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International Trade, International Investment and Industrial Profitability of US Manufacturing

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INTERNATIONAL TRADE, INTERNATIONAL
INVESTMENT AND INDUSTRIAL PROFITABILITY
OF U.S. MANUFACTURING*

Emilio Pagoulatos and
Robert Sorensen

I. INTRODUCTION

This paper, drawing on the analytical framework of international trade and industrial organization, reviews and tests some new hypotheses concerning the effect of foreign trade and investment on domestic industry profitability. Since Bain's [1] seminal paper in 1951, virtually all analyses of the market structure-profitability relationship have ignored the role of foreign factors.¹ While a few recent studies have incorporated variables which account for the impact of foreign competition, with the exception of a paper by L. Esposito and F. F. Esposito [12], these studies have involved countries other than the U.S.² The purpose of this study is two-fold: first, to extend the analytical framework proposed by Esposito and Esposito by investigating not only the role of import competition, but also the impact of export opportunities and foreign direct investment in the structure-profitability relationship and second, to provide a statistical test of the advanced hypotheses based upon one aspect of U.S. industrial performance: price-cost margins.

The organization of the paper is as follows: Section II discusses the relation between domestic profits and international economic activity. The third section describes the data and variables. The results are presented in Section IV. A final section considers the conclusions and general implications of this study.

II. FOREIGN TRADE, FOREIGN DIRECT INVESTMENT AND INDUSTRY PROFITABILITY

Economic theory predicts that in long run competitive equilibrium resources will be allocated efficiently when the prices of all goods equal their marginal cost and producers earn only normal rates of return. Since departures from the competitive norm lead to inefficient allocations of resources and result in some producers earning greater than normal returns, it has been one objective of industrial organization research to determine what particular market characteristics can be identified with the earning of excess economic profits. Traditionally, this type of analysis has related industry profitability to dimensions of market structure, such as the degree of seller concentration, the growth and elasticity of demand, and the conditions of entry as reflected by the extent of product differentiation, the importance of scale economies and the presence of absolute cost advantages.

If an economy were closed, these variables would theoretically be sufficient to describe the major determinants of inter-industry differentials in profitability. In an open economy a more complete specification of the structure-profitability relationship should account for foreign factors, since industries differ with respect to international trade and investment activity. In particular, attention should be given to the impact of actual and potential import competition, the availability of export opportunities and the extent of foreign direct investment and multi-national activity.

The role of actual import competition is straightforward. The presence of foreign suppliers increases the number of competitors in the domestic market. In effect, this reduces domestic seller concentration and should result in more competitively determined prices and lower profits for the domestic firms. Modern oligopoly theory suggests, however, that the existence of potential competition

may produce similar results. That is, the threat of entry and by extension the threat of foreign entry, may constrain domestic firms to adopt entry forestalling prices which more closely approximate competitive levels. In this regard, Esposito and Esposito [12, 343] have pointed out that foreign producers may more easily overcome barriers to entry, common to both potential domestic and foreign entrants and, thus, may pose the most "immediate" threat of entry and exert the strongest influence on the pricing decisions of the established domestic firms. To the extent, therefore, that actual or potential import competition limits the ability of established firms to maintain prices above long run average cost, it would be expected, other things equal, that profits rates would be lower in industries facing the greatest degree of import competition.

While it has been generally recognized that import competition could improve domestic market performance, the impact of export opportunities has been almost totally overlooked. Recent work by Caves [5; 6], however, suggests that the existence of export markets may serve to constrain domestic industries to a more competitive pricing behavior. Consider, for example, a protected profit maximizing monopolist who is currently selling only in the domestic market at prices above competitive world levels. If protection is eliminated, and as a result the monopolist is unable to discriminate between the domestic and foreign market, profit maximizing strategy leads to the monopolist exporting the product, expanding output in the domestic market and reducing the domestic price to world levels.³ Caves [5] has also argued that this type of result is equally plausible under conditions of oligopoly, in that the presence of alternative export markets may render sellers less conscious of their mutual interdependence in the domestic market and lead to less collusively determined prices. The implication is that reliance upon export

sales, in effect, dilutes an industry's market power and should lead to prices and profits being closer to competitive levels. It must be noted, however, that this analysis assumes domestic firms to be unable to engage in price discrimination (dumping) between the foreign and domestic markets. If tariff protection or other impediments to trade do allow the domestic firms to price discriminate and the world demand curve is more elastic than the domestic one, domestic prices and profits are likely to rise as export sales expand.

The other international factor which may influence the profitability of domestic firms is the extent of their foreign investment and multi-national activity. While early analyses of direct foreign investment focused primarily upon macroeconomic theories of international capital movements, recently attention has been given to the study of the international corporation in terms of industrial organization theory. These studies [4; 5; 17] suggest that foreign investment occurs mainly in industries characterized by oligopoly in both the parent and host countries. In addition, "horizontal" investment, which results in firms producing abroad the same or similar products to those produced in the domestic market, is likely to prevail in industries where product differentiation is prevalent, while "vertical" investment, undertaken in order to produce raw materials or other inputs for the production process at home, more typically arises in undifferentiated oligopoly.

The effects of direct foreign investment of a vertical nature are analogous to those of vertical integration in the domestic market. Upstream foreign investment in order to produce a necessary input, for example, may allow domestic processing firms to achieve lower input costs via importation of semi-finished goods and/or raw materials from foreign subsidiaries.⁴ This would be especially

important in cases in which firms integrate backward into less developed countries in order to obtain raw materials which otherwise might not be forthcoming, due to shortages in overhead capital or entrepreneurial talent in the host country. Furthermore, vertical investment abroad which provides established firms control over sources of non-ubiquitous raw materials, substantially raises the barriers to entry in the domestic market at the processing level. The profit rates earned by the established firms can, thus, be elevated without attracting new rivals. All of these factors suggest that vertical direct foreign investments would increase industry profitability in the domestic market.

It was indicated earlier that horizontal direct foreign investments typically arise in oligopolistic industries characterized by product differentiation. More specifically, it is argued that horizontal investments take place when a firm possesses a unique rent earning asset, such as a patented invention, a differentiated product, or specialized managerial expertise in the production and distribution of a product, on which maximum profits can be earned in foreign markets only through foreign production. The establishment of foreign subsidiaries is, thus, seen as a strategy providing for growth and the earning of further rents on these unique forms of capital without impairing the high rents currently being earned in the domestic market.⁵ Industries characterized by horizontal direct foreign investment, therefore, are those likely to be able to earn and maintain supra normal profits in the domestic market.

III. DESCRIPTION OF VARIABLES AND DATA

In this section, empirical evidence is presented on the nature of the structure-profitability relationship when account is made for the influence of international trade and multi-national activity. The industry sample consisted

of 88 United Nations Standard International Trade Classification (S.I.T.C.) three-digit industry groups of the U.S. manufacturing sector for 1967. The S.I.T.C. industrial classification was utilized because of constraints on the availability of foreign trade and investment data. Since the domestic market structure data could only be obtained from figures provided by the U.S. Bureau of Census according to their Standard Industrial Classification System (S.I.C.), an industry was included in the sample if it were possible to locate comparable figures provided in the S.I.T.C. system with those in the S.I.C. system. In this regard, a concordance between the two systems developed by Hufbauer [16, 208-210] proved very helpful.

Multiple regression equations are utilized to estimate the relationship between industry profitability and industry structure. The equations contain five independent variables representing major structural determinants of profitability, along with several combinations of additional independent variables representing the international factors previously mentioned. The construction and data sources utilized for the variables are discussed below. Since the theoretical rationale for the domestic structure variables is widely covered in the literature, we provide only brief justification for their inclusion in the model.

Industry Profitability

The dependent variable used in the analysis to represent profitability was the price-cost margin, defined as the gross return (before taxes) expressed as a percentage of industry value added.⁶ Gross margin on value added was used in preference to the more frequently used gross margin on sales, because it is less sensitive to differences in both the degree of vertical integration and the stage in the production process of the sample industries. Utilizing Census data [27; 28; 29], the margin was estimated as:

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

Value added was obtained by the Census by subtracting from value of shipments, the costs of materials, supplies and containers, fuel purchased electricity, and contract costs. Subtracting payrolls and rentals from value added and dividing by value added results in a figure approximating profits before taxes, plus interest, plus depreciation as a percentage of value added.

Seller concentration

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 that dominate the market. Price-cost margins are thus expected to be positively related to some measure of the degree of seller concentration. Two measures of seller concentration were utilized in the analysis. The first was a weighted four-firm concentration ratio (CR) with the weights being value of shipments. Since weighted concentration ratios have come under attack [2] as being representative of actual industry concentration, an employment entropy measure (E) which could be constructed more directly was also utilized. Entropy, a measure borrowed from information theory, indicates the degree of uncertainty of securing a random buyer. Thus, high entropy is indicative of low levels of concentration, while low entropy indicates high levels of concentration. Entropy is thus expected to be negatively related to price-cost margins.⁷

Capital-Labor Ratio

The inclusion of gross capital cost in the formulation of the price-cost margin implies that, ceteris paribus, margins will be greater in capital intensive industries. In order to account for differences in margins arising from differing capital intensities, the capital-labor ratio (K/L) was included as an explanatory variable. The capital-labor ratio has been provided for our sample of industries by Hufbauer [16]. This figure was estimated as net book value of depreciable assets per employee.⁸

Barriers to Entry

Oligopoly theory suggests that the higher the barriers to entry into an industry, the higher is the "limit price" which producers can charge without inducing entry. Profit margins should, thus, be positively related to the height of barriers to entry. Two variables were introduced into the model to account for barriers attributable to economies of scale and product differentiation.

An economies of scale barrier (ES) was approximated with a measure developed by Hufbauer [16]. This variable reflects cross industry differentials in the achievement of increases in value added per worker as the size of plant increases. Industries capable of achieving increases in productivity as the size of plant increases are considered to possess scale economy advantages as evidenced by higher scale coefficients. To the extent that plants differ in product mix, quality of labor employed, age of equipment, etc. this type of measure is subject to some bias, and empirically it appears to give lower estimates of scale economies than engineering methods have provided [16]. Recently, however, a similar scale proxy was developed by Caves, et. al. [7] with some success, especially in reducing collinearity between concentration and the scale economy proxy.

Product differentiation is very difficult to quantify. It may represent genuine differences in physical characteristics, distribution or customer service between competing products, or may simply reflect differences created in the minds of buyers through sales promotion techniques such as advertising. Bain [1] has suggested that the most important source of differentiation is advertising.⁹ Since this form of differentiation is more likely to occur in consumer as opposed to producer goods industries, the consumer good ratio (CGR),

constructed by Hufbauer [16], was adopted as a proxy for the degree of product differentiation. This is a measure which is developed through input-output analysis and reflected the percentage of total industry sales appearing as consumer goods directly and indirectly after the first and second rounds.¹⁰ Because advertising and product differentiation is an important barrier to entry primarily in consumer goods industries, price cost margins are expected to be higher, the higher the consumer goods ratio.

Growth Rate in Demand

It has been suggested that the growth rate of demand will also affect industry profit margins [12; 26] and some empirical evidence supports this proposition. When an industry experiences high growth in demand, firms may feel less compelled to behave in a competitive fashion and secure temporary profits. When growth is slow or declining (especially in industries in which fixed costs are high), firms may find it necessary to squeeze profit margins in order to maintain adequate levels of sales. Furthermore, slow growth may lead to breakdowns in collusive agreements among oligopolists. This reasoning would assert that growth in demand would exert a positive influence upon profit margins. To estimate growth of demand (GD), the percentage change in value added between 1963-67 was calculated.

Import Competition

While we have hypothesized the likely consequences of actual and potential import competition, no empirical counterparts have thus far been proposed. Three alternative proxies were adopted, each of which is subject to limitations discussed below, in order to measure import competition.

First, we included as explanatory variables barriers to entry faced by foreign producers: nominal tariffs (T) and non-tariff barriers (NTB).¹¹ The higher the degree of tariff and non-tariff protection the greater are the barriers to foreign suppliers and the higher would be the "limit price" domestic producers could charge without inducing foreign entry. This suggests, ceteris paribus, a prediction of a positive relationship between the measures of protection and price-cost margins. One problem with this approach, however, is that we do not know the purposes for which the import barriers were originally designed. For example, industries characterized by chronic excess capacity or high unit cost, may have sought and obtained protection and, thus, in some instances high protection may be simply be associated with inefficient industries characterized by low profitability.

Secondly, the ratio of current imports to domestic value of shipments (MVS) was introduced as a proxy for foreign competition. We conjecture that the higher the import share the greater the degree of actual and potential import competition. This is the approach utilized by Esposito and Esposito [12]. However, the use of this proxy is subject to several limitations. Indeed, it may not adequately describe potential competition, since potential competition is not related to the current share held by foreign firms, but rather the elasticity of foreign supply with respect to the domestic price. Therefore, a small ex post, foreign share could simply reflect a high elasticity of foreign supply and a "limit price" which yields relatively low profits. Moreover, it has been observed [19; 21] that in some U.S. industries (particularly those characterized as oligopoly) firms have readily yielded up a share of the domestic market to foreign producers rather than reduce prices and margins. The explanation for this phenomenon is that, at least in the short-run, firms would rather give up some portion of the

market to foreign firms, than engage in price cutting which if misinterpreted by rivals, could destroy agreed upon price structures. Under these circumstances, the share of the market captured by foreign suppliers may have to reach some critical level before price cutting and shaving of margins is initiated.

The final proxy used was the growth rate in imports (GM) over the 1963-67 time period. While this variable is subject to the qualifications given the import share variable, it is nonetheless appealing in that it may more accurately describe the threat of import competition to domestic producers. For example, a low current import share may tend to understate the degree of import competition in industries in which imports have been growing rapidly, while a high value of import share would tend to overstate import competition when imports have been declining. Thus, high import growth, indicative of greater degrees of foreign competition, should exert a negative influence on profits being earned by domestic industries.

Exports

Since we hypothesized that exporting opportunities, as well as import competition, would affect industry profitability, we included the ratio of exports to domestic value of shipments (XVS) as an explanatory variable in the model. In the absence of dumping, the hypothesis provided earlier suggests that a greater reliance on export sales, other things equal, should reduce an industry's profitability.

Direct Foreign Investment

Vertical and horizontal direct foreign investment activity were hypothesized to lead to higher industry profitability. A complete test of the hypotheses presented would require detailed information concerning the magnitude, location and specific type of investment undertaken for each of the industries in the sample. Since this type of data is not presently available, a measure

developed by Bruck and Lees was utilized. Their measure of multi-national activity (MN), based upon data for Fortune's 500 largest industrial corporations, estimates the percentage foreign component of total economic activity for the largest firms within each industry.¹² This variable was included in the model as a general proxy for direct foreign investment with the expectation it would exert a positive influence upon industry profitability.

IV. EMPIRICAL RESULTS

The results of the multiple regression equations relating price-cost margins to various combinations of structural variables are presented in Table I. Equations (1) and (2) include only domestic structural variables as independent variables, while equations (3) through (8) contain additional variables which represent various formulations of the foreign factors.¹³

Inspection of Table I indicates that, in general, the coefficients for the traditional market structure variables all possess the hypothesized signs. Price-cost margins were positively related to concentration, whether measured by the weighted concentration ratio or entropy and the coefficient for the concentration ratio was significant in all cases at the 10% level or better. The coefficients for the consumer goods ratio and the capital-labor ratio also display the expected positive sign and both were significant in all cases at the 1% level. Finally, the coefficient for the economies of scale variable in all cases, and that for the growth rate in demand in all but two cases, display the expected positive sign but neither is significant in any formulation of the model.

While these results confirm the importance of traditional domestic structural variables in affecting industry profitability, our interest lies more with the results obtained for the foreign factors. The regression coefficients for the

TABLE 1: Regression Equations Relating Price-Cost Margins to Domestic Market Structure Characteristics and Foreign Trade and Investment, 1967.
(t-values in parentheses)

Equation Number	Domestic Variables							Foreign Variables						R ²	F-tests
	Intercept	CR	E	K/L	ES	CGR	GD	MN	XVS	T	NTB	MVS	GM		
(1)	364.94 ^a (10.15)	1.15 ^b (1.82)		4.89 ^a (4.82)	.138 (1.06)	110.94 ^a (2.83)	.120 (.269)							.29	
(2)	444.77 ^a (9.08)		-5.62 (.865)	5.03 ^a (4.78)	.158 (1.20)	100.13 ^a (2.55)	.191 (.419)							.27	
(3)	319.59 ^a (7.75)	1.33 ^b (2.08)		3.90 ^a (3.81)	.044 (.347)	147.54 ^a (3.74)	-.174 (.395)	4.03 ^a (2.74)	-.106 (.937)	-1.06 (.858)	.935 ^a (2.71)			.40	F(4,77) = 3.48 ^b
(4)	414.98 ^a (7.32)		-8.19 (1.27)	3.92 ^a (3.67)	.062 (.480)	134.74 ^a (3.42)	-.082 (.182)	4.47 ^a (3.00)	-.088 (.761)	-.682 (.550)	.906 ^a (2.58)			.38	F(4,77) = 3.41 ^b
(5)	359.37 ^a (10.32)	1.36 ^b (2.10)		4.06 ^a (3.97)	.052 (.403)	118.00 ^a (3.12)	.137 (.318)	2.94 ^b (2.02)	.040 (.308)			-.222 ^b (2.17)		.37	F(3,78) = 3.36 ^b
(6)	494.52 ^a (9.02)		-13.16 ^b (1.90)	3.77 ^a (3.53)	.053 (.406)	111.61 ^a (2.97)	.290 (.660)	3.41 ^b (2.34)	.057 (.439)			-.255 ^b (2.36)		.37	F(3,78) = 3.97 ^b
(7)	367.56 ^a (10.09)	1.04 ^c (1.61)		4.28 ^a (4.15)	.135 (1.06)	103.67 ^a (2.66)	.026 (.060)	3.47 ^b (2.36)	-.064 (.539)				-.104 ^c (1.45)	.35	F(3,78) = 2.45 ^c
(8)	444.69 ^a (8.79)		-6.29 (.955)	4.26 ^a (3.96)	.150 (1.17)	96.43 ^a (2.48)	.105 (.236)	3.80 ^a (2.56)	-.050 (.409)				-.103 ^c (1.41)	.34	F(3,78) = 2.72 ^b

The significance of the regression constants was tested by a two-tail t-test while the significance of the slope coefficients was tested using a one-tail t-test. a indicates that the coefficient is significant at the 1% level while b and c indicate significance at the 5% and 10% level respectively. The independent variables are:

Domestic variables:

CR = weighted average 4-firm concentration ratio
E = employment entropy measure of concentration
K/L = capital-labor ratio
ES = scale economies
CGR = consumer good ratio
GD = percentage growth of value added from 1963 to 1967

Foreign variables:

MN = index of multinational activity
GM = percentage growth of imports from 1963 to 1967
XVS = exports as a percent of value of shipments
MVS = imports as a percent of value of shipments
T = nominal tariff rate
NTB = non-tariff barriers

variable representing non-tariff barriers to foreign competitors display the expected positive sign and were significant at the 5% level, while those for the nominal tariff rate variable were not significant and have negative signs. These results suggest that non-tariff barriers may directly affect profit margins by de facto restricting imports, while nominal tariff rates may effect price levels, but not necessarily price-cost margins. The degree of effective tariff protection, rather than nominal protection is likely to be more important in affecting price-cost margins [22, 346], but estimates of effective tariff rates could not be obtained at our level of aggregation. Nonetheless, these results do support the hypothesis that protection from import competition (especially of a non-tariff nature) has allowed industries to maintain margins in excess of what would have been obtained if the economy were more open to foreign producers.

This conclusion is supported by the results obtained utilizing current import share and growth rate of imports as proxies for import competition. The coefficients for the import share variable have negative signs and are significant at the 5% level, while those for the growth rate in imports also display negative signs and are significant at the 10% level.

The results obtained for the export share variable were inconclusive. While in most cases the coefficient for this variable was negative, it was never statistically significant. Thus, no firm support can be given to the proposition that export opportunities and reliance on export markets for sales constrains producers to more competitive pricing and output decisions.

Finally, the coefficient for the direct foreign investment variable was positive as expected, and was significant in all cases at the 5% level or better. Unfortunately the rather crude construction of this variable does not allow us to disentangle the precise relationships and linkages involved. At this point we can only indicate that a general and strong relationship exists between the degree of

an industry's direct foreign investment and its resulting profitability and that further work in this area is warranted as more detailed industry statistics become available.

In order to evaluate the overall impact of the foreign factors in the structure profit relationship one final test was undertaken. The error sum of squares was computed for the restricted form of the model which only included domestic variables and for the various unrestricted forms of the model which included combinations of the foreign variables. The significance of the foreign factors was then determined by an F test for the reduction in error sum of squares between the restricted and unrestricted regression models. The F statistics obtained are presented in Table 1 and are significant, with one exception, at the 5% level. This result further reinforces the conclusion that foreign influences are important determinants of domestic price-cost margins in U. S. manufacturing.

V. CONCLUSIONS

This paper has investigated the role of international trade and investment activity on domestic industry profitability. The main purpose has been to integrate these foreign factors with traditional market structure variables in an empirical test of the determinants of price-cost margins in U.S. manufacturing industries. The results obtained provide considerable support for the hypothesis that market structure influences industry profitability. In particular, fewness of sellers, as measured either by a weighted concentration ratio or entropy, exerted a positive and statistically significant influence upon industry price-cost margins. In addition, the empirical results suggest that even in the United States, where the foreign sector constitutes a small percentage of GNP, foreign factors represent a fruitful addition to conventional domestic structure variables in explaining inter-industry differentials in price-cost margins.

Although the relationship between foreign trade and investment and domestic industry profitability is a complex one, a number of conclusions can be drawn. The evidence indicates that industries which faced greater degrees of actual and potential import competition obtained lower price-cost margins. In particular, lower margins have been maintained in industries in which the import share of output and the growth rate of imports are higher and the degree of import protection (especially of a non-tariff nature) is lower. Secondly, an industry's profitability was systematically related to the degree of direct foreign investment of the industry. Industries which have expanded across national boundaries through horizontal or vertical direct investment have maintained higher price-cost margins.

For research purposes, our results suggest that further analyses of the structure performance relationship should take into account the impact of foreign factors. In particular, the impact of the multi-national corporation on the structure and conduct of domestic industries needs more attention both at a theoretical and empirical level.

Finally, from a policy point of view the results of this study suggest that an opening of the economy through the reduction non-tariff barriers could improve industry performance, but that considerations of the balance of trade and balance of payments should be made before such policies are adopted.

FOOTNOTES

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1. An excellent survey of these studies was recently published by Weiss [31, 362-411]
2. These include the studies by McFetridge [22] and Jones, et al. [19] on Canada, Khalilzadeh-Shirazi [20] on the United Kingdom and House [15] on Kenya.
3. For a partial equilibrium proof of this result, see Caves and Jones [6, 209-210]. For a general equilibrium proof see Caves [5].
4. The economies realized in obtaining inputs through vertical integration rather than using the market are discussed in detail by R. H. Coase [8].
5. It is of course possible that similar rents could be earned through exporting the product or through licensing a foreign producer. Factors which would make foreign production the most profitable alternative include: the existence of tariffs and transportation costs, the necessity to adapt the specialized product or knowledge to local market conditions and the necessity to provide ancillary service to the foreign customers.
6. It is important to note here that margins will also be affected by differences in elasticity of demand. For a fuller discussion of this point see: Collins and Preston [9, 9-10]
7. This measure was calculated along the lines suggested by Horowitz [14].

Definitionally, entropy (E) = $-\sum q_i \log_2 q_i$, where q_i equals the share of employment in the i th firm. In monopoly situations there is no uncertainty and q_i equals 1, thus E assumes a value of 0. Entropy increases with either an increase in the number of firms or an increase in equality of firm size. For a more complete discussion of the merits of entropy vs. other concentration measures see: [13; 18]. The data utilized to construct this variable was found in [27].

8. For a more detailed description of this variable see Hufbauer [16, 221].

9. While one might prefer to use a more standard measure, such as the advertising to sales ratio, figures for this could not be obtained at our level of aggregation. In addition to providing a proxy for product differentiation, the consumer goods ratio would help to control for the fact that advertising expenditures are not netted out of the price-cost margin.

10. More specifically, the consumer goods ratio is defined as:

$$(CGR) = \frac{S^{kh} + \sum S^{kn} \cdot S^{nh}/S^n}{S^k}$$

where: S^{kh} and S^{kn} equal sales by industry to k to households and industry n respectively, S^{nh} represents sales by industry n to households, and S^k and S^h represent total sales of industry k and n respectively.

11. The data for nominal tariff rates were obtained from [10] and those for non-tariff barriers have been estimated by Walter [30, 341-342]. The non-tariff barrier proxy was defined as the percent of commodities subject to non-tariff barriers within each SITC commodity group.

12. Values for imports and exports were obtained from [24; 25], for domestic value of shipments from [27] and the proxy for multi-national activity from [3]. Foreign content was measured by either one or a combination of the following factors: sales, earnings, employment, or production abroad.

13. Two statistical problems are frequently encountered in this type of analysis: multicollinearity and heteroscedasticity. Inspection of the correlation matrix indicated that multicollinearity was probably not a severe problem. The highest intercorrelation among independent variables was .31 between the concentration ratio and the capital-labor ratio. Since the possibility still exists that one variable may be a linear combination of two or more variables, a test beyond examination of the correlation matrix was undertaken. Utilizing a procedure suggested by Murphy [23, 375-376] which compares the sums of the incremental contribution of each independent variable in explaining variations in the dependent variable to the collective or joint contribution of all variables simultaneously, no detection of multicollinearity was evident. Since it would not be unreasonable to suspect that the variance of disturbances in profit rates would differ between large vs. small industries or highly concentrated vs. unconcentrated industries heteroscedasticity may pose problems. We tested for this by means of a Quandt-Goldfeld test and were unable to accept the hypothesis of heteroscedasticity. The resulting F values were 1.3 and 1.5, below the critical level of 2.1.

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