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Investigating Transatlantic Merger Policy Convergence

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Abstract

We propose a framework to examine convergence in the jurisdictional patterns of the American FTC and the European Commission. Based on a sample of 595 merger cases scrutinized by either of these agencies in the 1995 - 2007 period, we estimate logit models of the probability of intervening in a merger for both jurisdictions and use them to predict the decisions of the respectively other agency. The results point to an increasing harmonization of merger regimes and corroborate the theoretical appraisal, that the 2004 reform of EU merger law constituted a step towards the US system.

JEL Codes: K21, L40

Keywords: Convergence, merger policy, FTC, DG Competition

1. Introduction

The Federal Trade Commission (FTC) and the Directorate General for Competition (DG Competition) are among the most important regulatory authorities in merger control worldwide. Their verdicts on merger cases can shape global markets to a substantial degree and the scope of their jurisdictional competence extends far beyond national (or communal) borders. And yet these two institutions differ greatly in history, method and aim: whereas US merger control - and antitrust in general - looks back on a long history, for the longest part of which it was shaped and developed in the spirit of a pro-competitive doctrine with the goal of ensuring dynamic and efficient market structures,¹ the common European competition authority is a relatively young institution whose goals, like those of its predecessors, are more pluralistic in nature. While ensuring competitive markets features prominently among DG Competition’s objectives,

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issues of market integration, a distinct distrust for concentrated markets and market foreclosure as well as political motives also play a role.\textsuperscript{3}

This article attempts to evaluate empirically if and to what degree convergence of US and European merger policies took place between 1995 and 2007. This time period is a particularly interesting subject for an investigation of this kind, because it includes data prior to and after the 2004 reform of European merger law (ECMR\textsuperscript{04}),\textsuperscript{4} which led to an increased use of economic analysis in merger review (the 'more economic approach') and was interpreted as a step towards US policy (for example Verouden et al. (2004); Coppi and Walker (2004); Bergman et al. (2010b)). The principal research question of this article is whether this perception can be quantitatively substantiated. We address this question by checking for a structural break in the coefficients of the EU model after the coming-into-force of ECMR\textsuperscript{04} and comparing the results of all measures of convergence before and after May 2004.

While the subject of convergence of merger policies has been discussed in great detail from a theoretical point of view by legal and economic scholars as well as practitioners, empirical evidence on the issue is mostly limited to 'casual empiricism' and anecdotal evidence.\textsuperscript{5} The goal of this article is thus to quantitatively reassess the theoretical findings on the convergence of transatlantic merger policies by empirical analysis. To do this, a database containing 595 merger cases scrutinized by the FTC or DG Competition (or, in rare cases, both) during the period from January 1995 to December 2007 has been assembled to investigate whether their jurisdictions have become increasingly similar.

Both the EU Commission and the FTC pursue a consumer welfare standard; thus instead of total welfare the benefit of consumers is the focus of antitrust activity. According to standard oligopoly models, consumers benefit from mergers that increase the degree of competition that prevails in the industry (i.e. procompetitive mergers), while mergers with the opposite effect (anticompetitive mergers) increase producer surplus to the detriment of consumer welfare. Assuming that the competitive impact of a merger on markets can - at least partially - be captured by circumstantial information on the transaction, one would expect two agencies that maximize the same target function to exhibit similar jurisdictional patterns. Thus, while the impact of competition policy on welfare remains unobserved and controversial, the requirement that the Commission and the FTC should reach the same conclusion when investigating the same merger can be regarded as a consistency check of their efforts.


\textsuperscript{4}Commission No 139/2004 of 20 January 2004 on the control of concentrations between undertakings.

\textsuperscript{5}For a recent contribution in a quantitative vein, see Bergman et al. (2010a).
Additionally, consistent jurisdiction based on transparent, economically-motivated analysis reduces the uncertainty firms face when notifying transactions. This is of course also true when a merger is only notified to a single competition authority, but becomes increasingly important when multiple authorities are competent for the transaction. Large mergers are routinely reviewed by both US and EU authorities, increasing the risk of partially approved mergers, i.e., mergers that are cleared by one jurisdiction but not by the other; an outcome that is undesirable from both a business and a political perspective.

Finally and related to the previous point, there are also political rationales and credibility issues to consider: as much as diametrically opposed verdicts on the same subject matter undermine the credibility of the agencies, as much political calamities are they prone to entail.\footnote{A prime example for this and the point relating to partially approved mergers is the attempted GE/Honeywell merger in 2001, which was cleared by US authorities but blocked by the European Commission, resulting in the discontinuation of the merger by the parties and a major political quarrel. \textit{Patterson and Shapiro (2001)} discuss the case and ask: 'In an era of close cooperation and supposed convergence, how did the North American and European antitrust authorities reach diametrically opposed conclusions about the likelihood of anticompetitive effects in a high-profile transaction involving world-wide markets?' An explanation they offer is that 'the divergence exposed in GE/Honeywell is rooted in fundamental substantive and economic differences in doctrine between the United States and EU merger regimes.'}

Merger policy in the US is exercised by the FTC and its sister agency, the Department of Justice (DoJ). The division of merger cases between the two agencies is effected on an (informal) industry basis. Since detailed data on DoJ cases are not publicly available, they cannot be used in the analysis undertaken in this article, which requires in-depth case information. Therefore, this article’s conclusions, strictly speaking, only apply to US merger policy as practiced by the FTC. However, the US Horizontal Merger Guidelines,\footnote{Department of Justice & FTC, Horizontal Merger Guidelines (1992, rev. 1997) and Department of Justice & FTC, Horizontal Merger Guidelines (2010). See Shapiro (2010) for a discussion of the evolution of the US Horizontal Merger Guidelines.} which constitute the basis of the merger assessment by both agencies and offer detailed standard procedures, have been developed and published jointly by the FTC and the DoJ since 1992. Therefore, issues of merger policy convergence within the US are of much lesser concern than tendencies of convergence with different juridical systems. It might thus be argued that the US cases contained in the sample employed here can - at least when contrasted with a system of competition policy, the dissimilarity of which arguably dwarves intra-US discrepancies - be regarded as representative of US merger control.\footnote{Potential biases due to the lack of DoJ data in the sample are addressed econometrically in 5.3 and 5.4.3.}

The findings of this empirical investigation are very much in line with those of the theoretical literature: While there can be no talk of perfect convergence, the progress made in terms of harmonization is substantial. All measures of jurisdictional differences diminish over the sample period. In particular, the 2004 reform of European merger law seems to have been a substantial step
towards US merger policy: when comparing convergence results measured prior to and after ECMR04, we find significant differences in favor of convergence in the post-reform period.

The remainder of this article is structured as follows: Section 2 summarizes the history of policy convergence, reviews the relevant literature and highlights institutional differences between the FTC and the EU Commission, section 3 presents the data, section 4 the methodology employed. Results are presented in section 5. Section 6 concludes.

2. Historical overview and literature

The general notion of policy convergence in competition policy has been a subject of discussion for quite a while now. Scherer (1994, 1997) discusses the general tendency of worldwide competition policy to approach pro-competitive doctrines over the course of the twentieth century. The idea that competition policy should ensure competitive markets seems self-evident from today’s point of view, but at the beginning of the twentieth century only the US was actively prosecuting monopolies and cartels (for example Kovacic and Shapiro (2000)). In Europe and large parts of the rest of the world cartels were thought to dampen the impact of business cycles (for example Audretsch (1989)), while monopolies were deemed necessary to operate on efficient production scales and compete internationally. The change towards a pro-competitive doctrine came about after WW2, in the second half of the last century. In this sense, there has undeniably been a lot of progress in the harmonization of competition law. In this article, however, we take for granted that competition authorities in general (political or other motives aside) pursue the goal of ensuring competitive markets and instead focus on the convergence of their jurisdictional patterns, that is, their decision to intervene in certain mergers and to clear others.

More recent tendencies concerning the convergence and potential conflicts in international competition law are considered in Calvani (2004). Calvani examines the evolution of cooperation among competition authorities in the period from 1990 to 2004, gives examples for areas of convergence and remaining discrepancies and concludes in favor of harmonization. While Niels and Ten Kate (2004) focus on normative differences between the US and the EU approach to competition law (economic vs. legalistic approach, treatment of dominant firms etc.), Coppi and Walker (2004) discuss technical differences in the evaluation of mergers (market definitions, econometric techniques, concentration measures, dominance vs. market power; the perceived 'unilateral effects gap’ of pre-2004 European competition law is discussed in particular depth). Shenefield (2004) argues in a similar vein, highlighting the role of different objectives in US an EU antitrust. All of them concede that while some differences remain, tendencies of 'soft' convergence are undeniable.

Cooper et al. (2005) detect differing views on vertical policy on both sides of the Atlantic: While DG Competition takes vertical agreements very seri-
ously, US agencies have a more lenient regard of them. In contrast, opinions on horizontal combinations (as expressed in the respective 'horizontal merger guidelines': FTC (2010), DG Competition (2004)) seem to be rather similar in both competition authorities (for example Verouden et al. (2004)). Horlick and Meyer (1995) argue that competition policy convergence is especially noticeable in merger control, because it is in the interest of all countries concerned. In other areas of competition policy, for example the regulation of subsidies and tariffs, international consent might be harder to achieve due to conflicting national interests.

The topic of policy convergence is also discussed in the political science literature. Even though this literature focuses mainly on tendencies of global convergence of environmental and labor policies (for example Busch and Joergens (2005)), the driving forces for convergence identified can be assessed with a regard to competition policy. The most frequently cited drivers for policy convergence (for example Dreznner (2001)) are: i) a race-to-bottom (that is, complete deregulation) mechanism fuelled by economic pressure, ii) various forms of institutionalism and iii) an epistemic communities approach. While mechanism i) (a 'race of deregulation' among nations) seems implausible in competition policy, ii) arguably does play a role in the harmonization of global antitrust: institutions like the International Competition Network (ICN) or the World Trade Organization (WTO) certainly have their part in levelling competition policies around the globe. Van Waarden and Drahos (2002) propose, that the epistemic communities approach is most suited for explaining the convergence of competition policies. This approach postulates that the emergence of a community of legally trained officials - with similar epistemic beliefs - provides a channel for the international diffusion of ideas, methods and practices, which - in turn - cause convergence. See Haas (1992) for an introduction to the topic.

2.1. Institutional details

An investigation in transatlantic merger policy convergence warrants a brief discussion of institutional details and differences on both sides of the Atlantic. A more thorough comparison can be found in the more law-focused articles cited in the literature review above.

Both the EU and the US use a system of mandatory merger notification, such that mergers exceeding certain financial thresholds have to be notified before they can be consummated. This threshold is higher in the EU, such that smaller mergers can be delegated to individual member states for investigation. Once

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9To control for this possible area of divergence, the analysis is repeated in a subsample excluding non-horizontal mergers as a robustness check. See section 5.4.1.

10The epistemic communities approach is related to the elite consensus and the world society approaches, which are not discussed separately in this brief overview. Holzinger and Knill (2005) review the causes of policy convergence in the political science literature in greater detail.

11Details on the Commission’s notification threshold can be found in the EC Merger Regulation available at http://ec.europa.eu/competition/mergers/legislation/legislation.html, the
notified, an initial stage of merger review commences: in the US, the merging parties have to comply with a 30 day waiting period (15 days in the case of a cash tender offer) before consummating the transaction, in the EU the phase I investigation lasts up to 25 working days. Most mergers are cleared to proceed at the end of this period.

If at the end of the initial review period the agency has doubts with respect to the competitive impact of the merger, it can initiate a second stage of investigation, called a ‘second request’ in the US and phase II in the EU, providing them with a more generous time frame to conduct a full investigation on the likely effects of the transaction. After the second stage expires, the agency can decide to either unconditionally clear, conditionally clear or block a merger. In the first case the transaction proposed by the merging parties is allowed to proceed without modification. In the second case, the merger is permitted subject to conditions and obligations. This usually involves the divestiture of certain assets or branches (structural remedies) or requirements concerning the future conduct vis à vis competitors (behavioral remedies). If the agency prohibits a merger, the transaction has to be cancelled.

While remedies have to be negotiated with the merging firms by both agencies, the EU Commission can unilaterally decide to block a merger (although this decision can be appealed at the Court of First Instance). The FTC, on the other hand, only authorizes its staff to file a preliminary injunction against the merger, which has to be defended in court. Another notable difference is that the Commission commonly accepts remedies proposed by the merging parties during the phase I investigation while the FTC usually either clears or issues a second request. Still, the differences on an institutional level appear to be limited.

Before May 2004 there were, however, substantial differences in the merger guidelines of the two agencies. Most prominently, in the initial assessment of the market power effects of a combination the FTC tests if a merger will ‘substantially lessen competition’, while the EU tested whether a merger ‘creates or strengthens a dominant position as a result of which effective competition would be significantly impeded’, which obstructed the prosecution of coordinated effects cases. After ECMR04 the relevant question has become whether a merger will ‘significantly impede effective competition’, which allows to prosecute a wider range of cases and is semantically closer to the US criterion. Other changes effected by ECMR04 include the introduction of an efficiency defense clause (which was effectively introduced to US merger guidelines in April 1997), the appointment of a Chief Economist at the head of a team of economists and the issuance of explicit merger guidelines to encourage transparency and consistency in decision making. As was pointed out by several commentators, all of these changes point towards greater coherence with American merger control.

FTC’s current threshold can be looked up at http://www.ftc.gov/bc/hsr/index.shtm.
3. Data

The data used in this analysis were created by combining two datasets on mergers, one containing EU cases, one containing US cases. The EU dataset comprises merger cases handled by DG Competition in the time period from 1991 to 2007. The US dataset contains mergers which were assessed by the FTC between 1995 and 2008. The resulting dataset contains 595 observations, 309 EU and 286 US mergers. Since our analysis aims to achieve a direct comparison of the two agencies, most graphs are restricted to the overlap period 1995-2007, containing observations for both agencies (269 EU and 274 US observations). The logit models and time trend regressions employ all available data.

Information on EU cases was collected from the decisions available on DG Competition’s homepage,\(^{12}\) for the US cases we accessed the news releases and memoranda available on the FTC homepage.\(^{13}\) Going through these documents, we recorded the names of the merging parties, the outcome of the investigation as well as variables summarizing the results of the market investigation conducted.

The Hoover’s\(^{14}\) database was used to determine the primary competitors in each merger case. The companies (merging parties and their competitors from US and EU cases) were then linked to the Thomson Reuters Worldscope database,\(^{15}\) from which additional firm-level data was downloaded. The variables in the dataset are summarized in table 1.

The first variable in table 1 (\(\text{action}\)) is a dummy that indicates whether a merger was subjected to conditions and obligations or prohibited (\(\text{action} = 1\)) or cleared unconditionally (\(\text{action} = 0\)).\(^{16}\) This is the dependent variable of the logit models presented in section 5.1.

The next three variables (‘local markets’, ‘US- or EU-wide markets’, ‘worldwide markets’) report the extent of the geographic market concerned by the merger. Markets are local (or regional), if only a part of the US or a single EU member state is affected by the merger. If multiple (or all) regions (or member states) are affected, the merger was classified as community-wide. If the relevant market exceeded the US or the EU, it was classified as worldwide. In cases where multiple markets are concerned, the largest market definition was recorded.\(^{17}\) Cases for which no market definition could be identified were dropped from the sample.

\(^{12}\)http://ec.europa.eu/competition/mergers/cases/.
\(^{13}\)http://www.ftc.gov/bc/hsr/index.shtm.
\(^{14}\)http://www.hoovers.com/.
\(^{15}\)http://thomsonreuters.com/products_services/financial/financial_products/products_-az/worldscope_fundamentals.
\(^{16}\)Less than 5% of the cases in the sample were either prohibited by DG Competition or abandoned after the FTC succeeded in obtaining an injunction in court. Since the focus of this article lies on the decision to intervene in a merger and not on the choice or adequateness of the measure of intervention, these cases are not distinguished from other remedies. In section 5.4.2 we run a robustness check excluding these cases.
\(^{17}\)In some cases - in particular those, where a formal decision was unavailable - the relevant market was recorded from the filing of the transaction to the SEC.
Table 1: Summary Statistics of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>EU mean</th>
<th>US mean</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>0.50</td>
<td>0.68</td>
<td>1 if the merger was remedied or blocked, 0 if it was cleared</td>
</tr>
<tr>
<td>Local markets</td>
<td>0.41</td>
<td>0.27</td>
<td>Relevant market is local</td>
</tr>
<tr>
<td>US-(EU-)wide markets</td>
<td>0.38</td>
<td>0.52</td>
<td>Relevant market is EU- or US-wide</td>
</tr>
<tr>
<td>Worldwide markets</td>
<td>0.21</td>
<td>0.20</td>
<td>Relevant market is worldwide</td>
</tr>
<tr>
<td>HHI before merger</td>
<td>0.51</td>
<td>0.36</td>
<td>HHI using pre-merger market shares</td>
</tr>
<tr>
<td>Barriers to entry</td>
<td>0.44</td>
<td>0.61</td>
<td>1 if barriers to entry were found during investigation</td>
</tr>
<tr>
<td>Dominant firm</td>
<td>0.54</td>
<td>0.66</td>
<td>1 if one of the firms in the market has a market share &gt; 50%</td>
</tr>
<tr>
<td>Horizontal mergers</td>
<td>0.65</td>
<td>0.71</td>
<td>1 if merger between horizontal competitors</td>
</tr>
<tr>
<td>Cross-border merger</td>
<td>0.68</td>
<td>0.42</td>
<td>1 if the merging firms are from different nations</td>
</tr>
<tr>
<td>US dummy</td>
<td>0.29</td>
<td>0.67</td>
<td>1 if at least one merging party is from the US</td>
</tr>
<tr>
<td>EU dummy</td>
<td>0.63</td>
<td>0.24</td>
<td>1 if at least one merging party is from the EU</td>
</tr>
<tr>
<td>Intra-US</td>
<td>0.10</td>
<td>0.56</td>
<td>1 if both merging parties are from the US</td>
</tr>
<tr>
<td>Intra-EU</td>
<td>0.54</td>
<td>0.08</td>
<td>1 if both merging parties are from the EU</td>
</tr>
<tr>
<td>R&amp;D merging</td>
<td>11.83</td>
<td>11.94</td>
<td>Sum of R&amp;D spending merging firms</td>
</tr>
<tr>
<td>R&amp;D rivals</td>
<td>14.04</td>
<td>14.90</td>
<td>Sum of R&amp;D spending rivals</td>
</tr>
<tr>
<td>Market value merging</td>
<td>14.57</td>
<td>16.94</td>
<td>Sum of market value merging firms</td>
</tr>
<tr>
<td>Market value rivals</td>
<td>16.65</td>
<td>19.03</td>
<td>Sum of market value rivals</td>
</tr>
<tr>
<td>Dividends merging</td>
<td>34.97</td>
<td>24.52</td>
<td>Sum of profit payout ratios merging firms</td>
</tr>
<tr>
<td>Dividends rivals</td>
<td>103.81</td>
<td>125.24</td>
<td>Sum of profit payout ratios rivals</td>
</tr>
</tbody>
</table>

Observations: 309 286

R&D expenditures and market values are reported as logs of 1,000 USD.
'HHI before merger' reports the Herfindahl-Hirschmann index in the relevant market, prior to the transaction in question. Where available, this was recorded from the decisions. If the HHI was not reported in the decision, we calculated an approximation using the reported sales of the merging parties and their rivals. ‘Barriers to entry’ is a dummy indicating whether the market investigation revealed significant barriers for firms trying to enter the relevant market. These barriers can be due to high capital requirements, long product development times, existing trade agreements or similar reasons. The ‘dominant firm’ dummy is equal to one, if the market investigation revealed that one of the firms in the market (either a merging firm or a rival) has a market share in excess of 50% before the merger.\textsuperscript{18}

The remainder of the dataset is constructed from firm-level data: a combination is classified as a ‘horizontal merger’ if the acquirer and the target share the same SIC2 industry code. ‘Cross-border merger’ equals one for transactions between firms that are not headquartered in the same country. The US and EU dummies equal one, if at least one of the merging firms is headquartered in the US or EU. The ‘Intra-US’ and ‘Intra-EU’ variables indicate if both merging parties originate from the respective region. ‘R&D merging’ (‘R&D rivals’) reports the sum of R&D expenditures by the merging firms (rivals) as logs of 1,000 USD. The ‘market value’ variables report market values in an analogous fashion. Finally, ‘dividends merging’ (‘dividends rivals’) is the sum of the percentages of profit that are paid to shareholders in the form of dividends by the merging firms (rivals).

The variable means of US and EU cases reported in table 1 exhibit some differences with respect to both merger-specific as well as firm-specific variables. US and EU cases therefore are, to a degree, structurally different. This issue is explicitly addressed by our methodology: the results on convergence (section 5.2) are corroborated in section 5.3, where the analysis is restricted to propensity-score matched subsamples to control for the possibility of a sample selection bias. As a robustness check, we also report the results of an Oaxaca decomposition into regime- and case-specific differences in section 5.4.4.

\textsuperscript{18}In some cases - less than 15\% of the sample - the existence of barriers or a dominant firm had to be estimated from the data, because the market investigation was not publicly available. The predicted values for these dummies - obtained from logit models using a comprehensive set of SIC2 dummies and most other explanatory variables from the dataset - correlate highly with those collected from the decisions (\(\rho = 0.78\) for barriers, \(\rho = 0.70\) for dominant firms); additionally, we only retained clear-cut predictions where \(P(\text{barriers})\) and \(P(\text{dominant firm})\) are either < 0.3 or > 0.7. While this may add some noise to our data, the following robustness check suggests a small effect: in accord with economic theory, both entry barriers and dominant firms are strongly and significantly correlated with industry profitability (\(\rho = 0.22\) for barriers, \(\rho = 0.16\) for dominant firms). This correlation is not reduced by the addition of the predicted values.
4. Methodology

This section outlines this article’s approach to policy convergence and how it is measured and presents some details concerning the propensity score matching procedure we use to obtain a homogenous subsample.

4.1. Measuring convergence

The keystone of this inquiry in policy convergence are logit models, which emulate the decisions to either intervene or clear a merger case by the FTC and DG Competition. The dependent variable, action (equal to zero if the case was cleared, equal to one if it was either remedied or blocked), is regressed on the following covariates: dummies indicating the size of the relevant market, high pre-merger market concentration, barriers to entry, horizontal and crossborder mergers, the involvement of US or EU firms, intra-US and intra-EU mergers as well as a dummy for the Bush administration are complemented with continuous variables containing the pre-merger HHI, as well as R&D spending, market values and dividend payouts of merging parties and their rivals prior to the merger. Controls for industry effects, EU Commissioners and FTC chairmen are included, but not reported. To calibrate these models, the whole sample of merger cases, for which sufficient data is available, is used (309 observations for the EU model, 286 for the US model). The models are presented in section 5.1.

Since the subsample of cases which were actually scrutinized by both the FTC and DG Competition (the ‘overlap’ of jurisdictions) is too small for statistical analysis, the following workaround will be applied: Using the logit models calibrated to the jurisdictions of the FTC and DG Competition, we predict the likelihood of an intervention for all cases from the point of view of both agencies. The absolute difference of predictions in merger $k$ is defined as

$$\sigma_k = |\hat{P}^US(action_k) - \hat{P}^EU(action_k)|,$$

where $\hat{P}^m(action_k)$ ($m = US, EU$) is the probability of an intervention estimated by the model of agency $m$ in merger $k$. $k = 1, \ldots, N$ runs through the whole sample of (US and EU) mergers. $\sigma$-convergence occurs if the limit of $\sigma_k$ over a sequence of chronologically ordered mergers approaches zero, but in a finite sample we will conclude in favor of $\sigma$-convergence if the average $\sigma_k$ decreases over time. An increase, on the other hand, would suggest jurisdictional divergence.

4.2. Propensity score matching

As can be seen from table 1, the observations in the US and EU subsamples are to a certain degree different with regard to the characteristics we observe: while market values and R&D spending are higher for US merging firms and rivals in the sample, EU merging firms pay higher dividends. The Commission is more likely to find the relevant geographic market to be local (i.e. restricted to one member state), while the FTC finds US-wide markets in fifty percent of the cases. Industry dummies differ across the subsamples as well. This observed
heterogeneity could be either due to differences in the kind of mergers that are being investigated in the US and Europe, or due to the limitation of our sample to FTC cases for a lack of DoJ data. We address this issue explicitly via the use of propensity score matching. Since the number of yearly observations is too small to create an adequate pool for matching prior to 1999, the matched sample is restricted to the time period from 1999 to 2007.

Propensity score matching (PSM) was developed by Rosenbaum (1983) and is used to reduce the bias due to sample selection. The concept is frequently applied to the experimental design in the medical sciences: when trying to single out the causal effect of a treatment, the subjects of the control group should be as similar as possible to those of the treated group. The PSM algorithm provides a measure of similarity based on a set of covariates. In the context of our analysis, being ‘treated’ means being handled by one competition authority (the problem is symmetric). The PSM algorithm is used to find subsamples of US and EU cases, such that the heterogeneity with respect to the specified covariates is minimized.

The covariates used to calculate the propensity score are the challenge rate (‘action’), the dummies for geographic market definitions and entry barriers, the HHI index, the dummies for the involvement of EU- and US-firms, a dummy for cross-border transactions as well as the data on market values, R&D spending and dividends of merging firms and their rivals. We use a version of the PSM algorithm developed for Stata by Leuven and Sianesi (2003), modified to find unique best matches within the same year and removing them from the pool after matching. Thus, the algorithm calculates the matrix of propensity scores between all EU and US cases in a given year, finds the best match (the smallest difference in propensity scores) and removes the two cases thus matched from the pool. Then the second best match is selected and so on. Calibrating the algorithm such that after the matching procedure the average difference in propensity scores of the yearly matches (the average structural difference of cases in the subsample, based on the above covariates) remains below 10% determines the amount of matches per year at 11. This yields 22 merger cases per year from 1999 - 2007, producing a subsample of 198 cases in total.

All of the results presented in section 5.2 will be iterated in this subsample. While the whole sample contains the maximum amount of cases available to us and thus allows the most surveying picture of the two jurisdictional systems, the matched subsample is designed to eliminate effects that arise either due to differences in the types of cases the two authorities handle or due to sample selection.

\[\text{For an application to mergers see Weichselbaumer (2008).}\]

\[\text{Notice that in this setting there is not one ‘treated’ and one ‘control’ group, but actually two treated groups. We thus divert the algorithm from its originally intended use (singling out a causal effect between treatment and control groups) and employ it to increase the similarity of two subsamples.}\]
5. Results

5.1. Logit Models

To simulate the patterns of jurisdiction of the two competition authorities, we calibrate logit models using the subsamples of US cases (286 observations) and EU cases (309 observations). The dependent variable in these models is action, the decision to either clear a merger or intervene.

5.1.1. Do the model coefficients change?

Pooling all observations into a single model for each jurisdiction means implicitly assuming that both jurisdictions can be regarded as static constructs over the whole sample period. While continuity and predictability are desirable traits in a merger control authority, this is a strong assumption which has to be justified. We address this issue by first identifying points in time at which structural breaks in competition policy could plausibly occur, then estimating the jurisdictional models in the non-overlapping partitions thus defined and using a generalized Hausman specification test (based on the joint variance/covariance matrix of the models) to compare the coefficients of these models. The null hypothesis of the Hausman test is, that there is no significant difference in the model coefficients. If this is rejected, separate models will have to be estimated for the periods in question.

In the US sample, the most plausible points to test for structural breaks are potential regime changes due to changes in the political environment. In particular, our sample includes mergers scrutinized during the Clinton (1993 - 2001) and Bush (2001 - 2009) administrations, allowing us to check for different merger policy regimes during periods of democratic and republican presidency.

We estimate two logit models, restricted to the respective terms of office (columns 1 and 2 in figure 2), and compare their coefficients using a Hausman test. Most of the coefficients are similar in size and equal in sign across the models and the Hausman test does not reject the null hypothesis of equal model coefficients during the Clinton and Bush administrations ($p = 0.18$).\footnote{Coate and Ulrick (2006) report a similar finding, concluding that ‘[…] merger enforcement policy in the US has remained relatively stable during the 1996 to 2003 time period’.}

This continuity in US merger control in our sample may well be due to the fact that almost the whole sample falls between the 1997 revision of merger guidelines and the publication of the 2010 merger guidelines. Thus, while US merger policy certainly was not perfectly static, there are no obvious discontinuities in our data on US merger control, allowing us to pool all US observations.\footnote{Similarly, Leary (2002) concludes in favor of essential stability of US merger policy in the 1980ies and 90ies.}

The estimation results for the three different US models are reported in 5.1.2. The most obvious potential regime change in our data on European merger control is due to the major changes in European merger legislation brought about by the ECMR04. Therefore, two models of EU jurisdiction, one prior to and one after the reform in May 2004, are estimated; again, a Hausman test
is employed to compare the model coefficients. The Hausman test very significantly ($p = 0.001$) rejects the null hypothesis of equal coefficients between the two models. Thus, the perceived major impact of the 2004 reform on European merger law (for example Drauz and Reynolds (2003)) is reflected in the data and will have to be made allowance for by using separate models of EU jurisdiction for the periods prior to and after it. The two EU models are reported in 5.1.2 as well.

5.1.2. Estimation

Three logit models are calibrated using the subsamples of US cases, EU cases prior to ECMR04 and EU cases post-ECMR04.$^{23}$ Table 2 contains the results.

The most important drivers for the FTC’s decision to intervene (column 3) in a merger are the degree of market concentration as measured by the HHI index and the existence of barriers to entry. While higher industry profits - as proxied by rivals’ dividends - increase the probability of an intervention, markets with high R&D expenditures receive less regulatory scrutiny. A challenge is less likely if the relevant market is found to be worldwide. Mergers involving US firms have a better chance of being cleared unconditionally, particularly so if both merging firms are US-based. The same applies for horizontal mergers and cross-border mergers. Finally, the Bush administration significantly facilitated M&A activity.

Prior to the 2004 reform of European merger law (column 4), the main drivers for an intervention by DG Competition were barriers to entry, the existence of a dominant player in the market as well as the market values of both merging parties (proxying for the importance of the transaction) and rivals (proxying for market size). Political factors seem to have played an important role as well: firms originating from the EU or from the US were treated preferably in comparison to firms from other parts of the world. Finally, while DG Comp seems to have prosecuted horizontal transaction with particular rigor, cross-border mergers were treated significantly more lenient.

Post-reform (column 5), the significant covariates for an intervention of DG Competition change substantially: among the significant results, only those regarding barriers to entry and dominant firms remain. Instead, the Commission seems to place increased weight on geographic market definitions (worldwide markets strongly reduce the likelihood of an intervention) and market concentration (the pre-merger HHI now significantly affects the decision to intervene). The R&D expenditures of both merging firms and rivals decrease, while industry dividends increase the probability of a challenge, indicating that dynamic markets pose a lesser concern than mature markets, in which profits are paid out instead of reinvested. These findings are in line with the ‘more economic approach’ the ECMR04 was supposed to achieve.

$^{23}$The US models restricted to the terms of office of the Clinton and Bush administrations are reported as well, but are - since they do not significantly differ and are not used for the purposes of prediction - not discussed.
Table 2: Marginal Effects on the Probability of Intervention

<table>
<thead>
<tr>
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<td>Local markets</td>
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<td>0.059</td>
<td>0.053</td>
<td>0.003</td>
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<td></td>
<td>(0.065)</td>
<td>(0.106)</td>
<td>(0.061)</td>
<td>(0.055)</td>
<td>(0.075)</td>
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<td>Worldwide markets</td>
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<td>-0.169**</td>
<td>-0.109**</td>
<td>0.054</td>
<td>-0.300***</td>
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<td></td>
<td>(0.062)</td>
<td>(0.079)</td>
<td>(0.050)</td>
<td>(0.059)</td>
<td>(0.107)</td>
</tr>
<tr>
<td>HHI before merger</td>
<td>0.658**</td>
<td>0.528**</td>
<td>0.488***</td>
<td>0.123</td>
<td>0.300**</td>
</tr>
<tr>
<td></td>
<td>(0.263)</td>
<td>(0.245)</td>
<td>(0.151)</td>
<td>(0.091)</td>
<td>(0.152)</td>
</tr>
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<td>Barriers to entry</td>
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<td>0.189***</td>
<td>0.297***</td>
<td>0.263***</td>
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<td></td>
<td>(0.051)</td>
<td>(0.055)</td>
<td>(0.039)</td>
<td>(0.033)</td>
<td>(0.057)</td>
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<td>Dominant firm</td>
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<td>0.054</td>
<td>0.042</td>
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<td></td>
<td>(0.051)</td>
<td>(0.081)</td>
<td>(0.049)</td>
<td>(0.039)</td>
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<td>Cross-border merger</td>
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<td>-0.163**</td>
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<td>(0.127)</td>
<td>(0.076)</td>
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<td>0.089*</td>
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<td>(0.074)</td>
<td>(0.048)</td>
<td>(0.047)</td>
<td>(0.070)</td>
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<td>-0.128*</td>
<td>-0.152*</td>
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<tr>
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<td>(0.088)</td>
<td>(0.105)</td>
<td>(0.066)</td>
<td>(0.079)</td>
<td>(0.147)</td>
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<td>EU dummy</td>
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<td>-0.062</td>
<td>-0.017</td>
<td>-0.154**</td>
<td>0.068</td>
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<tr>
<td></td>
<td>(0.088)</td>
<td>(0.119)</td>
<td>(0.072)</td>
<td>(0.066)</td>
<td>(0.091)</td>
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<td>Intra-US</td>
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<td>-0.173*</td>
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<td>0.176</td>
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<td>(0.106)</td>
<td>(0.139)</td>
<td>(0.089)</td>
<td>(0.102)</td>
<td>(0.183)</td>
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<td>(0.105)</td>
<td>(0.138)</td>
<td>(0.093)</td>
<td>(0.072)</td>
<td>(0.108)</td>
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<tr>
<td>R&amp;D merging</td>
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<td>-0.027*</td>
<td>0.000</td>
<td>-0.033**</td>
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<tr>
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<td>(0.015)</td>
<td>(0.022)</td>
<td>(0.015)</td>
<td>(0.012)</td>
<td>(0.016)</td>
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<td>R&amp;D rivals</td>
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<td>-0.027</td>
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<td>(0.029)</td>
<td>(0.018)</td>
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<td>(0.016)</td>
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<td>Market value merging</td>
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<td>-0.008</td>
<td>0.016**</td>
<td>0.011</td>
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<td>(0.031)</td>
<td>(0.017)</td>
<td>(0.006)</td>
<td>(0.016)</td>
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<td>Market value rivals</td>
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<td>0.018</td>
<td>0.012**</td>
<td>0.025</td>
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<td>(0.038)</td>
<td>(0.022)</td>
<td>(0.006)</td>
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<td>Dividends merging</td>
<td>0.001</td>
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<td>0.001</td>
<td>0.001*</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Dividends rivals</td>
<td>0.002***</td>
<td>0.001***</td>
<td>0.001***</td>
<td>0.000</td>
<td>0.001***</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.000)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>Bush administration</td>
<td>-0.195***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.043)</td>
<td></td>
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</tr>
</tbody>
</table>

Observations: 140 146 286 211 98
Pseudo R²: 0.58 0.45 0.49 0.64 0.68
Correctly Classified: 93% 81% 86% 91% 94%

Standard errors in parentheses, the symbols ***, **, and * indicate significance at the 1%, 5%, and 10% levels respectively. Regression includes controls for the political environment (EU Commissioners and FTC chairmen) and industry effects. A case counts as 'correctly classified' if either (PM(action) > 0.5 and action = 1) or (PM(action) < 0.5 and action = 0).
The variables indicating local geographic markets as well as the dummy for intra-EU combinations remain insignificant in all three models.\(^\text{24}\) The goodness of fit measures are very good in all models: \(R^2\)'s of 49\% in the US model and 64\% and 68\% in the EU models permit the correct classification of 86\%, 91\% and 94\% of observations respectively.\(^\text{25}\)

When comparing the pre-reform EU model with the US model there doesn’t seem to be much common ground in the decision process: the only common significant factors are barriers to entry, US firms and cross-border mergers. Some relevant variables such as market definition and pre-merger concentration remain insignificant in the EU model, while the dummy for horizontal mergers is significant in both models, but with opposing signs. Post-reform, however, the significant covariates for a challenge seem to be more aligned in both models, with the main drivers for an intervention being market definitions, pre-merger market concentration, entry barriers, R&D expenditures and dividends. Thus from the change in coefficients it would seem, that post-ECMR04 EU jurisdiction has become more similar to that of the FTC.

To test this intuition, we compare the model coefficients using a generalized Hausman with the null hypothesis of not significantly different coefficients in both models (see section 5.1.1). Unsurprisingly, when comparing the pre-reform EU model with the US model the null hypothesis is rejected at \(p = 0.002\). When comparing the US model to the post-reform EU model, we find that the null hypothesis cannot be rejected \((p = 0.21)\). Thus, the two models do not significantly differ with respect to their coefficients. This finding is a considerable piece of evidence in support of the hypothesis that US and EU jurisdictions on merger cases have substantially converged with respect to the factors determining an intervention.

5.2. Convergence of predictions

In this section we use the logit models estimated in 5.1 to predict probabilities of intervention and apply the measure of convergence discussed in 4.1 to the predictions.

Figure 1 reports the yearly mean of the absolute differences in the predictions by the EU and US models as well as a polynomial fit with 95\% confidence interval to the individual data points (i.e. mergers, not yearly means) for all mergers in the sample after 1992 (574 observations).\(^\text{26}\)

\(^\text{24}\)Additional dummies for large and small EU member states and other political effects were found to be insignificant and collinear with other regressors and were excluded from the final specification.

\(^\text{25}\)A case counts as 'correctly classified' if the predicted probability of an intervention, \(\hat{P}^{\mu}(\text{action})\), is \(> 0.5\) and an intervention occurred, or if the probability is \(< 0.5\) and the case was cleared.

\(^\text{26}\)The fact that this measure effectively pools US and EU mergers, allows us to extend the observation period to 1993 - 2008. The means for 1993, 1994 and 2008 are based on significantly fewer observations than those of the other years, which is reflected in the larger confidence interval.
The mean absolute difference in predictions for all mergers between 1993 and 2008 is almost 27%. This is significantly higher at the start of the sample period: in the first four years, 1993 - 1996, the mean absolute difference amounts to almost 39%. The initial difference rapidly decreases and averages around 27% in the next four years. After rising to an average of 31% in the 2001 - 2003 period, we observe a reduction in the average, absolute predictive difference, reaching its minimum at the end of the sample period. The average difference in the post-reform period is only 23%. Regressing the prediction errors on the year in which the merger occurred (see table 3) confirms the existence of a negative time trend. Additionally, a t-test shows that prediction errors are on average 7.3% lower in the post-reform period.

While the initial high differences might be attributed to a relatively small sample (68 observations from 1993 - 1996) and the inexperience of a newly-founded institution (DG Competition commenced its activity in 1990), the second peak of incongruity in 2001/2002 coincides with the reversal of three EU decisions to block mergers by the Court of First Instance, marking a problematic period in European merger control. After 2002, the models’ predictions become increasingly similar, reducing the average predictive difference by about a third until the end of the observation period and indicating some degree of convergence in the agencies’ jurisdictional patterns.
<table>
<thead>
<tr>
<th></th>
<th>Full sample</th>
<th>Matched sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>-0.008***</td>
<td>-0.016**</td>
</tr>
<tr>
<td></td>
<td>(0.003)</td>
<td>(0.007)</td>
</tr>
<tr>
<td>Observations</td>
<td>595</td>
<td>198</td>
</tr>
<tr>
<td>Pre-reform mean</td>
<td>0.301</td>
<td>0.293</td>
</tr>
<tr>
<td>Post-reform mean</td>
<td>0.228</td>
<td>0.228</td>
</tr>
<tr>
<td>Difference</td>
<td>0.073***</td>
<td>0.065**</td>
</tr>
</tbody>
</table>

*p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors in parentheses.

5.3. Convergence in matched subsample

To rule out that the findings of the previous section are driven by sample selection we corroborate them in a propensity-score matched subsample (containing 198 observations, see section 4.2 for details) to account for the heterogeneity of the merger cases in our sample. The results are reported in figure 2.

Essentially, all the conclusions inferred in the whole sample can be maintained in face of the subsample-results. When comparing the differences of the predictions by the two models to the corresponding time period in figure 1, we find a similar pattern: average prediction differences of approximately 30% in the pre-reform period decline to around 20% post-reform. The reduction in predictive differences before and after ECMR04 is of similar size as in the whole sample and 5% significant. The coefficient of the time trend regression (table 3) is considerably larger than in the whole sample (-.16), but drops to 5% significance due to the reduced sample size.

5.4. Robustness checks

This section briefly discusses the results (reported in figure 3) of a number of robustness checks that were performed on the data.

5.4.1. Horizontal mergers

Dropping all non-horizontal mergers reduces the EU sample to 180 and the US sample to 190 observations. In spite of this significant reduction in sample size, all results remain qualitatively unchanged with some reduced significances. The plot of the differences of model predictions becomes somewhat smoother but exhibits the same dynamics.

5.4.2. Prohibited and abandoned mergers

About 4% of cases in the EU sample were blocked by DG Competition. Similarly, 6% of the US sample mergers were abandoned by the parties after the FTC obtained a preliminary injunction in court. Since these cases were considered strongly anticompetitive by the respective competition authorities, they are potential outliers in comparison with the rest of the sample. Even
though prohibitions and abortions amount to only 29 observations, dropping them somewhat improves the convergence results: the time trend coefficient of the difference in predictions as well as the drop in pre/post reform differences increase. It thus seems that some heterogeneity remains with respect to the decision of when to block a merger.

5.4.3. Control for industry dissimilarities

Most of the industry dummies differ substantially among the EU and US sample. The dummies for the finance and transport & communications industries have significantly higher means in the EU sample, since in the US these industries are routinely regulated by the DoJ. Conversely there are more US observation on mergers in services. Dropping all observations in these industries reduces the EU sample size to 192 and the US sample size to 214. The resulting reduction in the differences of the predictions is slightly higher than in the original sample.

5.4.4. Control for casemix

To control for the possibility that the two agencies systematically investigate different kinds of cases (i.e. face a different casemix) we employ a nonlinear version of the Oaxaca decomposition (Coate and Ulrick, 2009), thereby obtaining the degree of incoherence that can be attributed to a regime-specific difference.
From the point of view of both agencies, the absolute regime-specific difference in jurisdiction diminishes substantially during the sample period.

6. Conclusion

The degree of coherence of globally effective merger policies, such as those exercised by the EU and the US, is highly relevant from both a consumer welfare point of view as well as that of the firms notifying a transaction. Since policies are never perfectly static constructs - merger policy in particular has seen radical changes in the last decades -, not only the degree of coherence matters, but also whether the policies converge or diverge. We attempt to address the questions raised by these observations in an empirical framework.

While merger policy in the US evolved continuously during the sample period (models restricted to the terms of the Clinton and Bush administrations are not significantly different from each other), EU merger policy experienced a major shift induced by the reform of European merger law in 2004. In line with the theoretical literature on the topic, the empirical models presented here indicate that the effect of the reform was a step towards greater coherence with US merger law.
In particular, we find that the two decision models estimated for the FTC and the post-ECMR04 Commission do not significantly differ with respect to their coefficients and that there is a negative and significant time trend, reducing the difference of the predictions by the two models.

The fact that the decision models cease to significantly differ after 2004 suggests that a very similar set of decision rules is employed by both agencies in deciding when to intervene. Of course we cannot hope that the set of explanatory variables in the models is complete; obviously there are many additional considerations - some of which are confidential information - which determine each individual decision. However, with respect to externally observable factors, the models include a rather comprehensive set of variables, which is reflected in their goodness-of-fit measures. Given the number and explanatory power of the variables, the finding that the model coefficients are not significantly different constitutes powerful evidence in favor of convergence.

When estimating a time trend of prediction errors we find that incongruity is significantly decreased in the post-reform period. This is confirmed in a propensity-score matched subsample, yielding qualitatively similar results. Finally, we run a number of robustness checks to control for vertical and conglomerate mergers, prohibited combinations, industry dissimilarities and differences in the casemix of the two authorities, all of which corroborate the findings in the main sample.

In summary, the findings of this study indicate that gradual convergence of jurisdictional patterns occurred after 2004 and lend some empirical support to the claim, that the 2004 reform of European merger law was indeed a step towards the US system.

References


Leuven, E., Sianesi, B., 2003. PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing.


