

Wößner, Nicole; Stiebale, Joel

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M&As, Investment and Financing Constraints

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M&As, Investment and Financing Constraints

Joel Stiebale Nicole Wößner ¹

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Abstract

We use a panel data set of European firms to analyze the effects of domestic and international M&As on target firms' investment and financial constraints. Combining propensity score matching with a difference-in-differences estimator, our results show that upon acquisition, target firms obtain better access to external finance, are characterized by higher levels of tangible and intangible assets, and display lower dependence of investments and cash savings to the availability of internal funds. We also provide evidence that some of our estimated effects are concentrated among acquisitions during the 2007-2009 financial crisis, relatively small target firms, and domestic acquisitions within Western European countries.

JEL codes: F61, F23, G34, L25, D22, D24

Keywords: Financial constraints, Investment, Intangible Assets, Mergers and Acquisitions, Foreign Ownership, Financial Crisis

¹Joel Stiebale, Duesseldorf Institute for Competition Economics (DICE), Heinrich-Heine University Duesseldorf, stiebale@dice.hhu.de; Nicole Wößner, DICE, Heinrich-Heine University Duesseldorf, woessner@dice.hhu.de.

1 Introduction

Mergers and acquisitions (M&As) play an increasingly important role in the world economy with a global transaction value that exceeded \$4 trillion for the first time in 2015.¹ While there is evidence that acquisitions often create value and spur growth of target firms, critics claim that more than 50% of previous M&A deals have failed.² A growing body of theoretical and empirical research has analyzed how M&As affect prices, productivity, innovation, employment, and wages (e.g., Guadalupe et al., 2012; Ashenfelter et al., 2014; Braguinsky et al., 2015; Javorcik and Poelhekke, forthcoming), but there is less evidence of how target firms' investment and financial constraints change upon acquisition.³ Whether target firms can benefit from acquisitions and exploit growth opportunities, however, critically depends on the availability of finance.

This paper analyzes the following research questions: (1) What is the impact of acquisitions on investment and financial constraints in target firms? (2) Do results vary with the characteristics of target firms, countries, and types of acquisitions? (3) Are the effects different for acquisitions that took place during the recent financial crisis?

To answer these research questions, we analyze more than 700 M&As in which European firms were acquired between 2003-2012. We construct various indicators from balance sheet data which are related to investments and financing constraints, including cash savings, debt, capital stock and intangible assets. Since targets firms are not selected randomly, we apply propensity score matching to construct an adequate control group of non-acquired firms with similar characteristics. We compare changes in outcome variables around the time of acquisition events between acquired firms and the control group using a difference-in-differences (DiD) estimator.

Our results show that, on average, acquisitions lead to higher growth of assets in target firms which is consistent with M&As relaxing liquidity constraints. In line with the common perception that financial constraints are particularly relevant for intangible investment, we find that this effect is most pronounced for the growth of intangible assets. Changes in acquirers' assets around the time of acquisitions indicate that this increase cannot be explained by income shifting in which intangibles are transferred from acquirer's to target's balance sheet.

Previous research has found that the degree of cash holdings is associated with financing constraints since managers use cash as an insurance towards future financial shocks (e.g., Opler et al., 1999). Our results show that cash holdings fall upon acquisition while debt ratios increase which

¹See, for instance, <http://www.wsj.com/articles/2015-becomes-the-biggest-m-a-year-ever-1449187101>, accessed Jan 13, 2017.

²See <https://hbr.org/2016/05/so-many-ma-deals-fail-because-companies-overlook-this-simple-strategy>, accessed Feb 11, 2016.

³Recent contributions that relate M&As to proxies for financing constraints include Wang and Wang (2015) and Erel et al. (2015). See section two for a discussion of related literature.

indicates lower vulnerability to financial shocks and improved access to external finance. We find that changes in these variables are concentrated among target firms of relatively small size – which are arguably more likely to be financially constrained – and in acquisitions that take place during the 2007-2009 financial crisis.

The international economics literature argues that the characteristics of acquiring and target firms can be quite different in cross-border acquisitions (see, for instance, Guadalupe et al., 2012; Nocke and Yeaple, 2007). To test whether these characteristics matter for investment and financial indicators in target firms, we perform a separate matching and DiD analysis for international M&As. Our results indicate that the overall average effect of M&As mainly stems from domestic transactions while most changes in our outcome variables of interest are statistically insignificant for cross-border M&As. This result can be explained by a selection effect since target firms in international acquisitions are significantly larger and more productive compared to domestic acquisition targets. Further analysis of heterogeneous effects shows that the reduction of financing constraints mainly stems from target firms in Western and Northern European countries, while there is little evidence for changes in investment and financial constraints in Eastern European acquisition targets.

To measure financial constraints more directly, we use the sample of targets and matched control firms to estimate investment-cash flow and cash-cash flow sensitivities and allow for heterogeneous effects between acquired and non-acquired firms before and after acquisition. Following Fazzari et al. (1988) and Almeida and Campello (2007), these sensitivities increase with the cost premium for external finance and thus the degree of financing constraints. Our estimates show that both investment-cash flow and cash-cash flow sensitivities fall significantly after acquisitions indicating that M&As can alleviate financial constraints in target firms.

The rest of this paper is organized as follows. Section 2 discusses the related theoretical and empirical literature, section 3 provides a description of the data and section 4 describes the empirical strategy. Results of the empirical analysis are presented in section 5 and section 6 concludes.

2 Related literature

Capital markets are characterized by significant agency problems and information asymmetries between management and shareholders and between a firm's management and its creditors (e.g., Jensen and Meckling, 1976; Stiglitz and Weiss, 1981; Myers and Majluf, 1984; Jensen, 1986). Due to these information asymmetries, suppliers of finance are confronted with an adverse selection problem leading to the rationing of finance and external sources of financing being more expensive than internal sources. Some profitable investment projects will thus not be undertaken due to financial constraints.

M&As might alleviate target firms' liquidity constraints due to access to the acquirers' resources or relationships with financiers, higher collateral of the merged entity, or signaling to potential providers of finance (Erel et al., 2015; Boucly et al., 2011). We test this hypothesis in the empirical analysis by investigating how investments and cash savings of target firms depend on the availability of internal finance before and after acquisition.

Since asymmetric information problems are arguably more pronounced for investment in innovative assets than for tangible investment, and the collateral value of intangible assets is limited, financial constraints are especially relevant for the financing of research and development (R&D) and other types of intangible investments (Brown et al., 2012). Further, the riskiness of R&D makes debt financing particularly difficult to obtain, since in contrast to equity market investors, creditors do not benefit from upside returns (Brown et al., 2009; Hsu et al., 2014). If M&As decrease financing constraints, it is likely that we see a higher increase in the accumulation of intangible compared to tangible assets.

The extent to which firms are likely to be financially constrained and suffer from underinvestment varies across types of firms, countries, and time periods. For instance, large firms, which are often publicly listed, should experience little financing constraints due to relatively high collateral, strict reporting requirements – which reduce information asymmetries between firms and financiers – and access to equity markets. In contrast, low collateral and the difficulty to convey information to providers of finance make it more likely that small firms have to rely on internal financial resources and have limited access to bank loans (e.g., Behr et al., 2013; Carpenter and Petersen, 2002). If acquirers alleviate financial constraints in target firms, we would thus expect higher effects for acquisition targets of relatively small size. In our empirical analysis, we thus estimate heterogeneous effects according to the pre-acquisition size of target firms.

International M&As can be quite different from domestic ones. The foreign direct investment (FDI) literature argues that due to large sunk costs of entering a foreign market, only firms with superior productivity can operate abroad profitably (Helpman et al., 2004). This productivity advantage has, for instance, been related to management practices (e.g. Bloom and van Reenen, 2010) and differences in innovation and knowledge (e.g., Guadalupe et al., 2012). The knowledge capital model (Markusen, 2002) and related theories of multinational firms (e.g., Arkolakis et al., 2013; Ekholm and Hakkala, 2007) posit that the superior productivity of multinationals stems from knowledge generated in firms' headquarters and can be transferred across borders at relatively low costs to foreign affiliates. Foreign acquisition targets might therefore increase their productivity after international M&As. Besides knowledge transfer, foreign acquisitions might also benefit acquisition targets due to access to new markets (Guadalupe et al., 2012) or complementary assets of the

acquiring firm (e.g., Nocke and Yeaple, 2007, 2008). If these channels lead to improved profitability, target firms financial conditions may improve implying lower financial constraints.

Recently, the literature has argued that foreign acquisitions might be driven by liquidity of multinational firms (Alquist et al., 2014) and benefit target firms due to lower financing costs (e.g., Wang and Wang, 2015). The relevance of this channel is likely to depend on which firms are being acquired. While some theories suggest that foreign investors tend to acquire firms of high productivity and size (e.g., Guadalupe et al., 2012) (which are typically not very likely to be financially constrained), other scholars argue that there are incentives to invest in underperforming targets (e.g., Neary, 2007) or that the selection profile depends on industry characteristics such as the type of capabilities that determine productivity (Nocke and Yeaple, 2007). It is also likely that the relevance of this channel depends on the timing of acquisitions. For instance, financial shocks and changes in local demand during the 2007-2009 financial crisis differed across types of firms and countries, and foreign acquirers and their acquisition targets might thus not be affected in the same way as domestically owned firms (Alfaro and Chen, 2012). Whether target firms are likely to face financing constraints before acquisition, and domestic and international M&As thus have the potential to reduce these constraints, is therefore ultimately an empirical matter.

Several empirical studies have documented significant performance gains in the form of productivity improvements in target firms after international M&As (e.g. Arnold and Javorcik, 2009; Chen, 2011; Guadalupe et al., 2012). However, other scholars have argued that the effects of cross-border M&As are not that different from other ownership changes (e.g. Gugler et al., 2003; Fons-Rosen et al., 2013; Wang and Wang, 2015). There is a large literature on the effects of M&As on efficiency-related outcomes which either analyzes domestic transactions or does not explicitly distinguish between domestic and international M&As. This literature indicates that domestic acquisitions can lead to productivity gains as well (e.g. Maksimovic and Phillips, 2001; David, 2013; Braguinsky et al., 2015).

A number of empirical studies show that foreign owned firms are less likely to be financially constrained than domestic firms. For instance, Bridges and Guariglia (2008) and Guariglia and Mateut (2010) show that investment and death of British firms vary less with financial factors when firms have foreign ownership. Similarly, Harrison and McMillan (2003) find that domestically owned firms in Ivory Coasts are more likely to be credit constrained than foreign owned firms. Desai et al. (2008) show that affiliates of US multinationals are less affected by local currency devaluations that increase debt and potentially affect financing constraints. Evidence in Alfaro and Chen (2012) indicates that foreign owned firms display higher growth rates compared to domestically owned firms during the years of the financial crisis. However, all these studies analyze cross-sectional differences in

foreign ownership and therefore cannot isolate the causal effects of foreign acquisitions. Alquist et al. (2014) provide evidence for the incidence of liquidity-driven foreign acquisitions, i.e. multinationals acquire domestic firms in financially dependent industries and in industries with low asset tangibility. These patterns are most pronounced in target countries with low levels of financial development. However, the authors only analyze financial factors as a determinant of FDI and foreign acquisitions, not whether financial constraints in target firms are indeed reduced as a result of being acquired.

Findings by Erel et al. (2015) indicate that target firms display higher levels of investment and lower investment- and cash-cash flow sensitivities upon acquisition. However, they do not differentiate between domestic and foreign M&As. Further, they do not control for endogenous selection of acquisition targets and hence it is not clear whether acquired firms are less financially constrained due to acquisitions per se. Wang and Wang (2015) show that Chinese target firms' financial conditions measured as liquid assets and debt ratios improve for foreign relative to domestically acquired firms. Since financial conditions and the selection of target firms might differ substantially between Chinese and European markets, these results do not necessarily apply to M&As in developed countries. Previous research has also shown that acquisitions by financial companies such as private equity firms can lead to lower financing constraints and induce higher investment and innovation (Amess et al., 2016; Boucly et al., 2011), but it is unclear whether these mechanism also apply to M&As in general.

3 Data

Data and sample selection We link financial data on European firms from the Amadeus database to data on domestic and international M&As between 2003 and 2012 from the Zephyr database, both provided by Bureau van Dijk. The Amadeus database contains financial information on public and private firms of 43 countries in Europe, including standardised annual accounts. We use unconsolidated information, and match the observations to the Zephyr data using the common firm identifiers. The Zephyr database contains M&A, IPO, private equity and venture capital deals, and provides information on various characteristics of the deal, e.g. date, deal value, deal type, stake, and target and buyer firms. By combining these two datasets, we are able to identify financial information for target firms before and after an acquisition. In addition, we have data on firms which are not involved in M&As in the considered period.

The data are cleaned in the following way. First, observations with implausible values, like negative employment, are set to missing.⁴ Second, to deal with extreme outliers, we delete the lower

⁴Observations with implausible information on fixed assets, leverage, and the ratio of cash holdings to total assets are also set to missing.

and upper 0.5% quantile of firm-year observations. In addition, we do not consider very small firms with a median value of operating revenue smaller than half a million euros or less than 5 employees based on the available observations per firm. Following Erel et al. (2015, p. 295), we also address the concern that the target firm’s assets after an acquisition cannot be identified correctly as the acquirer might organizationally hold also some of its other assets in the target firm. We therefore exclude target firms with (implausible) large changes in the number of employees from one year to another (change of more than 100%) from the analysis. This procedure is also applied to non-acquired firms, as large variations in employment might indicate an unreported merger. Finally, the financial variables are deflated using data from the European Central Bank (Eurostat).⁵

The analysis is restricted to firms in the manufacturing sector (NACE Revision 2, 2-digit industry codes 10-33). In the main specification, we focus on majority acquisitions, i.e. the stake controlled rises from below to at least 50%. After restricting the sample to targets with information on all necessary variables for the analysis, the final M&A sample consists of 736 deals between 2003 and 2012. Table 1 gives an overview of the completed deals. We refer to a cross-border deal if the acquiring firm is located in another country than the target firm, whereas domestic deals describe M&As within the same country. The financial crisis is defined as taking place between the second half of 2007 until the end of 2009 (see, e.g., Flannery et al., 2013). 79% of the targets are West European firms, with France (17%), Italy (16%), and Spain (13%) being the countries with the highest share of acquired firms in the sample. In Eastern Europe, the countries with most target firms are the Czech Republic (5%), Ukraine (4%), and Serbia and Hungary (both 2%).⁶ 41% of M&As are cross-border.⁷ Almost one quarter of deals took place during the economic crisis. During this period, we observe an increase in the acquisition of Eastern European firms (30%), compared to deals before (19%) and after the crisis (16%).

Economic variables We have information on firms’ balance sheet and profit and loss account. Data on sales, employment and capital stock (measured as tangible fixed assets) provide information on the firm’s growth path, size, and capital intensity. The financial situation and liquidity are captured by the cash ratio, working capital ratio, cash flow ratio, and leverage ratio (all measures divided by total assets). The average wage (costs of employees over number of employees) approximates the average skill level in the firm, and intangible fixed assets normalized by fixed assets are

⁵We use as deflator the *Gross domestic product at market price* for the EU-28 countries (not industry- and country-specific).

⁶The following countries are classified as *East European*: Belarus, Bulgaria, Czech Republic, Hungary, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia, Ukraine, Estonia, Latvia, Lithuania, Albania, Bosnia and Herzegovina, Croatia, Montenegro, Serbia (including Kosovo), Slovenia, the former Yugoslav Republic of Macedonia. The remaining European countries are treated as *West European*. A list of the countries where the target firms are located is available in Table A.2 in the Appendix.

⁷Note that for 3% of deals we do not have information on the country of the acquirer.

used as a proxy for the R&D intensity. To obtain a measure of total factor productivity (TFP), we apply the generalized method of moments (GMM) estimation strategy suggested by Wooldridge (2009), controlling for unobserved productivity shocks using investments (Oley and Pakes, 1996). We conduct separate regressions per 2-digit NACE industry, and calculate firm-level TFP as the deviation from the industry mean.⁸ TFP figures are available for firms with information on operating revenue, capital, employment and material costs. Finally, we have information on the firm’s age and legal form.⁹

4 Econometric strategy

The aim of our study is to identify the causal impact of M&As on target firms’ investment and financing constraints. In doing so, we combine a DiD estimator with propensity score matching.

The effect of acquisition can be formalized by the average treatment effect on the treated (ATET)

$$\beta_{ATET} = E[y_{t+s}^1 | MA_t = 1] - E[y_{t+s}^0 | MA_t = 1], \quad (1)$$

where y_{t+s}^1 describes the observed outcome s periods after acquisition, and y_{t+s}^0 the hypothetical outcome in the absence of acquisition. MA_t is a binary variable equal to one if a firm is acquired in t and zero otherwise. The second term $E[y_{t+s}^0 | MA_t = 1]$ constitutes the counterfactual situation, i.e. the firms’ outcome had they not been the target of a deal. We employ a matching procedure to obtain an estimate for this unobserved outcome by constructing a comparison group of firms which are not acquired, but similar to target firms in terms of observable characteristics. In fact, we use propensity score matching as proposed by Rosenbaum and Rubin (1983), and exploit balance sheet data to estimate the probability of acquisition. The average outcome of the comparison group is then used to identify the mean counterfactual outcome of the target firms in the absence of acquisition. To illustrate, Equation 1 can be rewritten as follows:

$$\begin{aligned} \beta_{ATET} = & E[y_{t+s}^1 | MA_t = 1, X_{t-1}] - E[y_{t+s}^0 | MA_t = 0, X_{t-1}] \\ & - (E[y_{t+s}^0 | MA_t = 1, X_{t-1}] - E[y_{t+s}^0 | MA_t = 0, X_{t-1}]). \end{aligned} \quad (2)$$

The first term describes the difference in observed outcomes between acquired and non-acquired firms. The second term represents a comparison between the hypothetical outcome of acquired firms had they not been acquired and the observed outcome of non-acquired firms. The latter is the

⁸More specifically, we approximate the deviation from the industry mean by calculating differences in logs, i.e. by subtracting the average log of TFP in the industry from the firm-level log of TFP.

⁹For a summary of the variables including variable definitions see Table A.1 in the Appendix.

bias we aim to minimize by selecting non-acquired firms which are as similar as possible to target firms with respect to characteristics X_{t-1} in the period before acquisition.

We further combine the propensity score matching with a DiD estimator (e.g. Blundell and Costa Dias, 2000). The DiD estimator compares the targets' outcome in the period before acquisition with the outcome s periods afterwards, controlling for the difference in outcomes of matched non-acquired firms:

$$\beta_{DiD} = E[y_{t+s}^1 - y_{t-1}^1 | MA_t = 1, X_{t-1}] - E[y_{t+s}^0 - y_{t-1}^0 | MA_t = 0, X_{t-1}]. \quad (3)$$

This procedure has the advantage that the assumption of selection on observables is weakened by allowing the selection into acquisition to be correlated with time-invariant unobservable characteristics.

The estimation strategy consists of the following steps. First, we predict the probability that a firm is acquired in period t based on observable firm characteristics in the period before using a Probit model. The sample includes both acquired firms in period t as well as firms which are not involved in M&As in the whole period under study. By means of the estimated probability, the so-called *propensity score*, we apply one-to-one nearest neighbor matching without replacement, i.e. each acquired firm is matched to one firm in the comparison group of non-acquired firms such that the difference in propensity scores is minimized.¹⁰ Using this matched data set, the DiD estimation involves a simple ordinary least squares (OLS) regression of the change in outcomes on the dummy for acquisition:

$$y_{it+s} - y_{it-1} = \alpha + \beta_{DiD} MA_{it} + \epsilon_{it}. \quad (4)$$

Heterogeneous effects of acquisition are calculated using the following equation:

$$y_{it+s} - y_{it-1} = \alpha_0 + \beta_{1,DiD} MA_{it} \times small_{it} + \beta_{2,DiD} MA_{it} \times (1 - small_{it}) + \eta_{it}, \quad (5)$$

exemplified on the basis of the target firm's size (proxied by a binary variable *small*). By testing for equality of $\hat{\beta}_{1,DiD}$ and $\hat{\beta}_{2,DiD}$, one can investigate if the effect of acquisition is different for small firms. We examine the cash ratio, the leverage ratio, the intangible assets ratio, and the log capital stock as outcome y .¹¹ Standard errors are estimated heteroscedasticity-consistent (robust). In the Appendix, we also present results for the effects on log sales, log labour, and TFP.

Similar to Erel et al. (2015) we consider the change in cash holdings after acquisition. The idea is a precautionary motive in the presence of capital market imperfections, as described by Keynes (1936,

¹⁰The choice of matching with or without replacement can be seen as a tradeoff between bias and variance. Since our sample of potential firms in the comparison group is large, we decide to perform the matching without replacement.

¹¹All ratios are divided by the firm's total assets.

p. 196): “To provide for contingencies requiring sudden expenditure and for unforeseen opportunities for advantageous purchases [...]”, and taken up by e.g. Kim et al. (1998) and Opler et al. (1999). If management maximizes shareholders’ wealth, cash holdings are set such that their marginal benefit equals their marginal cost: holding cash is costly since it lowers the rate of return, but it is beneficial as it can be used to finance investments if external sources of financing are not available or simply too costly. Hence, as “there is no necessity to hold idle cash to bridge over intervals if it can be obtained without difficulty at the moment when it is actually required” (Keynes, 1936, p. 196), the amount of cash held by the firm should be higher the more it expects to face financing constraints in the future.¹² Consequently, if M&As reduce target firms’ financing constraints, the cash ratio is expected to decrease after acquisition.

Similarly, if targets obtain better access to capital markets after acquisition, debt may be used as a substitute for holding liquid assets such as cash holdings.¹³ Hence, in the presence of investment opportunities and financing constraints pre-acquisition, the leverage ratio should rise after a deal.¹⁴

We additionally test for increases in investment by analyzing the change in tangible and intangible fixed assets. If investments can be financed more easily as a result of a better access to capital, we expect them to go up after a deal. This should be especially the case for intangible assets, which might be particularly prone to asymmetric information problems.

To extend the analysis on investment and financing constraints, we analyze the investment-cash flow and the cash-cash flow sensitivity. Under the assumption that external finance is more costly than internal finance, Fazzari et al. (1988) study in a seminal paper the relation between investment and internal finance in the presence of financing constraints. They argue that financially constrained firms, which rely on internal sources to finance investments, should display a positive sensitivity of investment to cash flow (as a proxy for internal funds). In contrast, investment decisions of unconstrained firms should not depend on cash flow. The approach of Fazzari et al. (1988) is controversial and has been criticized extensively (e.g., Kaplan and Zingales, 1997; Erickson and Whited, 2000; Gomes, 2001; Cleary et al., 2007). The criticism involves that the investment-cash flow sensitivity does not monotonically increase with the level of financing constraints. In addition, critics argue that a positive cash flow coefficient may simply capture the correlation between cash flow and investment opportunities (which are not properly controlled for). However, this indicator has

¹²Empirical work such as Opler et al. (1999) show a negative relation between access to the capital market and the amount of cash held by the firm. More recently, Hadlock and Pierce (2010) also find that firms with more cash are more likely to be financially constrained.

¹³Kim et al. (1998) test this explanation and provide evidence that the leverage ratio is negatively related to liquid assets.

¹⁴We argue that increased leverage after acquisition is consistent with relaxed credit constraints as firms are able to rely more on external financial funds, in line with e.g. Bellone et al. (2010) and Boucly et al. (2011). In contrast, Wang and Wang (2015) interpret a decrease in the leverage ratio and an increase in the liquidity ratio as a reduction in financing constraints.

been applied in several recent contributions which find positive cash flow sensitivities for constrained firms even if mismeasurement of investment opportunities is not a problem (see, for instance, Almeida and Campello, 2007; Bond and Söderbom, 2013). In addition, it is argued that the sensitivity is at least a useful measure of differences in financing constraints across different groups of firms (see also Erel et al., 2015). Hence, if institutional acquirers facilitate access to external finance, we expect that acquired firms adjust their investment to a lesser extent to increasing cash flow. We are therefore interested in how the cash flow sensitivity of investment changes after an acquisition, and estimate for firm i at year t

$$I_{it} = \gamma_0 + \gamma_1 CF_{it} + \gamma_2 after_{it} + \gamma_3 after_{it} \times CF_{it} + \gamma_4 X_{it} + d_t + \alpha_i + u_{it}, \quad (6)$$

where I describes investment in capital stock (calculated as the change in tangible fixed assets plus depreciation), CF cash flow, and $after$ is a binary variable which is one after acquisition. I and CF are scaled by the beginning-of-year capital stock.¹⁵ We additionally include further control variables X (e.g. sales growth as a proxy for investment opportunities), as well as year dummies (d_t). Standard errors are clustered at the firm level. We are primarily interested in the change of the cash flow sensitivity of investment after acquisition: if firms' financing constraints decrease after a deal, we expect the coefficient on the interaction term between $after$ and CF to be negative. Taking into account the criticism that the sensitivity may not monotonically increase with the level of financing constraints, the results would be most convincing if the sensitivity is positive and significant before (γ_1), but small and insignificant after acquisition ($\gamma_1 + \gamma_3$). To deal with potential unobserved heterogeneity, we apply a fixed effects estimator, and use the results of the propensity score matching, i.e. the sample includes target firms and their matched controls.

A related measure of financing constraints is the sensitivity of cash to cash flow (Almeida et al., 2004). The idea is that a financially constrained firm will increase its cash holdings due to an increase in cash flow to finance investments today and in the future, while an unconstrained firm's cash holdings should not systematically vary with cash flow.¹⁶ Since cash is a financial variable (rather than a real variable as investment), the authors argue that this measure avoids some problems with the investment-cash flow sensitivity, for example that a positive cash flow coefficient simply captures the correlation between cash flow and investment opportunities.¹⁷ However, they point out that the

¹⁵The approach to scale the variables by the firm's beginning-of-year capital stock is also adopted by several other authors, e.g. Kaplan and Zingales (1997).

¹⁶Other authors, e.g. Khurana et al. (2006) and Hadlock and Pierce (2010), also provide empirical evidence that the cash flow sensitivity of cash is related to a firm's financing constraints.

¹⁷However, their approach has been criticized by Riddick and Whited (2009). They show in a dynamic framework that cash holdings are in fact negatively related to cash flow when accounting for measurement error in *Tobin's q*. In addition, they argue that the amount of cash savings is not only related to a firm's financing constraints, but also (and to a greater extent) to its income uncertainty.

cash flow sensitivity of cash of constrained firms does not necessarily increase monotonically with the degree of financing constraints, since the degree depends on the borrowing capacity and on the size of the firms' cash flows relative to their investment opportunities (Almeida et al., 2004, p. 1785). Similar to Equation 6, the cash-cash flow sensitivity is described by

$$\Delta Cash_{it} = \delta_0 + \delta_1 CF_{it} + \delta_2 after_{it} + \delta_3 after_{it} \times CF_{it} + \delta_4 X_{it} + d_t + \alpha_i + w_{it}, \quad (7)$$

with $\Delta Cash$ being the change in cash holdings between two consecutive years. $\Delta Cash$ and CF are scaled by beginning-of-year total assets. Like Almeida et al. (2004), we additionally control for sales growth, size (proxied by the natural logarithm of total assets), and working capital (a potential substitute for cash holdings).¹⁸ We employ the same estimation technique and use the same sample as for the cash flow sensitivity of investment. If financing constraints decrease after acquisition, we expect δ_3 to be negative. Again, the most clear result would be a positive and significant cash flow coefficient before acquisition (δ_1), and a small and insignificant coefficient afterwards ($\delta_1 + \delta_3$).

5 Results

5.1 Effect of M&As on financial variables and investment

Baseline specification

The results of the Probit estimation for the probability that a firm is acquired in a given period are shown in Table 2. In addition to firm characteristics, we include industry dummies at the NACE 2-digit level, year dummies, and country dummies in the estimation. Large firms with high liquidity, and firms with a high capital intensity are more likely to be acquired. In addition, public limited companies seem to be more likely the target of a deal. The negative coefficient for the change in sales indicates that target firms experience lower sales growth before acquisition. Higher average wages and a higher R&D intensity also increase the probability of a deal. This is in line with the idea of *cherry-picking*, i.e. only the most innovative and productive firms within an industry are selected for acquisition (Guadalupe et al., 2012). The negative coefficient for TFP does not point in the same direction; however, as Table 3 shows, target firms are in general significantly more productive than non-acquired ones.¹⁹ A reason for the negative coefficient for TFP might be that this variable is highly correlated with other included firm characteristics such as firm's size, the average skill level,

¹⁸Working capital is also scaled by beginning-of-year total assets.

¹⁹In the unmatched sample, target firms are on average approximately 12% more productive than their industry mean. Non-acquired firms are still more productive compared to the firms in their industry, but only by approximately 6%.

and the importance of innovation.

After performing the matching procedure, we check the balancing condition, i.e. conditional on the propensity score, the selection into acquisition should be independent of observable firm characteristics.²⁰ In Table 3, we report t-tests for the equality of means between treated and non-acquired (control) firms. Before matching, we observe significant differences in the firm characteristics used in the Probit estimation: acquired firms are on average larger, more capital-intensive, more innovative and more productive than non-acquired firms. Hence, there is selection of firms into acquisition, which justifies our matching approach. After matching, however, the hypothesis of equal means cannot be rejected at conventional significance levels for all variables. In addition, the mean propensity scores do not significantly differ after matching, i.e. the average probability of being acquired is very similar in both groups.

The results of the DiD estimation for the cash ratio, leverage ratio, log capital stock and the intangible assets ratio are displayed in Table 4. Compared to non-acquired firms, target firms experience on average a significant decline in the cash ratio. Considering the fact that the average cash ratio of target firms is 8.7% in the year before acquisition, a decline of 1.2 percentage points in the second year after a deal implies a reduction of around 14%. The estimates are comparable to Erel et al. (2015, p. 302), who find that cash holdings over total assets are reduced by 1.4 to 1.7 percentage points. The decrease in the cash ratio is accompanied by a moderate increase in the leverage ratio. This effect is driven by a significant rise in long-term debt, suggesting that target firms obtain better access to external finance after a deal.²¹ As we use unconsolidated financial statements of target firms, the increase in debt is unlikely to be due to borrowed funds by the acquirers in the context of the deal financing.²² With regard to investment, acquired firms experience a large increase in the intangible assets ratio from around 17% in the year of the deal to 40% two years afterwards when taking into account that the ratio is on average 0.030 for acquired years in the year before the deal.²³ In addition, we find a positive, albeit a smaller, impact on the capital stock. This effect does not occur immediately after a deal, but two (resp. three) years afterwards it amounts to approximately 8.7% (resp. 10.2%).²⁴ The findings are consistent with the view that M&As reduce target firms' financing constraints. In Table A.3 in the Appendix, we further have a look at the effects on sales,

²⁰Note that the common support condition is fulfilled for all acquired firms in the sample.

²¹See Table A.3 in the Appendix where we separately analyze the change in long-term debt and current liabilities, the two components of our definition of leverage.

²²The same argument is made by Boucly et al. (2011) who analyze credit constraints of target firms involved in leveraged-buyouts.

²³As a robustness check, we perform the DiD estimation for the log of intangible assets as an outcome variable (see Table A.3 in the Appendix). Since around 22% of acquired firms have zero intangible assets in the pre-acquisition year, the log of intangible assets is calculated as $\ln(\text{Intangible Assets} + 1)$. The estimates are highly significant and similar in magnitude.

²⁴The DiD estimates for the third year after a deal are available upon request.

labour and TFP.²⁵ As a result of an improved access to capital and rising investment, it is likely that firms invest in employment and increase their productivity and sales. In fact, we observe a positive effect on the number of employees (5.8%) and on sales (3.7%) two years after a deal. However, in contrast to previous empirical work (e.g. Arnold and Javorcik, 2009; Guadalupe et al., 2012), we do not find significant changes in productivity.

One might be concerned that the large increase in intangible assets is related to transfer pricing. If the acquirers' intangible assets significantly decrease after acquisition, we cannot rule out this possibility. In Table A.4, we therefore compare mean intangible assets of acquirers in the year before a deal with respective figures up to two years afterwards.²⁶ In fact, we do not find a significant negative effect for acquirers. This result holds both for the log of intangible assets and for the ratio of intangible assets to total assets, whereat for the former we even identify a significant increase.

Another concern could be that the increase in the outcome ratios is due to a decrease in total assets, as the measures are normalized by this value. However, when performing a DiD estimation using the log of total assets as an outcome variable (see Table A.3), we find that compared to non-acquired firms, target firms experience on average a significant increase in total assets (about 6.6% two years after a deal). The reported effects are therefore rather under- than overestimated.

If target firms' financial constraints were decreasing after acquisition, we should see greater effects for firms which are a priori more likely to be financially constrained and suffer from underinvestment. Hadlock and Pierce (2010) provide evidence that the size of a firm is correlated with financing constraints, whereat smaller firms are more constrained than larger ones. One reason might be that the problem of information asymmetries is more pronounced for small firms, so that external financing is especially difficult for this group of firms. Similar to Erel et al. (2015), we present DiD estimates separately for small, and medium and big firms. In fact, we treat a target firm as small if its employment is below or equal the bottom tercile of all acquired firms in the year before acquisition, and estimate Equation 5.²⁷ Table 5 illustrates that the effect of acquisition is especially pronounced for small firms: the decrease in the cash ratio as well as the increase in the leverage ratio are high in magnitude and only significant for this group of firms. For both measures, the effects for the size classes are significantly different. We also find a stronger rise in sales and employment for small firms (see Table A.5). However, with regard to investments, we do not find differences related to firm's size.

²⁵Henceforth, we refer to tables and figures in the Appendix by the prefix A.

²⁶Unfortunately, we only have data on intangible assets for a limited number of acquirers: the figures in Table A.4 are based on the 27% of deals for which we have information on acquirers' intangible assets in all three years.

²⁷We also split the firms based on their sales as another proxy for *size*. The DiD estimates are similar as can be seen in Table A.6. In addition, we redefine a target firm as small if its employment is below or equal the bottom tercile of acquired firms in the same 2-digit NACE industry in the year before acquisition. The results are similar and are displayed in Table ??.

Cross-border versus domestic acquisitions

The effects of M&As on target firms' financing constraints are likely to differ by the acquirers' origin. Foreign-acquired firms may benefit from the greater access to capital markets, in particular to foreign capital markets, which is likely to lower their costs of external sources of financing. This is especially important if acquiring firms active in international acquisitions are those which are highly productive (e.g. Helpman et al., 2004) and financially liquid (e.g. Alquist et al., 2014). However, the potential to decrease financing constraints after acquisition depends crucially on the degree target firms are constrained before a deal.

We distinguish cross-border and domestic acquisitions, and perform the propensity score matching and DiD estimation separately for both deal types, considering the fact that the selection profile might differ.²⁸ The results of the Probit regressions are shown in Table A.7. As for the whole sample of target firms, large firms in terms of employment, and those with high average wages and a high R&D intensity are more likely to be selected in both deal types. With regard to international acquisitions, target firms are additionally more capital-intensive and productive, while domestic-acquired firms are especially more liquid than non-acquired ones. The DiD estimates are displayed in Table 6.²⁹ The results suggest a decrease in financing constraints especially for target firms in domestic deals: their cash ratio (leverage ratio) decreases (increases) significantly after acquisition. In addition, we observe a significant rise in intangible assets for target firms involved in this deal type.

One explanation for these findings is that domestic acquisitions per se lead to a greater decrease in financial constraints. Similar to Wang and Wang (2015), we therefore directly compare the effects of cross-border and domestic M&As, and perform another propensity score matching using domestic-acquired firms as a control group.³⁰ Since the matching is aimed at finding control firms with similar pre-acquisition characteristics, we are able to assess directly if the effects found in Table 6 are due to the deal type or to targets' characteristics. While the leverage ratio significantly decreases for firms in cross-border relative to firms in domestic deals, we find neither significant differences in the cash ratio nor in assets accumulation (see Table A.11). However, the effect for leverage vanishes

²⁸For about 3% of acquired firms (=20 deals), we have no information on whether the deal is cross-border or domestic. These observations are excluded from this analysis.

²⁹We apply one-to-one nearest neighbor matching without replacement using non-acquired firms as a control group. The balancing condition is tested in Table A.8. For cross-border deals, the ratio of intangible assets to fixed assets is still significantly different (at the 10% level) between treated and control firms after matching. To check if this influences our results, we include both the variable concerned (lagged one period before acquisition) as a regressor in the DiD estimation, as well as its interaction with the treatment indicator *MA*. The effects for target firms in cross-border deals remain small and statistically insignificant in almost all cases (available upon request).

³⁰As the number of potential control firms is only somewhat larger than the number of treated firms, we allow for propensity score matching with replacement. In addition, the common support condition is imposed, i.e. foreign-acquired firms which are off common support are not included (corresponds to 30 deals in our sample). Table A.9 and A.10 display the results of the Probit estimation and the propensity score matching.

when additionally controlling for age and cash flow in the pre-acquisition period, the variables which are still not balanced between foreign-acquired and domestically acquired firms after matching.³¹ Hence, the deal type is not sufficient to explain the differences in outcomes between international and domestic acquisitions.

Another explanation is related to target firms' characteristics and the degree they are financially constrained prior to acquisition. The summary statistics in Table A.8 show that, in the pre-acquisition year, firms in domestic deals are considerably smaller, and somewhat less productive and have a lower R&D intensity than firms in cross-border deals. This is in line with the observation that the share of targets operating in low-technology industries is much higher for domestically acquired (76%) than for foreign-acquired firms (55%).³² We therefore argue that target firms in domestic deals are likely to be more financially constrained before acquisition which increases the potential for reducing such constraints, and may explain the different effects for the two deal types.

Focusing on cross-border deals, we further analyze if the effects on financing constraints differ by the acquirers' location, and distinguish the following classifications: Europe versus non-Europe, European Union (EU) versus non-EU, Organisation for Economic Co-operation and Development (OECD) versus non-OECD, and United States (US) versus non-US.³³ However, we do not find a consistent pattern of heterogeneous effects by region respectively country of the acquirer.³⁴

East versus West European acquisitions

After looking at the acquirer's origin, we consider heterogeneous effects of acquisition by the target's region. In doing so, we consider target firms in Eastern and Western Europe, and perform a DiD estimation applying Equation 5 with a binary variable *east* which is one if the target firm is located in Eastern Europe.³⁵ The results are displayed in Table 7, and show that the effect of acquisition found for the whole sample is driven by target firms in Western Europe. Compared to non-acquired firms, West European firms experience on average a significant decline in the cash ratio as well as significant rise in the leverage ratio. In addition, both tangible and intangible assets increase, and employment grows on average by about 6.7% two years after acquisition (see Table A.13). Although

³¹More precisely, we perform the DID estimation in Equation 4, while additionally controlling for the log of age and the cash flow ratio in period $t-1$, as well as their respective interaction with the treatment indicator *MA*. Results are available upon request.

³²The classification is based on the aggregation of the manufacturing industry according to technological intensity by the European Commission (Eurostat), see http://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf, accessed Jan 24, 2017. We distinguish high-technology (high tech and medium-high tech) and low-technology (low-tech and medium-low-tech) industries.

³³For a list of the acquirers' country in cross-border deals and the respective classifications see Table A.12.

³⁴Exploiting the results of the matching procedure for target firms in international acquisitions, we estimate Equation 5 using dummy variables for the mentioned country classifications (available upon request). We do not separately look at chinese acquirers, since they only account for less than 2% of cross-border deals.

³⁵We additionally include year, country, and year*country dummies to be sure to compare target and control firms within the same year and country in the DiD estimation.

we virtually find no effects with regard to financial variables for deals with East European targets, the estimated coefficients for the targets' regions are not significantly different from each other. However, as Table A.13 shows, firms in Eastern Europe benefit from acquisition with respect to average productivity, which increases by about 8.1% two years after a deal.

The findings may again be explained by a selection effect. As illustrated in Table A.14, acquired firms in Western Europe are on average considerably smaller, and have a higher cash and working capital ratio than East European firms, which suggests that the former are more financially constrained pre-acquisition. On the other hand, higher liquidity may also imply the presence of investment opportunities, a presumption that is reinforced by the fact that those firms are additionally a lot more productive and innovative, and have a higher cash flow. Hence, the combination of financing constraints and existing investment opportunities may explain the fact that firms in Western Europe benefit more from acquisition, at least with regard to a reduction in financing constraints.

Crisis versus non-crisis acquisitions

As the sample of M&As covers the period of the global financial crisis, we analyze whether the findings are different for deals that take place during and outside the crisis. There exist some evidence that foreign-owned firms perform better in economic crises than local firms (e.g. Desai et al., 2008; Alfaro and Chen, 2012), but we are not aware of a study that compares the effects of M&As in crisis- and non-crisis periods, especially with regard to financing constraints. We perform the propensity score matching and DiD estimation separately for both groups, since the motivation of parent firms to engage in an acquisition is likely to be different during an economic crisis.³⁶ In fact, when comparing the target firms' characteristics, we observe that firms differ, primarily in their TFP: those acquired during the crisis are on average about 2% more productive than the industry average, while those involved in deals before and after the crisis are substantially more productive (about 15%) than the other firms in their industry. Table 8 displays the results of the DiD estimations for the various outcomes. The effects are mixed. While cash holdings especially decrease for deals during the crisis, intangible assets only increase significantly for deals outside the crisis. The rise in intangible assets is quite substantial: compared to non-acquired firms, target firms' intangible assets increase on average by about 37% two years after acquisition. In line with Alfaro and Chen (2012), the finding on the reduced amount of cash holdings may indicate that acquired firms during the crisis particularly benefit from acquisition. The accompanying non-increase in investment may simply be explained by the lack of investment opportunities during an economic crisis. Moreover, the fact that firms involved in deals during the crisis are less productive may also reinforce the argument that

³⁶Again, we perform a one-to-one matching without replacement. Firms not involved in M&As in the considered period are used as control group. The Probit estimations and balancing tests are given in Table A.15 and Table A.16.

those firms may have less investment opportunities.

One could argue that the results are driven by the fact that the outcomes are observed in the financial crisis, and not primarily because of the acquisition takes place during this period of time. More specifically, depending on when a firm is acquired, the outcomes one and two years afterwards may be effected by the crisis. We test this in Table 9 for deals in the crisis by interacting the treatment variable *MA* with a dummy *crisis*, which is equal to one if the observed outcome is in the crisis.³⁷ The results support the argument that acquired firms during the financial crisis especially benefit from the parent company during crisis years: the cash ratio (leverage ratio) strongly decreases (increases) in the second year after acquisition only for observations in the crisis.³⁸

5.2 Effect of M&As on cash flow sensitivities

To provide further evidence that M&As reduce target firms' financing constraints, we present estimation results for the cash flow sensitivities of investment and of cash holdings. Again, the idea is to measure how investment (in capital stock) and cash holdings respond to changes in internal funds. A financially constrained firm, which primarily has to rely on internal sources to finance investments today and in the future, will increase its investment respectively cash holdings due to an increase in cash flow. By contrast, an unconstrained firm's investment (respectively cash holdings) should not systematically vary with cash flow. We are interested in how these sensitivities change after acquisition. The estimates for the cash flow sensitivity of investment (Panel A) and of cash (Panel B) are shown in Table 10. In the first column, we present a fixed effects (FE) regression using all acquired and matched control firms. We observe a positive and significant coefficient on cash flow for both equations, indicating that firms are indeed financially constrained. The negative estimate for the interaction term between cash flow and the dummy *after* is consistent with the view that firms' financing constraints decrease after a deal. However, the sensitivities are in both cases still significantly different from zero after acquisition (see F-test). Hence, our conclusion has to be treated with caution when taking into account the criticism that the relationship between the sensitivities of constrained firms and the level of financing constraints may not be monotonous. In the second and third column, we add additional control variables, namely sales growth as a proxy for investment opportunities, and the log of total assets to control for the firm's size. The results remain similar. In the fourth column, we drop the year of the deal for acquired firms to make sure that the findings are not only driven by the deal-year. While the interaction term between cash flow and *after* is

³⁷We additionally include the dummy *crisis* in the DiD regression (not presented). Since the dummy *crisis* does not vary if we look at the outcome in the year of acquisition, we only present the DiD estimates for the change in outcomes one year and two years after a deal.

³⁸This pattern is not observed when looking at deals outside the crisis, see Table A.17.

no longer significant for the cash flow sensitivity of investment, the decrease in the cash-cash flow sensitivity after acquisition is still significant and high in magnitude. In the last column, we add a binary variable *Deal* (=1 for acquired firms, =0 for non-acquired firms), and interact it with cash flow to control for the fact that the sensitivities may be different for target firms in the years before acquisition and non-acquired firms. The results are robust. In summary, the estimates in Table 10 support the previous findings that financing constraints decrease after M&As.³⁹

5.3 Robustness checks

We perform several robustness checks which we apply on the baseline DiD specification and investment-cash flow and cash-cash flow sensitivities. They are shortly summarized in the following.⁴⁰

First, some of the assumptions regarding the sample selection are relaxed. We additionally include firms with an employment change of more than 100% from one year to another, and implement again our preferred matching procedure. In another matching, we increase the sample by imposing the restriction of non-missing data on the outcome variables for up to one year after acquisition (instead of two years). In addition, instead of analyzing majority acquisitions, we focus on deals in which the stake controlled rises from below to above 25% (minority block acquisitions). The results are robust to these changes, except for the effect on the capital stock where we do not find a significant increase after acquisition.

Second, instead of one-to-one nearest neighbor matching, we implement caliper matching which avoids bad matches by imposing a maximum tolerance level for the propensity score distance, radius matching which uses all non-acquired firms within a caliper as control firms, and two variants of Mahalanobis matching as well as kernel matching.⁴¹ In another specification, the matching procedure is carried out with instead of without replacement. Moreover, regarding the propensity score estimation, we use a logit instead of a probit regression, and additionally include some key variables two years before the deal to control for pre-acquisition trends.⁴² The main results are not affected by this variation in matching algorithms. However, again, the effect on the capital stock is less robust as it is small and insignificant in some specifications.

³⁹We additionally include the working capital ratio in the cash flow sensitivity of cash equation to consider the fact that working capital is a potential substitute for cash holdings, and the estimates are similar (see column (6) in Table A.18). In addition, we recalculate specifications (1)-(5) for Panel A and B using all observations (i.e. both the acquired firms and all firms in the comparison group) and applying propensity score reweighting (i.e. acquired firms are weighted by 1, firms in the comparison group by $\hat{p}/(1-\hat{p})$ with \hat{p} being the estimated propensity score; see e.g. Guadalupe et al. (2012) for a similar approach), which also confirms our results (see columns (1)-(5) in Table A.18).

⁴⁰The corresponding tables are available upon request.

⁴¹With regard to Mahalanobis matching, we perform a one-to-one nearest neighbor matching on the propensity score while putting additional weight on the firm's year and country (first specification), and on the firm's year and industry (second specification).

⁴²The mentioned key variables are the cash ratio, leverage ratio, capital stock, employment, and intangible fixed assets over fixed assets.

Third, our approach to combine propensity score matching with a DiD estimator is only valid if the stable unit treatment value assumption is fulfilled, i.e. if the outcomes of matched non-acquired firms are not affected by the observed acquisitions. Since matched firms are very similar to target firms in terms of observable characteristics, and we also match on the industry, year and country, this assumption could be violated if a control firm is located in the same region within a country as the corresponding acquired firm. We therefore exclude those pairs and reestimate the DiD regression and cash flow sensitivities.⁴³ Since the results remain almost unchanged, we argue that a violation of this assumption is a minor concern in our case.

Finally, the estimation strategy is changed. We perform regressions similar to Equation 4; however, we do not rely on the matched data set, but exploit target firms and all available non-acquired firms. The change in outcomes is regressed on the dummy MA , lagged firm characteristics X_{t-1} used to estimate the propensity score, and time, year and country dummies. Standard errors are clustered at the firm level. The findings for the cash ratio, leverage ratio and intangible assets ratio are confirmed. As in some other robustness checks, the change in the capital stock is small in magnitude and not significant.

6 Conclusion

Agency problems and information asymmetries on capital markets lead to the rationing of finance. Firms which are financially constrained may not be able to exploit profitable investment projects as external sources of financing are not available or simply too costly. M&As may alleviate target firms' liquidity constraints since, for instance, being part of a larger organization may ease the access to bank loans due to a higher collateral and signaling to providers of finance. Previous literature has primarily looked at the effects of M&As on efficiency-related outcomes, but evidence on the financial channel of acquisitions is still scarce.

This paper provides evidence on the impact of domestic and international M&As on investment and financing constraints in target firms. We use a panel data set of European target firms exploiting financial information before and after acquisition, and combine propensity score matching with a DiD estimator. Our results show that upon acquisitions, firms obtain better access to external finance and increase their investments. More specifically, we find that acquisition targets hold less cash and increase their leverage after acquisition, suggesting that they obtain better access to capital markets and are therefore less in need of liquid assets for precautionary reasons. In addition, we provide evidence on higher growth of assets in target firms after a deal, especially of intangible assets.

⁴³This applies to 4 pairs of acquired and matched control firms. Unfortunately, for 276 firms (196 acquired firms, 171 control firms) we do not have information on the region.

This result is consistent with an alleviation of financing constraints which are particularly relevant for this type of assets. The effects vary across types of firms, types of acquisitions, countries, and time periods. The decrease in cash holdings and the associated increase in leverage are concentrated among relatively small acquisition targets, which are likely to be particularly financially constrained. Interestingly, we find stronger responses for firms involved in domestic than in international acquisitions. However, this finding may be rather explained by the firms' pre-acquisition characteristics than by the deal type as such. In addition, our results suggest that target firms located in Western Europe, and those acquired during the 2007-2009 financial crisis benefit more from the financial channel of acquisition. Further, we find that after acquisition, target firms display a lower dependence of investments and cash savings to the availability of internal funds, also indicating a reduction in liquidity constraints.

When assessing the potential benefits of acquisition, financial factors such as the possibility to decrease liquidity constraints of target firms should be taken into account. This channel is important, since availability of finance is crucial for growth and value creation in acquisition targets. One reason why we do not find effects for some subgroups of acquired firms may be the lack of investment opportunities, as financing constraints can only arise if firms plan new investments.

For future research, it might be interesting to focus on the channels how financing constraints are relaxed upon acquisition. This would create new insights on the motives of firms to engage in M&As and would therefore enrich the discussion on potential benefits.

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Tables

Table 1: M&A deals between 2003 and 2012.

	Absolute	Share (%)	Cross-border (%)	West European target (%)
Before the crisis	248	34	32	81
In the crisis	178	24	43	70
After the crisis	310	42	47	84
Total	736	100	41	79

NOTES: For 3% of all deals it is not known if the deal is cross-border or domestic.
Crisis: Q3/2007-Q4/2009.

Table 2: Probit regression. Prediction of M&A deals.

Cash ratio	0.0730 (0.1304)	Leverage ratio	0.1618* (0.0846)
Working capital ratio	0.2329*** (0.0861)	ln(Wage)	0.2278*** (0.0516)
ln(Capital)	0.0421*** (0.0148)	Public	0.0645* (0.0333)
ln(Labour)	0.4671*** (0.0714)	ln(Age)	- 0.0170 (0.0185)
ln(Labour) ²	- 0.0280*** (0.0077)	Intangible Assets/Fixed Assets	0.5379*** (0.0853)
$\Delta \ln(\text{Sales})$	- 0.0911* (0.0509)	TFP	- 0.0231 (0.0516)
Cash flow ratio	0.0285 (0.1536)		
Industry dummies	yes		
Country dummies	yes		
Year dummies	yes		
N	276,801		
Pseudo R^2	0.1552		

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses.
Number of observations N . The explanatory variables are lagged one period before the deal.

Table 3: Propensity score matching. Testing the balancing property.

	Unmatched	Mean		%bias	t-test	
	Matched	Treated	Control		t	p> t
Cash ratio	U	0.087	0.089	-2.0	-0.52	0.600
	M	0.087	0.083	2.7	0.53	0.599
Working capital ratio	U	0.227	0.212	6.2	1.73	0.083
	M	0.227	0.226	0.4	0.08	0.934
ln(Capital)	U	7.485	6.560	53.8	14.05	0.000
	M	7.485	7.484	0.0	0.00	0.996
ln(Labour)	U	4.487	3.514	82.0	22.57	0.000
	M	4.487	4.452	2.9	0.55	0.582
ln(Labour) ²	U	21.578	13.711	77.3	23.66	0.000
	M	21.578	21.207	3.7	0.65	0.517
$\Delta\ln(\text{Sales})$	U	0.019	0.023	-1.5	-0.39	0.694
	M	0.019	0.025	-2.1	-0.41	0.682
Cash flow ratio	U	0.091	0.084	6.0	1.92	0.055
	M	0.091	0.093	-1.5	-0.29	0.774
Leverage ratio	U	0.525	0.557	-14.4	-3.86	0.000
	M	0.525	0.518	2.7	0.52	0.600
ln(Wage)	U	3.304	3.203	12.5	3.61	0.000
	M	3.304	3.321	-2.2	-0.41	0.685
Public	U	0.473	0.304	35.1	9.92	0.000
	M	0.473	0.471	0.3	0.05	0.958
ln(Age)	U	2.934	2.836	12.2	3.44	0.001
	M	2.934	2.951	-2.1	-0.40	0.690
Intangible Assets/Fixed Assets	U	0.098	0.071	15.8	4.74	0.000
	M	0.098	0.109	-6.6	-1.10	0.271
TFP	U	0.116	0.058	13.4	3.75	0.000
	M	0.116	0.129	-3.0	-0.57	0.569
Propensity score	U	0.017	0.003	84.0	61.12	0.000
	M	0.017	0.017	-0.0	-0.00	0.998

Table 4: Difference-in-Difference estimation for the effect of M&As on the targets' performance.

$y_{t+s} - y_{t-1}$	s	DiD	SE
Cash ratio	0	0.000	(0.005)
	1	-0.010**	(0.005)
	2	-0.012**	(0.006)
Leverage ratio	0	-0.009	(0.007)
	1	0.010	(0.008)
	2	0.017*	(0.010)
ln(Capital)	0	-0.007	(0.021)
	1	0.037	(0.030)
	2	0.087**	(0.037)
Intangible Assets ratio	0	0.005***	(0.002)
	1	0.009***	(0.002)
	2	0.012***	(0.003)
N		736	

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Acquisition in period t . Number of observations N .

Table 5: Difference-in-Difference estimation for the effect of M&As on the targets' performance, by size (employment).

$y_{t+s} - y_{t-1}$	s	Small		Medium and Big		F-test
		DiD	SE	DiD	SE	
Cash ratio	0	-0.014	(0.009)	0.006	(0.005)	0.0294
	1	-0.034***	(0.010)	0.001	(0.005)	0.0006
	2	-0.033***	(0.011)	-0.002	(0.006)	0.0061
Leverage ratio	0	-0.004	(0.011)	-0.011	(0.008)	0.5467
	1	0.034**	(0.013)	-0.002	(0.010)	0.0181
	2	0.038**	(0.016)	0.007	(0.012)	0.0872
ln(Capital)	0	0.021	(0.035)	-0.020	(0.022)	0.2718
	1	0.073	(0.051)	0.020	(0.032)	0.3204
	2	0.117**	(0.058)	0.072*	(0.040)	0.4593
Intangible Assets ratio	0	0.007**	(0.003)	0.005**	(0.002)	0.5624
	1	0.011***	(0.004)	0.008***	(0.003)	0.4761
	2	0.012***	(0.004)	0.011***	(0.003)	0.7790
N		244		492		

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Acquisition in period t . Number of observations N .

F-test: p-value of an F-test on equality of interaction terms for the target's size.

Table 6: Difference-in-Difference estimation for the effect of M&As on the targets' performance, by deal type.

$y_{t+s} - y_{t-1}$	s	Cross-border		Domestic	
		DiD	SE	DiD	SE
Cash ratio	0	0.005	(0.007)	-0.003	(0.006)
	1	-0.011	(0.008)	-0.019**	(0.007)
	2	-0.004	(0.009)	-0.021***	(0.008)
Leverage ratio	0	-0.031***	(0.011)	0.012	(0.009)
	1	-0.030**	(0.014)	0.041***	(0.011)
	2	-0.011	(0.017)	0.045***	(0.014)
ln(Capital)	0	-0.034	(0.030)	-0.002	(0.026)
	1	0.031	(0.043)	0.047	(0.040)
	2	0.033	(0.053)	0.066	(0.046)
Intangible Assets ratio	0	-0.001	(0.003)	0.007***	(0.002)
	1	-0.002	(0.004)	0.011***	(0.003)
	2	-0.003	(0.005)	0.014***	(0.003)
N		303		413	

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Number of observations N . Acquisition in period t .

Table 7: Difference-in-Difference estimation for the effect of M&As on the targets' performance, by target region.

$y_{t+s} - y_{t-1}$	s	Western Europe		Eastern Europe		F-test
		DiD	SE	DiD	SE	
Cash ratio	0	0.000	(0.005)	-0.003	(0.009)	0.7783
	1	-0.011*	(0.006)	-0.001	(0.010)	0.3596
	2	-0.014**	(0.007)	-0.006	(0.010)	0.5502
Leverage ratio	0	-0.003	(0.007)	-0.020	(0.020)	0.4382
	1	0.016*	(0.009)	-0.008	(0.022)	0.3139
	2	0.021*	(0.012)	0.003	(0.025)	0.5178
ln(Capital)	0	0.016	(0.024)	-0.056	(0.050)	0.1935
	1	0.050	(0.036)	-0.003	(0.069)	0.4948
	2	0.109**	(0.044)	0.066	(0.082)	0.6441
Intangible Assets ratio	0	0.007***	(0.002)	-0.001	(0.002)	0.0106
	1	0.011***	(0.003)	0.005	(0.005)	0.2733
	2	0.014***	(0.003)	0.005	(0.004)	0.0891
N		583		153		

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Number of observations N . Acquisition in period t .

F-test: p-value of an F-test on equality of interaction terms for the target's region.

Table 8: Difference-in-Difference estimation for the effect of M&As on the targets' performance, by crisis.

$y_{t+s} - y_{t-1}$	s	Deal in crisis		Deal outside crisis	
		DiD	SE	DiD	SE
Cash ratio	0	-0.009	(0.010)	-0.001	(0.005)
	1	-0.024**	(0.011)	-0.011*	(0.006)
	2	-0.024**	(0.011)	-0.010	(0.007)
Leverage ratio	0	-0.008	(0.017)	-0.002	(0.008)
	1	0.024	(0.019)	0.007	(0.009)
	2	0.049**	(0.021)	0.021*	(0.012)
ln(Capital)	0	-0.032	(0.047)	-0.053**	(0.024)
	1	0.043	(0.059)	-0.029	(0.035)
	2	0.068	(0.072)	-0.022	(0.043)
Intangible Assets ratio	0	0.004	(0.005)	0.005**	(0.002)
	1	0.005	(0.006)	0.009***	(0.003)
	2	0.002	(0.007)	0.011***	(0.003)
N		178		558	

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Number of observations N . Acquisition in period t . Crisis: Q3/2007-Q4/2009.

Table 9: Difference-in-Difference estimation for deals in the crisis. Interaction term for observations in the crisis.

$y_{t+s} - y_{t-1}$	s=1	s=2
<i>Panel A: Cash ratio</i>		
MA	-0.022 (0.016)	-0.014 (0.012)
MA x crisis	-0.006 (0.022)	-0.073** (0.036)
<i>Panel B: Leverage ratio</i>		
MA	0.043 (0.028)	0.029 (0.022)
MA x crisis	-0.039 (0.038)	0.145*** (0.068)
<i>Panel C: ln(Capital)</i>		
MA	0.108 (0.091)	0.069 (0.081)
MA x crisis	-0.129 (0.119)	-0.022 (0.162)
<i>Panel D: Intangible Assets ratio</i>		
MA	-0.002 (0.008)	0.000 (0.008)
MA x crisis	0.012 (0.012)	0.019 (0.016)
N	178	178

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. $MA = 1$ if firm is acquired in period t , zero otherwise. $crisis = 1$ if observation in period s is in 2007-2009, zero otherwise. Number of observations N .

Table 10: The effect of M&As on the investment-cash flow and cash-cash flow sensitivity.

	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Investment</i>					
CF	0.089*** (0.012)	0.083*** (0.012)	0.082*** (0.012)	0.082*** (0.013)	0.078*** (0.015)
after	0.050** (0.021)	0.051** (0.021)	0.046** (0.021)	0.050** (0.023)	0.063*** (0.022)
after x CF	-0.025* (0.014)	-0.024 (0.015)	-0.026* (0.014)	-0.023 (0.015)	-0.039** (0.019)
$\Delta \ln(\text{Sales})$		0.149*** (0.031)	0.129*** (0.031)	0.149*** (0.032)	
$\ln(\text{Total Assets})$			0.159*** (0.024)	0.146*** (0.025)	
Deal x CF					0.029 (0.025)
N	11570	11462	11462	10781	11570
F-test	0.000	0.000	0.000	0.000	0.000
<i>Panel B: ΔCash</i>					
CF	0.202*** (0.016)	0.191*** (0.016)	0.191*** (0.016)	0.184*** (0.016)	0.206*** (0.021)
after	0.006** (0.003)	0.006** (0.003)	0.006** (0.003)	0.003 (0.003)	0.006* (0.003)
after x CF	-0.113*** (0.027)	-0.112*** (0.026)	-0.116*** (0.026)	-0.118*** (0.030)	-0.109*** (0.032)
$\Delta \ln(\text{Sales})$		0.016*** (0.004)	0.015*** (0.004)	0.015*** (0.004)	
$\ln(\text{Total Assets})$			0.012*** (0.003)	0.012*** (0.003)	
Deal x CF					-0.008 (0.032)
N	11545	11437	11436	10747	11545
F-test	0.000	0.000	0.001	0.008	0.000

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (clustered at the firm level) in parentheses. Number of observations N . The regressions include year dummies. (1) presents the results of a fixed effects regression using all acquired and matched control firms, (2) adds sales growth, (3) additionally adds the log of total assets as a proxy for size, (4) drops the year of the deal for acquired firms, and (6) adds a dummy $Deal$ (=1 for acquired firms, =0 for non-acquired firms).

F -test: Tests null hypothesis that the cash flow sensitivity is zero after acquisition (p-values are reported).

A Appendix

Table A.1: Variable definitions.

Variable	Definition
Total Assets	Fixed Assets + Current Assets (TOAS)
Fixed Assets	Total amount (after depreciation) of non-current assets (FIAS) (Intangible Assets + Tangible Assets + Other Fixed Assets)
Capital (stock)	Tangible Fixed Assets (TFAS)
Depreciation	Total amount of depreciation and amortization of the assets (DEPRE)
Investment	Investment in tangible fixed assets (Capital - L1.Capital + Depreciation*(Capital/Fixed assets))
Intangible Assets	Intangible Fixed Assets (IFAS)
Labour	Total number of employees (EMPL)
Cash	Cash and cash equivalents (CASH)
Δ Cash	Cash - L1.Cash
Cash Flow	Cash Flow (CF)
Working Capital	Current Assets (CUAS) - Current Liabilities (CULI)
Sales	Total Operating Revenues (Net sales + other operating revenues + stock variations) (OPRE)
Δ Sales	Sales - L1.Sales
Leverage ratio	(Long-term Debt + Current Liabilities) / Total Assets
Long-term Debt	Long-term financial debts (e.g. to credit institutions (loans and credits), bonds) (LTDB)
Current Liabilities	Current liabilities of the companys (loans + Creditors + Other current liabilities) (CULI)
Wage	Costs of Employees (STAF) / Labour
TFP	Total Factor Productivity (deviation from industry mean)
Age	Actual Year - Year of Incorporation
Public	=1 if public limited company =0 otherwise

NOTES: The variables are measured annually. Source: Amadeus.

Table A.2: Distribution of target countries.

Country	Country Code	Frequency	Percent
Austria	AT	2	0.27
Bosnia and Herzegovina	BA	3	0.41
Belgium	BE	46	6.25
Bulgaria	BG	11	1.49
Czech Republic	CZ	39	5.30
Germany	DE	41	5.57
Estonia	EE	4	0.54
Spain	ES	94	12.77
Finland	FI	48	6.52
France	FR	126	17.12
Croatia	HR	12	1.63
Hungary	HU	15	2.04
Italy	IT	116	15.76
Norway	NO	3	0.41
Poland	PL	11	1.49
Portugal	PT	15	2.04
Romania	RO	2	0.27
Serbia	RS	15	2.04
Sweden	SE	92	12.50
Slovenia	SI	6	0.82
Slovakia	SK	4	0.54
Ukraine	UA	31	4.21
Total		736	100.00

Table A.3: Difference-in-Difference estimation for the effect of M&As on the targets' performance. Additional variables.

$y_{t+s} - y_{t-1}$	s	DiD	SE
ln(Sales)	0	-0.034**	(0.015)
	1	0.025	(0.018)
	2	0.058***	(0.021)
ln(Labour)	0	0.002	(0.008)
	1	0.017	(0.011)
	2	0.037***	(0.013)
TFP	0	-0.005	(0.010)
	1	0.017	(0.011)
	2	0.019	(0.012)
ln(Total Assets)	0	0.003	(0.012)
	1	0.059***	(0.017)
	2	0.066***	(0.020)
ln(Intangible Assets)	0	0.110*	(0.059)
	1	0.301***	(0.083)
	2	0.441***	(0.099)
Long-term Debt ratio	0	0.010*	(0.005)
	1	0.017**	(0.007)
	2	0.021***	(0.008)
Current Liabilities ratio	0	-0.019***	(0.007)
	1	-0.007	(0.008)
	2	-0.004	(0.010)
N		736	

NOTES: The long-term debt ratio (current liabilities ratio) is defined as long-term debt (current liabilities) over total assets. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Acquisition in period t . Number of observations N .

Table A.4: Change in acquirers' characteristics after a deal.

	ln(Intangible Assets)			Intangible Assets ratio		
	Mean	SD	T-test	Mean	SD	T-test
$t - 1$	3.6103	3.2122		0.0209	0.0626	
t	3.8345	3.2039	0.0246	0.0202	0.0564	0.7526
$t + 1$	3.9223	3.1973	0.0207	0.0204	0.0544	0.8465
$t + 2$	3.9842	3.2178	0.0082	0.0191	0.0502	0.5864
N	201			182		

NOTES: Acquisition in period t . T -test reports the p-value of a T-test on equality of mean values in t (resp. $t+1$, $t+2$) and $t-1$. Number of observations N .

Table A.5: Difference-in-Difference estimation for the effect of M&As on the targets' performance, by size (employment). Additional variables.

$y_{t+s} - y_{t-1}$	s	Small		Medium and Big		F-test
		DID	SE	DID	SE	
ln(Sales)	0	-0.038	(0.028)	-0.032**	(0.016)	0.8342
	1	0.057*	(0.031)	0.009	(0.020)	0.1447
	2	0.092***	(0.035)	0.040*	(0.023)	0.1624
ln(Labour)	0	0.036***	(0.011)	-0.016*	(0.008)	0.0000
	1	0.076***	(0.017)	-0.012	(0.012)	0.0000
	2	0.117***	(0.020)	-0.002	(0.014)	0.0000
TFP	0	-0.016	(0.015)	0.000	(0.011)	0.2801
	1	0.000	(0.016)	0.025**	(0.013)	0.1574
	2	0.007	(0.018)	0.025*	(0.014)	0.3283
N		244		492		

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Acquisition in period t . Number of observations N .

F-test: p-value of an F-test on equality of interaction terms for the target's size.

Table A.6: Difference-in-Difference estimation for the effect of M&As on the targets' performance, by size. Alternative definition of size.

$y_{t+s} - y_{t-1}$	s	Small		Medium and Big		F-test
		DiD	SE	DiD	SE	
<i>Panel A: Operating revenue</i>						
Cash ratio	0	-0.009	(0.008)	0.004	(0.005)	0.1509
	1	-0.028***	(0.009)	-0.002	(0.006)	0.0086
	2	-0.031***	(0.010)	-0.003	(0.006)	0.0105
Leverage ratio	0	-0.001	(0.011)	-0.012	(0.008)	0.3957
	1	0.038***	(0.013)	-0.003	(0.010)	0.0049
	2	0.042**	(0.016)	0.005	(0.012)	0.0499
ln(Capital)	0	-0.002	(0.036)	-0.009	(0.022)	0.8504
	1	0.057	(0.051)	0.028	(0.032)	0.5837
	2	0.101*	(0.060)	0.079**	(0.039)	0.7257
Intangible Assets ratio	0	0.004*	(0.002)	0.006***	(0.002)	0.4899
	1	0.009**	(0.004)	0.009***	(0.003)	0.9394
	2	0.009**	(0.004)	0.013***	(0.003)	0.4724
N		243		493		
<i>Panel B: Employment, by industry</i>						
Cash ratio	0	-0.013	(0.009)	0.005	(0.005)	0.0294
	1	-0.033***	(0.010)	0.001	(0.005)	0.0006
	2	-0.033***	(0.011)	-0.002	(0.006)	0.0061
Leverage ratio	0	-0.009	(0.011)	-0.009	(0.008)	0.9374
	1	0.026*	(0.014)	0.003	(0.010)	0.1226
	2	0.033**	(0.016)	0.010	(0.012)	0.0499
ln(Capital)	0	-0.001	(0.035)	-0.010	(0.022)	0.8035
	1	0.057	(0.052)	0.028	(0.032)	0.5975
	2	0.111*	(0.058)	0.074*	(0.040)	0.5424
Intangible Assets ratio	0	0.007**	(0.003)	0.005**	(0.002)	0.6130
	1	0.010**	(0.004)	0.009***	(0.003)	0.7782
	2	0.013***	(0.005)	0.011***	(0.003)	0.6184
N		242		494		

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Acquisition in period t . Number of observations N .

F-test: p-value of an F-test on equality of interaction terms for the target's size.

Table A.7: Probit regression. Prediction of cross-border and domestic M&A deals.

	Cross-border	Domestic
Cash/Total Assets	0.1599 (0.1940)	0.0108 (0.1620)
Working Capital/Total Assets	-0.0218 (0.1233)	0.3805*** (0.1093)
ln(Capital)	0.0536** (0.0214)	0.0325 (0.0188)
ln(Labour)	0.4163*** (0.1073)	0.5289*** (0.0924)
ln(Labour) ²	-0.0207* (0.0112)	-0.0389*** (0.0103)
$\Delta\ln(\text{Sales})$	-0.0504 (0.0661)	-0.1076 (0.0686)
Cash flow/Total Assets	-0.2287 (0.2263)	0.2560 (0.1882)
Leverage	0.1117 (0.1225)	0.2229** (0.1030)
ln(Wage)	0.2568*** (0.0722)	0.1940*** (0.0682)
Public	0.0151 (0.0480)	0.0797* (0.0426)
ln(Age)	-0.0564** (0.0255)	0.0220 (0.0243)
Intangible assets/Fixed assets	0.5736*** (0.1166)	0.4066*** (0.1144)
ln(TFP)	0.1117* (0.0651)	-0.1436** (0.0722)
Industry dummies	yes	yes
Country dummies	yes	yes
Year dummies	yes	yes
N	275,729	276,337
Pseudo R^2	0.1504	0.1652

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Number of observations N . The explanatory variables are lagged one period before the deal.

Table A.9: Probit regression. Prediction of cross-border M&A deals. Domestic deals as control group.

Cash ratio	0.3694 (0.5939)	Leverage ratio	- 0.3251 (0.3885)
Working capital ratio	- 0.9843*** (0.3703)	ln(Wage)	0.3789 (0.2458)
ln(Capital)	0.0677 (0.0665)	Public	- 0.2103 (0.1370)
ln(Labour)	0.2673 (0.3250)	ln(Age)	- 0.1259* (0.0721)
ln(Labour) ²	- 0.0092 (0.0337)	Intangible Assets/Fixed Assets	0.1601 (0.3562)
Δ ln(Sales)	0.1036 (0.1827)	TFP	0.6802*** (0.2565)
Cash flow ratio	- 0.4777 (0.6060)		
Industry dummies	yes		
Country dummies	yes		
Year dummies	yes		
N	714		
Pseudo R^2	0.2412		

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Number of observations N . The explanatory variables are lagged one period before the deal.

Table A.10: Propensity score matching. Testing the balancing property. Domestic deals as control group.

	Unmatched	Mean		%bias	t-test		
		Matched	Treated		Control	t	p> t
Cash ratio	U		0.078	0.094	-13.2	-1.73	0.085
	M		0.078	0.074	4.0	0.52	0.601
Working capital ratio	U		0.199	0.244	-18.0	-2.38	0.018
	M		0.201	0.201	0.3	0.03	0.976
ln(Capital)	U		7.851	7.226	38.6	5.08	0.000
	M		7.761	7.724	2.3	0.26	0.794
ln(Labour)	U		4.768	4.252	43.8	5.80	0.000
	M		4.697	4.798	-8.6	-0.98	0.328
ln(Labour) ²	U		24.143	19.432	42.6	5.68	0.000
	M		23.406	24.540	-10.2	-1.14	0.257
$\Delta\ln(\text{Sales})$	U		0.030	0.015	4.7	0.63	0.531
	M		0.028	0.035	-2.0	-0.20	0.838
Cash flow ratio	U		0.085	0.097	-10.0	-1.30	0.194
	M		0.084	0.106	-18.0	-2.26	0.024
Leverage ratio	U		0.538	0.522	7.2	0.95	0.341
	M		0.540	0.525	6.7	0.080	0.423
ln(Wage)	U		3.338	3.338	-0.0	-0.00	0.999
	M		3.337	3.277	7.4	0.86	0.388
Public	U		0.454	0.478	-4.9	-0.65	0.517
	M		0.474	0.452	4.4	0.52	0.607
ln(Age)	U		2.846	3.019	-20.9	-2.78	0.006
	M		2.862	2.66	24.4	2.59	0.010
Intangible Assets/Fixed Assets	U		0.112	0.086	14.3	1.90	0.058
	M		0.113	0.133	-10.9	-1.08	0.281
TFP	U		0.151	0.111	9.5	1.25	0.211
	M		0.137	0.124	3.1	0.37	0.709
Propensity score	U		0.593	0.301	130.7	17.36	0.000
	M		0.555	0.555	0.1	0.01	0.992

Table A.11: Difference-in-Difference estimation for the effect of M&As on the targets' performance, by deal type. Domestic deals as control group.

$y_{t+s} - y_{t-1}$	s	DiD	SE
Cash ratio	0	0.012	(0.010)
	1	0.011	(0.011)
	2	0.008	(0.013)
Leverage ratio	0	-0.043**	(0.017)
	1	-0.052**	(0.020)
	2	-0.059**	(0.025)
ln(Capital)	0	0.012	(0.043)
	1	0.044	(0.055)
	2	0.069	(0.066)
Intangible Assets ratio	0	-0.004	(0.004)
	1	-0.001	(0.005)
	2	-0.003	(0.005)
N		272	

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Acquisition in period t . Number of observations N .

Table A.12: Distribution of acquirers' countries.

Country	Country Code	Frequency	Percent	Europe	EU	OECD
Armenia	AM	1	0.33	0	0	0
Argentina	AR	1	0.33	0	0	0
Austria	AT	8	2.64	1	1	1
Australia	AU	1	0.33	0	0	1
Bosnia and Herzegovina	BA	2	0.66	1	0	0
Belgium	BE	6	1.98	1	1	1
Bulgaria	BG	2	0.66	1	1 (since 2007)	0
Brazil	BR	2	0.66	0	0	0
Belize	BZ	1	0.33	0	0	0
Canada	CA	6	1.98	0	0	1
Switzerland	CH	11	3.63	1	0	1
China	CN	5	1.65	0	0	0
Costa Rica	CS	1	0.33	0	0	0
Cyprus	CY	2	0.66	1	1 (since 2004)	0
Czech Republic	CZ	4	1.32	1	1 (since 2004)	1
Germany	DE	27	8.91	1	1	1
Denmark	DK	4	1.32	1	1	1
Estonia	EE	1	0.33	1	1 (since 2004)	1 (since 2010)
Spain	ES	8	2.64	1	1	1
Finland	FI	10	3.30	1	1	1
France	FR	24	7.92	1	1	1
Great Britain	GB	22	7.26	1	1	1
Croatia	HR	1	0.33	1	1 (since 2013)	0
Hungary	HU	1	0.33	1	1 (since 2004)	1
Ireland	IE	4	1.32	1	1	1
Israel	IL	2	0.66	0	0	1 (since 2010)
India	IN	7	2.31	0	0	0
Iceland	IS	1	0.33	1	0	1
Italy	IT	14	4.62	1	1	1
Japan	JP	4	1.32	0	0	1
South Korea	KR	1	0.33	0	0	1
Liechtenstein	LI	1	0.33	1	0	0
Lithuania	LT	2	0.66	1	1 (since 2004)	0
Luxembourg	LU	1	0.33	1	1	1
Malta	MT	1	0.33	1	1 (since 2004)	0
Netherlands	NL	20	6.60	1	1	1
Norway	NO	4	1.32	1	0	1
Peru	PE	1	0.33	0	0	0
Poland	PL	2	0.66	1	1 (since 2004)	1
Portugal	PT	2	0.66	1	1	1
Romania	RO	1	0.33	1	1 (since 2007)	0
Russia	RU	6	1.98	0	0	0
Sweden	SE	17	5.61	1	1	1
Slovenia	SI	4	1.32	1	1 (since 2004)	1 (since 2010)
Tunisia	TN	1	0.33	0	0	0
Turkey	TR	1	0.33	0	0	1
Taiwan	TW	1	0.33	0	0	0
United States	US	53	17.49	0	0	1
South Africa	ZA	1	0.33	0	0	0
Total		303	100.00			

NOTES: *Europe*=1 if European country, *EU*=1 if country is in the European Union (EU), *OECD*=1 if country is member of the Organisation for Economic Co-operation and Development (OECD).

Table A.13: Difference-in-Difference estimation for the effect of M&As on the targets' performance, by target region. Additional variables.

$y_{t+s} - y_{t-1}$	s	Western Europe		Eastern Europe		F-test
		DID	SE	DID	SE	
ln(Sales)	0	-0.047***	(0.017)	0.023	(0.035)	0.0724
	1	0.018	(0.020)	0.052	(0.047)	0.5123
	2	0.052**	(0.023)	0.084	(0.055)	0.6035
ln(Labour)	0	0.017**	(0.008)	-0.029	(0.022)	0.0511
	1	0.037***	(0.012)	-0.009	(0.031)	0.1691
	2	0.067***	(0.014)	-0.031	(0.035)	0.0102
TFP	0	-0.017*	(0.010)	0.031	(0.036)	0.1935
	1	0.001	(0.012)	0.066*	(0.035)	0.0802
	2	0.001	(0.013)	0.081**	(0.039)	0.0512
N		583		153		

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. Number of observations N . Acquisition in period t .
F-test: p-value of an F-test on equality of interaction terms for the target's region.

Table A.14: Summary statistics, by target region.

Variable	Western Europe		Eastern Europe	
	Mean	SD	Mean	SD
Cash ratio	0.095	0.121	0.053	0.088
Working capital ratio	0.250	0.249	0.139	0.252
ln(Capital)	7.328	1.656	8.083	1.503
ln(Labour)	4.224	1.097	5.485	1.072
ln(Labour) ²	19.046	9.610	31.229	11.733
Δ ln(Sales)	0.020	0.304	0.012	0.377
Cash flow ratio	0.101	0.115	0.051	0.150
Leverage ratio	0.539	0.217	0.471	0.249
ln(Wage)	3.673	0.319	1.897	0.788
Public	0.460	0.499	0.523	0.501
ln(Age)	2.988	0.798	2.724	0.928
Intangible Assets/Fixed Assets	0.115	0.200	0.030	0.087
TFP	0.261	0.307	-0.438	0.462
N	583		153	

Table A.15: Probit regression. Prediction of crisis and non-crisis M&A deals.

	Deal in crisis	Deal outside crisis
Cash/Total Assets	0.2024 (0.2486)	0.0249 (0.1531)
Working Capital/Total Assets	0.2563 (0.1657)	0.2282** (0.1013)
ln(Capital)	0.0425 (0.0286)	0.0424** (0.0173)
ln(Labour)	0.3250** (0.1323)	0.5183*** (0.0850)
ln(Labour) ²	-0.0146 (0.0141)	-0.0333*** (0.0093)
Δ ln(Sales)	-0.0884 (0.1041)	-0.1026* (0.0590)
Cash flow/Total Assets	0.1435 (0.2732)	0.0241 (0.1859)
Leverage	0.2074 (0.1671)	0.1535 (0.0990)
ln(Wage)	0.2791*** (0.0944)	0.2111*** (0.0623)
Public	0.2021*** (0.0666)	0.0272 (0.0393)
ln(Age)	0.0287 (0.0351)	-0.0380* (0.0217)
Intangible assets/Fixed assets	0.4748*** (0.1718)	0.5545*** (0.0986)
ln(TFP)	-0.1028 (0.0986)	0.0032 (0.0616)
Industry dummies	yes	yes
Country dummies	yes	yes
Year dummies	yes	yes
N	131,240	180,394
Pseudo R^2	0.1267	0.1719

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors in parentheses. Number of observations N . The explanatory variables are lagged one period before the deal.

Table A.17: Difference-in-Difference estimation for deals outside the crisis. Interaction term for observations in the crisis.

$y_{t+s} - y_{t-1}$	s=1	s=2
<i>Panel A: Cash ratio</i>		
MA	-0.010 (0.006)	-0.006 (0.007)
MA x crisis	-0.007 (0.017)	-0.014 (0.017)
<i>Panel B: Leverage ratio</i>		
MA	0.006 (0.010)	0.020 (0.013)
MA x crisis	0.012 (0.029)	0.005 (0.029)
<i>Panel C: ln(Capital)</i>		
MA	-0.027 (0.036)	-0.056 (0.050)
MA x crisis	-0.010 (0.114)	0.129 (0.099)
<i>Panel D: Intangible Assets ratio</i>		
MA	0.007** (0.003)	0.010*** (0.004)
MA x crisis	0.011 (0.012)	0.004 (0.008)
N	558	558

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. $MA = 1$ if firm is acquired in period t , zero otherwise. $crisis = 1$ if observation in period s is in 2007-2009, zero otherwise (also included in the regression). Number of observations N .

Table A.18: The effect of M&As on the investment-cash flow and cash-cash flow sensitivity. Robustness check.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Panel A: Investment</i>						
CF	0.096*** (0.008)	0.089*** (0.009)	0.088*** (0.008)	0.088*** (0.008)	0.089*** (0.004)	
after	0.020 (0.020)	0.021 (0.021)	0.017 (0.021)	0.017 (0.022)	0.027 (0.021)	
after x CF	-0.028** (0.013)	-0.027** (0.013)	-0.029** (0.013)	-0.025* (0.013)	-0.036* (0.019)	
$\Delta \ln(\text{Sales})$		0.151*** (0.026)	0.134*** (0.026)	0.155*** (0.026)		
$\ln(\text{Total Assets})$			0.139*** (0.018)	0.128*** (0.018)		
Deal x CF					0.016 (0.021)	
N	590867	585627	585625	584944	590867	
F-test	0.000	0.000	0.000	0.000	0.005	
<i>Panel B: ΔCash</i>						
CF	0.197*** (0.011)	0.182*** (0.013)	0.183*** (0.012)	0.176*** (0.013)	0.203*** (0.006)	0.159*** (0.016)
after	0.006** (0.002)	0.006** (0.002)	0.006** (0.002)	0.004 (0.002)	0.005* (0.003)	0.006** (0.003)
after x CF	-0.107*** (0.026)	-0.104*** (0.026)	-0.110*** (0.025)	-0.111*** (0.029)	-0.100*** (0.033)	-0.119*** (0.025)
$\Delta \ln(\text{Sales})$		0.017*** (0.005)	0.015*** (0.005)	0.015*** (0.005)		0.015*** (0.004)
$\ln(\text{Total Assets})$			0.014*** (0.003)	0.015*** (0.003)		0.011*** (0.003)
Deal x CF					-0.015 (0.026)	
Working Capital						0.057*** (0.006)
N	588208	582982	582976	582287	588208	11390
F-test	0.000	0.000	0.001	0.009	0.002	0.061

NOTES: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors (clustered at the firm level) in parentheses. Number of observations N . The regressions include year dummies. Columns (1)-(5) present the results of a fixed effects regression using all observations and applying propensity score reweighting. (2) adds sales growth, (3) additionally adds the log of total assets as a proxy for size, (4) drops the year of the deal for acquired firms, and (6) adds a dummy *Deal* (=1 for acquired firms, =0 for non-acquired firms). For the cash flow sensitivity of cash in Panel B, column (6) presents the results of a fixed effect regression using all acquired and matched control firms, additionally controlling for working capital (scaled by beginning-of-year total assets).

F-test: Tests null hypothesis that the cash flow sensitivity is zero after acquisition (p-values are reported).