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**Post-M&A Operating Performance on European Markets**

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Dissertation  
Master in Finance

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September, 2018

## **Abstract**

The purpose of this study is to look at mergers and acquisitions (M&A) in European countries and to examine the post-merger operating performance of acquiring companies involved in merger activities during the period 2008-2014. This research uses the operating performance approach, which compares the pre-merger and post-merger performance of companies using accounting data to examine merger related gains to the acquiring firms. The value of this study is its extension of the mergers and acquisitions performance research, which has been conducted on mostly UK and US firms.

The results suggest that European companies are unable to use mergers and acquisition to improve their post-merger long-term performance. Even when we split the sample by country development stage, our conclusion remains unchanged.

Post-merger operating performance changes are strongly determined by some factors. We find that post-merger profitability of emergent and developing market acquirers is enhanced by cash-only as a method of payment for acquisition. Moreover, merged firms' post-M&A cost efficiency is adversely affected when mix is the method of payment, when the acquirer chooses a target from a different country, when the size of the firm being acquired increases relative to the acquiring firm; and when the acquirer has high levels of pre-M&A leverage. In turn, emergent and developing acquirers that have high pre-M&A cash reserves and that prefer to acquire targets from the same industry experience improvements on firms' post-merger cost efficiency. For advanced market acquirers, the positive effect of industry-related transactions on firms' post-merger efficiency will be higher than in emergent and developing markets, where it is significantly positive. Regarding how corporate governance characteristics of acquiring firms impact merger performance, we find that operating performance outcomes are worse when the emergent and developing acquiring firm has a large equity holder. While governance variables such as a large board, high proportion of outside independent directors on acquirers' board composition, and Chairman-CEO duality are expected to enhance operating performance after takeover. Regarding advanced markets, our results show a negative effect driven by acquirers' board being composed by a large proportion of outside independent directors.

**Key-words:** corporate governance; Europe; long-term operating performance; mergers and acquisitions; ownership structure.

**JEL codes:** G34

## Sumário

A presente dissertação examina fusões e aquisições (F&A) concluídas por adquirentes Europeus, ao longo de 7 anos (2008-2014). Para tal, a performance operacional de longo-prazo no período pós F&A será analisada. O nosso estudo irá comparar a performance antes da F&A com a performance pós F&A, utilizando dados contabilísticos para medir os ganhos ou perdas do adquirente originados pela decisão de participar numa F&A. Acreditamos que o nosso estudo tem valor, pois irá contribuir para aumentar a literatura sobre F&A na Europa, pois a maioria dos estudos até à data teve como foco empresas do Reino Unido ou dos Estados Unidos da América.

Os nossos resultados demonstram que, após a F&A e independentemente do nível de desenvolvimento do mercado, a performance operacional do adquirente tornando-se negativa.

Relativamente aos determinantes de performance operacional pós-F&A, os nossos resultados demonstram que adquirentes de países em desenvolvimento que paguem a transação em dinheiro irão experienciar incrementos na rentabilidade. Adicionalmente, é esperado que um *mix* de ações e dinheiro como pagamento pela transação; a opção de adquirir empresas estrangeiras e de crescente dimensão relativamente ao adquirente; e o facto de o adquirente possuir níveis de dívida elevados no período pré-F&A, origine um efeito negativo na eficácia de custos na empresa resultante da transação. Por sua vez, adquirentes de países em desenvolvimento que possuam elevadas reservas de dinheiro no período pré-F&A e escolham uma empresa-alvo da mesma indústria da sua, irão experienciar aumentos significativos na eficácia de custos pós-F&A. No caso dos países desenvolvidos, é esperado um aumento na eficácia de custos da empresa resultante superior ao efeito positivo sentido nos países Europeus em desenvolvimento. Relativamente ao modo como as características de governança corporativa das empresas adquirentes afetam o desempenho das F&A, é possível concluir que a performance operacional pós-F&A será pior se adquirentes de países em desenvolvimento possuírem elevada concentração acionista. Outros fatores, tais como, o facto de possuir um elevado número de membros no conselho de administração, o facto da maioria desses membros ser considerado independente e, por fim, o presidente do conselho de administração ser também o CEO da empresa, irá originar um efeito positivo na performance pós-F&A de adquirentes que pertençam a países Europeus em desenvolvimento. Por sua vez, à medida que a proporção de diretores considerados independentes aumenta na composição do conselho de administração, é esperado um efeito negativo na performance pós-F&A dos países desenvolvidos.

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## 1. Introduction

Mergers and acquisitions (hereafter, M&A) activity within the European Union has reached a 10-year high, despite uncertainty around numerous political votes in the area. Announced deal values between European Union nations have totalled \$206.9bn (£159.5bn) so far in 2017, which was the highest-year-to-date figure on record since 2007 (Thomson Reuters). Even though, United States companies remained Europe's biggest investors, European companies together are the biggest source of the continent's cross-border flows (56%). The 19 Eurozone countries are expected to achieve GDP growth of 1.7% in 2017 and 1.6% next year, as well the countries of emerging and developing Europe, are expanding almost twice as fast. Steadier and stronger growth around the world lifts demand for European products and services at home and abroad, raises capacity utilization, and gives business decision makers the confidence to expand and invest (EY's Attractiveness Survey Europe).

As is well known M&A continuing to be management's favourite growth strategy, since it can have a major impact on the competencies, organization, and therefore performance of the involved firms. The major channels through which M&A can increase the performance of acquirers are the achievement of synergies and the correction of mistakes made by management (Martynova and Renneboog, 2006). Synergies can be operational or financial. Operational synergies are more common in M&A between related industries (Comment and Jarrell, 1995), and can arise from economies of scale, a decrease in agency cost, and a knowledge or skill transfer (Ravenscraft and Scherer, 1989). On the other hand, financial synergies usually arise from diversifying deals (Martynova and Renneboog, 2006) though a decreased probability of bankruptcy, more stable cash flows and easier access to capital (Higgins and Schall, 1975; Stein, 1997).

Whether the motive for corporate acquisitions is indeed the anticipation of synergistic benefits, these benefits or improvements in efficiency should lead to improved performance following the combination. However, whereas empirical evidence suggests that M&A increase the value of target firms, the outcome is mixed for acquirers. Most studies find that shareholders of acquiring firms experience wealth destruction, on average, or at best break even, leading to an underperformance puzzle (Andrade *et al.*, 2001; Moeller *et al.*, 2004).

Therefore, this study aims to answer the following: Do European acquirers experience differences in performance after M&A? Do these differences in performance depends of the acquirer country development stage?

These questions are appealing for the following two reasons. Firstly, although the literature on stock performance following M&A transactions is extensive, empirical evidence regarding post-M&A operating performance in Europe is narrower (Martynova *et al.*, 2007) compared to the literature about M&A in the US and UK. To our best knowledge only Mueller (1980), Gugler *et al.* (2003) and Martynova *et al.* (2007) focus on M&A activity by European companies, and their studies report contradictory results. Hence, Papadakis and Thanos (2010) suggested a need for more geographically diverse samples to overcome the UK and US bias in the field of M&A studies. Secondly, this research is, in our understanding, the first to distinguish between the M&A performance of European advanced and emergent and developing acquirers<sup>1</sup>. Thanos and Papadakis (2012a) suggest a need to look at emerging economies, because M&A results in the developed world may be valid for the developed world, but may not be valid for the developing world (Wong and Cheung, 2009).

Our following research questions is: How corporate governance factors impacts operating performance effects?

Du and Boateng (2012) found that the most commonly studied determinants of post-acquisition performance are firm- and industry-specific variables. While the role of corporate governance in operating performance has received practically no attention (Carline *et al.*, 2009). Masulis *et al.* (2007) argue that M&A are among the largest and most readily observable forms of corporate investment thereby making acquisitions ideal for testing the role and effectiveness of corporate governance systems on M&A outcomes.

Typical issues considered in corporate governance of a firm are its ownership structure and board effectiveness. Board effectiveness variables considered in various studies include board size, board independence, and CEO duality (Dwivedi and Jain, 2005). Thus, as many merger hypotheses are either unrelated to or likely to be insufficiently tested by only a set of corporate governance factors, we unify and re-examine many of the prior results in the literature using proxies based on other characteristics of merging firms and the nature of the underlying deals. In this way, we aim to discover which group of variables can better explain the changes in post-merger performance of the merger firms and, at the same time, provide evidence about the relationship between corporate governance and M&A performance. Since the work in this regard has been made mainly in the context of developed countries (Liu and Wang, 2013).

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<sup>1</sup> The present work follows the International Monetary Fund country classification. See Appendix A.

The current analysis is based on a sample of 223 European takeovers completed between 2008 and 2014. Our results can be summarized as follows.

We find a deterioration of post-M&A performance of the combined firms as measured by the return on assets. When we split the sample by country development stage, we concluded for a significantly positive pre-M&A performance of emergent and developing acquirers, which worsened following acquisition. For advanced markets acquirers, results show a significant reduction on post-merger adjusted returns on assets, while no significant change was observed with respect to firms' cost efficiency after takeover.

Moreover, we find that post-merger operating performance changes are strongly determined by some factors. Post-merger profitability of emergent and developing market acquirers is enhanced by cash-only as a method of payment for acquisition. Also, merged firms' post-M&A cost efficiency is adversely affected when mix is the method of payment, when the acquirer chooses a target from a different country, when the size of the firm being acquired increases relative to the acquiring firm; and when the acquirer has high levels of pre-M&A leverage. In turn, emergent and developing acquirers that have high pre-M&A cash reserves and that prefer to acquire targets from the same industry experience improvements on firms' post-merger cost efficiency. For advanced market acquirers, the positive effect of industry-related transactions on firms' post-merger efficiency will be higher than in emergent and developing markets, where it is significantly positive. Furthermore, we find that operating performance outcomes are worse when the emergent and developing acquiring firm has a large equity holder. While governance variables such as a large board, high proportion of outside independent directors on acquirers' board composition, and Chairman-CEO duality are expected to enhance operating performance after takeover. Regarding advanced markets, our results show a negative effect driven by acquirers' board being composed by a large proportion of outside independent directors. Lastly, the impact on post-takeover operating performance of the method of payment, the relative size of the target, acquirers' pre-M&A cash reserves, and pre-M&A acquirers' board holdings, do not differ between advanced and emergent and developing markets. For the remaining factors the effect on post-merger operating performance do differ between acquirers' country development stage.

The rest of this work is organized as follows. Section 2 reviews previous research on the topics. Section 3 describes the methodology. Section 4 shows the sample characteristics. Section 5 and 6 comprises the results and discussions. Finally, Section 7 presents the conclusions of the dissertation.

## 2. Literature review and hypothesis development

The efficient markets hypothesis assumes that, at the time the M&A is completed, all future synergies must be already fully anticipated and incorporated into the acquiring firm's stock price (Lubatkin, 1983). Therefore, research stream based on share-price analysis or event study methodology has used market-based measures to capture synergistic gains in terms of value creation (Kumar, 2009). However, the continued presence as well as the length of time over which the negative post-outcome returns are observed, contradicts the notion of an efficient securities market (Ruback, 1988). Particularly, the event study methodology considers the value of the decision to acquire, but not the value of the acquisition's implementation (Haleblian *et al.*, 2009).

Results yielded by event studies methodologies are considered biased, since changes in market valuations, at the announcement period, could reflect the benefits of a merger, but also other factors, such as capital market inefficiencies like an overvalued security (Barber and Lyon, 1996; Kothari and Warner, 1997). Hence, the rise in the share price of the target firm reflects not efficiency gains from the merger but merely a market correction (Scherer, 1988).

Likewise, environment in emerging markets is normally characterised by weaker disclosure requirements, persistence of earnings management (Leuz *et al.*, 2003) and there is poor information intermediation. Thus, investors are not able of distinguish the equity stocks of well performing firms from the bad ones (Morck *et al.*, 2000). Consequently, the use of event studies in these markets is even more controversial, since they lack efficiency and are likely to have fully incorporated the price changes before the announcement date (Narayan and Thenmozhi, 2014).

Thus, a need for a different perspective emerge: that of company fundamentals. This group of studies usually assesses changes in company performance in terms of key indicators. The use of financial accounting data has several advantages (see Thanos and Papadakis 2012a, b). For example, accounts information is objective because they report actual performance and is available to the public, including for unlisted companies. For a comprehensive review see for instance Haleblian *et al.* (2009) and Thanos and Papadakis (2012a, b). Healy *et al.* (1992) posits that returns around the takeover announcement represent investor's expectation of acquisition benefits whereas post-acquisition cash flow operating performance measures the actual benefits, if any, generated by acquisitions. If synergies truly exist, economic gains from mergers should thus show up in the combined firm's fundamentals.

## 2.1. M&A and accounting-based measures

Empirical evidence about the use of accounting-based measures to evaluate whether mergers are wealth-enhancing or value-destroying yield inconsistent results. A summary of findings from previous empirical studies and their relevant features is displayed in Appendix B.

The most notable and commonly cited study about this topic is by Healy *et al.* (1992). Healy *et al.* (1992) investigated the 50 largest US acquisitions during the period of 1979 and mid-1984. Using industry median as a benchmark, the improvements in post-merger cash flow performance was analysed as the intercept of the regression of post-acquisition industry-adjusted cash flow of the combined firm. The results showed post-merger improvements in asset productivity, which lead to increases in post-merger operating cash flow returns in comparison with merged firms equals. However, their study has been criticized by analysing only very large mergers, during the time period generally referred to as "merger mania" (Switzer, 1996).

Ghosh (2001) replicated the methodology used by Healy *et al.* (1992), although he criticised the industry-median benchmark choose by the latter to measure improvements in operating performance of acquiring firms in contrast with their industry counterparts<sup>1</sup>. For a sample of 315 US mergers completed during the period of 1981-95, Ghosh (2001) found that merging firms' post-acquisition operating cash flow performance does improve by 2.4% per annum when Healy *et al.* (1992) research design is follow. However, once control firms matched on pre-acquisition performance and size from pre-event years is used, as suggested by Barber and Lyon (1996), any statistically significant evidence of improvements in the operating performance of merging firms following acquisitions was found.

As time goes by, and with the help of more sophisticated techniques to measure changes in the post-M&A performance evidence, for the US market, tends to support the conclusions of a significantly enhancement in profitability after the deal (Linn and Switzer, 2001; Heron and Lie, 2002), or at least the hypothesis of no change in operating performance

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<sup>1</sup> As regression-based results tend to be biased, since they do not account for acquirer firms' size and pre-performance. The use of industry-median firms can lead to non-random measurement errors, which in turn will be absorbed in the intercept of the regression and will bias upward conclusions about merging firms' post-acquisition performance (Powell and Stark, 2005). The errors are considered non-random since acquirer firms are normally of higher size than their industry counterparts and tend to undertake acquisitions during periods of superior performance (See, for example: Franks and Harris, 1989; Morck *et al.*, 1990; Penman, 1991; and Martynova *et al.*, 2007).

(Ghosh, 2001; Schlingemann and Moeller, 2004). Refusing the early evidence of a deterioration in profitability following a merger (Franks *et al.*, 1988; Ravenscraft and Scherer, 1989; Clark and Ofek, 1994)<sup>2</sup>.

For UK evidence about changes in post-merger operating performance is narrower and even more contradictory than for the US. Dickerson *et al.*, (1997) found an annual decrease of 1.86% in profitability, concluding that there is a detrimental long-term effect of acquisition on profitability, whereas Powell and Stark (2005) confirmed a significant enhancement. Powell and Stark (2005) followed Healy *et al.* (1992) and Ghosh (2001) methodologies for the period 1985-93. For the first matching procedure, statistically significant larger improvements in operating performance, ranging from 0.80% to 3.1%, were found. While for the second methodology, the median increase in post-takeover performance for acquiring firms ranges from 0.13% to 1.78% per annum, both statistically significant. Either result depends, however, on the definition of operating performance employed and deflator chosen. This difference in estimates of improvements was also found by Ghosh (2001) and Linn and Switzer (2001) for the US.

Most of the empirical evidence is from US and UK, which lead to the “overwhelming geographical bias”. Therefore, to overcome that, authors started to apply more geographically diverse samples to see whether the results of previous research are ‘culture free’ or ‘culture specific’ (Papadakis and Thanos, 2010).

Martynova *et al.* (2007) concluded that for European firms’ empirical evidence regarding this issue is practically non-existent. They studied 155 M&A of which both the acquiring and target companies are from Continental Europe or the UK from the time period 1997-2001. Their study followed Healy *et al.* (1992) and Ghosh (2001) models as methodology. In the pre-merger period merger firms significantly outperform the median peers in their industry. However, following the takeover, and once performance is control for industry, size and pre-event performance, no significant change, between pre-and post-merger profitability of the combined firm was found. Similar results that operating performance remains statistically

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<sup>2</sup> For the years 1957-77 Ravenscraft and Scherer (1989) examined 2,732 lines of business operated by U.S. manufacturing corporations to analyse differences in profitability between pre-and post-merger financial performance of target firms. They find that in 47% of cases acquired firms were sold off by the acquirer following a large decline in profitability after their initial acquisition. For the remaining cases where the acquired companies were not sold off, a significant decline in performance was detected post-acquisition.

Clark and Ofek (1994) collected a sample of 38 takeovers of distressed firms occurring between 1981-88 in the U.S. and were attempts to restructure distressed targets. Conclusions indicated bidders had negative post-merger performance, consequently, mergers were not successful.

unchanged after the acquisition were also found for Greece by Pazarskis *et al.* (2006), Australia (Sharma and Ho, 2002), and Canada (Dutta and Jog, 2009).

Giudici and Bonaventura (2017) observed the operating performance of a sample of 245 European IPO firms, listed in the period 1998–2008, conducting at least one acquisition in the 2 years after going public. Their results showed that acquiring IPO firms do not generally perform differently from their non-acquiring counterparts. However, they exhibit a significant drop in operating performance that is common to most IPO firms.

Empirical evidence about long-term impacts of M&A is based predominantly on studies from the developed markets. Although in recent years, researchers have begun to focus their interest in emerging markets, literature is still scarce. In line with developed-market studies, this literature does not yield a standardised answer (Bertrand and Betschinger, 2012).

From 2000-08, Bertrand and Betschinger (2012) investigated the long-term impact on operating performance of domestic and cross-border acquisitions initiated by Russian firms. Their main contribution consisted in the analyse of serial acquisitions and distinguishing their effects when compared to single acquirers. For a sample of more than 600 acquirers, their conclusions showed that both domestic and international deals are performance-reducing, i.e., acquirers performance decrease when compared to non-acquiring firms.

Rao-Nicholson *et al.* (2016) examined the post-M&A operating performance of 57 M&A in ASEAN countries between 2001-2012. They followed the same test techniques as Healy *et al.* (1992) and Ghosh (2001). They reached the conclusion of a detrimental impact on both raw performance and adjusted performance of merging firms.

Thus, considering the mixed results we theorize:

**H1.** *There is no significant change in the operating performance of the acquirer companies following M&A deals.*

## **2.2. Factors affecting post-M&A operating performance**

### **2.2.1. Bid and firm characteristics and their impact on post-M&A operating performance**

Du and Boateng (2012) found that the most commonly studied determinants of post-M&A performance are firm- and industry-level characteristics. Empirical evidence has mostly orbit around the following ones:

### a. **Method of payment: cash versus stock**

A wide range of empirical evidence has tested whether method of payment affects post-acquisition performance. Some authors defended that cash-financing deals originated a higher profitability improvement than transactions financed with equity or a mixture of securities (Linn and Switzer, 2001; Ghosh, 2001; Moeller *et al.*, 2004; Rao-Nicholson *et al.*, 2016)<sup>3</sup>. Franks *et al.* (1988) theorise that the better performance of cash-based acquisitions may be owing to the existence of asymmetries in information, where equity-financing acquisitions may occur during periods in which acquirer shares are, at best, not undervalued or targets' equity is perceived to be overvalued. Likewise, if targets' future excess returns are anticipated, buyers will set a large cash offer to end up with competition and accomplish the deal without any costly delay (Berkovitch and Narayanan, 1990). Alternatively, cash payment is frequently funded by debt (Ghosh and Jain, 2000; Martynova and Renneboog, 2009), which increases managerial discipline owing to increased scrutiny by the lenders and the pressure to meet the debt repayment obligations (Narayan and Thenmozhi, 2014). Also, restricts the availability of corporate funds at the managers' disposal and hence minimizes the scope for free cash flow problems (Jensen and Meckling, 1976).

**H2.** *Cash-financed M&A are likely to generate higher post-M&A performance.*

### b. **Domestic versus cross-border deals**

Globalization has led to exponential growth of cross-border M&A activity as barriers to entry into international markets are reduced (Mateev and Andonov, 2016). Companies expand abroad to take advantage of new resources and customers (Shimizu *et al.*, 2004), to internalize the R&D capabilities of target companies (Eun *et al.*, 1996), and to expanding their businesses into new markets (as a response to globalization trends). Also, Cross-border acquisitions make firms less vulnerable to international dynamics (Wang and Boateng, 2007). Companies can, for example, benefit from different tax systems or exploit favourable exchange rate movements by acquiring foreign firms (Kang, 1993). Thus, cross-border acquisitions are expected to increase the likelihood of synergy realization and improve profitability as observed by Wang and Boateng (2007). The literature is however conflicting. Cross-cul-

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<sup>3</sup> Whereas no significant change in post-M&A performance were found between transactions that employ different modes of payment (Healy *et al.*, 1992; Heron and Lie, 2002; Powell and Stark, 2005; and Martynova *et al.*, 2007).

tural sensitivity and communication in cross-border M&A is important to facilitate the integration process (Gomes *et al.*, 2013). The expected synergistic value may not be accomplished due to regulatory and cultural differences between the bidder and target countries which may lead to complications in managing the post-merger process and even deteriorate the performance of acquiring firms (Moeller and Schlingemann, 2004; Gomes *et al.*, 2013). Moeller and Schlingemann (2004), Goergen and Renneboog (2004), Martynova and Renneboog (2006) show that firms acquiring foreign targets experience significantly lower takeover announcement returns than their counterparts acquiring domestic targets.

**H3.** *Cross-border deals may negatively affect operating performance of firms engaged in M&A as compared to domestic deals.*

### c. Relative size of target

It is expected a proportional relationship between the size of the target and its contribution to the overall performance of the combined firm (Linn and Switzer, 2001). Thus, deals of relatively large targets enable bidders to quickly take advantage of valuable assets such as strong market position, well-recognized brand, and established distribution network, therefore leading to stronger profitability improvement compared to smaller targets (Healy *et al.*, 1992; Martynova *et al.*, 2007). However, Martynova *et al.* 2007<sup>4</sup> showed that managing a very large firm may be more difficult, due to acquiring managers' difficulties in integrating the target firm, and hence lead to a worsening of performance. Most of empirical evidence reports no significant relation between the relative target size and post-merger performance (Healy *et al.*, 1992; Heron and Lie, 2002; Sharma and Ho, 2002; Moeller *et al.*, 2004; Powell and Stark, 2005; Rao-Nicholson *et al.*, 2016)<sup>5</sup>.

**H4.** *The relative size of the target is likely to have no impact on post-M&A operating performance.*

### d. Pre-acquisition leverage and cash holdings of the acquirer

Acquirers with excessive free cash holdings are more likely to make value-destroying investments (Jensen, 1986), which in turn could increase the agency costs of firms and cause post-merger underperformance relative to those implemented by firms with limited cash

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<sup>4</sup> Martynova *et al.* (2007) discovered that the increase in post-merger profitability derive by the size effect is non-linear, since the medium-size M&A were found to be the most profitable, and only the smallest ones tend to have a significant negative impact on the operating performance of the combined firms.

<sup>5</sup> The size effect was either considered harmful (Clark and Ofek, 1994; Ramaswamy and Waagelein, 2003), or positive (Switzer, 1996; Linn and Switzer, 2001) for post-acquisition operating performance.

holdings (Rao-Nicholson *et al.*, 2016). Martynova *et al.* (2007) found cash-poor acquirers experience an increase in the post-acquisition profitability by 1.57%, whereas acquirers with the highest level of cash reserves experience a 2.46% decline. Therefore, acquisitions by cash-rich companies lead to significant deteriorations in the operating performance of the combined firm (Moeller *et al.*, 2004).

Normally, highly leveraged acquirers have their activities monitored by banks. Hence M&A which lead to losses of profitability will be prevented ex-ante (Ghosh and Jain, 2000). Although, empirical evidence on this relationship supports no relation between acquirer's leverage and post-merger operating performance (Clark and Ofek, 1994; Switzer, 1996; Linn and Switzer, 2001).

**H5.** *M&A by cash-rich firms are likely to negatively impact their operating performance. Leverage may have no impact.*

#### e. **Industry relatedness**

Bidders may acquire targets in related industry or engage in diversifying acquisitions. On the one hand, diversifying mergers are more likely to generate agency problems between managers and shareholders (Shleifer and Vishny, 1989), bargaining problems within the firm (Rajan *et al.*, 2000) or rent-seeking behavior by divisional managers (Scharfstein and Stein, 2000), which may offset the forecasted synergies and result in a detrimental impact on post-M&A performance. On the other hand, industry familiarity significantly diminishes the need for acquiring firm managers to 'learn' the business of the acquired firm, which facilitate the targets' integration process (Hitt *et al.*, 2001). Evidence regarding this issue is mixed. Powell and Stark (2005), Linn and Switzer (2001), Switzer, (1996), Sharma and Ho (2002) and Martynova *et al.* (2007) found that industry commonality has no impact on post-acquisition performance. Other authors defend that diversifying acquisitions significantly outperform their industry-related peers (Ghosh, 2001), and some empirical evidence defend a negative effect in performance as a result of diversifying acquisitions (Healy *et al.*, 1992; Heron and Lie, 2002).

**H6.** *Same-industry M&A are likely to positively impact post-M&A performance.*

#### 2.2.2. **Acquirers' corporate governance differences and their impact on post-M&A operating performance**

From the agency theory perspective, the objective of corporate governance is to ensure that managers resort to value maximizing strategies (Shleifer and Vishny, 1997). In spite

of the intensity of focus on the association between corporate governance and managerial decisions, relatively few studies have examined the role and effectiveness of corporate governance mechanisms on M&A performance. Since M&A are among the most observable forms of corporate investment, they are ideal for testing how corporate governance profiles of acquiring firms directly influence operating performance outcomes of merger decisions (Thenmozhi and Narayanan, 2016). Typical issues considered in corporate governance of a firm are its ownership structure and board effectiveness. Board effectiveness variable considered in various studies include board size, board independence, and CEO duality.

The clear majority of research examines the relationship between acquisition performance and ownership structures through market based event study (Andrade *et al.*, 2001). However, since the work of Healy *et al.* (1992) that financial researchers adopted a long-term perspective. In this sense, Wu and Chen (2007) studied the effects of corporate governance on the performance of Taiwanese acquiring firms from 1992 to 2002, and their results showed that insider ownership has no significant influence on long-term financial performance. By contrast, Boateng *et al.* (2017) found that corporate governance characteristics of acquiring firms (board ownership, board size, and block-holder control) have an economically and statistically significant impact on operating performance changes following mergers.

#### f. **Ownership concentration**

On the one hand, blockholders show more willingness to play an active role in corporate decisions because they partially internalize the benefits of their efficient monitoring effort over management (Grossman and Hart, 1986). Consequently, performance will improve, since they help in disciplining the erring managers, and help to alleviate free-rider problem in takeovers (Shleifer and Vishny, 1986). As large shareholders tend to have voting control, their pressure is important for resolving agency problems and increasing firm value, as costs associated with agency problems are reduced (Boateng *et al.*, 2017). On the other hand, without effective monitoring, controlling shareholders are likely to expropriate minority shareholders and make sub-optimal decisions, and even more so, when control rights exceed the cash flow rights (La Porta *et al.*, 1999). Concentrated ownership may also exercise control rights to create private benefits for themselves, which in turn creates agency problems and may have implications for a firm's long-term performance (Switzer, 1996; Young *et al.*, 2008). However, European studies by Holmen and Knopf (2004) and Faccio and Stolín (2006) find

no significant evidence to prove wealth transfer from minority shareholders to controlling shareholders through takeovers.

In the context of emerging countries, the state is often the dominant owner who exercise ultimate control (Young *et al.*, 2008). The state is recognised for having different goals, such as increase employment to reduce social instability, rather than profitability (Xu and Wang, 1999). The presence of single large shareholders is particularly relevant to countries with lower levels of legal investor protection (Shleifer and Vishny, 1997), which is the case of emerging countries. Thus a higher ownership concentration may substitute for the absence of strong external governance (Dharwadkar *et al.*, 2000). Empirical evidence in emerging countries have support the positive relationship between concentrated ownership and firm performance (Xu and Wang, 1999 in China; Ramaswamy *et al.*, 2002 in India and Russia by Buck *et al.*, 1999).

**H7.** *Ownership concentration is likely to positively influence post-M&A performance.*

#### **g. Board of directors**

It is argued that the effectiveness of a board increases with its size, at least up to a point (Jensen, 1986). Boards large at excess are difficult to coordinate, and are slower at adapt to change (Amar *et al.*, 2011). Consistent with this view, Judge and Zeithaml (1992) found board size related negatively to its involvement in the strategic decisions of the firm. Since larger boards may increase the risk of making out of the time decisions, and consequently negatively impact firm value (Eisenberg *et al.*, 1998). However, Dwivedi and Jain (2005) and Jackling and Johl (2009) defended large board sizes, since they give the firm a competitive edge in different fronts ranging from more expertise, experience, resource corporate strategy and provision of broad services.

**H8.** *Large board sizes may positively influence post-M&A operating performance.*

#### **a. Board independence**

Agency theory suggests that CEOs, if not monitored, may engage in actions which are detrimental to shareholder wealth maximization (Jensen and Meckling, 1976). As insiders are more subject to CEO influence (Fama and Jensen, 1983), it is important to have a board composed by a greater proportion of outside independent directors. Such composition ensures a more effective way in monitoring and controlling managerial actions (Byrd and Hickman, 1992) on behalf of shareholders. The independent directors will be responsible for

influencing and monitoring the proposed acquisition and resolving the conflicts of interests among decision makers and shareholders (Boateng *et al.*, 2017). They will do so, since competition in the labour market for independent board members encourages them to build and maintain a professional expert image, in which the interests of the shareholders they represent are promoted (Fama and Jensen, 1983). Choi *et al.* (2007) document a positive correlation between the proportion of independent directors and a firm financial performance. On the other hand, Duchin *et al.* (2010) point out that independent directors have inferior information about the company which limits their effectiveness.

**H9.** *The proportion of independent directors is likely to positively impact post-M&A operating performance.*

#### h. CEO duality

Chairman-CEO duality is defined in respect of one person heading both the Management and the Board (Liu and Wang, 2013). Agency theory (Jensen and Meckling, 1976) predicts adverse outcomes for the firm in the presence of CEO duality. Duality is a signal of the absence of separation between management decisions and control decisions (Fama and Jensen, 1983), leading to a restriction in the board's independence and monitoring effectiveness (Mallette and Fowler, 1992). On the other hand, and considering the perspective of organization theory (Boyd, 1996), when the same person concurrently holds the CEO and chairman of the board positions, it is expected an enhanced capability for quick decision making, which is important in M&A decisions to avoid delays with a potential of destroying firm value (Boateng *et al.*, 2017). Also, it allows precise leadership for purposes of strategy formulation and implementation which should result in better organisational performance (Anderson and Anthony, 1986). Empirical evidence range from positive (Coles *et al.*, 2001) to negative and mix findings (Heracleous, 2001; Adams *et al.*, 2005) about CEO duality.

**H10.** *CEO duality is likely to be positively related to operating performance.*

Considering the contradictories results presented in previous literature regarding post-M&A operating performance change in profitability and the effect of the several determinants chosen by scholars to explain such change, it is appropriate to investigate it with newly available data, and proper and standardized methodology to reach statistical significant conclusions. In this way we may help to build a consistent pattern in conclusions concerning post-merger operating performance of European companies.

### 3. Data and methodology

#### 3.1. Sample selection

The present study focuses only on intra-European domestic and cross-border M&A activity over the period 2008–2014. The data set is obtained from Zephyr database of Bureau van Dijk. Our sample meets the following criteria: (1) acquiring firms are public companies; (2) the financial and utility sectors are excluded due to different financial reporting methods; (3) deals in which the acquirer is the management or the employees were left out; (4) we also eliminate transactions from multiple bidders, who are involved in more than one deal over the sample period; (5) deals must be announced and completed; (6) the percentage of acquired stake should be between 50% and 100%, with the percentage of final stake minimum 100%; (7) we focus only on transactions classified as mergers or acquisitions of majority interest, excluding all the cases defined as an acquisition of assets, an acquisition of certain assets, a buyback, or a recapitalization; (8) only transactions greater than 100,000 euros are included; (9) and lastly, bidders need to have financial and accounting data available for at least one year before and three after the takeover, while targets are required to have financial and accounting data available for at least one year before acquisition. This procedure is consistent with empirical research in this area as operating performance, induced from corporate takeovers, might not materialize for several years (Healy *et al.*, 1992). The above restrictions led to the final sample of 223 deals.

Accounting data is collected from Bureau van Dijk's Amadeus Database for the years 2007-2017<sup>1</sup>.

#### 3.2. Sample description

Table 1 reports the annual numbers and values (in million euros) of transactions by year of deal conclusion. Our sample comprises 223 acquisitions with a total market value of 62,081 million euros. We see that the largest number of deals (25%) is concentrated in the year of 2008, during which Europe felt a financial crisis. This evidence is consistent with the findings of Chen and Miller (2007). Firms may experience performance gaps owing to an underperformance relative to aspirations, originated by a decline in performance and potential losses associated with the financial crisis, and to close these gaps, firms with greater levels

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<sup>1</sup> In our analysis, we focus on the year of the transaction's completion, rather than the year of the announcement of the bid. When a completion date is not available, we considered the announcement year.

of organizational slack may look to an acquisition as a set of resources.

**Table 1: Sample description: distribution across completion years**

This table describes the 2008-2014 sample of European mergers and acquisitions obtained from the Amadeus/Zephyr database. Information regarding total deal value and completion year of takeover is obtained from the Zephyr database. Source of table: Authors calculations.

Number and value of transactions			
Completion year	Number of deals	Percentage (%)	Total value (million €)
2008	55	24.7	15,833
2009	27	12.1	11,750
2010	31	13.9	630
2011	33	14.8	5,158
2012	27	12.1	11,200
2013	31	13.9	13,067
2014	19	8.5	4,443
Total	223	100	62,081

Table 2 shows the M&A distribution by the primary NAICS 2017 code. The largest proportion of deals is in the manufacturing sector, considering both number (77) and value (48,773 million euros). Following by Professional, Scientific, and Technical Service in terms of number of deals (35), and by Transportation and Warehousing in terms of value (3,003 million euros). The rest of the transactions are distributed across several other industries.

**Table 2: Sample description: distribution by industry**

Information regarding total deal value and acquirers' industry is obtained from the Zephyr database. Source of table: Authors calculations

Sample by industry by NAICS 2017 primary code 2008-2014			
	Number of deals	Percentage (%)	Total value (million €)
11: Agriculture, Forestry, Fishing and Hunting	1	0.4	12
21: Mining, Quarrying, and Oil and Gas Extraction	19	8.5	803
23: Construction	12	5.4	1,275
31-33: Manufacturing	77	34.5	48,773
42: Wholesale Trade	8	3.6	78
44-45: Retail Trade	12	5.4	2,542
48-49: Transportation and Warehousing	10	4.5	3,003
51: Information	23	10.3	1,611
53: Real Estate and Rental and Leasing	7	3.1	1,832
54: Professional, Scientific, and Technical Service	35	15.7	774
56: Administrative and Support and Waste Management and Remediation Services	10	4.5	106
61: Educational Services	1	0.4	1
62: Health Care and Social Assistance	1	0.4	1,102
71: Arts, Entertainment, and Recreation	2	0.9	27
72: Accommodation and Food Services	4	1.8	133
81: Other Services (except Public Administration)	1	0.4	8

Table 3 shows the sample distribution by acquirer nation. The data confirm that the main engine of the takeover activity in Europe is situated in the UK (31%), being Sweden the second largest market for corporate control in Europe (13%). In terms of value the biggest players are Ireland (20, 253 million euros) and Netherlands (13, 608 million euros). Regarding emerging and developing Europe, Poland is by far the largest takeover market in both, number of transactions (18) and value (356 million euros).

**Table 3: Sample description: distribution by acquirer nation**

Information regarding total deal value and acquirers' country location is obtained from the Zephyr database. Source of table: Authors calculations

<b>Sample by acquirer nation</b>			
	Number of deals	Percentage (%)	Total value (million €)
<b>Advanced Europe</b>			
Belgium	9	4.0	3, 568
Cyprus	2	0.9	17
Denmark	3	1.3	24
Estonia	1	0.4	10
Finland	10	4.5	1, 166
France	14	6.3	9, 485
Germany	10	4.5	2, 450
Greece	2	0.9	14
Iceland	1	0.4	41
Ireland	5	2.2	20, 253
Italy	9	4.0	216
Netherlands	5	2.2	13, 608
Norway	7	3.1	321
Portugal	1	0.4	20
Slovakia	1	0.4	27
Spain	12	5.4	3, 393
Sweden	28	12.6	553
Switzerland	7	3.1	170
United Kingdom	70	31.4	6, 312
Sub-total	197	88.3	61, 648
<b>Emerging and Developing Europe</b>			
Bulgaria	2	0.9	10
Croatia	2	0.9	35
Latvia	1	0.4	13
Lithuania	1	0.4	12
Poland	18	8.1	356
Russian Federation	1	0.4	7
Serbia	1	0.4	0.483
Sub-total	26	11.7	433
Total	223	100	62, 081

### 3.3. Performance benchmark

By measuring the changes in operating performance without using a benchmark the results may be biased. Thus, we need to compare the pre- and post-acquisition performance

as if the takeover has not taken place, and measure only the abnormal change in operating performance.

Healy *et al.* (1992) were the first to suggest an adjustment for industry trend. Following by Barber and Lyon (1996) who suggest adding a third adjustment, a pre-acquisition performance measure. Martynova *et al.* (2007) adjust both for industry (SIC-code) alone and industry, size (total assets) and pre-acquisition performance (EBITDA over total assets) and show that in most cases the results are not significantly different.

Based on the above and additional literature, we decided to adjust for industry, size, and pre-performance-based matching (see also e.g. Ghosh, 2001, and Powell and Stark, 2005). For every acquisition, we require a benchmark for acquirer and other for target firms. Our benchmarks were constructed following Yen and André (2007) and Yen *et al.* (2013) and meet the presented criteria:

1. Same 2-digit primary NAICS 2017 code<sup>2</sup>.
2. Similar size measured as book value of total assets within 70% and 130% 1 year before takeover.
3. Similar pre-performance measured as EBIT-to-Assets ratio within 90% and 110% 1 year before takeover.
4. Same nation code as the bidder and the target.

To do so, we used the Amadeus database. If there is no match, the pre-performance restriction is extended by choosing a matching firm with EBIT-to-Assets between 50% and 150%. If still no firm meets the criteria, book value of assets is also extended within 25% and 200% (Ghosh, 2001). After the second run, we obtain 96.0% matching for acquiring firms and 96.4% for target firms. For the few cases without a match at this point, the same country rule is replaced by a same legal origin country rule. Caution is taken to select peer companies that were not engaged in M&A activity over the period studied.

### 3.4. Performance measures

Following Martynova *et al.* (2007), Yen and André (2007), Papadakis and Thanos (2010), Rao-Nicholson *et al.* (2016), and Giudici and Bonaventura (2017) the combined return on assets (ROA), measuring the firms' profitability, and the combined sales margin (ROS), providing a picture of the firms' effectiveness (Thanos and Papadakis, 2012a), have

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<sup>2</sup> Yen and André (2007) and Yen *et al.* (2013) used 2-digit SIC. We choose the NAICS code following Wan & Yiu (2009).

been selected to measure acquisition performance.

Most studies on post-acquisition operating performance use EBITDA, pre-tax operating cash flow, as measure of operating performance (see e.g. Healy *et al.*, 1992; Ghosh, 2001; Heron and Lie, 2002). Researchers agree that, since it is the sum of operating income, depreciation, interest expense and taxes, such a performance measure is unaffected by differences in financial structure and applied accounting method in computing depreciation, interest, and taxes, making it a pure operating performance measure.

Even more common than the use of raw operating cash flow measure is to deflate it before and after the transaction's completion, in order to make financial ratios comparable between companies and over time (Rao-Nicholson *et al.*, 2016). The book value of assets and sales are the deflators most commonly used<sup>3</sup>.

We utilize these same performance measures. However, given the limited availability of acquirer depreciation and amortization data, and thus EBITDA figures, we are forced to substitute EBIT (earnings before interest and tax), the next best measure for EBITDA. Likewise, due to lack of data, sales were replaced by operating sales (turnover), which we consider an appropriated proxy. Barber and Lyon (1996) argue that, since both numerator and denominator of the return metric come from the income statement, they are appropriately matched.

We calculate two measures of operating performance for each firm(i) in each year(t):

$$\text{Return on assets, } ROA_{i,t} = \frac{EBIT_{i,t}}{\text{BOOK VALUE OF ASSETS}_{i,t}} \quad (1)$$

$$\text{Return on sales, } ROS_{i,t} = \frac{EBIT_{i,t}}{\text{TURNOVER}_{i,t}} \quad (2)$$

The next steps explain how we compute the aggregate data for merged firms and control firms, respectively. Even though the illustrations are for return on assets measure, the same procedures have been applied for return on sales variable. BASE indicates one of the two, book value of assets (for ROA) or turnover (for ROS), scaling measures.

Following test techniques designed by Martynova *et al.* (2007), we start by computing

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<sup>3</sup> The market value of total assets is a commonly used deflator (Healey *et al.*, 1992). However, will not be considered in the present study, since market values are a forward-looking measure and, intrinsically, reflect not only the assets in place but also all assets the firm is expected to acquire (Barber and Lyon, 1996). This method of adjustment is problematic as it relies on the assumption of efficient markets to properly assess the gains arising from the takeover (Powell and Stark, 2005). Empirical evidence in the UK and elsewhere suggests a systematic decline in market values for acquiring firms' post-takeover (e.g., Gregory, 1997). Another reason why we did not scale by market value is that the European accounting regulation (IAS) only allows the purchase method of accounting in corporate acquisitions. Finally, in order to be able to use market values we require both acquirer and target to be listed - a requirement that reduces extremely our sample.

the unadjusted pre-acquisition operating performance of the combined firm. Which is simply summing the acquirer's (A) and target's (T) EBIT measures and scaling this by the sum of their book values of total assets or turnover:

$$ROA_{\text{combined firm, } t} = \frac{EBIT_{A,t} + EBIT_{T,t}}{BASE_{A,t} + BASE_{T,t}} \quad (3)$$

Secondly, we compute the peer pre-acquisition operating performance of the combined firm, as the weighted average of the acquirer's and target's peer companies' profitability's, where acquirer's and target's relative book value of assets (or turnover) are the weights:

$$ROA_{\text{combined firm peer, } t} = \frac{BASE_{A,t}}{BASE_{A,t} + BASE_{T,t}} \times \frac{EBIT_{\text{peer } A,t}}{BASE_{\text{peer } A,t}} + \frac{BASE_{T,t}}{BASE_{A,t} + BASE_{T,t}} \times \frac{EBIT_{\text{peer } T,t}}{BASE_{\text{peer } T,t}} \quad (4)$$

Thirdly, we compute the post-acquisition operating performance of the combined firm, which is simply the realized EBIT measure of the consolidated firm scaled by the consolidated book value of total assets or turnover figure:

$$ROA_{\text{combined firm, } t} = \frac{EBIT_{A,t}}{BASE_{A,t}} \quad (5)$$

Fourthly, we compute the peer post-acquisition operating performance of the combined firm in the same way we computed the peer pre-acquisition operating performance of the combined firm (Eq. 4), only this time the weights are not the current book values of total assets or the current turnover figures of the acquirer and target, but the values one year prior to the acquisition:

$$ROA_{\text{combined firm peer, } t} = \frac{BASE_{A,t-1}}{BASE_{A,t-1} + BASE_{T,t-1}} \times \frac{EBIT_{\text{peer } A,t}}{BASE_{\text{peer } A,t}} + \frac{BASE_{T,t-1}}{BASE_{A,t-1} + BASE_{T,t-1}} \times \frac{EBIT_{\text{peer } T,t}}{BASE_{\text{peer } T,t}} \quad (6)$$

Finally, the combined firm's operating performance adjusted for industry, size, and pre-performance can be calculated as the difference between the combined firm's performance and the combined peer's performance<sup>4</sup>:

$$ROA_{\text{ind, size, perf-adjusted, } t} = ROA_{\text{merged firm, } t} - ROA_{\text{peer ind, size, perf-adjusted, } t} \quad (7)$$

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<sup>4</sup> Equations 3, 4, 5, 6, and 7 were also repeated for return on sales measure.

### 3.5. Empirical method's

To assess the change in operating performance caused by the takeover, we employ the change model of Ghosh (2001). As robustness check, we examine whether the intercept model of Healy *et al.* (1992) yields different conclusions than the change model. We confine analysis of pre- and post-acquisition periods over three years<sup>5</sup>, following Magenheim and Mueller (1988), Franks *et al.* (1991), Rau and Vermaelen (1998) and Ghosh (2001).

Healy *et al.* (1992) employed a regression-based approach to estimating any improvements in performance post-takeover. The model consists in an OLS regression ( $i=1, \dots, n$ ) where  $n$  is sample size:

$$\text{Median ROA}_{i \text{ adj}}^{\text{post-M\&A}} = \alpha + \beta \cdot \text{Median ROA}_{i \text{ adj}}^{\text{pre-M\&A}} + \epsilon_i \quad (8)$$

In regression Eq. (8)  $\text{Median ROA}_{i \text{ adj}}^{\text{post-M\&A}}$  is computed as the median return on assets of each merged firm in the years  $[t=+1, \dots, +3]$  following the takeover date less the median return on assets of each control firm in the same years.  $\text{Median ROA}_{i \text{ adj}}^{\text{pre-M\&A}}$  is the return on assets of each merged firm in the years  $[t=-3, \dots, -1]$  less the return on assets of each control company at the same time. The regression coefficients can be interpreted as follows:  $\beta$  is the coefficient and reflects the relation between pre- and post-acquisition performance, while the intercept  $\alpha$  is an estimate of the mean amount of post-takeover performance left unexplained and must be, by definition, attributable to the takeover. Thus, if the value of  $\alpha$  is significantly different from zero, there is evidence of a significant difference in the performance after the takeover, which is not explained by persistence in cash flows (Powell and Stark, 2005). A T-test is applied to test for significance of the intercept and the coefficient.

Ghosh (2001) defended a change model, because the intercept model is more likely to produce biased estimates since the presence of outliers often characterizes accounting figures. Thus, we compute Median change as the difference in industry, size, and pre-performance adjusted return on assets/sales  $i$  between the post-and pre-acquisition periods where  $i$  denotes the  $i$ th acquisition. Instead of arbitrarily using any one of the three years to represent either the pre- or the post-acquisition period, we use the median of the industry, size, and pre-performance adjusted return on assets/sales of years -1 to -3 to represent the pre-

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<sup>5</sup> At least one, but up to three years of both pre- and post-acquisition data is used in calculating the medians.

acquisition period (Median  $ROA_{i,adj}^{pre-M\&A}$ ). Similarly, the median of the years 1 to 3 represents the post-acquisition period for any acquisition  $i$  (Median  $ROA_{i,adj}^{post-M\&A}$ ). Accordingly, Median change is the median of the differences between the median annual post-performance and median annual pre-performance for each of the 223 acquisitions<sup>6</sup>.

$$\text{Median change} = \text{Median } ROA_{i,adj}^{post-M\&A} - \text{Median } ROA_{i,adj}^{pre-M\&A} \quad (9)$$

Furthermore, due to the presence of outliers, we apply a Wilcoxon signed rank test, to test whether the median post-acquisition performance is significantly different from the median pre-acquisition performance (Martynova *et al.*, 2007).

### 3.6. Independent variables definition

In this section, we explain the procedure followed to compute each independent variable. Our objective is to see whether these variables can determine the changes in post-M&A operating performance and whether their effect on post-merger performance validates our hypotheses of section 2.2.2.

The first set of variables, namely deal and firm characteristics, was chosen because they are considered some of the ‘Classic’ determinants of post-acquisition operating performance, since the early literature have most commonly studied them (see e.g., Healy *et al.*, 1992; Ghosh, 2001; Linn and Switzer, 2001; Sharma and Ho, 2002; Powell and Stark, 2005; Martynova *et al.*, 2007). However, more recent research about the topic, start to examine the role and effectiveness of corporate governance on M&A performance (see e.g., Yen & André, 2007, Carline *et al.*, 2009; Boateng *et al.*, 2017). Thus, as many merger hypotheses are either unrelated to or likely to be insufficiently tested by only a set of variables, we unify and re-examine many of the prior results in the literature using proxies based on characteristics of merging firms, the nature of the underlying deals, and corporate governance factors.

#### 3.6.1. Univariate analysis

Following test techniques designed by Martynova *et al.* (2007), we present the median

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<sup>6</sup> It is important to understand that, because of the way they are calculated, median differences are sometimes counterintuitive. A median difference is calculated as the median of differences, not by simply subtracting the median pre-acquisition performance from the median post-acquisition performance. As a result, the median difference might be a negative number, while, based on simply subtracting the median pre-acquisition performance from the median post-acquisition performance, one would expect a positive difference.

changes driven by each independent variable in the adjusted post-M&A operating performance measures for different sub-groups of deals. The division of each variable in sub-groups is made in an attempt to confirm nonlinear impacts of some independent variables in operating performance, as in previous literature (see e.g., Harford, 1999, Martynova *et al.*, 2007; Rao-Nicholson *et al.*, 2016). Wilcoxon ranked test was used to test for the statistical significance of the change in operating performance (median post-M&A performance minus median pre-M&A performance). Additionally, we test for statistical significance of the differences in performance measures across the sub-groups by employing a Mann-Whitney test when 2 sub-groups are compared and a Chi-Square test when more than 2 sub-groups are compared.

### 3.6.2. Multivariate analysis

Furthermore, in order to analyse the combined effect of the determinants of the post operating performance of M&A transactions, we employ the following multivariate linear models. Equations (10) and (11) were estimated by OLS technique. We test for individual and joint significance of the variables using a T-test and F-test, respectively.

#### 3.6.2.1. Deal and firm variables

$$\begin{aligned} \text{Median ROA}_{\text{adj}}^{\text{post-M\&A}} = & \alpha_i + \rho_j \text{Median ROA}_{\text{adj}}^{\text{pre-M\&A}} + \\ & \sum_{j=1}^4 \beta_j \text{DEAL}_{j,i} + \sum_{j=1}^3 \chi_j \text{FIRM}_{j,i} + \delta_j \text{ADVANCED}_{j,i} + \sum_{j=1}^4 \lambda_j \text{DEAL}_{j,i} \times \text{ADVANCED}_{j,i} + \\ & \sum_{j=1}^3 \varphi_j \text{FIRM}_{j,i} \times \text{ADVANCED}_{j,i} + \varepsilon_i \end{aligned} \quad (10)$$

Median ROA<sub>adj</sub><sup>post-M&A</sup> and Median ROA<sub>adj</sub><sup>pre-M&A</sup> computations were already explained below Eq.(8);  $\alpha_i$  is the constant of the model; DEAL<sub>j,i</sub> is the j-th deal-specific determinant (Cash, Mix, Cross border, Relative size) for the i-th observation; FIRM<sub>j,i</sub> is the j-th firm-specific determinant (Cash reserves, Leverage, Relatedness4) for the i-th observation; ADVANCED<sub>j,i</sub> represents the acquirer country development stage and is a dummy equal to one if the acquirer belongs to an advanced European country and zero otherwise; lastly, we have interactions between deal-specific and firm-specific determinants with the acquirer country development stage (ADVANCED<sub>j,i</sub>), respectively.  $\varepsilon_i$  is the error term.

First, we decided to examine the impact of the different means of payment in post-merger operating performance, since early evidence suggest that cash-financing deals are

expecting to originate a higher profitability improvement than transactions financed with equity or a mixture of securities (Linn and Switzer, 2001; Ghosh, 2001; Martynova *et al.*, 2007; Rao-Nicholson *et al.*, 2016). Thus, we define Cash as a dummy equal to one when cash is used to pay the entire acquisition price, zero otherwise. Following Fuller *et al.* (2002) we consider that all-cash acquisitions include full payments of any combination of cash, debt, and liabilities. Then, as in Gosh (2001) we define Stock as a dummy equal to one when combining firms issue stock to merge, and the remaining acquisitions are classified as Mix because they issue stock in combination with cash. Second, even though cross-border transactions may bring additional benefits of international diversification and access to new markets, they are also likely to be more complex and thus more costly and risky to execute than domestic ones (Danbolt and Maciver, 2012). Thus, as in Rao-Nicholson *et al.* (2016), we set a dummy that equals to one if the acquiring and target firms are from different countries (Cross border). Third, Linn and Switzer (2001) and Martynov *et al.* (2007), among others, have proved that acquisitions of relatively large targets are expected to outperform takeovers of relatively small targets, because the first have a greater scope for operational and financial synergies. Hence, following Martynova *et al.* (2007) we introduce the continuous variable Relative size, which is the ratio between the size of the target and the size of the acquirer, with size measured by total assets.

Regarding merged firms' characteristics, Jensen (1986) considered that excessive free cash holdings lead to an increase in agency costs. Which in turn, could lead to significant deteriorations in the operating performance of the combined firm (Moeller *et al.*, 2004; Martynova *et al.*, 2007). So, we introduce the continuous variable Cash reserves which is the book value of cash and cash equivalents relative to market value of common stock and total debt of acquiring firm before merger (as in Carline *et al.*, 2009). Also following Carline *et al.* (2009), the continuous variable Leverage is computed as book value of total debt relative to market value of common stock and total debt of acquiring firm before merger. We decided to analyse the effect of such variable due to the bank monitoring rationale, which states that highly leveraged acquirers have their activities monitored by banks. Therefore, M&A which lead to losses of profitability will be prevented ex-ante (Ghosh and Jain, 2000). Lastly, the findings on industry relatedness and takeover effect on operating performance tend to suggest that M&A of firms operating in different industries are normally associated with poorer performance compared to industry-related peers (Jensen, 1986; Healy *et al.*, 1992). Thus, we set the dummy Relatedness<sup>4</sup> which is equal to one if target firm and acquiring firm have the

same 4-digit NAICS 2017 code. Our approach follow Wan & Yiu (2009). They have used the North American Industry Classification System (NAICS) primary code to identify whether merging firms are in related or nonrelated industries.

### 3.6.2.2. Ownership, governance, and country variables

The following regression examines the combined effect of governance variables in post-merger operating performance. The firm and deal specific determinants are now incorporate as control variables, since they are important variables that may affect performance of M&A. Also, existing literature suggests that country-specific determinants may, as well, have impact on the value created by M&A. Thus, we also control for the rule of law of the target country.

$$\begin{aligned} \text{Median ROA}_{\text{adj}}^{\text{post-M\&A}} = & \alpha_i + \beta_j \text{Median ROA}_{\text{adj}}^{\text{pre-M\&A}} + \sum_{j=1}^4 \gamma_j \text{GOVERNANCE}_{j,i} + \\ & \delta_j \text{LARGE SHAREHOLDER HOLDINGS}_{j,i} + \eta_j \text{RULE OF LAW TARGET}_{j,i} + \\ & \chi_j \text{ADVANCED}_{j,i} + \sum_{j=1}^4 \sigma_j \text{DEAL}_{j,i} + \sum_{j=1}^3 \varphi_j \text{FIRM}_{j,i} + \sum_{j=1}^4 \phi_j \text{GOVERNANCE}_{j,i} \times \\ & \text{ADVANCED}_{j,i} + \xi_j \text{LARGE SHAREHOLDER HOLDINGS}_{j,i} \times \text{ADVANCED}_{j,i} + \epsilon_i \end{aligned} \quad (11)$$

GOVERNANCE<sub>j,i</sub> is the j-th governance-specific determinant (Board size, Board holdings, Independent directors, CEO duality) for the i-th observation. With respect to corporate governance variables, large board size gives the firm a competitive advantage in different fronts ranging from more expertise, experience, resource corporate strategy and provision of broad services (Liu and Wang, 2013). Some studies (Dwivedi and Jain, 2005; Jackling and Johl, 2009) favor large board sizes. Thus, as in Yen *et al.* (2013), Board size represent the numbers of directors on the board in the acquiring firm. Next, we defined Board holdings as the proportion of acquiring firm's outstanding common stock held by its board of directors in aggregate before merger (following Carline *et al.*, 2009). This variable attempt to measure the effect of ownership concentration with-in board of directors. Since Morck *et al.* (1988) in their "entrenchment argument" indicate a negative relationship between board ownership and corporate performance at high ownership levels. At higher ownership levels, managers may be so wealthy that they no longer intend to maximize profit but get more utility from maximizing market share or technological leadership. Furthermore, several studies have suggested that independent outside directors help mitigate the agency problem and monitor the large-scale transaction like mergers, because an independent board is in a better

position to monitor and control managers and hence can better align managers and shareholders interest (Dunn, 1987). Accordingly, and following Boateng *et al.* (2017), we defined Independent directors as the percentage of independent directors on the board of directors. Lastly, we set the variable CEO duality which is a dummy equal to one if CEO and COB positions are held by the same individual (as in Yen and André, 2007). Finkelstein and D'aveni (1994) point out that duality removes any internal and external ambiguity regarding responsibility for firm processes and outcomes. In M&A decisions quick and decisive action are important to avoid delays which may result in hostile and costly takeover with a potential of destroying firm value.

Concerning ownership concentration we set the variable Large shareholder holdings, which measure the proportion of voting power in the hands of the acquirer's largest shareholder (see Yen & André, 2007; Yen *et al.*, 2013). We consider this variable because researches argue that through mergers and acquisitions, controlling shareholder improved the value of non-listed companies. Large shareholders become involved in business management, to supervise managers, so agency conflicts between managers and shareholders can be alleviated (Sarkar and Sarkar, 2000).

Finally, the country-specific determinant Rule of law target (proxy to measure the 'efficient' of legal regimes: countries are scored on a scale from 0 to 100 based on an assessment of the law and order tradition) is used as control variable (calculations following Mateev and Andonov, 2016). Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (World Bank). We decide to control for this variable, because differences in law and enforcement of law are responsible for explaining the intensity and the pattern of mergers and acquisitions around the world (Rossi and Volpin, 2004).

It is important to highlight that data to compute firm and deal characteristics was obtained from Bureau van Dijk's Amadeus Database or Thomson Reuters Datastream. Ownership and corporate governance data must be available from annual reports of each company from company websites or Thomson Reuters Eikon filings database.

Appendix C summarizes all the variables we use in the regression analysis as well as respective data sources of each variable, while Appendix D shows the correlation matrix of dependent and explanatory variables. All the correlations, among independent variables, respect the maximum threshold of 0.7 suggested by Hair *et al.* (2010).

## 4. Descriptive analysis

### 4.1. Descriptive statistics

In Table 4, we display summary statistics of all variables for the all sample (n=223). We present the number, mean, median and standard deviations (SD) of corporate governance variables, acquirer and deal characteristics.

**Table 4: Descriptive statistics**

This table reports the number, mean, median and standard deviations (SD) of corporate governance variables, acquirer and deal characteristics as well as country-specific variables. Large shareholder holdings is the percentage of voting shares held by the largest shareholder; Board size represent the numbers of directors on the board in the acquiring firm; Board holdings represent proportion of acquiring firm's outstanding common stock held by its board of directors in aggregate before merger; Independent directors is the percentage of independent directors on the board of directors; CEO duality is a dummy equal to one if CEO and COB positions are held by the same individual; Cash is a dummy equal to one when cash is used to pay the entire acquisition price, zero otherwise; Stock is a dummy equal to one when combining firms issue stock to merge; Mix is a dummy equal to one for acquisitions that issue stock in combination with cash; Relative size is the ratio between the size of the target and the size of the acquirer, with size measured by total assets; Cash reserves is the book value of cash and cash equivalents relative to market value of common stock and total debt of acquiring firm before merger; Leverage is the book value of total debt relative to market value of common stock and total debt of acquiring firm before merger; Relatedness4 is a dummy equal to one if target firm and acquiring firm have the same 4-digit NAICS 2017 code; and Advanced represents the acquirer country development stage and is a dummy equal to one if the acquirer belongs to an advanced European country and zero otherwise. Source of table: Authors calculations.

Variables	All Sample			
	N	Mean	Median	SD
<b>Ownership variables</b>				
Large shareholder holdings	197	0.250	0.165	0.249
<b>Governance variables</b>				
Board size	175	7.309	7.000	2.647
Board holdings	170	5.565	0.051	40.929
Independent directors	166	0.445	0.449	0.305
CEO duality (dummy)	26	0.147	-	0.355
<b>Deal variables</b>				
Cash (dummy)	45	0.256	-	0.437
Stock (dummy)	41	0.233	-	0.424
Mix (dummy)	90	0.511	-	0.501
Cross border (dummy)	72	0.323	-	0.469
Relative size	223	0.454	0.067	1.517
<b>Firm variables</b>				
Leverage	211	0.197	0.159	0.197
Cash reserves	211	0.146	0.088	0.164
Relatedness4 (dummy)	166	0.744	-	0.437
<b>Country variables</b>				
Rule of law target	223	87.431	92.891	13.783
Advanced (dummy)	197	0.883	-	0.322

Becht and Rok (1999) suggested that in several European countries, the median largest voting stake in listed companies is over 50%. Although, in our sample the median percentage of holdings of the largest shareholder is 16.5% of the voting shares.

In the case of governance variables, median size of European boards' is seven members. A finding similar to Conyon and Peck (1998) for the UK (9), and Yen and André (2007) (7-10 members) for English-origin countries. In addition, 44.9% of the board members are considering independents; a number significantly higher than 36% reported in the study carried out by Boateng *et al.* (2017). The board own in median 5.1% of the voting shares; a higher percentage than the one discovered by Carline *et al.* (2009) which studied 81 domestic deals in the UK during the period 1985–1994 and found median board holdings equal to 0.9%. CEO and Chairman positions are hold together in 14.7% cases in our sample, our finding is similar to Boateng *et al.* (2017) (19% of the cases), but below the 26% documented by Carline *et al.* (2009).

With respect to deal characteristics, 25.6% are all-cash acquisitions, well below Martynova *et al.* (2007) finding of 70%. 23.3% of deals are entirely paid with stock, compared to 11.3% pure stock European deals in Faccio and Masulis (2005), and 16-19% of stock paid English-origin deals in Yen and André (2007). The largest amount of deals (51%) have a mixed payment method. The acquiring and target firms are from different countries in 32.3% of the cases, a value in accordance with the 33% of cross-border acquisitions in Martynova *et al.* (2007). The median size of acquirers is about 6.7% times larger than that of targets. Martynova *et al.* (2007) found a median target size of 8.28%.

Regarding firm-specific variables, the average level of leverage is 19.7% (compared to 21.5% in Maury and Pajuste (2005) for Western European firms and 16% in Yen and André (2007) for English origin-countries). The median cash holdings of acquirer in the year prior to acquisition represents 8.8% of acquirers' size. In turn, Carline *et al.* (2009) results show an ratio equal to only 0.08%. Overall, 74.4% of deals are classified as being in the same industry. A value higher than the one reported by Martynova *et al.* (2007) (32%) for European countries and Rao-Nicholson *et al.* (2016) (30% of the cases) for Asean countries.

To finish, agents rank their confidence in and abide by the rules of society around 92.

Table 5 highlights some differences between advanced and emergent and developing acquirers. Firstly, the concentration of voting power in the hands of the board of directors is higher in emergent and developing markets (15.1%) than it is in advanced markets (4.7%). Secondly, on average, 46.7% of the board members are considered independent in advanced markets, but only 5.9% have the same status in emerging and developing European markets. Thirdly, acquirers from emergent and developing markets prefer to pay for acquisitions issuing stock, rather than using only cash. This finding is in line with Martynova and Renneboog

(2006) which report that European bidders with insufficient cash resources to finance large acquisitions have increasingly resorted to a combination of equity and debt, but the very large transactions are fully financed with equity. Fourthly, emergent and developing acquirers favour domestic rather than cross-border acquisitions (7.7% vs 35.5% in the case of advanced acquirers). Emergent and developing acquires may consider that there is a greater scope for valuation error in cross-border than in domestic acquisitions, if targets in foreign markets are more difficult to value than domestic targets (due to less developed capital markets, differences in accounting practices, volatile exchange rates, uncertain cost of capital, or less knowledge of foreign markets) (Conn *et al.*, 2005).

**Table 5: Descriptive statistics by country development stage**

This table reports the number, mean, median and standard deviations (SD) of corporate governance variables, acquirer and deal characteristics as well as country-specific variables. See Appendix C for variables definition. Source of table: Authors calculation.

Variables	Advanced Europe				Emerging and Developing Europe			
	N	Mean	Median	SD	N	Mean	Median	SD
<b>Ownership variables</b>								
Large shareholder holdings	185	0.247	0.163	0.252	12	0.297	0.222	0.201
Governance variables								
Board size	160	7.369	7.000	2.695	15	6.667	6.000	2.024
Board holdings	156	5.894	0.047	42.681	14	1.906	0.151	6.460
Independent directors	157	0.467	0.500	0.297	9	0.059	0.000	0.122
CEO duality (dummy)	23	0.141	-	0.349	3	0.214	-	0.426
<b>Deal variables</b>								
Cash (dummy)	40	0.253	-	0.436	5	0.278	-	0.461
Stock (dummy)	32	0.203	-	0.403	9	0.500	-	0.514
Mix (dummy)	86	0.544	-	0.500	4	0.222	-	0.428
Cross border (dummy)	70	0.355	-	0.480	2	0.077	-	0.272
Relative size	197	0.376	0.059	0.947	26	1.045	0.118	3.606
<b>Firm variables</b>								
Leverage	190	0.194	0.151	0.201	21	0.222	0.197	0.165
Cash reserves	190	0.152	0.094	0.167	21	0.091	0.045	0.123
Relatedness4 (dummy)	145	0.736	-	0.442	21	0.808	-	0.402
<b>Country variables</b>								
Rule of law target	197	90.716	93.269	9.768	26	62.544	66.827	14.476

## 4.2. Operating performance before the deal

### 4.2.1. Pre-merger operating performance for the all sample

We first notice that the yearly means are more volatile than yearly medians. This is typical of accounting measures of performance, as the presence of few outliers has a strong impact on sample means. Since we are analysing accounting ratios, we will use estimates based on the medians because they are more informative (Ghosh, 2001).

Table 6 panel A presents the return on assets for the merging and control firms, as well as the industry, size and pre-performance adjusted return on assets. The median ROA for merged firms (1) in the 3 years before acquisition ranges from 6.01% to 6.99%. The median pre-acquisition ROA for control firms (2) varieties from 5.79% to 9.00%. The median measure of industry, size, and pre-performance adjusted return (1-2) for year -3, -2, and -1 is 1.83%, 0.39%, and 0.32%, respectively. Being the numbers for the year -3 and -1, statistically different from zero at the 1% and 5% level, correspondingly.

**Table 6: Firms' performance in the three years prior acquisition: Comparison between merged and control firms**

Sample of 223 European mergers and acquisitions between 2008 and 2014 for completed transactions over 10 million euros obtained from the Amadeus/Zephyr database. In panel A we have mean and median values of EBIT over book value of assets (ROA) for the three years prior takeover. Pre-acquisition performance of the merged firm (1) is calculated as a weighted-average of the ROA for the bidder and the target included. The weights are based on the book values of assets of both companies in the year before acquisition. For control firm construction, we matched firms based on acquiring and target firms' performance and size one year prior to the acquisition from their respective industries. Pre-acquisition performance of the control firm (2) is measured as weighted-average of the ROA of the two matched firms, being the weights the book value of assets of the two-matched firms. In panel B we have mean and median values of EBIT over operating sales (ROS) for the three years before takeover. The weights are now the operating sales of acquirer and target firm together (1), and of the two matched firms jointly (2). Industry, size and pre-performance adjusted measures are defined as the raw performance measure for each firm less the performance of a control firm (1-2). \*\*\*, \*\*, \* indicates a significant difference using a Wilcoxon signed ranks test at the 1%, 5% and 10% levels, respectively. Source of table: Authors calculations.

Year to acquisition	N	Merged firms (1)		N	Control firms (2)		N	Industry, size, and pre-performance adjusted (1) - (2)		
<b>Panel A: Return on assets, ROA</b>										
		Mean (%)	Median (%)		Mean (%)	Median (%)		Mean (%)	Median (%)	Positive (%)
-3	54	4.57	6.99	39	5.85	9.00	36	-2.45 ***	-1.83 ***	27.28
-2	77	4.14	6.95	65	0.09	6.25	63	1.76	0.39	53.97
-1	223	3.23	6.01	223	2.59	5.79	223	0.32	0.32 **	57.85
<b>Panel B: Return on sales, ROS</b>										
-3	44	9.23	6.97	30	12.99	5.86	30	-17.54 **	-1.30	36.67
-2	62	6.24	7.04	49	7.69	7.08	49	-6.63	1.80	53.06
-1	214	-10.69	5.78	206	0.80	5.60	206	-4.34 *	0.32	50.97

An important finding presented in Table 6 is that merging firms (1) significantly outperform control firms (2) before the M&A (except in year -3). Which may suggest that firms are likely to engage in M&A during a period when they experience a superior level of operating performance relative to the industry. This finding is in line with some prior studies (Ghosh, 2001, Martynova *et al.*, 2007 and Rao-Nicholson *et al.*, 2016).

When ROS is employed (panel B of Table 6), one can conclude that in terms of firms' effectiveness, both merged and control firms are quite similar, with merged firms having

slightly higher median earnings ability that could be mainly due to more efficient cost management or better revenue management. The medians of the difference in ROS between merging and matched firms are -1.30%, 1.80% and 0.32% for years -3, -2, and -1, respectively, and these numbers are not significant at the 10% level. This result is in line with Powell and Stark (2005), Rao-Nicholson *et al.* (2016), and Giudici and Bonaventura (2017).

#### **4.2.2. Pre-merger operating performance for advanced and emergent and developing acquires**

In table 7, we split the all sample by acquirer's country development stage: advanced versus emergent and developing markets. We present means and median values for ROA and ROS measures adjusted for industry, size and pre-performance.

Regarding advanced markets, median adjusted ROA for the 3 years before acquisition varies between -1.83% and 0.29%. The negative performance felt in year -3 is significant at a 5% level. Emergent and developing European countries present adjusted ROA ranging from -7.64% to 0.99%. In year -1 emergent and developing acquirers show a significant and slightly better performance than advanced bidders.

Even though performance was constructed to be similar across merged and control firms by research design, the difference in performance for year -1 for the all sample, may be induce by the results of emergent and developing market firms. Acquirer firms are normally of higher size than their industry counterparts and tend to undertake acquisitions during periods of superior performance (Franks and Harris, 1989; Morck *et al.*, 1990; Penman, 1991; and Martynova *et al.*, 2007). Thus, we conclude that it is more difficult to find truly control firms in those countries. Since for advanced Europe, the performance between the two sets of firms is similar in pre-acquisition period. However, Gosh (2001), Martynova *et al.* (2007), Yen and André (2007), Yen *et al.* (2013) and Rao-Nicholson *et al.* (2016), also report median measure of industry, size, and pre-performance adjusted return statistically different from zero in the 3 years prior takeover.

The adjusted ROS also present slightly better results, prior takeover, for emergent and developing firms when compared to advanced firms in year -1, although not significant. The ROS for advanced countries is -1.30%, 0.30% and -0.09% for years -3, -2, and -1, respectively. Emergent and developing markets firms present ROS values ranging from -4.63% to 3.09%.

**Table 7: Firms' performance in the three years prior the acquisition: Comparison between advanced and emergent and developing market acquirers**

The table splits the all sample by acquirer's country development stage: Advanced vs Emergent and developing markets. The table report means and median values of EBIT over book value of assets (ROA) and EBIT over operating sales (ROS), for the three years prior takeover, both measures adjusted. Industry, size and pre-performance adjusted measures are defined as the raw performance measure for each firm less the performance of a control firm matched according to industry, size and pre-performance, measured in the year prior to takeover. \*\*\*, \*\*, \* indicates a significant difference using a Wilcoxon signed ranks test at the 1%, 5% and 10% levels, respectively. Source of table: Authors calculations.

Year to acquisition	N	Advanced		N	Emergent and developing	
		Mean (%)	Median (%)		Mean (%)	Median (%)
<b>Panel A: Return on assets adjusted for industry, size, and pre-performance</b>						
-3	34	-2.19 **	-1.83 **	2	-7.64	-7.64
-2	56	1.79	0.27	7	1.73	0.99
-1	197	0.18	0.29	26	1.98 *	0.33
<b>Panel B: Return on sales adjusted for industry, size, and pre-performance</b>						
-3	28	-1.87	-1.30	2	-4.63	-4.63
-2	42	-4.81	0.30	7	3.50	3.09
-1	180	-6.01 *	-0.09	26	2.41	1.60

## 5. Operating performance following acquisitions: Results

### 5.1. Change model

#### 5.1.1. Return on assets for the all sample

Table 8 presents results of the change model. Represented we have the median return on assets (pre, post and change) for the merged firms (1), control firms (2) and the industry, size, and pre-performance adjusted return on assets (1)-(2). Henceforth, we present only median figures because when dealing with accounting ratios estimates based on the medians are more informative (Ghosh, 2001).

**Table 8: Change model applied to return on assets measure for the all sample**

Sample of 223 European mergers and acquisitions between 2008 and 2014 for completed transactions over 10 million euros obtained from the Amadeus/Zephyr database. Returns on assets (ROA) is calculated as EBIT over book value of assets. Pre-acquisition performance of the merged firm (1) is calculated as a weighted-average of the ROA for the bidder and the target included. The weights are based on the book values of assets of both companies in the year before acquisition. Post-acquisition performance for each deal is measured by ROA of the surviving acquirer after transaction. For control firm construction, we matched firms based on acquiring and target firms' performance and size one year prior to the acquisition from their respective industries. Pre-acquisition performance of the control firm (2) is measured as weighted-average of the ROA of the two matched firms, being the weights the book value of assets of the two-matched firms. Post-acquisition performances of the control firms are measured as weighted-average of the ROA. The weights are based on the book values of assets of acquirer and target companies, respectively, in the year before acquisition. Industry, size and pre-performance adjusted measures are defined as the raw performance measure for each firm less the performance of a control firm (1)-(2). Median pre-acquisition performance for merged firm (1) (equally for control firm (2)) is the three-year median ROA of each firm before takeover. Median pre-acquisition performance for industry, size, and pre-performance adjusted is the difference between median pre-acquisition performance of merged firm and control firm. Median post-acquisition performance follows the same procedures. Median change is equal to median post-acquisition performance minus median pre-acquisition performance. \*\*\*, \*\*, \* Significant at the 1% / 5% / 10% level. Wilcoxon signed rank test shows that the merged firm's performance is significantly different from peer performance in the same year. ###, ##, # Significant at the 1% / 5% / 10% level. Wilcoxon signed rank test shows that median post-acquisition performance is significantly different from median pre-acquisition performance. Source of table: Authors calculations.

CHANGE MODEL – RETURN ON ASSETS					
	N	Merged firm (1)	Control firm (2)	Industry, size, and pre-performance adjusted (1) – (2)	
Year to acquisition		Median (%)	Median (%)	Median (%)	Positive (%)
Median pre-acquisition performance (-3 to -1)	223	5.68	5.80	0.31 **	56.95
1	223	4.33	4.89	0.09	50.76
2	223	4.55	5.15	0.46	51.57
3	223	3.94	4.97	- 0.67 ***	47.98
Median post-acquisition performance (+1 to +3)	223	4.42	5.08	- 0.18 *	47.98
Median change (Post – Pre)	223	- 1.28 ###	0.02	- 0.83 ###	45.29

In the 3 years after acquisition merged firms present unadjusted ('raw') return on assets

ranging from 3.94% to 4.55%, while control firms show 'raw' return on assets from 4.97% to 5.15%. Therefore, the 'raw' performance of control firms improved after takeover and presents higher estimates than merged firms. Since, as one can remember, in the 3 years pre-event, control firms underperformed in relation to merged firms. However, median change result is not distinguishable from zero. Yen and André (2007) found similar results.

Concerning merged firms, when we compare the 'raw' pre- and post-acquisition performance there is a negative change, significant at 1% level, in operating performance following acquisitions of -1.28%. This result is in line with Powell and Stark (2005) and Martynova *et al.* (2007). Both find that, in general, a company's unadjusted operating performance decreases significantly following a merger or acquisition.

To avoid the bias created because of a superior pre-event performance, we compare the performance of merging firms with those of industry, size and pre-performance matched firms (Ghosh, 2001). In this case (last column), the results are less straight forward. We only have a significant deterioration in performance in year +3 of -0.18%. Even so, we can affirm that adjusted operating performance declines following takeovers. Since the median pre-acquisition performance was positive (0.31%) and significant at 5% level and after takeover becomes negative (-0.18%), with 10% of significance. At 1% level of significance, our results show that the change in adjusted performance is negative and equals to -0.83%. This result is in line with Clark and Ofek (1994), Dickerson *et al.* (1997), and Kruse *et al.* (2002) who report negative results. The results are also partly in line with Martynova *et al.* (2007), who document that measures scaled by book value indicate an insignificant decrease in the performance.

#### 5.1.2. Return on assets for advanced and emergent and developing acquirers

Table 9 splits the all sample by acquirer's country development stage: advanced versus emergent and developing markets. The table report 'raw' and industry, size and pre-performance adjusted median values of return on assets measure.

The 'raw' performance of advanced acquirers varies between 3.89% and 4.57%. Whereas adjusted return on assets median values are 0.21, 0.69, and -0.76 for years +1, +2 and +3, respectively, with a significant deterioration in performance in year +3 of -0.76%. The median change in performance is negative (-1.02%), significant at 1% level, for benchmark-unadjusted performance. For adjusted returns on assets the median change in performance is also significantly negative (-0.55%). Thus, for acquirers from advanced European

markets, there is a significant decrement in performance following acquisitions. Previous studies carry out by Meeks (1977) and Dickerson *et al.* (1997) for the UK and Pazarskis *et al.* (2006) for Greece, reach similar conclusions.

**Table 9: Change model applied to adjusted return on assets measure for advanced and emergent and developing acquirers**

The table splits the all sample by acquirer's country development stage: Advanced vs Emergent and developing markets. The table report 'raw' and adjusted median values of EBIT over book value of assets (ROA). 'Raw' performance corresponds to ROA of merged firm without adjustments. Industry, size and pre-performance adjusted measure is defined as the raw performance measure for each firm less the performance of a control firm matched according to industry, size and pre-performance, measured in the year prior to takeover. Median pre-acquisition performance is the three-year median ROA of each firm before takeover. Median post-acquisition performance follows the same procedures. Median change is equal to median post-acquisition performance minus median pre-acquisition performance. \*\*\*, \*\*, \* Significant at the 1% / 5% / 10% level. Wilcoxon signed rank test shows that the merged firm's performance is significantly different from peer performance in the same year. ###, ##, # Significant at the 1% / 5% / 10% level. Wilcoxon signed rank test shows that median post-acquisition performance is significantly different from median pre-acquisition performance. Source of table: Authors calculations.

CHANGE MODEL - RETURN ON ASSETS						
Year to acquisition	N	Advanced (Raw)	Advanced (Adjusted)	N	Emergent and developing (Raw)	Emergent and developing (Adjusted)
		Median (%)			Median (%)	
Median pre-acquisition performance (-3 to -1)	197	5.08	0.25	26	8.36	0.34 *
1	197	4.33	0.21	26	4.90	-1.03
2	197	4.57	0.69	26	3.47	-0.42
3	197	3.89	-0.76 ***	26	4.27	0.17
Median post-acquisition performance (+1 to +3)	197	4.42	-0.18 *	26	4.06	-0.42
Median change (Post – Pre)	197	-1.02 ###	-0.55 ##	26	-4.24 ##	-4.60 #

Emergent and developing market acquirers present 'raw' performance values ranging from 3.47% to 4.90%, and adjusted returns of -1.03, -0.42, and 0.17 for years +1, +2 and +3, correspondingly. Emergent and developing market acquirers show a positive and significant median pre-acquisition performance of 0.34%. Also, Chi *et al.* (2011) that investigated Chinese acquiring firms from 1998 to 2003, found significantly positive abnormal market returns for acquirers before acquisition. However, following acquisition, emergent and developing acquirers performed somewhat poorer than advanced acquirers, concerning both 'raw' and adjusted returns. Median change for 'raw' and adjusted performance is significantly negative. These results are significant at 10% level or better. The finding of a deterioration in performance, after takeover, for acquirers from emergent and developing markets is in line with some previous research: Yen *et al.* (2013) study whether from the late fifth to the peak

of the recent sixth acquisition wave, acquiring firms in emerging economies created operating performance following transactions, conclude that emerging market acquirers typically have good operating performance before transactions occur, but that the average adjusted operating performance over a three-year period following a merger transaction shows little improvement; likewise Bertrand and Betschinger (2012) show that both domestic and international acquisitions made by Russian firms tend to reduce the performance of acquirers compared to non-acquiring firms.

### 5.1.3. Return on sales for the all sample

Table 10 presents results of the change model. Represented we have the median return on sales (pre, post and change) for the merged firms (1), control firms (2) and for the industry, size, and pre-performance adjusted return on sales (1)-(2).

**Table 10: Change model applied to return on sales measure for the all sample**

Sample of 223 European mergers and acquisitions between 2008 and 2014 for completed transactions over 10 million euros obtained from the Amadeus/Zephyr database. Returns on sales (ROS) is calculated as EBIT over operating sales. Pre-acquisition performance of the merged firm (1) is calculated as a weighted-average of the ROS for the bidder and the target included. The weights are based on the operating sales of both companies in the year before acquisition. Post-acquisition performance for each deal is measured by ROS of the surviving acquirer after transaction. For control firm construction, we matched firms based on acquiring and target firms' performance and size one year prior to the acquisition from their respective industries. Pre-acquisition performance of the control firm (2) is measured as weighted-average of the ROS of the two matched firms, being the weights the operating sales of the two-matched firms. Post-acquisition performances of the control firms are measured as weighted-average of the ROS. The weights are based on the operating sales of acquirer and target companies, respectively, in the year before acquisition. Industry, size and pre-performance adjusted measures are defined as the raw performance measure for each firm less the performance of a control firm (1)-(2). Median pre-acquisition performance for merged firm (1) (equally for control firm (2)) is the three-year median ROS of each firm before takeover. Median pre-acquisition performance for industry, size, and pre-performance adjusted is the difference between median pre-acquisition performance of merged firm and control firm. Median post-acquisition performance follows the same procedures. Median change is equal to median post-acquisition performance minus median pre-acquisition performance. \*\*\*, \*\*, \* Significant at the 1% / 5% / 10% level. Wilcoxon signed rank test shows that the merged firm's performance is significantly different from peer performance in the same year. ####, ##, # Significant at the 1% / 5% / 10% level. Wilcoxon signed rank test shows that median post-acquisition performance is significantly different from median pre-acquisition performance. Source of table: Authors calculations

CHANGE MODEL – RETURN ON SALES						
	N	Merged firm (1)	N	Control firm (2)	Industry, size, and pre-performance adjusted (1) – (2)	
Year to acquisition		Median (%)		Median (%)	Median (%)	Positive (%)
Median pre-acquisition performance (-3 to -1)	214	5.75	206	5.68	0.33	52.43
1	223	5.40	206	5.53	0.57	52.91
2	223	4.95	206	6.25	0.12	50.49
3	223	4.64	209	5.83	-0.60	49.03
Median post-acquisition performance (+1 to +3)	223	5.09	209	5.86	-0.26	50.00
Median change (Post – Pre)	214	-0.69	206	-0.41	-0.26	48.54

The return on sales measure present positive values oscillating between 4.64% to 5.40% for merged firms and between 5.53% to 6.25% for control firms.

For the years subsequent to the transaction, merging firms continue to retain a positive level of performance but to a smaller extent. This finding is in line with empirical evidence from other studies (Heron and Lie, 2002; Kruse *et al.*, 2002; Martynova *et al.*, 2007; Rahman and Limmack, 2004) and reinforces the suggestions of Ghosh (2001) that empirical studies should take into account the pre-event performance of merging firms when selecting control benchmarks. For median change, we report an insignificant decrease between the unadjusted ('raw') pre- and post-acquisition performance of -0.69%. This tendency was also found by Marthynova *et al.* (2007) and Rao-Nicholson *et al.* (2016).

Considering the adjusted return on sales, Table 10 show median values of 0.57%, 0.12% and -0.60% for the years +1, +2, and +3, respectively. Consistent with Table 8 our results show a significant deterioration in performance in year +3 of -0.60%. We do not find any evidence that return on sales decrease following acquisitions similar to the return on assets conclusions in Table 8. The negative median change in return on sales of -0.26% is not statistically significant. This result contradicts Marthynova *et al.* (2007), who reports an enhancement on efficiency (even though also not significant).

#### **5.1.4. Return on sales for advanced and emergent and developing acquirers**

In Table 11 we continue to analyse the impact of M&A on firm's cost efficiency through return on sales measure. The table report 'raw' and industry, size and pre-performance adjusted median values of return on sales measure. We split the all sample by acquirer's country development stage: advanced versus emergent and developing markets.

The results for acquirers from advanced European markets confirm Table 10 conclusions of no statistically significant changes in the operating performance following acquisition, considering either the 'raw' or the adjusted return on sales measure.

For emergent and developing markets acquirers, inferences are to some extent different. Consistent with the results of return on assets measure, acquirers from those markets experience a significant reduction on firm's cost efficiency after takeover, considering both 'raw' and adjusted median change in return on sales. Also, in accordance with previous results, emergent and developing market acquirers show a positive and significant median pre-acquisition performance.

**Table 11: Change model applied to adjusted return on sales measure for advanced and emergent and developing acquirers**

The table splits the all sample by acquirer's country development stage: Advanced vs Emergent and developing markets. The table report 'raw' and adjusted median values of EBIT over operating sales (ROS). 'Raw' performance corresponds to ROS of merged firm without adjustments. Industry, size and pre-performance adjusted measure is defined as the raw performance measure for each firm less the performance of a control firm matched according to industry, size and pre-performance, measured in the year prior to takeover. Median pre-acquisition performance is the three-year median ROS of each firm before takeover. Median post-acquisition performance follows the same procedures. Median change is equal to median post-acquisition performance minus median pre-acquisition performance. \*\*\*, \*\*, \* Significant at the 1% / 5% / 10% level. Wilcoxon signed rank test shows that the merged firm's performance is significantly different from peer performance in the same year. ###, ##, # Significant at the 1% / 5% / 10% level. Wilcoxon signed rank test shows that median post-acquisition performance is significantly different from median pre-acquisition performance. Source of table: Authors calculations.

CHANGE MODEL - RETURN ON SALES							
Year to acquisition	N	Advanced (Raw)	N	Advanced (Adjusted)	N	Emergent and developing (Raw)	Emergent and developing (Adjusted)
		Median (%)		Median (%)		Median (%)	Median (%)
Median pre-acquisition performance (-3 to -1)	188	5.42	180	0.14	26	8.82	1.26 *
1	197	5.40	180	0.72	26	6.02	0.34
2	197	5.45	180	0.12	26	3.47	-0.89
3	197	4.66	183	-0.95	26	4.02	0.69
Median post-acquisition performance (+1 to +3)	197	5.16	183	-0.26	26	4.02	-0.005
Median change (Post – Pre)	188	-0.50	180	0.07	26	-2.81 ###	-0.69 #

All in all, we conclude that operating profitability decreases after takeover; while no significant change in post-merger combined firms' cost efficiency is verified. Our results partly confirm hypothesis 1, in the sense that, operating performance is likely to decrease after transaction, or at best, do not significantly change.

## 5.2. Robustness check

As robustness check, we examine whether the intercept model of Healy *et al.* (1992) yields conclusions different from the change model. We present the regression results of the 3-year post-acquisition median adjusted returns on the 3-year pre-acquisition median adjusted returns, for the all sample, and then for advanced and emergent and developing bidders. Table 12 exhibits the results. In panel A we show the results for the return on assets measure and in panel B the results for return on sales measure.

In panel A, the intercept  $\alpha$  is negative and significant in 4 out of 6 regressions, which indicates adjusted operating performance diminishment in the post-acquisition period after controlling for the effects of pre-performance. The slope coefficient is positive and different

from zero in 4 out of 6 regressions, indicating a positive correlation between the pre- and post-acquisition operating performance with persistence over time. Thus, for return on assets performance measure, the intercept model results confirm the change model ones.

Outcomes of panel B, reinforce the change model results of an insignificant change in firms' cost efficiency. In all significant regressions, there is a positive correlation between the pre- and post-acquisition adjusted operating performance with persistence over time.

Consistent with Martynova *et al.* (2007), Powell and Stark (2005), Ghosh, (2001), Linn and Switzer (2001), and Switzer (1996), the intercept model gives generally higher absolute changes in operating performance than the change model, which can be explained by the structure of the models. The intercept model uses means of the median differences in its estimations, whereas the change model is based on medians of the median differences, making it less sensitive to outliers.

**Table 12: Intercept model applied to all sample, and to the comparison between advanced and emergent and developing acquirers**

In panel A, industry, size, and pre-performance adjusted return on assets is the return on assets of merged firms minus those of matched firms, while 'Raw' performance corresponds to return on assets of merged firm without adjustments. In panel B, industry, size, and pre-performance adjusted return on sales is the return on sales of merged firms minus those of matched firms, while 'Raw' performance corresponds to return on sales of merged firm without adjustments. To test for individual and joint significance of the variables we use a T-test and F-test, respectively. Numbers in parentheses are standard errors. When needed we apply White's (1980) correction to the standard errors, to correct for an unknown form of heteroscedasticity.

	All sample (Raw)	Advanced (Raw)	Emergent and developing (Raw)	All sample (Adjusted)	Advanced (Adjusted)	Emergent and developing (Adjusted)
<b>Panel A: Return on assets</b>						
$\alpha$	-0.02 * (0.01)	-0.02 * (0.01)	0.03 (0.03)	-0.04 *** (0.01)	-0.03 ** (0.02)	-0.03 (0.02)
$\beta$	0.57 *** (0.04)	0.63 *** (0.04)	-0.01 (0.12)	0.25 *** (0.09)	0.32 *** (0.11)	0.02 (0.10)
F-statistic	198.58 ***	233.69 ***	0.02	8.11 ***	9.55 ***	0.03
R <sup>2</sup>	0.47	0.55	0.001	0.03	0.05	0.001
<b>Panel B: Return on sales</b>						
$\alpha$	0.02 (0.22)	0.03 (0.26)	0.02 (0.06)	0.28 (0.29)	0.33 (0.33)	-0.08 (0.05)
$\beta$	0.04 ** (0.01)	0.04 ** (0.02)	-0.16 (0.23)	0.01 *** (0.0001)	0.01 *** (0.0001)	-0.16 (0.20)
F-statistic	5.73 **	5.03 **	0.47	1269.98 ***	1108.31 ***	0.02
R <sup>2</sup>	0.03	0.03	0.02	0.86	0.86	0.60

## 6. The determinants of the post-acquisition operating performance

### 6.1. Univariate analysis

In this section, we investigate which determinants may help to explain post-acquisition operating performance of merging firms. In a first phase, we test whether acquirer's firm characteristics and deal features as means of payment, geographical scope of the deal (domestic versus cross-border M&A), relative size of the target firm, pre-acquisition leverage and cash holdings of the acquirer, and business expansion strategy (relatedness versus unrelatedness) influence the post-acquisition performance of the combined firm. In a second phase, we examine the role of governance (board size, board holdings, independent directors, CEO duality) and ownership variables (large shareholder holdings) on M&A performance. As explained in Section 3.6.1, following Martynova *et al.* (2007), we present predictions of the median change in the adjusted post-M&A operating performance measures associated with changes in specific variables. Also, we divide our continuous variables into quartiles and test for significance of the differences in post-acquisition profitability of the combined firms across the sub-samples.

Table 13 present the median values of the changes in post-merger operating performance determined by deal and firm variables. Our conclusions can be summarized as follow:

Regarding deal variables and in line with previous studies (Healy *et al.*, 1992; Heron and Lie, 2002; Sharma and Ho, 2002; Powell and Stark, 2005 and Rao-Nicholson *et al.*, 2016), the adjusted operating performance measures do not differ significantly between cash-financed and stock-financed M&A. However, mixed offers are associated with significantly negative changes in performance (Median  $ROA_{i,adj}^{post-M\&A}$ ). Also, as in Martynova *et al.* (2007), the geographic scope of the deal does not lead to statistically significant difference in the changes in performance. However, the profitability of the combined firm may decrease following domestic takeovers. As well, Martynova *et al.* (2007) found that although the post-merger profitability increases with the size of the target, this increase is non-linear. Thus, we split our sample into quartiles by the relative size of the target firm and we found similar conclusions. The first quartile 'small targets' and the fourth quartile 'largest targets' lead to significant reductions in post-merger efficiency of the combined firm (Median  $ROS_{i,adj}^{post-M\&A}$ ). For both measure, the relative size of the target is capable of significantly explaining the changes in performance. The result support the view that larger deviations in firm size leads to poorer acquisition performance (Loughran and Vijh, 1997; Moeller *et al.*, 2004).

**Table 13: Univariate analysis for deal and firm variables**

This table presents the change in post-merger operating performance driven by firm and deal determinates. Median  $ROA_{i,adj}^{post-M\&A}$  / Median  $ROS_{i,adj}^{post-M\&A}$  is computed as the median return on assets/sales of merged firm in the 3-years following the takeover date less the median return on assets/sales of the control firm in the same years. Cash is a dummy equal to one when cash is used to pay the entire acquisition price, zero otherwise; Stock is a dummy equal to one when combining firms issue stock to merge; Mix is a dummy equal to one for acquisitions that issue stock in combination with cash; Relative size is the ratio between the size of the target and the size of the acquirer, with size measured by total assets; Cash reserves is the book value of cash and cash equivalents relative to market value of common stock and total debt of acquiring firm before merger; Leverage is the book value of total debt relative to market value of common stock and total debt of acquiring firm before merger; Relatedness4 is a dummy equal to one if target firm and acquiring firm have the same 4-digit NAICS 2017 code; Advanced represents the acquirer country development stage and is a dummy equal to one if the acquirer belongs to an advanced European country and zero otherwise. The four quartiles of relative size are Q1: less than 1.44%; Q2: 1.44%–6.71%; Q3: 6.71%–33.35% and Q4: more than 33.35%; the four quartiles of pre-M&A cash reserves are Q1: less than 3.47%; Q2: 3.47%–8.75%; Q3: 8.75%–19.53% and Q4: more than 19.53%; and the four quartiles of pre-M&A leverage levels are Q1: less than 2.40%; Q2: 2.40%–15.93%; Q3: 15.93%–27.50% and Q4: more than 27.50%. \*\*\*, \*\*, \* Significant at the 1% / 5% / 10% level. Wilcoxon ranked test was used to test for the statistical significance of the change in operating performance (median post-M&A performance minus median pre-M&A performance). ###, ##, # Significant at the 1% / 5% / 10% level. To test for statistical significance of the differences in performance measures across the sub-groups. We employ a Mann-Whitney test when 2 sub-groups are compared and a Chi-Square test when more than 2 sub-groups are compared. Source of table: Authors calculations.

	<i>Median ROA<sub>t,adj</sub><sup>post-M&amp;A</sup></i>	<i>Median ROS<sub>t,adj</sub><sup>post-M&amp;A</sup></i>
<b>Deal variables</b>		
Cash	0.007	0.003
Stock	-0.027	0.003
Mix	-0.012 **	-0.021
<b>Difference (H0: Cash=Stock=Mix)</b>	<b>No</b>	<b>No</b>
<b>Difference (H0: Cash=Mix)</b>	<b>No</b>	<b>No</b>
Domestic M&A	-0.006 **	-0.013
Cross border M&A	0.005	0.010
<b>Difference (H0: Dom=Cross)</b>	<b>No</b>	<b>No</b>
Relative size Q1	0.001	-0.032 **
Relative size Q2	0.007	0.024
Relative size Q3	0.009	0.025
Relative size Q4	-0.042 ***	-0.049 *
<b>Difference (H0: Q1=Q2=Q3=Q4)</b>	<b>Yes #</b>	<b>Yes ##</b>
<b>Difference (H0: Q1=Q4)</b>	<b>Yes #</b>	<b>No</b>
<b>Firm variables</b>		
Cash reserves Q1	0.003	0.000
Cash reserves Q2	-0.014	-0.032 **
Cash reserves Q3	0.0003	0.007
Cash reserves Q4	0.0003	0.021
<b>Difference (H0: Q1=Q2=Q3=Q4)</b>	<b>No</b>	<b>No</b>
<b>Difference (H0: Q1=Q4)</b>	<b>No</b>	<b>No</b>
Leverage Q1	-0.003	0.016
Leverage Q2	-0.007	0.007
Leverage Q3	0.005	-0.003
Leverage Q4	-0.001	-0.022 *
<b>Difference (H0: Q1=Q2=Q3=Q4)</b>	<b>No</b>	<b>No</b>
<b>Difference (H0: Q1=Q4)</b>	<b>No</b>	<b>No</b>
Relatedness	0.0001	0.002
Unrelatedness	-0.024	-0.021 *
<b>Difference (H0: Relat=Unrelat)</b>	<b>No</b>	<b>Yes #</b>
Advanced	-0.002	-0.003
Emergent and developing	-0.004	-0.000
<b>Difference (H0: Adv=Emer)</b>	<b>No</b>	<b>No</b>

Concerning firm characteristics, we divided the amount of cash reserves held by the acquirer prior to acquisition into quartiles, because early evidence suggests that acquisitions

by cash-rich companies lead to declines in the operating performance of the combined firm (Jensen, 1986; Harford, 1999). Even though not significantly, our results show that acquirers with higher cash reserves experience better long-term performance. A possible explanation is that managers of cash-rich firms often benefit from having cash reserves which cost less than external financing to fund large projects thereby leading to better M&A performance (Sun and Tong, 2003). Following, we divide our sample into quartiles by the acquirers' pre-acquisition leverage, in order to confirm the bank monitoring rationale which says that highly leveraged acquirers outperform low leveraged acquirers due to better creditor monitoring (Ghosh and Jain, 2000). In line with Martynova *et al.* (2007) higher levels of pre-acquisition leverage do not lead to higher post-acquisition profitability. Regarding business expansion strategy, related acquisition strategy leads to a significant different performance of the combined firm than the diversification strategy. Also, diversification may impact negatively the cost efficiency of the merged firm following the takeover. Our results are in accordance with Healy *et al.* (1992) and Heron and Lie (2002).

Finally, the fact that the acquirer belongs to an advanced or to an emergent and developing market do not significantly explain the changes in post-merger performance.

Now we analyse the changes in post-merger operating performance driven by ownership, governance and country determinants. As previous, continuous variables are divided into quartiles to find out nonlinear effects of such variables in post-acquisition performance.

The median changes in operating performance determined by each variable are presented in Table 14.

Yen and André (2007) claimed that the relationship between concentrated ownership and the level and change in operating cash flow returns after takeovers is non-linear. Thus, we divided our ownership variable (Large shareholder holdings) into quartiles. The percentage of voting shares held by the largest shareholder is capable of significantly explain the changes in post-merger performance. Lower levels of concentration are associated with significant reductions in post-M&A operating performance. The results reinforce early evidence that ownership concentration provides an efficient way of resolving agency problems and consequently increases M&A performance (Xu and Wang, 1999; Claessens *et al.*, 2000).

With respect to governance variables, as the percentage of independent directors on the board of directors (Independent directors) increases it is more likely a negative effect on post-merger performance. Results show a significant difference in post-M&A operating performance between the first quartile (low proportion of independent directors on the board)

and the fourth quartile (more than 63% of the board members are considered independents).

**Table 14: Univariate analysis for ownership, governance and country variables**

This table presents the change in post-merger operating performance driven by ownership, governance and country determinants. Median  $ROA_{i,adj}^{post-M\&A}$  / Median  $ROS_{i,adj}^{post-M\&A}$  is computed as the median return on assets/sales of merged firm in the 3-years following the takeover date less the median return on assets/sales of the control firm in the same years. Large shareholder holdings is the percentage of voting shares held by the largest shareholder of bidder firm before M&A; Board size represent the numbers of directors on the board in the acquiring firm. The natural logarithm of Board size is used to capture a decreasing marginal effect for this explanatory variable; Board holdings represent proportion of acquiring firm's outstanding common stock held by its board of directors in aggregate before merger; Independent directors is the percentage of independent directors on the board of directors; CEO duality is a dummy equal to one if CEO and COB positions are held by the same individual; Rule of law target is a proxy to measure the 'efficient' of legal regimes: countries are scored on a scale from 0 to 100 based on an assessment of the law and order tradition. The four quartiles of large shareholder holdings are Q1: less than 9.79%; Q2: 9.79%–16.46%; Q3: 16.46%–33.51% and Q4: more than 33.51%; the four quartiles of board size are Q1: less than 1.61; Q2: 1.61–1.95; Q3: 1.95–2.20 and Q4: more than 2.20; the four quartiles of pre-M&A board holdings are Q1: less than 0.45%; Q2: 0.45%–5.08%; Q3: 5.08%–33.62% and Q4: more than 33.62%; the four quartiles of independent directors in the board are Q1: less than 25.00%; Q2: 25.00%–44.95%; Q3: 44.95%–62.50% and Q4: more than 62.50%; and the four quartiles of target rank country rule of law are Q1: less than 86.26; Q2: 86.26–92.89; Q3: 92.89–94.79 and Q4: more than 94.79. \*\*\*, \*\*, \* Significant at the 1% / 5% / 10% level. Wilcoxon ranked test was used to test for the statistical significance of the change in operating performance (median post-M&A performance minus median pre-M&A performance). ###, ##, # Significant at the 1% / 5% / 10% level. To test for statistical significance of the differences in performance measures across the sub-groups, we employ a Mann-Whitney test when 2 sub-groups are compared and a Chi-Square test when more than 2 sub-groups are compared. Source of table: Authors calculations.

	<i>Median ROA<sub>i,adj</sub><sup>post-M&amp;A</sup></i>	<i>Median ROS<sub>i,adj</sub><sup>post-M&amp;A</sup></i>
<b>Ownership variables</b>		
Large shareholder holdings Q1	-0.031 ***	-0.061 **
Large shareholder holdings Q2	-0.001	-0.012
Large shareholder holdings Q3	-0.001	0.005
Large shareholder holdings Q4	0.026	0.028
<b>Difference (H0: Q1=Q2=Q3=Q4)</b>	<b>Yes ##</b>	<b>Yes #</b>
<b>Difference (H0: Q1=Q4)</b>	<b>Yes ###</b>	<b>Yes ##</b>
<b>Governance variables</b>		
Board size Q1	0.011	0.032
Board size Q2	-0.029	-0.027
Board size Q3	-0.000	-0.019
Board size Q4	0.013	0.004
<b>Difference (H0: Q1=Q2=Q3=Q4)</b>	<b>No</b>	<b>No</b>
<b>Difference (H0: Q1=Q4)</b>	<b>No</b>	<b>No</b>
Board holdings Q1	0.001	0.000
Board holdings Q2	-0.003	-0.032
Board holdings Q3	0.015	0.004
Board holdings Q4	-0.009 *	-0.019
<b>Difference (H0: Q1=Q2=Q3=Q4)</b>	<b>No</b>	<b>No</b>
<b>Difference (H0: Q1=Q4)</b>	<b>No</b>	<b>No</b>
Independent directors Q1	0.014	0.035
Independent directors Q2	0.013	0.005
Independent directors Q3	-0.018 **	-0.047 *
Independent directors Q4	-0.004	-0.012
<b>Difference (H0: Q1=Q2=Q3=Q4)</b>	<b>No</b>	<b>No</b>
<b>Difference (H0: Q1=Q4)</b>	<b>Yes #</b>	<b>Yes #</b>
CEO and Chairman simultaneously	-0.005	0.023
Not CEO and chairman simultaneously	0.002	-0.012
<b>Difference (H0: Yes=Not)</b>	<b>No</b>	<b>No</b>
<b>Country variables</b>		
Rule of law target Q1	0.001	0.006
Rule of law target Q2	0.006	0.003
Rule of law target Q3	-0.024 **	-0.033
Rule of law target Q4	-0.003	-0.013
<b>Difference (H0: Q1=Q2=Q3=Q4)</b>	<b>No</b>	<b>No</b>
<b>Difference (H0: Q1=Q4)</b>	<b>No</b>	<b>No</b>

The remaining governance variables are not capable of significantly explain the changes on operating performance after takeover.

Regarding our legal variable which rank the rule of law in the target country, results show that post-merger operating performance is negative for higher ranks. Also, Mateev and Andonov (2016) found that cross-border bidding firms tend to experience lower announcement returns when targets are located in countries (the UK/Ireland in their case) with stronger investor protection mechanisms.

## 6.2. Cross-sectional analysis of operating performance changes following corporate mergers

Following we explore the combined effect of the determinants of the post-M&A operating performance in a multivariate framework. Table 15 presents the coefficient estimates from the cross-sectional analysis for each performance measure and for combinations of the deal and firm independent variables. The dependent variables (Median ROA<sub>i</sub><sup>post-M&A</sup><sub>adj</sub> and Median ROS<sub>i</sub><sup>post-M&A</sup><sub>adj</sub>) are the post-M&A adjusted operating performance measures. Pre-acq. adj. performance is the corresponding pre-M&A performance. We can see that all models are significant and that R<sup>2</sup> are between 15% and 89%.

The results of the change and intercept model presented in section 5 showed that a company's post-acquisition performance is generally lower than its pre-acquisition operating performance. The results of the intercepts of Table 15 support such statement. Also, Table 15 show that pre-acquisition operating performance and post-acquisition operating performance are positively related (all the coefficients are significant at 1% level), which is in accordance with intercept model conclusions of section 5.

In models (1) and (3) we analyse the change in post-M&A adjusted operating performance measures, determined by the combined effect of the explanatory variables, without interaction terms. In turn, models (2) and (4) report coefficient estimates including advanced interaction terms (indicated in bold). Advanced represents the acquirer country development stage and is a dummy equal to one if the acquirer belongs to an advanced European country and zero otherwise.

Concerning deal characteristics our main conclusions are:

First, an acquirer who chooses only cash to pay the entire acquisition price (Cash), experience a significant improvement in profitability after the takeover (column 1). This result confirms our hypothesis 2 and is in line with previous studies (see e.g., Linn and Switzer,

2001; Ghosh, 2001; Moeller and Schlingemann, 2004). Besides, there is no difference in the impact of Cash as a mean of payment on post-merger operating performance between country development stages. For emergent and developing markets it is expected that cash-only transactions will enhance the post-merger profitability. Boateng *et al.* (2017) found similar results for their sample of Chinese firms.

Conversely, when emergent and developing combined firms issue stock in combination with cash to merge (Mix), they felt a significant reduction in adjusted return on sales after takeover. Mix as a mean of payment do not lead to differences in firms' post-M&A cost efficiency between advanced and emergent and developing acquirers.

Second, the impact on post-M&A operating profitability of geographical diversification (Cross border) is significantly different between advanced and emergent and developing markets; and for emergent and developing markets the impact will be significantly negative. Accordingly, for emergent and developing markets the option of acquiring a target from a different country, lead to a decrease in firms' post-merger cost efficiency. However, there is no difference, in terms of post-M&A cost efficiency, between advanced and emergent and developing markets. Our results for emergent and developing markets, confirm that cross-border post-acquisition performance may decrease, due to difficulties in capturing the expected synergies, resulting from cultural and regulatory differences between the acquirer and target, as claimed by Schoenberg (2000). Thus, our hypothesis 3 is partially confirmed.

Third, considering the model without interactions, it is expected an increase in post-merger adjusted return on assets as the relative size of the target (Relative size) increases; as it was in other studies (e.g., Switzer, 1996; Linn and Switzer, 2001). Since we theorize no impact of Relative size on post-merger performance, this result rejects our hypothesis 4. Now, regarding the models with advanced interactions terms, it is possible to conclude that there is no difference in the impact of the increasing size of the target on firms' post-merger cost efficiency among acquirers from different country development stages. Merged firms from emergent and developing markets experienced a reduction on post-merger efficiency as the relative size of the target increases. Managers of bidding firms from these markets may find it more difficult to assimilate large targets (Clark and Ofek, 1994). Another explanation is that, as we showed in section 4.1., acquirers from emergent and developing markets tend to choose target firms from countries even less developed than theirs, normally with high bureaucracy cost, and the growing size of a company engaged in M&A could enhance such costs (Bertrand and Betschinger, 2012).

**Table 15: Determinants of operating performance changes following corporate mergers: deal and firm specific determinants**

Median ROA<sub>i</sub> <sup>post-M&A</sup><sub>adj</sub> / Median ROS<sub>i</sub> <sup>post-M&A</sup><sub>adj</sub> is computed as the median return on assets/sales of merged firm in the 3-years following the takeover date less the median return on assets/sales of the control firm in the same years. Pre-acq. adj. performance is equal to Median ROA<sub>i</sub> <sup>pre-M&A</sup><sub>adj</sub> / Median ROS<sub>i</sub> <sup>pre-M&A</sup><sub>adj</sub> and is the return on assets/sale of merged firm in the 3-years after takeover less the return on assets of the matched company at the same time for models. Cash is a dummy equal to one when cash is used to pay the entire acquisition price, zero otherwise; Mix is a dummy equal to one for acquisitions that issue stock in combination with cash; Relative size is the ratio between the size of the target and the size of the acquirer, with size measured by total assets; Cash reserves is the book value of cash and cash equivalents relative to market value of common stock and total debt of acquiring firm before merger; Leverage is the book value of total debt relative to market value of common stock and total debt of acquiring firm before merger; Relatedness4 is a dummy equal to one if target firm and acquiring firm have the same 4-digit NAICS 2017 code; Advanced represents the acquirer country development stage and is a dummy equal to one if the acquirer belongs to an advanced European country and zero otherwise. \*\*\*, \*\*, \* Values significantly different from zero at the 1%, 5%, and 10% levels, respectively. To test for individual and joint significance of the variables we use a T-test and F-test, respectively. Numbers in parentheses are standard errors. When needed we apply White's (1980) correction to the standard errors, to correct for an unknown form of heteroscedasticity.

	Median ROA <sub>i</sub> <sup>post-M&amp;A</sup> <sub>adj</sub>		Median ROS <sub>i</sub> <sup>post-M&amp;A</sup> <sub>adj</sub>	
	(1)	(2)	(3)	(4)
Intercept	-0.144 ** (0.069)	-0.011 (0.041)	-1.062 (1.453)	-0.068 *** (0.024)
Advanced	-0.035 (0.056)	-0.182 * (0.103)	0.588 (1.170)	-0.407 (0.663)
Pre-acq. adj. performance	0.301 *** (0.104)	1.172 *** (0.306)	0.005 *** (0.000)	0.609 *** (0.160)
<b>Advanced*Pre-acq. adj. performance</b>		<b>-0.871 ** (0.378)</b>		<b>-0.604 *** (0.160)</b>
<b>Deal variables</b>				
Cash (dummy)	0.088 * (0.049)	0.102 *** (0.031)	-0.565 (1.056)	0.057 ** (0.025)
<b>Advanced*Cash</b>		<b>-0.010 (0.073)</b>		<b>-0.802 (0.686)</b>
Mix (dummy)	0.025 (0.043)	-0.044 (0.032)	-0.250 (0.908)	-0.160 *** (0.028)
<b>Advanced*Mix</b>		<b>0.074 (0.071)</b>		<b>-0.171 (0.991)</b>
Cross border (dummy)	0.007 (0.035)	-0.117 *** (0.037)	-0.696 (0.771)	-0.070 *** (0.025)
<b>Advanced*Cross border</b>		<b>0.126 ** (0.053)</b>		<b>-0.678 (0.609)</b>
Relative size	0.057 *** (0.017)	-0.011 (0.046)	-0.234 (0.488)	-0.198 *** (0.045)
<b>Advanced*Relative size</b>		<b>0.069 (0.062)</b>		<b>-0.032 (0.511)</b>
<b>Firm variables</b>				
Cash reserves	0.171 * (0.096)	0.150 (0.118)	1.119 (2.158)	0.363 *** (0.071)
<b>Advanced*Cash reserves</b>		<b>0.031 (0.216)</b>		<b>0.841 (2.141)</b>
Leverage	0.084 (0.083)	-0.324 *** (0.067)	-0.053 (1.770)	-0.411 *** (0.084)
<b>Advanced*Leverage</b>		<b>0.427 *** (0.093)</b>		<b>0.408 (0.779)</b>
Relatedness4 (dummy)	0.043 (0.037)	0.045 (0.036)	1.564 * (0.790)	0.202 *** (0.029)
<b>Advanced*Relatedness</b>		<b>0.002 (0.056)</b>		<b>1.475 ** (0.723)</b>
Observations	167	167	154	154
F-statistic	3.138 ***	1.665 *	135.104 ***	67.807 ***
Adjusted R-squared	0.152	0.159	0.887	0.885

Regarding acquirers' firm characteristics Table 15 allow us the following conclusions:

The relative amount of cash reserves held by the acquirer prior to acquisition (Cash reserves) has a positive and significant impact in post-merger adjusted return on assets (column 1). Even though, the results are in line with our univariate analysis, they contradict our hypothesis 5. Moreover, the impact of the level of cash reserves prior takeover on firms' post-merger cost efficiency do not differ between advanced and emergent and developing markets. In emergent and developing markets cash-rich firms experience a positive and significant effect on post-merger efficiency.

Additionally, the effect on post-merger adjusted return on assets of the pre-M&A levels of leverage of the acquirer (Leverage) is significantly different between advanced and emergent and developing markets. Acquirers from emergent and developing markets with high levels of leverage prior takeover, experience a significantly reduction on post-merger adjusted return on assets. Regarding the impact of the pre-M&A levels of leverage of the acquirer on firms' post-merger cost efficiency, it is expected a reduction for emergent and developing markets acquirers, while there is no difference in the impact of such variable considering different country development stages. In a recent study Mateev and Andonov (2016) also show that acquirer's pre-M&A levels of leverage affect negatively the cumulative abnormal returns of 38 European M&As in the period 2003–2010. Even though, the result is in line with univariate analysis, our hypothesis 5 is not confirmed.

Lastly, we confirm our hypothesis 6, when the acquirer and the target are from the same industry (Relatedness<sup>4</sup>) it is expected a significant increase in post-merger operating performance; Healy *et al.* (1992) and Heron and Lie (2002) found similar conclusions. These results are in accordance with univariate analysis conclusions and confirms our hypothesis 6. Furthermore, the positive effect of industry-related transactions on firms' post-merger efficiency in advanced markets will be higher than in emergent and developing markets, where it is significantly positive.

The determinants of Table 15 have been broadly used in an attempt to explain the differences in post-merger operating performance (see e.g., Healy *et al.*, 1992; Ghosh, 2001; Linn and Switzer, 2001; Sharma and Ho, 2002; Powell and Stark, 2005; Martynova *et al.*, 2007). However, more recently, researches start to analyse how corporate governance profiles of acquiring firms directly influence operating performance outcomes of merger decisions (e.g., Carline *et al.*, 2009; Yen *et al.*, 2013; Boateng *et al.*, 2017). As many merger hypotheses

are either unrelated to or likely to be insufficiently tested by only a set of corporate governance factors, we unify and re-examine many of the prior results in the literature.

Thus, Table 16 reports regression results for our two operating performance measures on ownership structure and governance mechanisms after controlling for firm and transaction characteristics, and country variable which may also affect bidder post-merger operating performance. All models were significant and had adjusted  $R^2$  values between 20.3% and 88.2%. Table 16 follows the same structure as Table 15: Models with odd numbers report coefficient estimates without interaction between variables, and even-numbered models report the results including advanced interaction terms. Our main inferences are:

Firstly, as in Table 15, pre-acquisition operating performance and post-acquisition operating performance are positively related (all coefficients are significant at 1% level).

Secondly, the effect of higher levels of ownership concentration (Large shareholder holdings) on post-takeover adjusted return on assets is significantly different between advanced and emergent and developing markets. As the percentage of voting shares in the hands of the acquirers' largest shareholder increases, it is expected a deterioration in post-M&A performance of emergent and developing markets. A possible explanation for this result is that there might be a conflict of interest between majority shareholders and minority shareholders caused by wealth transfer from minority shareholders to controlling shareholders through takeovers (Detthamrong *et al.*, 2017). The results do not allow the confirmation of our hypothesis 7.

Thirdly, the size of the acquiring firm's board (Board size) has a positive and significant association with the operating performance effects of corporate mergers concerning emergent and developing markets. Dalton *et al.* (1999) and Pearce and Zahra (1992) argue that a larger board will have representation of people with diverse backgrounds, who bring knowledge and intellect to the board and thus improve the quality of strategic decisions. An alternative explanation is that larger boards could consist of more outsiders who make careful decision-making policy in firms since the reputation cost, if the firm fails, is likely to be high in comparison with their private benefit if a project turns out to be profitable (Eisenberg *et al.*, 1998). In addition, the impact of large boards in advanced markets is significantly different from the effect of such variable in emergent and developing markets. The results for emergent and developing markets allow the confirmation of our hypothesis 8.

**Table 16: Determinants of operating performance changes following corporate mergers: ownership and governance specific determinants**

This table reports ordinary least squares regression coefficient estimates and model summary statistics. Median  $ROA_{i,adj}^{post-M\&A}$  / Median  $ROS_{i,adj}^{post-M\&A}$  is computed as the median return on assets/sales of merged firm in the 3-years following the takeover date less the median return on assets/sales of the control firm in the same years. Pre-acq. adj. performance is equal to Median  $ROA_{i,adj}^{pre-M\&A}$  / Median  $ROS_{i,adj}^{pre-M\&A}$  and is the return on assets/sale of merged firm in the 3-years after takeover less the return on assets of the matched company at the same time for models. Large shareholder holdings is the percentage of voting shares held by the largest shareholder; Board size represent the numbers of directors on the board in the acquiring firm. The natural logarithm of Board size is used to capture a decreasing marginal effect for this explanatory variable; Board holdings represent proportion of acquiring firm's outstanding common stock held by its board of directors in aggregate before merger; Independent directors is the percentage of independent directors on the board of directors; CEO duality is a dummy equal to one if CEO and COB positions are held by the same individual; Rule of law target is a proxy to measure the 'efficient' of legal regimes: countries are scored on a scale from 0 to 100 based on an assessment of the law and order tradition. See Appendix C for remaining variables definition. \*\*\*, \*\*, \* Values significantly different from zero at the 1%, 5%, and 10% levels, respectively. To test for individual and joint significance of the variables we use a T-test and F-test, respectively. Numbers in parentheses are standard errors. When needed we apply White's (1980) correction to the standard errors, to correct for an unknown form of heteroscedasticity.

	<i>Median ROA<sub>t,adj</sub><sup>post-M&amp;A</sup></i>		<i>Median ROS<sub>t,adj</sub><sup>post-M&amp;A</sup></i>	
	(1)	(2)	(3)	(4)
Intercept	-0.213 (0.324)	-1.390 *** (0.502)	1.628 (2.153)	5.082 (10.071)
Pre-acq. adj. performance	0.407 ** (0.186)	0.408 ** (0.191)	0.005 *** (0.000)	0.005 *** (0.000)
Advanced	0.022 (0.101)	1.213 *** (0.447)	0.799 (0.991)	9.718 (6.001)
<b>Ownership variable</b>				
Large shareholder holdings	-0.007 (0.066)	-0.679 ** (0.280)	1.730 (1.139)	9.718 (6.001)
<b>Advanced*Large shareholder holdings</b>		<b>0.667 ** (0.273)</b>		<b>-8.043 (5.948)</b>
<b>Governance variables</b>				
Board size	0.033 (0.061)	0.633 *** (0.211)	-0.553 (0.636)	-3.483 (4.850)
<b>Advanced*Board size</b>		<b>-0.604 *** (0.223)</b>		<b>2.956 (5.142)</b>
Board holdings	-0.0002 (0.0002)	-0.078 (0.110)	-0.008 (0.011)	2.938 (2.481)
<b>Advanced*Board holdings</b>		<b>0.078 (0.110)</b>		<b>-2.946 (2.483)</b>
Independent directors	-0.271 *** (0.098)	0.792 *** (0.211)	0.116 (1.394)	1.757 (2.723)
<b>Advanced*Independent directors</b>		<b>-1.067 *** (0.224)</b>		<b>-1.964 (2.105)</b>
CEO duality (dummy)	-0.050 (0.070)	0.196 *** (0.062)	-0.691 (0.815)	-0.426 (0.960)
<b>Advanced*CEO duality</b>		<b>-0.248 *** (0.075)</b>		<b>-0.271 (0.629)</b>
<b>Country variable</b>				
Rule of law target	0.002 (0.004)	-0.001 (0.004)	-0.021 (0.023)	-0.021 (0.025)
<b>Deal variables</b>				
Cash (dummy)	0.062 (0.062)	0.058 (0.069)	-1.254 (0.952)	-1.334 (1.090)
Mix (dummy)	0.015 (0.054)	0.014 (0.060)	-0.738 (1.308)	-0.781 (1.496)
Cross border (dummy)	0.011 (0.042)	0.011 (0.043)	-0.928 (0.692)	-0.910 (0.712)
Relative size	0.070 ** (0.031)	0.069 ** (0.032)	-0.228 (0.686)	-0.228 (0.694)
<b>Firm variables</b>				

Cash reserves	0.163 (0.190)	0.170 (0.192)	1.910 (2.408)	1.880 (2.487)
Leverage	-0.009 (0.091)	0.014 (0.096)	-0.142 (1.280)	-0.100 (1.425)
Relatedness4 (dummy)	0.014 (0.040)	0.015 (0.043)	1.993 ** (0.761)	2.083 ** (0.823)
Observations	124	124	112	112
F-statistic	3.425 ***	2.566 ***	56.380 ***	40.168 ***
Adjusted R-squared	0.228	0.203	0.882	0.876

Fourthly, independent directors affect positively and significantly the post-merger operating performance of merged firms belonging to European emergent and developing markets. The positive impact of independent directors on firm performance also have been found by Choi *et al.* (2007) for Korean firms, Jackling and Johl (2009) for firms in India and by Muniandy and Hillier (2015) for firms in South Africa. On the other hand, board independence has a negative effect on post-merger operating performance concerning advanced European markets<sup>1</sup>. Agrawal and Knoeber (1996) found the same for the US. Only the results for emergent and developing markets confirm our hypothesis 9.

Lastly, the case where a firm's CEO is also its chairman of the board of directors (CEO duality) lead to better post-M&A operating performance in emergent and developing markets. Pham *et al.*, (2015) also document evidence that CEO duality positively impact changes in earnings' growth after M&A for a sample of Vietnam firms. When senior leadership candidates are in scarce supply, the CEO duality structure helps the firm to leverage on existing leadership expertise, the benefits of which outweigh the potential agency costs of CEO duality. In addition, the impact on post-takeover operating performance of CEO duality in emergent and developing markets is different than the effect of such determinant in advanced markets. Results for emergent and developing markets confirm our hypothesis 10.

Now we turn our attention to the control variables, our results suggest that, the relative size of the target (for adjusted return on assets) and the acquirer and the target being for the same industry (for adjusted return on sales) have positive and significant impact on the operating performance of European M&A after takeover. These results are in line with our conclusions of Table 15. The remaining control variables do not have a significant impact in explaining the change in post-M&A operating performance.

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<sup>1</sup> The Wald test was applied.

## 7. Conclusions

The empirical evidence on changes in post-acquisition operating performance is relatively scarce in comparison with the research on the stock price performance. Even considering the few studies about post-merger operating performance, it is not possible to confirm that they are ‘culture free’, since most of the empirical evidence is from US and UK. Also, conclusions are contradictory. Differences in the measurement of profitability and in the choice of the correct peer-companies is partly responsible for the inconsistency in conclusions across studies.

This dissertation contributes to the literature on mergers and acquisitions by investigating post-M&A performance of European companies over 2008–2014. Using two measures of adjusted operating performance and conducting both univariate and multivariate analyses, we find a deterioration of post-M&A performance of the combined firms as measured by the return on assets. This result is consistent with previous studies where authors find a harmful impact of M&A activity (Hogarty, 1970; Franks *et al.*, 1988; Clark and Ofek, 1994; Dickerson *et al.*, 1997; Sharma and Ho, 2002; Yeh and Hoshino, 2002; Pazarskis *et al.*, 2006; Bertrand and Betschinger, 2012). Furthermore, in line with Martynova *et al.* (2007), the intercept model documents higher absolute changes in operating performance than the change model.

When we split the sample by country development stage, our results show interesting conclusions. Advanced markets experienced a significant reduction on post-merger adjusted returns on assets, while no significant change was observed with respect to firms’ cost efficiency after takeover. Consistent with Chi *et al.* (2011) and Yen *et al.* (2013) emergent and developing market acquirers show a positive and significant median pre-acquisition performance. However, after acquisition, acquirers from these markets suffer a significant decrease in post-merger operating performance, considering both profitability and cost efficiency.

Our cross-sectional analysis of operating performance changes following corporate mergers confirmed our change model results. That is, a company’s post-acquisition performance is generally lower than its pre-acquisition operating performance, and pre-acquisition operating performance and post-acquisition operating performance are positively related. We find that post-merger operating performance changes are also strongly determined by some factors. Regression results show that post-merger profitability of emergent and developing market acquirers is enhanced by cash-only as a method of payment for acquisition. Moreover,

merged firms' post-M&A cost efficiency is adversely affected when a mix of securities is the method of payment, when the acquirer chooses a target from a different country, when the size of the firm being acquired increases relative to the acquiring firm; and when the acquirer has high levels of pre-M&A leverage. In turn, emergent and developing acquirers that have high pre-M&A cash reserves and that prefer to acquire targets from the same industry experience improvements on firms' post-merger cost efficiency. For advanced market acquirers, we can significantly conclude that the positive effect of industry-related transactions on firms' post-merger efficiency in advanced markets will be higher than in emergent and developing markets, where it is significantly positive.

It is surprising that, in spite of the intensity of focus on the association between corporate governance and managerial decisions practically no attention has been devoted to how corporate governance directly impacts the operating performance effects of mergers (Thenmozhi and Narayanan, 2016). Thus, we explicitly examining how corporate governance characteristics of acquiring firms impact merger performance. We find that operating performance outcomes are worse when the emergent and developing acquiring firm has a large equity holder. While governance variables such as a large board, high proportion of outside independent directors on acquirers' board composition, and Chairman-CEO duality are expected to enhance operating performance after takeover. Regarding advanced markets, our results show a negative effect drive by acquirers' board be composed by a large proportion of outside independent directors.

Lastly, the impact on post-takeover operating performance of the method of payment, the relative size of the target, acquirers' pre-M&A cash reserves, and pre-M&A acquirers' board holdings, do not differ between advanced and emergent and developing markets. For the remaining factors the effect on post-merger operating performance do differ between acquirers' country development stage.

This dissertation, however, has some limitations that should be taken in consideration when interpreting the findings. The relatively small size of European emergent and developing acquirers presented in our sample; which was driven by restrictions in deal size, and the fact that we only considered final acquisition stakes of 100%. Also, the use of EBIT instead of EBITDA. We were forced to use EBIT as measure of operating performance, due to the limited availability of EBITDA data for privately held acquirers.

Finally, this dissertation can be extended for future research, specifically increasing the sample size of European emergent and developing markets to obtain more robust results.

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## Appendix A: IMF country classification for Europe

<b>Advanced Europe</b>	<b>Emerging and Developing Europe:</b>
Germany, France, Italy, Spain, Netherlands, Belgium, Austria, Greece, Portugal, Ireland, Finland, Slovak Republic, Lithuania, Slovenia, Luxembourg, Latvia, Estonia, Cyprus, Malta, United Kingdom, Switzerland, Sweden, Norway, Czech Republic, Denmark, Iceland, and San Marino.	Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Kosovo, Latvia, Lithuania, FYR Macedonia, Montenegro, Poland, Romania, Serbia, Turkey, and Russian Federation <sup>a</sup> .

a) Russian Federation was considered an Emergent and Developing economy following the World Economic Situation and Prospects 2017. Russian Federation was considered a European country following Bureau van Dijk's Amadeus Database.

## Appendix B: Summary of post-M&A operating performance studies

Source of table: continuation of the review of Rao-Nicholson *et al.* (2016)

Author(s), year	Market	Sample period	Sample size	Performance measure	Scaled by	Benchmark	Object of study: bidder (B) or target (T)	Change (C) or Intercept (I) Model	Changes in post-M&A performance
Advanced markets									
Hogarty, 1970	US	1953–1964	43	(1) EPS, (2) Capital gains	Nr. of shares	Industry	B	Other	Deterioration
Lev and Mandelker, 1972	US	1952–1963	69	(1) Net income (2) Operating income	(1) BV assets, (2) BV equity, (3) Sales, (4) Nr. of shares	(1) Industry, (2) Size	B and T	C	No significant change
Franks <i>et al.</i> , 1988	US	1975–1979	42	(1) Return on common equity, (2) Total return to shareholders	None	(1) Industry, (2) Size, and (3) Pre-performance	B	C and I	Deterioration
Herman and Lowenstein, 1988	US hostile offers	1975-1983	56	(1) Net income (2) EBIT	(1) BV Equity (2) Capital	Unmatched	B	C	No significant change
Healy <i>et al.</i> , 1992	US	1979–1984	50	Pre-tax cash flow	Adj. MV Assets	Industry	B and T	C and I	Enhancement
Clark and Ofek, 1994	US	1981–1988	38	EBITD	Sales	Industry	B and dis-tressed T	C and I	Deterioration
Switzer, 1996	US	1967–1987	324	Pre-tax cash flow	MV assets	Industry	B and T	C and I	Enhancement
Parrino and Harris, 1999	US	1982–1987	197	Pre-tax cash flow	MV assets	Industry	B and T	C and I	Enhancement if target management is replaced

<b>Linn and Switzer, 2001</b>	<b>US</b>	1967–1987	413	Pre-tax cash flow	cash	MV assets	Industry	B and T	C	Enhancement
<b>Ghosh, 2001</b>	<b>US</b>	1981–1995	315	Pre-tax cash flow	cash	Adj. MV Assets	(1) Industry, (2) Size, and (3) Pre-performance	B and T	C and I	No significant change
<b>Heron and Lie, 2002</b>	<b>US</b>	1985-1997	859	Operating income	in-	Sales	(1) Industry, (2) Pre-performance	B	C	Enhancement
<b>Moeller and Schlingemann, 2004</b>	<b>US</b>	1985-1995	2,362	Pre-tax cash flow	Cash	MV assets	Industry	B	I	Deterioration
<b>Meeks, 1977</b>	<b>UK</b>	1964-1972	223	Pre-tax profits		Net assets	Industry	B and T	C	Deterioration
<b>Dickerson <i>et al.</i>, 1997</b>	<b>UK</b>	1948–1977	1443	Pre-tax cash flow	Cash	Net assets	Industry	B	Other	Deterioration
<b>Powell and Stark, 2005</b>	<b>UK</b>	1985–1993	191	Pre-tax cash flow adj. for changes in working capital	cash	(1) MV assets, (2) Adj. MV assets, (3) BV assets, (4) Sales	(1) Industry, (2) Size, and (3) Pre-performance	B and T	C and I	Enhancement
<b>Mueller, 1980</b>	<b>Belgium, Germany, UK, France, Netherlands, Sweden, US</b>	50s, 60s, 70s	Different per country	Pre-tax profits		BV Assets	(1) Industry, (2) Size	None	Other	Belgium, Germany, UK, and US: Enhancement; France, Netherlands, and Sweden: Deterioration
<b>Pazarskis <i>et al.</i>, 2006</b>	<b>Greece</b>	1998–2000	50	Profitability, Liquidity and Solvency ratios		None	None	B	C	Deterioration
<b>Papadakis and Thanos, 2010</b>	<b>Greece</b>	1997–2003	50	ROA		BV assets	Industry	B and T	C	No significant change
<b>Martynova <i>et al.</i>, 2007</b>	<b>Europe</b>	1997–2001	155	Pre-tax cash flow adj. for changes in working capital	Cash	(1) BV assets, (2) Sales	(1) Industry, (2) Size, and (3) Pre-performance	B and T	C and I	No significant change
<b>Giudici and Bonaventura (2017)</b>	<b>Europe</b>	1998–2008	245	Pre-tax cash flow	Cash	1) BV assets, (2) Sales	(1) Industry, (2) Size, and (3) Pre-performance	Bidder IPO company	C and I	No significant change

Sharma and Ho, 2002	Australia	1986–1991	36	Pre-tax flow adj. for changes in working capital	Cash flow	(1) BV assets, (2) BV equity, (3) Sales, (4) Nr. Of shares	(1) Industry, (2) Size	B and T	C and I	No significant change
Dutta and Jog, 2009	Canada	1993–2002	1300	Pre-tax flow	Cash flow	BV assets	(1) Industry, (2) Size, and (3) Pre-performance	B	C and I	No significant change
Ikeda and Doi, 1983	Japan	1964–1975	49	Pre-tax flow	cash flow	(1) BV equity, (2) BV assets	Industry	B and T	C	Enhancement
Yeh and Hoshino, 2002	Japan	1970–1974	86	ROA, Sales, Employment growth	ROE, growth,	None	Industry	B and T	Other	Deterioration
Kruse <i>et al.</i> , 2002	Japan	1969–1999	69	Pre-tax flow	Cash flow	(1) MV assets, (2) Sales	(1) Industry, (2) Size	B and T	C and I	Enhancement
Emerging and developing markets										
Rahman and Limmack, 2004	Malaysia	1988–1992	113	Pre-tax flow adj. for changes in working capital	Cash flow	BV assets	(1) Industry, (2) Size	B and T	C and I	Enhancement
Pawaskar, 2001	India	1992–1995	36	Pre-tax flow	Cash flow	Net assets	(1) Industry, (2) Size	B	Other	Deterioration
Mantravadi and Reddy, 2008	India	1991–2003	118	6 different financial and operating ratios		None	None	B	C	Deterioration
Kumar and Bansal, 2008	India	2003	74	Working capital, operating profit, profit before tax, ROE, debt to equity ratios		None	None	B	C	Enhancement

<b>Bertrand and Betschinger, 2012</b>	<b>Russia</b>	1999–2008	609	Pre-tax flow	Cash	BV assets	Non-acquiring firm	B	Other	Deterioration
<b>Rao-Nicholson <i>et al.</i>, 2016</b>	<b>ASEAN countries</b>	2001–2012	57	(1) ROA (2) ROA margin	ROA, mar-	(1) BV assets, (2) Sales	(1) Industry, (2) Size, and (3) Pre-performance	B and T	C	Deterioration

## Appendix C: Hypothesized determinants of operating performance following corporate mergers and respective source

Independent variables	Definition	Source
<b>Ownership variables</b>		
Large shareholder holdings	The percentage of voting shares held by the acquirers' largest shareholder	Company Reports
<b>Governance variables</b>		
Board size	Natural logarithm of the number of directors comprising acquiring firm's board before merge	Company Reports
Board holdings	Proportion of acquiring firm's outstanding common stock held by its board of directors in aggregate before merger	Company Reports
Independent Directors	Percentage of independent directors on the board of directors	Company Reports
CEO duality	One if acquiring firm's CEO has also been its chair before merger	Company Reports
<b>Deal variables</b>		
Cash	One when payment is 100% cash	Zephyr
Stock	One if common stock only is form of payment for merger	Zephyr
Mix	One when payment as a mix constitution	Zephyr
Cross border	One if the acquiring and target firms are from different countries	Zephyr
Relative size	Ratio between the size of the target and the size of the acquirer, with size measured by total assets	Zephyr
<b>Firm variables</b>		
Leverage	Natural logarithm of the acquiring firm's leverage (book value of debts divided by market value of assets) at the fiscal year end before the acquisition year	Amadeus, DataStream
Cash Reserves	Cash liquidity ratio (book value of cash and equivalents relative to SIZE) of acquiring firm before merger, being SIZE the market value of acquiring firm's assets (market value of common stock combined with book values of other stock and total debt) before merger	Amadeus, DataStream
Relatedness4	One if target firm and acquiring firm have the same 4-digit NAICS 2017 code;	Zephyr
<b>Country variables</b>		
RISK_T	Default spread expressed in basis points according to the target country rating in the announcement year	Aswath Damodaran web site
GDPPC_T	GDP per capita of the target country in the announcement year	International Monetary Fund
Rule of law target	For the target country. Countries are scored on a scale from 0 to 100 based on an assessment of the law and order tradition	Worldwide Governance Indicators

## Appendix D: Correlation coefficients among all our variables

	Median ROA (Pos. Adj.)	Median ROA (Pre. Adj.)	Cash	Stock	Mix	Cross border	Relative Size	Cash reserves	Leverage	Relatedenss 4	Large Shareholder Holdings	Board size	Board holdings	Independent directors	CEO duality	Rule of law target
Median ROA (Pos. Adj.)	1.0	0.3	0.1	0.1	-0.1	-0.1	0.3	0.1	0.0	0.0	-0.1	0.0	0.0	-0.3	0.0	0.0
Median ROA (Pre. Adj.)	0.3	1.0	0.1	-0.2	0.1	0.0	0.0	0.0	0.0	-0.1	-0.3	0.2	0.1	0.1	-0.1	-0.1
Cash	0.1	0.1	1.0	-0.3	-0.6	0.0	-0.2	-0.1	0.1	-0.1	0.1	0.2	-0.1	0.1	-0.1	0.0
Stock	0.1	-0.2	-0.3	1.0	-0.5	-0.2	0.3	0.1	0.1	0.1	0.1	-0.2	-0.1	-0.3	0.1	0.0
Mix	-0.1	0.1	-0.6	-0.5	1.0	0.1	-0.1	0.0	-0.1	0.0	-0.2	0.0	0.1	0.2	0.0	0.0
Cross border	-0.1	0.0	0.0	-0.2	0.1	1.0	-0.1	0.1	-0.1	0.1	-0.2	-0.1	0.0	0.3	0.0	0.0
Relative Size	0.3	0.0	-0.2	0.3	-0.1	-0.1	1.0	0.0	-0.1	0.0	0.0	-0.2	0.2	-0.1	0.0	0.1
Cash reserves	0.1	0.0	-0.1	0.1	0.0	0.1	0.0	1.0	-0.2	-0.1	-0.1	0.0	-0.1	0.0	0.1	0.1
Leverage	0.0	0.0	0.1	0.1	-0.1	-0.1	-0.1	-0.2	1.0	0.1	0.0	0.2	0.1	0.0	-0.2	0.0
Relatedenss 4	0.0	-0.1	-0.1	0.1	0.0	0.1	0.0	-0.1	0.1	1.0	-0.1	0.0	-0.2	-0.1	0.0	0.1
Large Shareholder Holdings	-0.1	-0.3	0.1	0.1	-0.2	-0.2	0.0	-0.1	0.0	-0.1	1.0	0.0	0.0	-0.1	0.3	-0.1
Board size	0.0	0.2	0.2	-0.2	0.0	-0.1	-0.2	0.0	0.2	0.0	0.0	1.0	-0.1	0.2	-0.1	-0.1
Board holdings	0.0	0.1	-0.1	-0.1	0.1	0.0	0.2	-0.1	0.1	-0.2	0.0	-0.1	1.0	0.0	-0.1	0.1
Independent directors	-0.3	0.1	0.1	-0.3	0.2	0.3	-0.1	0.0	0.0	-0.1	-0.1	0.2	0.0	1.0	-0.3	0.3
CEO duality	0.0	-0.1	-0.1	0.1	0.0	0.0	0.0	0.1	-0.2	0.0	0.3	-0.1	-0.1	-0.3	1.0	-0.1
Rule of law target	0.0	-0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	-0.1	-0.1	0.1	0.3	-0.1	1.0

	Median ROS (Pos. Adj.)	Median ROS (Pre. Adj.)	Cash	Stock	Mix	Cross border	Relative size	Cash reserves	Leverage	Relatedenss4	Large Shareholder holdings	Board size	Board holdings	Independent directors	CEO duality	Rule of law target
Median ROS (Pos. Adj.)	1.0	0.9	-0.1	0.2	-0.1	-0.1	0.6	-0.1	-0.1	0.1	0.0	-0.1	0.0	-0.2	0.0	0.0
Median ROS (Pre. Adj.)	0.9	1.0	-0.1	0.2	-0.1	-0.1	0.8	-0.1	-0.1	0.1	0.0	-0.1	0.0	-0.2	0.0	0.0
Cash	-0.1	-0.1	1.0	-0.3	-0.6	0.1	-0.2	-0.1	0.0	-0.1	0.1	0.1	-0.1	0.1	-0.1	0.0
Stock	0.2	0.2	-0.3	1.0	-0.5	-0.1	0.3	0.1	0.1	0.1	0.0	-0.1	-0.1	-0.3	0.0	0.0
Mix	-0.1	-0.1	-0.6	-0.5	1.0	0.0	-0.1	0.0	-0.1	0.0	-0.1	0.0	0.1	0.1	0.1	0.0
Cross border	-0.1	-0.1	0.1	-0.1	0.0	1.0	-0.1	0.1	-0.1	0.0	-0.1	-0.1	-0.1	0.3	0.0	0.0
Relative size	0.6	0.8	-0.2	0.3	-0.1	-0.1	1.0	0.0	-0.1	0.0	0.0	-0.2	0.2	-0.1	0.0	0.1
Cash reserves	-0.1	-0.1	-0.1	0.1	0.0	0.1	0.0	1.0	-0.3	-0.1	-0.1	-0.1	-0.1	0.0	0.1	0.1
Leverage	-0.1	-0.1	0.0	0.1	-0.1	-0.1	-0.1	-0.3	1.0	0.1	0.1	0.2	0.1	0.0	-0.1	0.0
Relatedenss4	0.1	0.1	-0.1	0.1	0.0	0.0	0.0	-0.1	0.1	1.0	-0.1	0.0	-0.2	-0.1	0.0	0.1
Large Shareholder holdings	0.0	0.0	0.1	0.0	-0.1	-0.1	0.0	-0.1	0.1	-0.1	1.0	0.1	0.1	-0.1	0.1	-0.2
Board size	-0.1	-0.1	0.1	-0.1	0.0	-0.1	-0.2	-0.1	0.2	0.0	0.1	1.0	-0.1	0.2	0.0	-0.1
Board holdings	0.0	0.0	-0.1	-0.1	0.1	-0.1	0.2	-0.1	0.1	-0.2	0.1	-0.1	1.0	0.0	-0.1	0.1
Independent directors	-0.2	-0.2	0.1	-0.3	0.1	0.3	-0.1	0.0	0.0	-0.1	-0.1	0.2	0.0	1.0	-0.2	0.3
CEO duality	0.0	0.0	-0.1	0.0	0.1	0.0	0.0	0.1	-0.1	0.0	0.1	0.0	-0.1	-0.2	1.0	-0.1
Rule of law target	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	-0.2	-0.1	0.1	0.3	-0.1	1.0

