

## An Econometric Analysis of the European Commission's Merger Decisions\*

Mats A. Bergman \*\*, Maria Jakobsson \*\*\* and Carlos Razo \*\*\*

February 3, 2003

### Abstract

Using a sample of 96 mergers notified to the EU Commission and logit regression techniques, we analyse the Commission's decision process. We find that the probability of a phase 2 investigation and of a prohibition of the merger increases with the parties' market shares. The probability increases also when the Commission finds high entry barriers or that post-merger collusion is easy. We do not find significant effects of "political" variables, such as the nationality of the merging firms or the identity of the commissioner.

**Keywords** : competition law, antitrust, merger, merger regulation

**JEL**: K21, L40, D78

---

\* We are grateful to Magnus Björk for excellent assistance in collecting the data set. Per Johansson and Mårten Palme have provided helpful comments concerning the econometrics. This paper was partly written while Carlos Razo was a visiting researcher at The Research Institute of Industrial Economics, where he benefited from an excellent research environment. Special thanks also to Christina Håkansson for great research assistance there. Financial support from the Swedish Competition Authority is gratefully acknowledged.

\*\* Department of Economics, Uppsala University, Box 513, SE-751 20 Uppsala, Sweden, Fax: +46 18 471 1478, E-mail: [mats.bergman@nek.uu.se](mailto:mats.bergman@nek.uu.se)

\*\*\* Department of Economics, Stockholm University, SE-106 91 Stockholm, Sweden, Fax: +46-8-161 425, E-mail: [maria.jakobsson@ne.su.se](mailto:maria.jakobsson@ne.su.se) and [cara@ne.su.se](mailto:cara@ne.su.se), respectively.

## 1. Introduction

What makes the EU Commission prohibit a merger? Are the Commission's decisions consistent with economic theory? These are important questions, in particular in the light of the recent criticism against the Commission for not making proper economic analyses and the on-going reform of the EU Merger Regulation.<sup>1</sup>

During the twelve years from September 1990 through October 2002, the European Commission received more than 2100 merger notifications, and it made almost as many final decisions in such cases. The number of decisions per year has been increasing, from around 60 during the early 1990s to well over 300 in the last few years.

Mergers – and merger control – are important, for firms and society. Mergers can reduce competition, leading to allocative inefficiencies (monopoly pricing) and inefficiency in production (because of weakened incentives for cost control). But they can also lead to efficiencies (because of economies of scale and scope). Furthermore, the threat of hostile take-overs keeps management on its toes (Manne, 1965).

Only 18 of the Commission's decisions have been prohibitions in a formal sense. However, this number underestimates the importance of the Commission for the development of the structure of European industry. In an additional 21 instances, the merging parties withdrew their notification during the phase 2 investigation and many of these cases could arguably be seen as prohibitions. In addition, the conditions for allowing a merger have in some cases been so strict as to effectively amount to a prohibition<sup>2</sup>, while in many others the conditions have implied significant sacrifices for the firms. The most important effect of the Commission's enforcement of the Merger Regulation, however, is likely to be its preventive effect, i.e., that it prevents firms from even notifying mergers likely to be blocked.

The European Commission holds vast powers in merger decisions. It has the power to completely block a merger – unless its decision is revoked by the Court of First Instances (CFI). However, since two or three years may easily pass between the Commission's decision and that of the CFI, few mergers are likely to be relevant if and when the CFI quashes the Commission's decision. The extended legal process gives the Commission a bargaining position for enforcing far-reaching commitments by the merging parties. Recently, the inquisitorial nature of the merger regulation has been criticised. The Commission is both prosecutor and judge, while its US counterparts – the Federal Trade Commission (FTC) and the Department of Justice (DOJ) – only act as prosecutors. In the US, a decision to block a merger must be taken by a court.

During the year 2002, the European Commission lost three merger cases in court: *Airtours/First*

---

<sup>1</sup> The formal name of the Merger Regulation is Council Regulation (EEC) No 4064/89 of December 21, 1989 on the control of concentrations between undertakings. Recently, the Court of First Instances has quashed three of the EU Commission's merger decisions, referred to below. The Commission has suggested a revised merger policy in the document "Draft Best Practice on the conduct of EC merger control proceedings", Brussels, December 19, 2002, and has published the document "Draft Commission Notice on the appraisal of horizontal mergers under the Council Regulation on the control of concentrations between undertakings", Official Journal 3003/C 331/03, December 31, 2002.

<sup>2</sup> See, e.g., *Skanska/Scancem* (case No. M 1157).

*Choice*<sup>3</sup>, *Schneider/Legrand*<sup>4</sup> and *TetraLaval/Sidel*<sup>5</sup>. In all three cases, the CFI strongly criticised the Commission's economic analyses. Against this background, it seems worthwhile to evaluate what factors have historically led the Commission to investigate and prohibit mergers. Such an analysis will also provide evidence on the consistency of its decision process. At times, it has been alleged that the decisions are biased against the interest of firms based in small member states or outside the European Union.

In the present paper, we provide such an evaluation, based on an econometric analysis of almost 100- decisions in EU merger cases. The main determinants of whether a merger is allowed appears to be the parties' market shares, the increase in market shares because of the merger and the existence of entry barriers. These variables, together with the Commission's view on the ease of collusion post-merger, are also the main determinants of the initiation of a phase 2 investigation. Interestingly, a number of "political" variables were *not* found to be significant. For example, it was not the case that mergers between firms based in small member states or outside the EU were more likely to be prohibited than mergers between firms based in large member states. Nor did we detect any differences in policies between the current commissioner, Mario Monti, who made his first decisions in mid-1999, and his predecessors.

## 2. The EC Merger Regulation

According to Article 2 (3) of the Merger Regulation, a concentration (merger) shall be prohibited if it "creates or strengthens a dominant position as a result of which effective competition would be significantly impeded in the common market or in a substantial part of it".

The European Court of Justice has defined "dominance" as "a position of economic strength enjoyed by an undertaking which enables it to prevent effective competition being maintained on the relevant market by giving it the power to behave to an appreciable extent independent of its competitors, customers and ultimately of consumers".<sup>6</sup> In practice, dominance is often found when a firm's market share (or the combined market shares of two merging firms') exceeds 40 per cent, although higher market shares are typically required when the buyers have strong countervailing market power or when the entry barriers are particularly low. It also appears to be the case that as soon as dominance is found, very little is required for finding competition to be "significantly impeded".

The issue of dominance is evaluated, and market shares are calculated, in relation to a market – the "relevant market", defined geographically and product-wise. Products that are sufficiently close substitutes are considered to be sold on the same relevant product market. The relevant geographical market is similarly defined as the smallest geographical area, within which the competitive situation is not considerably influenced by activities outside the area.<sup>7</sup>

---

<sup>3</sup> Commission decision M1524, CFI's case T - 342/99, June 6, 2002

<sup>4</sup> Commission decision M2283, CFI's case T - 310/01 and T - 77/02, October 22, 2002

<sup>5</sup> Commission decision M2416, CFI's case T - 5/00 and T - 80/02, October 25, 2002

<sup>6</sup> *United Brands* (27/76) [1978] E.C.R. 207, para. 65. See also Korah, 1997, p. 78.

<sup>7</sup> Commission Notice on the definition of the relevant market for the purposes of Community competition law, Official Journal C 372, September 9, 1997.

When a merger is notified, the Commission must make a preliminary evaluation within a month. If it finds that the merger “raises serious doubts as to its compatibility with the common market”, it may initiate an in-depth phase 2 investigation. As of September 2002, 121 of the over 2100 cases notified had been subject to a phase 2 investigation.<sup>8</sup> As previously mentioned, 18 of these mergers were blocked, while an additional 21 were cancelled by the merging parties after a phase 2 investigation had begun. 61 further mergers were found to be compatible with the Merger Regulation after the merging parties had undertaken to promote competition, for example through the sale of overlapping activities.

### 3. Earlier literature

There exists a relatively large analytical economics literature on mergers. Issues that have been addressed analytically are, for example, firms’ incentives to merge (“endogenous mergers”), the effects of vertical mergers (vertical foreclosures) and how efficiency gains should be considered.<sup>9</sup> Often, this literature takes a controversial merger decision as its starting point. The empirical merger literature analyses, e.g., the effects of mergers and merger announcements on share prices, firm profitability and efficiency. However, there is a paucity of positive empirical analyses of the competition authorities’ decisions that can answer the introductory questions: What types of mergers are typically prohibited? Are the decisions consistent with economic theory?

At least the first question has been addressed in the legal literature, but the mode of analysis is different from that of an economist. Often, these studies focus on a certain issue, such as how to deal with oligopoly mergers under the EU competition rules and how to account for countervailing market power. In other instances, in-depth analyses are made of certain cases.<sup>10</sup>

There exist only a few examples of research combining the two approaches, i.e., a positive but *quantitative* analysis of the authorities’ decisions, even if we broaden our perspective to competition cases in general. Posner (1970) analysed the correlation between the business cycle and the *number* of competition cases at the US Department of Justice. A few more recent studies have followed a similar approach.<sup>11</sup>

McFadden (1975, 1976) developed a methodology for analysing the decisions taken by government bureaucracy. His research agenda was based on the question of *which* decisions the authorities take, not the *number* of such decisions, and he suggested that these decisions be analysed with multinomial logit models.

Statistical techniques for analysing discrete choices have only been used in a few studies focusing on competition law (antitrust) cases. Coate and McChesney (1992) used a probit model to analyse 70 merger cases handled by the Federal Trade Commission (FTC, the other federal US agency

---

<sup>8</sup> As of September 4 when the sampling was done, 120 cases had been subject to a phase 2 investigation.

<sup>9</sup> For extensive surveys of the literature on efficiency defence, see Ilzkovitz and Meiklejohn (2001), Röller, Stennek and Verboven (2001) and Stennek and Verboven (2001).

<sup>10</sup> Nilssen (1997) analyse two merger decisions taken by the Norwegian Competition Authority in depth, but from an economic viewpoint.

<sup>11</sup> A recent example is Ghosal and Gallo (2001), who also provides references to this strand of the literature.

dealing with antitrust cases) during the 1982 to 1987 period. Four important explanatory variables in the regression were the Herfindahl index and three dummy variables representing the existence of entry barriers in the affected market, the risk of collusion, and the existence of efficiency gains from the merger. Coate and McChesney found that the authority apparently did not consider efficiency gains, that mergers were highly likely to be allowed above the critical level of concentration (in terms of the Herfindahl index) indicated in the *Merger Guidelines* and that the existence of entry barriers is a necessary condition for a merger to be blocked. They also found indications that political pressure from the Congress influenced the merger decisions and that the FTC lawyers had more influence than the authority's economists. (This conclusion could be drawn, since the lawyers and the economists made separate reports, recommending that the merger should be blocked or allowed.)

Similar studies have more recently been made by Khemani and Shapiro (1993), for mergers in Canada, and by Weir (1992, 1993), for mergers in the UK. The former found market shares and concentration to be the most important factors, but also found the level of entry barriers and competition from imports to be of importance. Weir found that the post-merger market share did *not* appear to affect the authority's decision, but that the Monopolies and Merger Commission (MMC) was less likely to allow hostile mergers. Davies *et al.* (1999) used a probit model to analyse 73 (non-merger) competition cases handled by the MMC in the UK.

We have not been able to find any quantitative empirical studies of the decision process in the EU Commission's competition law cases using these types of analytical tools. However, Neven and Röller (2002) analyse the relation between the Commission's decisions and the movements of the share prices on the stock market. If a merger is pro-competitive, we expect the share price of the merging firms' competitors to fall, while an anti-competitive merger is likely to lead to rising share prices for competitors. Neven and Röller found that six of the eight prohibitions in their sample corresponded to a merger evaluated as anti-competitive by the stock market, while about half of the mergers given unconditional clearance were evaluated as anti-competitive by the stock market.

#### **4. Factors influencing merger decisions**

From an economic point of view, a horizontal merger is potentially harmful, because it may increase the merging firms' market power. On the other hand, such a merger may increase efficiency, because of economies of scale. The negative effects are likely to be stronger when the merging parties market shares are high<sup>12</sup> and when there is a large increase in market shares. This is in accordance with legal practice under the Merger Regulation; hence, post-merger market shares and the increase in market shares are likely to influence the Commission's decisions.

Similarly, the negative effects of a merger are likely to be larger if the merger concerns a large market. Candidate measures of the size of a transaction are a) the firms' combined turnover or the turnover of the smaller firm, b) the number of relevant markets where dominance is created (or where certain market share thresholds are reached) and c) the size of the relevant geographical

---

<sup>12</sup> See Farrell and Shapiro (1990) and Werden and Frobe (1994), where this intuitive result is shown to hold for particular models.

markets (i.e., whether the merger affects the whole Common Market, or just one national or even local market). However, it may also be argued that the *benefits* of a merger (the economies of scale and scope) are also likely to be larger on a large market. If the number of markets where there is an increase is large, the negative effects are also likely to be large. Hence, an alternative hypothesis would be that the size of the transaction, or the scope of the affected markets, is irrelevant for the Commission's decision.

There are several other factors, which, according to economic theory, are of importance for the welfare effects of a merger: the level of the entry barriers, the (increased) risk of collusion after a merger, and the possible existence of countervailing buyer or seller market power. Hence, it is natural to include dummies representing the Commission's assessment of these factors.

The theoretical arguments against vertical mergers are less convincing than those against horizontal mergers. It has been argued that vertical mergers can foreclose competitors. On the other hand, they are likely to reduce transactions costs and may eliminate the "double marginalization" effect. In practice, most mergers have both vertical and horizontal effects. However, given the market shares pre and post merger, it is interesting to evaluate whether the Commission is more or less likely to investigate or prohibit a merger with a strong vertical effect.

Under the US Horizontal Merger Guidelines, a merger may also be justified by an "efficiency defence".<sup>13</sup> The European rules do not allow for this, but the argument has been put forward by the merging parties in some cases.<sup>14</sup>

In addition, the nature of the undertakings offered by the firm is likely to influence the Commission's willingness to allow a merger. If the firms undertake to sell all overlapping business, a merger is more likely to be allowed than if no – or only limited – undertakings are offered.

Variables that are irrelevant from an economic point of view may still potentially influence the merger decision, if the Commission allows political pressure to influence its decision. In particular, it can be hypothesised that firms based in small member countries or outside the European Union are more likely to face a prohibition. Similarly, it is possible that the Commission treats government-owned firms differently than otherwise similar private firms.

Finally, it is possible that the policy of the Commission has changed over the years. For example, it has been suggested that the current Competition Commissioner, Mario Monti, is more aggressive than his predecessor. Such effects could potentially be revealed by including a time trend or a commissioner dummy.

---

<sup>13</sup> There is also a failing firm defence, under both the U.S. and EU rules, but there are not enough instances to evaluate its empirical relevance.

<sup>14</sup> See, e.g., *Gencor/Lonrho*, Commission case M619 and *Danish Crown/Vestjyske Slagterier*, Commission case M1313. For a discussion of efficiency defence in economic theory and legal practice, see Horn and Stennek (2002).

## 5. Data

As of September 2002, approximately 2100 mergers had been notified to the European Commission. The total population we can study consists of the approximately 2020 formal decisions taken by the EU Commission under the Merger Regulation.<sup>15</sup> In order to increase the efficiency of the statistical analysis, we employed a retrospective sampling technique, i.e., the sampling was made conditional on the dependent variable. Our gross sample included all 18 negative cases, 60 of the 120 phase 2 cases<sup>16</sup> and 59 cases out of all cases. The last category included the two former categories; in our sample draw, four cases had already been sampled. Similarly, the phase 2 sample included 8 negative cases. Hence, our gross sample included 125 cases. For 15 of these, the decision was not available on the Commission's homepage and there is no other source of information available. For another 14 cases, the merger was aborted or withdrawn on the companies' request. In such cases, no information is available. This leaves us with a net sample of 96 cases, consisting of 17 prohibitions, 30 other phase 2 cases and 49 other cases, i.e., phase 1 decisions. (See Table 1.)

*Table 1. Case population and gross and net sample, September 4, 2002.*

	Prohibitions	Other phase 2	Other phase 1	Total
Population	18	102	(Approx. 1900)	(Approx. 2020)
Gross sample	18	60	59	137
<i>Double sampling</i>	-	-8	-4	-12
<i>Reclassification</i> <sup>17</sup>	-	+1	-1	-
Actual gross sample	18	53	54	125
<i>Withdrawn or aborted</i>	-	-14	0	-14
<i>No information available</i>	-1	-9	-5	-15
Net sample	17	30	49	96

All aborted/withdrawn cases were phase 2 cases. Potentially, this is a serious problem since cases aborted in phase 2 are likely to be cases where the Commission has raised strong objections. In fact, it has been suggested that cases aborted or withdrawn in phase 2 should be viewed as prohibitions.

In order to perform a statistical analysis, we transformed the information contained in the written decisions into a number of variables – mostly dummy variables. Some variables are unproblematic, such as the date of application, while others could only be coded based on a judgement of the text. Our basic approach was to interpret from the text whether the Commission believed that, e.g., entry barriers were high, rather than trying to make independent judgements of

<sup>15</sup> The difference is mainly made up by notified mergers, which were withdrawn by the firms before a formal decision had been taken.

<sup>16</sup> We drew our sample on September 4, 2002. There have been additional merger cases after that date.

<sup>17</sup> One phase-2 case, which was not included in the original phase-2 sample, was sampled in the phase-1 category.

how high the entry barriers *actually* were. An additional problem was that many of the quantitative facts were censored, as they were claimed to be confidential business secrets. In particular, this was often the case for figures for turnover and market shares.

The dependent variable is the type of decision. We view the decision process as consisting of two successive decisions, the first being whether a phase 2 analysis should be made. Given that a phase 2 analysis has been made, the Commission then either allows or prohibits the merger. Hence, we have chosen to see the extent of the undertakings by the firms as an explanatory variable. Alternatively, this could be viewed as part of the decision. For example, the Commission classifies a merger allowed in phase 1 into two categories, one with and one without conditions and obligations.

We have employed the following explanatory variables:

*Marketshare*: The combined post-merger market share in the relevant market where we believe the Commission expects the most serious negative consequences of the merger. Since the exact figures are often confidential, we have used the mid-point of the market-share range provided. When the market share was only referred to as “insignificant”, we arbitrarily assumed it to be 5 %.<sup>18</sup> If the market definition is left open, we have used the narrowest market considered.

*Dmarketshare*: The difference between *Marketshare* and the market share of the largest firm in the same relevant market, pre merger. In the three cases where no information on pre-merger market shares was available, we assumed that the merging firms had equal market shares prior to the merger.

[31-50]: A dummy variable taking the value of 1 if the market shares post merger lie between 31 and 50 %.

[51-75]: A dummy variable taking the value of 1 if the market shares post merger lie between 51 and 75 %.

[76-100]: A dummy variable taking the value of 1 if the market shares post merger lie between 76 and 100 %.

*Network*: A dummy variable taking the value of 1 if the merger concerns telecom, transports, electricity or the financial industry.

*Collusion*: A dummy variable taking the value of 1 if the Commission finds that the firms will be collectively dominant after the merger, or if it otherwise finds that collusion will be easy (easier) in the affected markets, post merger.

*Entrybarriers*: A dummy variable taking the value of 1 if the Commission finds that entry barriers are high in the relevant market(s).

---

<sup>18</sup> In simplified procedure cases, we also assumed the market share to be 5 %.



*Counter*: A dummy variable taking the value of 1 if the Commission finds that countervailing seller or buyer market power will be strong post merger.

*Worldleader*: A dummy variable taking the value of 1 if at least one of the firms is referred to as “world leader”, “super dominant” or similar.

*Marketsize*: A dummy variable taking the value of 1 if the relevant geographical market is national or smaller. If the market definition is left open, we have used the narrowest market considered.

*Domestic*: A dummy variable taking the value of 1 for domestic mergers.

*Small*: A dummy variable taking the value of 1 if only firms based in small (member and non-member) European countries are affected.

*EU*: A dummy variable taking the value of 1 if only firms based in EU are affected.

*US*: A dummy variable taking the value of 1 if at least one firm based in the US is affected.

*Monti*: A dummy variable taking the value of 1 for decisions taken after mid-1999; i.e., for decisions taken by commissioner Mario Monti.

*Undertakings*: A dummy variable taking the value of 1 if the merging parties propose undertakings that remove all horizontal overlap in the affected markets.

We use 30 and 50 % as critical levels when constructing market share dummies, since 50 % is the level above which dominance can be presumed, while 30 % is the level below which dominance is presumed *not* to exist (Carlsson *et al*, 1999, p 234-235). However, an important practical problem is that, normally, a notified merger affects more than one relevant market, both product-wise and geographically. Our solution to this problem is to focus on *the most problematic relevant market*.

For all dummy variables, we have interpreted the value as a zero if the issue to which they relate is never mentioned in the decision text. For example, if entry barriers are never discussed, we assume these to be low. The descriptive statistics for the variables are presented in Table 2.

**Table 2. Descriptive statistics.**<sup>19</sup>

Variable	# of observations	Mean	# of observations =1
Stage 2	96	0.5104	49
8(3) Cases	96	0.1667	16
<i>Marketshare</i>	87	41	-
<i>Dmarketshare</i>	87	11.7778	-
[0-30]%	90	0.4333	39
[31-50]%	90	0.2111	19
[51-75]%	90	0.1889	17
[76-100]%	90	0.0778	7
<i>Network</i>	96	0.2604	25
<i>Collusion</i>	96	0.2188	21
<i>Entrybarriers</i>	96	0.3750	36
<i>Counter</i>	96	0.0729	7
<i>Worldleader</i>	96	0.0729	7
<i>Marketsize</i>	96	0.6354	61
<i>Domestic</i>	96	0.3229	31
<i>Small</i>	96	0.1771	17
<i>EU</i>	96	0.6042	58
<i>US</i>	96	0.2292	22
<i>Monti</i>	96	0.5521	53
<i>Undertakings</i>	96	0.1458	14

## 6. The empirical model

We use logit regression techniques to estimate the two successive decision faced by the Commission: first, whether a certain case will be brought into a phase 2 analysis and second, whether a certain merger will be prohibited. The logit model can be derived from the assumption that

$$\log\left(\frac{P_t}{1-P_t}\right) = X_t \mathbf{b}$$

where  $P_t$  is the probability that a certain event occurs for observation  $t$ ,  $X_t$  is a vector of explanatory variables and  $\mathbf{b}$  is the parameter vector to be estimated. Let the event, i.e., the dependent variable, be represented by the variable  $y_t$ , which takes the value 1 if the event occurs (e.g., if the Commission decides to make a phase 2 investigation or to prohibit the merger) and 0 otherwise. Hence,  $P_t$  denotes the conditional probability that  $y_t = 1$ .

Solving for  $P_t$ , we find that

---

<sup>19</sup> Explanatory variables in italics.

$$P_i = (1 + \exp(-X_i \mathbf{b}))^{-1}$$

Alternatively, the logit model can be derived from the assumption that there exists a latent variable  $Z$ , which would in our case represent the Commission's view on the "severity" of the merger's anti-competitive effects. If the latent variable  $Z$  takes a value above a critical level  $Z^*$ , then  $y_i = 1$ . Such a derivation is similar to how the probit model is derived, except that the errors are assumed to follow the extreme value function, rather than the normal distribution (Davidson and MacKinnon, 1993, ch. 15.2).

In the previous section, we described the vector of explanatory variables,  $X$ , as well as our sampling strategy. We sampled retrospectively, i.e., conditional on the dependent variable, such that certain types of decisions were over-represented. The logistic model has the advantage that it can be estimated directly on a retrospective sample (see McCullagh and Nelder, 1989, ch. 4.3.3). Except for the intercept, we can estimate and interpret the parameters of interest. The disadvantage of using this method is that we cannot calculate predicted probabilities (for a given set of variable values), only odds ratios.<sup>20</sup>

## 7. Results

### *The decision to initiate phase 2 investigations*

Within a month of the notification, the Commission makes the decision to allow the merger – or initiate phase 2 investigations. At that time, the Commission will have less information than when making a final decision after the phase 2 investigation. However, we base our analysis on the final decisions. Arguably, for this reason we may not be able to use all of our explanatory variables, since some of them represent information that may not have been available to the Commission when making its decision to initiate phase 2 investigations. On the other hand, a substantial amount of information may be available already at this stage: the information provided by the parties in the notification, the additional information gathered during the preliminary investigation and the Commission's prior information, acquired in previous cases or by the staff in other contexts.

A more serious restraint on our use of information for predicting whether there will be a phase 2 analysis is the fact that phase 1 decisions are normally relatively brief. For some variables, we will only be able to find information in the more extensive phase 2 decisions. Hence, we will not be able to use the variable *Worldleader*, as it will never take the value of 1 for cases where phase 2 investigations are *not* initiated<sup>21</sup> Table 3 provides the estimation results for four alternative specifications of the model.

---

<sup>20</sup> If we estimated a probit function with CBMLE (Choice-Based sampling Maximum Likelihood Estimator) or WMLE (Manski-Lerman Weighted Maximum Likelihood Estimator), we would be able to calculate absolute probabilities. See Amemiya (1985).

<sup>21</sup> I.e., *Worldleader* is a perfect classifier.

**Table 3.** Estimation results for the decision to initiate phase 2 investigations.

Dependent Variable : Stage2	Estimated Coefficients			
	1	2	3	4
Dmarketshare	<b>0.1073</b> ** 2.15	0.1020 1.28	0.0999 1.34	
[31-50]	<b>2.7663</b> *** 2.73	<b>7.3161</b> * 1.95	<b>4.2131</b> *** 3.04	
[51-100]	<b>4.2981</b> *** 4.00	<b>8.6901</b> ** 2.12	<b>4.3202</b> *** 2.90	
[31-50]*Dmarketshare				<b>0.2496</b> *** 3.08
[51-100]*Dmarketshare				<b>0.3921</b> *** 2.94
Smalldom	-0.9805 -0.99	-3.5232 -1.14		-2.050 -0.85
US	-0.0964 -0.09	-1.5016 -0.31		0.4242 0.35
EU	0.3618 0.35	-2.0539 -0.45		1.2787 1.20
Marketsize	-1.0138 -1.15	-0.3314 -0.22		-0.9388 -1.22
Network	-0.6830 -0.93	-3.1934 -1.51		-0.3735 -0.49
Monti	0.7423 0.90	-1.1926 -0.59		0.6108 0.87
Counter		-1.6638 -0.91	-1.7697 -1.12	
Entrybarriers		<b>3.9204</b> * 1.69	<b>3.0876</b> ** 2.00	
Collusion		<b>8.4093</b> ** 1.96	<b>4.5297</b> *** 2.72	
_cons	<b>-2.4326</b> ** -2.36	-4.2639 -0.94	<b>-4.6418</b> *** -3.28	-1.8747 -1.74
Pseudo R2	0.5503	0.8189	0.7482	0.4945
<b>% of Correct Predictions</b>	<b>89.29</b>	<b>94.05</b>	<b>89.29</b>	<b>89.29</b>

\*, \*\*, \*\*\* Significant at the 10-, 5- and 1-% levels

The numbers below each coefficient are the t-values based on robust standard errors

We use only the discrete measures of market shares, since the continuous variable *Marketshare* seemed to cause heteroscedasticity. In regression 4, the market share variables were interacted with *Dmarketshare*.

In the first and fourth regressions, we use market-share variables and “political” variables, since these represent the type of information most likely to be available at the time the decision was

made.<sup>22</sup> In the first regression all market share variables are significant at least at the 5-% level and have the expected sign. For market shares between 31 and 50 % the odds of initiating a phase 2 investigating is 16 times higher than for market shares below 30 %.<sup>23</sup> When market shares are above 50 % the odds of further investigation is 73 times higher. For an increase in market shares of 1 percentage point the odds of a phase 2 initiation increases by a factor of 1.1.

In the fourth regression market share variables are significant at the 1-% level. The odds of blocking a case increase with a factor of 1.28 and 1.48 from a 1-percentage point increase in the combined market share at the levels 31-50 % and 51-100 % respectively. Interestingly, the probability of further investigations does not appear to depend on the size of the relevant geographical market, the merging parties' nationality or industry affiliation, or the identity of the commissioner.

In the second regression three additional variables are introduced: *Counter*, *Entrybarriers* and *Collusion*. The above result changes slightly so that *Dmarketshare* no longer is significant. As before none of the political variables are significant. Two of the three additional variables, *Entrybarriers* and *Collusion*, are significant at least at the 10-% level and have the expected sign. The two variables have large impact on the dependent variable and including them in the regression also increases the impact of the market share variables. The odds ratios turn out to be very large. The odds of a phase 2 investigation when the Commission suspects post-merger collective dominance is 4000 times higher than if there is no such suspicion. These extreme results carry through to the third regression where political variables are not included.

However, we have a missing-value problem that may make the parameter estimates biased upwards. The existence of high entry barriers or of a large risk for collusion can sometimes be established only after a thorough investigation. This means that given that there exists, e.g., high entry barriers, it is more likely that this will be reported by the Commission after a phase 2 investigation than after a phase 1 investigation. When we coded the data, we assumed that when entry barriers are not discussed, then the Commission is of the opinion that entry barriers are *not* particularly high. This may be a reasonable assumption for cases that have undergone a phase 2 investigation, but may be less reasonable for cases where there were only phase 1 investigations. Hence, there may be some phase 1 cases where the entry barriers were indeed high, but where we erroneously coded this as low entry barriers. This, in turn, will increase the apparent correlation between entry barriers and phase 2 investigations. Furthermore, since the three variables introduced in regression 2 and 3 are fairly subjective, there exists of course a temptation for the Commission to claim that the entry barriers are high, et cetera, when it has already decided to make a phase 2 investigation.

Approximately 90 % of the cases are correctly classified, in aggregate as well as for the negative and positive decisions separately.

---

<sup>22</sup> The variable *Smalldom* used in these regressions is an interaction of the dummies *Small* and *Domestic*.

<sup>23</sup> The odds of having one event occurring versus not occurring can be calculated by taking the exponent of the relevant estimate. See Liao (1994).

*The decision to allow or prohibit mergers*

In the analysis of the decision to allow or prohibit mergers, we were in principle able to use all variables. The estimation results for four alternative specifications are provided in Table 4.

**Table 4.** Estimation results for the decision to allow or prohibit mergers.

Dependent Variable: 8(3) cases	Estimated Coefficients		
	1	2	3
Dmarketshare			<b>0.0933</b> ** 2.05
[51-75]			<b>2.0389</b> ** 1.93
[76-100]			0.4481 0.33
[31-50]*Dmarketshare	<b>0.1347</b> * 1.90	0.1791 1.40	
[51-75]*Dmarketshare	<b>0.1478</b> ** 1.93	0.2064 1.46	
[76-100]*Dmarketshare	<b>0.0950</b> *** 2.81	<b>0.1166</b> *** 2.74	
Smalldom		-0.5792 -0.39	
US		0.4763 0.26	
EU		1.5636 0.67	
Marketsize		-0.7687 -0.55	
Network		0.0539 0.04	
Monti		-1.2312 -1.42	
Entrybarriers	<b>2.3132</b> * 1.67	<b>2.5200</b> ** 2.39	1.8224 1.29
Collusion	0.3352 0.30	0.1905 0.21	0.6945 0.61
Worldleader	2.9457 1.53	2.9817 1.43	<b>3.2375</b> * 1.63
Undertakings	-2.8367 -1.35	-2.9596 -1.11	-2.6115 -1.54
_cons	<b>-4.7317</b> *** -4.12	<b>-5.4180</b> ** -2.23	<b>-5.1331</b> *** -6.56
Pseudo R2	0.5682	0.5911	0.5686
<b>% of Correct Predictions</b>	<b>90.48</b>	<b>92.86</b>	<b>91.86</b>

\*, \*\*, \*\*\* Significant at the 10-, 5-, and 1-% levels  
The numbers below each coefficient are the t-values based on robust standard errors

For the same reason as above we use discrete measures of market shares. In the first two regressions the market share variables are interacted with *Dmarketshare* and in the last regression *Dmarketshare* and dummies for market shares are used separately. We were not able to use the dummy for market shares between 31 and 50 % because of collinearity.

All parameters related to market shares have the expected sign. In the first regression all market share estimates are significant at least at the 10-% level. A merger is more likely to be blocked if the market share increases at market share levels above 30-%. At these levels the odds that a merger is blocked increase by a factor of 1.1-1.6 from an increase in the combined market of 1 percentage point. In addition one of the three qualitative variables included, *Entrybarriers*, is significant at the same level of significance and have the expected sign. The odds of a case being blocked are 10 times higher if the Commission consider there to be entry barriers.

This result does not fully carry through to the second regression where also the six “political” variables are included. A market share increase at the highest level of combined market share is significant at the 5-% level, as well as *Entrybarriers*. However, we do not get significance for either of the lower levels of market shares. Neither are any of the political variables, such as the commissioner variable *Monti* or the variable *Marketsize*, significant.

An alternative specification of the first regression is presented as regression number three. Here, *Dmarketshare* is included separately and is significant at the 5-% level. So is also the dummy for market shares between 51 and 75 %. The odds of blocking a merger within this range of market shares is almost 8 times higher than for market shares less than 50 %. The odds that a merger is blocked increase by a factor of 1.1 from a 1-percentage point increase in the combined market share. *Entrybarriers* is no longer significant but instead *Worldleader* is, at the 10-% level of significance.

Again, the model accurately predicts about 90 % of the decision. However, the fraction of correctly predicted prohibitions lies in the 60-70 % range.<sup>24</sup>

## 8. Conclusions

When empirically analysing the EU Commission’s merger decisions, we find no indication that the Commission allows political aspects to influence its decisions. In particular, we cannot find that the nationality of the merging firms has any effect on the probability of a merger being subjected to a phase 2 analysis or being prohibited, neither do we find any significant effect of the change of commissioners that occurred in mid-1999. A similar finding was reported by Khemani and Shapiro (1993) for merger decisions under the Canadian competition rules. In contrast, Coate and McChesney (1992) report that political pressure from the Congress influenced merger decisions by the FTC, under the US rules, while Weir (1992, 1993) found that hostile mergers were more likely to be blocked by the UK Monopolies and Merger Commission.

Although the contrast between the decisions made by the EU Commission, on the one hand, and

---

<sup>24</sup> One of the decisions where the prediction was wrong was the controversial *Airtour/First Choice* decision, subsequently reversed by the CFI.



the decisions made by FTC and MMC, on the other, is interesting, its importance should not be exaggerated. The US and UK data used in the previous studies are approximately ten years older than our data and legal practice in both these countries have undergone important changes since the beginning of the 1990s. Furthermore, we cannot rule out the possibility that the EU Commission has discriminated against, e.g., firms from certain types of countries. Theoretically, the Commission could tend to delineate narrower markets, and hence exaggerate market shares rather than blocking mergers at lower market shares. Similarly, it could use lower standards for claiming that entry barriers were high, rather than admitting that entry barriers were low or moderate.

We find that the decisions appear to be influenced by variables that, according to economic theory, are related to a merger's welfare effects. In particular, higher post-merger market shares increase the risk of the Commission making a phase-2 analysis, as well as the risk of the merger being prohibited. Furthermore, if the merger involves a world leader (or super-dominant) and if entry barriers are high, it is more likely that the merger will be prohibited.

Finally, an interesting conclusion is that it is possible to make relatively good predictions of the Commission's decisions, using variables that are at least potentially available to outsiders, as well as to the firms themselves. This is interesting, since a predictable legal process is in itself desirable. However, the above findings cannot be interpreted as suggesting that the Commission has made the *right* decisions in the past, an issue we believe can only be evaluated on a case-by-case basis. An important caveat is also that our findings are based on information provided in documents written by the Commission itself. In many cases, this information consists of subjective judgments on issues such as the importance of entry barriers, countervailing market power, *et cetera*.

## References

- Amemiya, Takeshi, 1985, *Advanced Econometrics*, Harvard University Press, Cambridge, Ma.
- Carlsson, Kenny, Erik Söderlind and Magnus Ulriksson, 1999, *Konkurrenslagen. En kommentar*. (In Swedish), Norstedts, Stockholm.
- Coate, Malcolm B. and Fred s. McChesney, 1992, Enforcement of the U.S. Merger Guidelines. Empirical Evidence an FTC Enforcement of the Merger Guidelines, *Economic Enquiry*, 20, 277-293.
- Davidson, Russel and James G. MacKinnon, 1993, *Estimation and Inferences in Econometrics*, Oxford University Press, Oxford.
- Davies, Stephen W., Nigel L. Driffield and Roger Clarke, 1999, Monopoly in the UK: What Determines Whether the MMC Finds Against the Investigated Firms?, *Journal of Industrial Economics*, 47, 263-283.
- Farrell, Joseph and Carl Shapiro, 1990, Horizontal Mergers: An Equilibrium Analysis, *American Economic Review*, 80, 107-126.

Ghosal, Vivek and Joseph Gallo, 2001, The Cyclical Behavior of the Department of Justice's Antitrust Enforcement Activity, *International Journal of Industrial Organization*, 19, 27-54.

Horn, Henrik and Johan Stennek, 2002, EU Merger Control and Small Member State Interests, in *The Pros and Cons of Merger Control*, The Swedish Competition Authority, Stockholm.

Ilzkovitz, Fabienne and Roderick Meiklejohn, 2001, European Merger Control: Do We Need an Efficiency Defence, in *The Efficiency Defence and the European System of Merger Control*, *European Economy*, 5, 2001.

Khemani, R.S. and D.M. Shapiro, 1993, An Empirical Analysis of Canadian Merger Policy, *Journal of Industrial Economics*, 41, 161-177.

Korah, Valentine, 1997, *An Introduction to E.C. Competition Law and Practice*, 6<sup>th</sup> edition, Hart Publishing, Oxford.

Liao, T.F., 1994, *Interpreting Probability Models: Logit, Probit and Other Generalized Linear Models*, Sage University Paper Series on Quantitative Applications in the Social Sciences, series no. 07-101, Thousand Oaks, CA, Sage

Manne, Henry G., 1965, Mergers and the Market for Corporate Control, *Journal of Political Economy*, 73, 110-120.

McCullagh P. and J.A. Nelder, 1989, *Generalized Linear Models*, Chapman & Hall/CRC, London. 2<sup>nd</sup> edition.

McFadden, Daniel, 1975, The Revealed Preferences of a Government Bureaucracy: Theory, *Bell Journal of Economics*, 6, 401-416.

McFadden, Daniel, 1976, The Revealed Preferences of a Government Bureaucracy: Empirical Evidence, *Bell Journal of Economics*, 7, 55-72.

Nilssen, Tore, 1997, On the Consistency of Merger Policy, *Journal of Industrial Economics*, 45, 89-100.

Posner, Richard, 1979, A Statistical Study of Antitrust Enforcement, *Journal of Law and Economics*, 13, 365-419.

Röller, Lars-Henrik and Damien Neven, 2002, Discrepancies between Markets and Regulators: An analysis of the First Ten Years of EU Merger Control, in *The Pros and Cons of Merger Control*, The Swedish Competition Authority, Stockholm.

Röller, Lars-Henrik, Johan Stennek and Frank Verboven, 2001, Efficiency Gains from Mergers, in *The Efficiency Defence and the European System of Merger Control*, *European Economy*, 5, 2001.

Stennek, Johan and Frank Verboven, 2001, Merger Control and Enterprise Competitiveness: Empirical Analyses and Policy Recommendations, in *The Efficiency Defence and the European System of Merger Control*, *European Economy*, 5, 2001.

Weir, Charlie, 1992, Monopolies and Merger Commission, Merger Reports and the Public Interest: A Probit Analysis, *Applied Economics*, 24, 27-32.

Weir, Charlie, 1993, Merger Policy and Competition: An Analysis of the Monopolies and Merger Commission's Decisions, *Applied Economics*, 25, 57-66.

Werden, Gregory and Luke Froeb, 1994, The Effects of Mergers in Differentiated Products Industries: Logit Demand and Merger Policy, *Journal of Law, Economics, and Organization*, 10, 407-426.