THE DYNAMICS OF PRICE COST MARGINS: EVIDENCE FROM UK MANUFACTURING

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This paper estimates the dynamics of price cost margins in UK manufacturing over the period 1989-1997 and links it to the implementation of the Single Market Program. Using the Hall-Roeger methodology, we find a dramatic decline in price cost margins by 25% after 1990. This suggests that firms anticipated the competitive shock induced by the Single Market Program, which created a more competitive environment.

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1. Introduction

When the Single Market Program (SMP) was implemented in 1992, there were hopes that it would bring increased competition, meaning more productive and innovative companies, and lower prices for consumers. The SMP was therefore targeting improvement in both allocative efficiency and productive efficiency.

Estimating the evolution of price cost margins (PCMs, $\beta = \frac{P-c}{P}$) basically provides an estimate of change in allocative efficiency, as it measures a change in the difference between the actual price set by firms (P) and the standard of perfect competition where firms should price at marginal cost (c). Deviation from perfect competition has clear welfare implications because it leads to lower output, higher prices, and lower welfare (i.e. the sum of the consumer surplus and of the producer surplus).

Has the Single Market Program influenced firms' pricing behaviour in UK manufacturing? Has it forced the introduction of a tougher price competition in the spirit of Sutton (1991)? Can we talk of a "switch of regime"? In this paper we try to answer these questions by estimating the dynamics of price cost margins in the UK manufacturing.

To our knowledge, this paper is the first to estimate PCMs in UK manufacturing using firm level data following the methodology of Roeger (1995). By focusing on the firm as the unit of analysis, we are able to capture the evolution of the average PCM in a given subset. We devote a particular attention to the explanation of the change in intra-industry average PCM.

There is a small literature that has estimated the importance of market power in the UK. Using sector level data, Small (1997) estimated the level of PCMs in 16 industries in manufacturing and services over the period 1968-1991. He found evidence of large markups in most industries, especially in services. He also found pro-cyclical markups.

Other papers have tackled the issue using firms' profit margin and accounting margins to check for the presence of market power (Machin and Van Reenen, 1993; Haskel, Martin and Small, 1995). A more recent exercise by Griffith (2001) looked more particularly at the effect of the SMP on the Lerner index. Using the ARD dataset, she found that the Lerner index had declined more in sensitive industries than in the non sensitive industries.

Our analysis is complementary to hers in the sense that we use a different methodology that assumes that marginal costs are unobservable and indirectly estimates the deviation from perfect competition by observing the way firms adapt their input demand to changes in output.

Some papers have looked at the effect of the SMP in other European countries: Italy (Botasso and Sembenelli, 2001), Spain (Siotis, 2002) and Belgium (Warzynski, 2002), as well as the European Commission (1999), using sector-level data. The main finding is that PCM seem to have declined mostly in large countries, where PCMs were higher before 1992, but stayed relatively constant in small countries.

We find that price cost margins declined by 25% after 1990, controlling for cyclical effects, falling from 0.14 to 0.10 on average. This is an extremely large figure and we discuss whether this dramatic evolution can be attributed to the SMP. We also describe the heterogeneity of the evolution across sectors and discuss extensions to this work.

Section 2 details the methodology that we follow. Section 3 describes our dataset. Section 4 presents and discusses our results and section 5 concludes.

2. Methodology

2.1. Seminal work (Hall, 1986, 1988; Domowitz *et al.*, 1988)

Assume a standard production function:

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

where i is a firm index, t a time index, Θ_{it} is the Hicks neutral technical progress, K_{it} is capital stock (selected in advance of the realisation of demand), N_{it} is labour input.

For now assume constant returns to scale and competitive pricing for inputs, assumptions that we will relax later.

Under perfect competition the firm prices at marginal cost. In a competitive environment, taking logs, using standard rules of derivation and expressing employment and quantities per unit of capital, it can be shown that:

$$\Delta q_{it} = \alpha_{Nit} \Delta n_{it} + \vartheta_{it} \qquad (1)$$

where:

$$\Delta q_{it} = \Delta log\left(\frac{Q_{it}}{K_{it}}\right)$$

$$\Delta n_{it} = \Delta log\left(\frac{N_{it}}{K_{it}}\right)$$

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

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

However, when firms have market power, they will set a higher price that exceeds the marginal cost. In this case. Equation (1) then can be generalised as:

$$\Delta q_{it} = \mu_{it}\alpha_{Nit}\Delta n_{it} + \vartheta_{it} \quad (2)$$

where

$$\frac{P_{it}}{c_{it}} = \mu_{it} \geqslant 1$$

Incorporating material costs in the production function (Domowitz *et al.*, 1988):

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

Equation (2) becomes:

$$\Delta q_{it} = \mu_{it}(\alpha_{Nit}\Delta n_{it} + \alpha_{Mit}\Delta m_{it}) + \vartheta_{it} \quad (3)$$

where

$$\alpha_{Mit} = \frac{P_{Mit}M_{it}}{P_{it}Q_{it}}$$

$$\Delta m_{it} = \Delta log\left(\frac{M_{it}}{K_{it}}\right).$$

Equivalently:

$$\Delta q_{it} - \alpha_{Nit}\Delta n_{it} - \alpha_{Mit}\Delta m_{it} = \beta_{it}\Delta q_{it} + (1-\beta_{it})\vartheta_{it} \quad (4)$$

where β_{it} is the Lerner index:

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

The debate about this methodology has focused on four issues:

– *potential endogeneity problem and validity of instruments*: if there are productivity shocks to variable factors, which are observable, the setting of input levels will not be independent of changes in outputs. Typical instruments in studies using aggregate US data are the growth of real GDP, the price of oil, the political party of the president or the growth of military purchases (Hall, 1986, 1988; Domowitz *et al.*, 1988). Blanchard (1986) and Roeger (1995) criticised these instruments on the basis that productivity shocks are likely to be correlated with the instruments as well. To avoid this difficulty, Roeger (1995) and Oliveira Martins, Scarpetta and Pilat (1996) proposed a new method through which they could estimate markups by OLS in a consistent and unbiased way.

– *time varying parameters*: 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; Siotis, 2002; Warzynski, 2002) 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 (see e.g. Green and Porter, 1983; Rotemberg and Saloner, 1986; Rotemberg and Woodford, 1999). However, more structural aspects are likely to have changed the nature of competition.

– *size of the margin*: the original estimates were considered as too high and incoherent for some industries (negative markups). Successive refinements have lowered these estimates and made them more acceptable.

– *firm or sector level data*: the empirical methodology is based on a model of firm behaviour; yet the literature has mostly used industry level data. Moreover, by doing this, it assumes constant behaviour through time, has difficulty to identify structural change and to find instruments if these are necessary.

2.2. Coping with endogeneity and time varying parameters

A recent paper by Roeger (1995) proposed an alternative method to solve the endogeneity problem presented above. He argues that imperfect competition explains the difference between primal and dual productivity measures. From subsection 2.1, we know that

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

We can write a similar expression for the price-based Solow residual:

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

where p is the logarithm of price, w the logarithm of the price of labor and r the logarithm of the price of capital.

Combining these two equations we obtain an expression where the price cost margin can be estimated with OLS:

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

Rewriting the left hand side as Δy and the right hand side as Δx the expression simplifies to:

$$\Delta y_{it} = \beta_{it}\Delta x_{it} + u_{it} \qquad (5)$$

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 argues that this expression can be estimated by OLS because the error term in this case is not correlated with the regressor.

Again including material costs and slightly rewriting the previous equation (Oliveira Martins *et al.*, 1996):

$$(\Delta\log Q_{it} + \Delta\log P_{it}) - \alpha_{Nit}(\Delta\log N_{it} + \Delta\log W_{it})$$
$$-\alpha_{Mit}(\Delta\log M_{it} + \Delta\log P_{Mit}) - (1 - \alpha_{Nit} - \alpha_{Mit})(\Delta\log K_{it} + \Delta\log R_{it}) \quad (6)$$
$$= \beta_{it}[(\Delta\log Q_{it} + \Delta\log P_{it}) - (\Delta\log K_{it} + \Delta\log R_{it})]$$

or

$$\Delta y'_{it} = \beta_{it}\Delta x'_{it} + u_{it} \quad (6')$$

According to the availability of the data, another rewriting leads to this expression:

$$\Delta\log OR_{it} - \alpha_{Nit}\Delta\log CE_{it} - \alpha_{Mit}\Delta\log CM_{it} - \alpha_{Kit}(\Delta\log NK_{it} + \Delta\log R_{it})$$
$$= \beta_{it}[\Delta\log OR_{it} - (\Delta\log K_{it} + \Delta\log R_{it})]$$

where OR is operating revenue, CE cost of employees, CM cost of materials, all in nominal terms as specified in accounting data. NK is tangible fixed assets net of depreciation and P_K is the user cost of capital, defined as:

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

where δ_{it} is the firm-specific depreciation rate, 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.

Eq. (6) will be the key equation that we will estimate. To make our analysis econometrically feasible, we need to impose some identifying restrictions. We have at our disposal a panel dataset. We can therefore estimate β for a given time period (β_t), for a given industry (β_j), or for a given period and a given industry (β_{jt}). **This technique allows much more flexibility that what has been used in the literature.**

Klette (1999) proposes another method that allows to measure the heterogeneity of the markup within industry. However, he is forced to rely on IV estimation and only provides rough estimates of the within group heterogeneity. While his approach stresses an important issue in the literature, we focus our analysis in this paper on the dynamic evolution of the average price cost margin at the level of the industry.

3. Dataset

Our firm level data comes from the *OneSource* database, a commercial database derived from the accounts that companies are legally required to deposit at Companies House. The data cover the period 1987 to 1997. This means that we can analyse the dynamics of PCMs on the period 1989-1997, three years before 1992.

After dropping firms that were ultimate holding companies or subsidiaries under joint ownership[1] our dataset contains information on 18,253 firms of which 13,821 are UK-owned and 4,432 are foreign-owned. This yields a total of 124,412 observations implying that, on average, we have at least six observations per firm. However, because our analysis is in first difference and because of panel is unbalanced, the actual number of observations in our regressions will be reduced quite extensively.

4. Results

4.1. The dynamics of average price cost margins

We start by estimating Eq. (6') by year considering all firms in the same subset. This provides some descriptive information on the average price cost margin in the UK manufacturing and its evolution. Table 1 shows the results. We observe a dramatic decline especially after 1990, i.e. before the actual implementation of the SMP, what could suggest that firms anticipated its effects but could also reflect more general macroeconomic

1. The evolution of the average price cost margin

	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; ***/**/* indicates statistical signi?cance at the 1%/5%/10% critical level

1. These were dropped as it may lead to double counting if firms have consolidated accounts.

factors, as we discuss later. The next step is to analyze the level and evolution of the PCM in more disaggregated subsets, like 2-digit industries.

It is important to note that there are much les observations in the first and the last year of our panel, which means that we should be careful with the composition of our repeated cross section. To control for that we replicated the estimations using observations for those firms present all years (the complete panel). Results were unchanged. Another (and more drastic) way to solve this problem is to limit our attention to the 1990-1996 period.

We need to make a few remarks at that stage of the analysis. First of all, we notice that the size of the PCM is relatively small, between 0.096 and 0.141. This reduction in level can be explained by the methodology employed (reducing the upward bias due to endogeneity) and the nature of the dataset. Indeed, previous studies used mostly subsets of large firms, with established market presence, while this dataset has many characteristics of a population dataset, although imperfect. The fact that, by increasing the number of observations, the level of PCMs declines looks logical as small and medium companies are probably less able by definition to benefit from market power. Second, the highly unbalanced nature of our dataset can be explained by the natural evolution of industrial structure. We do not control for this selection effect in our analysis as we simply provide a series of snapshots at various levels that describe the evolution of PCMs over time.

4.2. Price cost margins by industry

We first estimate the average PCM by industry over the period 1989-1997. This documents the heterogeneity of PCMs across sectors (table 2). The highest PCMs are found in the other non metallic mineral products industry (SIC 26), the tobacco industry (SIC 16) and the medical, precision and optical instruments industry (SIC 33). These averages hide the dynamic evolution that might be different depending on the industry. In table 3 we estimate the average PCM by industry and by year. Most industries experienced a decline in PCM after 1990. The evolution would suggest that maybe some cyclical factors are more important than structural reforms. We analyse this aspect in the next subsection.

4.3. Cyclicality and SMP effect

We want to determine which part of the evolution of price cost margins can be attributed to a structural change and which part can be explained by cyclical factors. To do this, we first interact Δx with a sector-specific cyclical indicator CYC. As a first step, we use the growth of real output in the 5-digit industry. We assume a component of the PCM to be

2. 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, refined 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 semitrailers	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: see table 1

constant over the period but we allow another component to vary year by year depending on the cycle:

$$\beta = \beta_0 + \beta_{CYC} * CYC_{jt}$$

When we make this assumption, Eq. (6') becomes[2]:

$$\Delta y'_{it} = (\beta_0 + \beta_{CYC} * CYC_{jt}) \Delta x'_{it} + \delta \Delta CYC_{jt} + u_{it} \qquad (6'')$$

We then try to detect evidence of structural change by creating a dummy $POST1990$ equal to 1 if $year > 1990$. We interact Δx with this dummy:

$$\Delta x'_{it} = (\beta'_0 + \beta'_{CYC} * CYC_{jt} + \beta_{POST1990} * POST1990) \Delta x'_{it} + \delta \Delta CYC + u_{it} \qquad (6''')$$

2. Derivations are straightforward and can be found in Oliveira Martins and Scarpetta (1999). We thank Joaquim Oliveira Martins and Werner Roeger for clarifying this point.

3. The dynamics of average PCM by 2-digit SIC industry

	1989	1990	1991	1992	1993	1994	1995	1996	1997
15: Food and beverages	0.114***	0.132***	0.096***	0.08***	0.100***	0.074***	0.072***	0.088***	0.068***
standard error	0.004	0.002	0.004	0.005	0.003	0.003	0.003	0.004	0.004
Nr. obs.	181	389	386	393	431	478	531	566	278
16: Tobacco	na	na	na	na	na	na	na	na	na
17: Textiles	0.137***	0.110***	0.104***	0.081***	0.093***	0.089***	0.063***	0.068***	0.101***
standard error	0.008	0.004	0.008	0.005	0.003	0.005	0.005	0.007	0.006
Nr. obs.	113	242	239	234	242	243	261	279	141
18: Clothing	0.107***	0.076***	0.067***	0.063***	0.075***	0.077***	0.049***	0.062***	0.040***
standard error	0.008	0.005	0.005	0.006	0.006	0.007	0.004	0.004	0.005
Nr. obs.	58	125	131	141	151	162	183	203	103
19: Leather, luggage and footwear	0.164***	0.135***	0.088***	0.050***	0.076***	0.085***	0.063***	0.111***	0.124***
standard error	0.018	0.017	0.013	0.015	0.023	0.012	0.010	0.014	0.016
Nr. obs.	24	51	46	50	53	55	59	62	32
20: Wood, straw and plaiting materials	0.138***	0.136***	0.119***	0.086***	0.081***	0.066***	0.071***	0.083***	0.079***
standard error	0.013	0.006	0.008	0.008	0.012	0.008	0.007	0.006	0.009
Nr. obs.	41	92	90	96	99	110	120	129	63
21: Pulp, paper and paper products	0.105***	0.112***	0.090***	0.088***	0.089***	0.090***	0.077***	0.115***	0.131***
standard error	0.010	0.007	0.006	0.008	0.004	0.006	0.004	0.004	008
Nr. obs.	106	178	169	191	203	218	239	261	97
22: Publishing, printing and media	0.157***	0.171***	0.127***	0.115***	0.097***	0.113***	0.109***	0.113***	0.148***
standard error	0.004	0.003	0.007	0.004	0.004	0.002	0.002	0.002	0.005
Nr. obs.	266	528	511	526	562	600	685	761	322

Note: see table 1

3. The dynamics of average PCM by 2-digit SIC industry (...)

	1989	1990	1991	1992	1993	1994	1995	1996	1997
23: Coke, refined petroleum and nuclear fuel	na	na	na	na	na	na	na	na	na
24: Chemicals and chemical products	0.136***	0.142***	0.129***	0.098***	0.092***	0.124***	0.125***	0.104***	0.133***
standard error	0.004	0.003	0.006	0.006	0.007	0.007	0.005	0.002	0.011
Nr. obs.	225	329	321	341	358	385	411	444	148
25: Rubber and plastic products	0.125***	0.152***	0.104***	0.136***	0.113***	0.111***	0.096***	0.111***	0.124***
standard error	0.007	0.004	0.006	0.005	0.006	0.005	0.001	0.005	0.006
Nr. obs.	204	318	319	340	367	398	432	461	169
26: Other non metallic mineral products	0.206***	0.165***	0.108***	0.116 ***	0.122***	0.133***	0.107***	0.114***	0.173***
standard error	0.010	0.012	0.010	0.016	0.015	0.011	0.010	0.009	0.021
Nr. obs.	91	147	128	132	139	154	167	196	62
27: Basic metals	0.098***	0.132***	0.088***	0.086***	0.095***	0.090***	0.126***	0.117***	0.084***
standard error	0.006	0.006	0.005	0.009	0.010	0.008	0.007	0.005	0.014
Nr. obs.	113	180	177	185	188	197	214	229	79
28: Fabricated metal products	0.139***	0.176***	0.113***	0.123***	0.125***	0.087***	0.108***	0.078***	0.122***
standard error	0.004	0.003	0.004	0.005	0.003	0.003	0.003	0.003	0.006
Nr. obs.	303	541	545	587	600	622	686	749	300
29: Machinery and equipment nec	0.127***	0.131***	0.103***	0.082***	0.071***	0.118***	0.087***	0.118***	0.103***
standard error	0.006	0.002	0.002	0.004	0.003	0.004	0.004	0.003	0.005
Nr. obs.	355	656	652	653	675	717	773	826	362

Note: see table 1

3. The dynamics of average PCM by 2-digit SIC industry (...)

	1989	1990	1991	1992	1993	1994	1995	1996	1997
30: Office machinery and computers	0.214***	0.160***	0.132***	0.104***	0.139***	0.107***	0.100***	0.071***	0.108***
standard error	0.028	0.024	0.013	0.024	0.011	0.014	0.016	0.012	0.011
Nr. obs.	30	65	76	86	95	98	96	109	49
31: Electrical machinery and apparatus	0.199***	0.138***	0.104***	0.109***	0.093***	0.125***	0.127***	0.101***	0.105***
standard error	0.010	0.006	0.008	0.007	0.007	0.006	0.007	0.005	0.006
Nr. obs.	118	233	238	242	244	250	287	319	151
32: Radio, TV and communication equipment	0.189***	0.167***	0.147***	0.073***	0.086***	0.094***	0.140***	0.121***	0.104***
standard error	0.010	0.011	0.012	0.010	0.004	0.006	0.006	0.006	0.008
Nr. obs.	86	153	162	165	180	201	225	243	114
33: Medical, precision and optical instruments	0.152***	0.169***	0.119***	0.119***	0.104***	0.151***	0.124***	0.104***	0.104***
standard error	0.004	0.006	0.007	0.006	0.008	0.007	0.007	0.004	0.007
Nr. obs.	145	233	233	249	278	288	308	349	143
34: Motor vehicles, trailers and semitrailers	0.085***	0.131***	0.091***	0.050***	0.065***	0.128***	0.118***	0.091***	0.090***
standard error	0.011	0.006	0.007	0.005	0.008	0.006	0.005	0.003	0.006
Nr. obs.	95	164	164	176	181	203	226	237	84
35: Other transport equipment	0.214***	0.099***	0.115***	0.101***	0.118***	0.084***	0.109***	0.105***	0.191***
standard error	0.014	0.008	0.012	0.017	0.015	0.008	0.011	0.007	0.024
Nr. obs.	64	110	100	109	119	121	131	141	52
36: Furniture, manufacturing nec	0.139***	0.102***	0.098***	0.082***	0.083***	0.086***	0.075***	0.074***	0.099***
standard error	0.007	0.003	0.006	0.004	0.005	0.005	0.006	0.004	0.004
Nr. obs.	131	241	241	248	251	267	301	341	159

Note: see table 1

4. Cyclicality of PCM

	β_0	$\beta_{CY\,C}$
15: Food and beverages	0.086*** (0.001)	0.005* (0.003)
16: Tobacco	0.094*** (0.008)	0.111* (0.056)
17: Textiles	0.093*** (0.002)	0.0001 (0.007)
18: Clothing	0.067*** (0.002)	0.012 (0.008)
19: Leather, luggage and footwear	0.083*** (0.003)	0.017 (0.021)
20: Wood, straw and plaiting materials	0.091*** (0.003)	0.026*** (0.010)
21: Pulp, paper and paper products	0.104*** (0.002)	0.020* (0.011)
22: Publishing, printing and media	0.123*** (0.001)	0.054*** (0.005)
23: Coke, refined petroleum and nuclear fuel	0.046*** (0.007)	0.060 (0.082)
24: Chemicals and chemical products	0.112*** (0.002)	0.009 (0.006)
25: Rubber and plastic products	0.119*** (0.002)	0.008 (0.007)
26: Other non metallic mineral products	0.137*** (0.004)	0.017 (0.014)
27: Basic metals	0.108*** (0.002)	0.024*** (0.008)
28: Fabricated metal products	0.118*** (0.001)	0.010 (0.006)
29: Machinery and equipment nec	0.111*** (0.001)	0.002 (0.004)
30: Office machinery and computers	0.139*** (0.005)	0.018 (0.020)
31: Electrical machinery and apparatus	0.121*** (0.002)	0.002 (0.004)
32: Radio, TV and communication equipment	0.128*** (0.003)	0.027*** (0.010)
33: Medical, precision and optical instruments	0.144*** (0.002)	0.058*** (0.010)
34: Motor vehicles, trailers and semitrailers	0.109*** (0.002)	0.033*** (0.008)
35: Other transport equipment	0.101*** (0.002)	0.025*** (0.014)
36: Furniture, manufacturing nec	0.101*** (0.001)	0.060*** (0.004)

Note: see table 1

Table 4 shows the result of the cyclicality test without controlling for the structural change. We find a negative and significant effect in 8 industries and a positive effect in 2 industries. In table 5, we control for the structural change. This is important to consider both types of influence. First, we find evidence of counter-cyclical PCM in 11 industries and a pro-cyclical margin in only 1 industry. Second, we find a significant decline in 19 out of the 20 industries where estimation is possible. Thus, controlling for cyclical factors, we can estimate the importance of structural change. And controlling for structural change, we can better understand the cyclical nature of PCMs.

5. Discussion and Conclusion

Our analysis has illustrated a dramatic decline in price cost margins in UK manufacturing after 1990, even when controlling for conjectural factors. The most likely explanation for this impressive decline is the

5. Cyclicality and post- 1990 effect

	$ß/_0$	$ß/_{CYC}$	$ß_{POST1990}$
15: Food and beverages	0.113*** (0.003)	0.002 (0.003)	0.030*** (0.003)
16: Tobacco	–	–	–
17: Textiles	0.126*** (0.005)	–0.008 (0.007)	–0.040*** (0.005)
18: Clothing	0.083*** (0.005)	–0.001 (0.008)	–0.020*** (0.005)
19: Leather, luggage and footwear	0.140*** (0.012)	–0.063*** (0.021)	–0.062*** (0.013)
20: Wood, straw and plaiting materials	0.141*** (0.009)	–0.021*** (0.009)	–0.057*** (0.009)
21: Pulp, paper and paper products	0.120*** (0.005)	–0.035*** (0.012)	–0.022*** (0.005)
22: Publishing, printing and media	0.167*** (0.002)	–0.039*** (0.005)	–0.051*** (0.003)
23: Coke, refined petroleum and nuclear fuel	–	–	–
24: Chemicals and chemical products	0.137*** (0.002)	0.006 (0.008)	–0.030*** (0.003)
25: Rubber and plastic products	0.145*** (0.004)	–0.012* (0.007)	–0.029*** (0.004)
26: Other non metallic mineral products	0.206*** (0.008)	–0.038** (0.015)	–0.079*** (0.009)
27: Basic metals	0.133*** (0.005)	–0.045*** (0.009)	–0.030*** (0.005)
28: Fabricated metal products	0.174*** (0.003)	–0.028*** (0.007)	–0.066*** (0.003)
29: Machinery and equipment nec	0.139*** (0.002)	–0.003 (0.004)	–0.034*** (0.002)
30: Office machinery and computers	0.206*** (0.013)	0.012 (0.020)	–0.077*** (0.014)
31: Electrical machinery and apparatus	0.171*** (0.005)	–0.002 (0.004)	–0.055*** (0.006)
32: Radio, TV and communication equipment	0.184*** (0.007)	–0.002 (0.010)	–0.073*** (0.007)
33: Medical, precision and optical instruments	0.190*** (0.003)	–0.019* (0.010)	–0.069*** (0.004)
34: Motor vehicles, trailers and semitrailers	0.116*** (0.006)	–0.033*** (0.008)	–0.009 (0.006)
35: Other transport equipment	0.138*** (0.007)	0.029*** (0.014)	–0.046*** (0.007)
36: Furniture, manufacturing nec	0.145*** (0.003)	–0.044*** (0.007)	–0.050*** (0.004)

Note: see table 1

increase in competition generated by the SMP. Therefore, this paper contributes to a growing literature on the effect of increased competition on PCMs.

We have used the Hall-Roeger approach and have shown how the methodology can flexibly be adapted to analyze different issues, therefore allowing for straightforward extensions: joint estimation of PCMs and returns to scale (Hall, 1990); joint estimation of bargaining power and PCMs (Crépon, Desplatz and Mairesse, 1999), estimation of within industry heterogeneity (Klette, 1999), conduct, or the estimation of TFP growth corrected for the presence of imperfect competition. This offers new propects for future research in this area.

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