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PROFIT MARGINS IN FINNISH INDUSTRY

- a Panel Data Analysis

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ABSTRACT: The study investigates factors having an effect on the profit-margins in Finnish industry. The firm-level panel data has been used. The output markets have been split into domestic and foreign markets, and market shares in these two markets have been measured separately. The theoretical starting point for the study has been the Cowling-Waterson (1976) model. Also the models by Machin and van Reenen (1992), Porter (1979) and Demsetz (1973,1974) has been discussed.

Both static and dynamic equations has been estimated. Significant differences between the domestic and the export sectors are reported in the static estimation results. This may be due to the different competitive positions in the two sectors.

KEY WORDS: dynamic panel-data models, profit margins

SUMMARY

This study investigates factors having an effect on the profit-margins in Finnish industry. Firm-level panel data (Aalto, 1993) has been used. Etlatieto's database for the 500 biggest firms in Finland compiled by the business magazine Talouselämä has been used as a primary data source.

The aim of the paper is to study the relation between profit margins and market shares. The output markets have been split into domestic and foreign markets, and market shares in these two markets have been measured separately. Different measures for domestic market shares have been examined, and possible differences between the industries have been studied.

The theoretical starting point for the study has been the Cowling-Waterson (1976) model, which has been extended to include also factors affecting the profit margins other than the pure market share (Machin and van Reenen, 1992). Also the models by Porter (1979) and Demsetz (1973,1974) has been used to explain the relationship between the profit margins and the market shares.

Significant differences between the domestic and the export sectors are reported in the static estimation results. In the former sector the market share variable coefficients in the profit-margin equations were found to be negative, whereas in the export sector the corresponding coefficient was positive. The Cowling-Waterson model was rejected in the domestic sector, whereas the open sector results were not in a contradiction with this model.

Both static and dynamic equations were estimated. The largest deviation between these two approaches concerns the export market coefficient. In the former case the coefficient was found to be positive, whereas in the latter case an indication of negativeness was obtained. The contradiction in these findings complicates the overall conclusions concerning the export market behaviour. One possible reasoning for the ambiguous sign of the export market share variable might be that of a zero coefficient, which could be due to the competitive market behaviour in the export market. When a small open economy like Finland is considered, this outcome would be natural.

YHTEENVETO

Tutkimuksessa tarkastellaan yritysten voittomarginaaleihin vaikuttavia tekijöitä. Tutkimuksessa on käytetty yritystason paneeliaineistoa (Aalto, 1993). Aineiston lähteenä on ollut ETLATIEDON suuryritystietokanta, joka perustuu Talouselämä-lehden toimittamaan aineistoon.

Erityistä huomiota tutkimuksessa on kiinnitetty voittomarginaalien ja yritysten markkinaosuuksien väliseen suhteeseen. Yritysten tuotanto on jaettu koti- ja vientimarkkinoihin, ja näiden markkinaosuudet on arvioitu erikseen. Kotimarkkinoiden markkinaosuuksia on arvioitu usealla eri mittarilla. Myös toimialojen välisiä eroja on tutkittu.

Tutkimuksen teoreettinen lähtökohta on ns. Cowling-Waterson (1976) -malli, jota on laajennettu ottamaan huomioon markkinaosuuden lisäksi myös muita voittomarginaaleihin vaikuttavia tekijöitä (Machin ja van Reenen, 1992). Myös Porterin (1979) ja Demsetzin (1973,1974) malleja on käytetty selittämään voittomarginaalien ja markkinaosuuksien välistä suhdetta.

Tulosten mukaan markkinaosuuden ja voittomarginaalin välinen suhde on erilainen kotimarkkinasektorilla ja vientisektorilla. Kotimarkkinasektorilla markkinaosuusmuuttujan kerroin voittomarginaaliyhtälössä oli negatiivinen, kun taas vientisektorilla vastaava kerroin oli positiivinen. Tulosten mukaan Cowling-Waterson -malli hylättiin kotimarkkinasektorilla, kun taas vientisektorin tulokset eivät olleet ristiriidassa tämän mallin kanssa.

Tutkimuksessa estimoitiin sekä staattisia että dynaamisia yhtälöitä. Suurin ero näiden kahden eri lähestymistavan tuloksissa havaittiin viennin markkinaosuusmuuttujan kertoimessa. Staattisilla malleilla saatujen tulosten mukaan viennin markkinaosuusmuuttujan kerroin oli positiivinen, kun taas dynaamisissa yhtälöissä tilanne oli päinvastainen. Yksi mahdollinen tulkinta tälle on se, että tulokset ovat vientisektorilla lähellä kilpailullisten markkinoiden edellyttämää nollakerrointa.

Contents

1 Introduction

Perfect competition is often considered as an ideal solution for a market economy. When perfect competition regime prevails, the firms set their production volume so that the production cost of the last production unit is equal to the price. In other words, in the optimum marginal costs and prices are equal.

In practice, perfect competition seldom prevails. The small size of the market, product differentiation, public sector interventions and the existence of scarce factors of production may lead to deviations between the marginal costs and the prices. If this is the case, the producers may have an influence on the price-formation, and there may exist strategic behaviour between the competitors.

The larger are the deviations from perfect competition pricing, the larger are the possible inefficiencies in the allocation mechanism. Imperfect competition, market structures and pricing have been crucial targets for economic research. Lately studies in this area have been undertaken in Finland by, for example, Alho (1993) and Torsti (1993). At the industry level work in this field has been undertaken by Wahlroos (1980), Virtanen (1987) and Kivinen and Mäkinen (1993).

Although the aggregate- and industry-level studies may offer a clear general view about price-margins and their magnitudes, these studies inevitably obscure many factors concerning the price formation process. The aggregate-level data concentrates the economic analysis to a few data points, which may not give an adequate understanding of the problem under consideration. In principle a large proportion of the economic analysis related to the market structures and the pricing behaviour should concern micro-level phenomena. Also the relation between the micro-level decisions and the macro-level behaviour should play a key role in the economic analysis. This gives support to the use of micro-level data in economic research.

This study investigates factors having an effect to the profit-margins in Finnish industry. The firm-level panel data (Aalto, 1993) has been used. Etlatieto's database for the 500 biggest firms in Finland compiled by the business magazine Talouselämä has been used as a primary data source. The database covers accounting data for as much as 7 years. Aggregate-level data has been used to supplement the firm-level data. In this study the large manufacturing firms in the database which comprise at least four observations have been included in the sample under consideration. The firms operating in other branches than manufacturing, for example services, are excluded from the study.

The aim of the paper is to study the relation between the profit margins and the market shares. The output markets have been split into domestic and foreign markets, and market shares in these two markets have been measured separately. Different measures for domestic market shares have been examined, and possible differences between the industries have been studied. The theoretical starting point for the study has been the Cowling-Waterson (1976) model, which has been extended to include also other factors affecting on the profit margins than the pure market share (Machin and van Reenen, 1992). Also the models by Porter (1979) and Demsetz (1973,1974) has been used to explain the relationship between the profit margins and the market shares.

Section two briefly introduces the basic concepts related to the earlier price-margin studies. Section three introduces the data. The following section discusses the panel estimation of the profit-margin equations and presents the empirical results. At the end of the paper some conclusions are drawn.

2 Profit margins and market shares

Firm i is assumed to maximise its profit

$$\Pi_i = P(Q)q_i - C_i(q_i), \tag{1}$$

where $P(Q)$ denotes the inverse demand function in the market. The firms face a downward sloping demand curve, and the assumption of perfect competition is not maintained. The symbol q_i denotes the production quantity and C_i is the cost function of firm i.

The first order condition for the profit maximisation states that the output quantity of firm i should be set so that the marginal cost and the marginal revenue are equal:

$$\begin{aligned} \partial\Pi_i/\partial q_i &= (\partial P/\partial Q)(\partial Q/\partial q_i)q_i + P - \partial C/\partial q_i \\ &= (-(\partial P/\partial Q)(Q/P))(P/Q)(1 + \Sigma_{j\neq i}\partial q_j/\partial q_i)q_i + P - MC_i \\ &= ((-1/\epsilon)S_i(1+\lambda_i)+1)P - MC_i = 0. \end{aligned} \tag{2}$$

The symbol $S_i = q_i/Q$ denotes the market share of firm i, ϵ stands for the price elasticity on the market and λ_i denotes the conjectural variations. In other words, it describes the reactions of other firms to the changes in the output quantity of firm i.

The homogeneous product oligopoly model characterised above is called the Cowling-Waterson (1976) model. It can be written in the form

$$(P - MC_i)/P = S_i(1 + \lambda_i)/\epsilon. \tag{3}$$

The LHS of equation (3) is the price-cost margin. It announces the deviation between the market price P and the marginal cost MC_i of firm i. The equation above requires knowledge about the marginal costs. Usually this information is not directly available, but the marginal costs can be estimated. The characterisation of the production technology by using, for example, production or cost functions is needed to calculate the marginal costs. On the aggregate level these calculations have been undertaken by, for instance, Torsti (1993).

Several special cases can be obtained for equation (3) above. If the number of enterprises is very large, the market shares approach zero. In this special limit case the market structure of perfect competition is obtained, where prices and marginal costs are equal. The price-margins are zero also when $\lambda_i = -1$. In this case the other firms react to the increase of the output quantity q_i by reducing their production by the same amount. Furthermore, the monopoly or the collusion case is obtained when the firms make an attempt to keep their market shares constant. In this case $\partial q_j/\partial q_i = S_j/S_i$, and $\lambda_i = (1 - S_i)/S_i$. In the case of collusion the profit margin is $1/\epsilon$. If the firms' reactions to rivals' output changes are assumed to be zero, the case of the Cournot-competition is obtained. In this case $\lambda_i = 0$, and the profit margin is equal to S_i/ϵ. As a summary one can conclude that $-1 \leq \lambda_i \leq (1 - S_i)/S_i$.

The problem with the conjectural variation term λ_i is that it is not an observable variable. In empirical applications a proxy variable is needed to characterise the conjectural variations. For example Clarke and Davies (1982) used the following parameterisation: $\lambda_i = \alpha_i(1 - S_i)S_i$, which is a weighted average of the monopoly $(1/\epsilon)$ and the Cournot-competition (S_i/ϵ). Although the Clarke-Davies parameterisation is a tempting choice, it makes the term λ_i decreasing with respect to the market share $(\partial\lambda_i/\partial S_i < 0)$. This would mean that the rivals react to the output choices of the large firms less than to the output choices of the small firms. Machin and van Reenen (1992) have put forward an extended parameterisation $\lambda_i = \alpha_{1i}(1 - S_i)/S_i + \alpha_{2i}(1/S_i)$, which takes into account not only the distribution of the market shares but also the market share of the firm i.

The estimation of the marginal costs and the specification of the production technology is not always the most competent approach to the price-margin research. Particularly when micro-data is used, it is often assumed that the marginal costs and the average costs are on a par. In this case an assumption of the constant returns to scale is preserved. If this is the case, the LHS of the equation (3) may be written as a profit margin $\Pi/Sale$, where Π is, for example, the operating margin and $Sale$ is the total sales or turnover. Conyon and Machin (1991) have also extended equation (3) to include the possible bias following from the use of the average cost instead of the marginal cost. They added a correction term to the basic Cowling-Waterson (1976) equation (3), which allowed for analysing the impact of the non-homothetic technologies to the profit margins. In spite of the analytical interest the extension has not had a noticeable role in empirical price-margin research.

The model characterised above is totally based on the analysis of the market structure. It does not take into account the elements concerning factor prices, like the bargaining power of the labour unions or the relation between wages and labour productivity. For example Conyon and Machin (1991) and Machin and van Reenen (1992) have extended the basic Cowling-Waterson model to consider also the labour market conditions. In this case the relation between labour unions and profits is emphasised. For example, the empirical studies with US and UK data have given some evidence that when the unionisation rate of the workers grows the firms' profits decrease[1]. In Finland the unionisation rate is at an all-time high, and no differences in profits are expected to prevail owing to differences in unionisation rates.

Equation (3) is an equilibrium condition. It does not take into account adjustment costs or other intricate extensions. For example, if adjustment costs exist when the output quantities are altered, the firm's optimum may be a slow adjustment towards the long-run optimal steady state. If these adjustment costs play a key role in the firm behaviour, also the dynamic dimensions of the problem should be taken into account[2]. In practice

[1] See e.g. Freeman (1983), Karier (1985) and Machin (1990).

[2] The dynamic models have been discussed by e.g. Geroski and Masson (1987) and Levy (1987). With the aggregate data the comparison between the static and the dynamic models has been made by e.g. Torsti (1993).

this could mean the specification of a partial adjustment model and the use of lagged dependent variables. This requires the use of panel or time-series data.

Equation (3) is deficient also because it does not pay attention to the relation between business cycles and profits. The common opinion is that the macroeconomic fluctuations have especially in recent times had a remarkable effect on the firms' profits. The relation between the macroeconomic and profit fluctuations has been studied by, for example, Green and Porter (1984), Rotemberg and Saloner (1986) and Domowitz, Hubbard and Petersen (1986,1987,1988). Porter (1979) suggested that the profits behave pro-cyclically, whereas Green and Porter suggest that when the economy is booming, the profits decrease. Machin and van Reenen (1992) have obtained empirical evidence for the pro-cyclical behaviour.

The justification for the analysis above is based mainly of the Cowling-Waterson model. It is a model which relates the firm-level market power to its market share. Another explanation for the price-formation is the model of industry-level collusion. In this shared asset model (Porter, 1979) it is assumed that all firms in one industry can gain from the possible market power in the industry. Empirical tests of the Cowling-Waterson and the shared asset hypotheses can be performed by comparing the estimated coefficients of the market shares and the concentration ratios (Bourlakis, 1992). Unfortunately the data does not allow for the construction of the industry concentration indicator, and this comparison cannot be made in this study[3].

Yet another explanation for the relation between the profit margins and the market shares is Demsetz's (1973, 1974) efficiency doctrine approach. Demsetz propounded that the market share variable may be a proxy for scale economies, and this may lead to a dependence between the market shares and the profit margins. The dependence between the variables can also be - in principle - negative under decreasing returns to scale[4], whereas the shared asset and the Cowling-Waterson hypotheses always suggest a positive relationship.

Before the empirical analysis the theoretical starting points have to be transformed to the equations capable for the estimation. Perhaps the simplest empirical specification for the profit margin equation is

[3]See the data section for the definition of the market sizes, which generates a great number of industry combinations and complicates industry-level comparisons.

[4]Originally the efficiency doctrine approach has been announced in terms of increasing scale economies. Nothing prevents, however, the conversion of the problem into the case of decreasing scale economies.

$$\Pi_i/Sale_i = \alpha + \beta S_i, \tag{4}$$

where the relative profit or the relative operating margin of the firm i has been explained by a constant and a slope coefficient. A slight modification to equation (4) would be the use of a squared or square-rooted market-share variable.

The only independent variable in the equation above is the market share of firm i. Equation (4) is fairly general, and it is in harmony with many theoretical starting points. It can be interpreted, for example, as an equation of latent variables. In this approach all the factors having an effect on the market power and the pricing behaviour are interpreted as non-observable variables. On the other hand, the equation can be regarded as a first order condition for the firms' profit maximisation (Geroski, 1988).

The basic equation (4) can be easily extended to take into account also other variables, like macroeconomic indicators and other firm-level characterisations than the market share. Dynamic features can be incorporated by adding lagged dependent variables. Furthermore, the model can be extended by adding interaction terms of the dependent variables, as usual in cross sectional studies. Machin and van Reenen (1992), for example, have used the following specification:

$$\begin{aligned}(\Pi/Sale)_{it} = \gamma_{it} + \phi_1 S_{it} + (S_{it} \times X_{jt})'\phi_2 + \phi_3 S_{it} \times (\Pi/Sale)_{i,t-1} \\ + X_{jt}'\phi_4 + \phi_5(\Pi/Sale)_{i,t-1} + \phi_6 v_t.\end{aligned} \tag{5}$$

In the equation (5) the symbol i stands for the firm and t stands for the time period. The constant term, γ, describes firm-specific non-observable factors, whereas the X:s are observable explanatory variables. The symbol S stands for the market share variable. The ϕ terms are the parameters to be estimated. The symbol v_t denotes the vector of time-specific variables characterising, for example, the business cycle fluctuations.

The equation (5) is a general presentation for the profit-margin equation, and more simple equations can be derived from it by imposing zero restrictions. With the restrictions $[\phi_2, \phi_3, \phi_5] = 0$, for example, where the dynamics and the interaction effects have been eliminated, the equation corresponds to the fairly common specification used in the literature. Equation (5) or its slight modification is also the starting point for this study.

3 The data

The major part of the data used in this study is based on the Etlatieto database, which consists of the most essential accounting data for the 500 biggest firms in Finland compiled by Talouselämä. At the moment the database includes at most seven time periods from 1986 to 1992, even though the maximum seven observations are not available for all the firms as they enter and exit the top 500 list. In this study only the manufacturing industries are utilised, and the service industries are excluded from the study.

The firms which fail to make the top 500 during at least four years are excluded from the study. Despite this restriction the sample is not very large to be used as panel data. After all the exclusions the data includes 760 observations from 123 firms, and the average number of observations in each firm is about 6.

The industries in this study cover metal and engineering (37), forest (11), chemical (12), textile (3), food (40), printing and publishing (16), electrical machinery (3) and furniture (2) industries. The number of firms in each industry are indicated in parentheses.

The basic hypothesis studied is related to the concept of the market share. Unfortunately, there is no unambiguous method to measure the market share of a firm. The major problem is related to the measurement of the market size. When single products are considered, the size of the market and the market shares may be easily calculated, if only the data is available. When one considers large firms, which most often produce several products and possibly for different industries, the measurement problem becomes complicated. Furthermore, when the firm's production is export oriented, the market share measurement should take into account the size of the export market, which could in principle cover the entire world market.

In this study several market share variables were calculated. The first, MSA_i, was defined for the firm i as follows:

$$MSA_i = Turnover_i/(Grprod_j + M_j) \times 100, \tag{6}$$

where $Turnover_i$ stands for the turnover of the firm i, $Grprod_j$ is the value of the gross production in the industry j, and the variable M_j is the value of imports in the industry j. The industries were attached to the firms by using the SITC codes offered by The

Largest Companies in Finland (1987). One or several three-digit codes were given to each firm. The industry-level domestic market was obtained by summing up the values of the gross productions and the imports of the corresponding industries. Three-digit industry values for the gross productions were obtained from Industrial Statistics, compiled by Statistics Finland.

The values of industry imports are not directly available from the primary data sources. Fortunately the import data by goods-categories can be obtained. The import values by industries were calculated by using a code key between the SITC and ISIC classifications. Each good or group of goods in the ISIC classification was linked to one three-digit industry by using the code key. The number of three-digit industries used was 27, but because many firms were assigned to several three-digit industries, the number of industry combinations exceeds this figure. For example, if the firm is participating in the production of the industries 331 (wood products) and 341 (paper and paper products), its market is defined as a sum of these two industries. The more detailed division, where the examination could be done by products and not by firms, would naturally be more sophisticated, but the normal balance sheet data does not allow for the more accurate analysis.

The ISIC data was available for 1990, and the values for other years were calculated by using the annual changes in gross production. In other words, an implicit assumption of the short-run Leontief-technology was maintained.

The second measure for the market share, MSB_i, was defined as follows:

$$MSB_i = VA_i/VA_j \times 100, \tag{7}$$

where VA stands for the value added, indices i and j stand for the firms and the industries, respectively.

The third market share measure, MSC_i, is similar to the market share MSA_i, but the export market is separated from the domestic market by subtracting the value of exports,

$$MSC_i = (Turnover_i - X_i)/(Grprod_j - X_j + M_j) \times 100. \tag{8}$$

The market shares MSA_i, MSB_i and MSC_i are all related to the domestic markets. It is important, however, to measure the role of the export market. In the export market the total market was defined to be the OECD exports. The ISIC classification was used. The key code from ISIC to SITC was used in the same way as in the case of the imports, and the market share in the export markets was constructed as follows:

$$MSD_i = X_i / X_{OECD} \times 100. \tag{9}$$

The last measure of the market share in this study, MSE_i, is a weighted average of the market shares MSC_i and MSD_i:

$$MSE_i = [\frac{X_i}{Turnover_i} MSD_i + \frac{Turnover_i - X_i}{Turnover_i} MSC_i] \times 100. \tag{10}$$

The profit margin ($PRMAR$) in this study is the operating margin as a percentage of turnover. The indicator for the capital intensity ($CAPIN$) is defined as a ratio of the working capital plus the cumulative difference between the planned and real depreciation per the turnover of the firm. Exports as a percentage of turnover ($XSHARE$) is used to characterise the competitive position of the firm. The national unemployment rate ($UNEMP$) is used as a business cycle variable. The import intensity variable ($MSHARE$) is defined as a ratio of industry imports per the domestic production and the net exports. The debt ratio ($DEBTRA$) is defined as a ratio between liabilities and the annual turnover. Also the cross effects, where variables are multiplied with each other, are used in the empirical analysis. The coefficients of these variables measure the effects of one variable on different levels of another variable.

The descriptive statistic of the variables used are presented in the appendix. Also the distribution of the key variables are presented. The graphs reveal that the distribution of the variables is skewed in many cases. Also obvious outliers seem to exist in the data set, which can be seen by inspecting the maximum values of the variables.

4 Estimation results

The panel data analysis was performed by using both fixed-effect and random-effect estimations. The former was carried out with the normal LSDV (least squares dummy variable) estimation[5], and the latter with the error components GLS estimation. The equations to be estimated can be described with regression equations:

$$PRMAR_i = \alpha_{it} + \sum_{k=1}^{K} \beta_k Z_{kit} + u_{it} \tag{11}$$

The Z matrix includes all the explanatory variables and their interaction effects. It may also include the lagged dependent variable. The indices i, k and t refer to firms, variables and time, respectively. The equation (11) is presented in a general form. It allows for variation in the constant terms between the panel groups.

The constancy of the coefficients over the firms may not be an appropriate assumption. Usually there are many group or firm factors which lead to differences in the constant parameter estimates between the panel groups. Usually, and in this study also, the variation is allowed only in the constant terms. In principle, however, it is possible to allow for variation also in the slope coefficients. The usual choice for the analysis is to concentrate on the constant term variation only (Hsiao, 1986). In this case the differences between the groups are assumed to be related only to the omitted factors.

The difference between the fixed-effect and random-effect models is that while the former assumes the firm-variable constant term to be fixed, the latter assumes that it is random: $u_{it} = \alpha_i + v_{it}$, where α_{it} represents the individual specific effects and u_{it} the individual period varying effects. The fixed-effect model can be viewed as one where the inference is made conditional on the sample. In the case of the random-effects an unconditional or marginal inference is made with respect to the population (Hsiao, 1985).

In the case of the fixed-effect models the LSDV estimation is straightforward. Dummy-variables are constructed for each group or firm, and the estimations are carried out with the normal OLS method. The actual constant term is taken out from the equation to avoid the singularity of the moment matrix.

An alternative approach to the LSDV estimation is to calculate deviations from the variable means, which allows for estimation without the dummy-variables. When the number of groups is large, it may be practical to use this method to reduce the size of the moment matrix.

[5]The LSDV estimator is also called the within group or covariance estimator.

In the case of the random-effect estimation the residuals u_{it} are serially correlated. Although the LSDV still remains unbiased and consistent, it is no longer the BLUE[6]. The BLUE in this case is a GLS estimator, which is a weighted average of the ordinary OLS and within group estimators (Maddala, 1971). The weights used are the relative shares of the two random components.σ_u^2 and σ_α^2, $\Psi = \sigma_u^2/(\sigma_u^2+T\sigma_\alpha^2)$. If $\Psi \to 1$, the GLS estimator converges to the OLS, and if $\Psi \to 0$, the GLS becomes the within (LSDV) estimator.

When dynamic panel data models are considered, the ordinary LSDV or the random coefficient GLS estimators are not consistent (Nickell, 1981). In these cases the generalised method of moments (GMM) must be used (Arellano and Bond, 1988). When the GMM method is used, different instrument sets for each period are constructed. The GMM estimator produces the LSDV estimator as a special case when the instrument matrix is equal to the data matrix. Usually the GMM method is applied to the differenced data matrix. In this case at least two observations are lost: one owing to the lagged dependent variable, and another owing to the construction of instrument by using lagged variables.

If the error terms of the basic form GMM estimations are heteroskedastic as is commonly the case when panel data sets are used, a modified GMM estimator, which is more efficient in the case of heteroskedasticity, can be used (White, 1982). This two-step estimator utilizes the product of the basic form GMM residuals as a weight matrix.

The regression coefficients were calculated to all five market share measures. Also the combinations with the foreign market measure MSD_i and the domestic market measures MSA_i, MSB_i and MSC_i were estimated. In the static cases the estimations were carried out with both the fixed-effect and the random-effect models, with and without the interaction terms[7]. In addition to the operating margin per turnover variable the corresponding net profit variable was tested[8]. Also non-linear transformations, the squared and square-rooted market shares, were tested[9].

There were 123 firms and 760 observations in the estimations. The t-statistics are reported beside the coefficient estimates. Also the standard errors of the residuals and multiple correlations have been calculated. The R2-full term is the normal coefficient

[6]The best linear unbiased estimator.

[7]See tables 1-6 for the estimation results.

[8]See table 7.

[9]See tables 8 and 9.

for multiple correlation, the R2-Dcons was calculated by replacing the dummy variables with one constant term. In other words, the dummies have been restricted.

In the dynamic cases the equations were estimated with the two-step GMM method[10]. After the lagged variables and uniform time spans were constructed, only 589 observations and 89 firms were left for the dynamic estimations.

In the static estimations (tables 1-9) the data set was grouped by the firms, whereas in the dynamic estimations the industry indicator was used as a group variable. To allow for better comparison between the dynamic and static estimations, the static results with industry dummies are presented in table 12.

The static estimation results indicated a significant difference in the market share coefficients between the domestic and the export markets. The levels of the variables and the coefficients were naturally different, but also the signs of the coefficients differed. While the coefficients were positive or insignificant in the export sector, in the domestic sector the corresponding coefficients were negative or insignificant. The constancy of the firm-related dummy-variables was tested, and constancy was clearly rejected in all cases.

The positive coefficients for the export sector were in line with the Cowling-Waterson model and the shared asset model. A separation between these two models could not be made without the concentration ratio variable, which was not available in the study. Furthermore, in terms of the Demsetz model an indication for increasing returns to scale was obtained. In the domestic market, however, the negativity of the market share coefficients rejected the Cowling-Waterson and the shared asset models. Also the Demsetz model in its basic form was rejected. An extended interpretation of this model, where the negative coefficient is thought to reveal decreasing returns to scale or some underlying inefficiencies may have some explanatory power for the negative coefficients.

One explanation for the peculiar behaviour of the profits in the sheltered sector can be that the institutions related to the financial and subsidy structures have benefited especially the large domestic sector firms. In the long-run Finnish industrial policy has concentrated on the fostering the operations of large firms, and the arrangements related to the financing and the subsidies have been advantageous to the large firms. In the export sector, however, perpetual problems with price competitiveness have forced the

[10]See tables 10 and 11.

large firms to uphold their efficiency. The positive and significant coefficient of the export share variable supports this view. The annual change of the exchange rate index was used in the estimations to characterise price competitiveness, but this variable displayed no explanatory power.

In the first set of estimations (tables 1-6) the aggregate business cycle variable - the unemployment rate - was noticed to be insignificant with respect to the profits. The number of time periods in the panel data was not large, which may explain the finding. Furthermore, the aggregate business cycle indicator may not be a proper variable for the segmented markets. Especially now, when the export sector is experiencing a rapid climb and the domestic sector is still suffering from the lack of demand, the role of the aggregate business cycle indicator may be ambiguous.

Because the profit variable used was the operating margin, which does not take into account the user cost of capital in the production process, an indicator for capital-intensity was used in the estimations. In the estimations without the interaction terms the variable was significant with an unexpected sign. When the models were extended to incorporate the interaction terms, the multicollinearity between the variables made the capital-intensity variable insignificant, and it was dropped from the estimations.

In the tables 5 and 6 some insignificant coefficients have been restricted to zero, and time-dummies have been added to the equations. The overall conclusion from the static estimations is that the market share variables (6) and (9) had the best fit. The former describes the domestic market effect and the latter the export market effect. In the domestic market the coefficient was negative, which may indicate some underlying inefficiency in the large firms. Also Bourlakis (1992) - for example - has estimated negative market share coefficients with Greek data. In the export sector the key coefficient was positive in this study, which indicates increasing profits with growing market shares.

When the tables 6 and 7 are compared, the differences between the two dependent variables, the relative net profit and the relative opearting margin, can be analyzed. There were no crucial differences in the market share coefficients.

There were slight differences between the fixed-effect and the random-effect estimations, although the overall results were noticed to be on a par in these two approaches. The random-effect estimations offered somewhat smaller market-share responses than the fixed-effect models. The standard errors related to the constant terms were observed to be double compared to the white noise errors. This indicates that the GLS estimates were closer to the LSDV estimator than the OLS estimator.

The interaction variables $MSA \times XSHARE$ and $CAPIN \times XSHARE$ were significant in most static estimations. The former was positive, which indicates that the profitability of exports grows with the export intensity. The negativity of the latter interaction term can be interpreted so that the profitability in the export sector decreases while the capital intensity grows.

After the static estimations the setup was made dynamic by adding the lagged dependent variable to the estimation (table 10 for the level form estimations and table 11 for the difference form estimations). The lagged dependent variable proved to be significant especially in the level form estimations, which reveals the autocorrelation problem related to the static estimations. The number of observations in the dynamic estimations was 598, which is almost 200 observations less than in the static estimations.

In the level form GMM estimation the market share coefficients were practically non-significant, whereas in the difference form estimation the negativity of the market share variable in the domestic sector was observed, as in the static cases. The coefficient of the export market variable had a different sign than in the static estimations.

The dynamic estimations were carried out by using industry dummies. Especially the textile and furniture dummy variables were noticed to have significant negative signs in the dynamic difference form estimations. The period dummies were significantly negative in 1990, when the severe recession in the Finnish economy began. In 1991 the period dummies were negative as well, but the adjustment behaviour of the firms and the rise in unemployment allowed for smaller effects for 1991, although the decline in the total output was largest in that year.

5 Conclusions

The study investigates the relation between the market shares and the profit margins. Firm-level panel data covering 123 firms for as many as 7 years has been used. Several different measures for the market shares has been tested. Both domestic and export markets have been covered in the study. Static and dynamic models were estimated.

The relationship between the market shares and profit margins can be explained with several different starting points. The shared asset model (Porter, 1979) and the Cowling-Waterson model (1976) are based on the existence of the market power, which leads to increasing profit margins when market shares are increased. Another explanation, based on the increasing return to scale production technology, is based on the Demsetz (1973, 1974) model. This model can also be widened to the case of decreasing returns to scale, which may be a consequence of underlying institutional inefficiencies in the economy. In this case the market share coefficients can be negative.

Significant differences between the domestic and the export sectors are reported in the static estimation results. In the former sector the market share variable coefficients in the profit-margin equations were found to be negative, whereas in the export sector the corresponding coefficient was positive. The Cowling-Waterson model was rejected in the domestic sector, whereas the open sector results were not in a contradiction with this model.

The export share variable was found to have a significant positive effect on the profit-margins in the static estimations. This and the expected positive sign of the markup coefficient in the export sector may be the consequence of the different competitive positions in the two sectors. One possible explanation for the result is that the continuous problems with the open-sector price competitiveness has forced the export-sector firms to maintain their efficiency, whereas in the sheltered sector the pressure on efficiency has not been so keen.

Both static and dynamic equations were estimated. The largest deviation between these two approaches concerns the export market coefficient. In the former case the coefficient was found to be positive, whereas in the latter case an indication of negativeness was obtained. The contradiction in these findings complicates the overall conclusions concerning the export market behaviour. One possible reasoning for the ambiguous sign of the export market share variable might be that of a zero coefficient, which could be due to the competitive market behaviour in the export market. When a small open economy like Finland is considered, this outcome would be natural.

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Table 1: Fixed effect estimation, no interaction terms

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
MS	**-0.219**	2.9	-0.004	0.0	**-0.147**	3.3			**-0.199**	3.4	-0.129	1.7	0.106	1.2	-0.074	1.6
MSD							**30.02**	5.4			**27.54**	4.8	**31.70**	5.5	**26.68**	4.5
XSHARE	**0.094**	4.5	**0.102**	4.9	**0.080**	3.7	**0.073**	3.5	**0.074**	3.3	**0.070**	3.3	**0.074**	3.5	**0.065**	3.0
CAPIN	**-0.078**	6.9	**-0.074**	6.6	**-0.076**	6.9	**-0.060**	5.3	**-0.076**	6.9	**-0.063**	5.5	**-0.058**	5.1	**-0.063**	5.5
UNEMP	-0.021	0.4	-0.056	1.2	-0.021	0.4	-0.022	0.5	-0.021	0.4	-0.004	0.1	-0.034	0.7	-0.001	0.1
MSHARE	0.107	1.3	0.075	0.9	0.107	1.3	0.080	1.0	0.149	1.8	0.099	1.2	0.072	0.9	0.116	1.4
std.error	3.680		3.710		3.680		3.626		3.673		3.620		3.624		3.621	
R2-full	0.735		0.732		0.736		0.743		0.737		0.745		0.744		0.744	
R2-Dcons	0.197		0.198		0.197		0.197		0.197		0.197		0.198		0.198	

N=123 TN=760

Table 2: Fixed effect estimation with interaction terms

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
MS	**-0.376**	2.6	0.019	0.1	-0.123	1.2			-0.052	0.4	**-0.202**	2.6	0.026	0.2	-0.123	1.2
MSD							-4.293	0.2			-2.703	0.2	12.163	1.7	**18.55**	2.8
XSHARE	**0.127**	4.5	**0.114**	4.2	**0.145**	5.4	**0.142**	5.1	**0.152**	5.6	**0.144**	5.2	**0.108**	3.9	**0.123**	4.4
CAPIN	-0.017	0.9	-0.013	0.7	-0.016	0.9	-0.011	0.5	-0.014	0.7	-0.010	0.4	-0.017	0.9	-0.022	1.2
UNEMP	0.002	0.0	-0.039	0.5	-0.031	0.4	-0.010	0.1	-0.016	0.2	0.027	0.3	-0.045	0.6	-0.041	0.5
MSHARE	0.087	1.1	0.037	0.5	0.120	1.4	0.079	1.0	0.110	1.3	0.106	1.3	0.043	0.5	0.114	1.4
MSxXHSARE	**0.001**	3.0	**0.014**	4.9	0.002	0.8	0.327	1.7	-0.001	0.3	0.251	1.3	0.011	3.5	0.002	0.8
MSxCAPIN	-0.001	0.8	**-0.003**	2.3	**-0.002**	2.1	0.070	0.9	**-0.003**	1.9	0.092	1.2	-0.002	1.6	-0.001	1.2
MSxUNEMP	0.000	0.1	-0.005	1.0	0.003	0.8	0.698	1.5	0.002	0.4	**0.985**	2.1	-0.003	0.7	0.003	0.7
XSHARExCAPIN	**-0.002**	4.8	**-0.001**	4.3	**-0.002**	4.9	**-0.002**	4.1	**-0.002**	5.1	**-0.002**	4.4	**-0.001**	3.8	**-0.001**	4.0
CAPINxUNEMP	-0.001	0.5	0.000	0.1	0.000	0.1	-0.001	0.8	0.000	0.2	-0.002	1.1	0.000	0.1	0.000	0.2
std.error	3.599		3.571		3.604		3.580		3.607		3.564		3.566		3.584	
R2-full	0.749		0.753		0.748		0.752		0.748		0.754		0.754		0.752	
R2-Dcons	0.279		0.276		0.274		0.301		0.273		0.302		0.286		0.298	

N=123 TN=760

Table 3: Random-effect estimation, no interaction terms

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
constant	**10.22**	10.9	**9.818**	11.1	**10.21**	11.2	**9.379**	10.7	**10.29**	11.2	**9.567**	11.1	**9.405**	10.4	**9.505**	11.0
MS	-0.053	1.0	0.084	1.7	-0.068	1.9			**-0.097**	2.1	**-0.112**	2.2	-0.008	0.2	**-0.079**	2.3
MSD							**20.18**	5.6			**21.91**	6.0	**20.97**	5.4	**20.67**	5.8
XSHARE	**0.092**	5.7	**0.090**	5.7	**0.086**	5.2	**0.060**	3.6	**0.082**	4.9	**0.056**	3.4	**0.060**	3.6	**0.051**	3.0
CAPIN	**-0.045**	4.5	**-0.041**	4.2	**-0.043**	4.3	**-0.042**	4.3	**-0.043**	4.3	**-0.040**	4.2	**-0.044**	4.5	**-0.040**	4.1
UNEMP	-0.068	1.5	-0.087	1.9	-0.060	1.3	-0.045	1.0	-0.060	1.3	-0.028	0.6	-0.042	0.9	-0.026	0.6
MSHARE	0.027	0.5	0.001	0.0	0.048	0.8	0.041	0.7	0.051	0.9	0.064	1.1	0.044	0.8	0.078	1.4
stde/noise	3.682		3.707		3.675		3.626		3.673		3.620		3.624		3.621	
stde/cons	7.244		6.600		7.055		6.550		7.049		6.380		6.973		6.372	

N=123 TN=760

Table 4: Random-effect estimation with interaction terms

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
constant	**8.220**	7.6	**7.835**	7.4	**7.942**	7.3	**7.056**	7.1	**7.721**	7.1	**7.147**	7.1	**7.644**	7.3	**7.433**	7.4
MS	**-0.261**	2.2	-0.042	0.3	-0.055	0.6			0.022	0.2	**-0.118**	2.1	-0.037	0.3	-0.057	0.7
MSD							-15.61	1.4			-5.547	0.4	**14.71**	3.0	**21.10**	5.7
XSHARE	**0.134**	5.8	**0.127**	5.7	**0.151**	6.8	**0.143**	6.3	**0.159**	7.1	**0.142**	6.2	**0.123**	5.5	**0.128**	5.9
CAPIN	0.023	1.3	0.025	1.4	0.024	1.4	0.038	2.1	0.026	1.5	**0.039**	2.2	0.017	1.0	0.023	1.4
UNEMP	0.050	0.7	0.013	0.2	0.021	0.3	0.028	0.4	0.033	0.4	0.050	0.6	-0.003	0.0	-0.004	0.0
MSHARE	0.019	0.3	-0.009	0.2	0.029	0.5	0.033	0.6	0.024	0.4	0.056	1.0	0.017	0.3	0.059	1.0
MSxXHSARE	**0.008**	3.3	**0.009**	4.3	0.003	1.3	**0.434**	3.1	0.000	0.0	**0.309**	2.0	**0.005**	2.0	-0.001	0.3
MSxCAPIN	0.000	0.3	-0.002	1.5	-0.001	1.5	0.051	0.8	-0.002	1.4	0.051	0.8	-0.001	1.1	-0.001	0.8
MSxUNEMP	-0.003	0.7	-0.004	0.9	0.000	0.2	0.678	1.6	-0.002	0.4	**0.953**	2.2	0.000	0.2	0.003	0.8
XSHARExCAPIN	**-0.002**	5.5	**-0.002**	5.2	**-0.002**	5.3	**-0.002**	5.7	**-0.002**	5.5	**-0.002**	5.8	**-0.002**	5.2	**-0.002**	5.7
CAPINxUNEMP	-0.002	1.6	-0.002	1.2	-0.002	1.3	-0.002	1.7	-0.002	1.3	-0.003	1.8	-0.001	0.7	-0.001	0.7
stde/noise	3.599		3.571		3.604		3.580		3.607		3.564		3.566		3.584	
stde/cons	7.121		6.901		7.240		6.015		7.163		6.123		6.900		6.191	

N=123 TN=760

Table 5: Fixed effect estimation with time dummies

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
MS	**-0.359**	3.6	0.034	0.3	-0.044	0.8			0.072	0.8	**-0.167**	2.1	0.114	1.3	-0.060	1.3
MSD							**21.12**	3.8			**19.30**	3.3	**23.02**	4.0	**18.34**	3.1
XSHARE	**0.147**	5.8	**0.118**	4.7	**0.169**	7.4	**0.151**	6.4	**0.162**	7.1	**0.135**	5.5	**0.148**	6.2	0.149	0.2
MSxXHSARE	**0.001**	2.7	**0.013**	4.9												
MSxCAPIN			**-0.004**	2.8	-0.002	1.6			**-0.004**	3.1						
MSxUNEMP											**0.961**	2.2				
XSHARExCAPIN	**-0.002**	8.0	**-0.002**	5.8	**-0.002**	6.9	**-0.002**	6.2	**-0.002**	7.6	**-0.001**	4.7	**-0.002**	5.8	**-0.002**	6.4
CAPINxUNEMP											**-0.002**	2.2				
D87	**1.588**	3.1	**1.596**	3.1	**1.666**	3.2	**1.517**	2.9	**1.697**	3.3	**1.561**	3.0	**1.474**	2.9	**1.535**	3.0
D88	**1.837**	3.6	**1.784**	3.6	**1.961**	3.8	**1.688**	3.3	**2.004**	4.0	**1.747**	3.5	**1.629**	3.2	**1.724**	3.4
D89	**1.670**	3.3	1.555	3.1	**1.718**	3.4	**1.475**	3.0	**1.735**	3.5	**1.569**	3.1	**1.406**	2.8	**1.529**	3.1
D90	0.203	0.4	0.058	0.1	0.262	0.5	0.001	0.0	0.280	0.6	0.196	0.4	-0.100	0.2	0.096	0.2
D91	-0.300	0.6	-0.559	1.1	-0.228	0.4	-0.497	1.0	-0.141	0.3	0.103	0.2	-0.650	1.3	-0.354	0.7
D92	**1.064**	1.9	0.678	1.3	**1.241**	2.2	0.905	1.7	**1.315**	2.4	**2.000**	2.8	0.719	1.3	**1.084**	2.0
std.error	3.505		3.462		3.516		3.499		3.498		3.481		3.497		3.497	
R2-full	0.762		0.768		0.761		0.763		0.763		0.766		0.763		0.763	
R2-Dcons	0.097		0.119		0.127		0.105		0.122		0.197		0.108		0.105	

N=123 TN=760

Table 6: Random effect estimation with time dummies

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
constant	**8.090**	10.2	**7.666**	9.6	**7.837**	9.8	**7.295**	10.5	**7.734**	9.6	**7.732**	10.2	**7.217**	9.9	**7.576**	10.6
MS	**-0.187**	2.3	-0.032	0.3	-0.081	1.6			0.041	0.5	**-0.101**	2.0	0.016	0.3	-0.052	1.7
MSD							**17.51**	5.3			**18.34**	5.2	**17.30**	4.8	**18.15**	5.5
XSHARE	**0.130**	2.3	**0.117**	5.8			**0.124**	7.0	**0.148**	8.1	**0.121**	6.4	**0.127**	7.0	**0.121**	6.8
MSxXHSARE	**0.006**	2.6	**0.008**	4.1												
MSxCAPIN			**-0.002**	1.6	0.001	0.9			-0.002	1.6						
MSxUNEMP											0.480	1.2				
XSHARExCAPIN	**-0.001**	6.7	**-0.001**	5.6	**-0.002**	6.5	**-0.001**	6.5	**-0.001**	6.3	**-0.001**	5.3	**-0.001**	6.6	**-0.001**	6.6
CAPINxUNEMP											-0.001	0.8				
D87	**1.554**	3.1	**1.583**	3.2	**1.533**	3.0	**1.554**	3.1	**1.613**	3.2	**1.570**	3.1	**1.550**	3.1	**1.553**	3.0
D88	**1.791**	3.6	**1.792**	3.6	**1.784**	3.6	**1.720**	3.4	**1.890**	3.8	**1.742**	3.5	**1.716**	3.5	**1.723**	3.4
D89	**1.524**	3.1	**1.522**	3.1	**1.505**	3.1	**1.452**	2.9	**1.579**	3.2	**1.522**	3.1	**1.449**	3.0	**1.483**	3.0
D90	-0.038	0.1	-0.034	0.1	-0.083	0.2	-0.046	0.1	0.015	0.0	0.086	0.2	-0.055	0.1	0.026	0.1
D91	-0.652	1.3	-0.670	1.3	-0.700	1.4	-0.568	1.1	-0.561	1.1	-0.264	0.5	-0.585	1.2	-0.432	0.9
D92	0.732	1.4	0.668	1.3	0.753	1.4	0.881	1.7	0.896	1.7	**1.347**	2.0	0.853	1.6	1.050	1.9
stde/noise	3.505		3.462		3.516		3.499		3.498		3.481		3.497		3.497	
stde/cons	6.458		6.691		6.781		5.635		6.713		5.908		5.985		5.593	

N=123 TN=760

Table 7: Random effect estimation with time dummies

Dependent variable: Net profit as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
constant	1.314	1.7	0.986	1.3	0.941	1.2	0.353	0.5	0.677	0.9	**2.278**	3.1	0.579	0.8	0.975	1.4
MS	**-0.223**	2.7	-0.039	0.3	-0.061	1.1			**0.201**	2.4	**-0.134**	2.7	**-0.103**	2.0	**-0.105**	3.2
MSD							**18.69**	5.5			**17.88**	5.0	**22.17**	5.8	**20.25**	6.2
XSHARE	**0.153**	7.3	**0.135**	6.3	**0.184**	9.2	**0.156**	8.2	**0.171**	8.7	**0.107**	5.5	**0.157**	8.1	**0.144**	7.9
MSxXHSARE	**0.006**	2.6	**0.009**	4.2												
MSxCAPIN			**-0.003**	2.7	-0.001	0.5			**-0.005**	4.2						
MSxUNEMP											0.303	0.7				
XSHARExCAPIN	**-0.003**	10.9	**-0.002**	8.8	**-0.003**	9.8	**-0.003**	11.7	**-0.002**	10.1	**-0.002**	5.9	**-0.003**	11.7	**-0.003**	11.7
CAPINxUNEMP											**-0.008**	6.9				
D87	**2.074**	3.5	**2.155**	3.7	**2.090**	3.5	**2.083**	3.5	**2.208**	3.8	**2.065**	3.6	**2.095**	3.6	**2.085**	3.5
D88	**2.626**	4.5	**2.678**	4.6	**2.673**	4.6	**2.551**	4.4	**2.830**	4.9	**2.488**	4.5	**2.558**	4.4	**2.561**	4.4
D89	**2.062**	3.6	**2.099**	3.7	**2.101**	3.7	**1.992**	3.5	**2.188**	3.8	**1.687**	3.0	**2.028**	3.6	**2.047**	3.6
D90	-0.292	0.5	-0.191	0.3	-0.246	0.4	-0.282	0.5	-0.141	0.2	-0.508	0.9	-0.188	0.3	-0.143	0.2
D91	**-2.342**	4.0	**-2.220**	3.8	**-2.271**	3.9	**-2.230**	3.9	**-2.067**	3.5	-0.938	1.6	**-2.060**	3.5	**-1.960**	3.3
D92	-1.215	1.9	-1.142	1.9	-1.073	1.7	-1.073	1.8	-0.867	1.4	**2.554**	3.4	-0.872	1.4	-0.723	1.2
stde/noise	4.168		4.099		4.142		4.128		4.084		3.953		4.131		4.122	
stde/cons	5.414		5.750		6.413		5.440		5.943		5.056		5.656		4.830	

N=123 TN=760

Table 8: Random effect estimation with time dummies

Dependent variable: square root of operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
constant	**8.394**	8.1	**5.967**	5.5	**7.956**	8.1	**7.266**	9.4	**7.834**	8.8	**7.770**	8.7	**5.143**	5.0	**7.809**	9.0
MS	-0.611	1.3	**1.255**	2.1	-0.345	0.9			-0.159	0.5	-0.425	1.0	**2.256**	4.9	-0.456	1.4
MSD							4.43	0.8			8.31	1.3	**-13.66**	2.0	9.78	1.5
XSHARE	**0.083**	3.0	**0.056**	2.0	**0.130**	5.5	**0.080**	3.8	**0.076**	3.5	**0.075**	3.5	**0.095**	4.1	**0.073**	3.4
MSxXHSARE	**0.038**	3.1	**0.051**	4.2	0.016	1.4	**0.230**	2.8	**0.288**	5.8	**0.197**	2.2	**0.387**	4.3	**0.178**	1.9
MSxCAPIN			**-0.007**	1.2												
MSxUNEMP																
XSHARExCAPIN	**-0.001**	6.5	**-0.001**	4.5	**-0.001**	6.4	**-0.001**	6.8	**-0.001**	6.8	**-0.001**	5.3	**-0.002**	7.0	**-0.001**	6.8
CAPINxUNEMP											-0.001	0.6				
D87	**1.531**	3.0	**1.532**	3.2	**1.565**	3.1	**1.537**	3.0	**1.531**	3.0	**1.541**	3.1	**1.466**	3.1	**1.530**	3.0
D88	**1.772**	3.6	**1.795**	3.8	**1.816**	3.6	**1.764**	3.6	**1.763**	3.6	**1.767**	3.6	**1.708**	3.6	**1.763**	3.6
D89	**1.447**	2.9	**1.407**	3.0	**1.516**	3.1	**1.482**	3.0	**1.494**	3.1	**1.498**	3.0	**1.339**	2.9	**1.513**	3.1
D90	-0.131	0.3	-0.193	0.4	-0.078	0.2	0.001	0.0	0.032	0.1	0.055	0.1	-0.245	0.5	0.086	0.2
D91	-0.736	1.5	-0.851	1.8	-0.716	1.4	-0.418	0.8	-0.384	0.8	-0.222	0.4	-0.846	1.8	-0.272	0.5
D92	0.517	1.0	0.285	0.6	0.582	1.1	0.901	1.7	0.930	1.7	1.295	1.9	0.263	0.5	1.100	2.0
stde/noise	3.492		3.362		3.522		3.473		3.473		3.473		3.379		3.475	
stde/cons	6.325		8.101		6.339		5.802		5.705		5.855		8.356		5.760	

N=123 TN=760

Table 9: Random effect estimation with time dummies

Dependent variable: squared operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
constant	**7.682**	10.2	**7.625**	10.1	**7.645**	10.3	**7.664**	10.8	**7.682**	10.8	**7.790**	10.2	**7.655**	10.6	**7.689**	10.7
MS	-0.004	1.9	-0.002	1.0	-0.001	0.6			-0.001	1.0	-0.001	1.1	0.000	0.1	0.000	0.9
MSD							-10.40	0.7			-7.48	0.5	-10.23	0.7	-8.75	0.6
XSHARE	**0.147**	8.1	**0.143**	7.9	**0.148**	8.2	**0.132**	7.5	**0.132**	7.5	**0.132**	7.0	**0.134**	7.5	**0.134**	7.5
MSxXHSARE	0.000	1.3	**0.0001**	3.2	0.000	0.0	**0.355**	1.7	**0.205**	4.8	0.301	1.4	0.350	1.6	0.324	1.5
MSxCAPIN			**0.000**	1.6												
MSxUNEMP																
XSHARExCAPIN	**-0.001**	6.5	**-0.001**	6.3	**-0.001**	6.3	**-0.001**	6.2	**-0.001**	6.2	**0.301**	1.4	**-0.001**	6.3	**-0.001**	6.3
CAPINxUNEMP											-0.001	0.6				
D87	**1.590**	3.1	**1.603**	3.2	**1.581**	3.1	**1.534**	3.0	**1.554**	3.1	**1.548**	3.1	**1.536**	3.0	**1.544**	3.1
D88	**1.835**	3.7	**1.800**	3.6	**1.832**	3.7	**1.628**	3.3	**1.645**	3.3	**1.649**	3.3	**1.633**	3.3	**1.642**	3.3
D89	**1.562**	3.2	**1.554**	3.2	**1.531**	3.1	**1.394**	2.8	**1.415**	2.9	**1.404**	2.9	**1.399**	2.9	**1.415**	2.9
D90	-0.021	0.0	0.002	0.0	-0.062	0.1	-0.099	0.2	-0.071	0.1	-0.077	0.2	-0.091	0.2	-0.069	0.1
D91	-0.590	1.2	-0.574	1.2	-0.617	1.2	-0.639	1.3	-0.569	1.1	-0.479	0.9	-0.629	1.3	-0.575	1.2
D92	0.743	1.4	0.718	1.4	0.739	1.4	0.685	1.3	0.777	1.5	1.029	1.5	0.694	1.3	0.761	1.4
stde/noise	3.504		3.483		3.513		3.493		3.488		3.479		3.492		3.488	
stde/cons	6.349		6.425		6.230		5.824		5.833		6.292		6.032		6.007	

N=123 TN=760

Table 10: GMM estimation of dynamic models in level form

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
constant	0.970	1.0	1.010	1.1	0.913	0.9	0.902	1.0	0.883	0.9	0.977	0.9	0.982	1.0	1.076	1.0
MS	0.013	0.4	0.019	0.6	0.018	0.9			0.023	1.1	0.012	0.7	**0.039**	2.1	0.009	0.6
MSD							-1.36	0.5			-3.47	1.1	-6.33	1.4	-4.05	1.3
XSHARE	**0.034**	3.3	**0.033**	3.2	**0.034**	3.6	**0.039**	4.1	**0.035**	3.7	0.031	1.5	0.032	1.5	0.029	1.3
MSxXHSARE	0.000	0.3	0.0000	0.1	0.000	0.9	**0.037**	0.9	**-0.001**	1.2	0.058	0.9	0.099	1.2	0.066	1.0
XSHARExCAPIN	**-0.0002**	2.1	**-0.0002**	2.8	**-0.0002**	1.9	**-0.0003**	2.9	**-0.0002**	1.8	0.000	0.6	0.000	0.7	0.000	0.5
PRMAR(-1)	**0.840**	27.2	**0.839**	26.4	**0.844**	27.4	**0.841**	21.4	**0.843**	27.4	**0.864**	18.9	0.860	18	0.872	19
D89	-0.054	0.1	-0.050	0.1	-0.035	0.1	-0.041	0.1	-0.039	0.1	-0.040	0.1	-0.057	0.1	-0.025	0.0
D90	**-1.326**	3.7	**-1.324**	3.7	**-1.337**	3.7	**-1.294**	3.7	**-1.328**	3.7	**-1.348**	3.7	**-1.360**	3.7	**-1.379**	3.8
D91	**-0.966**	2.5	**-0.947**	2.5	**-0.937**	2.4	**-0.882**	2.3	**-0.936**	2.4	**-0.829**	2.2	**-0.840**	2.2	**-0.817**	2.2
D92	0.644	1.6	0.616	1.6	0.679	1.7	0.665	1.8	0.663	1.7	0.706	1.9	0.629	1.7	0.740	1.9
Textile	-0.772	0.7	-0.863	0.8	-0.783	0.7	-0.571	0.4	-0.769	0.7	-1.134	0.7	-1.294	0.8	-1.316	0.8
Metal and engin.	-0.478	0.6	-0.514	0.6	-0.475	0.6	-0.459	0.6	-0.460	0.6	-0.622	0.6	-0.575	0.6	-0.777	0.8
Printing & publ.	1.992	1.8	1.989	1.9	1.956	1.8	2.068	1.9	1.992	1.8	1.577	1.1	1.677	1.2	1.360	0.9
Forest	0.263	0.2	0.381	0.4	0.227	0.2	0.500	0.5	0.251	0.2	0.179	0.1	0.687	0.4	-0.168	0.1
Electrical mach.	0.931	0.7	1.000	0.7	0.929	0.7	1.011	0.7	0.975	0.7	0.848	0.5	0.974	0.6	0.719	0.5
Food	-0.029	0.0	-0.051	0.1	-0.040	0.0	0.037	0.0	-0.014	0.0	-0.193	0.2	-0.165	0.2	-0.337	0.3
Furniture	-1.434	1.6	-1.477	1.7	-1.486	1.6	-1.297	1.4	-1.473	1.6	-1.704	1.5	-1.743	1.6	-1.876	1.6
std.error	3.910		3.902		3.914		3.897		3.913		3.913		3.896		3.921	

N=89 TN=420

Table 11: GMM estimation of dynamic models in difference form

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
constant	0.261	0.6	0.130	0.3	0.453	1.1	0.328	0.8	0.514	1.3	0.415	0.7	0.129	0.2	0.280	0.5
MS	**-0.520**	3.5	**-0.303**	2.5	-0.166	1.7			-0.102	1.2	**-0.395**	3.0	-0.051	0.3	**-0.222**	3.1
MSD							**-38.560**	3.8			**-149.4**	2.9	**-160.1**	3.4	**-143.0**	2.9
XSHARE	0.032	0.9	0.034	1.0	**0.104**	2.8	0.052	1.5	0.109	3.3	**0.356**	4.8	**0.333**	4.6	**0.329**	4.6
MSxXHSARE	**0.017**	5.1	**0.018**	5.8	0.000	0.1	**0.773**	4.9	-0.007	1.6	**1.819**	2.9	**1.979**	3.5	**1.712**	2.9
XSHARExCAPIN	**-0.002**	5.0	**-0.002**	4.8	**-0.002**	5.8	**-0.0020.**	5.0	**-0.002**	6.0	**-0.007**	4.7	**-0.007**	4.6	**-0.007**	4.8
PRMAR(-1)	**-0.069**	2.8	**-0.053**	2.1	**-0.070**	2.8	**-0.100**	4.4	**-0.074**	3.1	**0.079**	3.1	**-0.087**	3.2	**-0.091**	3.5
D89	-0.104	0.3	0.066	0.2	-0.166	0.4	-0.233	0.6	-0.199	0.5	-0.726	1.7	-0.764	1.8	-0.709	1.7
D90	**-1.214**	3.0	**-1.112**	2.7	-1.174	1.4	**-1.296**	3.2	**-1.220**	2.8	**-1.141**	2.2	**-1.281**	2.6	**-1.087**	2.1
D91	-0.766	1.8	-0.754	1.8	-0.627	1.5	**-0.932**	2.2	-0.648	1.5	-0.766	1.5	-0.831	1.7	-0.745	1.5
D92	0.320	0.9	0.417	1.0	0.366	1.0	0.170	0.5	0.348	0.9	-0.083	0.2	-0.118	0.2	0.000	0.0
Textile	**-1.101**	2.1	**-1.543**	2.3	**-1.246**	2.4	**-1.631**	2.4	**-1.246**	2.4	-1.186	1.8	**-1.774**	2.2	**-1.330**	2.1
Metal and engin.	-0.309	0.8	-0.361	1.0	-0.539	1.6	-0.397	1.0	-0.560	1.7	0.123	0.3	0.369	0.7	0.265	0.5
Printing & publ.	0.208	0.5	0.219	0.5	-0.016	0.0	0.180	0.4	-0.064	0.2	0.314	0.7	0.624	1.2	0.392	0.8
Forest	-0.537	1.1	-0.380	0.8	-0.612	1.5	0.134	0.3	-0.548	1.4	1.245	1.6	**1.509**	2.0	1.355	1.8
Electrical mach.	0.429	0.4	0.518	0.2	0.170	0.2	0.489	0.4	0.126	0.1	-0.417	0.8	-0.111	0.2	-0.240	0.4
Food	0.021	0.1	0.058	0.2	-0.205	0.7	0.015	0.0	-0.253	0.9	0.043	0.1	0.342	0.7	0.094	0.2
Furniture	**-2.398**	5.0	**-2.377**	5.2	**-2.668**	6.6	**-2.444**	6.0	**-2.704**	7.0	**-2.386**	5.3	**-2.087**	4.3	**-2.309**	5.3
std.error	3.945		3.902		3.945		3.882		3.882		4.797		4.766		4.731	

N=89 TN=420

Table 12: Fixed effect estimation with the short data used in dynamic estimations

Dependent variable: operating margin as a percentage of turnover

	A		B		C		D		E		A & D		B & D		C & D	
const	**9.908**	8.7	**9.723**	8.7	**10.166**	9.0	**10.526**	9.8	**10.120**	9.0	**10.311**	9.4	**10.288**	9.6	**10.528**	9.5
MS	0.093	1.9	**0.151**	2.6	0.054	1.3			0.076	1.6	0.033	0.9	**0.106**	3.0	0.000	0.0
MSD							9.098	1.4			4.763	0.6	-7.818	-0.9	9.124	1.1
XSHARE	0.034	1.9	**0.041**	2.4	**0.037**	2.2	**0.034**	2.1	**0.038**	2.3	**0.033**	2.1	**0.034**	2.1	**0.034**	2.1
MSxXHSARE	0.000	-0.3	-0.001	-0.8	0.000	-0.3	-0.012	-0.1	-0.001	-0.4	0.040	0.3	0.184	1.4	-0.012	-0.1
XSHARExCAPIN	0.000	-0.3	0.000	-0.8	0.000	0.0	0.000	-1.4	0.000	0.1	0.000	-1.4	0.000	-1.6	0.000	-1.4
D87	1.584	1.9	1.587	1.9	1.585	1.9	1.585	1.9	1.586	1.9	1.585	1.9	1.579	1.9	1.585	1.9
D88	**2.044**	2.4	**2.052**	2.5	**2.054**	2.4	**2.000**	2.4	**2.058**	2.5	**1.997**	2.4	**1.995**	2.4	**2.000**	2.4
D89	1.498	1.8	1.517	1.8	1.528	1.8	1.515	1.8	1.529	1.8	1.498	1.8	1.502	1.8	1.515	1.8
D90	-0.260	-0.3	-0.249	-0.3	-0.242	-0.3	-0.103	-0.1	-0.249	-0.3	-0.136	-0.2	-0.171	-0.2	-0.103	-0.1
D91	-0.984	-1.2	-0.976	-1.2	-0.973	-1.1	-0.657	-0.8	-0.975	-1.2	-0.716	-0.9	-0.812	-1.0	-0.657	-0.8
D92	0.030	0.0	0.017	0.0	0.067	0.1	0.371	0.4	0.073	0.1	0.278	0.3	0.127	0.1	0.372	0.4
Textile	0.481	0.3	0.262	0.2	0.220	0.2	0.605	0.4	0.168	0.1	0.720	0.5	0.539	0.4	0.604	0.4
Metal and engin.	**-2.874**	-3.2	**-3.002**	-3.4	**-3.091**	-3.4	**-3.144**	-3.6	**-3.060**	-3.4	**-2.998**	-3.3	**-3.112**	-3.6	**-3.145**	-3.5
Printing & publ.	**4.337**	4.0	**4.424**	4.2	**4.132**	3.8	**3.826**	3.6	**4.119**	3.7	**4.025**	3.8	**4.039**	3.9	**3.825**	3.5
Forest	2.721	1.8	**3.105**	2.1	2.220	1.5	1.002	0.7	2.198	1.5	1.396	0.9	2.223	1.4	1.000	0.6
Electrical mach.	1.589	0.9	1.663	0.9	1.132	0.6	1.499	0.8	1.070	0.6	1.749	1.0	1.828	1.0	1.498	0.8
Food	**-4.618**	-4.7	**-4.485**	-4.6	**-4.821**	-4.9	**-5.081**	-5.3	**-4.852**	-4.9	**-4.916**	-5.0	**-4.920**	-5.2	**-5.082**	-5.2
Furniture	-1.539	-0.9	-1.584	-0.9	-1.618	-0.9	-1.660	-1.0	-1.719	-1.0	-1.608	-0.9	-1.802	-1.1	-1.661	-1.0
std.error	5.516		5.454		5.544		5.483		5.543		5.483		5.446		5.487	
R2	31.9		33.4		31.2		32.7		31.2		32.8		33.8		32.7	

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