Do Small Firms Compete with Large Firms?

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Despite the pervasive phenomenon of scale economies, the majority of firms have always been small firms. The emergence of small firms as a means of economic development on both sides of the Atlantic has been one of the major new topics of economic policy since the 1980s. This has drawn renewed attention to the question: How are small firms able to exist? The theories of strategic niches and dynamic complementarity imply that small firms seek out markets where they are able to avoid competition with their larger counterparts. This paper tests the validity of these theories by examining the extent to which small-firm profitability is set by large-firm profitability. Considerable evidence shows that the price-cost margins of small firms do not tend to follow those of large firms. This supports the theory that small firms pursue a strategy of producing in distinct product niches. (JEL L0, L6)

Introduction

One of the most consistent and striking empirical phenomena in economics is the persistence of an asymmetric size distribution of firms that are comprised of a relatively small number of large enterprises and heavily skewed toward a large number of small firms. This skewed firm-size distribution has been found to persist across industries, countries, and over time with a remarkable tenacity. At the same time, a large body of literature suggests that some, if not most, of these small enterprises are sufficiently small to be operating at a suboptimal scale of output because they are below the minimum efficient scale level of output. In 1991, upon reviewing the literature and examining the extent of suboptimal scale plants and firms in industrial markets, Leonard Weiss[1] concluded that:

> "In most industries the great majority of firms is sub-optimal. In a typical industry there are, let's say, one hundred firms. Typically only about five to ten of them will be operating at the MES (minimum efficient scale) level of output, or anything like it. So here is a subject that ought to be measured and critically analyzed and evaluated."

The persistence of a large portion of the firm-size distribution to consist of small enterprises raises the question of not only why do small firms exist, but also how are they able to exist? One answer, provided by a growing body of literature linking survival rates to firm size and age, is that they cannot exist, at least not for an indefinite period of time

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[Audretsch, 1995]. However, this paper suggests a different explanation. A theory of duality is relied upon which argues that small firms provide a different economic function than their larger counterparts and therefore do not directly compete with large firms. In particular, the theory of strategic niches, developed by Porter [1979] and Caves and Porter [1977], implies that by strategically occupying a market niche, small firms can avoid directly competing with large companies. A more precise justification of this niche strategy of small firms is given by Nooteboom [1994] who uses the concept of dynamic complementarity to explain why small and large firms might not compete with each other.

The view that small firms are suboptimal implies that firm profitability will be positively related to size. While substantial theoretical literature has emerged which predicts that firm profitability will rise along with firm size, a persuasive body of empirical studies have identified a positive relationship between market share and profitability [Schmalensee, 1985]. However, more recently, Porter [1979] and Caves and Porter [1977] have questioned the link between firm size and profitability. They argue that the activities of large and small firms differ within the same industry and are anything but homogeneous. The existence of what they term as interindustry barriers to mobility enables the formation of strategic groups and, in particular, small firms to seek out and defend strategic product niches. According to the theory of strategic niches, small firms will actually exhibit higher levels of profitability by occupying product niches in strategic groups that are inaccessible to their larger counterparts.

The purpose of this paper is to examine the extent to which small firms actually compete with large firms. This is done by comparing the determinants of large firm profitability with those of small firm profitability and the extent to which the profitability of small firms is determined by large firm profitability based on disaggregated manufacturing data from the Netherlands from 1975 to 1986. Considerable evidence shows that not only do price-cost margins tend to be higher for smaller firms than for their larger counterparts, but that small firms tend to constitute a strategic group in an industry that is distinct from the larger enterprises. Thus, it is concluded that, at least for the Netherlands, small firms do not tend to compete directly with large firms. There is no indication that these results are specific to the Netherlands and would be different in other countries of the Organization for Economic Cooperation and Development.

Theories of Strategic Niches and Dynamic Complementarity

The theory of strategic niches suggests that small and large enterprises are not engaged in homogeneous activities. Rather, the activities of smaller firms can be distinguished from their larger counterparts as a result of strategic choice. One variant of the strategic choice theory is that while all of the firms in a market may produce a homogeneous product, systematic differences exist regarding the deployment of production factors [Newman, 1978; Caves and Pugel, 1980]. An alternative is that small firms produce goods which are distinct from those manufactured by large firms. In particular, Porter [1979] hypothesized that such differences permit smaller firms to seek out and maintain

distinct product niches which enable smaller firms to experience higher rates of profitability than their larger counterparts for prolonged periods of time.

Acs and Audretsch [1990] found that small firms tend to be more innovative in the highly concentrated industries dominated by large enterprises. This suggests that in order to compensate for their size disadvantage, small firms deploy a strategy of creating an innovative niche. The pressure to create such an innovative niche is apparently greater in industries dominated by large enterprises.

A different approach is applied by Nooteboom [1994] where the strengths and weaknesses of small firms *vis-à-vis* their larger counterparts are discussed in his survey of many studies of both a qualitative (process descriptions) and quantitative (econometric cause and effect studies) nature. Building upon the core characteristics of small firms being small scale, their personality and independence, and by reinterpreting the work of Rothwell and Zegveld [1985], Nooteboom creates an image of derived characteristics and preferred core strategies which are different for small firms but which also differ with the various stages of development cycle of the industry. This implies that small firms have a greater potential flexibility and closeness to the customer but are lacking economies of scale, scope, and learning. Nooteboom refers to evidence of this so-called dynamic complementarity concerning the semiconductor technology, microcomputers, and even self-service retailing. The interpretation is that small firms have the edge on customization (low-volume niche markets) and innovation (low-volume temporary monopolies). Again, small firms seek out markets where their advantages count and they are not confronted with the direct competition from their larger counterparts.

Hypotheses and Measurement Issues

The Dutch Manufacturing data source is used to test the hypothesis that small firms seek out and maintain strategic niches. The data set consists of 66 Dutch manufacturing industries (equivalent to the three-digit level of the standard industrial classification in the U.S.) for the period 1975-86. The data will enable the construction of price-cost margins for two main groups of firms: large firms, defined as those with more than 50 employees, and small firms, defined as firms with fewer than 50 employees.[2] Price-cost margins are defined as the value of production minus labor costs, and cost of materials divided by value of production. The value of production equals that of sales plus the change in inventories. Figure 1 shows that the average price-cost margin of small firms exceeds that of large firms in every year, with the exception of the first year.

To explicitly test the hypothesis that the price-cost margins of the small firms follow those of the large firms, the following nonlinear two-equation model is estimated:

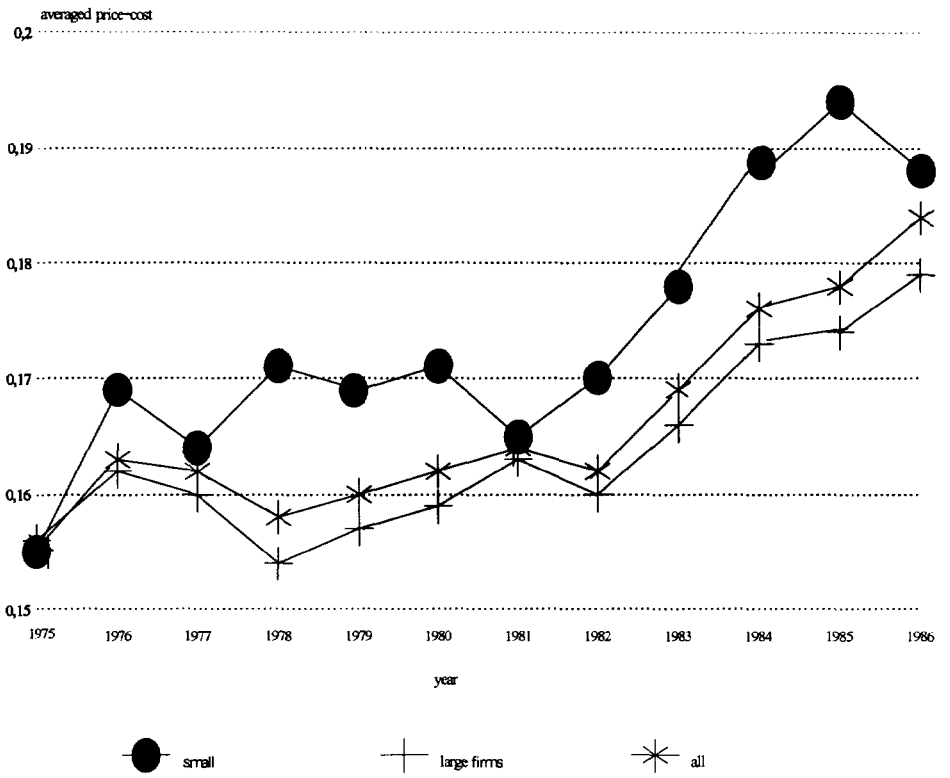
$$\pi_s^{it} = \alpha\pi_l^{it} + (1 - \alpha)\gamma MS_s^{it} + \eta_s^{it} \quad , \tag{1}$$

and

$$\pi_l^{it} = \beta MS_l^{it} + \eta_l^{it} \quad , \tag{2}$$

where price-cost margins of the large firms, π_l, are explained by industry-specific variables, MS_l. The price-cost margins of the small firms, π_s, are explained by those of the large firms, π_l, and by industry-specific characteristics, MS_s. The extent to which the price-cost margins of the small firms follow those of large firms is measured by α. If α approaches 1, then it can be inferred that large firms are the leaders and small firms tend to be price-cost margin followers. On the other hand, if α approaches zero, then it can be inferred that the price-cost margins of small firms tend to be set independently of their larger counterparts. The superscripts refer to the industry, i, and the year, t. The error terms are expressed by η_s and η_l.

FIGURE 1
Average Price-Cost Margins for 1975-86
and Aggregated Figures for the 36 Dutch Manufacturing Industries



The industry-specific characteristics which have traditionally been hypothesized to influence price-cost margins [Scherer and Ross, 1990] include the extent of seller concentration, measured as the four-firm concentration ratio, and the small business

presence, measured as the number of firms in the industry with between 10 and 50 employees [Prince and Thurik, 1993]. While the four-firm concentration ratio is expected to have a positive impact on price-cost margins, the small business presence should have a negative impact on price-cost margins. Capital intensity is measured as the value of the capital stock divided by the value of production where the value of the capital stock is approximated by totaling the amount of fixed capital formation in the preceding 10 years. The price-cost margin is expected to be positively related to capital intensity. The degree of capacity utilization in explaining price-cost margins is addressed in Domowitz et al., [1986]. A positive relationship is expected between the price-cost margin and the degree of capacity utilization. Market growth, measured as the relative change in sales over this period, is expected to have a positive impact on price-cost margins.

In a small open economy such as the Netherlands, imports and exports have an impact on price-cost margins [Pugel, 1980; Prince and Thurik, 1992]. While the export share is expected to exert a positive influence on price-cost margins, the import share is expected to have a negative impact on price-cost margins.[3] In addition, as Pugel [1980] argues, price-cost margins may be particularly sensitive to export performance in industries which are oriented toward consumer goods. Thus, this study includes a multiplicative variable of the share of consumption represented by household consumption (HHC) times the export share. An analogous multiplicative variable multiplying the concentration ratio times the share of consumption represented by HHC is similarly included.

From the great deal of literature linking industry-specific characteristics to price-cost margins, the following explanatory variables are expected to have a positive impact on price-cost margins: concentration ratio, capital intensity, capacity utilization, growth, and export share. By contrast, the small business presence and the relative importance of competing imports are expected to exert a negative impact on the price-cost margin. Because capacity utilization, growth, and export share can be measured separately for large and small firms, the matrices of industry-specific variables MS_s and MS_l differ from each other.

Results

The within-between estimation method is applied to partition the effects of the explanatory variables in time-serial (intertemporal) and cross-sectional (interindustry) effects [Prince and Thurik, 1992]. Table 1 shows the pooled results. The most striking result concerns the coefficient, α, which measures the extent to which the price-cost margins of small firms follow the price-cost margins of the large firms. The pooled coefficient does not differ statistically from zero[4] which suggests that the price-cost margins of small firms are completely independent of the price-cost margins of large firms. There is no evidence of any type of leader-follower relationship between large and small firms.

However, when the model is partitioned into intertemporal and interindustry effects, there does appear to be a positive relationship of price-cost margins between large and

small firms, at least in the long run. Still, the coefficient of 0.281, although statistically significant, is not particularly large. In the short run, the relationship is actually negative, suggesting that there is again no evidence of a leader-follower relationship between large and small firms.

TABLE 1
Pooled Estimation Results of (1) and (2)

	Small Firms (α, γ)		Large Firms (β)	
Price-Cost Margin $_{\text{Large Firms}}$	.048	(0.8)		
Intercept	.112	(4.3)	.111	(4.1)
Seller Concentration	-.104	(-2.4)	-.122	(-2.9)
Small Business Presence	-.080	(-3.1)	-.048	(-1.9)
Capital Intensity	.134	(5.6)	.007	(0.3)
Capacity Utilization	.097	(7.0)	.109	(9.5)
Relative Change in Sales	.013	(2.0)	.019	(2.3)
Export Share	.115	(2.0	.067	(2.4)
Competing Imports	.002	(0.3)	.003	(0.5)
Share HHC x Seller Concentration	.090	(1.2)	-.134	(-2.1)
Share HHC x Export Share	-.194	(-1.8)	-.107	(-2.2)
Adjusted R^2	.723		.391	

Notes: Number of observations = 432. A test on heteroskedasticity showed that there is heteroskedasticity over the industries. There also appeared to be first-order autocorrelation. The model is estimated by means of nonlinear 3SLS and corrected for first-order autocorrelation and heteroskedasticity.

The other determinants of price-cost margins suggest some similarities and some differences between large and small firms. In the pooled regression results shown in Table 1, the price-cost margins of both large and small firms are similarly influenced by the extent of seller concentration, the small business presence, capacity utilization, growth, the export share of the industry, and competing imports. However, the price-cost margins of large firms respond differently than those of small firms to the degree of capital intensity in the industry and the degree to which an industry is oriented toward consumer goods. These differences become somewhat more accentuated when the effects are decomposed into intertemporal (within) and interindustry (between) as in Table 2.

This paper does not discuss the particular estimations of b and g here at length because the focus is on the leader-follower effect represented by α (see Prince and Thurik [1993]).

TABLE 2
Within-Between Results of (1) and (2)

	Small Firms (α, γ)		Large Firms (β)	
Intertemporal Effects (Within)				
Price-Cost Margin $_{\text{Large Firms}}$	-.106	(-2.1)		
Seller Concentration	.041	(0.6)	-.151	(-2.2)
Small Business Presence	-.024	(-0.6)	-.017	(-0.6)
Capital Intensity	-.070	(-2.8)	-.054	(-2.1)
Capacity Utilization	.048	(4.3)	.056	(6.1)
Relative Change in Sales	.008	(1.3)	.024	(2.6)
Export Share	-.003	(-0.1)	.085	(2.1)
Competing Imports	.020	(2.8)	.005	(0.6)
Share HHC x Seller Concentration	.032	(0.5)	.069	(0.9)
Share HHC x Export Share	.031	(0.6)	-.155	(-2.2)
Interindustry Effects (Between)				
Price-Cost Margin $_{\text{Large Firms}}$	.281	(3.1)		
Intercept	-.278	(-2.7)	-.391	(-2.5)
Seller Concentration	-.125	(-2.2)	-.067	(-0.8)
Small Business Presence	-.168	(-4.7)	-.034	(-0.6)
Capital Intensity	.292	(6.9)	.034	(0.9)
Capacity Utilization	.575	(4.7)	.593	(3.8)
Relative Change in Sales	-.350	(-2.6)	-.018	(-0.1)
Export Share	.217	(3.2)	.035	(0.6)
Competing Imports	-.001	(-0.1)	.019	(1.8)
Share HHC x Seller Concentration	.099	(1.2)	.132	(1.3)
Share HHC x Export Share	-.321	(-2.5)	-.056	(-0.7)
Adjusted R^2	.850		.437	

Notes: Number of observations = 432. A test on heteroskedasticity showed that there is heteroskedasticity over the industries. There also appeared to be first-order autocorrelation. The model is estimated by means of nonlinear 3SLS and corrected for first-order autocorrelation and heteroskedasticity.

Conclusions

The evidence presented in this paper suggests that small firms do not compete directly with large firms. The evidence is provided based on a data set covering an extensive share of the manufacturing industry in a period (1975-86) with considerable cyclical variation in a midsized economy (the Netherlands). The inference is based on the finding that small-firm profits are independent of large-firm profits. Most importantly, this result suggests that large and small firms operate in distinct segments of the market rather than competing directly. The evidence suggests that small firms do not follow large firms but, rather, pursue their own independent policies. By pursuing a strategy of product niches, small firms may belong to a strategic group that is distinct from that of their larger counterparts. Such niche strategies apparently enable small firms to realize price-cost margins that are actually in excess of price-cost margins earned by their larger counterparts. The theory of dynamic complementarity implies that such strategies involve customization and innovation.

What are the economic welfare and policy implications? In 1991, Leonard Weiss argued that the existence of small firms that are suboptimal within the organization of an industry represented a loss in economic efficiency. Weiss advocated any public policy which "...creates social gains in the form of less sub-optimal capacity" [Audretsch and Yamawaki, 1992]. Such policy conclusions are based on the belief that small firms are merely small-scale clones of their larger counterparts. To the degree that they experience higher costs, small firms impose a loss in allocative efficiency. However, the evidence from this paper suggests a different view of small firms. Rather than imposing a dead-weight loss on society, the process of creating and occupying a strategic niche enables the small firm to serve as an agent of change through innovative activity.

Footnotes

1. The quotation is from the Editor's Introduction in Audretsch and Yamawaki [1992, p. xiv].
2. No information is available for the smallest firms employing fewer than 10 employees.
3. See Prince and Thurik [1994] for more evidence of the (dis)similarities between the U.S. and the Netherlands when explaining price-cost margins.
4. The test-statistic T^0, described in Gallant and Jorgenson [1979, p. 279], equals 32.7 while the corresponding critical value is 16.9.

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