-to-capital ratio is now defined as follows:

$$d = \frac{D}{K} = \frac{D_r + D_w}{K}$$

Moreover by assuming away inflation, we estimate the growth rate of debt-to-capital ratio by taking the logarithmic derivative of aggregate debt-to-capital ratio:

$$(106) \hat{d} = \hat{D} - \hat{K} = (\hat{D}_r + \hat{D}_w) - g_i^*$$

It is implied that the additional amount for financing investment plan is granted in each period (ΔD) by rentiers' and workers' savings. This assumption does not set savings as a precondition for credit and investment, although the aggregation of their initial savings and capitalists' internal funds are initially financed by short term credit, as defined in monetary circuit theory. As a consequence the additional long run credit granted in each period equals:

$$(107) \Delta D = s_r i D_r + s_w i D_w$$

while the growth rate of aggregate debt is defined as:

$$(108) \hat{D} = \frac{\Delta D}{D} = \frac{s_r i D_r}{D_r} + \frac{s_w i D_w}{D_w} = s_r i + s_w i$$

By substituting equations (94) and (108) into equation (106), the long run growth rate of debt-to-capital ratio is:

$$(109) \hat{d} = \frac{(s_r i + s_w i)((s_c - b_1)h - b_2) - b_0 s_c h + (b_1 h + b_2) s_w w l - i d_r (b_2 s_c - (b_1 h + b_2) s_r) - i d_w b_2 s_c}{((s_c - b_1)h - b_2)}$$

Considering the constancy of the growth rate of aggregate debt-to-capital ratio ($\hat{d} = 0$), the long run equilibrium levels for rentiers' and workers' debt-to-capital ratios are respectively:

$$(110a) d_r^* = \frac{i[(s_r + s_w)(h(s_c - b_1) - b_2) - d_w b_2 s_c] - b_0 s_c h + (b_1 h + b_2) s_w w l}{i[b_2 s_c - (b_1 h + b_2) s_r]}$$

$$(110b) d_w^* = \frac{i[(s_r + s_w)(h(s_c - b_1) - b_2) - d_r (b_2 s_c - (b_1 h + b_2) s_r)] - b_0 s_c h + (b_1 h + b_2) s_w w l}{i[b_2 s_c]}$$

The required conditions that ensure long run stability, provided that stability conditions characterise the short run equilibrium, are reflected on the negative responses of long run debt-to-capital ratio to changes in rentiers' and workers' debt-to-capital ratios, i.e.

when both the inequalities of $\frac{\partial \hat{d}}{\partial d_w} < 0$ and $\frac{\partial \hat{d}}{\partial d_r} < 0$ stand. Hence, with respect to equation (109):

$$(111a) \frac{\partial \hat{d}}{\partial d_r} = \frac{-i(b_2 s_c - (b_1 h + b_2) s_r)}{((s_c - b_1)h - b_2)} \quad \text{and} \quad (111b) \frac{\partial \hat{d}}{\partial d_w} = \frac{-i b_2 s_c}{((s_c - b_1)h - b_2)}$$

Further, long run stability arises when the numerators of both the partial derivatives are positive signed, i.e. $((b_2 s_c - (b_1 h + b_2) s_r) > 0)$ and $(b_2 s_c > 0)$. To be more specific, the partial derivative with respect to *rentiers' debt-to-capital ratio* it is required: capitalists' saving propensity to be higher than that of rentiers ($s_c > s_r$) and simultaneously investment to be relatively elastic with respect to capacity utilization changes (b_2 relatively high) but very inelastic with respect to debt shifts (b_1 relatively low). Additionally, by taking into account the partial derivative with respect to *workers' debt-to-capital ratio*, it is required: capitalists' saving propensity to be positive ($s_c > 0$), whereas the degree of elasticity of capitalists' investment to changes in capacity utilization to be inelastic (b_2 relative low). Under these conditions, the *long run stability* corresponds to the *short run puzzling case* according to which interest rates shifts affect the variables in question positively. Indeed, stability conditions are affirmed when both rentiers' and workers' debt-to-capital ratio changes move in the same direction.

In order to consider whether monetary factors affect economic activity, we calculate the partial derivatives of each of rentiers and workers debt-to-capital ratio with respect

to interest rate changes. Thus by using equations (110a) and (110b), we obtain the following expressions:

$$(112a) \quad \frac{\partial d_r}{\partial i} = \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_w b_2 s_c - d_r (b_2 s_c - (b_1 h + b_2) s_r)}{i(b_2 s_c - (b_1 h + b_2) s_r)}$$

or equivalently

$$(112a') \quad \frac{\partial d_r}{\partial i} = \frac{1}{i} \left[\frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_w b_2 s_c - d_r}{(b_2 s_c - (b_1 h + b_2) s_r)} \right]$$

and

$$(112b) \quad \frac{\partial d_w^*}{\partial i} = \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_r (b_2 s_c - (b_1 h + b_2) s_r) - d_w b_2 s_c}{i[b_2 s_c]}$$

or equivalently

$$(112b') \quad \frac{\partial d_w^*}{\partial i} = \frac{1}{i} \left[\frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_r (b_2 s_c - ((b_1 h + b_2) s_r))}{b_2 s_c} - d_w \right]$$

We distinguish among three possible cases to capture the effect of variations in the interest rate on rentiers' and workers' debt-to-capital ratios¹⁸⁹.

Firstly when rentiers' and workers' debt-to-capital ratios respond to an increase in the interest rate negatively, we implicitly assume that their ratios are very high in the

¹⁸⁹It should be noted that the analysis requires the constancy of workers' debt-to-capital ratio ($d_w = \bar{d}_w > 0$) when we examine the effects of monetary factors on rentiers' debt-to-capital ratio and respectively the constancy of rentiers' debt-to-capital ratio ($d_r = \bar{d}_r > 0$) when we examine the responses of workers' debt-to-capital ratio to interest rate changes.

initial equilibrium position. Under these conditions, economic expansion is unconstrained:

$$(113a) \quad d_r > \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_w b_2 s_c}{i(b_2 s_c - (b_1 h + b_2)s_r)}, \text{ then } \frac{\partial d_r}{\partial i} < 0$$

$$(113b) \quad d_w > \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_r (b_2 s_c - (b_1 h + b_2)s_r)}{i[b_2 s_c]}, \text{ then } \frac{\partial d_w}{\partial i} < 0$$

On the other hand, when the initial equilibrium of rentiers' and workers' debt-to-capital ratios are low, they respond to an increase in the interest rate positively and economic expansion is constrained:

$$(114a) \quad d_r < \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_w b_2 s_c}{i(b_2 s_c - (b_1 h + b_2)s_r)}, \text{ then } \frac{\partial d_r}{\partial i} > 0$$

$$(114b) \quad d_w < \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_r (b_2 s_c - (b_1 h + b_2)s_r)}{i[b_2 s_c]}, \text{ then } \frac{\partial d_w}{\partial i} > 0$$

Finally when rentiers and workers' debt-to-capital ratios rest upon their equilibrium levels, interest rate variations cannot affect them. In other words, increasing interest rate has no impact on capital accumulation, employment and the general economic activity levels:

$$(115a) \quad d_r = \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_w b_2 s_c}{i(b_2 s_c - (b_1 h + b_2)s_r)}, \text{ then } \frac{\partial d_r}{\partial i} = 0$$

$$(115b) \quad d_w = \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_r(b_2s_c - (b_1h + b_2)s_r)}{i[b_2s_c]}, \text{ then } \frac{\partial d_w}{\partial i} = 0$$

The analysis becomes more interesting if we assume long run instability where the growth rate of debt-to-capital ratio is affected positively by changes in both rentiers' and workers' debt-to-capital ratios $\left(\frac{\partial \hat{d}}{\partial d_r}, \frac{\partial \hat{d}}{\partial d_w} > 0 \right)$. In this case, the numerators of the partial derivatives of growth rate with respect to rentiers' and workers' debt-to-capital ratios shall be negative, i.e. when $((b_2s_c - (b_1h + b_2)s_r) < 0)$ and $(b_2s_c < 0)$. Therefore, in the derivative with respect to *rentiers' debt-to-capital ratio*, rentiers' propensity to save out of their incomes is higher than that of capitalists $(s_r < s_c)$ and capitalists' investment decisions are affected significantly by changes in debt and debt payments but not by changes in demand levels (relatively elastic b_1 and relatively inelastic b_2). Additionally, in the derivative with respect to *workers' debt-to-capital ratio*, capitalists must be characterised by a negative saving propensity $(s_c < 0)$; a hypothesis that falls outside the Post Keynesian-Kaleckian tradition. In other words, by considering workers' debt-to-capital ratio instability conditions do not stand, since we can assume neither capitalists' dissaving nor that the coefficient that reflects the effects of capacity utilization on investment can be negatively signed. Besides by relaxing assumptions and suggesting that workers' debt-to-capital ratio affirms instability, the implication that capitalists' savings propensity is higher than that of rentiers $(s_r < s_c)$ is directly implied. This makes clear that the fundamental assumptions cancel out the possibility of instable long run equilibrium.

The significance of these results is reflected on workers' incentives to use their savings in order to finance capitalists' investment plans. As a consequence, rentiers' dominance in external finance is squeezed down, whereas the growth of economic activity becomes essential. Thus in accordance with the adopted assumptions, when both workers and rentiers finance capitalists' investment plans, long run instability conditions do not stand.

Attention shall also be paid on the case where stability with respect to workers' debt-to-capital ratio is combined with instability with respect to rentiers' debt-to-capital ratio. In this case, workers' debt-to-capital ratio responds positively to interest rate changes $\left(\frac{\partial d_w}{\partial i} > 0\right)$ (eq. (112b')), whereas rentiers' debt-to-capital ratio responds negatively to interest rate increases $\left(\frac{\partial d_r}{\partial i} < 0\right)$ (eq. (112a'))¹⁹⁰. The final impact on economic activity depends on the sensitivity of actual economic conditions to each of these ratios.

We now continue to examine the effects that changes in monetary factors may have on capacity utilization, capital accumulation and profit rate respectively, by assuming that both short and long run equilibriums are characterised by stability conditions. As a result, the responses of each of them given the constancy of aggregate debt-to-capital ratio $(d = \bar{d} = \bar{d}_r + \bar{d}_w > 0)$ are respectively equal to:

¹⁹⁰Bearing in mind that long run stability conditions respond to short run puzzling case, whereas long run instability corresponds to short run normal case.

$$(116) \quad \frac{\partial cu}{\partial i} = \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(s_c - s_r - b_1) + \left(d_w + i \frac{\partial d_w}{\partial i}\right)(s_c - b_1)}{(s_c - b_1)h - b_2}$$

$$(117) \quad \frac{\partial g}{\partial i} = \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(b_2 s_c - (b_1 h + b_2) s_r) + \left(d_w + i \frac{\partial d_w}{\partial i}\right)(b_2 s_c)}{h(s_c - b_1) - b_2}$$

$$(118) \quad \frac{\partial r}{\partial i} = h \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(s_c - s_r - b_1) + \left(d_w + i \frac{\partial d_w}{\partial i}\right)(s_c - b_1)}{(s_c - b_1)h - b_2}$$

Additionally, we estimate the responses of each of the above magnitudes to interest rate changes by assuming the constancy of workers' debt-to-capital ratio ($d_w = \bar{d}_w > 0$) and rentiers' debt-to-capital ratio ($d_r = \bar{d}_r > 0$) respectively:

$$(116a) \quad \frac{\partial cu}{\partial i} = \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(s_c - s_r - b_1) + d_w(s_c - b_1)}{h(s_c - b_1) - b_2} \quad \text{and}$$

$$(116b) \quad \frac{\partial cu}{\partial i} = \frac{d_r(s_c - s_r - b_1) + \left(d_w + i \frac{\partial d_w}{\partial i}\right)(s_c - b_1)}{h(s_c - b_1) - b_2}$$

$$(117a) \quad \frac{\partial g}{\partial i} = \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(b_2 s_c - (b_1 h + b_2) s_r) + d_w b_2 s_c}{h(s_c - b_1) - b_2} \quad \text{and}$$

$$(117b) \frac{\partial g}{\partial i} = \frac{\left(d_w + i \frac{\partial d_w}{\partial i} \right) (b_2 s_c) + d_r (b_2 s_c - (b_1 h + b_2) s_r)}{h(s_c - b_1) - b_2}$$

$$(118a) \frac{\partial r}{\partial i} = h \frac{\left(d_r + i \frac{\partial d_r}{\partial i} \right) (s_c - s_r - b_1) + d_w (s_c - b_1)}{h(s_c - b_1) - b_2} \quad \text{and}$$

$$(118b) \frac{\partial r}{\partial i} = h \frac{d_r (s_c - s_r - b_1) + \left(d_w + i \frac{\partial d_w}{\partial i} \right) (s_c - b_1)}{h(s_c - b_1) - b_2}$$

Moreover by assuming an interest inelastic mark-up, we prevent debt-to-capital ratios from affecting interest rate or the mark-up itself and thereby the rest of the endogenously determined variables. Besides changes in debt-to-capital ratios are compatible with income redistribution that in this section concerns not only rentiers and capitalists but also workers. This is shown by examining the responses of each of the endogenously determined variables to debt-to-capital ratios changes. As a result, the partial derivatives of capacity utilization, capital accumulation and profit rates relevant to rentiers and workers' debt-to-capital ratios respectively, under the assumption about a constant but positive interest rate ($i = \bar{i} > 0$) are given by:

$$(119a) \frac{\partial cu}{\partial d_r} = \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} \quad \text{and} \quad (119b) \frac{\partial cu}{\partial d_w} = \frac{i(s_c - b_1)}{(s_c - b_1)h - b_2}$$

$$(120a) \frac{\partial g_i}{\partial d_r} = \frac{i(b_2 s_c - (b_1 h + b_2) s_r)}{h(s_c - b_1) - b_2} \quad \text{and} \quad (120b) \frac{\partial g}{\partial d_w} = \frac{i(b_2 s_c)}{h(s_c - b_1) - b_2}$$

$$(121a) \frac{\partial r}{\partial d_r} = \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} h \quad \text{and} \quad (121b) \frac{\partial r}{\partial d_w i} = \frac{i(s_c - b_1)}{(s_c - b_1)h - b_2} h$$

All the responses of long run equilibrium values to changes in debt-to-capital ratio, given short and long run stability and the constancy of rentiers' and workers' debt to capital ratio and interest rate respectively are presented in *Table 5.6.*

Table 5.6..

<i>Responses of capacity utilization, capital accumulation and profit rate to long run equilibrium level interest rate and debt-capital ratio shifts when equilibrium is stable</i>	
<p><i>Short run stability</i></p> <p>$h(s_c - b_1) > b_2$</p> <p><i>Long run stability</i></p> <p>$\frac{\partial d_r}{\partial d}, \frac{\partial d_w}{\partial d} < 0$</p> <p><i>workers' and rentiers' debt-to-capital ratio constancy</i></p> <p>$(d_w = \bar{d}_w, d_r = \bar{d}_r > 0)$</p>	<p>$(d_w = \bar{d}_w > 0) \frac{\partial g}{\partial i} > 0$ if $b_2 s_c - (b_1 h + b_2) s_r > 0$ and $b_2 s_c > 0$</p> <p>$(d_r = \bar{d}_r > 0) \frac{\partial g}{\partial i} > 0$, if $b_2 s_c > 0$ and $b_2 s_c - (b_1 h + b_2) s_r > 0$</p> <hr/> <p>$(d_w = \bar{d}_w > 0) \frac{\partial cu}{\partial i} > 0$, if $(s_c - s_r - b_1) > 0$ and $(s_c - b_1) > 0$</p> <p>$(d_r = \bar{d}_r > 0) \frac{\partial cu}{\partial i} > 0$, if $(s_c - s_r - b_1) > 0$ and $(s_c - b_1) > 0$</p> <hr/> <p>$(d_w = \bar{d}_w > 0), \frac{\partial r}{\partial i} > 0$, if $h(s_c - s_r - b_1) > 0$ and $h(s_c - b_1) > 0$</p> <p>$(d_r = \bar{d}_r > 0), \frac{\partial r}{\partial i} > 0$, if $h(s_c - s_r - b_1) > 0$ and $h(s_c - b_1) > 0$</p>
<p><i>Short run stability</i></p> <p>$h(s_c - b_1) > b_2$</p> <p><i>Long run stability</i></p> <p>$\frac{\partial d_r}{\partial d}, \frac{\partial d_w}{\partial d} < 0$</p>	<p>$\frac{\partial cu}{\partial d_r} > 0$ if $s_c - s_r - b_1 > 0$</p> <p>and $\frac{\partial cu}{\partial d_w} > 0$, if $s_c - b_1 > 0$</p> <hr/> <p>$\frac{\partial g_i}{\partial d_r} > 0$, if $(b_2 s_c - (b_1 h + b_2) s_r) > 0$</p>

<i>interest rate constancy</i> $i = \bar{i} > 0$	and $\frac{\partial g_i}{\partial d_w} > 0$, if $b_2 s_c > 0$
	$\frac{\partial r}{\partial d_r} > 0$, if $h(s_c - s_r - b_1) > 0$
	and $\frac{\partial r}{\partial d_w} > 0$ if $h(s_c - s_r - b_1) > 0$

Evidently the final impact of monetary factors on the long run is determined mainly by the degree at which each of debt-to-capital ratios finance investment plans. Further, similarly with the core model and its extension even when workers share the role of rentiers, the final impacts from monetary factors changes on macroeconomic magnitudes depend on the relation between rentiers' and capitalists' propensities to save as well as on the degree investment elasticity with respect to capacity utilization and external finance.

In order to determine the general macroeconomic effects of interest rate changes, we consider the partial derivative of capital accumulation with respect to interest rate shifts (eq. (117)). There are three alternative ways that debt-to-capital ratios are affected by interest rate changes relative to their initial equilibrium levels, as well as the stability of both rentiers' and workers' debt-to-capital ratios. Thus after integrating equations (112a) and (112b), it yields that:

$$(117') \quad \frac{\partial g}{\partial i} = \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(b_2 s_c - (b_1 h + b_2) s_r) + \left(d_w + i \frac{\partial d_w}{\partial i}\right)(b_2 s_c)}{h(s_c - b_1) - b_2} = 2(s_r + s_w) - \frac{d_r(b_2 s_c - (b_1 h + b_2)) + d_w b_2 s_c}{h(s_c - b_1) - b_2} > 0$$

Moreover, by considering as given initially workers' debt-to-capital ratio ($d_w = \bar{d}_w > 0$) and thereby that of workers ($d_r = \bar{d}_r > 0$), the responses of capital accumulation are respectively equal to:

$$(117a') \quad \frac{\partial g}{\partial i} = \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(b_2 s_c - (b_1 h + b_2) s_r) + d_w b_2 s_c}{h(s_c - b_1) - b_2} = s_r + s_w > 0$$

$$(117b') \quad \frac{\partial g}{\partial i} = \frac{\left(d_w + i \frac{\partial d_w}{\partial i}\right)(b_2 s_c) + d_r (b_2 s_c - (b_1 h + b_2) s_r)}{h(s_c - b_1) - b_2} = s_r + s_w > 0$$

Obviously for stability conditions over the long run term, the final outcome of interest rate changes on capital accumulation is positive. More precisely, the responses of capital accumulation to interest rate changes are squeezed downward when both workers and rentiers' debt-to-capital ratios are considered, but increase when each one of them is regarded. In addition, the positive effects of interest rate on capital accumulation turn to be lower than those of the core model. This is easily explained by comparing the expressions of the responses of capital accumulation to interest rate changes when either workers' ($d_w = \bar{d}_w > 0$) or rentiers' ($d_r = \bar{d}_r > 0$) constancy of debt-to-capital ratios is assumed with the case where the constancy of both of them is regarded $\left(\frac{\partial g}{\partial i} = s_r + s_w > 0\right)$.

It is however possible for rentiers' and workers' debt-to-capital ratios not to be characterised by the same initial position. For instance it is possible the initial equilibrium of rentiers' debt-to-capital ratio to be relatively high but that of workers'

debt-to-capital ratio relatively low or the opposite. Moreover, it is possible one of the debt-to-capital ratios to be at its equilibrium position and the other to be above or below its own equilibrium. In this case the final impact of interest rate increases on aggregate debt-to-capital ratio is determined with respect to the sensitivity of these ratios to interest rate changes as well as by the degree of their dominance in financing capitalists' investment plans and actual conditions.

Nevertheless, in the case of long run instability the effects of interest rate changes on capital accumulation and the rest of economic process remain similar to those of stability conditions. The only change that occurs, concerns the sign of inequality in the equation of the response of aggregate debt-to-capital ratio to changes in rentiers' debt-to-capital ratio changes (eq. (111a), $\frac{\partial \hat{d}}{\partial d_r} > 0$). However, even in this case, economic activity is positively affected. Indeed, it is suggested that under long run stability and instability conditions, upward interest rates shifts always affect the equilibrium rate of capital accumulation positively. A result that can be reached even by regarding the constancy of long run debt-to-capital ratio ($\hat{d} = 0$).

The most interesting part in this analysis is the behaviour of long run equilibrium of employment that is affected directly by external finance. Particularly, we define the long run equilibrium level of employment by substituting into equation (8'), equations (93) and (94):

$$(122) \quad L = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} &(b_0 - s_w wl)(b_0 s_c h - (b_1 h + b_2) s_w wl) \\ &+ id_r [(b_0 - s_w wl)(b_1 h s_r + b_2 (s_c - s_r)) + (s_c - s_r - b_1)(b_0 s_c h - s_w wl(b_1 h + b_2))] \\ &+ id_w [b_2 s_c (b_0 - s_w wl) + (s_c - b_1)(b_0 s_c h - (b_1 h + b_2) s_w wl)] \\ &+ i^2 d_w d_r [(s_c - b_1)(b_1 h s_r - b_2 (s_c - s_r)) + b_2 s_c (s_c - s_r - b_1)] \\ &+ (id_r)^2 (s_c - s_r - b_1)(b_1 h s_r + b_2 (s_c - s_r)) + (id_w)^2 b_2 s_c (s_c - b_1) \end{aligned} \right]$$

We estimate the effects of changes in: a) interest payments (id_r, id_w), b) interest rate increases (i), given the constancy of both debt-to-capital ratios, c) interest rate increases (i), given the constancy of workers' long run debt-to-capital ratio ($d_w = \bar{d}_w > 0$) and rentiers' long run debt-to-capital ratio ($d_r = \bar{d}_r > 0$), d) changes in rentiers' and workers' debt-to-capital ratio under the assumption of constant interest rate levels ($i = \bar{i} > 0$). We then obtain the following expressions:

$$(123a) \quad \frac{\partial L}{\partial id_r} = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} &((b_0 s_w wl)(b_1 h s_r + b_2 (s_c - s_r)) + (s_c - s_r - b_1)(b_0 s_c h - s_w wl(b_1 h + b_2))) \\ &+ 2id_w ((s_c - b_1)(b_1 h s_r - b_2 (s_c - s_r)) + b_2 s_c (s_c - s_r - b_1)) \\ &+ 2id_r (s_c - s_r - b_1)(b_1 h s_r + b_2 (s_c - s_r)) \end{aligned} \right]$$

$$(123b) \quad \frac{\partial L}{\partial id_w} = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} &(b_2 s_c (b_0 - s_w wl) + (s_c - b_1)(b_0 s_c h - (b_1 h + b_2) s_w wl)) \\ &+ 2id_r ((s_c - b_1)(b_1 h s_r - b_2 (s_c - s_r)) + b_2 s_c (s_c - s_r - b_1)) \\ &+ 2id_w b_2 s_c (s_c - b_1) \end{aligned} \right]$$

$$(124) \quad \frac{\partial L}{\partial i} = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} & \left(d_r + i \frac{\partial d_r}{\partial i} \right) \left[(b_0 - s_w w l)(b_1 h s_r + b_2(s_c - s_r)) + (s_c - s_r - b_1)(b_0 s_c h - s_w w l(b_1 h + b_2)) \right] \\ & + \left(d_w + i \frac{\partial d_w}{\partial i} \right) \left[b_2 s_c (b_0 - s_w w l) + (s_c - b_1)(b_0 s_c h - (b_1 h + b_2) s_w w l) \right] \\ & + \left(2i d_w d_r + i^2 d_w \left(d_r + \frac{\partial d_r}{\partial i} \right) + i^2 d_w \left(d_w + \frac{\partial d_w}{\partial i} \right) \right) \left[(s_c - b_1)(b_1 h s_r - b_2(s_c - s_r)) + b_2 s_c (s_c - s_r - b_1) \right] \\ & + 2i d_r \left(d_r + i \frac{\partial d_r}{\partial i} \right) (s_c - s_r - b_1)(b_1 h s_r + b_2(s_c - s_r)) + 2i d_w \left(d_w + i \frac{\partial d_w}{\partial i} \right) b_2 s_c (s_c - b_1) \end{aligned} \right]$$

$$(124a) \quad \frac{\partial L}{\partial i} (d_w = \bar{d}_w > 0) = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} & \left(d_r + i \frac{\partial d_r}{\partial i} \right) \left((b_0 - s_w w l)(b_1 h s_r + b_2(s_c - s_r)) + (s_c - s_r - b_1)(b_0 s_c h - (s_w w l(b_1 h + b_2))) \right) \\ & + d_w (b_2 s_c (b_0 - s_w w l) + (s_c - b_1)(b_0 s_c h - (b_1 h + b_2) s_w w l)) \\ & + 2d_w \left(d_r + i \frac{\partial d_r}{\partial i} \right) \left((s_c - b_1)(b_1 h s_r - b_2(s_c - s_r)) + b_2 s_c (s_c - s_r - b_1) \right) \\ & + 2 \left(d_r + i \frac{\partial d_r}{\partial i} \right) \left((s_c - s_r - b_1)(b_1 h s_r + b_2(s_c - s_r)) \right) + 2d_w (b_2 s_c (s_c - b_1)) \end{aligned} \right]$$

$$(124b) \quad \frac{\partial L}{\partial i} (d_r = \bar{d}_r > 0) = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} & d_r \left((b_0 - s_w w l)(b_1 h s_r + b_2(s_c - s_r)) + (s_c - s_r - b_1)(b_0 s_c h - (b_1 h + b_2) s_w w l) \right) \\ & + \left(d_w + i \frac{\partial d_w}{\partial i} \right) \left(b_2 s_c (b_0 - s_w w l) + (s_c - b_1)(b_0 s_c h - (b_1 h + b_2) s_w w l) \right) \\ & + 2d_r \left(d_w + i \frac{\partial d_w}{\partial i} \right) \left((s_c - b_1)(b_1 h s_r - b_2(s_c - s_r)) + b_2 s_c (s_c - s_r - b_1) \right) \\ & + 2d_r \left((s_c - s_r - b_1)(b_1 h s_r + b_2(s_c - s_r)) \right) + 2 \left(d_w + i \frac{\partial d_w}{\partial i} \right) \left(b_2 s_c (s_c - b_1) \right) \end{aligned} \right]$$

$$(125a) \quad \frac{\partial L}{\partial d_r} (d_w = \bar{d}_w > 0, i = \bar{i} > 0) =$$

$$\frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} & i \left((b_0 - s_w w l)(b_1 h s_r + b_2(s_c - s_r)) + (s_c - s_r - b_1)(b_0 s_c h - s_w w l(b_1 h + b_2)) \right) \\ & + i d_w (b_2 s_c (b_0 - s_w w l) + (s_c - b_1)(b_0 s_c h - (b_1 h + b_2) s_w w l)) \\ & + i^2 d_w \left((s_c - b_1)(b_1 h s_r - b_2(s_c - s_r)) + b_2 s_c (s_c - s_r - b_1) \right) \\ & + 2i^2 d_r \left((s_c - s_r - b_1)(b_1 h s_r + b_2(s_c - s_r)) \right) + (i d_w)^2 (b_2 s_c (s_c - b_1)) \end{aligned} \right]$$

$$(125b) \quad \frac{\partial L}{\partial d_w} (d_r = \bar{d}_r > 0, i = \bar{i} > 0) =$$

$$\frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{array}{l} id_r((b_0 - s_w w l)(b_1 h s_r + b_2(s_c - s_r)) + (s_c - s_r - b_1)(b_0 s_c h - s_w w l(b_1 h + b_2))) \\ + i(b_2 s_c(b_0 - s_w w l) + (s_c - b_1)(b_0 s_c h - (b_1 h + b_2) s_w w l)) \\ + i^2 d_r((s_c - b_1)(b_1 h s_r - b_2(s_c - s_r)) + b_2 s_c(s_c - s_r - b_1)) \\ + (id_r)^2((s_c - s_r - b_1)(b_1 h s_r + b_2(s_c - s_r))) + 2id_w(b_2 s_c(s_c - b_1)) \end{array} \right]$$

Obviously for stability conditions, independently of the way that each of rentiers' and workers' debt-to-capital ratios responds to interest rate variations (eq. (113a,b)-(115a,b)), employment is affected positively by interest rate changes as long as rentiers' saving propensity is higher than that of capitalists and investment plans are thinly affected by changes in external finance (b_1 relative low). The additional factor that we should consider in this case is the level of workers' saving propensity, which affects the final level of employment.

It should be additionally mentioned that the impact of interest rate changes on employment levels is similar, when long run equilibrium is characterised by instability with respect to rentiers' debt-to-capital ratio and stability with respect to workers' debt-to-capital ratio. However a comparison between the case where both rentiers and workers lend capitalists (eq. (124)), with the case where only rentiers finance investment (eq. (48)) reveals that in the former case employment is triggered down. This result contradicts the suggestion according to which increases in workers' income by interest payments, create the proper conditions for economic expansion through consumption expenditures. All these results are presented in *Table 3*. in *Appendix A*.

Although the effects in each case depend on the adopted assumptions, the crucial role is attributed to the adopted levels of each of rentiers' or workers' debt-to-capital ratios as well as the degree of economy's sensitivity to each of them. Thus when capitalists are in favour of workers' borrowing, economic activity is determined by the way that workers adjust their behaviour towards their increased aggregate income. Due to workers' behaviour as rentiers, an easily upward employment shift and a general sustained mobility of economic activity through demand side are highly possible. This occurs even when workers reduce the level of their savings propensity and thereby the funds for financing investment in order to increase their consumption equivalently. But even in the case where capitalists insist on preferring rentiers' rather than workers' finance for the achievement of their investment plans, it is certain that employment is downward triggered by monetary factors.

Generally, the final results about the equilibrium conditions and the effects of monetary factors, even when workers and rentiers finance investment depend on the relation between capitalists' and rentiers' debt-to-capital ratios as well as on the degree of impact from capacity utilization and external finance changes on investment plans.

5.4.2. Long-run Equilibrium: A simplified analysis

By assuming the constancy of long run equilibrium level of debt to capital ratio ($\hat{d} = 0$) and using equations (94') and (110), the long run growth rate of debt-to-capital ratio is:

$$(109') \quad \hat{d} = \frac{s_r i((s_c - b_1)h - b_2) + s_w i((s_c - b_1) - b_2(1 + s_c w l)) - i d_r (b_2 s_c - (b_1 h + b_2) s_r) - b_0 s_c h + (b_1 h + b_2) s_w w l}{((s_c - b_1)h - b_2)}$$

whereas the long run equilibrium level of debt-to-capital ratio is:

$$(110a') \quad d_r^* = d^* = \frac{i(s_r((s_c - b_1)h - b_2) + s_w((s_c - b_1) - b_2(1 + s_w w l))) - b_0 s_c h + (b_1 h + b_2) s_w w l}{i(b_2 s_c - (b_1 h + b_2) s_r)}$$

The growth rate of debt-to-capital ratio is written only in terms of rentiers' debt-to-capital ratio. As a result, the required condition for long run stability is expressed in terms of rentiers' debt-to-capital ratio $\left(\frac{\partial \hat{d}}{\partial d_r} < 0\right)$ and yields that:

$$(111a) \quad \frac{\partial \hat{d}}{\partial d_r} = \frac{-i(b_2 s_c - (b_1 h + b_2) s_r)}{((s_c - b_1)h - b_2)}$$

Hence, long run stability stands when the numerator is positively signed in equation (111a) $((b_2 s_c - (b_1 h + b_2) s_r) > 0)$ and suggests that capitalists' saving propensity is higher than rentiers' $(s_c > s_r)$ but simultaneously investment is very elastic with respect to capacity utilization changes and inelastic with respect to shifts in debt changes (relative high values for b_2 but low for b_1). This suggestion sets the correspondence between *long run stability* and *short run puzzling case*. Besides, if $\left(\frac{\partial \hat{d}}{\partial d_r} = \frac{\partial \hat{d}}{\partial d} > 0\right)$, long run equilibrium is characterised by instability conditions, corresponds to *short run normal case*.

Given the way that long run debt-to-capital ratio is being determined, we can calculate the partial derivatives of long run debt-to-capital ratio with respect to interest rate changes:

$$(112a') \frac{\partial d_r}{\partial i} = \frac{s_r((s_c - b_1)h - b_2) + s_w((s_c - b_1)h - b_2(1 + s_c wl)) - d(b_2 s_c - (b_1 h + b_2)s_r)}{i(b_2 s_c - (b_1 h + b_2)s_r)}$$

or

$$(112a'') \frac{\partial d_r}{\partial i} = \frac{1}{i} \left[\frac{s_r((s_c - b_1)h - b_2) + s_w((s_c - b_1)h - b_2(1 + s_c wl))}{(b_2 s_c - (b_1 h + b_2)s_r)} - d_r \right]$$

Considering both short and long run stability conditions, interest rate increases cause a downward pressure to the equilibrium debt-to-capital ratio, if its initial equilibrium level is relatively high:

$$(113a') \text{ if } d_r (= d) > \frac{s_r((s_c - b_1)h - b_2) + s_w((s_c - b_1)h - b_2(1 + s_c wl))}{i(b_2 s_c - (b_1 h + b_2)s_r)}, \text{ then } \frac{\partial d_r}{\partial i} < 0$$

When the initial equilibrium level is relatively low, the debt-to-capital ratio is positively affected and imposes constraints on the possibility of economic expansion:

$$(114a') \text{ if } d_r (= d) < \frac{s_r((s_c - b_1)h - b_2) + s_w((s_c - b_1)h - b_2(1 + s_c wl))}{i(b_2 s_c - (b_1 h + b_2)s_r)}, \text{ then } \frac{\partial d_r}{\partial i} > 0$$

Finally, interest rate increases have no impact on debt-to-capital ratio when it rests upon its equilibrium

$$(115a') \text{ if } d_r (= d) = \frac{s_r((s_c - b_1) - b_2) + s_w((s_c - b_1)h - b_2(1 + s_c wl))}{i(b_2 s_c - (b_1 h + b_2)s_r)}, \text{ then } \frac{\partial d_r}{\partial i} = 0$$

The responses of capacity utilization, capital accumulation and profit rate to monetary factors changes are given by:

$$(116a') \frac{\partial cu}{\partial i} = \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(s_c - s_r - b_1) + s_w wl(s_c - b_1)}{(s_c - b_1)h - b_2}$$

$$(117a') \frac{\partial g}{\partial i} = \frac{\left(d + i \frac{\partial d_r}{\partial i}\right)(b_2 s_c - (b_1 h + b_2)s_r) + b_2 s_c s_w wl}{(s_c - b_1)h - b_2}$$

$$(118a') \frac{\partial r}{\partial i} = h \frac{\left(d_r + i \frac{\partial d_r}{\partial i}\right)(s_c - s_r - b_1) + s_w wl(s_c - b_1)}{(s_c - b_1)h - b_2}$$

Moreover, by calculating the partial derivatives of capacity utilization, capital accumulation and profit rates with respect to debt-to-capital ratio, given the assumption of a constant but positive interest rate ($i = \bar{i} > 0$), we determine the impact from long run debt-to-capital ratio changes on macroeconomic magnitudes. We then obtain:

$$(119a') \frac{\partial cu}{\partial d_r} = \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2}$$

$$(120a') \frac{\partial g_i}{\partial d_r} = \frac{i(b_2 s_c - (b_1 h + b_2) s_r)}{h(s_c - b_1) - b_2}$$

$$(121a') \frac{\partial r}{\partial d_r} = \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} h$$

The response of each of the magnitudes in question to changes in the interest rate and to debt-to-capital ratio depends on the relation between capitalists and rentiers' propensity to save out of their incomes.

Considering that the responses of debt-to-capital ratio to interest rate changes affect capital accumulation and thereby the whole economic process, we use equation (117a') so that after the appropriate substitutions capital accumulation is positively affected by interest rate changes.

$$(116') \frac{\partial g}{\partial i} = s_r + s_w((s_c - b_1)h - b_2) > 0$$

It is confirmed even in this case that long run stability conditions correspond to short run puzzling case. Further, as long as we express workers' debt-to-capital ratio as the product of their saving propensity times their real wage, it is revealed that the effects of interest rate changes on capital accumulation are higher relative to the case we include terms for both rentiers' and workers' debt-to-capital ratios (eq.(117)). But even in the presence of long run instability, the negative response of debt-to-capital ratio to interest rate changes is clear (eq.(112a'')) that in turn allows the response of

capital accumulation to monetary factors changes to be positive (eq.(116')). As a result, *long run instability* corresponds to *short run normal case*.

Attention should also be paid to the way that long run equilibrium level of employment is being determined and affected by monetary factors. Hence, the substitution of equations (93') and (94') into (8'), yield the long run employment:

$$(122') \quad L = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{array}{l} (b_0 - s_w wl)(b_0 s_c h - (b_1 h + b_2) s_w wl) \\ + id_r \left((s_c - s_r - b_1)(b_0 s_c h - s_w wl(b_1 h + b_2)) \right) \\ + (b_2 s_c - (b_1 h + b_2) s_r)(b_0 + s_2 wl) \end{array} \right] \\ + (id_r)^2 ((s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r)) + \\ i^2 d_r (b_2 s_c s_w wl(s_c - s_r - b_1) + (b_2 s_c - (b_1 h + b_2) s_r) s_w wl(s_c - b_1)) \\ + (i s_w wl)^2 b_2 s_c (s_c - b_1)$$

We continue to estimate the responses of employment to changes in: a) interest payments (id); b) interest rate increases (i) considering the constancy of the long run debt-to-capital ratio ($d_r = \bar{d}_r > 0$) as given and c) changes in debt-to-capital ratio under the assumption of constant interest rate levels ($i = \bar{i} > 0$):

$$(123') \quad \frac{\partial L}{\partial id} = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{array}{l} ((s_c - s_r - b_1)(b_0 s_c h - s_w wl(b_1 h + b_2))) \\ + (b_2 s_c - (b_1 h + b_2) s_r)(b_0 + s_2 wl) \end{array} \right] \\ + 2((s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r)) \\ + 2i(b_2 s_c s_w wl(s_c - s_r - b_1) + (b_2 s_c - (b_1 h + b_2) s_r) s_w wl(s_c - b_1))$$

$$(124') \quad \frac{\partial L}{\partial i} = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} & \left(d_r + i \frac{\partial d}{\partial i} \right) \left((s_c - s_r - b_1)(b_0 s_c h - s_w w l (b_1 h + b_2)) \right) \\ & + (b_2 s_c - (b_1 h + b_2) s_r) (b_0 + s_2 w l) \\ & + 2 \left(d_r + i \frac{\partial d}{\partial i} \right) \left((s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r) \right) + \\ & 2i \left(d_r + \frac{\partial d}{\partial i} \right) \left(b_2 s_c s_w w l (s_c - s_r - b_1) + (b_2 s_c - (b_1 h + b_2) s_r) s_w w l (s_c - b_1) \right) \\ & + 2i (s_w w l)^2 b_2 s_c (s_c - b_1) \end{aligned} \right]$$

$$(125a') \quad \frac{\partial L}{\partial d_r} \left(= \frac{\partial L}{\partial d} \right) = \frac{a}{(h(s_c - b_1) - b_2)^2} \left[\begin{aligned} & d \left((s_c - s_r - b_1)(b_0 s_c h - s_w w l (b_1 h + b_2)) \right) \\ & + (b_2 s_c - (b_1 h + b_2) s_r) (b_0 + s_2 w l) \\ & + i^2 \left((s_c - s_r - b_1)(b_2 s_c - (b_1 h + b_2) s_r) \right) + \\ & i^2 \left(b_2 s_c s_w w l (s_c - s_r - b_1) + (b_2 s_c - (b_1 h + b_2) s_r) s_w w l (s_c - b_1) \right) \end{aligned} \right]$$

We note that the response of long run employment to interest rates shifts, regardless of whether stability $\left(\frac{\partial d_r}{\partial i} > 0 \right)$ or instability $\left(\frac{\partial d_r}{\partial i} < 0 \right)$ conditions stand, is positive and given by:

$$(124'') \quad \frac{\partial L}{\partial i} = a \left[\begin{aligned} & \frac{(s_r + s_w)(s_c - s_r - b_1)(b_0 s_c h - s_w w l (b_1 h + b_2)) + 2i(b_2 s_c s_w w l (s_r + s_w)(s_c - s_r - b_1))}{(h(s_c - b_1) - b_2)(b_2 s_c - (b_1 h + b_2) s_r)} \\ & + \frac{(s_r + s_w)[(b_0 + s_w w l) + 2(s_c - s_r - b_1) + 2i s_w w l (s_c - b_1)](b_0 + s_w w l)}{(h(s_c - b_1) - b_2)} \\ & - \frac{b_2 s_c s_w w l (s_c - s_r - b_1)}{(s_c - b_1) h - b_2} \\ & - \frac{1}{(h(s_c - b_1) - b_2)^2 (b_2 s_c - (b_1 h + b_2) s_r)} \left[\begin{aligned} & (b_2 (1 - s_w w l)) \left((s_c - s_r - b_1)(b_0 s_c h - s_w w l (b_1 h + b_2)) \right) \\ & + (b_2 s_c - (b_1 h + b_2) s_r) (b_0 + s_w w l) \end{aligned} \right] \\ & + 2i b_2 (1 + s_w w l) (b_2 s_c s_w w l (s_c - s_r - b_1) + (b_2 s_c - (b_1 h + b_2) s_r) s_w w l (s_c - b_1)) \\ & + 2i (s_w w l)^2 b_2 s_c (s_c - b_1) \end{aligned} \right]$$

Even under these suggestions, it is implied that the response of employment level to interest rate changes is closely related with the inequality relation of rentiers' and capitalists' propensities to save as well as with the response of investment on external finance. However, in this case the level of workers' savings propensity and the level of interest rate affect significantly the way that employment reacts to interest rate changes.

5.5. Concluding thoughts and policy implications

It is beyond any doubt that the main intention of the macroeconomic Post Keynesian–Kaleckian models developed in the previous sections is the achievement of employment expansions during both short and long run analysis. Regarding the adopted assumptions and especially the fact that economic activity is assumed to operate at excess capacity and below full employment income levels, it becomes clear that there is space for improving these conditions without causing additional problems in terms of inflation. However, the adoption of economic policy requires attention to be paid on the actual and not ideal conditions of economy, alongside with the possibility for stable or unstable (mainly) economic activity.

Bearing in mind the results of the above analysis and setting economic acceleration as the main policy target without promoting rentiers' dominance, it seems reasonable to adopt a policy that would combine increasing profit and wage levels. Such a policy would push both investment and consumption expenditures at high levels; economic expansion would then be a purely demand side phenomenon. In other words, the appropriate combination of interest and income distribution policies raises the possibility of achieving these targets. It seems however convenient to adopt an

income policy that would redistribute profits towards wages so as saving to be squeezed whereas consumption, output, employment and in general aggregate demand to be fuelled. In these conditions any attempt to stimulate economic activity at high levels can be ensured with the adoption of policies of low interest rates, in order for capitalists to be persuaded to take on investment plans. Further, given the available sources of capacity utilization and capital in economy, high levels of aggregate demand can be satisfied through economy's own sources.

Nevertheless, the presence of a more active government intervention seems to be necessary for economic acceleration to be accommodated. Besides, the thought that government intervenes with respect to actual economic conditions raises the degree of its accuracy, though in some cases the incorrect use of governmental spending packages is likely to lead to incorrect results. Hence the proper use of income taxation receipts and mainly the appropriate direction of government expenditures would lead to more than expected results; unemployment would be reduced and due to excess capacity and the adoption of a demand side approach there would be no aggressive inflationary pressures to hold down economic activity.

The essence of these suggestions becomes clearer as long as they rest upon the intention of creating a secure economic environment and urging for more activated income classes. In particular the degree of economy's sensitivity to external finance is responsible for the upshot of policy suggestions, reflected on Kalecki's 'principle of increasing risk' and its closely related Minsky's 'financial instability hypothesis'. More specifically, the stable or unstable macroeconomic conditions that are caused by the behaviour of the financial sector affect (directly) capital and (indirectly) labour

markets and in turn the whole economic process. However, the desirability for long run macroeconomic stability so that capitalists to be forced to take on more investment plans without thinking of interest rate variations or deterioration of their debt, is usually elusive. Contrary to that, in practice the dominance of the financial sector raises conditions of macroeconomic long run instability that are reflected on continuous interest payment variations and unlimited increases in internal funds, which in turn constrain investment and enrich income inequality. Additionally, in the presence of balanced or imbalanced budgets the level of investment becomes the most significant, though its instability, factor of aggregate demand for leading economic expansion.

Generally with respect to the implications of the core model and its extensions, it is clear that any policy suggestion should be made by considering both short and long run periods. Besides each policy concerns different time horizons and has different implications. Moreover, the availability of policy instruments and the actual economic conditions determine both the realisation of policy suggestions and their consistency with actual necessities or with utopian thoughts. Nevertheless, nowadays the most essential factor in determining policy suggestions is the behaviour of financial markets, whose interrelation with the real sector (capital and labour markets), sets it responsible for the way that monetary factors affect real macroeconomic magnitudes. In other words, such decisions should not be taken without considering their future effects.

It is thereby time to reassess economic priorities as well as capitalists', rentiers' and, generally, policymakers' investment, savings and finance decisions. The

concentration on purely inflation targeting should be replaced by a 'policy project' in favour of sustainable development. The adoption of monetary and income policies should concern the achievement of a fairer income distribution and the creation of an environment of stable prices, which in conjunction with the appropriate budgetary policies would affect not only the level but also the structure of employment. Further a policy that would ensure low interest rates and restrain variations in financial sector would create the appropriate environment for accelerating aggregate demand and 'real' economic activity. In other words, the adoption of structural changes in policies so as the utilization of existing economic sources to be used, seems to be the only way for vitalising economic growth.

Appendix A

Table 1.

<i>Effects from short and long run interest rate and debt-to-capital variations</i>		
Short- run stability condition: $h(s_c - b_1) > b_2$	$(s_c - s_r - b_1) > 0$	$(s_c - s_r - b_1) < 0$
$\partial g^i / \partial i = \frac{d(hb_1 + b_2)(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} - b_1 d$	+	-
$\partial g_i / \partial d = \frac{i(hb_1 + b_2)(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} - b_1 i$	+	-
$\partial L / \partial i = \frac{aKd(s_c - s_r - b_1)}{(s_c - b_1)h - b_2}$	+	-
$\partial L / \partial d = \frac{aKi(s_c - s_r - b_1)}{(s_c - b_1)h - b_2}$	+	-
Long- run equilibrium condition: $(b_1 h + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2) > 0$	$(b_1 h + b_2)(s_c - s_r - b_1) > b_1((s_c - b_1)h - b_2)$ (stability)	$(b_1 h + b_2)(s_c - s_r - b_1) < b_1((s_c - b_1)h - b_2)$ (instability)
$\frac{\partial d^*}{\partial i} = \frac{1}{i[(hb_1 + b_2)(s_r - s_c - b_1) - b_1(h(s_c - b_1) - b_2)]}$ $(s_r(h(s_c - b_1) - b_2) - d[(hb_1 + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2)])$	a) $\frac{\partial d}{\partial i} > 0$, if $d < d^*$ b) $\frac{\partial d}{\partial i} < 0$, if $d > d^*$ c) $\frac{\partial d}{\partial i} = 0$, if $d = d^*$	-
$\frac{\partial g}{\partial i} = \frac{\left(d + i \frac{\partial d}{\partial i}\right)[b_2 s_c - (b_1 h + b_2) s_r]}{h(s_c - b_1) - b_2}$, $d = \bar{d} > 0$	+	+
$\frac{\partial g_i}{\partial d} = (b_1 h + b_2) \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} - b_1 i$, $i = \bar{i} > 0$	+	-

$\frac{\partial L}{\partial i}$, eq. (49)	+	+
$\frac{\partial L}{\partial d}$, eq. (50)	+	-

Table 2.

<i>Effects from short and long run interest rate and debt-to-capital variations</i>		
Short- run stability condition: $h(s_c - b_1) > b_2$	$(h((s_c - b_1)(t_c - 1) + t_c) > b_2)$	$(h((s_c - b_1)(t_c - 1) + t_c) < b_2)$
$\partial g^i / \partial i = \frac{d(hb_1 + b_2)(s_c - s_r - b_1) - b_1 d}{h(s_c - b_1) - b_2}$	+	-
$\partial g_i / \partial d = \frac{i(hb_1 + b_2)(s_c - s_r - b_1) - b_1 i}{h(s_c - b_1) - b_2}$	+	-
$\partial L / \partial i = \frac{aKd(s_c - s_r - b_1)}{(s_c - b_1)h - b_2}$	+	-
$\partial L / \partial d = \frac{aKi(s_c - s_r - b_1)}{(s_c - b_1)h - b_2}$	+	-
Long- run equilibrium condition: $(b_1 h + b_2)(s_c - s_r - b_1) - b_1(h(s_c - b_1) - b_2) > 0$	$\left[\begin{array}{l} (b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c))) \\ (> b_1 h((1-t_c)t_r + (1-t_r)s_r)) \end{array} \right]$	$\left[\begin{array}{l} (b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c))) \\ (< b_1 h((1-t_c)t_r + (1-t_r)s_r)) \end{array} \right]$
	(stability)	(instability)
$\frac{\partial d^*}{\partial i} = \frac{1}{i} \left[\frac{s_r(h(1-t_c)(s_c - b_1) + t_c - b_2)}{(b_2(s_c(1-t_c) - s_r(1-t_r) - (t_r - t_c)) - b_1 h((1-t_c)t_r + (1-t_r)s_r))} - d \right]$	a) $\frac{\partial d}{\partial i} > 0$, if $d < d^*$ b) $\frac{\partial d}{\partial i} < 0$, if $d > d^*$ c) $\frac{\partial d}{\partial i} = 0$, if $d = d^*$	-
$\frac{\partial g}{\partial i} = \frac{\left(d + i \frac{\partial d}{\partial i} \right) [b_2 s_c - (b_1 h + b_2) s_r]}{h(s_c - b_1) - b_2}$, $d = \bar{d} > 0$	+	+

$\frac{\partial g_i}{\partial d} = (b_1 h + b_2) \frac{i(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} - b_1 i, \quad i = \bar{i} > 0$	+	-
$\frac{\partial L}{\partial i}$, eq. (103)	+	+
$\frac{\partial L}{\partial d}$, eq. (104)	+	-

Table 3.

<i>Effects from short and long run interest rate and debt-to-capital variations</i>		
<i>Short- run stability condition:</i> $h(s_c - b_1) > b_2$	$(s_c - s_r - b_1) > 0$ and $(s_c - b_1) > 0$	$(s_c - s_r - b_1) < 0$ and $(s_c - b_1) < 0$
$\partial g_i^* / \partial i = (b_1 h + b_2) \frac{d_r(s_c - s_r - b_1) + d_w(s_c - b_1)}{(s_c - b_1)h - b_2} - b_1(d_w + d_r)$	+	-
$\partial L / \partial i = aK \frac{d_r(s_c - s_r - b_1) + d_w(s_c - b_1)}{(s_c - b_1)h - b_2 - a s_w w}$	+	-
<i>Short run constancy $h(s_c - b_1) > b_2$ given workers' debt-to-capital ratio $d_w = \bar{d}_w > 0$</i>		
$\partial g_i / \partial d_r = \frac{i(hb_1 + b_2)(s_c - s_r - b_1)}{h(s_c - b_1) - b_2} - b_1 i$	+	-
$\partial L / \partial d_r = \frac{aKi(s_c - s_r - b_1)}{(s_c - b_1)h - b_2 - a s_w w}$	+	-
<i>Short run constancy $h(s_c - b_1) > b_2$, given rentiers' debt-to-capital ratio $d_r = \bar{d}_r > 0$</i>		
$\partial g_i / \partial d_w = \frac{i(s_c - b_1)}{h(s_c - b_1) - b_2} - b_1 i$	+	-

$\frac{\partial L}{\partial d_w} = \frac{aKi(s_c - b_1)}{(s_c - b_1)h - b_2 - as_w w}$	+	-
<p style="text-align: center;"><i>Long-run equilibrium condition:</i></p> $[(s_r + s_w)((s_c - b_1)h - b_2) - d_w b_2 s_c > 0]$ <p style="text-align: center;">and</p> $[(s_r + s_w)((s_c - b_1)h - b_2) - d_r (b_2 s_c - (b_1 h + b_2) s_r) > 0]$	$[(s_r + s_w)((s_c - b_1)h - b_2) > d_w b_2 s_c]$ <p style="text-align: center;">and</p> $\left[\frac{(s_r + s_w)((s_c - b_1)h - b_2)}{d_r (b_2 s_c - (b_1 h + b_2) s_r)} > 1 \right]$ <p style="text-align: center;">(stability)</p>	$[(s_r + s_w)((s_c - b_1)h - b_2) < d_w b_2 s_c]$ <p style="text-align: center;">and</p> $\left[\frac{(s_r + s_w)((s_c - b_1)h - b_2)}{d_r (b_2 s_c - (b_1 h + b_2) s_r)} < 1 \right]$ <p style="text-align: center;">(instability)</p>
$\frac{\partial d_r}{\partial i} = \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_w b_2 s_c - d_r}{i(b_2 s_c - (b_1 h + b_2) s_r)}$ <p style="text-align: center;">and</p> $\frac{\partial d_w^*}{\partial i} = \frac{(s_r + s_w)((s_c - b_1)h - b_2) - d_r (b_2 s_c - (b_1 h + b_2) s_r) - d_w}{i[b_2 s_c]}$	<p>a) $\frac{\partial d_{r,w}}{\partial i} > 0$, if $d_{r,w} < d_{e,w}^*$</p> <p>b) $\frac{\partial d_{r,w}}{\partial i} < 0$, if $d_{r,w} > d_{r,w}^*$</p> <p>c) $\frac{\partial d_{e,w}}{\partial i} = 0$, if $d_{r,w} = d_{r,w}^*$,</p>	
$\frac{\partial g}{\partial i} = \frac{\left(d_r + i \frac{\partial d_r}{\partial i} \right) [b_2 s_c - (b_1 h + b_2) s_r] + \left(d_w + i \frac{\partial d_w}{\partial i} \right) [b_2 s_c]}{h(s_c - b_1) - b_2}$ <p>where $d_r = \bar{d}_r > 0$ and $d_w = \bar{d}_w > 0$</p>	+	
$\frac{\partial g_i}{\partial d_r} = \frac{i(b_2 s_c - (b_1 h + b_2) s_r)}{h(s_c - b_1) - b_2}$ and $\frac{\partial g}{\partial d_w} = \frac{i[b_2 s_c]}{h(s_c - b_1) - b_2}, \quad i = \bar{i} > 0$	+	
$\frac{\partial L}{\partial i}$, eq. (122), where $d_r = \bar{d}_r > 0$ and $d_w = \bar{d}_w > 0$	+	
$\frac{\partial L}{\partial d}$, eq. (123), $\frac{\partial L}{\partial d_r} (d_w = \bar{d}_w > 0)$ (eq. 123a) $\frac{\partial L}{\partial d_w} (d_r = \bar{d}_r > 0)$ (eq. 125a)	+	

Chapter 6

European Unemployment: An Econometric Investigation

6.1. Introduction

It is widely argued that the persistently high levels of unemployment is the most substantial problem that industrialized economies, especially European, are called to face. The consequences of such persistence on income inequality and economic growth raise a number of socioeconomic problems, the dimensions of which cannot be ad hoc predicted. Despite the urgency of these problems and the inability of current policies to solve them, economic priorities are still reflected on regimes of inflation targeting, labour market institutions and imperfections.

These conditions are perfectly represented in the case of European economies, where the dominance of inflation targeting since 1980s has dealt only superficially with unemployment. In particular the consolidation of neoliberal view in conjunction with tight fiscal and monetary policies, implied by the undertaking of European Monetary Unification (EMU) conditions, does not concern the core of unemployment. As a result and contrary to expectations that stem from the preference of supply side factors, European economies are characterised by continuous recessions and unemployment expansions.

However, according to Post Keynesian-Kaleckian manner and the developed models in the previous Chapter, unemployment can be easily but substantially faced through demand policies that in conjunction with an income distribution in favour of workers and a shrink of external finance would expand capital accumulation, capacity utilization and thereby economic activity. In this respect, the aim of this Chapter is to confirm in empirical grounds the inverse relation that exists between unemployment and demand side variables and workers' income as well as the positive relation between unemployment and rentiers' income, at least in the case of Europe. More precisely, Section 6.2 presents the employed method of estimations as well as the used variables and the required tests in order for estimations to be efficient. Section 6.3 testifies econometrically the relation between demand side and debt variables with unemployment by employing the method of panel data. Finally, Section 6.4 summarises the implied policy suggestions deriving from econometric evidences.

6.2. Econometric Analysis¹⁹¹

Bearing in mind the implications of the theoretical model in Chapter 5, we proceed to test some of its major hypotheses in terms of variations in the unemployment rate. First, a higher rentiers' income share is assumed to have a positive impact on unemployment, this is the case whereby the rising rentiers' income might cause negative distribution effects on capitalists' decisions and on capital accumulation. Second, a higher wage income share is assumed to have a negative impact on unemployment. Third a higher level of aggregate demand is assumed to affect negatively the level of unemployment. Fourth, a government intervention in the form

¹⁹¹ Downward and Mearman (2002) analyses the way that econometric analysis is being treated and placed into Post Keynesian analysis.

of progressive income taxation and government expenditures is also assumed to affect negatively the level of unemployment. In what follows we conduct an econometric analysis to test these hypotheses.

For this purpose we estimate a panel data model, the advantages of which, i.e. the ability for double subscript¹⁹² and therefore the ability for examining the actual effects and identifying certain parameters or questions without requiring specific restrictions, are well documented in the literature (e.g. Baltagi, 2005; Verbeek, 2007). In particular, the use of panel data provides the opportunity to examine the behaviour of individual units across time and across groups of individual units (See *Appendix A*).

We estimate two fixed effects (LSDV¹⁹³) and two random effects (FGLS¹⁹⁴) models (For the sources and definition of the variables see *Appendix B*).

$$(1) LSDV_1: UNR_{it} = a_i + a_1 GAD1_{it} + a_2 COES_{it} + a_3 INTS_{it} + e_{it}$$

$$(-) \quad (-) \quad (+)$$

$$(2) LSDV_2: UNR_{it} = a_i + a_1 GAD2_{it} + a_2 COES_{it} + a_3 INTS_{it} + e_{it}$$

$$(-) \quad (-) \quad (+)$$

¹⁹²The double subscript refers to cross-section dimension, in our case countries (i) and the time series dimensions and thereby the time (t).

¹⁹³As fixed effects estimator is known the LSDV: Least Square Dummy Variable (Fixed Effects model) or the within-group or the analysis of covariance estimator.

¹⁹⁴As random effects estimator is known the FGLS: Feasible General Least Squares as long as the variance is unknown; otherwise the method of Generalized Least Squares (GLS) would be employed.

$$(3) FGLS_1: NAIRU_{it} = a_i + a_1 GAD1_{it} + a_2 COES_{it} + a_3 INTS_{it} + n_{it}$$

(-) (-) (+)

$$(4) FGLS_2: NAIRU_{it} = a_i + a_1 GAD2_{it} + a_2 COES_{it} + a_3 INTS_{it} + w_{it}$$

(+ (-) (+)

(anticipated signs are given in parentheses).

where: *UNR* : unemployment rate as a percentage

NAIRU : Unemployment Rate with non-accelerating inflation rate as a percentage

COES : Compensation of Employees as a share of GDP

INTS : Interest Income as a share of GDP

GAD1 : Growth Rate of Aggregate Demand for a closed economy without public sector

GAD2 : Growth Rate of Aggregate Demand for a closed economy including governmental expenditures

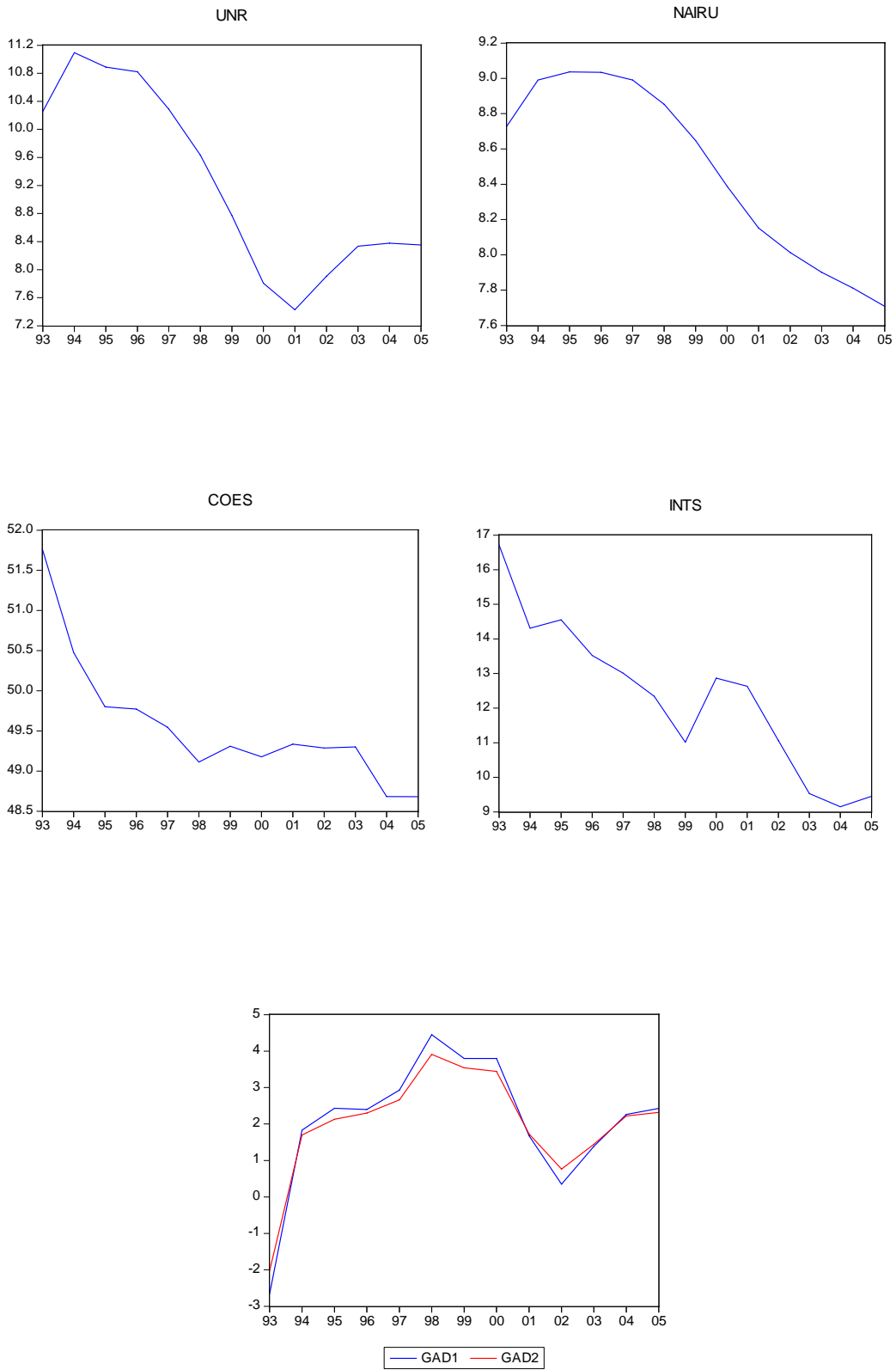
It should be noticed that all the variables are expressed in constant prices at 2000 and as percentages. Further, the use of the variable of *GAD1* as a proxy of the capacity utilization is directed by the inability of the variable of output gap, which is usually considered to represent capacity utilization in economy, to capture its effects on economic activity. In addition the variable of *GAD2*, that simply equals the sum of *GAD1* and the government consumption, is being used as a proxy of the government intervention. Although it seems appropriate the use of government's taxation receipt

for representing governmental intervention, data limitations prevent us from using it in our analysis. Finally, the use of interest income received by banks *INTS* is thought to be the best possible proxy for capturing the impact from rentiers in economic activity, where the variable of compensation of employees *COES* reflects the impact from workers' income shares on economic activity¹⁹⁵.

The general behaviour of each of these variables (expressed in average values) is plotted in the *Figure 1*. In general, it is showed that unemployment *UNR* is inversely related with growth rate of aggregate demand *GAD1*, *GAD2*. More specifically and despite the required time in order the effects of aggregate demand to be reflected on unemployment, it can be said that the upward slopes of *GAD1* and *GAD2* are implicitly related with the downward slope of *UNR*. Similar arguments can be made about the relation between the behaviour of *NAIRU* and that of *GAD1* and *GAD2*, as long as *UNR* is being used as the indicator for the determination of *NAIRU*. It is also clear that *UNR* and *INTS* are related with a time lag, something that is revealed by comparing the behaviour of their slopes. Finally, a glance at the behaviour of rentiers' income *INTS* and growth rate of aggregate demand *GAD1* and *GAD2* signifies their inverse relation, while there is also some consistency between the behaviour of *COES* and *GAD1* and *GAD2*.

¹⁹⁵ The definition of rentiers' and workers' shares is in accordance with Argitis (2008).

Figure 1.



It is beyond any doubt that the use of data provides some evidence about the relations that we intent to examine.

6.2.1. Estimation

Equations (1, 2, 3, 4) are estimated by pooling annual time series and cross data in levels¹⁹⁶, for the period 1993-2005 and by using data for eight of twelve members of European Monetary Unification: Austria, Belgium, Finland, France, Germany, Italy, Portugal, Spain. The composition of the country sample is determined by the limitations of the data about the variable of interest income received by banks and by the requirement that the time period covered for each cross-section be the same. Further, the composition of the countries in the sample is also determined by data limitations.

Firstly, in order to deal with the possibility for endogeneity of independent variables that are included in each equation, we employ the Wu-Hausman test (Wu, 1973; Hausman, 1978). Accordingly we regress each variable on the others by using as instrument its one year lag through *Ordinary Least Square (OLS) estimation*. The estimated residuals are added to the equation we intent to estimate and following a *t-test*, we examine if we can reject the null hypothesis: $H_0 : \gamma_i = 0, i = 1, \dots, N$ that implies the absence of any sign of endogeneity so as the *OLS* estimation to be an efficient one. Otherwise, a *Two Stage Least Square (TSLS)* estimation should be applied.

¹⁹⁶ A log linear regression was also estimated but the results were not robust.

More precisely for $LSDV_I$ by employing the Hausman test we intent to cope with the issue of endogeneity of the aggregate demand of a closed economy with no government intervention $GADI$, compensation of employees $COES$ and interest income received by banks $INTS$. So, we regress each of these variables to the others by using as instrument one year lag of each one through *Ordinary Least Square* (OLS) estimation:

$$(7) GAD_{it} = \beta_{10} + \beta_{11}GAD_{it}(-1) + \beta_{12}COES_{it} + \beta_{13}INTS_{it} + \varepsilon_{1it}$$

$$(8) COES_{it} = \beta_{20} + \beta_{21}COES_{it}(-1) + \beta_{22}GAD_{it} + \beta_{23}INTS_{it} + \varepsilon_{2it}$$

$$(9) INTS_{it} = \beta_{30} + \beta_{31}INTS_{it}(-1) + \beta_{32}GAD_{it} + \beta_{33}COES_{it} + \varepsilon_{3it}$$

The estimated residuals are added to equation (10) and following a *t-test*, we examine whether the null hypothesis that suggests $\gamma_5, \gamma_6, \gamma_7 = 0$ can be rejected or not:

$$(10) UNR_{it} = \gamma_1 + \gamma_2GAD_{it} + \gamma_3COES_{it} + \gamma_4INTS_{it} + \gamma_5\hat{\varepsilon}_{1it} + \gamma_6\hat{\varepsilon}_{2it} + \gamma_7\hat{\varepsilon}_{3it}$$

As it is shown in *Table 6.1*. the residuals of $GADI$ and $COES$ are insignificant in 5% significance level, while only the residuals of $INTS$ are proved to be statistically significant.

TABLE 6.1. ENDOGENEITY TESTING

Independent Variables	
GAD1	-0.184854 (-0.492990)
COES	-0.139535 (-1.591347)
INTS	-0.037573 (-0.037573)
RGAD1	0.717599 (1.613200)
RCOES	-0.610010 (-1.139757)
RINTS	-0.460406 (-3.856121)

Note: The symbol R denotes the estimated residuals. In the parentheses t-values are presented. Critical value for $t_{13,5\%} = 1.833$

Following the same process for the rest of equations, it is proved that with respect to $LSDV_2$ (Table 1., Appendix C) the residuals of $GAD2$ are proved to be statistical significant in 5% significant level. The fact that $NAIRU$ is used as the policy guidepost for most of economic decisions, allows us preceding our analysis by setting it as the dependent variable. Thus, considering $FGLS_1$ (Table 3., Appendix C), it is proved that the residuals of $INTS$ are marginally significant, whereas with respect to the results about $FGLS_2$ (Table 4., Appendix C) it is proved that all of the residuals are statistically insignificant in 5% significance level.

As long as the degree of heterogeneity is important in deciding whether to pool or not, we test the degree of panels' heterogeneity. Thus, by considering as given the rejection of homogeneity hypothesis as long as the sample size is sufficiently large and the significance level fixed, we use the *Schwarz Information Criterion (SIC)* that

penalises over-parameterisation more heavily than tests at conventional significance levels (Karanasou et al. 2003b). More precisely, the selection between each of the pooled models and the corresponding individual regressions through *SIC* is computed as follows:

$$(11) \quad SIC_{fixed} = MLL_{fixed} - 0.5k_{fixed} \log(NT)$$

$$(12) \quad SIC_{individual} = \sum_{i=1}^N MLL_i - N[0.5k_i \log(T)]$$

where: MLL_{fixed} : maximum likelihood of the fixed-effects model

MLL_i : maximum log likelihood of the *ith* country time series regressions

k_{fixed} : the number of parameters estimated in the fixed effects model (i.e. number of explanatory variables plus the country specific effects)

k_i : the number of parameters estimated in the individual country time series regression, (i.e. number of explanatory variables plus an intercept)

N and T : the number of countries and the estimation period respectively.

The results given in table below, show that the pooled fixed effects model is preferred for all the estimated models.

Table 6.2. Poolability test (homogeneous vs. heterogeneous panels)

	$SIC_{fixed} / SIC_{individual}$
$LSDV_1$	214.974 > 121.631
$LSDV_2$	214.503 > 122.548
$FGLS_1$	132.515 > 12.921
$FGLS_2$	132.978 > 25.163

Note: The model that maximises the selection criterion is preferred.

6.2.3. Specification Test

The Random versus the Pooled model is tested via the *Breusch-Pagan LM test* that is asymptotically distributed under H_0 as χ^2_1 . This test allows us to examine whether there are random effects as well as whether their variance equals to zero or not. In accordance the random model reduces to the pooled if the variance of the individual effects becomes zero. The hypotheses we wish to test suggest that:

$$H_0 : \sigma_\alpha^2 = 0, \forall i$$

$$H_1 : \sigma_\alpha^2 \neq 0, \forall i$$

For the calculation of *Breusch-Pagan statistic* we use the residuals derived by the OLS residuals from the pooled (common) model.

$$(13) \text{ LM} = \frac{NT}{2(T-1)} \left(T^2 \frac{\sum_i e_i^{-2}}{\sum_i \sum_t e_{it}^2} - 1 \right)^2 \sim \chi^2_1 \text{ under } H_0$$

where N: countries

T: years

e: pooled estimated residuals

Table 6.3. Breuch-Pagan LM Test

	LM-statistic
$LSDV_1$	0.002
$LSDV_2$	0.010
$FGLS_1$	0.020
$FGLS_2$	0.007

Note: The model that maximises the selection criterion is preferred

For X_1^2 and 5% significance level, the critical value is 3.84 and thus the null hypothesis is accepted in all the cases and thereby pool is the best model.

In order to test the *Fixed* versus the *Pooled* model we use an *F-test* that is actually a simple *Chow test*. So, the restricted sums of squares (*RRSS*) are those of *OLS* on the pooled model which number of parameters equals $p_r = K + 1$, and the unrestricted residual sums of squares (*URSS*) are those of the fixed effects regression (*LSDV*)¹⁹⁷ and the number of their parameters is equal to $p_u = N + K$ ¹⁹⁸.

¹⁹⁷It should be mentioned that if N is large, the unrestricted residual sum of squares are estimated by performing the Within Transformation Method.

¹⁹⁸The number of observations equals to NT in both cases. However, if there are p_q individual specific variables in the model that are included in the pooled model but excluded in the fixed effects model, as long as we test for unobservable heterogeneity

By utilising a one-way error component model for the disturbances, with

$$z_{it} = \lambda_i + v_{it}, \text{ where } \lambda_i : \text{ the unobservable individual specific effect}$$

$v_{it} : \text{ the remainder disturbance}$

the hypotheses we intent to examine suggest:

$$H_0 : \lambda_i = \lambda_{N-1} = 0, \forall i \text{ (pooled (restricted) model)}$$

$$H_0 : \lambda_i \neq 0, \forall i \text{ (fixed (unrestricted) model)}^{199}$$

Under the null hypothesis

$$(14) F = \frac{(RRSS - URSS)/(N - 1)}{URSS/(NT - N - K)} \sim F_{N-1, N(T-1)-K}$$

Table 6.4. Test cross-section fixed effects

	Statistic	df
$LSDV_1$	32.915	(7.93)
$LSDV_2$	32.243	(7.93)
$FGLS_1$	97.769	(7.93)
$FGLS_2$	97.353	(7.93)

The critical values for 5% significance level are for all the cases are $F = 2.18$.

It is clear that in all cases, the null hypothesis is rejected in 5% significance level and thereby the fixed model is the efficient one.

¹⁹⁹ In other words, λ_i the unobservable individual effects.

Finally, for the comparison between the *Fixed* and the *Random* model and thereby about whether the individual effects (a_i) are constant or not, we use the *Hausman test* (Hausman, 1978). More specifically, the fact that the fixed effects model can be interfered by considering the effects that are in the sample and the random effects model by taking into account the population characteristics, imply that:

$$\text{Fixed effects model: } E(y_{it} / x_{it}, a_i) = x_{it}'\beta + a_i$$

$$\text{Random Effects model: } E(y_{it} / x_{it}) = x_{it}'\beta$$

Clearly, the coefficients β in the two conditional expectations are the same as long as $E(a_i / x_{it}) = 0$.

The general idea of *Hausman test* is to compare two estimators: the one that is consistent under both null and alternative hypotheses and the one that is consistent and more efficient only under the null hypothesis. As a result, the difference between these two estimators is the inability of null hypothesis to hold for both of them. In this case, we assume $E(\varepsilon_{it}, x_{is}) = 0$ for all s, t so as the implied fixed effect estimator $\hat{\beta}_{fe}$ to be consistent for β , regardless of whether x_{it} and a_i are uncorrelated. On the other hand, the random effects estimator $\hat{\beta}_{re}$ is consistent and efficient only if x_{it} and a_i are not correlated²⁰⁰.

²⁰⁰Alternatively, we compare the *Generalized Least Square (random effects) Estimators* ($\hat{\beta}_{GLS}$) with the *Within (fixed effects) Estimators* ($\tilde{\beta}_{within}$), both of which are assumed to be consistent under the null hypothesis H_0 ; $(Eu_{it}|X_{it}) = 0$, but are characterised by different probability limits if H_0 is rejected. In fact, $\tilde{\beta}_{within}$ is consistent under both H_0 and H_1 but inefficient under H_1 , whereas $\hat{\beta}_{GLS}$ is consistent and asymptotically efficient under H_0 , but is inconsistent when H_0 is rejected.

Hence, the hypotheses we intent to test suggest:

$$H_0 : E(x_{it}, a_i) = 0 : \text{Random Effects model the most efficient}$$

$$H_1 : E(x_{it}, a_i) \neq 0 : \text{Fixed Effects model the most efficient}$$

Given these conditions, we estimate the covariance of the difference of the two estimators $V(\hat{\beta}_{fe} - \hat{\beta}_{re})$, which because of the efficient of $\hat{\beta}_{fe}$ only under the null hypothesis, it follows that:

$$(15) V(\hat{\beta}_{fe} - \hat{\beta}_{re}) = V(\hat{\beta}_{fe}) - V(\hat{\beta}_{re})$$

As a result, the Hausman-test statistic equals:

$$(16) \xi_H = (\hat{\beta}_{fe} - \hat{\beta}_{re})' [\hat{V}(\hat{\beta}_{fe}) - \hat{V}(\hat{\beta}_{re})]^{-1} (\hat{\beta}_{fe} - \hat{\beta}_{re}) \sim X_k^2 \text{ under } H_0$$

where \hat{V}_s : estimates of the true covariance matrices.

It can thereby be said that under the null hypothesis, stands that $p \lim(\hat{\beta}_{fe} - \hat{\beta}_{re}) = 0$ and then the statistic ξ_H has an asymptotic Chi-squared distribution with K degrees of freedom, where K is the number of elements in β . Further, under H_0 the statistic of ξ_H is distributed as X_k^2 , when K denotes the dimension of slope vector, while as long as under H_0 both the estimators are consistent, it is expected the difference between the estimators $(\hat{\beta}_{fe} - \hat{\beta}_{re})$ to be small. Moreover, since $\hat{\beta}_{re}$ is efficient, the variance of the difference must be equal to the differences of the variances (Verbeek, 2007).

Hence the *Hausman test* can be estimated because the covariance matrix satisfies equation (15). Besides, an important reason that diversify the two estimators is the existence of correlation between x_{it} and a_i , though other sorts of misspecification may also lead to rejection. However the use of ξ_H statistic, raise the possibility for the covariance matrix in square brackets not to be positively defined in finite samples, so as its inverse not can be computed. Alternatively, it is possible to test for a subset of the elements in β .

Table 6.5. Hausman test

	Statistic	df
$LSDV_1$	10.645	3
$LSDV_2$	8.650	3
$FGLS_1$	6.369	3
$FGLS_2$	5.206	3

The critical values for 5% significance level are for all the cases are $X_3^2 = 7.815$.

According to the results, in equations where the variable of *UNR* is being used as dependent ($LSDV_{1,2}$), the null hypothesis is rejected; so the fixed effects models is proved to be the most appropriate one for our estimations. On the other hand, by considering the equations where the *NAIRU* is being used as the dependent variable ($FGLS_{1,2}$), we fail to reject the null hypothesis and thereby the random effects model turns out to be the most significant for our estimations.

6.2.4. Mispesification Tests

6.2.4.1. Heterogeneity

One of the main assumptions we should take into account in our analysis, suggests that the residuals of estimated regression are distributed as homoskedastic and with the same variance across time and individual countries. Thus, in cases where heteroskedasticity stands, although the provided estimations are consistent are not efficient and the standard errors of these estimations are biased and need to be corrected. In order to test the hypothesis H_0 of homoskedasticity, we adopt the Bartlett's test by using N sample variances (s_i^2) with degrees of freedom (df) and assuming normality, i.e. $\varepsilon_{it} \sim N(0, \sigma_{\varepsilon}^0)$,²⁰¹.

The hypotheses we wish to test suggest that: $H_0 : S_i^2 = S^2; \forall i$

$$H_1 : S_i^2 \neq S^2; \forall i$$
²⁰²

Considering that under homoskedasticity, the Bartlett statistic is distributed X_{N-1}^2

$$(17) B = \frac{(T-1)[N \ln S^2 - \sum_{i=1}^N \ln S_i^2]}{1 + \{(N+1)/3(T-1)\}} \sim X_{N-1}^2; \text{ under } H_0$$

where $S^2 \left(= \frac{1}{NT - N - K} \sum_i^N \sum_t^N \hat{\varepsilon}_{it}^2 \right)$: the total variance of the residuals

²⁰¹This assumption rests upon the suggestion about homoskedasticity within individuals that allows for testing for heteroskedasticity between individuals. Besides, Bartlett's test concerns both within and between heteroskedasticity, whereas as long as the adopted time periods is medium we assume homoskedasticity within individuals and test for heteroskedasticity between them.

²⁰²For the estimations of this test, we use the residuals from the fixed effects model.

$$S_i^2 \left(= \frac{1}{T-1} \sum_t \hat{\varepsilon}_{it}^2 \right) : \text{the variance of the residuals for each unit}^{203}$$

$\hat{\varepsilon}_{it}$: residuals that derive by estimating the within regression

The results in *Table 6.6.* below indicate the presence of heteroskedasticity in all sample groups with and without country specific variable.

Table 6.6. Barlett Heteroskedasticity Test

	Barlett- statistic
$LSDV_1$	25.498
$LSDV_2$	26.651
$FGLS_1$	36.341
$FGLS_2$	31.935

The critical values in 5% significance level are for χ_8^2 (14.067)

6.2.4.2. Serial correlation

Given the assumption that the disturbance follows a one-way error component model,

$$u_{it} = \rho_i + v_{it}, \text{ where } \rho_i \approx IIN(0, \sigma_\mu^2)$$

we test if the remainder disturbance follows a stationary AR(1) process:

$$v_{it} = \rho v_{i,t-1} + \kappa_{it} \text{ with } |\rho| < 1.$$

²⁰³ We should consider that the average of residuals for each individual unity (country) equals to zero $\bar{\varepsilon}_i = 0$

For the serial correlation testing, the hypotheses we set under question suggest:

$H_0: \rho = 0$, there is no autocorrelation

$H_1: \rho_i < 0$, there is autocorrelation among residuals

The simplest test for examining autocorrelation is the LM Breuch-Godfrey statistic, expressed in terms of the usual within residuals (\hat{v}_{it})

$$(18) LM = \sqrt{\frac{NT^2}{T-1}} r \sim N(0,1) \text{ under } H_0$$

Considering that the autocorrelation coefficient is known to have a slow convergence to normality, a superior alternative is probably a test due to Fisher:

$$(19) z = \frac{\sqrt{NT - N - K}}{2} \ln\left(\frac{1+r}{1-r}\right) \sim N(0,1) \text{ under } H_0$$

where $r = \frac{\sum \hat{v}_{it} \hat{v}_{it-1}}{\sum \hat{v}_{it}^2}$ that stem from the first order within individual autocorrelation

coefficient by using the within regression residuals.

Table 6.7. LM Serial Correlation Test

	z-statistic
$LSDV_1$	7.630
$LSDV_2$	7.921
$FGLS_1$	9.064
$FGLS_2$	9.079

Following *Table 6.7.* for X_1^2 and 5% significance level, the critical value is 5.99 and thus the null hypothesis is rejected. As a result, the model is characterised by serial correlation.

6.3. Estimations

Regarding the results of the above selection tests, it is proved that in the equations where the variable of unemployment UNR is being used as dependent ($LSDV_{1,2}$), the fixed effects model is more preferable to both the pooled and the random effects models. However in the equations where $NAIRU$ is being used as dependent ($FGLS_{1,2}$), although the fixed effects model is proved to be more preferable than the pooled, the random effects model turned to be more preferable than pooled. In accordance with these results, we estimate two fixed effects models ($LSDV$) and two random effects models ($FSGL$).

Moreover with respect to the applications of Bartlett's heteroskedasticity test and LM serial correlation test, there are evidences for the contemporaneous presence of

heteroskedasticity and serial correlation. In addition, due to the endogeneity indicated by the Wu-Hausman test in $LSDV_1$, $LSDV_2$ we employ the TLS (Two Stage Least Square) and the $3SLS$ (Three-Stage Least Square)²⁰⁴ to correct the problems of heteroscedasticity and of serial correlation. On the other hand in order to correct the endogeneity indicated in $FGLS_1$, $FGLS_2$ we employ the TLS (Two Stage Least Square).

Several specifications of equations (1, 2, 3, 4) following a general to specific approach were estimated. We notice that all of the estimated parameters, at least for the case where $LSDV$ is employed, bear the anticipated signs and all pass the significance test at the 5% level.

More specifically, by using equation (1) we regress unemployment as a function of growth rate of aggregate demand with no public sector and workers and rentiers' income shares. The estimated equation suggests that the second lag of $GADI$ as well as the current value of $COES$ affect the current unemployment rate UNR negatively, whereas the first lag of $INTS$ affects it positively (*Table 6.8.*). So, a one percentage point change in the two lags of $GAD2$ and in the current value of $COES$ reduce UNR by 0.29 and 0.22 percent respectively, whereas a one percentage point change in the first lag of $INTS$ accelerates current level of UNR by 0.60 percent. According to the estimated results, the growth rate of aggregate demand in conjunction with an income distribution in favour workers can sustain macroeconomic activity with a time lag. This result is expected, as long as it is required a time period until changes in growth

²⁰⁴The three-stage least squares (3SLS) method is simply the two-stage least squares version of the SUR method; it is an appropriate method when right-hand side variables are correlated with the error terms, and there is both heteroskedasticity, and contemporaneous correlation in the residuals.

rate of aggregate demand fuel the whole economic process. On the other hand, it is proved that the presence of rentiers that are coincided with future payment obligations expands unemployment. It is thereby proved the suggestion about the requirement for an income distribution in favour of workers and the shrinkage of external finance.

Table 6.8. Estimated Equations EMU-8

<i>LSDV_i</i>					
Dependent Variables					
TSLS ²⁰⁵					
UNR	11.70 (1.38)	-0.37 GAD1 (-2) (-6.21)	-0.16 COES (-0.93)	0.51 INTS (-1) (5.56)	
					R ² 0.82
3TSL					
UNR	13.46 (4.42)	-0.29 GAD1 (-2) (-9.61)	-0.22 COES (-3.78)	0.60 INTS (-1) (14.35)	
					R ² 0.80

Note: The instruments used here are GAD1 (-3), COES (-1), INTS (-1). The t-values are given in parentheses. The critical value at 5% level of significance is (1.860).

In order to examine the effects of government intervention from consumption side, we regress an equation where unemployment is estimated as a function of growth rate of aggregate demand for a closed economy that includes government intervention and incomes shares of workers and rentiers. So, according to the estimated equation in *Table 6.9*, it is implied that current *UNR* is inversely related with the one year lag of both *GAD2* and *COES* but positively with the two year lag of *INTS*. To be more specific, a one percentage point change in the first lag of *GAD2* and *COES* shift *UNR* downward by 1.14 and 0.11 percent respectively. On the other hand, a one percent

²⁰⁵The use of instruments require the strictly exogeneity of variable x_{it} . According to Verbeek (2007), if a particular element in x_{it} is known to be uncorrelated with a_i , there is no need to instrument it; this variable can itself be used as an instrument.

change of the second lag of *INTS* accelerates *UNR* by 0.85 percentage point. In other words, both income distribution and the growth rate of aggregate demand when public sector is considered with the required time lag, have the expected effects on unemployment. Further, although the impact from rentiers' income on unemployment has been increased compared to the case where public sector is not included, its coefficient is still positively signed. Thus, even in the presence of governmental consumption, the implications about the impact of demand and income distribution effects on unemployment are affirmed.

Table 6.9 Estimated Equations EMU-8

<i>LSDV_t</i>					
Dependent Variables					
TSL					
UNR	8.21 (0.52)	-1.03 GAD2 (-1) (-3.02)	-0.14 COES (-1) (-0.44)	0.82 INTS (-2) (4.59)	
					R ² 0.48
3TSL					
UNR	6.49 (2.44)	-1.14 GAD2 (-1) (-14.38)	-0.11 COES (-1) (-2.23)	0.85 INTS (-2) (22.71)	
					R ² 0.41

Note: The instruments used here are GAD2 (-1), COES (-2), INTS (-3). The t-values are given in parentheses. The critical value at 5% level of significance is (1.860).

Considering that *NAIRU* is being used as a policy guide, we repeat the previous estimations by using this variable as the dependent one. To be more specific, *Table 6.10* presents the regression equation where *NAIRU* is estimated as a function of growth rate of aggregate demand with no public sector as well as workers' and rentiers' income shares. The difference of this estimation is the use of *General Least Squares* method; so, all the factors that affect the dependent variable but are not

included as regressors, can be appropriately summarised by a random term that is included in the estimation.

More precisely, similarly with the case where *UNR* is being used as a dependent variable, *NAIRU* turns to be negatively related with the second time lag of *GADI* and the first time lag of *COES* but positively with the second lag of *INTS*. These relations can be explained by the fact that *UNR* is the major instrument in the determination of *NAIRU* behaviour. Moreover, in accordance with the estimations, a one percentage point change in *GADI* and *COES* reduces current level of *NAIRU* by 0.23 and 0.03 percent respectively; whereas a one percentage point change in *INTS* increases currently *NAIRU* level by 0.20 percent. However, the effects from the variable of *COES* on *NAIRU* turn to be statistically insignificant, while both the effects from growth rate of aggregate demand when there is no public sector and rentiers' income are proved to be statistically significant in 5% significance level. As a result, it is implied that the actual effects of aggregate demand and income distribution should be considered in the determination of policies that are set with respect to *NAIRU*; a suggestion that is opposed to the supply side *NAIRU* framework where it is regarded the constancy of income distribution and aggregate demand in order the expected results to come up.

Table 6.10 .Estimated Equation EMU-8

		Dependent Variables		
FGLS (Cross- section random effects)				
NAIRU	0.78 (0.17)	-0.03 GAD1 (-2) (-1.01)	0.10 COES (-1) (1.16)	0.18 INTS (-2) (4.80)
				R ² 0.32

The t-values are given in parentheses. The critical value at 5% level of significance is (1.833)

Continuous Table

Two Stage FGLS	Instruments			
NAIRU	7.07 (1.03)	-0.23 GAD1 (-2) (-1.91)	-0.03 COES (-1) (-0.26)	0.20 INTS (-2) (4.40)
				R ² 0.02

NOTE: The instruments used here are: GAD1(-3), COES (-2), INTS (-2).

The t-values are given in parentheses. The critical value at 5% level of significance is (1.943).

In the same manner, *Table 6.11*. presents a regression equation which indicates that NAIRU increases when rentiers' income share rises, but decreases when growth rate of aggregate demand including government intervention and workers' income shares rises. This evidence is in accordance with the demand side economics. More specifically, we find that a one percentage point change in the second lag of *GAD2* and current value of *COES* affect the current level of *NAIRU* negatively, whereas the first lag of *INTS* is coincided with *NAIRU* increases. According to our estimations, a one percentage change in the second lag of *GAD2* and the current value of *COES* reduces current *NAIRU* by 0.31 and 0.05 percent respectively, while a change in the first lag of *INTS* increases *NAIRU* by 0.24 percent. Although according to the estimations, the effects from *COES* on *NAIRU* are insignificant in 5% significance level, the significance of the variable of *INTS* proves the negativities that stem from the presence of rentiers in economic process. Further, the significant of the variable of

GAD2 in 5% significance level affirms the notability of government intervention and demand side generally in determining the magnitude that is being used as the guidepost for policy decisions, *NAIRU*.

Table 6.11. Estimated Equation EMU-8

		Dependent Variables		
FGLS (Cross- section random effects)				
<i>NAIRU</i>	5.67 (1.24)	-0.11 <i>GAD2</i> (-2) (-2.90)	0.01 <i>COES</i> (0.19)	0.17 <i>INTS</i> (-1) (4.28)
				R ² 0.29

The t-values are given in parentheses. The critical value at 5% level of significance is (1.833)

Continuous Table

Two Stage FGLS	Instruments			
<i>NAIRU</i>	6.47 (1.21)	-0.31 <i>GAD2</i> (-2) (-2.53)	-0.05 <i>COES</i> (-0.04)	0.24 <i>INTS</i> (-1) (4.40)
				R ² 0.02

NOTE: The instruments used here are: *GAD1*(-3), *COES* (-1), *INTS* (-2).
The t-values are given in parentheses. The critical value at 5% level of significance is (1.943).

Consequently the estimations of the employed regressions, confirm the Keynesian thought of political economy and the suggestion for concentrating our attention on demand side of economics. Moreover the negative impact of workers' income shares on unemployment in conjunction with the positive impact of rentiers' income shares on unemployment provides evidence on Keynes's monetary theory of unemployment. Also, it should be mentioned that the empirical evidence affirm the results that were reached in the theoretical macroeconomic model developed in the previous chapter and convince us about the ability of economy to sustain economic activity through the

adoption of income policies as well as policies that recognise an active role in aggregate demand.

6.4. Conclusions

Considering the empirical findings of this Chapter, there is no doubt that the Keynesian thought is confirmed, at least in the case of the European Monetary Unification. According to the results, the policy agenda of restrictive monetary policies reflected on inflation targeting, supply side ideology and the suggestions for more flexible labour markets coincides with depressing levels of employment and financial sectors' growth, instead of expanding the real macroeconomic side of economy. As a consequence our thoughts about the responsibility of demand levels and income inequality in favor of rentiers for the persistently high unemployment levels are affirmed.

However the fact that the implementation of restrictive macroeconomic policies imposes constraints against expansion of real economy, postulates the reassigning of challenges via changes in the structure of neoliberal policies, the implied targets and priorities that are set. All these suggest that we should focus not on policymakers' ideologies and expectations but on real conditions and necessities in both national and monetary unification grounds.

More specifically, it seems reasonable for economists and policymakers to become more Keynesian. It should be realised that economies do not operate at their full levels of capacity and employment but full employment income and social equality should be directly targeted. Besides, it cannot a priori be considered that the

superiority of the private sector and markets' self-correcting behaviour can reduce the persistently high unemployment levels. In these conditions, it is possible for labour market policies such as unemployment benefits, minimum wages, and workers' training to be helpful provided that their structure and potential implications are set on a new basis and concentrate on the core of unemployment and not on temporary solutions.

Hence macroeconomic policy should ensure the expansion of demand either by increases in capacity utilization or the introduction of a more equitable income distribution, so that economic process is 'released' from its dependence on external finance and a secure environment for consumption and expenditures can be created. Therefore increases in quality and quantity in terms of both equipment and structure are required; conditions that can be reached by focusing on demand side policies. In our view, these conditions seem to be reasonable in making the suggestions for employment expansion without inflationary pressures feasible, under conditions that ensure macroeconomic stability.

Appendix A

We begin with a general linear panel data model, by indexing all the variables by an i for the individual ($i = 1, \dots, N$) and a t for time ($t = 1, \dots, T$), as follows:

$$(1A) \quad y_{it} = \alpha_i + x'_{it}\beta + \varepsilon_{it}, \quad \varepsilon_{it} \sim i.i.d.(0, \sigma_\varepsilon^2)$$

where α_i : a (1 x 1) scalar constant

β : a (K x 1) vector of slope coefficients that measures the partial effects of x_{it} in period t for unit i

y_{it} : the dependent variable

x_{it} : a (Kx1) vector of explanatory variables that does not include a constant.

In addition, the disturbances are assumed, for simplicity reasons, to follow a one-way error component, so it yields that:

$$\varepsilon_{it} = \mu_i + v_{it}, \quad i = 1, \dots, N \text{ and } t = 1, \dots, T$$

where $v_{it} \approx iid(0, \sigma_v^2)$

$\sigma_i^2 = \sigma_\varepsilon^2, \forall i$, similarity for the variances among individual countries in the country

$Cov(\varepsilon_{it}, \varepsilon_{jt}) = 0$ for $i \neq j$, zero covariances between countries

It should be mentioned that μ_i that reflects the unobservable individual-specific effect is time-invariant to both individual units and time period and accounts only the

individual-specific effect that is not included in the regression, whereas the remainder disturbance v_{it} varies with individuals and time and can be treated as the usual disturbance in the regression.

So, by assuming that the scalar μ_i represents the effects that are peculiar to the constant i -th unit and treating the a_i term as being equal to N fixed unknown parameters while the x_{it} term as being independent from all the ε_{it} , equation (1) represents the standard fixed-effects (*FE*) model. This is a simple linear regression model in which the intercept terms vary across the individual units (subjects) i , while the slope coefficients and variance are identical across groups. As a result a change in x_{it} affects in the same way all the units for all the periods, though the average level for unit i is possible to differ from that of unit j . Hence, the fixed effects model represents the case where the differences between units can be treated as parametric shifts of the regression.

However, in the case where the sample cross sectional units is drawn randomly from a large population, it seems reasonable the intercepts of individuals to differ although can also be treated as drawings from a distribution with mean μ and variance σ_a^2 . In this case, provided that the components of error terms are independently distributed, i.e. μ_i ($\mu_i \sim i.i.d.(0, \sigma_\mu^2)$) and v_{it} ($v_{it} \sim i.i.d.(0, \sigma_v^2)$), as well as that each of the error term components (μ_i, v_{it}) are not correlated, i.e. $E(x_{it}, \mu_i), E(x_{it}, v_{it}) = 0, \forall i, j$ and there is no dependence between explanatory variables (x_{it}), equation (1A) represents the Random Effects (*RE*) model, which is rewritten as:

$$(2A) \ y_{it} = \alpha + x_{it}'\beta + \mu_i + \varepsilon_{it}$$

Evidently the fixed effects model is a linear regression in which the intercept terms vary over the individual units i . On the other hand, in the random effects model all the factors affect the dependent variable but are not included as regressions and can be appropriately summarised by a random error term (Verbeek, 2007).

Appendix B

The related sources of the used variables:

UNR: Unemployment Rate as a Percentage, Source: OECD (2007), Economic Outlook Statistics and Projections

NAIRU: Unemployment Rate with Non-Accelerating Inflation Rate as a Percentage, Source: OECD (2007), Economic Outlook Statistics and Projections

INTS: Interest Income Received by Banks / GDP, Source: OECD, Bank Profitability – Financial Statement of Banks, various years. The variable interest income has been deflated by the GDP Deflator, 2000.

GADI: *Growth Rate of Aggregate Demand*: $AD=CON+INV$, where CON =Household Final Consumption; INV =Gross Fixed Capital Formation, Source: OECD (2007), National Accounts, in constant prices.

GAD₂: Growth Rate of Aggregate Demand: AD=CON+INV+GE where CON and INV the same as above; GE=Government Final Consumption Expenditure, Source: OECD (2007), National Accounts, in constant prices 2000.

GDP: Gross Domestic Product/ GDP, Source: OECD (2007), National Accounts, in constant prices 2000.

COES: Compensation of Employees / GDP, Source: OECD (2007), National Accounts, The variable interest income has been deflated by the GDP Deflator, 2000.

Appendix C

Endogeneity Hausman test:

$$LSDV_2: UNR_{it} = a_i + a_1 GAD2_{it} + a_2 COES_{it} + a_3 INTS_{it} + \varepsilon_{it}$$

In accordance with the endogeneity Hausman test, we regress each of independent variables: aggregate demand *GAD2*, compensation of employees *COES*, interest received by banks *INTS* and general government debt *GGD*, on the others by using as instrument its one year lag through *Ordinary Least Square (OLS) estimation*:

$$(1C) \quad GAD2_{it} = \beta_{10} + \beta_{11} GAD2_{it}(-1) + \beta_{12} COES_{it} + \beta_{13} INTS_{it} + \beta_{14} GGD_{it} + \varepsilon_{1it}$$

$$(2C) \quad COES_{it} = \beta_{20} + \beta_{21} COES_{it}(-1) + \beta_{22} GAD2_{it} + \beta_{23} INTS_{it} + \beta_{24} GGD_{it} + \varepsilon_{2it}$$

$$(3C) \quad INTS_{it} = \beta_{30} + \beta_{31} INTS_{it}(-1) + \beta_{32} GAD2_{it} + \beta_{33} COES_{it} + \beta_{34} GGD_{it} + \varepsilon_{3it}$$

The estimated residuals are added to equation (4C) and following a *t-test*, the rejection of the null hypothesis that $\gamma_5, \gamma_6, \gamma_7, \gamma_8 = 0$ implies that there is no sign of

endogeneity and thus the *OLS* estimation is an efficient one. Otherwise, a *Two Stage Least Square (TSLS)* estimation should be applied.

$$(4C) \text{UNR}_{it} = \gamma_1 + \gamma_2 \text{GAD2}_{it} + \gamma_3 \text{COES}_{it} + \gamma_4 \text{INTS}_{it} + \gamma_6 \hat{e}_{1it} + \gamma_7 \hat{e}_{2it} + \gamma_8 \hat{e}_{3it} + \gamma_8 \hat{e}_{4it}$$

Table1 ENDOGENEITY TESTING

Independent Variables	
GAD2	-0.369831 (-0.992401)
COES	-0.136509 (-1.561835)
INTS	-0.051912 (-0.798845)
RGA2	1.010296 (2.135454)
RCOES	-0.525841 (-0.984538)
RINTS	-0.395146 (-1.749649)

Note: The symbol R denotes the estimated residuals. In the parentheses t-values are presented.
Critical value for $t_{13.5\%} = 1.833$

In this case, the residuals of GAD2 are statistically significant, whereas those of COES and INTS are statistically insignificant in 5% significance level.

$$FGLS_1: \text{NAIRU}_{it} = a_i + a_1 \text{GAD1}_{it} + a_2 \text{COES}_{it} + a_3 \text{INTS}_{it} + \varepsilon_{it}$$

In accordance with the above cases, we regress each of the independent variables on the others by using as instrument its one year lag through *Ordinary Least Square (OLS) estimation*. More specifically:

$$(5C) \text{ GAD1}_{it} = \beta_{10} + \beta_{11}\text{GAD1}_{it}(-1) + \beta_{12}\text{COES}_{it} + \beta_{13}\text{INTS}_{it} + \varepsilon_{1it}$$

$$(6C) \text{ COES}_{it} = \beta_{20} + \beta_{21}\text{COES}_{it}(-1) + \beta_{22}\text{GAD1}_{it} + \beta_{23}\text{INTS}_{it} + \varepsilon_{2it}$$

$$(7C) \text{ INTS}_{it} = \beta_{30} + \beta_{31}\text{INTS}_{it}(-1) + \beta_{32}\text{GAD1}_{it} + \beta_{33}\text{COES}_{it} + \varepsilon_{3it}$$

Further by adding the estimated residuals to (8C), we examine whether null hypothesis that $\gamma_5, \gamma_6, \gamma_7 = 0$ can be accepted or not.

$$(8C) \text{ NAIRU}_{it} = \gamma_1 + \gamma_2\text{GAD1}_{it} + \gamma_3\text{COES}_{it} + \gamma_4\text{INTS}_{it} + \gamma_5\hat{\varepsilon}_{1it} + \gamma_6\hat{\varepsilon}_{2it} + \gamma_7\hat{\varepsilon}_{3it}$$

Table 2. ENDOGENEITY TESTING

Independent Variables	
GAD1	0.390990 (1.402492)
COES	-0.074901 (-1.148939)
INTS	-0.006750 (-0.139217)
RGAD1	-0.011625 (-0.035149)
RCOES	-0.343380 (-0.862929)
RINTS	-0.316042 (-1.894329)

Note: The symbol R denotes the estimated residuals. In the parentheses t-values are presented. Critical value for $t_{13.5\%} = 1.833$.

It is proved that only the residuals of *INTS* succeed in rejecting the null hypothesis in significant level of 5%, so the residuals of *GAD1* and *COES* are characterised by endogeneity.

$$FGLS_2: NAIRU_{it} = a_i + a_1GAD2_{it} + a_2COES_{it} + a_3INTS_{it} + \varepsilon_{it}$$

Similarly, we regress each of the independent variables on the others by using as instruments their one year lag and through *Ordinary Least Square (OLS) estimation*:

$$(9C) GAD2_{it} = \beta_{10} + \beta_{11}GAD2_{it}(-1) + \beta_{12}COES_{it} + \beta_{13}INTS_{it} + \varepsilon_{1it}$$

$$(10C) COES_{it} = \beta_{20} + \beta_{21}COES_{it}(-1) + \beta_{22}GAD2_{it} + \beta_{23}INTS_{it} + \varepsilon_{2it}$$

$$(11C) INTS_{it} = \beta_{30} + \beta_{31}INTS_{it}(-1) + \beta_{32}GAD2_{it} + \beta_{33}COES_{it} + \varepsilon_{3it}$$

By adding the estimated residuals to equation (12C) and following a *t-test* we attempt to reject the null hypothesis that $\gamma_5, \gamma_6, \gamma_7 = 0$ so as to ensure the absence of any sign of endogeneity.

$$(12A) NAIRU_{it} = \gamma_1 + \gamma_2GAD2_{it} + \gamma_3COES_{it} + \gamma_4INTS_{it} + \gamma_5\hat{\varepsilon}_{1it} + \gamma_6\hat{\varepsilon}_{2it} + \gamma_7\hat{\varepsilon}_{3it}$$

Table 3. ENDOGENEITY TESTING

Independent Variables	
GAD2	0.313653 (1.121700)
COES	-0.078439 (-1.196050)
INTS	-0.014629 (-0.300015)
RGAD2	0.124786 (0.351521)
RCOES	-0.321744 (-0.802846)
RINTS	-0.282846 (-1.669118)

Note: The symbol R denotes the estimated residuals. In the parentheses t-values are presented. Critical value for $t_{13,5\%} = 1.833$

According to the results presented in *Table 5*, none of the residuals is statistically significant in 5% significance level.

Conclusion

The main purpose of this thesis was to evaluate the efficiency of demand side policies (income distribution and taxation) in reducing unemployment and promoting economic growth. A thought which contradicts the widely adopted inflation targeting regime that recognises only a passive role for aggregate demand and determines employment policies relating to labour market rigidities and imperfections, i.e. reservation wages, unemployment benefit systems as well as unemployment insurance systems. However, it is commonly argued that these practices extend the core of unemployment rather solve it.

In this manner, it seemed reasonable to criticise the currently dominant policy guidepost of NAIRU and re-examine the adopted policy benchmark for stabilising economy and sustaining its growth. Besides, in practice neither do economies operate at full employment and capacity utilization levels, nor is capital stock constant or perfectly substitutional with labour. Further, the continuous enforcement of the financial sector in economic pressures, the instability of economic conditions and the serious consequences of inflation targeting regime, highlight the urgency of targeting employment directly. Thus, there is no doubt that the adoption of post Keynesian-Kaleckian framework provides realistic and accurate suggestions for accumulating employment.

Bearing in mind all these, the theoretical model developed in these grounds proved that the degree of stability, the structure and the general behaviour of economic activity are essentially affected by inter and intra relations among included income classes. More precisely the equilibrium values are basically determined by the

intentions and priorities of each income class about investing, saving and financing decisions with respect to their available incomes; also by the form of taxation when government intervenes and the alternative finance sources. Regardless of the degree of economic stability or instability, in accordance with the model's implications we deduce the presence of a positive relation between monetary factors and employment. This result becomes more interesting when we introduce progressive income taxation and we provide a more active role for workers. So, the fact that economic process can be endogenously fuelled by actual inside sources cancels out any possibility of stagnation even in the presence of the financial sector.

All these suggestions are also confirmed in empirical grounds, at least, in case of most of the core economies of the European Monetary Unifications that are known for their supply side ideology and austere macroeconomic conditions in sustaining economic growth. Contrary to the agreement that the causes of persistent unemployment across economies are reflected on the inability of these policies to face it, rather than on individual circumstances of each economy, policymakers have no intention of changing their target priorities. However, the suggestions about a negative relation between growth rate of aggregate demand either when there is no public sector or even when it is considered and workers' income shares with unemployment and NAIRU but a positive one with rentiers' income shares ensure the agreement that mass unemployment stems from deficient demand levels and inequitable income distribution.

As a consequence of all these, the adoption of a policy agenda that would suggest the stimulation of investment alongside with expenditures (public and mainly private) is

recommended so that real growth to be obtained and sustained. Relative to all these, the introduction of progressive income taxation, interest rate and income distribution policies seems to be reasonable for realising economic activity from external finance and refreshing it via new investment plans and consumption expenditures. In these conditions, unemployment would be limited while the presence of excess capacity and plenty of unused capital would not hold economic activity down by harmful inflationary pressures. Generally, any suggested policy should be in accordance with actual conditions and available policy instruments and not in relation to the suggestions of adopted frameworks.

Although this thesis provides convincing evidence in favour of demand side economics, there is a number of issues that are still open and require further research. Hence in a future study, we aim at extending the current theoretical model by distinguishing workers' income class into those who receive interest income (creditors) and those that receive dividend income (shareholders) and are being characterised by different interest payments and savings propensities. Although such a suggestion would complicate the analysis, the high degree of its realism persuades us about the informative and realistic suggestions that will be reached. Another way of extending the current analysis and assessing the importance of NAIRU within demand environment is by assuming the presence of inflation. In this case, the corresponding inflation barrier will be the condition to face economic problems properly. Besides the fact that inflation into Post Keynesian-Kaleckian grounds is being approached through conflict inflation distribution makes clear that we can also examine among others the effects of wage policies on income distribution, provided that firms do not completely pass unity labour cost variations to prices or prices of other inputs do not change in

line with unit labour costs. In our view, an additional attempt to extend the current study is to examine economic activities by assuming the characteristics of an open economy. It seems reasonable to examine the way that the endogenously determined economic process is affected by variations in exchange rates, trade in foreign capital and employment as well as finance dealings in a globalized interrelated world. Although changes in equilibrium values depend on the adopted assumptions, the fact that economic growth can be determined by inside economy's availabilities, confirms the ability of each economy to face its actual problems appropriately.

We also believe that an enrichment of empirical results would assure the necessity for demand side policies. More specifically, in a future study we will attempt to examine the way that results can be affected by considering estimation for the enlarged EMU, since the characteristics of most of 'new participants' raise questions about their ability to set their policy priorities in line with the required. Further, the needs of these countries and their inability to follow the stability criteria have removed the adoption of the common currency away from the near future and cast doubts on their consistency with implied EMU targets. Also by considering the enlargement of the European Union, we aim in examining the accuracy of supply and demand side policies for economies that are participants in both euro-zone and EMU and those that join only the euro-zone. In our view such a distinction will inform us about the specific characteristics of each country group as well as whether their growth expansion can be determined in accordance with demand or supply policies.

Further we believe that empirical results of this thesis can be enriched with the introduction of more dynamic methods. For instance the use of dynamic panel data,

would allow us to estimate a dynamic model on individual level without cancelling the specific characteristics of each economy. Likewise, the adoption of Vector Autoregressive model (VAR) would allow us to estimate simultaneous equation models, distinguish between short and long run dynamic relations and analyse from a dynamic point of view the dynamic structure of adopted variables. In our view, both of these methods would reflect the characteristics of current economies perfectly.

In particular, the common wisdom about the inappropriateness of currently neoliberal ideology and policies for promoting economic activity provides us the opportunity to examine the correctness of alternative economic approach in both theoretical and empirical modeling. Besides, there is much evidence that supports the purpose of structural changes in inflation targeting regime; whereas there is no space for treating unemployment as a consequence of actual conditions. It is time to realise that the growth in real side of economy can be reached only by rearranging the adopted policy agenda and targets with respect to actual needs, facilities and available instruments of economies, so as economic growth to go a step beyond. But all these thoughts and suggestions are only the starting point of further research and improvement of these results.

References

- Akerlof, G. A., (1982), "Labour Contracts as Partial Gift Exchange", *Quarterly Journal of Economics*, Vol. 97, No. 4, pp. 543-569.
- Akerlof, G. A. and Yellen, J. L., (1988), "Fairness and Unemployment", *American Economic Review*, Vol. 78, No. 2, pp. 44-49.
- Akerlof, G. A., and Yellen, J. L., (1985a), "A Near-Rational Model of Business Circles, With Wage and Price Inertia", *Quarterly Journal of Economics*, Vol. 100, Supplement, pp. 823-838.
- Akerlof, G. A., and Yellen, J. L., (1985b), "Can Small Deviations from Rationality Make Significant Differences to Economic equilibria?", *American Economic Review*, Vol. 75, No. 4, pp. 708-720.
- Alexiou, C., (2001), "Crafting a Post Keynesian Macroeconomic Framework to explain European unemployment: Econometric Evidence from the European Union countries", *Journal of Post Keynesian Economics*, Vol. 24, No. 1, pp. 59-80.
- Alexiou, C., (2000), "An Alternative Approach to Explaining Unemployment: Evidence from a Three Country Study", *Spoudai*, Vol. 50, No. 3-4, pp. 19-35.
- Alexiou, C., and Argitis, G., (2005), "Macroeconomic Policy and Unemployment: Empirical Evidences from the Euroland", *Review of Applied Economics*, Vol. 1, No. 1, pp. 99-119.
- Alexiou, C., and Argitis, G., (2003), "Capital Shortages and Unemployment in OECD countries", *Spoudai*, Vol. 53, No. 2, pp. 23-36.
- Alexiou, C., and Pitelis, C., (2003), "On capital shortages and European unemployment: a panel investigation", *Journal of Post Keynesian Economics*, Vol. 23, No. 4, pp. 613-640.

- Amadeo, E. J., (1986a), "The role of capacity utilization in long period analysis", *Political Economy*, Vol. 2, No. 2, pp. 147-160.
- Amadeo, E. J., (1986b), "Notes on capacity utilization, distribution and accumulation", *Contributions to Political Economy*, Vol. 5, No. 1, pp. 83-94.
- Amadeo, E. J., (1987), "Expectations in a steady-state model of capacity utilization", *Political Economy*, Vol. 3, No. 1, pp. 147-185.
- Amable, B., Henry J., Lordon, F., and Topol, R., (1995), "Hysteresis revisited: a methodological approach", in R. Cross, (eds.), *The Natural Rate of Unemployment*, Cambridge University Press, pp. 153-180.
- Arestis, P., (2005), "New Monetary Policy: Theory and Evidence", *Cambridge University and the Levy Economics Institute*, available at: http://matisse.univ-paris1.fr/fr/IMG/pdf/Arestis_NEW_MONETARY_POLICY.pdf, pp. 1-26,
- Arestis, P., Baddeley, M., and Sawyer, M. C. (2007), "The Relationship between Capital Stock, Unemployment and Wages in Nine EMU Countries", *Bulletin of Economic Research*, No. 59, Vol. 2, pp. 125-147.
- Arestis, P., and De Antoni, E., (2007), "Rediscovering Fiscal Policy Through Minskyan Eyes", *University of Trento, Department of Economics*, Discussion Paper Series, No. 31, pp. 1-39.
- Arestis, P., and Mariscal, B.- F., (2000), "Capital Stock, Unemployment and Wages in the UK and Germany", *Scottish Journal of Political Economy*, Vol. 47, No. 5, pp. 487-503.
- Arestis, P., and Mariscal, B.- F., (1998), "Capital shortages and asymmetries in UK unemployment", *Structural Change and Economic Dynamics*, Vol. 9, No. 2, pp. 189-204.

- Arestis, P., and Mariscal, B. -F., (1997), “Conflict, Effort and Capital Stock in UK Wage Determination”, *Empirica*, Vol. 24, No. 3, pp. 179-193.
- Arestis, P., and Sawyer, M. C., (2007), “The weak foundations of the Phillips’ Curve”, Leeds University Business School, University of Leeds, pp. 1-20. Available at: <http://129.11.89.221/MKB/MalcolmSawyer/philips%20curve.pdf>.
- Arestis, P, and Sawyer, M. (2006), “Fiscal policy Matters”, *Public Finance*, Vol. 54, No. 3-4, pp. 133-153.
- Arestis, P., and Sawyer, M., (2004a), “The ‘new consensus’ in macroeconomics and monetary policy”, in P. Arestis, and M. C. Sawyer, (eds), *Re- examining Monetary and Fiscal Policy for the 21st Century*, Edward Elgar Press, pp. 10-26.
- Arestis, P., and Sawyer, M. C., (2004b), “Can monetary policy affect inflation”, in P. Arestis, and M. C. Sawyer, (eds), *Re- examining Monetary and Fiscal Policy for the 21st Century*, Edward Elgar Press pp. 41-72.
- Arestis, P., and Sawyer, M. (2004c), “On Fiscal Policy and Budget Deficits” *Intervention, European Journal of Economics and Economic Policies*, Vol. 1, No. 2 pp. 65-77.
- Arestis, P., and Sawyer, M. (2003), “Aggregate Demand, Conflict, and Capacity in the Inflationary Process”, *Jerome Levy Economic Institute of Bard College*, Working Paper No. 391, pp. 1-28.
- Argitis, G., (2008), “Inflation targeting and Keynes’s political economy”, *Journal of Post Keynesian Economics*, Vol. 31, No. 2, pp. 249-270.
- Argitis, G., (2001), “Intra-capitalist Conflicts, Monetary Policy and Income Distribution”, *Review of Political Economy*, Vol. 13, No. 4, pp. 453-470.
- Argitis, G., and Pitelis, C., (2006), “Global Finance, Income Distribution and Capital Accumulation”, *Contributions to Political Economy*, Vol. 25, No. 1, pp. 63-81.

- Argitis, G., and Pitelis, C., (2001), “Monetary policy and the distribution of income: evidence for the United States and the United Kingdom”, *Journal of Post Keynesian Economics*, Vol. 23, No. 4, pp. 618-638.
- Asimakopoulou, A., (1975), “A Kaleckian Theory of Income Distribution”, *Canadian Journal of Economics*, Vol. 8, No. 3, pp. 313-333.
- Asimakopoulou, A., and Burbudge, J., (1974), “The short-period Incidence of Taxation”, *Economic Journal*, Vol. 84, No. 433, pp. 267-288.
- Atesoglu, H. S., and Smithin, J., (2006), “Inflation targeting in a simple macroeconomic model”, *Journal of Post Keynesian Economics*, Vol. 28, No. 4, pp. 673-688.
- Baker, D., Glyn, A., Howell, D., and Schmitt, J. (2004), “Unemployment and Labour Market Institutions: The Failure of the Empirical Case for Deregulation”, *International Labour Organization (ILO)*, Working Paper No. 43, pp. 1-35.
- Ball, L., (1997), “Disinflation and the NAIRU”, in C. D. Romer, and D. H. Romer, (eds.), *Reducing Inflation: Motivation and Strategy*, National Bureau of Economic Research Studies in Business Cycles, Vol. 30, The University of Chicago Press, pp. 167-194.
- Ball, L., (1994), “Credible Disinflation with Staggered Price Setting”, *American Economic Review*, Vol. 84, No. 1, pp. 282-289.
- Ball, L., (1990), “Insiders and Outsiders: A Review Essay”, *Journal of Monetary Economics*, Vol. 26, No. 3, pp. 459-469.
- Ball, L., and Mankiw, G. N., (2002), “The NAIRU in Theory and Practice”, *Journal of Economic Perspectives*, Vol. 16, No. 4, pp. 115-136.

- Ball, L., Mankiw, G. N., and Nordhaus, W. D., (1999), "Aggregate Demand and Long Run Unemployment", *Brookings Papers on Economic Activity*, Vol. 199, No. 2, pp. 189-251.
- Ball, L., Mankiw, G. N., and Romer, D., (1988), "The New Keynesian Economics and the Output-Inflation Trade-Off", *Brooking Papers on Economic Activity*, Vol. 1988, No. 1, pp. 1-82.
- Ball, L., and Sheridan, N., (2003), "Does Inflation targeting Matter?", *International Monetary Fund (IMF) Working Paper Series*, No. 03/129, pp. 1-35.
- Baltagi, B. H., (2005), "*Econometric Analysis of Panel Data*", 3rd Edition, John Willey and Sons, New York.
- Bande, R., and Karanassou, M., (2007), "Labour Market Flexibility and Regional Unemployment Rate Dynamics: Spain 1980-1995", *Institute for the Study of Labour (IZA) Discussion Papers Series*, No. 2593, pp. 1-35.
- Barro, R. J., (1988), "The persistence of Unemployment", *American Economic Review*, Vol. 78, No. 2, pp. 32-37.
- Barro, R. J., (1986), "Recent Developments in the Theory of Rules versus Discretion", *Economic Journal*, Vol. 96, No. 380 (Supplement), pp. 23-37.
- Barro, R. J., (1983), "Inflationary Finance under Discretion and Rules" *Canadian Journal of Economics, Economic Journal*, Vol. 16, No. 1, pp. 1-16.
- Barro, R. J., (1978), "Unanticipated Money, Output and the Price Level in the United States", *Journal of Political Economic*, Vol. 86, No. 4, pp. 549-580.
- Barro, R. J., (1977), "Unanticipated Money Growth and Unemployment in United States", *American Economic Review*, Vol. 67, No.2, pp. 101-115.
- Barro, R. J., (1976), "Rational Expectations and the Role of Monetary Policy", *Journal of Monetary Economics*, Vol. 2, No. 1, pp. 1-32.

- Barro, R. J., and Gordon, D. B., (1983a), “Rules, Discretion and Reputation in a Model of Monetary Policy”, *Journal of Monetary Economics*, Vol. 12, No. 1, pp. 101-121.
- Barro, R. J., and Gordon, D. B., (1983b), “A Positive Theory of Monetary Policy in a Natural Rate Model”, *Journal of Political Economy*, Vol. 91, No. 4, pp. 589-610.
- Bean, C. R., (1994a), “European Unemployment: A Survey”, *Journal of Economic Literature*, Vol. 32, No. 2, pp. 573-619.
- Bean, C. R., (1994b), “European Unemployment, Two Decades Later, European Unemployment: A retrospective”, *European Economic Review*, Vol. 38, No. 3-4, pp. 523-534.
- Bean, C. R., (1989), “Capital shortages and persistent unemployment”, *Economic Policy*, Vol. 8, pp. 12-53.
- Bean, C. R., Layard, R., and Nickell, S., (1986), “The Rise in Unemployment: A Multi-Country Study”, *Economica*, Vol. 53, No. 210, Supplement: Unemployment, pp. 1-22.
- Bellofiore, R., and Ferri, P., (2001), “Introduction: ‘Things fall apart, the centre cannot hold’”, in R. Bellofiore, and P. Ferri, (eds.), *Financial Fragility and Investment in the Capitalist Economy The Economic Legacy of Hyman Minsky*, Volume II, Edward Elgar, pp. 1-29.
- Bernaske, B. S., and Mishkin, F. S., (1997), “Inflation Targeting: A New Framework for Monetary Policy”, *Journal of Economic Perspectives*, Vol. 11, No. 2, pp. 97-116.
- Bhaduri, A., and Marglin, S. A., (1991), “Profit squeeze and Keynesian theory”, in E. J. Neil, W. Semmler, (eds.), *Nicholas Kaldor and Mainstream Economics*, Basingstoke, London: Macmillan, pp. 123-163.

- Bhaduri, A., and Marglin, S. A., (1990), "Unemployment and the Real Wage: the economic basis for contesting political ideologies", *Cambridge Journal of Economics*, Vol. 14, No. 4, pp. 43-39.
- Blachflower, D. G., and Oswald, A. J., (1995) "An introduction to the wage curve", *Journal of Economic Perspectives*, Vol. 9, No. 3, pp. 153-167.
- Blanchard, O. J., (1991), "The Medium Run", *Brooking Papers on Economic Activity*, Vol. 1997, No. 1, pp. 89-158.
- Blanchard, O. J., (1991), "Wage bargaining and Unemployment Persistence", *Journal of Money, Credit and Banking*, Vol. 23, No. 3, pp. 277-292.
- Blanchard, O. J., (1990), "Unemployment: Getting the Questions Right and Some of the Answers", in J. H. Dreze, and C. R. Bean, (eds.), *Europe's Unemployment Problem*, Cambridge, MA: MIT Press, pp. 66-89.
- Blanchard, O. J., (1986), "The Wage Price Spiral", *Quarterly Journal of Economics*, Vol. 101, No.3, pp. 543-566.
- Blanchard, O. J., and Katz, F. L., (1997), "What We Know and Do Not Know About the Natural Rate of Unemployment", *Journal of Economic Perspective*, Vol. 11, No. 1, pp. 51-72.
- Blanchard, O. J., and Kiyotaki, N., (1986), "Monopolistic Competition and the Effects of Aggregate Demand", *American Economic review*, Vol. 77, No. 4, pp. 647-666.
- Blanchard, O. J., and Summers, L. H., (1987), "Hysteresis in Unemployment", *European Economic Review*, Vol. 31, No. 1-2, pp. 288-295.
- Blanchard, O. J., and Quah, D., (1989), "The Dynamic Effects of Aggregate Demand and Supply disturbances", *American Economic Review*, Vol. 79, No. 4, pp. 655-673.

- Blanchard, O. J., and Wolfers, J., (2000), "The Role of Shocks and Institution in the Rise of European Unemployment: The Aggregate Evidences", *Economic Journal*, Vol. 110, No. 462, Conference Papers, pp. 1-33.
- Blecker, R., (2002), "Distribution, demand and growth in neo-Kaleckian macro models" in M. Setterfield, (eds), *The Economics of Demand-led Growth*, Edward Elgar, Cheltenham, pp. 129-152.
- Blecker, R., (1999), "Kaleckian macro models for open economies", in J. Deprez, and J. T. Harvey, (eds.), *Foundations of international economics: post Keynesian perspectives*, Routledge, London and New York, pp. 116-149.
- Blinder, A. S., (1997), "Is there a core of Practical Macroeconomics That We Should All Believe?", *American Economic Review*, Vol. 87, No. 2, pp. 240-243.
- Blinder, A. S., (1987), "Keynes, Lucas and Scientific Progress", *American Economic Review*, Vol. 77, No. 2, pp. 130-136.
- Bowles, S., and Boyer, R., (1995), "Wages, Aggregate Demand and employment in an open economy: an empirical investigation" in G. Epstein, and H. Gintis, (eds.), *Macroeconomic Policy after a Conservative Era: Studies in Investment, Savings and Finance*, Cambridge University Press, pp. 143-171.
- Brown-Collier, E., and Collier, B., (1995), "What Keynes Really Said About Deficit Spending," *Journal of Post Keynesian Economics*, Vol. 17, No. 3, pp. 341- 355.
- Calmfors, L., and Driffill, J., (1988), "Centralization of wage bargaining and macroeconomic performance", *Economic Policy*, Vol. 98, No. 6, pp. 13-61.
- Card, D., (1995), "The Wage Curve: A Review", *Journal of Economic Literature*, Vol. 33, No. 2, pp. 785-799.

- Cassetti, M., (2002), "Conflict, Inflation, Distribution and Terms of Trade in the Kaleckian Model", in M. Setterfield, (eds.), *The Economics of Demand-Led Growth*, Cheltenham: Edwards Elgar, pp. 189-211.
- Clarida, E., Gali, J., and Gertlet, M., (2000), "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory", *Quarterly Journal of Economics*, Vol. 115, No. 1, pp. 147-180.
- Clarida, E., Gali, J., and Gertlet, M., (1999), "The Science of Monetary Policy - A New Keynesian Perspective", *Journal of Economic Literature*, Vol. 37, No. 4, pp. 1661-1707.
- Clark, P., and Laxton, D., (1997), "Phillips Curves, Phillips Lines and the Unemployment Costs of Overheating", *International Monetary Fund (IMF) Working Paper Series 97/17*, pp. 1-50.
- Coen, R. M., Hockman, B. G., Golfeld, S. M., and Tobin, J., (1987), "Keynesian and Classical Unemployment in Four Countries", *Brookings Papers on Economic Activity*, Vol. 1987, No. 1, pp. 123-206.
- Collington, S., (2003), "The Role of Monetary Policy in Setting the Natural Rate of Unemployment", paper prepared to be presented at *Workshop Quantitative Prognosen Realwirtschaftlicher Effekte der Gelpolitik* (23 October, 2003), pp. 1-38.
- Cottrell, A., (1994), "Post- Keynesian monetary economics", *Cambridge Journal of Economics*, Vol. 18, No. 6, pp. 587-605.
- Cross, R., (1995), "Is the natural rate hypothesis consistent with hysteresis?", in R. Cross, (eds), *The Natural Rate of Unemployment*, Cambridge University Press, pp. 181-200.

Crotty, J. R., (1986), “Marx, Keynes and Minsky on the Instability of the Capitalist Growth Process and the Nature of Government Economic Policy”, pp. 1-31, Available at: <http://people.umass.edu/crotty/MarxKeynesMinsky.pdf>.

Damaria, R., and Mair, D., (1992), “A Post – Keynesian Approach to the Incidence of Taxation”, in P. Arestis and V. Chick, (eds.) *Recent Developments in Post Keynesian Economics*, Aldershot, UK: Edward Elgar, pp. 123-142.

Davidson, P. (1998), “Post Keynesian employment analysis and the macroeconomics of OECD unemployment”, *Economic Journal*, Vol. 108, No. 448, pp. 817-831.

Davis, J. B., (1998), “New Keynesians, Post Keynesians and History”, in R. J. Rotheim, (eds.), *New Keynesian Economics/Post Keynesian Alternatives*, Routledge, Taylor & Francis Group, pp. 168-181.

De Long, J. B., and Summers, L. H., (1986), “Is Increased Price Flexibility Stabilizing?”, *American Economic Association*, Vol. 76, No. 5, pp. 1031-1044.

DeBelle, G., (1997), “Discussion of Design Inflation Targets”, *Reserve Bank of Australia*, pp. 1-12.

Demertzis, M., and Hallet, A.H., (1995), “Is the natural rate of unemployment a useful concept?”, in R. Cross (ed.), *The Natural Rate of Unemployment*, Cambridge University Press, pp. 315-345.

Dixon, H., (1998), “Controversy: the macroeconomics of unemployment in the OECD”, *Economic Journal*, Vol. 108, No. 448, pp. 779-781.

Dixon, H., (1995), “Of coconuts, decomposition and a jackass: the genealogy of the natural rate”, in R. Cross (ed.), *The Natural Rate of Unemployment*, Cambridge University Press, pp. 57-74.

Downward, P., and Mearman, A., (2002), "Critical Realism and Econometrics: Constructive Dialogue with Post Keynesian Economics", *Metroeconomica*, Vol. 53, No. 4, pp. 391-415.

Dreze, J. H., and Bean, C. R., (1990), "Europe's Unemployment Problem: Introduction and Synthesis," in J. H. Dreze, and C. R. Bean, (eds.), *European Unemployment: Lessons from a Multi-Country Econometric Study*, Cambridge: MIT Press, pp. 1-65.

Dutt, A. K., (1992), "Rentiers in Post Keynesian Models", in P. Arestis, and V. Chick, (eds.) *Recent Developments in Post Keynesian Economics*, Aldershot: Edward Elgar, pp. 95-122.

Dutt, A. K., (1989), "Accumulation, distribution and inflation in a Marxian/post Keynesian model with a rentier class", *Review of Radical Political Economics*, Vol. 21, No. 3, pp. 18-26.

Dutt, A. K., (1987), "Alternative closures again: A comment on 'growth, distribution and inflation'", *Cambridge Journal of Economics*, Vol. 11, No. 1, pp. 75-82.

Dutt, A. K., (1984), "Stagnation, income distribution and monopoly power", *Cambridge Journal of Economic*, Vol. 8, No. 1, pp. 25-40.

Dutt, A. K., and Amadeo, E. J., (1991) "A Post Keynesian theory of growth, interest and money", Department of Economics PUC-Rio (Brazil), *Working Paper* No. 264, pp. 1-41.

Easterly, W., and Fischer, S., (2001), "Inflation and the Poor", *Journal of Money and Credit and Banking*, Vol. 33, No. 3, pp. 160-178.

Eisner, R., (2003), "The NAIRU and fiscal and monetary policy for now and our future: some comments" in E. J. Nell, M. B. Smith, and M. Forstater, (eds.),

Reinventing Functional Finance: Transformational Growth and Full Employment, Edward Elgar Publishing, pp. 91-115.

Eisner, R., (1996), "The Retreat from Full Employment", in P. Arestis, (eds.), *Employment, Economic Growth and the Tyranny of the Market: Essays in Honour of Paul Davidson*, Vol. 2, Edward Elgar Publications, pp. 106-130.

Eisner, R., (1995), "A new view of NAIRU", in P. Davidson, and J. A. Kregel, (eds.), *Improving the Global Economy, Keynesianism and the Growth in Output and Employment*, Chaltenham (UK), Edward Elgar Publications, pp. 196-230.

Elmeskov, J., (1993), "High and Persistent Unemployment: Assessment of the Problem and Its Causes", *OECD Economics Department Working Papers*, No. 132, OECD Publishing, pp. 1-127.

Epstein, G. A., (2002), "Financialization, Rentier Interests, and Central Bank Policy", Paper prepared for Department of Economics and Political Economy Research Institute Conference on "*Financialization of the World Economy*", December 7-8, 2001, University of Massachusetts, pp. 1-43, Available at: http://www.peri.umass.edu/fileadmin/pdf/financial/fin_Epstein.pdf.

Epstein, G. A., and Power, D., (2003), "Rentier incomes and financial crises: an empirical examination of trends and cycles in some OECD countries", *Political Economy Research Institute (PERI), University of Massachusetts Amherst*, Working Paper Series No. 57, pp. 1-23.

Espinosa-Vega, M. A., and Russell, S., (1997), "History and Theory of the NAIRU: A Critical Review", *Economic Review*, Journal of Federal Reserve Bank of Atlanta, Vol. 1997, No. Q2, pp. 4-25.

Estrella, A., and Mishkin, F. S., (1999), "Rethinking the Role of NAIRU in Monetary Policy: Implications of Model Formulation and Uncertainty", in J. B. Taylor, (eds.),

Monetary Policy Rules, National Bureau of Economic Research Studies in Business Cycles, Vol. 31, The University of Chicago Press, Chicago, IL., pp. 405-435.

Fair, R. C., (1999), "Testing the NAIRU model for the United States", Cowles Foundation, Yale University, New Haven, mimeo, pp. 1-28.

Fair, R. C., (1997), "Testing the NAIRU model for 27 Countries", Cowles Foundation, Yale University, New Haven, mimeo, pp. 1-32.

Fazzari, S., (1993), "The Investment-Finance Link: Investment and U.S. Fiscal Policy in the 1990s", *Jerome Levy Economics Institute of Bard College*, Working Paper, No. 98, pp. 1-44.

Fazzari, S., and Mott, T., (1986), "The investment theories of Kalecki and Keynes: an empirical study for firm data, 1970-1982", *Journal of Post Keynesian Economics*, Vol. 9, No. 2, pp. 171-187.

Fischer, I., (1926), "A Statistical Relation between Unemployment and Price Changes", *International Labour Review*, Vol. 13, No. 6, pp. 785-792.

Fischer, S., (1993), "The Role of Macroeconomic Factors in Growth", *Journal of Monetary Economics*, Vol. 32, No. 3, pp. 485-512.

Fischer, S., (1988a), "The Role of Macroeconomic Factors in Growth", *Journal of Monetary Economics*, Vol. 32, No. 3, pp. 485-512.

Fischer, S., (1988b), "Recent developments in Macroeconomics", *Economic Journal*, Vol. 98, No. 391, pp. 294-339.

Fischer, S., (1977), "Long- Term Contracts, Rational Expectations and the Optimal Money Supply Rule", *Journal of Political Economy*, Vol. 85, No. 1, pp. 191-205.

Fitoussi, J.-P., Jestaz, D., Phelps, E., and Zoega, G., (2000), "Roots of the Recent Recoveries: Labour Reforms or Private Sector Forces?", *Brookings Papers on Economic Activity*, Vol. 2000, No.1, pp. 237-331.

- Fortin, P., (1996), "The Unbearable Lightness of Zero Inflation Optimism", in B. K. MacLead, and L. Osberg, (eds.) *The Unemployment Crisis*, McGill Queen's University Press, pp. 14-38.
- Fortin, P., (1989), "How 'natural' is Canada's high unemployment rate?", *European Economic Review*, Vol. 33, No. 1, pp. 89-110.
- Friedman M., (1977), "Nobel Lecture: Inflation and Unemployment", *Journal of Political Economy*, Vol. 85, No. 3, pp. 451-472.
- Friedman, M., (1970), "A Theoretical Framework for Monetary Analysis", *Journal of Political Economy*, Vol. 78, No. 2, pp.193-238.
- Friedman Milton (1968), "The Role of Monetary Policy", *American Economic Review*, Vol. 58, No. 1, pp. 1-17.
- Galbraith J. K., (2005), "Breaking Out of the Deficit Trap: The Case Against the Fiscal Hawks", *The Levy Economics Institute of Bard College*, Public Policy Brief, Working Paper, No, 81, pp. 1-31.
- Galbraith, J. K., (1997), "Time to Ditch the NAIRU", *Journal of Economic Perspectives*, Vol. 11, No. 1, pp. 93-108.
- Galbraith, J. K., (1996), "Unemployment, Inflation and the Job Structure", *Jerome Levy Economics Institute of Bard College*, Working Paper No. 154, pp. 1-31.
- Glyn, A., Baker, D., David, H., and Schmitt, J., (2003), "Labour Market Institutions and Unemployment: A critical Assessment of the Cross-country Evidence", *University of Oxford, Department of Economics Discussion Paper Series*, No, 168, pp. 1-65.
- Gordon, D. M., (1995a), "Putting the Horse (back) before the cart: disentangling the macro relationship between investment and saving", in G. Epstein and H. Gintis

(eds.), *Macroeconomic Policy after a Conservative Era: Studies in Investment, Savings and Finance*, Cambridge University Press, pp. 57-108.

Gordon, D. M., (1995b), "Growth, distribution and the rules of the game: social structuralist macro foundations for a democratic economic policy" in G. Epstein and H. Gintis (eds.), *Macroeconomic Policy after a Conservative Era: Studies in Investment, Savings and Finance*, Cambridge University Press, pp. 384-407.

Gordon, D. M., (1988), "The Un-Natural Rate of Unemployment: An Econometric Critique of the NAIRU Hypothesis", *American Economic Review*, Vol. 78, No. 2, pp. 117- 123.

Gordon, R. J., (1997), "The Time-Varying NAIRU and its implications for economic policy", *Journal of Economic Perspective*, Vol. 11, No. 1, pp. 11-32.

Gordon, R. J., (1990), "What Is New-Keynesian Economics?", *Journal of Economic Literature*, Vol. 28, No. 3, pp. 1115-1171.

Gordon, R. J. (1989), "Hysteresis in History: Was There Ever A Phillips Curve?", *American Economic Review*, Vol. 79, No. 2, pp. 220-225.

Gordon, R. J., and Stock, J. H., (1998), "Foundations of the Goldilocks Economy: Supply Shocks and the Time-Varying NAIRU", *Brookings Papers on Economic Activity*, Vol. 1998, No. 2, pp. 297-346.

Gray, J. A., (1976), "Wage Indexation: A Macroeconomic Approach," *Journal of Monetary Economics*, Vol. 2, No. 2, pp. 221-235.

Greenwald, B. C., and Stiglitz, J. E., (1995), "Labour Market Adjustments and the Persistence of Unemployment", *American Economic review*, Vol. 85, No. 2, pp. 219-225.

Greenwald, B. C., Stiglitz, J. E., Hall, R. E., and Fischer, S., (1988), "Examining Alternative Macroeconomic Theories", *Brookings papers on Economic Activity*, Vol. 1988, No.1, pp. 207-270.

Greenwald, B. C., and Stiglitz, J. E., (1987), "Keynesian, New Keynesian and New Classical Economics", *Oxford Economic Papers*, Vol. 39, No. 1, pp. 119-133.

Hahn, F. H., (1980), "Unemployment from a Theoretical Viewpoint", *Economica*, Vol. 47, No. 187, pp. 285-298.

Hall, R. E., (1988), "Fluctuations in Equilibrium Unemployment", *American Economic Review*, Vol. 78, No. 2, pp. 269-275.

Hall, R. E., Sims, C., Solow, R., and Gordon, R. A., (1975), "The Rigidity of Wages and the Persistence of Unemployment", *Brookings Papers on Economic Activity*, Vol. 1975, No. 2, pp. 301-349.

Hausman, J. A., "Specification Tests in Econometrics", *Econometrica*, Vol. 46, No. 6, pp. 1251-1271.

Hein, E., (2007), "Interest rate, Debt, distribution and capital accumulation in a post Kaleckian model", *Metroeconomica*, Vol. 58, No. 2, pp. 310-339.

Hein, E., (2006a), "Wage bargaining and monetary policy in a Kaleckian monetary distribution and growth model: trying to make sense of the NAIRU", *Intervention Journal of Economics*, Vol. 3, pp. 305-329.

Hein E., (2006b), "Interest, debt and capital accumulation- a Kaleckian approach", *International Review of Applied Economics*, Vol. 20, No. 3, pp. 337-352.

Hein, E., (1999), "Interest rates, income shares and investment in a Kaleckian model", *Review of Political Economy and Social Sciences*, Vol. 1999, No. 5, pp. 5-22.

Hein, E., and Kramer, H., (1997), "Income shares and capital formation: patterns of recent developments", *Journal of Income Distribution*, Vol. 7, No. 1, pp. 5-28.

Hein, E., and Oschen, C., (2003), "Regimes of interest rates, income shares, savings and investment: A Kaleckian model and empirical estimation for some advanced OECD-economies", *Metroeconomica*, Vol. 54, No. 4, pp. 404-433.

Hein, E., and Truger, A., (2006), "Fiscal Policy and Macroeconomic Performance in the Euro-area: Lessons for the Future", *Macroeconomic Policy Institute*, Working Paper 7/2006, pp. 1-33.

Hein, E., and Vogel, L., (2007), "Distribution and growth in France and Germany-single equation estimations and model simulations based on the Bhaduri/ Marglin-model", *Macroeconomic Policy Institute*, Working Paper 4/2007, pp. 1-33.

Hein, E., and Tarassow, A., (2008), "Distribution, aggregate demand and productivity growth- theory and empirical results for six OECD countries based on Post-Keynesian model", *Macroeconomic Policy Institute*, Working Paper 18/2008, pp. 1-33.

Jackman, R., and Roper, S., (1987), "Structural Unemployment", *Oxford Bulletin Economic and Statistics*, Vol. 49, No. 1, pp. 155-159.

Jekinson, T., (1987), "The natural rate of unemployment: Does it Exist?", *Oxford Review of Economic Policy*, Vol. 3, No. 3, pp. 20-26.

Juhn, C., Murphy, K. M, Topel, R. H., Yellen, J. L., and Baily, M. N., (1991), "Why Has the Natural Unemployment Increased over Time?", *Brookings Papers on Economic Activity*, Vol. 1991, No. 2, pp. 75-142.

Kaldor, N., (1957), "A Model of economic growth", *Economic Journal*, Vol. 67, No. 268, pp. 591-624.

Kaldor, N., (1956), "Alternative theories of economic growth", *Review of Economic Studies*, No. 23, Vol. 2, pp. 83-100.

Kalecki, M., (1971), *Selected Essays in the Dynamics of the Capitalist Economy*, Cambridge; Cambridge University Press.

Kalecki, M., (1954), *Theory of Economic Dynamics: An Essay on Cyclical and Long Run Changes in Capitalist Economy*, London: George Allen and Unwin Books.

Kalecki, M., (1943), "Political Aspects of full employment", *Political Quarterly*, Vol. 14, No. 4, pp. 322-331.

Kalecki, M., (1937a), "The principle of increasing risk", *Economica*, Vol. 4, No. 76, pp. 441-447.

Kalecki, M., (1937b), "A Theory of Commodity, Income and Capital Taxation", *Economic Journal*, Vol. 47, No. 187, pp. 444-450.

Karanassou, M., Sala, H., and Snower, D.J., (2005), "A reappraisal of the inflation-unemployment trade off", *European Journal of Political Economy*, Vol. 25, No. 1, pp. 1-32.

Karanassou, M., and Snower, D. J., (2004), "Unemployment Invariance", *German Economic Review*, Vol. 5, No. 3, pp. 297-317.

Karanassou, M, Sala, H., and Snower, D. J., (2003a), "Unemployment in the European Union: Institutions, Prices and Growth", *Institute for the Study of Labour (IZA) Discussion Papers Series*, No. 899, pp. 1-38.

Karanassou, M., Sala, H., and Snower, D. J., (2003b), "Unemployment in the European Union: A dynamic reappraisal", *Economic Modelling*, Vol. 20, No. 2003, pp. 237-273.

Karanassou, M., and Snower, D. J., (2002), "An Anatomy of the Phillips curve", *Institute for the Study of Labour (IZA)*, Discussion Paper Series No. 635, pp. 1-20.

Karanassou, M., and Snower, D. J., (2000), "Characteristics of Unemployment Dynamics: The Chain Reaction Approach", *Institute for the Study of Labour (IZA)*, Discussion Paper Series, No. 127, pp. 1-59.

- Karanassou, M., and Snower, D. J., (1997), "Is the natural rate a reference point?", *European Economic Review*, Vol. 41, No. 3-5, pp. 559-569.
- Kregel, J., A., (1979), "The Relation of Distribution to Growth", *World Development*, Vol. 7, No. 10, pp. 933-941.
- Kriesler, P., and Lavoie, M., (2005), "The New Consensus and its Post-Keynesian Critique", *Robinson Working Paper*, No. 05-10, pp. 1-16.
- Kydland, F. E., and Prescott, E. C., (1977), "Rules Rather than Discretion: The Inconsistency of Optimal Plans", *Journal of Political Economy*, Vol. 85, No.3, pp. 473-492.
- Lamarie, A., (1991), "Taxation and Kalecki's Distribution Factors", *Journal of Post Keynesian Economics*, Vol. 4, No. 13, pp. 583-594.
- Lamarie, A. J., and Mair, D., (2003a), "The Effects of Taxation in a Kaleckian Growth Model", *Metroeconomica*, Vol. 54, No. 2-3, pp. 326-345.
- Lamarie, A. J., and Mair, D., (2003b), "Fiscal Policy and the Scottish Economy", paper prepared to be presented in the conference of *Economics of Devolution*, University of Cardiff, (June 2003), pp. 1-18.
- Lamarie, A. J., and Mair, D., (1996), "Taxation and Kalecki's theory of the business cycle" *Cambridge Journal of Economics*, Vol. 20, No. 4, pp. 451-464.
- Lavoie, M., (2003), "Kaleckian Effective Demand and Sraffian Normal Prices towards a reconciliation", *Review of Political Economy*, Vol. 15, No. 1, pp. 53-74.
- Lavoie, M., (2002), "The Kaleckian Growth model with target return pricing and conflict inflation", in M. Setterfield, (eds.), *The Economics of Demand-led Growth*, Edward Elgar, Cheltenham, pp. 172-788.

- Lavoie, M., (1996), "Real wages, employment and the structure of the aggregate demand curve in a Kaleckian short-run model", *Journal of Post Keynesian Economics*, Vol. 19, No. 2, pp. 275-288.
- Lavoie, M., (1995), "Interest rates in post-Keynesian models of growth and distribution", *Metroeconomica*, Vol. 46, No. 2, pp. 146-177.
- Lavoie, M., (1992), *Foundations of Post Keynesian Economic Analysis*, Edward Elgar, Aldershot.
- Lavoie, M., Rodriguez, G., Seccareccia, M., (2004), "Similarities and Discrepancies in Post-Keynesian and Marxist Theories of Investment: A theoretical and Empirical Investigation", *International Review of Applied Economics*, Vol. 18, No. 2, pp. 127-149.
- Layard, R., and Nickell, S., (1986), "Unemployment in Britain", *Economica*, Vol. 53, No. 210, Supplement: Unemployment, pp. 121-170.
- Layard, R., Nickell, S., and Jackman, R., (1991), *Unemployment: Macroeconomic Performance and the Labour Market*, Oxford: Oxford University Press.
- Lilien, D. M., (1982), "Sectoral Shifts and Cyclical Unemployment", *Journal of Political Economy*, Vol. 90, No. 4, pp. 777-794.
- Lindbeck, A., and Snower, D. J., (1988), "Long-Term Unemployment and Macroeconomic Policy", *American economic Review*, Vol. 78, No. 2, pp. 38-43.
- Lipsey, R. G., (1960), "The Relation between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1862-1957: A Further Analysis", *Economica*, Vol. 27, No. 105, pp. 1-31.
- Lucas, R. E., (1976), "Econometric Policy Evaluation: A Critique", *Carnegie-Rochester Conference Series of Public Policy*, Vol. 1, No. 1, pp. 19-46.

- Lucas, R. E., (1975), "An Equilibrium Model of the Business Cycle", *Journal of Political Economy*, Vol. 83, No. 6, pp. 1113-1144.
- Lucas, R. E., (1973), "Some International Evidence on Output-Inflation Tradeoffs", *American Economic Review*, Vol. 63, No. 3, pp. 326-334.
- Lucas, R. E., (1972), "Expectations and the Neutrality of Money", *Journal of Economic Theory*, Vol. 4, No. 2, pp. 103-124.
- Lucas, R.E., and Rapping, L.A., (1969), "Real Wages, Employment and Inflation", *Journal of Political Economy*, Vol. 77, No. 5, pp. 721-754.
- Mair, D., Courvisanos, J., and Lamarie, A., (2008), "Tax Policy and Innovation: A Search for Common Ground", paper prepared to be presented in "Research Network Macroeconomics and Macroeconomic Policies", 31/10-1/1, Berlin, pp. 1-15.
- Malley, J., and Moutos, T., (2001), "Capital Accumulation and unemployment: a tale of two 'continents'", *Scandinavian Journal of Economics*, Vol. 103, No. 1, pp. 79-99.
- Mankiw, G. N., (2001), "The Inexorable and Mysterious Trade-off between Inflation and Unemployment", *Economic Journal*, Vol. 111, No. 471, pp. 45-61.
- Mankiw, G. N., (1990), "A Quick Refresher Course in Macroeconomics", *Journal of Economic Literature*, Vol. 28, No. 4, pp. 1645-1660.
- Mankiw, G. N., (1985), "Small Menu Costs and Large Business Circles: A Macroeconomic Model of Monopoly", *Quarterly Journal of Economics*, Vol. 100, No. 2, pp. 239-53.
- Marglin, S. A., (1984), "Growth, distribution and inflation: a centennial synthesis", *Cambridge Journal of Economics*, Vol. 8, No. 2, pp. 115-144.
- McCallum, B. T., (1985), "Credibility and monetary policy", Proceedings, Federal Reserve Bank of Kansas City, pp. 105-135.

- McCallum B. T., (1984), "Monetarist Rules in the Light of Recent Experience", *American Economic Review*, Vol. 74, No. 2, pp. 388-391.
- McCallum B. T., (1980), "Rational Expectations and Macroeconomic Stabilization Policy: An Overview", *Journal of Money, Credit and Banking*, Vol. 12, No. 4, pp. 716-746.
- McDonald, I. M., (1995), "Models of the range o equilibria", in R. Cross (eds), *The Natural Rate of Unemployment*, Cambridge University Press, pp. 101-152.
- McDonald, I. M., and Solow, R. M., (1981), "Wage Bargaining and Employment", *American Economic Review*, Vol. 71, No. 5, pp. 896-908.
- Miaouli, N., (2001), "Employment and Capital Accumulation in unionized labour markets", *International Review of Applied Economics*, Vol. 15, No. 1, pp. 5-30.
- Minsky, H. P., (1992), "The Financial Instability Hypothesis", *Jerome Levy Economics Institute of Bard College*, Working Paper, No.74, pp. 1-9.
- Mitchell, W., and Bill, A., (2004), "The real problem with inflation problem", *Centre of Full Employment and Equity*, University of Newcastle, Australia, Working Paper No. 04-04, pp. 2-55, Available at: <http://e1.newcastle.edu.au/coffee/pubs/wp/2004/04-04.pdf>.
- Modigliani, F., and Papademos, L., (1975), "Targets for Monetary Policy in the Coming Year", *Brooking Papers on Economic Activity*, Vol. 1975, No. 1, pp. 141-165.
- Moore, B. J., (1989), "The endogeneity of credit money", *Review of Political Economy*, Vol. 1, No. 1, pp. 65-93.
- Mott, T., (2002), "Longer-run aspects of Kaleckian macroeconomics", in M. Setterfield, (eds.), *The Economics of Demand-led Growth*, Edward Elgar, Cheltenham, pp. 153-175.

- Mott, T., (1989), "The Structure of Class Conflict in a Kaleckian-Keynesian Model", *Jerome Levy Economic Institute of Bard College*, Working Paper No. 21, pp. 1-34.
- Mott, T., and Slattery, E., (1994), "Tax Incidence and macroeconomic effects in a Kaleckian model when profits finance investment and prices may respond to taxes", *Journal of Post Keynesian Economics*, Vol. 16, No. 3, pp.391-409.
- Murphy, K. M., and Topel, R. M., (1997), "Unemployment and Non-employment", *American Economic Review*, Vol. 87, No. 2, pp. 295-300.
- Muth, J. F., (1961), "Rational Expectations and the Theory of Price Movements", *Econometrica*, Vol. 29, No. 2, pp. 315-335.
- Naastepad, R., and Storm, S., (2006), "OECD Demand Regimes (1960-2000)", *Post Keynesian Journal of Economics*, Vol. 29, No. 2, pp. 213-248.
- Newell, A., and Symons, J. V., (1987), "Corporatism Laissez-Faire, and the Rise in Unemployment", *European Economic Review*, Vol. 31, No. 3, pp. 567-601.
- Nickell, S., (1998), "Unemployment: Questions and Some Answers", *Economic Journal*, Vol. 108, No. 448, pp. 802-816.
- Nickell, S., (1997), "Unemployment and Labour Market rigidities: Europe versus North America", *Journal of Economic Perspectives*, Vol. 11, No. 3, pp. 55-74.
- Nickell, S., (1990), "Unemployment: A Survey", *Economic Journal*, Vol. 100, No. 401, pp. 391-439.
- Osberg, L., (1996a), "Digging a Hole or Laying the Foundations? The Objectives of Macroeconomic Policy in Canada", in B. K. MacLead, and L. Osberg, (eds.), *The Unemployment Crisis*, McGill Queen's University Press, pp. 14-38.
- Osberg, L., (1996b), "Unemployment Insurance and Unemployment-Revisited", in B. K. MacLead, and L. Osberg, (eds.), *The Unemployment Crisis*, McGill Queen's University Press, pp. 75-106.

- Ossama, M., Curtis, E., and Jagdish, H., (2005), "On the Evidence of Non-Linear Structure in Canadian Unemployment", *Applied Economics Letters*, Vol. 12, No. 2, pp. 101-104.
- Palacio-Vera, A., (2005), "The 'modern' view of macroeconomics: some critical reflections", *Cambridge Journal of Economics*, Vol. 29, No. 5, pp. 747-767.
- Palacio-Vera, A., Martinez-Canete A-R., Marquez, de la C. E., and Aguilar, I. P-S., (2006), "Capital Stock and Unemployment: Searching for the Missing-Link", *Levy Economic Institute of Bard College*, Working Paper No. 475, pp. 1-31.
- Palley, T. I., (2007), "Financialization: What it is and Why it Matters?", Working Papers Series, No, 153, *Political Economy Research Institute*, pp. 1-37.
- Park, M.-S., (1997), "Accumulation, Capacity Utilization and Distribution", *Contribution to Political Economy*, Vol. 16, No. 1, pp. 87-101.
- Parkin, M., (1986), "The Output-Inflation Trade-Off When Prices Are Costly to Change", *Journal of Political Economy*, Vol. 94, No. 1, pp. 200-224.
- Perasan, H., and Smith, R., (1995), "The natural rate hypothesis and its testable implications", in R. Cross, (eds), *The Natural Rate of Unemployment*, Cambridge: Cambridge University Press, pp. 203-230.
- Phelps, E. S., (1995), "The origins and further developments of the natural rate of unemployment", in R. Cross, (eds), *The Natural Rate of Unemployment*, Cambridge: Cambridge University Press, pp. 15-31.
- Phelps, E. S., (1968), "Money-Wage Dynamics and Labor-Market Equilibrium", *Journal of Political Economy*, Vol. 76, No. 4, pp. 678-711.
- Phelps, E. S., (1967), "Phillips Curves, Expectations of Inflation and Optimal Unemployment over Time", *Economica*, Vol. 34, No. 135, pp. 254-281.

- Phelps, E. S., and Zoera, G., (1998), "Natural-Rate Theory and OECD Unemployment", *Economic Journal*, Vol. 108, No. 448, pp. 782-801.
- Phillips, W.A., (1958), "The Relationship between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861-1957", *Economica*, Vol. 25, No. 100, pp. 283-299.
- Pollin, R., (1998), "The 'Reverse Army of Labour' and the 'Natural Rate of Unemployment': Can Marx, Kalecki, Friedman and Wall Street All Be Wrong?", *Review of Radical Political Economy*, Vol. 30, No. 3, pp.1-13.
- Poterba, M. J., (1987), "Tax Policy and Corporate Savings", *Brookings Papers on Economic Activity*, Vol. 18, No. 1987, pp. 455-516.
- Rogerson, R., (1997), "Theory Ahead of Language in the Economics of Unemployment", *Journal of Economic Perspective*, Vol. 11, No. 1, pp. 73-92.
- Romer, D., (1993), "The New Keynesian Synthesis", *Journal of Economic Perspectives*, Vol. 7, No. 1, pp. 5-22.
- Romer, D., (1990), "Staggered Price Setting with Endogenous Frequency of Adjustment", *Economic Letters*, Vol. 32, No. 3, pp. 205-210.
- Romer, C. D., and Romer, D. H., (1999), "Monetary policy and the well being of the poor", *Economic Review, Federal Reserve of Kansas City*, First Quarter (Q1), pp. 21-49.
- Rowthorn, R. E., (1999), "Unemployment, Wage Bargaining and Capital-Labour Substitution", *Cambridge Journal of Economics*, Vol. 23, No. 4, pp. 413-425.
- Rowthorn, R. E., (1995), "Capital Formation and Unemployment", *Oxford Review of Economic Policy*, Vol. 11, No. 1, pp. 26-39.
- Rowthorn, R. E., (1981), "Demand, Real Wages and Economic Growth", *Thames Papers in Political Economy*, Autumn, pp. 1-39.

- Rowthorn, R. E., (1977), "Conflict, Inflation and Money", *Cambridge Journal of Economics*, Vol. 1, No. 4, pp. 215-239.
- Samuelson, P. A., and Solow, R. M., (1960), "Analytical Aspects of Anti-Inflation Policy", *American Economic Review*, Vol. 50, No. 2, pp. 177-194.
- Sarantis, N., (1993), "Distribution, Aggregate Demand and Unemployment in the OECD Countries", *Economic Journal*, Vol. 103, No. 417, pp. 459-467.
- Sargent, T. J., (1972), "Anticipated Inflation and the Nominal Interest Rate", *Quarterly Journal of Economics*, Vol. 86, No. 2, pp. 212-225.
- Sargent, T. J., Fand, D., and Goldfeld, S., (1973), "Recent Expectations, the Real Rate of Interest, and the Natural Rate of Unemployment", *Brookings Papers on Economic Activity*, Vol. 1973, No. 2, pp. 429-480.
- Sargent, T. J., and Wallace, N., (1976), "Rational Expectations and the Theory of Economic Policy", *Journal of Monetary Economics*, Vol. 2, No. 2, pp. 169-183.
- Sargent, T.J., and Wallace, N., (1975), "Rational Expectations, the Optimal Monetary Instrument, and the Optimal Money Supply Rule", *Journal of Political Economy*, Vol. 83, No. 2, pp. 241-254.
- Sawyer, M. C., (2007a), "Kalecki on the causes of unemployment and policies to achieve full employment", *University of Leeds*, Available at: <http://129.11.89.221/MKB/MalcolmSawyer/kalecki.pdf>, pp. 1-22.
- Sawyer, M. C., (2007b), "Seeking to reformulate macroeconomic policies", *University of Leeds*, Available at: <http://www.ubourgogne.fr/CEMF/doccollo/Malcom%20SAWYER.doc>, pp. 1-23.
- Sawyer, M. C., (2004), "The NAIRU, Labour Market Flexibility and Full Employment", in J. Stanford, and L. F. Vosko, (eds), *Challenging the Market: The*

Structure to Regulate Work and Income, Montreal: McGill-Queen's University Press, pp. 33-50.

Sawyer, M. C. (2002), "The NAIRU, Aggregate Demand and Investment", *Metroeconomica*, Vol. 53, No. 1, pp. 66-94.

Sawyer, M. C., (2001), "The NAIRU: A critical appraisal", in P. Arestis and M. C. Sawyer, (eds), *Money, Finance and Capitalist development*, Northampton Mass Edward Elgar Publishing, pp. 220-254.

Sawyer, M. C., (1998), "New Keynesian Macroeconomics and the Determination of Employment and Wages", in R. J. Rotheim, (eds), *New Keynesian Economics/Post Keynesian Alternatives*, Routledge, Taylor & Francis Group, pp. 118-133.

Sawyer, M. C. (1997a), "Aggregate Demand, Investment and the NAIRU", *Jerome Levy Economics Institute of the Bard College*, Working Paper No. 202, pp. 1-23.

Sawyer, M.C., (1997b), "Income Distribution, Macroeconomic Analysis and Barriers to Full Employment", *Jerome Levy Economics Institute of Bard College*, Working Paper No. 211. pp. 1-20.

Sawyer, M. C., (1992), "On the Origins of Post Keynesian Pricing Theory and Macroeconomics", in P. Arestis, and V. Chick, (eds.), *Recent Developments in Post Keynesian Economics*, Edward Elgar, pp. 64-81.

Sawyer, M. C., (1987), "The Political Economy of the Phillips', *Thames Papers in Political Economy*, Summer 1987, pp. 1-22.

Sawyer, M. C., (1982), *Macro-Economics in Question: The Keynesian-monetarist orthodoxies and the Kaleckian Alternative*, Wheatsheaf Books, Armonk N.Y.: ME. Sharpe.

Sen A., and Dutt A. K., (1995), "Wage Bargaining, imperfect competition and the markup: Optimizing microfoundations", *Economic Letters*, Vol. 48, No. 1, pp. 15-20.

Setterfield, M. A., (2006), "Is inflation targeting compatible with Post Keynesian Economics?", *Journal of Post Keynesian Economics*, Vol. 28, No. 4, pp. 653-671.

Setterfield, M. A., (2003), "Supply and Demand in the Theory of Long-run Growth: introduction to a symposium on demand led growth", *Review of Political Economy*, Vol. 15, No. 1, pp. 23-32.

Setterfield, M. A., (1996), "Using the NAIRU as a Basis for Macroeconomic Policy: An Evaluation", in B. K. MacLead, and L. Osberg, (eds), *The Unemployment Crisis*, McGill Queen's University Press, pp. 56-72.

Setterfield, M. A., and Lima, G. T., (2008), "Inflation targeting and macroeconomic stability in a Post Keynesian Economy", *Journal of Post Keynesian Economics*, Vol. 30, No. 3, pp. 435-461.

Setterfield, M. A., Gordon, D. V., and Osberg, L. (1992), "Searching for a will o' the wisp: An empirical study of the NAIRU in Canada", *European Economic Review*, Vol. 36, No. 1, pp. 56-72.

Siebert, H., (1997), "Labour Market Rigidities: At the Root of Unemployment in Europe", *Journal of Economic Perspectives*, Vol. 11, No. 3, pp. 37-54.

Smithin, J., (2002), "Aggregate demand, effective demand and aggregate supply in the open economy", in P. Arestis, M. Desai, and S. Dow, (eds.), *Money, Macroeconomics and Keynes: Essays in Honour of Victoria Chick* (Vol. 1), Routledge, UK, pp. 150-62.

Smithin, J., (1996), "Real Interest Rates, Inflation and Unemployment, in MacLead B. K., and Osberg, L., (eds.) *The Unemployment Crisis*, McGill Queen's University Press, pp. 39-55.

Snowdon, B., and Vane, H. R., (2005), *“Modern Macroeconomics: Its Origins, Development and Current State”*, Edward Elgar: Cheltenham, UK, Northampton, MA, USA.

Sockice, D., (1990), “Wage Determination: The changing role of Institutions in Advanced Industrialized Countries”, *Oxford Review of Economic Policy*, Vol. 6, No. 4, pp. 36-61.

Solow, R. M., (1998), “How Cautious Must the Fed Be?”, in B. M. Friedman, (eds.), *Inflation, Unemployment and Monetary Policy*, MIT Press, pp. 1-28.

Solow, R. M., (1986), “Unemployment: Getting the Questions Right”, *Economica*, Vol. 53, No. 210, Supplement: Unemployment, pp. 23-34.

Solow, R. M., (1980), “On theories of unemployment”, *American Economic Review*, Vol. 70, No. 1, pp. 1-11.

Solow, R. M., (1979a), “Alternatively Approaches to Macroeconomic Theory: A Partial View”, *Canadian Journal of Economics*, Vol. 12, No.3, pp. 339-354.

Solow, R. M., (1979b), “Another Possible Source of Wage Stickiness”, *Journal of Macroeconomics*, Vol. 1, No. 1, pp. 79-82.

Staiger, D., Stock, J. H., Watchon, M. W., (1997a), “The NAIRU, Unemployment and Monetary Policy”, *Journal of Economic Perspectives*, Vol. 11, No. 1, pp. 33-49.

Staiger, D., Stock, J. H., and Watchon, M. W., (1997b), “How Precise Are Estimates of the Natural Rate of Unemployment”, in C.D. Romer, and D. H. Romer (eds.), *Reducing Inflation: Motivation and Strategy*, National Bureau of Economic Research Studies in Business Cycles, Vol. 30, The University of Chicago Press, pp. 195-246.

Stiglitz, J. E., (1997), “Reflections on the Natural Rate Hypothesis”, *Journal of Economic Perspectives*, Vol. 11, No. 1, pp. 3-11.

- Stiglitz, J. E., and Shapiro C., (1984), "Equilibrium Unemployment as a Wage Discipline Device", *American Economic Review*, Vol. 74, No. 3, pp. 433-444.
- Stock, J. H., and Watchon, M. W., (1999), "Forecasting Inflation," *Journal of Monetary Economics*, Vol. 44, No. 2, pp. 293-335.
- Stock, J. H., and Watchon, M. W., (1996), "Evidence on Structural Instability in Macroeconomic Time Series Relations", *Journal of Business and Economic Statistics*, Vol. 14, No. 1, pp. 11-29.
- Stockhammer, E., (2007a), "Is The NAIRU a Monetarist, New Keynesian, Post Keynesian or a Marxist Theory?", *Vienna Department of Economics & B.A. Department of Economics Working Paper Series*, Working Paper No.89, pp. 1-36.
- Stockhammer, E., (2007b), "Some Stylized Facts on the Finance-Dominated Accumulation Regime", *Political Economy Research Institute (PERI), University of Massachusetts Amherst*, Working Paper Series No. 142, pp. 1-23.
- Stockhammer, E., (2004a), "Explaining European Unemployment: testing the NAIRU hypothesis and a Keynesian approach", *International Review of Applied Economics*, Vol. 18, No. 1, pp. 3-24.
- Stockhammer, E., (2004b), "Is there an equilibrium rate of unemployment in the long run?", *Review of Political Economy*, Vol. 16, No. 1, pp. 59-77.
- Stockhammer, E., (2004c), "Financialization and the slowdown of accumulation", *Cambridge Journal of Economics*, Vol. 28, No. 5, pp. 719-741.
- Stockhammer E., Onaran O., and Ederer, S., (2007), "Functional income distribution and aggregate demand in the Euro- area", *Vienna University of Economics & B.A. Department of Economics Working Paper Series*, Working Paper No. 102, pp. 1-38.

- Stockhammer, E., and Onaran, Φ ., (2004), "Accumulation, Distribution and Employment: A Structural VAR approach to a Kaleckian Macro- model", *Structural Change and Economic Dynamics*, Vol. 15, No. 4, pp. 421-447.
- Summers, L. H., (1988), "Relative Wages, Efficiency Wages and Keynesian Unemployment", *American Economic Review*, Vol. 78, No. 2, pp. 383-388.
- Summers, L. H., Abraham, K. G., and Watchter, M. L., (1986), "Why Is the Unemployment Rate So Very High near Full Employment?", *Brookings Papers on Economic Activity*, Vol. 1986, No. 2, pp. 339-396.
- Taylor, J. B., (1999), "A Historical Analysis of monetary Policy Rules", in J. B., Taylor, (eds), *Monetary Policy Rules*, NBER- Business circles Series, Vol. 31, University of Chicago Press, Chicago, IL., pp. 319-347.
- Taylor, J. B., (1998), "Monetary Policy Guidelines for Employment and Inflation", in B. M., Friedman, (eds.), *Inflation, Unemployment and Monetary Policy*, MIT Press, pp. 29-54.
- Taylor, J. B., (1995), "The Monetary Transmission Mechanisms: An Empirical Framework", *Journal of Economic Perspective*, Vol. 9, No. 4, pp. 11-26.
- Taylor, J. B., (1993), "Discretion versus policy rules in practice", *Carnegie-Rochester Conference Series on Public Policy*, Vol. 39, No. 1, pp. 195-214.
- Taylor, J. B., (1980), "Aggregate Dynamics and Staggered Contracts", *Journal of Political Economy*, Vol. 88, No. 1, pp. 1-23.
- Taylor, J. B., and Phelps, E. S., (1977), "Stabilizing Powers of Monetary Policy under Rational Expectations", *Journal of Political Economy*, Vol. 85, No.1, pp.163-190.
- Taylor, L., (1985), "A stagnationist model of economics growth", *Cambridge Journal of Economics*, Vol. 9, No. 4, pp. 381-394.

- Tobin, J., (1999), "Monetary Policy: Recent Theory and Practice", *Cowles Foundation For Research in Economics at Yale University*, Cowles Foundation Paper No. 975, pp. 1-10.
- Tobin, J., (1995), "The natural rate as new classical macroeconomics", in R. Cross (eds), *The Natural Rate of Unemployment*, Cambridge University Press, pp. 32-42.
- Tobin, J., (1993), "Price Flexibility and Output Stability: An Old Keynesian View", *Journal of Economic Perspectives*, Vol. 7, No. 1, pp. 45-65.
- Tobin, J., (1980), "Stabilization Policy Ten Years After", *Broking Papers on Economic Activity*, Vol. 1980, No. 1, pp. 19-89.
- Tobin, J., (1972), "Inflation and Unemployment", *American Economic Review*, Vol. 62, No.1, pp. 1-18.
- Verbeek, M., (2007), *A guide to Modern Econometrics*, 2nd Edition, John Willey and Sons, New York.
- Wilkinson, F., (1997), "Changes in the notions of unemployment and what that means for the poor" in P. Arestis, G. Plama, and M. Saywer, (eds.), *Markets, Unemployment and Economic Policy, Essays in honour of Geoff Harcourt, Vol. 2*, Routledge Frontiers of Political Economy, pp. 364-376.
- Winnet, A., (1992), "Some Semantics of Endogeneity", in P. Arestis, and V. Chick, (eds.), *Recent Developments in Post Keynesian Economics*, London: Edward Elgar, pp. 47-63.
- Yellen, J. L., (1984), "Efficiency Wage Models of Unemployment", *American Economic Review*, Vol. 74, No. 2, pp. 200-205.
- Zannoni, D. C., and McKenna, E. J., (2007), "The right to a job: a post Keynesian perspective", *Journal of Post Keynesian Economics*, Vol. 29, No. 4, pp. 556-571.