RUHR
ECONOMIC PAPERS

Joel Stiebale
Michaela Trax

The Effects of Cross-border M&As on the Acquirers' Domestic Performance

Firm-level Evidence

#159

Imprint

Ruhr Economic Papers

Published by

Ruhr-Universität Bochum (RUB), Department of Economics
Universitätsstr. 150, 44801 Bochum, Germany

Technische Universität Dortmund, Department of Economic and Social Sciences
Vogelpothsweg 87, 44227 Dortmund, Germany

Universität Duisburg-Essen, Department of Economics
Universitätsstr. 12, 45117 Essen, Germany

Rheinisch-Westfälisches Institut für Wirtschaftsforschung (RWI)
Hohenzollernstr. 1-3, 45128 Essen, Germany

Editors

Prof. Dr. Thomas K. Bauer
RUB, Department of Economics, Empirical Economics
Phone: +49 (0) 234/3 22 83 41, e-mail: thomas.bauer@rub.de

Prof. Dr. Wolfgang Leininger
Technische Universität Dortmund, Department of Economic and Social Sciences
Economics – Microeconomics
Phone: +49 (0) 231/7 55-3297, email: W.Leininger@wiso.uni-dortmund.de

Prof. Dr. Volker Clausen
University of Duisburg-Essen, Department of Economics
International Economics
Phone: +49 (0) 201/1 83-3655, e-mail: vclausen@vwl.uni-due.de

Prof. Dr. Christoph M. Schmidt
RWI, Phone: +49 (0) 201/81 49-227, e-mail: christoph.schmidt@rwi-essen.de

Editorial Office

Joachim Schmidt
RWI, Phone: +49 (0) 201/81 49-292, e-mail: joachim.schmidt@rwi-essen.de

Ruhr Economic Papers #159

Responsible Editor: Volker Clausen

ISSN 1864-4872 (online) – ISBN 978-3-86788-178-4

Ruhr Economic Papers #159

Joel Stiebale and Michaela Trax

The Effects of Cross-border M&As on the Acquirers' Domestic Performance

Firm-level Evidence

Bibliografische Informationen der Deutschen Nationalbibliothek

Die Deutsche Bibliothek verzeichnet diese Publikation in der deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über: *http//dnb.ddb.de* abrufbar.

ISSN 1864-4872 (online)
ISBN 978-3-86788-178-4

Joel Stiebale and Michaela Trax[1]

The Effects of Cross-border M&As on the Acquirers' Domestic Performance – Firm-level Evidence

Abstract

This paper provides empirical evidence on the effects of cross-border M&As on investing firms' domestic performance in the U.K. and France. We build a new firm-level dataset that combines a global M&A database with balance sheet data for the years 2000–2007. Combining matching techniques with a difference-in-differences estimator, we find that cross-border deals boost on average domestic employment, sales, and investment, and they are not accompanied by a downsizing of the domestic labor force in neither of both countries. Further, acquisitions in knowledge-intensive industries lead to improvements in domestic productivity. Our results display some heterogeneity across industries and types of acquisitions, suggesting a connection between the motives for international acquisitions and their resulting effects.

JEL Classification: F23, G34, L23, D24

Keywords: Multinational firms; cross-border M&A; productivity; employment growth; investment

January 2010

1 *Joel Stiebale, RWI; Michaela Trax, Ruhr Graduate School in Economics, Mercator School of Management, University of Duisburg-Essen.* *– We are grateful for comments by Jens Südekum, Holger Breinlich, Ingo Geishecker, Karolien De Bruyne, Stefano Federico, Dirk Engel, Isabel Ruhmer, and conference participants in Brussels, Ljubljana, and Rome as well as workshop participants in Kiel, Göttingen, Duisburg, and Essen. Michaela Trax acknowledges financial support by the Ruhr Graduate School of Economics.* *– All correspondence to Michaela Trax, RGS Econ, c/o University of Duisburg-Essen, Lotharstr. 65, 47057 Duisburg, Germany, e-mail: michaela.trax@rwi-essen.de.*

1 Introduction

The globalization of the economy still causes heated debates in most developed countries. Advocates point out productivity improvements in firms that decide to 'go global'. These could either stem from cost differences between countries or from access to new technologies helping firms to stay competitive. Opponents, in contrast, fear both the replacement of jobs if firms indeed decide to relocate production abroad, and the loss in bargaining power of workers and sequent wage reductions due to the thread of offshoring alone. What is often ignored in the discussion is the diversity of the firms' possible internationalization strategies. A firm that decides to produce abroad can choose to acquire an existing foreign firm - cross-border mergers and acquisitions (M&As) - or to build a new firm abroad, usually referred to as Greenfield investment.[1] Cross-border M&As have increased sharply in the last two decades. In years of merger waves, cross-border M&A flows amounted up to 80% of global foreign direct investment (FDI).[2] As they constitute a major share of transnational investment, cross-border M&As as a form of FDI started to receive more and more attention in the international trade literature recently (see, for example, Nocke & Yeaple, 2007, 2008; Neary, 2007; Head & Ries, 2003). Meanwhile, empirical evidence of the effects of cross-border M&As is still sparse and mostly limited to the analysis of the impact on the target firms, whereas there is almost no empirical work on the effects on the investing enterprises.[3]

A separate analysis of cross-border M&As and their impact on the acquiring firm is important for several reasons. First, recent theoretical contributions stress the importance of heterogeneity in firm characteristics and the role of the different motives behind the choice between Greenfield entries versus cross-border M&As (Nocke & Yeaple, 2007; Norbäck & Persson, 2007). While M&As are frequently driven by the acquisition of complementary assets and technology, Greenfield investments do not provide direct access to the foreign stock of knowledge. Therefore, the resulting effects regarding productivity and substitution of production may vary across foreign entry modes. Second, the few empirical M&A studies that compare the determinants of international and domestic deals find that motives for cross-border M&As are quite different from those of national deals (Shimizu et al., 2004), which impedes the generalization of results found in the M&A literature. Third, complementing the work on the effects on

[1] We do not address the decision to outsource versus producing in-house in this paper.

[2] http://stats.unctad.org/FDI/TableViewer/tableView.aspx?ReportId=1254 (accessed March 5, 2009)

[3] E.g. Girma & Görg (2004) and Bandick & Görg (forthcoming) analyze the effects on survival and employment, and Benfratello & Sembenelli (2006); Harris & Robinson (2003) look at productivity spillovers in target firms. Breinlich (2008) is one study that considers both sides of a deal comparing characteristics of acquirers and target firms, however he does not address the *effects* on the involved firms.

the target firm with an analysis of the investors' side, we add to the discussion on the evaluation of cross-border M&As. On the one hand, many governments restrict the acquisition of firms in technology-intensive or other key industries. Welfare effects of such mutual restrictions of cross-border acquisitions, however, depend on the effects of both sides involved in a deal. On the other hand, in the case of cross-border deals it matters from a policy makers' perspective, whether substitution and efficiency effects take place at the target or at the acquiring firm, and thus in the domestic or foreign country.

To the best of our knowledge, there is no empirical investigation that explicitly deals with the home country effects of cross-border acquisitions at the firm-level. Our paper fills this gap and aims to identify the effects of cross-border M&As on domestic growth and productivity of the investing firm.

To provide first evidence on the effects of cross-border M&As, we construct a unique firm-level data set that combines financial data of firms from the United Kingdom (U.K.) and France with a global M&A database for the years 2000-2007. Both the U.K. and France are among the top five countries with respect to cross-border acquisitions worldwide, so the potential effects of acquisitions should be pronounced. Furthermore, these countries differ with respect to several institutional characteristics, such as labor laws and financial institutions, which allows more general conclusions. We implement matching techniques in combination with a difference-in-differences estimator to control for selection based on observable characteristics as well as for time-invariant unobserved firm heterogeneity.

We find that cross-border deals boost domestic sales growth on average, and they are not accompanied by a downsizing of the domestic labor force in neither of the two countries. Our results show significant average productivity gains as a consequence of cross-border M&As for French acquirers, but not for British firms. Separate estimations for related and unrelated deals as proxies for horizontal and other investments, respectively, and for industries of different technological intensity reveal an overall positive effect on domestic production. Changes in domestic investment and employment growth vary across industries and types of acquisitions, however never indicate a substitution effect. Heterogeneity is also found with respect to changes in productivity, where a positive effect follows acquisitions in technology-intensive sectors only. These findings suggest a connection between the motives for international M&As and their resulting impacts. Apparently, the substitution of activity at home by cheaper production abroad does not appear to be the main motive for cross-border M&As, which is the dominant mode of investment between developed countries. Those deals seem to either serve foreign market entry or – in particular in technology-intensive industries – they are rather motivated by the possibility to access the technology and knowledge stock of the foreign target firm.

The rest of the paper is organized as follows: In the next section, previous research on FDI and M&As is discussed, section 3 describes our estimation strategy and section 4 provides a description of the data. Results of the empirical analysis are presented in section 5 with some robustness checks in chapter 6; section 7 concludes the paper.

2 Related Literature

Several strands of literature are relevant for the effects of cross-border M&As on the investing firm. We first look at the M&A literature that is usually focused on domestic acquisitions. There is evidence, however, that cross-border investments differ considerably from national acquisitions. Therefore, we additionally try to extract predictions from the FDI literature that does not consider the particular mode of foreign market entry. Overall, theoretical predictions regarding substitution effects and efficiency gains after M&As depend crucially on the underlying motives that determine the investment (see Shimizu et al., 2004).

If M&As are characterized as a natural selection process in which underperforming firms are targeted, positive effects on the efficiency of the combined firm can be expected (Morck et al., 1989). The higher the underperformance of target firms, the higher the potential for value gains and thus profits for the acquiring firms. Since the costs of mounting a takeover are often extremely high, it is sometimes argued that they can only be profitable if the target firm displays serious underperformance (Shleifer & Vishny, 1997), or if there are important gains in efficiency (Jovanovic & Braguinsky, 2004). Other motives are attempts to undermine competition in product markets (Kamien & Zang, 1990) or technology markets (Grimpe & Hussinger, 2008b) via the acquisition of main competitors. Furthermore, recent theoretical and empirical contributions argue that technology shocks are a main driver of M&As which reallocate assets to more efficient firms (Jovanovic & Rousseau, 2008). Similarly, M&As play an important role in firms' responses to trade liberalization, where more productive firms acquire targets with a lower productivity level that suffer from increased competition in the home market (Breinlich, 2008).

Yet, there are other motives for M&As that do not necessarily imply efficiency increases related to the discussion on unprofitable M&As (Budzinski & Kretschmer, 2009). Since most M&As are conducted by public corporations that are typically not owner-led, M&As may be a result of failure in corporate governance mechanism in the acquiring firms (see Shleifer & Vishny, 1997, for an overview). If these investments arise out of managers' utility maximization, which may include preferences for expansion and a large number of employees under control ("Empire-building" motive (see Shleifer & Vishny, 1988)), efficiency might not improve after

the deal. Hence, these investments do not necessarily yield a maximization of shareholder value. Similarly, according to the free cash flow hypothesis (Jensen, 1986), managers have a preference to reinvest free cash rather than to return it to investors. Finally, even if managers really hope to achieve efficiency gains, it might be difficult to attain them if synergies cannot be realized as well as expected in the post-merger integration process. Concluding, the effects of M&As on efficiency can be both positive and negative from a theoretical point of view. Empirical evidence available in the form of event studies reports declining stock prices of acquiring firms in advance of a merger, but rising stock prices of target firms (Andrade et al., 2001) supported by anecdotic evidence (Jensen, 1986). Similarly, while several empirical studies find productivity effects of M&As on the combined entity (see, e.g., Conyon et al., 2002b; Maksimovic & Phillips, 2001), this does not necessarily reflect efficiency gains in the acquiring firm, especially in diversifying acquisitions (compare Schoar, 2002).

Supposing that efficiency gains indeed existed, a crucial point for policy makers is the source of these improvements. Policy makers and trade unions often argue that efficiency gains are the result of rationalization, especially of downsizing the workforce. Shleifer & Summers (1998) argue that M&As provide an opportunity to cancel implicit contracts with trade unions or employees. Empirical evidence regarding the employment consequences of M&As is mixed. Harris et al. (2005) report that productivity increases after ownership changes are at least partly due to a layoff of workers, disinvestment and outsourcing of production stages. Gugler & Yurtoglu (2004) find that on average, M&As within Europe do involve a downsizing of the labor force in the merged firm, while this is not the case for U.S. deals. They trace the difference back to more rigid labor markets in Europe. These cross-country differences show up in further studies. Conyon et al. (2002a) find that after an M&A, employment shrinks in the combined firm, and Amess et al. (2008) report negative employment adjustment at the acquired firm using a sample of U.K. targets. In contrast, McGuckin & Nguyen (2001), among others, find that acquired plants in the U.S. are characterized by faster employment growth after the acquisition than other plants.

Furthermore, all cited studies so far refer to national M&As only with the exception of Breinlich (2008). Yet, the characteristics of cross-border deals are quite different from those of national deals (Shimizu et al., 2004). Grimpe & Hussinger (2008a) find that acquisitions that aim to access foreign markets are on average much larger than national deals. One explanation is that information asymmetries – which are generally larger for foreign targets – are less severe for larger and listed firms. Frey & Hussinger (2006) find that technological relatedness (in terms of the patent portfolio) of acquirer and target is a significant determinant of cross-border acquisitions, but not of domestic ones. This probably reflects that competition in technology

markets mainly takes place internationally. Cross-border deals are also associated with higher uncertainty and with higher risk of failure (Bertrand & Zuniga, 2006; Harris & Ravenscraft, 1991). Further, (transaction) costs are higher due to the larger cultural distance and institutional differences (di Giovanni, 2005). In general, (geographical) distance increases the (marginal) costs of monitoring (Degryse & Ongena, 2005) and for transmitting tacit knowledge (Blanc & Sierra, 1999). Therefore, acquirers might require a higher expected return from cross-border acquisitions than from domestic deals in order to compensate for the higher costs and risks that are associated with these transactions.

The observed different nature of cross-border deals can be traced back to additional motives for cross-border transactions that can be derived from the FDI literature. Foreign market access is one important reason for cross-border acquisitions. This type of market-seeking cross-border M&As is usually referred to as horizontal investment. In contrast to exporting and Greenfield investment, cross-border M&As provide access to existing products that are suitable to and proven and tested in the foreign market. In addition, access to existing networks with customers and suppliers is provided (see Görg, 2000, e.g.). Head & Ries (1997) cite market power as another main motive for cross-border M&As, while Nocke & Yeaple (2007, 2008) provide a model where cross-border M&As are conducted to exploit complementarities in the acquirer's and the target's resources; both strategies are singular for cross-border M&As compared to Greenfield investment. In addition, there is also scope for factor-seeking vertical investment activity in analogy to Head & Ries (2003). The acquired firm, typically located in regions with lower labor costs, then performs part of the firm's production process at a lower cost.

The multiplicity of motives for cross-border M&A makes it hard to predict their potential effects on the investing firm's input decisions and efficiency. While vertical M&As may substitute domestic production at the extensive margin, horizontal deals are less suspect to reduce domestic investment and employment if they are not associated with a substitution of domestic export activity. Contrariwise, substitution at the intensive margin is more probable after horizontal M&As as production can be easier shifted between similar firms. In case of technology driven cross-border M&As, the acquirer's productivity can be expected to rise due to the acquired complementary knowledge. If less productive stages of the production are shifted towards the foreign country due to cost saving motives, efficiency gains can also be realized. However, if substitution of exporting activities indeed takes place after horizontal cross-border M&As, efficiency in the home country could also be negatively affected, as the firm loses economies of scale.

Several empirical contributions analyze the effects of FDI on the productivity of multinational firms and accompanying substitution effects on their domestic investment and labor with-

out taking into account the different modes of foreign entry.[4] The results from these studies are mixed, especially regarding the question whether FDI is a substitute for or complementary to domestic activity. The differences in the results may partly stem from institutional differences and distinct industry structures across countries and from a mixture of the extensive and the intensive margin of FDI. In addition, neglecting cross-country heterogeneity in the composition of FDI makes it impossible to derive unambiguously the effects of these investments.

As the theoretical literature does not predict unambiguous effects, the issue whether cross-border acquirers can realize efficiency gains and substitute domestic activity boils down to an empirical question. The empirical literature, however, either deals with national deals or looks at FDI flows in the aggregate, and the effect of cross-border acquisitions on the acquirers is still an open question. With this paper, we aim to provide first evidence.

3 Estimation

Our empirical strategy aims to identify the causal impact of cross-border M&As on the performance of the acquiring firm. We employ a propensity score matching procedure combined with a difference-in-differences estimator. This empirical strategy is prominent in labor market evaluation studies (see Heckman et al., 1997, as an example) and became popular in the international trade literature, where Wagner (2002), among others, started to address the impact of exporting on productivity and firm size using a similar methodology.[5]

The evaluation of a treatment effects on the treated s periods after treatment at time t comprises a comparison between the actual outcome and the situation had the firm not invested abroad.

$$\tau_{ATT} = E[y^1_{t+s}|X_{t-1}, CB_t = 1] - E[y^0_{t+s}|X_{t-1}, CB_t = 1] \quad (1)$$

where y^1 is the outcome of an acquirer, y^0 the outcome of the acquirer had it not invested abroad, X contains a set of control variables, and CB is a binary indicator of cross-border M&A activity taking the value one if the firm acquirers at least one foreign target in the respective year.

As the counterfactual situation $E[y^0_{t+s}|X_{t-1}, CB_t = 1]$ is not observable, the evaluation problem is often framed as a missing data problem. The main task is to construct a consistent

[4] See for example Desai et al. (2008), Pfaffermayr (2004), Becker & Muendler (2006), Konings & Murphy (2006), or Muendler & Becker (2009) on employment; Navaretti & Castellani (2004), Jäckle (2006) or Damijan et al. (2007) for productivity, Fors & Svensson (2002) for R&D, and Desai et al. (2005) for investment.

[5] See Girma & Görg (2007), Greenaway & Kneller (2008), and Yasar & Rejesus (2005) for further applications of the matching estimator to research questions regarding the effects of exporting and FDI.

estimate for the average outcome of acquirers had they not invested abroad.

The average outcome of the non-acquirers does not provide a good estimate of the counterfactual in non-experimental settings as firms select themselves into the different groups based on characteristics that might also influence the measured outcome. We use matching techniques to construct a comparison group. The goal of the matching procedure is to identify matches of acquirers and non-acquirers that are similar to each other with respect to a range of observable characteristics. The expected outcome of this comparison group provides a valid construction of the counterfactual outcome under the conditional independence assumption. The conditional independence assumption requires the potential outcome to be independent of the treatment assignment given the set of observable control variables that are not influenced by the treatment.

$$y^1, y^0 \quad \perp \quad CB|X \tag{2}$$

That is, we assume that selection into treatment is on observable characteristics only and that unobservable variables do not influence simultaneously the treatment assignment and the outcome determination. This assumption is not testable, but the inclusion of a wide range of covariates that are suggested by theory helps to justify the validity of the approach (Caliendo & Kopeinig, 2008).

The number of relevant variables to be included is large, hence we take advantage of Rosenbaum & Rubin's (1983) results: if the conditional independence holds conditional on X, it will also be true for the balancing score. We implement a logit estimation and use the predicted probability of a cross-border deal as the balancing propensity score:

$$\hat{P}(CB_t = 1|X_{t-1}) = \Lambda(\hat{\beta}X_{t-1}) \tag{3}$$

where Λ is the cumulative logistic probability function. The matrix X_{t-1} contains only pre-deal characteristics from period $t-1$ to avoid reverse causality problems (Caliendo & Kopeinig, 2008). The best match is a firm not active in cross-border M&As with the propensity score that is closest to the acquirer's score.

As our dataset is a panel, we can release the strong assumption of selection on observables by combining the matching technique with a difference-in differences estimator (Blundell & Costa Dias, 2000). Instead of comparing differences in the levels of the outcome variables between the two groups we focus on the growth rates. This procedure allows the decision to engage in a cross-border acquisition to be based on the expected returns to this investment and on time-invariant unobservables (Heckman et al., 1997). The difference-in-differences estimator

for the effect of cross-border acquisitions can be expressed as follows:

$$\tau_{DID} = E[y^1_{t+s} - y^1_{t-1}|X_{t-1}, CB_t = 1] - E[y^0_{t+s} - y^0_{t-1}|X_{t-1}, CB_t = 1] \tag{4}$$

Still, unobserved time-varying factors that differ across groups and influence both the treatment and outcome variables as well as differential reactions to common macroeconomic shocks would lead to inconsistent results.

The second assumption for the validity of matching, the overlap condition, requires for each set of X_{t-1} of all treated and control firms a positive probability to be involved in a cross-border deal.

$$0 < P(CB_t = 1|X_{t-1}) < 1 \tag{5}$$

This guarantees that a suitable match for each acquirer is in principle available and no perfect prediction based on X_{t-1} is possible. This assumption is less critical in the present case, as the share of acquirers in cross-border deals is small and the pool of potential matches is quite extensive. The results presented are based on estimations where the common support condition is imposed, acquirers off common support are not included.[6] Furthermore, one has to decide whether the matching procedure is carried out with or without replacement. Basically, this choice involves a tradeoff between bias and variance. We decide to perform the propensity score matching with replacement, as in the British sample the balancing quality is reduced considerably in the version without replacement. Therefore, we calculate the variance of the matching estimator with a correction for matching estimators with replacement as suggested by Lechner (1999) to account for the repeated use of several matches.[7]

One potential concern with the propensity score estimation is that the decision of firms in our comparison group might be affected by the acquirers' decision to invest abroad. Our approach is valid only if the stable unit treatment assumption holds, i.e. if there are no significant general equilibrium effects. If acquirers hamper domestic growth of competitors in the comparison group due to strategic interaction, our results might overestimate the effect of cross-border M&As. For this to happen, however, firms would have to be direct competitors in a market, i.e. only if the demand for the acquirer directly affects the non-acquirers' market position. The substitutability of products within two-digit industries – which we use in the estimation of the propensity score – is probably limited. This clearly reduces the risk of overestimation. In addition, the problem is probably even less severe in our application as only a small fraction of

[6] Only six French firms and two of the U.K. sample are off common support, compare table 4.

[7] The propensity-score matching and covariate balance testing is carried out using Leuven & Sianesi's (2003) software psmatch2 in STATA® 10.

firms engages in cross-border M&As and hence average interaction effects are probably small (Caliendo & Kopeinig, 2008).

4 Data and Model Specification

4.1 Data

We compile a unique firm-level data set that combines financial data for European firms with a global M&A database covering the years 2000-2007. The financial data is taken from the Amadeus database published by Bureau van Dijk, which provides information on firms' balance sheet, and profit and loss accounts for up to ten years. The data is collected from company reports which are supplemented by specialized regional information providers. Amadeus has been used in numerous empirical studies on FDI (see Helpman et al., 2004; Budd et al., 2005, as examples). Combining several updates of the Amadeus database, we are able to consider entry and exit of firms and thus, a broader sample of firms to identify acquirers in cross-border deals.[8]

We merge the observations from Amadeus with the transaction data from our second data source, the Zephyr database, an M&A database from the same provider. Zephyr includes data on M&As, IPOs, joint ventures and private equity transactions and provides information about date and value of a deal, the source of financing as well as a description of the type of transaction, and the firms involved in the deal. We are thus able to identify the sequent foreign investments and to reconstruct the growing international commitment of firms. Compared to other M&A data sources like Thompson Financial Securities data, the Zephyr database has the advantage that there is no minimum deal value for a transaction to be included in the data set.[9]

The data structure of this new combined European firm level data set allows us to focus explicitly on cross-border M&A. Moreover, we try to identify differences in the effects of cross-border M&A across countries. Since the availability of balance sheet data - which is necessary to calculate our productivity measure - varies considerably across countries we restrict our analysis to firms from the U.K. and France. Both countries belong to the top five countries with respect to the number of acquiring firms in international deals (Brakman et al., 2006) and are characterized

[8] Update numbers 88, 113, 136, 146 and 168 are used. Although Amadeus provides information on subsidiaries, this information is only available at one point in time for each update. Further, the data does not allow for a definite distinction between newly founded subsidiaries and existing firms that have been acquired.

[9] When comparing aggregate statistics derived from own calculations of the Zephyr database with those from Thompson financial data as used in Brakman et al. (2006), we found that the coverage of transactions with a deal value above 10 million US$ is very similar. Calculations are available upon request.

by several institutional differences. While the former exhibits a market-based financial system and flexible labor markets, France features a more bank-based financial system and highly rigid labor markets.

The FDI definition applied by the OECD (1999) refers to foreign investment of at least 10% in order to seperate portfolio investments from investment with a lasting interest in and relevant influence on the foreign firm. For the purpose of our paper, we consider only deals where a substantial change in the stakes hold is involved as it is usual in the M&A literature. The presented results only refer to M&As where the stake controlled rises from below 25% to above 25% threshold as firms gain at least a blocking minority.

In our sample, we delete enterprises with a median value of annual sales and total assets below €2 million based on all available firm-year observations, and firms active in the primary sector (NACE two-digit industry codes 1-14) as these enterprises are usually not taking an active part in cross-border M&As. We further deleted holding companies (NACE 7415), firms from the public sector (NACE 75, 91), and financial companies (NACE 65-67) as the definition of output or sales and hence any measure of total factor productivity in financial companies is not comparable to other firms. Inspecting the growth rates of variables like firm size and number of employees, we delete large outliers at both ends of the distribution as they could indicate an unreported merger. After applying standard cleaning procedures[10] and restricting the sample to observations that have data for all necessary variables in at least four consecutive years, we are left with 270 French firms and 646 British firms with at least one cross-border deal recorded. We classify deals where the main activity of the acquirer equals the target's activity at the NACE two-digit level as related deals, which are used as a proxy for horizontal M&As. Different NACE codes suggest unrelated M&As. The share of observations that display related deals only is around 52% in both countries (compare table 5), in line with the share of horizontal deals reported in other studies (see Brakman et al., 2006, for example).

4.2 Construction of variables and model specification

We evaluate the impact of international acquisitions on several outcome variables. Growth rates in capital (measured as tangible fixed assets), sales and employment are analyzed to evaluate whether international acquisitions complement or substitute domestic investment and whether a possible rise in efficiency is accompanied by rationalization in production factors. In addition, total factor productivity (TFP) is a further considered as an outcome variable. We implement

[10] We deleted observations with implausible values such as negative input factors or R&D intensities above one, and with growth rates larger than the 199. and smaller than the first 200-quantile.

the Olley & Pakes' (1996) estimation algorithm where we use investments to control for unobserved productivity shocks that induce a simultaneity problem in TFP estimation. This method is restricted to observations with strictly positive investment in order to guarantee a necessary invertability condition, unfortunately introducing a selection problem.[11] We calculate TFP for all observations with sales, labor, and capital figures available.

Regarding the choice of control variables that are included in the Logit model, theoretical models suggest a systematic selection into foreign investment activity according to the firms' productivity levels. Melitz (2003) and Helpman et al. (2004) theoretically derived a heterogeneous firm model of international trade, where firms select themselves into exporting and FDI, respectively. The predicted observed productivity ranking could be confirmed in several empirical investigations.[12] To control for the selection of more productive firms into foreign markets we include the level of TFP before the acquisition.

We include the log of the number of employees as a measure of firm size to capture the firms' ability to realize economies of scale as well as their capacity of taking risks through internal diversification. The log average wage (total labor costs divided by the number of employees) accounts for different skill structures of the labor force. The log capital stock captures differences in the production process and controls for the fact that multinational firms usually have higher capital intensity than domestic firms. Further, as an R&D proxy, we control for the share of intangible assets in non-financial fixed assets, as this may affect domestic growth as well as the returns to acquisitions and should account for the importance of knowledge and technology for acquisitions. The working capital ratio defined as the ratio between net current assets and total assets reflects the firm's liquidity and captures the ability to raise funds for an international acquisition. We include past sales growth to capture differing domestic growth paths between acquirers and other firms before the deal to avoid a spurious correlation between domestic growth and acquisitions.

The firms' internationalization status and past M&A activity before the deal is captured by an exporting dummy in the precious year, and the national and cross-border deal variables. These variables take the value one if the firm had acquired at least one national or foreign target in the three years before the deal, respectively. Further, a variable with three categories that reflects the change in the number of foreign subsidiaries is included (no change, increase, or decrease in the

[11] The alternative estimation strategy using material inputs instead of investment as suggested in Levinsohn & Petrin (2003) is not an option as this variable is not available for the UK sample. However, we found that measures of TFP constructed with materials instead of investment in France were very similar.

[12] For example Arnold & Hussinger (2006) for Germany, Girma et al. (2004) for Ireland, Benfratello & Razzolini (2007), for Italy, and Damijan et al. (2007) for Slovenia, among others.

number of foreign subsidiaries owned).

The age of a firm in years can be interpreted as a reflection of learning (Jovanovic, 1982) and is included as the logarithm of the number of years since incorporation as a further control for growth potentials and experience. In addition, a dummy controlling for the legal form equals one if the acquirer is a public limited company. Finally, differences in technological opportunities and the competitive environment are accounted for by industry dummies at the NACE two-digit industry level. A set of time dummies captures macroeconomic factors such as changes in the business cycle or exchange rate movements. All variables are measured one period before the cross-border M&A.

5 Results

Results from the Logit estimation for the probability to invest abroad are shown in table 1. A higher firm size in terms of employment or capital stock makes it more likely to engage in an international acquisition. The positive coefficient for sales growth shows that firms that invest abroad display higher domestic growth rates before the acquisition. The working capital ratio coefficient indicates that insufficient internal finance could be an impediment to cross-border M&As. International acquirers seem to have higher innovation potentials and employees with higher skills as indicated by the positive coefficients for intangible assets and wages, respectively. This supports the idea of technology and knowledge as a driving factor for cross-border M&As.

Past M&A activity – both national and international – appears to be an important predictor of cross-border M&As in subsequent periods. The same is true for changes in the number of foreign subsidiaries owned by the firm and previous export activities - although this effect is only significant for British firms. This seems plausible, as the knowledge of a firm gained in earlier operations at a global stage reduces uncertainties related to foreign market entry and makes the successful realization of cross-border M&As more likely. The exporting status of French firms does not explain further international activity significantly. One possible explanation is that differences in the average firm size between acquirers and non-acquirers are much more pronounced in the U.K. as can be seen in table 2 and 3. These tables also show that the differences in the fraction of exporters between the unmatched groups are also much larger in the British sample. Foreign-owned firms have a lower probability to invest abroad, probably since they already have access to foreign markets and technologies. So far, the results are in line with the expectations.

Surprisingly, TFP has no significant effect on the probability of cross-border acquisitions in the case of French firms, while British firms that engage in acquisitions seem to be less

productive conditional on all other regressors. This does not necessarily contradict the results from the FDI literature predicting a positive association between a firm's productivity and its FDI propensity. The reason is the inclusion of further variables as proxies for skills and innovation in our estimation equation apart from TFP levels. Those variables are important determinants of firm heterogeneity and productivity differences and are positively correlated with foreign market entry. Tables 2 and 3 show that unconditional on these control variables firms that engage in cross-border M&A are significantly more productive.

The success of the matching procedure is documented in table 2 and 3. The means of the covariates used in the logit equation of the unmatched sample are compared in order to quantify the ex-ante differences between acquirers and the comparison group. Selection into treatment is reflected in almost all variables.

The matching procedure is able to reduce a substantial amount of bias resulting from differences in the observed covariates. As the test statistics show, the differences between the two groups are small and insignificant for all variables used for the estimation of the propensity score after the matching. Most importantly, there is practically no difference in the propensity score between the two groups within each country, which is confirmed by an inspection of the shape of the propensity score distribution of both groups (compare figures 1 and 2). There, we also see that imposing the common support condition does not reduce the sample significantly (six French and two British acquirers are dropped).

Table 4 displays the results from the difference-in-differences estimation for the various outcome measures. Compared to other firms, both French and British international acquirers realize higher output growth. Thus, overall cross-border acquisitions do not seem to substitute domestic production. On the contrary, they are associated with higher domestic sales growth in both countries. This complementarity between foreign and domestic activity is accompanied by significant faster growth of capital and employment. The results differ across countries, however, when it comes to the resulting productivity effects. The growth of TFP is about 4% and 7% larger for French firms that engage in international acquisitions in the year of the deal and in the first year after the deal, respectively, compared to firms that do not engage in cross-border acquisitions. This difference becomes insignificant after two years, however. British firms that engage in cross-border acquisitions do not achieve significantly higher growth in TFP. While the size of the effects on sales and employment are comparable, the capital growth rate is even higher, resulting in an insignificant TFP effect in the U.K. sample.

As stressed previously, results might vary depending on the underlying motivation for the deal. So we are interested to see if there is some heterogeneity in the results. Therefore, we divide the sample with the aim to discriminate between different types of deals. Doing this, we

also try to shed some further light on the observed cross-country differences in the productivity result, where the composition of the deals could drive the observed effects on average. Therefore, we perform additional calculations for different types of deals.

Foreign market access is the goal of horizontal foreign investments and as described in the data section, we now use related deals to approximate this type of investments. The remaining deals are classified as unrelated. In table 5, results for separate estimations for the different deal types are depicted. In our French estimation sample, 52% of the firms acquired only targets in the same two-digit NACE industry, and 42% invested in unrelated deals. For 6% of the acquiring firms, deals of both types are recorded within one year. In the analysis, we exclude firms that engaged in more than one type of acquisition in one year as they are too few to dislpay them separately and adding them to the other categories would water down the distinction, therefore the number of acquiring firms do not necessarily add up to the overall amount. We see only weak evidence for positive effects on productivity growth for French firms that engage in one type of deal only. The positive effect on sales is more pronounced for unrelated deals and the positive effect on investment shown in table 4 seems to be a result of unrelated deals to a large extent. For the British sample, the results do not vary as much across deal types. 53% of the firms have only related deals within one year, and this group obviously dominates the general results. The seperate estimation of related and unrelated deals thus does not extract differential behavior clearly. Although this distinction is quite often applied in empirical work, defining within-industry deals as horizontal FDI as opposed to across-industry investment is quite a crude approximation that probably does not reflect perfectly the differences in the motives for the deals (see Alfaro & Charlton, 2007, for a discussion).

Another way to approximate the type of investment would be to split the sample according to the target country or region. The motive to gain access to cheaper factor inputs should lead to cross-border acquisitions in low-cost countries, whereas market-seeking motives can be assumed for investments in large, equally developed countries. As one could have expected, most French firms invest in other Western European countries for their economic, geographic,and cultural proximity. The second highest share is directed towards the U.S., where access to the technological frontier might be decisive in addition to the large market. British firms, on the contrary, prefer U.S. targets and Western European countries are the second largest target region in terms of the number of deals (compare the first two colums in table 6). Hence, factor costs do not seem to be a main driver of acquisitions in our sample. This is in line with theoretical models that predict FDI motivated by differences in production costs to take mostly the form of Greenfield investment (Nocke & Yeaple, 2008). Splitting the sample according to the target regions does not generate new insights as the number of observations for investment in low-cost countries is too small and we face the problem of multiple deals and target regions per firm

again. The results are therefore not presented.

In an alternative approach, we take a closer look at the industry composition of the deals. Thinking of knowledge and technology access as an important factor behind acquisitions, we use an industry classification that groups activities in the manufacturing and service sector according to the importance of technology and knowledge. Tables 7 and 8 show the industry composition of cross-border deals in France and the U.K, respectively. While in both countries international acquisitions happen most frequently in the knowledge intensive service industries, acquisitions of French firms are even more biased towards knowledge intensive service sector, where almost half of all acquisitions belong to in our estimation sample.

In France, the positive effect on sales is quite robust across the four subgroups. Again, we cannot find any evidence for a negative employment effect. Interestingly, the overall significantly positive effect on domestic labor demand stems precisely from industries that are less technology oriented. Furthermore, less knowledge intensive services cause the overall capital effect. The positive productivity effects for French firms seem to be predominantly driven by deals of acquirers in technology and knowledge intensive industries, where the productivity differences are most pronounced and significant. The point estimates for other services are even negative, however not significant.

The differences across industries are less pronounced for British firms. Sales and production inputs grow significantly faster for acquiring firms within all types of industries. We observe a significantly positive productivity effect of international acquisitions only in high-tech manufacturing. Hence, in both countries, there are industries, where cross-border acquirers show a significant higher TFP growth and this seems to be mainly the case in high-tech industries. One possible explanation is that in technology intensive industries, acquirers focus on access to complementary foreign technologies and knowledge that improve domestic efficiency. Investments in low technology sectors might be undertaken to gain access to the target's market and products rather than to acquire complementary technologies. This view is supported if we take another look at table 6. Overall, 11% of the French acquirers and 28.% of the British cross-border acquirers invest in the U.S. In the high-tech manufacturing sectors, however, this share is highest and is about ten percentage points above the average in each of the two countries. Thus, precisely in the sectors with an above average share of deals in the most technologically advanced region, we find positive productivity effects supporting the view of technology-seeking motives for these deals.

All in all, the results indicate that cross-border acquisitions yield higher domestic production and in some cases efficiency gains in the home country. Neither do we find that international acquisitions substitute domestic investment, nor are there adverse effects on employment growth for any of the two countries and any of the four industries. At first sight, our results suggest that

there is some heterogeneity in the impact of international acquisitions across countries and types of deals with respect to the effect on the productivity growth of the acquirers. However, if we consider the industrial composition of cross-border deals, we find a positive productivity effect in technology-intensive sectors in both countries.

6 Robustness Checks

We perform several robustness checks.[13] First, we vary the chosen threshold for the deals considered in our analysis. While we showed the estimation results for the 25% threshold sample, the displayed results do practically not change considering deals where the acquirer obtains a majority-interest after the acquisition. A look at the distribution of the acquired stake reveals that there are quite a lot of deals with very small changes around one per cent only that stem from repeated share buy back activity. The two peaks of the distribution can be found at 50% and 100%. Thus we have only little variation across the two samples. We further checked whether firms with multiple acquisitions led to an overestimation of the average treatment effect. Calculating the effects for firms with only one acquisition per year separately - which is the case in the majority of the observations - changes the results only slightly. The same holds true for the British sample if alternatively firms with the first acquisition after at least three years are considered, while the productivity effects disappears in the French case.

A further decision that we have to make is the number of years that we follow the effects of the deals. On the one hand, potential restructuring measures might take some time to come into effect, so a longer time horizon would be an interesting extension. On the other hand, the longer the time passed by after a deal, the more likely is the occurrence of another event that could interfere with the effects of the acquisition we aim to measure. In addition, even the basic specification is already quite data demanding as we need data for all important variables for four consecutive years (or even five years for variables of which we use growth rates as controls in the logit equation). Including the third year after the deal in the analysis thus reduces the sample quite substantially. As a consequence, some of the effects loose their statistical significance. All results, however, still indicate the same direction of the effects and effects even increase in the third period after the deal.

The inclusion of the smallest firms in a country is another variation in the definition of the estimation sample. In our main specification we decided to exclude firms with a median value of annual sales and total assets below €2 million based on all available firm-year observations.

[13] Results are available from the authors upon request.

However, removing this restriction and using all firms in the sample again does not change the results notably.

Further robustness checks relate to the assumption of selection on observables. To account for possible differences in the growth trends of the two groups, we included the last years sales growth as a conditioning variable in the estimation of the propensity to acquirer a foreign firm. One could argue for the inclusion of the past changes of all dependent variables of interest in order to control for varying trends in the evolution of the firms' productivity level, capital, or employment. Including all but one growth rates does not change our results.[14] This indicates that the inclusion of a large number of controls in the logit estimation captures already a substantial part of the important differences between the two groups of firms.

Although the results of the matching procedure seem to be robust to introducing further covariates, we cannot formally test the assumption of selection on observables. However, it is possible to calculate the magnitude of the bias that would be necessary to outweigh our estimated treatment effects. For this purpose we display Rosenbaum bounds (Rosenbaum, 2002), which indicate the minimum value by which an unobserved factor would have to change the odds ratio of a matched pair *i* and *j*

$$\frac{P(CB_{it}=1|X_{it})(1-P(CB_{it}=1|X_{it}))}{P(CB_{jt}=1|X_{jt})(1-P(CB_{jt}=1|X_{jt})} \tag{6}$$

to reduce the significance of our estimated average treatment effect on the treated below a certain confidence level.

The results show that – given conventional levels of significance – the critical values for domestic sales, capital and employment growth vary between 1.2 for capital growth for French firms and above 2.0 for employment growth in the British sample. A factor that could change the odds ratio even by a factor of the lower bound of 1.2 in France would have to have a larger effect on the probability of an acquisition than an increase of the number of employees in the pre-acquisition period by 50% or an increase in the capital stock by 70%.[15] Note also that this factor must in addition completely determine the observed difference in the outcome variables of acquiring firms and the comparison group. Given that our propensity score estimates control for a large set of covariates including the main determinants from the theoretical and empirical

[14] We have to exclude one growth rate and one level to avoid multicollinearity problems as the TFP measure is a linear combination of the factor inputs and output. We excluded the TFP growth rate and the sales levels.

[15] Transforming the estimated coefficients of the logit model into odds ratios led to values of 1.279 for capital and 1.384 in the French sample. The critical values for TFP are as expected quite low, as they were only partly significant in our main specifications.

literature, we argue that it is unlikely that an omitted factor has such a large effect on both the propensity to engage in a cross-border acquisition and the domestic growth of sales, employment and capital. In conclusion, it does not seem very plausible that our estimated positive effects of cross-border acquisitions on domestic growth are entirely due to omitted variables.

Furthermore, we use labor productivity (sales per employee) as an alternative productivity measure instead of TFP. While the Olley & Pakes method used to construct a consistent TFP measure takes into account some of the major estimation problems, it critically hinges on functional form restrictions and instrument variables and it is constructed only from firms with positive investments.[16] Similarly to our previous results we find positive productivity effects for French firms, but insignificant effects for British firms. The results for the industry classification again show positive productivity effects only in technology-intensive industries.

Finally, we investigate the robustness of our results to using alternative matching algorithms.[17] In our baseline specification we use only one control observation as a match where the one with the closest propensity score is chosen irrespective of the actual distance. First, we implement caliper matching imposing a maximum distance of 0.1 for the difference in propensity scores within each matched pair. Second, some alternative matching algorithms that use a larger number of matches for each acquiring firm are applied to reduce the variance of the estimator. However, this comes at the cost of an increased potential bias as on average the matching quality is lower. We perform radius matching with a maximum bandwidth of 0.1, which uses all firms from the comparison group within a maximum distance in the propensity score of 0.1. Further, we show the results using three instead of only one nearest neighbor combined with a caliper of 0.1. The sensitivity of the results with respect to the primary matching criterion – the propensity core – are analyzed by the use of a Mahalanobis matching estimator that chooses a nearest neighbor not only with respect to the propensity score, but gives additional weight to a firmt's industry, age and the year of acquisition, as these variables might be especially important determinants of firm growth. This comes at the cost of a large sample reduction as we lose several matches due to the common support condition. Next, some variants of a kernel matching estimator that uses a weighted average of all firms in the comparison group to construct the counterfactual. The weights for the kernel estimator are based on the differences in the propensity score between acquirors and firms from the comparison group and a normal and alternatively a uniform kernel function. Using kernel funtions, an even more important choice than the specific kernel function

[16] In both samples, labor productivity and TFP à la Olley and Pakes are highly correlated with a correlation coefficient of 0.98.

[17] See Caliendo & Kopeinig (2008) for an overview on these methods.

seems to be the bandwidth of the estimator (see again Caliendo & Kopeinig, 2008). Considering the implied trade-off between variance and potential bias, we re-ran the matching procedure with a bandwidth of 0.2 and 0.02. The estimations show that our main findings are robust to using alternative matching estimators. For both countries we find large and highly significant effects on the domestic growth of sales, employment and capital. Positive productivity effects only show up for French firms, but they are not significant in all cases.

7 Conclusion

This paper provides first results for the effects of cross-border deals on the investing firms' domestic performance. Applying a combination of matching techniques with a difference-in-differences estimator, we find that acquiring firms in cross-border deals yield higher growth rates of domestic sales, employment, and capital. Further, we find significant productivity effects for French acquirers only but not for British firms. Separate analysis of related and unrelated deals and the differentiation of four industry types shed further light on the composition of the deals behind these effects. We find significant effects on total factor productivity for technology-intensive industries only, which suggests that firms within these industries acquire complementary technologies abroad. This view is supported by the fact that the largest share of deals in these sectors target U.S. firms. Domestic growth is positively related to cross-border acquisitions in virtually all industry types and employment growth and investment is not negatively affected at the acquiring firm. We conclude that domestic activity is on average positively affected by cross-border M&As, but the effects of cross-border M&As depend also on the motives for the deal. Heterogeneity in the productivity effects probably cannot be explained with acquirer characteristics only, but depend on the role and complementarities of technology and knowledge in both the acquiring and target firm, and industry specific characteristics as well. Future research might shed more light on the factors that determine this heterogeneity. The apparently positive effects on the investing firms should be taken into account when evaluating the welfare effects of cross-border M&As and when considering policy measures that impose restrictions on cross-border M&As.

References

Alfaro, L. & Charlton, A. (2007). Intra-Industry Foreign Direct Investment. NBER Working Papers 13447, National Bureau of Economic Research, Inc.

Amess, K., Girma, S., & Wright, M. (2008). What are the Wage and Employment Consequences of Leveraged Buyouts, Private Equity and Acquisitions in the UK? Research Paper Series No. 2008-01, NUBS.

Andrade, G., Mitchell, M., & Stafford, E. (2001). New Evidence and Perspectives on Mergers. *Journal of Economic Perspectives*, 15(2), 103–120.

Arnold, J. M. & Hussinger, K. (2006). Exports Versus FDI in German Manufacturing: Firm Performance and Participation in International Markets. Discussion Paper Series 1: Economic Studies 2006,04, Deutsche Bundesbank, Research Centre.

Becker, S. O. & Muendler, M.-A. (2006). Margins of multinational labor substitution. Discussion Paper Series 1: Economic Studies No. 24/2006, Deutsche Bundesbank.

Benfratello, L. & Razzolini, T. (2007). Firms' productivity and internationalisation choices: Evidence from a large sample of Italian firms. Development Studies Working Papers No. 236, Centro Studi Luca DŠAgliano.

Benfratello, L. & Sembenelli, A. (2006). Foreign ownership and productivity: Is the direction of causality so obvious? *International Journal of Industrial Organization*, 24(4), 733–751.

Bertrand, O. & Zuniga, P. (2006). R&D and M&A: Are cross-border M&A different? An investigation on OECD countries. *International Journal of Industrial Organization*, 24(2), 401 – 423.

Blanc, H. & Sierra, C. (1999). The Internationalisation of R&D by Multinationals: A Trade-off Between External and Internal Proximity. *Cambridge Journal of Economics*, 23, 187–206.

Blundell, R. & Costa Dias, M. (2000). Evaluation Methods for Non-Experimental Data. *Fiscal Studies*, 21(4), 427–468.

Brakman, S., Garretsen, H., & Marrewijk, v. C. (2006). Cross-border mergers & acquisitions: the facts as a guide for international economics. Working Paper No. 1823, CESifo.

Breinlich, H. (2008). Trade liberalization and industrial restructuring through mergers and acquisitions. *Journal of International Economics*, 76, 245–266.

Budd, J. W., Konings, J., & Slaughter, M. J. (2005). Wages and international rent sharing in multinational firms. *Review of Economics and Statistics*, 87(1), 73–84.

Budzinski, O. & Kretschmer, J.-P. (2009). Implications of Unprofitable Horizontal Mergers: A Positive External Effect does not Suffice to Clear a Merger! Working Papers 84/09, University of Southern Denmark, Department of Environmental and Business Economics.

Caliendo, M. & Kopeinig, S. (2008). Some Practical Guidance For The Implementation Of Propensity Score Matching. *Journal of Economic Surveys*, 22(1), 31–72.

Conyon, M. J., Girma, S., Thompson, S., & Wright, P. W. (2002a). The impact of mergers and acquisitions on company employment in the United Kingdom. *European Economic Review*, 46(1), 31–49.

Conyon, M. J., Girma, S., Thompson, S., & Wright, P. W. (2002b). The Productivity and Wage Effects of Foreign Acquisition in the United Kingdom. *Journal of Industrial Economics*, 50(1), 85–102.

Damijan, J., Polanec, S., & Prasnikar, J. (2007). Outward FDI and Productivity: Micro-evidence from Slovenia. *World Economy*, 30(1), 135–155.

Degryse, H. & Ongena, S. (2005). Distance, Lending Relationships, and Competition. *Journal of Finance*, 60(1), 231–266.

Desai, M. A., Foley, C. F., & Hines, J. R. (2008). Domestic Effects of the Foreign Activities of U.S. Multinationals. Working Paper Series No. 1020, Ross School of Business.

Desai, M. A., Foley, C. F., & Jr., J. R. H. (2005). Foreign Direct Investment and Domestic Economic Activity. Working Paper 11717, National Bureau of Economic Research.

di Giovanni, J. (2005). What drives capital flows? The case of cross-border M&A activity and financial deepening. *Journal of International Economics*, 65(1), 127 – 149–.

Fors, G. & Svensson, R. (2002). R&D and foreign sales in Swedish multinationals: a simultaneous relationship? *Research Policy*, 31(1), 95–107.

Frey, R. & Hussinger, K. (2006). The Role of Technology in M&As: A Firm Level Comparison of Cross-Border and Domestic Deals. Discussion Paper No. 06-069, ZEW.

Girma, S. & Görg, H. (2004). Blessing or curse? Domestic plants' employment and survival prospects after foreign acquisition. *Applied Economics Quarterly*, 50, 89–110.

Girma, S. & Görg, H. (2007). Evaluating the foreign ownership wage premium using a difference-in-differences matching approach. *Journal of International Economics*, 72(1), 97 – 112.

Girma, S., Görg, H., & Strobl, E. (2004). Exports, international investment, and plant performance: evidence from a non-parametric test. *Economics Letters*, 83(3), 317–324.

Görg, H. (2000). Analysing Foreign Market Entry: The Choice between Greenfield Investment and Acquisitions. *Journal of Economic Studies*, 27(3), 165–181.

Greenaway, D. & Kneller, R. (2008). Exporting, productivity and agglomeration. *European Economic Review*, 52(5), 919–939.

Grimpe, C. & Hussinger, K. (2008a). Market and Technology Access Through Firm Acquisitions: Beyond One Size Fits All. Discussion Papers No. 08-037, ZEW.

Grimpe, C. & Hussinger, K. (2008b). Pre-empting technology competition through firm acquisitions. *Economics Letters*, 100(2), 189–191.

Gugler, K. & Yurtoglu, B. B. (2004). The effects of mergers on company employment in the USA and Europe. *International Journal of Industrial Organization*, 22(4), 481–502.

Harris, R. & Robinson, C. (2003). Foreign Ownership and Productivity in the United Kingdom, Estimates for U.K. Manufacturing Using the ARD. *Review of Industrial Organization*, 22(3), 207–223.

Harris, R., Siegel, D. S., & Wright, M. (2005). Assessing the Impact of Management Buyouts on Economic Efficiency: Plant-Level Evidence from the United Kingdom. *The Review of Economics and Statistics*, 87(1), 148–153.

Harris, R. S. & Ravenscraft, D. (1991). The Role of Acquisitions in Foreign Direct Investment: Evidence from the U.S. Stock Market. *Journal of Finance*, 46(3), 825 – 844.

Head, K. & Ries, J. (1997). International Mergers and Welfare under Decentralized Competition Policy. *The Canadian Journal of Economics / Revue canadienne d'Economique*, 30(4b), 1104–1123.

Head, K. & Ries, J. (2003). Heterogeneity and the FDI versus export decision of Japanese manufacturers. *Journal of The Japanese and International Economies*, 17(4), 448–467.

Heckman, J. J., Ichimura, H., & Todd, P. E. (1997). Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme. *Review of Economic Studies*, 64(4), 605–54.

Helpman, E., Melitz, M. J., & Yeaple, S. R. (2004). Export Versus FDI with Heterogeneous Firms. *The American Economic Review*, 94(1), 300–316.

Jäckle, R. (2006). Going Multinational: What are the Effects on Home Market Performance? Discussion Paper Series 1: Economic Studies No. 03/2006, Deutsche Bundesbank.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review*, 76(2), 323–29.

Jovanovic, B. (1982). Selection and the Evolution of Industry. *Econometrica*, 50(3), 649–70.

Jovanovic, B. & Braguinsky, S. (2004). Bidder Discounts and Target Premia in Takeovers. *American Economic Review*, 94(1), 46–56.

Jovanovic, B. & Rousseau, P. L. (2008). Mergers as Reallocation. *The Review of Economics and Statistics*, 90(4), 765–776.

Kamien, M. I. & Zang, I. (1990). The Limits of Monopolization through Acquisition. *The Quarterly Journal of Economics*, 105(2), 465–99.

Konings, J. & Murphy, A. (2006). Do Multinational Enterprises Relocate Employment to Low-Wage Regions? Evidence from European Multinationals. Discussion Paper No. 100/2001, Review of World Economics.

Lechner, M. (1999). Identification and Estimation of Causal Effects of Multiple Treatments Under the Conditional Independence Assumption. IZA Discussion Papers 91, Institute for the Study of Labor (IZA).

Leuven, E. & Sianesi, B. (2003). PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing. Statistical Software Components, Boston College Department of Economics. This version: 3.1.4 17dec2008.

Levinsohn, J. & Petrin, A. (2003). Estimating Production Functions Using Inputs to Control for Unobservables. *Review of Economic Studies*, 70, 317–341.

Maksimovic, V. & Phillips, G. (2001). The Market for Corporate Assets: Who Engages in Mergers and Asset Sales and Are There Efficiency Gains? *Journal of Finance*, 56(6), 2019–2065.

McGuckin, R. H. & Nguyen, S. (2001). The Impact of Ownership Changes: A View from Labor Markets. *International Journal of Industrial Organization*, 19(5), 739–762.

Melitz, M. J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica*, 71(6), 1695–1725.

Morck, R., Shleifer, A., & Vishny, R. W. (1989). Alternative Mechanisms for Corporate Control. *American Economic Review*, 79(4), 842–52.

Muendler, M.-A. & Becker, S. O. (2009). Margins of Multinational Labor Substitution. Working Paper 14776, National Bureau of Economic Research.

Navaretti, G. B. & Castellani, D. (2004). Investments abroad and performance at home, Evidence from Italian multinationals. Discussion Paper No.4248, CEPR.

Neary, J. P. (2007). Cross-Border Mergers as Instruments of Comparative Advantage. *Review of Economic Studies*, 74(4), 1229–1257.

Nocke, V. & Yeaple, S. (2007). Cross-border mergers and acquisitions vs. greenfield foreign direct investment: The role of firm heterogeneity. *Journal of International Economics*, 72, 336–365.

Nocke, V. & Yeaple, S. (2008). An Assignment Theory of Foreign Direct Investment. *Review of Economic Studies*, 75(2), 529–557.

Norbäck, P.-J. & Persson, L. (2007). Investment liberalization – Why a restrictive cross-border merger policy can be counterproductive. *Journal of International Economics*, 72(2), 366–380.

OECD (1999). *Benchmark Definition of Feoreign Direct Investment*. Paris, third edition.

Olley, G. S. & Pakes, A. (1996). The Dynamics of Productivity in the Telecommunications Equipment Industry. *Econometrica*, 64(6), 1263–1297.

Pfaffermayr, M. (2004). Export orientation, foreign affiliates, and the growth of Austrian manufacturing firms. *Journal of Economic Behavior and Organization*, 54(3), 411–423.

Rosenbaum, P. R. (2002). *Observational studies*. New York: Springer Verlag.

Rosenbaum, P. R. & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika*, 70(1), 41–55.

Schoar, A. (2002). Effects of Corporate Diversification on Productivity. *The Journal of Finance*, 57(6), 2379–2403.

Shimizu, K., Hitt, M. A., Vaidyanath, D., & Pisano, V. (2004). Theoretical foundations of cross-border mergers and acquisitions: A review of current research and recommendations for the future. *Journal of International Management*, 10, 307Ű–353.

Shleifer, A. & Summers, L. (1998). Breach of Trust in Hostile Takeovers. In A. Auerbach (Ed.), *Corporate Takeovers: Causes and Consequences*. Chicago: Chicago University Press.

Shleifer, A. & Vishny, R. (1997). A Survey of Corporate Governance. *Journal of Economic Perspective*, 21(1), 7–20.

Shleifer, A. & Vishny, R. W. (1988). Value Maximization and the Acquisition Process. *The Journal of Economic Perspectives*, 2(1), 7–20.

Wagner, J. (2002). The causal effects of exports on firm size and labor productivity: first evidence from a matching approach. *Economics Letters*, 77, 287–292.

Yasar, M. & Rejesus, R. M. (2005). Exporting status and firm performance: Evidence from a matched sample. *Economics Letters*, 88, 397–402.

A Tables

Table 1
Logit estimation – dependent variable: at least one cross-border M&A deal.

	France		United Kingdom	
	β	SE	β	SE
TFP	0.0493	(0.1267)	-0.1382*	(0.0819)
Sales growth	0.6238**	(0.2665)	0.2391*	(0.1441)
Wages	1.4633***	(0.2214)	1.2289***	(0.1404)
Capital	0.2463***	(0.0663)	0.1476***	(0.0495)
Labor	0.3248***	(0.0799)	0.4056***	(0.0614)
Intangible assets	1.0796***	(0.2737)	1.6428***	(0.1833)
Working capital ratio	0.8664***	(0.3273)	1.5834***	(0.2271)
Exporter	0.1354	(0.1550)	0.5304***	(0.1010)
National deals	1.5082***	(0.1996)	0.7829***	(0.1180)
Cross-border deals	2.3501***	(0.1889)	1.7771***	(0.1204)
Δ *foreign subsidiaries*	1.4689***	(0.1718)	0.5442***	(0.0948)
Foreign owner	-1.0254***	(0.3027)	-0.8581***	(0.2346)
Legal form	0.8614***	(0.1668)	1.4631***	(0.1171)
Age	-0.0317	(0.0934)	-0.0586	(0.0519)
Industry dummies	yes		yes	
Time dummies	yes		yes	
N	107,878		104,202	
Pseudo-R^2	0.4194		0.4834	

Standard errors in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Industry and time dummies are included.

Table 2
Balancing test – France.

	Sample	Treated	Comparison	% bias	bias reduction	t-test equal means	p-value
TFP	Unmatched	1.129	0.750	52.0		8.65	0.000
	Matched	1.111	1.167	-7.7	85.2	-0.84	0.400
Wage	Unmatched	4.051	3.590	104.5		20.09	0.000
	Matched	4.038	4.019	4.3	95.9	0.47	0.640
Sales growth	Unmatched	0.099	0.051	18.6		3.41	0.001
	Matched	0.098	0.107	-3.4	81.6	-0.38	0.703
Capital	Unmatched	8.471	6.303	99.6		21.57	0.000
	Matched	8.398	8.623	-10.4	89.6	-1.01	0.315
Labor	Unmatched	5.609	4.047	96.4		22.74	0.000
	Matched	5.565	5.839	-16.9	82.5	-1.61	0.109
Intangible assets	Unmatched	0.326	0.190	46.7		8.36	0.000
	Matched	0.324	0.323	0.4	99.2	0.04	0.968
Working capital ratio	Unmatched	0.129	0.175	-18.3		-3.05	0.002
	Matched	0.131	0.162	-12.4	32.6	-1.50	0.135
Exporter	Unmatched	0.596	0.546	10.3		1.67	0.095
	Matched	0.598	0.598	0.0	100.0	0.00	1.000
National deals	Unmatched	0.322	0.007	94.0		61.87	0.000
	Matched	0.311	0.295	4.5	95.2	0.38	0.705
Cross-border deals	Unmatched	0.430	0.003	120.9		115.81	0.000
	Matched	0.417	0.383	9.7	92.0	0.80	0.425
Δ *foreign subsidaries*	Unmatched	0.474	0.025	102.0		40.18	0.000
	Matched	0.462	0.485	-5.2	94.9	-0.47	0.638
Foreign owner	Unmatched	0.052	0.106	-20.0		-2.87	0.004
	Matched	0.053	0.049	1.4	92.9	0.20	0.844
Legal form	Unmatched	0.785	0.346	98.6		15.14	0.000
	Matched	0.780	0.792	-2.6	97.4	-0.32	0.751
Age	Unmatched	3.189	2.964	26.8		4.80	0.000
	Matched	3.174	3.150	2.9	89.3	0.32	0.746
Propensity score	Unmatched	0.217	0.002	103.0		156.82	0.000
	Matched	0.201	0.201	0.1	99.9	0.01	0.992

Table 3
Balancing test – United Kingdom.

	Sample	Treated	Comparison	% bias	bias reduction	t-test equal means	p-value
TFP	Unmatched	1.085	0.980	12.9		2.92	0.004
	Matched	1.084	1.094	-1.2	90.5	-0.26	0.792
Wage	Unmatched	3.858	3.657	42.1		10.03	0.000
	Matched	3.859	3.880	-4.5	89.4	-0.85	0.394
Sales growth	Unmatched	0.099	0.062	10.5		2.78	0.006
	Matched	0.099	0.096	0.6	94.1	0.11	0.911
Capital	Unmatched	10.752	7.724	125.3		37.59	0.000
	Matched	10.742	10.887	-6.0	95.2	-0.93	0.351
Labor	Unmatched	7.457	4.713	148.2		48.77	0.000
	Matched	7.450	7.496	-2.5	98.3	-0.38	0.707
Intangible assets	Unmatched	0.413	0.076	122.3		42.14	0.000
	Matched	0.412	0.410	0.8	99.3	0.12	0.901
Working capital	Unmatched	0.155	0.127	10.3		2.33	0.020
	Matched	0.156	0.152	1.5	85.7	0.32	0.753
Exporter	Unmatched	0.638	0.335	63.6		16.26	0.000
	Matched	0.637	0.643	-1.3	97.9	-0.23	0.817
National deals	Unmatched	0.489	0.029	123.5		68.31	0.000
	Matched	0.491	0.503	-3.3	97.3	-0.45	0.656
Cross-border deals	Unmatched	0.528	0.007	145.6		146.88	0.000
	Matched	0.526	0.489	10.4	92.9	1.34	0.181
Δ *foreign subsidieries*	Unmatched	0.370	0.012	74.5		56.85	0.000
	Matched	0.368	0.373	-1.0	98.7	-0.13	0.893
Foreign owner	Unmatched	0.037	0.113	-29.0		-6.06	0.000
	Matched	0.037	0.037	0.0	100.0	0.00	1.000
Legal form	Unmatched	0.728	0.083	174.1		59.04	0.000
	Matched	0.727	0.741	-3.8	97.8	-0.57	0.571
Age	Unmatched	2.992	2.866	12.7		3.59	0.000
	Matched	2.995	2.961	3.5	72.6	0.56	0.572
Propensity score	Unmatched	0.293	0.004	140.1		193.43	0.000
	Matched	0.291	0.291	0.0	100.0	0.01	0.996

Figure 1
Propensity score density – France.

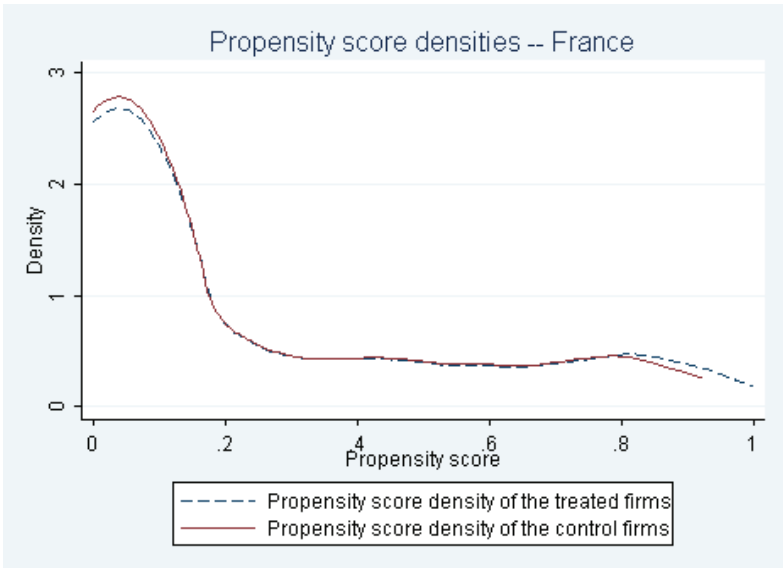

Figure 2
Propensity score density – U.K.

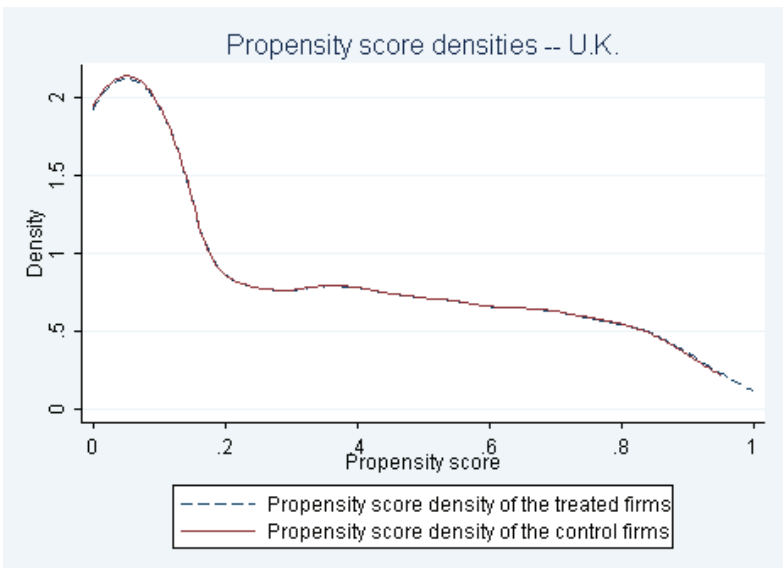

Table 4
Average effect of cross-border M&A on the aquirer's performance.

$y_{t+s} - y_{t-1}$		France		United Kingdom	
		DID	SE	DID	SE
Sales	t	0.0824***	(0.0206)	0.0935***	(0.0196)
	t+1	0.1455***	(0.0294)	0.1966***	(0.0300)
	t+2	0.1313***	(0.0364)	0.2358***	(0.0372)
Labor	t	0.0421***	(0.0156)	0.1045***	(0.0158)
	t+1	0.0710***	(0.0241)	0.1853***	(0.0240)
	t+2	0.0802**	(0.0318)	0.2320***	(0.0314)
Capital	t	0.0837**	(0.0363)	0.1451***	(0.0264)
	t+1	0.1493***	(0.0524)	0.1942***	(0.0378)
	t+2	0.1701***	(0.0641)	0.2596***	(0.0483)
TFP	t	0.0405**	(0.0178)	-0.0063	(0.0210)
	t+1	0.0743***	(0.0254)	0.0242	(0.0261)
	t+2	0.0507	(0.0320)	0.0188	(0.0261)
N on (off) support		264	(6)	644	(2)

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

Table 5
Average effect of related and unrelated cross-border M&A on the aquirer's performance.

		France				U.K.			
		Related Deals		Unrelated Deals		Related Deals		Unrelated Deals	
$y_{t+s} - y_{t-1}$		DID	SE	DID	SE	DID	SE	DID	SE
Sales	t	0.0844***	(0.0322)	0.0818*	(0.0421)	0.1193***	(0.0337)	0.0702	(0.0441)
	t+1	0.1427***	(0.0473)	0.1425**	(0.0628)	0.2591***	(0.0524)	0.1261*	(0.0678)
	t+2	0.0898	(0.0614)	0.1525**	(0.0778)	0.2993***	(0.0655)	0.1546*	(0.0859)
Labor	t	0.0418*	(0.0249)	0.0360	(0.0301)	0.1418***	(0.0271)	0.0555	(0.0358)
	t+1	0.0741*	(0.0381)	0.0506	(0.0492)	0.2446***	(0.0413)	0.0979*	(0.0547)
	t+2	0.0424	(0.0519)	0.1037	(0.0657)	0.3040***	(0.0541)	0.1137	(0.0730)
Capital	t	0.0827	(0.0596)	0.1124	(0.0736)	0.1499***	(0.0463)	0.1386**	(0.0601)
	t+1	0.0931	(0.0852)	0.2717**	(0.1127)	0.2123***	(0.0649)	0.1709*	(0.0890)
	t+2	0.0416	(0.1061)	0.3606***	(0.1358)	0.2878***	(0.0830)	0.2157*	(0.1154)
TFP	t	0.0428	(0.0280)	0.0431	(0.0389)	-0.0127	(0.0242)	0.0130	(0.0327)
	t+1	0.0727*	(0.0419)	0.0803	(0.0552)	0.0345	(0.0369)	0.0303	(0.0472)
	t+2	0.0506	(0.0537)	0.0385	(0.0694)	0.0186	(0.0462)	0.0421	(0.0598)
N on (off) support		139	(2)	110	(2)	339	(1)	247	(1)

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

Related deals: acquiring and target firm belong to the same NACE two-digit industry code. Unrelated deals: otherwise.

Table 6
Number and percentage of deals according to target regions.

	All, absolute	All, relative	Manufacturing, hightech	Manufacturing, lowtech	Services, knowledge intensive	Services, other
France						
EUW	141	53.4	40.5	48.8	52.4	69.8
US	29	11.0	23.8	11.6	9.5	3.8
CEE	15	5.7	4.8	9.3	4.0	7.5
other	42	15.9	21.4	20.9	14.3	11.3
multiple	37	14.0	9.5	9.3	19.8	7.5
	264	100.0	100.0	100.0	100.0	100.0
United Kingdom						
EUW	209	32.5	34.5	23.6	35.1	37.8
US	180	28.0	37.1	28.2	27.0	21.7
CEE	18	2.8	5.2	0.0	2.8	4.2
other	131	20.3	13.8	25.3	19.4	21.0
multiple	106	16.5	9.5	23.0	15.6	15.4
	644	100.0	100.0	100.0	100.0	100.0

Table 7
Average effect of cross-border M&A on the aquirer's performance by industry type – France.

		Manufacturing, hightech		Manufacturing, lowtech		Services, knowledge intensive		Services, other	
$y_{t+s} - y_{t-1}$		DID	SE	DID	SE	DID	SE	DID	SE
Sales	t	0.0709*	(0.0391)	0.0625	(0.0404)	0.1141***	(0.0373)	0.0325	(0.0345)
	t+1	0.1865***	(0.0569)	0.1124**	(0.0482)	0.1645***	(0.0524)	0.0948	(0.0582)
	t+2	0.1042	(0.0739)	0.1584***	(0.0513)	0.1564**	(0.0648)	0.0711	(0.0771)
Labor	t	0.0082	(0.0248)	0.0525*	(0.0282)	0.0392	(0.0289)	0.0672**	(0.0271)
	t+1	0.0604	(0.0401)	0.0746*	(0.0409)	0.0454	(0.0439)	0.1375***	(0.0474)
	t+2	0.0216	(0.0704)	0.1537***	(0.0482)	0.0557	(0.0554)	0.1254*	(0.0676)
Capital	t	0.0296	(0.0606)	0.0213	(0.0548)	0.0664	(0.0688)	0.2184***	(0.0658)
	t+1	0.0750	(0.0807)	-0.0026	(0.1013)	0.1899*	(0.0970)	0.2347***	(0.0896)
	t+2	-0.0044	(0.1114)	0.0544	(0.1040)	0.1891	(0.1189)	0.3571***	(0.1184)
TFP	t	0.0618*	(0.0366)	0.0160	(0.0261)	0.0758**	(0.0330)	-0.0403	(0.0290)
	t+1	0.1295***	(0.0497)	0.0486	(0.0481)	0.1124**	(0.0456)	-0.0394	(0.0452)
	t+2	0.0860	(0.0559)	0.0228	(0.0589)	0.0955*	(0.0575)	-0.0612	(0.0612)
N on (off) support		42	(1)	43	(0)	126	(4)	53	(1)

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

Industry classification based on NACE two-digit industry code. Manufacturing: 15-37. Hightech: 24, 29, 31, 33-35.

Knowledge intensive services: 61, 62, 64, 70-74. Other services: 45, 50-52, 55, 60, 63.

Table 8
Average effect of cross-border M&A on the aquirer's performance by industry types – U.K.

		Manufacturing, hightech		Manufacturing, lowtech		Services, knowledge intensive		Services, other	
$y_{t+s} - y_{t-1}$		DID	SE	DID	SE	DID	SE	DID	SE
Sales	t	0.0779**	(0.0369)	0.0216	(0.0337)	0.1457***	(0.0421)	0.1163***	(0.0374)
	t+1	0.1997***	(0.0630)	0.0986**	(0.0485)	0.2807***	(0.0638)	0.1892***	(0.0551)
	t+2	0.2607***	(0.0631)	0.1171**	(0.0594)	0.3104***	(0.0806)	0.2499***	(0.0741)
Labor	t	0.0626**	(0.0288)	0.0504*	(0.0280)	0.1664***	(0.0323)	0.1131***	(0.0322)
	t+1	0.1374***	(0.0453)	0.0957**	(0.0414)	0.2993***	(0.0522)	0.1649***	(0.0412)
	t+2	0.1459***	(0.0544)	0.0950*	(0.0539)	0.3896***	(0.0697)	0.2357***	(0.0544)
Capital	t	0.1141**	(0.0505)	0.1511***	(0.0366)	0.1900***	(0.0578)	0.0967*	(0.0528)
	t+1	0.2100***	(0.0709)	0.1939***	(0.0559)	0.2542***	(0.0798)	0.0932	(0.0784)
	t+2	0.2456***	(0.0847)	0.2615***	(0.0775)	0.2925***	(0.1072)	0.2203**	(0.0908)
TFP	t	0.0163	(0.0235)	-0.0321	(0.0250)	-0.0102	(0.0333)	0.0126	(0.0244)
	t+1	0.0673*	(0.0386)	0.0031	(0.0344)	0.0063	(0.0450)	0.0413	(0.0416)
	t+2	0.1185***	(0.0382)	0.0174	(0.0417)	-0.0440	(0.0551)	0.0324	(0.0566)
N on (off) support		116	(0)	174	(2)	211	(0)	143	(0)

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

Industry classification based on NACE two-digit industry code. Manufacturing: 15-37. Hightech: 24, 29, 31, 33-35.

Knowledge intensive services: 61, 62, 64, 70-74. Other services: 45, 50-52, 55, 60, 63.