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«THE EFFECTS OF COMPETITIVE PRESSURE ON FIRMS' PRICE-COST MARGINS: EVIDENCE FROM GREEK FOOD INDUSTRY»

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ΕΠΙΒΛΕΠΩΝ ΚΑΘΗΓΗΤΗΣ: ΒΑΓΓΕΛΗΣ ΤΖΟΥΒΕΛΕΚΑΣ

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Abstract

In this paper we have used representative panel data on 1169 Greek firms of food industry to analyze how price-cost margins vary with domestic competitive pressure, with the introduction of euro in 2002 in Greece and the last oil crisis that begun in 2000.The price-cost margin, also known as the Lerner index of monopoly power, gives an indication of how competitive an industry is. Lacking of the potential to observe marginal costs, we use o a method proposed by Roeger(1995)who starts from the Hall(1988)approach, estimating total factor productivity, and shows that the presence of imperfect competition requires an adjustment in the computation of TFP.

In order to obtain an estimation of the price-cost margin, we use information on sales growth, growth in the wage bill, growth in material costs, and growth in the value of capital.

Concentration in sectors seems to be the main reason explaining higher price cost margins while euro and oil crisis impact on the latter seems to be less important.

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I.Introduction

This paper is motivated by the growing public discontent in Greece surrounding the growing prices of EMU and also the disappointment and frustration over the passing of the oil price increases as a result of the oil crises of 2000. Furthermore the aim of this paper is to study and analyze the impact of domestic competition on markups in food industry.

In most of the EU member states there is a constant discomfort concerning rising prices as a euro introduction consequence. Greece is an example of such a discomfort. In particular public disappointment over the euro is increasingly prevalent. That can be clearly seen in the most recent Eurobarometer survey according to which only 49% of Greeks remain in favour of the European Monetary Union, versus the 59% average for the EU. This survey ranges Greece among the nations most opposed to euro(Pelagidis and Toay, 2007).

Furthermore, there is a growing discomfort of consumers on how the increases of oil prices since 2000 and on, are passed on the prices of goods and so increasing the latter's prices, decrease the consumers' purchasing power. In 2000 the oil price increased to 27,6 $ from 17,48$ in year 1999. Ever since the price of oil follows an upward drift, provoking a great frustration at general public. The purpose of this study is to examine if there is a connection between the increase of prices in Greek food industry and the fluctuation of the latter's price-cost margins.

Finally we aim to study the effect of the sectors' concentration on the configuration of price-cost margins. In particular this paper studies whether increased competitive pressure has been associated with changing price cost-margins.

It is particularly interesting to take the price-cost margin(P-c)/P, with P the product price and c the marginal cost of production, as a measure of performance. The price-cost margin is also known as the Lerner index of monopoly power and gives an indication of how of competitive an industry is in terms of pricing close to marginal costs. Under perfect competition, the Lerner index is zero. A difficulty in using this measure, however, is that marginal costs are not observable. We therefore estimate price-cost margins using a method proposed by Roeger(1995)who starts from Hall(1988), showing that the presence of imperfect competition requires a markup adjustment in the primal Solow residual. The Hall(1988)type of approach

suffers from a potential simultaneity bias between output growth in the input factors. In order to overcome this problem Roeger subtracts the dual Solow residual from the primal(Konings, Van Cayseele, Warzynski, 2005). This implies that price-cost margins can be estimated consistently, without having to appeal to instrumental variables. Although the present method allows us to use nominal value of data on sales and input factors, we deflate them, since there is information on the appropriate price deflator.

In order to estimate the Lerner index, data on 13 of the 30 sectors of the Greek food industry are used. The nominal value of data on sales and input factors are retrieved from the balance sheets of 1969 firms for a period of ten years(1997-2007).

Our main findings can be summarized as follows. We find that the introduction of euro as well as the oil crisis, do increase the price-cost margins but not in such point to justify the consumers' frustration. Vice-versa the concentration per sector gives a satisfactory explanation why the prices are constantly increasing. Domestic competition, measured by Herfindahl index, increases the price-cost margins notably.

The rest of this paper is organized as follows. The next section describes the econometric approach. Section III discuses the data used, and section IV gives the results and the last section reports the conclusions of the present study.

II.Background and Econometric Model

The methodology used in this study is the one proposed by Roeger(1995), which relies on Hall's approach(1988)who estimates monopolistic markups in the American economy using aggregated sectoral data with the assumption of constant returns to scale. Assuming two production factors(labor and capital), the empirical specification of Hall leads to an equation where the dependent variable is a change in the logarithm of the volume of production per unit of capital and independent variable is a change in the logarithm of employment per unit of capital, multiplied by the labor share in the total production cost. The estimated slope equals to the monopolistic markup expressed as a percentage of marginal cost. But this method suffers a problem of endogeneity since there is a correlation between the error term and the depended variables. In order to estimate the markup, Hall uses instrumental variables which influence the changes in employment and demand and at the same time they do not affect productivity. The use of instrumental variables that relate to demand is necessary to separate the supply –related fluctuations of the economy affecting the unobserved productivity term. However identification of appropriate instrumental variables is problematic.

Roeger(1995)proposes an alternative methodology to estimate consistently price cost margins, which allows for elimination of the unobserved productivity term from the econometric model. This solves the problem of endogeneity, since the unobserved productivity term, which may be correlated with the input factors (capital, labor and materials), cancels out. Estimation based on the difference between primal(calculated from the production function)Solow residual and dual(derived from the cost function)can be carried out using ordinary least squares.

We start from a standard production function $Q= \Theta_{it} \text{ X } F(N_{it}, K_{it} , M_{it})$where i is an index of the firm, t is a time index, Q is output, F is a production function, Θ_{it} is the productivity term(or firm-level efficiency), N is labor input, K is capital input and M is material input. Assuming constant returns to scale and perfect competition, the growth rate of output(the Solow output decomposition)is;

$$\frac{\Delta Q_{it}}{Qit} = a_{Nit} \frac{\Delta \mathrm{N}_{it}}{\mathrm{N}_{it}} + a_{Kit} \frac{\Delta \mathrm{K}_{it}}{K_{it}} + a_{Mit} \frac{\Delta M_{it}}{M_{it}} + \theta_{it} \quad (1)$$

.

where $\alpha_{jit} = P_{it} J_{it} / P_{it} Q_{it}$ (J=N, K, M) $P_{J it}$ is the cost share of inputs in turnover. $P_{J it}$ stands for the unit cost of input factor J and $\theta_{it} = \Delta\Theta_{it} / \Theta_{it}$.

$$\Leftrightarrow \frac{\Delta Q_{it}}{Q_{it}} = a_{Nit} \frac{\Delta N_{it}}{N_{it}} + a_{Mit} \frac{\Delta M_{it}}{M_{it}} + (1 - a_{Nit} - a_{Mit}) \frac{\Delta K_{it}}{K_{it}} + \theta_{it} \quad (1a)$$

since constant returns to scale are assumed. Under imperfect competition (1a) becomes(Hall,1988) ;

$$\Leftrightarrow \frac{\Delta Q_{it}}{Q_{it}} = \mu a_{Nit} \frac{\Delta N_{it}}{N_{it}} + \mu a_{Mit} \frac{\Delta M_{it}}{M_{it}} + \mu(1 - a_{Nit} - a_{Mit}) \frac{\Delta K_{it}}{K_{it}} + \theta_{it} \quad (2)$$

where μ=P/c is the markup f price over marginal cost. Rearranging the equation(2)we can write as following;

$$\frac{\Delta Q_{it}}{Q_{it}} - \alpha_{Nit} \frac{\Delta N_{it}}{N_{it}} - \alpha_{Mit} \frac{\Delta M_{it}}{M_{it}} - (1 - a_{Nit} - \alpha_{Mit}) \frac{\Delta K_{it}}{K_{it}} + \theta_{it} =$$

$$= \beta_{it} \left(\frac{\Delta Q_{it}}{Q_{it}} - \frac{\Delta K_{it}}{K_{it}}\right) + (1 - \beta_{it}) \theta_{it} \quad (3)$$

where $\beta_{it} = \frac{P_{it} - c_{it}}{P_{it}} = 1 - \frac{1}{\mu}$ is the price-cost margin, or Lerner index, of

firm i at time t, in which c_{it} stands for the marginal cost of firm i in at time t.

As told before, the productivity term θ_{it} is probably correlated with the input factors K, M and N. To deal with this potential endogeneity of the error term we follow Roeger's(1995)methodology, obtaining a similar equation to(3) derived from the so called dual Solow residual, as a function of prices, input compensation and technical progress.

$$a_{Nit} \frac{\Delta P_{Nit}}{P_{Nit}} + a_{Mit} \frac{\Delta P_{Mit}}{P_{Mit}} + (1 - a_{Nit} - a_{Mit}) \frac{\Delta P_{Kit}}{\Delta P_{Kit}} - \frac{\Delta P_{it}}{P_{it}} =$$

$$= -\beta_{it} \left(\frac{\Delta P_{it}}{P_{it}} - \frac{\Delta P_{Kit}}{P_{Kit}}\right) + (1 - \beta_{it}) \theta_{it} \quad (4)$$

If we subtract equation (4) from equation (3) we are led to;

$$\left(\frac{\Delta Q_{it}}{Q_{it}} + \frac{\Delta P_{it}}{P_{it}}\right) - \alpha_{Nit.} \left(\frac{\Delta N_{it}}{N_{it}} + \frac{\Delta P_{Nit}}{P_{Nit}}\right) - \alpha_{Mit} \left(\frac{\Delta M_{it}}{M_{it}} + \frac{\Delta P_{Mit}}{P_{Mit}}\right) - (1 - \alpha_{Nit.} - \alpha_{Mit}) \left(\frac{\Delta K_{it}}{K_{it}} + \frac{\Delta P_{Kit}}{P_{Kit}}\right)$$

$$= \beta_{it} \left[\left(\frac{\Delta Q_{it}}{Q_{it}} + \frac{\Delta P_{it}}{P_{it}}\right) - \left(\frac{\Delta K_{it}}{K_{it}} + \frac{\Delta P_{Kit}}{P_{Kit}}\right)\right]$$

(5)

As we can see the error term capturing unobserved productivity shocks has cancelled out and now β, which stands for Lerner index, can be estimated consistently.

To obtain an estimation of the price-cost margin we need information on sales growth, growth in the wage bill, growth in material costs, and growth in the value of capital. The firms' balance sheets provide us the data on these variables. For capital we use the book value of capital fixed assets taken also taken from the balance sheets. To calculate the rental price of capital (P_{Kit})we follow Hall and Jorgenson(1967)and Hsieh(2002), taking

$$P_K = P_I\left(r_{it} + \delta_{it}\right)$$

where P_I stands for stands for the index of prices in buildings construction, R_{it} stands for the real interest rate for each period, and δ stands for the depreciation rate, measured at the firm level.

Rewriting the left-hand side of equation (5) as Δy (the difference between the primal and dual Solow residual, and the right-hand side as Δx, and adding a white noise error term ε_{it}.

We also assume that the markups are the same for all firms within the same sector. It is not possible to estimate a markup for each firm separately, because we would not have enough degrees of freedom.

Our baseline model is;

$$\Delta y_{it} = \beta_{it} \Delta x_{it} + \varepsilon_{it}$$

We also use baseline model under three different specifications , to examine the effects of the euro introduction, the oil crisis and the concentration per sector.

- $\Delta y_{it} = \beta_{1it} \Delta x + \beta_{2it} D_E + \varepsilon_{it}$

where D_E is a dummy equal to zero for the years before 2002, when euro replaced the domestic currency, and equals to 1 for the years from 2002 and on.

- $\Delta y_{it} = \beta_{1it} \Delta x + \beta_{2it} D_O + \varepsilon_{it}$

where D_O is a dummy equal to zero for the years before 2000 when the oil crisis occurred, and gets to be 1 for the years from 2000 and on.

- $\Delta y_{it} = \beta_{1it} \Delta x + \beta_{2it} H_{it} + \varepsilon_{it}$

where H_{it} stands for the Herfindahl index of concentration in sector j at time t, measured at the four-digit level NACE level of industrial classification. Herfindahl index is a measure of domestic concentration.

According to Roeger(1995), the error term should in principle be zero under the maintain assumption that factors of production can be adjusted instantaneously and all variables in equation (5) can be measured without error. But Roeger points out a number of reasons why the error term should not be zero, without causing any problem to our estimations. An important reason for a non zero error term is classical measurement errors, such as a mismeasurement of labour input. There is also a probability of measurement error in the capital stock and there are two reasons for that; firstly, because of simplifying assumptions concerning depreciation, which are usually regarded as negligible. However, to calculate the rental value of capital we use the actual depreciation rate at the firm level. Secondly because we consider tangible fixed assets as a measure of for capital. However this error only adds noise to the regression without causing any bias for the mark-ups, according to Roeger.

Finally, since we use data retrieved from the firms' balance sheets, we cannot have adequate information associated with the financial flows of individual products. Thereby in cases of multi- productional firms, we assume that if the firm has product market power over one of its product, it will have market power over its other products as well.

III. Data

The data used in this study are derived from ICAP's database (www.findbiz.gr). The used data are retrieved from the balance sheets of 1169 firms, classified in the larger(more than 50 firms per sector) thirteen sectors of Greek food industry(table 1)for a period of eleven years, from 1997 to 2007.

TABLE1. SECTORS OF GREEK FOOD INDUSTRY

NACE 4-DIGIT CODE	SECTOR
1511	MEAT PRODUCTION AND CONSERVATION
1513	COOKED PORK AND POULTRY MEAT PRODUCTS
1520	FISH ELABORATION AND CONSERVATION
1533	FRUIT AND COLEWART ELABORATION AND CONSERVATION
1541	UNREFINED OIL AND GREASE PRODUCTION
1542	REFINED OIL AND GREASE PRODUCTION
1551	MILK AND CHEESE PRODUCTION
1561	FLOUR AND MEAL PRODUCTION
1571	FORAGE PRODUCTION
1581	BREAD AND PASTRY
1582	CRACKERS AND BISCUIT PRODUCTION-CONSERVED
1584	COCOA, CHOCOLATE PRODUCTION
1587	SPICES' PRODUCTION

The database includes information on sales, labour compensation, materials' cost, tangible fixed assets and their depreciation value. The three-digit Herfindahl index was calculated per sector. Capital's rental value was calculated according to Hall and Jorgenson(1967)and Hsieh(2002). The depreciation rate was computed, in firm level, as the total amount of depreciations in year t divided by tangible fixed assets' value in year t-1. Real was computed as the average per year interest rate for business loans, as retrieved from Bank of Greece's database on bulletins of Conjunctural Indicators, minus the inflation rate based on the Consumer Price Index, retrieved from the General Secretariat of the National Statistical Service of Greece. In the following two tables averages of the needed variables along with Herfindahl Index are presented in tables 2 and 3. In table 2 we present the foresaid averages per year and in table 3 the averages per sector. In table 4 we present the number of firms, whose data were used, per year and sector.

TABLE 2. VARIABLE AVERAGES PER SECTOR

YEAR	CAPITAL'S VALUE	SALES	MATERIALS' COST	LABOR COMPENSATION	HERFINDAHL INDEX
1997	6133926	16113843	7003589	9179497	0.144
1998	5768377	14915795	6594047	8249571	0.132
1999	7472167	13913371	7883612	9609591	0.123
2000	7330414	9554349	7183093	8488245	0.114
2001	7233357	12023114	6753455	7719998	0.125
2002	7036982	11480875	6640026	7324501	0.094
2003	7859958	12166459	6811543	7257440	0.096
2004	8627676	12117278	6872212	7115859	0.102
2005	10620191	10845140	7892106	7892106	0.109
2006	9101341	10419128	7036342	6818425	0.113
2007	9282442	11137095	7072703	6660862	0.144

TABLE 3. VARIABLE AVERAGES PER SECTOR

SECTOR	CAPITAL'S VALUE	SALES	MATERIALS' COST	LABOR COMPENSATION	HERFINDAHL INDEX
1511	4801060	4806155	45838006	215580	0.042
1513	5431414	10547074	7080051	10547074	0.063
1520	4186630	15653413	5939617	376358	0.150
1533	8439704	13892316	9107283	799087	0.133
1541	4157881	8974542	8760768	226072	0.253
1542	4613891	14044926	11651849	387467	0.138
1551	11045437	18063925	13218030	696152	0.111
1561	8038062	16022161	10444810	512684	0.097
1571	8400096	13303529	11848019	834957	0.098
1581	4955150	7418691	4286918	453394	0.143
1582	9099674	12244223	7556516	736985	0.091
1584	7860621	10067461	7067521	7846918	0.109
1587	3604264	5949372	4535840	594128	0.106

TABLE 4. NUMBER OF FIRMS PER YEAR AND SECTOR

	1511	1513	1520	1533	1541	1542	1551	1561	1571	1581	1582	1584	1587
1997	26	36	27	99	36	45	47	41	39	53	46	35	28
1998	2	42	32	112	46	56	56	49	45	62	57	41	32
1999	40	45	39	126	48	64	68	52	54	73	58	43	36
2000	50	51	41	145	53	73	84	56	60	77	61	43	43
2001	54	55	40	155	55	75	92	58	62	85	68	44	43
2002	56	58	42	167	59	79	96	63	70	94	72	48	46
2003	66	66	43	177	60	80	100	65	73	108	73	48	47
2004	65	70	45	180	61	80	99	66	78	119	78	49	48
2005	66	71	49	181	59	82	102	67	81	121	81	47	49
2006	64	73	50	181	59	82	105	69	85	128	85	51	47
2007	64	72	48	174	56	81	105	68	80	125	83	48	47

IV. RESULTS

Table 5 presents the estimates of price-cost margins for each individual sector of Greek food industry. It is easy to note that price-cost margins are different between sectors, as expected. The average price-cost margin for all the sectors is 0.754. According to the results of our baseline model we observe a relatively high price-cost margin for all the sectors, since the prices of the products exceed the marginal cost by 75%.

TABLE 5. PRICE-COST MARGINS PER SECTOR

4-DIGIT NACE CODE	SECTOR	β_{it}	R^2-ADJUSTED
1511	**MEAT PRODUCTION AND CONSERVATION**	**0.690 (0.015)**	**0.762**
1513	**COOKED PORK AND POULTRY MEAT PRODUCTS**	**0.736 (0.012)**	**0.842**
1520	**FISH ELABORATION AND CONSERVATION**	**0.924 (0.031)**	**0656**
1533	**FRUIT AND COLEWART ELABORATION AND CONSERVATION**	**0.807 (0.008)**	**0.854**
1541	**UNREFINED OIL AND GREASE PRODUCTION**	**0.761 (0.055)**	**0.240**
1542	**REFINED OIL AND GREASE PRODUCTION**	**0.497 (0.045)**	**0.575**
1551	**MILK AND CHEESE PRODUCTION**	**0.814 (0.013)**	**0.783**
1561	**FLOUR AND MEAL PRODUCTION**	**0.766 (0.012)**	**0.849**
1571	**FORAGE PRODUCTION**	**0.646 (0.018)**	**0.617**
1581	**BREAD AND PASTRY**	**0.767 (0.012)**	**0.793**
1582	**CRACKERS AND BISCUIT PRODUCTION-CONSERVED**	**0.780 (0.011)**	**0.866**
1584	**COCOA, CHOCOLATE PRODUCTION**	**0.761 (0.013)**	**0.857**
1587	**SPICES' PRODUCTION**	**0.853(0.021)**	**0.774**

In our further analysis we pool data across sectors and test how the average price-cost margin varies with sector characteristics related to domestic competitive pressure on the one hand and with the international economical simultaneities such as the oil crisis of 2000 and with political decisions such as the introduction in eurozone on the other.

a. The effect of the introduction of euro

Table 6 presents the results of our second model, by which we aim to examine whether the introduction of euro had effects on the mark-ups of each individual studied sector of Greek food industry.

4-DIGIT NACE CODE	SECTOR	β_{1it}	β_{2it}	ESTIMATED PRICE-COST MARGINS	R^2 - ADJ
1511	MEAT PRODUCTION AND CONSERVATION	0,698(0,015)	0,057(0,018)	0,755	0,765
1513	COOKED PORK AND POULTRY MEAT PRODUCTS	0,738(0,012)	0,041(0,008)	0,779	0,848
1520	FISH ELABORATION AND CONSERVATION	0,934(0,031)	0,070(0,041)	1,004	0,657
1533	FRUIT AND COLEWART ELABORATION AND CONSERVATION	0,815(0,008)	0,064(0,009)	0,879	0,858
1541	UNREFINED OIL AND GREASE PRODUCTION	0,765(0,051)	0,039(0,645)	0,804	0,240
1542	REFINED OIL AND GREASE PRODUCTION	0,500(0,015)	0,022(0,020)	0,522	0,576
1551	MILK AND CHEESE PRODUCTION	0,821(0,013)	0,044(0,014)	0,865	0,785
1561	FLOUR AND MEAL PRODUCTION	0,775(0,012)	0,046(0,012)	0,821	0,852
1571	FORAGE PRODUCTION	0,653(0,019)	0,043(0,174)	0,696	0,620
1581	BREAD AND PASTRY	0,772(0,012)	0,030(0,010)	0,802	0,795
1582	CRACKERS AND BISCUIT PRODUCTION-CONSERVED	0,790(0,011)	0,033(0,009)	0,823	0,868
1584	COCOA, CHOCOLATE PRODUCTION	0,775(0,014)	0,054(0,012)	0,829	0,862
1587	SPICES PRODUCTION	0,867(0,021)	0,063(0,017)	0,930	0,779
	AVERAGES	0,762	0,047	0,808	

It can be easily observed that although the euro introduction did have a positive contribution in price-cost margins, it did not effect them at a great extend. The average price-cost margin is 0,808(0,762+0,047), while the introduction of euro has an effect on it that barely reaches a percentage of 5,7%. Hence, it is clear that the Greek food industrie's price-cost margins where high earlier than euro's introduction and remained equally high after the later. Therefore, it cannot be argued that the introduction of euro created conditions that incurred growth in price-cost margins and thereby generated the opportunity for speculation of the firms causing loss of welfare to

consumers. What can safely be argued is that the firms maintain an upgraded margin of profit before the introduction of the new currency as well as after the latter .

b. The effect of the oil crisis.

In 2000 the average price of crude oil increased to 27,6 $ per barrel seeting an upgrade of near ten dollars relatively to the precedent year , when oil's price was 17,48 $ per barrel. Table 7 gives information on crude oil's price for the years studied(1997-2007). Ever since 2000 the price of crude oil rises constantly rises.

TABLE 7.CRUDE OIL'S PRICE

YEAR	YEARLY BASKET PRICE
1997	18.68
1998	12.28
1999	17.48
2000	27.60
2001	23.12
2002	24.36
2003	28.10
2004	36.05
2005	50.64
2006	61.08
2007	69.08

SOURCE: OPEC, 2008

Table 8 presents presents the results of our third model, by which we aim to examine whether the oil crisis of 2000 had effects on the mark-ups of each individual studied sector of Greek food industry.

TABLE 8. CRUDE OIL'S PRICE EFFECT ON PRICE-COST MARGINS

4-DIGIT NACE CODE	SECTOR	β_{1it}	β_{2it}	ESTIMATED PRICE-COST MARGINS	R^2 - ADJ
1511	MEAT PRODUCTION AND CONSERVATION	0,692(0,015)	0,065(0,015)	0,757	0,768
1513	COOKED PORK AND POULTRY MEAT PRODUCTS	0,738(0,012)	0,041(0,084)	0,779	0,848
1520	FISH ELABORATION AND CONSERVATION	0,930(0,031)	0,037(0,036)	0,967	0,656
1533	FRUIT AND COLEWART ELABORATION AND CONSERVATION	0,808(0,007)	0,062(0,008)	0,870	0,859
1541	UNREFINED OIL AND GREASE PRODUCTION	0,776(0,053)	0,039(0,053)	0,815	0,303
1542	REFINED OIL AND	0,500(0,015)	0,053(0,018)	0,553	0,579

	GREASE PRODUCTION				
1551	**MILK AND CHEESE PRODUCTION**	**0,816(0,013)**	**0,076(0,012)**	**0,892**	**0,791**
1561	**FLOUR AND MEAL PRODUCTION**	**0,769(0,012)**	**0,046(0,010)**	**0,815**	**0,853**
1571	**FORAGE PRODUCTION**	**0,650(0,018)**	**0,065(0,015)**	**0,715**	**0,625**
1581	**BREAD AND PASTRY**	**0,769(0,044)**	**0,044(0,009)**	**0,813**	**0,798**
1582	**CRACKERS AND BISCUIT PRODUCTION-CONSERVED**	**0,783(0,011)**	**0,038(0,008)**	**0,821**	**0,869**
1584	**COCOA, CHOCOLATE PRODUCTION**	**0,765(0,043)**	**0,013(0,010)**	**0,778**	**0,862**
1587	**SPICES PRODUCTION**	**0,854(0,021)**	**0,050(0,015)**	**0,904**	**0,778**
	AVERAGES	**0,788**	**0,048**	**0,806**	

As it can be clearly seen the oil crisis does not seem to have a remarkable effect on the configuration of price-cost margins. The average price-cost margin is 0,806(0,758+0,048)while the oil crisis has an effect on the former' s configuration by a percentage of 6%. This observation cannot of course give us an indication that the increase of fuel's price is not being passed on the prices of goods, since we cannot observe whether the oil crisis affects, and if it does in what way it does, the configuration of marginal costs and prices of goods. What can safely be said is that price-cost margins remained almost fixed.

c. The effect of domestic competitive pressure on price-cost margins

To test whether increased domestic competitive pressure in Greek food industry we use the three digit Herfindahl index of concentration. For homogeneous oligopoly models it can be shown that there exists a negative relationship between the number of firms in an industry and the price-cost margins(Sutton, 1991). There is also empirical evidence that concentration is positively related to price-cost margins(Domowitz, Hubbard &Petersen, 1988). Table 9 presents the results of our baseline model under the specification of the fourth econometric model used. Comparing columns (4) and (5) of the table, where Herfindahl index based on the real market shares and a computed Herfindahl index, assuming equal market shares for each individual firm within each sector, are juxtaposed, we can clearly see that there exists high concentration in all sectors level. That gets clear in the last column that presents the ratio between the "real Herfindahl index" divided by the "computed under equal market shares Herfindahl". We can observe that the sectors with the higher concentration are those who work on fruit and colewart elaboration and production(1533), unrefined oil and grease production(1541), refined oil and grease production(1542), milk and cheese production(1551) and bread and pastry production.

TABLE 9. DOMESTIC COMPETITIVE PRESSURE'S EFFECT ON PRICE-COST MARGINS

4-DIGIT NACE CODE	SECTOR	β_{1it} (1)	β_{2it} (2)	R^2 - ADJ (3)	HERF.INDEX UNDER EQUAL MAKET SHARES (4)	HERFINDAHL INDEX (5)	(5)/(4)
1511	MEAT PRODUCTION AND CONSERVATION	0,693 (0,015)	0,469 (0,113)	0,771	0,020	0,042	2,117
1513	COOKED PORK AND POULTRY MEAT PRODUCTS	0,741 (0,012)	0,587 (0,115)	0,849	0,018	0,063	3,442
1520	FISH ELABORATION AND CONSERVATION	0,931 (0,031)	0,595 (0,195)	0,662	0,025	0,155	6,033
1533	FRUIT AND COLEWART ELABORATION AND CONSERVATION	0,809 (0,079)	0,386 (0,052)	0,858	0,007	0,132	19,640
1541	UNREFINED OIL AND GREASE PRODUCTION	0,777 (0,054)	0,508 (0,191)	0,280	0,019	0,254	13,253
1542	REFINED OIL AND GREASE PRODUCTION	0,520 (0,015)	0,717 (0,118)	0,593	0,015	0,138	9,517

1551	**MILK AND CHEESE PRODUCTION**	**0,822 (0,013)**	**0,671 (0,101)**	**0,792**	**0,012**	**0,111**	**9,068**
1561	**FLOUR AND MEAL PRODUCTION**	**0,766 (0,012)**	**0,390 (0,095)**	**0,852**	**0,017**	**0,093**	**5,592**
1571	**FORAGE PRODUCTION**	**0,653 (0,018)**	**0,631 (0,147)**	**0,625**	**0,016**	**0,094**	**6,099**
1581	**BREAD AND PASTRY**	**0,765 (0,011)**	**0,318 (0,051)**	**0,801**	**0,011**	**0,145**	**12,493**
1582	**CRACKERS AND BISCUIT PRODUCTION-CONSERVED**	**0,787 (0,011)**	**0,381 (0,078)**	**0,869**	**0,014**	**0,091**	**6,554**
1584	**COCOA, CHOCOLATE PRODUCTION**	**0,765 (0,013)**	**0,330 (0,839)**	**0,861**	**0,022**	**0,109**	**4,864**
1587	**SPICES PRODUCTION**	**0,860 (0,021)**	**0,530 (0,129)**	**0,781**	**0,024**	**0,106**	**4,351**
	AVERAGES	**0,761**	**0,501**		**0,017**	**0,118**	

Especially goods produced by some of the foresaid sectors(1533,1551,1581), such as bread, milk, fruits and , are goods of daily consumption, because they are essential for every day nutrition. This fact constitutes itself the main reason why all those goods' demand is inelastic and therefore, rise of their prices would not cause a decrease in their demand. That is a strong motive for the firms working on these goods to increase their prices, far more their marginal cost that happens to be low, increasing this way their price-cost margins. Those are the sectors most expected to be affected by competitive pressure as well as by market 's peculiarities.

As far as we are concerned on the price-cost margin estimation under the specification of sector concentration, we observe that sectors with the higher domestic concentration effect work on refined oil and grease production(1542), milk and cheese production(1551), forage production(1571). As expected sector 1551(milk and cheese production), seems to receive a strong effect by sector concentration, confirming this way the empirical evidence that indicates speculation because of collusions between firms of the sectors.

Lack of regulations that ensure the operation of the market under conditions of competition, allows domestic oligopolies to icrease their prices at expense of consumers' welfare as well as at expence of primary producers' welfare.

V. Conclusion

In this study we have used representative firm-level panel data to analyze how price-cost margins vary with euro introduction, oil crisis and domestic competitive pressure in Greek food industry.

The results in all the regressions are statistically significant. We observe robustness in price- cost margins estimations despite the different specifications of our baseline model. We find that euro as well as oil crisis have a weak effect on food industrie's price-cost margins that are already high because of market's characteristics. Domestic competitive pressure indicates low competition in Greek food industry, confirming empirical evidence on the existence of firms' collusions and lack of a competitive environment that would drive prices down. High concentration leads to especially high price-cost margins confirming the empirical evidence that concentration is positively related to price-cost margins.

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DATA APPENDIX

We make use of a commercial database of company accounts, which is commercialized under the name “FINDBIZ”(www.findbiz.gr) by ICAP(www.icap.gr). The findbiz database includes information onf the balance sheets of greek industry firms. We retrieved detailed information on 1169 greek firms that operated in the food industry between 1997 and 2007.

1. Data on Output and Input Factors

- PQ =operating revenue in local currency.
- P_M M =costs of material inputs in local currency.
- P_N N =cost of employees in local currency
- K = net tangible fixed assets, including machinery, equipment, and buildings, evaluated at book value in of local currency.
- The price of capital is defined as $P_K=P_i(r+\delta_{it})$, where P_i is the index of investment goods prices; r is a firm-specific real interest rate, computed as the interest paid relative to total debt minus the inflation rate based on the consumer price index; and δ is a firm-specific depreciation rate, computed as the total amount of depreciations in year t divided by net tangible fixed assets in year t-1. The investment goods price index is taken from the N.S.S.G(National Statistical Service of Greece).

3. Data at the Sector Level

The Herfindahl index (HERF) is the sum of squared market share , computed in a given four-digit sectoral NACE code.