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Causes and Consequences of Merger Waves

by

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Abstract

This paper presents some ideas about determinants of merger waves and some evidence on their effect on profitability and employment. A brief survey of previous merger waves and an analysis of the recent one give support to the hypothesis that sectoral shocks are at the root of merger waves. Deregulation and globalization are identified as the shocks responsible for the latest wave. The impact of merger activities on profitability and employment growth are studied by using the DOME database which has been built up at the Kiel Institute of World Economics. On average, performance of merging and non-merging firms do not differ significantly. In smaller, more homogenous sub-samples, however, substantial sectoral differences are found. The most important determinant of the success of mergers is the size of the target unit.

Keywords: Mergers, Deregulation, Globalization, Event Studies

JEL Classification: G34, L22, F23

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I. Introduction

Merger waves are a challenge not only for stock market traders, but also for economists. Although mergers have attracted a considerable amount of both theoretical and empirical research, the number of unsettled issues still exceeds the number of settled ones. Why do mergers occur in waves? Why do these waves exhibit significant sectoral clusters, and why do these clusters change over time? How do mergers affect the profitability of firms and the development of employment?

This papers presents some pieces of evidence which may contribute to empirically based answers to such questions. For this purpose, Part II presents a brief survey of merger waves over the past century, and it discusses whether the present merger wave differs from previous ones. Part III is concerned with the database which has been established by the Kiel Institute of World economics and which contains data on 1,228 firms which were engaged in merger and acquisition activities since 1990. This database allows to empirically address several hypotheses which are related to the above-raised questions. Part IV of the paper concludes.

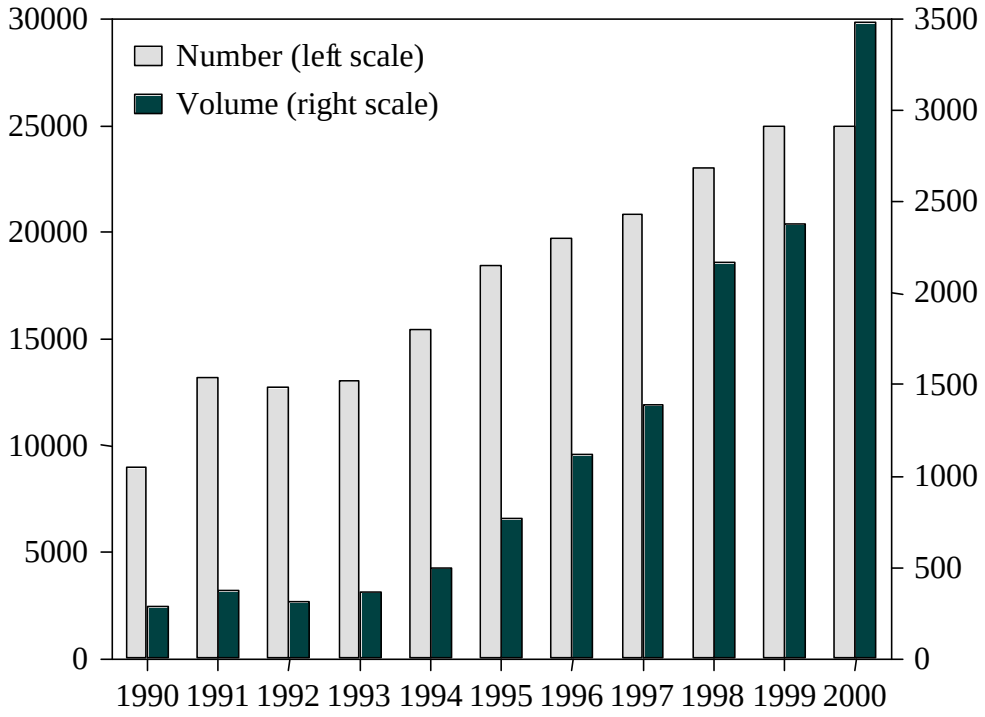
II. Causes of Merger Waves

1. Merger Activities Since the Beginning of the 20th Century

Since the mid-1990s, the world economy has experienced an unprecedented merger wave. The number of worldwide mergers and acquisitions more than tripled between 1990 and 2000, and the transaction volume increased by the factor 12 (Figure 1). The transaction volume has of course been inflated by the speculative bubble at stock markets, because many mergers have been financed

by an exchange of equity.[1] Nevertheless, there seems no doubt that the year 1995 marks the starting point of a considerable merger wave which reached its top in the year 2000 and which has not completely drained away until today.

Figure 1 - Number and Transaction Volume (billion U.S.-$) of World Mergers and Acquisitions



Merger waves are not an entirely new phenomenon. There occurred several merger waves in the past, and each of them was characterized by distinct features. The statistical analysis of the historical development is hampered, however, because systematic statistics on mergers and acquisitions have only been introduced in the recent past on a worldwide scale. For the European Union, for instance, time series start in the late 80s when the common merger control was established. For West Germany, which disposes of a merger control

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[1] In 1999, 36.3 per cent of worldwide cross-border mergers and acquisitions were equity-financed, whereas this share reached a level of only 8.4 per cent in 1990 (UNCTAD 2000, p. 239).

since 1973, time series reach back to the mid-1960s. For longer time series, one has to rely on U.S.-data, where a merger control was established in 1940. In the vicinity of the establishment of a U.S.-merger control, merger statistics were introduced by the end of the 19th century. Taking into account certain structural breaks in these time series, one can identify five more or less distinct waves over the past 100 years (Figure 2):

– The first merger wave occurred from 1897 to 1904. It basically reflected the industrial revolution which enabled the exploitation of high scale economies by the refusion of the steam engine and the emergence of heavy industries. It led to the establishment of large industrial trusts which are still prevalent in the old economy of the United States and elsewhere. Merger activities in those days were mainly horizontal ones. As a political result of this first wave, the Sherman Act and the Clayton Act were passed, which significantly impeded horizontal merger activities which gives rise to undue market power.[2]

– The second wave started around the year 1920 and lasted until 1929. As horizontal mergers had come under the control of government and the courts, this wave was dominated by vertical and conglomerate mergers. New sectoral clusters emerged in railroads and utilities, where the existence of networks opened up new opportunities for exploiting economies of scale.

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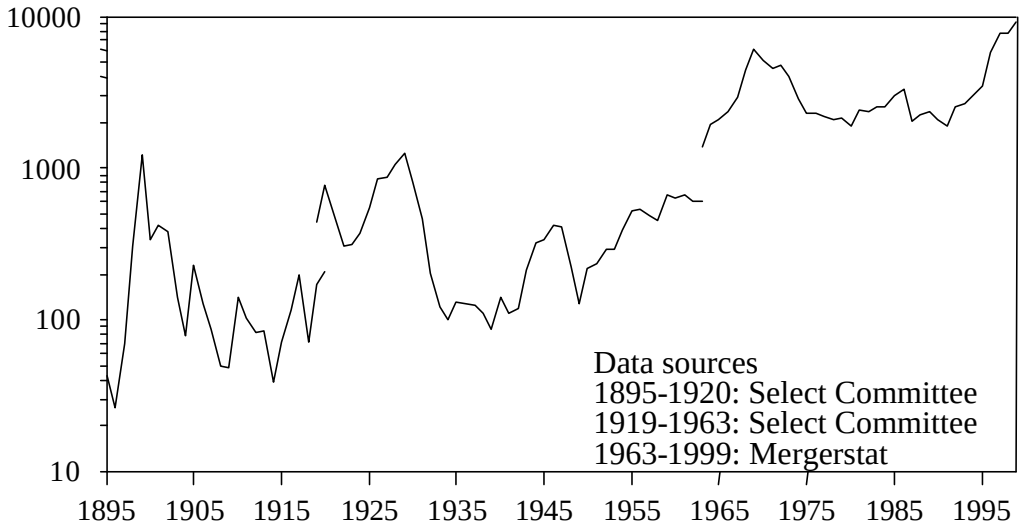
[2] Today's merger control in the United States is mainly based upon the Clayton Act which was enacted in 1914. Already in 1904, however, Section II of the Sherman Act was referred to merger control in the so called Northern Securities Decision by the U.S. courts.

Figure 2 - Merger Waves in the United States (Number of Cases)



— The third merger wave can be identified for the period from 1965 to 1975. It was dominated by the strive for economies of scale by industrial mass production in consumer goods industries, by the diversification of products, and by acquiring firms from other markets. In the course of this wave, Germany introduced a merger control in 1973, and the United States further strengthened their merger control by the Hart-Scott-Rudino Improvement Act of 1976.

— The fourth wave, which occurred from 1984 to 1988 was less distinct in the United States than in Europe where firms tried to prepare for the completion of the Single Market by converting national champions into international or at least European ones. The antitrust policy result of this wave was the EU directive on merger control of the year 1989 (in force since September 21, 1990). The catch-word of this merger wave were the synergies which were expected from melting production activities with related technologies. Correspondingly, the sectoral clusters were in technology-intensive industries.

– The fifth merger wave, which started in 1995 and which still lasts, can be characterized by the catch-words globalization and deregulation. Globalization leads to an extension of markets and firm sizes tend to follow this trend. Deregulation opens up former national monopolies for international competitors, and there are rich opportunities to penetrate foreign markets by cross-border mergers and acquisitions. The antitrust policy result of this wave is the intense debate about global competition rules (Klodt 2001). The most active industries in the current merger wave are those where globalized markets are of particular importance (for instance in the motor car or pharmaceutical industry), and in those industries where deregulation and liberalization significantly changed competition intensity (especially telecommunications and utilities).

As this historical overview demonstrates, merger activities can basically be interpreted as business reactions to a changed environment. These changes may vary and differ over time, but are mostly related to technology changes. The driving forces of merger waves will be further elaborated for the present merger wave in the following section.

II. Sectoral Clusters of Mergers and Acquisitions in the 1990s

Andrade, Mitchell, and Stafford (2001) have conclusively demonstrated that merger and acquisition activities tend to cluster not only over time and by region, but also by industry. The activity of sectors varies between different waves. The five most active sectors during the 1970s, the 1980s, and the 1990s are listed in Table 1.

Table 1 - Top Five Industries Based on Average Annual Merger Activity in the United States

1970s	1980s	1990s
Metal Mining	Oil & Gas	Metal Mining
Real Estate	Textile	Media & Telecom.
Oil & Gas	Misc. Manufacturing	Banking
Apparel	Non-Depository Credit	Real Estate
Machinery	Food	Hotels

Source: Andrade, Mitchell, Stafford (2001).

There is no overlapping between these sectors in the 1980s and the 1990s. The two merger waves of those decades were driven by different industries. Andrade, Mitchell, and Stafford could identify no significant rank correlation across sectors between these two decades. The industry-specific probability of a high merger activity does not increase, therefore, with a high level of activity in a previous period. A similar clustering can also be observed for European mergers and acquisitions. A disaggregation by 60 industries reveals that the five most active ones - insurances, banks, chemicals, machinery, and motor car industry - were responsible for more than 1/3 of all merger cases.

The distinct sectoral clusters point out that sectoral shocks might be at the root of merger waves. For the 1990s, significant sectoral shocks resulted from deregulation. In deregulated industries, the conditions for competition have substantially changed. A second group of industries was strongly exposed to globalization which also alters the nature and intensity of competition. A third group of industries was exposed to stronger competition by reduction of subsidization. Among the first group (deregulation industries) were air transport, road and rail transport, banking and insurance, telecommunications, and

utilities.[3] The second group (globalized industries) consists of chemicals, motor vehicles, and non-electrical and electrical machinery. Among the industries of the third group (reduced subsidization) are European heavy industries, and U.S. defense industries. In all three groups, competition has increased which calls for a considerable restructuring of firms.[4]

One possible reaction to sectoral shocks is an increase of merger and acquisition activities. Mergers may induce market entry or exit, may help to improve the cost efficiency of firms, and may reduce competition pressures by establishing or extending a dominant market position. Industries are hit by sector-specific shocks at different points in time and different intensity which might explain that the sectoral pattern of merger activities changes over time. Sectoral differences may also occur in the intensity of restructuring responses to external shocks. Presumably, adjustment requirements not only result from those external shocks, but also from adjustment activities of other firms within the same industry. If some firms within an industry merge, this may encourage other firms to merge as well. Such a circular causation may lead to distinct sectoral merger waves. Moreover, industries are not independent from each other. The deregulation of telecommunications, for instance, has reduced the costs of transmitting information across long distances which has in turn fostered the process of globalization. Similarly, the deregulation of transport industries has facilitated the worldwide fragmentation of production and the integration of global markets. Therefore, it seems impossible to clearly separate the different sectoral shocks from each other.

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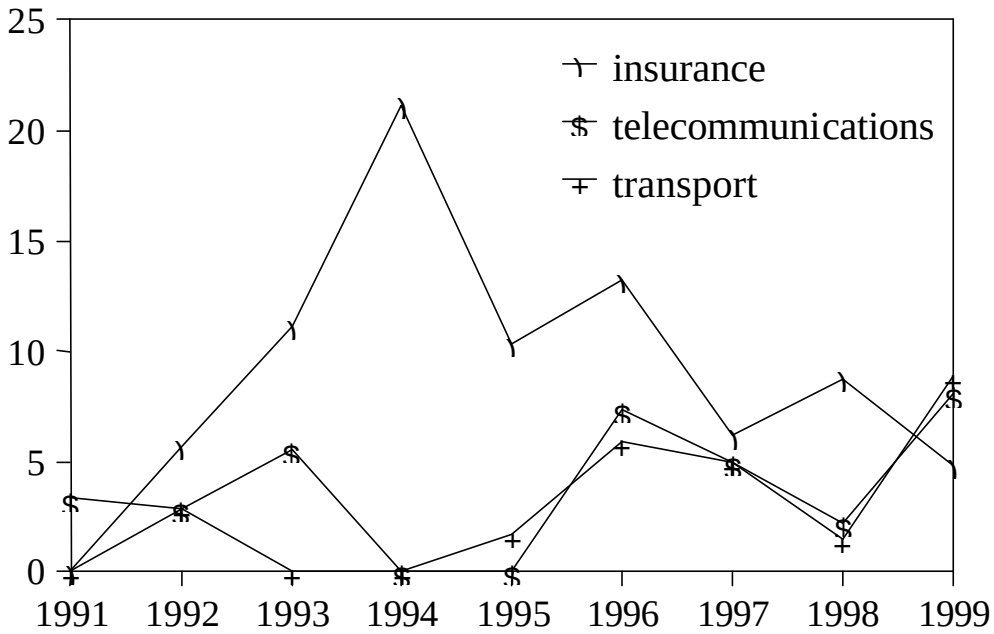
[3] For a survey of deregulation activities in the past decades see OECD (1997).

[4] For a set of indicators about the globalization of the world economy, see Siebert (1999).

a) Deregulation and Merger Activities in Europe

In the course of the creation of a Single European Market, a number of member states was forced to reconsider their traditional regulation policy. Deregulation activities which were strongly supported by the EU Commission, concentrated on network industries, on transport, and on financial markets. A substantial part of the economy within the European Union was re-exposed to market-oriented mechanisms which effectuated severe adjustment requirements. Mergers are one activity among others to cope with these requirements. As Figure 3 demonstrates, this response was actually chosen by a large number of firms in deregulated industries.

Figure 3 - Share of Deregulated Industries in Mergers Notified to the EU (per cent)



The strong increase of mergers and acquisitions in insurance can be related to the completion of the Single Market and subsequent reductions of trans-border barriers for insurance companies. The third EU directive on insurance, which was adopted in 1992, shifts responsibilities of surveillance from the country of

destination to the country of origin. The directive on accounting procedures in insurance firms from December 1991 increased international transparency and reduced a number of smaller obstacles to cross-border competition. As a result, former national champions in insurance converted into European champions. About 80 per cent of mergers and acquisitions in these industries involved firms from different countries in the 1990s.

The strong increase of merger activities in telecommunication and transport can be traced back to deregulation, privatization, and the abolition of state monopolies. The strong increase of the volume of total merger activities in the second half of the 1990s was mainly driven by telecommunication. The six largest mergers in this industry which were notified to the European Commission up to 1999 accounted 233.8 billion U.S.-$ which equals about 7 per cent of the worldwide transaction volume. This number even exclude the acquisition of Mannesmann by Vodafone which took place in the year 2000. The strong increase of mergers in transport industries in 1999 was almost exclusively driven by merger activities of former state-owned postal service monopolies: six out of eleven majority acquisitions can attributed to such firms.

b) Globalization and Merger Activities in Europe

As stated above, globalization is the second major source of increased merger activities in the 1990s. This applies not only to typical globalization industries such as chemicals, motor vehicles, and non-electrical and electrical machinery, but increasingly also to certain service industries such as retail trade, banking, and business services, In addition, privatization of state-owned monopolies has enabled the respective firms to take part in international merger activities which had been prevented by government rules in the past. As a result of a dominant impact of globalization, the share of cross-border activities accounts for one

quarter up to one third of the total transaction volume in worldwide mergers and acquisitions. Moreover, increased competition from globalization may also be responsible for national merger activities because it also alters competition intensity in national markets. Many national mergers in the European banking sector, for instance, can be explained by increased competition intensity in their international environment.

The rising importance of mergers and acquisitions in the process of globalization also shows up in the structure in foreign direct investment. Until the mid-1990s, cross-border mergers and acquisitions accounted for about 50 per cent of total FDI outflows, whereas this share significantly increased in the most recent years. In 1999, a ratio of cross-border mergers and acquisitions to foreign direct investment increased to a level of 84 per cent, and in the year 2000 it reached almost 100 per cent (M&As: 1144 billion U.S-$; FDI outflows: 1150 billion U.S.-$). Although these two data series are based on different statistical sources (merger data are calculated from balance sheets, whereas FDI flows are mainly derived from balance-of-payments statistics), this development demonstrates that mergers and acquisitions have become a dominant strategy in adopting the pressures of globalization (Figure 4).

European firms were highly active in cross-border merger activities both on the acquiring and on the selling side. They did not only engage in intra-European mergers. Hence, the increase of European merger activities cannot exclusively be explained as a result of the completion of the European Single Market. The share of intra-European mergers remained rather stable since the early 1990s, whereas the share of mergers of third countries increased (Table 2).

Figure 4 - World FDI Outflows and Cross-Border Mergers and Acquisitions (billion U.S.-$)

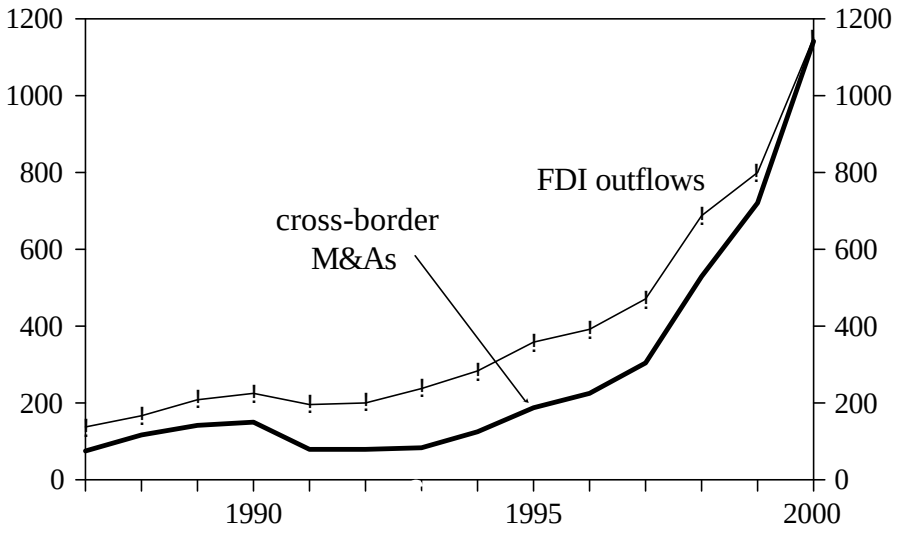


Table 2 - Merger and Acquisition Activities of European Firms by Region (per cent)

Year	National	Intra-EU	International EU acquirer	International EU Target	Total Number
1987	71.6	9.6	4.4	14.5	2775
1988	65.9	13.5	4.3	16.2	4242
1989	63.2	19.1	7.6	10.1	6945
1990	60.7	21.5	7.9	9.9	7003
1991	66.4	17.9	7.8	7.9	6607
1992	65.0	16.6	10.0	8.4	6005
1993	63.4	15.9	10.8	9.8	5740
1994	62.9	15.1	12.2	9.8	6334
1995	59.5	16.5	11.5	12.5	6810
1996	55.7	17.4	13.0	13.9	6327
1997	52.3	17.4	16.0	14.2	7097
1998(a)	50.1	16.5	17.1	16.3	7600

(a) Estimate

Source: European Commission (1999, Tables 1 and 2).

All in all, it can be concluded that the current merger wave is mainly driven by a rising intensity of competition on world markets due to deregulation and globalization. In the following section, the focus is shifted towards the effects of these activities on profitability and employment of participating firms. In addition, the level of aggregation is shifted from the macro to the micro view.

III. Consequences of Merger Waves

1. DOME: The Merger Data Base

For analyzing the consequences of merger activities, a database was established which consists of individual company data related to merger activities in the 1990s. The individual cases exhibit substantial differences which may rest upon national or sectoral features or on firm-specific features. Mergers in globalizing industries tend to follow rather different rules than mergers in deregulated industries or in privatized former state monopolies. U.S. or British firms, which are traditionally stronger engaged in merger activities, are facing different conditions than firms from continental Europe where merger activities have been of minor importance in previous decades. Finally, the features of cross-border mergers differ from the features of national ones.

Differences can also result from the underlying motive of the merger. Mergers which aim at the exploitation of increased market power show different characteristics and consequences than, for instance, mergers which intend to streamline production after a “war of attrition”. Mergers which are brought forward to make use of economies of scale are different again. They can roughly be divided according to the kind of scale economies: those might occur in production as in chemical processes, where put-through is important, or in the joint non-rivalry use of headquarter services as research and development or maintenance of a brand name. Furthermore, mergers which aim at market entry

may differ from those which aim at market exit, especially if the merger precedes bankruptcy of a company.

Mergers, especially mega-mergers, change the market structure. The new emerging structure after one merger is not necessarily stable. A merger of two companies in an industry is likely to induce reaction of other companies in this industry, which might include other mergers. A competitor could regard it advantageous to merge with a third company or with the new company emerged from the merger. There are theoretical explanations for offensive merger waves (Horn and Person 1996) as well as defensive ones (Schenk 1996). The term offensive refers to merger decisions based on profit maximization, the term defensive to those driven by risk minimization.

In the face of such differences, we should expect large heterogeneity in the merger cases in the 1990s. We search for regularities and relationships on the micro-level by employing our “Database On Mergers in Europe” (DOME), which was compiled for this purpose and which is based upon mergers which have been under investigation by the European commission. According to the Council Regulation (EEC) of 21 December 1989 on the control of concentrations between undertakings, the European Commission is responsible for the investigation of all merger cases with Community dimension. According to the regulation a concentration has Community dimension, if

– the aggregate worldwide turnover of all the undertakings concerned is more than Euro 5 000 million, and

– the aggregate Community-wide turnover of each of at least two of the undertakings concerned is more than Euro 250 million, unless

– each of the undertakings concerned achieves more than two-thirds of its

aggregate Community-wide turnover within one and the same member state.

Since the European Commission investigates also mergers in third countries for their effect on competition in Europe on the basis of the effects doctrine, we believe that our database includes nearly all mega mergers in the analyzed time period.

The Council Regulation came into force on September 21st 1990. Since then up to July 2001 the Commission received 1782 notifications of mergers for examination. These include majority ownership cases, joint ventures and minority ownership cases of larger shares. The analyses presented in this paper focus on majority ownership cases taken from the DOME database.

The DOME database of the Kiel Institute of World Economics contains the merger cases which have been under examination of the European Commission. Presently, DOME holds information about 1123 of the 1228 decisions, which were released by the Commission until December 31st 1999. It includes the date of notification of the intended transaction, the name, the country and the sectoral affiliation of the buyer, the target and the transferred unit as well as the value of the transaction (if available). Furthermore a qualification for the kind of merger (majority ownership, joint ventures and minority ownership) is given. Some additional information about majority ownership cases are added: (i) capital profitability of the buyer before and after the transaction relative to a sectoral average and (ii) employment effects. This information is derived from the Worldscope Database. Finally, some explanatory notes are added to every merger case.

The two criteria of the success of a merger (the capital profitability of the acquiring company before and after the merger relative to the sector and employment growth of the buyer before and after a merger relative to the

development of the employment in the sector) can only be provided for majority ownership cases. For minority ownership cases it is unclear how strong the influence of the buyer's management is on target's management. It might be only a capital investment. Joint ventures of two companies do not report own unconsolidated balance sheets which makes it impossible to value capital profitability and employment effects. Majority ownership cases, however, can be analyzed.

Especially for the target a merger is a very incisive event. A new management and the integration in other decision and control processes imply many changes. But also for the buyer, a merger does not come without any change. At least partly, this should be reflected in the balance sheet. For this analysis, we compared the capital profitability of the buyer before and after the merger. Capital profitability has been calculated as ratio of profits before taxes and interests and the capital employed. For companies of the financial sector (banks, investment banks, insurances) equity capital and reserves has been used instead of capital employed, since those firms often do not report capital employed. In order to control for other (for instance cyclical) effects, which could influence the comparison at two points in time, capital profitability is calculated relative to the sectoral average.

Given the problematic employment situation in various European countries, mergers are often discerned with regards to their employment effects. To give this debate an empirical basis, the number of employees of the buyer before and after the merger have been included in absolute terms as well as in comparison to the sectoral average. As with capital profitability the truly interesting comparison (what would have been without merger) can only be approximated but not be completely reflected.

In order to evaluate the success of mergers, a binominal test has been executed, which tests whether the successes of the mergers in our sample differ statistically significant from 0.5, the a-priori probability of success, given the two possibilities: success (performance improved) or failure (performance worsened).

$$Z = \frac{M - \frac{1}{2}n}{\frac{1}{2}\sqrt{n}}$$

M gives the number of improvements in capital profitability or employment growth after a merger, *n* is the sample size. The test is a t-test with the t-test statistic for the critical values.

Furthermore, we compared the averages of pre-merger and past-merger profitability and employment growth which allow to assess the (average) change induced by the merger on these success measures. Following Ravenscraft und Scherer (1989), these changes have been controlled for sectoral effects by subtracting the sectoral average profitability or employment growth rate from the ones of the individual company analyzed.

2. The Sample

Among the 1123 decisions of the European commission, which are included in DOME and compose the original sample, there are 625 majority ownership cases. 367 of these took place between 1990 (the start of the EU-wide merger control) and the end of 1997, the end point of this analysis. We choose 1997 as the end year, because the comparison of profitability and employment growth is based on three-year averages to control for cyclical and singular effects and to make sure that most effects of the mergers are included in the three-year period after the merger. The last balance sheet reports are only available for the year

2000. Thus, in order to ensure a three-year comparison period, the merger must have been completed in 1997 at the latest.

However, not all of the majority ownership cases could be included in the sample of our analysis. Some of the companies were too active in the period under study. If one merger is followed very soon by another merger of the same company it is impossible to separate the effects. Shell, for instance, was involved in 9 merger cases between 1990 and 1997, either as buyer or as target. Because we use the three-year comparison the effects of different mergers superpose each other. Rhône-Poulenc was similarly active in the merger market in this period. Because the effects of the individual events could not be separated, we had to exclude these firms from our sample.

Mergers of individual firms in two successive years have been consolidated to one single event. These cases include the acquisitions of Volvo in 1992 and 1993, and of Assicurazioni Generali, Jefferson Smurfit, and Ingersoll in Rand 1994 and 1995.

Another group of mergers could not be analyzed, because they were carried out by firms which have ceased to exist as independent entities in the meantime. They are excluded from the Worldscope Database, which provides us with the balance sheet information. Thus, no profitability or employment growth could be calculated. In the Worldscope Database, information on the buyer is found, but target information is not included. Daimler Benz balance sheet figures from before 1998 can still be found under DaimlerChrysler, whereas Chrysler balance sheet information is not available any more. This is relevant for firms which acquired another firm between 1990 and 1997 and became the target of a merger later on. For this reason, the mergers of Winterthur, UAP or LucasVarity, for instance, could not be studied.

As said above, the analyzed sample contains mergers from 1990 through 1997. The DOME database provides 653 cases, which have been examined by the commission until the end of 1997. 367 of those have been majority ownership cases, the remaining minority ownership cases and joint ventures were excluded. Some mergers had to be excluded due to the lack of data or because the firm undertaking the mergers have been too active. This reduces the sample to 196 cases. Table 4 gives some descriptive statistics of the sample of the buyers in the merger cases analyzed.

Table 4 - Analyzed Sample of Merger Cases 1990–97 (n = 196)

Growth in capital employed		Number of cases with negative growth of capital employed: 32
Median	0.19	
Mean	0.27	Number of cases with capital growth >1: 12
Standard deviation	0.47	
Largest growth	2.61	(Suez Lyonnaise des Eaux 1997)
Smallest growth	-0.41	(Imperial Chemical Industries 1997)

Source: DOME.

The average growth in capital employed in the analyzed merger cases amounts to 27% with a very high variance. The growth, therefore, is not different from zero statistically. That results from the use of the annual balance sheet data, which does not allow to separate events, which occur within one year, from each other. The large growth of Suez Lyonnaise des Eaux, for instance, resulted from the merger of Suez and Lyonnaise des Eaux and the acquisition of Browning-Ferris Industries by the newly merged entity in 1997. The remarkable decrease of ICI's capital employed in 1997 results from the acquisition of the special chemicals division from Unilever and the selling of its fertilizer business unit to Terra and its polyester and titanium dioxide businesses to DuPont. On the one hand, these intense activities complicate the analysis of the merger activities, on

the other hand, it has been exactly this kind of restructuring process, which has driven the impressive merger wave in the second half of the 1990s.

3. The Analysis

The changes of profitability and growth in employment resulting from mergers are given in Table 5. In 88 out of 196 cases the merger could be regarded as success if measured by change in the profitability relative to the sectoral average. The performance of a majority of firms has deteriorated relative to the sector it was compared to. Using the binominal test, however, this result is however statistically not different from the a-priori probability of success of 0.5. The same holds if the growth in employment is taken as success measure. According to this sample, a merger is not related to a cut in employment. That can also be seen using the mean. Although the sign of the mean of employment growth relative to the sectoral average changes from positive to negative, due to the high standard deviation this is not distinguishable from a random development. The mean of the profitability relative to the sector changes its sign as well. From a relative (but insignificant) better profitability before the merger it changes to a relative (but also insignificant) worse profitability after the merger. Changes in profitability and employment growth are (insignificantly) positively related. The correlation coefficient is 0.03, the critical value 0.14. According to this study, employment reduction is not a characteristic of a successful (profitable) merger.

The large heterogeneity in the micro-data makes an evaluation of the effect of mergers on companies' performance in terms profitability and employment growth rather difficult. Therefore, we form smaller, more homogenous sub-samples to extract additional information. We start with the differentiation of the

Table 5 - Profitability and Employment Growth Changes of Acquiring Companies in a Merger

Profitability			Employment Growth		
	before	after		before	after
Profitability better than sectoral average (Number)	100	96	Employment growth better than sectoral average (Number)	80	71
Profitability worse than sectoral average (Number)	96	100	Employment growth worse than sectoral average (Number)	81	89
Profitability relative to the sectoral average			Employment growth relative to the sectoral average		
Median (% points)	0.10	-0.31	Median (% points)	-0.22	-1.95
Mean (% points)	1.05	-0.08	Mean (% points)	0.64	-1.65
Standard deviation	8.20	10.49	Standard deviation	27.34	25.49
Changes in profitability relative to the sectoral average (Number)			Changes in employment growth relative to the sectoral average (Number)		
Improvements		88	Improvements		74
Deteriorations		108	Deteriorations		86

Source: DOME, own calculations.

sample with regards to the growth of capital employed by the merger. We think of this as a measure for the size of the target company or business unit. It is calculated as growth rate of the capital employed between the year prior to the merger and the year after the merger and is depicted with O (O=(empl. Cap_{t+1}- empl. Cap_{t-1})/ empl. Cap_{t-1}). The effects of relative size of the target on the buyer's performance are given in Table 6.

The results are clear-cut. The larger the acquired entity relative to the buyer the worse the success of the merger in terms of profitability and employment growth. Here we only discuss the effect on profitability. The best results are achieved by those companies of which the capital actually fell in the period around the merger. These companies not only acquired another unit but also sold off some of their business units in the refocus and restructuring process. These

Table 6 - Effect of Relative Size of the Target on Profitability and Employment Growth in Mega Mergers

Profitability	O <0	O >0	0< O <0.5	0.5< O <1	O > 1
Number	31	164	128	24	12
Improvements	20	68	59	9	1
Deteriorations	11	96	69	15	11
Ratio	1.82	0.71	0.86	0.60	0.09
Z-Statistic	1.62	-2.19**	-0.88	-1.22	-2.89***
Mean before merger	-1.40 (-0.26)	1.53 (0.18)	0.95 (0.12)	1.77 (0.16)	7.29 (0.98)
Mean after merger	0.05 (0.006)	0.43 (0.05)	0.80 (0.1)	-2.62 (-0.27)	2.45 (0.35)
Mean difference	1.45 (0.2)	-1.1 (-0.2)	-0.14 (-0.02)	-4.39 (-0.33)	-4.85 (-1.16)
Employment growth	**O <0**	**O >0**	**0< O <0.5**	**0.5< O <1**	**O > 1**
Number	26	128	96	22	10
Improvements	13	55	44	8	3
Deteriorations	13	73	52	14	7
Ratio	1.00	0.75	0.85	0.57	0.43
Z-Statistic	0	-1.59	0.82	-1.34	-1.21
Mean before merger	-11.6 (-0.46)	2.76 (0.09)	0.89 (0.04)	10.9 (0.23)	3.28 (0.06)
Mean after merger	-5.99 (-0.20)	-0.54 (-0.1)	0.28 (0.01)	0.33 (0.01)	-10.7 (0.67)
Mean difference	5.55 (0.14)	-3.58 (-0.1)	-0.50 (-0.01)	-12.4 (-0.27)	-14.0 (-0.31)

*, **, *** significant on the 10%, 5% or 1% level; t-values in parenthesis.

Source: DOME, own calculations.

effects are not separable here, since we stay on firm level and cannot go down to the product line level as Ravenscraft and Scherer did. The last three columns are sub groups of the second column. The last column dominates with its non-ambiguous negative result the two others. All in all, the negative trend of the profitability with increasing relative target size is obvious.

It is interesting to see that Table 6 shows trends in various characteristics. Firstly, the ratio of improvement to deterioration decreases with growing rela-

tive size of the target (1.82; 0.86; 0.60; 0.09). For a company which acquired units that are larger than itself the change in profitability becomes significantly negative. Secondly, prior to the merger profitable companies have faith in their ability to handle (relatively) larger transactions. Thirdly, the post-merger profitability falls with increasing relative size of the target unit. Not only the binominal test, but also the mean difference test shows that only companies with negative growth in capital gain in profitability. With increasing relative size, performance deteriorates. However, the difference in the mean of profitability is not statistically significant even for the group with O>1 (t-value 1.16).

More or less the same can be said about the effect of the absolute size of the target. In our sample there are 31 mergers with a transaction value of more than 1 but less than 5 billion US$. Eleven of them improve their profitability, 20 fail to do so (Table 7). The profitability mean falls after a merger. However, the difference between pre- and post-merger profitability is not significant. Mergers in the group with the very large targets (larger than 5 billion US$), in contrast, show a profitability which deteriorates significantly more often than it improves after the merger. The mean decreases as well, but again this difference is not significant. Interestingly, there seems to be no negative effect of size on employment growth, according to the Z-statistic. The mean of employment growth, however, falls sharply (but not significantly) for mergers which include very large target units. Outliers do not drive this result.

The EU merger control has been put in force to examine mergers with community dimension. Apart from the minimal size of a merger necessary to fall into the responsibility of the EU commission, which was introduced to keep the numbers of cases manageable, there is the other criterion, the two-third rule, which hands mergers over to national authorities if the effects are expected to

Table 7 - Absolute Size (F in Billion US$), Profitability and Employment Growth

	Profitability			Employment Growth		
	full sample	1 < F < 5	F > 5	full sample	1 < F < 5	F > 5
Number	196	31	15	160	28	13
Improvements	88	11	4	74	13	7
Deteriorations	108	20	11	86	15	6
Z-Statistic	-1.43	-1.62	-2.11**	-0.94	-0.38	0.28
Mean before merger	1.05 (0.13)	0.89 (0.15)	-0.18 (-0.02)	0.64 (0.02)	6.46 (-0.22)	4.18 (0.13)
Mean after merger	-0.08 (-0.008)	0.11 (0.03)	-0.74 (-0.16)	-1.65 (-0.07)	-4.41 (0.38)	-5.21 (-0.36)
Mean difference	-1.13 (-0.12)	-0.77 (-0.18)	-0.55 (-0.09)	-2.29 (-0.07)	-10.87 (-0.33)	-9.39 (-0.25)

*, **, *** significant on the 10%, 5% or 1% level; t-values in parenthesis.

Source: DOME, own calculations.

occur almost exclusively in their jurisdiction. Insofar, it is not surprising, that in our sample cross-border transaction are over-represented. 64% of all mergers are cross-border in our sample compared to 25%–30% worldwide.

The companies in our sub samples of national and cross-border mergers do not differ in their mean profitability prior to the merger (Table 8). After the merger, both group's profitability means have fallen — the one of the national merger group a bit more. The ratio of improvements to the total number of mergers is the same in both groups (46%). The picture is different if measured in employment growth. Employment growth of companies involved in national mergers already has been below average prior to the merger. This tendency becomes even more pronounced after the merger. In contrast, companies which engage in cross-border merger grow only little slower than the sectoral average.

Table 8 - Cross-Border versus National Mergers

	Profitability		Employment Growth	
	Cross- Border	National	Cross- Border	National
Number	122	70	105	51
Improvements	56	32	46	23
Deteriorations	66	38	59	28
Z-Statistic	-0.91	-0.72	-1.27	-0.7
Mean before merger	0.98 (0.11)	0.98 (0.13)	1.21 (0.05)	-1.68 (-0.04)
Mean after merger	0.03 (0.003)	-0.70 (-0.08)	-0.77 (-0.04)	-6.31 (-0.27)
Mean difference	-0.94 (-0.09)	-1.68 (-0.19)	-1.98 (-0.07)	-4.63 (-0.1)

*, **, *** significant on the 10%, 5% or 1% level; t-values in parenthesis.

Source: DOME, own calculations.

Consolidation and rationalization in an industry are often carried out by national mergers. Among the ten mergers in the steel and the defense sector, two typical consolidation industries in the 1990s, only three have been cross-border. This share is far below average in our sample. Two of the three cross-border mergers show positive employment effects, just one negative. That is different in the group of the national mergers: one improvement compared to three deteriorations. Employment growth falls by 27% points relative to the sector average, whereas it increases by 5% point in the group of the cross-border mergers.

Consolidation mergers differ from other mergers by increased profitability, while the negative employment growth relative to the sectoral average is especially pronounced (Table 9). Apart from consolidation mergers, only the transport equipment sector and consumer goods (textiles, food and paper) have increasing mean profitability after a merger. The financial sector (banks, insurance companies and investment banks), in some countries a kind of consolidation

Table 9 - Sectoral Differences in Merger Performance

Sector	N	Profitability			Employment Growth		
		Z-Stat.	Mean Difference	t-Value	Z-Stat.	Mean Difference	t-Value
Deregulated Sectors	21	-0.65	-3.23	-0.34	-2.24**	-9.38	-0.37
Consolidation Sectors	10	0.63	1.03	0.18	-0.38	-13.76	-0.29
Finance Sector	37	-1.81*	-3.29	-0.23	-1.41	-18.44	-0.43
Chemicals/Pharmacy	27	0.58	-0.52	0.12	0.69	7.18	0.19
Machinery	18	-0.47	-1.03	-0.11	0	15.61	0.34
Transport Equipment	16	0.5	2.64	0.31	0.53	-0.12	0
Electronics	16	-1.5	-1.21	-0.12	0.9	24.71	0.36
Consumer Goods	18	-0.47	0.83	0.14	0.73	8.58	0.23
Resource-based Sectors	7	-1.13	-5.12	-0.36	-0.82	-2.84	0.09

*, **, *** significant on the 10%, 5% or 1% level; t-values in parenthesis.

Source: DOME, own calculations.

sector as well, and deregulated sectors (telecommunication, airlines, transportation and utilities) show a similar degree of negative employment growth as consolidation industries. Resource-based industries include five oil mergers and one mining and wood merger, respectively.

Whereas the share of cross-border merger is very high in the DOME database, horizontal mergers are under-presented in DOME. One of the features of the recent merger wave is the strong concentration on horizontal mergers. That is only partly reflected in our sample, where only 72% of the analyzed mergers are horizontal mergers. That's in part result of the large size of the mergers in the sample, which always introduces a conglomerate dimension. In contrast to the often-heard opinion, vertical and conglomerate mergers in our sample did not perform worse than horizontal mergers. Regarding profitability they achieved a better performance, but their employment growth after the merger has been less dynamic (Table 10).

Table 10 - Horizontal, Vertical and Conglomerate Mergers

	Profitability		Employment Growth	
	Horizontal	Vertical/Congl.	Horizontal	Vertical/Congl.
Number	139	54	112	42
Improvements	60	26	49	19
Deteriorations	79	28	63	23
Z-Statistic	-1.61	-0.27	-1.32	-0.62
Mean before merger	1.10 (0.12)	0.67 (0.12)	-0.46 (-0.01)	2.14 (0.09)
Mean after merger	-0.49 (-0.04)	0.42 (0.05)	-1.99 (-0.09)	-4.29 (-0.22)
Mean difference	-1,58 (-0.16)	-0.26 (-0.03)	-1.54 (-0.04)	-6.43 (-0.21)

*, **, *** significant on the 10%, 5% or 1% level; t-values in parenthesis.

Source: DOME, own calculations.

IV. Conclusions

The intense merger activity, which started in the mid 1990s, is predominantly driven by deregulation and globalization of various industries. These two causes, coinciding in time, and their interrelation caused the fifth merger wave. The recent wave is characterized by a large share of cross-border mergers and, therefore, is much more international than earlier merger waves. Developments in foreign countries influence the domestic markets to a larger extent. Of similar importance for the recent merger boom are deregulation and privatization activities in various sectors of many countries. Structural adjustments of companies are often achieved by mergers, sell-offs and purchases of business units. A large number of mergers with rather high transaction volumes, have been carried out in recently deregulated sectors. The recent merger wave is, therefore, quite well explained by sector-specific shocks.

As the analysis based on our database has shown sectoral differences can not only be identified with respect to the intensity of merger activities in the second half of the 1990s, but also in the consequences of mergers on profitability and employment growth. On average however, the profitability of the buyer deteriorates insignificantly relative to the sector, and so does employment growth. A better post-merger profitability is positive correlated with a higher post-merger employment growth. Therefore, in general it is not the cut of employment that generates larger profitability in the restructuring following a merger. The largest effect has the size of the target on the merger success. The smaller the growth in capital, the better the post-merger performance.

Cross-border mergers do not substantially differ from national ones. The same result has been found for horizontal mergers versus vertical and conglomerate mergers. Company-specific factors determine widely the success of a merger. As in earlier merger waves, the probability of success does not differ from the one of a coin toss.

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