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## Foreign Trade, Concentration and Profitability in Open Economies

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FOREIGN TRADE, CONCENTRATION AND  
PROFITABILITY IN OPEN ECONOMIES

Emilio Pagoulatos and  
Robert Sorensen

FOREIGN TRADE, CONCENTRATION AND PROFITABILITY  
IN OPEN ECONOMIES \*

Introduction

During the last two decades, empirical research has provided useful insights into the relationship between industrial structure and performance; but the majority of these studies involved the economies of the United States, Canada and Britain.<sup>1</sup> Louis Philips [15] recently completed a study of the industrial structure of Common Market countries, a part of which analyzed the empirical relation between rates of return and industry concentration in Belgium, France and Italy. While this study filled a gap in the Common Market literature, Philips results concerning the concentration-profitability relationship did not conform well to results obtained in similar studies for other countries. Using a model where rates of return are explained by industry concentration and a dummy for technological barriers to entry, Philips detected a negative relationship between average rates of return and industry concentration ratios in Belgium and the same relationship was found in Italy for several of the years studied.<sup>2</sup> These unconventional results, as Philips points out, may indicate either data problems inherent in the compilation of Common Market country statistics [15, pp. 58-59] or analytical problems, since industrial concentration and other elements of domestic market structure will not accurately measure market power in these small relatively "open" economies, as it is hypothesized to do in larger relatively "closed" economies such as the U.S.<sup>3</sup> Whatever the reasons for the unorthodox

results obtained by Philips, further analysis of the impact of market structure on industry performance in Common Market countries is necessary.

The purpose of this paper is to provide further empirical evidence on the relation between industry structure and profitability in the industrial sector of the European Economic Community (E.E.C.) and assess the importance of foreign versus domestic factors on industry profitability in countries which have a long tradition of openness.<sup>4</sup> A model is developed which integrates the impact of international factors such as the degree of foreign competition, exporting opportunities, and multi-national activity with the more traditional elements of market structure in explaining cross industry differentials in price-cost margins. Section I describes the analytical framework and variables included in the model. Section II presents the empirical results; and the conclusions of the paper are summarized in section III.

### I. Analytical Framework and Variables

A fundamental proposition of industrial organization theory is that a relationship exists between industry structure and profitability.<sup>5</sup> Empirical analyses of this relationship have generally characterized the dimensions of market structure to include the degree of domestic seller concentration, the growth and elasticity of industry demand, and the conditions of entry. But, these variables will represent an accurate description of market structure only to the extent that industries are isolated from international influences. In cases where

industries face significant import competition, export a large portion of their output to markets which differ substantially from the domestic one or experience entry by multi-national firms, purely domestic elements of market structure will give an incomplete account of competitive conditions in the industry. Because in E.E.C. countries the above conditions typically arise, in this study, the empirical analysis of industry profitability incorporates not only traditional elements of domestic market structure, but also variables that capture international factors.

The industry sample consists of 38 manufacturing industries uniformly defined for Belgium, France, Italy, the Netherlands, and Germany obtained from Input-Output tables for E.E.C. countries. The size and composition of the sample was determined by the availability and comparability of data for all five E.E.C. countries and the correspondence of industry categories between the 1963 Common Market Industrial Census [21] and the Input-Output information. The theoretical rationale for the inclusion of the variables in the model and the definitions adopted in their construction are as follows.

#### Profitability

The dependent variable utilized to represent profitability was the price-cost margin, defined as the net return (before taxes) expressed as a percentage of industry sales. Utilizing data from the 1965 Input-Output Table for Common Market countries, the margin was estimated as:

$$(1) \text{ Price-cost margin (PCM)} = \frac{\text{Value added} - \text{Payroll} - \text{Depreciation}}{\text{Value of Shipments}}$$

In the Input-Output data, value added is obtained by adding together factor payments, taxes and depreciation. By subtracting payroll and depreciation from value added a figure approximating profit before taxes plus interest is obtained. The division of this figure by value of shipments results in an estimate of a profit margin or rate of return on sales. While conceptually it might be preferable to use a rate of return on equity estimate, it was impossible to find reliable data of this nature for uniform industry definitions across the countries studied.<sup>6</sup>

#### Seller Concentration

The measure of seller concentration used in the analysis was a weighted four-firm employment concentration ratio (CR) with the weights being number of employees. Values for this concentration ratio were estimated along the lines suggested by Bain [2] from the frequency distributions of employment by size of firm provided in the 1963 Common Market Industrial Census [21]. Since oligopoly theory suggests that the ability of firms to collude (tacitly or overtly) in order to maintain prices above long-run average cost of production is greater in industries in which there are few sellers which dominate the market, industry price-cost margins are expected to be positively related to the degree of seller concentration.

#### Growth Rate in Demand

Economic theory and empirical evidence suggests that growth in demand may exert a positive influence upon industry profits. When an industry experiences high growth in demand, firms are less compelled to behave as rivals and this lack of competitiveness may result in

temporary or windfall profits. Slow or declining demand growth, on the other hand, may lead to breakdowns in collusive agreements. This would be especially true in high fixed cost industries where firms may find it necessary to squeeze profit margins in order to maintain adequate levels of sales. A growth variable (GVA) was included in the model and defined as the percentage change in value added between 1959 and 1965. The data for the construction of this variable were obtained from input-output tables for Common Market countries.

#### Consumer Goods Dummy

Industrial organization theory and empirical evidence suggests that profits will be greater in industries characterized by product differentiation since differentiation creates barriers to entry. Product differentiation is, however, difficult to measure since it may arise from genuine differences in physical characteristics, distribution or customer services associated with competing products, or from spurious differences created in the minds of buyers through sales promotion techniques such as advertising. Bain [1] has suggested that the most important source of product differentiation is advertising, and that the scope for advertising activities is greater for consumer as opposed to producer goods. Since product differentiation is likely to be more important in consumer goods industries a dummy variable was introduced into the model taking the value one for consumer goods and 0 for producer goods industries. To the extent that product differentiation is an important barrier in consumer goods industries, it is expected that price-cost margins will be higher in these industries.

### Import Competition

Domestic firms in relatively "open" economies experience actual and potential import competition. While it is traditional to characterize firms in highly concentrated industries as those possessing market power, this inference can be misleading in the context of industries faced with significant degrees of actual import competition. In effect, high levels of imports dilute domestic seller concentration and reduce the ability of domestic firms to maintain prices above long-run average cost of production. Moreover, modern oligopoly theory suggests that potential competition through the threat of entry, and by extension, foreign entry, may also constrain domestic producers to adopt prices more closely approximating competitive levels. Esposito and Esposito [7] have pointed out that foreign producers often may more easily overcome barriers to entry faced by potential domestic and foreign entrants and, thus, may exert the strongest influence upon the pricing decisions of domestic firms. It is expected, therefore, that other things equal, profit margins will be lower in industries facing the greatest degree of actual or potential import competition.

As a quantitative measure of import competition the current share of imports ( $M/V_S$ ) defined as imports as a percentage of domestic shipments was included in the model.<sup>7</sup> Conjecturing that the higher the import share, the greater the degree of actual and potential import competition, it is expected that this variable should exert a negative influence on profit margins.<sup>8</sup>

### Export Opportunities

While it has been generally recognized that import competition could have a significant impact on domestic industry profitability



recent work suggests that export opportunities may also play a significant role. The theoretical relationship between exports and profitability yields conflicting hypotheses. Caves [6] suggests that an export market may constrain domestic producers to a more competitive pricing behavior. He has demonstrated, for example, that in response to export demand a profit maximizing monopolist, who is unable to price discriminate between the foreign and domestic market and who faces non-decreasing marginal cost, will expand total output and reduce the domestic price. He has further argued that this result is equally plausible under conditions of oligopoly, in that the presence of export markets may render sellers less conscious of their mutual interdependence in the domestic market. In effect, a reliance on more competitive world markets for sales is seen to dilute the market power of domestic firms and lead to prices and profits being closer to competitive levels. For these reasons one could hypothesize that exporting would exert a negative influence on industry profitability.

A number of arguments, however, run counter to this conclusion. In the Caves analysis, for instance, if the monopolist were capable of international price discrimination and the world demand curve were more elastic than the domestic one, then an expansion of exports will cause the domestic price to rise. A similar conclusion is suggested by the theories of two-way international trade which attempt to explain the peculiarity that advanced countries are increasingly simultaneously exporting and importing the same manufactured good. While this phenomenon can, in part, be attributed to the aggregative nature of international trade statistics, the explanation provided by the theories is the existence of

"international product differentiation". This suggests that exporting industries may be selling products which have a special appeal on world markets and hence may earn rents abroad. Exporting may then be associated with increased profitability.

In order to test for the possible impacts of exporting on industry profitability a variable defined as exports as a percentage of domestic shipments ( $X/VS$ ) was included in the model. The data utilized in the construction of this variable were obtained from the input-output table of Common Market countries.

#### Multi-national activity

A final international factor is direct foreign investment within a domestic industry.<sup>9</sup> As in the case of exports, the effects of foreign investment on the performance of host country's industries are too complex to put forth in a single hypothesis. One argument suggests that direct foreign investment increases the degree of competition in the host country's industries since the establishment of foreign subsidiaries constitutes de novo entry. In addition, since multi-nationals tend to enter industries in which barriers to entry are high, the industries affected by their entry are those in which monopoly distortions are probably the greatest. If foreign investment does indeed provide these competitive effects, the profit rates of domestic firms should be inversely related to the degree of pressure supplied by the foreign firms. On the other hand, it has been argued that the behavior of foreign subsidiaries and host country firms may be such to offset the alleged competitive improvements. For example, multi-national firms have a predisposition for product rivalry and advertising.

These activities may simply increase barriers to further entry, and raise the "limit price" which established firms may charge. Moreover, in some cases entry by multi-national firms has resulted in defensive mergers among firms in the host country. Reactions such as this could simply tighten oligopolistic collusion. In order to test for these possible effects, a dummy variable was constructed from available United Nations information [24]. The variable has the value of one for industries in which foreign controlled firms account for 10% or more of industry output, assets, or employment, and zero for the remaining industries.

## II. Statistical Results

The estimation procedure utilized to analyze the relationship between price-cost margins and various industry structural characteristics was joint generalized least squares (JT/GLS).<sup>10</sup> The results obtained from an ordinary least squares estimation of the equations by country suggested that contemporaneous correlation of disturbances across equations posed estimating problems.<sup>11</sup> Under such circumstances these OLS estimates will not be efficient. The use of the JT/GLS procedure will yield at least asymptotically more efficient estimators than the single equation least squares estimators. For comparison purpose the results obtained from both estimating procedures are presented in Table 1. While, the pattern of results obtained from the OLS and the JT/GLS estimating procedures is similar, the standard errors of the estimated coefficients are lower as expected, when the later technique is used. This is not always reflected by an increase in t-values because a different quadratic form is minimized under the JT/GLS, and the coefficient estimates differ.

TABLE 1: Ordinary and Joint Generalized Least Squares Regression Equations Explaining Price-Cost Margins in Common Market Countries, 1965.

(t-values in parentheses)

Country	Method of Estimation	Intercept	CR	GVA	CGD	MND	X/V <sup>S</sup>	M/V <sup>S</sup>	R <sup>2</sup>	F(7,30)
Belgium	OLS <sup>1/</sup>	14.54 <sup>a</sup> (2.80)	.040 (.633)	.023 (1.15)	3.31 (.882)	-2.43 (.729)	-.143 (1.13)	-.254 <sup>a</sup> (2.47)	.27	1.95 <sup>c</sup>
Belgium	JT/GLS <sup>2/</sup>	12.07 <sup>a</sup> (3.84)	.027 (.865)	.017 <sup>b</sup> (2.08)	3.94 <sup>c</sup> (1.38)	-.251 (.174)	-.063 (1.11)	-.242 <sup>a</sup> (4.96)		
France	OLS	16.13 <sup>a</sup> (2.84)	.238 <sup>a</sup> (2.67)	.066 <sup>b</sup> (2.13)	2.48 (.604)	-5.43 (1.38)	-.555 <sup>b</sup> (2.19)	-.547 <sup>b</sup> (2.25)	.42	3.73 <sup>a</sup>
France	JT/GLS	15.93 <sup>a</sup> (3.76)	.118 <sup>b</sup> (2.22)	.057 <sup>a</sup> (3.26)	3.20 (.882)	-5.12 <sup>b</sup> (2.36)	-.305 <sup>c</sup> (1.93)	-.447 <sup>a</sup> (3.02)		
Italy	OLS	6.69 (.991)	.128 (1.48)	.031 (.707)	4.64 (1.08)	5.96 (1.33)	-.274 (1.50)	-.168 (.774)	.25	1.71
Italy	JT/GLS	8.98 <sup>b</sup> (1.97)	.036 (.689)	.025 (1.06)	5.08 <sup>c</sup> (1.39)	3.05 (1.17)	-.249 <sup>b</sup> (2.23)	-.023 (.183)		
Netherlands	OLS	51.19 <sup>a</sup> (2.52)	-.127 (.562)	-.009 (.712)	-22.82 <sup>b</sup> (1.90)	-22.06 <sup>c</sup> (2.02)	.412 (1.12)	-.459 <sup>c</sup> (1.34)	.27	1.94 <sup>c</sup>
Netherlands	JT/GLS	48.22 <sup>a</sup> (2.57)	-.090 (.441)	-.008 (.715)	-21.59 <sup>b</sup> (1.87)	-18.38 <sup>c</sup> (1.85)	.413 (1.26)	-.492 <sup>c</sup> (1.56)		
Germany	OLS	8.48 <sup>c</sup> (1.49)	.176 <sup>c</sup> (1.36)	.094 <sup>c</sup> (1.65)	2.50 (.713)	5.62 (1.55)	-.191 (1.10)	-.477 <sup>b</sup> (2.42)	.32	2.40 <sup>b</sup>
Germany	JT/GLS	11.69 <sup>a</sup> (3.21)	.099 <sup>c</sup> (1.35)	.036 <sup>c</sup> (1.31)	3.52 (1.19)	2.38 (1.33)	-.018 (.185)	-.406 <sup>a</sup> (3.76)		

The significance of the coefficients was tested using a one-tail test except for the coefficients for multinational activity (MND) and export share (X/V<sup>S</sup>) where a two-tail test was used. <sup>a</sup> indicates that the coefficient is significant at the 1% level while <sup>b</sup> and <sup>c</sup> indicate significance at the 5% and 10% level respectively.

<sup>1/</sup> OLS indicates the method of ordinary least squares estimation.

<sup>2/</sup> JT/GLS indicates the joint generalized least squares or "seemingly unrelated" estimation technique.

The following interpretations and inferences will be limited, for the sake of brevity, to the results obtained by the JT/GLS procedure.

An examination of Table 1 indicates that in all countries, with the exception of the Netherlands, the domestic market structure variables display signs which conform to theoretical expectation. One explanation for the unique performance of the Netherlands might be the considerable "openness" of that economy in the early sixties, as exemplified by a trade ratio (imports as a percent of GNP) in the neighborhood of 48% as compared to ratios of approximately 34%, 19%, 15% and 13% for Belgium, Germany, Italy and France respectively. Seller concentration and price-cost margins were positively associated. Only the coefficients for Germany and France, however, were significant at a 10% level or better. Since concentration was found to be a significant contributor to profit margins only in the larger economies of France and Germany, this finding supports the hypothesis that domestic industry concentration does not accurately reflect the degree of monopoly power in small relatively "open" economies. The coefficients for the growth rate in demand variable have the expected positive sign, but were significant at a 10% level or better, only in the cases of Belgium, France, and Germany. Finally, the coefficients for the consumer goods dummy exhibit the expected positive sign, but were only significant at 10% level or greater in the cases of Belgium and Italy.

With regard to the international factors, the most striking results were obtained for the import competition variable. In all countries the coefficients for the import share variable have negative signs, and in all cases except Italy they are significant at 10% level or better. This result not only indicates that actual and/or potential foreign

competition plays a major role in affecting profitability in Common Market countries, but also provides an explanation for the observation that domestic concentration was found to be an insignificant determinant of industry profitability in many of the countries studied.

Although the evidence is not as conclusive for exporting and direct foreign investment as is in the import case, the results suggest also that these factors have important consequences for domestic industry profitability. In the case of exports, in all countries except the Netherlands, the coefficient for the export share variable had a negative sign. The coefficient, however, was only significant at a 10% level or better in the cases of France and Italy. Thus, while not conclusive, tentative support can be given to the hypothesis that in these countries, exporting opportunities and reliance on export markets may have constrained producers to more competitive pricing and output decision. The results for the direct foreign investment dummy were less consistent. In some cases the coefficient is negative while in others it is positive. In the only cases, however, in which the coefficient was significant at a 10% level or greater (France and the Netherlands), it had a negative sign. Taken as a whole, this result does then provide some evidence that de novo entry by international firms leads to more competitive outcomes in host country markets.

A final test was undertaken in order to assess the contribution of international factors (MND, X/VS, M/VS) in explaining inter-industry differentials in price-cost margins. The error sum of squares was computed for an ordinary least squares estimate of both a restricted form of the model (including only the domestic variables) and an unrestricted

form (including both domestic and international variables) of the model. The significance of international factors was then determined by an F-test for the reduction in error sum of squares between the restricted and unrestricted regression models.<sup>12</sup> The F values obtained were statistically significant at a 10% level or better in all cases. International factors are thus seen to be statistically important in affecting profit margins in Common Market countries.

The empirical results of this study provide also some indirect evidence on the possible impact of integration in the Common Market upon industrial market structure and performance. While evidence presented by Jaquemin and Cardon de Lichtbeur [9] and Schwindt [22] suggests that industry as well as aggregate concentration has increased following the formation of the E.E.C., this alone cannot be taken as a demonstration of a general decline in competitiveness within the European Community. Rather, to the extent that trade creation<sup>13</sup> in manufactures has been one of the effects of the Common Market's establishment, import competition and exporting opportunities have enhanced competitive performance. In effect, the elimination of tariffs has widened markets and increased the numbers of suppliers in these larger markets which counters the observed increases in domestic concentration.

### III. Conclusions

This paper has reviewed and tested a number of hypotheses concerning the relationship between industry structure and industry profitability in the context of the European Economic Community. On the basis of the empirical results obtained a number of conclusions can be drawn.

First, from the contemporaneous correlation of disturbances it appears that similar factors affected common industries across the countries studied such that a simultaneous estimating procedure was required. Second, foreign factors such as import competition, exporting opportunities and multi-national activity, are an important addition to domestic structural variables in explaining inter-industry differentials in price-cost margins. Furthermore, in Belgium and the Netherlands these appear to be of overriding importance. Third, purely domestic factors such as the degree of seller concentration appear to be only significant in the larger E.E.C. economies which could provide an explanation for the paradoxical results obtained by Philips. Finally, the trade creating effects attributed to the formation of the Common Market appear to have enhanced efficiency and competition within the member countries through the widening of markets and the increasing of the numbers of competing suppliers within the larger markets; and that these effects appear to have dominated and offset observed increases in industry concentration within specific E.E.C. countries.



## Notes

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1. Excellent surveys of these studies have recently be published by Weiss [25, 26] and Philips [15, pp. 36-53].
2. The results for France were so disappointing that Philips did not report them.
3. A few recent studies have incorporated foreign trade and investment variables in the structure-profitability relationship and found them to have significant impact on resulting industry performance. These include a study by McFetridge [12] and Jones, et al. [10] on Canada, Khalilzadeh-Shirazi [11] on the United Kingdom, White [27] on Pakistan, House [8] on Kenya, Esposito and Esposito [7] and Pagoulatos and Sorensen [13] on the United States.
4. In effect, the Common Market nations had begun a process of trade liberalization in industrial products during the fifties and this process has continued after the formation of the European Economic Community, especially in the formerly highly protected economies of France and Italy.
5. More generally, the relationship is said to exist between structure and performance, where performance is taken to include not only

static allocation efficiency (profitability), but also such aspects of behavior as cost minimization and innovative activity.

6. There exists a good deal of controversy surrounding the most appropriate measure of profitability. More recently, the case has been made by Weiss [26, p. 198-199] that rates of return on sales may indeed be conceptually superior to returns on equity or assets, since two firms with the same degree of monopoly power would not have the same rates of return on equity if the capital they needed per dollar of sales differed.
7. The data for imports and domestic shipments were obtained from the input-output tables for the European Economic Community.
8. The use of this variable may not adequately describe potential competition, since potential competition is related to the elasticity of foreign supply with respect to the domestic price, rather than the current share held by foreign firms. Therefore, it is possible that a small foreign share, ex post could simply reflect a high elasticity of foreign supply and a "limit price" which yielded relatively low profits.
9. The role of the multi-national enterprise in affecting the host country market performance has been recently studied by Caves [4, 5, 6] and Parry [14].
10. JT/GLS, sometimes referred to as ZEF (Zellner's Efficient Estimator) and "seemingly unrelated regression" is more fully described in [23, 28, 29]. The name JT/GLS is due to Theil.

11. Evidence of high contemporaneous correlations across equations can be observed from the correlation matrix of residuals obtained from ordinary least squares estimation, provided below. All of the correlations are significant at least at the 5% level.

	<u>Belgium</u>	<u>France</u>	<u>Italy</u>	<u>Netherlands</u>	<u>Germany</u>
Belgium	1.000	.625	.506	.548	.508
France		1.000	.470	.532	.364
Italy			1.000	.311	.470
Netherlands				1.000	.670
Germany					1.000

12. The appropriate F-statistic was calculated as follows:

$F(3,31) = [(SSRR - SSRU)/r] / [SSRU/(n-k)]$ ,  $SSRR \gg SSRU$  where  $SSRR$  and  $SSRU$  are the sums of squared residuals in the restricted and unrestricted forms of the model,  $r (=3)$  is the number of additional parameters estimated in the unrestricted form,  $n (=38)$  is the sample size for each country and  $k (=7)$  is the number of estimated parameters in the later form. The F-statistics obtained were 3.61, 5.08, 2.58, 2.73 and 3.44 for Belgium, France, Italy, the Netherlands and Germany respectively and are statistically significant at the 10% level or better in all cases.

13. Estimates of substantial trade creation and relatively small magnitudes of trade diversion in manufacturing due to the formation of the E.E.C. have been recently reported by Balassa [3].

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