

Merger Review: How Much of Industry is Affected in an International Perspective?

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Abstract The paper develops a methodological framework for quantifying the impact of merger control regulations. While most countries have different criteria in terms of sales, market shares or combinations of the above, and while listing an inventory of these criteria is easy, such an exercise does not provide an answer regarding their impact on the market for corporate control. A methodology is developed to compare empirically the percentage of firms affected in an industry in a country by the “clearing in advance” regulation. By comparing industries and countries, we are able to provide an indication of the impact of merger regulations for a large number of industries in Europe. As such we provide a first indication of the tightness of ex ante merger review.

Keywords merger control · firm size distribution

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1 Introduction

The ex ante merger control process that exists at the EC as well as in many of the constituting member states is a particular type of government intervention, namely one in the market for corporate control. As such, it is supposed to correct for a market failure. Here in particular, merging firms could gain market power and raise prices at the expense of consumers in a way that reduces welfare.¹

As with any government intervention, the potential benefits of it can be neutralized by government failure. Recently, Duso et al. (2003) have focussed at government failures in the area of merger control.²

The present paper addresses the difficulties associated with ex ante merger control by focussing on the obligation to notify the merger i.e. to go through a merger review process in order to obtain a favorable decision by the antitrust authorities. The costs of such a notification affect both mergers beneficial and detrimental to welfare of the economy alike. For the first group, one thus could argue that an operation which improves economic efficiency is unnecessarily taxed by the burden of notification, even if it is cleared afterwards.³ But of course, in order to find out ex ante, the relevant authority and the merging parties have to go through the review process.

In many cases, merger control excludes the notification of operations for which there is *prima facie* no reason to expect that they will create market power and hence need to be scrutinized by the competition authority. This adds to the efficiency of the merger review process. Usually “small” operations are seen to create no harm.⁴ Given the renewed interests in the Costs and Benefits of Antitrust policies, it is appropriate to ask for estimates of the cost of red tape in merger review (Baker 2003; Crandall and Winston 2003).

Merger notification in addition to welfare considerations has a political economy dimension, because the thresholds that trigger the obligation to clear in advance are economy wide, but widely different between the economies of the EC member states. This implies among other things that a merger which needs to be reviewed in order to obtain clearance in one country, could go through without notification if the merging firms had been located in another member state of the EC. Clearly, this will affect the potential for firms to grow by merger and acquisition within a country differently. Or a growing firm in one country will be able to get much further in his external

¹Economists over decades have provided estimates of the welfare losses due to monopoly, for a recent survey, see Office of Fair Trading (2002). The dead weight loss estimates associated with monopoly tend to be substantial, sometimes amounting to several percentages of GDP.

²For the EC practice of merger control and over a substantial period of time, they show how the merger control process can make type I-errors, that is block pro-competitive mergers which increase welfare and growth. Equally, type II-errors can take place, when anti-competitive mergers which are detrimental to welfare are cleared. The authors also identify the causes that may lead a competition authority to make errors of type I and II (see also Katsoulacos 2002).

³A recent study by Price Waterhouse Coopers, see PWC (2003), documents the costs associated with merger reviews. A typical multi-jurisdictional deal on average involves \$ 3.3 million external merger review costs. To this, one has to add the internal costs, to obtain the full costs for the company. For the economy, there are also the costs for the public administration, hearings, legal support, involved in the review.

⁴But this re-opens the door for type II-errors since a merger between two relatively small firms operating beyond strong barriers to entry on a particular product or geographic market could do much more harm than a merger between larger but contestable firms who need to notify.

growth strategy without encountering merger scrutiny than a firm in another country. Hence the dynamics of the size distribution of firms will be affected differently across countries by merger control.⁵ It also may interfere with the localization decisions of multinational firms. Through spin-off activities and agglomeration effects, this will further affect the growth path of the economy.

It could be argued that firms operating in countries with a lower threshold will adapt to the domestic situation by growing through cross-border merger and acquisition.⁶ This however assumes that cross-border operations are as easy as national mergers and acquisitions. Empirical evidence on this points to the contrary: many merger operations are still within the boundaries of a country.⁷ Although this changes with increased globalization.⁸ Moreover, firms in this way only can circumvent the stricter criteria for notification if authorities do not use triggers such as worldwide sales. Otherwise a merger operation with a foreign firm, in terms of the criteria triggering the merger review process, boils down to exactly the same operation but with a domestic firm.

In the rest of the paper, we maintain the hypothesis that the most likely candidate for a merger or acquisition is another firm operating in the same industry in the same country. This is an even more pronounced hypothesis regarding the merger and acquisition process since it not only considers cross-country but also mergers across industries to be less likely. While the latter occur more often than cross-border mergers, they are unlikely to trigger merger review, and probably they should not, for it is not evident that market power could result from the merger of firms operating in different sectors of the economy.⁹ Under this maintained assumption, we show that differences in national thresholds matter in an important way for the number of merger operations that are affected by merger control regulations.¹⁰

To show this result, we first provide a brief survey of merger control criteria in the EC. As such, we identify classes of comparable countries in terms of the different types of criteria used to trigger merger review. In the third section, we introduce a

⁵See Sutton (1998) for the economic processes determining the dynamics of the size distribution of firms. Note also in particular the “Fate of Ilford” when facing actions from the U.K. Antitrust Authorities.

⁶The idea that firms will circumvent particular forms of antitrust legislation if other possibilities are available has been put forward by Bittlingmayer (1985). He argues that the Sherman Act of 1890 created such uncertainty about the legality of agreements between firms competing in the same industry that they preferred to merge.

⁷The European Commission recently has proposed a guideline to simplify cross-border mergers, motivated by the argument that such operations for the moment are virtually impossible in The Netherlands, Sweden, Ireland, Greece, Germany, Finland, Denmark and Austria.

⁸For economic reasons as well as implications, see respectively, Brakman et al. (2006) and Neary (2003).

⁹There could of course always exist “conglomerate” effects such as enhanced buyer power or improved coordination due to multi-market contact, see e.g. Bernheim and Whinston (1990). For the purpose of the present paper however, it is noteworthy that some countries even have adapted rules saying that such operations should not be reviewed. In Belgium for example, this is called the O+ rule, used to indicate that if a company buys another one in a market in which it has no sales yet, it should not notify.

¹⁰Barros et al. (2006) use a cross European panel to evaluate the impact of competition policy on the occurrence of mergers. They note that notification threshold levels clearly impact allocation of institutional resources, and in turn impacts merger activity.

framework that determines quantitatively the impact of threshold differences within a particular class of countries (cluster) using the same qualitative criteria identified in Section 2. A statistic for the quantitative impact of threshold differences on merger notification cases is derived. In Section 4, we show how this statistic is misleading if the actual size distribution of firms is used to compute the percentage numbers of firms affected by notification in the event of potential merger or acquisition. For a number of manufacturing industries in different countries, it turns out that there are important differences. We indicate how countries can be compared to each other when they do not belong to the same cluster. The last section concludes by offering some reflections on, and extensions of the methodology introduced. Also some policy recommendations are made.

2 Merger control thresholds in the EC: a survey

The triggers for merger notification of EC member states as well as for other European countries are widely different in many respects. Firstly, the criteria employed are different. Some countries specify turnover on the domestic territory as a trigger, other use worldwide sales, market shares, or even the size of assets as a yardstick. Secondly, sometimes a single criterion is used while in other countries many criteria are considered simultaneously. Finally, the trigger values of the criteria used are largely different.

In order to give an idea of the qualitative impact of the merger control thresholds and to compare them between countries, it is clear that an analytical approach has to be taken.¹¹ In the rest of this section, we therefore group countries in terms of having similar (qualitatively speaking) criteria for notification. In terms of the above paragraph, this implies that within a group of countries we will have notification triggers that combine the same elements in the same way. A survey of the different merger control procedures in terms of criteria used, thresholds to be met, a.s.o. is to be found in Merger Control (2002), where the situation as of 1999 in a number of countries is represented.

A particular class of countries that we can identify is what we call the double sales threshold category. In short, the double sales threshold category groups countries for which notification is mandatory if a combined turnover of y million euro is met and at least two of the parties involved each have a turnover of x million euro. Within the double sales thresholds category, a further distinction can be made according to the way one measures the combined turnover. In France for example, a combined worldwide turnover of 150 million euro is used, whereas in Belgium the criterion is filled in by a combined turnover of 40 million euro on the Belgian market. We denote the first group by “double sales threshold/worldwide” and the second by “double sales threshold/national.”

Still within the double sales thresholds category, a third cluster of countries uses for the combined threshold both sales on the domestic market and worldwide sales.

¹¹An economic analysis of competition policy in general in four EC member states has been given by Van Cayseele et al. (2000).

This implies that instead of two triggers, a third one could lead to merger review. We denote this category by “double sales threshold/both.”

Finally, a last cluster of countries can be identified because another criterion is added to the double sale threshold. Mostly, countries that verify additional criteria on top of the double sales threshold use a market share criterion to trigger merger review. We will denote this category by “double sales threshold/market share.”

Building upon this, we grouped some European countries according to the similarity of the notification criteria used. This leads to the four distinct clusters just discussed. Appendix 1 provides the details of the countries concerned as well as the particular triggers used. Cluster A includes countries such as France and The Netherlands. Cluster B has Belgium and Hungary in it. Cluster C includes among others Switzerland and the Czech Republic. Finally, cluster D incorporates Greece and Spain. Since the methodology to count potential mergers reviews, to be developed in the next section, is designed to deal with data on worldwide sales only (as they are made available by the Amadeus dataset), the results will be biased upward for all four clusters. Yet, the magnitude of the bias differs from cluster to cluster, as will be shown in the fifth section. The reason why the methodology will yield an upward bias is the following. In each group, merger review is triggered by each firm participating in the merger having sales of x in the domestic market.

Since the Amadeus dataset only provides worldwide sales, we use the latter whilst verifying whether each party involved in the merger has sales exceeding x . The difference between the true trigger value for x and the one used for our empirical research thus is exports. Since the latter are nonnegative, the method used will identify more merger review cases than those who will actually require merger review. This can best be explained by an example. Suppose the algorithm described in more formal detail in the next section identifies a couple of French firms with respectively worldwide sales of 100 and 55 million euro. Since combined worldwide sales are 155 million euro and each individual firm realizes sales in addition of 15 million euro, the algorithm will count this operation as one coming up for merger review.

In reality however, it could well be that the company realizing worldwide sales of 55 million euro exports 45 million euro, leaving it with 10 million of sales on the domestic, French market. In that case, and supposing that the company realizing 100 million euro of worldwide sales does not export, we have an operation that does not involve two companies each realizing 15 million euro or more on the domestic market, and hence it is not subject to merger review. Hence, in the absence of having data on domestic sales, working with worldwide sales instead of domestic sales will bias our estimate of the number of cases that will need to be cleared in an upward fashion.

This implies that even within one and the same cluster of countries, one has to be careful in drawing conclusions regarding the impact of the different thresholds from the percentage of firms that is affected by merger review. The reason is the possibility of an export bias. Only to the extent that one assumes that the magnitude of the bias is the same, by assuming that firms in particular countries do not export more than their counterparts in another country, it is possible to conclude from the results of the algorithm that one country is “tougher” than another, when a higher percentage of firms needing review shows up. Also, if one is able to make a justified assumption regarding the direction of the export bias, interesting comparisons can be made.

Consider again two countries in cluster A, i.e. France and Sweden. The only measurement error that arises in that cluster comes from the use of worldwide sales instead of domestic sales for the individual sales trigger x . Suppose Sweden exports, as a small country relative to France, more.¹² In the extreme, suppose France does not export at all. Then the algorithm described in the next section, when using Amadeus data, as in the fifth section will exactly identify the number of merger operations that need review for France, but it will over-estimate the number for Sweden, since exports are nonnegative in this country. Therefore, should we then find that the percentage of operations affected by merger review in a particular industry in Sweden is less than in France, it is safe to conclude that French thresholds indeed have a stronger impact on that sector.

When the volume of exports of a company becomes substantive, the probability that the operation will be under scrutiny of a foreign authority increases. The objective function of this authority, however, might be different (Smets and Van Cayseele 1995), and this does not influence the tightness of the domestic procedure.

Along these lines, i.e. by assuming that there either is no export bias, or that exports proportionally decrease in country size, it will also be possible to propose further ordering, within and even between clusters. As argued before, this will be done in section four.

A final remark regarding the inventarization of the possible biases relates to imports. While imports will not directly affect the numbers of mergers that need review, imports change the relative size of the firms in the domestic market and hence may influence the perception of a merger by the antitrust authority. As to the competitive discipline that imports exert, and hence the policies of antitrust authorities, the evidence is mixed. For two small open economies, Konings et al. (2001) show that competition policy can either act as a substitute or a complement to imports. When a market share threshold is included in the set of criteria, it is appropriate to include in the relevant market definition the size of imports. This could lead to a bias when comparing smaller countries (with substantial levels of imports) to larger ones.¹³ For the moment it is sufficient to note this effect, since the empirical application in Section 4 only considers clusters A, B, and C where the market share criteria is absent. In cluster D market share matters and therefore one has to take into account that the market definitions used will be much narrower than the industry classification used in the empirical application (2 digit NACE rev. 1 code).

The next section introduces the algorithm used to compute the number of operations affected, in more detail, where both the underlying theoretical foundations and the empirical implementation, however see also Appendix 2, are discussed.

3 A theoretical framework

In this section, we introduce a theoretical framework that illustrates the impact of the different merger control thresholds as well as other parameters on the percentage

¹²Of course, there can be important sectoral differences in relative exports.

¹³With respect to this, the data indicate that comparative advantages together with gravity and demand controls explain a skew distribution of the trade interactions between countries, see Hinloopen and Van Marrewijk (2006).

number of firms affected by prior notification, for a particular cluster, namely A. The purpose is to graphically expose the forces at work. We initially assume a uniform distribution regarding the size of firms. In reality, also higher moments of the size distribution of firms will affect outcomes, and hence it is worthwhile to contrast the true outcomes with the indicators proposed in this section. First, some notation is introduced. Then a graphical illustration which is helpful in understanding the algorithm used in the next section is given. Finally some indicative statistics are put forward.

3.1 Notation

Since we focus on the class of countries which maintain at the individual level national thresholds for merger notification, let x denote the individual threshold each of the firms needs to have in terms of sales on the national territory. The combined sales are denoted by y and these are worldwide sales. We focus on mergers of two firms. Finally, denote by z the worldwide sales of the largest firm in the industry.

3.2 A graphical exposition

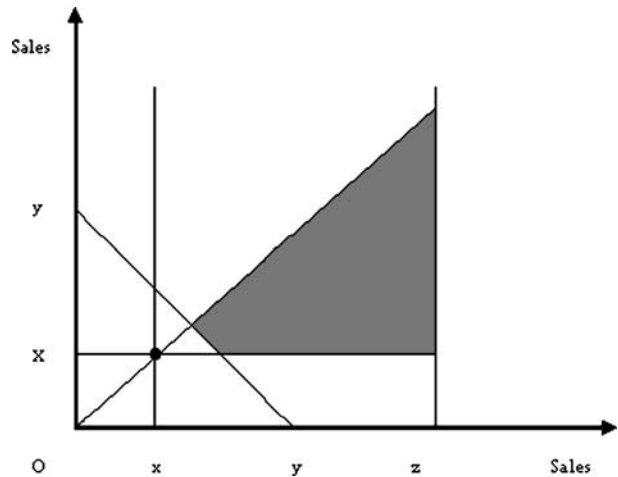
Consider all firms in an industry. On the horizontal axis, they are ordered from small to large. Since we assume a uniform distribution between 0 and z , each point on the horizontal axis represents a firm (should the population be a continuum). Next, plot exactly the same population on the vertical axis. Each point in this plane now represents a merger of two firms, but in order to avoid double counting, only the area below the 45° line should be considered.¹⁴ Then introduce the merger control thresholds. Since only operations including firms each realizing a sales volume of x are affected, all operations involving firms to the left of x remain outside merger control. The next threshold involves both parties realizing sales together of y or above. This introduces in the graph a straight line with slope -1 , extending from y on the vertical axis to y on the horizontal axis. Finally, the areas considered are always bound by the sales of the largest firm. Therefore, the shaded area in Figure 1 represents the number of pair of firms affected, for the case of $z > y > x$. (This holds for all countries in the class of “double sales thresholds” identified in the previous section).

3.3 Indicators of the impact of merger controls

As argued in the previous sub-section, the potential merger combinations in this industry that are affected by prior control are represented by the shaded area. The total of potential mergers simply is represented by the area of the triangle with base and height z . As an initial indicator for the impact of merger control in an industry with sales of the largest company equal to z and operating in a country belonging to the “double sales threshold-class”, we propose the ratio of the shaded area and $z^2/2$.

¹⁴For merger control purposes, it does not matter whether firm A buys firm B or vice versa. Nor whether the operation comes about by merger or acquisition.

Figure 1 A graphical illustration of the number of firms affected in the “double sale threshold/national” class.



Formally, let P represent the percentage number of firms affected, then it is easy to show that:

$$P = 1 - \frac{1}{2} \left(\frac{y}{z} \right)^2 - \left(\frac{x}{z} \right)^2 - \frac{2(z-y)x}{z^2} \quad (1)$$

A few conclusions result from analyzing how the different parameters affect P . Clearly, P increases in the sales of the largest firm in the industry. It decreases both in the combined and individual sales threshold. Whenever the individual and combined thresholds are 0, $P = 1$ and all firms are affected. This all is quite intuitive.

As x , y and z determine P , and as countries have different thresholds, the P s will be different in each country. But moreover, the P s will be different for each industry within a country as z differs across industries. Since the size distribution of firms tend to be particularly skew in the tails, see Sutton (1998), we may expect large differences in P across industries within the same country. This illustrates a first effect of the skewness of the size distribution of firms which is usually missed in the political economy debate on thresholds.

Another aspect related to the skewness—which will be illustrated more forcefully in the next section—has to do with the shape of the distribution assumed. For the moment, results are derived for a uniform density of firms having sales between 0 and z . In reality, many more firms will be small and only few will be larger. This implies that the area used to represent the number of potential merger cases that need to be cleared is a biased indicator. Indeed, above y the actual number of possible mergers will be less frequent than indicated by the area used until now. This implies that P is an upper bound for the true statistic, or that in reality, the “true” P will be lower. More important however is that the magnitude of the bias increases in y .

Finally, there is a large literature on Zipf’s law when analyzing (firm) size distributions. It is well known that the upper tails of (firm) size distributions are well represented by a Pareto distribution or a power law. Despite the analytical advantages of using the Pareto distribution in obtaining a closed form solution for

the “notification measure,” the individual sales thresholds x only cuts off around (on average) 80% of the size distribution. Most tails of firm size distribution satisfy the Pareto only for a much higher cut off (upper nineties percentile). The truncated distribution is therefore not as well represented by Zipf law. By means of example in Appendix 3 we show the plot of log rank on log size for the *Food Products Manufacturing Sector* in Belgium (NACE 15). Comparing countries with different truncation points, which in addition are not in the upper tails, makes the use of Zipf’s law not very appealing for our purposes.

3.4 Export bias

As explained extensively in the previous section, the Amadeus data set provides worldwide sales while one threshold of the countries grouped in cluster A denotes domestic sales, viz. at the level of the individual sales criterion x . This implies that the more a country is export oriented, the more the algorithm identifies operations that need to be reviewed while in reality they do not. In Figure 1, on both the horizontal and vertical axis, one finds both domestic and worldwide sales. But since the data set used only provides worldwide sales, domestic sales have been omitted. Worldwide sale however also include exports, hence when worldwide sales data are used to cut off the part of the distribution of firms that needs to notify, whereas domestic data should be used, too few cases will be identified as not needing merger review. But then the domestic sales threshold represented by an horizontal line at x in Figure 1, in fact should be above this horizontal line. This clearly shows how the algorithm, making use of worldwide rather than domestic sales identifies too many cases for review.

3.5 Summing up

The present section has introduced a statistic P for indicating percentage-wise how much of industry is affected by merger review. This statistic clearly shows the importance of the level of the thresholds x and y , as well as the impact of the support of the size distribution of firms, i.e. z . The statistic is an upper bound for the true number of cases that need review because the skewness in the size distribution of firms implies that less merger combinations exist with large firms, as opposed to what the statistic P will indicate due to the uniform distribution of firm size that underlies it. Therefore, to investigate the problem using actual data, a numerical algorithm is designed to replace the P statistic. Because the algorithm derived in the next section actually counts all potential cases, it is not affected by the skewness of the size distribution of firms.¹⁵

However, an *export bias* comes from working with Amadeus data, and hence worldwide sales, while one criterion involves domestic sales. This will lead to an overestimation of the cases identified as being affected, and this bias is not corrected by the numerical algorithm used in the next section for it is inherent to the data used.

¹⁵The fact that we - empirically - count the actual affected merger cases, implies that we do not suffer from comparing small and large countries that (potentially) differ in the degree of skewness in the firm size distribution.

4 The impact of ex ante merger review

We now turn to the results where we in turn discuss the impact of different trigger values within clusters as defined above and compare across clusters. Finally, we demonstrate how our method allows for various forms of simulations by imposing different merger review thresholds (x, y) .

4.1 The impact of different trigger values within the clusters

In this section, we actually compute the percentage of pair of firms affected by merger control for a number of manufacturing sectors in a selected number of countries. This is done by applying the algorithm described in Appendix 2 on the Amadeus data set, for a selected number of countries.

The Amadeus data is a pan-European set of company accounts with harmonized entries for small, medium sized and large European enterprises for the period 1992–2000. It is a commercial dataset that can usefully be compared to COMPUSTAT data in the US, but in addition to the large and listed firms, our version of also include small and medium sized enterprises. This data set has become a standard source of data for a number of recent academic applications (e.g. Konings et al. (2005); Checchi et al. (2003), among others). The data provide detailed information on financial and operational items of the company's annual reports. Yet, due to the existing accounting legislation regarding reporting of certain variables, the coverage of some countries is not very good (e.g. Greece and Germany). Therefore, we focus on countries for which we have a full coverage of the manufacturing sector, i.e. we capture virtually the entire population of manufacturing firms.

We start with the countries in cluster A, that is France (F) and Sweden (S).¹⁶ See Table 1 for the results. A few interesting conclusions emerge. The most striking are the sometimes very substantial differences between countries for one and the same industry, as well as the substantial differences between industries in one and the same country. Commenting upon the differences between countries first, and abstracting from industries in which a particular country has a 0-entry (this could be explained either by zero percent affected or by the country not having any serious activity in that country), we see how, for NACE 15 (Manufacture of Food and Beverages), NACE 27 (Manufacture of Basic Models), NACE 29 (Manufacture of Machinery and Equipment, NACE 32 (Manufacture of Radio, Television, Communication), NACE 34 (Manufacture of Motor Vehicles), NACE 35 (Manufacture of Other Transport Equipment), France tends to have percentage-wise more of industry affected by merger review than Sweden. Given the assumption that a given level of worldwide sales in France and Sweden results in more domestic sales in France and less in Sweden, the algorithm tends to be biased against Sweden in that it takes too many operations as being affected there.¹⁷

¹⁶Due to the specific accounting legislation of The Netherlands, we have a lot of missing observations so we decide not to include that country into the analysis.

¹⁷Especially for NACE 29, NACE 32 and NACE 34, there could be “obvious” cases of overcounting for Sweden given the resp. strong export position of players such as ABB, B&O, Volvo and Saab.

Table 1 Potential merger cases needing prior notification in cluster A.

Nace 2-digit	Industry	France	Sweden
15	Food products	0.09	0.01
16	Tobacco products	16.66	0.00
17	Textiles	0.03	0.00
18	Wearing apparel	0.01	0.00
19	Leather and leather products	0.02	0.00
20	Wood and wood products	0.00	0.00
21	Pulp, paper and paper products	0.79	0.89
22	Publishing and printing	0.00	0.00
23	Coke and petroleum products	12.46	0.00
24	Chemicals	2.55	0.00
25	Rubber and plastic products	0.13	0.00
26	Other non-metallic mineral products	0.07	0.00
27	Basic metals	1.96	0.42
28	Fabricated metal products	0.00	0.00
29	Machinery and equipment n.e.c.	0.08	0.01
30	Office machinery and computers	0.67	0.00
31	Electrical machinery	0.21	0.00
32	RTv and communication	0.31	0.26
33	Medical, precision and optical instr.	0.02	0.00
34	Motor vehicles	1.00	0.33
35	Other transport equipment	0.26	0.03
36	Furniture/manufacturing n.e.c.	0.01	0.00
37	Recycling	0.00	0.00
Median		0.09	0.00

Hence, it is safe to conclude that in those sectors, the French thresholds for merger notification are tougher in that they affect percentage wise more of industry. Overall France seems to have tougher triggers than Sweden.¹⁸

Next, within each of the countries, pronounced differences exist between different industries. For France, the manufacture of tobacco products (NACE 16) and the manufacture of coke, refined petrol and nuclear fuel (NACE 23) is percentage wise much more affected than say the manufacture of furniture (NACE 36). This clearly illustrates how economy-wide thresholds are always to affect industries with strong economies of scale (also notice the “intermediate” -percentages of chemicals (NACE 24) and basic metals (NACE 27)) more than those that do not have such scale economies.¹⁹

Using the same methodology of tracing the nature of the bias, we can engage in country comparisons within other clusters too. In cluster B, we have Belgium (B) and Hungary (H). For this cluster, the algorithm will certainly be biased since both the individual and combined thresholds are in domestic sales whereas the algorithm uses worldwide sales. Between these countries, it seems that Belgium is

¹⁸The Swedish Authority on the other hand has a strong tradition in fighting cartels, see Konkurrensverket (2001).

¹⁹Of course, strong scale economies will imply fewer players being able to reach the minimum efficient scale and hence fewer competitors.

Table 2 Potential merger cases needing prior notification in cluster B.

Nace 2-digit	Industry	Belgium	Hungary	Belgium ^a
15	Food products	3.55	17.75	15.82
16	Tobacco products	35.95	100	56.21
17	Textiles	3.71	2.18	14.72
18	Wearing apparel	0.43	2.92	3.50
19	Leather and leather products	0.62	0.00	6.46
20	Wood and wood products	0.37	1.69	3.48
21	Pulp, paper and paper products	8.24	10.13	27.88
22	Publishing and printing	0.75	12.59	5.04
23	Coke and petroleum products	41.18	37.14	64.71
24	Chemicals	19.23	10.17	47.28
25	Rubber and plastic products	5.82	2.97	20.41
26	Other non-metallic mineral products	1.54	0.00	10.09
27	Basic metals	17.28	9.52	43.38
28	Fabricated metal products	0.52	3.34	4.13
29	Machinery and equipment n.e.c.	2.64	2.72	13.95
30	Office machinery and computers	0.95	12.46	0.95
31	Electrical machinery	3.65	12.22	17.74
32	RTv and communication	7.21	17.48	29.90
33	Medical, precision and optical instr.	0.86	15.93	5.39
34	Motor vehicles	8.92	10.24	31.58
35	Other transport equipment	1.96	14.28	18.94
36	Furniture/manufacturing n.e.c.	0.85	6.45	4.91
37	Recycling	0.54	0.00	4.44
Median		2.64	10.13	14.72

^aSimulation of Belgian data with Hungarian threshold.

more export oriented, given the relative state of development of the two economies and their geographic position. Therefore it seems safe to conclude that should we find a Hungarian industry that is percentage wise more affected than its Belgian counterpart, Hungary has the tougher regulatory standard for the Belgian percentage will even be more overestimated.

In Table 2, it shows that this seems to be the case for a number of industries, namely:²⁰ NACE 15 (Manufacture of Food and Beverages), NACE 16 (Manufacture of tobacco products), NACE 18 (Manufacture of wearing apparel), NACE 20 (Manufacture of wood and wood products), NACE 21 (Manufacture of pulp, paper and paper products), NACE 22 (Publishing, printing and reproduction), NACE 28 (Manufacture of fabricated metal products), NACE 30 (Manufacture of office Machinery and computers), NACE 31 (Manufacture of electric machinery), NACE 32 (Manufacture of radio, television, communication), NACE 33 (Manufacture of medical, precision and optical), NACE 34 (Manufacture of motor vehicles), NACE 35 (Manufacture of other transport equipment), NACE 36 (Manufacture of furniture), NACE 37 (Recycling).

²⁰Again, zero percentages have been left out of the comparison because this could point to the activity not being undertaken.

This is a rather long list, indicating that Hungary has rather tough merger review enforcement standards. To judge on Belgium, a comparison with another developed economy should be made. This is deferred to the next section.

Also in this cluster, pronounced differences exist between different industries. For Belgium, as in France, the manufacture of tobacco products (NACE 16) and the manufacture of coke, refined petrol and nuclear fuel (NACE 23) is strongly affected, but so are the manufacture of chemicals and chemical products (NACE 24) and the manufacture of basic metals (NACE 27). The just mentioned comparison with another developed economy therefore is more than justified.

Finally, a comparison of the countries within cluster C can be made, for within cluster D we only have been able to compute the results for Spain. Countries in cluster C are as any other country upward biased in terms of the percentages of merger operations that need review due to the use of worldwide instead of domestic sales. But compared to countries in cluster A or B, another criterion is added, in the form of an “or” condition. More in particular, these countries have an individual sales threshold at the domestic level, and two combined thresholds: one using domestic sales, another using worldwide sales. Since the algorithm only looks at individual worldwide (instead of domestic) and combined worldwide sales, one trigger (combined domestic sales) is ignored, leading to possible underestimation.

Within the cluster however, it again is plausible to assume that more exports will lead to a relative overestimation, and hence that Switzerland being more advanced

Table 3 Potential merger cases needing prior notification in cluster C.

Nace 2-digit	Industry	Czech Rep.	Switzerland
15	Food products	29.8	15.82
16	Tobacco products	100	71.42
17	Textiles	19.24	0.00
18	Wearing apparel	2.85	0.00
19	Leather and leather products	13.33	0.00
20	Wood and wood products	8.85	0.00
21	Pulp, paper and paper products	31.88	14.00
22	Publishing and printing	4.72	0.89
23	Coke and petroleum products	100	0.00
24	Chemicals	24.95	15.96
25	Rubber and plastic products	10.94	1.17
26	Other non-metallic mineral products	23.57	3.29
27	Basic metals	40.90	0.00
28	Fabricated metal products	8.32	2.66
29	Machinery and equipment n.e.c.	11.62	10.03
30	Office machinery and computers	0.00	0.00
31	Electrical machinery	8.13	12.92
32	RTv and communication	7.69	4.76
33	Medical, precision and optical instr.	5.07	6.83
34	Motor vehicles	38.38	16.67
35	Other transport equipment	29.42	6.67
36	Furniture/manufacturing n.e.c.	8.91	0.00
37	Recycling	0.00	0.00
Median		11.62	2.66

will in reality probably have fewer cases than estimated. This again implies that if we find a percentage for Switzerland (CH) below that of the Czech Republic (CR), we will conclude that the last countries regulations are tougher for that particular industry. Again as becomes clear from Table 3, this happens in very many cases. The list here tends to be as long as that for Hungary (compared to Belgium). We only mention the codes of the industries, viz. NACE 15, NACE 16, NACE 21, NACE 22, NACE 24, NACE 25, NACE 26, NACE 28, NACE 29, NACE 32, NACE 34 and NACE 35. This leads to the conclusion that also this transition country tends to have low trigger values for merger review.²¹

4.2 A comparison between clusters

It is easy to see that clusters C and D are using the same triggers as cluster B, but add an additional criterion that triggers review. Therefore, if we compare countries similar in exports (hence controlling for the export bias overestimation) in the B cluster to countries in the C and D cluster, it is clear that a lower percentage of merger operations affected in the B cluster points to tougher standards in the countries belonging to the C or D cluster. As such, when we for example assume that Belgium and Switzerland have about the same export bias, Switzerland is tougher than Belgium on NACE 15 (Manufacture of food and beverages), NACE 16 (Manufacture of tobacco products), NACE 21 (Manufacture of pulp, paper and paper products), NACE 26 (Manufacture of other non-metallic mineral products), NACE 27 (Manufacture of basic metals), NACE 28 (Manufacture of fabricated metal products), NACE 29 (Manufacture of machinery and equipment), NACE 31 (Manufacture of electrical machinery), NACE 33 (Manufacture of medical, precision and optical instruments), NACE 34 (Manufacture of motor vehicles) and NACE 35 (Manufacture of other transport equipment).

Again this is a long list indicating that Belgian thresholds are rather high although they induce a tremendous work load on an extremely low budget antitrust authority. Comparing Hungary (from cluster B) to the Czech Republic (from cluster C) is an equally interesting exercise. Since the Czech Republic adds a criterion that is not checked by the algorithm (or to put it differently: it checks two criteria that are different by computing only one test), it tends to underestimate the percentage of cases affected for this country. Hence if we find a lower percentage in Hungary, we again may conclude that the latter has a softer standard, assuming the export bias is the same to the two countries. Again a long list of sectors for which this holds true can be given. Hungary tends to have softer standards than the Czech Republic for NACE 15, NACE 17, NACE 20, NACE 21, NACE 23, NACE 24, NACE 25, NACE 27, NACE 28, NACE 29, NACE 34, NACE 35 and NACE 36. A few sectors in which the reverse situation might prevail however also exist. A comparison between Belgium or Hungary and Spain, the only country from cluster D for which we could do computations seems less relevant due to the very different economies induced. Methodologically speaking, a higher percentage for Spain would lead us to the conclusion that Spain is tougher, for we miss cases by not taking into account the fact that the market share threshold might be reached.

²¹The question of course is: how tough is the review process once it has been triggered?

Other comparisons between countries belonging to different clusters can be done in the same spirit. Cluster C can be seen as cluster A with an additional criterion, allowing also comparisons between e.g. Switzerland and Sweden. A smaller percentage of operations affected for Sweden would then lead to the conclusions that Swedish standards are weaker for that industry. Such an exercise would show that this indeed holds for NACE 15, NACE 21, NACE 29, NACE 31, NACE 32, NACE 33, NACE 34 and NACE 35. Each of these sectors (except NACE 26 for which Switzerland cannot be compared to Sweden for we detected not any significant activity of it in Sweden), was also in the list of countries for which we argued there was a reasonable indication that Switzerland was tougher than Belgium, hence it is safe to conclude that Switzerland is a rather tough country for these sectors.

The most interesting comparison however seems to be between countries in cluster A and B, more in particular between Belgium, France and Sweden. As argued already, although Belgium asks for a combined sales thresholds in terms of domestic sales, we use worldwide sales instead. Also, in terms of openness, this country seems to export on average more than Sweden or France. Hence the algorithm will overestimate the percentage of merger operations affected by merger review most for this country and hence if we find an higher percentage for France or Sweden, we may conclude that Belgium has softer standards. Nonetheless, comparing industries in Belgium vis-à-vis France and Sweden yields the conclusion that there is no single sector where Belgian regulatory standards are softer than those in France or Sweden.

4.3 Simulations

The current situation is that merger thresholds are country specific and hence industry neutral. The framework suggested in this paper allows for various simulation exercises by imposing a “given” threshold, e.g. an EU wide threshold. However, having such one threshold across all countries would be the analogue of ignoring industry differences within a given country by ignoring differences in firm size distribution across countries.

The advantage of the method proposed here is that we can evaluate the impact of introducing a new merger threshold as we do control for the underlying firm size distribution. We demonstrate this by imposing the threshold of Hungary on the Belgian data. The implied “affected merger pairs” are given in the final column of Table 2. It is clear when performing simulations, countries within a class (as presented in Appendix 1) have to be considered. The implied percentages for Belgium are much higher and show that even when correcting for the differences in firm size distribution, the different merger notification rules would impose a great burden on antitrust authorities. We leave simulations of a common EU threshold outside the scope of the present paper as this requires a model delivering an optimal threshold - if there is any - across countries incorporating costs and benefits thereof.

5 Conclusion

The present paper has investigated the impact of the different criteria used to determine whether or not a merger should be cleared in advance. We have documented the implications of such a prior notification regulation in terms of the percentage

number of potential merger cases affected. To our knowledge, it is the first time that such an endeavour has been taken. Nonetheless, according to the most recent “Worldwide Antitrust Notification Requirements”, the complexity of notifying a merger only increases since more countries extend their legislation or start up a new one where before merger review was not required.

As was to be expected, since the criteria in a country hold for all industries involved, substantial cross industry variation emerges. However, as the criteria used differ between countries, the latter generically impose different burdens upon the private sector plans for growth by domestic mergers or acquisition.

In order to show the above results, a number of assumptions had to be made, and hence limitations are around. Future research should in this context certainly proceed by using true domestic sales rather than approximating them by worldwide sales to determine the impact of the individual sales trigger. Other interesting extensions could be done in the format of simulation exercises. For example, one could apply the criteria that prevail in France to the size distribution of firms in other countries. This would provide an indication of how interesting it is for firms to relocate their activities in view of avoiding tougher regulations.

Cross-country comparisons yield many interesting conclusions. While there may be individual sectors that do not follow the pattern described below, it nonetheless seems to be the case that:

- transition countries tend to have low trigger values, implying many cases needing review;
- Hungary tends to review less than the Czech Republic;
- developed countries such as Belgium, Sweden and France do not seem to review many cases, in contrast to Switzerland.

Again it is important to stress that this contribution has focussed on the number of cases that come up for review. There also exist wide differences between countries in how many cases that actually have been blocked. Switzerland for example has 0% for the ratio prohibited/examined, whereas Belgium has 1,6% and France even 4,6%, see Katsoulacos (2002).

The data used to show these results is a pan-European set of company accounts with harmonized entries for small, medium sized and large European enterprises for the period 1992–2000. The data provide detailed information on financial and operational items of the company’s annual reports. Yet, due to the existing accounting legislation regarding reporting of certain variables, the coverage of some countries is not very good. Therefore, we focus on countries for which we have a full coverage of the manufacturing sector, i.e. we capture virtually the entire population of manufacturing firms, but future research should try to use other data sets to complete our understanding of the impact of merger review.

Since we have indicated that all conclusions are based on biased estimates, few policy conclusions, especially regarding toughness standards between countries, can be drawn for the moment. But the “order” of toughness indicated in this contribution however is a good first indication of the impact of the different merger criteria used. Mostly if not always, these criteria are determined “ad hoc”. Hence, this first contribution should “trigger” an academic discussion regarding the determination of the criteria for merger review, in view of finding a “fair level playing field” for industries willing to grow by merger and acquisition.

Appendix 1: Clusters of countries following qualitatively the same/similar criteria for notification (Situation anno 1999)

Cluster	Thresholds				
A	Individual Domestic Sales				
B	Combined Worldwide Sales				
C	Individual Domestic Sales				
D	Combined Domestic Sales				
	Individual Domestic Sales				
	Domestic Combined Sales				
	Worldwide Combined Sales				
	Individual Domestic Sales				
	Combined Worldwide Sales				
	Market Shares				

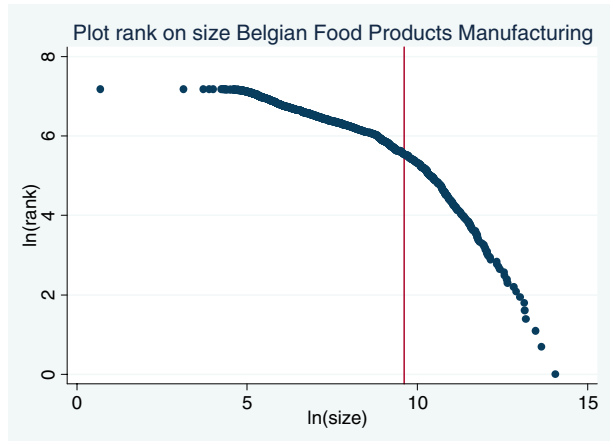
Cluster	Country	x	y_D^C	y_W^C	ms (%)
A	France	15 mln		150 mln	
A	Netherlands	30 mln		113.5 mln	
A	Sweden	11.4 mln		454.2 mln	
B	Belgium	15 mln	40 mln		
B	Hungary	212,260	42.6 mln		
C	Czech Rep.	5.6 mln	15.4 mln	140 mln	
C	Switzerland	48.4 mln	241.8 mln	967 mln	
D	Spain	60.1 mln	240.4 mln		25
D	Israel	2.8 mln	37.8 mln		50
D	Greece	15 mln	150 mln		35

Where x denotes sales on the domestic market by an individual firm, y_D^C is combined sales on the domestic market, y_W^C is combined sales worldwide and ms denotes the market share of the merged entity. We report thresholds in EUR and where necessary we converted local currencies into EUR using real effective exchange rates (IFS database).

Appendix 2: The algorithm used to calculate percentage of pairs affected

Following the notation introduced in the text, x represents individual sales while y stands for combined sales. We implement the algorithm within the industry of interest for a given year, 1999. In a first step we count the number of firms in the industry, N . The maximum number of pairs in this industry is then given by $NP = \frac{N(N-1)}{2}$. We drop all firms that have sales lower than x . We now generate a variable - for every individual firm - that sums the sales of every individual firm with every other firm in the industry. From this we generate a dummy variable that is equal to '1' if the joint sales are higher or equal than y (the second criteria). Note that the first criterion is satisfied by construction since any firm with sales lower than x is dropped already. In Germany the rules are such that only one of the parties have to reach the x thresholds. This changes the algorithm as we cannot a priori drop all firms with sales below x .

Figure 2 Plot log rank on log size for Belgian food products manufacturing.



Now what is left is to sum over this dummy variable and this generates the number of pairs in the industry (m) that have to file a report when merging. The fraction $\frac{m}{NP}$ then gives the fraction of the total number of pairs that have to file a report when merging.

Note that the way the data is treated and are handled, clearly shows the analogy with the graphical representation. That is, for every firm a new column dummy variable is created. This results in a symmetric matrix with dimension: the number of firms having sales over criteria x . The diagonal is irrelevant since firms cannot merge with themselves and is the analogue of the 45 line in the graphical representation. The summation is only relevant under (or equivalently above) the diagonal and is the analogue to only considering the area under the 45 line. This transparent algorithm can be used to simulate the impact of thresholds changes by adopting different (x, y) values.

Appendix 3: Size distribution in belgian food product manufacturing

We show the plot of log rank on log size for the Food Products Manufacturing Sector in Belgium (NACE 15), where we introduced the 15 mln EUR threshold by the red vertical line. For the underlying distribution to be Pareto, the plot must be a straight line on this log–log graph. Figure 2 clearly shows that the truncated size distribution from the threshold (15 mln EUR) is not a straight line. Moreover, the estimated coefficient is a function of the truncation point x as there is a convex part the further away from the top of the distribution. This is consistent with an underlying untruncated distribution like the lognormal, which has the property that the very upper tail cannot be distinguished from the Pareto (Eeckhout 2004).

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