Price Cost Margins and Exporting Behaviour: Evidence from UK Manufacturing*

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preliminary and incomplete, comments welcome!

Abstract

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1 Introduction

If markets are less than perfectly competitive firms are able to charge prices higher than marginal cost. In other words their price-cost margin (PCM) defined as p/mc will be greater than one. The evidence that mark-ups exist is widespread (e.g., Hall, 1988, Roeger, 1995, Konings et al., 2001) and is taken as evidence that competition is less than perfect. Much has been written about the effect of trade on PCMs and this literature has recently been reviewed by Tybout (2001). Trade theoretic models (e.g., Krugman, 1979, Brander, 1981) show that a move from autarky to free trade will lead to increases in output through imports, resulting in stronger competition and hence reductions in PCMs. Empirical studies that look at the link between import competition and mark-ups are provided by, for example, Levinsohn (1993), Harrison (1994), Krishna and Mitra (1998) and Thompson (2002). With the exception of the latter study, which does not find consistent evidence of a negative effect of imports on mark-ups in Canada, all other studies find that increases in imports, or reductions in trade protection, are related with decreasing mark-ups.

This paper examines the trade - competition link from a slightly different point of view. We investigate whether exporting activity impacts on firm's price cost margins. After all, firms entering export markets experience a new competitive environment and, hence, we may expect this to have an effect on mark-ups. The direction of such an effect is not, a priori, clear, however.

The price-cost margin is given as p/mc as pointed out above. Hence, changes in the numerator and denominator will have different effects. We may take as given that entering world markets will expose a firm to stronger competition than would be found domestically. Hence, entering export markets will lead to increased competition which, all other things equal, may force the firm to reduce its price. This, ceteris paribus, would lead to a reduction in the price cost margin and this is the effect implicitly assumed in the empirical studies cited above. However, it has recently been argued that firms may improve their efficiency by entering into export markets (Clerides et al., 1998, Bernard and Jensen, 1999). The observed positive link between firm efficiency and its exporting status can either be due to "self selection" or through "learning by exporting". In the former case, firms increase their efficiency levels before becoming exporters, perhaps due to expected increased competitive pressure. In the case of the latter, exposure to international best practice, competition with other internationally operating firms and learning from international customers may help exporters to become more efficient (Girma et al., 2002).[1] In both cases, firms are able to reduce their marginal cost which, ceteris paribus, would lead to an increase in PCM.

Given the theoretical inconclusive priors this paper sets out to analyse the effect of exporting on price cost margins empirically. We contribute to the literature in a number of ways. First, our paper is the first that we are aware of that calculates price-cost margins using the approach developed by Hall (1988) and Roeger (1995) for the UK using firm level panel data.[2] Second, unlike most of the earlier papers on measuring PCMs we allow for an effect of structural change over time to affect pricing behaviour.[3] Third, as pointed out above, while there is a large literature studying the effect of import competition on PCMs and the link between exporting and productivity, this is, to the best of our knowledge, the first paper that looks at the implications of exporting for domestic firms in terms of their domestic mark-up ratios.

This link is important for a number of reasons. Firstly, if there is evidence of a negative effect of exporting status on firms' PCMs then we can conclude that firms are subject to increased competition. This, in turn, may act as a channel through which exporters improve their efficiency post becoming exporter. Second, there may be implications for policy. If there are effects of exporting on domestic mark-ups competition policy aimed at reducing PCMs may also take into account exporting behaviour.

Section 2 briefly introduces the methodology proposed by Hall (1988) and Roeger (1995). Section 3 describes our dataset. The results are divided in two sections: section 4 provides estimates of average PCMs and their evolution, in manufacturing industry as a whole and in mode disaggregated (2-digit SIC) subsets, while section 5 analyzes more precisely the effect of exporting. Section 6 concludes.

[1] The empirical evidence for this 'learning by exporting' effect is however mostly negative (Clerides et al., 1998, Bernard and Jensen, 1999) or inconclusive (Delgado et al., 2002). Girma et al. (2002) is one of the few papers that find evidence in support of this hypothesis.

[2] Small (1997) calculates PCMs for UK manufacturing using industry level data. As we discuss in more detail below, firm level data are more appropriate to study this issue. Griffith (2001) attempts to measure PCMs using observed data on total output divided by total costs (assuming that AC = MC).

[3] In a companion paper (Görg and Warzynski, 2002) we look in more detail at the dynamics of price-cost margins.

2 Methodology

The methodology used to calculate price cost margins is based on Roeger's (1995) extension of the seminal work by Hall (1988) and Domowitz et al. (1988). Assuming an imperfectly competitive world where &rms set prices higher than marginal cost and starting from a standard production function

$$Q_{it} = \Theta_{it} F(K_{it}, N_{it})$$

where i is a &rm index, t a time index, K_{it} is capital stock (selected in advance of the realisation of demand), N_{it} is labour input, and Θ_{it} is the Hicks neutral technical progress, Hall (1988) and Domowitz et al. (1988) show that the Solow residual (i.e., total factor productivity (TFP)) can be written as

$$\Delta q_{it} - \alpha_{it} \Delta n_{it} = \beta_{it} \Delta q_{it} + (1 - \beta_{it})\, \vartheta_{it} \tag{1}$$

where

$$\Delta x_{it} = \Delta log \left(\frac{X_{it}}{K_{it}} \right), \forall X = N, Q,$$

$$\alpha_{it} = \frac{W_{it} N_{it}}{p_{it} Q_{it}}$$

is the wage share in total output, and

$$\vartheta_{it} = \Delta \log (\Theta_{it})\,.$$

is the unobserved productivity term. The coefficient β_{it} is of special interest as it is equal to the Lerner index

$$\beta_{it} = \frac{P_{it} - MC_{it}}{P_{it}} = 1 - \frac{1}{\mu_{it}}$$

which in turn allows one to retrieve the price cost margin $\mu_{it} = P_{it}/MC_{it} = -1/(\beta_{it} - 1)$.

Hall (1988) and Domowitz et al. (1988) suggest that μ can be retrieved from estimating speci&cations of equation (1) and this approach has been followed in a number of empirical studies (e.g., Thompson, 2002, Konings et al., 2001, Jun, 1998, Levinsohn, 1993). However, the problem with such an estimation is that the explanatory variables are potentially correlated with the unobserved productivity term ϑ_{it}. Hence, consistent estimation of equation (1) relies on the use of suitable instruments for the right-hand-side variables, which are potentially endogenous. The selection of proper instruments has, however, turned out to be rather difficult in practice (e.g., Levinsohn, 1993, Harrison, 1994).

Roeger (1995) discusses this problem in some detail and suggests an alternative approach that does not rely on “the use of instruments that are very hard to select” (Roeger, 1995, p. 318). His proposed technique for estimating price-cost-margins stems from his idea that the difference between the primal Solow residual as described in equation (1) and its price-based dual (derived from a cost function) is due to imperfect competition.

Hence, starting off with the primal Solow residual derived from the production function as in equation (1)

$$SR_{it} = \Delta q_{it} - \alpha_{Nit} \Delta n_{it} = \beta_{it} \Delta q_{it} + (1 - \beta_{it})\, \vartheta_{it}$$

we can write a similar expression for the price-based Solow residual (SRP_{it})

$$SRP_{it} = \alpha_{it} \Delta w_{it} + (1 - \alpha_{it})\, \Delta r_{it} - \Delta p_{it} = -\beta_{it} (\Delta p_{it} - \Delta r_{it}) + (1 - \beta_{it})\, \vartheta_{it}$$

Subtracting SRP from SR yields

$$\begin{aligned} SR_{it} - SRP_{it} &= \Delta q_{it} + (\Delta p_{it} - \Delta r_{it}) - \alpha_{it} \Delta n_{it} - \alpha_{it} (\Delta w_{it} - \Delta r_{it}) \\ &= \beta_{it} [\Delta q_{it} + (\Delta p_{it} - \Delta r_{it})] + u_{it} \end{aligned}$$

which cancels out the unobserved productivity term $(1 - \beta_{it})\, \vartheta_{it}$. Rewriting the left hand side as Δy and the right hand side as Δx the expression simpli&es to:

$$\Delta y_{it} = \beta_{it} \Delta x_{it} + u_{it} \tag{2}$$

where

$$\Delta y_{it} = \Delta q_{it} + (\Delta p_{it} - \Delta r_{it}) - \alpha_{it} \Delta n_{it} - \alpha_{it} (\Delta w_{it} - \Delta r_{it})$$

$$\Delta x_{it} = \Delta q_{it} + (\Delta p_{it} - \Delta r_{it})$$

Roeger (1995) argues that this expression can be estimated using OLS because the error term in this case is not correlated with the regressor, i.e., there is no endogeneity problem. Hence, there is no need to use instrumental variables.

Oliveira Martins et al. (1996) expand this approach by including material inputs in the production function. Doing so and slightly rewriting the previous equation yields

$$\begin{aligned} & \left(\Delta \log Q_{it} + \Delta \log P_{it}\right) - \alpha_{Nit}\left(\Delta \log N_{it} + \Delta \log W_{it}\right) \\ & -\alpha_{Mit}\left(\Delta \log M_{it} + \Delta \log P_{Mit}\right) - \left(1 - \alpha_{Nit} - \alpha_{Mit}\right)\left(\Delta \log K_{it} + \Delta \log R_{it}\right) \\ = \; & \beta_{it}\left[\left(\Delta \log Q_{it} + \Delta \log P_{it}\right) - \left(\Delta \log K_{it} + \Delta \log R_{it}\right)\right] \end{aligned} \tag{3}$$

or

$$\Delta y'_{it} = \beta_{it} \Delta x'_{it} + u_{it} \tag{4}$$

where P_{it} is the price of output, W_{it} is the wage rate, P_{Mit} is the price of materials and R_{it} is the rental rate for capital. Equation (4) is the key equation to be estimated.

To make our analysis econometrically feasible, we need to impose some identifying restrictions. It is not possible to estimate price-cost margins for each &rm separately using this approach. We have at our disposal a &rm level panel dataset. Therefore, we can estimate β for a given time period (β_t) assuming that price-cost margins are the same for all &rms in a given year, for a given industry $\left(\beta_j\right)$ assuming PCMs to be identical for all &rms within the same sector, or for a given period and a given industry $\left(\beta_{jt}\right)$. This technique allows much more ! exibility than what has been used in the literature thus far as we can estimate the evolution of mark-ups over time by sector and therefore capture more of the heterogeneity present in our sample.

A number of issues arise when estimating price-cost-margins using this approach or the approach developed by Hall (1988). First, there is the question of whether to use &rm or industry level data to estimate the above equations. Clearly, the empirical methodology is based on a model of firm behaviour and, therefore, firm level data should be most appropriate to estimate the model. However, the literature has mostly used industry level data (see Hall, 1988, Roeger, 1998). As is well known, industry level data may lead to biased results as they aggregate over potentially heterogenous units. Our dataset provides us with firm level data for UK manufacturing industries which are arguably more appropriate for such an analysis.

Second, it is difficult to believe that the degree of market power has remained constant over time. Nevertheless, most studies estimate the average markup over a period. Exceptions are studies using firm level data with a smaller time span and/or trying to capture structural adjustments (Levinsohn, 1993; Konings et al., 2001; Bottasso and Sembenelli, 2001) and sector studies trying to control for changes in some exogenous parameters like trade (Hakura, 1998) or the nature of antitrust control (Warzynski, 2001). Another aspect is the pro- or counter-cyclicality of the markup ratio, allowing the markup to change from one year to another depending on the economic activity. We allow for changes in mark-ups over time in the estimations of equation (4).

Third, we can also look more closely at some firm level characteristics that might be associated with higher price cost margins. As pointed out above, the main aim of the paper is to analyse whether exporting activity impacts on price cost margins. To do this, reconsider equation (4) and assume that the coefficient β_{it} is made up of two components, capturing the average mark-up for non-exporters plus a term allowing for a difference in mark-ups between exporters and non-exporters, i.e., $\beta_{it} = (\beta_1 + \beta_2 * ED_{it})$, where ED_{it} is a dummy variable equal to 1 if the firm is an exporter. We can estimate these two components of the mark-up by substituting this expression back into equation (4) and re-arranging, which yields

$$\Delta y'_{it} = \beta_1 \Delta x'_{it} + \beta_2 ED_{it} * \Delta x'_{it} + u_{it} \tag{5}$$

If exporters indeed have different price-cost margins we would expect β_2 to be statistically significantly different from zero. Similarly, we investigate for the set of exporting firms whether export intensity affects price cost margins by estimating the following equation

$$\Delta y'_{it} = \theta_1 \Delta x'_{it} + \theta_2 EI_{it} * \Delta x'_{it} + v_{it} \tag{6}$$

for exporting firms only, where EI_{it} is a firm's export intensity defined as exports over total turnover. Again, if exporting activity matters we would expect θ_2 to be statistically signi&cantly different from zero.

3 Dataset

The analysis is based on &rm level data taken from the *OneSource* database. This is a commercial database derived from company accounts data that &rms are legally required to deposit at Companies House. This dataset is particularly suitable for our purposes as it is one of the few datasets providing recent &rm level data on, *inter alia*, output, employment, physical capital, wages, exports and accounting data in a consistent way across &rms in the UK. Also, it has a time series element allowing investigation of the exporting - price cost margin link over time.

The data available to us cover the period 1989 to 1997. After dropping &rms that were ultimate holding companies or subsidiaries under joint ownership our dataset contains information on 18,253 &rms of which 13,821 are UK-owned and 4,432 are foreign-owned.[4] This yields a total of 124,412 observations implying that, on average, we have at least six observations per &rm. Of the &rms included in the sample, 3,479 are exporters throughout the sample period, 10,530 never export and the remaining 4,244 exported in at least one year during the sample period.

For the discussion of the variables included in the empirical estimation it is useful to rewrite equation (4) as follows

$$\begin{aligned} & \Delta \log OR_{it} - \alpha_{Nit} \Delta \log CE_{it} - \alpha_{Mit} \Delta \log CM_{it} \\ & -\alpha_{Kit} \left(\Delta \log NK_{it} + \Delta \log R_{it} \right) \\ = \; & \beta_{it} \left[\Delta \log OR_{it} - \left(\Delta \log NK_{it} + \Delta \log R_{it} \right) \right] \end{aligned} \tag{7}$$

OR is operating revenue, CE is total cost of employees, CM is total cost of materials and NK is tangible &xed assets net of depreciation. All of these variables are available at the &rm level from our dataset. Note that all variables are speci&ed in nominal terms which is a further advantage of the Roeger method compared to others. R_{it} is the user cost of capital, de&ned as

[4] These were dropped as it may lead to double counting if &rms have consolidated accounts

$$R_{it} = P_I \frac{r + \delta_{it}}{1 - t}$$

where δ_{it} is the &rm-speci&c rate of depreciation on capital assets, available from the dataset. P_I is the index of investment goods prices, r is the real interest rate and t is corporate taxation. P_I, r and t are at the country level and time varying.

Table 1 presents some summary statistics on the growth rates of operating pro&ts, capital stock, total cost of employees and cost of materials for 1997. Note that, in all cases, the growth rates are higher for non-exporters than for exporters.

Table 1 here

4 Average price cost margins

As pointed out above, our analysis is based on &rm level panel data for UK manufacturing industries. Since equation (3) is essentially a twice differenced equation it cancels out any possible &rm speci&c unobservable effects that may impact on a &rm's production function. Hence we can use simple pooled regression techniques for the estimation.[5] In order to deal with outliers in the empirical analysis we estimate equation (3) using a robust regression estimator.[6]

We start with estimating equation (3) for each year and for the entire sample in order to illustrate the evolution of the average PCM in UK manufacturing &rms. Table 2 reports the coefficients of β_{it} estimated from the regressions and also the implied value of the price-cost margin μ_{it}. The

[5] We also replicated all estimations using a &xed effects estimator. In most cases, a simple F test of the signi&cance of the &rm &xed effect rejects the speci&cation, hence we prefer the pooled estimations as used here.

[6] The robust regression technique takes account of potential outliers in the data by weighting observations according to their distance to the average in the sample. See, for example, Berk (1990). The estimator is implemented using Stata 7. We also estimated all equations using simple OLS; results are similar in most cases and are not reported here to save space.

estimates of the Lerner index β_{it} are statistically signi&cantly different from zero in every period, suggesting the existence of market power and, hence, deviations from perfect competition in UK manufacturing industries. Interestingly, our results indicate a decline in the average mark-up from 1991 onwards compared to 1989 and 1990. This &nding is in line with Griffith (2001) conclusion that the European Single Market Programme has increased competitive pressure in UK manufacturing industries.

Table 2 here

The results in Table 2 are, of course, averaged over a number of heterogeneous sub-sectors. We therefore disaggregated the manufacturing industry into 22 SIC92 two digit sub-sectors and estimate equation (3) for each subset separately. The results of this exercise are reported in Table 3. For all subsectors we &nd statistically signi&cant price-cost margins, although there is some variation in the size of the mark-ups across sectors ranging from 1.05 in sector 23 to 1.153 in sector 26.

Table 3 here

These averages of course hide the evolution over time of mark-ups which might be different depending on the subsector. In further estimations of equation (3) we allowed the mark-ups to change over time for each subsector (similar to the results in Table 2). These results, which are not reported here to save space, do indeed suggest that there are sectoral differences in the development of mark-ups across industries over time.[7]

5 The effect of exporting behaviour

We now turn to the issue of whether exporting affects price-cost margins for those &rms who do export. The &rst step is to estimate the simple premia to exporting, as described in equation (4). The result of this estimation for the whole manufacturing sector is presented in column (1) of Table 4. Note that the average Lerner index is still positive and statistically signi&cant. The

[7] See also Görg and Warzynski (2002) for a further discussion.

inclusion of the export dummy only leads to a marginal change in comparison to the estimate presented in Table 2 (1989 - 1997).

The positive and statistically signi&cant coefficient on the export interaction term ($ED_{it} * \Delta x'_{it}$) suggests that exporters have, on average, higher price cost margins than non-exporters. This is consistent with the idea discussed above that exporters improve their efficiency by entering into exporting. This allows them to reduce marginal cost and hence increase their price cost margins.

The previous estimation does, of course, not allow for the cyclicality of mark-ups which was shown to be important. In order to take account of these we constructed interaction terms of year dummies with $\Delta x'_{it}$. Inclusion of these in equation (4) allows for the markup to change over time. The estimation results are reported in column (2) of Table 4. The coefficients on the interaction terms re! ect the picture shown in Table 2, that mark-ups appear to have fallen after 1991 relative to 1989. Most interestingly from our point of view is the &nding that, once we account for the cyclicality of mark-ups we do not &nd a statistically signi&cant effect of exporting on mark-ups for manufacturing as a whole.

Table 4 here

In columns (3) and (4) of Table 4 we present results for the estimation of equation (5) for exporters only. We &nd that the higher a &rm's export intensity, the higher its price cost margin. This result is robust to the inclusion of the time-interaction terms.

These estimations of course aggregate over very heterogeneous manufacturing sectors in terms of price-cost margins (as shown in Table 3). Hence, we &rstly re-estimated the same equation as in column (2) of Table 4 but estimate it separately for the two digit industries as in Table 3. The results are reported in Table 5.[8] Considerable heterogeneity is apparent from these estimations. For the majority of manufacturing sectors we do not &nd any evidence that exporters have different mark-ups compared to non-exporters. However, for two sectors (SIC 22 - publishing and printing and 32 - radio, TV, communication equipment) we &nd statistically signi&cant evidence that

[8] We do not report the coefficients on the time-interaction terms in order to save space. The same applies to Table 6.

exporters have lower price cost margins. Here it may suggest that the increased competition on export markets forces &rms in these sectors to reduce their price. On the other hand, there are four sectors (SIC 19 - leather, luggage and footwear, 25 - rubber and plastics, 29 - machinery and equipment and 31 - electrical machinery) for which we &nd that exporters have higher price cost margins, which is in line with the hypothesis that exporting increases efficiency.

Table 5 here

There is no obvious pattern to this picture. We investigated whether the average export intensity of a sector matters for the effect on PCMs but that did not seem to be the case (for example, average export intensity (exports/turnover) are very similar in SIC 29 and 32). Also, classifying sectors into high and low tech, according to the OECD classi&cation does not shed light on this issue (SIC 31 and 32 are both high tech sectors). Therefore, all we can conclude at this stage is that there is substantial heterogeneity across sectors in the effect of exporting on price cost margins.

Finally, we also re-estimated equation (5) using data for exporting &rms only by two-digit sector. The results are reported in Table 6. Again we &nd evidence of substantial heterogeneity in the effect of exporting intensity on mark-ups for exporting &rms. In 11 cases we &nd evidence for positive effects of exporting intensity on mark-ups, while in three cases (SIC 22 - publishing etc., 29 - machinery and equipment and 35 - other transport equipment) we &nd that higher exporting intensity is correlated with lower mark-ups.

Table 6 here

6 Conclusion

to be written....

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7 Tables

Table 1: Summary statistics

	Non-exporters		Exporters	
	mean	std.dev.	mean	std.dev.
$\Delta \log PQ$	0.073	0.207	0.053	0.218
$\Delta \log K$	0.292	0.899	0.198	0.731
$\Delta \log WN$	0.073	0.209	0.060	0.198
$\Delta \log P_M M$	0.062	0.233	0.045	0.245

Table 2: the evolution of average price cost margins

	β	μ	Nr. obs.
1989	0.141*** (0.0005)	1.164	2795
1990	0.138*** (0.0007)	1.160	5026
1991	0.104*** (0.001)	1.116	4974
1992	0.101*** (0.001)	1.112	5184
1993	0.096*** (0.0005)	1.106	5457
1994	0.105*** (0.0009)	1.117	5816
1995	0.101*** (0.0009)	1.112	6386
1996	0.103*** (0.0008)	1.115	6950
1997	0.111*** (0.001)	1.125	2926
1989-1997	0.108*** (0.0002)	1.121	45527

Note: standard errors in parentheses; *** denotes statistical signi&cance at 1 percent level

Table 3: Average price cost margins by 2-digit SIC industry

	β	μ	Nr. obs.
15: Food and beverages	0.085*** (0.0007)	1.093	3650
16: Tobacco	0.132*** (0.006)	1.152	73
17: Textiles	0.093*** (0.001)	1.102	2001
18: Clothing	0.070*** (0.001)	1.075	1262
19: Leather, luggage and footwear	0.084*** (0.003)	1.092	437
20: Wood, straw and plaiting materials	0.088*** (0.002)	1.096	845
21: Pulp, paper and paper products	0.104*** (0.002)	1.116	1667
22: Publishing, printing and media	0.121*** (0.001)	1.138	4770
23: Coke, re&ned petroleum and nuclear fuel	0.050*** (0.005)	1.053	151
24: Chemicals and chemical products	0.114*** (0.001)	1.129	2970
25: Rubber and plastic products	0.117*** (0.001)	1.132	3017
26: Other non metallic mineral products	0.133*** (0.004)	1.153	1219
27: Basic metals	0.110*** (0.002)	1.123	1567
28: Fabricated metal products	0.121*** (0.0007)	1.138	4944
29: Machinery and equipment nec	0.109*** (0.001)	1.122	5677
30: Office machinery and computers	0.087*** (0.002)	1.095	712
31: Electrical machinery and apparatus	0.119*** (0.002)	1.135	2086
32: Radio, TV and communication equipment	0.114*** (0.002)	1.129	1533
33: Medical, precision and optical instruments	0.129*** (0.002)	1.148	2234
34: Motor vehicles, trailers and semi-trailers	0.112*** (0.002)	1.126	1538
35: Other transport equipment	0.105*** (0.002)	1.117	954
36: Furniture, manufacturing nec	0.095*** (0.001)	1.105	2189

Note: standard errors in parentheses; *** denotes statistical signi&cance at 1 percent level

Table 4: export interactions per year

	(1)	(2)	(3)	(4)
x2	0.105	0.142	0.102	0.118
	(0.001)**	(0.001)**	(0.001)**	(0.002)**
x2ed	0.006	0.002		
	(0.001)**	(0.001)		
x2ei			0.033	0.031
			(0.002)**	(0.002)**
x290		0.000		0.017
		(0.001)		(0.002)**
x291		-0.030		-0.018
		(0.002)**		(0.002)**
x292		-0.039		-0.020
		(0.002)**		(0.002)**
x293		-0.046		-0.026
		(0.001)**		(0.002)**
x294		-0.043		-0.021
		(0.002)**		(0.002)**
x295		-0.045		-0.019
		(0.001)**		(0.002)**
x296		-0.038		-0.027
		(0.001)**		(0.002)**
x297		-0.039		-0.024
		(0.002)**		(0.003)**
Constant	-0.008	-0.008	-0.007	-0.007
	(0.000)**	(0.000)**	(0.000)**	(0.000)**
Observations	48219	48216	25697	25695
R-squared	0.68	0.73	0.66	0.67

Standard errors in parentheses

* significant at 5%; ** significant at 1%

Table 5: Estimations by sector for exporters and non-exporters, allowing for cyclical effects

	x2		x2ed			
sector	coefficient	std.error	coefficient	std.error	Obs	R-squared
15	0.077	(0.003)**	-0.003	-0.003	3526	0.58
16	0.046	-0.137	0.06	-0.096	72	0.74
17	0.164	(0.012)**	-0.013	-0.009	1958	0.6
18	0.11	(0.011)**	0.003	-0.005	1213	0.55
19	0.089	(0.027)**	0.07	(0.016)**	429	0.52
20	0.134	(0.016)**	0.005	-0.006	822	0.56
21	0.111	(0.011)**	0.001	-0.005	1623	0.58
22	0.179	(0.004)**	-0.023	(0.003)**	4614	0.74
23	0.112	(0.035)**	0.003	-0.024	147	0.43
24	0.123	(0.011)**	0.015	-0.01	2871	0.64
25	0.104	(0.007)**	0.026	(0.005)**	2943	0.62
26	0.211	(0.013)**	-0.007	-0.01	1399	0.54
27	0.113	(0.009)**	-0.012	-0.006	1748	0.63
28	0.141	(0.005)**	-0.002	-0.003	5518	0.64
29	0.119	(0.007)**	0.023	(0.006)**	6277	0.69
30	0.268	(0.040)**	-0.055	-0.031	820	0.53
31	0.171	(0.011)**	0.017	(0.006)**	2332	0.61
32	0.231	(0.017)**	-0.037	(0.015)*	1837	0.61
33	0.138	(0.014)**	0.02	-0.013	2549	0.66
34	0.08	(0.012)**	0.013	-0.007	1786	0.59
35	0.162	(0.022)**	0.008	-0.012	1053	0.65
36	0.137	(0.008)**	-0.001	-0.004	2611	0.72

Standard errors in parentheses
* significant at 5%; ** significant at 1%

Table 6: Estimations by sector for exporters only, allowing for cyclical effects

	x2		x2ei			
sector	coefficient	std.error	coefficient	std.error	Obs	R-squared
15	0.045	(0.007)**	0.108	(0.009)**	1228	0.63
16	-0.003	-0.072	0.085	(0.033)*	30	0.9
17	0.14	(0.011)**	0.073	(0.010)**	1216	0.95
18	0.103	(0.013)**	-0.002	-0.009	682	0.49
19	0.134	(0.027)**	0.058	-0.035	221	0.63
20	0.103	(0.033)**	-0.097	-0.103	197	0.44
21	0.09	(0.019)**	0.099	(0.022)**	713	0.44
22	0.122	(0.008)**	-0.052	(0.011)**	1227	0.57
23	0.141	(0.033)**	-0.12	-0.087	76	0.64
24	0.075	(0.006)**	0.044	(0.012)**	1860	0.61
25	0.119	(0.010)**	0.058	(0.016)**	1602	0.64
26	0.142	(0.019)**	0.038	-0.027	671	0.49
27	0.075	(0.011)**	0.023	(0.011)*	1050	0.67
28	0.149	(0.008)**	0.014	-0.007	2705	0.57
29	0.117	(0.006)**	-0.02	(0.005)**	4146	0.62
30	0.223	(0.035)**	0.015	-0.026	488	0.46
31	0.15	(0.011)**	0.099	(0.012)**	1490	0.58
32	0.177	(0.012)**	0.031	(0.013)*	1248	0.61
33	0.151	(0.004)**	0.071	(0.009)**	1781	0.72
34	0.087	(0.012)**	0.037	(0.013)**	1054	0.63
35	0.215	(0.030)**	-0.052	(0.024)*	646	0.48
36	0.136	(0.010)**	0.008	-0.013	1322	0.64

Standard errors in parentheses
* significant at 5%; ** significant at 1%