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The discontinuous integration of Western Europe's heterogeneous market for corporate control from 1995 to 2007

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Abstract

As, in Europe, many institutional reforms have been undertaken to establish an economic union, it can be expected that the relevance of borders has decreased over time. For the EU 15, we investigate the expected integration process of the market for corporate control – an illustrative market for studying integration issues – over the period from 1995 to 2007. Our gravity regressions show that borders lost relevance from 1995 up to the bursting of the new economy bubble. During this period, the transition from the European Economic Community to the European Union at the end of 1993 and the introduction of the euro may have led to accelerated integration. However, thereafter we find no evidence for further progress driven by institutional factors. On the other hand, geographical distance became less relevant for M&As for the entire time span from 1995 to 2007. The continued lack of full integration is also evidenced by heterogeneity inside Europe. This becomes apparent in differing and continuing bilateral border effects. Country pairs with supposedly liberal capital market thinking, such as the Netherlands, Germany and the UK are found to be divided by relatively small barriers. Hence, a still existing lack of integration in Europe may not be a result of missing institutional reforms. In the Poisson estimations, the results depend neither on the choice of the number of observations nor on the log of aggregated transaction value as the dependent variable; however, the use of the levels is inappropriate.

Keywords: integration, Europe, border effects, bilateral borders, distance, gravity, Poisson, panel, mergers and acquisitions

JEL-classification: F21, F23, F36, G15, G34, R12

Non-technical summary

Despite its roots as a political concept, European integration has increasingly become an economic issue. In the 1990s in particular, politicians undertook enormous measures to strengthen the European economic union. The Single European Act of 1987 strived for the completion of the internal market by the end of 1992. The year 1993 marks a milestone with the coming into force of the Maastricht Treaty and, at the end of the year, the transition from the European Economic Community to the European Union. In light of these institutional changes, the question arises as to whether firms started to behave differently and, in particular, whether the relevance of borders as barriers to economic transactions has declined. We then consider the relevance of borders for mergers and acquisitions in the EU 15. The market for corporate control is an illustrative market for integration issues as the factor capital is per se mobile but, due to the ownership implications of M&As, there are political, administrative and informational prerequisites for an engagement and for integration. Below, we focus on the period from 1995 to 2007. In addition to the institutional changes, this time span also encompasses the new economy boom, which was accompanied by a boom in M&A transactions, as well as the subsequent bursting of the bubble with an abrupt fall in M&As around the turn of the millennium. All these events may have affected the integration process in Europe.

We rely on European regional data, enabling a more thorough analysis owing to the fact that distance and GDP are measured at a regional level and thus in a much more focused way than at the national level, which is the level of investigation of nearly all of the literature in this field. Regional data also allow discrimination between national and international deals.

A common concept used when investigating the stage of integration is the gravity equation model. In the course of time, the problems with data heterogeneity and zero flows between some regions were noticed and dealt with in different ways. We apply Poisson estimation in combination with source and host country fixed effects as well as random and time-fixed effects in a panel. To investigate the integration process in Europe, we interact both the border dummy and distance with time. In the regressions, we take the number of M&A transactions as the dependent variable. Furthermore, we show that it is also possible to use the logarithm of the aggregated transaction value as the dependent variable. The level of the transaction value proved to be inappropriate, probably owing to the high volatility of M&A transactions.

As a result, when the sample is split in time, there is some evidence that border barriers decreased shortly after the transition from the EEC to the EU and in the run-up to European

Monetary Union, which coincided with the new economy euphoria. Around the turn of the century, however, some countermovement may have taken place. As the year 2001 marks the turning point at which cross-border integration came to a halt, the bursting of the new economy bubble is probably the reason for the negative development. This event may have led to a sharp rise in investors' and transaction financing banks' risk aversion and to a restraint on their engagement in new deals. In contrast, geographical distance between acquirer and target firms became less relevant over the entire period under consideration. Thus, technological innovations, such as in the field of information technologies and/or logistics, may have been important in the period from 1995 to 2007.

Furthermore, despite all institutional efforts to promote capital market integration, bilateral border effects between Western European countries were still very different in the period under review. At one end of the scale, countries such as the Netherlands, Germany and the UK show on average relatively small border coefficients in absolute terms vis-à-vis the other EU 15 countries, while these values are much higher for Spain, Portugal, Italy and Greece at the other end of the scale. A split of the period under consideration into two subsamples shows that there is a small decline in heterogeneity across the EU 15 countries – though this decline is not significant. Thus, national considerations may still affect international takeovers in Europe.

Nicht-technische Zusammenfassung

In den 90 er Jahren wurden große Anstrengungen unternommen, um die Integration in Europa voranzubringen. Die Einheitliche Europäische Akte von 1987 strebte die Vollendung des Binnenmarktes bis Ende 1992 an. Das Jahr 1993 markiert mit dem Inkrafttreten des Vertrags von Maastricht einen Meilenstein und am Ende jenes Jahres vollzog sich die Umwandlung der Europäischen Wirtschaftsgemeinschaft (EWG) in die Europäische Union (EU). Vor diesem Hintergrund stellt sich die Frage, ob sich das Verhalten der Firmen dadurch beeinflussen ließ und ob die Bedeutung von Ländergrenzen als Hemmnis für ökonomische Transaktionen seither weiter abgenommen hat. Konkret betrachten wir die Relevanz von Grenzen für Unternehmensübernahmen und –fusionen (M&A) in der EU 15. Der Markt für Corporate Control ist besonders interessant für Integrationsthemen, da der Faktor Kapital einerseits von sich aus eine hohe Mobilität aufweist; allerdings müssen wegen den eigentumsrechtlichen Implikationen von M&A politische, administrative und informationelle Voraussetzungen für ein Engagement und damit für Integration erfüllt sein. In unserer Studie konzentrieren wir uns auf den Zeitraum von 1995 bis 2007. Neben den institutionellen Neuerungen umfasst dieser Zeitraum den „New Economy"-Boom, der die M&A-Transaktionen in Anzahl und Umfang um die Jahrtausendwende befeuerte, aber auch das anschließende Platzen der entstandenen „New Ecomomy"-Blase mit dem abrupten Rückgang an M&A-Aktivitäten. All diese Ereignisse könnten den Integrationsprozess in Westeuropa beeinflusst haben.

In unserer Arbeit zu Unternehmensübernahmen und -fusionen greifen wir – im Unterschied zu den meisten anderen Arbeiten auf diesem Gebiet – auf europäische Regionaldaten zurück, was uns eine genauere Analyse als mit nationalen Zahlen ermöglicht, da einerseits die Entfernung zwischen Standorten auf regionaler Ebene präziser gemessen werden kann und auch der Heterogenität innerhalb der Länder besser Rechnung getragen werden kann. Regionale Daten erlauben auch die Unterscheidung zwischen nationalen und internationalen Transaktionen.

In unserer empirischen Analyse verwenden wir einen Gravitätsansatz. Dabei versuchen wir der Heterogenität der Daten und der häufig vorkommenden Regio-Pärchen ohne Tansaktionen Rechnung zu tragen. Wir greifen auf eine Pseudo-Maximum-Likelihood-Poisson-Schätzung zurück und bauen Dummies für Ziel- und Herkunftsländer sowie fixe Zeiteffekte und Zufallseffekte in einer Panel-Schätzung ein. Um den Integrationsprozess in Europa zu analysieren, interagieren wir sowohl das Grenzdummy als auch die Entfernungsvariable mit der Zeit. Die Anzahl der aggregierten jährlichen M&A-Transaktionen für die einzelnen

Regio-Pärchen ist dabei die abhängige Variable in den Schätzungen. Der Transaktionswert von Firmenkäufen und -fusionen zeigt sich als ungeeignet – möglicherweise aufgrund seiner hohen Volatilität. Allerdings sind die Regressionen mit dem aggregierten Transaktionswert in logarithmierter Form als abhängige Variable mit denen für die Anzahl an Transaktionen vergleichbar.

Als Ergebnis finden wir, dass die Bedeutung der Grenzbarrieren kurz nach dem Übergang von der Europäischen Wirtschaftsgemeinschaft in die Europäische Union beziehungsweise im Vorfeld der Einführung der europäischen Einheitswährung in Kombination mit der „New Economy"-Euphorie abgenommen haben. Um die Jahrtausendwende scheint jedoch eine Gegenbewegung eingesetzt zu haben und die grenzüberschreitende Integration kam zum Stillstand. Das Platzen der „New Ecconomy"-Blase mag hierfür verantwortlich zeichnen. Dieses Ereignis ließ wahrscheinlich mit der Risikoaversion die Zurückhaltung möglicher Investoren und der finanzierenden Banken ansteigen. Im Gegensatz dazu nahm die Rolle der geographischen Entfernung zwischen Kauf- und Zielunternehmen über den gesamten Betrachtungszeitraum ab. Dies deutet darauf hin, dass technologische Innovationen, zum Beispiel im Bereich der Informationstechnologie und/oder der Logistik, im Zeitraum von 1995 bis 2007 bedeutend gewesen sind.

Des Weiteren unterscheiden sich die bilateralen Grenzeffekte zwischen den europäischen Länderpärchen in dem untersuchten Zeitraum trotz institutioneller Anstrengungen weiterhin beträchtlich. Dabei weisen am einen Ende Länder wie die Niederlande, Deutschland und das Vereinigte Königreich, niedrige relative Grenzeffekte gegenüber den jeweils anderen EU 15 Staaten auf, während am anderen Ende diese Werte für Spanien, Portugal, Italien und Griechenland höher ausfielen. Wenn wir den Zeitraum aufteilen, können wir zwar sehen, dass die Heterogenität unter den EU 15-Länder etwas zurückgegangen ist – allerdings ist dieser Rückgang nicht signifikant.

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1 Introduction

Firms' accelerated internationalisation within the past few decades can be attributed to two main factors. On the one hand, technological progress has reduced transportation and information costs significantly. On the other, the removal of trade barriers and the opening up of capital markets either through bilateral or multilateral agreements is likely to have facilitated cross-border activity. In the 1990s in particular, politicians undertook enormous measures to strengthen the European economic union. The Single European Act of 1987 strived for the completion of the internal market by the end of 1992. The year 1993 marks a milestone with the coming into force of the Maastricht Treaty and the transition from the European Economic Community (EEC) to the European Union (EU) at the end of the year. The treaty removed still existing regulatory and bureaucratic barriers. Furthermore, it paved the way for European Monetary Union. In doing so, it gave a clear roadmap towards a significantly more integrated Europe. In view of these institutional and technological changes, the question arises as to whether European firms started to behave differently compared to the years before and, in particular, whether the relevance of borders as barriers to economic transactions declined.

In this paper we concentrate on the integration process via mergers and acquisitions (M&A). The majority of FDI occurs in the form of M&A, which are rather common between industrialised countries as they provide rather quick access to foreign markets. If investment takes the form of M&A, the motivation behind the deal is often less about obtaining additional production facilities and more about acquiring customer bases.[1] The market for corporate control is an illustrative market to investigate integration issues. Capital is per se a very mobile factor. However, due to the ownership implications of M&A, several prerequisites have to be fulfilled before an engagement is feasible and makes sense: Here, the overcoming of possibly political, administrative and/or informational restrictions are the first factors to mention but cultural factors may also have an impact. These prerequisites stand for the most important indicators of economic integration in general. Thus, measuring the

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[1] Foreign firms may also be bought because of technology sourcing (see Frey and Hussinger, forthcoming).

integration stance on the market for corporate control allows us to draw much a broader conclusion with respect to the integration of the European Union. However, the integration process in Europe fostered by policy measures may have been eclipsed by other developments. In the field of corporate control, merger waves and the bursting of stock market valuation bubbles like that of the new economy bubble at the turn of the millennium should be mentioned in this regard. Indeed, our paper aims to disentangle the influence of these different forces.

A common concept used when investigating the stage of integration is the gravity equation model. Initially, the gravity equation tells us that trade decreases with distance and increases with the market sizes of the countries involved (Tinbergen, 1962 and Pöyhönen, 1963). One of the first to provide a theoretical underpinning for this was Anderson (1979). The recent literature has increasingly applied the gravity model to areas other than trade issues and also uses it to explain the geography of capital flows, In empirical studies, the behaviour of FDI and portfolio investment show important similarities to trade (Guerin, 2006, Altomonte, 2007). However, the impact of individual factors on trade and FDI may differ.[2] Head and Ries (2008) and Umber, Grote and Frey (2010) apply the gravity in the field of M&As. In my co-authered previous paper, which also forms the starting point for the methodology and data applied in the study below, we compare the integration process in Europe with the one in the US. Following the empirical literature, Martin and Rey (2004) derive the gravity equation properties for asset trade. In the trade literature, distance is first and foremost a proxy for transportation costs but, with respect to capital flows, distance may represent other factors. In the field of FDI and portfolio flows, these are information costs (Lane and Milesi-Ferretti, 2004, Portes and Rey, 2005, Guerin, 2006).[3] The location of acquirer and target firms in different countries may be another reason for a reduced information stance.[4] For example, the media often have a national focus. In the field of M&As, the degree of national capital market liberalism may also be an issue: The less open an economy the more this prevents foreign firms from investing. In addition, cultural differences may render cross-border engagements more burdensome and thus less attractive. Moreover, Guiso, Sapienza and Zingales (2009) find an important role of trust between citizens of different countries for bilateral trade,

[2] Gosh and Wolf (2000) estimate the gravity for trade and FDI, bank lending, portfolio debt and portfolio equity. The spatial determinants are less significant for the FDI equation than for the export regressions.
[3] Portes and Rey (2005) also introduce telephone call traffic as a direct measure of information.
[4] Accordingly, fund managers are found to have a significantly higher performance with local securities, probably owing to informational advantages (Coval and Moskowitz, 2001).

portfolio investment and FDI.[5] Consequently, the hampering effects of borders may differ across the individual country pairs. In a largely debated article, McCallum (1995) addresses the hampering impact of the border between the US and Canada on trade.[6] Regarding Europe, there are already studies that address bilateral border effects, e.g. Chen (2004) and Minondo (2007). The effects of borders and distance may be influenced by institutional changes over time. In the trade literature, it is shown that the relevance of borders and distance decreases within an integration process backed by institutional reforms (see e.g. Altomonte, 2007).

In this paper we consider the market for corporate control in the EU 15. Thus, besides the euro-area member states, we include the UK, Sweden and Denmark in the study. Including the United Kingdom is particularly interesting as it is responsible for more than half of all relevant M&A transactions in the EU 15.[7] As in Umber, Grote and Frey (2010), we rely on European regional data. Therefore, we have more precise measures of distance and we can do justice to the heterogeneity inside the countries, which may be greater than between countries. Regional data also allows discrimination between national and international deals, and we take up this issue below. We consider the relevance of borders in the period from 1995 to 2007. In this time span, in addition to the transition from the EEC to the EU and the launch of European Monetary Union, integration may also have been affected by the new economy boom, which was accompanied by a boom in M&A transactions (number and deal volume) around the turn of the millennium, and the subsequent bursting of the new economy bubble with a drastic decline in M&A activity. All these events may have had implications for the European integration process in the market for corporate control but they have not yet been addressed together in the existing literature. Furthermore, the study then takes a closer look at bilateral border effects within Western Europe to highlight any potential differences in the integration status between European country pairs, an aspect that has not yet been taken up by the literature for FDI and M&A in the gravity model context. We then split the sample into two subsamples to check whether there was a decline in the heterogeneity of the European market for corporate control.

Section 2 discusses some econometric problems and presents the estimation model applied in this study. In Section 3, the data are outlined. Section 4 includes the regression outputs. First,

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[5] Similarly, Ekinci, Kalemi-Ozcan and Sorenson (2007) find "social capital" to be an important factor for financial integration, and La Porta et al. (1998) see national differences in the legal protection of investors as a reason for deviations across the countries.

[6] Similarly, Engel and Rogers (1996) find borders to be obstacles to trade by considering price volatility in Canadian and US American cities. They pin down the effect to a distance equivalent to 75,000 miles.

[7] The United Kingdom is also a very important marketplace for financial deals denominated in euro and, with respect to European M&A deal participation, is the most relevant player. Unusually for a non-euro-area country, the UK also has privileged access to euro-area settlement platforms.

the relevance of borders and geographical distance as barriers over time is analysed and then bilateral border coefficients within the EU 15 are determined. We conclude in Section 5, where we report the implications of our output for capital market integration in Europe.

2 Some Econometric Issues and the Estimation Model

As a starting point for our empirical model, we refer to McCallum's (1995) adoption of the gravity model, which he uses to compare intra-country trade with trade across the border between the United States and Canada. As in his approach, we look at flows across regional and national borders, although we address M&A flows in the EU 15. In such a setting we observe many zero flows between some regions, which raises some econometric problems.

A relatively simple way to address the zero-value problem is to use the Tobit estimation as this econometric procedure deals with censored data (e.g. Eaton and Tamura, 1994, for FDI and trade, or Stein and Daude, 2007, for the location of FDI). Moreover, the application of the OLS procedure does not account for heterogeneity in the data and may lead to an overestimation of the effect of integration (see Cheng and Wall, 2005).[8] Anderson and van Wincoop (2003) handle this problem by the consideration of relative trade barriers and include multilateral resistance terms – composed of price indices. For the sake of simplicity, they propose the use of country-specific dummies (see also Feenstra, 2002, Eaton and Kortum, 2002), which lead to consistent – albeit less efficient – estimates. However, Silva and Tenreyro (2006) show that controlling for fixed effects is not sufficient to eliminate heteroscedasticity. Irrespective of whether fixed effects are used, a log-linear gravity equation should not be estimated using OLS or NLS but using Poisson pseudo-maximum likelihood estimation (PPML) as it gives the same weight to all observations and does not require Poisson distribution of the data.[9] Thus, as we have already done in Umber, Grote and Frey (2010), we apply the Poisson estimation procedure and we include source and host country fixed effects as well as random and time-fixed effects within a panel setting. Apart from other differences to Silva and Tenreyro (2006) and our previous paper, we take the number of M&A transactions as the dependent variable in our main estimations to contribute to the origins of the Poisson as a count model (instead of levels).[10] Moreover, we show that, in the

[8] Carr et al (2001) find heterogeneity in the OLS specification by applying the Breusch-Pagan test.
[9] In another approach, Helpman, Melitz and Rubinstein's (2008) Probit estimation output allows the calculation of two controls for the potential two biases that enter an NLS estimation at the second stage. They show that their estimation yields similar results to those of Silva and Tenreyro (2006).
[10] An early econometric application of the Poisson with count data in a panel is provided by Hausman, Hall and Griliches (1984), who address the relationship between the number of patents and R&D expenditures. Huizinga

context of M&As and FDI, the log of the aggregated deal value may also be used as the dependent variable in the gravity estimations, which contrasts with all of the trade literature in which the level of the aggregated transaction value is established as the dependent variable. In the field of M&As, it is probably inappropriate to take the level as the dependent variable owing to a higher dispersion of M&As.

Furthermore, in recent studies, not only is the direction of flows considered but a variety of fixed effects specifications are also introduced to account for unobservable factors and thus to control for heterogeneity. Besides the inclusion of random effects to control for unobservable regional effects (see also Bellak and Leibrecht, 2009), we consider country dummies for the source and host country effects separately[11] as well as year dummies. Especially relevant to our integration issue below are the fixed effects that capture the effects over time. In particular, the cross-border dummy and distance are interacted with different specifications of time trends.[12] Finally, cultural distance is added as a control variable and is assumed to take up all cultural factors that may have an effect on the mutual economic relationships between the inhabitants of two countries via its impact on frequency and depth of communication. As the measure, we take the Kogut and Singh index (Kogut and Singh, 1988), which relies on Hofstede's four dimensions of national culture (Hofstede, 1980).[13]

Thus, with all these effects considered – up to the different time trend specifications – and with the error term standardised to its conditional expectation equal to 1, this yields for our basic regression equation

$$\ln ma_{ijt} = \beta_0 + \beta_t + \beta_I + \beta_J + \beta_4\delta_{ij} + \beta_5\theta_{IJ} + \beta_6 H_{IJ} + \beta_1 \ln y_{it} + \beta_2 \ln y_{jt} + \beta_3 \ln d_{ij} + \ln \upsilon_{ijt}\,, \quad (1)$$

with $\upsilon_{ijt} = 1 + \varepsilon_{ijt} / (\exp(\beta_0 + \beta_t + \beta_I + \beta_J + \beta_4\delta_{IJ} + \beta_5\theta_{IJ} + \beta_6 H_{IJ}) y_{it}{}^{\beta_1} y_{jt}{}^{\beta_2} d_{ij}{}^{\beta_3})$

and $E(\upsilon_{ijt} \mid x_{ijt}) = 1$,

where ma_{ijt} is the aggregated number of M&A transactions from acquirer region *i* to target region *j* in period *t*, y_i and y_j are the gross domestic products in regions *i* and *j*, δ_{ij} is a cross-

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and Voget (2009) use the Poisson method as a robustness check. The use of the number of observations is rare in gravity equations probably due to a lack of count data as often only aggregated volumes are published.

[11] Mátyás (1997) considers host and source country effects but also time effects (interpreted as business cycle effects). Mátyás interprets the target-specific effect as trade openness of the economy vis-à-vis investors. The local country effects show the efficiency of a country in exporting relative to other countries.

[12] The only study up to now that interacts the border dummy and distance with time and that estimates the effects simultaneously is Jacks (2009), who looks at barriers to the trade of wheat in the 19th century. Micco et al. (2003) include yearly bloc dummies. Berger and Nitsch (2008) introduce a simple linear time trend for the EMU countries to show that integration occurs as a process. Baldwin and Taglioni (2006) and Klein and Shambaugh (2006) propose a combination of time-varying country dummies and time-invariant pair dummies.

[13] Hofstede's four dimensions are individualism and collectivism, power distance, uncertainty avoidance and masculinity and femininity.

border dummy set to 1 if region i and region j are placed in different countries, β_0 is a constant, β_t is a time dummy, β_I and β_J are country fixed effects from the acquirer country I and the target country J in which the regions i and j are located; θ_{IJ} is a dummy set 1 if country I and country J are neighbouring, H_{IJ} is a cultural distance parameter between the two countries, with 0 standing for no distance and increasing with distance, and d_{ij} describes the geographical distance between the centroids of the regions, and ε_{ijt} is a disturbance term with mean zero and which is independent of the regressors.

For the Poisson pseudo-maximum likelihood (PPML) estimation, the equation is brought into the form of an exponential regression function

$$E[ma_{ijt}] = \exp(\beta_0 + \beta_t + \beta_I + \beta_J + \beta_4 \delta_{ij} + \beta_5 \theta_{IJ} + \beta_6 H_{IJ} + \beta_1 \ln y_{it} + \beta_2 \ln y_{jt} + \beta_3 \ln d_{ij} + \ln \upsilon_{ijt}). \tag{2}$$

A suitable specification for PPML estimation is the assumption that the conditional variance is proportional to the conditional mean

$$E[ma_{ijt} \mid x_{ijt}] = \eta V[ma_{ijt} \mid x_{ijt}]. \tag{3}$$

In the Poisson estimation, the dependent variable ma_{ijt} is the number of M&A observations from region i to region j in period t, a discrete count variable that is independently distributed and the distribution has the parameter

$$\lambda_{ijt} = \exp(x_{ijt} b) = \exp\left(\sum_{k=1}^{K} x_{ijtk} b_k \right), \tag{4}$$

where x_{ijt} are the exogenous variables associated with the ijtth observation and b_k are K unknown parameters.

The mean and variance of ma_{ijt} are equal to λ_{ijt} and the density of the function of the random effects specification is

$$f(ma_{ijt} \mid \alpha_{ij}, x_{ijt}, \lambda_{ijt}, \beta) = \prod_{t=1}^{T} \frac{\lambda_{ijt}^{ma_{ijt}}}{ma_{ijt}!} \exp\left\{ -\exp(\alpha_{ij}) \sum_{t=1}^{T} \lambda_t \right\} \exp[\alpha_{ij} \sum_{t=1}^{T} ma_{ijt}], \tag{5}$$

where α_{ij} is the random effect of the ijth observation that is assumed to be gamma-distributed in the estimations below.

3 Data

The study investigates the integration process of Western Europe. In our data set, that is a modification of the one of Umber, Grote and Frey (2010), we focus on the EU 15 countries,[14] it concentrates on a region with some tradition in widely liberal capital markets. Furthermore, the concrete length of the sample period – the time span from 1995 to 2007 – was driven by the availability of regional GDP data at the NUTS2 level from Eurostat's Nomenclature of Statistical Territorial Units (NUTS). Population size is the crucial criterion for the shaping of the NUTS regions: On the NUTS2 level the minimum is 800 thousand and the maximum 3 million inhabitants. For Germany, this geographical unit is placed between the German administrative levels "Länder" and "Kreise". In France, it corresponds to the administrative level "région" and, in Spain, to the administrative level "comunidades autónomas" (see Figure A1 in the Appendix for a graphical presentation of GDP distribution at the regional NUTS2 level in Europe). Moreover, M&A transactions were taken from Thomson One Banker provided by Thomson Reuters. We consider deals where the announced transaction date falls into the observation period, a transaction value is given and ownership exceeds 50% of shares after the transaction. In addition, the acquirers' headquarters and the target firms are located within the EU 15. Financial investors' transactions are excluded (SIC 6700 to 6799) as their acquisitions are motivated as financial engagements, while non-financial investors have strategic interests relating to their economic activities. For the estimation, the transaction values and the regional GDPs are deflated using national HICPs.

In the time span from 1995 to 2007, our sample includes 6,691 deals, of which 2,398 are cross-border. In the sample, the UK is by far the most important country – especially in the field of intranational deals, while in 36% of cross-border deals the acquirer is British – and accounts for more than half of the total observations (see Table 1).[15] To determine the distance between the NUTS2 regions, we first use acquirers' and targets' postal codes to obtain the latitude and longitude data[16] and then assign the single NUTS regions in which the firms are located in a second step. Subsequently, the distances between the centroid points of the acquirers' and the targets' regions are calculated (see Coval and Moskowitz, 1999).

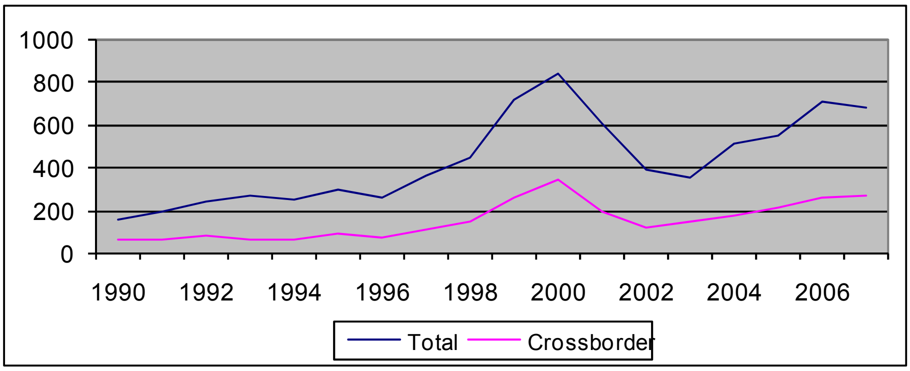
[14] In the analysis, the exclusion of the rest of the world is possible as bilateral variables dominate location decisions, although third country effects are found to be significant (see Hall and Petroulas, 2008).
[15] The UK has a high share in both the matched sample and the master sample.
[16] The matching was carried out automatically.

Table 1: Regional distribution in the sample (1995-2007)

	Acquirer Nation	Target Nation	National Deals
AT	34	39	7
BE	145	133	36
DE	422	615	196
DK	58	83	0
ES	266	380	175
FI	103	88	33
FR	432	606	185
GR	9	4	1
IE	134	83	3
IT	350	372	221
LU	16	9	0
NL	259	269	79
PT	34	40	12
SE	369	322	164
UK	4060	3648	3186
Total	6691	6691	4293

To first obtain a broader picture of M&A activities in Western Europe, we take up the development starting as early as 1990.[17] In both the yearly sums of observations and the aggregated deal volumes, we see a smooth growth in M&As in the 1990s, with a rapid acceleration at the end of the 1990s (see Figures 1 and 2). Outstandingly high figures were registered in the new economy boom stage from 1999 to 2001. The subsequent bursting of the bubble caused a sharp drop in the number and volume of M&As. From 2003 to the end of 2007, a recovery process took place.

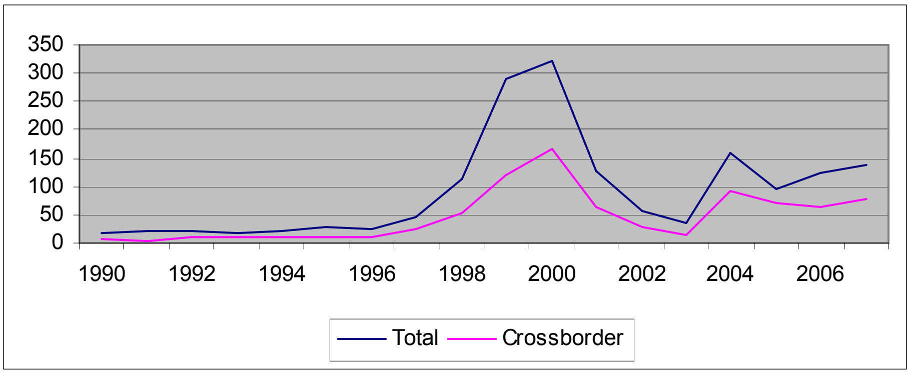
Figure 1: Number of transactions in the EU 15 – matched sample



In comparison, the series of aggregated M&A volumes exhibits more volatility over time than that of the number of observations (Figure 1 and Figure 2).[18]

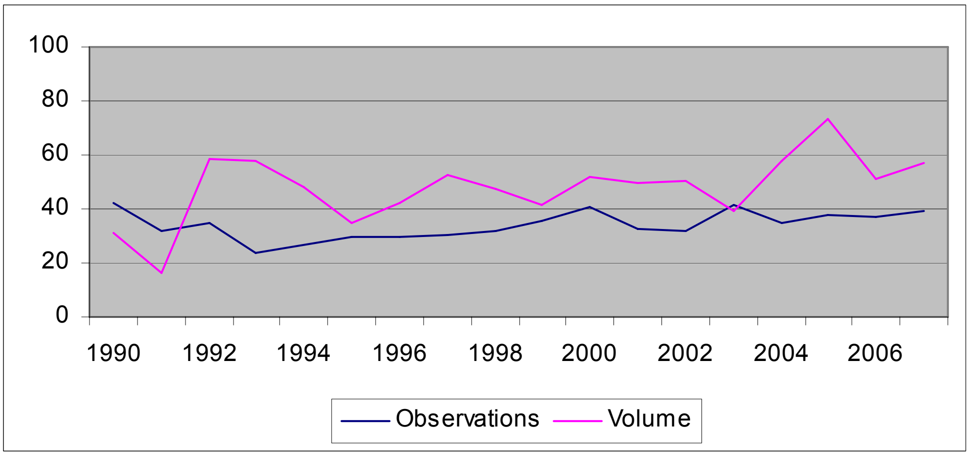
[17] Kleinert and Todt (2002) see a merger wave which was especially relevant in Europe just before the sample from 1984-1988: European firms converted from former national into international champions.
[18] These developments are also found in the larger pre-matching data set (Figures A2 and A3 in the Appendix).

Figure 2: Transaction volume in the EU 15 in € billion – matched sample



Besides the increase in overall M&A activity within the EU 15, there seems to be a positive trend in the share of cross-border activity with respect to both the number of yearly observations and the yearly aggregated deal volume figures (Figure 3).[19] As the share of cross-border activity of the yearly aggregated deal volumes is higher on average than that for the number of observations, cross-border deals seem to be more sizeable than national ones.

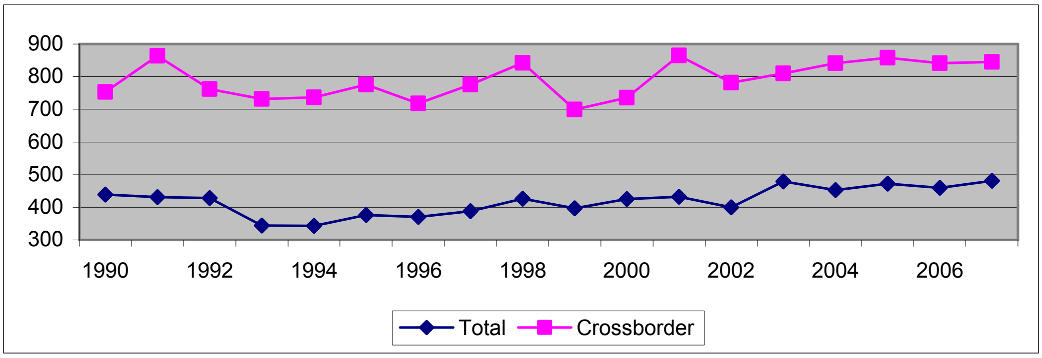
Figure 3: Share of cross-border transactions in the EU 15 over time – matched sample



In addition, the average distance between acquirer and target over time also depicts an increasing pattern (see Figure 4). Across the sample, the average distance of a deal is 433 km. This value reaches 908 km at the international level.

[19] Firms within the EU 15 not only acquire target firms within their own country or in other countries within the EU 15 but are also heavily engaged outside the EU 15 (Figures A1 and A2 in the Appendix). There is a co-movement for the number of observations of cross-border investments within the EU 15 and with targets outside the EU 15. The number of targets hosted outside is slightly higher and vice versa with respect to the aggregated transaction volumes. Thus no strategic regional shift took place in the period under consideration.

Figure 4: Distance over time – matched sample



4 Estimation Output

As described above, we rely on Poisson estimations with the number of M&A observations as the dependent variable (marked in the columns with the letter 'a' in Tables A1 and A2 in the Appendix). As a robustness check and to make the comparison with the outcome of large parts of the literature easier, we add Poisson estimations with the log of the aggregated M&A transaction volume as the dependent variable (columns marked 'b') and Tobit estimations of the log-linearised gravity equation (columns marked 'c').[20]

First, we address the relevance of borders and distance as barriers to M&A activity in the EU 15 over time. Across the regressions we find significant evidence for the relevance of the traditional gravity equation variables, and the coefficients have the expected sign. First, an increase in GDP both in the host and in the source regions results in higher M&A activity. This does not come as a surprise since large financially solvent firms may be located in economically strong regions and target firms in prosperous regions may be attractive in terms of taking over the targets' established customer bases. The latter is especially relevant between industrialised countries – such as the EU 15 countries in this example – where demand aspects are of great importance in firm acquisition decisions as consumption markets are often already saturated. The results for the other variables that are common in the gravity literature also meet expectations: An increase in the geographical distance between the acquirer and a potential target negatively affects the probability of the choice of that target. In addition, firms abroad are generally avoided to some extent. However, the preference for close and known regions or countries about which information can easily be collected is documented by the finding that firms hosted in neighbouring and/or less culturally distant

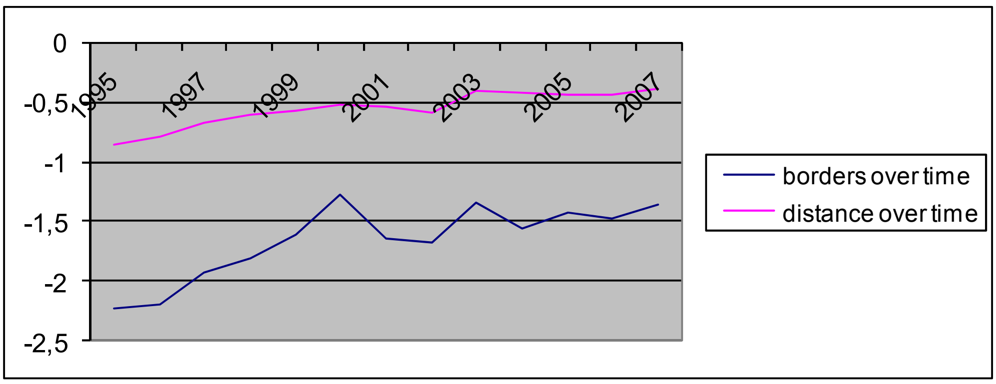
[20] Here, one is added to each M&A value before taking the log. In addition, we run negative binomial regressions to check for biases due to potential overdispersion. Furthermore, to see whether the euro area behaves differently, regressions are run without UK, SE and DK. However, the results proved to be robust.

countries are more attractive for investing firms. All of these factors already indicate that informational frictions are a major concern in the field of firm acquisitions.

Next we consider whether the reforms within the Western European countries have led to an integration of the market for corporate control in Europe. For this, we first rely on the interaction terms between the cross border dummy and year dummies as we also did in Umber, Grote and Frey (2010). As in our preceding paper, integration seems to take place as the relevance of borders has diminished in Western Europe over time (column (1a) in Table A1 and Figure 5). While the absolute value of the cross-border coefficient reaches a level of 2.2 in 1995, this value gradually declines to 1.4 in 2007, the final year under consideration. Facing this development, it is the aim of this paper to get a deeper understanding of European integration. In a first step, we can check whether this movement has rather an erratic character or whether it is backed by a trend. For this, we start by adding a simple linear cross-border time trend component – an interaction of the cross-border dummy with a time trend (see Table A1 column (3a)). Its significantly positive coefficient seems to provide further evidence that there is a continuous decline in the relevance of borders in Western Europe over time.

However, as international firm acquisitions generally take place at greater distances than national ones, one might mistakenly capture the impact of time dependency of distance in the variation of the cross-border dummy, too. As is shown in the outcome of the regression with the yearly distance variables (in column (2a) of Table A1 and in Figure 5),[21] it is not only the hampering influence of the cross-border dummy that diminishes over time; there is also a decline in the yearly absolute distance coefficient. While the coefficient is still at 0.9 in absolute terms at the beginning of the observation period, it goes down to 0.4 for 2007.

Figure 5: Relevance of borders and distance over time



Source: The cross-border dummies and the distance variable interacted with year dummies are taken from the regression outcomes tabulated in columns (1a) and (2a) in Table A1.

[21] For this, we interact distance and year dummies in a separate equation. See also Altomonte (2007).

In the next step, we therefore test for linear trends in the cross-border dummy and in distance simultaneously (see column (4a) in Table A1). While the trend in distance remains significant, that of the cross-border dummy becomes insignificant. This outcome gives a hint that over the time span from 1995 to 2007, only distance shows a continuous decline in relevance.

However, the integration process may have changed over the considered time horizon. When we look again at the yearly coefficients of distance and the cross-border dummy in Figure 5, it suggests allowing for a break in the sense of a different gradient for the period from the year 2001 onwards. For this, the economic rationale is that the new economy boom/bubble peaked in 2000 and afterwards a correction took place. To investigate this, we start with spline estimations which allow for piecewise definitions of intervals for linear trends (Poirier and Garber, 1974). In column (1a) of Table A2, we find that up to 2000 there was a decline in both the relevance of borders and distance, but the bursting of the new economy bubble significantly negatively affected this development for borders and, from then on, there was even a slight countermovement, whereas the role of distance declined further. The bursting of the new economy bubble may have rendered potential acquirers and their deal-financing banks insecure and may have increased their risk aversion with respect to cross-border engagements.

In our next regression, we allow for – completely – separate trends before 2001 and from 2001 onwards (column (2a) in Table A2). Thus, both the intercepts and the gradients are estimated separately for both time intervals. In this scenario, the integration process with respect to border effects continues until the end of 2000, but borders kept their relevance from 2001 onwards; in contrast, distance lost relevance in both subsamples.[22] However, since some important steps in the liberalisation of capital markets in Western Europe were already taken a long time prior to the sample period, the border effects within Western Europe had probably also decreased to some extent by 1995: According to our data, from 1992 to 1995, firms domiciled in the EU 15 started acquiring more firms outside Western Europe than in the other EU 15 countries. From 1995 onwards, we observe a parallel movement in the cross-border engagement of Western European firms both inside and outside Western Europe, with the rest of the world keeping its slight dominance. Furthermore, our estimations show that the relevance of distance declined for both national and cross-border deals; however, the relevance of distance at the national level starts out from a much lower level (see Table A2

[22] We also add quadratic terms for both distance and the cross-border dummy. For the cross-border dummy, the linear trend is significantly positive and the quadratic component shows a significantly negative sign. Thus, at the beginning of the observation period, integration is relatively strong in the sense of a reduction of international barriers; however, this effect fades out after six years and turns negative from 2001 onwards.

column (3a)). Allowing for a break in the trend components in 2001, we find a decline in the effect of distance at the national level for both subsamples (see Table A2 column (4a)). However, for international deals, the hampering impact of distance even increased first – while simultaneously the role of the border itself diminished – and stagnated from 2001 onwards.

As seen above, borders still play a negative role in European M&A transactions. It is likely that – despite all efforts to unite the continent – heterogeneity across the countries is still an issue and may be reflected in differing bilateral border effects. To address this issue, we create individual cross-border dummies for all combinations of country pairs and on each of these country pair dummies, we regress both directions of capital flows between the two countries to obtain more robust results. As a result, the coefficients of the standard variables of the gravity equation are again significant and show the expected signs (Table A3). Furthermore, the sizes of the coefficients more or less equal those in the previous regressions. The main outcome addresses the individual bilateral border effects between the EU 15 countries, which are often as expected. Countries presumed to have widely liberal capital market thinking or a high degree of openness for cross-border changes in corporate control or with traditionally strong economic links reveal relatively small barriers to cross-border flows on average – however, there remain discrepancies depending on the counterpart abroad. Here, the Netherlands, Germany and the UK are the first to mention. For Germany, the coefficient is lowest vis-à-vis Austria, followed by relatively good capital market links to France, the UK, Sweden and the Netherlands. The borders of the UK are most open vis-à-vis Ireland, followed by Germany and the Netherlands. Furthermore, unsurprisingly there are also only small border frictions between Belgium and the Netherlands, Belgium and France, Spain and Portugal, and Sweden and Finland. As a result, the barriers seem to be generally higher in transactions with Southern European countries, especially Spain, Portugal, Italy and Greece; however, the Northern non-continental country Finland and, with a gap, Sweden and Ireland should also be mentioned in this respect. On the bilateral level, most frictions arise between Spain and Finland and between Italy and Ireland.

Finally, we estimate the bilateral coefficients separately for the subsamples from 1995-2000 and from 2001-2007 but within one regression equation (Table A4). As a result, heterogeneity – measured in terms of the variance of the bilateral coefficients – diminished over time. However, the F-test could not reject the hypothesis that heterogeneity was unaltered over the two periods. Moreover, we again find a decrease in the relevance of borders when we compare the averages of the bilateral coefficients for the two subsamples.

5 Conclusions

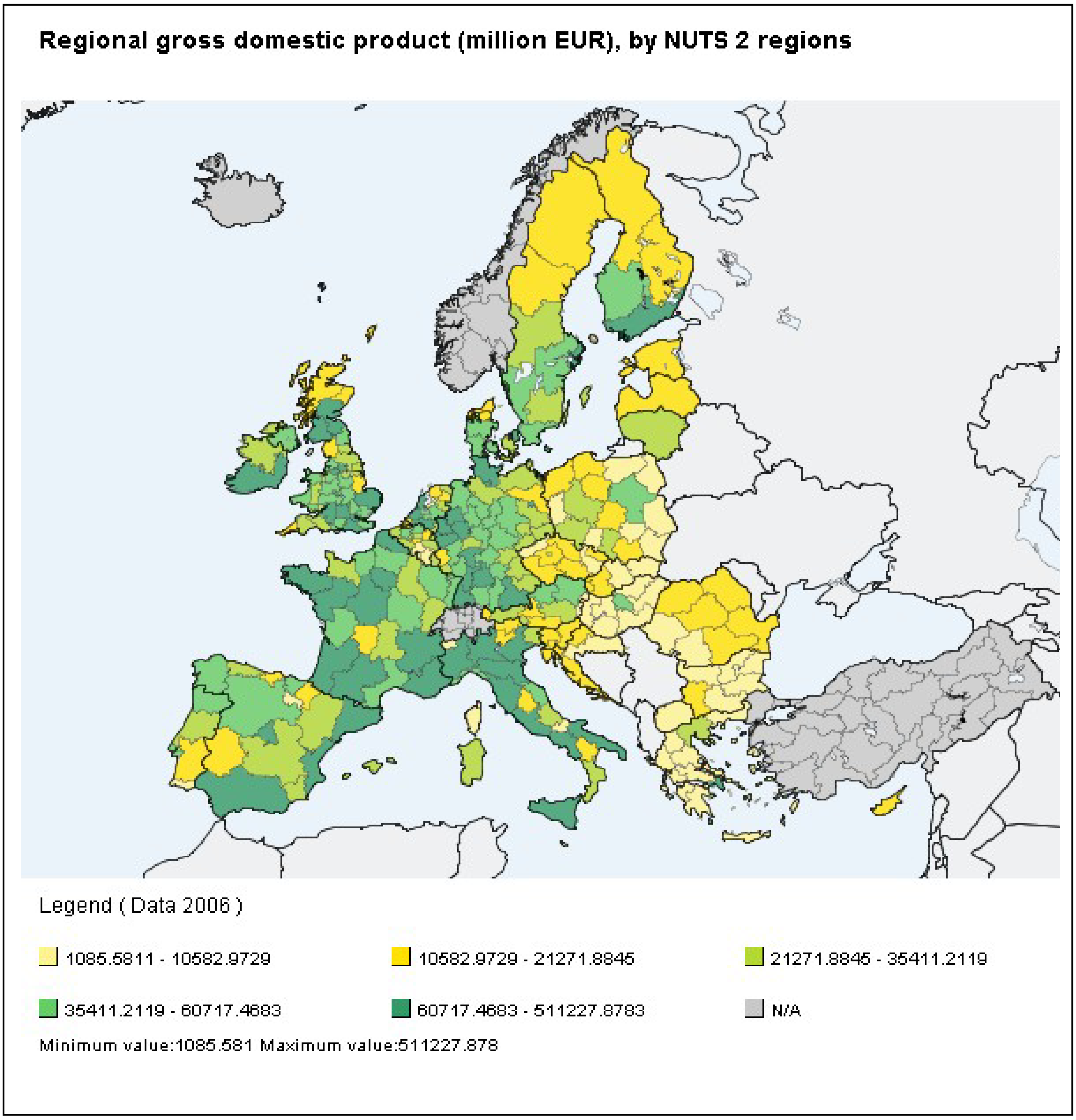
In the EU, many measures have been taken to establish a single economic market. The study takes a closer look at the supposed integration of the market for corporate control – an illustrative market for considering integration issues – as capital is per se mobile but may be hampered by institutional, political and cultural factors. For the first subsample from 1995 up to 2001 – shortly after the completion of the internal market foreseen in the Single European Act by the end of 1992 and the transition from the EEC to the EU and in the run-up to European Monetary Union in combination with the new economy euphoria – we find a decline in the role of borders as barriers between the EU 15 countries. Probably due to the bursting of the new economy bubble, some countermovement took place from 2001 onwards and the integration process came to a halt. The bursting of the bubble may have increased the risk aversion of potential acquirers and deal-financing banks concerning their international engagement. The outcome of a rather moderate integration in Europe is supported by Umber, Grote and Frey (2010) who found in a slightly deviating time span less integration for the European than for the US American market for corporate control. However, since some important steps in the liberalisation of capital markets in Western Europe were already taken a long time prior to the sample period, the border effects may also have decreased to some extent by 1995. In contrast to the national borders, the study provides empirical evidence that geographical distances between acquirer and target firms became less relevant in the total period from 1995 to 2007 and a look at the figures reveals that distances between acquirer and target firms increased in the case of national and international transactions. Thus, the technological innovations that facilitated a bridging of distance, for instance in the field of information technologies and/or logistics, may have been important in the period under consideration.

Despite all institutional efforts to promote capital market integration, bilateral border effects between Western European countries proved to still be very different. At one end of the scale, countries with a rather liberal and open stance vis-à-vis their capital markets such as the Netherlands, Germany and the UK show on average relatively small border coefficients in absolute terms vis-à-vis the other EU 15 countries. For Germany, the coefficient is lowest vis-à-vis Austria, followed by relatively good capital market links to France, the UK, Sweden and the Netherlands. The borders of the UK are most open vis-à-vis Ireland, followed by Germany and the Netherlands. Furthermore, unsurprisingly there are also only small border frictions between Belgium and the Netherlands, Belgium and France, Spain and Portugal, and Sweden and Finland. At the other end of the scale, these values are much higher for Spain, Portugal, Italy and Greece. In Southern European countries, government considerations might be a greater issue in takeovers by foreign firms, probably in particular for takeovers on a large scale. For Finland, and, with some reservations, for Sweden and Ireland, their isolated geographical location on the outer borders of Europe may account to some extent for their relatively high barriers vis-à-vis the other countries. When we split the period under consideration into two subsamples we see a decline in heterogeneity – though this decline is not significant. In Chen's (2004) analysis, the outcome for the relevance of borders for trade flows does not differ much from ours. However, the German border effect is much smaller than the British one. One reason for this may be that transportation costs are important for trade and thus the location of Germany in the centre of Europe may be much more advantageous. Minondo's (2007) tariff equivalents of bilateral borders vary between zero (Netherlands-Finland) and 70 percent (Austria-Spain). Guiso et al (2009) conclude that even in the European Union cultural barriers are still important and their effects on world trade might be even greater.

Although there was some decline in the relevance of borders in the period under consideration, the institutional reforms may not have been backed by a liberalisation of thinking in some Western European economies at the same speed, which is indicated by the largely ongoing differences in bilateral border barriers. However, there may also be other determinants that are not captured in the study and that affect the integration process to some degree. For an in-depth analysis, a look at the micro level may provide additional information.

Annex

Figure A1:



Source: Eurostat

Figure A2: Number of M&A observations in EU 15 in thousands – before matching

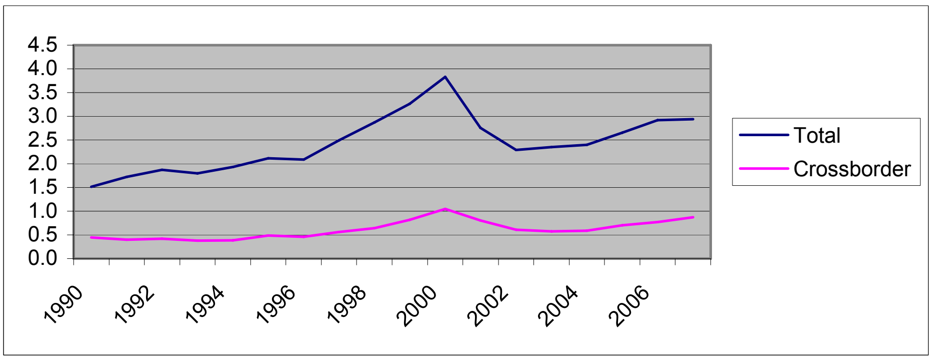


Figure A3: M&A volume in EU 15 in € billion – before matching

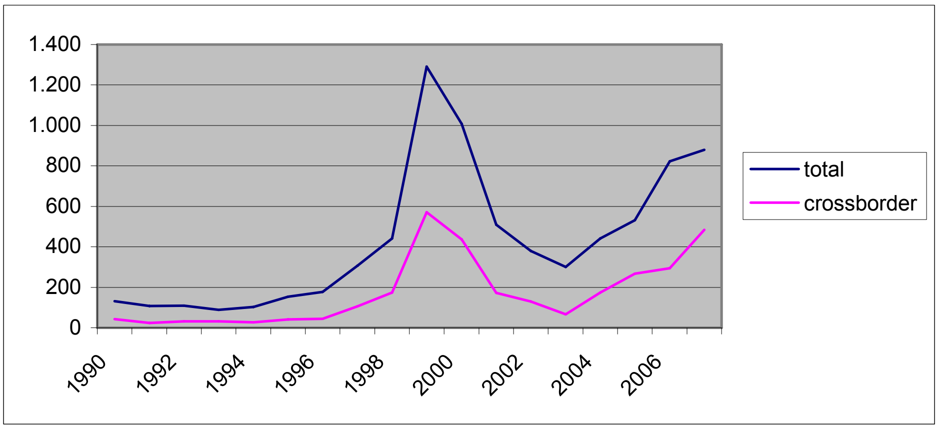


Figure A4: Number of cross-border transactions from EU 15 acquirers with intra-EU 15 targets and extra-EU 15 targets in thousands

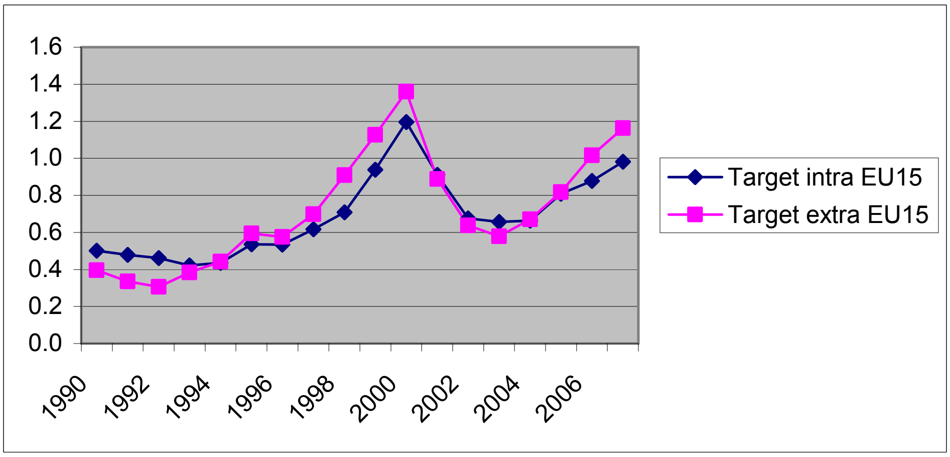


Table A1: Assessment of the integration process A

VARIABLES	(1) a P (obs)	(1) b P (lg(val))	(1) c Tobit		(2) a P (obs)	(2) b P (lg(val))	(2) c Tobit	(3) a P (obs)	(3) b P (lg(val))	(3) c Tobit	(4) a P (obs)	(4) b P (lg(val))	(4) c Tobit
lg(gdp_n2_tg)	1.373***	0.778***	0.590***		1.375***	0.794***	0.589***	1.369***	0.737***	0.590***	1.372***	0.757***	0.589***
	(0.0268)	(0.0325)	(0.0116)		(0.0269)	(0.0325)	(0.0116)	(0.0268)	(0.0325)	(0.0116)	(0.0268)	(0.0324)	(0.0116)
lg(gdp_n2_aq)	1.849***	1.007***	0.810***		1.854***	1.026***	0.810***	1.846***	0.983***	0.811***	1.851***	1.001***	0.810***
	(0.0290)	(0.0319)	(0.0133)		(0.0291)	(0.0319)	(0.0133)	(0.0290)	(0.0319)	(0.0133)	(0.0290)	(0.0318)	(0.0133)
lg(distance)	-0.543***	-0.835***	-0.223***					-0.543***	-0.844***	-0.223***	-0.764***	-1.047***	-0.283***
	(0.0352)	(0.0697)	(0.0133)					(0.0352)	(0.0700)	(0.0133)	(0.0462)	(0.0711)	(0.0241)
trend in dis											0.0297***	0.0273***	0.0082***
											(0.00401)	(0.00173)	(0.00275)
same border	0.401***	0.0261	0.181***		0.391***	0.0243	0.180***	0.392***	0.0193	0.179***	0.390***	0.0193	0.179***
	(0.0691)	(0.0974)	(0.0272)		(0.0691)	(0.0974)	(0.0272)	(0.0690)	(0.0976)	(0.0272)	(0.0691)	(0.0976)	(0.0272)
cultural dis	-0.189***	-0.200***	-0.0797***		-0.191***	-0.201***	-0.0801***	-0.189***	-0.199***	-0.0798***	-0.191***	-0.200***	-0.0801***
	(0.0280)	(0.0384)	(0.0105)		(0.0280)	(0.0383)	(0.0105)	(0.0280)	(0.0384)	(0.0105)	(0.0280)	(0.0384)	(0.0105)
cross-border					-1.604***	-1.199***	-0.827***	-1.963***	-1.409***	-0.922***	-1.640***	-1.152***	-0.816***
					(0.0805)	(0.132)	(0.0397)	(0.0970)	(0.134)	(0.0555)	(0.107)	(0.135)	(0.0642)
trend in cb								0.0491***	0.0323***	0.00980**	0.00518	-0.00355	-0.00115
								(0.00721)	(0.00258)	(0.00382)	(0.00933)	(0.00343)	(0.00530)
crossb 1995	-2.228***	-1.694***	-0.768***	lg(dis) 1995	-0.865***	-1.104***	-0.300***						
crossb 1996	-2.188***	-1.632***	-0.757***	lg(dis) 1996	-0.796***	-1.100***	-0.302***						
crossb 1997	-1.924***	-1.366***	-0.651***	lg(dis) 1997	-0.675***	-0.962***	-0.237***						
crossb 1998	-1.811***	-1.405***	-0.696***	lg(dis) 1998	-0.613***	-0.908***	-0.223***						
crossb 1999	-1.618***	-1.208***	-0.663***	lg(dis) 1999	-0.584***	-0.875***	-0.263***						
crossb 2000	-1.283***	-0.830***	-0.547***	lg(dis) 2000	-0.533***	-0.757***	-0.223***						
crossb 2001	-1.648***	-1.154***	-0.629***	lg(dis) 2001	-0.543***	-0.816***	-0.215***						
crossb 2002	-1.687***	-1.282***	-0.631***	lg(dis) 2002	-0.590***	-0.861***	-0.202***						
crossb 2003	-1.354***	-1.079***	-0.535***	lg(dis) 2003	-0.416***	-0.774***	-0.153***						
crossb 2004	-1.568***	-1.191***	-0.648***	lg(dis) 2004	-0.425***	-0.784***	-0.199***						
crossb 2005	-1.435***	-1.120***	-0.625***	lg(dis) 2005	-0.445***	-0.764***	-0.189***						
crossb 2006	-1.479***	-1.088***	-0.635***	lg(dis) 2006	-0.451***	-0.769***	-0.216***						
crossb 2007	-1.362***	-1.065***	-0.647***	lg(dis) 2007	-0.393***	-0.692***	-0.195***						
constant	-59.18***	-32.06***		constant	-59.94***	-33.18***		-59.15***	-31.01***		-59.29***	-32.69***	
	(0.764)	(0.860)			(0.772)	(0.866)		(0.763)	(0.863)		(0.750)	(0.807)	
observations	522600	522600	522600		522600	522600	522600	522600	522600	522600	522600	522600	522600

Fixed effects: Source and host countries, years, standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A2: Assessment of the integration process B

VARIABLES	(1)a P (obs)	(1) b P (lg(val))	(1) c Tobit	(2) a P (obs)	(2) b P (lg(val))	(2) c Tobit		(3) a P (obs)	(3) b P (lg(val))	(3) c Tobit	(4) a P (obs)	(4) b P (lg(val))	(4) c Tobit
lg(gdp_n2_tg)	1.376***	0.802***	0.589***	1.376***	0.803***	0.589***	lg(gdp_n2_tg)	1.367***	0.756***	0.586***	1.373***	0.807***	0.586***
	(0.0269)	(0.0325)	(0.0116)	(0.0269)	(0.0325)	(0.0116)		(0.0266)	(0.0325)	(0.0116)	(0.0266)	(0.0326)	(0.0116)
lg(gdp_n2_aq)	1.855***	1.031***	0.810***	1.855***	1.030***	0.810***	lg(gdp_n2_aq)	1.842***	1.000***	0.805***	1.847***	1.038***	0.805***
	(0.0291)	(0.0319)	(0.0133)	(0.0291)	(0.0319)	(0.0133)		(0.0287)	(0.0319)	(0.0133)	(0.0288)	(0.0321)	(0.0132)
same border	0.401***	0.0271	0.181***	0.400***	0.0273	0.180***	same border	0.208***	-0.0512	0.110***	0.220***	-0.0423	0.112***
	(0.0692)	(0.0974)	(0.0272)	(0.0692)	(0.0974)	(0.0272)		(0.0731)	(0.0992)	(0.0285)	(0.0732)	(0.0991)	(0.0285)
cultural dis	-0.191***	-0.201***	-0.0800***	-0.191***	-0.201***	-0.0801***	cultural dis	-0.189***	-0.202***	-0.0791***	-0.190***	-0.203***	-0.0794***
	(0.0280)	(0.0383)	(0.0105)	(0.0280)	(0.0383)	(0.0105)		(0.0281)	(0.0385)	(0.0105)	(0.0281)	(0.0384)	(0.0105)
							cross-border	-1.912***	-1.617***	-0.822***			
lg(distance)	-0.768***	-1.053***	-0.247***					(0.122)	(0.188)	(0.0800)			
	(0.0612)	(0.0728)	(0.0365)				trend in cb	0.00329	-0.00273	-0.0130*			
trend in dis	0.0306***	0.0310***	-0.00113					(0.0113)	(0.00442)	(0.00710)			
	(0.0108)	(0.00472)	(0.00768)				lg(dis) nat	-0.610***	-0.680***	-0.279***			
cross-border	-2.124***	-1.605***	-1.078***				lg(dis) cb	-1.028***	-1.190***	-0.337***			
	(0.150)	(0.140)	(0.101)				trend in dis nat	0.0313***	0.0270***	0.0152***			
trend in cb	0.120***	0.101***	0.0499***				trend in dis cb	0.0259***	0.0281***	0.00177			
	(0.0271)	(0.00988)	(0.0148)										
							cborder 9500				-2.264***	-1.911***	-0.790***
Δ trend in dis 01	-0.000959	-0.00530	0.0144				cborder 0107				-1.975***	-1.637***	-0.593***
Δ trend in cb 01	-0.164***	-0.150***	-0.0776***				trend in cb 9500				0.0938***	0.0667***	0.00769
trend in ds 01	0.02964***	0.0257***	0.0133				trend in cb 0107				0.00714	-0.00395	-0.0253
trend in cb 01	-0.04375**	-0.04915***	-0.0277										
							lg(dis) nat 9500				-0.659***	-0.766***	-0.296***
lg(dis) 9500				-0.753***	-1.047***	-0.229***	lg(dis) nat 0106				-0.531***	-0.615***	-0.253***
lg(dis) 0106				-0.675***	-0.993***	-0.237***	lg(dis) cb 9500				-0.718***	-0.920***	-0.208***
trend dis 9500				0.0247**	0.0289***	-0.00864	lg(dis) cb 0106				-0.902***	-1.165***	-0.279***
trend dis 0107				0.0219**	0.0233***	0.00468	trend dis nat 9500				0.0439***	0.0525***	0.0209*
cborder 9500				-2.243***	-1.695***	-0.922***	trend dis nat 0106				0.0235**	0.0204***	0.0126
cborder 0107				-1.738***	-1.143***	-0.616***	trend dis cb 9500				-0.0576*	-0.0408***	-0.0351***
trend in cb 9500				0.165***	0.135***	0.0628***	trend dis cb 0106				0.0183	0.0296***	-0.00203
trend in cb 0107				0.00930	-0.0104	-0.0127							
constant	-59.68***	-33.20***		-59.64***	-33.18***			-58.76***	-32.16***		-59.25***	-33.02***	
	(0.771)	(0.863)		(0.771)	(0.863)			(0.747)	(0.824)		(0.769)	(0.880)	
observations	522600	522600	522600	522600	522600	522600							

Table A3: Bilateral border effects for 1995-2007 (without LU)

VARIABLES	(1) P (obs)	(2) P (lg(val))	(3) Tobit		(1) P (obs)	(2) P (lg(val))	(3) Tobit
lg(gdp_n2_tg)	1.380***	1.240***	0.549***	cb_DKNL	-0.242	-0.336	-0.143
	(0.0264)	(0.0318)	(0.0112)	cb_DKPT	-29.04	-25.92	-2.195***
lg(gdp_n2_aq)	1.855***	1.701***	0.751***	cb_DKSE	0.377	0.0323	0.0300
	(0.0284)	(0.0335)	(0.0130)	cb_DKUK	-0.872	-0.675	-0.392*
lg(distance)	-0.406***	-0.505***	-0.159***	cb_ESFI	-4.117***	-3.453***	-1.160***
	(0.0368)	(0.0604)	(0.0130)	cb_ESFR	-1.999***	-2.075***	-0.714***
constant	-60.84***	-54.97***		cb_ESGR	-28.76	-23.58	-2.399***
	(1.046)	(1.813)		cb_ESIE	-3.734***	-4.376***	-1.250***
				cb_ESIT	-2.281***	-2.199***	-0.781***
cb_DEAT	-0.732**	-1.069***	-0.259***	cb_ESNL	-1.895***	-2.040***	-0.684***
cb_DEBE	-2.161***	-1.849***	-0.650***	cb_ESPT	-1.138***	-0.269	-0.412***
cb_DEDK	-0.856	-0.996	-0.355	cb_ESSE	-2.987***	-2.235***	-0.949***
cb_DEES	-1.901***	-1.686***	-0.630***	cb_ESUK	-2.592***	-2.185***	-0.853***
cb_DEFI	-2.185***	-2.213***	-0.746***	cb_FIFR	-3.522***	-3.725***	-1.092***
cb_DEFR	-1.453***	-1.578***	-0.512***	cb_FIGR	-20.01	-24.19	-2.342***
cb_DEGR	-2.455***	-2.703***	-0.738***	cb_FIIE	-33.50	-28.14	-2.450***
cb_DEIE	-1.760***	-1.299	-0.717***	cb_FIIT	-3.778***	-2.738***	-1.094***
cb_DEIT	-2.099***	-1.906***	-0.690***	cb_FINL	-2.531***	-2.329***	-0.849***
cb_DENL	-1.660***	-1.754***	-0.579***	cb_FIPT	-30.02	-25.70	-2.381***
cb_DEPT	-2.576***	-1.885***	-0.754***	cb_FISE	-1.429***	-1.780***	-0.588***
cb_DESE	-1.585***	-1.146***	-0.558***	cb_FIUK	-3.185***	-2.799***	-1.014***
cb_DEUK	-1.514***	-1.448***	-0.562***	cb_FRGR	-2.574***	-1.877***	-0.839***
cb_BEAT	-2.146***	-2.266***	-0.632***	cb_FRIE	-2.912***	-2.429**	-0.972***
cb_BEDK	-1.997	-1.699	-0.672**	cb_FRIT	-2.042***	-2.316***	-0.736***
cb_BEES	-2.237***	-1.593***	-0.697***	cb_FRNL	-1.681***	-1.617***	-0.582***
cb_BEFI	-31.03	-26.95	-2.330***	cb_FRPT	-2.772***	-2.990***	-0.889***
cb_BEFR	-1.338***	-1.329***	-0.466***	cb_FRSE	-2.290***	-2.221***	-0.771***
cb_BEGR	-1.900*	-1.176	-0.603**	cb_FRUK	-1.901***	-1.880***	-0.690***
cb_BEIE	-1.545**	-1.166	-0.605***	cb_GRIE	-20.61	-24.51	-2.279***
cb_BEIT	-2.356***	-1.952***	-0.740***	cb_GRIT	-3.395***	-2.488***	-0.978***
cb_BENL	-1.184***	-0.725**	-0.419***	cb_GRNL	-2.387**	-5.327	-0.749***
cb_BEPT	-2.399***	-1.732***	-0.708***	cb_GRPT	-27.08	-23.05	-2.248***
cb_BESE	-2.605***	-1.980***	-0.821***	cb_GRSE	-20.32	-24.45	-2.331***
cb_BEUK	-2.008***	-1.750***	-0.692***	cb_GRUK	-3.081***	-2.812***	-0.932***
cb_ATES	-3.672***	-3.356***	-1.000***	cb_IEIT	-4.144***	-3.432***	-1.193***
cb_ATFI	-1.719***	-2.150***	-0.571***	cb_IENL	-2.089***	-1.687	-0.773***
cb_ATFR	-3.294***	-2.673***	-0.950***	cb_IEPT	-30.97	-26.56	-2.378***
cb_ATGR	-25.96	-23.79	-2.208***	cb_IESE	-2.269***	-1.578	-0.818***
cb_ATIE	-2.365**	-2.465*	-0.796***	cb_IEUK	-0.786**	-0.822	-0.354***
cb_ATIT	-3.067***	-3.320***	-0.881***	cb_ITNL	-2.066***	-2.053***	-0.718***
cb_ATNL	-1.913***	-1.448***	-0.593***	cb_ITPT	-3.466***	-3.212***	-0.999***
cb_ATPT	-28.82	-24.72	-2.204***	cb_ITSE	-3.171***	-2.698***	-0.978***
cb_ATSE	-1.925***	-1.164**	-0.619***	cb_ITUK	-2.598***	-2.516***	-0.869***
cb_ATUK	-3.198***	-2.792***	-0.941***	cb_NLPT	-2.855***	-2.137***	-0.846***
cb_DKES	-1.645*	-1.386	-0.579**	cb_NLSE	-1.913***	-1.784***	-0.669***
cb_DKFI	-0.738	-1.109	-0.270	cb_NLUK	-1.772***	-2.040***	-0.653***
cb_DKFR	-0.557	-0.556	-0.268	cb_PTSE	-3.297***	-3.630***	-1.003***
cb_DKGR	-19.77	-24.72	-2.217***	cb_PTUK	-3.883***	-3.133***	-1.140***
cb_DKIT	-1.790*	-1.295	-0.651***	cb_SEUK	-2.293***	-2.134***	-0.816***
observations	522600	522600	522600				

Fixed effects: Source and host countries, years

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A4: Bilateral border effects for 1995-2000 and 2001-2007

The concentration on significant effects led to the exclusion of the countries AT, DK, GR, LU and the pairs BEFI, BEIE, BEDK, DKES, DKPT, DKIE, FIES, FIIE, FIPT, IEIT, IEES, IEUK, IEPT and ITPT

VARIABLES	P (obs)
lg(gdp_n2_tg)	1.384***
	(0.0271)
lg(gdp_n2_aq)	1.865***
	(0.0293)
lg(dis)9500	-0.509***
	(0.0409)
lg(dis)0107	-0.330***
	(0.0399)
constant	-59.24***
	(0.737)

	1995-2000	2001-2007		1995-2000	2001-2007
cb_DEBE	-2.221***	-2.039***	cb_ESNL	-1.981***	-1.861***
cb_DEDK	-2.594***	-2.714***	cb_ESPT	-1.971***	-0.790***
cb_DEES	-1.916***	-1.886***	cb_ESSE	-4.387***	-2.671***
cb_DEFI	-2.404***	-2.060***	cb_ESUK	-2.430***	-2.740***
cb_DEFR	-1.837***	-1.152***	cb_FIFR	-4.218***	-3.301***
cb_DEIE	-3.103***	-1.478***	cb_FIIT	-3.275***	-4.423***
cb_DEIT	-2.068***	-2.089***	cb_FINL	-2.708***	-2.452***
cb_DENL	-1.664***	-1.620***	cb_FISE	-1.755***	-1.236***
cb_DEPT	-2.467***	-2.609***	cb_FIUK	-2.952***	-3.377***
cb_DESE	-1.651***	-1.483***	cb_FRIE	-2.925***	-3.016***
cb_DEUK	-1.474***	-1.526***	cb_FRIT	-2.179***	-1.935***
cb_BEES	-2.905***	-1.958***	cb_FRNL	-1.465***	-1.907***
cb_BEFR	-1.378***	-1.283***	cb_FRPT	-2.447***	-3.099***
cb_BEIT	-3.868***	-1.821***	cb_FRSE	-2.170***	-2.396***
cb_BENL	-1.512***	-0.889***	cb_FRUK	-1.594***	-2.212***
cb_BEPT	-2.215**	-2.469**	cb_IENL	-1.895**	-2.262***
cb_BESE	-2.468***	-2.687***	cb_IESE	-2.730**	-2.176***
cb_BEUK	-1.866***	-2.108***	cb_ITNL	-2.093***	-2.026***
cb_DKFI	-2.701***	-2.734***	cb_ITSE	-3.933***	-2.841***
cb_DKFR	-2.265***	-2.774***	cb_ITUK	-2.516***	-2.687***
cb_DKIT	-4.022***	-3.567***	cb_NLPT	-2.650**	-2.967***
cb_DKNL	-3.036***	-1.785***	cb_NLSE	-2.179***	-1.725***
cb_DKSE	-1.803***	-1.418***	cb_NLUK	-1.578***	-1.931***
cb_DKUK	-2.669***	-2.969***	cb_PTSE	-3.063***	-3.448***
cb_ESFR	-2.889***	-1.683***	cb_PTUK	-4.649***	-3.609***
cb_ESIT	-2.615***	-2.120***	cb_SEUK	-2.304***	-2.308***

Observations: 399880
Fixed effects: Source and host countries, years

Test on a decline in heterogeneity in bilateral border coefficients

	1995-2000	2001-2007	1995-2007
Mean bil coefs	-2.493	-2.275	-2.384
Standard dev bil coef	0.7834	0.7451	0.7695
Var bil coeff	0.6137	0.5552	0.5921

Test statistic on equal variances 1.1055, Critical value (5% level): F(51,51)=1,60

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