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The Dynamics of Industrial Markups in Two Small Open Economies: Does National Competition Policy Matter ?

by

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DISCUSSION PAPER

The Dynamics of Industrial Markups in Two Small Open Economies: Does National Competition Policy Matter ? [1]

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Abstract

In order to determine whether competition policy a¤ects competition and the pricing behaviour of …rms, we estimate markup ratios according to the techniques developed by Hall (1986, 1988) and Domowitz et al. (1988) for the Dutch and Belgian manufacturing industry from 1992 to 1997. Competition law was applied less toughly in the Netherlands. We correct for three major weaknesses of the method: …rst, because the estimating equation is derived within the context of the theory of the …rm, we use …rm-level data. This increases e¢ciency thanks to the larger number of observations. Second this allows us to select valid instruments that have economic sense. Third we include material costs in our calculations to avoid the upward bias that occurs when omitting them. We …nd evidence of large markup ratios in the manufacturing industry as a whole and in a lot of 2-digit industries. The markup ratio did not decline in Belgium following the creation of a national competition policy authority. However we show that the markup ratio is higher in the Netherlands than in Belgium in the whole manufacturing industry but also in most smaller subsets. In addition, the import penetration ratio positively in‡uences the markup ratio in the Netherlands, meaning that imports do not discipline the industry.

JEL Classi…cation: C23, K21, L13, L4

Keywords: competition policy, markup, import penetration

1 Introduction

Competitive pressure is generally seen as a good thing in economics, since it reduces monopoly power and forces …rms to organise production more e¢ciently. Welfare increases when markets become more competitive, and hence governments have an interest in establishing and maintaining competitive product markets. As such an antitrust legislation has been implemented in the U.S. since 1890. For more than a century, the Department of Justice and -later on- the Federal Trade Commission have investigated a countless number of cases, the most important and recent one being the case against Microsoft.

On the contrary most European countries adopted competition laws only after World War II. Moreover these were not applied coherently, except perhaps in Germany and in the UK[1]. Parallel to these, the founding Treaty of the European Community has included tough antitrust rules against agreements between …rms (Art.85) and against the abuse of a dominant position (Art.86). Under these rules, most attention has been given to agreements and abuses that had cross-border implications, for example attacking …rms that were blocking imports into their country. Within countries, the enforcement of antitrust rules was rather disparate. With the Maastricht Treaty, subsidiarity as a principle was also implemented within this area of policy making. Therefore, countries that were lagging behind have recently brought their legislation closer to European standards.

In this paper we investigate the impact of competition policy on …rm markups in two European countries, Belgium and the Netherlands. Both are small open economies with very similar economic characteristics. However, in 1993, Belgium adopted a new antitrust legislation very similar to the European one, while the Netherlands continued the implementation of their antitrust law dating from the …fties until January 1998. In practice it was not e¢cient in …ghting cartels.

It often has been claimed that the Netherlands are the "cartel paradise" in Europe (de Jong, 1990). By comparing the two countries we try to get some insights into the e¤ect of antitrust on the markup behaviour of …rms in manufacturing. To this end, we use an exceptionally rich data set based on …rm level company accounts covering the years 1992-96 to estimate price markups and to analyse their dynamic behaviour. We base our method on

[1] See various contributions in Martin (1998)

the approach originally introduced by Hall (1986 & 1988) and later adjusted by Domowitz, Hubbard and Petersen (1988).

Unlike most papers in this literature we base our estimates on …rm rather than sector level data. This is important because it not only increases the reliability of the estimates due to an increased number of observations, but also allows us to take into account …rm-heterogeneity. Moreover, by the nature of the data we are able to …nd good instruments for estimating markups.

Apart from analysing the evolution of markups with respect to the implementation of antitrust policy, we make a number of other contributions in this paper. First, we estimate markups for separate sectors and compare them across the two countries. Second, as Belgium and the Netherlands are small open economies, both countries are vulnerable to competition from imports, which potentially have an impact on price-cost margins. We explore whether import competition disciplines …rm behaviour.

The remainder of this paper is organised as follows. In the next section we present the policy changes in both Belgium and the Netherlands. We then discuss the econometric methodology in section 3. In section 4 we describe the data and report the results of the estimations. Section 5 concludes.

2 Antitrust policy in Belgium and the Netherlands: Theory and practice

Belgium

In the late eighties the price regulation system was abolished. The regulatory system was mainly replaced by a new competition law that came into e¤ect in April 1993. The new law was designed very similarly to the European Union legislation, i.e. Articles 85 and 86 of the Treaty of Rome and the Merger regulation. Three institutions were established to put law into practice:

1) an investigation body under the authority of the Ministry of Economic A¤airs (the Service for Competition)

2) a mixed advisory body, composed half of economic experts and half of representants of the Ministry (the Central Economic Council)

3) an independent decision body (the Council for Competition)

The organisational structure reveals that the Ministry of Economic A¤airs plays an important role both directly and indirectly: it grants exemptions, can ask the Service to investigate a case and more importantly, the Service is part of the Ministry. This casts doubt about the independence and effectiveness of the court since it must rely on information received from the Ministry. Moreover the Service su¤ers from lack of …nancial resources and understa¢ng. As a result only merger cases are investigated at the expense of the …ght against anticompetitive practices and the treatment of demand for exemptions. All these factors suggest that the competition authorities have not been operating as they should and that a period of adjustment is necessary before establishing credibility[2].

Netherlands

Compared to Belgium, the Dutch political authorities have been slower to adapt the legislation to the European standard. They were traditionally more enclined to tolerate or even favour cartels (de Jong, 1990). These were numerous and were fought only if they injured general interest (abuse principle), a notion that was not de…ned in the law. This attitude gradually changed under pressure from the EU. In 1991, the existing law from 1956 was amended. Later a new competition law inspired by the European principles was introduced. The Dutch Competition Authority (known under its Dutch acronym, NMa) was created and started operating in January 1998. Contrarily to Belgium, a single institution is responsible for investigating, judging and punishing. It is divided in three sections:

1) Investigation, Supervision and Dispensations (OTO)
2) Control of Concentrations (CoCo)
3) Decisions, Objections and Appeals (BBB)

Although the new body is also part of the Ministry of Economic A¤airs, the new law ensured that the Ministry's intervention would be presented to the parliament in an annual report and that the current structure would be revised after three years, making the NMa a transient body before a more independent institution is established.

In a report presented to the OECD, the Dutch delegation stated that "the NMa must build up a reputation and image of irreproachable conduct,

[2] For a more detailed description of the evolution of competition policy in Belgium, see Sleuwaegen and Van Cayseele, Chapter 9 in Martin (1998) and OECD (1998)

reliability and independence, and must meet the usual Dutch standards for supervisory authorities in the …nancial sectors or the standards of the Bundeskartelamt in Germany" (OECD, 1997).

Given the evolution of the competition law in the Netherlands, we do not expect that the Dutch business community drastically changed its collusive behaviour over the period of our analysis, 1992 to 1996. We address this issue in section 4 of the paper[3].

3 The Hall approach and the speci…cation of the model

3.1 The model

A …rm i in time t operates according to a production function $£_{i;t}F(K_{i;t}; N_{i;t})$. $£_{i;t}$ is the Hicks neutral technical progress. The …rm chooses capital stock $K_{i;t}$ in advance of the realisation of demand ($K_{i;t}$ depreciates over time). On the labour market the …rm can engage any amount of labour at wage $W_{i;t}$. The …rm chooses labour-input $N_{i;t}$ so as to maximise pro…t $¦_{i;t}$ after the realisation of demand. Demand for the output is stochastic. Under perfect competition the …rm prices at marginal cost so that $\frac{p}{c} = 1$

In a competitive environment, taking logs, using standard rules of derivation and expressing employment and quantities per unit of capital, it is easy to show that:

$$(1)\quad ¢q_{i;t} = ®_{i;t}¢n_{i;t} + #_{i;t}$$

where:

$$¢x_{i;t} = ¢\log\left(\frac{X_{i;t}}{K_{i;t}}\right), \text{ where } X = N; Q$$

$$®_{i;t} = \frac{W_{i;t}N_{i;t}}{p_{i;t}Q_{i;t}} = \text{factor share earned by labour}$$

$$#_{i;t} = ¢\log(£_{i;t})$$

[3] For an overview of the evolution of competition policy in the Netherlands see Brusse and Gri¢ths, Chapter 2 in Martin (1998) and OECD (1997)

However, when …rms have market power, they will set a higher price that exceeds the marginal cost. In this case: $\frac{p}{c} = \mu \geq 1$

Equation (1) then can be generalised as:

(2) $\Delta q_{i;t} = \mu_t \theta_{i;t} \Delta n_{i;t} + \#_{i;t}$

The economic mechanism behind this mathematical reasoning is the following. Under competition, the labour's share measures the elasticity of output with respect to labour input. In a non competitive environment, …rms will abstain from raising output at the point of equality since it would lower price. As a result μ will be higher than 1 (Hall, 1988, p.926). Another way to see this is to rewrite (2) as:

(2') $\Delta q_{i;t} = \theta_{i;t} \Delta n_{i;t} + (\mu_t - 1) \theta_{i;t} \Delta n_{i;t} + \#_{i;t}$

where the second term in the right hand side of (2') is the rent that the …rm extracts.

(Appendix 1 describes the derivation of equations 1 and 2 and presents a more structural approach following Levinsohn, 1993)

Applying this method to estimate markups su¤ers from a number of shortcomings that could lead to unreliable and high estimates. The …rst of these relates to the di¢culty in …nding good instruments to deal with the simultaneity problem in equation (2). When using aggregated US data, the usual instruments are the growth of real GDP, the price of oil, the political party of the president or the growth of military purchases (Hall, 1986 and 1988, Hakura, 1998, Jun, 1998, 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 di¢culty, Roeger (1995), van Dijk and van Bergeijk (1996) and Oliveira Martins, Scarpetta and Pilat (1996) modi…ed Hall's model so that they could estimate markups by OLS in a consistent and unbiased way. However their way of proceeding requires more data and is less straightforward mathematically and logically. Moreover their work has been recently challenged by Hylleberg and Jørgensen (1998), who argued that their method also su¤ered from endogeneity as well as from heteroskedasticity and autocorrelation (the latter problems were recognised and corrected by Roeger (1995)).

The second shortcoming is that, in the original speci…cation, Hall (1986, 1988) only incorporated two inputs in the production function: labour and capital. However, if materials represent a signi…cant part of the variable costs

that the …rm must incur and if these costs vary in proportion to output, excluding them would lead to an upward bias in the measurement of the markup. In order to eliminate this bias, Domowitz et al. (1988) generalised the Hall's approach by incorporating material costs. We present a slightly modi…ed version of their model. If we include material costs $M_{i;t}$ in the production function so that:

$$(3)\quad Q_{i;t} = £_{i;t} F(L_{i;t}; K_{i;t}; M_{i;t});$$

we can generalise Equation (2) the following way:

$$(4)\quad ¢q_{i;t} = {}^{1}_{t}(®_{L;i;t} ¢ n_{i;t} + ®_{M;i;t} ¢ m_{i;t}) + #_{i;t};$$

where $®_{M;i;t} = \frac{p_M M_{i;t}}{pQ_{i;t}}$ is the share of materials in turnover, and $¢m_{i;t} = ¢ \log \frac{Q_{i;t}}{K_{i;t}}$:

This also can be written as:

$$(5)\quad ¢q_{i;t} - ®_{L;i;t} ¢ n_{i;t} - ®_{M;i;t} ¢ m_{i;t} = ¯_t ¢ q_{i;t} + (1 - ¯_t) #_{i;t}$$

where $¯_t$ is the Lerner index $¯ = \frac{p - c}{p}$.

Therefore by regressing the LHS of (5) over $¢q$ we obtain an estimate of the Lerner index that can be easily transformed again as an estimate of the markup.

3.2 Our speci…cation

We apply the approach by Domowitz et al. (1988) in order to …nd good and reliable markup estimates according to a widely accepted econometric model. Then we adapt the methodology in order to check for three main points. First, did the implementation of a competition policy law have any e¤ect on markups? Unfortunately the toughness of antitrust enforcement is di¢cult to establish quantitatively. We approximate it in two ways:

A) by capturing the dynamics of the markup. We look at the evolution of the markup ratio in a country before and after a 'switch of regime' occurred. In Belgium the new competition authorities started to operate from April

1993 on. This means that if competition policy was effective in disciplining the industry, we should observe a decline in the markup ratio after this date[4].

B) by interacting a country dummy with the explanatory variable for the Netherlands, we can compare two different regimes of antitrust: the Belgian system since April 1993 that applies a new antitrust law both similar and complementary to European law, and the Dutch system that was much more permissive both in theory and mostly in practice. This allows us to verify whether the Dutch economy was a "cartel paradise" as has been argued and documented in the literature (see de Jong, 1990 quoted above).

The markup ratio should therefore be higher in the Netherlands than in Belgium during the period under analysis. Hence, in Equation (6) the coefficient γ_2 should be positive and significantly different from 0.

$$(6)\quad \Delta q_{i;t} - \beta_{L;i;t}\Delta n_{i;t} - \beta_{M;i;t}\Delta m_{i;t} = (\gamma_1 + \gamma_2 NED)\,\Delta q_{i;t} + \gamma_3 NED + \varepsilon_{i;t}$$

Second, after we disaggregate the manufacturing industry to 22 subsets, we test whether some sectors have higher markups and should therefore be under more scrutiny by the competition authorities.

Finally, we check whether a change in the import penetration ratio induces a decrease in the markup.

$$(7)\quad \Delta q_{i;t} - \beta_{L;i;t}\Delta n_{i;t} - \beta_{M;i;t}\Delta m_{i;t} = (\gamma_4 + \gamma_5 IPR_{j;t})\,\Delta q_{i;t} + \gamma_6 IPR_{j;t} + \varepsilon_{i;t}$$

(j :industry index)

Introducing this factor will allow us to check for the robustness of our claim. We test the sign and the significance of γ_5 in Equation (7).

Note that instead of interpreting the Solow residual as the growth of productivity plus an error term, we prefer to model it as a more general error term, since this term represents the part of growth that can not be explained by factors' growth. Therefore,

$$(8)\quad \#_{i;t} = \varepsilon_{i;t}$$

In our specification both Δy and Δq should be viewed as endogenous. Then estimating the previous equations using OLS yields biased and inconsistent estimates since $E(\Delta q_t; \varepsilon_t) \neq 0$:

[4] In Sutton's terminology, we check whether the policy change led to an increase in the toughness of price competition

Therefore we estimate the model using instrumental variables (IV) for the endogenous variable ¢q. Depending on the speci…cation, instruments include the growth of output at 2-digit level minus the growth of capital in the …rm or in the industry. We also used GMM estimates using as instruments lagged values of the level of output in …rm i for t ¡ 2 onwards. Estimations with this alternative set of instruments yielded the same results, which are presented in the appendix. We eliminate potential industry-speci…c components in the error term by including sectorial dummies. We expect of course that these instruments are correlated with ¢q and that they are not correlated with the error term. Finally we control for macroeconomic shocks by adding year dummies.

4 Data and estimation

4.1 Data

Our data consist of an unbalanced panel of 2205 Belgian and 2471 Dutch …rms from the manufacturing sector (see the Appendix for a detailed list of the selected industries), extracted from the Amadeus database that covers the period from April 1992 until March 1997. This unique database compiled by the Bureau Van Dijk furnishes us with …rm-level accounting data including sales, operating revenue, tangible …xed assets, the cost of employees, the number of employees and material costs. All companies complying with at least one of the following criteria are included on the Amadeus CD-Rom:

- minimum operating revenue of 8 million USD
- minimum total assets of 16 million USD
- minimum number of employees of 100

Using …rm-level data in estimating markups has a number of advantages over aggregate sector-level data;

1) e¢ciency: it increases the number of observations and allows us to estimate the markup for every year of the data;

2) coherence: the estimating equation derives from the theory of the …rm and therefore should require …rm level data (Levinsohn, 1993);

3) an econometric reason: it allows us to …nd good instruments by using the industry-level variables as instruments for the …rm-level variable;

4) dynamics: we can follow the evolution of the markup over the period we survey, albeit we use a limited time dimension.

We use sales as a proxy for production and tangible …xed assets as a proxy for capital. Table 1 and 2 display summary statistics of our samples.

Notice that the average …rm in the Netherlands in terms of employment, capital and sales is much larger than in Belgium. The share of labour costs in turnover β_L is 20% on average and similar in both Belgium and the Netherlands. The share of material costs β_M in turnover is much larger than the previous index and slightly higher in Belgium (55%) than in the Netherlands (50%).

Imports and exports data are available from the OECD STAN database at the 2-digit industry level and are used to compute the import penetration ratio.

Table 1: summary statistics for Belgium, 2205 …rms

	1992		1993		1994		1995		1996	
	av.	s.d.	av.	s.d.	av.	s.d.	av.	s.d.	av.	s.d.
Q	62.9	167.3	54	154	76.4	304.3	100.1	556	80.4	508
K	29.2	216	24.4	197	23.1	191.5	24.9	210.5	21.3	205.7
N	295.4	776	258.4	682	221.3	598.2	220.8	592.1	195	499.4
β_L	20.1	13.3	20.7	13.4	20.5	13.7	19.8	13.3	19.3	13.1
β_M	56.3	19.9	55.1	20.3	55	19.9	56.1	19.6	55.7	19.6

Note: Q and K are expressed in millions UDS, N in number of employees and β_L and β_M are percentages

Table 2: summary statistics for the Netherlands, 2471 …rms

	1992		1993		1994		1995		1996	
	av.	s.d.	av.	s.d.	av.	s.d.	av.	s.d.	av.	s.d.
Q	371.2	3222	332	2935	361	3137	407	3533	667	5251
K	93	1558	83	1442	86	1461	101	1661	180	2418
N	1238	10911	1142	10190	1076	9829	1131	10422	2013	15139
β_L	20.1	10.2	20.6	10.6	19.7	10.3	19.0	9.9	19.6	9.4
β_M	48.5	18.5	48.3	18.6	49.5	18.8	50.7	18.3	48.3	18.6

Note: cf. Table 1

4.2 Results

We start with estimating Equation (5) by IV using the instruments presented in subsection 3.2 for each year. This illustrates the evolution of the markup ratio in both countries. Table 3 shows that the estimates of the Lerner index are statistically di¤erent from 0, indicating a sign of market power in every period. Comparing the second and the fourth column, we observe that the markup is always higher in the Netherlands than in Belgium. It is slightly increasing in Belgium while it decreased in 1995 in the Netherlands, only to recover the next year to the previous level.

As a next step we pool the three years of data. We estimate the average markup over the period. Unsurprisingly, the …rst two columns of table 4 con…rm the previous results: the average price-cost margin is signi…cantly di¤erent from 0, and is higher in the Netherlands.

The estimates in Table 3 suggest that the markup did not decrease after April 1993 in Belgium. It stayed more or less constant and we even …nd a slight but not signi…cant increase in the markup in 1996, as shown in the third column of Table 4, where we interacted ¢q with a time dummy for 1996.

In the fourth column, we estimated equation (6). The interactive country variable is positive and signi…cant. This con…rms that the markup ratio is indeed higher in the Netherlands than in Belgium and that this di¤erence is statistically signi…cant. This important …nding gives weight to the "cartel paradise" hypothesis and makes clearer the importance of applying a tougher antitrust policy in the Netherlands[5].

This is further con…rmed by the results in Table 5. We …rst disaggregate the Belgian and Dutch manufacturing industries to twenty-two 2-digit subindustries, then estimate markups in each subset. In all but one subsector, markups in the Netherlands are higher than in Belgium.

In Belgium, the Lerner index is not signi…cantly di¤erent from zero in six subindustries, while it always is in the Netherlands. Moreover the Belgian subindustry with the highest markup is still below the Dutch average. In the Netherlands many subindustries exhibit very strong signs of market power.

[5] An alternative explanation might come from a well known feature of the Dutch economy: the Polder model (that is an institutionally organised discussion between government, …rms and trade unions introducing labour ‡exibility and moderate wage increase) could act as a facilitating device for abusive behaviour by lowering the part of the rent dissipated in higher wages. This corresponds to a de facto decline in trade union's bargaining power.

Table 3: yearly IV estimates of the average markup ratio in the manufacturing industry

	Belgium		Netherlands	
	$\bar{\ }$	1	$\bar{\ }$	1
1994	0.19¤	1.23	0.34¤	1.52
1995	0.20¤	1.26	0.25¤	1.33
1996	0.24¤	1.32	0.34¤	1.51

Note: * indicates statistical signi…cance from 0 at the 5% critical level

Table 4: IV estimates of average markup and interactive e¤ects

dy	(1): B	(2): N	(3): B	(4): B&N
dq	0.22¤	0.34¤	0.21¤	0.24¤
D96 ¤ dq	-	-	0.04	-
NED ¤ dq	-	-		0.06¤
year dummies	Yes	Yes	Yes	Yes
country dummy	-	-	-	Yes

Note: cf. Table 3

Finally, an astonishing result comes out from Table 6. While for Belgium we …nd that indeed the import penetration ratio negatively in‡uences the markup ratio (although not signi…cantly), we …nd the opposite in the Netherlands. This suggests that the Dutch product market is not disciplined by increased foreign competition and hence free market mechanism might not guarantee competitive behaviour of …rms. This might be caused by the fact that there existed no competition policy in the Netherlands while there was in Belgium. In other words, competition policy might be important for foreign competition to have disciplining e¤ects on …rm behaviour.

Our results are consistent with the literature about the pro…tability of cartel arrangements or mergers (Deneckere and Davidson, 1985) and the literature of IO models incorporating foreign competition (Geroski and Jacquemin, 1981; Jacquemin and Sapir, 1991).

Deneckere and Davidson (1985) reacted to a paper by Salant, Switzer and Reynolds (1983). The latter argued that, under very general conditions, an exogenous change in market structure lowered the endogenous payo¤s of the …rms that provoked this change (think of such a change as a merger or the formation of a cartel). However, this result holds only when …rms compete in

quantity and when goods are homogeneous. When …rms compete in price and when goods are di¤erentiated, Deneckere and Davidson (1985) show that the results are reversed in the sense that all …rms are better o¤ after the merger, or after the cartel started operating. This comes from the fact that reaction functions are upward sloping in a price setting game, and therefore the initial price jump by the coalition is mimicked by the competitors.

Table 5: IV estimates of average markup by industry

		Belgium		Netherlands	
Code	Name	$\bar{\mu}$	μ^1	$\bar{\mu}$	μ^1
15	Food and beverages	0.23¤	1.30		
16	Tobacco	0.22¤	1.28		
17	Textiles	0.26¤	1.35		
18	Wearing apparel; fur	0.26¤	1.35		
19	Leather, luggage and footwear	0.16	1.19		
20	Wood, straw and plaiting materials	0.15¤	1.18		
21	Pulp, paper and paper products	0.29¤	1.41	0.34¤	1.52
22	Publishing, printing and media	0.26¤	1.35	0.45¤	1.82
23	Coke, re…ned petroleum products and nuclear fuel	0.15	1.18		
24	Chemicals and chemical products	0.25¤	1.33	0.43¤	1.75
25	Rubber and plastic products	0.27¤	1.37		
26	Other non metallic mineral products	0.31¤	1.45	0.28¤	1.39
27	Basic metals	0.20¤	1.25	0.44¤	1.79
28	Fabricated metal products	0.16¤	1.19	0.27¤	1.37
29	Machinery and equipment n.e.c.	0.19	1.23	0.44¤	1.79
30	O¢ce machinery and computers	0.22	1.28		
31	Electrical machinery and apparatus n.e.c.	0.13	1.15	0.43¤	1.75
32	Radio, TV and communication equipment	0.34¤	1.52		
33	Medical, precision and optical instruments	0.32¤	1.47	0.50¤	2.00
34	Motor vehicles, trailers and semi-trailers	0.23¤	1.30	0.31¤	1.45
35	Other transport equipment	0.17	1.20		
36	Furniture, manufacturing n.e.c.	0.23¤	1.30	0.32¤	1.47

Note: cf. Table 3; because of missing observations we were not able to compute markups for all Dutch 2-digit industries

Table 6: IV estimates of interactive e¤ect of import penetration ratio

dy	(1): B	(2): N
dq	0.24¤¤	0.19¤¤
dq ¤ IPR	-0.02	0.23¤
Year dummies	Yes	Yes

Note: *(*) indicates statistical signi…cance at the 10% (5%) critical level

This mechanism can be applied to a situation where domestic …rms form the coalition, and the foreign …rms act as competitors. Non competitive behaviour by domestic …rms is then followed by foreign competitors who 'join' the cartel.

Another explanation comes from oligopoly models that take into account foreign competition. These models have taught us that it matters very much what the nature of the imports is and where they come from.

Product di¤erentiation would lead to monopolistic competition that tends to reduce the intensity of import discipline and to favour intra-industry trade. The importance of intra-…rm trade might increase the prospects of e¤ective market 'cartelisation': a multinational …rm located in the domestic country can control imports in this country (since many multinationals have their headquarters in the Netherlands this factor is potentially important). Barriers to trade could also play a role by reducing the e¤ectiveness of foreign competition.

Moreover the origin might play a role: …rst, the European integration has been associated with more intra-industry (synonym of di¤erentiated goods) and intra-…rm trade. Sapir (1992) shows that the share of intra-industry trade in intra-EC trade is higher than 75% in Benelux countries.

Second, market behaviours of various types reducing competition are widespread in the EU. Businesses are very inventive when it comes to avoid tough regulation and protect rents. That is why the EU competition authority-D.G.IV- and the national competition authorities are so active trying to detect anticompetitive behaviours. For example, the number of new cases related to antitrust treated by the D.G.IV increased during the …rst half of 1998 to 277 as compared to 220 for the same period in 1997; the number of solved cases increased as well from 244 to 278 (European Commission, 1998).

These behaviours are likely to be less e¤ective for imports coming from the rest of the world. Indeed, Jacquemin and Sapir (1991) …nd that extra-EC

imports exert a signi…cant disciplinary e¤ect on price-cost margin but that intra-EC imports do not seem to have any e¤ect at all. Therefore they argue that lowering non trade barriers on extra-EC imports would produce more e¤ective competition and more e¢ciency.

To sum up, the documented existence of cartels in the Netherlands coupled with the evolution of the European industry towards more intra-industry and intra-…rm trade are factors that are likely to explain the non disciplinary e¤ect of imports on the Dutch manufacturing industry.

5 Conclusion

In this paper we analysed markups in the Belgian and Dutch manufacturing industries using …rm level data, while most other studies used aggregate industry level data. We followed the approach developed by Domowitz et al. (1988) and added to this methodology by looking at "switch of regime" aspects to represent di¤erent regimes of competition policy.

Comparing two similar countries that apply di¤erent antitrust laws, we found that the Netherlands which applied the law much less toughly also displayed higher markups, both in the manufacturing industry as a whole and in almost all 2-digit industries. This seems to indicate that too lax a competition policy induces businesses to abuse market power, thereby harming e¢ciency and total welfare. Import competition in such an environment does not appear to play any disciplinary role, especially since most of the imports are of an intra-industry type, which are di¤erentiated by nature. This brings further support for the dramatic change in policy introduced in the Netherlands, where a competition authority is working since January 1998.

We also showed that markups remained fairly constant in Belgium after a competition authority started operating in April 1993. Our analysis does not allow us to infer whether this change in policy was anticipated, the policy was badly implemented, it was badly designed or whether a combination of the above explains the …ndings.

Finally, we stress two areas of future research. First, our 'switch of regime' analysis simply approximates of the toughness of competition policy. In the future one would like to use an index of the toughness of competition policy built on objective information about the e¤ectiveness of the competition authorities' actions, so that this type of analysis could be replicated in more general environments. The construction of this index is currently under way.

Second, a deeper analysis about the importance of the nature and the origin of imports might be needed. The direction taken by Jacquemin and Sapir (1991) might be followed.

Appendix A

The production function is:

$$Q_{i;t} = £_{i;t} F(K_{i;t}; N_{i;t})$$

A change in costs is written as:

$$C_{i;t} = W ¢ N_{i;t} + P_M ¢ M_{i;t} + r ¢ K_{i;t}$$

Therefore a measure of marginal costs can be:

$$c_{i;t} = \frac{W ¢ N + P_M ¢ M + r ¢ K}{¢ Q ¡ \#Q}$$

Rearranging terms, this can also be written as:

$$¢ Q ¡ \#Q = \frac{1}{c}(W ¢ N + P_M ¢ M + r ¢ K)$$

Dividing both terms by Q:

$$\frac{¢ Q}{Q} = \frac{W N}{cQ}\frac{¢ N}{N} + \frac{P_M M}{cQ}\frac{¢ M}{M} + \frac{r K}{cQ}\frac{¢ K}{K} + \#$$

A) Under constant returns to scale, $\frac{W N}{cQ}\frac{¢ N}{N} + \frac{P_M M}{cQ}\frac{¢ M}{M} + \frac{r K}{cQ}\frac{¢ K}{K} = 1$, so:

$$\frac{¢ Q}{Q} ¡ \frac{¢ K}{K} = \frac{W N}{cQ}\left(\frac{¢ N}{N} ¡ \frac{¢ K}{K}\right) + \frac{P_M M}{cQ}\left(\frac{¢ M}{M} ¡ \frac{¢ K}{K}\right) + \#$$

Denote as $¹$ a measure of the markup of price over marginal cost: $¹ = \frac{p}{c}$

$$\frac{¢ Q}{Q} ¡ \frac{¢ K}{K} = \frac{p}{c}\frac{W N}{pQ}\left(\frac{¢ N}{N} ¡ \frac{¢ K}{K}\right) + \frac{p}{c}\frac{P_M M}{pQ}\left(\frac{¢ M}{M} ¡ \frac{¢ K}{K}\right) + \#$$

This expression can be reduced to:

$$¢ q_{i;t} = ¹_t(®_{L;i;t} ¢ n_{i;t} + ®_{M;i;t} ¢ m_{i;t}) + \#_{i;t},$$

where:

$$¢ x_{i;t} = ¢ \log\left(\frac{X_{i;t}}{K_{i;t}}\right) \quad (X = Q; N; M)$$

$®_{L;i;t} = \frac{w_{i;t} N_{i;t}}{p_{i;t} Q_{i;t}}$ = share of employee costs in turnover

$®_{M;i;t} = \frac{p_M M_{i;t}}{p Q_{i;t}}$ = share of material costs in turnover

$\#_{i;t} = ¢ \log(£_{i;t})$

B) Under increasing returns to scale, $\frac{WN}{cQ}\frac{¢N}{N} + \frac{P_M M}{cQ}\frac{¢M}{M} + \frac{rK}{cQ}\frac{¢K}{K} = 1 + °$, where $° ¸ 0$

$$\frac{¢Q}{Q} ¡ \frac{¢K}{K} = \frac{p}{c}\frac{WN}{pQ}\left(\frac{¢N}{N} ¡ \frac{¢K}{K}\right) + \frac{p}{c}\frac{P_M M}{pQ}\left(\frac{¢M}{M} ¡ \frac{¢K}{K}\right) + °\frac{¢K}{K} + #$$

So that …nally:

$$¢q_{i;t} = {}^{1}{}_{t}\left(®_{L;i;t}¢n_{i;t} + ®_{M;i;t}¢m_{i;t}\right) + °\frac{¢K}{K} + #_{i;t}$$

Structural approach

Use the same production function. The time index is dropped for simplicity. Write the pro…t function as:

$$¦_i = pQ_i ¡ w_i L_i ¡ r_i K_i$$

where p is the price of the good, w is the wage paid to labour and r is the cost of capital. Maximising pro…t with respect to labour and capital input implies:

$$£_i\frac{@F_i}{@L_i} = \left[1 + \frac{s_{i¸}}{¸}\right]^{¡1}\frac{w_i}{p}$$

where s stands for market share, ´ stands for the price elasticity of demand and $¸_i = \frac{@Q}{@Q_i}$ stands for the conjectural variations term with $Q = Q_0 + ¸_i Q_i$ and Q_0 is taken as given by the …rm.

If $¸ = 1$ then …rms engage in Cournot competition. If $¸ = 0$ the Bertrand case is valid.

A similar equation holds for capital:

$$£_i\frac{@F_i}{@K_i} = \left[1 + \frac{s_{i¸}}{¸}\right]^{¡1}\frac{r_i}{p}$$

Pro…t maximisation with respect to output levels implies:

$$\left[1 + \frac{s_{i¸}}{¸}\right]^{¡1} = \frac{p}{MC_i} = {}^{1}{}_{i}$$

Di¤erentiating the production function yields:

$$dQ_i = £_i\left(\frac{@F_i}{@L_i}dL_i + \frac{@F_i}{@K_i}dK_i\right) + F_i d£_i$$

Substituting the partial derivatives of F_i in the latter gives:

$$dQ_i = \theta_i \left(\frac{w_i}{p} dL_i + \frac{r_i}{p} dK_i \right) + F_i d\varepsilon_i$$

This is basically the same equation as in Levinsohn (1993) working with discrete changes and is similar to the approach of Hall presented in section 3 and infra in the Appendix. To see this divide both sides of the latter equation by Q_i so that:

$$\frac{dQ_i}{Q_i} = \theta_i \left(\frac{w_i L_i}{pQ_i} \frac{dL_i}{L_i} + \frac{r_i K_i}{pQ_i} \frac{dK_i}{K_i} \right) + d\varepsilon_i$$

This is equation (2) in section 3 of the paper.

Appendix B

Table B1: GMM estimates of average markup and interactive effects

dy	(1): B	(2): N	(3): B&N
dq	0.27***	0.37***	0.27***
NED * dq	-	-	0.06**
year dummies	Yes	Yes	Yes
country dummy	-	-	Yes
Sargan test, df	8.85, 8	14.28, 8	19.4, 16

Note: cf. Table 3

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