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The Determination of Profits in Japan’s Small Business Sector

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Abstract

In this paper we seek to establish those factors which are fundamental to the determination of price-cost margins (PCM) in Japanese manufacturing SMEs. Our major empirical findings are that; (1) concentration and mobility across markets appear not to influence PCM; (2) the relative dominance of SMEs in an industry has no effect either; (3) the nature of subcontracting relationship was not influential; (4) industry growth and import propensity had insignificant effects, and; (5) advertising and R&D do influence PCM. We conclude that the ability of SMEs to generate profits in Japan’s manufacturing sector depends, to a large extent, on the ability of firms to successfully differentiate their products combined with a commitment to successfully innovate by supporting R&D. This latter finding has significant implications for public policy vis a vis SMEs in Japan.

I. Introduction

Although SMEs in Japan have long been viewed as a fundamental component in the success of Japanese industrial development, increasingly academics and policymakers are looking to this sector to drag Japan’s stagnant economy into a new era of dynamic growth. This must occur in the face of increasing internal and external pressure. Yet despite these serious difficulties, SMEs are expected to play a significant role in the industrial restructuring of Japan’s depressed economy despite the fact that they are suffering on a previously unprecedented scale with failure rates at their highest levels for decades.

However, whilst Japanese SMEs have been a focal point for researchers seeking to explain the post-war success of Japanese industry, there have been virtually no studies examining their profit performance. What little research there has been is derived from ad hoc studies which have tended to highlight relative performance but not considered how performance has been determined. In short they have lacked rigour and have failed to systematically identify why performance differs between SMEs and larger firms.
Yet such an investigation is fundamental to our understanding of the role and functioning of the small business sector. Thus we propose to examine how profits are determined in Japanese manufacturing by adopting a highly disaggregated approach designed to fill this research gap. To our knowledge, this is the first study to examine these relationships in this fashion. As such, our findings may have significant implications for public policy and for the determination of business strategies for firms.

The rest of the paper is organised as follows; section II examines the existing literature and seeks to draw out the key concepts and relationships which impact on PCM from the field of industrial economics. In section III we discuss our empirical methodology for testing these relationships. Section IV presents our results and discussed their implications. We conclude in section V and identify some key areas for future research.

II. Literature Review
The industrial economics literature strongly supports the view that profits depend upon market structure. As such there is likely to be considerable variation across industries. We can generalise profits (π) as;

\[ \Pi = P*Q(P) - AC(Q)*Q(P) \]  

(1)

where P (=αP) is SMEs price, P_i industry price or leading firms price, α an index of SME pricing power (usually <1), Q, SMEs output, and AC(Q) SMEs average cost. From (1) we observe that SME profits depend upon either the magnitude of α, the level of AC, or both. Importantly, α is normally less than unity as SME pricing power is typically less than their large firm counterparts. Thus market structure elements are likely to affect SME profits through pricing effects or through cost efficiency.

On prices, and assuming that leading firms in a concentrated industry can set higher prices, then the effects of market power may spill over to SMEs. This occurs because SMEs may set prices at a similar level (i.e α=1). This is termed the umbrella effect of
monopolistic pricing. In this way SMEs in a concentrated industry can generate high profits. It follows that with increasing concentration the profit rate of SMEs may tend to increase across industries.

The reverse might be true if SMEs have no power over prices ($\alpha<1$). This feature has been identified in the real world where we frequently observe price differentials between national brands, private own brands and tertiary brands. Here prices fall as we move from national brands down to tertiary brands. Such relationships have been observed in the UK and Japan. Importantly, the tertiary brands are usually the products of SMEs. This represents a significant disadvantage for SMEs vis a vis larger firms. These sorts of effects are termed inter-industry mobility barriers and arise as SMEs have no product differentiation advantages of the type available to large firms. In many consumer goods industries in particular, there exist large price differentials between national and local brands. Such effects are further compounded in progressive industries where it is difficult for SMEs to keep pace with changing technology.

Next we consider technical efficiency. Firstly, it is apparent that SMEs may suffer disadvantages in efficiency in industries with large scale economies primarily due to their size of operation being below the optimum level. Secondly, intra-industry mobility barriers may provide SMEs with significant disadvantages. This can be particularly acute in situations where product differentiation forces SMEs to incur higher costs in order to offset the goodwill assets of large firms. Thus SMEs in an advertising intensive industry would generate lower profits. Thirdly, technological progress provides SMEs with significant costs disadvantages, although the advantage of leading firms over SMEs in innovation is neither empirically or theoretically conclusive. The fourth, and final, factor influencing SME profits are inherent in the structural relationships of their production. By this we refer to vertical subcontracting relationships. Doi and Cowling (1998b), for example, show that many Japanese SMEs are involved in subcontracting, although the rate of this has decreased in recent years. For those SMEs involved in such vertical relationships the possibility of large firms exerting a degree of monopsonistic power over small firms is likely to lower
profits. Thus we can identify many factors which might generate considerable disadvantages for SMEs in terms of pricing and efficiency.

Several studies have sought to empirically verify such relationships. Osborn (1970), Demsetz (1973) and Bowring (1986), for example, all found it difficult to establish relationships between concentration and profitability for SMEs. However, they did identify a positive and significant relationship between concentration and industry profitability. Demsetz attributes this to increased efficiency in larger firms in highly concentrated markets due to scale economies and innovation. Yet this reasoning is incomplete as it fails to explain why the relative inefficiency of SMEs and lower pricing power does not translate into lower profits. The opposing view is put by Caves and Pugel (1980), who show that SMEs in more concentrated industries tend to generate higher profits, not too dissimilar to that recorded by large firms. These findings imply that the effects of leading firms market power may indeed spill over to SMEs.

In short, there is no empirical consensus on the relationship between concentration and SME profits. This is compounded in Japan by the lack of empirical investigation to date. However, one previous study in Japan which investigated efficiency considerations, that of Doi (1988), found that SME efficiency tends to decline relative to leading firms as concentration increases. This supports the Demsetz type relationship, not the Caves-Pugel type. Despite this, lower efficiency does not always imply lower profits. In SMEs, for example, lower efficiency may be offset by lower wages. On this, Audretsch and Yamawaki (1992) suggest that the difference between suboptimal and optimal size in an industry is positively related to its compensation. Therefore there is no consistent bilateral relationship between efficiency and profits across firms or industries.

III. Methodology
In order to establish those factors which significantly determine SME profits we estimate the following equation;
\[ \Pi = \beta_0 + \beta_i \Sigma_i X_i \quad i = 1, \ldots, n \]  

where \( \Pi \) is SMEs price-cost margin (PCM) in an industry, \( X_i \) \( (i = 1, \ldots, n) \) a vector of \( n \) observable industry specific variables, \( \beta_0 \) and \( \beta_i \) coefficients and \( \mu \) the error term. SME profit performance is measured by the price-cost margin. Our potential explanatory variables are concentration, industry growth, SMEs share of total output, capital intensity, advertising intensity, R&D intensity, market mobility, outsourcing ratio and import intensity. The equations were estimated by OLS for 76 four-digit industries in 1990. The choice of sample size was determined by data availability.

The profit equations take into account possible interdependence between profit and its determinants to avoid simultaneity bias arising from the dependence of the explanatory variables and the error terms. Here this problem is reduced as the data is collected at the industry level and as such is more likely to be exogenous to the decision-making of SMEs.

Here we discuss our data sources and definitions:

(1) SMEs PCM (PCM) - SMEs are firms with less than 100 million Yen of equity capital. This is consistent with official definitions. PCM are calculated from the Census of Manufacturers: Report by Firms and defined as: [value of shipments - wages]/ value of shipments for SMEs.

(2) Concentration (CR) - Measured at the 4-firm cumulative concentration ratio by production for 1990. Source: The Cumulative Concentration Ratio and Herfindahl Index in Major Industries.


(5) SME share (MS) - Defined as the market share of firms with less than 100 million Yen equity capital as a share of total industry value of shipments. Source: Census of Manufacturers by Firm and Census by industry.

(6) Advertising Intensity (AD) - Defined as the ratio of advertising expenditures to industry output in 1990. Source: The Input-Output Table, 1990.


(8) Market Mobility (MB) - Defined as: \[ \frac{\sum_{i} (S_{it} - S_{i0}) + \sum_{j} X_{j0} + \sum_{j} E N_{kt}}{\sum_{i} S_{i0} + \sum_{j} E X_{j0}} \quad i,j = 1,...,n \]

where \( S_{it} \) is the share in the final year, \( t \), of firm \( i \) surviving within the largest \( N \) firms throughout the period. \( S_{i0} \) is its share in the initial period, 0. \( EX_{j0} \) is the start year share of firm \( j \) which existed in the top \( N \) firms in the start year, but was not in the top \( N \) in the final year. \( E N_{kt} \) is the final year share of firm, \( k \), which was not in the top \( N \) firms in the start year but was by the final year. The numerator is the cumulative concentration ratio of the top \( N \) firms in the start year. In this case \( N \) is the top 5 firms.

(9) Outsourcing Ratio (OS) and Internal Transactions Ratio (IN) - The outsourcing ratio is defined here as production consignments/output in an industry. The internal transaction ration is defined as total output / intra-industry output derived at the 6-digit industry level. Source: OS from the Census by Industry, IN from Input-Output Tables.

(10) Import Intensity (IM) - Defined as Imports / Industry Output. Source: Input-Output Table.
IV Results

The estimated results are shown in Table 1. We now consider the specific results in turn.

[insert table 1 here]

The first point of interest is that concentration (CR) has a negative, but insignificant effect. This contrasts with the results of some previous studies but is consistent with those reported by Demsetz. We tentatively conclude that the effect of concentration does not spill over to SMEs. This negative sign has two possible explanations; firstly that SMEs in more concentrated industries are less efficient due to scale economies or intra-industry mobility barriers and secondly that SMEs have a low $\alpha$ indicating weak pricing power. Yet the overall insignificance of this effect suggests that neither explanation is valid in our study. This is given further support by the insignificance of our market mobility variable (MB) and our second key finding that the relative share of SMEs in an industry has no significant effect.

Where we do find significant effects are in terms of industry level capital intensity. Here we observe that capital intensive industries have higher PCM. This result is consistent with industry level studies. Further important non-significant result are that industry growth (IG) and import propensity (IM) both exert no influence on profit determination. These results are particularly vexing and contrary to many existing studies at the industry level. One might expect, for example, that growth industries provide a fertile climate for SMEs, and one in which benefits might be observed through increased profits. Conversely, SME profits do not appear to be adversely affected by pressure from import competition. Equally, we find no significant relationships between our two subcontracting variables (OS) and (IN) and profits, which implies that subcontracting relationships have no discernible effects upon efficiency amongst SMEs.
Perhaps our most important significant findings were that advertising intensity (AD) and R&D intensity (RD) both influence PCM in a positive fashion. This conflicts with our a priori expectations where we assumed a negative relationship with PCM attributable to the ability of both factors to act as barriers to growth. This result is consistent, at a more general level, with the role of advertising as a means of raising PCM by product differentiation via its affects on the price elasticity of demand. Paradoxically, in advertising and R&D intensive industries SMEs as well as large firms have higher PCM. These results imply that in consumer goods industries and progressive industries SMEs have greater advantages than SMEs in other industries. This sort of evidence is as important for corporate strategy as it is for public policy.

V. Conclusion.

We have sought to empirically identify the key determinants of PCM at a disaggregated industry level in Japan's manufacturing sector with particular reference to SMEs. Our major findings are that market concentration has little influence over PCM, nor does the nature of subcontracting relationships. The first result is contrary to perceived wisdom in mainstream industrial economics and the second implicitly questions the precise nature of the role that subcontracting has played in Japan's phenomenal post-war industrial success.

At the level of the firm the results strongly support the notion that successful SMEs should focus on internal characteristics and seek to be innovative in terms of the products they offer to the market and adroit in the way they market these to consumers. Both of these findings have important implications for public policy in Japan. For example, it would appear desirable for policy to seek to create environments conducive to the promotion of innovative activity in SMEs. This contrasts with the current policy focus which is one of protectionism often via government organised cartels.

In terms of the direction of future research, this study has left many important gaps in our knowledge. In particular we did not explicitly address the issue of profit differentials between large and small firms, confining our analysis to those factors
which did most to influence the level of profit. In addition our estimation, although
disaggregated at the industry level, did not incorporate firm level variables which as
our own results suggest may play a significant role in profit determination. This
would require survey based information which currently is not available. To
summarise we have provided empirical evidence on an issue which has to date been
neglected in Japan and in the light of our findings have provided a base for further
work on an issue of fundamental importance to the Japanese economy in the coming
decade.

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