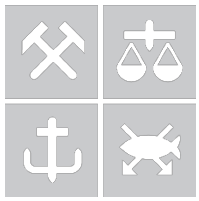

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Firm Size and the Gains From Divestitures

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ABSTRACT

Recent academic studies indicate that corporate divestitures generate considerable shareholder wealth. The field is emerging as an important topic in the finance, strategy and organizational literature, but the understanding of what determines these gains remains somewhat fragmented and inconsistent. This thesis contributes to this understanding by specifically studying the effect of firm size on seller announcement abnormal return. We use a sample of 6699 divestitures completed by 2350 different sellers in the United States between 1995 and 2014 and conclude that small sellers outperform large sellers by an average of 1.96% at the announcement of divestitures. The size effect is robust to a wide range of firm and deal characteristics introduced by the literature. We propose that the size effect could be explained by greater idiosyncratic risk associated with the divestiture announcement by small sellers.

CONTENTS

1. INTRODUCTION

A divestiture is the sale of a portion of the firm's assets in a private transaction (Eckbo & Thorburn, 2013). During the last 20 years, almost 15.000 divestitures were completed by public US corporations, generating in excess of $269 billion to its shareholders[1]. Despite the considerable shareholder gain, executives often have a hard time letting go or are simply too busy doing acquisitions (McKinsey & Company, 2015). The reward is not automatic, and often involves large costs and painful organizational restructuring (Bain & Company, 2014). Naturally, the field is emerging as an important topic in different research areas, but the understanding of what determines the wealth creation is still limited (Moschieri & Mair, 2008). This paper attempts, in all modesty, to contribute to the understanding of these determinants by specifically investigating the effect of the size of the seller on announcement abnormal returns.

This paper investigates a sample of 6699 divestitures completed by 2350 different public corporations in the United States between 1995 and 2014. On average, shareholders of selling firms gain 1.25% on the announcement of a divestiture and small sellers outperform large sellers by 1.96%. We examine possible reasons for this difference by drawing on research in both the divestiture and acquisition literature. We find that the size effect is not explained by (1) relative deal size, (2) increase in focus, (3) operational fit with the buyer, (4) agency cost of holding cash, (5) financial distress (6) divestiture experience, or (7) partial anticipation. Hence, we conclude that firm size is an important determinant for value creation in divestitures and that further work is required to fully understand the reasons for this effect.

We believe this paper contributes to the existing literature in four ways. First, we find that the size effect in divestiture is robust to a wide variety of characteristics believed to have impact on abnormal return. Second, it provides an updated look at announcement abnormal return generated from divestitures. Third, it tests existing hypotheses in the divestiture literature using a bigger and updated dataset. Lastly, it proposes and tests new hypotheses to explain value creation in divestiture inspired by theories in the acquisition literature.

The paper is organized as follows. Section 2 introduces the concept of divestitures. Section 3 provides an overview of existing literature pertaining to divestitures and establishes a set of hypotheses to explain the size effect. In section 4 we describe the dataset and briefly discuss key methodology and limitations in the data. Section 5 is divided into 2 stages. Stage 1 offers key descriptive statistics to get an indication of the relationships proposed by the hypotheses. Stage 2 discusses the key findings from the empirical analysis. Lastly, we introduce two alternative explanations for the size effect in section 6.

[1] From SDC and CRSP adjusted for inflation

2. BACKGROUND

This section provides an introduction to divestitures. First, we discuss the concept of divestitures in the context of the broader mergers and acquisition field. Second, we briefly review existing literature studying the wealth creation from divestitures. In section 3, we dive deeper into the determinants of this wealth creation.

2.1 DIVESTITURES IN THE M&A CONTEXT

Eckbo & Thorburn (2013) define a divestiture as the sale of a portion of the firm's assets in a private transaction. Often being the counterpart to an acquisition, divestitures are different from other transactions in the sense that the parent continues to exist as a separate entity. The assets range in types and sizes, and could be a division, segment, subsidiary or a product line. Typically the seller receives cash, but could also receive securities as payment either in full or in parts (Eckbo & Thorburn, 2013).

Divestitures impact different stakeholders of the selling firm. By engaging in a divestiture, the value of stocks and bonds outstanding are typically affected (Datta et al., 2003), whilst customers, employees and suppliers face increased uncertainty about the future (Gole & Hilger, 2008). Divestitures also have a significant economic impact. For example, Gole & Hilger (2008) found that the total value of all divestitures with an announced price amounted to $342 billion in the United States between 2002 and 2006, averaging $175 million per deal. Furthermore, the total number of divestitures totaled over 16 000, representing over a third of all M&A transactions.

Although divestitures is a theoretically and practically interesting field, it is often treated as the smaller cousin of corporate restructuring (Brauer, 2006). Our interests lie mainly in the field of portfolio restructuring, which encompasses divestitures, mergers, acquisitions and dissolutions. Corporate portfolio restructuring can also be thought of as the question of the economic boundary of the firm. Coase (1937) states that the ideal firm size is where the cost of arranging a marginal transaction on the market equals the marginal cost of arranging it within the firm. As the external environment of the firm changes, so does the optimal size of the firm leading to corporate portfolio restructuring. However, agency issues, regulation and creditor demands complicate the understanding. Managers could be motivated to divest to obtain cash to follow personal projects (Lang et al., 1995), obtain cash to pay back debt to creditors to avoid a future bankruptcy, or due to antitrust regulations.

Divestitures are also often treated as the counterpart to mergers and acquisitions. Although every divestiture must have a buyer, it is qualitatively different from an acquisition.

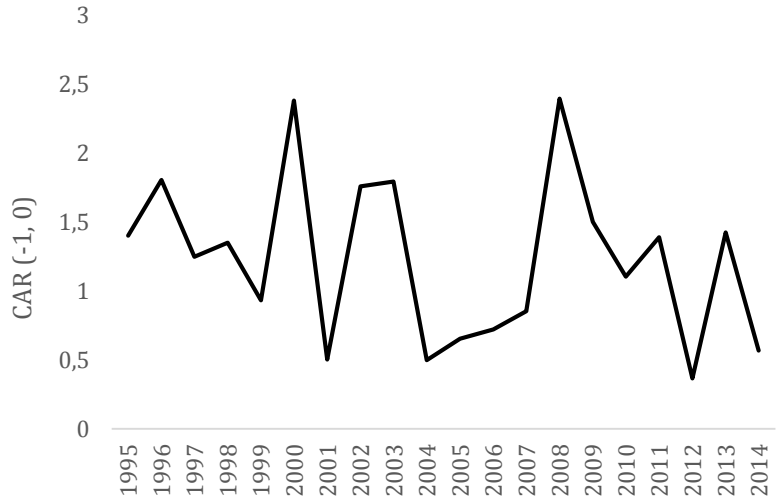
Gole & Hilger (2008) describe that the average divestiture is more complicated managerially and psychologically, as selling is usually viewed as dead-end transactions accompanied with meticulous planning beforehand and substantial uncertainty for the employees. Managers of divestitures thus have a significant challenge in communicating and managing the process before the actual divestiture. A merger or an acquisition on the other hand is often marked by excitement, with the organizational challenges arising post-acquisition (Shrivastava, 1986). Another significant difference is that divestitures might be forced, either by creditors or competitive authorities whilst mergers and acquisitions typically are voluntary.

Hamilton and Chow (1993) studied divestiture motivations by surveying 59 managers asking them to rank their objectives. The four most common objectives were (1) to discard unprofitable units, (2) to focus on core activities, (3) to meet corporate liquidity requirements and (4) to get a good price for the offered units. Interestingly these objectives correspond well to some of our hypotheses explored later, mainly corporate focus, buyer fit and financial distress.

2.2 WEALTH CREATION FROM DIVESTITURES

Figure 2.1

Average seller cumulative abnormal return at the announcement of divestitures by year. The event window is (-1, 0). The data is collected from CRSP and SDC.



The study of divestitures mainly revolves around the antecedents and the effect on the wealth of the various stakeholders. We are especially interested in the effect of a divestiture on the wealth of shareholders. Given the assumption that the market is semi-strong efficient, we assume that the announcement abnormal returns reflect the actual changes in wealth due to the

divestiture, given no information leakages. The literature uses different event windows to measure cumulative abnormal return in order to pick up any information leakage prior to the event. Figure 2.1 shows average cumulative abnormal return per year measured using a two-day interval (-1, 0). Average abnormal return fluctuates around 1 percent and is positive in all years.

Eckbo & Thorburn (2013) review numerous studies investigating the magnitude of abnormal announcement returns. They find that returns range from 0.3% to 3.4% in the period between 1963 and 2005, and almost all are significantly positive at the 1% significance level. They also report a sample-size-weighted-average of 1.2%. However, as the samples of the studies cited are concentrated in the 1980s and 1990s, the return is slightly biased towards the average return in the two decades. Furthermore there is also evidence that divestitures create value for the buyers. Eckbo & Thorburn (2013) review buyers of divested assets between 1963 and 2002, and find a range from 0.0% to 2.3% with a sample-sized-weighted average abnormal return of 1.2%.

3. DETERMINANTS OF WEALTH CREATION

The main objective of this paper is to explore determinants of wealth creation in divestitures, and in particular, determine the effect of firm size. We approach this objective by first investigating whether a size effect exists. Next, we explore whether the size effect, if any, can be explained by existing theories drawn from the divestiture research. In this section we review the literature and derive a set of hypotheses that will form the basis for our analysis. In particular, we explore the concepts relative deal size, corporate focus, operational fit with the buyer, agency issues of holding cash, inter-temporal effects and financial distress. In the following sections we discuss these topics in turn.

3.1 FIRM SIZE

ABSOLUTE SIZE

Firm size is often used to control for and explain *acquisition* returns. Moeller et al. (2004) conducted a large-sample study documenting a size effect in acquisitions. Later studies seeking to explain acquirer returns frequently use firm size as a moderator for acquisition returns, with significant explanatory effect (Golubov et al., 2015 and Moeller et al., 2005). Although explanatory factors such as managerial hubris and acquisition premium has been attributed to the size effect, it remains a significant explanatory variable for acquisition returns and a "fertile area for acquisition research" (Haleblian et al, 2009).

To the best of our knowledge, no empirical work has explored whether a similar size effect exists in divestitures. We suspect that small sellers are inherently different from large sellers in aspects that affect wealth creation in divestitures, and consequently, that small sellers might outperform large sellers at the deal announcement. Hence, our first hypothesis is:

Hypothesis 1: *Small sellers outperform large sellers at the announcement of divestitures*.

In the following discussion we will derive new hypotheses assuming that hypothesis 1 is true.

RELATIVE DEAL SIZE

A natural explanation for a difference in wealth creation between small and large sellers is the relative size of the deal. The percentage abnormal return is a function of the absolute dollar gain and the pre-announcement market capitalization of the seller. Paralleling the intuition in acquisitions (Asquith et al, 1983), a large percentage abnormal return could be caused by a large deal value relative to the market capitalization of the seller, rather than a

larger value creation per dollar of deal value. Previous studies, including Zaima & Hearth (1985), Klein (1986) and Mulherin & Boone (2000), document a significant relative size effect on divestiture announcement returns.

Because small sellers typically divest assets with larger relative deal size than large sellers (see section 5.1.3), we hypothesize that relative deal size could explain some of the size effect. To determine whether the size effect is not only capturing the mechanical relationship between two variables, we examine whether the size effect is persistent when controlling for relative size.

Hypothesis 2*: The size effect is persistent when controlling for relative deal size*

Given that the size effect is not explained by relative size effect, we seek to explain the remaining effect by establishing hypotheses drawing on ideas from both the acquisition and divestiture literature.

3.2 CORPORATE FOCUS

Numerous studies have pointed to corporate focus as a driver for wealth creation in divestitures. For instance John & Ofek (1995) find that 34% of all divesting firms in their sample decreased the number of segments in the year of the divestiture as compared to the previous year. The resulting increase in corporate focus is associated with wealth creation for the shareholders of the divesting firm. Several studies, such as John & Ofek (1995), Dittmar & Shivdasani (2003) and Berger & Ofek (1999) have all documented significant positive abnormal return for focus-increasing divestitures ranging from 1.5% to 3.4%. The literature presents two reasons for this wealth creation. Firstly, Linn & Michael (1984) argue that shareholder wealth is generated when management increases its attention on core business units. Secondly, John & Ofek (1995) argue that the increase in focus reduces the conglomerate discount of the parent firm. The following discussion centers on the conglomerate discount.

There are costs and benefits associated with diversification, and the impact on value creation depends on the net sum of these effects. The literature proposes two main arguments for the benefits of diversification. Firstly, the information flows are more efficient intra-firm than inter-firm, and thus diversified firms might be able to allocate resources more efficiently than external capital markets (Weston, 1970). Secondly, by combining businesses with imperfectly correlated earning streams, diversified firms are able to borrow more due to the coinsurance created (Lewellen, 1971) and have a higher tax shield than non-diversified firms. Another tax advantage is that diversified firms might be able to match losses to earnings in the

same year the losses are made, creating an advantage over undiversified firms that would have to use carry-back or carry-forward provisions (Majd & Myers, 1987).

Diversification also entails possible costs to the firm. Stultz (1990) argues that diversified firms tend to overinvest and cross-subsidize businesses with poor investment opportunities. A related argument to cross-subsidization made by Meyer & Roberts (1992) is that businesses that are part of a bigger firm can have a negative value for the firm, whilst operating as a stand-alone it cannot have a negative value for its stockholders. Lastly, as firms become more diversified, information asymmetries might arise between central managers and divisional managers translating into increased costs (see Myerson, 1982 and Harris et al., 1982).

The empirical evidence is mostly consistent with a conglomerate discount. For example, Berger & Ofek (1995) find a diversification discount between 13% and 15% by computing imputed stand-alone values for each of the segments of a diversified firm and Lang & Stulz (1994) find a diversification discount using imputed Tobin's Q. We expect to observe a focus effect similar to that found by John & Ofek (1995). We also hypothesize that the focus-effect is contingent on the size of the firm, where deals made by small sellers are more sensitive to an increase in focus than large firms. We build on previous work by Berger & Ofek (1995), who found that small firms with book assets under 50$ million had significantly larger diversification discounts than larger firms.

***Hypothesis 3a**: Increase in corporate focus due to an asset sale affects abnormal return positively*.

3.3 FIT WITH THE BUYER

Another important driver for wealth creation in corporate divestitures is the selling of an asset to a buyer valuing the asset higher than the seller (Eckbo & Thorburn, 2013). For example, Hite et al. (1987) stressed that allocation of assets from a lower-valuing seller to a higher-valuing buyer is important for value-creation in corporate divestitures. In the 1990s, John & Ofek (1995) expanded the research by finding that seller abnormal returns were 1.8% higher for deals with an LBO group buyer. They also found that seller abnormal returns were 5.0% higher for deals where the target's industry affiliation is related to the buyer's and not to the seller's. These findings suggest that the seller announcement return is higher if the buyer has a comparative advantage in operating the asset, or if the seller has a comparative disadvantage in doing so.

We expect to find that seller announcement return is positively related to a good operational fit between the buyer and the asset, and that buying LBO groups yield higher announcement abnormal returns for the seller.

Hypothesis 3b: *Better fit between the asset and buyer leads to larger abnormal announcement return for the seller*.

To the best of our knowledge, the literature does not provide any convincing arguments indicating that small sellers more often sell to higher-valuing buyers. However, a possible reason could be that divestitures by small sellers often involve managers sticking with the asset after the change in ownership. Given this agenda, they might be more personally motivated to sell to a buyer with better fit because his or her competences will be valued higher. On the contrary, key personnel in large selling firms might be more prone to stay with the parent firm and therefore have less personal interest in a "perfect" match with the buyer. This argument is speculative but plausible. If small sellers more often sell to higher valuing buyers, we hypothesize that this could explain why small firms have greater announcement abnormal return.

3.4 AGENCY COSTS OF HOLDING CASH

Now we turn to determinants of wealth creation in divestitures that center on corporate governance issues. In particular, we review literature studying agency costs of holding cash. We discuss the benefits of receiving cash proceeds from asset sales followed by the agency costs of holding cash and determinants for these costs.

Numerous studies in the literature have discussed benefits of holding cash. Myers & Majluf (1984) and Bates (2005) contend that information asymmetries between shareholders and managers lead to underinvestment if the firm must issue equity. In addition, Myers (1977) introduced the problem of debt overhang and corresponding underinvestment if the firm cannot issue risk free debt. Building on these ideas, Lang et al. (1995) introduced the *Financing Hypothesis* arguing that firms are motivated to carry out asset-sales in order to obtain cash proceeds to circumvent the problems of raising outside funds.

If the incentives of managers are not fully aligned with investors', they might be motivated to conduct unprofitable investments and hence destroy shareholder value (Roll, 1986). Thus, if the motivation to divest is to obtain cash, the impact on abnormal return can be both positive and negative depending on the level of agency issues in the firm. Several studies examined agency costs of holding cash. In particular, Jensen & Meckling (1976), Roll (1986), Jensen (1986) and Stulz (1990) argue that managers have incentives to grow the firm larger

than the optimal size by carrying out unprofitable investments and hence destroy shareholder value. As a result, excess free cash flow is only beneficial to shareholders if allocated optimally. Motivated by this discussion, Lang et al. (1995) examined the use of proceeds in 151 asset sales and found that the stock price reaction to asset sales is significantly positive when the proceeds are used to pay down debt and negative if retained in the firm. They argue that for firms with agency costs of cash, the market interprets a decision to pay out proceeds positively because the alternative would imply that managers would spend it on negative NPV projects.

So what determines the magnitude of agency costs of holding cash? Extensive literature investigates these determinants. Most notably, monitoring of management and management incentive programs are determinants that dominate the debate. For example, Agrawal & Mandelker (1987) find evidence in support of the hypothesis that executive holdings of common stock and options reduce the level of management discretion problems. Similarly, Tehranian et al. (1987) studied divestitures in particular and found that firms with long term executive compensation plans experience a significant positive announcement return whereas firms without such compensation plans experience insignificant negative announcement returns. Hirschey et al. (1989) find that divestiture announcement return is more favorable when the ownership is concentrated and significant insider trading activity has taken place prior to the deal. The importance of long-term executive compensation was confirmed in recent studies such as Atullah et al. (2010). They studied 2080 asset sales by UK firms between 1992 and 2005 and found that CEO ownership and stock options are positively related to announcement returns when proceeds are retained but insignificant if paid out.

As first documented in Jensen & Meckling (1976), shareholders are motivated to incur monitoring costs to limit divergences between shareholder and management interests. Likewise, Fama & Jensen (1983) contend that the separation of ownership and control in corporations survives partly due to an effective approach to monitor the behavior of management. Hirschey et al. (1990) examined the effect of banks as monitors of management activity on divestiture announcement return. They find that firms with high bank debt experience higher abnormal returns than firms with low bank debt. Interestingly, they find that leverage in general has no significant impact and conclude that the market regards the bank debt as different from other debt due to the monitoring function of banks. The results are similar to those found by Datta (2003) and Nguyen (2013).

As implied by the financing hypothesis presented by Lang et al. (1995), the existence of agency issues will only destroy value in divestitures if the purpose of the asset sale was to obtain cash to finance sub-optimal projects. If the seller has a large cash reserve before the divestiture, we would not expect less managerial discretion to create value because it is less likely that the management wanted cash. Furthermore, if the seller is in financial distress, the

motivation to sell might be driven by pressure from creditors rather than by self-interested managers. Therefore, we argue that greater alignment of incentives only has a positive impact on abnormal return if the motivation to divest is to obtain cash, given that the firm is not in financial distress.

Hypothesis 3c: *Greater alignment of incentives and more bank monitoring will affect abnormal return positively if the firm is healthy and has low cash*.

If agency cost of holding cash explain the size effect in corporate divestitures, we would expect that they are more pertinent for large firms than for small firms. We argue that agency issues might be a bigger problem in large corporations than in small corporations. As argued by Moeller et al. (2004), executive incentives in small firms are generally better aligned with that of shareholders due to more executive ownership and longer-term compensation plans. In addition, as suggested by Demsetz & Lehn (1985), managers of large firms typically have more hubris because they are more important socially and face fewer obstacles due to greater financial capacity. Furthermore, small firms might have a higher share of private (bank) debt compared to large firms because large firms generally need more capital. Thus, we expect management in small firms to be better monitored by banks than in large firms.

3.5 FINANCIAL DISTRESS

We define financial distress as a state in which the firm is in danger of not meeting its hard obligations (most usually debt repayments) either due to illiquidity or insolvency. When firms are financially distressed, creditors typically apply pressure on the firm to ensure repayment of its claims. Asquith et al. (1992) and Ofek (1993) show that firms in financial distress frequently divest or sell assets as a part of their restructuring process. The literature is divided in its conclusions concerning the effect of financial distress on announcement abnormal return of asset sales.

Two main theories suggest that financial distress destroys wealth in divestitures. Firstly, Brown et al. (1994) argue that for firms with liquidation value of its assets below the face value of its liabilities, stockholders hold a call option that might potentially realize a profit in the future. If the assets are liquidated and the proceeds paid to the creditors, this call options ceases to exist, which destroys value for the shareholders. Second, the firm might be forced to sell the asset at a discounted price. Shleifer & Vishny (1992) argue that financial distress often is an industry-wide phenomenon, forcing distressed firms to look for buyers in a different industry, which typically have lower best-value use of the asset. Eckbo & Thorburn (2008)

look at bankrupt firms in Sweden and find evidence of a discount when bankrupt firms are liquidated piece-wise, but not when the whole firm is sold as a going concern.

In contrast to the above theories, some scholars argue that financial distress more often create wealth than destroy wealth in divestitures. Afshar et al. (1992) argue that by completing a successful sale, the firm might be able to avoid an expected costly bankruptcy, and thus signal good news to the market. In a similar vein, Brown et al (1994) argue that retention of proceeds from an asset sale signals that creditors' have faith in the value of the remaining assets.

Empirically, Afshar et al (1992) show that financially distressed firms in the UK display significantly larger abnormal returns than healthy firms on divestiture announcements, implying a larger signaling effect than value-destruction effect. We expect to observe the same tendency by sellers in the United States. Thus we hypothesize that:

Hypothesis 3d: *Divestitures by firms in financial distress experience higher announcement abnormal returns than healthy firms*.

We hypothesize that financial distress could explain some of the size effect because small firms are typically more often in distress[2]. Furthermore, financial distress might have a different effect depending on whether the divesting firm is small or large. We reason that asset sales by large distressed firms do not significantly reduce the risk of bankruptcy because the deal value is typically small relative to the size of the outstanding liabilities. In contrast, small sellers typically divest a larger share of their pre-deal market capitalization, which theoretically could reduce the bankruptcy risk significantly.

3.6 INTER-TEMPORAL EFFECTS

Now we draw inspiration from the acquisition literature, and discuss the effect of carrying out several successive asset sales on the wealth creation of the next asset sale. This is interesting to our study because large sellers typically make more asset sales than small sellers (see section 5.1.3). Specifically, we discuss CEO learning and decreasing marginal efficiency of subsequent deals. Both effects depend on previous deal behavior, and we thus group them collectively as inter-temporal effects.

Literature dedicated to inter-temporal determinants of divestiture performance is scarce. However, recent studies in the acquisition literature have provided evidence of a declining cumulative abnormal return in the number of subsequent deals (see Billet & Qian,

[2] Credit ratings and other financial distress measures are typically functions of firm size, implying that smaller firms have a higher probability of being in distress.

2008; Ismail, 2008; Fuller et al., 2002; Ahern, 2008). Different explanations have been suggested for this negative trend. For example Ismail (2008) points out that the declining trend supports Keynes' Marginal Efficiency of Capital principal as the best investment opportunities are exploited first. The theory implies that the least profitable projects are left for the higher order deals and hence affect the later acquisitions negatively.

Another explanation for the declining acquisition announcement return is Aktas et al.'s (2009) model of CEO learning. They argue that a rational CEO learn from the stock reaction of the previous acquisition announcement and adjusts his bidding behavior of the next prospective acquisition accordingly. A positive stock reaction in the first acquisition creates a positive signal to the CEO, making him bid more aggressively in the next deal and increase the bid premium. As a result, the acquirer abnormal return is expected to decline. Using an autoregressive approach, Aktas et al. (2011) empirically test the model and find that CEOs increase the bid premium if the stock reaction of the previous deal was positive (and vice versa). Moreover, they show that CEO acquisition experience increases the sensitivity of the learning effect so that more experienced CEOs make a more aggressive bid than less experienced CEO following a positive stock reaction. To control for the existence of CEO hubris (see Billet & Qian, 2008; Ismail, 2008), Aktas et al. (2011) study the interaction between net insider stock purchases by the CEO prior to the deal and investor reactions at earnings announcements (similar approach as Billet & Qian, 2008). They find that CEOs learn from previous stock reactions regardless of whether the CEO is hubristic or rational.

The idea of CEO learning presented by Aktas, de Bodt and Roll (2011) may also be applied to divestitures. This plausibility was confirmed by talking to Professor Eric de Bodt in October 2015. We argue that CEOs of frequently divesting firms also learn from the stock reaction of the previous asset sale; CEOs consider the stock reaction of the previous asset sales and accept a lower bid premium if the previous reaction was positive which lowers the abnormal return but also increases the likelihood of a new deal taking place. In addition, a CEO of a divesting firm may be more eager to approach potential buyers if he has received a positive signal on the prior sale. We would therefore expect the announcement abnormal return of selling firms to decline in the subsequent order of divestitures. Moreover, we apply the marginal efficiency argument developed by Keynes to divestitures and expect that abnormal return will decline with deal order because assets with the highest transaction value relative to internal valuation are divested first.

Hypothesis 3e: *Announcement abnormal return of selling firms decline in the firm's deal order number*.

As larger firms tend to do more divestitures, we expect inter-temporal effects to be more pertinent to larger firms. Given that the abnormal return for selling firms is declining with deal order, deals made by large firms should on average underperform those of smaller firms. Thus, we expect that the deal order number contributes to the size effect.

3.7 THE SIZE EFFECT

Section 3.1 to 3.6 derived a set of hypotheses to explain announcement abnormal returns in divestitures using existing literature. To investigate whether a size effect exists, we test whether the effect of firm size on abnormal return is persistent after controlling for all other determinants introduced in the literature. Thus:

Hypothesis 4: *The size effect is persistent after controlling for relative deal size, corporate focus, buyer fit, agency issues, financial distress and firm deal order.*

3.8 HYPOTHESES

Hypothesis 1: *Small sellers outperform large sellers at the announcement of divestitures.*
Hypothesis 2*: The size effect is persistent when controlling for relative deal size*

Hypothesis 3a*: Increase in corporate focus due to an asset sale affects abnormal return positively.*
Hypothesis 3b: *Better fit between the target and buyer leads to larger abnormal announcement return for the seller.*
Hypothesis 3c: *Greater alignment of incentives and more bank monitoring will affect abnormal return positively if the firm is healthy and has low cash.*
Hypothesis 3d: *Divestitures by firms in financial distress experience higher announcement abnormal returns than healthy firms.*
Hypothesis 3e: *Announcement abnormal return of selling firms decline in the firm's deal order number.*

Hypothesis 4: *The size effect is persistent after controlling for relative deal size, corporate focus, buyer fit, agency issues, financial distress and firm deal order.*

4. DATA AND METHODOLOGY

To analyze determinants of shareholder gains in divestitures we obtained data from the Thomson Financial SDC database, the Center for Research in Security Prices (CRSP) and COMPUSTAT. This section seeks to (1) describe the procedures used to construct the sample, (2) present key variables used in the thesis and (3) outline limitations and econometric assumptions.

4.1 THE SAMPLE

The sample was constructed by selecting all completed mergers and acquisitions in the SDC database with announcement dates between 1995 and 2014 and deal size greater than $1 million. The deal value is defined by SDC as the total consideration paid by the acquirer, including fees. We then identified a divestiture, also referred to as an asset sale, if the transaction satisfied the following criteria:

1. The transaction is flagged as "divestiture" in the SDC database;
2. The immediate or ultimate parent of the target has minimum 50 percent ownership prior to the announcement date;
3. The acquirer ownership post transaction is higher than 50 percent;

The above selection excludes spin-offs, equity carve-outs and recapitalizations. Next, we identify the divesting firm, hereafter referred to as the "seller". If both the immediate parent and the ultimate parent are public, the immediate parent is identified as the seller. If only one is public, the respective public parent is identified as the seller. Having identified the seller in each divestiture we further reduce the sample applying the subsequent criteria:

1. The nationality of the seller is US
2. The seller is public
3. Information on stock prices of the seller is available in the CRSP database
4. The seller is non-financial[3]

[3] SIC codes in the range 60-67

Table 4.1

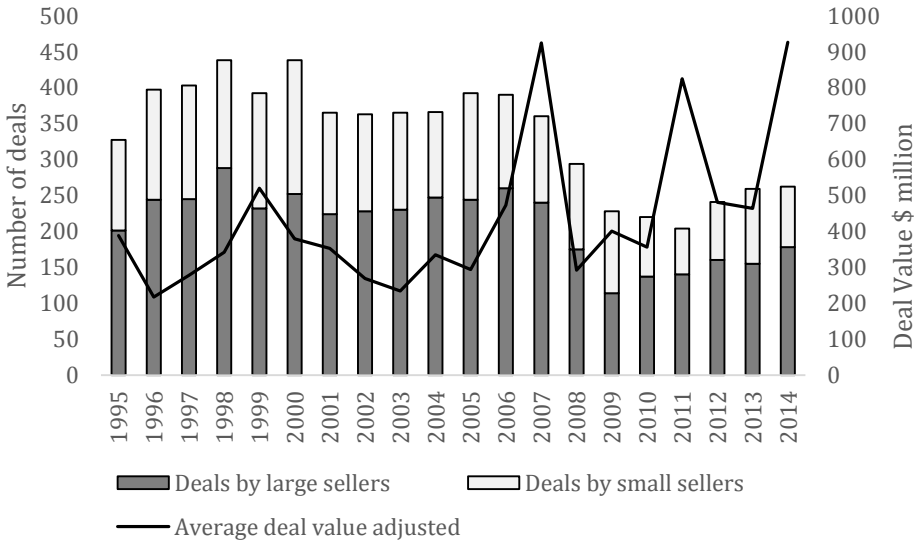
Data population and sample selection in the period 2005 to 2014. Appendix 9.2 provides data for the entire sample period between 1995 and 2014.

Year	Total transactions	Divestitures	US divestitures	Public US divestitures	Sample	Sample/Total divestitures
2005	11927	3952	1327	802	392	9.9%
2006	13201	4099	1364	797	390	9.5%
2007	15026	4453	1384	832	360	8.1%
2008	12920	3779	1029	630	294	7.8%
2009	11035	3506	857	573	228	6.5%
2010	11429	3816	904	476	220	5.8%
2011	11502	3778	936	478	204	5.4%
2012	10897	3733	1011	531	241	6.5%
2013	9911	3539	984	553	259	7.3%
2014	11305	3838	1071	553	262	6.8%
Total[4]	**223188**	**72873**	**23428**	**14728**	**6699**	**9.2%**

The final sample consists of 6699 transactions completed by 2350 different sellers between 1995 and 2014. Although the seller is always a non-financial public US firm, the target and the acquirer could be non-US and private. Table 4.1 displays the filtering process per year between 2005 and 2014. We emphasize that the full sample size also depends on the availability of additional data. In particular, the Compustat ExecuComp database and the Compustat segments data are more incomplete.

Figure 4.1

Number of deals and average deal value per year by large and small sellers. Average deal value is adjusted for inflation using the CPI index (2014-index=1).



[4] Total values are accumulated from 1995 to 2014

Figure 4.1 shows the number of divestiture transactions by small and large sellers in the sample between 1995 and 2014. Divestiture activity before 2008 was stable at 350-400 deals but has remained low at 200-250 deals after 2008. However, the distribution of deals between small and large sellers has been persistent with large sellers accounting for approximately 60% of all divestitures. From the solid line we observe that average deal value adjusted for inflation fluctuates around $200 million and is correlated with economic cycles, spiking in 1999, 2007, 2011 and 2014.

4.2 KEY VARIABLES

In general, the variables are calculated similar to those used by studies in the acquisition and divestiture literature, although some variables are entirely designed by the writers of this thesis. A thorough description of all variables is provided in the appendix, section 9.2.1 This section describes the most essential variables.

Cumulative abnormal return: We apply a conventional event study methodology[5] and measure the wealth creation to investors using the abnormal return of the selling firm cumulated over the event window (-1,0) [6]. Results are robust checked using the different event windows (-1, 1) and (-2, 2). To account for dividends, stock repurchases and stock splits, we use the holding period return provided in CRSP. We use the value weighted worldwide index from CRSP as a benchmark for the market return as we assume that investors have a global investment scope. Betas and standard errors for each event are estimated from CRSP using our own programming macro code in STATA with a 250 trading-day interval ending 30 days before the announcement day.

Firm Size: To measure firm size at a given event date we use the market capitalization two days prior to the announcement. The market capitalization is standardized into 2014-dollars using the CPI index. Following Moeller et al. (2004), we classify a seller as large if its market capitalization is greater than the market capitalization of the 75th percentile of firms listed on the NYSE, NASDAQ and AMEX in a given year.

Corporate Focus: Like John & Ofek (1995), we define an increase in corporate focus as a decrease in the number of business segments the firm is involved in during the fiscal year of the event.

[5] Section 9.1 describes the econometric assumptions and mathematical calculations

[6] We use the market model as the benchmark model, following amongst many Moeller et al (2004). The advantage of the market model is that it is a statistical model, and does not rely on economic arguments. The other model frequently used by practitioners is the Capital Asset Pricing Model (Sharpe, 1964), which builds on an expected relationship between the risk free rate, market returns and the specific stock returns. For reasons documented by Fama & French (2004) we prefer the market model.

Buyer Fit: Also motivated by John & Ofek (1995), we identify an operational fit between the asset and the buyer if the respective two-digit SIC codes of the core operations are identical.

Low Cash: We define the cash reserve as low if the cash reserve relative to market capitalization is below the median level of firms with the same two-digit SIC code in a given year.

Financial Distress: We use the different Z score models developed by Altman (1983) to identify financially distressed firms. The Z score (Z'' score) compresses five (four) ratios into a single score in order to predict the probability of default within the next two years for manufacturers (non-manufacturers). Appendix 9.2.3 describes the Z-score in detail.

CEO Divestiture Experience: Inspired by Aktas et al. (2011) we measure CEO divestiture experience as the number of deals completed by the incumbent CEO for the current firm.

4.3 LIMITATIONS IN THE DATA

The databases used in this study (SDC, CRSP and COMPUSTAT) are commonly cited in academic research. Although some papers are concerned with the accuracy and completeness of the data, most scholars agree that the data is sufficiently accurate (Barnes et al., 2014). In particular, Barnes et al. (2014) studies the accuracy of the SDC database and find that it is more accurate for large, public, firms and that it improves over time. Because divesting firms typically are larger than the average firm and we only study selling firms that are public, we expect inaccuracies in the SDC data to be minimal. In addition, we avoid incomplete data series from the 1980s by using a sample starting in 1995.

However, variables related to corporate focus, executive compensation and bank monitoring are obtained from COMPUSTAT and have missing observations. If the data is missing in a systematic pattern, we might introduce a bias in our sample. To measure corporate focus, we only have segment data after 2006. Because segments data was not collected prior to 2007, we treat the data as missing at random. We also assume that observations relating to CEO ownership, CEO long-term compensation and CEO insider trading are missing at random. As for bank debt, we treat missing observations as no bank debt, rather than missing data. These assumptions are bold, but we recognize the limitations they may cause and leave it to further studies to improve data collection of executive compensation data and the level of bank debt.

Lastly, many of our variables are measured noisily or used as proxies for an effect. For instance, we use decrease in segments over a fiscal year to measure whether a divestiture

decreased the amount of segments of the selling firm. As the firm might increase or decrease the number of segments for reasons unrelated to the asset sale, there is measurement error in our independent variable. Assuming that we measure the effect noisily but unbiased, the coefficients of those variables are biased towards zero (classic measurement error, see for instance Stock & Watson, 2010). However, most of the variables used in this thesis are commonly applied in the divestiture literature.

4.4 METHODOLOGY

The following section discusses the assumptions required for a meaningful interpretation of our results and the main econometric considerations taken. The technical aspects are described in appendix 9.1.

In order to use abnormal returns to measure the impact of a divestiture, two properties must be true: firstly *(1)*, the stock price reactions must be informationally efficient given the public information about the event, and secondly *(2)*, the choice of benchmark model must be correct. Otherwise, our measure of abnormal return would be incorrect under (1) and biased under (2). Studies of abnormal returns in finance typically assume that these assumptions hold.

To interpret announcement abnormal return as wealth creation, we require the absence of partial anticipation and information revelation. Partial anticipation causes some of the wealth creation of a divestiture to occur prior to the event. On the announcement date, only the unanticipated component of the economic benefit will be captured by the cumulative abnormal return (Malatesta & Thompson, 1985; Eckbo, 2014). Furthermore, additional information about the firm might be revealed as a result of the divestiture announcement which could lead to imprecise measurements of value creation. If the additional information has an impact on the stock price, cumulative abnormal return would capture both the effect of the divestiture and the additional information (Eckbo et al, 1990). We assume the absence of both effects in our study. In section 6.1 we relax the assumption of no partial anticipation and tests whether partial anticipation affects abnormal return.

A common issue in finance event-studies is that industry and macro effects affect groups in the sample, leading to highly correlated returns within those groups. For instance Mulherin & Boone (2000) find evidence of industry clustering in divestitures. By not taking clustering into account, a standard OLS regression will underestimate the standard errors of the coefficients and thus create deceivingly small confidence intervals. We control for clustering by using two-way clustering on years and two-digit SIC codes by utilizing the ivreg2 command in STATA constructed by Baum et al. (2007). We choose to cluster on year and two-digit SIC codes by starting on the lowest level (4 digit-SIC and months) and progressively

clustering in bigger groups until there were little changes in the standard errors, as described by Cameron & Miller (2015).

5. RESULTS

We discuss our results in two stages. In the first stage we explore key statistics to get an indication of the hypotheses derived in section 3. Stage two uses multivariate regression analysis to draw inferences about the causal relationships stated by the hypotheses.

5.1 STAGE ONE: DESCRIPTIVE

So far, we have discussed the size effect hypothetically, with no quantitative evidence to support our arguments. In this section we provide descriptive statistics to get a sense of the relationships proposed by the hypotheses which will be examined in stage two. First, we compare announcement abnormal return for the sample of small and large sellers. In 5.1.2 we explore the distribution of firm size and divestiture activity. In section 5.1.3 we compare firm and deal characteristics between small and large sellers to assess the strength of each hypothesis. Lastly, we study the development of abnormal return in subsequent deals.

5.1.1 DIFFERENCE IN ANNOUNCEMENT ABNORMAL RETURN

Hypothesis 1: *Small sellers outperform large sellers at the announcement of divestitures*.

Following Moeller et al. (2004), we classify a seller as large if its market capitalization is greater than the market capitalization of the 75th percentile (4th quartile) of firms listed on the NYSE, NASDAQ and AMEX in a given year[7]. By aggregating the abnormal returns over several days we allow for some pre-announcement drift as well as announcement after closing or misreporting of the announcement day (Eckbo & Thorburn, 2013). We use (-1, 0), (-1, 1) and (-2, 2) as event windows for the calculation of the cumulative abnormal return (CAR). For a technical description of benchmark model specifications and standard error calculations, see appendix 9.1.

[7] We refer to large sellers and 4th quartile sellers interchangeably throughout the paper.

Table 5.1 reports the abnormal return for the whole sample and for the subsamples of small and large sellers. T-values are reported in parentheses. Based on the event window (-1, 0), we observe that shareholders of selling firms on average enjoy a significantly positive abnormal return of 1.25% at the announcement of the divestiture, equivalent to $40.18 million dollars. This finding is consistent with that reported by Eckbo & Thorburn (2013).

Table 5.1

Announcement cumulative abnormal returns (CAR) and dollar abnormal returns sorted on small and large selling firms. Statistical t-values are reported in parentheses. Average dollar return is the abnormal dollar return adjusted for inflation using the US CPI-index (base 2014 dollars). See appendix 9.1.1 for the mathematical calculations of cumulative abnormal return and the corresponding t-statistic. In appendix 9.1.2 we outline the mathematical calculations for the dollar abnormal return and derive the t-statistic.

	All (1)	Large (2)	Small (3)	Difference (4)
Cumulative Abnormal Return (-1,0) (%)	1.25 (19.92)	0.51 (10.26)	2.47 (17.08)	-1.96 (-12.83)
Cumulative Abnormal Return (-1,1) (%)	1.45 (18.90)	0.61 (10.00)	2.84 (16.03)	-2.23 (-11.91)
Cumulative Abnormal Return (-2,2) (%)	1.59 (16.02)	0.76 (9.62)	2.96 (12.94)	-2.20 (-9.11)
Average dollar return ($ million)	40.18 (3.02)	61.17 (2.86)	5.42 (16.38)	55.75 (2.61)
Total dollar return ($ million)	269,140	255,464	13,676	
Observations	6,699	4,176	2,523	

Furthermore, we show that small sellers on average outperform large sellers by 1.96%, and that abnormal returns are 2.47% and 0.51% for small and large sellers, respectively. The finding is also robust to the different event windows (-1, 1) and (-2, 2). As expected, the t-values decrease as the event window widens, as the estimated standard deviations increases in proportion to the length of the event window.

Average abnormal dollar return is measured as the total abnormal dollar amount of changes in market capitalization due to deal announcements[8]. Table 5.1 reports that the average divestiture generated $40.18 million to its shareholders, with small and large sellers on average generating $5.42 million and $61.17 million, respectively. Between 1995 and 2014, the accumulated dollar return for all divestitures in our sample amounted to $269 billion.

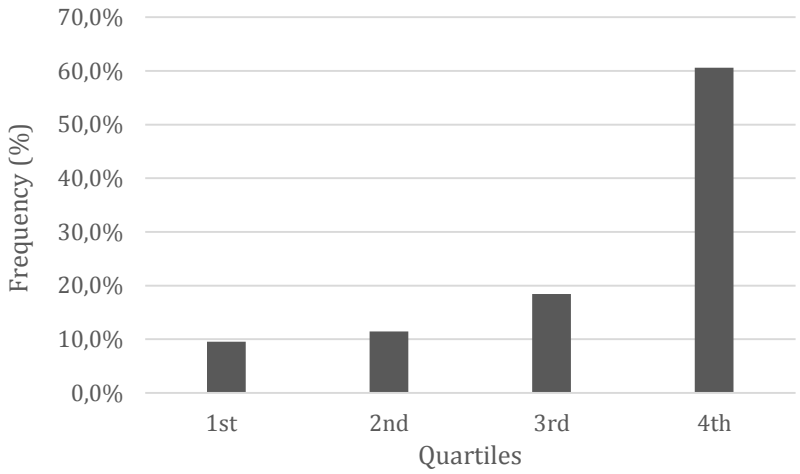
[8] The market capitalization is standardized into 2014-dollars using the CPI index.

In sum, we conclude that divestitures on average create positive wealth to shareholders and that small sellers outperform large sellers at the deal announcement. In the following sub-sections we explore how small and large sellers differ in aspects that are relevant to explain this size effect. First, section 5.1.2 examines the distribution of firm size to understand the difference in size between large and small sellers (4th quartile vs 1st, 2nd and 3rd quartiles). Second, 5.1.3 compares key characteristics between the 4th quartile and the rest.

5.1.2 DISTRIBUTION OF FIRM SIZE AND DIVESTITURE ACTIVITY

Figure 5.1

Distribution of divestiture activity by size quartiles. The sample is all 6699 divestitures completed between 1995 and 2014. Size quartiles are defined for each year in the period.



As noted in in the last section, we defined a seller as large if the market capitalization is greater than the 75th percentile (4th quartile) of firms listed on the NYSE, NASDAQ and AMEX in a given year. In figure 5.1, we split all firms listed on these three stock exchanges into quartiles based on market capitalization for each year between 1995 and 2014. The distribution of divestiture activity is strongly skewed towards large firms, with 4th quartile firms completing more than 60% of all divestitures registered in the United States. The smallest 75 percent of the firms completed 39 percent of all deals, and there are small differences within the first three quartiles.

Figure 5.2

Distribution of adjusted market capitalization and quartile cut-offs in 2014. The sample consists of 5771 public firms listen on NYSE, NASDAQ and AMEX in 20014. .

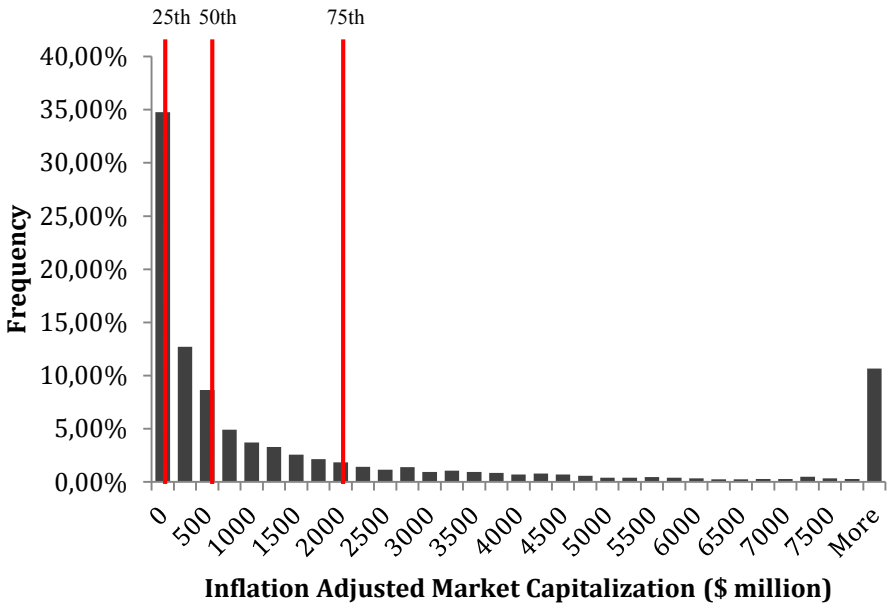


Figure 5.2 shows the distribution of adjusted market capitalization of all traded firms on NYSE, NASDAQ and AMEX in 2014[9]. The red lines mark the 25th, 50th and 75th percentile, respectively. The distribution of size is clearly centered on smaller values, with half of the firms reporting adjusted market capitalization below $560 million. Furthermore, the distribution has a very long tail, with 10.67% of the firms being larger than $8 billion.

When comparing small and large sellers using the 75th percentile (Moeller et al., 2004), we are comparing firms that are '*very*' large to firms that have '*normal'* size. This observation is interesting and suggests that large firms (4th quartile) are inherently different from small firms (1st, 2nd, and 3rd quartile). In the next section we examine differences in characteristics between small and large sellers.

[9] The distribution of adjusted market capitalization is similar in the years 1995 to 2013

5.1.3 DIFFERENCES IN CHARACTERISTCS BETWEEN SMALL AND LARGE SELLERS

In section 5.1.1 we concluded that small sellers outperform large sellers at divestiture announcements. By drawing on existing literature, we constructed a set of hypotheses that affect abnormal return and possibly explain the size effect. This section investigates differences between small and large sellers with respect to characteristics proposed by these hypotheses.

Table 5.2

Difference in characteristics between small and large sellers. Columns (2) to (4) report average values and (5) reports the t-statistics of the difference between (3) and (4). The t-statistic assumes unequal variances in the subsamples of small and large sellers. Problems with missing observations were discussed in section 4.3.

	Obervations (1)	All (2)	Small (3)	Large (4)	t-stat (5)
Market Capitalization (Million USD)	6,699	24,600	340	39,257	-23.36
Deal Value (Million USD)	6,699	420	73	629	-9.45
Relative size (%)	6,699	26.54	58.71	7.10	18.34
Number of segments	1,536	3.92	2.83	4.55	-13.61
Decrease in segments	1,536	0.16	0.17	0.16	0.52
Dummy=1 if fit with the buyer	6,699	0.49	0.44	0.51	-5.72
Dummy=1 if buyer is LBO group	6,699	0.06	0.06	0.06	0.12
Dummy=1 if low cash relative to industry	5,748	0.53	0.48	0.57	-6.82
Seller bank debt ratio	1,489	0.09	0.12	0.08	1.49
CEO ownership (%)	4,006	1.22	3.01	0.83	6.52
Net CEO insider purchases	3,169	0.49	0.55	0.48	3.17
Long-term compensation plan	4,108	0.89	0.78	0.92	-11.01
Dummy=1 if CEO is hubristic	2,941	0.25	0.29	0.24	2.15
Firm deal order number	6,699	5.95	2.12	8.27	-20.81
CEO deal order number	4,052	4.59	1.65	5.23	-7.70
Financial Distress	5,125	0.29	0.41	0.21	15.51

Table 5.2 shows the sample differences of the most important variables between deals by small and large sellers. Averages are reported in column 2-4 and t-statistics for the difference is reported in column 5

Relative Deal Size: As expected, we find that the average deal value is significantly larger for deals done by large firms and that small sellers divest a larger portion of their pre-deal market capitalization. On average, small sellers divest assets valued at 60% of their market value whereas large sellers only divest 7%. As larger relative deal size should increase abnormal returns (Asquith et al, 1983), this sample difference indicate that relative deal size explains some of the size effect. In section 5.2.3 we test whether the size effect is persistent when we control for relative deal size.

Financial Distress: We measure financial distress using Altman's Z-score (Altman, 1983) and show that small sellers are more often in distress than large sellers. Specifically, we find that 41% of divestitures made by small sellers are done whilst in financial distress, as opposed to 21% for large sellers. Firms in financial distress are usually under the influence of creditors, and might divest in order to satisfy creditors' demands. However, Afshar et al (1992) found that divestitures by firms in financial distress perform better than those by healthy firms. If this effect also holds for our sample, the difference found between small and large sellers indicate that financial distress may explain some of the size effect.

Fit with The Buyer: To identify operational fit between the buyer and the asset, we inspect whether the two-digit SIC codes of the asset and the buyer match. Contrary to our expectation, table 5.2 reports that divestitures by large sellers more often have a good fit with the asset, which might indicate a negative impact on the size effect. Despite that it might have an opposite effect on the size effect, operational fit with the buyer should be included in the cross sectional analysis as a control variable.

Agency Issues: We measure the degree of agency issues using different proxy variables proposed by the literature. Specifically, executive holdings of common stock, long-term executive compensation, bank debt ratio and relative cash reserve all contribute to less severe issues of managerial discretion (Agrawal & Mandelker, 1987; Hirschey et al., 1990; Lang et al., 1995). Table 5.2 reports that small sellers on average have higher CEO ownership and greater cash reserves relative to industry peers. These differences indicate that agency issues are less severe for small sellers. However, on average large sellers more often have a long-term CEO compensation plan in place which work to reduce the agency issues for large sellers. These findings indicate that the net effect of these determinants is unclear. In section 5.2, we examine the effect of each determinant by conducting a cross sectional analysis.

Corporate Focus: Following John & Ofek (1995), we identify an increase in corporate focus as a decrease in the number of business segments the firm is involved in. We do not find a statistical difference in the degree of focus following a divestiture between small and large firms. This finding is inconsistent with our hypothesis that focus could explain the size effect. However, in the cross sectional analysis in section 5.2, we include corporate focus as a control variable.

5.1.4 ABNORMAL RETURN IN SUBSEQUENT DIVESTITURES

Numerous studies in the acquisition literature have reported a declining trend in announcement abnormal returns of subsequent acquisitions (see Ismail, 2008; Billet & Qian., 2008; Fuller et al., 2002). Similar studies in the divestiture field are, to the writers´ knowledge, non-existing. As reported in table 5.2, deals made by large sellers have a significantly higher order[10] on average than deals made by small sellers. Therefore, the effect of deal order on abnormal return, if any, could potentially explain some of the size effect. In this section we test for a declining trend in announcement abnormal returns in the subsequent deal order of divestitures and discuss possible explanations.

Hypothesis 3e: *Announcement abnormal returns of selling firms decline in the firm's deal order number*.

Table 5.3

Seller abnormal return by deal order: Firm deal order is the order of the deal among the firm's total deals during the sample period. CEO deal order is the order of the deal performed by the incumbent CEO. See appendix 9.1.1 for the mathematical calculation of the t-statistics for the different types of t-tests.

Panel A: Performance by firm deal order				Panel B: Performance by CEO deal order			
Deal order	N	CAR (-1, 0)	t-stat	Deal order	N	CAR (-1, 0)	t-stat
1	2,350	1.74	13.38	1	1,850.00	0.94	11.26
2	1,164	1.58	10.42	2	743	0.85	6.73
3	682	0.88	4.92	3	391	0.85	4.8
4	453	1.38	6.00	4	245	1.00	4.63
5	317	0.54	2.33	5	161	-0.06	-0.22
6	252	0.56	2.43	6	119	-0.1	-0.35
7	190	0.76	3.08	7	88	0.13	0.4
8	154	0.25	0.98	8	69	0.43	1.16
9	129	0.86	3.12	9	54	0.38	0.9
10	116	0.89	3.06	10	42	0.82	1.69
>10	897	0.55	4.77	>10	290	0.46	1.99
>=2	4,354.00	0.98	14.86	>=2	2202	0.64	8.79
1 vs >=2		0.77	5.24	1 vs >=2		0.29	2.65

Panel A in table 5.3 reports average announcement abnormal returns sorted on the seller's deal order in the entire sample period. It depicts that a seller's first divestiture outperforms all subsequent deals with 0.77%. The abnormal return is declining from 1.74% in the first deal to 0.54% in the fifth deal with a positive spike in the fourth deal. However, after the fifth deal, the return fluctuates around 0.5% with no positive or negative trend. The finding

[10] Order is defined as the consecutive deal number in a series of divestitures

is consistent with the acquisition literature, though with a sharper decline during the first 5 deals (e.g. Ismail, 2008; Billet & Qian, 2008), and supports the hypothesis that small sellers outperform large sellers because small sellers have significantly lower average deal order than large (see table 5.2). In panel B we report abnormal return for deal orders by the incumbent CEO. Also here the abnormal return is declining and the first sale outperforms higher order sales with a significant 0.29%.

We find that abnormal returns decline in increasing firm deal order and CEO deal order. This is consistent with both the learning hypothesis and the decreasing marginal efficiency of capital principal hypothesis. Because large sellers complete more divestitures than small sellers, this finding indicates that small sellers outperform large sellers at the announcement of divestitures.

5.2 STAGE TWO: CROSS SECTIONAL ANALYSIS

In this section we investigate whether the size effect found in 5.1.1 can be explained by characteristics put forward in the existing divestiture literature using multivariate analysis. The discussion consists of three main parts. First, we test whether the size effect is persistent after controlling for relative deal size. Next, section 5.2.3 uses all variables proposed by the literature to determine whether the size effect can be explained by all hypotheses in combination. Lastly, 5.2.4 discusses the impact of the different effects on abnormal return. First, we discuss correlation between the various variables to be included in the regression model.

5.2.1 Correlation Between Variables

The following table shows the correlation between each of the independent variables. Imperfect multicollinearity exists when there is high correlation between the independent variables in a cross-sectional regression, which leads to two issues: firstly the coefficient estimates become sensitive to minor changes in the model, and secondly at least one of the coefficients will be imprecisely (albeit unbiasedly) measured. We also show variation inflation factors (VIF) tables for each regression in appendix 9.4.

The correlation values between different size measures (column/row 1-5) are high. However, as they are measures of the same variable, this is not problematic. The remaining values are low, with the highest correlation between relative deal size and Dummy 1st quartile of 0.35. Multicollinearity does not seem to be an issue, although we refer to the VIF tables in 9.4 for conclusive evidence.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Dummy=1 if 1st quartile	1.00													
2	Dummy=1 if 2nd quartile	-0.03	1.00												
3	Dummy=1 if 3rd quartile	-0.06	-0.11	1.00											
4	Dummy=1 if 4th quartile	-0.24	**-0.41**	**-0.81**	1.00										
5	Log market capitalization	**-0.37**	**-0.41**	**-0.46**	**0.73**	1.00									
6	Relative deal size	**0.35**	0.02	0.01	-0.13	-0.21	1.00								
7	Dummy=1 if decrease in segments	0.02	0.00	0.07	-0.06	-0.06	0.01	1.00							
8	Dummy=1 if fit with buyer	0.06	-0.04	0.01	-0.01	0.02	0.03	-0.04	1.00						
9	Dummy=1 if buyer is LBO	-0.01	0.00	-0.05	0.05	0.02	0.00	0.11	**-0.28**	1.00					
10	Dummy=1 if low cash	0.05	-0.05	-0.08	0.08	0.01	0.04	-0.04	0.02	-0.04	1.00				
11	Dummy=1 if not distressed	-0.15	-0.10	-0.06	0.15	0.26	-0.12	0.06	-0.03	0.04	-0.16	1.00			
12	Bank debt ration	-0.03	-0.04	-0.08	0.10	0.08	-0.02	-0.01	0.03	-0.08	0.07	-0.09	1.00		
13	CEO ownership	0.26	0.00	0.00	-0.09	-0.16	0.09	-0.01	0.02	-0.01	0.04	-0.07	-0.02	1.00	
14	CEO relative LT compensation	-0.08	-0.11	-0.14	0.21	**0.29**	-0.04	-0.03	-0.01	-0.02	0.00	0.05	0.02	0.00	1.00

5.2.2 RELATIVE DEAL SIZE

Building on Asquith et al. (1983), we expect the relative size of the deal to have a positive impact on abnormal return. We hypothesized that the relative deal size is likely to explain some of the size effect because small sellers divest assets with a larger relative value than large sellers. Following we test whether the size effect is persistent when controlling for relative deal size. In addition, we investigate the functional form of absolute size and relative size, and whether there exists an interaction effect between size and relative size.

Hypothesis 2*: The size effect is persistent when controlling for relative deal size*

Table 5.4

Cross sectional regression analysis of cumulative abnormal return on firm size and relative deal size. One, two and three stars represent 10%, 5% and 1% significance level, respectively. Appendix 9.5.1 and 9.5.2 conduct robust checks with event windows (-1, 1) and (-2, 2). VIF tables are provided in appendix 9.4.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1	(5) CAR1	(6) CAR1	(7) CAR1
Log market capitalization	-0.323***				-0.274***		-0.275***
Dummy=1 if seller is large		-1.579***		-1.058***		-1.850***	
Relative deal size	0.660***	0.741***	0.684***	0.684***	1.258**	0.667*	-0.191
1st quartile			2.137***	1.079			
2nd quartile			1.954***	0.896**			
3rd qaurtile			1.058***				
Relative Size Squared					-0.0288		
Seller is large x Relative deal size						3.278***	
Log market cap. x Relative deal size							0.500***
_cons	3.551***	2.036***	0.461***	1.519***	3.058***	2.079***	2.848***
N	6699	6699	6699	6699	6699	6699	6699
R^2	0.028	0.027	0.028	0.028	0.030	0.031	0.043

As discussed, we classify a seller as large if its market capitalization was greater than the 75th percentile (4th quartile) of public firms in the US for a given year. We measure the effect of firm size using a dummy variable taking the value one if the seller is large in regression (1), and the logarithm of market capitalization in regression (2). In both regressions the size effect is significant at the 1% level. Hence, relative size, at least in linear form, does

not seem to explain much of the variation attributed to size. In appendix 9.5.1 and 9.5.2 we show that the size effect is persistent when using event windows (-1, 1) and (-2, 2).

Having determined that the size effect is persistent, we dig deeper into the effect and explore its functional form. From the descriptive statistics in section 5.1.2, we observed that the distribution of firm size is centered on the smallest 75 percent of firms and that the 4th quartile is considerably larger than the rest. We argued that the distribution could cause large sellers to be fundamentally different from the rest and hence be the source of the size effect. Alternatively, the size effect could be a continuous effect relevant across all ranges of sizes. Consistent with a fundamental difference, regression (3) shows that abnormal returns of the 1st, 2nd and 3rd quartiles are significantly different from the 4th quartile. However regression (4) show that the 3rd quartile is significantly different from both the 2nd and 4th quartile[11], indicative of a continuous effect of size on abnormal return. These findings indicate that there is a size effect beyond the simple difference between the long tail and the common sized firms.

We now investigate the functional form of relative deal size and the interaction effect between size and relative deal size. Regression (5) includes the squared term of relative size, but we do not find evidence of a quadratic effect of relative deal size on abnormal return. In regression (6) and (7) we test the interaction between relative deal size and absolute firm size using a size dummy and the log of market capitalization, respectively, to measure size. Both interaction terms are positive and significant at 1% significance level, implying that the effect of relative size is larger if the seller is large. We interpret these coefficients after controlling for more variables in section 5.2.4.

The findings in this section confirm that small sellers outperform large sellers after controlling for relative deal size. The interaction terms in model (6) and (7) cause a high degree of multicollinearity between size and the interaction term. This introduces additional correlation between the variables which decreases the statistical significance of size, leading us to interpret the corresponding size coefficients to be statistically significant on *at least* the 1% level. In sum, we find strong evidence that the size effect is not controlled for by relative deal size.

5.2.3 Persistence Of The Size Effect

In table 5.5, we regress announcement abnormal returns on different measures of firm size and control for the characteristics proposed by the literature. To test whether these characteristics explain the size effect we want all the variation from size to be captured in the other size variables. Hence, we do not include interaction terms between size and the different

[11] We suspect that the 3rd quartile is not significant from the 1st quartile because of few observations in the 1st quartile and large variance.

characteristics. However, in the next section we include interaction terms to account for different effects from these characteristics between small and large sellers.

Hypothesis 4: *The size effect is persistent after controlling for relative deal size, corporate focus, buyer fit, agency issues, financial distress and firm deal order.*

Table 5.5

Cross sectional regression analysis of cumulative abnormal return on firm and deal characteristics. One, two and three stars represent 10%, 5% and 1% significance level, respectively. Appendix 9.5.3 and 9.5.4 conduct robust checks with event windows (-1, 1) and (-2, 2). VIF tables are provided in appendix 9.4.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1
Size measures:				
Dummy=1 if seller is large	-1.292**			-0.977**
Log market capitalization		-0.408**		
Dummy=1 if 1st quartile			2.333	1.357
Dummy=1 if 2nd quartile			2.130	1.154
Dummy=1 if 3rd quartile			0.977**	
Relative deal size	1.754***	1.692***	1.714***	1.714***
Firm and deal characteristics:				
Dummy=1 if decrease in focus	0.388	0.359	0.404	0.404
Dummy=1 if fit with the buyer	-0.183	-0.133	-0.180	-0.180
Dummy=1 if buyer is LBO group	0.522	0.532	0.497	0.497
Dummy=1 if low cash	-1.078**	-1.282**	-1.077*	-1.077*
Dummy=1 if not financially distressed	-0.451	-0.327	-0.390	-0.390
Bank debt ratio	-0.0751*	-0.0784*	-0.0741*	-0.0741*
Bank debt ratio x not distressed and low cash	0.0434	0.0615	0.0420	0.0420
CEO ownership	0.00769***	0.00345	0.00549	0.00549
CEO ownership x not distressed and low cash	-0.0316	-0.0285*	-0.0280	-0.0280
Long-term compensation ratio	-0.0168*	-0.00955	-0.0155**	-0.0155**
Long-term compensation ratio x not distressed and low cash	0.0759*	0.104**	0.0756	0.0756
CEO deal order number	-0.0191	0.00481	-0.0210	-0.0210
constant	2.689***	5.014***	1.346**	2.322***
N	912	912	912	912
adj. R^2	0.151	0.156	0.151	0.151

In regression (1) we capture the size effect using a dummy taking the value one if the seller is large (4th quartile). This variable is statistically significant at the 5% significance level and imply that small sellers on average experience 1.292% higher announcement abnormal return than large sellers after controlling for key characteristics. In regression (2) the size effect is measured using the log of market capitalization which is also significant at the 5% significance level. Specifically, given a 10% difference in market capitalization between two selling firms, we expect the smaller firm to enjoy a roughly 0.04% higher abnormal return than the larger firm. The model predicts that the difference in average abnormal return between the

50th and 75th percentile cutoff of firms listed on the NYSE[12] in 2014 is approximately 0.25%, which is economically significant[13].

When comparing the results in table 5.5 against 5.4, we find that the size effect measured using the dummy decreases when we control for all characteristics, whereas the size effect captured by log market capitalization increases. This finding is interesting and suggests that the control variables in the model explain some of the size effect caused by systematic differences between small and large sellers, but strengthens the size effect caused by continuous variation within size ranges.

Now that we have determined that the size effect is persistent to firm and deal characteristics, we examine the functional form of the remaining effect. In regression (3) we capture firm size using dummy variables for the 1st, 2nd and 3rd quartile of firms listed on NYSE. Sellers within the 3rd quartile enjoy significantly higher abnormal return compared to 4th quartile sellers, but the difference is not significant for 1st and 2nd quartile sellers despite large coefficients. The insignificance of the 1st and 2nd quartile relative to regression (3) in table 5.5 is most likely caused by greater variance among small sellers and considerably fewer observations in table 5.5 compared to 5.4 (912 vs. 6699).

In regression (4) we include dummy variables for whether the seller is in the 1st, 2nd or 4th quartile. Also here the 1st and 2nd quartiles are insignificant, meaning that we cannot conclude that 3rd quartile sellers outperform 1st or 2nd quartile sellers. However, here the insignificance is also likely to be caused by high variance and few observations.

We have concluded that the size effect in corporate divestitures is not explained by variation in relative deal size, corporate focus, fit with the buyer, agency issues and financial distress. In appendix 9.5.3 and 9.5.4 we run the same regressions using event windows (-1, 1) and (-2, 2), respectively. Longer event windows introduce more noise and the coefficients in the model therefore become less significant. The coefficient for log market capitalization remains significant at 5% level, whereas the coefficient for the size dummy becomes insignificant. This finding indicates that the remaining size effect is primarily a continuous effect rather than an effect caused by systematic difference between the very large and 'normal'.

[12] New York Stock Exchange

[13] The 50th and 75th percentiles were 560 and 2,303 $million, respectively, in 2014. In terms of log (base=10), the difference equals 0.62 which translates into an effect of 0.25% on abnormal return given the coefficient of 0.408 in model (2).

5.2.4 EFFECT OF CHARACTERISTICS ON ABNORMAL RETURN

Table 5.6

Cross sectional regression analysis of cumulative abnormal return on firm and deal characteristics. One, two and three stars represent 10%, 5% and 1% significance level respectively. Appendix 9.5.5 and 9.5.6 conduct robust checks with event windows (-1, 1) and (-2, 2). VIF tables are provided in appendix 9.4.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1
Size measures				
Dummy=1 if seller is large	-0.736		-0.892	-0.537
Log market capitalization		-0.280		
Relative deal size	1.748***	0.559**	1.743***	1.767***
Firm and deal characteristics:				
Dummy=1 if decrease in segments	0.823	-1.199	0.917	
Dummy=1 if increase in Herfindahl				1.637
Dummy=1 if fit with the buyer	0.330	-0.605	0.351	0.190
Dummy=1 if buyer is LBO group	2.329	-0.607	2.340	2.302
Dummy=1 if low cash	-1.061**	-1.299**	-0.594*	-1.005**
Bank debt ratio	-0.0757*	-0.0732*	-0.0588*	-0.0749*
Bank debt ratio x not distressed and low cash	0.0619	0.0780		0.0607
CEO ownership	0.0103***	0.0153***	0.00866***	0.0119***
CEO ownership x not distressed and low cash	-0.0259	-0.0347*		-0.0214
Long-term compensation ratio	-0.0169*	-0.00895	-0.0129*	-0.0165*
Long-term compensation ratio x not distressed and low cash	0.0791*	0.121**		0.0719*
Dummy=1 if not financially distressed	0.237	2.830	0.385	0.115
CEO deal order number	-0.170	-0.544	-0.180	-0.257
Interaction with 4th quartile size				
Seller is large x relative deal size	5.437***		5.460***	5.446***
Seller is large x decrease in segments	-0.973		-1.083	
Seller is large x Herfindahl				-1.856
Seller is large x Fit with buyer	-0.575		-0.592	-0.440
Seller is large x LBO buyer	-2.078		-2.137	-2.062
Seller is large x not financial distressed	-0.987		-0.709	-0.852
Seller is large x CEO deal order number	0.169		0.188	0.258
Interaction with log market cap.				
Log market cap. x relative deal size		0.703***		
Log market cap. x decrease in segments		0.135		
Log market cap. x Fit with buyer		0.0669		
Log market cap. x LBO buyer		0.112		
Log market cap. x not financial distressed		-0.398		
Log market cap. x CEO deal order number		0.0571*		
constant	2.083	3.851	1.826	1.917
N	912	912	912	912
adj. R^2	0.161	0.181	0.162	0.165

In this section we examine the effect of firm and deal characteristics on announcement abnormal return. In particular, we examine hypotheses 3a to 3e which we derived in section 3. To test whether the effects are conditional on firm size, we include interaction variables between characteristics and size. As expected, these interaction variables render the size measures insignificant because much of the variation from size is captured by the interactions. This is not a problem for the persistence of the size effect.

***Hypothesis 3a**: Increase in corporate focus due to an asset sale affects abnormal return positively*.
***Hypothesis 3b:** Better fit between the target and buyer leads to larger abnormal announcement return for the seller*.
***Hypothesis 3c:** Greater alignment of incentives and more bank monitoring will affect abnormal return positively if the firm is healthy and has low cash*.
***Hypothesis 3d:** Divestitures by firms in financial distress experience higher announcement abnormal returns than healthy firms*.
***Hypothesis 3e:** Announcement abnormal return of selling firms decline in the firm's deal order number*.

RELATIVE DEAL SIZE

In regression (1) in table 5.6 we find that the relative size of the deal has a positive and highly significant effect on announcement abnormal return. It is unquestionably the most influential determinant of value creation in divestitures depicted by our model. The result is consistent with Zaima & Hearth (1985) and Mulherin & Boone (2000) who all find significantly positive effects from relative deal size in divestitures. Furthermore, we show that the effect of relative deal size is conditional on the firm size of the seller. Specifically, an increase in relative deal size by 10 percentage point leads to 0.175 percentage point higher abnormal return if the seller is small, and 0.719 percentage points higher abnormal return if the seller is large. This result implies that large sellers experience higher value creation per dollar of assets divested. In regression (2) we measure firm size using the log of market capitalization and reach the same conclusion.

A possible explanation for the difference in effects is that divestitures by large sellers are less anticipated by the market if the deal is relatively large, whereas divestitures by small sellers are typically unanticipated regardless of the relative size. The explanation builds on two arguments. Firstly, large sellers typically divest asset with low relative deal size causing divestiture with large relative size to be more surprising. On average, large sellers divest only 7% of their pre-deal market capitalization whereas small sellers on average divest 60%. Secondly, many subsequent asset sales with high relative deal size will naturally cause the firm

to be smaller which cannot continue indefinitely without it becoming a small firm[14]. On the contrary, large sellers divesting asset with low relative size can typically maintain a high frequency of asset sales over time which makes each deal more anticipated. We argue that divestitures by small sellers are surprising to the market regardless of the relative deal size because they typically have only completed 1 deal in the past. Hence, we expect that large sellers divesting assets with high relative deal size perform less badly than those divesting assets with low relative size. We explore the effect of partial anticipation in section 6.1.

AGENCY ISSUES

Following Lang et al. (1995) firms are motivated to divest assets because proceeds from asset sales often is a cheap financing alternative compared to equity or debt in the existence of adverse selection or debt overhang. However, the existence of agency issues could offset this positive effect if the proceeds are not employed to maximize shareholder wealth. In regression (1) we use CEO stock ownership (Agrawal & Mandelker, 1987), bank debt (Hirschey et al., 1990) and long-term CEO compensation (Tehranian et al., 1987) as proxy variables for the degree of agency issues. However, for these variables to be relevant determinants for the financing hypothesis presented by Lang et al. (1995), we must control for whether the motivation for the divestiture was to obtain cash or not. We include a dummy variable for whether the cash level in the selling firm is below the median value in the respective industry[15] and argue that firms with low cash are more likely to sell assets to obtain cash. Because sellers in financial distress typically sell assets to pay back debt, they have a different motive[16] to sell compared to healthy sellers, leaving the financing hypothesis less relevant. Therefore, to control for situations where the financing hypothesis is relevant, we include an interaction variable that takes the value one if the firm has low cash and the firm is not financially distressed and zero otherwise.

In regression (1) we show that increased long-term compensation to CEOs given that the seller has low cash and is not financially distressed has a positive effect on abnormal return, significant at the 10% level. Regression (2) measures size using the log of market capitalization, and leaves the same coefficient significant at 5% level. These findings support the notion that when firms divest assets to obtain cash, the market views higher long-term compensation to CEOs positively because it signals better alignment of incentives and hence less agency issues. If the condition for the financing hypothesis is not satisfied, the effect from increased long-term compensation is weakly negative and at best significant at the 10% level.

[14] Frequent large acquisitions could balance out the effect, but it is untypical that firms acquire many subsequent assets valued above 50% of their market capitalization (Thomson Financial SDC database).
[15] Cash is relative to market capitalization of the industry defined as the two-digit sic code.
[16] In financial distress, firms might divest assets to pay back debt to creditors.

Moreover, if the seller is healthy and has low cash, we find weak evidence that CEO ownership contributes negatively whilst the effect of bank debt is insignificant. However, if the condition is not satisfied, the coefficient for CEO ownership is positive and significant whereas bank debt is negative and significant. These results are inconsistent with the hypothesis that when firms sell assets to finance new projects, more monitoring by banks and higher CEO ownership limit management's incentives to freely allocate cash to poor projects, which would have a negative effect on abnormal return.

Lastly, we show in regression (1) and (2) that the coefficient for low cash is negative and statistically significant at the 5% level. Due to the interaction variables including low cash, we interpret the coefficient as the effect of low cash given that the seller is financially distressed[17]. Specifically, low cash decreases abnormal return by 1.06 percentage points if the seller is distressed. A possible explanation is that financially distressed firms with low cash typically are distressed because of liquidity dry-ups, whereas distressed firms with high cash typically have problems with insolvency. The former group might be pressured by creditors to divest assets quickly and hence run the risk of a sub-optimal divestiture, while the latter group avoid this problem by having more time.

FINANCIAL DISTRESS

Following Altman (1983) we use the Z-score model to measure financial distress[18]. In regression (3) we exclude the interaction variables between low cash and financial distress to better show the pure effect from financial distress. We do not find support for the hypothesis that sellers in distress experience greater abnormal return. The finding is hence inconsistent with Afshar et al (1992) who argued that by completing a successful asset sale, the firm might be able to avoid an expected costly bankruptcy, and thus signal good news to the market.

Furthermore, we do not find evidence for a different effect from financial distress for small and large sellers. This is inconsistent with our hypothesis that the effect is larger for small firms because asset sales by large distressed firms do not significantly reduce the risk of bankruptcy, as the deal value is typically small relative to the size of the outstanding liabilities.

CORPORATE FOCUS AND FIT WITH THE BUYER

In model (1) and (2) we conclude that neither a decrease in the number of segments, a good operational fit with the buyer nor the existence of an LBO buyer significantly affect abnormal returns at divestiture announcements. In regression (4) we replace the decrease in number of segments with the Herfindahl index as a measure of increase in focus, but find no

[17] The coefficient is the effect of low cash given that the firm is financially distressed or that CEO ownership, long-term compensation to CEOs and bank debt all are zero. We believe the latter is unlikely.
[18] Altman's Z-score is described in detail in section 9.2.2

significant effect on abnormal return. This in inconsistent with studies such as John & Ofek. (1995), Dittmar & Shivdasani (2003) and Berger & Ofek (1999) who all documented significant positive abnormal return for focus-increasing divestitures ranging from 1.5% to 3.4%. In addition, it is inconsistent with Hite et al. (1987) who found that allocation of assets from a lower-valuing seller to a higher-valuing buyer is important for value-creation in corporate divestitures.

6. ALTERNATIVE EXPLANATIONS FOR THE SIZE EFFECT

So far, this thesis has demonstrated that small sellers outperform large sellers at the announcement of divestitures. Drawing on core research in the divestiture field, we compiled a set of characteristics that we expected would explain the size effect. Interestingly, the size effect was still persistent after controlling for these characteristics. In this section we introduce two alternative explanations. First, we investigate whether the size effect can be explained by divestitures by large sellers being more anticipated by the market than divestitures by small sellers. Second, we discuss whether the announcement abnormal return for divestitures by small sellers is likely to be larger because the idiosyncratic risk in announcement return is higher for divestitures completed by small sellers.

6.1 PARTIAL ANTICIPATION

Several studies in the acquisition literature (Eckbo, 2014; Schipper & Thompson, 1983; Loderer & Martin, 1990; Billet & Qian, 2008) have pointed to the issue of partial anticipation when studying acquisition gains in event studies. Eckbo (2014) argue that cumulative abnormal return only captures the unanticipated component of the economic benefit of the acquisition. If the acquirer is large and has completed several acquisitions in the past, the anticipation is typically higher and the abnormal return is smaller. Schipper & Thompson (1983) predict that no returns should be observed on the announcement of subsequent deals following an announced acquisition program. An extension of this work was provided by Loderer & Martin (1990), who studied acquisition series starting after a two-year non-acquisition hiatus and ending with a similar two-year hiatus. They contended that investors partially anticipate subsequent deals after observing an implicit acquisition program take shape.

In section 5.1.3 we showed that deals by small and large sellers on average have a deal order of 2.11 and 8.25 divestitures, respectively. Hence, we hypothesize that the anticipation of divestitures by large sellers are higher than for small sellers. In turn, this difference in anticipation could potentially explain the size effect.

To investigate this hypothesis, we first conduct a logit analysis of the likelihood of a given seller completing a divestiture in a given year. Next, we control for the predicted probability in the multivariate regression to determine whether partial anticipation explains the size effect. We assume that if we can predict the likelihood of a deal by studying the past, so can the market. To perform the logit analysis, we constructed a panel data set for all the selling firms between 1995 and 2014. The dependent variable takes the value of one if the seller has completed at least one divestiture during a given year, and zero otherwise. Using this approach

our dataset consists of 6514 seller-year combinations with all variables included. If a seller has completed more than one divestiture during a given year, we get a downward bias in the predicted probability because we only consider the first divestiture in that year.

Table 6.1

Logistic regression analysis of the likelihood of an asset sale in a given year for a given seller. One, two and three stars represent 10%, 5% and 1% significance level, respectively. To interpret the coefficients as probabilities, we study the marginal effects included in appendix 9.6.

	(1) Deal Dummy	(2) Deal Dummy	(3) Deal Dummy
Panel A. Variables of interest			
Number of past divestitures by the firm	0.0684***	-0.00801	
Number of past divestitures by the CEO		0.233***	0.209***
Dummy=1 if CEO change same year as the deal	0.303***	0.320***	0.259***
Dummy=1 if CEO change year prior to deal	-0.0313	0.0128	0.00727
Dummy=1 if Financial distress year prior	0.537***	0.476***	0.417***
Log market capitalization year prior	0.123***	0.113***	0.107***
Abnormal return of previous divestiture[19]	-0.479	-0.424	-0.616
Dummy=1 if CEO is hubristic year prior			0.169**
Panel B: Control variables			
Tobins Q	-0.00134	-0.00147	-0.0160
S&P 500 market return year prior	1.708***	1.690***	1.533***
Stock return year prior	-0.390***	-0.421***	-0.415***
Cash-assets ratio year prior	-0.344*	-0.220	-0.343
Number of M&A deals in US year prior	-0.0000696***	-0.0000714***	-0.0000617***
Number of M&A deals in industry year prior	0.00000390	-0.00000633	-0.0000331
constant	-1.663***	-1.755***	-1.805***
N	8694	8556	6514
Pseudo R^2	0.0532	0.0807	0.0811

The results of the logit regression is reported in table 6.1. Control variables are reported in panel B. We follow Billet & Qian (2008) and control for firm specific characteristics such as Tobin's Q, cash-asset ratio, market return and stock return of the year prior to the divestiture announcement. Because acquisitions and divestitures tend to cluster in time (Mitchel and Mulherin, 1996) we control for M&A waves by including the total number of deals completed in the US the year prior to the deal as well as the total number of deals within the same two-digit SIC-code industry as the seller.

In regression (1) we show that the likelihood of a seller completing a divestiture in a given year increases with the number of past divestitures. Model (2) includes the number of past deals completed by the incumbent CEO-firm combination maximum 5 years apart.

[19] Abnormal return of the previous divestiture takes the value zero if the seller has not completed divestitures in the past.

Interestingly, the coefficient for past CEO-deals is positive and renders the number of past firm-deals insignificant. Given average values of all other covariates, an increase in past CEO-deals by one increases the likelihood by 4.2 percentage points[20][21]. This result suggest that market anticipation of future divestitures is more closely attached to past CEO experience than to firm experience.

From regression (2) we also infer that the probability of an asset sale is larger if the seller was in financial distress the year prior to the deal, or changed its CEO during the same year as the divestiture. Specifically, the likelihood of a divestiture is 8.6 percentage point higher if the seller is distressed the year prior to the deal and 5.8 percentage points higher if the firm changes CEO during the same year. These findings are consistent with our expectations. Firstly, firms in financial distress are more likely to divest because they are typically forced by creditors to obtain cash. Secondly, newly hired CEOs might be more prone to divest because the announcement typically signals a correction of poor management by the previous CEO, rather than poor management by himself.

Regression (2) reports that an increase in market capitalization by 50% is expected to increase the likelihood of a divestiture by 1 percentage point[22]. Hence, a change in market size from the 25th percentile to the 75th percentile would imply an increase in the likelihood of a deal by 6 percentage points. Clearly, the market considers firm size in its anticipation of future deals, but the effect is small compared to past CEO-deals and financial distress.

Lastly, in regression (3) we examine the effect of a hubristic CEO the year prior to the deal. Studies in the acquisition literature contend that the likelihood of an acquisition increases if the CEO is overconfident (hubristic) (Billet & Qian, 2008). An overconfident CEO believes he can manage assets better than existing owners and hence engages in more acquisitions. Applying the same logic to divestitures would entail that CEOs would be more likely *to keep* assets because he thinks he can manage them better than potential buyers. We therefore expect the likelihood of a divestiture to be less likely if the CEO is hubristic. However, regression (3) depicts that the likelihood of a divestiture increases if the CEO is hubristic.

[20] A description of interpreting the coefficients from the logit regression using the margins function in STATA is provided in 9.1.4
[21] The complete table of marginal effects is provided in 9.6
[22] See appendix 9.6

Table 6.2

Cross sectional regression analysis of cumulative abnormal return on firm and deal characteristics. One, two and three stars represent 10%, 5% and 1% significance level, respectively.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1
Size measures:				
Dummy=1 if 4th quartile	-1.292**	-1.392**		
Log market capitalization			-0.408**	-0.493**
Relative deal size	1.754***	1.753***	1.692***	1.678***
Predicted probability of divestiture		-0.162		2.104
Firm and deal characteristics:				
Dummy=1 if decrease in focus	0.388	0.351	0.359	0.293
Dummy=1 if fit with the buyer	-0.183	-0.235	-0.133	-0.203
Dummy=1 if buyer is LBO group	0.522	0.479	0.532	0.484
Dummy=1 if low cash	-1.078**	-0.939*	-1.282**	-1.182**
Dummy=1 if not financially distressed	-0.451	-0.345	-0.327	-0.0556
Bank debt ratio	-0.0751*	-0.0747*	-0.0784*	-0.0777*
Bank debt ratio x not distressed and low cash	0.0434	0.0406	0.0615	0.0672
CEO ownership	0.00769***	0.00735***	0.00345	0.00246
CEO ownership x not distressed and low cash	-0.0316	-0.0343*	-0.0285*	-0.0286*
Long-term compensation	-0.0168*	-0.0167*	-0.00955	-0.00826
Long-term compensation x not distressed and low cash	0.0759*	0.0642	0.104**	0.0950*
CEO deal order number	-0.0191	-0.0128	0.00481	-0.0637
constant	2.689***	2.737***	5.014***	5.058***
N	912	908	912	908
adj. R^2	0.151	0.154	0.156	0.161

Based on the logit model (3) in table 6.1, we predicted the probability of a divestiture being completed by a given firm for a given year. If a seller completes more than one sale during one year we force the same probability for all the divestitures in that year. In table 6.2 we control for this probability in a multivariate regression using the same control variables as in section 5.2.3. The results show that the size effect is persistent after controlling for partial anticipation. The effect is persistent both when measuring size using dummy and log of market capitalization. Hence, we do not find evidence in support for the hypothesis that divestitures by large sellers have lower abnormal returns because they are more anticipated by the market.

6.2 IDIOSYNCRATIC RISK

Another possible explanation for the size effect is that managers care about idiosyncratic risk and will not divest unless the expected return compensates for the uncertainty introduced by the asset sale. Because smaller firms have a larger standard deviation in announcement abnormal returns, the two effects in tandem might explain the size effect.

Figure 6.1
Average cumulative abnormal return, standard deviation and CAR/standard deviation reported by bins of size percentile ranges. Data points at 10% refer to the smallest 10%. Data points at 20% refer to the deals done by firms between the 10th and 20th percentile of adjusted market capitalization in the period between 1995 and 2014, and so on. Market capitalization is adjusted for inflation using the US CPI-index (base 2014 dollars).

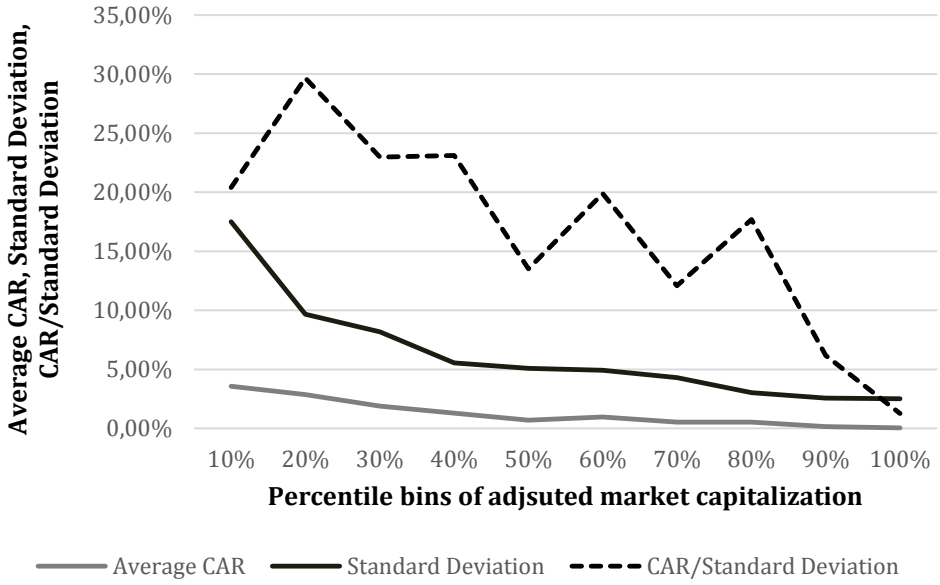


Figure 6.1 displays the average announcement abnormal return, standard deviation and the ratio of abnormal return to standard deviation by bins consisting of the 10 preceding percentiles. Because announcement abnormal return has been adjusted for the market return, the standard deviation is a measure of the idiosyncratic risk. We observe that abnormal return and standard deviation decline with increasing percentile bins. However, standard deviation declines more than abnormal return, causing the ratio of the two to also decline.

We argue that the declining standard deviation could be caused by characteristics related to the size of the seller, and thus be expected by managers for two main reasons. Firstly, managers of small selling firms typically have less experience in conducting divestitures (see table 5.2), leading to greater uncertainty about the true value of the divested assets. On the contrary, managers of large selling firms might have learned from stock reactions of previous asset sales and therefore have a more precise estimate of the true value (see Aktas et al, 2009).

Secondly, an asset sale by a small seller might work as a stronger signal to the market about the value of the remaining assets because small sellers generally divest a larger portion of their market value (see table 5.2).

Managers generally care about the idiosyncratic risk of their own firm. In contrast to standard portfolio theory, which states that investors only care about systematic risk as all other forms of variations can be diversified away, managers are often exposed to non-diversifiable idiosyncratic risk of the firm they manage (see for instance Glover & Levine, 2014; Coles et al, 2006; Meulbroek, 2001). This is due to incentive pay plans and ownership requirements with the purpose of aligning the incentives of the manager with those of the shareholders. Managers might also care about idiosyncratic risk due to employment risk. Amihud & Lev (1981) argue that the likelihood for managers of losing their job or professional reputation depends in part on the probability of negative outcomes for the firm.

If managers care about idiosyncratic risk, a rational manager will only divest if the expected return compensates for the added uncertainty introduced by the divestiture. Because small sellers face a higher standard deviation in abnormal return on divestiture announcements, we expect managers of small sellers to require a higher premium than managers of large sellers. From figure 6.1, we see that the ratio between average abnormal return and standard deviation is falling with increased average market capitalization. This finding is consistent with managers being risk-averse and requiring a higher abnormal return to compensate for the added risk of small sellers. In sum, we argue that idiosyncratic risk is a plausible explanation for the size effect. Further research is needed to formalize a model of risk-averse managers that can be tested empirically.

7. CONCLUSION

Despite considerable shareholder wealth creation in corporate divestitures, the existing literature remains somewhat fragmented and inconsistent as to what determines these gains. This paper attempted, in all modesty, to expand the understanding of these determinants by specifically investigating the effect of absolute firm size on announcement abnormal return. Moeller et al. (2004) studied the effect of firm size on acquisitions abnormal return and found that small buyers outperform large buyers, and that the effect is not explained by characteristics of the firm or the deal. To the best of our knowledge, similar studies have not been conducted on divestitures. We use a sample of 6699 divestitures completed by 2350 different sellers between 1995 and 2014. We identify divestitures and sellers from the Thomson Financial SDC database and use CRSP and COMPUSTAT to construct the variables needed.

First, we found that shareholders of divesting firms on average enjoy a significantly positive abnormal return of 1.25%[23], equivalent to $40 million. When splitting the sample based on firm size, we show that small firms significantly outperform large firms by 1.96% and that the abnormal returns are 2.47% and 0.51% for small and large sellers respectively[24]. The result is robust to different event windows (-1, 1) and (-2, 2). Next, we examined possible reasons for this size effect by drawing on existing literature in the divestiture and acquisition research. This process led to a set of hypotheses that we believed could explain abnormal returns and possibly also the size effect.

(H2) Holding the absolute gain fixed, the smaller the selling firm, the larger the percentage gain (Asquith et al., 1983). Since small firms typically divest a larger fraction of their market capitalization, we expected small firms to outperform large firms. (H3A) Motivated by John & Ofek (1995) and Dittmar & Shivdasani (2003), we hypothesized that focus-increasing asset sales affect value creation positively and that the effect is larger for small sellers. (H3B) According to Hite et al. (1987), seller gains are realized if assets are allocated from a lower-valuing seller to a higher-valuing buyer. We argued that operational fit could explain some of the size effect if small sellers more often divest to buyers with a good fit with the asset. (H3C) We contended that agency issues of holding cash are less severe in small firms. Following Lang et al. (1995), this would affect seller gains positively because management is less likely to divest to obtain cash to pursue their own objectives. (H3D) Because financial distress typically has a positive net effect on abnormal return (Afshar et al., 1992), we expected that small sellers have higher gains because they are more likely to be financially distressed. (H3E) Lastly, we hypothesized that the size effect could be explained

[23] Event window: (-1,0)
[24] Both are statistically significantly different from zero

by declining abnormal return in the subsequent deal order because small sellers typically complete fewer asset sales over time compared to large sellers.

We analyzed the effect of these hypothesis on abnormal return and obtained the following results organized according to the hypotheses:

H2 First we concluded that small sellers on average divest a larger portion of their pre-deal market capitalization and that relative deal size affects abnormal return positively but does not explain the size effect. However, the effect of relative deal size is greater if the seller is large. We argued that a possible explanation for the difference in effects is that divestitures by large sellers are less anticipated by the market if the deal is relatively large, whereas divestitures by small sellers are typically unanticipated regardless of the relative size

H3 (A) We did not find evidence in support for the hypothesis that focus-increasing asset sales create value. Our finding is inconsistent with that found by John & Ofek (1995) and Dittmar & Shivdasani (2003), but we use a larger dataset and control for more determinants. (B) Also inconsistent with previous literature, we found no evidence of a positive effect from operational fit with the buyer. (C) We further found that CEO ownership, long-term compensation and bank debt in general have significant effects on abnormal return. However, we do not find convincing support for the hypothesis that they limit the motivation to divest assets to obtain cash to finance poor projects. (D) Moreover, we did not find support for the hypothesis that sellers in financial distress experience greater abnormal return. (E) Lastly, we conclude that abnormal return is declining in subsequent deal order but that it does not explain abnormal return when controlling for other effects. Hence it is inconsistent with the learning hypothesis and marginal efficiency hypothesis.

H4 We conclude that the size effect in corporate divestitures is not explained by variations in relative deal size, corporate focus, fit with the buyer, agency issues and financial distress. However, the effect is only partly persistent to longer event windows (-2, 2) and (-1, 1), which is likely to be caused by more measurement noise. We therefore have more confidence in the short interval (-1, 0).

We introduced two alternative explanations for the size effect: (A1) Partial anticipation and (A2) idiosyncratic risk.

A1 We showed that it is possible to partly predict the likelihood of a divestiture taking place for a given seller in a given year. The likelihood of a deal is higher if the incumbent CEO has completed many divestitures in the recent past, if the seller was distressed before the deal or if the firm changed its CEO prior to the deal. Despite some predictive power, we do not find evidence for that partial anticipation explains the size effect in divestitures.

A2 Lastly, we argued that mangers care about idiosyncratic risk and hence require a higher premium to compensate for the uncertainty introduced by the divestiture. Because small sellers face higher idiosyncratic risk when they announce a divestiture, we expect small sellers to enjoy a higher abnormal return than large sellers.

Taken as a whole, our study provides evidence that the size of the seller is an important determinant for wealth creation in divestitures. Further work is required to fully understand what causes this effect. For example, formalizing a model of risk-averse managers with empirical testing would enable us to better account for differences in idiosyncratic risk. Also, further studies could control for information leakage over a longer period using long-term event study methodology such as the buy-and-hold method.

8. BIBLIOGRAPHY

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9. APPENDIX

9.1 CALCULATIONS AND METHODOLOGY

This sections discusses the technical methods and assumptions behind our thesis. Section 9.1.1 and 9.1.2 pertains to event studies, whilst 9.1.3 and 9.1.4 discusses cross sectional and logistic regressions, respectively.

9.1.1 ABNORMAL RETURN MEASURES AND TEST STATISTICS

Following we describe the technical treatment behind the univariate tests found in section 5.1. Several steps are required in order to estimate the cumulative average abnormal return (CAAR) and determine whether it is different across subsamples. First we show how the abnormal return (AR) is obtained for each security for each of the days in its event window and its corresponding variance. Second we show how we aggregate AR for a single event into a cumulative abnormal return (CAR) spanning the event window. Third we average all the CARs into CAAR, and find its test statistic. Fourth we show how we use a simple test of difference to discern whether the CAAR is different across subsamples.

The notation used is primarily taken from Lim (2011). However all our methods surrounding event study, to the best of our knowledge, is considered standard event study methodology as described by Campbell, Lo & MacKinlay (1997) and Kothari & Warner (2007). We extend the use of estimates gathered from the event study by using them in a standard test of differences.

Benchmark Model and the Abnormal Return

In order to find the abnormal return due to an event, the movement due to normal circumstances must be filtered out. We use the market model as a benchmark model, defined as:

$$r_{it} = \alpha_i + \beta_i r_{mt} + e_{it}$$

where r_{it} is the *i*'th event return on the *t*'th day of the event, with the event occurring at *t*=0. r_{mt} denotes the market return (value weighted worldwide index from CRSP) at time t, α and β are standard OLS regression coefficients and e is the residual. We estimate the parameters of the market model using data starting 279 days prior to the event and ending 30 days prior, both days inclusive.

For the market model to be valid we make the following assumptions:

1. $\text{cov}(r_{mt}, e_{it}) = 0$
2. $\text{var}(e_{it}) = \sigma_i^2$, a constant
3. $\text{cov}(e_{it}, e_{it-k}) = 0$ for $k \neq 0$

The abnormal return is defined as the residual of the difference between the actual return and the expected return using the estimated parameters from the market model. We calculate an AR for each of the days in our larger event window, i.e. $\tau \in (-2,2)$. The 'hat' above coefficients or variables denotes that it is the estimated value of the coefficient or predicted value of the variable using coefficients from the market model.

$$AR_{i\tau} = r_{i\tau} - \hat{r}_{i\tau} = r_{i\tau} - \hat{\alpha}_i - \hat{\beta}_i r_{m\tau}$$

Our estimate of AR is dependant on the predicted return from the benchmark model, which itself is a random variable. Thus our estimate of AR is a random variable, with its distribution dependant on the statistical properties of the predicted return. More specifically the variance of our AR can be estimated by the variance of our estimate of $\hat{r}$[25] when L is large. This is calculated as follows:

$$\hat{\sigma}_i^2 = \frac{1}{L-2} \sum_{t=-L-29}^{-30} (r_{it} - \hat{\alpha}_i - \hat{\beta}_i r_{mt})^2 = \frac{1}{L-2} \sum_{t=-L-29}^{-30} \hat{e}_{it}^2$$

Where L is the length of our event window (250 days), and the sum of the square of the difference is divided by the number of observations subtracted for 2 degrees of freedom correction.

Cumulative Abnormal Return

Next we aggregate the individual ARs for an event into a CAR for the whole of the event window of interest. The CAR is simply defined as the sum of all AR for an event in the event window with τ_1 marking the start of the event window and τ_2 marking the end:

$$CAR_i(\tau_1, \tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau}$$

The corresponding variance is defined as:

---

[25] The precise expression for the variance of AR is as follows:

$$\text{var}(AR_{it} | r_{mt}) = \sigma_i^2 \left(1 + \frac{1}{L} + \frac{(r_{mt} - \bar{r}_m)^2}{\sum_{t=-L-29}^{-30} (r_{mt} - \bar{r}_m)^2} \right)$$

Which asymptotically converges to σ_i^2. Lim (2011) recommends using σ_i^2 as an approximation when L is "fairly large, e.g. L=240" (page 165).

$$\text{var}(CAR_i(\tau_1,\tau_2)\big|r_{m\tau_k},...) = \sum_{\tau_1}^{\tau_2}\text{var}(AR_{i\tau}\big|r_{m\tau}) \approx (\tau_2-\tau_1+1)\sigma_i^2$$

Due to assumption 3, the covariances between different AR for the same event all equal to zero and thus disappear. Furthermore due to assumption 2 we assume that the variance stays constant for an individual firm. We are therefore able to estimate the variance of the CAR as a sum of the individual variances.

CAAR and its Test Statistic

Next we aggregate the individual CARs into CAAR to test whether divestitures on average are associated with positive announcement returns. We define CAAR as the average CAR for all events in our sample, or for different subsamples of our sample. We define CAAR simply as:

$$CAAR(\tau_1,\tau_2) = \frac{1}{N}\sum_{i=1}^{N}\sum_{\tau=\tau_1}^{\tau_2}AR_{i\tau} = \frac{1}{N}\sum_{i=1}^{N}CAR_i(\tau_1,\tau_2)$$

where N is the number of events in our sample. The corresponding variance is simply the variance of the average of the CARs.

$$\text{var}(CAAR(\tau_1,\tau_2)\big|r_{mt_k},...) \approx \frac{1}{N^2}\sum_{i=1}^{N}(\tau_2-\tau_1+1)\sigma_i^2$$

Under the null hypothesis the CAAR is distributed:

$$CAAR(\tau_1,\tau_2)\big|r_{mt_k},... \approx N(0,\frac{1}{N^2}\sum_{i=1}^{N}(\tau_2-\tau_1+1)\sigma_i^2)$$

We can thus test whether our resulting CAAR is statistically significantly different from zero by using the following:

$$\frac{CAAR(\tau_1,\tau_2)}{\sqrt{\frac{(\tau_2-\tau_1+1)\sum_{i=1}^{N}\hat{\sigma}_i^2}{N^2}}} \approx N(0,1)$$

Which follows a standard normal distribution. We test whether our estimate is statistically significantly different from zero by adjusting our CAAR by its estimated standard error and comparing it to the Z-statistic.

Test Statistics of Difference, and the Difference of Differences

Lastly we wish to test whether the difference in CAAR between two subsamples, such as large and small, is significantly different. We simply use a t-test as described by Stock & Watson (2010):

$$t = \frac{(CAAR_1 - CAAR_2) - d_0}{SE(CAAR_1 - CAAR_2)}$$

Where d_0 is the value of the difference under the null hypothesis. We use 0 exclusively as the value of the difference under the null hypothesis, and thus the term d_0 disappears from all our tests.

We define the standard error of the difference as follows

$$SE(CAAR_1 - CAAR_2)\Big| r_{m\tau_k}, \ldots = \sqrt{\hat{\text{var}}(CAAR_1) + \hat{\text{var}}(CAAR_2)}$$

$$= \sqrt{\frac{(\tau_2 - \tau_1 + 1)\sum_{i=1}^{N_1} \hat{\sigma}_{1i}^2}{N_1^2} + \frac{(\tau_2 - \tau_1 + 1)\sum_{i=1}^{N_2} \hat{\sigma}_{1i}^2}{N_2^2}}$$

Where we denote with subscript 1 for the first subsample and 2 for the second subsample. The resulting test statistic follows a student t distribution. However as all our values of N is large, it can be approximated by a standard normal distribution. We thus test our resulting t-value to a standard normal distribution to determine the probability that it is generated by the random variable under the null hypothesis.

9.1.2 ABSOLUTE RETURN MEASURE AND TEST STATISTIC

The discussion so far has revolved around the percentage returns and its test statistics. Following we show how we translate the CAAR into the cumulative average abnormal dollar return (CAA$R) and its test statistic. We use simple algebraic alterations of standard event study methodology to construct our estimates of coefficients and standard errors.

Our approach is to take the cumulative abnormal return and translate this into the cumulative abnormal dollar return. To do this we take the CAR(-1, 0) for each firm and multiply it with the market capitalization of the firm two days prior. We use closing price two days prior, as that is the latest point prior to the estimation window of the CAR. We then average the entire sample of cumulative abnormal dollar returns in order to find the CAA$R. It is defined as follows:

$$CAA\$R = \frac{1}{N}\sum_{i=1}^{N} CAR_i(\tau_1, \tau_2) \times MarketCap_i(-2)$$

We simply scale the variance accordingly. It can be shown with some algebra[26] that

$$\text{var}(CAA\$R)\big|r_{mt},\ldots \approx \frac{(\tau_2 - \tau_1 + 1)}{N^2}\sum_{i=1}^{N} MarketCap_i^2 \times \sigma_i^2$$

The values for the t-statistic are simply constructed as:

$$t = \frac{CAA\$R}{\sqrt{\hat{\text{var}}(CAA\$R)}}$$

The test of differences are constructed simply as:

$$t = \frac{(CAA\$R_1 - CAA\$R_2) - d_0}{SE(CAA\$R_1 - CAA\$R_2)}$$

where our hypothesized value of d_0 is 0 and the SE is defined as:

$$SE(CAA\$R_1 - CAA\$R_2)\big|r_{m\tau_k},\ldots = \sqrt{\hat{\text{var}}(CAA\$R_1) + \hat{\text{var}}(CAA\$R_2)}$$

$$= \sqrt{\frac{(\tau_2 - \tau_1 + 1)\sum_{i=1}^{N_1} MarketCap_i^2 \times \hat{\sigma}_{1i}^2}{N_1^2} + \frac{(\tau_2 - \tau_1 + 1)\sum_{i=1}^{N_2} MarketCap_i^2 \times \hat{\sigma}_{2i}^2}{N_2^2}}$$

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[26] The algebra:

$\text{var}(CAA\$R)\big|r_{mt},\ldots = \text{var}(\frac{1}{N}\sum_{i=1}^{N} CAR_i \times MarketCap_i)$

$= \frac{1}{N^2}\text{var}(\sum_{i=1}^{N} CAR_i \times MarketCap_i)$, by taking out the constant $\frac{1}{N}$

$= \frac{1}{N^2}\sum_{i=1}^{N}\text{var}(CAR_i \times MarketCap_i)$, as all the covariances are zero by assumption 2

$= \frac{1}{N^2}\sum_{i=1}^{N} MarketCap_i^2 \times \text{var}(CAR_i)$, as given i, we can treat MarketCap as a constant

$\approx \frac{1}{N^2}\sum_{i=1}^{N} MarketCap_i^2 \times (\tau_2 - \tau_1 + 1)\sigma_i^2$, substituting $\text{var}(CAR_i)$ from earlier

$\approx \frac{(\tau_2 - \tau_1 + 1)}{N^2}\sum_{i=1}^{N} MarketCap_i^2 \times \sigma_i^2$, as $(\tau_2 - \tau_1 + 1)$ is a constant

9.1.3 CROSS SECTIONAL REGRESSIONS

We use cross-sectional regressions in Stata to determine the effect of a range of variables on CAR. Ordinary least squares (OLS) regressions are used to estimate the coefficients, which limits the functional form to be linear in the coefficients but not in the variables (for instance the interaction of 'not in financial distress' and 'large' is non-linear in the base variables). We will not delve into the details of OLS, but rather refer to a standard econometric textbook such as Stock & Watson (2010) for calculations of the estimates of coefficients and residuals.

The only addition we make to standard OLS regression is to use clustered standard errors utilizing the ivreg2 command in Stata due to Baum et al. (2007). We cluster on both two-digit-industry-SIC code and year-date, allowing us to control for any intra-group variation due to industry and year, as well as any heteroskedasticity. We use clustering on industry and month in reduced samples due to insufficient variation inter-group. The choice of the level that is clustered on is essentially a trade-off between bias and variance (Cameron & Miller, 2015), where larger clusters control better for intra-group variance, but increases the overall variance due to smaller number of clusters.

9.1.4 LOGISTIC REGRESSION

For regressions with a binary dependent variable, non-linear regression models that give predicted values between 0 and 1 are preferred to an OLS regression. In section 6.1, partial anticipation of future divestitures, we use logistic regressions to forecast the probability of a divestiture in a given year by a given firm.

A logistic regression estimates the parameters by a log likelihood function. The logistic model takes the following form:

$$\Pr(Y=1\left|X_1,...\right.)=\frac{1}{1+e^{-(\alpha+\beta_1 X_1+...)}}$$

where the estimates of the coefficients (i.e. $\beta_1,\ldots$) are interpreted as the effect of the independent variable on the natural logarithm of the odds of the dependent variable.

Due to the complexity of the intuitive interpretation of the coefficients, we utilise the margins command in Stata to calculate the marginal effect of each independent variable. The margins command calculates the marginal effect of a variable holding all the other variables constant at their mean value. As our functional form is non-linear, the marginal effect for a variable differs depending on the values of all the other independent variables. The predicted marginal effect is a ballpark measure rather than a precise marginal effect of the variable of interest.

9.2 VARIABLES

9.2.1 VARIABLE DESCRIPTION

VARIABLE	UNIT	DESCRIPTION	SOURCE
Dependant variable			
Announcement Cumulative Abnormal Return (-1, 0)	Percent	Cumulative abnormal return (-1, 0 of the selling firm calculated using the market model. The stock return is adjusted for stock splits and dividends. The event beta is estimated using daily stock returns over a 250-day period ending 30 days before the event date. The market return is approximated using the CRSP value weighted world-wide index. We also include event windows (-1, 1) and (-2, 2). See 9.1 for the mathematical specifications.	CRSP and SDC
Firm size and deal value			
Firm Size	Log	Log of market capitalization based on the closing price of the stock two days prior to the announcement	CRSP and SDC
Seller is Large	Binary	Dummy=1 if the divesting firm's market capitalization two days prior to the announcement is greater than the 75th percentile of firms listed in the NYSE, NASDAQ and AMEX in a given year (and 0 otherwise).	CRSP and SDC
Dollar Return	Absolute ($, millions)	Percentage abnormal return (-1, 0) multiplied by the market capitalization two days prior to the announcement.	CRSP and SDC
Deal Value	Absolute ($, millions)	Total value of the consideration (cash and other forms) payed to acquire the asset	SDC
Relative Deal Size	Ratio	Deal value divided by the market capitalization of the parent firm two days prior to the announcement.	CRSP and SDC
Corporate focus			
Number of Segments	Absolute	Total number of segments reported at the end of the year prior to the deal.	Compustat
Decrease in Segments	Binary	Dummy=1 if the number of segments decreased during the year of the divestiture (and 0 otherwise).	SDC and Compustat
% Change in Segments	Percent	Percentage change in the number of segments during the year of the divestiture.	SDC and Compustat

Herfindahl Index	Index	The sales based Herfindahl index one year prior to the event. Measure of focus on core business. Measured as the sum of squared sales for each segment divided by the square of the sum of sales for each segment. $$Herfindahl = \frac{\sum SegmentSales_i^2}{(\sum SegmentSales_i)^2}$$	Compustat and SDC
% Change in Herfindahl Index	Percent	Percentage change of the Herfindahl index during the year of the divestiture	Compustat and SDC
Increase in Herfindahl Index	Binary	Dummy=1 if there has been an increase in the Herfindal index during the year of the divestiture (and 0 otherwise).	Compustat and SDC
Fit with the Seller	Binary	Dummy=1 if the seller and the divested asset share the same two-digit SIC code.	SDC
Fit with the buyer			
Fit with the Buyer	Binary	Dummy=1 if the buyer and the acquired asset share the same two-digit SIC code (and 0 otherwise).	SDC
LBO Group	Binary	Dummy=1 if the buyer is classified as an LBO group in the SDC database (and 0 otherwise).	SDC
Agency issues			
Low Cash	Binary	Dummy=1 if the seller's cash reserve relative to market capitalization is below the median value for firms within the same two-digit SIC industry as the seller (and 0 otherwise).	SDC and Compustat
Bank Debt Ratio	Ratio	Value of bank debt in the end of the previous year divided by market capitalization two days prior to the announcement. Bank debt is defined as "Debt in current liabilities" minus "debt in one year". (see Hirschey et al., 1990)	SDC and Compustat
CEO ownership	Percent	Percent of total common stocks outstanding owned by the CEO of the selling firm at the end of the year prior to the announcement.	SDC and Compustat (Execucomp)
Long Term Compensation Plan	Binary	Dummy=1 if the selling firm has a long-term compensation plan in place for the CEO. Long-term compensation plans are non-stock compensation tied to long-term performance (and 0 otherwise).	SDC and Compustat (Execucomp)
Firm Deal Order Number	Absolute	Past number of deals plus one completed by the firm since 1995.	SDC

CEO Deal Order Number	Absolute	Past number of deals plus one completed by the incumbent CEO for the given firm	SDC and Compustat (Execucomp)
Hubris	Binary	Dummy=1 if the CEO is hubristic during the year of the divestiture (and 0 otherwise). See 9.2.1 for the definition of CEO hubris	SDC, Compustat and CRSP
Multiple Seller	Binary	Dummy=1 if the Firm Deal Order Number is greater than one (and 0 otherwise).	SDC
Financial distress			
Finical distress	Binary	Dummy=1 if the parent of the divested asset is in financial distress at the end of the year prior to the divestiture, as measured by Altman's Z score (and 0 otherwise). See 9.2.2 for the description of the Z-score.	SDC and Compustat
Logistic regression			
Number of Past Divestitures by the Firm	Absolute	The number of past divestitures completed by the seller at any given year[27]	SDC
Number of Past Divestitures by the Firm	Absolute	The number of past divestitures completed by the incumbent CEO after a three year dormant period at any given year between 1995 and 2014	SDC and Compustat
Tobin's Q	Ratio	Calculated as follows: $Tobin's\ Q = \frac{MarketCap + LongTermDebt}{TotalAssets}$	Compustat
Market Return previous year	Percent	Yearly market return the previous year. Market return is the value weighted world-wide CRSP index.	CRSP
Hubris	Binary	Dummy=1 if the CEO is hubristic during the year of the divestiture (and 0 otherwise). See 9.2.1 for the definition of CEO hubris	SDC, Compustat and CRSP
Stock Return previous year	Percent	Yearly stock return of the firm the previous year	CRSP
Total Number of Acquisitions in the market	Absolute	Total number of acquisitions reported in the SDC database during a given year	SDC

[27] Firm Deal Order Number is different as it measures the deal order number of a given deal, whereas Number of Past Divestitures measure the number of past deals made by the firm at any given year between 1995 and 2014.

Total Number of Acquisitions in the industry	Absolute	Total number of acquisitions reported in the SDC database within the same two-digit SIC industry as the firm	SDC
Abnormal return of the previous divestiture	Percent	Cumulative abnormal return at the announcement of the previous deal completed by the seller	SDC and CRSP
CEO change previous year	Binary	Dummy=1 if the seller replaced the CEO during the previous year	SDC and COMPUSTAT

9.2.2 HUBRIS PROXY

We define the CEO as hubristic if three cumulative conditions are fulfilled (see Aktas, et al., 2011): (1) The CEO has been employed as CEO for at least 12 months at the announcement of the divestiture. (2) The CEO has been a net inside purchaser of common stocks during 12 months preceding the divestiture. (3) The average abnormal return (-1, 0) at the announcement of quarterly earnings during 12 months preceding the divestiture is below the median value for the market. The hubris variable hence takes the value 1 if these three conditions are satisfied and 0 otherwise. The methodology used for calculating abnormal returns at the announcement of quarterly earnings is the same as for the announcement of divestitures.

9.2.3 Z-SCORE FOR FINANCIAL DISTRESS

We use the Z-score models as described by Altman (1983). We use separate calculations for manufacturers and non-manufacturers, identifying manufacturers as those with SIC codes between 2000 and 3999. The Z score for manufacturers is calculated as follows:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

Where:

X_1 = Working Capital/Total Assets

X_2 = Retained Earnings/Total Assets

X_3 = Earnings Before Interest and Taxes/Total Assets

X_4 = Market Value of Equity/Book Value of Total Liabilities

X_5 = Sales/Total Assets

We use the cut-off of 1.81, which is the lower bound where all firms scoring below 1.81 in Altman's (1983) original sample became bankrupt within two years.

The Z'' score model pertains to non-manufacturers. We use the Z'' score model to identify financially distressed non-manufacturing firms. The model is as follows:

$$Z'' = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$$

The X_i refers to the corresponding variable in the previous model. Parallel to the Z score model, we use the lower bound of 1.1 as cut-off for financial distress (Hayes et al, 2010).

9.3 DATA POPULATION AND SAMPLE SELECTION

Table 9.3.1

Data population and sample selection in the period 1995 to 2014:

Year	Total transactions	Divestitures	US divestitures	Public US divestitures	Sample	Sample/Total divestitures
1995	7957	2574	1096	708	322	12.5%
1996	9301	2955	1281	849	397	13.4%
1997	10967	3690	1547	950	403	10.9%
1998	11858	3828	1498	970	438	11.4%
1999	12272	3885	1248	930	392	10.1%
2000	13211	3860	1276	914	438	11.3%
2001	9625	3263	1073	792	365	11.2%
2002	8724	3148	1156	830	363	11.5%
2003	9558	3526	1217	828	365	10.4%
2004	10562	3651	1169	732	366	10.0%
2005	11927	3952	1327	802	392	9.9%
2006	13201	4099	1364	797	390	9.5%
2007	15026	4453	1384	832	360	8.1%
2008	12920	3779	1029	630	294	7.8%
2009	11035	3506	857	573	228	6.5%
2010	11429	3816	904	476	220	5.8%
2011	11502	3778	936	478	204	5.4%
2012	10897	3733	1011	531	241	6.5%
2013	9911	3539	984	553	259	7.3%
2014	11305	3838	1071	553	262	6.8%
Total	**223188**	**72873**	**23428**	**14728**	**6699**	**9.2%**

9.4 VIF TABLES

Variable	VIF
Table 5.5 Regression (1): Persistence of the size effect	
Long-term compensation ratio x not distressed and low cash	2.44
Dummy=1 if low cash	2.13
Dummy=1 if not financially distressed	1.47
Bank debt ratio x not distressed and low cash	1.42
Bank debt ratio	1.29
Dummy=1 if 4th quartile	1.19
Dummy=1 if buyer is LBO group	1.11
Dummy=1 if fit with the buyer	1.1
CEO deal order number	1.09
Long-term compensation ratio	1.08
CEO ownership x not distressed and low cash	1.07
CEO ownership	1.05
Relative deal size	1.04
Dummy=1 if decrease in focus	1.03
Mean VIF	1.32

Variable	VIF
Table 5.5 Regression (3): Persistence of the size effect	
Long-term compensation ratio x not distressed and low cash	2.44
Dummy=1 if low cash	2.13
Dummy=1 if not financially distressed	1.47
Bank debt ratio x not distressed and low cash	1.42
Bank debt ratio	1.29
Dummy=1 if 4th quartile	1.26
Relative deal size	1.15
Dummy=1 if 3rd quartile	1.14
CEO ownership	1.12
Dummy=1 if buyer is LBO group	1.12
Dummy=1 if fit with the buyer	1.1
CEO deal order number	1.09
Long-term compensation ratio	1.09
CEO ownership x not distressed and low cash	1.08
Dummy=1 if 2nd quartile	1.07
Dummy=1 if decrease in focus	1.03
Average	1.3125

Variable	VIF
Table 5.4. Regression (1): Relative Deal Size	
Log market capitalization	1.11
Relative deal size	1.11
Mean VIF	1.11

Table 5.4. Regression (2): Relative Deal Size	
Relative Deal size	1.05
Dummy=1 if 4th quartile	1.05
Mean VIF	1.05

Table 6.1. Regression (3): Logistic regression	
Number of M&A deals in US year prior	20.13
Log market capitalization year prior	17.95
Dummy=1 if CEO change same year as the deal	3.29
Dummy=1 if CEO change year prior to deal	3.28
Number of M&A deals in industry year prior	2.18
Cash-assets ratio year prior	1.9
Number of past divestitures by the CEO*	1.68
S&P 500 market return year prior	1.31
Dummy=1 if CEO is hubristic year prior	1.3
Stock return year prior	1.23
Dummy=1 if Financial distress year prior	1.23
Tobins Q	1.1
Abnormal return of previous deal	1.04
Mean VIF	4.43

9.5 ALTERNATIVE EVENT WINDOWS

9.5.1 RELATIVE DEAL SIZE (-1, 1)

Table 9.5.1

Cross sectional regression analysis of cumulative abnormal return on firm size and relative deal size. One, two and three stars represent 10%, 5% and 1% significance level, respectively.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1	(5) CAR1	(6) CAR1	(7) CAR1
Log market capitalization	-0.378***				-0.290***		-0.326***
Dummy=1 if seller is large		-1.684***		-0.860***		-1.971***	
Relative deal size	0.950**	1.060**	0.941**	0.941**	2.029**	0.982**	0.0420
1st quartile			2.973***	2.113**			
2nd quartile			1.955***	1.095**			
3rd qaurtile			0.860***				
Relative Size Squared					-0.0519*		
Seller is large x Relative deal size						3.475***	
Log market cap. x Relative deal size							0.534***
_cons	4.094***	2.217***	0.542***	1.401***	3.205***	2.263***	3.343***
N	6699	6699	6699	6699	6699	6699	6699
R^2	0.029	0.027	0.030	0.030	0.034	0.030	0.040

9.5.2 RELATIVE DEAL SIZE (-2, 2)

Table 9.5.2

Cross sectional regression analysis of cumulative abnormal return on firm size and relative deal size. One, two and three stars represent 10%, 5% and 1% significance level, respectively.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1	(5) CAR1	(6) CAR1	(7) CAR1
Log market capitalization	-0.395***				-0.269***		-0.350***
Dummy=1 if seller is large		-1.549***		-0.744***		-1.969***	
Relative deal size	1.155**	1.297***	1.140**	1.140**	2.724***	1.171**	-0.123
1st quartile			3.215***	2.471***			
2nd quartile			1.513***	0.769			
3rd qaurtile			0.744***				
Relative Size Squared					-0.0813**		
Seller is large x Relative deal size						5.018***	
Log market cap. x Relative deal size							0.644***
_cons	4.318***	2.213***	0.675***	1.418***	3.037***	2.286***	3.582***
N	6693	6693	6693	6693	6693	6693	6693
R^2	0.030	0.027	0.030	0.030	0.038	0.033	0.041

9.5.3 PERSISTENCE OF THE SIZE EFFECT (-1, 1)

Table 9.5.3

Cross sectional regression analysis of cumulative abnormal return on firm and deal characteristics. One, two and three stars represent 10%, 5% and 1% significance level, respectively.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1
Size measures:				
Dummy=1 if 4th quartile	-1.033			-0.630
Log market capitalization		-0.408**		
Dummy=1 if 1st quartile			2.697	2.067
Dummy=1 if 2nd quartile			2.012	1.382
Dummy=1 if 3rd quartile			0.630	
Relative deal size	1.769***	1.698***	1.706***	1.706***
Firm and deal characteristics:				
Dummy=1 if decrease in focus	0.525	0.473	0.541	0.541
Dummy=1 if fit with the buyer	-0.191	-0.140	-0.191	-0.191
Dummy=1 if buyer is LBO group	0.434	0.474	0.402	0.402
Dummy=1 if low cash	-1.877***	-2.076***	-1.883***	-1.883***
Dummy=1 if not financially distressed	-0.772	-0.617	-0.692	-0.692
Bank debt ratio	-0.0478**	-0.0479**	-0.0464*	-0.0464*
Bank debt ratio x not distressed and low cash	0.00490	0.0217	0.00301	0.00301
CEO ownership	-0.00390	-0.00857*	-0.00744	-0.00744
CEO ownership x not distressed and low cash	0.00806	0.00964	0.0138	0.0138
Long-term compensation ratio	-0.0145*	-0.00560	-0.0128	-0.0128
Long-term compensation ratio x not distressed and low cash	0.136**	0.167***	0.136**	0.136**
CEO deal order number	-0.0248	0.00345	-0.0278	-0.0278
constant	2.954***	5.403**	1.861**	2.491***
N	912	912	912	912
adj. R^2	0.110	0.116	0.111	0.111

9.5.4 PERSISTENCE OF THE SIZE EFFECT (-2, 2)

Table 9.5.4

Cross sectional regression analysis of cumulative abnormal return on firm and deal characteristics. One, two and three stars represent 10%, 5% and 1% significance level, respectively.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1
Size measures:				
Dummy=1 if 4th quartile	-1.201			-0.475
Log market capitalization		-0.408**		
Dummy=1 if 1st quartile			2.697	2.067
Dummy=1 if 2nd quartile			2.012	1.382
Dummy=1 if 3rd quartile			0.475	
Relative deal size	1.778***	1.692***	1.660***	1.660***
Firm and deal characteristics:				
Dummy=1 if decrease in focus	0.808	0.743	0.837*	0.837*
Dummy=1 if fit with the buyer	-0.155	-0.0939	-0.156	-0.156
Dummy=1 if buyer is LBO group	0.832	0.883	0.772	0.772
Dummy=1 if low cash	-2.300***	-2.537***	-2.313***	-2.313***
Dummy=1 if not financially distressed	-1.009	-0.820	-0.864	-0.864
Bank debt ratio	0.0268	0.0271	0.0294	0.0294
Bank debt ratio x not distressed and low cash	-0.0911	-0.0712	-0.0946	-0.0946
CEO ownership	0.00220	-0.00343	-0.00440	-0.00440
CEO ownership x not distressed and low cash	0.0168	0.0185	0.0274	0.0274
Long-term compensation ratio	-0.0174	-0.00654	-0.0142	-0.0142
Long-term compensation ratio x not distressed and low cash	0.204***	0.242***	0.204***	0.204***
CEO deal order number	-0.0405	-0.00604	-0.0460	-0.0460
constant	3.443***	6.388***	2.137**	2.611**
N	912	912	912	912
adj. R^2	0.110	0.118	0.117	0.117

9.5.5 EFFECT OF CHARACTERISTICS ON ABNORMAL RETURN (-1, 1)

Table 9.5.5

Cross sectional regression analysis of cumulative abnormal return on firm and deal characteristics. One, two and three stars represent 10%, 5% and 1% level respectively.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1
Size measures				
Dummy=1 if 4th quartile	-1.029		-1.252	-0.815
Log market capitalization		-0.354		
Relative deal size	1.757***	0.393*	1.745***	1.775***
Firm and deal characteristics:				
Dummy=1 if decrease in segments	0.220	-3.788	0.394	
Dummy=1 if increase in Herfindahl				1.566
Dummy=1 if fit with the buyer	0.182	-0.854	0.165	0.0171
Dummy=1 if buyer is LBO group	0.625	-1.518	0.595	0.555
Dummy=1 if low cash	-1.846***	-2.116***	-1.028***	-1.777***
Bank debt ratio	-0.0421	-0.0391	-0.0317	-0.0455*
Bank debt ratio x not distressed and low cash	0.0199	0.0389		0.0227
CEO ownership	-0.00170	0.00279	-0.00273	-0.0000820
CEO ownership x not distressed and low cash	0.00821	0.00202		0.0139
Long-term compensation ratio	-0.0129	-0.00382	-0.00648	-0.0135*
Long-term compensation ratio x not distressed and low cash	0.142**	0.183***		0.133**
Dummy=1 if not financially distressed	-0.0952	2.302	0.223	-0.258
CEO deal order number	-0.169	-0.529	-0.180	-0.250
Interaction with 4th quartile size				
Seller is large x relative deal size	6.558***		6.617***	6.679***
Seller is large x decrease in segments	0.0134		-0.163	
Seller is large x Herfindahl				-1.647
Seller is large x Fit with buyer	-0.335		-0.327	-0.177
Seller is large x LBO buyer	-0.0812		-0.110	0.0195
Seller is large x not financial distressed	-0.891		-0.506	-0.680
Seller is large x CEO deal order number	0.162		0.186	0.244
Interaction with log market cap.				
Log market cap. x relative deal size		0.793***		
Log market cap. x decrease in segments		0.452		
Log market cap. x Fit with buyer		0.0977		
Log market cap. x LBO buyer		0.206		
Log market cap. x not financial distressed		-0.360		
Log market cap. x CEO deal order number		0.0549		
constant	2.625	4.786	2.177	2.413
N	912	912	912	912
adj. R^2	0.117	0.139	0.116	0.120

9.5.6 EFFECT OF CHARACTERISTICS ON ABNORMAL RETURN (-2, 2)

Table 9.5.6

Cross sectional regression analysis of cumulative abnormal return on firm and deal characteristics. One, two and three stars represent 10%, 5% and 1% level respectively.

	(1) CAR1	(2) CAR1	(3) CAR1	(4) CAR1
Size measures				
Dummy=1 if 4th quartile	-1.370		-1.627	-1.051
Log market capitalization		-0.255		
Relative deal size	1.775***	0.379	1.757***	1.800***
Firm and deal characteristics:				
Dummy=1 if decrease in segments	0.659	-1.451	0.937	
Dummy=1 if increase in Herfindahl				2.208
Dummy=1 if fit with the buyer	0.722	1.110	0.677	0.510
Dummy=1 if buyer is LBO group	2.097	1.844	2.045	2.026
Dummy=1 if low cash	-2.231***	-2.551***	-1.092***	-2.137***
Bank debt ratio	0.0385	0.0341	0.0323	0.0366
Bank debt ratio x not distressed and low cash	-0.0728	-0.0468		-0.0725
CEO ownership	0.00630*	0.0113*	0.00527	0.00847**
CEO ownership x not distressed and low cash	0.0227	0.0113		0.0307
Long-term compensation ratio	-0.0161	-0.00746	-0.00715	-0.0163
Long-term compensation ratio x not distressed and low cash	0.209***	0.263***		0.197***
Dummy=1 if not financially distressed	-0.315	3.316	0.146	-0.515
CEO deal order number	-0.414*	-0.933**	-0.424*	-0.530**
Interaction with 4th quartile size				
Seller is large x relative deal size	9.097***		9.211***	9.302***
Seller is large x decrease in segments	-0.398		-0.668	
Seller is large x Herfindahl				-2.475*
Seller is large x Fit with buyer	-0.954		-0.938	-0.755
Seller is large x LBO buyer	-1.340		-1.366	-1.222
Seller is large x not financial distressed	-1.027		-0.545	-0.774
Seller is large x CEO deal order number	0.412		0.439*	0.530**
Interaction with log market cap.				
Log market cap. x relative deal size		0.823***		
Log market cap. x decrease in segments		0.198		
Log market cap. x Fit with buyer		-0.128		
Log market cap. x LBO buyer		-0.136		
Log market cap. x not financial distressed		-0.535		
Log market cap. x CEO deal order number		0.0968***		
constant	3.233	4.500	2.606	2.963
N	912	912	912	912
adj. R^2	0.133	0.149	0.128	0.139

9.6 MARGINAL EFFECTS FROM LOGISTIC REGRESSION

Table 9.5.6

Marginal effects from logistic regression 6.1.

	Regression (1)		Regression (2)		Regression (2)	
	dy/dx	z	dy/dx	z	dy/dx	z
Number of past divestitures by the firm	0.0129	10.35	-0.0015	-0.93		
Number of past divestitures by the CEO			0.0423	16.36	0.0376	16.21
Dummy=1 if CEO change same year as the deal	0.0574	5.34	0.0581	5.46	0.0465	3.94
Dummy=1 if CEO change year prior to deal	-0.0059	-0.57	0.0023	0.23	0.0013	0.11
Dummy=1 if Financial distress year prior	0.1015	7.75	0.0864	6.65	0.0749	4.94
Log market capitalization year prior	0.0232	7.81	0.0206	6.96	0.0192	5.60
Abnormal return previous divestiture	-0.0907	-1.10	-0.0770	-0.96	-0.1107	-1.19
Dummy=1 if CEO is hubristic year prior					0.0303	2.46
Tobins Q	-0.0003	-0.19	-0.0003	-0.22	-0.0029	-0.54
S&P 500 market return year prior	0.3233	11.37	0.3071	10.90	0.2754	8.58
Stock return year prior	-0.0738	-6.55	-0.0764	-6.73	-0.0745	-5.46
Cash-assets ratio year prior	-0.0652	-1.82	-0.0400	-1.13	-0.0616	-1.33
Number of M&A deals in US year prior	0.0000	-4.16	0.0000	-4.15	0.0000	-3.10
Number of M&A deals in industry year prior	0.0000	0.06	0.0000	-0.10	0.0000	-0.45