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Value-based Management and Merger & Acquisition Returns: A Multi-level Contingency Model

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ABSTRACT Whereas the performance effects of value-based management (VBM) have been intensively addressed in previous research, little is known regarding whether—and which—specific managerial decisions are improved by VBM. In this study, we take advantage of merger and acquisition (M&A) decisions that allow us to analyze a specific managerial decision with a direct assessment by the capital market. Moreover, to better grasp the underlying mechanisms of VBM, we consider potential contingency factors that may affect the relationship between VBM and M&As. Specifically, we examine the risk of managerial self-interest in M&A decisions that may be influenced by a firm's internal, industry- and country-specific contexts. We gather VBM data of firms from the Standard & Poor's 500 Index and the MSCI Europe Index between 2005 and 2011, and combine the data with deal data resulting in a sample of 2787 deals. Our empirical results do not indicate a positive direct effect from VBM on M&A returns. However, we find that VBM leads to superior M&A returns in the presence of contingency factors that increase the risk for self-interested managerial decisions.

Keywords: Value-based management; Mergers & acquisitions; Event study; Managerial self-interest

JEL classifications: M41; G34

1. Introduction

Originating from the notion of shareholder value creation by Rappaport (1986), several academic scholars (Burkert & Lueg, 2013; Dekker, Groot, Schoute, & Wiersma, 2012; Malmi & Granlund, 2009; Riceman, Cahan, & Lal, 2002) and corporations (such as Coca-Cola, Procter & Gamble and Siemens)¹ have devoted their attention to the field of value-based management (VBM). Proponents of VBM suggest a better alignment between managerial and shareholder interests by linking the corporate decision-making process with key value-based metrics (Ameels,

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¹Tortella and Brusco (2003) highlight several prominent VBM adopters who stress the importance of VBM as a management technique in business practice. Motivated by this practical relevance, Haspeslagh, Noda, and Boulos (2001) summarize the initial results of VBM adopters. They outline examples both of success stories and of corporations that only achieved mediocre results.

Bruggeman, & Scheipers, 2003; Madden, 1999; Young & O'Byrne, 2000). Based on this, most VBM research has focused on whether VBM leads to an increase in firm performance (e.g. Athanassakos, 2007; Cordeiro & Kent, 2001; Firk, Schrapf, & Wolff, 2016; Ittner, Larcker, & Randall, 2003; Ryan & Trahan, 2007). However, as firm performance may increase for multiple reasons, previous studies emphasize the challenge of inferring causality in VBM performance research (Ittner & Larcker, 2001; Lueg & Schäffer, 2010). Whereas recent research has focused on methodological advancements to address this challenge (Firk et al., 2016; Rapp, Schellong, Schmidt, & Wolff, 2011), a more direct assessment of managerial decisions that drive VBM's performance outcomes could provide another opportunity to better grasp the underlying mechanisms of VBM (Lueg & Schäffer, 2010; Rapp et al., 2011).

Previous research has taken a closer look into specific decision-making aspects of VBM, particularly by investigating VBM's effect in regards to investment decisions (Balachandran, 2006; Hogan & Lewis, 2005; Wallace, 1997). Although the results of these studies indicate VBM's influence on investment behavior, little is known about whether this impact is aligned with shareholder interests (i.e. does it create shareholder value or not?). Hence, to advance the understanding of VBM's benefits, a direct evaluation of managerial decisions is needed. Consequently, we take advantage of merger and acquisition (M&A) decisions that are considered to provide a direct assessment of the quality of a managerial decision via the capital market (i.e. shareholders) (Bens, Goodman, & Neamtiu, 2012; Moeller, Schlingemann, & Stulz, 2004).²

M&A decisions are major investments that have frequently been highlighted as being susceptible to agency conflicts and managerial self-interest, leading to empire building or entrenchment strategies (Jensen, 1986; Masulis, Wang, & Xie, 2007; Morck, Shleifer, & Vishny, 1990). Therefore, M&A decisions call for a control system (such as VBM) that could reduce these conflicts. However, several researchers also highlight how the risk of the self-interested behavior of managers in M&A decisions may not always be equally present but driven by the opportunities for managers to expend resources on M&As (e.g. Campbell, Sirmon, & Schijven, 2016; Jensen, 1986). Hence, as VBM should mitigate self-interested managerial decisions, considering the opportunities to expend resources may help us to gain further insight into whether this benefit of VBM can be realized. Consequently, we attempt to answer the following question: *Does VBM have a positive effect on M&A decisions and how is this effect influenced by the risk of managerial self-interest in M&A decisions?*

We predict that VBM will lead to better M&A decisions based on the suggested alignment between managerial and shareholder interests (Ameels et al., 2003; Madden, 1999; Young & O'Byrne, 2000). In addition, we suggest that the risk of managerial self-interest will positively moderate VBM's effect on M&A decisions. To examine these predictions, we hand-collect VBM data for firms listed on Standard & Poor's 500 (S&P 500) Index and the MSCI Europe Index between 2005 and 2011. We then combine these firm-years with deal data, resulting in a sample of 2787 M&A deals. Our analysis is conducted in two parts. First, we analyze the direct effect of VBM on the returns stemming from M&A decisions. Second, we relate the relationship between VBM and M&As to factors that provide opportunities for managers to expend resources in their own interests. To do so, we focus on three contextual levels: the firm (free cash flow (FCF)), the industry (industry competition) and the country (equity availability). Our results are unable to support a positive and significant direct effect from VBM on M&A returns. However, we consistently find that VBM leads to higher M&A returns when managers have more opportunities to expend resources in their own interests. Hence, our results indicate that VBM aligns managerial

²For a similar reason, a recent study by Knauer, Silge, and Sommer (2018) adopted an event-study methodology to investigate the impact of VBM on M&A and divestiture returns in a German setting.

decisions with shareholder interests in situations where self-interested decisions of managers are more likely to occur.

Our study contributes to the literature in several ways. First, we extend recent VBM performance literature (e.g. Firk et al., 2016; Ittner et al., 2003; Rapp et al., 2011; Ryan & Trahan, 2007) by delving deeper into the mechanisms of the VBM performance effect. By focusing on the M&A setting, we are able to outline how VBM can align managerial decisions (i.e. M&As) with shareholder interests in situations that are prone to self-interested managerial behavior. Thereby, we substantiate a recent study by Knauer et al. (2018) indicating that the mitigation of managerial self-interest is a key mechanism driving the positive performance outcomes of VBM.³ Moreover, the focus on the M&A setting extends previous research studying the effects of VBM on managerial investment decisions (Balachandran, 2006; Kleiman, 1999; Wallace, 1997) by highlighting the direct shareholder effects stemming from these decisions. Second, we enhance previous research calling for the consideration of contextual factors when studying VBM effects (Firk et al., 2016; Lueg & Schäffer, 2010). Whereas a recent study by Firk et al. (2016) indicates that complementary institutional factors may strengthen the performance outcomes of VBM through effective integration, this study highlights how the benefits of VBM during managerial decision-making may be particularly relevant in situations where managers could more easily fund self-interested decisions. Revealing contingency factors that moderate the relationship between VBM and M&A returns also contextualizes recent findings of Knauer et al. (2018) on the direct relationship between VBM and M&A returns. Finally, we add VBM to the existing control instruments influencing M&A decisions such as board monitoring (Ahn, Jiraporn, & Kim, 2010; Kim, Mauldin, & Patro, 2014), active shareholder control (Ben-Amar & Andre, 2006; Zhu & Yang, 2016) and management compensation (Jaggi & Dorata, 2006; Yim, 2013).

The remainder of the paper is organized as follows. Section 2 presents a review of the relevant theory and literature through which we generate our hypotheses. Section 3 discusses the sample, the variables and the analytical model. Section 4 presents the results and section 5 the robustness tests. Finally, section 6 concludes the study.

2. Prior Literature and Hypotheses

2.1. Value-Based Management and Performance Outcomes

VBM is frequently defined as an integrated management system that aims at creating shareholder value (e.g. Firk et al., 2016; Ittner & Larcker, 2001; Malmi & Ikäheimo, 2003). Precisely, VBM considers value creation through value-based metrics that combine the cost of invested capital with the profitability of a firm (Koller, Goedhart, & Wessels, 2010). These metrics are used as key indicators to assess managerial performance and replace traditional accounting measures. In turn, goals and objectives, resource allocation and performance evaluation should focus on the creation of shareholder value (Ittner et al., 2003; Malmi & Ikäheimo, 2003).

Based on these characteristics, many researchers conduct analyses grounded in agency theory (Jensen & Meckling, 1976) to analyze the performance effects of VBM (e.g. Rapp et al., 2011; Ryan & Trahan, 2007; Wallace, 1997). Although recent research predominantly indicates a positive relationship (Firk et al., 2016; Ittner et al., 2003; Rapp et al., 2011; Ryan & Trahan, 2007),

³Based on a German sample, Knauer et al. (2018) document a positive association between VBM and M&A returns and a non-significant association between VBM and divestiture returns. They argue that VBM provides more benefits in the context of acquisitions as these decisions are more prone to managerial self-interest than divestitures. The results of our cross-country study did not show a direct and positive effect of VBM on M&A returns. However, similar to the arguments of Knauer et al. (2018), we find that VBM has a positive association with M&A returns in situations where self-interested M&A decisions of managers are more likely to occur.

other studies cannot find a homogeneous favorable effect (Cordeiro & Kent, 2001; Kyriazis & Anastassis, 2007; Riceman et al., 2002). In this context, Lueg and Schäffer (2010) emphasize that it is difficult for VBM research to detect whether VBM is the cause of a performance increase, as a firm's performance may increase for several reasons. To overcome this challenge, some VBM studies have relied on the use of more sophisticated econometrical methods. For example, Firk et al. (2016) employ a dynamic panel data technique, Rapp et al. (2011) use an instrumental variable approach, and Ryan and Trahan (2007) rely on a matched sample approach. Nevertheless, while these studies foster the view that VBM is associated with positive performance outcomes, Rapp et al. (2011) highlight that performance analyses of VBM generally provide only limited insights into the way in which VBM affects managerial decision-making. Hence, the direct assessment of the impact of VBM on specific managerial decisions could provide another fruitful opportunity to better understand the causes of the VBM performance effect.

2.2. Value-Based Management and Managerial Decisions

Several researchers have analyzed the relationship between VBM and more specific managerial actions to take a closer look at the effects of VBM. In particular, investment decisions are addressed (Balachandran, 2006; Hogan & Lewis, 2005; Wallace, 1997). For example, Wallace (1997) finds that the adoption of VBM is associated with a decrease in investments, in line with the perception that the capital charge of value-based metrics disciplines management to avoid overinvestments. In contrast, Hogan and Lewis (2005) point out that changes in investment behavior after VBM adoption are not different from a matched sample of anticipated adopters. The results of Balachandran (2006) contextualize these findings by indicating that an increase or decrease in investments is conditional on the key performance indicators (KPIs: earnings-based or return on investment-based) that were used prior to the adoption of VBM. Hence, although prior research suggests that VBM may impact investment decisions, little is known about whether this impact aligns managerial action with shareholder interests and thus adds to shareholder value. In this context, a direct evaluation of specific investment decisions could help to clarify the influence of VBM on managerial decisions from a shareholder perspective (see also Knauer et al. 2018). M&A decisions could provide a solution as they are directly evaluated by the reaction of shareholders in the capital market (Bens et al., 2012; Moeller et al., 2004; Schijven & Hitt, 2012).⁴ Thus, they allow an analysis of the relationship between VBM and the shareholder evaluation of a specific managerial decision.

2.3. The Effect of Value-Based Management on M&A Decisions

As M&As usually involve important expenditures consisting of large sums, they are one of the most frequently discussed investment decisions (Appadu, Faelten, Moeller, & Vitkova, 2016; Dhaliwal, Lamoreaux, Litov, & Neyland, 2016; Masulis et al., 2007; Moeller & Schlingemann, 2005). In particular, researchers have analyzed the reasons behind why M&As often destroy value instead of creating value. M&As induce the threat of value destruction because shareholders and managers can have different goals when making M&A decisions (Masulis et al., 2007; Morck et al., 1990). Shareholders aim for long-term value creation, whereas managers can seek to fulfill inefficient desires such as private benefits (empire building or entrenchment strategies; Jensen, 1986; Morck, Shleifer, & Vishny, 1988). For example, managers commonly receive higher remuneration when firm size increases (Frydman & Jenter, 2010), which gives them an incentive to realize M&As even when such decisions could ultimately destroy shareholder value.

⁴Similar to Bens et al. (2012), we argue that the M&A announcement returns (being one of the most significant corporate investment decisions) can provide a direct assessment regarding the quality of managerial decisions, unlike annual stock returns that can vary for different reasons.

In response to the potential for value destruction, mechanisms have been created to address and diminish agency conflicts. Previous research mainly analyzes the effects of corporate governance instruments such as board monitoring (Ahn et al., 2010; John & Senbet, 1998; Kim et al., 2014), active shareholder control (Ben-Amar & Andre, 2006; Cornett, Marcus, Saunders, & Tehranian, 2007; Zhu & Yang, 2016) and compensation (Jaggi & Dorata, 2006; Yim, 2013). In contrast, little is known about the effects of internal management control systems on the value of M&As. As VBM aims at managers focusing on shareholder interests, VBM should present itself as an ideal mechanism for aligning the divergent interests of managers and shareholders in the M&A context.

Precisely, two attributes of VBM could counteract value-destroying M&As. First, VBM implementation is grounded on the consistent integration of a value-based metric and its value drivers into the information and planning systems (Firk et al., 2016; Ittner & Larcker, 2001; Knauer et al., 2018; Malmi & Ikäheimo, 2003). Therefore, value creation becomes more transparent in firms using VBM, which may help them to better differentiate between the value-destroying and value-creating potential of M&As. In particular, the increased transparency of value creation in the firm makes it harder for managers to assert value-destroying and self-fulfilling M&As. Second, VBM aligns managerial and shareholder goals because managerial actions will be subject to ongoing evaluation based on the development of the value-based metric, thus changing the mindsets of managers. Hence, managers will be more careful when executing an investment decision because they will be held accountable for value destruction in the future. In particular, they would refrain from using their discretionary scope to push through potentially value-destroying M&As. Based on the potential benefits of VBM implementation, we expect that VBM will lead to better M&A decision-making.

H1: Value-based management positively influences the returns from M&A decisions.

2.4. *The Risk of Managerial Self-Interest in M&As as a Moderator*

While M&A decisions are frequently seen as an indicator of managerial self-interest, several researchers highlight how contextual factors could influence the risk of self-interested manager motives in M&As (e.g. Campbell et al., 2016; Masulis et al., 2007). Based on Jensen's FCF hypothesis, the risk of value-destroying M&As is dependent on the degree to which managers dispose of uncommitted resources (Jensen, 1986). Specifically, if managers have the opportunity to expend uncommitted resources, they are more likely to invest in projects below the cost of capital to fulfill their private benefits. Conceptually, VBM's benefits are attributed to the integration of value-based metrics, thus promoting the consideration of capital costs in managerial decision-making. Hence, if VBM causes positive performance outcomes through more aligned managerial decision-making, this benefit should increase with the likelihood that self-interested managers will invest in value-destroying M&As (i.e. below the cost of capital). Thus, considering a manager's opportunities for pursuing self-interested M&As may help to better understand whether the conceptual benefits of VBM can be realized.

Besides the consideration of internal FCF, Jensen (1986) and additional studies suggest that external factors may also influence the opportunities for managers to expend resources on self-interested investments (Haleblian, Devers, McNamara, Carpenter, & Davison, 2009; Latham & Braun, 2009). Hence, it is likely that external contingencies that increase the risk for the self-interested motives of managers also moderate the benefits of VBM on M&As. Based on this, we focus on the contextual factors on the (1) firm, (2) industry and (3) country level that influence the opportunity for managers to expend resources on self-fulfilling M&As. In doing so, we aim to gain further insight into whether VBM's empirical effects are attributed to its conceptual benefits.

2.4.1. *The impact of high free cash flow*

One main firm internal factor that may provide managers with uncommitted resources is the amount of FCF. As FCF is cash that is in excess after all worthwhile investment decisions have been made (Fama & Jensen, 1983; Jensen, 1986), managers in firms with low FCF cannot resort to major spending on uncommitted resources. In contrast, when managers have high FCF available, they can use their latitude to fund investment decisions in their own interests instead of paying dividends to shareholders or arranging share buybacks. Hence, it is not surprising that FCF is frequently highlighted as a driver for self-interested M&As by managers (Jensen, 1986; Morck et al., 1990). VBM can pressure managers into evaluating investment decisions in the context of high FCF more adequately, as the capital charge considered in value-based metrics could discipline managers to focus only on value-creating investments. Specifically, the ongoing evaluation based on value-based metrics may lead to managerial losses in the long run if their value-destroying M&A decisions are implemented. Hence, managers should be led to focus on value-creating investments even when they do have the opportunity to expend uncommitted resources. Therefore, we suggest that the increased risk of self-interested M&As in firms with high FCF enhances the benefits of VBM with regards to M&A decisions.

H2a: High levels of FCF positively influence the relationship between VBM and the returns from M&A decisions.

2.4.2. *The impact of low industry competition*

In addition to the internal perspective, the opportunities for managers to expend resources in their own interests may be influenced by the degree of industry competition. High industry competition pressures management to allocate resources efficiently, only allowing for a small margin of error, as the company could be overrun by its competitors (Ammann, Oesch, & Schmid, 2013; Comment & Jarrell, 1995; Masulis et al., 2007; Narayanan, Raman, & Singh, 2005; Thomson & Pederesen, 2000). Conversely, in less competitive industries, managers might not face severe pressure from their industry peers to expend uncommitted resources efficiently, as they have less fear of being taken over by their competitors, or by being ousted from the industry (Ammann et al., 2013). For example, if managers have the possibility of investing resources in their own interests, a value-destroying investment decision may not substantially strengthen the position of their competitors in a less competitive industry. Therefore, managers may use their freedom to act through self-interest and may not be vigilant enough to permanently focus on value-creating investment decisions (e.g. value-creating M&As). VBM implementation should serve as a control system generating a compulsion by management to invest resources only in projects exceeding the cost of capital. This holds especially true as the continuous evaluation based on value-based metrics will increase the awareness of managers when assessing whether their decisions will generate or destroy shareholder value. Therefore, managers will act in the interests of their shareholders, even when a lack of industry pressure facilitates self-interested decisions. Thus, we suggest that the higher risk of self-interested M&As increases the benefits of VBM with regards to M&A decisions in less competitive industries.

H2b: Low industry competition positively influences the relationship between VBM and the returns from M&A decisions.

2.4.3. *The impact of abundant equity availability*

Finally, country-specific characteristics can also affect the availability of resources and thus enable self-interested managerial decision-making (di Giovanni, 2005). This is the case because the availability of equity strongly depends on the stock market in which a company is listed

(Pagano, Röell, & Zechner, 2009). Equity availability indicates the degree to which companies have access to funds on the stock market (Thapa & Poshakwale, 2012). In markets with scarce equity financing, management faces more pressure to invest capital in profitable investments because there is less money to finance overall investments (Aguilera & Jackson, 2003). However, in markets where equity financing is abundant, funds are easier to obtain and access to equity is broader (Levine & Zervos, 1996). In these liquid capital markets, managers may use this opportunity to augment their funds in excess or to be more venturesome and to finance self-interested decisions. Furthermore, borrowing money from the capital market does not entail strict lending conditions compared to bank loans, which need to be paid back on time and are ordinarily not provided in excess (Berger & Bonaccorsi di Patti, 2006). Hence, when equity financing is abundant, it increases the risk that managers will invest in self-interested M&A decisions. In this case, VBM should regulate managers' funding decisions by encouraging the accommodation and allocation of capital only for investments that seek value creation. Specifically, even if abundant equity facilitates self-interested decisions, VBM should induce managers to only tie up capital that is needed for value-creating investments (M&As). Hence, we expect that the higher risk of self-interested M&As enhances the benefits of VBM with regards to M&A decisions in markets where capital is easy to procure.

H2c: High equity availability positively influences the relationship between VBM and the returns from M&A decisions.

3. Sample and Method

3.1. Sample

We focus on firms with shares listed in the MSCI Europe Index or the S&P 500 Index in the timespan from 2005 to 2011. The MSCI Europe Index includes large, publicly traded European securities. The S&P 500 Index covers the 500 largest US firms in terms of market capitalization. To select the firm year of a firm, the following criteria need to be fulfilled: (1) the firm is listed in the MSCI Europe or S&P 500 Index in a respective year; (2) the firm is headquartered and its stocks are listed in one of 16 European countries or the USA; (3) the firm is non-financial (with Standard Industrial Classification or SIC codes differing from 6000 to 6999) and (4) the firm's annual report is available for the collection of VBM data. The resulting sample comprises of 5610 firm-year observations. From these observations, we select M&A deals provided by the Securities Data Corporation (SDC). To prove that all deals are noticed by the equity market, the following commonly used criteria need to be fulfilled (e.g. Moeller, Schlingemann, & Stulz, 2005): (1) the acquisition is completed; (2) the acquirer controls less than 50% of the target's shares prior to the announcement and owns 100% of the target's shares after the transaction; (3) the deal value disclosed by the SDC is more than \$1 million and (4) the acquirer has all necessary financial data available for our regressions and stock return data (210 trading days prior to acquisition announcements). The fulfillment of these criteria yields a sample of 2787 deals conducted by 639 firms. Table 1 provides an overview of the sample.

3.2. Dependent Variable: Acquirer's Return From M&As

As described above, the investigation of whether managerial decisions align with shareholder interests involves the problem that a direct evaluation by the shareholders of managerial decisions is needed. Hence, assuming efficient markets (Fama, 1998), the market's reaction to M&A announcements presents a potential solution. Specifically, it provides a direct response from shareholders, as the valuation of the announced acquisition is assimilated into the price of the

Table 1. Sample Composition

Cross sectional perspective	Observations
+ Firm-years listed in MSCI Europe Index during 2005–2011	4079
+ Firm-years listed in S&P 500 Index during 2005–2011	3497
– Firm-years listed of double or outside stock listings	438
– Firm-years listed of financial companies (SIC 6000–6999)	1425
– Firm-years without annual reports data	103
Potential number of firm-years	5610
M&A deals of potential firm-years	16,508
– M&A deals not meeting restriction criteria	7469
– M&A deals with deal data restrictions	5950
– M&A deals with interaction and control data restrictions	302
Final M&A deals	2787

acquirer's stock in a short period. This enables us to analyze the alignment between management and shareholders based on a specific decision. Therefore, we use the capital market reaction to M&A announcements, measured by cumulative abnormal returns (CARs), as our dependent variable.

To calculate CARs, we use announcement dates from the SDC's M&A database and daily stock price information from Datastream. We calculate CARs for multiple time windows. Each time window is defined by day 0 as the acquisition announcement date, with x leading days and y trailing days (i.e. $-x, +y$). We follow previous research (Gygax & Otchere, 2010; Humphery-Jenner & Powell, 2011; Wright, Kroll, Lado, & Van Ness, 2002) in analyzing 7-day CARs ($-3, +3$).⁵ Furthermore, similar to previous research (Autore, Billingsley, & Schneller, 2009; Humphery-Jenner, 2014; Masulis et al., 2007; Moeller et al., 2004), we assess the market model parameters over a 200 trading-day period from 210 days up to 11 days prior to the event in order to account for seasonal effects over one year as well as to avoid an overlap of market models and event time windows. Finally, we use the bidder's national stock market index as the market return index.

3.3. Independent Variable: Value-Based Management

Corresponding to previous research on VBM (Firk et al., 2016; Hogan & Lewis, 2005; Knauer et al., 2018; Lovata & Costigan, 2002; Rapp et al., 2011), we hand-collect VBM data from corporate annual reports. We draw on this methodology because it enables us to gather a large data set (Bloomfield, Nelson, & Soltes, 2016). Moreover, a firm's annual report is a major instrument used by the firm to communicate with its shareholders and should provide information about a firm's strategy, targets and performance indicators.

We examine each annual report for value-based metrics as a target control. We follow previous studies that differentiated between value-based metrics (Firk et al., 2016; Hogan & Lewis, 2005; Rapp et al., 2011; Ryan & Trahan, 2007), and consider both measures of accounting and cash flow as well as their relative and absolute values. Specifically, we consider the KPIs of Cash Value Added (CVA), Cash Flow Return on Investment (CFROI), Economic Value Added (EVATM) and Shareholder Value Added (SVA), which take the firm's cost of capital into account (Madden, 1999; Rappaport, 1986; Stewart, 1991). Moreover, we integrate measures that divide the operating profit by a firm's invested capital (such as ROIC and ROCE) if they are compared to the cost of capital (Koller et al., 2010; Ryan & Trahan, 2007).

⁵Moreover, we ran 11-day ($-5, +5$) CARs as a robustness check and yielded similar results.

To guarantee consistent VBM coding, we specify guidelines *ex ante*. The identification of a VBM user requires that a firm's annual report (1) displays one of the above-mentioned value-based metrics and (2) illustrates its role as a key performance measure in the target or control system of the firm. The second criterion is needed as some firms solely display a VBM metric in the appendix or mention VBM metrics in a standardized form accompanied by a list of numerous other performance metrics. In these cases, we did not codify the firm as a VBM firm as the value-based metric was not stated as a prime performance figure.⁶ With regards to the guidelines, the VBM assessment was conducted by two selected coders on partly overlapping parts. The overlapping parts showed a high reliability. The resulting variable *VBM* takes the value of 1 if, in a given year, the company utilized a value-based metric as a key figure for its internal target or control system, and 0 otherwise.

3.4. Moderating Variables

To account for contingencies that drive self-interested investment decisions by managers, we focus on factors increasing the opportunities for managers to expend resources in their own interests. In doing so, we consider the firm (H2a), industry (H2b) and country (H2c) level. The following section will discuss these variables.

Firm Level: Free Cash Flow. FCF is measured by dividing a company's FCF by its total assets. Thereafter, we subtract the average FCF of its related industry based on the relevant two-digit SIC code (Schlingemann, 2004).

Industry Level: Low Industry Competition. Low industry competition is measured as the price cost margin (PCM), which is frequently used as a measure of competition (Boone, 2008; Haw, Hu, & Lee, 2015). It is measured by dividing the sales of an industry by its operating expenditures for each two-digit SIC code. The higher the PCM is, the less competitive the industry is (Domowitz, Hubbard, & Peterson, 1986). Here, we use all companies in Thomson Reuters Datasream that have the required measures available and thus calculate the PCM by using 402,829 firm-year observations.

Country Level: Equity Availability. Following Levine and Zervos (1996) and Chan, Covrig, and Ng (2005), we measure equity availability by taking the logarithm of the market capitalization of a country to GDP. The variable reflects the relative size of an equity market in the economy, suggesting that in countries with bigger markets, companies can raise funds more easily (Thapa & Poshakwale, 2012). The data for the variable are gathered from the World Bank.⁷

3.5. Control Variables

We control for several confounding factors at different levels. The selection of these variables is structured into four main characteristics: (1) governance characteristics, (2) bidder characteristics, (3) deal characteristics and (4) country characteristics.

Governance Structure. As we analyze VBM as a potential internal governance mechanism that improves M&A decisions, we need to control for the confounding effects of other corporate governance mechanisms. To account for the overall governance structure, we decided to include the corporate governance score of the Thomson Reuters Asset4 dataset.⁸ The overall corporate

⁶To gain a better understanding of the criteria, we included examples of when a firm fulfilled and not fulfilled the requirements to be codified as a VBM firm (refer to Table A2 of the Appendix).

⁷<http://data.worldbank.org/indicator/CM.MKT.LCAP.GD.ZS>

⁸The Thomson Reuters Asset4 dataset has been recently used in empirical management studies (Cheng, Ioannou, & Serafeim, 2014; Lys, Naughton, & Wang, 2015) and is also extensively used for investment purposes by professionals.

governance score (*CG quality*) is composed of five categories, which account for (1) Board Structure, (2) Board Functions, (3) Compensation Policy, (4) Shareholder Rights and (5) Vision and Strategy. *CG quality* is derived by equally weighting and z-scoring the five underlying categories and comparing them against all companies in the Asset4 database. The resulting *CG quality* is therefore a relative measure of the internal corporate governance, which is z-scored and normalized between 0 and 100%. Moreover, we account for ownership characteristics as they may affect the monitoring of managers (Shleifer & Vishny, 1997) and have shown to influence the effect of VBM (Firk et al., 2016). Therefore, we control for *ownership concentration* measured as the percentage of voting rights of the five largest investors, with *individual ownership* measured as the sum of fractional holdings by individual investors holding five percent or more, and *financial-oriented ownership*⁹ being measured as the sum of fractional holdings by professional investment managers.

Bidder Characteristics. Based on Masulis et al. (2007), we include three bidder characteristics as control variables: firm size, Tobin's *q* and leverage. Concerning firm size, Moeller et al. (2004) find a negative effect on M&A returns, as large acquirers are more likely to pay higher premiums and to conduct acquisitions with negative synergies. Firm size is measured as the natural logarithm of the number of employees in a firm and is defined as *Size* in our regressions. Tobin's *q* does not have a precise effect on M&A returns, as findings suggest a positive (Lang, Stulz, & Walkling, 1991), a negative (Appadu et al., 2016), or non-significant relation (Masulis et al., 2007). We define *Tobin's q* as the market value of assets over the book value of assets, i.e. market capitalization, preferred stock and long-term debt, over total assets minus short-term debt and the current portion of long-term debt. Concerning leverage, Jensen (1986) denotes that leverage can act as a disciplinary tool on managers as it reduces FCF. While we have already included FCF, we follow Masulis et al. (2007) by further incorporating *leverage*, calculated by adding short-term debt and the current portion of long-term debt divided by total assets.

Deal Characteristics. Concerning deal characteristics, we control for deal size, target ownership status, deal type, method of payment, and whether the bidder and the target are both from high-tech industries. Relative deal size (*deal significance*) is included as it has been shown to hold a positive association with M&A returns in previous studies (e.g. Martínez-Jerez & Marti, 2008; Masulis et al., 2007). In addition, we consider deal relatedness (*related acquisition*) because diversifying deals have been emphasized as destroying firm value (e.g. Masulis et al., 2007; Morck et al., 1990). Moreover, we created a further dummy variable (*high-tech deal*) if both the acquirer and target are in high-tech industries, which we also combined with deal significance (Loughran & Ritter, 2004; Masulis et al., 2007), because high-tech firms rely heavily on human capital, which is often lost during M&As. Furthermore, the type of target entity can influence the acquirer's result (Fuller, Netter, & Stegemoller, 2002; Moeller & Schlingemann, 2005). Hence, we divided target firms into three groups based on their entity type: *public target*, *private target* and *subsidiary target*. Finally, we also control for the method of payment, which is taken into account by the stock market (Masulis et al., 2007), by employing two payment-method variables: *stock deal* and *all-cash deal*. We then combine all three entity types with the two payment-method indicators because the effect may depend upon the combination of the two variable choices (Chang, 1998; Fuller et al., 2002). Hence, we obtain six mutually exclusive and collectively exhaustive deal categories: *public target * stock deal*, *public target * all-cash deal*, *private target * stock deal*, *private target * all-cash deal*, *subsidiary target * stock deal* and *subsidiary target * all-cash deal*. Consistent with the prior literature and to avoid perfect

⁹Financial-oriented investors include investment companies, independent investment advisors, hedge funds, and pension funds.

multicollinearity, we exclude the *subsidiary * stock deal* indicator from our regressions (Masulis et al., 2007).

Country Characteristics: As Firk et al. (2016) have shown that a country's institutional structure may influence the effect of VBM, we include the variable *national shareholder orientation*. To do so, we follow Firk et al. (2016) and calculate national shareholder orientation by building an aggregated index of the country-level measures of investor protection, accounting and accountability, and director liability.

3.6. Empirical Method

To analyze the economic effect of VBM on M&A decisions, we follow previous M&A research and run several ordinary least square (OLS) regressions (e.g. Aktas, de Bodt, & Cousin, 2011; Beltratti & Paladino, 2013). We account for time-series dependence on the firm level by clustering standard errors at the firm level (Petersen, 2009). Our model includes the dependent variable CAR_{ij} and the independent variable VBM_{ij} , as well as several control variables accounting for corporate governance, bidder, deal and country characteristics. Moreover, we include industry fixed effects ($industry_i$), country fixed effects ($Country_i$) and year fixed effects ($time_i$) in addition to our controls. Finally, ϵ_{ij} denotes the standard error term. Hence, we use the following model to test our first hypothesis:

$$CAR_{ij} = \alpha + \beta * VBM_{ij} + \gamma_1 * (control\ variables)_{ij} + country_i \\ + industry_i + time_j + \epsilon_{ij}$$

To investigate our second set of hypotheses, we include interaction terms, namely *FCF * VBM*, *low industry competition * VBM* and *equity availability * VBM*, respectively. To avoid potential problems of multicollinearity and to improve the interpretation of our results, we center the interaction terms on their means (Aiken & West, 1991). Formula 2 represents the model used for Hypotheses 2a, 2b and 2c, where the term *contingency factor* represents the moderator variable for each hypothesis. Moreover, we tested a full model in which all interaction terms are included.¹⁰

$$CAR_{ij} = \alpha + \beta_1 * VBM_{ij} + \beta_2(VBM_{ij} * contingency\ factor_{ij}) + \beta_3 contingency\ factor_{ij} \\ + \gamma_1 * (control\ variables)_{ij} + country_i + industry_i + time_j + \epsilon_{ij}$$

4. Empirical Findings

4.1. Descriptive Statistics

Table 2 displays the descriptive statistics of the number of deals per year combined with the VBM usage rate. A general trend is detected regarding different deal characteristics. Through the years of 2005–2007, the number of acquisitions stays relatively constant and then largely decreases in 2008 and 2009 before increasing in 2010. This trend can be linked to the financial crisis that began to affect economies around the world in 2008. The phenomenon is also noticeable in weaker CARs. Regarding the average transaction volume and average CARs, findings

¹⁰We exclude industry (country) fixed effects when analyzing the impact of the moderator variable at the industry (country) level. However, we also test a full model where industry and country fixed effects, as well as all our moderator and interaction variables are included. By adding industry and country fixed effects into the regression besides our moderator variables on the industry and country level, we follow Hillier, Pindado, Queiroz, and de la Torre (2011) and Mihet (2013), who suggest that this approach helps to decompose the fixed (country) effects from the error term.

Table 2. Deal Characteristics over Time and Mean VBM Usage

Year	Number of Acquisitions	Mean Acquirer Market Value (EUR million)	Mean Deal Value (EUR million)	Mean CAR $-3/+3$ (in %)	Deals by VBM users
2005	473	30,242	713	0.15	0.14
2006	486	36,584	548	0.23	0.24
2007	460	31,774	779	0.70	0.26
2008	368	31,428	431	-0.43	0.21
2009	291	25,903	919	0.11	0.19
2010	363	26,285	636	0.37	0.15
2011	346	26,536	678	0.07	0.15
Total/ Average	2787	29,822	672	0.19	0.19

Notes: The table consists of completed, non-financial, majority-acquiring mergers and acquisitions (listed in SDC), worth more than \$1 million dollar between 2005 and 2011. *Deals by VBM-users* refer to the percentage of deals performed by VBM users.

coincide with results from previous studies (Humphery-Jenner & Powell, 2011; Masulis et al., 2007; Masulis, Wang, & Xie, 2015). Moreover, almost 20% of M&As in our sample were conducted by firms using VBM. Interestingly, VBM firms undertook relatively more deals when returns until 2007 increased and less deals when returns after 2007 decreased. It is important to note, that while the proportion of deals conducted by VBM firms partly shows strong annual changes, VBM use in our underlying sample is relatively stable. Hence, these changes indicate towards a possibly different M&A behavior of VBM firms but less to fluctuation in firms using VBM.

Table 3 presents the summary statistics for the variables used in our regression models. Regarding the variables' means and medians for deal-related variables, our findings are in line with previous research (Masulis et al., 2007; Moeller, Schlingemann, & Stulz, 2007). We checked the variables for outliers and winsorized the variables with outliers on the 1st and 99th percentile. Comparing the CARs of VBM-using firms with non-VBM-using firms, we can observe slightly better results for VBM users, suggesting that these firms produce better M&A results.

The pairwise correlations of the central variables are provided in Table 4. The matrix indicates a slightly negative but non-significant correlation between VBM and the dependent variable CAR ($-3, +3$). Thus, we find no initial support for the first hypothesis. The correlations between our moderating variable FCF and our dependent variable is rather negligible. The same results were found for the correlations between low industry competition and equity availability and CARs.

4.2. Regression Results

H1 states that VBM has a positive influence on M&A investments. To test this hypothesis, we relate VBM to the CARs on a 7-day basis as our dependent variable, $CAR(-3, +3)$, while controlling for various confounding effects. Model 1 of Table 5 displays the results of the analysis and shows a non-significant effect between VBM and M&A returns. Hence, we find no indications in support of VBM having a positive effect on M&A returns on average. Hence, H1 cannot be confirmed.

Our second hypothesis (H2a) integrates the notion of FCF into the relationship between VBM and M&As. We propose that the benefits of VBM with regards to M&A decisions are enhanced when a manager's self-interested pursuit in terms of high FCF increases. We include an interaction term of the moderating variable *FCF* and our independent variable *VBM* in addition to the moderator and independent variable. Similar to the results of the models of our first hypothesis,

Table 3. Summary Statistics

Variable	All M&A deals		VBM deals		Non-VBM deals	
	Mean	Median	Mean	Median	Mean	Median
CAR (−3, +3) ^a	0.19	0.02	0.27	0.03	0.17	0.02
VBM	0.19	0.00	1.00	1.00	0.00	0.00
VBM-sophistication (alt.)	1.38	1.00	3.65	4.00	0.84	1.00
FCF	−0.01	−0.01	−0.01	0.01	0.01	−0.01
Low industry competition	0.03	0.02	0.03	0.02	0.03	0.02
Equity availability	0.03	0.14	−0.08	0.11	0.05	0.14
CG Quality	73.54	79.03	70.28	76.40	74.32	79.62
Ownership concentration	0.28	0.25	0.27	0.24	0.28	0.25
Individual ownership	0.12	0.00	0.13	0.00	0.12	0.00
Financial-oriented ownership	0.43	0.00	0.37	0.00	0.44	0.00
Size	10.39	10.45	10.66	10.62	10.33	10.37
Tobin's q^b	1.55	1.28	1.40	1.20	1.58	1.30
Leverage ^b	0.20	0.18	0.21	0.19	0.19	0.18
Stock deal	0.05	0.00	0.03	0.00	0.06	0.00
Cash deal	0.48	0.00	0.47	0.00	0.48	0.00
Target public	0.19	0.00	0.16	0.00	0.20	0.00
Target private	0.37	0.00	0.34	0.00	0.38	0.00
Target subsidiary	0.41	0.00	0.47	0.00	0.39	0.00
Deal significance	0.05	0.01	0.04	0.01	0.05	0.01
High-tech deal	0.21	0.00	0.11	0.00	0.24	0.00
Related acquisition	0.33	0.00	0.33	0.00	0.33	0.00
National shareholder orientation	2.42	3.00	2.01	2.56	2.50	3.00

Notes: The sample consists of 2787 deals completed U.S. and European mergers and acquisitions (listed in SDC) between 2005 and 2011.

^aIn percent.

^bWinsorized at the 1st and 99th percentile level. VBM deals are defined as deals performed by a firm that has adopted a value-based metric as key figure. Variable definitions are in the Appendix.

the direct effect of VBM on abnormal returns is not significant. However, concerning the interaction between VBM and FCF on abnormal returns, Model 2 of Table 5 shows a significant and positive coefficient, indicating that VBM enhances the effect on M&A returns in firms with high FCF. Thus, H2a is supported.

H2b suggests that the higher risk of managers pursuing self-interested M&As in less competitive industries increases the benefits of VBM with regards to M&A decisions. Therefore, we include the interaction term of *low industry competition* and the independent variable *VBM* in addition to the moderator and independent variable. Model 3 of Table 5 does not yield a significant direct effect from VBM. In contrast, we find a positive and significant coefficient for our interaction term, indicating that under low industry competition, VBM enhances the effect on the returns from M&A decisions. Therefore, H2b is confirmed.

H2c proposes that in markets where capital is easy to procure, the greater risk of managers undertaking self-interested M&As will enhance the benefits of VBM with regards to M&A decisions. The results of the tested hypothesis are reported in Model 4 of Table 5. We include the interaction term between *equity availability* and our independent variable *VBM* with the moderator and independent variable. The results do not show a direct effect of VBM on CARs. Nevertheless, the significant interaction term indicates that VBM enhances the effect of M&A returns when equity is abundantly available. Hence, H2c is supported.

In addition, we run overall models, which comprise of the direct effect and all three interaction effects with moderators. Model 5 of Table 5 displays the results without industry and country

Table 4. Correlation Matrix of all Regression Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	
(1) CAR (−3, +3)	1																							
(2) VBM	0.01	1																						
(3) VBM-sophistication (alt.)	−0.01	0.85	1																					
(4) FCF	−0.01	−0.07	−0.08	1																				
(5) Low industry competition	0.02	0.01	0.01	−0.04	1																			
(6) Equity availability	0.03	−0.12	−0.10	0.09	0.00	1																		
(7) CG Quality	−0.04	−0.08	−0.09	0.11	−0.03	0.31	1																	
(8) Size	−0.05	0.10	0.13	−0.08	0.03	−0.06	0.14	1																
(9) Tobin's q^a	0.03	−0.09	−0.13	0.47	−0.10	0.31	0.10	−0.23	1															
(10) Leverage ^a	0.02	0.04	−0.01	−0.22	0.03	−0.08	−0.02	0.06	−0.21	1														
(11) Ownership concentration	−0.01	−0.02	−0.08	0.00	0.06	−0.34	−0.40	−0.22	−0.11	0.05	1													
(12) Individual ownership	0.02	0.01	−0.01	0.04	0.00	−0.13	−0.17	0.02	0.08	−0.12	0.28	1												
(13) Financial-oriented ownership	0.01	−0.06	−0.01	0.04	−0.08	0.21	0.16	−0.08	0.12	−0.08	−0.30	−0.22	1											
(14) Deal significance	−0.02	−0.03	−0.03	−0.08	0.03	−0.01	−0.03	−0.11	−0.09	0.12	0.03	0.00	0.01	1										
(15) High-tech deal	−0.03	−0.12	−0.10	0.12	−0.14	0.06	0.12	−0.06	0.20	−0.16	−0.05	0.03	0.05	−0.01	1									
(16) High-tech deal * deal significance	−0.11	−0.04	−0.04	−0.02	−0.03	0.01	−0.01	−0.06	−0.02	0.01	0.00	0.01	0.04	0.53	0.21	1								
(17) Public target * stock deal	−0.10	−0.03	−0.02	−0.04	0.02	0.00	0.02	−0.01	−0.03	0.04	−0.02	−0.01	0.03	0.47	−0.01	0.22	1							
(18) Public target * all-cash deal	0.01	−0.05	−0.04	0.03	−0.03	0.05	0.08	0.11	0.05	−0.07	−0.09	0.01	0.04	0.05	0.11	0.04	−0.07	1						
(19) Private target * stock deal	0.01	−0.05	−0.03	−0.01	−0.01	0.03	0.01	−0.10	0.12	−0.02	0.00	0.03	0.02	0.02	0.08	0.02	−0.02	−0.05	1					
(20) Private target * all-cash deal	−0.06	−0.02	−0.03	0.07	−0.06	0.10	0.05	−0.10	0.15	−0.11	−0.02	−0.01	0.07	−0.09	0.12	−0.02	−0.07	−0.17	−0.05	1				
(21) Subsidiary target * all-cash deal	0.00	0.04	0.01	−0.01	0.02	0.03	0.02	0.01	−0.04	0.05	−0.01	−0.03	−0.05	−0.05	−0.02	−0.03	−0.08	−0.19	−0.06	−0.20	1			
(22) Related acquisition	0.00	0.00	−0.03	0.06	0.02	−0.02	−0.04	−0.11	0.02	0.03	0.05	−0.01	0.00	0.03	0.12	0.01	0.05	−0.08	0.01	0.00	−0.01	1		
(23) National shareholder orientation	−0.03	−0.26	−0.22	0.09	0.04	0.51	0.50	−0.12	0.22	−0.04	−0.28	−0.19	0.20	0.01	0.17	0.04	0.05	0.05	0.06	0.11	0.01	0.01	1	

Notes: $N = 2787$. All correlations above 0.051 indicate significance at the 1% level, all correlations above 0.037 indicate significance at the 5% level, and all correlations above 0.031 indicate significance at the 10% level.

^aWinsorized at the 1st and 99th percentile level.

Table 5. Regression results of Hypotheses 1 and 2a–2c

Model Method Dependent variable	Model 1 OLS CAR (−3, +3)	Model 2 OLS CAR (−3, +3)	Model 3 OLS CAR (−3, +3)	Model 4 OLS CAR (−3, +3)	Model 5 OLS CAR (−3, +3)	Model 6 OLS CAR (−3, +3)
VBM(H1)	−0.043 (0.854)	−0.017 (0.942)	0.194 (0.406)	0.010 (0.962)	0.181 (0.419)	0.152 (0.533)
FCF		−1.971 (0.330)			−1.234 (0.537)	−2.028 (0.324)
VBM * FCF (H2a)		0.002 (0.000) ***			0.002 (0.000) ***	0.002 (0.000) ***
Low industry competition			0.577 (0.507)		0.635 (0.480)	0.688 (0.452)
VBM*Low industry competition(H2b)			8.689 (0.002) ***		8.617 (0.002) ***	7.583 (0.008) ***
Equity availability				−0.046 (0.896)	−0.098 (0.776)	−0.513 (0.543)
VBM*Equity availability(H2c)				0.875 (0.075) *	0.776 (0.098) *	0.916 (0.077) *
<i>Control variables</i>						
CG quality	−0.008 (0.144)	−0.008 (0.163)	−0.008 (0.139)	−0.009 (0.077) *	−0.006 (0.272)	−0.008 (0.146)
Ownership concentration	−1.486 (0.150)	−1.492 (0.146)	−1.418 (0.157)	−1.594 (0.084) *	−1.962 (0.022) **	−1.436 (0.150)
Individual ownership	0.539 (0.085) *	0.538 (0.085) *	0.559 (0.074) *	0.568 (0.057) *	0.358 (0.263)	0.549 (0.079) *
Financial-oriented ownership	0.187 (0.341)	0.175 (0.370)	0.220 (0.260)	0.171 (0.364)	0.147 (0.777)	0.213 (0.276)
Size	−0.154 (0.042) **	−0.152 (0.043) **	−0.159 (0.034) **	−0.149 (0.045) **	−0.181 (0.018) **	−0.150 (0.045) **
Tobin's q^a	0.082 (0.420)	0.142 (0.247)	0.068 (0.511)	0.088 (0.385)	0.051 (0.657)	0.133 (0.273)
Leverage ^a	0.357 (0.598)	0.229 (0.734)	0.483 (0.483)	0.370 (0.572)	0.246 (0.698)	0.297 (0.665)
National shareholder orientation	−2.363 (0.564)	−2.535 (0.535)	−2.742 (0.502)	−0.052 (0.736)	−0.132 (0.493)	−3.116 (0.451)
Public target * Stock deal	−2.959 (0.000) ***	−2.991 (0.000) ***	−2.936 (0.000) ***	−2.974 (0.000) ***	−3.050 (0.000) ***	−2.986 (0.000) ***

(Continued).

Table 5. Continued.

Public target * All-cash deal	-0.220 (0.354)	-0.222 (0.347)	-0.222 (0.348)	-0.213 (0.367)	-0.197 (0.397)	-0.218 (0.353)
Private target * Stock deal	-0.311 (0.753)	-0.373 (0.702)	-0.313 (0.752)	-0.298 (0.762)	-0.289 (0.766)	-0.364 (0.710)
Private target * All-cash deal	-0.888 *** (0.000)	-0.894 *** (0.000)	-0.888 *** (0.000)	-0.855 *** (0.000)	-0.921 *** (0.000)	-0.885 *** (0.000)
Subsidiary target * All-cash deal	-0.330 (0.102)	-0.319 (0.114)	-0.359 * (0.072)	-0.309 (0.120)	-0.303 (0.126)	-0.339 (0.091)
Deal significance	2.238 *** (0.008)	2.227 *** (0.008)	2.225 *** (0.008)	2.291 *** (0.006)	1.957 ** (0.028)	2.255 *** (0.007)
High-tech deal	0.152 (0.527)	0.159 (0.509)	0.163 (0.494)	0.134 (0.571)	0.041 (0.856)	0.171 (0.473)
High-tech deal * Deal significance	-6.081 ** (0.016)	-6.067 ** (0.016)	-6.088 ** (0.016)	-6.150 ** (0.015)	-5.685 ** (0.027)	-6.082 ** (0.017)
Related acquisitions	0.104 (0.555)	0.109 (0.532)	0.109 (0.535)	0.064 (0.715)	0.047 (0.790)	0.113 (0.522)
Year fixed effects	yes	yes	yes	yes	yes	yes
Industry fixed effects	yes	yes	no	yes	no	yes
Country fixed effects	yes	yes	yes	no	no	yes
Adjusted $R^2/(N)$	0.03 (2787)	0.03 (2787)	0.03 (2787)	0.04 (2787)	0.04 (2787)	0.04 (2787)

Notes: Standard errors are firm-level clustered. As a dependent variable 7-day (-3, +3) CARs are used. All variables are defined in the Appendix. For each regression, the table reports the number of observations (N) and the Adjusted R^2 . P -values displayed in parentheses. All regressions include a constant term, which is not reported. Industry effects comprise industry dummies for each one-digit SIC industry. For year effects, a dummy variable for each year is integrated. Country effects comprise a dummy variable for each country.

^aWinsorized at the 1st and 99th percentile level.

***, **, * significance at the 1%, 5% and 10% levels (two-tailed), respectively.

fixed effects, whereas Model 6 of Table 5 includes both of them.¹¹ The results of this analysis show again that the direct effect between VBM and CARs is not significant, whereas each interaction term is significant and has a positive sign. In turn, the regression results give support for H2a, H2b and H2c.

5. Robustness

To validate the results of our analysis, we apply several dimensions of possible constraints. First, we consider an alternative specification regarding our dependent and moderator variables as well as the deal sample criteria. Second, we check the reliability of our independent variable by applying an alternative measure for VBM. Third, we discuss and address potential endogeneity concerns.

5.1. Alternative Specifications

To verify that our results are not affected by our specification in the main models, we ran several alternative regressions. First, we applied an alternative CAR time window ($-5, +5$) and reran our main analyses. The results (untabulated) supported our previous findings. Second, we used alternative moderating variables¹² to check our previous results. Again, we found results that substantiate our main analyses (untabulated). Third, we altered the sample criteria by only including M&As where the estimation window of the market model was not affected by another deal of the firm (reducing the sample to 1289 deals). Using this alternative criterion, we reran our regression and found similar results (untabulated) to our main analyses. Fourth, we included additional interaction terms of variables, which could also potentially act as corporate governance mechanisms and drive the potential conflict of managerial self-interest. More precisely, we relate *VBM* with the moderators of *Institutional ownership* and *National shareholder protection*, as both variables have revealed to affect the outcome of VBM (Firk et al., 2016). In addition, we included the interaction effect between *VBM* and *CG quality* as the corporate governance quality may also influence VBM's effect. Model 7 (without industry and country fixed effects) and Model 8 (including industry and country fixed effects) of Table 6 present the results, which substantiate our initial findings.

5.2. Alternative Independent Variable

Several researchers emphasize that VBM should consider different degrees of VBM use (Burkert & Lueg, 2013; Firk, Schmidt, & Wolff, 2018; Malmi & Ikäheimo, 2003). Hence, to check whether our results remain stable when considering a more nuanced measure of VBM, we test an alternative VBM measure accounting for the sophistication of VBM implementation. Thereby, we follow Firk et al. (2018) by capturing five distinct elements of VBM implementation. Specifically, these five elements indicate: (1) whether a firm commits to the overall objective of value creation (i.e. value orientation), (2) whether a firm adopts a value-based metric (our initial VBM

¹¹ Industry and country fixed effects generally do not explain a large part of the results. Hence, similar to research studying effects of country (industry) variables while including country (industry) fixed effects (Galasso & Simcoe, 2011; Giroud & Mueller, 2011), we test models with and without both fixed effects.

¹² Regarding FCF, we again used free cash flow divided by total assets but without any industry adjustment (Dey, 2008). The alternative for industry competition is proxied by the Herfindahl–Hirschmann Index (HHI) (Hirschman, 1945), which is a frequently utilized market competition proxy (Ammann et al., 2013; Custódio, 2014; Geletkanyecz & Boyd, 2011). The alternative equity availability measure refers to market turnover as a proxy of market liquidity (Chan et al., 2005). It is calculated by dividing the total value of shares traded to GDP for a given market during a set period.

Table 6. Robustness Test – Alternative specifications (Multiple corporate governance interaction terms)

Model Method Dependent variable	Model 7 OLS CAR (– 3, + 3)		Model 8 OLS CAR (– 3, + 3)	
VBM(H1)	0.178 (0.497)		0.092 (0.740)	
FCF	– 1.044 (0.595)		– 1.643 (0.421)	
VBM* FCF (H2a)	0.002 (0.000)	***	0.002 (0.000)	***
Low industry competition	0.787 (0.384)		0.978 (0.295)	
VBM*Low industry competition(H2b)	8.455 (0.002)	***	7.741 (0.006)	***
Equity availability	– 0.141 (0.686)		– 0.564 (0.509)	
VBM*Equity availability(H2c)	0.910 (0.095)	*	1.033 (0.073)	*
<i>Additional interaction terms</i>				
Financial-oriented ownership	0.059 (0.920)		0.316 (0.600)	
VBM*Financial-oriented ownership	1.240 (0.278)		1.651 (0.163)	
National shareholder orientation	– 0.239 (0.385)		– 3.433 (0.417)	
VBM*National shareholder orientation	– 0.181 (0.658)		– 0.364 (0.404)	
CG quality	– 0.007 (0.222)		– 0.007 (0.219)	
VBM*CG quality	– 0.010 (0.511)		– 0.006 (0.694)	
<i>Control variables</i>				
Ownership concentration	– 1.888 (0.035)	**	– 1.780 (0.076)	*
Individual ownership	0.302 (0.342)		0.474 (0.149)	
Size	– 0.148 (0.057)	*	– 0.193 (0.017)	**
Tobin's q^a	0.023 (0.832)		0.076 (0.495)	
Leverage ^a	– 0.055 (0.930)		– 0.118 (0.857)	
Public target * Stock deal	– 3.048 (0.000)	***	– 3.091 (0.000)	***
Public target * All-cash deal	– 0.217 (0.350)		– 0.198 (0.401)	
Private target * Stock deal	– 0.242 (0.803)		– 0.358 (0.712)	
Private target * All-cash deal	– 0.939 (0.000)	***	– 0.912 (0.000)	
Subsidiary target * All-cash deal	– 0.314 (0.113)		– 0.360 (0.072)	*
Deal significance	2.045 (0.022)	**	1.903 (0.035)	**
High-tech deal	0.034 (0.883)		0.153 (0.525)	

(Continued).

Table 6. Continued.

High-tech deal * Deal significance	- 5.739 (0.025)	**	- 5.723 (0.024)	**
Related acquisitions	0.065 (0.717)		0.121 (0.496)	
Year fixed effects	yes		yes	
Industry fixed effects	no		yes	
Country fixed effects	no		yes	
Adjusted $R^2/(N)$	0.04 (2787)		0.04 (2787)	

Notes: Standard errors are firm-level clustered. As a dependent variable 7-day (- 3, + 3) CARs are used. All variables are defined in the Appendix. For each regression, the table reports the number of observations (N) and the Adjusted R^2 . P -values displayed in parentheses. All regressions include a constant term, which is not reported. Industry effects comprise industry dummies for each one-digit SIC industry. For year effects, a dummy variable for each year is integrated. Country effects comprise a dummy variable for each country.

^aWinsorized at the 1st and 99th percentile level.

***, **, * significance at the 1%, 5% and 10% levels (two-tailed), respectively.

measure), (3) whether a firm sets targets in regard to the adopted value-based metric, (4) whether a firm's compensation is linked to the applied value-based metric and (5) whether the adopted value-based metric is integrated into lower firm-levels (e.g. division, business unit). To collect the data for the five VBM elements, we searched through annual reports (and DEF 14A for U.S. companies) to verify whether the VBM elements are present or not (Firk et al., 2018). Thereafter, we summed up the binary-coded elements into a single measure (i.e. *VBM-sophistication*). We then reran our main analyses with *VBM-sophistication* as an alternative independent variable. Model 9–14 of Table 7 reveal that a direct effect between VBM-sophistication and M&A returns can still not be found. However, we find indications that Hypotheses 2a, 2b and 2c are all robust to the alternative VBM measure. Hence, the results suggest that a more sophisticated implementation of VBM affects M&A returns positively under a high risk of self-interested managerial behavior.

5.3. Endogeneity Concerns

The implementation of VBM may be regarded as an endogenous choice. In particular, VBM adoption may be influenced by the risk of self-interested managerial behavior. Hence, our results might suffer from simultaneity when VBM implementation is driven by our moderators. To investigate this issue, we conducted a reverse regression where we used VBM as the dependent variable and our moderators as explanatory variables. To select the control variables, we followed previous studies investigating determinants of VBM (Burkert & Lueg, 2013; Firk et al., 2016; Lovata & Costigan, 2002). The results from the reversed regressions alleviate endogeneity concerns to some extent, as all three moderators did not significantly affect the implementation of VBM (untabulated). However, it is surprising that companies with a higher availability of resources and less competitive pressure tend to forego the benefits of implementing VBM as a disciplining mechanisms. In particular, as prior research highlights the risk of managerial self-interest as a major determinant of control systems (e.g. Dey, 2008). Drawing on the literature on organizational change, however, we find arguments that firms with higher resource availability and less competitive pressure exhibit inertial forces that prevent organizational change (Dobrev, Kim, & Carroll, 2003; D'Aunno, Succi, & Alexander, 2000; Kraatz & Zajac, 2001). As the implementation of VBM is constituted as a significant change for the implementing firm (McLaren, Appleyard, & Mitchell, 2016), this may explain the non-significant impact of our moderator variables on VBM implementation. Finally, as arguments for both effects exist, it may

Table 7. Robustness Test – Alternative Independent Variable (VBM-sophistication)

Model Method Dependent variable	Model 9 OLS CAR (-3, +3)	Model 10 OLS CAR (-3, +3)	Model 11 OLS CAR (-3, +3)	Model 12 OLS CAR (-3, +3)	Model 13 OLS CAR (-3, +3)	Model 14 OLS CAR (-3, +3)
VBM-sophistication(H1)	-0.049 (0.481)	-0.040 (0.569)	0.025 (0.719)	-0.022 (0.730)	0.055 (0.405)	0.018 (0.801)
FCF		-1.722 (0.403)			-0.900 (0.646)	-1.737 (0.401)
VBM-sophistication*FCF(H2a)		0.000 (0.000) ***			0.000 (0.000) ***	0.001 (0.000) ***
Low industry competition			0.436 (0.618)		0.488 (0.583)	0.560 (0.544)
VBM-sophistication*Low industry competition (H2b)			2.209 (0.007) ***		2.245 (0.006) ***	1.934 (0.020) **
Equity availability				-0.194 (0.589)	-0.261 (0.458)	-0.558 (0.506)
VBM-sophistication*Equity availability (H2c)				0.331 (0.021) **	0.327 (0.019) **	0.404 (0.006) ***
<i>Control variables</i>						
CG quality	-0.006 (0.315)	-0.006 (0.336)	-0.005 (0.421)	-0.008 (0.128)	-0.007 (0.227)	-0.007 (0.223)
Ownership concentration	-1.951 (0.058) *	-1.968 (0.055) *	-2.020 (0.037) **	-2.121 (0.022) **	-2.143 (0.013) **	-1.947 (0.050) **
Individual ownership	0.477 (0.148)	0.478 (0.147)	0.279 (0.402)	0.541 (0.081) *	0.329 (0.297)	0.466 (0.159)
Financial-oriented ownership	0.552 (0.380)	0.535 (0.399)	0.460 (0.458)	0.655 (0.243)	0.477 (0.388)	0.569 (0.367)
Size	-0.211 (0.012) **	-0.207 (0.013) **	-0.177 (0.031) **	-0.190 (0.022) **	-0.157 (0.049) **	-0.196 (0.017) **

(Continued).

Table 7. Continued.

Tobin's q^a	0.070 (0.492)	0.121 (0.321)	-0.001 (0.995)	0.084 (0.411)	0.038 (0.740)	0.129 (0.290)
Leverage ^a	0.011 (0.984)	-0.099 (0.864)	0.003 (0.996)	0.010 (0.985)	-0.055 (0.920)	-0.119 (0.839)
National shareholder orientation	-2.205 (0.594)	-2.380 (0.565)	-2.288 (0.583)	-0.096 (0.634)	-0.063 (0.748)	-2.715 (0.516)
Public target * Stock deal	-3.078 (0.000) ***	-3.108 (0.000) ***	-3.085 (0.000) ***	-3.108 (0.000) ***	-3.120 (0.000) ***	-3.158 (0.000) ***
Public target * All-cash deal	-0.196 (0.407)	-0.200 (0.396)	-0.218 (0.352)	-0.206 (0.380)	-0.232 (0.317)	-0.203 (0.385)
Private target * Stock deal	-0.339 (0.727)	-0.392 (0.683)	-0.260 (0.791)	-0.307 (0.752)	-0.258 (0.791)	-0.361 (0.710)
Private target * All-cash deal	-0.914 (0.000) ***	-0.920 (0.000) ***	-0.947 (0.000) ***	-0.875 (0.000) ***	-0.925 (0.000) ***	-0.896 (0.000) ***
Subsidiary target * All-cash deal	-0.353 (0.078) *	-0.343 (0.089) *	-0.330 (0.093) *	-0.343 (0.085) *	-0.322 (0.101) *	-0.366 (0.066) *
Deal significance	1.889 (0.036) **	1.880 (0.037) **	1.985 (0.026) **	1.967 (0.029) **	2.063 (0.020) **	1.947 (0.030) **
High-tech deal	0.117 (0.633)	0.121 (0.621)	0.040 (0.866)	0.116 (0.628)	0.036 (0.875)	0.134 (0.581)
High-tech deal * Deal significance	-5.753 (0.022) **	-5.740 (0.023) **	-5.703 (0.026) **	-5.830 (0.021) **	-5.763 (0.024) **	-5.745 (0.024) **
Related acquisitions	0.116 (0.514)	0.121 (0.496)	0.097 (0.589)	0.076 (0.670)	0.061 (0.735)	0.121 (0.499)
Year fixed effects	yes	yes	yes	yes	yes	yes
Industry fixed effects	yes	yes	no	yes	No	yes
Country fixed effects	yes	yes	yes	no	No	yes
Adjusted $R^2/(N)$	0.03 (2787)	0.03 (2787)	0.03 (2787)	0.04 (2787)	0.04 (2787)	0.04 (2787)

Notes: Standard errors are firm-level clustered. As a dependent variable 7-day (-3, +3) CARs are used. All variables are defined in the Appendix. For each regression, the table reports the number of observations (N) and the Adjusted R^2 . P -values displayed in parentheses. All regressions include a constant term, which is not reported. Industry effects comprise industry dummies for each one-digit SIC industry. For year effects, a dummy variable for each year is integrated. Country effects comprise a dummy variable for each country.

^aWinsorized at the 1st and 99th percentile level.

***, **, * significance at the 1%, 5% and 10% levels (two-tailed), respectively.

depend on additional factors (e.g. investors or boards) whether companies (with a higher availability of resources and less competitive pressure) realize the benefits of implementing VBM as a disciplining mechanisms or not.

In addition to the simultaneity concern, our results could be subject to an omitted variable bias. While we control for various confounding effects, we cannot rule out that unobserved factors drive VBM use and M&A returns at the same time. To challenge this potential constrain, we followed previous research by running a two-stage least square (2SLS) approach. 2SLS is highlighted as an effective method to address endogeneity concerns, but leads to the challenge of finding an appropriate instrument (Chenhall & Moers, 2007; Larcker & Rusticus, 2010). Similar to previous VBM research, we decided to use the industry average (based on the two-digit SIC code) of VBM implementation as an instrument (Knauer et al., 2018; Rapp et al., 2011).¹³ We believe that the industry average of VBM implementation is a valid instrument as it should be correlated with VBM, but should not have a significant influence on M&A returns. Hence, we estimated a first-stage regression, in which we included the industry average of VBM implementation as an instrumental variable besides our control variables from the previous regressions. In the second step, we estimated all our main analyses using the fitted values from the first-stage regression. Models 15–21 of Table 8 display the results of these regressions. Regarding our first hypothesis, VBM still does not significantly affect M&A returns. However, considering each moderating hypothesis, the regressions show positive and significant effects for all three effects. Hence, our findings are robust in accounting for endogeneity concerns.

6. Discussion and Conclusion

Although recent empirical papers indicate that VBM is associated with positive performance outcomes (Balachandran, 2006; Firk et al., 2016; Rapp et al., 2011; Ryan & Trahan, 2007; Wallace, 1997), little is known about the managerial decisions that drive these outcomes. We take advantage of the M&A setting, which allows us to analyze a visible managerial decision that is directly evaluated by a shareholder reaction. Based on this, we are able to advance the understanding of VBM's benefits by providing indications as to whether VBM aligns managerial decisions (M&As) with shareholder interests.

We hypothesized that VBM helps to achieve superior M&A returns by promoting the alignment of managerial and shareholder goals. Moreover, we assume that the relationship between VBM and M&A returns is moderated by the risk that managers will make self-interested M&A decisions. Hence, we examine the impact of contingency factors influencing the opportunities for managers to expend uncommitted resources. Based on the previous M&A literature, we focus on factors related to the firm (i.e. high FCF), industry (i.e. low industry competition) and country (i.e. high equity availability) level. Our empirical results did not show that VBM directly leads to better returns from M&A decisions. However, in situations that increase the risk of self-interested managerial decisions, VBM positively impacts M&A returns. Hence, the consideration of contextual factors that increase the risk of self-interested managerial decisions indicates that VBM's conceptual benefits can be realized when they are particularly needed. However, if self-interested managerial decisions are less likely, we cannot support the positive impact of VBM on M&A returns. All these results are derived from multiple regressions on a data set of 2787 M&A deals during the period from 2005 to 2011.

¹³Industry averages of the independent variable are frequently used as instrumental variables in previous research (Chen, Chen, & Wei, 2011; Chen, Huang, & Wei, 2013).

Table 8. Robustness Test – 2SLS

Model Method Dependent variable	Model 15 Logit VBM deal	Model 16 OLS CAR (-3, +3)	Model 17 OLS CAR (-3, +3)	Model 18 OLS CAR (-3, +3)	Model 19 OLS CAR (-3, +3)	Model 20 OLS CAR (-3, +3)	Model 21 OLS CAR (-3, +3)
Industry VBM	6.175 *** (0.000)						
VBM instrument		-0.026 (0.856)	-0.032 (0.829)	0.134 (0.285)	-0.000 (0.992)	0.011 (0.626)	0.054 (0.709)
FCF			-1.869 (0.364)			-1.242 (0.535)	-2.041 (0.328)
VBM*FCF(H2a)			0.002 *** (0.000)			0.002 *** (0.000)	0.002 *** (0.000)
Low industry competition				0.750 (0.403)		0.551 (0.536)	0.846 (0.366)
VBM*Low industry competition(H2b)				9.034 *** (0.001)		8.146 *** (0.002)	7.687 *** (0.006)
Equity availability					-0.059 (0.869)	-0.099 (0.773)	-0.455 (0.589)
VBM*Equity availability(H2c)					0.955 * (0.052)	0.767 * (0.099)	0.995 * (0.052)
<i>Control variables</i>							
CG quality	0.016 (0.107)	-0.008 (0.212)	-0.007 (0.238)	-0.006 (0.290)	-0.009 * (0.090)	-0.006 (0.282)	-0.008 (0.190)
Ownership concentration	0.000 (1.000)	-1.742 * (0.087)	-1.737 * (0.086)	-1.867 * (0.057)	-1.798 ** (0.049)	-1.956 ** (0.027)	-1.699 * (0.084)
Individual ownership	-0.113 (0.765)	0.476 (0.150)	0.473 (0.152)	0.349 (0.296)	0.523 * (0.093)	0.361 (0.258)	0.485 (0.140)
Financial-oriented ownership	1.131 (0.127)	0.437 (0.474)	0.415 (0.506)	0.139 (0.806)	0.433 (0.449)	0.124 (0.818)	0.360 (0.561)
Size	0.070 (0.481)	-0.148 * (0.051)	-0.146 * (0.054)	-0.195 *** (0.010)	-0.141 * (0.062)	-0.181 ** (0.018)	-0.151 ** (0.048)
Tobin's q^a	-0.020 (0.928)	0.086 (0.399)	0.141 (0.254)	0.011 (0.908)	0.097 (0.341)	0.052 (0.646)	0.139 (0.258)
Leverage ^a	1.034 (0.372)	0.290 (0.671)	0.176 (0.796)	0.195 (0.764)	0.287 (0.666)	0.271 (0.674)	0.135 (0.846)

(Continued).

Table 8. Continued.

National shareholder orientation	0.534 (0.281)	-2.467 (0.550)	-2.605 (0.527)	-2.553 (0.538)	-0.148 (0.469)	-0.141 (0.467)	-3.137 (0.454)
Public target * Stock deal	0.115 (0.790)	-3.068 (0.000)	*** -3.097 (0.000)	*** -3.044 (0.000)	*** -3.081 (0.000)	*** -3.045 (0.000)	*** -3.101 (0.000)
Public target * All-cash deal	-0.210 (0.292)	-0.208 (0.383)	-0.213 (0.369)	-0.179 (0.447)	-0.198 (0.400)	-0.202 (0.383)	-0.195 (0.411)
Private target * Stock deal	-1.047 (0.241)	-0.323 (0.745)	-0.390 (0.691)	-0.105 (0.916)	-0.274 (0.780)	-0.289 (0.767)	-0.278 (0.777)
Private target * All-cash deal	-0.048 (0.756)	-0.896 (0.000)	*** -0.903 (0.000)	*** -0.925 (0.000)	*** -0.866 (0.000)	*** -0.922 (0.000)	*** -0.887 (0.000)
Subsidiary target * All-cash deal	0.164 (0.254)	-0.331 (0.102)	-0.319 (0.116)	-0.319 (0.096)	* -0.316 (0.116)	-0.302 (0.130)	-0.345 (0.087)
Deal significance	-0.612 (0.345)	1.899 (0.036)	** 1.884 (0.038)	** 1.966 (0.028)	** 1.966 (0.029)	** 1.956 (0.028)	** 1.958 (0.030)
High-tech deal	-0.188 (0.623)	0.130 (0.613)	0.133 (0.606)	0.129 (0.607)	0.125 (0.603)	0.038 (0.867)	0.171 (0.502)
High-tech deal * Deal significance	-2.299 (0.577)	-5.751 (0.025)	** -5.750 (0.025)	** -5.295 (0.041)	** -5.765 (0.023)	** -5.664 (0.027)	** -5.555 (0.032)
Related acquisitions	0.321 (0.100)	0.129 (0.484)	0.137 (0.457)	0.044 (0.809)	0.082 (0.642)	0.048 (0.786)	0.114 (0.538)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes
Industry fixed effects	yes	yes	yes	no	yes	no	yes
Country fixed effects	yes	yes	yes	yes	no	no	yes
Pseudo R^2 or Adjusted $R^2/(N)$	0.29 (2787)	0.03 (2787)	0.03 (2787)	0.03 (2787)	0.04 (2787)	0.04 (2787)	0.04 (2787)

Notes: The regressions are performed using Logit (Model 15) and Ordinary Least Squares (OLS) for the other models. Standard errors are firm-level clustered. As a dependent variable VBM deal is used for Model 15, and 7-day (-3, +3) CARs are used for the other models. All variables are defined in the Appendix. For each regression, the table reports the number of observations (N) and the Pseudo/Adjusted R^2 . P -values displayed in parentheses. All regressions include a constant term, which is not reported. Industry effects comprise industry dummies for each one-digit SIC industry. For year effects, a dummy variable for each year is integrated. Country effects comprise a dummy variable for each country.

^aWinsorized at the 1st and 99th percentile level.

***, **, * significance at the 1%, 5% and 10% levels (two-tailed), respectively.

Our study contributes to the literature in several ways. First, we extend the recent VBM performance literature (e.g. Firk et al., 2016; Rapp et al., 2011; Ryan & Trahan, 2007) by delving deeper into the mechanisms underlying the VBM performance effect. Specifically, we make use of M&A decisions to investigate the impact of VBM on a directly evaluated decision taken by managers. By outlining how VBM aligns managerial decisions (i.e. M&As) in situations that are prone to self-interested managerial behavior, we substantiate empirical evidence on the potential mechanisms that drive the positive performance outcomes of VBM (Knauer et al., 2018). Moreover, analyzing the shareholder effects of VBM on a specific managerial investment decision allows us to extend previous VBM research on investment decisions (Balachandran, 2006; Kleiman, 1999; Wallace, 1997).

Second, we enhance previous VBM research calling for the consideration of contextual factors when studying VBM effects (Firk et al., 2016; Lueg & Schäffer, 2010). Recent research by Firk et al. (2016) indicates that contextual factors (i.e. financially oriented ownership and a national shareholder orientation) could contribute to a more effective integration of VBM and thus to higher performance outcomes. In the context of M&A decisions, we add to recent findings of Knauer et al. (2018) by indicating that also the positive effect of VBM on M&A returns is contingent upon the risk that managers pursue self-interested decisions. Moreover, highlighting the risk of self-interested managerial behavior as a contingency factor of VBM's performance effect helps to contextualize previous VBM studies that did not find a general positive effect of VBM (Cordeiro & Kent, 2001; Griffith, 2004; Riceman et al., 2002).

Third, we contribute to the M&A literature. Prior research on M&As has uncovered control mechanisms such as board monitoring (Ahn et al., 2010; John & Senbet, 1998), shareholder control (Borisova & Brockman, 2012; Cornett et al., 2007; Maury & Pajuste, 2005) and compensation (Ozkan, 2012; Yim, 2013) as potential antecedents of value-creating M&As. By revealing that VBM is an internal control mechanism that can lead to better M&A decisions, we add to the stream of research that aims to solve the puzzle around making better M&A decisions.

Apart from these contributions, our findings are subject to limitations. First, capturing VBM information from annual reports also comes at a price. Specifically, we cannot exclude that companies will vary in the way in which they unfold their data, as opposed to their actual practices. Therefore, the value orientation of firms could be over- or under-reported. However, due to the usage of a large longitudinal and multinational data set, we have had to rely on publicly available information. Moreover, doubts could arise in the mechanism behind VBM's influence on M&As that may not be triggered by more aligned managerial decisions, but by VBM acting as a signal to investors and analysts. By relating the effect to contingency factors that should moderate VBM's conceptual benefits, we aim to better grasp the actual influence and underlying mechanisms of VBM. As our analysis did not show a direct effect between VBM and M&A returns, but a significant effect in situations where its conceptual benefits are particularly pronounced, we can alleviate the threat of alternative explanations to some extent. Finally, limitations can also be addressed in relation to our measure of deal performance. We use CARs of a specific event, as this allows for the direct measurement of a managerial decision. However, by relying on abnormal returns, we assume efficient markets based on the hypothesis from Fama (1998). Fourth, although we assume that our results may be transferable to other managerial investment decisions, the focus on M&A decisions does not allow us to make general assumptions on the influence of VBM on various other management decisions.

Despite these limitations, our study provides fruitful avenues for future research. Specifically, future research may consider that different managerial decisions call for specific (additional) contingency factors. Our study highlights factors encouraging self-interested M&As to pronounce the beneficial impact of VBM in the M&A context, while other studies documented the influence of different factors (e.g. Firk et al., 2016) when it comes to fundamental performance. Hence,

instead of focusing on a potentially full model depicting all the multiple contingencies, it may be fruitful to focus on further managerial decisions (e.g. corporate restructuring or strategic change) and their specific contextual factors to better grasp the various effects of VBM implementation. In particular, this could help practitioners and investors to better evaluate whether VBM implementation can pay off in certain conditions. For example, our results suggest that VBM could be beneficial by aligning managerial investment decisions in situations where self-interested investment decisions are more likely. This may be particularly relevant, as we could not observe that the threat of self-interested investment decisions is a major determinant of VBM use.¹⁴ However, in not finding a general positive effect from VBM on M&A returns, we also provide ‘food for thought’ for corporations that may succumb to the temptation of VBM being a so-called miracle cure.

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¹⁴Our reverse regressions mentioned in the robustness section do not document a significant influence of our moderating variables on the use of VBM.

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Appendix

Table A1. Data Sources and Variable Description

Variable	Description/Calculation	Source
<i>Dependent variable</i>		
CAR (−3, +3)	Seven-day cumulative abnormal return (in percent) calculated using the market model. The market model parameters are estimated over the period (210–11) with bidder's national stock market index as the market return index.	SDC Platinum & Datastream
<i>Independent variable</i>		
VBM	Binary variable that takes the value 1, if in a given year a company has implemented a value-based measure as the key metric for their internal target or control system, and 0 otherwise.	Hand-collected
<i>Moderator variables</i>		
FCF	FCF excess measured by dividing a firm's FCF funds from operations to total assets and subtracting the average FCF of its related industry (2-digit SIC code).	Datastream
Low industry competition	PCM, measured by dividing the industry's (2-digit SIC Code) net sales by its operating expenses.	Datastream
Equity availability	Stock market size, calculated by taking the logarithm of market capitalization of a market to GDP.	World Bank
<i>Control variables</i>		
CG quality	CG quality is derived by equally weighting and z-scoring the five underlying categories: (1) Board Structure, (2) Board Functions, (3) Compensation Policy, (4) Shareholder Rights and (5) Vision and Strategy and comparing them with all companies in the Asset4 database. The resulting variable is therefore a relative measure of the internal corporate governance, which is z-scored and normalized between 0 and 100%.	Thomson Reuters Asset4
Ownership concentration	Measured as the sum of fractional block holdings of the five largest investors of a company.	Thomson One Banker
Individual ownership	Measured as the sum of fractional holdings by individual investors containing five percent or more.	Thomson One Banker
Financial-oriented ownership	Measured as the sum of fractional holdings by professional investors (investment companies, independent investment advisors, hedge funds and pension funds).	Thomson One Banker
Size	Natural logarithm of the company's number of employees.	Datastream
Tobin's q	Calculated as (market capitalization + total assets – total shareholders' equity)/total assets. Winsorized at the 1st and 99th percentiles.	Datastream

(Continued).

Table A1. Continued.

Leverage	Short-term debt and current portion of long-term debt divided by total assets. Winsorized at the 1st and 99th percentiles.	Datastream
Related acquisition	Dummy variable that takes the value 1 if bidder and target share the same SIC industry classification.	SDC Platinum
Deal significance	SDC's deal transaction value relative to acquirer's market value of equity.	SDC Platinum
High-tech deal	Dummy variable that takes the value 1 if bidder and target are from high-tech industries defined by Loughran and Ritter (2004), 0 otherwise.	SDC Platinum
Public target	Dummy variable: 1 for public targets, 0 otherwise.	SDC Platinum
Private target	Dummy variable: 1 for private targets, 0 otherwise.	SDC Platinum
Subsidiary target	Dummy variable: 1 for subsidiary targets, 0 otherwise.	SDC Platinum
Cash deal	Dummy variable: 1 for purely cash-financed, 0 otherwise.	SDC Platinum
Stock deal	Dummy variable: 1 for deals at least partially stock-financed, 0 otherwise.	SDC Platinum
National shareholder orientation	Following Firk et al. (2016) measured as the aggregated index composed of three country-level measures: investor protection, accounting and accountability, and director liability. The value ranges from low shareholder orientation (0) to high shareholder orientation (3)	Own calculation
Industry effects	Dummy variables classifying firms into industry sectors based on one-digit SIC industries.	SDC Platinum
Country effects	17 dummy variables for each country.	S&P and MSCI Europe
Robustness		
VBM-sophistication	Index variable that consists of five elements representing distinctive VBM design choices: (1) value orientation, (2) value-based metric adoption, (3) target setting, (4) compensation linking and (5) operational integration. VBM-sophistication is calculated by summing up the binary-coded VBM elements into a single measure. The value ranges from 1 to 5 in steps of one.	Hand-collected based on Firk et al. (2018)
Industry VBM	Industry average (based on the two-digit SIC code) of VBM implementation.	Hand-collected

Table A2. Examples of VBM coding

Firm	Statement	Source	Classification
Whole Foods	'We use Economic Value Added ("EVA" TM) as a basis for our business decisions and for determining incentive compensation. In its simplest definition, EVA is equivalent to net operating profits after taxes minus a charge for the cost of invested capital necessary to generate those profits. [...] We believe this is one of our strongest competitive advantages and that EVA is the best financial framework that team members can use to help make decisions that create sustainable shareholder value.'	10-k Report 2007, p. 11.	VBM user
Thyssen Krupp	'The central performance indicator for our value-based management system is ThyssenKrupp Value Added (TKVA), which measures the value added in a period at all levels of the Group. It is calculated as earnings before interest and taxes (EBIT) minus cost of capital. Cost of capital represents the expected return on equity and debt.'	Annual report 2009, p.93.	VBM user
Thomas Cook	'ROIC was chosen to measure the efficiency of the use of the Group's capital in achieving the underlying earnings target. The ROIC ranges were set by reference to the Weighted Average Cost of Capital [...]	Annual report 2011, p. 64.	VBM user
Benetton	'Acronym for Economic Value Added. This performance indicator is calculated as a difference between NOPAT and average cost of capital employed, which is intended as capital employed multiplied by WACC (Weighted Average Cost of Capital). EVA therefore represents a measure of residual operating profitability, i.e. net of the return on capital employed.'	Annual report 2008, pp. 142–144.	No VBM user, as the value-based metric (EVA) is solely listed in the glossary of the annual report, where a definition of EVA is stated and not elsewhere.
Northrop Grumman Corporation	'New business awards or backlog, revenues, operating margin (dollars or rate), net earnings (on a total or continuing basis and either before or after (i) taxes, (ii) interest and taxes, or (iii) interest, taxes, depreciation, and amortization), earnings per share (on a total or continuing basis and either before or after (i) taxes, (ii) interest and taxes, or (iii) interest, taxes, depreciation, and amortization), cash flow or free cash flow (either as dollars or as a percentage of net earnings), returns on equity, investment, assets or net assets, cash flow return on equity, investment, assets or net assets, stock price or stock price appreciation, total shareholder returns, EVA [...], overhead or expense containment or reduction, working capital level or working capital turnover, and/or asset levels or asset turnover. The financial metrics identified above can be measured on an as reported or pension adjusted basis, on an annual or cumulatively over a defined period of time basis, and can be measured on an absolute, relative or growth basis.'	Def 14A Filing 2011, pp. 80–81.	No VBM user, as the value-based metric (EVA) is solely mentioned in a standardized list that mentions various other performance measures.