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Master Thesis

The Impact of Selloffs on Parent Company Performance

Empirical Evidence of Divestitures by US Companies

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Preface and acknowledgments

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Abstract

This study seeks to contribute to the ongoing discussion of selloffs by examining the short- and long-term financial impact of selloffs and the potential influencing factors from the seller's perspective. Divestitures have gained a lot of attention recently, with corporates aiming to make their portfolio more resilient, seeking opportunities to off-load non-core assets and underperforming businesses, clearly illustrating that they have become a necessity for many companies to survive long term. The analysis of short-term performance shows that parent companies experience an increase in stock price immediately after the announcement. In addition, there is evidence that selloffs boost operating performance and lead to more shareholder wealth over a longer timeframe of two years. By examining the long-term effects and combining accounting and market-based measures of performance, this study explores relatively unexplored territory. Additional tests of potential drivers show that larger transactions and more diversified firms generate larger short-term gains and that firms with high pre-announcement leverage have higher long-run performance. By using a sample of 1,785 selloffs, announced by U.S. companies between 2004 and 2018, this study differs from the existing literature in terms of sample size and updated timeframe and therefore may present more correct results.

Keywords: Divestment, Selloff, Long-run Performance, Operating Performance, Restructuring, Mergers and Acquisitions

JEL Classification: G32, G34

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1 Introduction

The end of the past decade marked record-breaking global deal activity, which topped US$3 trillion for the sixth consecutive year. Much of this was accounted for by divestments, which include various forms such as selloffs, spin-offs, and equity carve-outs (Deloitte, 2020). The reason for the increase in disinvestment activities is due to several factors. In the face of rapidly evolving industrial landscapes, corporate divestments have become a popular corporate strategy tool as they help companies realign their business models for growth. Amid the global pandemic, divestitures have received even more attention as companies reevaluate their strategies and portfolios. They are also seen as a powerful defensive tool and a unique opportunity to offload non-core assets and underperforming businesses, allowing companies to make their portfolios more resilient for the next phase of normalcy (Deloitte, 2020). The consequences of this crisis are severe, and many have already failed. Others will have to change significantly to survive. Even surviving companies may need to raise new funds or downsize to continue. A survey of CEOs and CFOs of companies around the world found that at least 76% of executives expect to accelerate their divestment plans due to the ongoing impact of the pandemic (EY, 2021), making the issue of divestment even more relevant in today's context.

As divestment activities have increased in recent years, it is striking that they have received less attention from scholars compared to mergers and acquisitions (M&A) (Brauer, 2006; Lee & Madhaven, 2010; Teschner & Paul, 2020). Possible explanations for this lack of attention may be related to the reputation of the firm and the perception of the manager by outsiders. There is a stigma that divestments are seen as a sign of weakness or failure of the firm. They may also be a sign of a manager's incompetence. Other explanations relate to the challenge of stranded costs and not being able to accept that the asset could perform better in the hands of someone else (Feldman & McGrath, 2016). Furthermore, Brauer (2006) explains that divestitures have received little attention because they have been treated as a small part of the larger parent, corporate restructuring. As a result, this neglect has led to the misconception that divestitures are merely a mirror image of mergers and acquisitions and that they are merely a tool used in corporate restructuring rather than a stand-alone, value driving strategic option for corporate realignment. Despite the relative lack of academic attention, it is important to study the impact of divestitures as they affect parameters at the macro level (industry concentration, size), the firm level (performance, ownership), and the individual level (motivation of employees and managers).

Regarding the impact on the firm and whether divestment increases performance, the results are mixed (Brauer, 2006). We find positive results (Hoskisson & Johnson, 1992; Klein, 1986; Krishnaswami & Subramaniam, 1999; Markides, 1992a) and negative results (Bergh, 1995; Schill & Zhou, 2001; Wright & Ferris, 1997). However, there is consensus on the expectation that divestment has a positive impact on firm performance. Several arguments are put forward in the literature to explain the positive effects we expect from divesting. First, divestment is used by firms as a tool to alleviate capital

constraints within the firm, thereby reducing the firm's cost of capital (Lang, Poulsen & Stulz, 1995). This can enable a firm to make other value-enhancing investments (Nguyen, 2016). In addition, divestment allows firms to dispose of assets with negative synergies (John & Ofek, 1995). Finally, asset divestment allows firms to reallocate their internal resources and management efforts more efficiently and to higher value activities. It is argued that the amount of value created depends on a number of factors that have been independently studied. Teschner and Paul (2020) argue that the relative size of the divestment affects the magnitude of the impact of divestment. Haynes, Thompson, and Wright (2002) attempt to explain the variance in subsequent performance gains by the degree of relatedness of the asset sold. They argue that the positive effects of divestment are larger for firms selling unrelated assets than for firms selling related assets. Other studies focus more on the financial position of the parent firm before divestment. Warusawitharana (2008) argues that a firm's past performance affects its post-divestiture performance and finds that poorly performing firms earn larger profits compared to better performing firms. Moreover, firms with high leverage are expected to achieve greater performance growth than firms with low leverage (Afshar, Taffler & Sudarsanam, 1992). In addition to variation in results due to specific firm and business characteristics, inconsistent results are also due to different performance measures used to analyse the effects. Much of the literature analyses stock market responses and calculates cumulative abnormal returns as a measure of performance. Brauer (2006) argues that this measure is mainly used by finance scholars and that strategic management studies mostly use accounting measures such as return on assets and/or return on equity (ROA, ROE) for performance. Moreover, a small part of the existing literature focusses on the market-based measures of performance such as Jensen's alpha.

In addition, performance differences are also attributed to the technical form of the divestment, the distribution of proceeds, and the nature of the transaction. In a spin-off, a separate listed company is established. The parent company distributes the shares of the asset proportionately among its current shareholders so that the asset is sold at arm's length. In contrast, in a sale, the parent company cuts all ties to an asset and sells it to another company. Prezas and Simonyan (2015) argue that spin-offs have no tax consequences for the firm selling the asset because the shares that are created during spin-off are treated as stock dividends to existing shareholders (i.e., a tax-free exchange). However, the proceeds from a selloff are taxed to the parent company. The parent company can use those proceeds to for example repay a portion of its debt, or to invest in other projects. However, it can also choose to distribute the proceeds to its shareholders. Moreover, Prezas and Simonyan (2015) argue that the after-tax proceeds from selling a poor performing asset will probably be higher than from a spin-off of the same asset. In addition, a better-performing asset is expected to have a higher value in the market when it is spun off, while the after-tax proceeds from selling the same asset can be expected to be lower (which is due to the depleting effect of taxes). The way in which the proceeds from the sale of assets are allocated also affects the performance of the parent company. Lang, Poulsen and Stulz (1995) explain how firms that use the proceeds for expansion through acquisitions destroy value and argue that value

is gained by paying bondholders and shareholders. Finally, it is also assumed that the nature of the transaction affects performance. It is argued that forced divestitures have different motivations and contexts and, in turn, report lower post-divestiture returns (Woo, Willard & Daellenbach. 1992).

Accordingly, the purpose of this study is to investigate the relationship between divestitures and subsequent parent company performance. The focus for this research is on selloffs, as a form of divestment, where an asset is sold by one firm, to another firm. In addition, we seek to examine the impact of firm and transaction characteristics on subsequent firm performance. Henceforward, this study aims to answer the following question:

"How do divestments in the form of selloffs affect the performance of a parent firm?"

To meaningfully answer this question, performance will be analysed in three-fold. First, we will assess the effects on short-term stock performance, using the event study method. Then, the long-run performance will be addressed, where a distinction is made between long-run stock performance (Buy-and-hold abnormal returns, average security alpha returns), and long-run operating income (accounting and market measures). After performing these analyses, OLS regressions are run to examine the impact of specific firm and transaction characteristics. We use a carefully selected sample of 1,785 selloffs announced by U.S. companies listed on the New York Stock Exchange and NASDAQ from 2004 to 2018.

In light of the aforementioned motivations, this study aims to make a number of contributions. Recent literature has shown that much of the existing research has mainly focused on short-term earnings and changes in market expectations (Brauer & Schimmer, 2010; Moschieri & Mair, 2008). However, analyses of whether these short-term gains translate into long-term profitability are lacking. By analysing the BHARs and the average security alphas as well as address the implications for operating performance, this study aims to bridge the gap between short-term and long-term performance effects. In addition, there is a need to integrate performance measures. Earlier research on the impact of divestiture on parent firm performance has always used either an accounting measure or a market measure. Silva and Moreira (2019) argue that future research should combine both accounting measures and market measures of performance to ensure more robust results. In view of this, in this study we will combine both performance measures to provide more reliable results and more robust conclusions for the ongoing discussion on divestment performance. Moreover, in our reading of the literature, we find that researchers have predominantly used small samples and outdated time frames. Therefore, this study uses the most recent time frame possible, and a much larger sample compared to previous research.

Overall, the results suggest that performance is positively affected by a selloff. We observe an increase in stock performance when we analyse the days surrounding the announcement. When we look at the long-term impact, we observe improved operating performance and positive abnormal buy-and-hold returns two years after the announcement. Moreover, it appears that returns around the day of the

announcement are more positive when deals are larger and when firms are more diversified. Finally, we find that long-run stock performance is more positive for firms that are highly leveraged before the announcement.

The remainder of this paper is organized as follows. In Section 2, we first provide a comprehensive review of the literature on divestment outcomes in terms of subsequent performance, the main issues in current research, and the factors that may explain the effects on performance. Then, in Section 3, we describe the data and how we obtained them. Section 4 sets out our research approach. Here we describe all the models used for the analysis. In section 5, we share the results of the analyses performed. Finally, in Section 6, we provide an overview of the conclusions and discuss limitations and opportunities for future research.

2 Literature review

The following section provides a comprehensive review of the existing literature on divestment, why firms engage in divestment, and its impact on firm performance, dating back to 1983. In addition, hypotheses are formulated, and control variables are discussed.

2.1 Divestments, Modes, and Motives

Divestment can be seen as a mechanism to rationalize and reorient companies (Chen & Guo, 2005). When a firm wants to divest a business unit, subsidiary, or division, it can choose among various divestment modalities. This research focuses on asset sale. Asset sale is the only form of divestiture in which the parent gives up full ownership and control of the divested asset (Silva & Moreira, 2019). To understand the mechanisms of potential value creation from divestiture, it is helpful to gain insight into the reasons that lead managers to divest an asset. Chen and Guo (2005) categorize the motives for divestment discussed in the existing literature within a framework of three hypotheses. It is important to note that the motives put forward are not mutually exclusive and that it could be the case that a firm decides to divest an asset because it is exposed to several of these scenarios.

In the scenario described in the financing hypothesis, managers are motivated to divest assets because the parent company is subject to capital constraints. Divestiture may relax these constraints. Evidence consistent with the financing hypothesis shows that firms that divest assets tend to perform poorly (Markides 1992; Montgomery & Thomas, 1988) and/or have higher leverage (Allen & McConnel, 1998; Lang, Poulsen & Stulz, 1995).

The focus hypothesis is closely related to the financing hypothesis and describes how the extent to which the asset is unrelated to the core business motivates managers to divest. Assets that are not related to a parent firm's core business are not focused and are associated with lower interdependence (Duhaime & Grant, 1984) and negative synergies (Bergh, 1995; Hitt, Hoskisson & Ireland, 1994; Zuckerman, 2000). Divesting these assets ultimately leads to improved investment efficiency and reduces the likelihood of biased investment allocation (Ahn & Dennis, 2004; McNeil & Moore, 2005). Moreover, the focusing hypothesis explains that managers are not always able to manage a large number of assets, especially when they are unrelated. By divesting these unrelated assets and refocusing the firm, a manager can reduce the possibility of diminishing returns to managers (John & Ofek, 1995; Schipper & Smith, 1983). Closely related, divestiture is seen as a means to combat the phenomenon of conglomerate discounting, which affects many companies with multiple business units (Khorana et al. 2011). Globally, nearly half of all conglomerates trade at a discount to their pure-play competitors, and the desire to reduce or even eliminate this conglomerate discount drives divestment transactions. When we compare such conglomerates to those trading at a premium, the most common difference is that the

individual businesses are interconnected and offer synergies. This brings us back to the need for a focused and interdependent business that reduces organizational complexity for managers.

The last hypothesis is referred to as the information hypothesis and describes how the risk of undervaluation by external capital markets due to information asymmetries serves as a motivation for managers to divest an asset. When managers divest and the shares are traded independently, the risk of information asymmetry can be mitigated (Chen & Guo, 2005). Schipper and Smith (1986) conclude that divestitures lead to increased market monitoring, which in turn reduces the extent of information asymmetry that can be present between management of the firm and its shareholders. In addition, Krishnaswami and Subramaniam (1999) found evidence that individual firms' forecasting errors decreased significantly after a spin-off. This in turn led to a reduction in adverse selection problems caused by information asymmetry.

What Chen and Guo (2005) do not explain, but is still worth mentioning, is the growing social pressure created by increased shareholder activism and attacks in the (social) media, which leads managers to engage in divestment programs. In a study by Durand and Vergne (2015), companies in stigmatized industries that are attacked by the media were found to be highly likely to divest. Managers of these attacked companies responded to the attacks by selling assets. Moreover, they have also shown that when a company is under media attack, its peers sought divestment in anticipation of future attention. A recent example is the divestment by large pension fund, ABP, selling its holdings in fossil fuels companies, worth more than €15 billion (FT, 2021). Prior to the announcement to divest from these companies, it was in the news several times as activists called on the company to divest from these holdings.

2.2 Divestments and value creation literature

The economic impact of divestment has been widely studied in both strategic management and financial research. From the existing literature, we can conclude that there is little consensus on whether they lead to positive or negative returns. According to Lee and Madhavan (2010), from a practical perspective, the lack of consensus can be justified by the fact that the construct of divestment is subject to different boundaries. They argue that divestments are often grouped with M&A and portfolio restructuring in the literature, which makes it difficult to isolate the effects of divestments in the absence of a precise definition.

2.2.1 Positive effect theories

Regarding divestitures and the subsequent performance of the parent firm, the literature suggesting positive effects can be divided into a framework of four theories (Lee and Madhaven, 2010). Much of the research relies on transaction cost theory and agency theory when providing reasoning for positive effects on performance, while others rely on resource-based theory and evolutionary theory. Advocates of agency theory assume that divestment creates value because it leads to a reduction in agency costs. Denning (1988) was one of the first to describe this concept with his agency problem resolution hypothesis. The hypothesis predicts an increase in stock value due to the reduction of agency problems and costs through divestment. They can improve the agency relationship between shareholders (principals) and managers (agents) when these two parties have mismatched goals and risk profiles and when high costs are applicable in determining what actions manager will take, and what outcomes they will have. In such situations, divestment is seen as a mechanism to reduce such agency costs and increase flexibility (Seth & Easterwood, 1993). Monitoring costs are reduced because the divestiture is not hidden among multiple levels of the firm, reducing shareholder information gathering costs. Moreover, the likelihood of managers shirking becomes smaller, and the quality of the information becomes better (Woo, Willard & Daellenbach, 1992). Mulherin and Boone (2000) also use agency theory to explain the positive effects of divestment. They refer to them as nonsynergistic theories and introduce existing literature that explains how divestment has the potential to reduce agency problems such as managerial entrenchment, empire building and management hubris (Jensen, 1986; Roll, 1986; Shleifer & Vishny, 1989). Even though these studies vary in their assumptions, they all conclude that divestment creates wealth for the parent firm. The positive effect is related to greater specialization and lower agency costs. Lee and Madhaven (2010), further suggest that the distance between policy and implementation is smaller and that the complexity of the organizational structure decreases, after divestment.

In terms of transaction cost economics, Markides (1995) explains that it may happen that a firm is overdiversified, i.e., organizational capabilities cannot keep up with the range of business activities carried out. In this case, the advantages of diversification tend to decrease as firms move away from their core business. Value can be created by refocusing, through diversification reducing transactions, as the efficiency of the remaining businesses should improve (Hoskisson & Turk, 1990; Markides, 1995). The improvement in efficiency is largely explained by the concentration of managers' resources on fewer and less diverse operations (Haynes, Thompson & Wright, 2002).

The resource-based view assumes that firms make divestitures when certain firm resources become redundant after acquisitions. Even if these resources are valuable, they can be used more efficiently by reallocating some ownership, thus maintaining some kind of link between the firm and the entity. According to Ito and Rose (1994), the parent firm profits when the unit’s skills and knowledge are created by and within the unit.

Evolutionary theory explains how divestitures can be viewed as a means of 'survival' in a changing environment. The synergistic theories presented by Mulherin and Boone (2000) are related to evolutionary theories. They argue that changing economic environments and industry shocks play a role in restructuring activities and conclude that divestitures used as a tool to adapt to such a situation can create wealth for the parent company. According to Moschieri and Mair (2008), value creation lies in the ability to adapt and transform. They argue that divestitures are used to develop and introduce new technologies to ensure wealth and survival. The 2019 coronavirus pandemic can be viewed as such an economic shock of unprecedented magnitude. The need for business adaptation and survival presented in evolutionary theories is highly relevant in today's context. Faced with the continuous lockdowns of countries and the temporary closure of many sectors, companies are trying to adapt to the changing landscape. In light of these recent events and in line with the evolutionary theories presented above, divestment can be seen as a very useful tool for companies to stay in business and should be considered when developing strategies after current global pandemic.

There are two hypotheses put forward by Denning (1988) that do not fall under the above theories but nevertheless expect a positive effect after divestment. The wealth transfer hypothesis states that wealth is transferred from the stakeholder to the shareholder. When a firm disposes of an asset, the total assets that cover the seller's debt decrease. This in turn leads to a decrease in the market value of the debt. If the value of a company is the sum of its debt and equity and it is assumed that this value remains constant. Then a decrease in debt must ultimately be accompanied by an increase in equity. The final theory is the good news signalling hypothesis. Here it is argued that management would only consider a divestment if the selling price of the asset exceeds the cash flows of the asset. Consequently, the divestment is perceived as a transaction with positive net present value. Such value creation is in turn reflected in the stock value.

There are a variety of theories in the finance and strategy literature that predict positive wealth outcomes for divestitures. The above arguments suggest that divestitures help to enhance firm performance. It has been shown that the above claim is largely true. Bergh (1998), Hoskisson and Johnson (1992) and Markides (1995) all find positive results in evaluating accounting performance after divestment. As for announcement returns as a measure of performance, much of the literature provides positive results. According to Brauer (2006), the positive results vary from +1.12% to +3.9%. Based on the theories and results presented, we propose:

H1: Selloffs by U.S. listed firms are positively related to subsequent firm performance

2.2.2 Negative and no effect theories

Although most theoretical expectations about the effects of divestment on performance in the current finance and strategic management literature are positive, there are some theories that expect a negative effect or no effect.

The theory of no effect is put forward in the no effect hypothesis by Klein (1986)**.** The argument of this theory is that if we assume a perfect capital market, the divestiture of an asset may be no different from the divestiture of stocks or bonds from the parent company's portfolio. In this case, according to Klein (1985), we would not expect abnormal returns. Moreover, Denning (1988) argues that if a divestiture is viewed as a mirror image of a merger, then in this case the findings related to mergers might also be applicable to divestitures. He explains that if an investor can hold shares of both the seller and the acquirer in the case of a merger, there may be no advantage to a merger. Conversely, it may be possible for a shareholder to be entitled to both streams of profits following an asset sale. In this case, splitting up the firm may not result in an increase in shareholder wealth.

The negative impact theory is explained by Denning's (1988) bad new information hypothesis. In contrast to the good news hypothesis, it is argued here that bad news may be signalled when divestiture indicates managers' negative perceptions of the firm (e.g., poor liquidity, loss-making operations, inefficiencies). In such cases, stock prices decline with news of the divestiture.

2.3 Performance measures

Two measures are used in the literature to evaluate the impact of divestment on the seller's firm performance. In finance-based research, this financial effect is usually analysed in terms of changes in the parent firm's stock price. Here, cumulative abnormal returns (CARs) are calculated, and the event study methodology is utilised to capture this effect. Strategy scholars, on the other hand, mainly use accounting measures to capture the financial effect by analysing financial ratios of the parent company's such as return on assets (ROA) and more (Moschieri & Mair, 2008).

2.3.1 Key issues of performance measures

Performance measures have been the subject of much debate. Silva and Moreira (2019) explain how the use of different performance measures (accounting vs. market measures) can lead to conflicting results. The literature mentions several times that a more integrative approach combining both accounting measures and market measures would be a solution **(**Brauer & Schimmer, 2010**;** Moschieri & Mair, 2008; Silva & Moreira, 2019). The use of such an integrative approach allows a comparison between

the two metrics in terms of divestment and its financial impact. Moreover, Richard et al. (2009**)** state that by combining these metrics, they provide a better balance between risks (which are often ignored by accounting metrics) and operational performance, which is sometimes lost in market metrics, offering more robust results on which more reliable conclusions can be made.

Another problem is that scholars using announced returns, only adopt short event time windows. This approach only captures short-term gains and changes in market expectations of parent company performance (Brauer & Schimmer, 2010). By also focusing on the long-run effects of performance, one can analyse whether the short-term gains around the announcement date and the market expectations made, also translate into differences in long-run profitability. Consistent with this, Moschieri and Mair (2008) argue that the long-run effects of divestment on parent firm performance remain largely unexplored. They argue that addressing this gap can help managers better understand whether divestments increase the value of their firm and how to determine this.

In an attempt to address this gap, this study additionally tests for the impact on long-run performance, examining subsequent operating performance, as well as abnormal stock returns. The theories presented in Section 2.2.1 that justify improved performance following divestment do not distinguish between short-term and long-term performance. However, it is important to note that for long-run performance, the way proceeds are redistributed play an important role. A study by Bates (2005) reported an increase in long-run parent firm performance 24 months after announcing a selloff. Based on the theories set out in Section 2.2.1, we posit the second hypothesis, where a distinction is made between long-run stock performance and operating performance.

H2a: Selloffs by U.S. listed firms are positively related to subsequent long-run stock performance.

H2b: Selloffs by U.S. listed firms are positively related to subsequent long-run operating performance.

2.4 Determinants of performance

In this research, we wish to find explanations that help explain the performance effects tested in H1 and H2. According to the existing literature, there are several variables that are claimed to explain the variation in performance effects across firms. To find out whether these claims hold, we test the determinants introduced in the literature. The most important variable is the relative transaction size, measured as the transaction value to market value of the parent firm. Scholars assume that larger transactions have larger impact on the abnormal returns compared to smaller transactions. According to Teschner and Paul (2020), the positive effect of relative transaction size on the parent firm performance,

generally moves together with the overall expected positive effect. Afshar, Taffler and Sudarsanam (1992), Alexandrou and Sudarsanam (2001), Clayton and Reisel (2013), Hanson and Song (2006), Hearth and Zaima (1984), Kaiser and Stouraitis (1995), and Mulherin and Boone (2000), all provide evidence for this proposition. To evaluate this determinant, we propose:

H3: The relative transaction size is positively related to the parent firms' performance after a selloff.

Another variable that is expected to explain the impact of divestment on parent firm performance is the financial condition of the parent firm. However, the results of studies that have included this variable vary, with different theories on the expectation of this variable (Teschner & Paul, 2020). On the one hand, it is argued that firms in good financial condition should earn higher returns because they have a better bargaining position since they do not have direct pressure to divest (Heart & Zaima, 1984). On the other hand, firms that divest in financial distress are more likely to improve their performance because they can reduce their size and return to their optimal scale by divesting excess assets (Warusawitharana, 2008).

H4: The financial condition of the parent firms is related to the performance after a selloff.

The variations in performance effects are also explained by the parent firm's leverage. The literature illustrates that firms characterised with having high debt levels, tend to benefit from a divestment as the costs of financial distress decrease (Nguyen, 2016). In most cases, divesting firms choose to reallocate the proceeds from the divestiture to pay down debt. This allows firms to move further away from a situation where the expected costs of debt exceed the advantages of having a high debt ratio, leading to a decreased firm value (Bates, 2005; Lang, Poulsen & Stulz, 1995). In addition, Nguyen (2016) argues that the cost of capital is likely to decrease, which may make firms better able to make value-increasing investments. Afshar, Taffler and Sudarsanam (1992) found higher announcement returns for divesting firms with lower Z-scores, which in general have higher levels of leverage. Lasfer, Sudarsanam and Taffler (1996) found evidence that distressed firms earn higher profits when they announce a divestiture.

H5: Leverage is positively related to the parent firms' performance after a selloff.

Studies have shown that companies that reduce diversification or narrow the focus of their business activities achieve greater performance growth (Haynes, Thompson & Wright, 2002). The reason for this proposition is that overdiversified firms, lacking in focus tend to establish negative synergies (Berger & Ofek, 1999; John & Ofek, 1995). This problem can be mitigated by divesting assets

that are unrelated to a firm's core business. Desai and Jain (1999), Markides **(**1992**)**, and Montgomery, Thomas, and Kamath (1984), all observe greater returns when a refocussing divestment is announced. We posit the following hypotheses, where focus is explained through diversification and asset relatedness.

H6a: The positive effect of a selloff on parent firm performance is greater for companies that are more diversified.

H6b: The positive effect of a selloff on parent firm performance is greater when it involves non-core assets being sold.

In addition, for each hypothesis, we control for industry dependence to determine whether the performance effect differs significantly across industries. Furthermore, since firms in the sample differ in size, we control for the size effect. Finally, we also control for year effects.

3 Data

This chapter describes what the final sample looks like and the reasoning behind it. First, we need to obtain the events. We also need to evaluate the type of event and ensure that we only consider selloffs. After we obtain all the relevant events, the financial data for each divesting firm is obtained, to calculate the abnormal returns. In addition to investigating the impact of divestments on subsequent performance, we also want to find out whether certain firm and transaction characteristics have an impact on the magnitude of performance impact of divestitures. Therefore, in addition to the deal-specific data, we obtain firm-specific data to run the regressions.

3.1 Deal data

To analyse the hypotheses in this study, data on the selloff event needs to be obtained. Finding this data can be done using online databases. For the event data the ThomsonOne database is utilized. This database allows us to obtain the exact announcement date for each sale. It also provides the transaction values for each divestiture, as well as information on the industries in which the parent company operates, the type of transaction, and the country in which the parent company is located. To find firm-specific information at a later stage using other databases, it is important to obtain the firm identifiers. For this research, we obtain the company's ticker symbol and Sedol codes.

3.1.1 ThomsonOne

ThomsonOne is an online database founded in June 2000. The database provides useful tools to collect all kinds of data. You can get M&A specific information through the Screening & Analysis option. The database provides comprehensive details on all announced transactions, both completed and pending, for US targets back to 1979.

3.1.2 Sample

The initial sample sourced from ThomsonOne included 14,901 selloffs announced by publicly traded U.S. firms from January 5, 2004, to December 27, 2018. This time frame was carefully chosen to ensure that economic upturns and downturns were accounted for while using a current sample. In addition, the sample included only sales that were voluntary. Separating voluntary and involuntary divestitures when examining the impact of divestitures is a common approach in previous research. According to Woo et al. (1992), involuntary divestments (e.g., forced through legislation or) have different contexts,

motivations, and performance outcomes. The current war between Russia and Ukraine is also an example where companies may divest involuntarily pressured by the public.

Each entry contained the date of the event, the name of the parent company, the name of the target company, the Sedol code, the ticker, and information about the sectors in which the company operates (based on the SIC codes). However, the dataset with the 14,901 entries is not yet ready for analysis. Following Fama and French (1992), firms operating in the financial and real estate sector (SIC: 6000 - 6999) and the utilities sector (SIC: 4900 - 4999) were dropped from the dataset. The reason is that these sectors are heavily regulated. Moreover, the real estate and utilities sectors are characterised by predetermined prices. Furthermore, having a high debt ratio could indicate distress for a non-financial firm, whereas it has a different meaning for a financial firm where it is part of the business model and commonly observed among these firms. Consequently, 4,975 entries are found and removed from the dataset. The remaining entries are distributed across 8 industries, allowing for comparison across industries.

A total of 9,926 entries remains. However, in line with Jain (1985) and Nguyen (2016), a minimum transaction value of $10 million is set. According to these studies, this threshold is high enough to ensure a non-trivial impact on the seller's market value. Based on these criteria, 6,165 listings were found and removed from the dataset. In the final stage of selection, we ensure that firms with multiple selloff announcements had at least two years between the announcements, and the entries with incomplete information are deleted.

Table 1 provides an overview of the criteria used to remove data from the original sample. Now 1,785 events remain that are suitable for further analysis. Comparing this sample to the previous literature on U.S. firm divestitures, this sample appears to be much larger. This provides us with a unique dataset from which to draw conclusions.

Table 1. Overview of sample construction

Criteria	Amount	Percentage of original
Original Sample	**14,901**	**100%**
Excluding Finance, Real Estate, and Utilities Industries	4,975	33.3%
Minimum Deal Value	6,165	41,4%
Identifiers Unknown	161	1.1%
Multiple Announcements and Unavailable Information from Datastream	1,813	12.2%
Final Sample	**1,785**	**12%**

Table 2 describes the distribution of selloffs over time. In terms of divestiture activity, we see that the number of transactions peaked in 2006, with 164 selloffs, and a total value of divested assets of over $71 billion. Interestingly, selloff activity slowed with the onset of the financial crisis, affecting companies on a global scale. In tandem with the decline in divestiture activity, the average transaction value also declined until it began to rise again in 2012. When we compare average transaction size to relative size, we find that they do not move in parallel, with relative size increasing against the backdrop of the financial crisis while average size decreased. When we evaluate the "Total" row in the table, we see that the average transaction size was $388.4 million, representing about 16.8% of the market value of the seller's equity. The largest transaction was in 2006 by Pfizer Inc, the largest pharmaceutical company in the world, which sold Pfizer Consumer Healthcare to Johnson & Johnson for $16.6 billion in cash.

Table 2. Time-series distribution of selloffs

Year	N	Total value	Average value	Highest value	Relative value
2004	137	34,749.1	253.6	3,700	0.114
2005	130	31,669.1	243.6	5,600	0.134
2006	164	71,254.1	434.5	16,600	0.137
2007	149	46,882.0	312.5	8,500	0.118
2008	127	31,807.5	250.5	7,400	0.161
2009	99	19,882.2	200.8	3,100	0.305
2010	106	37,165.4	350.6	4,000	0.155
2011	96	24,030.9	247.7	2,375	0.198
2012	123	47,354.6	385.0	11,850	0.134
2013	115	46,327.1	402.8	4,827	0.262
2014	113	74,944.6	663.2	7,056	0.150
2015	101	48,198.7	477.2	10,790	0.178
2016	115	69,849.0	607.4	7,349	0.167
2017	102	58,372.7	572.3	8,065	0.216
2018	108	51,637.2	478.1	3,300	0.175
Total	**1,785**	**694,124.3**	**388.4**	**16,600**	**0.168**

Total value, average value and highest value are in $ million. Relative value is the transaction size to seller's market value of equity.

Table 3 describes the distribution of selloffs across industries. The classification system used is that of Fama and French (1988), which can best be described as a reclassified SIC system. They developed their own classification system by linking the existing SIC classification codes to 17 industry groups[1]. Later they further developed this system introducing 30 and 48 industry groups. The main reasoning behind this reclassification was that the companies within these newly developed groups were

[1] The corresponding 4-digit SIC codes for every industry group are found on the website of Kenneth R. French.

expected to have more similar risk characteristics. Table 3 shows that the Machinery and Business Equipment sector recorded the most sales between 2004 and 2018, at about 15.1%, excluding the classification Other, which is reported by every sector that does not belong to one of the other sectors (i.e., Legal Services and Communication Services). Furthermore, the Oil and Petroleum Products classification also shows high activity within the sample period at 13.6%.

Table 3. Industry divisions and selloffs

Fama-French industry code	N	Percent	Cum.
Food	72	4.03	4.03
Mining and Minerals	28	1.57	5.60
Oil and Petroleum Products	243	13.61	19.22
Textiles, Apparel & Footwear	29	1.62	20.84
Consumer Durables	38	2.13	22.97
Chemicals	77	4.31	27.28
Drugs, Soap, Parfums, Tobacco	112	6.27	33.56
Construction and Construction Materials	51	2.86	36.41
Steel Works etc.	40	2.24	38.66
Fabricated Products	29	1.62	40.28
Machinery and Business Equipment	269	15.07	55.35
Automobiles	31	1.74	57.09
Transportation	67	3.75	60.84
Retail Stores	108	6.05	66.89
Other	591	33.11	100.00
Total	**1,785**	**100.00**	

Financials and real estate (SIC: 6000 – 6999) and utilities (SIC: 4900 – 4999) excluded.

Table 4 presents the summary statistics for the sample. First, the transaction characteristics are presented. As previously mentioned, we report a mean transaction value of $388.8 million. Relative to the market value of the parent company's equity, this value averages 16.8%. Furthermore, the characteristics related to the parent firm are presented. We see that, on average, these companies have a market value of about $19.7 billion. In terms of performance measures, we find that the firms have an average return on assets of 2.6% in the year prior to the announcement of the divestiture, which is considered quite low. The mean Tobin's q ratio is 1.8, which is high. A value above 1 means that the company is worth more than the cost of its assets. For shareholders, this means that their shares may be overvalued. In terms of debt, we see that the parent company has more debt than equity on average, with a debt-to-equity ratio of 118.1% (1.18). This means that for every $1 of equity, the company has $1.18 of debt. Finally, Table 4 provides information on the extent of diversification and the relatedness of the

asset sold. We see that, on average, a parent firm operates in 2.2 industry segments, given the first 2 digits of the respective SIC codes. Moreover, 69.8% of the selloffs are characterized as related assets.

Table 4. Summary statistics (*N* = 1,785)

Variable	Mean	Std. Dev.	p25	Median	p75
Value of transaction	388.1	969.4	33.9	100.0	300.0
Relative transaction value	.166	.421	.010	.0418	.144
Market value	19,718.6	49,804.58	744.4	3,008.9	13,104.4
Lagged asset turnover	0.970	0.736	0.480	0.810	1.21
Lagged operating profit margin	-5.95	197.00	3.64	8.98	16.18
Lagged ROA	2.61	14.22	.54	5.14	8.51
Lagged Tobins'q	1.768	0.996	1.188	1.486	2.009
Lagged Debt-to-Equity	118.2	10.147	23.0	58.1	113.4
Number of segments	3.01	1.78	1	2	3
Relatedness (0 = unrelated; 1 = related)	.698	.459	0	1	1

Value of transaction and market value are in $ million. Lagged ROA, Lagged Debt-to-Equity and Lagged operating profit margin are in percentages. Tobins'q and Lagged asset turnover are ratios.

3.2 Financial data

In addition to the event data, the stock prices for each event must be determined. More precisely, the stock prices of the selling firms in the estimation period and the event window must be obtained. Consistent with John and Ofek (1995), Nguyen (2016), and others, I estimate normal returns using the market model by adjusting the selling firm's stock returns around the event date to reflect broader market movements. In this case, the Standard & Poor's 500 Index (hereafter S&P 500) is used as a proxy for the market portfolio. The S&P 500 is the leading indicator of U.S. equities and is believed to best track upward and downward cycles since it contains companies from a wide variety of industries. In addition, the index is available throughout the sample period in this study, ensuring a suitable benchmark index.

The stock prices are obtained on a daily basis for each parent company divesting an asset. Specifically, for the analysis of short-term performance, daily stock prices are obtained for the 250 trading days preceding the announcement of the divestiture up to 10 days after the announcement, and for the long-run performance we gather stock price information up to 2 years post-divestiture. In addition to the stock prices of the seller, the daily stock prices for the S&P 500 Index are collected. To perform robustness checks, we further obtain daily stock prices of various other market index benchmarks. To be able to calculate the average security alphas, the Fama and French 3 factors, and the Momentum factor are downloaded from the Kenneth R. French Data Library.

The next step in this research is cross-sectional analysis, which requires firm-specific data. First, I gather data on the size of the seller. Following Hillier et al. (2009), I obtain the market value of equity for each firm in the sample 11 days before the announcement. The market value of equity is a commonly used indicator of firm size in the literature and is readily available. For very large numbers the natural logarithm is taken. In addition, data on operating performance is requested. Lui (2007), Montgomery and Thomas (1988), and Warusawitharana (2008), use the return on assets as a measure of operating performance. However, for more precise results, and more detailed insights we will split up return on assets into asset turnover and operating profit margin. To assess the impact of leverage in the cross-sectional regressions, we use the debt-to-equity ratio, in line with Nguyen (2016) and Pham et al. (2021). Each variable is adjusted by its respective industry median value, to control for macro-economic factors and ensure robust interpretation of the variables during regression analyses and the analysis of operating income. Finally, information is collected on the industry in which each company operates. Following Berger and Ofek (1999), Bergh, Johnson, and Dewitt (2008), Comment and Jarrell (1995), John and Ofek (1995), and others, I collect the primary 4-digit SIC code for each selling firm as well as any other non-primary 4-digit SIC codes. In addition, I obtain the primary 4-digit SIC of the asset being sold. An overview of the variables used for the regressions and information regarding their sources can be viewed in Appendix A.

4 Methodology

To test the hypotheses, the study will follow a well-defined methodology that includes all the necessary steps. In the first part of the study, the direct effects of selloffs on stock prices will be determined, using an event study method. Moreover, the changes in operating performance, resulting from a selloff will be addressed. In the second part of the study, regression analyses are used to evaluate the possible determinants of short- and long-term performance.

4.1 Short-term performance

To test the first hypothesis, we evaluate the impact of a selloff on the short-run performance of the parent company. For this test, we use the event study method, which allows us to analyze the financial impact on abnormal returns.

4.1.1 Event study

For the first analysis of the study, I will follow the steps presented by MacKinlay (1997) to perform the event study. Accordingly, we must first determine the length of the event window. For this analysis, we will use daily stock returns. Regarding the event window, MacKinlay (1997) explains how uncertainty about the exact announcement date can cause researchers to miss the event. To account for this, it is recommended that the event window be extended from the reported announcement date to one day before and one day after. With this in mind, we take a three-day interval [-1,1], a commonly used event window in divestiture research, and argued to identify abnormal returns more easily compared to longer event windows (Armitage, 1995). Moreover, the methodology for event studies assumes efficient markets of the semi strong form, where information is immediately reflected in stock prices. To account for the fact that this assumption is not always true (Oler, Allen, & Harrison, 2008), we follow Nguyen (2016) and include multiple event windows to ensure the robustness of abnormal returns. Consequently, we include an 11-day interval [-5,5] and a 21-day interval [-10,10].

Next, we need to determine the impact of the event, by calculating the abnormal returns over the event windows. MacKinlay (1997) defines abnormal returns as the difference between a firm's actual return and the estimate of its normal return. The normal return can be described as a firm's expected return if the event does not occur. For firm i at time τ the abnormal returns ($AR_{i\tau}$) can be calculated with the following expression:

$$AR_{i\tau} = R_{i\tau} - E(R_{i\tau}) \quad (1)$$

Where, $R_{i\tau}$ is a firm's actual return, and $E(R_\tau)$ is the normal return during the event window. These normal returns are modeled using the market model presented by MacKinlay (1997), which is a commonly used method in the literature on divestment performance, used for example by John and Ofek (1995), Lang, Poulsen and Stulz (1995), Nguyen (2016), and more. This model assumes that the market return and the return on a particular security are linearly related. Furthermore, the market model is considered superior to the alternative constant mean return model. The superiority stems from the fact that the variance of abnormal returns decreases when factoring out the part of the return that is associated with the variation in the market return (MacKinlay, 1997). For any given security i the market model is

$$R_{i\tau} = \alpha_i + \beta_i R_{m\tau} + \varepsilon_{i\tau} \quad (2)$$

Where, $R_{m\tau}$ are the period τ returns of the market portfolio and α_i and β_i are the parameters of the market model. For the market portfolio a stock index is used. For this research the S&P500 index has been chosen as market benchmark.

The next step is to choose an appropriate estimation window to estimate the normal returns. Usually, a period is chosen that precedes the event window. In addition, according to MacKinlay (1997), it is important to ensure that the event window is not included in the estimation period. In this way, one can ensure that the event does not affect the estimates of the market model parameters. In line with Lang, Poulsen and Stulz (1995) and Nguyen (2016), the estimation period starts 250 trading days before the event and ends 11 days before the event [-250, -11]. The estimates of the market model parameters α_i and β_i allow us to calculate and analyze the abnormal returns for each event. However, in order to draw conclusions from the abnormal returns, they must be aggregated. According to MacKinlay (1997), this aggregation is done over time and cross-sectional. For aggregation over time, we compute the cumulative abnormal returns (CAR). These returns are necessary when using an event window with multiple periods and can be described as the total abnormal returns over the event period. Equation (3) gives us the mathematical formulation for calculating these returns.

$$CAR_i(\tau_1\tau_2) = \sum_{\tau=\tau_1}^{\tau_2} AR_{i\tau} \quad (3)$$

To compute useful results, we also need to aggregate the abnormal returns of the individual securities. This is done using $AR_{i\tau}$ from equation (1) and gives the average abnormal returns (AAR) at each time τ. This computation helps eliminate idiosyncrasies in measurement due to particular stocks.

$$AAR_{\tau} = \frac{1}{N}\sum_{i=1}^{N} AR_{i\tau} \tag{4}$$

The average abnormal returns can now be aggregated across the event window as shown in equation (5). An alternative method is to average the cumulative abnormal returns as shown in equation (6). Through any of these equations, the cumulative average abnormal returns are computed.

$$CAAR_{(\tau_1,\tau_2)} = \sum_{\tau=\tau_1}^{\tau_2} AAR_{\tau} \tag{5}$$

$$CAAR_{(\tau_1,\tau_2)} = \frac{1}{N}\sum_{i=1}^{N} CAR_i(\tau_1,\tau_2) \tag{6}$$

To accept or reject the null hypothesis, the significance of the events is tested. To calculate the t-statistic the CAARs and the standard deviation of the CAAR are used. In equation (7) the variance of the AARs is calculated. Using equation (8), the variance of CAAR is calculated by summing the variances of the AAR.

$$\text{var}(AAR_{\tau}) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_{\varepsilon}^2 \tag{7}$$

$$\text{var}(CAAR_{(\tau_1,\tau_2)}) = \sum_{\tau=\tau_1}^{\tau_2} \text{var}(AAR_{\tau}) \tag{8}$$

Consequently, once we have the variance of CAAR, we can compute the parametric test-statistic with the following equation.

$$t_{CAAR} = \frac{CAAR_{(\tau_1,\tau_2)}}{\text{var}(CAAR_{(\tau_1,\tau_2)})^{\frac{1}{2}}} \tag{9}$$

To compute t_{CAAR} we assume a normal distribution. To assess robustness, it is useful to perform an additional non-parametric significance test that does not require such rigorous assumptions about the normality of the return distributions. Consequently, we perform a Wilcoxon signed-rank test for which we make no assumptions about the distribution of the returns. Besides looking at the signs of each abnormal return, this test also considers the magnitude of the observed differences.

First the absolute differences in returns are ranked from highest to lowest. Then a + or a – sign is attached to each rank, and $W^{+,-}$ is computed taking the sum of each sign. In the following equation (10), the z-value is computed.

$$Z_{Wilcoxon,\tau} = \frac{W - N(N-1)/4}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}) \tag{10}$$

Finally, using the Z-value, a corresponding p-value can be reported, and we are able to accept or reject the null hypothesis, stating that the median difference is zero.

4.2 Long-run performance

To test the second hypothesis, we evaluate the impact of divestiture on the long-term performance of the parent company. For this part of the study, we will analyze long-run abnormal returns, specifically buy-and-hold returns (BHAR). We will also evaluate the long-run impact on the parent firm's operating performance, addressing various ratios.

4.2.1 Buy-and-hold returns

According to Barber and Lyon (1997), the use of CARs as a measure of long-term performance leads to distorted results known as measurement bias. They advocate the use of a buy-and-hold method of abnormal returns. Buy-and-hold returns can be explained as the returns an investor earns through the investment strategy of buying a security and holding it over a period of time. By subtracting a benchmark, abnormal buy-and-hold returns can be estimated. These returns differ from CAR in the sense that they take into account the compounding effect of returns when a security is held for an extended period of time. Since CARs do not account for the compounding effect, the use of BHARs is preferred when conducting long-term event studies (Barber & Lyon, 1997).

As mentioned earlier, BHARs are calculated by subtracting the long-term returns of an appropriate benchmark from the buy-and-hold returns of the sample firm.

$$BHAR_{i\tau} = \prod_{\tau=1}^{\tau}[1 + R_{i\tau}] - \prod_{\tau=1}^{\tau}[1 + E(R_{m\tau})] \tag{11}$$

Where $R_{i\tau}$ is the raw buy-and-hold return of security i for time τ, and $E(R_{m\tau})$ is the buy-and-hold return of benchmark m for time τ. In line with Barber and Lyon (1997), these raw returns are calculated as simple returns, computing the change in price plus dividends and scaling this by the beginning of period price.

To test whether selloffs create value for the parent over a longer time interval, BHARs are estimated over a 12- and 24-month period after the event, where months are defined as consecutive periods of 21 trading days, and the 24-month period serves as a period addressed for long-term performance effects. For each of these intervals, statistical significance can be tested using a parametric test statistic.

$$t_{BHAR} = \frac{\overline{BHAR}_{i,\tau}}{\sigma(BHAR_{i,\tau})/\sqrt{n}} \tag{12}$$

Where $\overline{BHAR}_{i,\tau}$ can be described as the average buy-and-hold abnormal returns across the 12-months and 24-moths holding period. In line with Pham et al. (2021) none of the buy and hold periods include the month of the announcement date.

With respect to BHARs, Barber and Lyon (1997) note that there are potential statistical biases of which we must be aware. First, BHARs are subject to bias from new listings. It is argued that newly listed firms perform worse than the market average (Ritter, 1991). When new firms are added to the benchmark portfolio, BHARs may be positively biased. In addition, rebalancing bias occurs when an equally weighted market index is used as a benchmark. This is because the returns of such an index are usually calculated by periodic rebalancing. In order for such indexes to remain equally weighted, the stocks that have performed well are sold, while the stocks that have performed poorly are bought, resulting in a negative bias in the population mean of the BHARs. However, Canina et al. (1998) point out that such a bias is more pronounced when daily returns are used instead of monthly returns. Therefore, we use the monthly returns of the S&P500 Composite, a value-weighted index, to calculate BHARs. Moreover, since long-term returns depend on the choice of benchmark, we use more than one index benchmark to ensure the robustness of the results. Finally, Barber and Lyon (1997) argue that BHARs are positively skewed. They explain that it is common for a company in the sample to have annualized returns greater than 100%, whereas this is less common for market indexes. Looking at the distribution of the BHARs, we see there is skewness, so we winsorized the BHARs[2]. Next, instead of a student's t-statistic, we turn to a modified t-statistic explicitly accounting for skewness, presented by Johnson (1978).

[2] See appendix C for descriptive statistics of dependent variables

$$t_1 = \left[(\overline{x} - \mu) + \frac{\mu_3}{6\sigma^2 \mathrm{N}} + \frac{\mu_3}{3\sigma^4}(\overline{x} - \mu)^2\right][s^2/\mathrm{N}]^{-\frac{1}{2}} \quad (13)$$

With mean μ, variance σ^2, third central moment μ_3, sample mean $\overline{x}$, unbiased sample variance s^2 and sample size N. The Johnson's corrected t-test for skewed data loses little power, compared to the standard t-test (Kleijnen, Kloppenburg & Meeuwsen, 1986).

In addition to the BHARs, we adopt an alternative method to using index benchmarks proposed by Barber and Lyon (1997) to compute long-run abnormal stock returns. Specifically, we adopt the adjusted Fama-French three-factor model, namely the Carhart four-factor model, in which monthly excess returns are regressed on various factors. The four-factor model additionally accounts for momentum and thus improves the explanatory power of multifactor models (Carhart, 1997). Equation (14) describes what the models consist of:

$$R_{i\tau} - R_{f\tau} = \alpha_i + \beta_i(R_{m\tau} - R_{f\tau}) + s_i SMB_\tau + h_i HML_t + p_{i\tau} UMD_\tau \varepsilon_{i\tau} \quad (14)$$

Where, $R_{i\tau}$ is described as the simple return to the common stock of firm i, $R_{f\tau}$ is the return on a one-month treasury bill, and $R_{m\tau}$ is the return on a value-weighted market index of all NYSE, AMEX and NASDAQ listed stocks. Furthermore, SMB is a factor for size, HML addresses the book-to-market factor and UMD is a factor added to consider momentum, on which the monthly excess returns are regressed. The parameter of interest is the intercept α_i, with a positive value indicating that after having controlled for the various factors in returns, the sample firm has performed better than expected. This method might serve as a useful alternative as it considers cross-correlation and is less subject to skewness. On the other hand, advocates of the BHAR methodology explain how this method better represents the investor's investment experience, compared to other approaches measuring risk-adjusted performance (Dutta, 2015).

Following Lee and Lin (2008) we calculate the average security alphas and test their significance. To calculate the parametric t-statistic, first the intercepts from these regressions are averaged across the n sample firms. Then, this mean intercept term is divided by the cross-sectional standard deviation of the intercept terms, multiplied by the square root of n (Barber & Lyon, 1997).

4.2.2 Long-run operating performance

In addition to long-term stock price performance, we also examine the operating performance of the parent company's remaining assets succeeding the divestment. We compare efficiency, profitability, and growth measures over 12- and 24-month periods. We study asset turnover, operating profit margin, and Tobin's q, and examine whether there have been any significant changes subsequent of a selloff.

Following John and Ofek (1995), we adjust asset turnover and operating profit margin with the industry median for each parent company to account for macroeconomic factors. This procedure is performed by subtracting the industry median from the firm-specific values. To test the significance of the median changes, we perform a Wilcoxon signed-rank test[3]. The mean changes are assessed using a standard-test.

4.3 Multivariate regression analyses

In Sections 4.1.1 and 4.2.1, we establish whether the relationship between events and stock returns is positive or negative and examine the magnitude of the returns. In this section, we aim to examine the relationship between the magnitude of returns and the determinants that may explain the variance in performance while controlling for firm size, year, and industry fixed effects. Such additional insights can be obtained using cross-sectional regressions where the model can be estimated using OLS (MacKinlay, 1997). Consider the following basic model setup:

$$Y_i = \beta_0 + \beta_1 X_{1,i} + \beta_2 X_{2,i} + \cdots + \beta_m X_{m,i} + \varepsilon_i \tag{15}$$

We use the model presented in equation (15) to estimate the effects of the exogenous variables on the different measures of return used, where the parameter of interest is β. Applying this model to our study, we obtain equation (16).

$$\begin{aligned} CAR_i = {} & \beta_0 + \beta_1 T_i + \beta_2 AT_i + \beta_3 OP_i + \beta_4 DE_i + \beta_5 SEG_i + \beta_6 REL_i \\ & + \beta_7 \ln(CompanySize)_i + Industry_i + Year_i + \varepsilon_i \end{aligned} \tag{16}$$

In equation (16), CAR_i refers to the measure of short-term performance, namely cumulative abnormal returns, for each firm on each event window, β_0 is the constant, T_i is the relative transaction value, AT_i is the asset turnover, OP_i is the operating profit margin, DE_i is the debt-to-equity ratio, SEG_i is the number of segments the parent firm operates in before the divestment, REL_i is the relatedness of the asset being sold and $CompanySize_i$ refers to the size of the company. Furthermore, $Industry_i$ and $Year_i$ refer to the industry in which the company operates and the year the selloff has been announced and are incorporated to capture fixed effects.

The above equation is replicated below in equation (17) for the long-run abnormal returns as dependent variables.

[3] Please refer to section 4.1.1 for the mathematical formulation of the Wilcoxon signed-rank z-statistic.

$$BHAR_i = \beta_0 + \beta_1 T_i + \beta_2 AT_i + +\beta_3 OP_i + \beta_4 DE_i + \beta_5 SEG_i + \beta_6 REL_i + \beta_7 \ln(CompanySize)_i + Industry_i + Year_i + \varepsilon_i \quad (17)$$

Here, $BHAR_i$ refers to the measure of long-run performance, represented by the buy-and-hold abnormal returns, for each firm over a medium-term (12 months) and a long-term (24 months) period.

In using OLS regressions, it is important to be aware of the assumptions that are taken, which are outlined in MacKinlay (1997). First, we assume that the ε_i is has a mean of zero and is cross-sectionally uncorrelated. Next, we assume that the error terms are uncorrelated with the dependent variables. We also assume that the variance of the errors is constant (homoscedasticity) and that they follow a normal distribution. Finally, we assume that the independent variables are not exactly correlated with each other.

In the regression analyses, we test for heteroscedasticity using the Breusch-Pagan (1979) / Cook-Weisberg (1983) test. If it turns out that heteroscedasticity is present, we use an approach introduced by White (1980) that uses robust standard errors. To test whether two explanatory variables are strongly correlated with each other (multicollinearity), we evaluate the variance inflation factors (VIF), of which the values can be found in Appendix C. In addition, the logarithm is taken to handle nonlinearity due to large observations, if necessary. Finally, according to the Central Limit Theorem (CLT), we can assume that our sample is approximately normally distributed due to the large sample.

5 Results

In this part of the study, the empirical results will be brought forward. Each of the hypotheses is treated in a chronological order, with a clear distinction between the short-term performance implications, the long-term effects on performance. Moreover, the impact of the explanatory variables will be addressed.

5.1 Short-term performance results

H1: Selloffs by U.S. listed firms are positively related to subsequent firm performance

The abnormal returns and the cumulative abnormal returns averaged over the events are shown in Figure 1 below. The figure shows us the returns from 10 days before the event to 10 days after the event. It appears that the market reacts positively to the announcement of a selloff as evidenced by the observable increase in CAARs. It is interesting to observe that share prices rise even before the actual event (day 0), indicating a possible information leak. From this preliminary observation, we can already conclude that the Efficient Market Hypothesis does not take a strong form. Moreover, we see that the event date itself seems to capture much of the impact of the divestment announcement and we observe a quick market reaction.

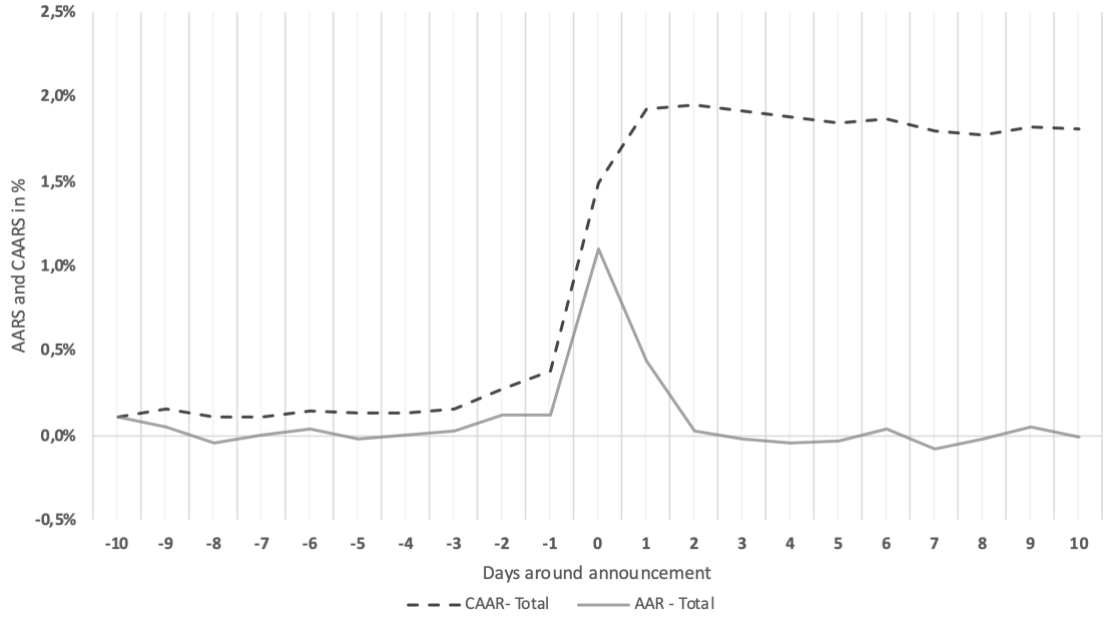

Figure 1. Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR) of the sample firms around the announcement date.

To test whether the selloff positively affects the parent company's short-term stock performance of the parent company (see Hypothesis 1), the statistical significance of the cumulative abnormal average returns is evaluated using the different intervals. Table 5 shows the aggregate abnormal returns for the day the event was announced and the intervals around the event date. In addition, the test statistics of the non-parametric Wilcoxon tests are given. In general, the results in Table 5 are consistent with the expectation in Hypothesis 1. We find that, on average, a firm announcing a divestment records a positive abnormal return of 1.10%, which is called a significant change at the 1% level. When we evaluate the 3 days surrounding the announcement date, we record a positive abnormal return of 1.65%, which we find to be significant at the 1% level.

Table 5. Overview of event study

	N	Mean (%) (t-statistic)	Median (%)	Sign Rank Z
$AAR_{[0]}$	1,785	1.10^{***} (8.287)	0.27	8.223^{***}
$CAAR_{[-1,1]}$	1,785	1.65^{***} (8.373)	0.46	7.956^{***}
$CAAR_{[-5,5]}$	1,785	1.69^{***} (6.643)	0.73	5.983^{***}
$CAAR_{[-10,10]}$	1,785	1.81^{***} (5.661)	0.82	5.079^{***}

This table displays the average change in stock prices surrounding the announcement of divestment for a firm. The returns are estimated over a 240-day estimation window [-250, -11] using the market model and the S&P500 index as a benchmark. $AAR_{[0]}$ is described as the average abnormal return on the event day. $CAAR_{[-1,1]}$ is the cumulative average abnormal return for the interval one day before to one day after the event. $CAAR_{[-5,5]}$ is the cumulative average abnormal return for the interval five days before to five days after the event. $CAAR_{[-10,10]}$ is the cumulative average abnormal return for the interval ten days before to ten days after the event. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector. A standard t-test is performed to compute the t-values. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

For the 11-day interval, a positive abnormal return of 1.69% is observed, which is significant at the 1% level. Finally, for the 21-day period around the event, a positive abnormal return of 1.81% is observed. This return is also found to be significant at the 1% level. Interpreting the results of the Wilcoxon tests, we can conclude that the results are robust at the 1% significance level. The results of both the standard t-test and the Wilcoxon tests indicate that there is reason to believe that the abnormal returns during the event periods are significantly different from zero. This tells us that the market generally reacts positively when a company announces that it will sell an asset. When using alternative market indices to account for different weighting approaches, and to incorporate mid cap firms, the results are similar,

suggesting the findings are robust[4]. Furthermore, we see that CAARs increase with the length of the interval, suggesting that news of the divestment is not immediately priced in. When we compare these results with those of previous studies, we find that these results are consistent with previous research and that the cumulative abnormal returns in this study are within the range of 1.12% to 3.9% reported in similar research on divestments by Brauer (2006). Therefore, we accept Hypothesis 1.

5.2 Long-run performance results

5.2.1 Results long-run abnormal returns

> **H2a:** Selloffs by U.S. listed firms are positively related to subsequent long-run stock performance.

The above analysis provides evidence of positive CAARs associated with announcements of selloffs. As described in Section 2, academics have increasingly questioned, whether divestments also affect the long-term performance of the parent company.

To test whether selloffs affect the parent's long-term stock performance (Hypothesis 2a), we assess the statistical significance of the abnormal buy-and-hold returns, and average security alpha. Table 6 shows the aggregate abnormal returns for the 12-month period and the 24-month period. In addition, the test statistics of the non-parametric Wilcoxon tests are reported.

In Table 6 we find statistically significant positive abnormal stock returns for parent firms after the selloff announcement, over both the 12-month period and the 24-month period using the skewness adjusted t-test. We report an average abnormal return of 1.70% and 1.60% respectively, both significant at the 1% level. Interpreting the results of the Wilcoxon signed rank tests, we can see that both the 12- and 24-month period are significant at the 1% level. As a test for robustness, we used different market indices as benchmarks, to account for weighting of the indices, and to incorporate mid cap companies. The results of these robustness checks for the BHARs, report similar outcomes in terms of the t-test and the signed rank test[5]. Compared to Pham et al. (2021), the abnormal buy-and-hold returns are lower. However, a more conservative approach was taken in calculating the t-statistic by adjusting it for skewness in this study. However, apart from the differences in methods, my results are consistent with those of Pham et al. (2021), who find significant and positive abnormal returns.

When addressing the long-run stock performance with an alternative measure, namely the average security alpha, using Carhart's four-factor model, we find a positive average security alpha of

[4] Please see appendix D for the results of using different market indices as benchmarks.
[5] Please see appendix D for the results of using different market indices as benchmarks.

0.64% for the 12-month period and 1.05% for the 24-month period. Both these values are significant at the 1% level. This suggests that actual returns are positive given their loading of risk factors.

Table 6. Overview long-run abnormal stock returns

	N	Mean (%) (t-statistic)	Median (%)	Sign Rank Z
$BHAR_{[12\ months]}$	1,785	1.70^{***} (5.100)	1.0	4.715^{***}
$BHAR_{[24\ months]}$	1,785	1.60^{***} (3.980)	0.8	4.709^{***}
$\alpha_{[12\ months]}$	1,785	0.64^{***} (2.626)	1.0	0.733
$\alpha_{[24\ months]}$	1,785	1.05^{***} (5.786)	0.81	5.672^{***}

This table displays the average buy-and-hold abnormal return for holding periods that extend from 12 months ($BHAR_{[12\ months]}$) to 24 months ($BHAR_{[24\ months]}$) following the divestiture event both winsorized at 1 and 99% cuts. The abnormal returns are calculated using the S&P500 Index as a benchmark. The average security alpha using the Carhart four-factor model are reported in the table for a 12-month period ($\alpha_{[12\ months]}$) and a 24-month period ($\alpha_{24\ months]}$) and are calculated using multiple factor loadings. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector. For the buy-and-hold abnormal returns a Johnson adjusted t-test is performed to compute the t-values. For the Carhart four-factor model abnormal returns a standard t-test is performed to compute the t-values. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

Looking at the Wilcoxon signed rank tests, we conclude that the results for the 24-month period are significant at the 1% level, yet no significance was found for the 12-month period of the alphas.

Overall, the results of the average security alphas are at odds with those of Lee and Lin (2008), who report a negative and significant average security alpha of 0.64%. However, a direct comparison is problematic as they draw a sample of UK selloffs and over a shorter period (1993 - 1997). Moreover, their security alpha returns focus on a 60-month period after the announcement. When we compare with a more similar research design, we see that our results are consistent with those of from Bates (2005) and show overall significant and positive alphas.

For hypothesis 2a we assess the overall results of the long-term period (24 months) and conclude that the reported values for both the BHAR method, and the average security alpha method are statistically significant. Moreover, the results remain consistent using both an adjusted t-test and a signed rank test. Hence, we accept hypothesis 2a and conclude that selloffs do indeed have a positive impact on the long-run stock performance of the parent company. For the medium-term, i.e., the 12 subsequent months, caution is required when interpreting the results due to the lack of significance of the Wilcoxon signed rank test for the alpha security.

5.2.2 Results long-run operating performance

H2b: Selloffs by U.S. listed firms are positively related to subsequent long-run operating performance.

In addition to the stock price analysis for long-run performance, we analyze the operating performance of parent companies that sell assets (Hypothesis 2b).

Table 7. Changes in parent company's operating performance following the selloff

	N	Median	Mean
Operating profit margin			
Industry-adjusted year 0 level		0.035***	0.001
Industry-adjusted change year 0 to 1	1,777	0.001	0.003
Industry-adjusted change year 0 to 2	1,775	0.004***	0.002
Asset turnover			
Industry-adjusted year 0 level	1,785	-0.083***	0.047
Industry-adjusted change year 0 to 1	1,785	0.019***	0.003
Industry-adjusted change year 0 to 2	1,785	0.025***	0.019**
Tobin's q			
Change year 0 to 1	1,785	0.013	-0.0001
Change year 0 to 2	1,785	0.017*	0.030*

This table reports the change in seller's profitability following the divestiture. Industry-adjusted values are computed by subtracting the medians for a given industry, from the divesting firm's values. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector. The number of observations for operating profit margin differs due to missing values in the subsequent years of divesting. The median significance tests are based on the Wilcoxon signed-rank test. The mean significance tests are based on the standard t-test. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

We use a combination of accounting and market-based measures to assess the post-sale impact. We look at the median change in the ratios from year zero to year 1 and year 2. Table 7 shows the results. We see that firms generally become more profitable after divestment. In terms of operating profit margins, the parent firms experience positive median changes in the two subsequent years. In the first year, a small and insignificant industry-adjusted median change of 0.001 is observed. Comparing the second year with the year of the announcement, we find a median change of 0.004. This is significant at the 1% level and represents an 11.67% improvement in operating profit margins.

The asset turnover rate also shows positive changes after adjusting for the industry-wide movement. A median change of 0.019 was observed, between year zero and year one. This change was significant at the 1% level and corresponded to a 17.78% increase in asset turnover. Comparing the second year to year zero, we find that the median change is 0.025, adjusted for industry movements, also significant at the 1% level. This corresponded to a 13.69% increase in asset turnover. The lower than industry asset turnover in year zero and the improvement afterward are consistent with the research of John and Ofek (1995) and complement the expectation of increased efficiency of the remaining assets.

As for the changes in Tobin's q, the results are less pronounced compared to the other measures. The first year after the announcement is characterized by a median industry-adjusted change of 0.013, which is, however, not significant. Comparing the second year to year zero, the change appears to become significant at the 10% level, with a positive change result of 0.017. This corresponds to an increase in Tobin's q of 0.51%.

The results presented in Table 7 are consistent with our expectations. We accept hypothesis 2b and confirm that parent firms in our sample experienced an increase in operating performance after the announcement of a selloff. The effect is observed two years after of the announcement for all ratios.

5.3 Regression results

In order to analyze the determinants that have a possible influence on the variance of performance outcomes, a series of cross-sectional regressions are conducted for variables that have been found to be influential according to previous literature. The most commonly discussed variables are transaction value, prior firm performance, leverage, degree of diversification and the relationship of the divested asset to the core business of the parent firm. Therefore, these variables are included in the regression models, as well as a control variable for firm size and fixed effects for year and industry. We will discuss Hypotheses 3, 4, 5, 6a and 6b separately for both short and long-run stock performance.

5.3.1 Regression results short-term performance

First, the determinants are regressed on the short-term stock performance results. The results are reported in Table 8 and include three different dependent variables. Namely, the cumulative average abnormal returns for the three event windows. We see that the constant for each event window has a positive coefficient, suggesting that on average, selloffs lead to positive abnormal returns when everything else is held constant.

> **H3**: The relative transaction size is positively related to the parent firms' performance after a selloff.

We see that the relative transaction value, measured as the natural logarithm of the transaction value over the market value of the parent company, seems to positively influence the stock market reaction to selloffs. The coefficients range from 0.0075 to 0.0010 and are significant at the 1% level in all event windows. When the relative transaction value increases by 1 percent, the cumulative average abnormal returns for the 3-day event window increase by 0.0075 percent. The observed effect in the different event windows is consistent with the findings of previous research, e.g., Afshar, Taffler and Sudarsanam (1992), and seems logical since as larger transactions have a greater impact on the stock price than smaller transactions. Based on the results presented, we accept hypothesis 3 and conclude that an increase in relative transaction size leads to an increase in parent company performance.

> **H4:** The financial condition of the parent firms is related to the performance after a selloff.

Regarding the seller's prior financial condition, although the adjusted asset turnover does not seem to affect the abnormal returns in any of the event windows, the signs of the coefficients are positive and in line with our expectations. Moreover, the operating profit margin seems to positively influence the stock market's reaction to selloff announcements. For the event window [-10,10], the effect seems to be significant with a coefficient of 0.0763, at the 5% level. For a 1 percent increase in the operating profit margin, cumulative abnormal returns increase by 7.63%. The fact that the asset turnover ratio and the operating profit margin are generally positive is consistent with our expectations and the evidence provided by Heart and Zaima (1984). One possible explanation for the lack of significance across event windows for asset turnover is that the selloff may have been expected, as firms with low asset base efficiency have a higher probability of selling these inefficient assets (Nguyen, 2016). Even though positive signs of the coefficients can be detected, they are not significant across the different time intervals, except for the 21-day event window. Therefore, we cannot accept hypothesis 4 with certainty.

Table 8. Regression results of CARs

	$CAAR_{[-1,1]}$	$CAAR_{[-5,5]}$	$CAAR_{[-10,10]}$
Constant	0.0307**	0.0359*	0.0307
	(0.040)	(0.086)	(0.249)
Relative transaction value (T)	0.0075***	0.0083***	0.0010***
	(0.000)	(0.000)	(0.000)
Adjusted asset turnover (AT)	0.0037	0.0067	0.0093
	(0.302)	(0.169)	(0.128)
Adjusted operational profit margin (OP)	-0.0052	0.0352	0.0763***
	(0.808)	(0.215)	(0.032)
Adjusted debt-to-equity (DE)	0.0005	0.0012	0.0018
	(0.418)	(0.192)	(0.149)
Number of segments (SEG)	0.0024**	0.0031**	0.0023*
	(0.016)	(0.010)	(0.100)
Relatedness (REL) (0 = unrelated; 1 = related)	-0.0015	-0.0051	-0.0008
	(0.702)	(0.348)	(0.902)
Firm size	-0.0042***	-0.0058***	-0.0063***
	(0.011)	(0.004)	(0.020)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
F-value	2.49***	2.62***	1.77***
R^2	0.0895	0.0745	0.0620
N	*1,785*	*1,785*	*1,785*

This table reports the results of the OLS regression, where the cumulative average abnormal return for specific event window is the dependent variable and shown across the three columns. $CAAR_{[-1,1]}$ refers to the 3-day interval, $CAAR_{[-5,5]}$ to the 11-day interval and $CAAR_{[-10,10]}$ to the 21-day interval surrounding the event. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector *Relative transaction value* is the natural logarithm of the transaction value over the seller's market value of equity. *Adjusted asset turnover* is the difference between the seller's asset turnover and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Adjusted operational profit margin* is the difference between the seller's operational profit margin and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Number of segments* is based on the 4-digit SIC codes of the seller. *Adjusted debt-to-equity is* the difference between the seller's debt-to-equity and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Relatedness* indicates whether the divested asset is a noncore asset (unrelated) or a core asset (related) comparing the main 2-digit SIC code of the divested asset. Heteroskedasticity is present for all event windows, thus robust standard errors used. For the p-values, indicated between brackets, and the F-values, ***, **, * denote statistical significance at 1%, 5% and 10% level.

H5: Leverage is positively related to the parent firms' performance after a selloff.

When we assess the influence of leverage, we observe a positive effect in the results, with coefficients ranging from 0.0005 to 0.0018. Despite the lack of solid evidence, the relation is in line with our expectations and shows that firms with higher leverage, expressed as parent company's debt-to-equity ratio, have a more positive impact on performance. Moreover, when running an additional regression including leverage squared, we observe the presence of an inverse effect, with negative coefficients being reported. Even though insignificant, these findings support the static tradeoff theory, that predicts an inverse U-shaped relation between leverage and firm value. Based on these results, we are not able to accept hypothesis 5.

H6a: The positive effect of a selloff on parent firm performance is greater for companies that are more diversified.

H6b: The positive effect of a selloff on parent firm performance is greater when it involves non-core assets being sold.

Regarding the seller's focus, the degree of diversification, explained as the amount of segments in which a seller is active, seems to positively influence the stock market's reaction to selloffs. The coefficients range from 0.0023 to 0.0031 and turn out to be significant at the 5% significance level for the event windows [-1,1] and [-5,5] and at the 10% significance level for the event window [-10,10]. These results are consistent with our expectations and support the findings of Haynes, Thompson, and Wright (2002), which suggest that parent companies increase their performance when they reduce their degree of diversification, thereby increasing the focus of their business operations. Based on these results, we can accept hypothesis 6a. When we evaluate focus based on asset relatedness, we observe a negative relationship with firm performance. The coefficients range from -0.0008 to -0.0051 and suggest that the market reacts more positively to a selloff of an unrelated asset than to the sale of a related asset. However, no significant impact was found. Therefore, we cannot accept hypothesis 6b.

5.3.2 Regressions results long-run performance

In this part we will evaluate the results of the regressions for long-run stock performance. The determinants remain the same, however the dependent performance variables have changed. The dependent variables used vary in terms of time. A medium-term (12 months) and a long-term (24 months) period are evaluated, for which the results can be found in Table 9.

H3: The relative transaction size is positively related to the parent firms' performance after a selloff.

Evaluating hypothesis 3, we find that the impact of the transaction has become insignificant, which contrasts with the results of abnormal returns around the announcement date. Despite the lack of solid evidence in terms of significance, the relationship of the variable remains positive with coefficients ranging from 0.0027 to 0.0032. The results are in line with our expectations and support the results of the regression on the CARs, which suggest that larger transactions have a more positive impact on parent company performance following a selloff. Due to the lack of significance, we cannot accept hypothesis 3 for the long-run stock performance.

H4: The financial condition of the parent firms is related to the performance after a selloff.

Looking at the impact of the financial condition of the parent firm, asset turnover seems to positively affect the market value of the parent firm. The coefficients range from 0.0121 to 0.0172 and prove to be significant for the 24-month holding period. These results are in line with our expectations and suggest that firms with a higher turnover rate generate higher abnormal returns in the long run than firms that are less efficient. For operating profit margin, the coefficients are 0.0644 and 0.0775, indicating a positive relationship with the subsequent performance of the parent company. However, due to the lack of significance, operating profit does not seem to be a crucial determinant in explaining long-run performance. Moreover, we find that the two measures used to determine the financial condition of the parent firm preceding a selloff, complement each other in terms of sign. When we compare the results of the impact of financial condition on the short and long-run performance, we find that firms that firms that are profitable in terms of operating profit obtain higher announcement returns. Moreover, firms that have a high asset efficiency in terms of asset turnover, have higher long-run stock performance. Even though we observe some significant effects, they are not convincing for all dependent variables, so we do not accept hypothesis 4.

H5: Leverage is positively related to the parent firms' performance after a selloff.

With regards to leverage, we find that the market reacts more positively to a selloff announcement, for companies characterized as highly levered, compared to companies with less debt. The coefficients range from 0.0031 to 0.0044 and are significant at the 10% significance level for $BHAAR_{[12\ months]}$ and the 5% level significance level for $BHAAR_{[24\ months]}$. What this entails, is that for a 1 percent increase in leverage, expressed as the debt-to-equity ratio of the parent firm, abnormal returns increase by 0.31 percent for a 12-month holding period, and by 0.44 percent for a 24-month holding period.

Table 9. Regression results long-run stock performance

	BHAAR [12 months]	BHAAR [24 months]
Constant	0.0700**	0.0511
	(0.036)	(0.156)
Relative transaction value (T)	0.0027	0.0032
	(0.399)	(0.291)
Adjusted asset turnover (AT)	0.0121	0.0172*
	(0.107)	(0.058)
Adjusted operational profit	0.0644	0.0775
margin (OP)	(0.135)	(0.135)
Adjusted debt-to-equity (DE)	0.0031*	0.0044**
	(0.063)	(0.046)
Number of segments (SEG)	-0.0003	-0.004
	(0.908)	(0.878)
Relatedness (REL) (0 = unrelated;	-0.0141	-0.0160
1 = related)	(0.119)	(0.120)
Firm size	-0.0031	-0.0017
	(0.374)	(0.653)
Industry FE	Yes	Yes
Year FE	Yes	Yes
F-value	1.60**	1.59**
R^2	0.0490	0.0540
N	*1,785*	*1,785*

This table reports the results of the OLS regression where the buy-and-hold average abnormal returns, and the average Carhart four-factor model abnormal returns for specific intervals are the dependent variables and shown across the four columns. The intervals taken are 12-months and 24-months subsequent of a selloff announcement. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector. *Relative transaction value* is the natural logarithm of the transaction value over the seller's market value of equity. *Adjusted asset turnover* is the difference between the seller's asset turnover and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Adjusted operational profit margin* is the difference between the seller's operational profit margin and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Number of segments* is based on the 4-digit SIC codes of the seller. *Adjusted debt-to-equity is* the difference between the seller's debt-to-equity and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Relatedness* indicates whether the divested asset is a noncore asset (unrelated) or a core asset (related) comparing the main 2-digit SIC code of the divested asset. Heteroskedasticity is present for all event windows, thus robust standard errors used. For the p-values, indicated between brackets, and the F-values, ***, **, * denote statistical significance at 1%, 5% and 10% level.

These results are in line with our expectations and support the findings of Bates (2005), who explains how highly levered firms typically use the proceeds from a selloff to pay down debt, which

lowers their cost of capital and opens up opportunities for future value-creating investments (Nguyen, 2016). Based on the results presented, we accept hypothesis 5 for the long-run performance.

> **H6a:** The positive effect of a selloff on parent firm performance is greater for companies that are more diversified.

> **H6b:** The positive effect of a selloff on parent firm performance is greater when it involves non-core assets being sold.

As for the degree of focus of the parent company, the level of diversification does not seem to be a determinant of the variance of long-term stock performance, so we cannot accept hypothesis 6a. Looking at the level of relatedness of the asset, Table 9 reports a coefficient of -0.0141 for the 12-month holding period, and -0.0160 for the 24-month holding period. There appears to be a negative relationship between the relatedness of the asset and the subsequent long-run stock performance of the parent company, suggesting that when an unrelated asset is sold, the abnormal returns are higher than when a related asset is sold. Although the results are not significant, they are in line the results in Table 8 in terms of signs and are consistent with our expectations. However, we cannot accept hypothesis 6b.

In assessing the legitimacy of all regressions, we analysed the variance inflation factors to detect severe multicollinearity, as well as evaluated the correlation matrix. However, no multicollinearity issues were identified. In addition, we performed a Breusch-Pagan and Cooks-Weisberg test for heteroscedasticity, which was found to be present. Therefore, the regressions were run with robust standard errors. Looking at the F-statistics of the model, the results indicate that the independent variables can significantly explain the dependent variable. Finally, we added dummy variables to the models to control for industry and year fixed effects.

5.4 Robustness

The robustness of the results has already been addressed throughout the paper, but we address the issue here in summary. First of all, the standard S&P500 index is calculated using a value-weighted approach, where the companies with the largest market capitalization are given the highest weight in the index. Although this type of index gives a good indication of a company's importance in the economy, the method favours larger companies too much. Therefore, it might be useful to repeat the analyses using an equally weighted form of the S&P500 index that favours smaller companies by giving them the same weighting as larger companies. Therefore, to ensure the robustness of the abnormal returns in the short- and long-term performance analysis, we perform additional analyses using the equally weighted S&P500 index. We find that the results are very similar to the value-weighted results, suggesting that

our results are robust across different weighting schemes. In addition to the different weightings, we take into account the fact that the S&P500 index focuses on large-cap firms. Since our sample also consists of mid-cap companies, using an index that also includes mid-cap companies might provide more reliable results. Therefore, we repeat the short- and long-term stock performance analyses using the FTSE USA index and the MSCI USA index, both of which include mid-sized companies. The results are very similar to our original findings, so we conclude that they are robust to different market indexes. In addition, we incorporated an alternative measure for long-run stock performance. Using Carhart's four-factor model we obtain similar results in terms of sign and significance. Finally, because we find that the buy-and-hold abnormal returns are heavily skewed, thus not perfectly normally distributed, we winsorized the BHARs at 1 and 99% cuts. Moreover, we used a skewness adjusted t test.

Using the equally weighted version of the S&P500 index, the MSCI USA and the FTSE USA, we run the regressions again. We see that for short-term performance, all coefficients remain the same in terms of sign and significance. For long-term stock performance, the only notable change is that the asset relatedness variable has become significant, but only at the 10% significance level for the 24 months BHAR using the equally weighted S&P500 index. Beyond that, no major changes are observed. These results once again confirm the robustness of our original findings.

We obtained all relevant data from Datastream, for the independent variables. We used lagged variables dating back one year before the divestment, ensuring that the divestment did not influence the performance before the selloff was announced. Taking these lagged variables help us deal with possible endogeneity problems. Moreover, because we incorporated control variables, we made sure that the independent variables did not suffer from omitted variables bias.

6 Discussion

In this study we aim to answer the research question, "How do divestments in the form of selloffs affect the performance of a parent firm?" The theories and logical considerations put forward in the literature suggest that selloffs have a positive impact on the performance of the parent company. Divestment provides the opportunity to reduce agency costs, improve operational efficiency and adapt to a changing environment, which increases the value of the firm. In addition, the literature provides evidence that various firm- and asset-specific characteristics influence the variance in the magnitude of performance improvement. Section 5 presents the results of the different types of analyses. First, the results of the short and long-run performance implications are presented. These results are then used for the second part, the cross-sectional regressions. A total of 1,785 selloff events were examined, which is a substantially larger quantity compared to the previous literature. Mulherin and Boone (2000), examined 370 events of which only 139 were designated as selloffs. In addition, Jain (1985) used about 1000 events, but in an outdated time frame (1976 - 1978).

To understand the impact on performance from the viewpoint of the shareholders and other stock market participants, an event study shows the direct impact on the market value of the company. In this study, different event windows are used to account for possible information leakage. The event study analysis shows an average cumulative abnormal return of 1.65% in the 3 days around the event. When we use different time intervals, we observe a consistent positive and significant return at the 1% level. This implies that, on average, the market reacts positively to a selloff announcement across the different industries and years. This finding supports previous empirical results, including those of Nguyen (2016) and Mulherin and Boone (2000). Moreover, this conclusion holds even when different benchmarks are used, and the Wilcoxon signed rank test is performed. Therefore, we accept with confidence hypothesis 1, which states that selloffs are positively associated with subsequent parent company performance. Although this result is not really new, it is a useful extension of previous research as a more recent time frame and a much larger sample was used.

In a departure from previous research on selloffs, we also include an analysis of the long-run stock performance implications. This analysis allows us to observe whether the short-term gains, and market expectations translate into long-term success. These effects are still largely unexplored (Moschieri & Mair, 2008), but provide useful information to managers. The results of the long-run stock performance seem to be consistent with the short-term gains from the previous analysis, suggesting that the short-term success is sustainable. We find that for the long-run period of 24 months, an average buy-and-hold abnormal stock return is achieved of 1.60%. Using Carhart's four-factor model instead, reports an average return of 1.05%. These two abnormal returns are significant at the 1% level and support earlier empirical results by Bates (2005). These results prove to be robust to various market benchmarks and remain the same when performing the Wilcoxon signed rank test. Therefore, we accept hypothesis

2a which states that selloffs positively impact the subsequent long-run stock performance of the parent firm. Several theoretical explanations for the performance effects have been put forward in the previous literature. For example, Mulherin and Boone (2000) argue within the framework of agency theory that selloffs have the potential to reduce agency problems such as managerial entrenchment, empire building and management hubris. In addition, Haynes, Thompson, and Wright (2002) argue that through selloffs, efficiency improves, which can be largely explained by the concentration of managers on fewer resources and less diverse operations.

The other part of the long-term performance analysis is the analysis of the operating performance of the parent company. Richard et al. (2009) argue that by combining an accounting measure of performance and a market-based measure, a better balance is struck between risk (often ignored in accounting metrics) and operational performance (sometimes lost in market measures) is provided. In this study, both performance measures are combined to address the need for such an integrative approach, which is not present in the existing literature (Moschieri & Mair, 2008). The results of the analysis of the long-run operating performance show positive and significant changes in the comparison between the second year post selloff to year zero for all three measures. For example, asset turnover has a median change of 0.025, adjusted for industry, between year zero and year two and is significant at the 1% level. These positive and significant results for all three measures lead us to accept hypothesis 2b, which states that selloffs have a positive impact the subsequent long-run operating performance of the parent company. The significant improvement in the asset turnover ratio suggests that the remaining assets of the parent company that undertakes a selloff become more efficient, which is consistent with the focusing hypothesis presented the literature review. When a firm is overdiversified, organizational capabilities can no longer keep up with the range of business activities carried out. In this case, the marginal benefit of diversification decreases as firms move away from their core business. Selling an asset, reduces diversification and increases focus on the core business, leading to improved efficiency of the remaining business. The higher the asset turnover rate, the more efficient a firm is in generating revenue from its assets, and as John and Ofek (1995) argue, a direct consequence of this can be higher operating profit margins, as the results of this study also show. Higher operating profit margins indicate that a firm has lower fixed costs, and a better gross margin, or that its revenues are increasing faster than its costs. In addition, the increase in Tobin's q suggests that after a selloff the parent firm becomes a better investment opportunity, has a higher potential for growth, and that its management performs better with the remaining assets (Lang, Stulz & Walkling, 1989).

OLS regressions were run to find out which firm and asset characteristics affect the short and long-run abnormal returns. The first variable is transaction size. The results of this study confirm the findings presented by Alexandrou and Sudarsanam (2001), Clayton and Reisel (2013), Mulherin and Boone (2000), and others that transaction size is positively related to the abnormal returns of a selloff event. We observe positive coefficients for the short-term abnormal returns that are significant at the 1% level. We do not observe significance for the long-run abnormal returns, but we report positive signs.

This suggests that the market rewards larger transactions significantly more than smaller transactions. This could indicate that divestment in the form of a selloff, is not the best option when disposing of very small units. The fact that we observe a significant effect relatively soon after the announcement can be explained by the fact that the sample used in this study only includes announcements where the transaction value was disclosed. The market is therefore able to react immediately. Based on these results, we accept hypothesis 3 for the short-term performance, and reject the hypothesis for having an effect on the long-run performance.

To find out whether the preceding financial condition of the parent firm influences the abnormal returns, we analysed the effect of asset turnover and operating profit margin of the parent firm one year before the announcement on abnormal returns. We find that there is a positive relationship with the announcement of a selloff. Thus, the short- and long-term stock abnormal stock returns are likely to be higher for firms with a high asset turnover ratio and a high operating profit margin than for firms with low ratios when a firm announces to divest an asset. One possible reason for the observed positive relationship is that the market expects firms, that are performing well, to have a better bargaining position. Heart and Zaima (1984) argue that high-performing firms seeking divestiture are not under direct pressure to divest, they are not in a hurry, so they have an advantageous bargaining position when it comes to obtaining the highest possible price. However, in terms of significance, we find weak results. Asset turnover seems to be significant only in the second year after the selloff, at the 10% level. Moreover, the operating profit margin is only significant at the 1% level in 21-day interval. The fact that the market reacts more quickly to companies with higher operating profit margins than to information on asset turnover could be due to the fact that information on asset efficiency is less readily available compared to standard profit margins. In any case, we cannot accept hypothesis 4 as it does not affect either the short-term or the long-term performance of the parent company. Moreover, these results are inconsistent with those of Warusawitharana (2008), who stated that firms that divest in financial distress are more likely to improve their performance because they can reduce their size and returns to their optimal scale by divesting excess assets. This possibly suggests that higher bargaining power is more valued by the market than returning to an optimal scale of size and returns.

Another variable discussed in the literature as a determinant of the abnormal returns is leverage. This study finds that leverage, measured as the debt-to-equity ratio, is positively related to the announcement of a selloff. Firms that use the proceeds of a selloff to pay down debt move further away from a situation where the expected costs of distress exceed the advantages of having a high level of debt. Moreover, it is likely that the cost of capital for companies that choose to repay their debt with the proceeds will fall, allowing these companies to make better value-enhancing investments. As illustrated in the static tradeoff theory, leverage can have a positive and a negative effect on firm value (Myers, 1984). The theory predicts an inverse U-shaped relationship between leverage and firm value, where the value of the firm increases with increasing leverage due to tax benefits and the disciplining effect on agency costs. However, beyond a certain optimal point, the value of the firm decreases due to the

increased cost of financial distress. To find out whether this inverse U shape exists in the sample, we also included a leverage squared term in the regression. Although none of the squared coefficients were significant, they were negative in all regressions, consistent with the static tradeoff theory, indicating the presence of an optimal point for debt and an inverse U-shaped relationship with firm value. As for the significance of the coefficients of the initial leverage, we find that for the impact on short-run performance is not significant, which is consistent with Nguyen (2016) but in contrast to the results of Afshar, Taffler and Sudarsanam (1992) and Lasfer, Sudarsanam and Taffler (1996), who found a positive effect between leverage and announcement returns. The effect of leverage on the parent's long-term stock performance appears to be significant, at the 10% and 5% levels. According to Bates (2005), companies do not always immediately disclose what is done with the proceeds of the sale, so the effect is observed after a longer period of time, when this information is available. Based on these results, hypothesis 5 is not accepted in terms of the effect on the short-term performance but is accepted in terms of long-run performance.

To determine whether a firm's degree of focus has an impact on the performance after a selloff, as stated in the literature, we tested hypothesis 6. Following John and Ofek (1995), we used more than one variable to capture the effect of focus. First, we assessed the firm's degree of diversification prior to the sale by the number of segments in which it operated, based on the two-digit SIC code. We find the degree of diversification before the selloff, is positively related to the performance of the parent company. This means that the more diversified a firm is (i.e., the more segments it serves), the more positively the market reacts to the announcement of a selloff. This relationship seems counterintuitive, as it is often argued that diversification is good. For companies that diversify, this means that they avoid relying on a single product, customer, or supplier. It can also be seen as a way of mitigating risk from an investor's perspective. However, companies may also over diversify, where the assets under management possess little, or no, synergies. As explained in section 2, there is a lack of efficiency, leading to a point of value destruction where too many unrelated assets are managed. It is common for the market to value such over-diversified companies at less than the sum of its part, also known as a conglomerate discount. For these firms to sell off assets, entails the company to increase its focus on the remaining business and be able to allocate more capital to the core business. In addition, the overall efficiency of the remaining business increases, as John and Ofek (1995) show and as our results in Table 7 demonstrate, which provides reason for the market response of a selloff announcement. Based on the overall observed significance we accept hypothesis 6a. It seems that the market easily perceives the degree of diversification and reacts quickly, as the effect is not observed over a long-term period. Therefore, we cannot accept hypothesis 6a for long-term performance. The second variable of interest is the relatedness of the asset, which is closely related to the level of focus of the company. It appears that unrelated assets that are sold generate higher gains in terms of short- and long-run stock performance. This supports the argument above that the market responds more positively to companies enhancing their corporate focus. However, in terms of significance, we do not have strong evidence to

support hypothesis 6b, for both short- and long-term performance. The results on the degree of diversification extend the of previous studies. On the other hand, the results on asset relatedness differ from previous research, e.g., John and Ofek (1995). A possible explanation could be that the sample contains companies that are not overdiversified but have a certain business line that is no longer related to the core business anymore, for example due to a change in business strategy.

It is noticeable that the control variable firm size is negative in all five models for performance, and significant in the three models for the short-term effects of performance. This implies that when controlling for firm size, smaller firms tend to achieve greater abnormal returns compared to larger firms.

Table 10 provides an overview of the hypotheses tested and their respective results for both short-term performance (ST) and long-term performance (LT).

Table 10. Overview of hypothesis and results

	Hypothesis	Result ST	Result LT	Note
H1	Selloffs are positively related to parent firm performance	Accepted	N.A.	
H2a	Selloffs are positively related to parent firm long-run stock performance	N.A.	Accepted	
H2b	Selloffs are positively related to parent firm long-run operating performance	N.A.	Accepted	
H3	Transaction size is positively related to firm performance	Accepted	Rejected	Evidence found in terms of signs for LT
H4	The preceding financial condition is related to firm performance	Rejected	Rejected	Evidence found in terms of signs for both
H5	Leverage is positively related to firm performance	Rejected	Accepted	Evidence found in terms of signs for ST
H6a	Companies that are more diversified achieve greater performance gains	Accepted	Rejected	
H6b	The performance gains are higher when a non-core asset is sold	Rejected	Rejected	Evidence found in terms of signs for both

7 Conclusion

"How do divestments in the form of selloffs affect the performance of a parent firm?"

The aim of this study was to analyse the financial effect of selloffs and to find out which firm- and asset-specific characteristics determine the variance of this effect. Because financial impact is multidimensional, we examined the stock market reaction, and changes in operating performance to provide a comprehensive and differentiated answer to the research question. In addition, various hypotheses were put forward to find out what drive's performance. It is noteworthy that previous research on divestment has each focused on a tiny piece of the puzzle, with few studies attempting a comprehensive assessment. Furthermore, it is striking that the topic has received relatively little attention from scholars, compared to mergers and acquisitions. Especially as the topic of divestment has become more popular in recent years given the rapidly evolving industry landscapes. Moreover, the topic is highly relevant in today's context where companies are trying to survive the global pandemic and are navigating through highly uncertain times due to the Russian-Ukraine war. A more integrative approach is needed to extend the outdated literature as well as fill the gaps that have not been adequately addressed. In this sense, the study aims to contribute to the literature on divestments and to the general understanding of the stakeholders of the firm, with regards to selloffs and their impact on performance.

The theoretical framework of this study relies on four theories related to agency problems, transaction cost economics, the resource-based view, and evolutionary theory. The foundation of this research is then formed by combining these theories and incorporating findings from previous research on the determinants of financial performance in the context of corporate divestment. In addition, a sample of 1,785 selloff announcements between 2004 and 2018 by US listed companies is used, which allows us to conduct multiple analyses. Using several statistical tests, we are able to draw meaningful conclusions regarding financial impact of a selloff for the parent company. First, we find a significant increase in the share price around the announcement of a selloff. An increase around the time of the announcement date has already been suggested by other scholars. However, empirical evidence on the long-term impact is lacking. Therefore, in order to draw a more comprehensive conclusion, we also examine the long-term stock performance, which we find has also increased significantly over a two-year period. In addition to the share price analysis, we also find that the long-term operating performance increases significantly, for both accounting ratios and market-based performance indicators when comparing the year zero ratios with those in year two.

To gain a better understanding of what factors are driving these performance increases, we conducted regression analyses. It appears that the parent company's performance is more positively affected by larger transactions. Moreover, the more diversified a company is, the more positively the performance seems to be influenced. Although one might think this counterintuitive, markets tend to value over-diversified companies as worth less than the sum of its parts due to the expected negative

synergies between unrelated assets and the lack of focus of the company. The sale of assets is seen as a useful tool by the market, used to refocus the company and ultimately increase efficiency. Interestingly, these determinants only seem to affect the short-term performance, possibly suggesting that these factors are easy to observe, and that the market expects these firms to perform selloffs, leading to a quicker reaction. Moreover, it appears that the higher a company's leverage ratio is before the selloff is announced, the more positively subsequent performance is affected. Leverage only explains part of the long-run performance and has no impact on the short-term performance. This may be because of delayed communication by the parent firm on what is done with the proceeds.

All in all, this study of the impact of selloffs by US companies on the subsequent performance of the parent company has led to the conclusion that selloffs create wealth for the seller. It appears that investors reward companies that sell assets and that these companies also show improvements in operating performance noticeable two years after the sale. Moreover, they may be particularly rewarding for companies that are overly diversified and/or highly leveraged and/or for companies that decide to sell large assets. These results could contribute to the ongoing debate on the usefulness of divestments and support the view that they should be considered as a stand-alone, purposeful strategic option for corporate realignment, instead of merely a means of corporate restructuring. Moreover, these results could contribute nicely to the discussion on whether divestments damage the reputation of the company and the perception of the manager by outsiders and conclude that there is actually much to be gained. Furthermore, if we consider the results as part of a roadmap for companies to deal with the current crisis, we re-emphasise the benefits of selloffs. It may be that companies are highly levered and trying to return to some sort of optimal point of leverage, that they are over-diversified and not focussed on their core business, or that they are simply seeking new funds for the survival of their current business. Either way, selloffs appear to be boosting operating performance and bringing wealth to shareholders. So, to answer the research question, selloffs affect the performance of the parent firm in a positive manner with increases witnessed in the stock performance as well as the operating performance.

In conclusion, there is much to be gained from further research on selloffs and divestitures in general. To provide managers with even more insights, it might be useful to shed light on the question of *how* do companies divest? What is the optimal design of a divestment? It can be useful to understand the dynamics of the organizational change processes in depth to find best practices in terms of maximizing performance outcomes. A limitation in this study is that due to lack of available information, the distribution of the proceeds was not considered. I recommend that future studies take a closer look on the impact of distributing the proceeds to debt, retention, or equity pay-out, to find out which alternative yields the highest returns, and how these relate to the firm and asset specific characteristics incorporated in this study. Moreover, as companies now operate in many different countries, they are subject to different economic and political environments. Therefore, another avenue for future research could be to find out how the impact on performance differs foreign and local divestment. In this study, market indices were used to calculate long-term stock returns. However, an even more reliable result

can be obtained if the firms in the sample are compared with control companies. Future studies with smaller samples could use the control company method to find out whether the conclusions drawn in this study still hold.

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Appendix

Appendix A

Table 11. Overview of variables used in regressions

Variable name	Description	Source	Code
Relative transaction value (T)	Transaction size to seller's market value of equity	ThomsonOne Datastream	Deal value MV
Asset turnover (AT)	Revenue to seller's total assets	Datastream	WC08401
Operational profit margin (OP)	Operating income to seller's revenue (%)	Datastream	WC08316
Debt-to-equity (DE)	Total debt to seller's common equity (%)	Datastream	WC08231
Number of segments (SEG)	Based on 2-digit SIC code of seller	ThomsonOne	SIC code
Relatedness (REL)	Based on 2-digit SIC code of seller compared to asset	ThomsonOne	SIC code of seller and target

Appendix B

Table 12. Correlation matrix of variables used in regressions

	T	AT	OP	DE	SEG	REL
T	1.000					
AT	0.082	1.000				
OP	-0.293	-0.208	1.000			
DE	0.069	-0.047	0.033	1.000		
SEG	-0.226	0.045	0.009	0.006	1.000	
REL	0.077	-0.067	0.0758	0.023	-0.220	1.000

This table contains the independent variables used for the regressions on the CAARs and the BHAARs.

Table 13. VIF of regressions

Variable	VIF	1/VIF
Relative transaction value (T)	2.22	0.450
Asset turnover (AT)	1.48	0.674
Operational profit margin (OP)	1.16	0.860
Debt-to-equity (DE)	1.04	0.777
Number of segments (SEG)	1.30	0.869
Relatedness (REL)	1.15	0.340

Appendix C

Table 14. Descriptive statistics of dependent variables

	Mean	Std dev	Median	p25	p75
CAR11	0.017	0.008	0.005	-0.013	0.029
CAR55	0.017	0.009	0.007	-0.028	0.048
CAR1010	0.018	0.012	0.008	-0.041	0.064
BHAR12	0.031	0.089	0.010	-0.045	0.068
BHAR24	0.038	0.191	0.008	-0.043	0.067

Appendix D

Table 15. regressions coefficients for year and industry fixed effects

	$CAAR_{[-1,1]}$	$CAAR_{[-5,5]}$	$CAAR_{[-10,10]}$	BHAAR $_{[12\ months]}$	BHAAR $_{[24\ months]}$
2005	-0.002	0.008	0.005	0.016	0.032
	(0.006)	(0.009)	(0.012)	(0.016)	(0.020)
2006	-0.005	0.009	0.006	-0.013	-0.011
	(0.006)	(0.009)	(0.012)	(0.015)	(0.015)
2007	-0.003	0.002	-0.000	-0.000	-0.003
	(0.006)	(0.010)	(0.013)	(0.015)	(0.015)
2008	-0.002	-0.005	0.005	-0.056***	-0.054**
	(0.010)	(0.015)	(0.019)	(0.020)	(0.025)
2009	0.026*	0.042***	0.067***	0.064*	0.087**
	(0.014)	(0.016)	(0.022)	(0.033)	(0.037)
2010	0.001	0.013	0.011	0.035*	0.038*
	(0.007)	(0.010)	(0.014)	(0.019)	(0.021)
2011	0.012	0.020	0.014	-0.034	-0.038
	(0.009)	(0.013)	(0.014)	(0.022)	(0.026)
2012	0.014*	0.033***	0.033**	-0.017	-0.007
	(0.008)	(0.011)	(0.014)	(0.019)	(0.024)
2013	0.001	0.024*	0.029**	0.019	0.026
	(0.011)	(0.014)	(0.015)	(0.020)	(0.022)
2014	0.014	0.009	0.005	-0.010	-0.013
	(0.011)	(0.011)	(0.013)	(0.017)	(0.019)
2015	-0.005	0.022*	0.014	-0.053***	-0.060**
	(0.009)	(0.012)	(0.016)	(0.021)	(0.025)
2016	0.011	0.021*	0.023	-0.003	0.010
	(0.009)	(0.012)	(0.015)	(0.019)	(0.021)
2017	0.015	0.013	0.023	-0.026	-0.022
	(0.011)	(0.013)	(0.015)	(0.019)	(0.024)
2018	0.013	0.017	0.006	-0.019	-0.025
	(0.010)	(0.011)	(0.015)	(0.017)	(0.020)
Mining and Minerals	-0.007	0.026	0.037	0.057	0.056
	(0.010)	(0.027)	(0.031)	(0.054)	(0.063)
Oil and Petroleum Products	-0.003	-0.010	-0.006	-0.024	-0.029
	(0.007)	(0.011)	(0.014)	(0.017)	(0.019)
Textiles, Apparel & Footwear	-0.010	0.019	0.010	-0.009	-0.069*
	(0.009)	(0.027)	(0.031)	(0.031)	(0.038)
Consumer Durables	-0.023*	-0.026*	-0.037	-0.038	-0.046
	(0.013)	(0.018)	(0.020)	(0.019)	(0.022)
Chemicals	-0.009	-0.009	-0.014	-0.005	-0.001
	(0.012)	(0.015)	(0.019)	(0.024)	(0.025)
Drugs, Soap, Perfumes, Tobacco	-0.009	-0.009	-0.003	-0.048**	-0.061*
	(0.009)	(0.012)	(0.015)	(0.019)	(0.022)
Construction and Construction Materials	-0.017*	-0.018	-0.014	-0.016	-0.015
	(0.010)	(0.013)	(0.016)	(0.021)	(0.023)
Steel Works Etc.	-0.016*	-0.012	-0.011	-0.036**	-0.030*
	(0.008)	(0.013)	(0.016)	(0.018)	(0.018)
Fabricated Products	-0.016	-0.032**	-0.021	-0.008	0.009
	(0.010)	(0.013)	(0.019)	(0.030)	(0.039)
Machinery and Business Equipment	0.003	-0.003	0.000	-0.012	-0.006
	(0.007)	(0.011)	(0.013)	(0.014)	(0.017)
Automobiles	-0.034**	-0.016	0.014	0.008	0.022
	(0.017)	(0.023)	(0.030)	(0.034)	(0.041)
Transportation	-0.007	-0.017	-0.003	-0.038	-0.015
	(0.008)	(0.011)	(0.014)	(0.025)	(0.023)
Retail Stores	0.006	0.018	0.026*	0.002	0.003
	(0.010)	(0.012)	(0.016)	(0.022)	(0.022)
Other	0.005	-0.004	0.002	-0.021	-0.016
	(0.007)	(0.010)	(0.012)	(0.013)	(0.014)

This table shows the coefficients of the control variables industry and year fixed effects, for all regressions. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector. The reference year taken is 2004 and the reference industry is Food. The robust standard errors are shown in parenthesis and *, **, *** indicate statistical significance at 10, 5, 1% level respectively.

Appendix E

Table 16. CAARs with alternative benchmarks

	FTSE USA	MSCI US	S&P500 Equally Weighted
	Mean (%)	Mean (%)	Mean (%)
$AAR_{[0]}$	1.0975^{***}	1.0971^{***}	1.0968^{***}
$CAAR_{[-1,1]}$	1.6526^{***}	1.6534^{***}	1.6511^{***}
$CAAR_{[-5,5]}$	1.6939^{***}	1.6945^{***}	1.6921^{***}
$CAAR_{[-10,10]}$	1.8106^{***}	1.8113^{***}	1.8115^{***}

This table displays the average change in stock prices surrounding the announcement of divestment for a firm. The returns are estimated over a 240-day estimation window [-250, -11] using the market model and various market indices for benchmarks. $AAR_{[0]}$ is described as the average abnormal return on the event day. $CAAR_{[-1,1]}$ is the cumulative average abnormal return for the interval one day before to one day after the event. $CAAR_{[-5,5]}$ is the cumulative average abnormal return for the interval five days before to five days after the event. $CAAR_{[-10,10]}$ is the cumulative average abnormal return for the interval ten days before to ten days after the event. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector. A standard t-test is performed to compute the t-values. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

Table 17. Buy-and-hold abnormal returns with alternative benchmarks

	FTSE USA	MSCI US	S&P500 Equally Weighted
	Mean (%)	Mean (%)	Mean (%)
$BHAR_{[12\ \text{months}]}$	1.69^{***}	1.68^{***}	1.48^{***}
$BHAR_{[24\ \text{months}]}$	1.57^{***}	1.58^{***}	1.34^{***}

This table displays the average buy-and-hold abnormal return for holding periods that extend from 12 months ($BHAR_{[12\ \text{months}]}$) to 24 months ($BHAR_{[24\ \text{months}]}$) following the divestiture event, using alternative market indices for benchmarks. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector. For the buy-and-hold abnormal returns a Johnson adjusted t-test is performed to compute the t-values. ***, **, * indicate significance at the 1%, 5% and 10% level respectively.

Appendix F

Table 18. Overview of short-term performance regressions using different benchmarks

	MSCI $CAAR_{[-1,1]}$	MSCI $CAAR_{[-5,5]}$	MSCI $CAAR_{[-10,10]}$	FTSE $CAAR_{[-1,1]}$	FTSE $CAAR_{[-5,5]}$	FTSE $CAAR_{[-10,10]}$
Constant	-0.00335	0.02017	0.04445	-0.00345	0.01973	0.04423
Relative transaction value (T)	0.00751***	0.00827***	0.00893***	0.00752***	0.00828***	0.00896***
Adjusted asset turnover (AT)	0.00365	0.00668	0.00928	0.00365	0.00667	0.00923
Adjusted operational profit margin (OP)	-0.00512	0.03497	0.07549**	-0.00512	0.03509	0.07610**
Adjusted debt-to-equity (DE)	0.00052	0.00121	0.00178	0.00052	0.00122	0.00179
Number of segments (SEG)	0.00239**	0.00310**	0.00275	0.00239**	0.00311**	0.00275
Relatedness (REL) (0 = unrelated; 1 = related)	-0.00157	-0.00510	-0.00085	-0.00156	-0.00509	-0.00082
Firm size	-0.00419**	-0.00584***	-0.00635**	-0.00418**	-0.00584***	-0.00636**
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
F-value	2.484	2.606	1.753	2.488	2.612	1.758
R^2	0.08955	0.07438	0.06164	0.08960	0.07447	0.06174
N	1,785	1,785	1,785	1,785	1,785	1,785

This table reports the results of the OLS regressions, where different market indices have been used as benchmarks. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector *Relative transaction value* is the natural logarithm of the transaction value over the seller's market value of equity. *Adjusted asset turnover* is the difference between the seller's asset turnover and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Adjusted operational profit margin* is the difference between the seller's operational profit margin and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Number of segments* is based on the 4-digit SIC codes of the seller. *Adjusted debt-to-equity is* the difference between the seller's debt-to-equity and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Relatedness* indicates whether the divested asset is a noncore asset (unrelated) or a core asset (related) comparing the main 2-digit SIC code of the divested asset. Heteroskedasticity is present for all event windows, thus robust standard errors used. For the p-values, indicated between brackets, and the F-values, ***, **, * denote statistical significance at 1%, 5% and 10% level.

Table 19. Overview of long-term performance regressions using different benchmarks

	SP500 EW BHAAR [12 months]	SP500 EW BHAAR [24 months]	MSCI BHAAR [12 months]	MSCI BHAAR [24 months]	FTSE BHAAR [12 months]	FTSE BHAAR [24 months]
Constant	0.126	0.043	0.136	0.051	0.136	0.051
Relative transaction value (T)	0.004	0.003	0.004	0.003	0.004	0.003
Adjusted asset turnover (AT)	0.017	0.017*	0.017	0.017*	0.017	0.017*
Adjusted operational profit margin (OP)	-0.019	0.075	-0.017	0.077	-0.017	0.077
Adjusted debt-to-equity (DE)	0.001	0.004*	0.002	0.004**	0.002	0.004**
Number of segments (SEG)	0.005	-0.000	0.005	-0.000	0.005	-0.000
Relatedness (REL) (0 = unrelated; 1 = related)	-0.025	-0.017*	-0.024	-0.016	-0.024	-0.016
Firm size	-0.011	-0.001	-0.012	-0.002	-0.012	-0.002
	(0.013)	(0.004)	(0.013)	(0.004)	(0.013)	(0.004)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
F-value	1.199	1.401	1.270	1.578	1.271	1.578
R^2	0.049	0.047	0.053	0.054	0.053	0.054
N	1,785	1,785	1,785	1,785	1,785	1,785

This table reports the results of the OLS regressions where the buy-and-hold average abnormal returns, are calculated using alternative market indices as benchmarks. The sample consists of divestitures announced between January 2004 and December 2018 by US firms, excluding firms operating in the Financials, Real Estate and Utilities sector. *Relative transaction value* is the natural logarithm of the transaction value over the seller's market value of equity. *Adjusted asset turnover* is the difference between the seller's asset turnover and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Adjusted operational profit margin* is the difference between the seller's operational profit margin and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Number of segments* is based on the 4-digit SIC codes of the seller. *Adjusted debt-to-equity is* the difference between the seller's debt-to-equity and the corresponding industry median one year before divestment, winsorized at 1 and 99% cuts. *Relatedness* indicates whether the divested asset is a noncore asset (unrelated) or a core asset (related) comparing the main 2-digit SIC code of the divested asset. Heteroskedasticity is present for all event windows, thus robust standard errors used. For the p-values, indicated between brackets, and the F-values, ***, **, * denote statistical significance at 1%, 5% and 10% level.