Corporate Acquisitions, Profitability, and Markups: Evidence from Europe*

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Abstract

This paper assesses how mergers and acquisitions (M&As) affect firms' profitability and markups. Comparing firms that go through M&As with matched control firms that never go through M&As during our sample period in Europe, we find that acquirers' and targets' profitability declines substantially, while their markups remain nearly unchanged. These results remain for the aggregate (targets and acquirers combined) outcomes. Additional heterogeneity analyses across sectors and types of M&A deals further suggest that our findings seem inconsistent with the idea that corporate acquisitions contribute to a rise in firms' market power; rather M&As are associated with negative firm performance in the medium-run.

JEL Codes: G11, G34, L44
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1 Introduction

Competition among firms is crucial for spurring innovation and growth in the economy. Firms with market power may have incentives to reduce the supply of their goods to maintain higher prices (Harberger, 1995), which will dampen investment in capital and innovation (Aghion et al., 2005). An important policy tool the government can use to promote competition is the regulation on mergers and acquisitions (M&As henceforth), as M&As may allow firms to exploit higher market power, leading them to increase markups and profits. However, theoretical predictions on the effects of M&As on firms' profits or markups are ambiguous. On the one hand, M&As may allow firms to be more productive and to reduce costs, which could increase their profit margins. On the other hand, M&As may be initiated by empire-building motives (Jensen, 1986) or misaligned CEO incentives (Morck, Shleifer and Vishny, 1988), which can lead to a fall in profits. Therefore, how M&As will affect firms' profits and markups needs to be answered empirically.

In this paper, we study how corporate M&As impact firms' profitability and markups in the medium-run. We compare the outcomes of firms that go through M&As with a matched sample of firms that are never involved in any M&A deals during our sample period before and after the event. Our key contribution relative to prior work is to aggregate data across ten major European countries from 2010 to 2018. We link financial data from these countries to a database of M&A events to define our treated and control units and implement a matched difference-in-differences design to estimate the impact of M&A on firm-level outcomes. Given that these countries all share a comparable set of antitrust regulations and are governed by the European Union, our main estimates pool all countries together and show the average effects across these countries. Importantly, our main specification includes country-by-industry-by-time fixed effects, meaning that our estimates are based on within country by within industry variation and account for any country-by-industry specific shock coinciding with the M&A event in a given year.

We first examine the impacts of M&As on profitability and markups at the firm level. Importantly, in our setting, around 80 percent of M&A events involve acquisitions, where the target firm

sells its assets, divisions, or only a part of its share, and remains operating as a separate company following the event. This allows us to track the target's and the acquirer's outcomes after an acquisition, so that we can assess the impacts on targets and on acquirers separately. By contrast, in mergers, the whole target is sold to (or merged with) the acquirer, meaning there is an absolute change of control. Given that there can be qualitative or quantitative differences in firm-level impacts depending on whether there is a change of control, we separate our analyses into those involved in acquisitions and those involved in mergers, although we do not find meaningfully different results on firm-level outcomes in the aggregate between the two types. Given that the vast majority of M&A activities in Europe involve acquisitions, analyzing these activities in addition to mergers allows us to examine a larger and broader sample of relevant firms.

It is possible that there may not be any change in product-market power or productivity unless there is a change of control (i.e., via mergers). However, even without a change of control, an acquirer may still increase its market share by buying a part of the target's businesses in the same industry. Furthermore, by purchasing particular divisions of the target with potential synergies, the acquirer may enhance its productivity. Therefore, the impacts on firms' profitability may be qualitatively similar in both mergers and acquisitions, although there could be still quantitative differences. Furthermore, if the acquirer buys only productive units of the target in the case of acquisitions, then the acquirer's profits may increase, while the target's profits decrease, but implying no aggregate change in productivity.

Focusing on these acquisitions, we find that acquirers' and targets' profitability (measured by returns on assets or profit margins) declines after M&As. Acquirers' profitability decreases by 0.6 percentage points on average relative to their matched control firms after M&As, while targets' profitability decreases by 1.1 percentage points on average. At the aggregate (pooling targets and acquirers) level, we also find similar declines in profitability in both mergers and acquisitions. By contrast, we find almost no changes in firms' markups after M&As.

These results are perhaps surprising given that M&A is generally motivated by the possibil-

ity of increased profitability through productivity synergies or increased market power, neither of which is consistent with decreased profitability. Overall, prior work finds mixed impacts of M&A on productivity and profitability, which seem to depend on the setting. For example, Braguinsky et al. (2015) and Demirer and Karaduman (2024) find evidence of increased productivity after acquisitions in the Japanese cotton spinning industry and U.S. power plants, respectively. In contrast, Malmendier, Moretti and Peters (2018) find that acquiring firms that win bidding contests for target firms suffer losses in stock returns relative to competitors. Possible motivations for productivity-reducing M&As include misaligned empire-building motives (Jensen, 1986) or CEO overconfidence (Malmendier and Tate, 2005). Decreases in productivity will lead to declines in profits. This is a key distinction: increases in product-market power should not be associated with profit decreases, while decreases in productivity can lead to lower profits. Our results are consistent with the latter set of findings that show negative impacts of M&As on firm performance.

Our markup results rely on applying the estimation method by De Loecker and Warzynski (2012) in which markups are proportional to sales over costs of goods sold. This measure is not without critiques. For example, Bond et al. (2021) discuss how markups are not identified given most datasets have revenue data, but not price and outputs separately. One of our central claims in this paper is that M&A activity on average is not associated with increases in markups in our sample of European countries. Therefore, we also consider heterogeneity on baseline characteristics to understand if markups may be rising. First, we test whether the estimated impacts on profitability are smaller in non-tradable sectors, the logic being that tradable sectors are close to being competitive and a single merger is unlikely to impact global competition. We find that profits decline in both tradable and non-tradable M&As. We also consider the distinction between domestic versus cross-border M&As, where a cross-border M&A involves at least one of the parties being a foreign company. Contrary to the market power channel, we find no significant difference in profitability or markup outcomes between these two types of M&As. Taken together, our findings suggest that a rise in M&A activities across these major European countries may not have been associated with a rise in profitability, markups or market power at least in the medium run.

In all of our results, the key identification assumption is that M&A firms and non-M&A firms would have followed similar trajectories in the absence of M&A. This may be a strong assumption in our setting. For example, M&A events may be undertaken by productive acquirers that will continue to expand. In this case, high profitability could be correlated with M&A events, biasing our estimates. Furthermore, spillover effects could contaminate our estimates if increased market power from an M&A event impacts all firms in an industry, and not just the merging parties.

We provide a number of tests to corroborate our findings. First, we find parallel trends in our main outcomes between M&A firms and non-M&A firms prior to the M&A event. Despite the parallel pre-trends, it is still possible that coinciding shocks could bias our estimates. For example, acquiring firms may face positive productivity shocks in the year of the M&A, which would not be apparent in pre-trends. In this case, our estimates would be attenuated toward zero. Therefore, one may interpret our estimated effects on profitability as a lower bound of the true effects for acquirers. The opposite story, of coinciding negative shocks, is potentially more relevant for target firms if underperforming targets are acquired. However, again we would expect these trends in profitability to be visible prior to the acquisition, which we do not observe in practice.

This paper contributes to several distinct literatures. First, it contributes to the literature that studies the impacts of mergers on firm performance. For example, Braguinsky et al. (2015) utilizes detailed firm-level data to study the effects of acquisitions in the Japanese cotton spinning industry on productivity. Most closely related to this work are papers in the United States that use firm-level data (in manufacturing industries) to estimate impacts on productivity, for example Maksimovic and Phillips (2001) and Blonigen and Pierce (2016). In particular, Blonigen and Pierce (2016) consider both productivity and market power changes separately by applying the method by De Loecker and Warzynski (2012) to estimate markups. Overall, empirical findings in this literature are somewhat mixed. Braguinsky et al. (2015), Maksimovic and Phillips (2001), Healy, Palepu and Ruback (1992), and Devos, Kadapakkam and Krishnamurthy (2009) document efficiency gains while Blonigen and Pierce (2016), Cohn, Mills and Towery (2014), and González, Lemus and Marshall (2024) find little evidence of increases in productivity or operating improve-

ments. Relative to these papers, we focus on how M&As affect corporate profits and markups, examining M&A activities across a wide range of countries in Europe. Lastly, Boucly, Sraer and Thesmar (2011) and Erel, Jang and Weisbach (2015) find that after leveraged buyouts, target firms become more profitable, grow faster, and issue more debt, using a sample of French firms between 1994 and 2004 and a sample of European firms between 2001 and 2008, respectively. While their findings contrast with our overall results, our paper focuses on more recent years and with a broader set of M&A deals, which can lead to differences in results. Most recently, Arnold et al. (2026) study the impacts of M&As on both firm-level and worker-level outcomes, finding that targets and acquirers experience declines in profitability, with little change in markups, using administrative data in Canada. Our paper complements this study by using a similar empirical design and looking at broader sets of firms across many countries in Europe, thereby providing external validity of their findings based on different settings and datasets.

Second, this paper also contributes to a recent literature on the relationship between market power and corporate outcomes. Gutiérrez and Philippon (2017) argues that declining competition in the U.S. has resulted in lower investment rates. Similarly, De Loecker, Eeckhout and Unger (2020) document a rise in market power in the U.S., which is consistent with patterns of declining competition. In this paper, we study one potential source of changing competition – changing ownership structure. While some large M&A events may cause important increases in market power, we find that the average event does not. This suggests a limited role in M&A activity driving these aggregate trends in market power.

Finally, our paper contributes to the literature that studies negative stock-market reactions to merger announcements. Prior studies have interpreted such findings as evidence of empire building (Jensen, 1986), misaligned incentives (Morck, Shleifer and Vishny, 1988), or CEO overconfidence (Malmendier and Tate, 2005), which imply that some M&A events may not be profit-maximizing. Our results are consistent with this interpretation, as we find declines in profitability following M&As. The declines in profits among acquiring firms are consistent with the empirical evidence on the negative stock-market returns of corporate acquisitions (Betton, Eckbo and Thorburn, 2008).

The remainder of the paper is organized as follows. Section 2 describes the institutional setting. Section 3 describes our data and Section 4 explains our empirical design. Section 5 presents our main results. Section 6 discusses potential mechanisms and Section 7 concludes.

2 Institutional Background

The regulations regarding M&As are comparable across 10 European countries we study: Belgium, Finland, France, Germany, Italy, Netherlands, Poland, Spain, Sweden, and United Kingdom. We choose these 10 countries based on the total number of M&A events in each country within the European Union, as these countries give us enough variation to estimate the effects of M&As on firm outcomes.[1] Each country has its own antitrust agency which oversees and regulates M&A activities and bidding processes that occur both within the country or across the border. At a broader level, all competition authorities enforce a comparable set of rules when reviewing the proposed M&As, and follow the guidelines set by the European Union. These countries may differ primarily in terms of which types of firms they grant exemptions on regulations. For example, in Finland, foreign target companies are not subject to the regulations (see Appendix A).

All of the countries in our sample have pre-merger notification rules to block potentially anti-competitive M&As. Typically, those rules are based on firm size: (1) domestic sales and (2) global sales. Each country has its own thresholds, but they are typically set higher than the thresholds in North America (Wollmann, 2019). Appendix A summarizes the regulations regarding pre-merger notification rules in each country. There have been several legislation changes on the antitrust regulations, especially regarding pre-merger notification rules, across these countries during our sample period. These legislative changes, however, depend on firms' global sales, which we do not observe in our data. Furthermore, these thresholds are generally set at a high level, likely affecting only a tiny share of very large firms. In other words, in our analysis sample, most M&A deals and involved parties are not large enough to trigger any of these thresholds.

[1] See Table B1 in Appendix B for the number of M&A transactions across these countries over time.

3 Data

This section describes two main datasets for our analyses. First, the SDC Platinum database contains information on M&A activities around the world, including the countries in our analysis sample. Second, we use the Amadeus database, which contains financial information on firms in these countries.

3.1 SDC Platinum

The SDC Platinum database covers the near universe of M&A activities around the globe involving either publicly traded or private companies in the European countries that are part of our analysis sample. This database includes names of the parties, NAICS industry codes, and other identifying information such as addresses. The dataset on M&A activities was merged with the firm-level data from Amadeus Database using all available identifying variables, such as firm names, addresses, and industry codes. The match rate is around 60 percent on average from 2010 to 2018.

Importantly, this database contains variables that identify the target firm and the acquiring firm in each transaction, and indicate the type of a transaction, such as merger or acquisition. Our analyses include both mergers and acquisitions and present the results separately. Because prior studies on M&As use the change of control as a key determinant of post-M&A outcomes, we also look at acquisitions given that some of these events do result in a change of control. Even if the entirety of the target does not change control, it is often the case that a portion of the target changes control (for example if a firm sells a division of the company to another firm). Given potential complications with different merger or acquisition types, we next provide details on how the SDC database categorizes each M&A transaction.

In the SDC database, a merger is an event in which a target and an acquirer become one entity. In the case of public firms, a merger can be an event where an acquirer buys 100 percent of a target's stock. By contrast, an acquisition is an event where an acquirer takes over either a target's

assets or a part of its stock. In the sample of all M&As that are matched with our firm-level data in our analysis sample between 2010 and 2018, mergers account for 17 percent (19 percent in our analysis sample) of the cases. Acquisitions are further classified into the following categories: (1) acquisition of majority interest, in which the acquirer holds less than 50 percent and is seeking to purchase 50 percent or more, but less than 100 percent of the target company's stock, (2) acquisition of remaining interest, in which the acquirer holds over 50 percent and is seeking to purchase 100 percent of the target company's stock, (3) acquisition of partial interest, meaning deals in which the acquirer holds less than 50 percent and is seeking to acquire less than 50 percent, or the acquirer holds over 50 percent and is seeking less than 100 percent of the target company's stock, (4) acquisition of assets, in which the assets of a company, subsidiary, division, or branch are acquired, and (5) acquisition of certain assets, in which certain assets of a company, subsidiary, division, or branch are acquired. While the acquirer may not purchase the entirety of the target in the case of an acquisition, the acquirer gains the controlling stake of the target in the acquisition of majority interest (12 percent of all M&As). In this sense, an acquisition of majority interest is similar to a merger to the extent that there is a change of control.[2]

When an acquirer buys the target's assets (51 percent of all M&As), the acquirer may purchase the entire company's assets or its division's assets. Therefore, in the case of asset purchases, the acquirer may or may not have the controlling stakes, and it is difficult to know whether there is an absolute change of control without more information from the data. If the acquisition of assets leads to a change of control, then it is also similar to a merger.[3]

Because M&As may lead to different outcomes depending on whether there is a change of control, we separate our firm-level analyses into those involving mergers and those involving acquisitions. Furthermore, M&As may have different quantitative impacts depending on whether the acquirer buys a part or the entirety of the target, regardless of a change of control. In the acquisition

[2]In contrast, when the acquirer buys the remaining interest (3 percent of all M&As), there is no change of control. Similarly, when the acquirer buys a partial interest (16 percent of all M&As), there is no change of control either. Furthermore, the acquirer does not have the controlling stake unless it already had the majority of the target's stock prior to the event.

[3]In the acquisition of certain assets (1 percent of all M&As), however, there is unlikely to be a change of control.

of majority interest, there is a definite change of control and most asset purchases likely result in a change of control as well, despite not buying the entire target.

3.2 Amadeus Database

The Amadeus Database contains financial information for both private and publicly listed firms in Europe from 2010 to 2018 across the ten European countries: Belgium, Finland, France, Germany, Italy, Netherlands, Poland, Spain, Sweden, and United Kingdom. We choose these countries as they give us enough variation based on the number of M&A deals in each year to conduct event-study analyses. They include a wide range of firm characteristics and outcome variables, which we detail in the next subsection. Importantly, they include unique identifying variables, such as firm names and addresses, which we use along with other identifying variables (e.g., industry codes) to perform fuzzy matching with the M&A dataset.

We perform fuzzy matching between the financial data and M&A data at the firm-level. We standardize the name, city, address, website, email, and phone number of each firm. Then, we perform fuzzy matching using *matchit* command in STATA which matches two variables (firm names here) based on similar text patterns. Other variables are used to increase both quality and the number of matches (see Appendix B for more details). Since different establishments of a firm may be active in different industries, matching based on industry codes will not be perfect and a firm might be matched with an establishment that is not active in its industry.[4] Therefore, we do not use the NAICS industry code as the unique identifying variable. The final dataset contains firm financial data matched with M&A information for 10 European countries from 2010 to 2018. As a robustness check, we also show the results where we only use firms that are perfectly matched between the financial dataset and M&A dataset (Appendix C).

Our analysis sample consists of both publicly traded (mostly large) and private (small to large) firms across 10 European countries from 2010 to 2018. The share of listed firms in our analysis

[4]For example, Airbus SE is a company primarily active in "Manufacturing" sector; however, it also has establishments active in "Retail" and "Management of Companies and Enterprises" sectors.

sample is about 5 percent on average, and dropping them does not quantitatively affect our main estimates. Having data on both private and listed firms is one key advantage of Amadeus over U.S.-based studies that utilize Compustat, which is only available for public firms. In our main specification, we consider firms that completed at least one transaction (whether as an acquirer or target) as treated firms and firms without any completed transaction as control firms. We checked that our control firms have never been involved in any M&A transaction since 2005 (i.e., at least six years before the start of the first M&A event in our analysis sample).

3.3 Variable Definitions

The main firm-level outcome variables are various measures of firms' profitability and markups. We use two different measures of profitability: (1) returns on assets, defined as net income divided by total assets and (2) net profit margins directly observed in our data. In Appendix C, we look at two additional measures of profitability (both directly observed in our data) as a robustness check. The first uses returns on assets that is reported directly in Amadeus and differs slightly from our constructed measure above by considering Earnings Before Interest and Taxes as the numerator rather than Net Income. As one final profitability measure we also consider Earnings Before Interest and Taxes divided by total revenue (labeled as EBMA), rather than total assets.

Lastly, we define markup as the elasticity of output with respect to variable costs as well as the variable costs share following (De Loecker and Warzynski, 2012). For the elasticity of output with respect to variable costs, we use estimates from De Loecker, Eeckhout and Unger (2020) based on the U.S. data that allow for different elasticities across two-digit NAICS industry codes and years. Given the elasticity estimates, this allows us to estimate firm-level markups as the output elasticity multiplied by the inverse of the variable costs (total wage bills and material costs) share: $\hat{\theta}_{st} * \frac{Sales}{Costs\ of\ Goods}$.

4 Empirical Strategy

This section describes our empirical strategy for estimating the impacts of mergers or acquisitions on firm-level outcomes.

4.1 Estimating M&A Effects on Firm Outcomes

To assess the effects of mergers or acquisitions on firm-level outcomes, we implement a matched difference-in-differences design by estimating a regression of the following form:

$$Y_{jt} = \sum_{k=-4}^{4} \beta_k^{MA} \mathbb{1}(t_j = t^* + k) \times MA_j + \tau_t + \phi_j + \psi_{sct} + \pi_{st} + \omega_{ct} + u_{jt} \quad (1)$$

where Y_{jt} is an outcome variable for firm j at year t, MA_j is an indicator for an M&A firm, $\mathbb{1}(t_j = t^*+k)$ indicates an M&A event occurred k years in the past (or future) relative to the period of the M&A event t^*, τ_t are year fixed effects that vary by the year of the M&A event, ϕ_j are firm fixed effects, and u_{jt} is an error term. To absorb any country-specific shock or industry-specific shock affecting M&A activities in a given year (Maksimovic and Phillips 2001), we include industry by country by time fixed effects (ψ_{sct}) as well as industry by time (π_{st}) and country by time fixed effects (ω_{ct}) as control variables. In this way, our variation is coming from cross-firm comparisons (i.e., M&A firms versus their matched non-M&A firms) within an industry and a country. The standard errors are clustered at the firm level. Note that we focus on their first M&A event for firms that go through M&As more than once, although we still allow the subsequent M&A event(s) to affect their outcomes in the post-event period.[5] Furthermore, most of the M&A firms and their matched control firms are private (95 percent) in our analysis sample, so our results remain similar even if we focus our analyses exclusively on private firms (Appendix C).

[5]When focusing on the first acquisition or merger, we still include the subsequent event(s) in the post-event period for firms that go through M&As more than once. The vast majority (roughly 74 percent) of firms go through a merger or an acquisition only once during our sample period. Our main analysis sample still includes these acquirers involved in multiple M&As over time. In addition, we separately examine acquirers that go through multiple M&As in Appendix C.

In our matched sample (described in the next subsection), roughly 81 percent of M&A events involve acquisitions. Compared to a merger, an acquisition results in the target firm continuing its operation as an independent company, allowing us to track the target's outcomes separately from the acquirer's outcomes after the event. To see where the effects are coming from, we assess our firm-level outcomes separately for those involved in acquisitions and for those involved in mergers. In particular, when looking at acquisitions, we look at targets and acquirers separately. By contrast, when looking at mergers, we assess the aggregate (targets and acquirers pooled) outcomes, although we also assess the aggregate outcomes for acquisitions as a comparison.

The main identifying assumption is that outcomes for M&A firms and for control firms would have trended similarly in the absence of the M&A event. This assumption seems strong since M&As are firms' endogenous decisions. For instance, acquiring firms may plan to purchase firms that will be profitable in the future, whose profits may grow even absent the acquisition. By contrast, acquirers may buy underperforming businesses whose profits would fall regardless of M&As. One way to determine the direction of the potential bias is by comparing outcomes for M&A firms to the control firms in the years prior to the M&A event. Parallel pre-trends in firm-level outcomes would help alleviate the aforementioned concerns. In practice, we do find that M&A firms' outcomes share parallel pre-trends with those of control firms in terms of the key outcomes. Our design is similar to designs implemented in other settings, including the U.S. (Arnold, 2021), Brazil (Lagaras, forthcoming) and Canada (Arnold et al., 2026), all of which find evidence of parallel pre-trends.

While verifying parallel pre-trends is helpful for a causal interpretation, our estimates can be still biased due to contemporaneous shocks that occur with M&A events. For example, there could be a negative shock that hits a particular market and causes both a decline in profits and an increase in M&A activities as firms get purchased before they shut down. In this case, M&A activities are correlated with shocks that decrease firms' profits. We can also have the opposite scenario; in fact, merger activities tend to be pro-cyclical in aggregate (Rhodes-Kropf and Viswanathan, 2004). Therefore, rather than claiming our results as causal effects of M&As, we focus on whether we

find strong evidence of increased profitability and markups consistent with the increased market power after M&As. If we do not find strong evidence of increased profitability or markups after 4 years of the event, it is difficult to conclude that M&As are associated with increased market power at least in the medium run.

4.2 Matched Samples

To perform a matching procedure between M&A firms and control firms, we impose the following restrictions. First, we drop firms that have missing observations for the key variables used for matching (total revenue, returns on assets, and firm age), measured one year prior to the event. During our sample period, the total number of M&A events is 5,683 per year in the whole sample, and 3,592 per year on average among this sample of firms eligible for matching (see Figure 1).

We then match each firm one year prior to an M&A event to a control firm in the same 2-digit NAICS sector. A firm is a potential control firm for firm j if: (1) the firm is never involved in an M&A event between 2005 and 2018, and (2) the firm is in the same ventile bin of total revenue and is in the same quintile bins in returns on assets and firm age one year prior to the M&A event of firm j.[6] Of all possible counterfactual firms for a given M&A firm, we choose one with the closest propensity score (one-to-one matching within a caliper), which is estimated by predicting treatment using a linear probability model with a quadratic function in total revenue, returns on assets, and firm age in year $[t-1]$. This matching strategy is similar to a number of recent papers implementing a matched difference-in-differences design (Goldschmidt and Schmieder, 2017; Arnold et al., 2026). The matching strategy finds a control firm in about 97 percent of all cases among this eligible sample. Choosing one counterfactual control firm for each M&A firm ensures that both groups are comparable on the matched variables. We construct an unbalanced panel of firms extending 4 years prior to and 4 years after the M&A event.

[6]While this specification yields the best parallel pre-trends on the key outcomes, our main results remain qualitatively similar when we use different bin sizes or other related firm characteristics (e.g., leverage ratio) for matching. Results based on other variation in matching can be provided upon request.

Since we use a matched control group that is never involved in M&A during our sample period, the specifications above do not suffer from the identification issues that arise in conventional event-study designs with staggered timing (Goodman-Bacon, 2018). Our identification comes from differences in always-treated and never-treated units over time, not from units coming in and out of treatment.[7] Moreover, we use only completed M&A deals in our analyses following the literature.[8]

4.3 Descriptive Statistics

We close this section with descriptive statistics of our analysis sample. Panel A of Table 1 shows the averages for main variables across firms, comparing M&A firms to the set of matched control firms one year before the event. On average, M&A firms are a bit larger than their control firms, in terms of total revenue. However, for returns on assets, profit margins, leverage ratio, and markups, M&A firms are comparable to their control firms, suggesting that firms that go through M&As and firms that never get involved in M&As are comparable with regards to their profitability and financing structure prior to the event. Importantly, as we show in Section 5, M&A firms and their control firms share parallel pre-trends on the key outcomes. The dominant sectors are manufacturing, wholesale, and services (two thirds of our analysis sample).

5 Results

This section presents results from estimating the difference-in-differences model in Section 4.

[7] We let the first M&A event in our analysis sample start from 2011 to ensure that our matched control firms did not go through any M&A event at least 6 years prior to (or after) the first M&A event, given that our SDC Platinum data starts from 2005. In this way, we ensure that none of the matched control firms went through any M&A event from 2005 to 2018.

[8] The number of withdrawn M&A events that meet the sample restrictions described above is very small in our data. While using firms involved in withdrawn M&A events as a placebo group yields null effects across the key outcomes, many of these results are also underpowered due to the small sample size.

5.1 Profitability and Markups After M&As

Figure 2 plots estimates of β_k^{MA} from equation (1) across the key firm-level outcomes based on our matched sample. As mentioned in Section 4, we show these results separately for targets and for acquirers involved in acquisitions (Panels (a) – (c)) and for the aggregate (targets and acquirers pooled, Panels (d) – (f)). Panel (a) shows that acquiring firms' and target firms' returns on assets followed a similar pattern as those of their matched control firms before the M&A event. Both targets' and acquirers' returns on assets significantly decreased after the event, compared to those of matched control firms. Panel (b) shows that the pre-event trends for profit margins are also similar between M&A firms and their control firms. We see declines in both targets' and acquirers' profit margins after M&As, compared to control firms' profit margins. Panel (c) shows that targets' and acquirers' markups remain flat both before and after M&As, compared to those of their control firms. Importantly, we do not see any statistically significant evidence of increased profitability or markups for either target or acquiring firms relative to their matched control firms after the acquisition.

In Panels (d) – (f), we pool targets and acquirers and compare their outcomes with those of their matched control firms before and after the M&A event. Here, we simply drop the distinction between acquirers and targets when estimating the equation (1) so that acquirers, targets, and their matched control pairs are all in the same estimation.[9] The black line indicates the aggregate outcomes for those involved in mergers and the red line indicates the aggregate outcomes for those involved in acquisitions. In both mergers and acquisitions, returns on assets and profit margins decreased after M&As, relative to their matched control firms. By contrast, markups stayed roughly flat after acquisitions, except we see a small (but statistically insignificant) increase in markups in the case of mergers.

To interpret the magnitude of these results, Table 2 presents the difference-in-differences es-

[9] Alternatively, we could combine acquirers and targets into single entities (i.e., summing up their observations), re-do the firm-level matching to find their control firms, and estimate the equation (1) using the combined entities. However, this new matched sample would likely differ from the original analysis sample, given that finding matched control firms for the combined entities may result in a lower match rate and therefore a smaller matched sample.

timates on these outcomes, separately for targets and acquirers involved in acquisitions (Column 1 and 2) and for the aggregate (Column 3 and 4). Column (1) shows that target firms' returns on assets and profit margins fell by 1.1 percentage points and 1.0 percentage points, respectively, after the event. Column (2) shows that acquiring firms' returns on assets and profit margins decreased by 0.6 percentage points and 0.7 percentage points, respectively, after the event. These drops in returns on assets and profit margins for targets and acquirers are large in magnitude considering the baseline averages (at $t = -1$) for these outcomes. Columns (3) and (4) show these outcomes in the aggregate, separately for those involved in acquisitions and for those involved in mergers. Columns (3) and (4) show that returns on assets decreased by 0.9 percentage points in the case of acquisitions and 0.4 percentage points in the case of mergers. Similarly, profit margins decreased by 0.9 percentage points in both acquisitions and mergers. By contrast, we do not see much changes in markups either for targets or acquirers, or either in the case of acquisitions or mergers. Overall, our results show that M&As lead to declines in profitability for both targets and acquirers either in the case of acquisitions or mergers. By contrast, markups stay relatively flat after M&As.

6 Market Power Channel and Economic Interpretations

We find that both acquiring and target firms experienced a decline in profitability, which appears inconsistent with these firms gaining market power after M&As (De Loecker, Eeckhout and Unger, 2020). While efficiency gains through synergies are often argued as potential benefits of M&As, we do not find any evidence of increased profitability for either acquiring or target firms after M&As. This has potentially important implications for pro-merger arguments that rely on predicted synergy gains. This result might be surprising if M&A events are undertaken by profit-maximizing firms, but this is consistent with a corporate finance literature that finds negative effects of M&A events on firm performance or market valuation. Note that our results capture short to medium run outcomes, so firms' profitability may improve in the long run. Whether or not profits actually increase in the long run, these negative results on firm performance suggest that increased

market power via M&As seems unlikely to be the key channel in the medium run in our setting. Therefore, it seems unlikely that M&A activity contributes significantly to the rise in market power documented in prior work (De Loecker and Warzynski, 2012; De Loecker and Eeckhout, 2018). However, it is still debated how to best measure markups in the data. For example, Bond et al. (2021) notes that prior work generally uses revenue instead of physical output, which implies markups are not necessarily identified by these approaches. Therefore, in this next section we take an alternative approach. We split our sample by M&A that are more or less likely to impact market power and consider how our main outcomes vary across these groups.

6.1 Heterogeneity by Tradable vs. Non-Tradable Sectors

Increases in market power rely on the firms not facing a large competitive marketplace. If the firm produces a tradable good, then a single merger is unlikely to have large impacts on overall market power. Therefore, in our next set of analyses we consider effects separately by M&A in tradable sectors versus those in non-tradable sectors. We define firms as active in tradable good sectors if they fall under Agriculture, Forestry, Fishing and Hunting, Mining, Quarrying, and Oil and Gas Extraction, and Manufacturing. Firms active in other sectors (e.g., Construction, Retail, Real Estate, Services, etc.) are defined as falling under non-tradable sectors (Berger, Herkenhoff and Mongey, 2021; Delgado, Bryden and Zyontz, 2014).

Figure 3 shows the results separately for tradable sectors (27 percent of M&A deals in our analysis sample) and for non-tradable sectors. Panels (a) and (c) show that the declines in returns on assets and profit margins in the case of acquisitions (in the aggregate) are similar for both tradable sectors and non-tradable sectors. Panel (b) shows that the decline in returns on assets is smaller for non-tradable sectors compared to the decline in tradable sectors in the case of mergers. If tradable sectors are able to raise prices to ameliorate some of the losses, then the direction of the results is consistent with market power rising in these mergers. However, the difference is not statistically different from zero, as shown in Table 3. Furthermore, we see similar declines in profit

margins for both tradable and non-tradable sectors in the case of mergers, implying that M&As are unlikely to lead target firms to gain market power.

6.2 Heterogeneity by Domestic vs. Cross-border M&As

In our pooled sample across 10 European countries, cross-border M&As account for 34 percent of total M&A deals. We test whether the effects of M&As on profitability differ depending on whether an M&A deal was international rather than domestic, deals which presumably have little impact on product-market power as the acquirer and target operate in different markets. We define a deal as domestic if both target and acquiring firms are within the same country, and define the deal as cross-border if the parties are from different countries. Figure 4 shows that the effects of M&A on returns on assets and profit margins in the case of acquisitions are not statistically different between domestic M&As and cross-border M&As. In the case of mergers, the declines in returns on assets and profit margins are a bit larger (albeit not statistically different from zero) for domestic deals compared to cross-border deals (see Table 4), which seems again inconsistent with the rise in market power channel.

7 Conclusion

In this paper, we study how corporate M&As affect firms' profitability and markups in the medium-run. We compare the outcomes of firms that go through M&As with a matched sample of non-M&A firms before and after the event. Using financial data merged with M&A data at the firm-level across 10 European countries from 2010 to 2018, we exploit a large number of M&A activities based on a pooled sample of firms across these countries, given that they all share a comparable set of antitrust regulations and are governed by the European Union. Our results show economically and statistically significant drops in profitability for both acquiring and target firms, while markups remain unchanged. Additional heterogeneity analyses based on sectors and types of M&A deals

suggest that the changes in profitability and markups are unlikely to be driven by the market power channel. Our findings cast doubt on the efficiency effects of M&A through synergies and raise concerns regarding the efficiency-defence commonly used by merging parties. They also suggest that rising markups that have been documented in prior work are unlikely to be driven by M&A activities, as these events, on average, do not lead to increases in markups in our setting.

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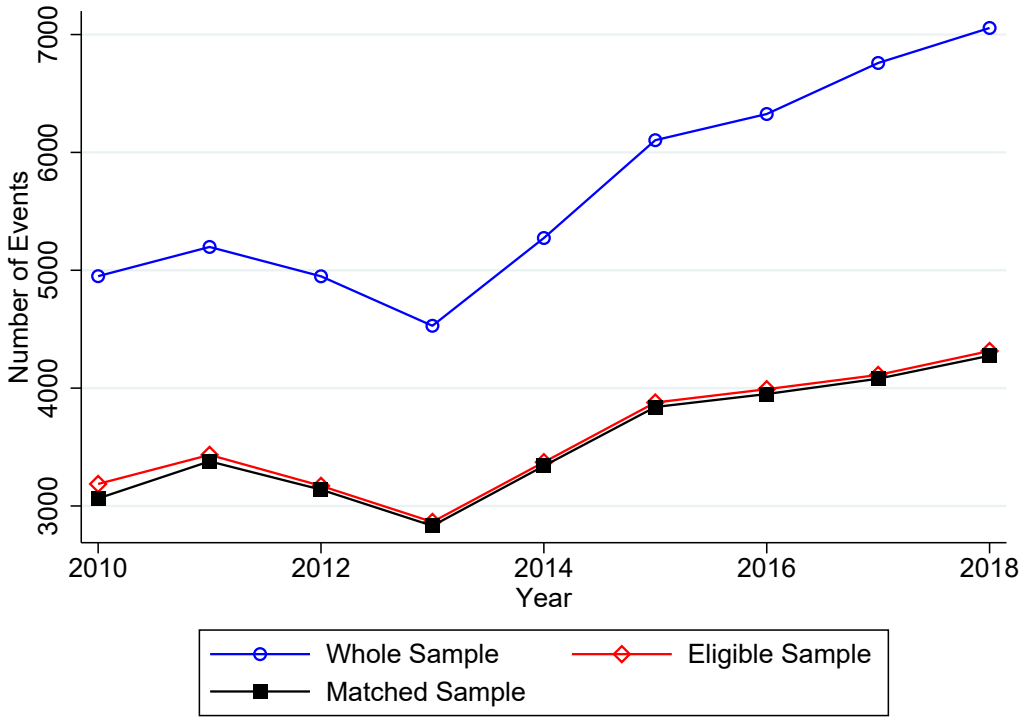
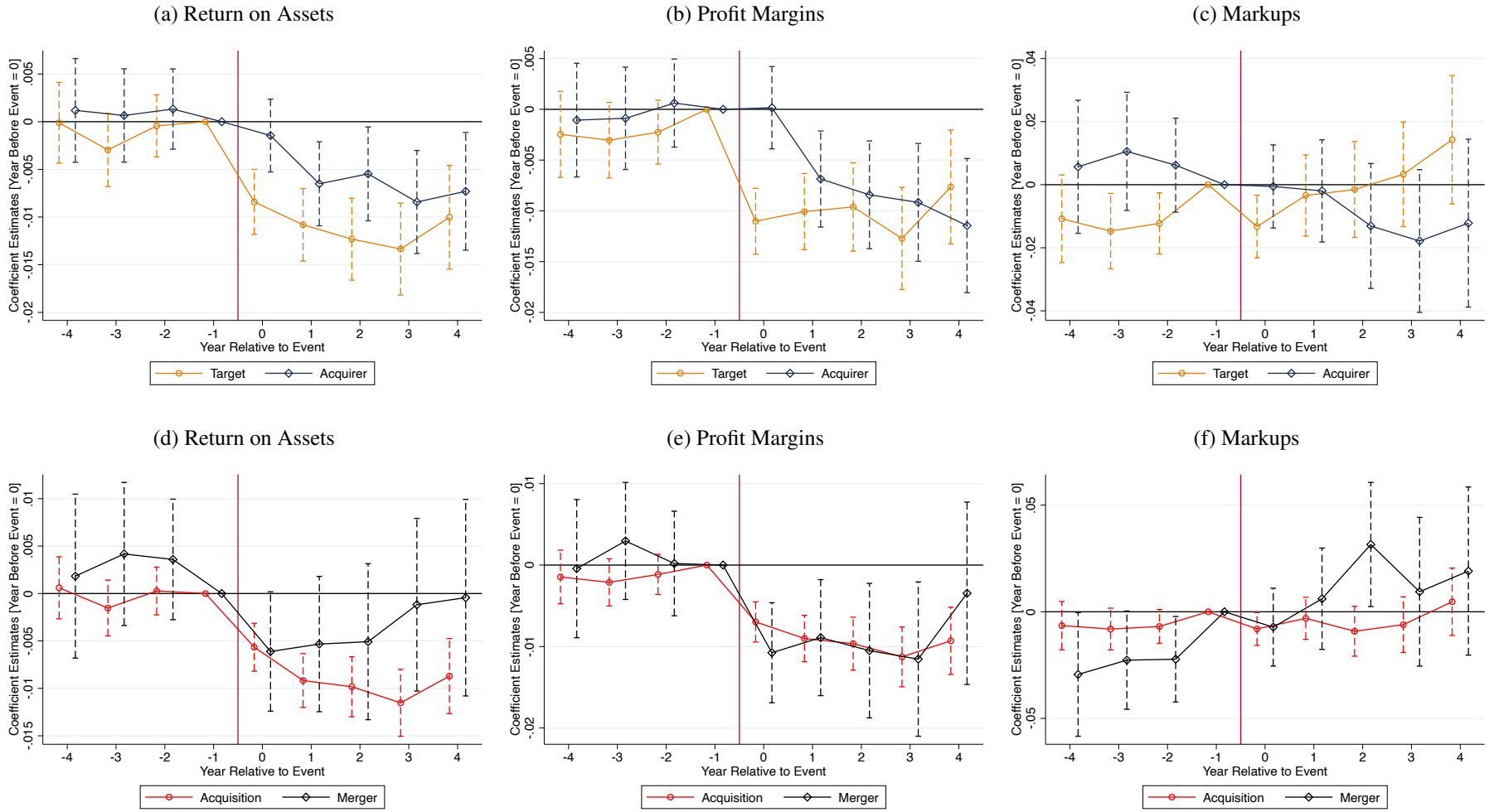
Figure 1: Number of M&A Events



Notes: During our sample period, the number of M&A events is 5,683 per year (including multiple events for a given firm) on average among all firms (eligible and ineligible for matching) as explained in Section 3 (blue line). The number of eligible M&A events is 3,592 per year (including multiple events for a given firm) on average (red line). Finally, the number of matched M&A events is 3,544 per year (black line). Therefore, the matching strategy finds a counterfactual firm in about 97 percent of all cases among this sample of eligible firms. Section 3 describes how we construct our matched sample of firms.

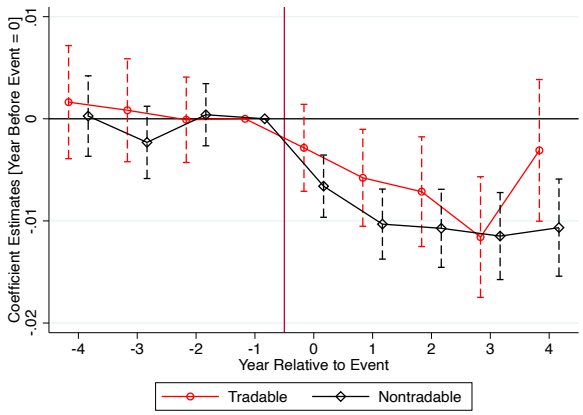
Figure 2: Profitability and Markups After M&As



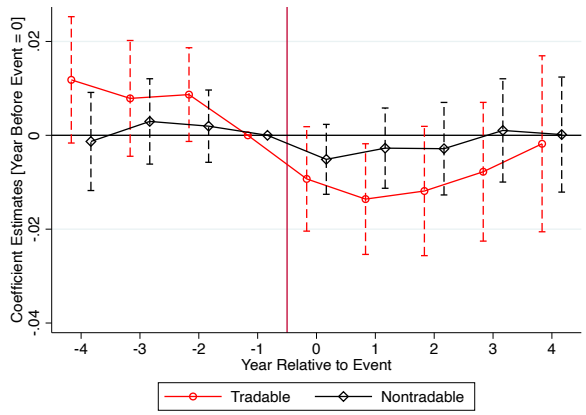
Notes: Panels (a) – (c) display event-study estimates for the impact of M&As on firm-level profitability for firms involved in acquisitions, separately for acquiring firms (navy line) and for target firms (orange line). Panel (a) shows the estimates for return on assets. Panel (b) shows the estimates for profit margins. Panel (c) shows the estimates for markups. Panels (d) – (f) display event-study estimates for the impact of M&As on the aggregate firm-level (targets and acquirers pooled) profitability, separately for those involved in acquisitions (red line) and for those involved in mergers (black line). Panel (d) shows the estimates for return on assets. Panel (e) shows the estimates for profit margins. Panel (f) shows the estimates for markups. The dashed lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm level. The M&A event is in year 0 and the coefficient is normalized to be zero in year -1. Return on assets is defined as firms' net income divided by its total assets. We define markup as the elasticity of output with respect to variable costs as well as the variable costs share (De Loecker and Warzynski, 2012).

Figure 3: Profitability After M&As By Tradable Sectors vs. Non-tradable Sectors

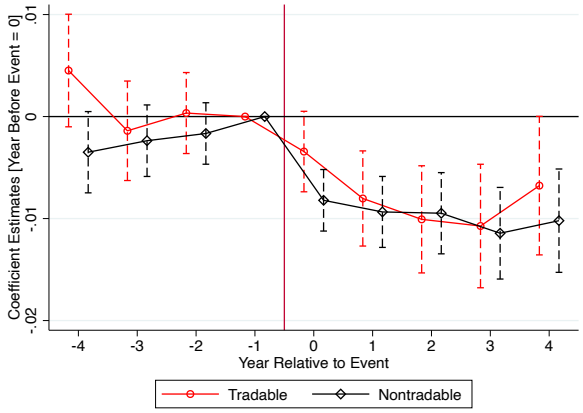
(a) Return on Assets - Acquisitions



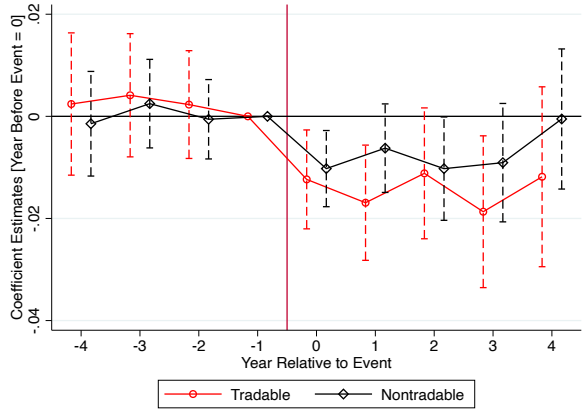
(b) Return on Assets - Merger



(c) Profit Margins - Acquisitions



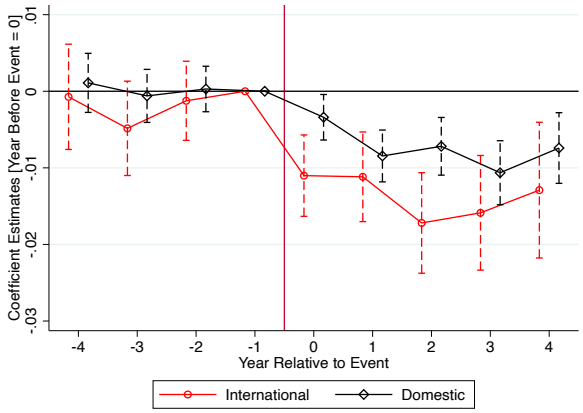
(d) Profit Margins - Merger



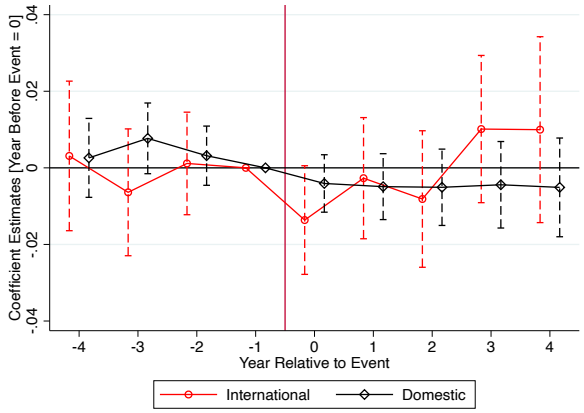
Notes: Panels (a) – (d) display event-study estimates for the impact of M&As on firm-level profitability for firms active in tradable sectors (red line) and for firms in non-tradable sectors (black line). Panel (a) shows the estimates for return on assets for firms involved in acquisitions. Panel (b) shows the estimates for return on assets for mergers. Panel (c) shows the estimates for profit margins for firms in acquisitions. Panel (d) shows the estimates for profit margins for firms involved in mergers. We define firms as active in tradable good sectors if they fall under Agriculture, Forestry, Fishing and Hunting, Mining, Quarrying, and Oil and Gas Extraction, and Manufacturing. The dashed lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm level. The M&A event is in year 0 and the coefficient is normalized to be zero in year -1.

Figure 4: Profitability After M&As By Cross-border M&As vs. Domestic M&As

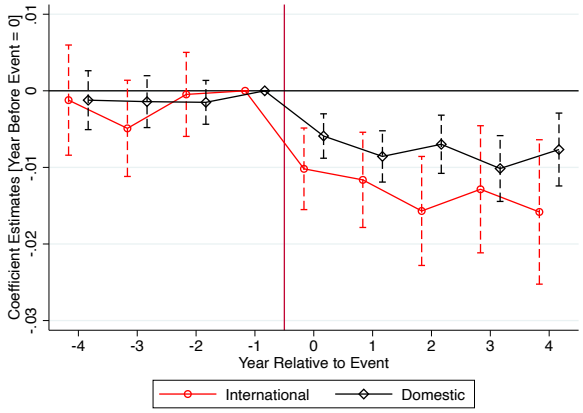
(a) Return on Assets - Acquisitions



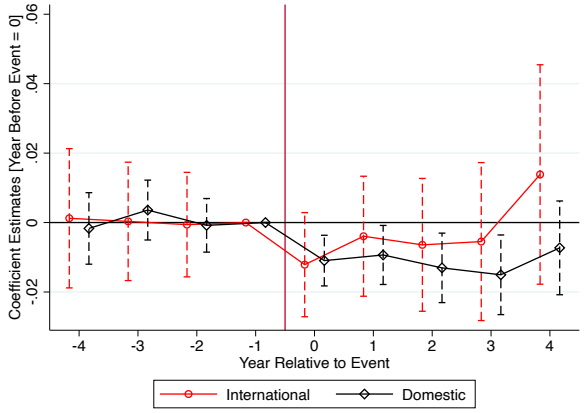
(b) Return on Assets - Merger



(c) Profit Margins - Acquisitions



(d) Profit Margins - Merger



Notes: Panels (a) – (d) display event-study estimates for the impact of M&As on firm-level profitability for firms involved in international M&As (red line) and for firms involved in domestic M&As (black line). Panel (a) shows the estimates for return on assets for firms involved in acquisitions. Panel (b) shows the estimates for return on assets for mergers. Panel (c) shows the estimates for profit margins for firms in acquisitions. Panel (d) shows the estimates for profit margins for firms involved in mergers. The dashed lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm level. The M&A event is in year 0 and the coefficient is normalized to be zero in year -1.

Table 1: Descriptive Statistics on the Matched Sample of Firms

	(1) Acquirer	(2) Control	(3) Target	(4) Control
Panel A: Firm Characteristics				
Total Revenue (in millions)	65.1	47.5	29.7	24.0
Return on Assets	0.044	0.049	0.034	0.044
Profit Margins	0.059	0.054	0.046	0.048
Leverage Ratio	0.600	0.617	0.631	0.613
Markups	2.884	3.294	2.482	2.619
Number of Firms	8,096	8,096	14,636	14,636
Panel B: Sector Composition				
Construction	0.06	0.06	0.06	0.06
Manufacturing	0.24	0.24	0.26	0.26
Wholesale	0.14	0.14	0.13	0.13
Retail	0.03	0.03	0.04	0.04
Transportation	0.04	0.04	0.04	0.04
Information	0.06	0.06	0.06	0.06
Services	0.28	0.28	0.25	0.25
Other Sectors	0.17	0.17	0.18	0.18

Notes: This table reports descriptive statistics on the matched sample of firms measured one year prior to the event. Panel A reports firm characteristics such as total revenue, return on assets, profit margins, leverage ratio, and markups. Columns (1) and (3) report these statistics for acquiring firms and for target firms, respectively, and column (2) and (4) report these statistics for their respective matched control firms. Panel B reports the distribution of firms in the matched sample across 2-digit NAICS sectors. Other sectors include (1) Agriculture, forestry, and fishing, (2) Mining, quarrying, and oil and gas extraction, (3) Utilities, (4) Real estate and rental and leasing, (5) Arts, entertainment and recreation, (6) Accommodation and food services, (7) Other services, and (8) Public administration.

Table 2: Profitability and Markups After M&As

	(1)	(2)	(3)	(4)
	Acquisition		**Aggregate**	
	Target	Acquirer	Acquisition	Merger
Return on Assets	-0.011***	-0.006***	-0.009***	-0.004
	(0.002)	(0.002)	(0.001)	(0.003)
Mean at t=-1	0.03	0.04	0.04	0.05
Adj. R squared	0.467	0.431	0.460	0.449
Firm-Year	198,406	108,377	311,436	64,347
Profit Margins	-0.010***	-0.007***	-0.009***	-0.009***
	(0.002)	(0.002)	(0.001)	(0.003)
Mean at t=-1	0.04	0.06	0.05	0.06
Adj. R squared	0.522	0.521	0.524	0.500
Firm-Year	177,146	97,401	279,210	57,546
Markups	-0.000	-0.009	-0.004	0.012
	(0.006)	(0.008)	(0.005)	(0.011)
Mean at t=-1	0.37	0.48	0.41	0.26
Adj. R squared	0.935	0.941	0.938	0.949
Firm-Year	158,616	85,475	248,441	49,430

Notes: This table reports the difference-in-differences estimates for the impact of M&As on firm profitability. Columns (1) and (2) report the estimates for the impact of acquisitions on target firms and on acquiring firms, respectively. Columns (3) and (4) report the estimates on the aggregate firm-level (targets and acquirers pooled) outcomes for those involved in acquisitions and for those involved in mergers, respectively. The standard errors are clustered at the firm level.

Table 3: Profitability After M&As By Tradable Sectors vs. Non-tradable Sectors

	(1)	(2)	(3)	(4)
	Return on Assets		**Profit Margins**	
	Acquisition	Merger	Acquisition	Merger
Post x Treated	-0.006***	-0.008	-0.008***	-0.014***
	(0.002)	(0.005)	(0.002)	(0.005)
Post x Treated x Nontradable	-0.004	0.006	-0.002	0.006
	(0.003)	(0.006)	(0.003)	(0.006)
Mean at t=-1 (Tradable = 1)	0.04	0.05	0.05	0.05
Mean at t=-1 (Nontradable = 1)	0.03	0.04	0.05	0.06
Adj. R squared	0.460	0.449	0.524	0.500
Firm-Year (Tradable = 1)	84,461	19,396	78,311	18,031
Firm-Year (Nontradable = 1)	230,179	49,154	204,810	43,872

Notes: This table reports the difference-in-differences estimates for the impact of M&As on firm profitability. Columns (1) and (2) report the estimates for the impact on return on assets for M&As involved in tradable sectors and M&As involved in non-tradable sectors. We define firms as active in tradable good sectors if they fall under Agriculture, Forestry, Fishing and Hunting, Mining, Quarrying, and Oil and Gas Extraction, and Manufacturing. Columns (3) and (4) report the estimates for the impact on profit margins for M&As involved in tradable sectors and M&As involved in non-tradable sectors. The triple interaction term captures the triple-difference estimates for firms active in non-tradable sectors. The standard errors are clustered at the firm level.

Table 4: Profitability After M&As By Cross-border M&As vs. Domestic M&As

	(1)	(2)	(3)	(4)
	Return on Assets		**Profit Margins**	
	Acquisition	Merger	Acquisition	Merger
Post x Treated	-0.011***	0.003	-0.012***	0.004
	(0.002)	(0.003)	(0.002)	(0.003)
Post x Treated x Domestic	0.001	-0.006	-0.003	-0.007
	(0.006)	(0.007)	(0.006)	(0.007)
Mean at t=-1 (Cross-border = 1)	0.03	0.04	0.05	0.06
Mean at t=-1 (Domestic = 1)	0.04	0.05	0.05	0.06
Adj. R squared	0.460	0.449	0.524	0.500
Firm-Year (Cross-border = 1)	90,672	19,087	79,429	16,721
Firm-Year (Domestic = 1)	223,968	49,463	203,692	45,182

Notes: This table reports the difference-in-differences estimates for the impact of M&As on firm profitability. Columns (1) and (2) report the estimates for the impact on return on assets for cross-border M&As and domestic M&As, respectively. Columns (3) and (4) report the estimates for the impact on profit margins for cross-border M&As and domestic M&As, respectively. The triple interaction term captures the triple-difference estimates for firms involved in a domestic deal. The standard errors are clustered at the firm level.

For Online Publication

This appendix supplements our paper "Corporate Acquisitions, Profitability, and Markups: Evidence from Europe" with the following sections:

- Section A provides additional institutional details.
- Section B provides details of data cleaning and fuzzy matching.
- Section C shows results from robustness tests.

A Additional Institutional Details

In Appendix A, we provide additional institutional details on M&A regulations for 10 European countries in our main analysis sample.

Table A.1 summarizes the regulations regarding pre-merger notification. In column "Joint" of Table A.1, ✓suggests it is a joint threshold. If the column is empty, then it means if one threshold is satisfied, then the firm has to file a pre-merger notification.

Table A.2 summarizes overall regulations regarding M&As. In column "Regulation" of Table A.2, the first agency is in charge of takeover bid processes, and the second agency is responsible for merger controls. For "Exceptions" in Germany, the Takeover Act is applicable to foreign companies whose voting shares are exclusively listed in Germany at the organized market. For "Exceptions" in Italy, small and medium firms are subject to some special rules. Takeover Directives do not apply to some public offers in EU. The concentration that has a community dimension in EU Merger Regulation is defined with turnovers.

Table A.1: Threshold changes

Country	Time	Thresholds	Value	Joint
Belgium	2009-2018	domestic combined turnover	EUR 100 million	✓
		domestic individual turnover of at least two of the undertakings concerned	EUR 40 million	✓
Finland	2009-2018	global combined turnover	EUR 350 million	✓
		domestic individual turnover of at least two of the undertakings concerned	EUR 20 million	✓
France	2009-2018	global combined turnover	EUR 150 million	✓
		domestic individual turnover of at least two of the undertakings concerned	EUR 50 million	✓
Germany	2009-2017	global combined turnover	EUR 500 million	✓
		domestic turnover of at least one participating	EUR 25 million	✓
		domestic individual turnover of at least one further participating undertaking	EUR 5 million	✓
	2017-2018	global combined turnover	EUR 500 million	✓
		domestic turnover of at least one participating	EUR 25 million	✓
		domestic individual turnover of at least one further participating undertaking	EUR 5 million	✓
		transaction value	EUR 400 million	
Italy	2009	domestic combined turnover	EUR 461 million	
		domestic individual turnover of targets	EUR 46 million	
	2009-2012	domestic combined turnover	EUR 474 million	
		domestic individual turnover of targets	EUR 47 million	
	2013-2017	domestic combined turnover	EUR 499 million	✓
		domestic individual turnover of targets	EUR 50 million	✓
	2018	domestic combined turnover	EUR 498 million	✓
		domestic individual turnover of at least	EUR 30 million	✓

Table A.1 (continued): Threshold changes

Country	Time	Thresholds	Value	Joint
Netherlands	2009-2018	global combined turnover	health care: EUR 55 million	✓
			pension funds: EUR 500 million	✓
		domestic individual turnover of at least two concerned undertakings	health care: EUR 10 million	✓
			pension funds: EUR 100 million	✓
	2009-2014	global combined turnover	EUR 113.45 million	✓
		domestic individual turnover of at least two concerned companies	EUR 30 million	✓
	2015-2018	global combined turnover	EUR 150 million	✓
		domestic individual turnover of at least two concerned companies	EUR 30 million	✓
Poland	2009-2014	global combined turnover	EUR 1 billion	✓
		domestic combined turnover	EUR 50 million	✓
	2015-2018	global combined turnover	EUR 1 billion	✓
		domestic combined turnover	EUR 50 million	✓
		domestic individual turnover	EUR 10 million	✓
Spain	2009-2018	domestic combined turnover	EUR 240 million	✓
		domestic individual turnover of at least two of the undertakings concerned	EUR 60 million	✓
	2009-2010	domestic market share acquired or increased	30%	
	2011-2018	domestic market share acquired or increased	50%	✓
		domestic individual turnover of targets	EUR 10 million	✓

Table A.2: Summary of Regulations

Countries	Regulation	Who is applied to	Exceptions	Timeline
Belgium	*agencies:* FSMA, Belgian Competition Authority	voluntary or mandatory public takeover bids if securities are in Belgium, primary market is in Belgium, or registered office is in Belgium and stocks are traded on Belgian stock exchange. any public squeeze-out bid.	registered office and primary market of target outside Belgium	without pre-merger notification: 4 to 16 weeks. with pre-merger notification: 6 to 36 weeks
Finland	*agencies:* Financial Supervisory Authority, FCCA	public takeovers. firms listed on Nasdaq Helsinki.	foreign target firms	without pre-merger notification: 20 to 24 weeks. with pre-merger notification: 24 to 48 weeks
France	*agencies:* Autorité des Marchés Financiers, Autorité de la Concurrence	irrespective of targets corporate form. Foreign buyers of certain sectors (energy, water, defense etc.) are subject to approval by the Minister of Economy. Banking, insurance, etc. are subject to approval regardless of buyers nationality.	Listed companies have slightly different rules regarding corporate governance.	without pre-merger notification: 12 to 16 weeks. with pre-merger notification: 16 to 32 weeks

Table A.2 (continued): Summary of Regulations

Countries	Regulation	Who is applied to	Exceptions	Timeline
Germany	*regulation:* Takeover Act. *agencies:* Federal Financial Supervisory Authority, Federal Cartel Office	only applies entirely to German-registered German-traded firms.	Only part of Takeover Act is applicable if a company is registered outside Germany or is traded only outside Germany.	without pre-merger notification: 1 to 16 weeks. with pre-merger notification: 5 to 36 weeks
Italy	*regulation:* Italian Civil Code, Italian Financial Act (TUF). *agencies:* National Commission for Companies and the Stock Exchange, Italian Competition Authority	joint-stock companies traded on Italian markets. Both public and private transactions subject to Italian Civil Code. The TUF applies to listed companies.	Small/medium enterprises have special rules.	without pre-merger notification: 4 to 10 weeks. with pre-merger notification: 6 to 24 weeks
Netherlands	*agencies:* Authority for the Financial Markets, Authority for Consumers and Markets	target admitted to trading on Netherlands regulated market.	N/A	without pre-merger notification: 10 to 24 weeks. with pre-merger notification: 14 to 41 weeks
Poland	*agencies:* Polish Financial Supervision Authority,	Target is public company registered in Poland with shares in a Polish regulated market.	non-Polish companies not traded in	without pre-merger notification: 24 to 48 weeks.

Table A.2 (continued): Summary of Regulations

Countries	Regulation	Who is applied to	Exceptions	Timeline
Spain	*agencies:* Securities Exchange Commission, Competition Authority	N/A	N/A	without pre-merger notification: 6 to 12 weeks. with pre-merger notification: 10 to 32 weeks
Sweden	*agencies:* Swedish Financial Authority, Swedish Competition Authority	targets whose shares are admitted to a regulated or alternative market in Sweden.	No special rules for foreign buyers except some restrictions in energy, nuclear, and defense sectors.	without pre-merger notification: 4 to 14 weeks. with pre-merger notification: 6 to 36 weeks
United Kingdom	*agencies:* Takeover Panel, Competition and Markets Authority	public companies registered in the UK whose shares are traded on UK markets.	Foreign buyers restricted in aviation	without pre-merger notification: 4 to 16 weeks. with pre-merger notification: 4 to 184 weeks
EU	*regulation:* Takeover Directive 2004/25/EC, Council Regulation (EC) No 139/2004 (the EU Merger Regulation)	Takeover Directive: (1)public offers not made by the target company itself; (2)objective of control; (3)not issued by EU member states' central banks. EU Merger Regulation: all	Takeover Directive: (1)made by the target company itself; (2)do not have as their	without pre-merger notification: 2 to 10 weeks. with pre-merger notification: 7 to 35 weeks.

B Fuzzy Matching

In this appendix, we explain the steps to merge the firm-level datasets between the SDC Platinum database and the Amadeus database.

B.1 SDC Platinum Data

First, we drop M&A transactions with missing dates of submission from the SDC dataset. Second, the SDC dataset lists a target firm and an acquiring firm for each transaction, but the names of the parties are not always disclosed. For example, an investor group acquired "Albingia SA" in 2018 but the names of acquiring parties are not disclosed or "Animagi Oy" acquired a set of companies whose names are not disclosed. We label these undisclosed parties as *unmatchable* and do not include them in our fuzzy matching. Roughly 7% of M&A parties are labeled *unmatchable* and dropped.

Moreover, a firm may have participated in multiple transactions during our sample period. However, information such as addresses might not be reported for all of the transactions. The SDC Platinum does not have a unique identifier for firms, hence, we use firms' original (non-standardized) names to recover these unique identifying variables (UIVs). We explain below how we use UIVs in our fuzzy matching.

To perform fuzzy matching, we standardize names of the firms. This task is particularly difficult since names are in various languages such as English, French, German, Italian and Finnish. First, we remove punctuation such as comma, colon, dot, and ampersand from the firm's name. For example, "A. & J. VOEGEL" will turn into "A J VOEGEL" and common words such as "AND", "THE", "OF" (in various languages). Second, we identify common phrases. For example, the German phrase "Gesellschaft mit beschränkter Haftung" or "GmbH" and the Swedish phrase "Aktiebolag" or "AB" are equivalent to "Ltd." used in the U.K. or "Inc." in the U.S. Third, we harmonize these common phrases. For example, "Gesellschaft MBH", "Ges MBH" and "Gesell

MBH" are all various formats of "Gesellschaft mit beschränkter Haftung", all of which we replace with the phrase "GMBH". As another example, "PHARMACOLOGIQUES", "PHARMACIES", "FARMACEUTICO" are all various formats of "PHARMACEUTICALS", all of which we replace with the phrase "PHARM". Fourth, we remove phrases that represent the legal status of a firm but are not specific to the firm such as "PLC", "LTD", "INC" (in various languages). Fifth, we identify and harmonize phrases related to the country of the firm e.g. "ITALIENNE", "ITALIE", and "ITALIANO" are all related to Italy, and we replace them with the phrase "IT".

B.2 Amadeus Data

The Amadeus database contains financial information for both private and publicly listed firms in Europe from 2010 to 2018. We drop firms with missing names and standardize the names of firms, as described above.

B.3 Fuzzy Matching

We perform fuzzy matching between SDC data and Amadeus data using the STATA command *matchit*.[10] We tokenize standardized names by splitting on spaces. For instance, in "SEVEN NETWORKS", there are two tokens: SEVEN and NETWORKS. These match perfectly with "SEVEN NETWORKS" and "NETWORKS SEVEN" (score = 1), imperfectly with "NETWORK SEVEN" or "SEV NETWORKS" (score = 0.5) but do not match with "SEVE NET" (score = 0). The score is calculated by dividing number of matched tokens by the total number of tokens. We keep all the matches with a score equal to or above 0.5.

We use unique identifying variables (UIV) such as phone number, email, website, postal code, and ticker symbol if available to identify perfect matches. This helps us improve both quality and quantity of identified matches. We define four classes of quality in our matched data with class 1 having the highest quality: (1) Identical standardized names and at least one matching UIV

[10] See the STATA documentation for details.

(2) Imperfect fuzzy-matched names with at least one matching UIV (3) Identical standardized names with no conflicting UIVs but same industry codes, and (4) Identical standardized names with conflicting UIVs. At this point, a firm might have multiple matches. We keep matches with the highest quality. If a firm has two or more matches of the same quality, we choose one randomly.

Panel A of Table B1 shows the fuzzy match rate between the SDC data and Amadeus data for each country in each year. On average, the match rate is around 60 percent across these countries during our sample period. Panel B describes the total number of M&A transactions across 10 countries from 2010 to 2018. On average, there are 1,857 M&A deals per year per country during our sample period, with the United Kingdom having the largest number of M&A transactions in any given year among these countries. Note that the number of M&A deals in Table B2 is without any sample restrictions, so it is larger than the number of M&A events described in Figure 1.

Table B1: M&A Deals Across Countries (2010 - 2018)

Panel A: Fuzzy Match Rate (Perfect Match Rate)

	(1) Belgium		(2) Finland		(3) France		(4) Germany		(5) Italy		(6) Netherlands		(7) Poland		(8) Spain		(9) Sweden		(10) UK		(11) Average	
2010	53	(84)	58	(88)	48	(82)	52	(93)	40	(37)	41	(77)	66	(91)	36	(81)	50	(82)	59	(93)	51	(86)
2011	51	(83)	59	(93)	46	(81)	54	(93)	42	(37)	41	(78)	65	(93)	38	(81)	52	(87)	62	(93)	52	(86)
2012	52	(81)	59	(86)	48	(81)	57	(92)	44	(40)	44	(73)	64	(90)	43	(77)	51	(83)	62	(92)	54	(85)
2013	54	(81)	58	(85)	48	(81)	58	(91)	49	(39)	46	(70)	60	(90)	49	(74)	53	(82)	67	(93)	56	(84)
2014	60	(83)	63	(84)	48	(79)	66	(88)	49	(39)	51	(74)	63	(87)	51	(72)	59	(83)	69	(92)	59	(83)
2015	56	(79)	62	(86)	45	(77)	68	(89)	49	(39)	51	(69)	62	(86)	54	(71)	61	(79)	72	(91)	59	(81)
2016	59	(68)	68	(85)	48	(73)	70	(89)	52	(42)	57	(68)	62	(85)	56	(71)	67	(75)	74	(91)	62	(79)
2017	68	(77)	72	(83)	54	(77)	74	(91)	56	(41)	60	(72)	67	(84)	59	(70)	69	(73)	72	(86)	65	(78)
2018	69	(78)	76	(83)	59	(76)	73	(88)	63	(42)	63	(75)	69	(85)	61	(66)	73	(75)	65	(72)	66	(74)
Average	59	(79)	64	(86)	49	(78)	64	(90)	51	(40)	51	(73)	64	(87)	49	(73)	59	(79)	67	(88)	59	(81)

Panel B: Total Number of M&A Deals

	Belgium	Finland	France	Germany	Italy	Netherlands	Poland	Spain	Sweden	UK	Average
2010	398	484	2,795	2,474	1,164	1,113	623	1,724	1,522	4,575	1,687
2011	431	497	3,299	2,856	1,054	1,207	459	1,753	1,548	4,758	1,786
2012	365	379	3,208	2,608	872	1,089	347	1,454	1,373	4,686	1,638
2013	355	365	3,072	2,515	846	982	441	1,252	1,239	4,172	1,524
2014	414	381	4,238	2,804	992	998	721	1,543	1,030	4,801	1,792
2015	538	404	5,336	2,763	1,409	1,101	1,162	1,626	1,115	5,016	2,047
2016	538	494	5,186	2,855	1,674	1,338	888	1,521	1,236	4,849	2,058
2017	577	432	4,167	2,709	1,862	1,222	658	1,699	1,330	6,075	2,073
2018	554	430	3,671	2,563	1,930	1,258	659	1,894	1,398	6,689	2,105
Average	463	430	3,886	2,683	1,311	1,145	662	1,607	1,310	5,069	1,857

Notes: Panel A reports the match rate between SDC Platinum (M&A data) and Amadeus (firm-level financial data). In the parentheses, we report the share of perfectly matched observations. A match is perfect if two observations match on at least one unique identifying variable (i.e., phone number, website, email, and ticker symbol). Panel B reports the total number of deals (in the whole sample without any restrictions) across years and countries in our data.

C Robustness

In this section, we provide results from robustness tests discussed in Sections 3 – 5.

C.1 Different Clustering

Our main firm-level results are based on clustering at the firm level. We also do robustness tests on the key firm-level outcomes, where standard errors are clustered at the market level (defined at the four digit NAICS by country) for firm-level results. Figure C.1 and Table C.1 show these estimates, finding similar results to our main estimates.

C.2 Perfectly Matched Sample

In Table B.1 of Appendix B, we show that among the fuzzy-matched sample (between SDC data and Amadeus data), roughly 80 percent of firms are perfectly matched using the unique identifying variables. We repeat the main analysis using the perfectly matched sample. Figure C.2 and Table C.2 show the estimates on returns on assets and profit margins that are qualitatively similar to our main estimates (where we include the fuzzy matched sample).

C.3 By One-time vs. Repeat Acquirers

Prior research points out that a part of the motive behind M&As involves empire-building, which could result in losses in profitability or productivity after the event (Jensen, 1986). While it is difficult to discern whether a particular acquirer has an empire-building motive in our data, we test whether the effects on returns on assets and profitability are different depending on whether an acquirer engages in multiple M&A transactions (roughly 26 percent of our analysis sample). Specifically, we compare the outcomes of acquirers involved in a single acquisition relative to the outcomes of acquirers involved in multiple acquisitions during our sample period. Figure C.3 and

Table C.3 show that acquirers involved in multiple M&A transactions experience similar declines in profitability after the event, compared to acquirers involved in a single M&A deal.

C.4 Using Private Firms Only

Prior research shows that publicly listed firms engage in M&As more than private firms during merger waves, and that acquisitions can be efficiency improving, especially when buyers and sellers are publicly listed firms during on-the-wave mergers (Maksimovic and Phillips, 2001). While the vast majority (95 percent) of firms that go through M&As in our matched sample are private, we repeat our analysis focusing only on private firms, since the effects of M&As on firm-level outcomes might be different between listed firms and private firms. Figure C.4 and Table C.4 show that the results on returns on assets and profit margins are similar to our main results where we include both private and publicly listed companies, implying that our results are robust to just focusing on private firms in our sample.

C.5 Other Measures of Profitability

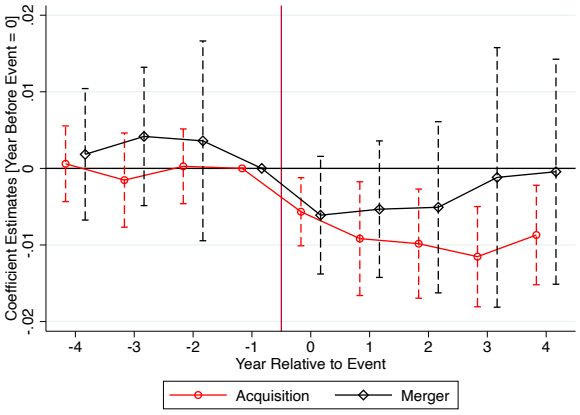
For our main analysis, we focus on two measures of profitability: returns on assets and profit margins. We use two additional measures of profitability directly observed in our data: returns on assets (labeled as RTAS in our data) and Earnings Before Interest and Taxes divided by total revenue (labeled as EBMA in our data). The difference between RTAS and our main return on assets measure is that RTAS uses Earnings Before Interest and Taxes divided by total assets rather than Net Income divided by total assets. Figure C.5 and Table C.5 show the results on these additional measures of profitability that are qualitatively similar to the estimates on our main measures of profitability.

C.6 Firm Exit Rate

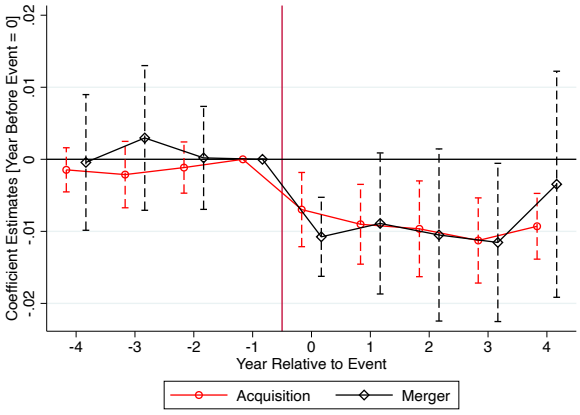
One potential concern regarding the decline in profitability after acquisitions is that the result could be driven by treated firms exiting the sample more compared to control firms after the event. This is a potential issue especially for target firms involved in acquisitions because it is possible that some of them may shut down and exit the sample after acquisitions. To check whether this is indeed the case, Figure C.6 shows the share of target firms exiting the sample after the event. It shows that the share of firms exiting the sample is actually quite similar between target firms and their matched control firms, which would help alleviate the aforementioned concern.

Figure C1: Different Clustering

(a) Return on Assets



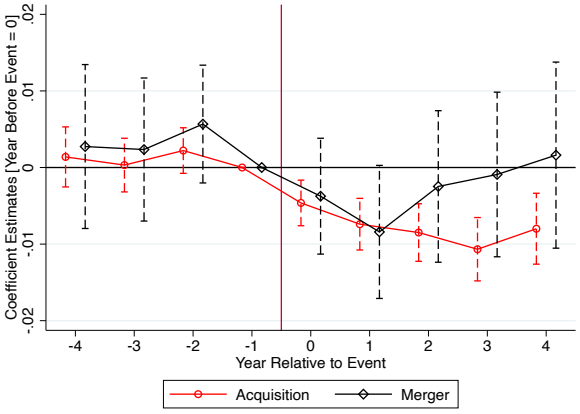
(b) Profit Margins



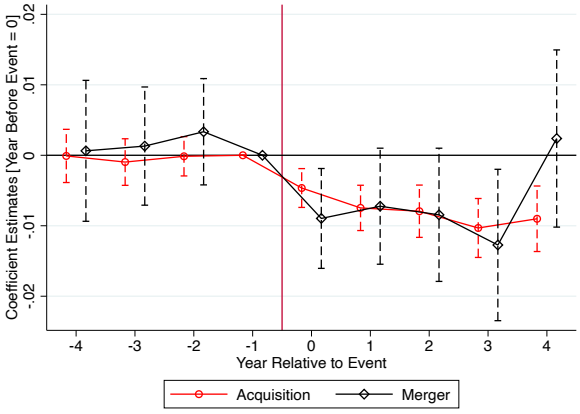
Notes: Panels (a) and (b) display event-study estimates for the impact of M&As on the aggregate firm-level (targets and acquirers pooled) profitability, separately for those involved in acquisitions (red line) and for those involved in mergers (black line). Panel (a) shows the estimates for return on assets. Panel (b) shows the estimates for profit margins. Return on assets is defined as firms' net income divided by its total assets. We define markup as the elasticity of output with respect to variable costs as well as the variable costs share (De Loecker and Warzynski, 2012). The dashed lines indicate 95 percent confidence intervals where the standard errors are clustered at the industry-by-country level. The M&A event is in year 0 and the coefficient is normalized to be zero in year -1.

Figure C2: Perfectly-Matched Sample

(a) Return on Assets



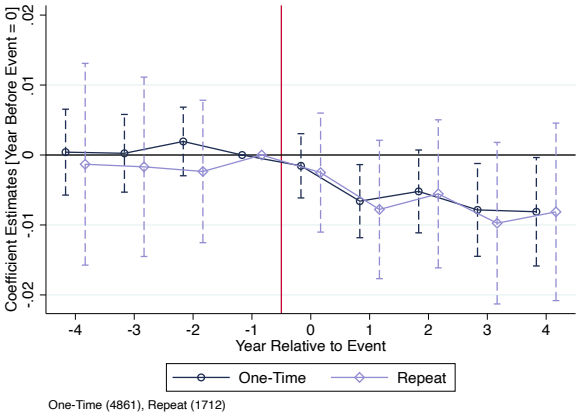
(b) Profit Margins



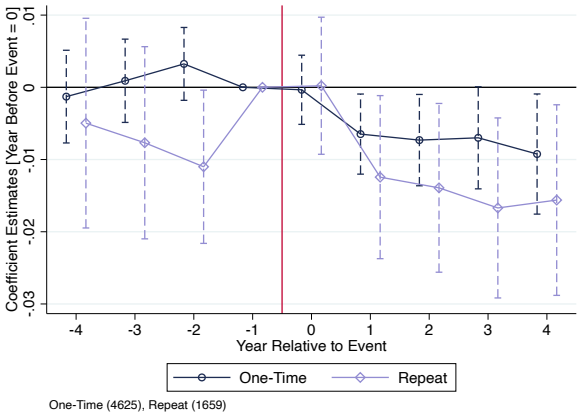
Notes: Panels (a) and (b) display event-study estimates for the impact of M&As on the aggregate firm-level (targets and acquirers pooled) profitability, separately for those involved in acquisitions (red line) and for those involved in mergers (black line). We restrict our sample to perfectly-matched observations. A match is perfect if two observations match on at least one unique identifying variable (i.e., phone number, website, email, and ticker symbol). Panel (a) shows the estimates for return on assets. Panel (b) shows the estimates for profit margins. Return on assets is defined as firms' net income divided by its total assets. We define markup as the elasticity of output with respect to variable costs as well as the variable costs share (De Loecker and Warzynski, 2012). The dashed lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm level. The M&A event is in year 0 and the coefficient is normalized to be zero in year -1.

Figure C3: By One-time M&As vs. Repeat M&As (Acquirers)

(a) Return on Assets



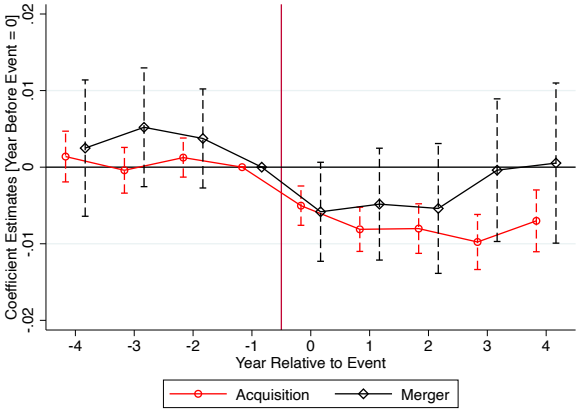
(b) Profit Margins



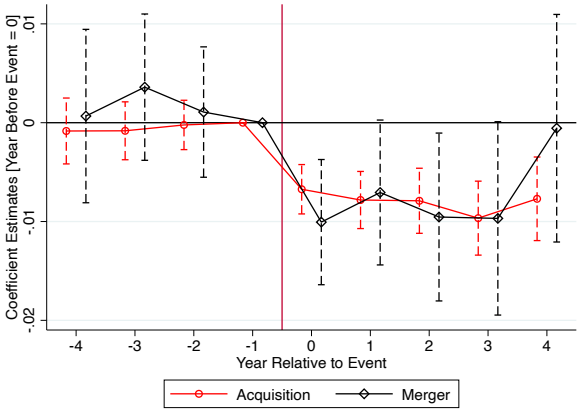
Notes: Panels (a) and (b) display event-study estimates for the impact of M&As on firm-level profitability, separately for acquiring firms that go through an M&A only once throughout our sample period (blue line) and for acquiring firms with multiple M&A events (navy line). Panel (a) shows the estimates for return on assets. Panel (b) shows the estimates for profit margins. The dashed lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm level. The M&A event is in year 0 and the coefficient is normalized to be zero in year -1.

Figure C4: Private Firms Only

(a) Return on Assets

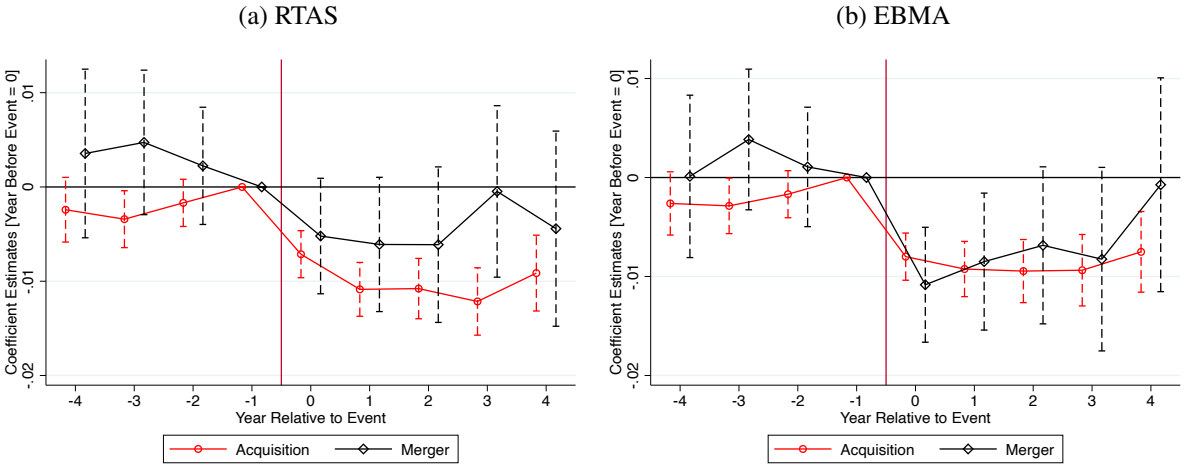


(b) Profit Margins



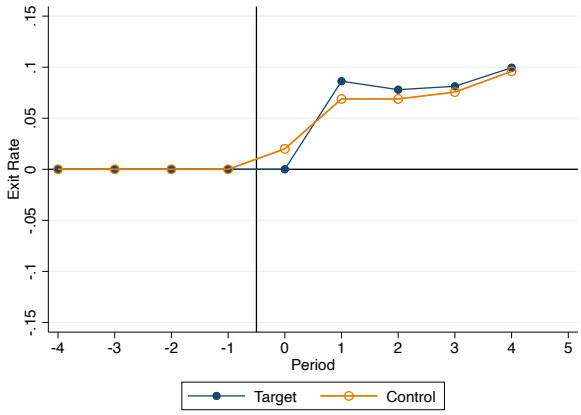
Notes: Panels (a) and (b) display event-study estimates for the impact of M&As on the aggregate firm-level (targets and acquirers pooled) profitability, separately for those involved in acquisitions (red line) and for those involved in mergers (black line). We restrict our sample to private firms. Panel (a) shows the estimates for return on assets. Panel (b) shows the estimates for profit margins. Return on assets is defined as firms' net income divided by its total assets. We define markup as the elasticity of output with respect to variable costs as well as the variable costs share (De Loecker and Warzynski, 2012). The dashed lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm level. The M&A event is in year 0 and the coefficient is normalized to be zero in year -1.

Figure C5: Alternative Performance Measures after M&As



Notes: Panels (a) and (b) display event-study estimates for the impact of M&As on the aggregate firm-level (targets and acquirers pooled) profitability, separately for those involved in acquisitions (red line) and for those involved in mergers (black line). Panel (a) shows the estimates for return on assets as reported in the balance sheet data. Panel (b) shows the estimates for EBMA (Earnings Before Interest and Taxes) scaled by total revenue. The dashed lines indicate 95 percent confidence intervals where the standard errors are clustered at the firm level. The M&A event is in year 0 and the coefficient is normalized to be zero in year -1.

Figure C6: Share of Target Firms Exiting the Sample



Notes: This figure displays the exit rate of target firms in the matched sample, separately for target firms and their matched control firms.

Table C1: Different Clustering

	(1) Acquisition	(2) Merger
Return on Assets	-0.009***	-0.004
	(0.002)	(0.004)
Mean at t=-1	0.04	0.05
Adj. R squared	0.460	0.449
Firm-Year	311,436	64,347
Profit Margins	-0.009***	-0.009**
	(0.002)	(0.004)
Mean at t=-1	0.05	0.06
Adj. R squared	0.524	0.500
Firm-Year	279,210	57,546

Notes: This table reports the difference-in-differences estimates for the impact of M&As on firm profitability. Columns (1) and (2) report the estimates on the aggregate firm-level (targets and acquirers pooled) outcomes for those involved in acquisitions and for those involved in mergers, respectively. The standard errors are clustered at the industry-by-country level.

Table C2: Perfectly-Matched Sample

	(1) Acquisition	(2) Merger
Return on Assets	-0.008***	-0.003
	(0.001)	(0.004)
Mean at t=-1	0.04	0.05
Adj. R squared	0.458	0.436
Firm-Year	228,085	47,470
Profit Margins	-0.008***	-0.007*
	(0.001)	(0.004)
Mean at t=-1	0.05	0.06
Adj. R squared	0.530	0.492
Firm-Year	205,656	42,620

Notes: This table reports the difference-in-differences estimates for the impact of M&As on firm profitability. Columns (1) and (2) report the estimates on the aggregate firm-level (targets and acquirers pooled) outcomes for those involved in acquisitions and for those involved in mergers, respectively. We restrict our sample to perfectly-matched observations. A match is perfect if two observations match on at least one unique identifying variable (i.e., phone number, website, email, and ticker symbol). The standard errors are clustered at the firm level.

Table C3: By One-time M&As vs. Repeat M&As (Acquirers)

	(1) Return on Assets	(2) Profit Margins
Post x Treated	-0.006**	-0.006***
	(0.002)	(0.002)
Post x Treated x Repeat	-0.000	-0.003
	(0.004)	(0.004)
Mean at t=-1 (One-Time = 1)	0.04	0.06
Mean at t=-1 (Repeat = 1)	0.04	0.07
Adj. R squared	0.431	0.521
Firm-Year (One-Time = 1)	82,460	74,290
Firm-Year (Repeat = 1)	30,130	27,581

Notes: This table reports the difference-in-differences estimates for the impact of M&As on firm profitability, separately for acquiring firms that go through an M&A only once throughout our sample period and for acquiring firms with multiple M&A events. Columns (1) reports the estimates for the impact on return on assets. Columns (2) reports the estimates for the impact on profit margins. The triple interaction term captures the triple-difference estimates for firms with multiple M&A events. The standard errors are clustered at the firm level.

Table C4: Private Firms Only

	(1) Acquisition	(2) Merger
Return on Assets	-0.008***	-0.003
	(0.001)	(0.003)
Mean at t=-1	0.04	0.05
Adj. R squared	0.455	0.447
Firm-Year	297,032	60,460
Profit Margins	-0.008***	-0.007**
	(0.001)	(0.003)
Mean at t=-1	0.05	0.06
Adj. R squared	0.526	0.503
Firm-Year	266,516	54,150

Notes: This table reports the difference-in-differences estimates for the impact of M&As on firm profitability. Columns (1) and (2) report the estimates on the aggregate firm-level (targets and acquirers pooled) outcomes for those involved in acquisitions and for those involved in mergers, respectively. We restrict our sample to private firms. The standard errors are clustered at the firm level.

Table C5: Alternative Measures of Profitability

	(1) Acquisition	(2) Merger
RTAS	-0.010***	-0.004
	(0.001)	(0.003)
Mean at t=-1	0.06	0.07
Adj. R squared	0.513	0.505
Firm-Year	307,172	63,597
EBMA	-0.009***	-0.007**
	(0.001)	(0.003)
Mean at t=-1	0.06	0.07
Adj. R squared	0.572	0.560
Firm-Year	283,111	58,425

Notes: This table reports the difference-in-differences estimates for the impact of M&As on firm profitability. Columns (1) and (2) report the estimates on the aggregate firm-level (targets and acquirers pooled) outcomes for those involved in acquisitions and for those involved in mergers, respectively. The top panel shows the estimates for return on assets as reported in the balance sheet data. The bottom panel shows the estimates for EBMA scaled by total revenue. The standard errors are clustered at the firm level.