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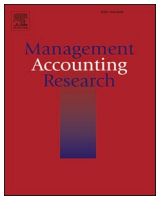

Does value-based management facilitate managerial decision-making? An analysis of divestiture decisions

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ABSTRACT

While recent studies indicate that value-based management (VBM) helps owners in aligning managerial interests (i.e., *decision-influencing role*), little evidence is provided for its support in managerial decision-making (i.e., *decision-facilitating role*). We investigate whether the depth of VBM implementation and contextual factors may determine VBM's decision-facilitating role. We investigate our research question on a dataset of 1,774 divestitures by European firms between 2005 and 2016. Divestitures allow for the analysis of managerial decision-making in situations where managerial self-interest is less pronounced and, thus, where VBM's decision-facilitating role can be differentiated from its decision-influencing role. Our empirical results indicate that VBM implementation down to the business-unit level is positively associated with divestiture returns, while we find no such effect if VBM implementation is limited to the corporate level. Further empirical tests indicate that this positive association is contingent on a high dispersion of the costs of capital across a firm's business portfolio. In sum, our study indicates that VBM can facilitate managerial decision-making when firms consider its depth of implementation and firm-specific information needs.

1. Introduction

During the last few decades, various studies have investigated the performance implications of value-based management (VBM). While many studies indicate that firms that implement a value-based metric within their control and reporting systems can outperform their peers who opt against implementing such a metric (e.g., Athanassakos, 2007; Firk et al., 2016; Rapp et al., 2011; Ryan and Trahan, 2007), several others do not find support for this positive effect (e.g., Bezemer et al., 2015; Hogan and Lewis, 2005). Recent studies, therefore, have started to shift from the question of "whether" VBM increases firm performance toward a focus on "when" or "how" VBM can affect firm performance (Firk et al., 2019a, 2019b; Knauer et al., 2018; Schultze et al., 2018). To address the latter questions, it is particularly relevant to parse out which conceptual benefits of VBM can be realized under which circumstances. The normative literature mainly highlights two conceptual benefits of VBM (Ameels et al., 2003; Young and O'Byrne, 2000). First, VBM should provide a *decision-influencing role* by aligning managerial interests with the goal of shareholder value creation, and second, VBM should provide a *decision-facilitating role* by supporting managers in making more value-creating decisions. In this study, we investigate VBM's decision-facilitating role.

Recent VBM studies have mainly provided support for VBM's decision-influencing role. Yet, evidence for VBM's decision-facilitating role is scarce. Specifically, Firk et al. (2019a) and Knauer et al. (2018) focused on merger and acquisition (M&A) decisions and found that VBM can improve the returns from M&A decisions, arguably by mitigating managerial self-interest. Knauer et al. (2018) further analyzed VBM's impact on divestiture[1] returns. In contrast to M&As, self-interested manager motives (e.g., empire building) have been found to be rare in divestiture decisions (e.g., Feldman and McGrath, 2016). At the same time, divestitures are complex and ambiguous decisions by nature that should benefit from decision-making support (Thywissen, 2015; Thywissen et al., 2018). Thus, divestiture decisions provide a unique setting allowing to isolate VBM's decision-facilitating role from its decision-influencing role. However, Knauer et al. (2018) did not find support for a positive impact of VBM on divestiture returns on average. This is somewhat surprising considering that VBM proponents have

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[1] Brauer (2006, p. 751) defines divestitures as "a firm's adjustments of its ownership and business portfolio structure via spin-off, equity carve-out, split-up, or unit sell-off."

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typically stressed that VBM provides a decision-facilitating role (Haspeslagh et al., 2001; Koller et al., 2010; Young and O'Byrne, 2000). Moreover, several arguably less costly measures (e.g., equity-based compensation) than implementing value-based metrics could also promise an improved alignment of managerial interests, thus questioning the widespread use of VBM. Hence, we believe it is worthwhile to further explore the circumstances under which VBM may provide a decision-facilitating role in the divestiture setting. Specifically, we consider two additional factors: (1) the depth of VBM implementation[2] and (2) the decision context.

First, for a decision-facilitating role, VBM needs to provide superior information that allows managers to make better-informed decisions. In the divestiture decision-making process, managers should benefit from access to information that allows them to better detect and compare value creation throughout the firm's business portfolio. With such information, managers may select a more appropriate divestiture candidate and, at an earlier time, two crucial determinants of divestiture effectiveness (Thywissen, 2015; Thywissen et al., 2018). Conceptually, VBM should provide more accurate information on value creation throughout the business portfolio through considering both profitability and the costs of capital of business units (BUs) and thus of potential divestiture candidates. However, we believe that this requires implementing value-based metrics not only at the corporate level but also at the BU level. Only then can managers benefit from information on value creation across the entire business portfolio and be able to adequately compare the BUs' value creation. Prior VBM literature, however, indicates that only some VBM users decide to implement value-based metrics down to the BU level (e.g., Firk et al., 2019b; Malmi and Ikäheimo, 2003).

Second, to further investigate whether decision facilitation is the mechanism behind the potential impact of VBM on divestiture decisions, we focus on two contextual factors. First, we focus on a factor that should strengthen the benefits of VBM's decision-facilitating role. Specifically, we consider the existence of differences in the costs of capital across the business portfolio. We argue that, in comparison to profitability measures (e.g., return on investment [ROI]), value-based metrics provide additional information on value creation due to their consideration of the costs of capital. However, when evaluating potential divestiture candidates, such information is mainly valuable when the costs of capital vary across the business portfolio. If the costs of capital are similar among the firm's BUs, value-based metrics should only provide incremental additional information for the selection of the appropriate divestiture candidate.[3] Second, we focus on a factor that should strengthen the benefits of VBM's decision-influencing role. Following our assumption that the divestiture setting allows us to isolate the decision-facilitating role of VBM, we would not expect that such a factor would significantly affect the impact of VBM implementation on divestiture returns. We focus here on the potential risk of self-interested managerial decisions.

We examine our predictions empirically by analyzing the impact of VBM on divestiture returns based on 1,774 divestitures of multi-business firms in the 500 largest non-financial firms listed in the STOXX® Europe Total Market Index (TMI) in 2005, which we followed up until the end of our research period in 2016. We differentiate between VBM implementation only at the corporate level and down to the BU level (i.e., corporate and BU level). We find a positive association between VBM and divestiture returns only when implemented down to the BU level. We further demonstrate that this finding is contingent on a high dispersion of the costs of capital across the business portfolio, while the positive association is not significantly affected by the risk of managerial self-interest. Several robustness tests regarding alternative specifications for the dependent, independent, and moderator variables as well as endogeneity concerns validate our results. Moreover, we also consider that our findings may stem from a signaling effect and investigate the long-term performance consequences of divestiture decisions. We find that VBM implementation down to the BU level is positively associated with the long-term performance of divestitures, however, only when there is a high dispersion of the costs of capital across the business portfolio.

We contribute to the previous literature in several ways. In particular, we contribute to the literature devoted to VBM–performance implications. First, we extend VBM studies that indicate VBM's decision-influencing role in, for example, improving M&A decisions (Firk et al., 2019a; Knauer et al., 2018), reducing investment spending (Balachandran, 2006), or increasing the likelihood of asset disposition (Wallace, 1997) by providing empirical evidence that VBM can fulfill a decision-facilitating role. Specifically, VBM may support managers in making more value-creating decisions in situations where managerial alignment is already present (i.e., the divestiture setting). This also supports indications from case studies that VBM can be helpful in divestiture decisions (e.g., Malmi and Ikäheimo, 2003). Second, we show that this decision-facilitating role, however, depends on both the depth of VBM implementation and contextual factors. Thereby, we extend the VBM literature that calls for an exploration of the drivers of VBM effectiveness (Firk et al., 2016; Lueg and Schäffer, 2010). On the one hand, we support the line of argumentation of several VBM studies (Burkert and Lueg, 2013; Firk et al., 2019b; Malmi and Ikäheimo, 2003) that the decision-making impact of VBM depends on the depth of its implementation. On the other hand, we add the dispersion of the costs of capital across the business portfolio of a firm as an important contingency factor in the context of the decision-facilitating role. Thereby, we also provide a more nuanced view on the crucial role of diversification for VBM benefits, as suggested by prior literature (e.g., Firk et al., 2019b).

Our focus on the divestiture setting further contributes to divestiture and management accounting research in general. First, the divestiture literature has particularly called for the investigation of factors involved in the divestiture decision-making process (e.g., Thywissen, 2015) that may explain differences in divestiture outcomes (divestiture effectiveness). We highlight the crucial role that management accounting information (in the form of value-based metrics) can play in the selection and timing of divestitures and thereby add a further determinant of divestiture effectiveness (Brauer, 2006; Feldman and McGrath, 2016; Lee and Madhavan, 2010). Moreover, by illustrating that (1) the divestiture setting allows us to better isolate the decision-facilitating role and that (2) management accounting information is of great relevance for such decisions, our study may also help to advance the literature on the decision-facilitating role of management accounting information (e.g., Anderson and Kimball, 2019; Gallemore and Labro, 2015).

We structure the remainder of our study as follows. In Section 2, we provide a review of the literature. Section 3 presents the hypotheses' development. We describe the research design of our study in Section 4. We then present the results of our empirical analysis and robustness tests in Sections 5 and 6, respectively. Finally, in Section 7, we conclude and outline directions for future research.

[2] Knauer et al. (2018) consider the link between VBM and compensation as one element of the depth of VBM implementations in their study. They still find no empirical evidence for VBM's *decision-facilitating role* in the divestiture setting.

[3] Divestiture selection could be viewed as a picking decision. In contrast to winner picking, which is typically applied in resource allocation decisions (Busenbark et al., 2017), the divestiture candidate may be picked based on the worst performance. In this scenario and with a portfolio consisting of divestiture candidates with similar costs of capital, managerial decision-making based on mere profitability measures (e.g., ROI) should theoretically result in a similar decision as to the one using value-based metrics.

2. Prior literature

2.1. The benefits of value-based management

Generally, management accounting information could fulfill two key roles: A decision-influencing role, by motivating managers to take actions in the interests of owners and a decision-facilitating role, by providing information that helps managers in better assessing decision alternatives and, thus, in taking more value-creating decisions (e.g., Demski and Feltham, 1976; Sprinkle, 2003; van Veen-Dirks, 2010). Proponents of VBM typically stress that, by means of integrating a value-based metric into the reporting, evaluation, and decision-making processes, VBM implementation is able to fulfill both of these roles (e.g., Koller, 1994; Stewart, 1991; Young and O'Byrne, 2000). Specifically, (1) the implementation of value-based metrics that consider the costs of capital should influence managers to aim for decisions that are in the shareholders' interests (i.e., decision-influencing role) and (2) these metrics should provide managers with superior information on value creation and thus facilitate value-creating decisions (i.e., decision-facilitating role).

Based on the promised benefits of VBM and the lively debate about them in corporate practice (e.g., Benson-Armer et al., 2004; Haspeslagh et al., 2001), a substantial number of empirical studies have devoted attention to the performance implications of VBM. While the majority of these studies (see, Lueg and Schäffer, 2010) indicate a positive association between VBM implementation and firm performance (e.g., Athanassakos, 2007; Firk et al., 2016; Rapp et al., 2011; Ryan and Trahan, 2007), several other studies could not find support for this positive association (e.g., Bezemer et al., 2015; Hogan and Lewis, 2005). Many of these studies focused purely on the relationship between VBM and firm performance and did not further investigate the mechanisms by which VBM induces positive performance effects. For example, it remains rather open as to whether these findings could be explained by either the decision-influencing role, the decision-facilitating role, or even both. Focusing on the mechanisms behind the VBM–performance relationship may, however, help to put the partly inconclusive empirical picture into perspective. Recent studies, therefore, have started to dig deeper into the mechanisms that may explain how and when VBM may increase firm performance (e.g., Firk et al., 2019a, 2019b; Knauer et al., 2018).

For example, Firk et al. (2019b) highlight the role of the implementation level and contextual factors that create a particular need for the two roles of VBM as drivers of the VBM–performance relationship. While the importance of the implementation level affirms conceptual and case-based VBM studies (Malmi and Ikäheimo, 2003; Young and O'Byrne, 2000), the focus on overall firm performance makes it difficult to distinguish between the decision-influencing role and the decision-facilitating role. Hence, in addition to focusing on contextual factors and the implementation level, other studies have investigated specific decisions to better grasp the mechanism(s) behind the VBM–performance effect. Considering the high risk of managerial self-interest in M&A decisions, these studies argue and indicate that VBM can improve the outcome of M&A decisions (Firk et al., 2019a; Knauer et al., 2018). These results may be mainly determined by VBM's decision-influencing role, which helps in aligning the interests of managers with owners.[4] Still, the investigation setting (i.e., M&As) does not allow for parsing out VBM's decision-facilitating role, which may also contribute to better outcomes regarding M&A decisions. Knauer et al. (2018) further investigated the relationship between VBM and the outcome of divestiture decisions. In contrast to M&As, the divestiture setting allows us to isolate VBM's decision-facilitating role, as self-interested manager motives (e.g., empire building) to engage in such decisions are found to be rare (Feldman and McGrath, 2016; Lee and Madhavan, 2010). The results of Knauer et al.'s (2018) study, however, indicate that VBM is not significantly associated with the outcome of divestiture decisions. Hence, besides considerable support for VBM's decision-influencing role, empirical evidence for its decision-facilitating role is scarce.

VBM proponents particularly stress that the implementation of value-based metrics provides a decision-facilitating role (Haspeslagh et al., 2001; Koller et al., 2010; Young and O'Byrne, 2000). Considering that several arguably less complex control elements, such as equity-based compensation, may be effective in influencing managerial decision-making, the question of whether or when the implementation of value-based metrics provides a decision-facilitating role is of high relevance. Recent VBM literature points to the level of VBM implementation and contextual factors that could play a role in pronouncing the benefits of VBM (e.g., Firk et al., 2019b; Lueg and Schäffer, 2010). Hence, we aim to contextualize the seminal findings of Knauer et al. (2018) on VBM's decision-facilitating role in the divestiture context by considering both the implementation level of VBM as well as the decision context.

2.2. Divestitures as a setting to analyze VBM's decision-facilitating role

Divestitures are a basic portfolio restructuring choice where firms exit a business via a spin-off, equity carve-out, split-up, or unit sell-off (e.g., Brauer, 2009, 2006). These decisions are typically carried out at the corporate headquarters (e.g., Thywissen, 2015) and, similar to M&As, they receive great attention from the capital markets (Markides and Berg, 1992). However, in contrast to M&As that are typically plagued by self-interested manager motives (Haleblian et al., 2009), managerial self-interest in the context of divestitures is found to be rare (Feldman and McGrath, 2016; Lee and Madhavan, 2010; Thywissen, 2015). The management literature even refers to managers as "value-maximizing" (i.e., acting in the interests of the shareholders) when they opt for a divestiture (Feldman and McGrath, 2016). This notion coincides with the finding of Lee and Madhavan (2010), who parsed several divestiture studies to analyze the performance effect and concluded that "divestiture outcomes are positive on the whole" (Lee and Madhavan, 2010, p. 1363). Still, the divestiture literature consistently emphasizes the variations in divestiture returns (Brauer and Wiersema, 2012; Markides and Berg, 1992; Thywissen et al., 2018). Hence, Feldman and McGrath (2016) clarify how the view that managers "are value-maximizing does not preclude divestitures from potentially having negative consequences for the firms that undertake them" (Feldman and McGrath, 2016, p. 5). This may be because divestitures are complex and ambiguous by nature (Duhaime and Schwenk, 1985), which makes it difficult to select the right divestiture candidate in the firm's portfolio. Hence, less positive or even negative results from divestitures are "not attributable to managers pursuing their own interests at the expense of their shareholders, but rather to inadvertent mistakes or misperceptions as to the best courses of actions for the firms they run" (Feldman and McGrath, 2016, p. 5).

The view that managerial self-interest is less relevant in the divestiture setting allows to better isolate the decision-facilitating role of VBM in the divestiture context. In addition, prior divestiture literature points to the fact that management accounting information (e.g., hard data on performance metrics) plays a key role in the divestiture decision-making process, for example, in the form of selecting and justifying the selection of a certain divestiture candidate (Thywissen, 2015). However, this may also entail the risk that accounting information fosters shareholder value incongruent decisions when managers rely on misleading measures of corporate performance. In addition, limited internal information quality in general could encourage a decision-making process led by intuition, potentially resulting in the selection of an inappropriate divestiture

[4] In addition to that, the study by Schultze et al. (2018) argues that VBM implementation may reduce information asymmetries between managers and shareholders. They find a negative association between VBM implementation and the firms' implied cost of capital, which is explained by aligning shareholders' and mangers' interests' and thus also rather relates to VBM's decision-influencing role.

candidate at the lower end (Duhaime and Grant, 1984; Nees, 1981; Thywissen, 2015). In sum, management accounting information, such as in the form of value-based metrics and a coherent set of value drivers, could play a crucial role in facilitating the selection of the right divestiture candidate and thus for divestiture outcomes.

3. Hypotheses development

3.1. VBM implementation and the effectiveness of divestiture decisions

Knauer et al. (2018) emphasize that VBM's decision-influencing benefits may be of less relevance in the divestiture setting. At the same time, they indicate that using value-based metrics in analyzing the firm's business portfolio could make a divestiture candidate more salient. In addition, the consideration of profitability as well as the costs of capital (e.g., in the form of value-based metrics) across the business portfolio in VBM firms should help to find a more appropriate divestiture candidate as when neglecting the costs of capital. The divestiture literature points out that selecting the right candidate (i.e., selection effectiveness) and detecting the right time to divest (i.e., timing effectiveness) are two major criteria explaining differences in the outcome of divestiture decisions (Brauer and Wiersema, 2012; Markides and Berg, 1992; Nees, 1981; Owen et al., 2010; Thywissen et al., 2018). While this underpins the potential decision-facilitating role of VBM, the results of Knauer et al. (2018) show that the divestiture outcomes of VBM users are not different from those of non-users. In addition to the limited benefits from VBM's decision-influencing role, this indicates that VBM users do not benefit from more effectiveness in the selection and timing of divestitures on average. We aim to contextualize their findings by suggesting that, depending on the implementation level of value-based metrics, VBM users may be able to realize more effectiveness in (the selection and timing of) their divestiture decisions.

For a decision-facilitating role in selecting and timing divestitures, VBM implementation needs to provide managers with access to information that allows them to better detect and compare value creation throughout the firm's business portfolio (Brauer, 2006; Nees, 1981). Conceptually, by considering both profitability and the costs of capital, value-based metrics could provide more accurate information on value creation throughout the firm's business portfolio (e.g., Young and O'Byrne, 2000). To realize this, VBM users would need to break down the value-based metrics into the different units—potential divestiture candidates—in the business portfolio. However, VBM users frequently decide to merely use a single, central value-based metric displaying the corporation's value creation, and only some VBM users decide to also integrate value-based metrics on a more operative level, for example, at BUs (Firk et al., 2019b; Malmi and Ikäheimo, 2003).

VBM implementation at the BU level provides corporate management with greater transparency and comparability in terms of value creation for the different BUs in the firm's business portfolio. As VBM typically calls for breaking the value-based metrics down into a coherent set of value drivers (Burkert and Lueg, 2013), it should further help corporate management to better understand the impact of a divestiture decision on the overall portfolio. For example, corporate management could more easily analyze the potential change in the overall risk profile or costss of capital due to the divestiture. While rich accounting information throughout the portfolio may also generally help in the divestiture process, the consideration of the costs of capital in value-based metrics at the BU level has a "significant information value beyond traditional accounting measures" (Cordeiro and Kent, 2001, p. 58). In conclusion, we expect that if VBM users also implement value-based metrics at the BU level, the increased information on value creation throughout the portfolio should facilitate the managers in selecting a more appropriate divestiture candidate and to divest at the right time. Hence, we hypothesize that:

H1. The implementation of VBM down to the business unit level is positively associated with the returns from divestiture decisions.

3.2. The dispersion of the costs of capital across the business portfolio

The divestiture literature highlights how the corporate context can affect the divestiture decision-making process. For example, the complexity of the firm's business portfolio might call for more information processing but hamper it at the same time (Bergh and Lawless, 1998; Thywissen, 2015). Similarly, the VBM literature assumes that the benefits of VBM, including its decision-facilitating benefits, may not be equally realizable for all firms (e.g., Cordeiro and Kent, 2001; Firk et al., 2019b; Lueg and Schäffer, 2010). Hence, we assume that the firm's specific need for information on value-based metrics at the BU level should determine the decision-facilitating benefits that such a VBM implementation could provide in the divestiture decision-making process.

The additional information provided by implementing VBM at the BU level should stem from the fact that value-based metrics, in comparison to profitability measures such as ROI, also consider the BUs' cost of capital. In the process of finding the right divestiture candidate in the firm's business portfolio, this information should mainly help when the BUs in the portfolio have different risk profiles and thus different costs of capital. In a business portfolio where the costs of capital barely differ, selecting, for example, a divestiture candidate from among the BUs based on differences in profitability measures, such as ROI, would lead to relatively similar results as when considering differences in value-based metrics.[5] The benefits of value-based metrics at the BU level for the selection effectiveness of divestitures are thus likely to depend on the dispersion of the costs of capital in the business portfolio. While timing benefits due to value-based metrics at the BU level could still be relevant in both a portfolio with more and less dispersed costs of capital across the portfolio, the reduced information complexity in a business portfolio with less dispersed costs of capital could also help to better detect the potential for a divestiture in general. This further supports the view that, in particular, dispersed costs of capital across the portfolio unlock the benefits of implementing VBM at the BU level. In sum, we hypothesize that:

H2. The positive association between VBM implementation down to the BU level and divestiture returns is more pronounced for firms with a high dispersion of the costs of capital across the business portfolio.

3.3. The potential of self-interested managerial decisions

The divestiture literature emphasizes that managerial self-interest is one reason why managers tend to avoid divestiture decisions (Chen and Feldman, 2018; Thywissen, 2015). Specifically, managers associate divestitures with a reduction in control and tend to perceive them as personal failures (e.g., Hayward and Shimizu, 2006). Therefore, the literature assumes that managers deciding for a divestiture do act in the interests of shareholders. Managerial self-interest should thus hardly explain differences in divestiture returns (Feldman and McGrath, 2016). Specifically, even when managers have greater leeway to act in their own interests (e.g., limited external control by shareholders, competitors, directors, or stakeholders), it is rather unlikely that a divestiture decision will provide personal benefits for those managers who are not aligned with shareholder interests. The potential for VBM to prevent divestiture decisions motivated by self-interest (i.e., to mitigate agency concerns) is thus also very limited. However, the increased information on value creation throughout the portfolio when value-based metrics are implemented at the BU level should make a difference in divestiture

[5] Divestiture selection could be viewed as a picking decision, where the divestiture candidate is picked based on the worst performance relative to the other BUs.

effectiveness even among managers acting in the interests of shareholders. Based on this, we expect that the positive association between VBM and divestiture returns will not vary significantly with the risk that managers could act in their own interests, and we posit the following null hypothesis:

H3. The positive association between VBM implementation down to the BU level and divestiture returns does not differ between firms with a high potential for managerial self-interest and firms with a low potential for managerial self-interest.

4. Data and methodology

4.1. Sample selection

In order to study the effects of VBM on divestiture success, we need to focus on a sample of firms that are likely to implement VBM and to initiate divestitures. We draw on a sample that covers the 500 largest non-financial firms listed in the STOXX® Europe TMI in 2005 based on their market capitalization. We then followed up on these firms until the end of our research period in 2016. Given the size of the selected firms, it is quite likely that all have comprehensive management accounting systems in place. Moreover, the focus on large corporations enables us to study a sufficient number of divestitures, which become increasingly common with the greater the size of the company (Berry, 2010).

In the sample selection, we follow a two-step procedure. First, the selection of a firm year requires the fulfillment of the following criteria: (1) the firm has been one of the 500 largest non-financial firms listed in the STOXX® Europe TMI Index in 2005; (2) the firm has been listed on the capital markets in the respective year of our research period (2005–2016); and (3) the firm is a multi-business firm. The resulting sample comprises 4,554 firm years. Second, we select all divestitures of these firm years that meet the following criteria: (1) the divestiture is complete; (2) the transaction involves more than a 50 % stake in the divested unit (Brauer and Wiersema, 2012; Owen et al., 2010); (3) the deal value is at least US$ 10 million (Knauer et al., 2018); and (4) all the data for the divesting firm and divestiture for regression analyses are available. The fulfillment of these criteria yields a sample of 1,774 divestitures (see Table 1).

4.2. Sample selection correction

As a firm's decision to initiate a divestiture is not exogenous, we face the challenge of a potential sample-selection bias. Therefore, we employ the commonly used two-step sample-selection correction suggested by Heckman (1979) (Kimbrough and Louis, 2011; Louis, 2005).[6] As suggested by Lennox et al. (2012), we include an additional exclusion-restriction variable in our first-stage probit regression. Precisely, we calculate the activity of the M&A market prior to the divestiture. High M&A activity suggests a certain liquidity in the M&A market, which increases the likelihood of divestitures (Barker and Duhaime, 1997). However, we do not expect that M&A activity will directly affect divestiture success. The results from the first-stage probit regression on the initial sample show that our exclusion criterion is valid since it significantly influences the likelihood of a sample firm initiating a divestiture.[7] We then use the probit regression results to calculate the inverse Mills ratio[8] (*INVMILLSIND*) and, finally, we include this self-selection correction factor in all regressions on divestiture success.

Table 1
Sample selection.

Sample selection	Observations
Number of listed multi-business firm years between 2005 and 2016 of the 500 largest non-financial firms of the Europe STOXX TMI in 2005	4,554
Number of completed divestitures in the potential firm years	5,357
- Divestitures with deal data restrictions	3,192
- Divestitures not meeting restriction criteria	258
- Divestitures with data restrictions	133
All divestiture sample	1,774

Notes: This table presents the sample selection procedure. For further detail, see Section 4.1.

[6] Heckman (1979) suggests incorporating a correction factor derived from a first-stage probit regression with the selection criterion as the dependent variable.

4.3. Main variables

4.3.1. Dependent variable – Divestiture success (CARs)

The most frequently used analytical approach to study divestiture success is an event-study methodology that measures the abnormal stock market returns of divestiture announcements (e.g., Boone and Mulherin, 2007; Brauer and Wiersema, 2012; Feldman et al., 2016; Lang et al., 1995; Thywissen et al., 2018). This approach provides a direct response from shareholders to a specific corporate decision, which coincides with our aim of analyzing the impact of VBM on the success of divestiture decisions. Therefore, we calculated cumulative abnormal returns (*CARs*) that measure the differences between the actual return of an equity over the respective event window and an estimated return based on a firm's market model predictions (Brauer and Wiersema, 2012; Knauer et al., 2018). We estimated the market model parameters over a 200-day period from 211 to 11 days before each event (Masulis et al., 2007; Owen et al., 2010). For the market portfolio, we draw on a firm's national composite index. Precisely, we calculated daily abnormal returns as follows:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i * R_{mt})$$

R_{it} is the return of an equity (i) on day (t) and R_{mt} is the return of a benchmark index (m) on day (t). Moreover, α_i equals to the constant and β_i to the firm's (i) systematic risk based on the market model estimation. Finally, we followed previous divestiture research that has often focused on *CARs* over a 2-day event window $[-1, 0]$ (Desai and Jain, 1999; Hite et al., 1987; Krishnaswami and Subramaniam, 1999; Lang et al., 1995; Markides and Berg, 1992; Rosenfeld, 1984).

4.3.2. Independent variables – level of VBM implementation

Previous empirical studies have mostly used a dichotomous classification of "VBM adopters" and "non-adopters" as a proxy for VBM implementation (Firk et al., 2016; Fiss and Zajac, 2004; Knauer et al., 2018; Rapp et al., 2011; Ryan and Trahan, 2007; Wallace, 1997). However, we believe that the depth of VBM implementation is especially relevant in divestitures, given that these corporate decisions require a thorough evaluation of the firm's business portfolio prior to initiating the divestiture (Brauer, 2009, 2006; Nees, 1981). To account for this, we follow the approach of Firk et al. (2019b) and account for different levels of VBM implementation based on information retrieved from annual reports.[9] Specifically, we expect that it is relevant to implement VBM down to the BU level, as this provides managers with more information

[7] The first-stage probit results can be found in Table IA2.5 of the Internet Appendix.

[8] The inverse Mills ratio is calculated as the probability density function divided by the cumulative density function for the initiation of a divestiture worth at least US$ 10 million (Lennox et al., 2012).

[9] As with recent archival VBM research (Firk et al., 2019b; Knauer et al., 2018; Rapp et al., 2011), we believe that annual reports are an adequate source for our data collection, since they are an essential form of communication to the shareholders. Given this, firms should be prone to communicating VBM implementation in their annual reports.

on value creation for potential divestiture candidates. To delineate between the performance implications of VBM implementation at the corporate level and the BU level, we develop two VBM proxies: one accounting for an implementation only at the corporate level and another accounting for VBM implementation down to the BU level. Specifically, we code the variable as follows:

1. Corporate VBM implementation (*VBMCORP*) captures the adoption of a value-based metric[10] as a key performance indicator at the corporate level, but not at lower levels of the organization. *VBMCORP* takes the value of 1 if a value-based metric is disclosed at the corporate level but not at the BU level, and 0 otherwise.
2. VBM implementation down to the BU level (*VBMBU)* captures whether a firm has disclosed a value-based metric at both the corporate level and BU level.[11] Consequently, *VBMBU* takes the value of 1 if a company reports the chosen value-based metric both at the corporate and at the BU level, and 0 otherwise.

4.3.3. Moderating variable – dispersion of risk

Variations in a firm's cost of capital are, to a large extent, driven by variations in its systematic risk. Accordingly, we proxy for variations in the costs of capital by variations in betas. The firm's beta, also known as its systematic risk, gives an indication of how volatile a firm's stock is in comparison to the market (Sharpe, 1964). As we intend to measure the dispersion of the costs of capital across the entire business portfolio of a firm, we would ideally need data on betas at the BU level of the firm. However, considering that BUs are not separately listed in the capital markets, data on betas at the BU level of a firm are not available. In this context, previous research has tackled issues with data unavailability at the BU level by calculating industry averages for single-business firms and then applying these averages to the BUs' matching industries (D'Mello et al., 2017; Lang and Stulz, 1994; Rajan et al., 2000). We follow this approach by calculating yearly industry averages of single-business firms' 12-month betas at the Fama–French 48 industry classification level[12] and applying them to the BUs' matching industries. Then, we calculate the standard deviation between the different betas across a firm's business portfolio *(DISPRISK)*.[13]

4.3.4. Moderating variable – the potential of self-interested managerial decisions

To capture the theoretical potential that managers may act in their own interests in a divestiture setting, we focus on an index of several factors that proxy for the external control of managers. Specifically, we follow the idea that external monitoring decreases the risk of self-interested managerial decisions, while a lack of monitoring provides managers with more leeway to engage in self-interested decisions. We focus on the potential control by shareholders, competitors, directors, and banks. First, given our international sample, we start by considering legal differences that may explain more or less potential for shareholder control and account for the anti-director rights index (*ADR*) of the firm's country (Spamann, 2009). Second, we consider the level of industry competition that is highlighted as a powerful external force preventing or, in the case of industry concentration (*INDCONC*), allowing for managerial self-interest (Shleifer and Vishny, 1997). Third, we consider whether board members are appointed under the current CEO, as co-option (*BDCOOPT*) is found to prevent effective oversight by the board (e.g., Huang et al., 2019). Fourth, to account for the control by a major shareholder, we consider the shareholdings of the largest investor (*OWNC*). Fifth, we also consider the level of leverage (*LEV*), as this indicates the dependency on banks, which should curb the potential for self-interested decisions. Finally, we created z-scores of each individual measure and summed them up into a single measure for the risk of managerial self-interest (*MGMT_SELFINT*). For anti-director rights (*ADR*), leverage (*LEV*), and ownership concentration (*OWNC*), high values indicate more control; hence, we used reversed z-scores for these variables.

4.4. Control variables

To select our control variables, we screened various empirical studies on divestiture research (Berger and Ofek, 1999; Brauer and Wiersema, 2012; Lang et al., 1995; Owen et al., 2010; Shimizu and Hitt, 2005; Vidal and Mitchell, 2015). On the firm level, we included *firm size (SIZE)* as the natural logarithm of the firm's number of employees because previous research has found that size negatively affects divestiture success (Lang et al., 1995; Shimizu and Hitt, 2005). Moreover, effects on divestiture success have been discussed in terms of a firm's leverage and diversification (Berger and Ofek, 1999; Brauer and Wiersema, 2012). Hence, we included leverage *(LEV)* as the ratio of total debt to total assets and *diversification* measured as a firm's number of segments *(SEGMENTS)*. Moreover, business strategy is highlighted in the context of divestiture success (Lee and Madhavan, 2010). Hence, we follow Bentley et al. (2013) in accounting for a firm's strategy (*STRATG*) as defined by Miles and Snow (i.e., defender, analyzer, or prospector) (Miles et al., 1978). Similarly, the firm's life cycle and environmental uncertainty may determine divestiture success (Lee and Madhavan, 2010). Hence, we considered sales growth (*GROWTH*), the firm's market-to-book ratio *(MTB),* and the standard deviation of the ROA over the last three years (*STDROA3Y*). Moreover, when firms with high liquidity decide to divest, previous studies suggest positive divestiture returns (Lang et al., 1995; Owen et al., 2010). Hence, we included a firm's liquidity *(LIQUID),* measured as the ratio of funds from operations to total assets. Furthermore, we included a firm's operating performance measured as *ROA* because previous research suggests that profitability negatively influences divestiture success (Brauer and Wiersema, 2012; Vidal and Mitchell, 2015).

In addition to these firm-level characteristics, several researchers emphasize that corporate governance characteristics at the board, ownership, and industry level can enforce shareholder-oriented investment decisions (Masulis et al., 2007). Therefore, we included several corporate governance characteristics that have been discussed and have been found to affect divestiture success (Berger and Ofek, 1999; Brauer and Wiersema, 2012; Masulis et al., 2007; Owen et al., 2010; Shimizu and Hitt, 2005). First, similar to Owen et al. (2010), we included *board size (BOARDSIZE),* measured as the natural logarithm of the number of directors serving on the board, and board independence *(BOARDINDEP)* as the percentage of independent directors. Furthermore, previous research indicates that the presence of institutional owners influences divestiture success (Brauer and Wiersema, 2012; Owen et al., 2010; Shimizu and Hitt, 2005). Therefore, we included institutional ownership *(INSTOWN),* calculated as the sum of shareholdings by active institutional investors (Cornett et al., 2007). Moreover, we included ownership

[10] We follow Firk et al. (2019b) and considered value-based metrics along their three most prominent representatives: discounted cash flow, economic value added, and cash value added. All "look-alike" metrics were subsumed under these frameworks. Metrics may come in the form of absolute, relative, or multi-period discounted figures. Since the relative metrics (e.g., ROCE) do not necessarily consider the costs of capital, we verified whether they were compared to the costs of capital within the annual report.

[11] As such, our variable *VBMBU* corresponds with the two elements *"Value-based metric adoption"* and *"Operational integration"* in the VBM sophistication measure of Firk et al. (2019b). Moreover, it is important that, in our sample, the case does not exist where only a specific BU implemented VBM, while the headquarters and other BUs did not use VBM.

[12] Specifically, we calculated the betas for all listed single-business firms in Thomson Reuters DataStream, which are from either the USA or Europe, based on 12 months and with the local market index provided by Thomson Reuters DataStream as a benchmark.

[13] While we acknowledge that these industry averages might differ from the actual risk profiles of a firm's BUs, we expect that the proxy could adequately capture the relative dispersion of the risk profiles of a firm's BUs.

concentration *(BLOCKHOLD)*, measured as the sum of shares held by investors holding 5% or more of the shares.

We further included several variables that account for divestiture characteristics. First, we included the deal size *(DEALSIZE)*, which has regularly been found to influence the returns from a divestiture (Brauer and Wiersema, 2012; Mulherin and Boone, 2000). Second, we included a control variable for the transaction format. Specifically, we created a dummy variable spin off *(SPINOFF)* that indicates whether the divestiture is a spin-off or not, as Lee and Madhavan (2010) suggest that spin-offs generate higher market returns than sell-offs do. Third, we followed Brauer and Wiersema (2012), who control for the type of payment, and included a variable that captures whether the payment is purely cash-financed *(CASHDEAL)*, and a second one that captures whether the payment is partially or fully stock-financed *(SHAREDEAL)*. Fourth, we integrated the variable divested unit relatedness *(DIVRELATE),* since divestitures where the BU's industry differs from that of the core business's industry have been found to be evaluated more positively. Following prior studies, we categorized a divested unit to be related to the core business if its two-digit standard industrial classification (SIC) code matched that of the core business, and we coded the corresponding dummy variable as 1, and 0 otherwise (Brauer and Wiersema, 2012; Markides and Berg, 1992). Finally, we integrated 17 industry dummy variables *(INDUSTRY)* based on Fama–French and dummy variables for each year within our time frame *(YEAR)*. The Appendix A briefly summarizes the calculation of each variable and provides information on the respective data source.

4.5. Method of analysis

Given that divestiture returns are normally distributed within our sample, we follow previous research and run several ordinary least squares (OLS) regressions (Feldman et al., 2016; Laamanen et al., 2014; Lang et al., 1995; Mulherin and Boone, 2000; Owen et al., 2010; Rosenfeld, 1984; Slovin et al., 1995). As firms vary in their divestiture activity, we adjusted for time-series dependence by clustering standard errors on the firm level (Petersen, 2009). Our regression model includes the dependent variable $CARs_{it}$ as a measure of divestiture success, the two independent variables $VBMCORP_{it}$ and $VBMBU_{it}$ as measures for a firm's level of VBM implementation, and control variables for firm characteristics, board characteristics, owner characteristics, and deal characteristics. Finally, we include industry- and time-fixed effects in our regression model. Using the subscript i for firms and t for time, our regression model to test our first hypothesis is as follows:

$$\begin{aligned} CARs_{it} = {} & INTERCEPT + \beta_1 VBMBU_{it} + \beta_2 VBMCORP_{it} + \beta_3 INSTOWN_{it} \\ & + \beta_4 BLOCKHOLD_{it} + \beta_5 BOARDSIZE_{it} + \beta_6 BOARDINDEP_{it} \\ & + \beta_7 SIZE_{it-1} + \beta_8 STRATG_{it-1} + \beta_9 STDROA3Y_{it-1} \\ & + \beta_{10} GROWTH_{it-1} + \beta_{11} LEV_{it-1} + \beta_{12} LIQUID_{it-1} + \beta_{13} ROA_{it-1} \\ & + \beta_{14} SEGMENTS_{it-1} + \beta_{15} MTB_{it-1} + \beta_{16} DEALSIZE_{it} \\ & + \beta_{17} DIVRELATE_{it} + \beta_{18} CASHDEAL_{it} + \beta_{19} SHAREDEAL_{it} \\ & + \beta_{20} SPINOFF_{it} + \beta_{21} INVMILLSIND_{it} + INDUSTRY_i + YEAR_t \\ & + \varepsilon_{it}, \end{aligned}$$

Where, besides our dependent, independent, and control variables, $INVMILLSIND_{it}$ is a measure of the probability density function controlling for a potential sample-selection bias, $INDUSTRY_i$ and $YEAR_t$ are fixed effects, and finally, ε_{it} is an error term (for further details regarding the variables, see the Appendix A). We used a one-year lag ($t-1$) for all non-governance firm controls.

Next, our study aims to investigate the moderating effect of the dispersion of the costs of capital across the business portfolio of a firm, proxied by the dispersion of betas *(DISPRISK)*. Therefore, we conduct a sample split based on the median of the dispersion of betas of the firms within our final divestiture sample. Subsequently, we run two OLS regressions on the subsamples. We follow the same approach with our variable capturing the risk for managerial self-interest (*MGMT_SELFINT)*. For the independent variable VBMBU, we further perform a coefficient difference test between the two subsamples to test hypotheses 2 and 3.

5. Results

5.1. Descriptive statistics

Panel A of Table 2 presents the divestiture activity over time. During the financial crisis, divestiture activity declines sharply. With a short delay, this also holds for the proportion of divestiture deals by VBM adopters (at only 18 % in 2009 compared to 30 % in 2008). Panel B of Table 2 presents the summary statistics for all regression variables. It is striking that, on average, VBM adopters (0.42–0.78 %) are associated with higher *CARs* than non-VBM adopters are (0.33 %). When further differentiating between different types of VBM adopters, the summary statistics indicate that firms that implement VBM down to the BU level experience higher *CARs* (0.78 %) than those that only implement VBM at the corporate level (0.42 %).

We provide the pairwise correlations of the variables used for our regression models in Table 3. *VBMBU* exhibits a positive, albeit small, correlation with the *CARs* of divestiture announcements. This provides preliminary evidence for our reasoning in H1. Furthermore, the variance inflation factors (VIFs) are all below a conservative threshold of five, suggesting that multicollinearity does not seem to be a problem in our regression model.

5.2. Regression results

In our first hypothesis (H1), we hypothesize that the implementation of VBM at the BU level will be positively associated with divestiture returns. To investigate this hypothesis, we run OLS regressions calculating the effect of two different levels of VBM implementation on *CARs* on a 2-day basis, while controlling for various confounding effects.

While we expect that the implementation of VBM down to the BU level (*VBMBU*) will be positively related to *CARs*, the mere implementation at the corporate level (*VBMCORP*) should not have a statistically significant effect on *CARs*. Model 1 of Table 4 displays the results of this analysis and shows a positive and statistically significant coefficient for *VBMBU* ($\beta = 0.596$; $p < 0.01$) as opposed to the non-significant relation between *VBMCORP* and divestiture returns ($\beta = 0.106$; $p = 0.62$). In practical terms, the results suggest that the abnormal returns of divestiture decisions by firms that implemented VBM down to the BU level are around 60 basis points higher than those of non-VBM users. Considering the average market capitalization of our sample (i.e., 28 billion Euros), this suggests a difference of 168 million Euros in terms of market capitalization. Hence, the results support our first hypothesis.

In our second hypothesis (H2), we predict that the effect of *VBMBU* on divestiture returns will be contingent on a high dispersion of betas in a firm's business portfolio. To test this prediction, we split our sample based on whether firms exhibit a high or low dispersion of betas. The regression results (see Models 2 and 3 of Table 4) indicate that *VBMBU* is only positively associated with divestiture returns when firms exhibit a high dispersion of betas ($\beta = 1.039$; $p < 0.01$). In contrast, there is no statistically significant coefficient of *VBMCORP* on *CARs*, neither in firms with a high nor a low dispersion of betas. We further run a coefficient difference test between the coefficient for VBMBU in the sample where firms exhibit a high dispersion of betas ($\beta = 1.039$) and the coefficient for VBMBU in the sample where firms exhibit a low dispersion of betas ($\beta = 0.031$). The results support that the coefficient in the high dispersion of beta sample is significantly different from the one in the low dispersion of beta sample. In practical terms, the results suggest that the abnormal returns of divestiture decisions by firms that implemented VBM down to the BU-level are around 104 basis points higher than the ones of non-VBM

Table 2
Descriptive statistics.

Panel A: Divestiture activity over time and by type of VBM user

Year	Number of divestitures	Divestitures of VBMBU firms	Divestitures of VBMCORP firms	Divestitures of non-VBM firms
2005	165	12 %	18 %	70 %
2006	205	21 %	14 %	64 %
2007	229	14 %	17 %	69 %
2008	135	17 %	13 %	70 %
2009	114	8 %	10 %	82 %
2010	172	9 %	5 %	86 %
2011	133	7 %	6 %	87 %
2012	143	6 %	15 %	79 %
2013	144	13 %	10 %	77 %
2014	142	10 %	14 %	76 %
2015	106	8 %	15 %	77 %
2016	86	10 %	7 %	83 %
Total / Average	1,774	11%	12 %	77 %

Panel B: Summary statistics by type of VBM user

	All Deals		VBMBU deals		VBMCORP deals		Non-VBM deals	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
CAR(%) [-1, 0]	0.40	3.30	0.78	3.43	0.42	2.91	0.33	3.34
VBMBU	0.12	0.32	1.00	0.00	0.00	0.00	0.00	0.00
VBMCORP	0.12	0.33	0.00	0.00	1.00	0.00	0.00	0.00
DISPRISK[a]	0.15	0.21	0.19	0.21	0.19	0.27	0.14	0.19
MGMT_SELFINT	−0.16	2.34	−0.03	1.68	0.04	1.83	−0.21	2.49
INSTOWN	0.21	0.17	0.22	0.17	0.22	0.16	0.21	0.17
BLOCKHOLD	0.25	0.20	0.24	0.21	0.19	0.17	0.27	0.21
BOARDSIZE	2.27	0.31	2.24	0.27	2.24	0.30	2.28	0.32
BOARDINDEP	0.51	0.21	0.50	0.19	0.50	0.20	0.51	0.21
SIZE[c]	10.71	1.29	11.16	1.11	11.00	1.09	10.59	1.32
STRATG	18.56	3.40	19.17	2.82	20.11	3.29	18.22	3.41
STDROA3Y[a]	0.88	1.38	0.72	1.11	0.81	1.50	0.91	1.40
GROWTH[a]	0.04	0.18	0.05	0.13	0.05	0.14	0.04	0.19
ROA[a,b]	7.51	6.34	6.63	4.18	7.37	5.58	7.68	6.72
LEV[a]	0.29	0.14	0.25	0.10	0.28	0.12	0.30	0.15
LIQUID[a]	0.08	0.05	0.07	0.04	0.08	0.04	0.08	0.05
MTB[a]	1.41	0.51	1.34	0.37	1.45	0.57	1.42	0.52
SEGMENTS	4.35	1.79	4.58	1.88	4.38	1.67	4.31	1.79
DEALSIZE	0.09	0.27	0.07	0.13	0.07	0.18	0.09	0.30
DIVRELATE	0.52	0.50	0.55	0.50	0.48	0.50	0.52	0.50
CASHDEAL	0.37	0.48	0.34	0.47	0.38	0.49	0.37	0.48
SHAREDEAL	0.03	0.17	0.02	0.14	0.02	0.15	0.03	0.18
SPINOFF	0.02	0.14	0.00	0.07	0.03	0.16	0.02	0.15
N	1,774		209		220		1,345	

Notes: Panel A exhibits divestiture activity over time. Panel B exhibits summary statistics for all regression variables. Both panels differentiate between divestitures by VBM users (i.e., VBMBU and VBMCORP) and other divestitures. a: Winsorized at the 1 st and 99th percentile levels. b: percentage points. c = logarithm. For detailed information on all regression variables see Appendix A.

users when firms exhibit a high dispersion of betas. Considering the average market capitalization in the high dispersion of betas subsample, this suggests a difference of 291 million Euros in terms of market capitalization. Hence, the results support our second hypothesis.

In our third hypothesis (H3), we predict that the effect of *VBMBU* on divestiture returns will not be different for firms having a high risk for managerial self-interest versus firm having a low risk for managerial self-interest. To test this prediction, we split our sample based on whether firms exhibit a high or low risk for managerial self-interest. The regression results (see Models 4 and 5 of Table 4) indicate that *VBMBU* is positively associated with divestiture returns when firms exhibit a high risk for managerial self-interest ($\beta = 0.554$; $p < 0.1$) and positively associated with divestiture returns when firms exhibit a low risk for managerial self-interest ($\beta = 0.823$; $p < 0.05$) as well. While we observe a slight difference between these two subsamples, the coefficient difference test clearly indicates that this difference is not significantly different from zero. Hence, the results support our third (null) hypothesis.

6. Robustness & additional tests

To validate the results of our analysis, we address several dimensions of potential constraints. First, we test alternative specifications for our dependent variable, independent variables, and moderating variable. Second, we discuss and address potential endogeneity concerns. Finally, we focus on long-term results to mitigate concerns regarding a signaling effect only.

6.1. Alternative specifications of main variables

6.1.1. Alternative CAR estimation windows

Throughout our main regression models, we apply *CARs* with a narrow 2-day event window to measure the impact of VBM implementation on divestiture success. In robustness tests, we further test a 3-day (CAR11), 4-day (CAR12), and 5-day event window (CAR22). The results are consistent with our main results. Specifically, we again find a positive and mostly[14] significant association between *VBMBU* and the

[14] For the CAR22 window, the main effect is only slightly significant when considering a one-tailed *p* value, but not when considering a two-tailed *p* value. However, we again find a positive and significant (two-tailed) influence for VBM implementation at the BU level in the subsample with a high dispersion of the costs of capital.

Table 3
Correlation matrix of all regression variables.

No.	Variable	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(%) [-1, 0]*	1.00																						
2	*VBMBU*	0.04	1.00																					
3	*VBMCORP*	0.00	−0.14	1.00																				
4	*DISPRISK*	−0.01	0.06	0.06	1.00																			
5	*MGMT_SELFINT*	−0.04	0.02	0.03	0.07	1.00																		
6	*INSTOWN*	0.06	0.01	0.02	0.02	−0.05	1.00																	
7	*BLOCKHOLD*	0.01	−0.02	−0.12	−0.12	−0.44	−0.18	1.00																
8	*BOARDSIZE*	−0.06	−0.03	−0.04	0.08	0.03	−0.39	0.09	1.00															
9	*BOARDINDEP*	0.02	−0.02	−0.02	−0.05	0.03	0.08	0.07	−0.02	1.00														
10	*SIZE*	−0.07	0.13	0.09	0.10	0.06	−0.19	−0.17	0.40	−0.03	1.00													
11	*STRATG*	−0.02	0.07	0.17	0.15	−0.03	0.08	−0.11	0.00	−0.05	0.37	1.00												
12	*STDROA3Y*	0.00	−0.04	−0.04	−0.02	0.05	0.07	−0.07	−0.10	−0.06	−0.02	0.02	1.00											
13	*GROWTH*	0.00	0.00	0.02	−0.01	−0.06	−0.09	0.08	0.06	−0.04	−0.04	−0.01	0.04	1.00										
14	*ROA*	−0.02	−0.05	−0.01	0.01	0.09	−0.02	−0.09	−0.01	−0.06	0.01	−0.03	0.14	0.16	1.00									
15	*LEV*	0.03	−0.10	−0.03	−0.12	−0.62	−0.02	0.26	0.02	0.03	−0.11	−0.09	−0.11	0.02	−0.14	1.00								
16	*LIQUID*	0.01	−0.07	−0.01	−0.04	0.10	0.04	−0.18	−0.08	−0.03	−0.03	0.00	0.14	−0.10	0.48	−0.09	1.00							
17	*MTB*	−0.04	−0.05	0.02	0.06	0.05	0.19	−0.20	−0.20	−0.07	−0.14	0.10	0.17	0.02	0.56	−0.11	0.53	1.00						
18	*SEGMENTS*	−0.03	0.05	0.01	0.08	−0.01	−0.11	0.02	0.11	−0.05	0.18	0.08	0.03	0.03	−0.04	−0.02	−0.06	−0.01	1.00					
19	*DEALSIZE*	0.16	−0.02	−0.02	0.00	−0.13	0.07	0.08	−0.15	0.03	−0.19	−0.05	−0.01	−0.05	−0.13	0.14	−0.01	−0.08	−0.09	1.00				
20	*DIVRELATE*	0.03	0.02	−0.04	−0.05	0.03	0.00	−0.05	0.02	0.04	−0.02	0.02	0.04	0.02	0.03	0.04	0.04	0.04	−0.05	0.01	1.00			
21	*CASHDEAL*	0.00	−0.02	0.01	0.04	−0.04	0.13	−0.04	−0.11	0.02	−0.04	0.04	0.03	−0.01	0.04	−0.02	0.08	0.06	−0.03	0.00	−0.02	1.00		
22	*SHAREDEAL*	0.00	−0.02	−0.01	−0.01	0.02	−0.05	0.02	0.00	−0.01	0.00	0.06	0.03	0.00	0.01	0.00	0.04	0.03	0.01	0.06	0.02	−0.13	1.00	
23	*SPINOFF*	0.13	−0.04	0.02	−0.01	0.05	0.02	−0.01	−0.04	−0.02	−0.02	0.02	−0.03	−0.01	−0.03	0.00	0.02	0.01	0.04	0.13	0.05	−0.11	−0.03	1.00

Notes: This table presents the correlation coefficients for all regression variables. For detailed information on all regression variables see Appendix A.

different CAR specifications. Moreover, the impact of *VBMBU* is positive and significant in subsamples where firms have a high dispersion of risk but are not significantly different from zero in samples with a low dispersion of risk. A coefficient difference test consistently supports that the *VBMBU* coefficient is significantly larger for the subsample of firms with a high dispersion of risk. Finally, we consistently find no significant difference between the *VBMBU* coefficients in the sample with a high versus low risk for managerial self-interest. Hence, these tests indicate that our results are robust to different CAR specifications (Table IA2.1 of the Internet Appendix).

6.1.2. *Alternative VBM variable specification*

Moreover, we seek to validate the results obtained with the independent variables *VBMBU* and *VBMCORP* by employing an alternative measure of the depth of VBM implementation. Specifically, we employ the VBM sophistication measure (*VBMSOPH*) of Firk et al. (2019b) (Table 5). This measure is an additive index considering five different VBM design choices, ranging between 0 and 5 in steps of one. The highest values for VBM sophistication indicate that a firm espouses the goal of value-maximization, adopts a value-based metric, sets a target for the value-based metric, integrates the value-based metric into the compensation system, and also adopts the value-based metric on operational levels (i.e., the BU level). It is likely that the benefits of VBM in the divestiture setting increase with the level of VBM sophistication. We find a positive and significant coefficient for *VBMSOPH* on average ($\beta = 0.113$; $p < 0.05$). We also find an even larger significant and positive coefficient in the subsample of firms with a high dispersion of risk ($\beta = 0.270$; $p < 0.01$), while the coefficient is not significant and smaller in the subsample of firms with a low dispersion of risk ($\beta = -0.017$; $p > 0.1$). The coefficient difference test supports that the *VBMSOPH* coefficient is significantly larger in the subsample of firms with a high dispersion of risk. Finally, we again observe no significant difference for the *VBMSOPH* coefficient between samples with a high versus a low risk for managerial self-interest. In sum, our results also hold true for the VBM sophistication measure.

6.1.3. *Alternative specification of moderator variables*

We further test variations of our moderator variables' dispersion of risk across the business portfolio and the risk of managerial self-interest. Additionally, as a further test of robustness, we use interaction terms instead of splitting the sample.

First, we run additional regressions where we use a *DISPRISK* measure with a different calculation period for the betas (from 12 months to 36 months) and find consistent results. We also used a broader industry classification (FF10 instead of FF48) for calculating the single-industry firm betas and the matching to a focal firm's BUs. Both tests show results that were highly similar to those of our main regressions (Table IA2.2 of the Internet Appendix).

Second, we run tests where we used each individual variable of our risk of managerial self-interest measure (i.e., anti-director rights, industry competition, board co-option, ownership concentration, and leverage). We again investigate whether the *VBMBU* coefficient differs between subsamples with high or low values of the specific managerial self-interest variable. The test indicates that the *VBMBU* coefficient does not differ significantly between any of the high versus low samples (Table IA2.3 of in the Internet Appendix).

Third, we test hypotheses 2 and 3 by using interaction terms between *VBMBU* and our two moderator variables. The results are similar to our main results, indicating a positive and significant moderation for the dispersion of risk across the business portfolio and no significant moderation for the risk of managerial self-interest (Table IA2.4 of in the Internet Appendix).

6.2. *Endogeneity concerns*

We also address potential endogeneity concerns. While the typical

Table 4
Main Results.

Model	Model 1	Model 2	Model 3	Model 4	Model 5
Subsample	–	High *DISPRISK*	Low *DISPRISK*	High *MGMT_SELFINT*	Low *MGMT_SELFINT*
Dependent variable	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*
VBMBU	**0.596*** **	**1.039*** **	**0.031**	**0.554***	**0.823** **
	(2.638)	**(2.967)**	**(0.074)**	**(1.947)**	**(2.267)**
VBMCORP	0.106	0.340	−0.080	0.133	−0.031
	(0.450)	(1.031)	(-0.202)	(0.475)	(-0.100)
Controls					
INSTOWN	0.820	1.055	0.264	0.477	0.907
	(1.619)	(1.248)	(0.385)	(0.467)	(1.332)
BLOCKHOLD	0.201	0.543	−0.228	0.440	−0.088
	(0.400)	(0.618)	(−0.336)	(0.435)	(−0.136)
BOARDSIZE	−0.308	−0.132	−0.118	0.187	−0.910**
	(-1.020)	(-0.260)	(-0.232)	(0.383)	(-2.058)
BOARDINDEP	0.378	0.087	0.453	0.797	−0.147
	(1.049)	(0.143)	(0.926)	(1.429)	(-0.256)
SIZE	−0.139	−0.216	−0.184	−0.036	−0.263
	(-1.192)	(-1.064)	(-1.267)	(-0.201)	(-1.567)
STRATG	−0.044	−0.029	−0.015	0.005	−0.125**
	(-1.393)	(-0.609)	(-0.385)	(0.093)	(-2.486)
STDROA3Y	0.000	0.000	0.000	0.000	0.001
	(0.663)	(-0.014)	(0.269)	(-0.660)	(1.056)
GROWTH	0.343	0.435	0.082	0.125	0.791
	(0.602)	(0.616)	(0.080)	(0.170)	(0.901)
ROA	0.027	0.017	0.040	0.026	0.033
	(1.245)	(0.484)	(1.602)	(0.899)	(1.042)
LEV	0.028	0.646	−1.340	0.217	−0.948
	(0.048)	(0.680)	(-1.366)	(0.168)	(-0.909)
LIQUID	2.948	5.913*	0.036	3.407	3.008
	(1.095)	(1.725)	(0.009)	(0.895)	(0.839)
MTB	−0.766***	−0.794**	−0.736*	−0.730*	−0.890**
	(-2.752)	(-2.093)	(-1.722)	(-1.913)	(-2.193)
SEGMENTS	−0.017	0.057	−0.048	0.021	−0.035
	(-0.346)	(0.848)	(-0.671)	(0.328)	(-0.458)
DEALSIZE	1.505**	0.921	2.435**	4.500***	0.843
	(2.132)	(1.490)	(2.123)	(4.338)	(1.480)
DIVRELATE	0.226	0.058	0.324	0.114	0.160
	(1.363)	(0.237)	(1.420)	(0.517)	(0.657)
CASHDEAL	0.046	0.015	−0.061	0.192	−0.056
	(0.303)	(0.072)	(-0.282)	(1.044)	(-0.245)
SHAREDEAL	0.105	1.037	−0.452	−0.237	0.788
	(0.190)	(1.366)	(-0.602)	(-0.447)	(0.668)
SPINOFF	2.655***	0.793	3.752**	2.011	3.056***
	(2.784)	(0.776)	(2.562)	(1.514)	(2.654)
INVMILLSIND	−0.500	−0.594	−0.696	0.091	−1.054*
	(-1.145)	(-0.672)	(-1.274)	(0.107)	(-1.807)
INTERCEPT	3.572*	3.156	4.474	−0.544	9.153***
	(1.888)	(0.988)	(1.626)	(-0.170)	(3.182)
INDUSTRY	yes	yes	yes	yes	yes
YEAR	yes	yes	yes	yes	yes
Adjusted R^2	0.046	0.025	0.076	0.076	0.039
N	1774	886	888	885	889
VBMBU high vs. low		*χ2(1) = 3.20*; p = 0.074*		*χ2(1) = 0.59; p = 0.44*	

Notes: This table presents OLS regression estimates. The VBMBU high vs. low row provides the results of a coefficient difference tests for VBMBU in the high versus the low subsample. For detailed information on all regression variables see Appendix A. T-statistics calculated using clustered standard errors by firm are provided in parentheses. ***, **, and * indicate significance at the 1 %, 5 %, and 10 % level (two-tailed), respectively.

reverse causality concerns of the VBM–performance relationship are less severe in our event-study setting, in particular, omitted variables could drive both the decision to implement VBM at the BU level and divestiture returns. To alleviate such concerns to some extent, we (1) include, in addition to our broad set of control variables, further factors that could be especially related to VBM implementation at the BU level and divestiture returns, and (2) apply an instrumental variable (IV) approach.

6.2.1. Additional TMT and MCS controls

In addition to the selection of our control variables, we expect that there could be two further sources of omitted variables. First, specific top management team (TMT) expertise and experience could be associated with both a preference for comprehensive VBM implementation and more competence in divestiture decisions. Second, the firms' preference for a comprehensive management control system (MCS) in general might explain VBM implementation at the BU level and, simultaneously, more effective divestiture decisions. Hence, we selected additional controls for the expertise and experience of TMTs and the sophistication of other MCS elements.

Regarding TMTs, we follow prior VBM literature positing that, in addition to CEOs, CFOs have a major influence on the level of VBM implementation (Burkert and Lueg, 2013; Firk et al., 2019c) as well as on major strategic decisions, such as divestitures (e.g., Hoitash et al., 2016). Burkert and Lueg (2013) argue that the profound business education of CEOs and CFOs might affect the sophistication of VBM. While they only find support in the case of the CFO, their arguments for both the CEO and CFO are convincing. Evidence regarding CEO and CFO characteristics on divestiture effectiveness is scarce; yet the profound business education of the CEO and CFO should arguably help in selecting

Table 5
Robustness Test: VBM sophistication as alternative independent variable.

Model	Model 1	Model 2	Model 3	Model 4	Model 5
Subsample	–	High *DISPRISK*	Low *DISPRISK*	High *MGMT_SELFINT*	Low *MGMT_SELFINT*
Dependent variable	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*
VBMSOPH	**0.113****	**0.270*****	**−0.017**	**0.102**	**0.169***
	(1.969)	**(2.837)**	**(-0.172)**	**(1.372)**	**(1.812)**
Controls					
INSTOWN	0.799	0.983	0.270	0.473	0.873
	(1.564)	(1.153)	(0.397)	(0.463)	(1.266)
BLOCKHOLD	0.285	0.647	−0.215	0.557	−0.046
	(0.560)	(0.725)	(-0.316)	(0.557)	(-0.071)
BOARDSIZE	−0.298	−0.062	−0.130	0.175	−0.824*
	(-0.971)	(-0.122)	(-0.256)	(0.356)	(-1.831)
BOARDINDEP	0.351	0.078	0.451	0.728	−0.130
	(0.971)	(0.127)	(0.937)	(1.322)	(-0.225)
SIZE	−0.139	−0.234	−0.184	−0.042	−0.263
	(-1.195)	(-1.127)	(-1.275)	(-0.231)	(-1.588)
STRATG	−0.047	−0.036	−0.015	0.001	−0.130***
	(-1.494)	(-0.758)	(-0.381)	(0.026)	(-2.605)
STDROA3Y	0.000	0.000	0.000	0.000	0.001
	(0.648)	(-0.039)	(0.262)	(-0.736)	(1.082)
GROWTH	0.334	0.436	0.075	0.143	0.746
	(0.586)	(0.622)	(0.073)	(0.195)	(0.861)
ROA	0.025	0.014	0.041	0.025	0.030
	(1.168)	(0.400)	(1.614)	(0.875)	(0.948)
LEV	−0.063	0.607	−1.359	0.158	−1.061
	(-0.105)	(0.649)	(-1.397)	(0.124)	(-1.018)
LIQUID	2.929	5.740*	0.051	3.454	2.906
	(1.088)	(1.693)	(0.013)	(0.909)	(0.803)
MTB	−0.763***	−0.775**	−0.738*	−0.738*	−0.852**
	(-2.728)	(-2.069)	(-1.719)	(-1.932)	(-2.107)
SEGMENTS	−0.017	0.058	−0.047	0.017	−0.026
	(-0.344)	(0.856)	(-0.671)	(0.260)	(-0.329)
DEALSIZE	1.515**	0.939	2.435**	4.492***	0.879
	(2.140)	(1.515)	(2.124)	(4.300)	(1.528)
DIVRELATE	0.239	0.081	0.327	0.127	0.177
	(1.444)	(0.331)	(1.442)	(0.577)	(0.735)
CASHDEAL	0.041	0.033	−0.065	0.184	−0.053
	(0.273)	(0.159)	(-0.298)	(1.004)	(-0.228)
SHAREDEAL	0.098	1.083	−0.461	−0.241	0.772
	(0.177)	(1.417)	(-0.611)	(-0.458)	(0.642)
SPINOFF	2.618***	0.701	3.744**	1.999	2.900**
	(2.758)	(0.710)	(2.558)	(1.510)	(2.543)
INVMILLSIND	−0.525	−0.631	−0.708	0.018	−1.032*
	(-1.208)	(-0.711)	(-1.299)	(0.022)	(-1.772)
INTERCEPT	3.726*	3.128	4.529	−0.329	8.845***
	(1.959)	(0.977)	(1.630)	(-0.104)	(3.046)
INDUSTRY	yes	yes	yes	yes	yes
YEAR	yes	yes	yes	yes	yes
Adjusted R^2	0.045	0.027	0.077	0.075	0.038
N	1774	886	888	885	889
VBMBU high vs. low		*χ2(1) = 3.76*; p = 0.053*		*χ2(1) = 0.58; p = 0.45*	

Notes: This table presents OLS regression estimates. The VBMBU high vs. low row provides the results of a coefficient difference tests for VBMBU in the high versus the low subsample. For detailed information on all regression variables see Appendix A. T-statistics calculated using clustered standard errors by firm are provided in parentheses. ***, **, and * indicate significance at the 1 %, 5 %, and 10 % level (two-tailed), respectively.

Table 6
Robustness Test: Including TMT controls and other MCS controls.

Model	Model 1	Model 2	Model 3	Model 4	Model 5
Subsample	–	High *DISPRISK*	Low *DISPRISK*	High *MGMT_SELFINT*	Low *MGMT_SELFINT*
Dependent variable	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*
VBMBU	**0.668*** **	**1.113*** **	**0.098**	**0.650** **	**0.933** **
	(2.912)	**(2.954)**	**(0.243)**	**(2.316)**	**(2.504)**
VBMCORP	0.115	0.343	−0.049	0.234	0.006
	(0.491)	(1.034)	(-0.127)	(0.823)	(0.018)
Additional TMT controls					
CEOBUSEDU	−0.111	−0.166	0.040	0.012	−0.191
	(-1.020)	(-1.101)	(0.239)	(0.078)	(-1.220)
CEOSTRATFINEXP	0.485**	0.368	0.531*	0.452	0.494
	(2.221)	(1.030)	(1.861)	(1.364)	(1.635)
CFOBUSEDU	0.149*	0.234*	0.154	0.071	0.217
	(1.815)	(1.926)	(1.315)	(0.649)	(1.576)
CFOSTRATFINEXP	0.182	0.660**	−0.219	0.725***	−0.274
	(0.860)	(2.073)	(-0.683)	(2.644)	(-0.812)
Other MCS					
EMCS	−0.078	0.046	−0.150	−0.152	−0.155
	(-0.791)	(0.312)	(-1.185)	(-1.056)	(-1.158)
CONTROLS	yes	yes	yes	yes	yes
INDUSTRY	yes	yes	yes	yes	yes
YEAR	yes	yes	yes	yes	yes
Adjusted R^2	0.048	0.029	0.078	0.081	0.040
N	1774	886	888	885	889
VBMBU high vs. low		*χ2(1) = 3.32*; p = 0.069*		*χ2(1) = 0.40; p = 0.52*	

Notes: This table presents OLS regression estimates. The VBMBU high vs. low row provides the results of a coefficient difference tests for VBMBU in the high versus the low subsample. For detailed information on all regression variables see Appendix A. T-statistics calculated using clustered standard errors by firm are provided in parentheses. ***, **, and * indicate significance at the 1 %, 5 %, and 10 % level (two-tailed), respectively.

and timing divestitures. Moreover, VBM has been advocated by management consultancies. Similarly, banks have played a role in promoting VBM implementation (Fiss and Zajac, 2004). At the same time, both management consultancies and banks are typically heavily involved in the divestiture processes. CEOs and CFOs with consulting and/or banking experience could thus prefer VBM and possess more experience with divestitures (possibly leading to higher divestiture returns). Hence, we add control variables capturing the level of business education of the CEO (*CEOBUSEDU*) and CFO (*CFOBUSEDU*) and whether they have experience in management consulting or banking (*CEOSTRATFINEXP* and *CFOSTRATFINEXP*).

Regarding other sophisticated MCS elements, we face the typical data-availability problems of archival management accounting research (Zimmerman, 2001). Recently, the topic of environmental management control systems (EMCSs) has received increasing attention. Comparable to the VBM sophistication measure, Hennig et al. (2020) developed a measure based on archival data that describes the level of EMCS implementation (e.g., whether environmental metrics and targets are adopted). A high EMCS level is one indicator that the firm's management accounting is able to provide rich non-financial information, which may also play a role in selecting and timing divestitures. Hence, we add the EMCS measure (*EMCS*) of Hennig et al. (2020) in our analyses. Table 6 displays the regression results, including the additional control variables.

The results in Table 6 again indicate a positive and significant association between VBM implementation at the BU level and divestiture returns. Moreover, this positive association is significantly larger in firms with a high dispersion of risk across the business portfolio than in firms with a low dispersion of risk across the business portfolio. The risk for managerial self-interest again does not significantly affect the positive and significant association between VBM implementation down to the BU level and divestiture returns. Finally, it is interesting to note that several of the CEO and CFO variables indicate a positive and significant effect (*CEOSTRATFINEXP, CFOSTRATFINEXP,* and *CFOBUSEDU)*, while the EMCS variable is not significant.

6.2.2. Instrumental variable approach

While we control for several potentially confounding factors, it could still be the case that unobserved factors induce a firm's decision to implement VBM and to make more value-creating divestiture decisions. To address this concern, we use an IV approach. In line with previous VBM research, we select average industry VBM implementation (based on the Fama–French 48 industry classification) as an instrument *(VBMINSTR)* for VBM implementation at the BU level (Firk et al., 2019a; Knauer et al., 2018; Rapp et al., 2011). We believe that our instrument is appropriate given that the industry diffusion of VBM should determine VBM use on the firm level but should not correlate with the returns from divestiture decisions. However, we acknowledge that this instrument is not without caveats. As Knauer et al. (2018) reason, it could be that "VBM industry averages might vary systematically with the level of agency costs" (2018, p. 58). This could lead to the exogeneity of our instrument being questioned, yet this is a central prerequisite for the validity of the IV approach (Larcker and Rusticus, 2010).

In the first-stage regression, we include the average industry VBM implementation as an IV to proxy for firms' VBM implementation besides the controls from our previous regressions. In a second step, we run our main analyses using the fitted values from the first-stage regression. As Table 7 shows, the results support our previous findings, suggesting that they are not biased by the existence of inconsistent OLS estimates. Hence, the findings of the IV regressions further alleviate omitted-variable concerns.

6.3. Just short-term or long-term performance effects?

Abnormal announcement returns only capture a very narrow event window. Hence, it could be that investors' short-term evaluations of the effect of VBM implementation drive positive divestiture returns rather than improvements in managerial decision-making. Recent behavioral literature on investor reactions to deal announcements indicates that because investors suffer from an "informational disadvantage relative to the management" (Schijven and Hitt, 2012, p. 1262), they "turn to signals" (Campbell et al., 2016, p. 166), such as publicly available information, in the evaluation of these organizational events. The investors' short-term judgment of deal announcements might thus be biased (Schijven and Hitt, 2012). This may not only be the case for M&A announcements but also for divestiture announcements (Bergh et al.,

Table 7
Robustness Test: Instrumental Variable Regression.

Model	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5
Subsample	–	–	High *DISPRISK*	Low *DISPRISK*	High *MGMT_SELFINT*	Low *MGMT_SELFINT*
Dependent variable	*VBMBU*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*	*CAR(%) [-1, 0]*
INDUSTRYVBM	4.274***					
	(3.914)					
VBMBU (Instr)		**3.377*** **	**5.628*** **	**0.828**	**2.684** **	**4.881** **
		(3.168)	**(3.623)**	**(0.417)**	**(2.119)**	**(2.596)**
VBMCORP		0.047	0.116	0.019	0.142	−0.125
		(0.201)	(0.379)	(0.050)	(0.531)	(-0.376)
Controls						
INSTOWN	0.086	0.543	0.984	0.127	0.497	0.472
	(0.199)	(1.302)	(1.416)	(0.249)	(0.679)	(0.790)
BLOCKHOLD	0.236	−0.267	−0.396	−0.589	−0.021	−0.835
	(0.489)	(-0.489)	(-0.478)	(-0.782)	(-0.023)	(-1.130)
BOARDSIZE	−0.991***	0.262	0.822	0.048	0.581	−0.217
	(-2.783)	(0.778)	(1.410)	(0.078)	(1.261)	(-0.376)
BOARDINDEP	−0.229	0.462	0.310	0.512	0.793	0.128
	(-0.626)	(1.309)	(0.534)	(0.994)	(1.521)	(0.229)
SIZE	0.262***	−0.171	−0.177	−0.126	−0.047	−0.295*
	(2.845)	(-1.453)	(-0.913)	(-0.857)	(-0.286)	(-1.670)
STRATG	−0.019	−0.014	−0.015	0.004	0.031	−0.117**
	(-0.613)	(-0.494)	(-0.329)	(0.096)	(0.741)	(-2.427)
STDROA3Y	0.000	0.000	0.001	0.000	0.000	0.001
	(-0.876)	(0.671)	(0.985)	(-0.091)	(-0.106)	(0.983)
GROWTH	0.116	0.199	0.391	−0.117	0.049	0.510
	(0.338)	(0.360)	(0.613)	(-0.117)	(0.069)	(0.615)
ROA	−0.003	0.022	0.033	0.026	0.027	0.034
	(-0.303)	(1.035)	(1.005)	(1.078)	(0.994)	(1.126)
LEV	−2.178***	1.364**	3.055***	0.067	1.118	0.634
	(-3.281)	(2.171)	(2.759)	(0.080)	(0.887)	(0.579)
LIQUID	−1.046	2.232	3.980	−0.338	3.238	2.806
	(-0.536)	(0.827)	(1.102)	(-0.089)	(0.859)	(0.790)
MTB	−0.351	−0.549**	−0.592*	−0.532	−0.645*	−0.662*
	(-1.497)	(-2.321)	(-1.854)	(-1.450)	(-1.929)	(-1.890)
SEGMENTS	0.104*	−0.031	−0.049	−0.023	−0.023	−0.055
	(1.724)	(-0.641)	(-0.778)	(-0.324)	(-0.378)	(-0.694)
DEALSIZE	0.059	1.521**	0.791	2.570**	4.652***	0.838
	(0.397)	(2.088)	(1.203)	(2.196)	(4.349)	(1.428)
DIVRELATE	0.155	0.081	−0.163	0.246	0.005	−0.011
	(1.238)	(0.470)	(-0.660)	(1.024)	(0.024)	(-0.043)
CASHDEAL	−0.116	0.140	0.162	0.030	0.241	0.015
	(-1.227)	(0.918)	(0.793)	(0.133)	(1.368)	(0.061)
SHAREDEAL	−0.279	0.138	1.126	−0.602	−0.225	0.899
	(-1.140)	(0.248)	(1.479)	(-0.800)	(-0.418)	(0.765)
SPINOFF	−0.701	2.868***	1.482	3.703**	2.187	3.326***
	(-1.351)	(2.908)	(1.249)	(2.479)	(1.631)	(2.788)
INVMILLSIND		0.284	1.052	−0.113	0.709	−0.199
		(0.611)	(1.311)	(-0.180)	(0.947)	(-0.293)
INTERCEPT	−1.303	0.817	−2.054	2.195	−2.576	6.156*
	(-1.093)	(0.448)	(-0.675)	(0.821)	(-0.938)	(1.952)
INDUSTRY	yes	yes	yes	yes	yes	yes
YEAR	yes	yes	yes	yes	yes	yes
Pseudo/Adjusted R^2	0.188	0.061	0.054	0.111	0.109	0.083
N	1774	1774	886	888	885	889
VBMBU high vs. low			*χ2(1) = 2.86*; p = 0.091*		*χ2(1) = 0.94; p = 0.33*	

Notes: This table presents the first-stage probit regression (Model 0) and the second-stage OLS regressions (Models 1-5). The VBMBU high vs. low row provides the results of a coefficient difference tests for VBMBU in the high versus the low subsample. For detailed information on all regression variables see Appendix A. T-statistics (Z-statistics) calculated using clustered standard errors by firm are provided in parentheses. ***, **, and * indicate significance at the 1 %, 5 %, and 10 % level (two-tailed), respectively.

Table 8
Additional Test: Long-term performance.

Panel A: Change (%) in market-to-book value one year before to one year after the divestiture					
Model	Model 1	Model 2	Model 3	Model 4	Model 5
Subsample	–	High *DISPRISK*	Low *DISPRISK*	High *MGMT_SELFINT*	Low *MGMT_SELFINT*
Dependent variable	*Δ(%)MTB (1y)*	*Δ(%)MTB (1y)*	*Δ(%)MTB (1y)*	*Δ(%)MTB (1y)*	*Δ(%)MTB (1y)*
VBMBU	**1.471**	**4.417****	**−2.310**	**1.165**	**2.866**
	(0.822)	**(2.089)**	**(-0.885)**	**(0.568)**	**(0.988)**
VBMCORP	−0.578	−0.694	1.711	2.499	−2.569
	(-0.033)	(-0.356)	(1.034)	(0.990)	(-1.361)
CONTROLS	yes	yes	yes	yes	yes
INDUSTRY	yes	yes	yes	yes	yes
YEAR	yes	yes	yes	yes	yes
Adjusted R^2	0.396	0.413	0.433	0.436	0.401
N	1703	850	853	850	853
VBMBU high vs. low		*χ2(1) = 4.68**; p = 0.031*		*χ2(1) = 0.17; p = 0.68*	
Panel B: Change (%) in market-to-book value one year before to two years after the divestiture					
Model	Model 1	Model 2	Model 3	Model 4	Model 5
Subsample	–	High *DISPRISK*	Low *DISPRISK*	High *MGMTDISCR*	Low *MGMTDISCR*
Dependent variable	*Δ(%)MTB (2y)*	*Δ(%)MTB (2y)*	*Δ(%)MTB (2y)*	*Δ(%)MTB (2y)*	*Δ(%)MTB (2y)*
VBMBU	**2.022**	**4.988****	**−1.737**	**1.110**	**2.703**
	(0.995)	**(2.057)**	**(-0.498)**	**(0.532)**	**(0.790)**
VBMCORP	−1.150	−0.527	−1.324	−0.526	−2.041
	(-0.531)	(-0.199)	(-0.547)	(-0.215)	(-0.726)
CONTROLS	yes	yes	yes	yes	yes
INDUSTRY	yes	yes	yes	yes	yes
YEAR	yes	yes	yes	yes	yes
Adjusted R^2	0.348	0.364	0.375	0.423	0.336
N	1597	796	801	796	801
VBMBU high vs. low		*χ2(1) = 3.09*; p =0.079*		*χ2(1) = 0.13; p = 0.72*	

Notes: This table presents OLS regression estimates. The VBMBU high vs. low row provides the results of a coefficient difference tests for VBMBU in the high versus the low subsample. Both Panel A and Panel B include the same control variables than the regressions reported in Table 4. For detailed information on all regression variables see Appendix A. T-statistics calculated using clustered standard errors by firm are provided in parentheses. ***, **, and * indicate significance at the 1 %, 5 %, and 10 % level (two-tailed), respectively.

2020). In our case, investors could interpret firms' VBM implementation as a signal of managerial decisions aligned with value creation and thus evaluate the deals of VBM adopters more positively. Moreover, VBM implementation at the BU level might not only help managers to better understand the potential of divestitures, but also investors. This might reduce information asymmetries and could also positively affect the shareholder reaction.

To alleviate the concern regarding a potential signaling effect of VBM adoption biasing our results and to validate that VBM actually enhances managerial decision-making, we further investigate the long-term performance of divestitures. Similar to prior divestiture research (Feldman et al., 2016), we use the difference between the pre-divestiture MTB ratio (t − 1) and the post-divestiture MTB ratio at the end of the following year (t + 1). We also consider an even longer time period and focus on the two-year change in the MTB ratio (t + 2). We further decided to focus on the relative change compared to the pre-divestiture MTB ratio to account for different levels of the MTB ratio prior to the divestiture. The results of these regressions are displayed in Table 8.

First, while we again find a positive influence for VBM implementation at the BU level, the effect falls below the significance level (Panel A—Model 1: $\beta = 1.471$; $p = 0.41$; Panel B—Model 1: $\beta = 2.023$; $p = 0.32$) for both the one-year and the two-year change in the MTB ratio.[15] Second, we find a positive and significant influence from VBM implementation at the BU level in firms with a high dispersion of betas (Panel A—Model 2: $\beta = 4.416$; $p < 0.05$; Panel B—Model 2: $\beta = 4.988$; $p < 0.05$). Among firms with a high dispersion of betas, this suggests a long-term increase in the MTB ratio of around 5 percent. Third, the coefficient for the influence of VBM implementation at the BU level is significantly larger in firms with a high dispersion of betas than for firms with a low dispersion of betas. Finally, we find no significant difference for the influence of VBM implementation at the BU level between firms with a high versus a low risk for managerial self-interest. In sum, these results suggest that signaling could have partly affected our main results (i.e., we do not find a positive long-term influence from VBM implementation at the BU level on average). However, the consistent positive and significant long-term effect in firms with a high dispersion of betas further supports our arguments that VBM implementation at the BU level provides a decision-facilitating role in firms with a high dispersion of the costs of capital across their business portfolio.

7. Conclusions

In this study, we examine under which circumstances VBM may provide a decision-facilitating role in divestiture decisions. We focus on divestitures, as this setting allows us to investigate managerial decision-making in a situation where managerial self-interest is scarce, and thus to better attribute effects to VBM's decision-facilitating role. We predict that VBM needs to be implemented down to the BU level to facilitate managers in making more value-creating divestiture decisions. Moreover, we suggest that this effect only holds true when the dispersion of the costs of capital is high across a firm's business portfolio. In such a business portfolio, information on value-based metrics at the BU level should provide a significant information advantage over, for example, profitability measures, such as ROI. The results derived from multiple regressions substantiate this reasoning. Moreover, we find that the risk of self-interested managerial decisions does not affect the association between VBM and divestiture returns. This provides further support that the observed results stem from VBM's decision-facilitating role and not from its decision-influencing role.

[15] We also tested, similar to Humphery-Jenner (2014), the absolute MTB values for the years after the transaction while controlling for the pre-MTB value (instead of the percentage change). In this test, we even found a positive and slightly significant influence from VBM implementation at the BU level in the full sample.

Our results should be interpreted in light of several limitations. First, our results are limited to the divestiture setting. Nevertheless, we would expect that when managers aim to act in the interests of shareholders, our findings are at least transferable to comparable corporate headquarters decisions (e.g., resource allocation). Second, we cannot completely rule out managerial self-interest as a motive in divestiture decisions and thus, that our results are affected by VBM's decision-influencing role. We followed a major assumption of divestiture research that divestiture decisions are not motivated by managerial self-interest, and we provided an empirical test on the potential risk for self-interested managerial decisions that supported this view.[16] This indicates that it is unlikely that our results stem from VBM's decision-influencing role. Third, similar to other studies, we rely on secondary data derived from annual reports (e.g., Firk et al., 2019a; Knauer et al., 2018; Rapp et al., 2011). This is not without its drawbacks. For example, some firms might decide not to disclose their value-based metrics at the BU level while using this information internally. However, such noise in our indicators would have instead led to underestimating the effect of VBM implementation at the BU level. Fourth, we acknowledge the potential that signaling might drive the positive market reactions to divestiture announcements and not support in managerial decision-making. To address this concern, we further examined the long-term change in the firm's MTB ratio after the divestiture. While the results indicated that there is also a long-term effect of VBM implementation at the BU level if firms have dispersed costs of capital across their business portfolio, the MTB ratio might also be affected by events other than the divestiture in the time after the announcement. Fifth, while we aimed for a large longitudinal and European multi-country sample, the generalizability of our findings is still restricted. Specifically, our results might not be transferable to non-listed and non-European firms.[17] Finally, while we aimed to comprehensively account for potential omitted variables and run an IV approach using industry peer averages as the instrument, we could, similar to prior VBM research, not exploit clear exogenous variations that may allow us to establish causality.

Despite these limitations, our study illustrates that VBM can provide a decision-facilitating role, and we also highlight the importance of considering the "how" and "when" in studying VBM consequences. We recommend that future research should further analyze both VBM's decision-facilitating role and its decision-influencing role. In so doing, future studies should also account for the level of VBM implementation and contextual factors. Future research could also devote more attention to situations in which VBM information may have limited benefits or may even be harmful. For example, Govindarajan et al. (2018) emphasize the limited information value of accounting measures in the context of digital businesses, which questions the decision-facilitating benefits of VBM in the context of digital transformation to some extent. We believe that following these paths will help to put the performance-enhancing effect of VBM into perspective. In addition to that, we encourage future studies to further develop even more nuanced or alternative measures capturing the level of VBM implementation. Combining textual analysis and machine learning techniques (e.g., Harrison et al., 2019; Li et al., 2020) could be particularly valuable for this endeavor and the measurement of management accounting constructs in general.

Finally, our study provides implications for managerial practice by indicating that firms should synchronize the level of VBM implementation with their need for information on value creation at the different levels of the organization. As such, our study shows that firms that consider this aspect when implementing VBM could probably make better investment decisions.

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Appendix A. Data sources and variable definitions.

Variable	Description / Calculation	Source
Dependent variable:		
CAR(%) (-1, 0)	Two-day cumulative abnormal return (in percentage points) calculated using the market model. The market model parameters are estimated over the period (210–11) with the bidder's national composite index.	Datastream
Independent variables:		
VBMBU	Binary variable that takes the value of 1 if in a given year a company has implemented a value-based metric as a key metric at both the corporate and the BU level, and 0 otherwise.	Hand-collected
VBMCORP	Binary variable that takes the value of 1 if in a given year a company has implemented a value-based metric as a key metric at the corporate level but not at lower levels, and 0 otherwise.	Hand-collected
Moderator variables:		
DISPRISK	Standard deviation of 12-month betas across a firm's business units (BU). To proxy for the betas of a firm's BU, we calculate industry averages (Fama and French 48) for all single-business firms in the Datastream database and then apply these averages to the BUs' matching industries.	Datastream

(*continued on next page*)

[16] In this regard, it may also be of interest that we did not find a significant direct effect for our managerial self-interest proxy on divestiture returns, but a negative and significant direct effect of the dispersion of the costs of capital across the business portfolio (Table IA2.4 of the Internet Appendix). This further indicates that differences in divestiture returns are "not attributable to managers pursuing their own interests at the expense of their shareholders, but rather to inadvertent mistakes or misperceptions as to the best courses of actions for the firms they run" (Feldman and McGrath, 2016, p. 5), which are more likely in complex business portfolios with varying costs of capital (risk profiles).

[17] In this context, we also ran a test that included country fixed effects and obtained similar results to those reported. Moreover, due to the focus of prior studies on the German context (Knauer et al., 2018; Rapp et al., 2011; Schultze et al., 2018), we tested whether our results only held for the German and/or the non-German parts of our sample. For both the German and the non-German parts, we found that VBM implementation at the BU level was associated with more positive divestiture returns.

(*continued*)

Variable	Description / Calculation	Source
MGMT_SELFINT	Calculated as an index of the sum of the z-scores of the following four variables: *ADR*, *INDCONC*, *BDCOOPT*, *OWNC* and *LEV*. As increasing values of *ADR*, *OWNC* and *LEV* indicate less discretion we reversed the value of these variables by multiplying it with minus one. *ADR* stands for the anti-director rights index as defined by Spamann (2009). *INDCONC* stands for industry concentration, which is measured by a Herfindahl-Hirschmann Index for each Fama and French 10 industry on our initial sample (see Table 1). *BDCOOPT* refers to a cooption at the board level and is measured as the number of co-opted (CEO appointed) non-executive directors by all non-executive directors. *OWNC* stands for the shareholdings of the largest owner. *LEV* stands for leverage and is calculated as total debt divided by total assets.	Spamann (2009), Datastream, Thomson One Banker & Boardex
Control variables:		
INSTOWN	Institutional ownership is measured as the sum of fractional holdings by institutional investors.	Thomson One Banker
BLOCKHOLD	Sum of shares held by owners with more than 5 % of total shares.	Thomson One Banker
BOARDSIZE	Natural logarithm of the number of non-executive and non-employee representative directors serving on the board.	BoardEx
BOARDINDEP	Percentage of outside directors serving on the board.	BoardEx
SIZE	Natural logarithm of the firm's number of employees.	Datastream
STRATG	Discrete score with values ranging from six to 30 where high (middle) [low] values indicate prospector (analyzer) [defender] firms, respectively, following Bentley et al. (2013). The score is based on six firm characteristics: ratio of research and development to sales, ratio of employees to sales, change in total revenue, marketing (SG&A) to sales, employee fluctuations and capital intensity.	Datastream
STDROA3Y	Standard deviation of ROA over a 3-year period.	Datastream
GROWTH	Growth of net sales in year t compared to year t-1.	Datastream
LEV	Debt position calculated as total debt divided by total assets.	Datastream
LIQUID	Ratio of funds from operations to total assets.	Datastream
ROA	Calculated as EBIT, divided by total assets (in percentage points).	Datastream
SEGMENTS	A firm's number of product segments.	Datastream
MTB	Calculated as (market cap + total assets – total shareholder equity) / total assets.	Datastream
DEALSIZE	SDC's deal value divided by the firm's market value of equity.	SDC Platinum & Datastream
DIVRELATE	Binary variable that takes the value of 1 if the divested unit's two-digit SIC code matches the one of the core business and 0 otherwise.	SDC Platinum
CASHDEAL	Dummy variable that takes the value of 1 for purely cash-financed deals and 0 otherwise.	SDC Platinum
SHAREDEAL	Binary variable that takes the value of 1 for partially or fully stock-financed deals and 0 otherwise.	SDC Platinum
SPINOFF	Binary variable that takes the value of 1 if the divestiture is a spin-off.	SDC Platinum
INVMILLSIND	Inverse Mills ratio calculated as the probability density function divided by the cumulative density function for the initiation of a divestiture.	Own calculation
INDUSTRY	Seventeen dummy variables classifying firms into industry sectors based on Fama–French 17.	Website of Kenneth French
Robustness:		
VBMSOPH	Index variable that consists of five elements capturing different VBM design choices: (1) value orientation, (2) value-based metric adoption, (3) target setting, (4) compensation linking, and (5) operational integration. VBMSOPH is calculated by summing up the binary-coded VBM elements into a single measure. The value ranges from 0 to 5 in steps of one (Firk et al., 2019b).	Hand-collected
CEOBUSEDU	Discrete variable that takes the value of 0 if the CEO does not have a business related degree, the value of 1 if the CEO has either a business related university degree (Bachelor, Master or something similar [e.g., Diploma]) or a postgraduate related business degree or certificate (e.g., CPA, MBA, CMA or PhD), the value of 2 if the CEO has both a university degree in business and a postgraduate business degree or certificate and the value of 3 if the CEO has a university degree in business, a business related PhD and a postgraduate degree or certification (e.g., CPA, MBA, CMA).	Hand-collected
CEOSTRATFINEXP	Indicator Variable taking the value of 1 if the CEO has worked in the Banking industry and/or in management consulting (e.g., McKinsey).	Hand-collected
CFOBUSEDU	Coded analog to *CEOBUSEDU*.	Hand-collected
CFOSTRATFINEXP	Coded analog to *CEOSTRATFINEXP*.	Hand-collected
EMCS	Index variable that captures four environmental management control system design choices: (1) environmental orientation, (2) environmental metric adoption, (3) environmental target setting, and (4) compensation linking. EMCS implementation is calculated by summing up the binary-coded elements into a single measure. The value ranges from 0 (no EMCS implementation at all) to 4 (strong EMCS implementation) in steps of one (Hennig et al., 2020).	Hennig et al. (2020)
INDUSTRYVBM	Industry diffusion of VBM implementation at the BU level based on Fama–French 48.	Hand-collected
Δ(%)MTB (1y)	One year growth in the MTB. Calculated as change in the MTB from before (t-1) to one year after the divestiture (t+1) divided by the MTB of the year before the divestiture (t-1). MTB is calculated as (market cap + total assets – total shareholder equity) / total assets.	Datastream
Δ(%)MTB (2y)	Two year growth in the MTB. Calculated as change in the MTB from before (t-1) to one year after the divestiture (t+2) divided by the MTB of year before the divestiture (t-1). MTB is calculated as (market cap + total assets – total shareholder equity) / total assets.	Datastream

Appendix B. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.mar.2021.100736.

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