RADBOUD UNIVERSITEIT NIJMEGEN

Master thesis

The effect of downsizing on the firm performance of small- and medium-sized enterprises in the Netherlands

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Abstract

Purpose: Explore the differential effect of downsizing on firm performance for firms categorized as small- and medium-sized enterprises and firms categorized as large firms in terms of profitability and growth.

Design/methodology/approach: Analyzed six-year longitudinal data of 123 downsizing firms in the Netherlands between 2002-2016 and 74 non-downsizing firms between 2003-2011. Using panel data regressions, this thesis examines the relation between downsizing and two measures of firm profitability and two measures of firm growth which are return on assets, return on equity, sales growth, and asset growth, respectively.

Findings: No significant findings were found examining the direct effect of downsizing and firm category on firm profitability or growth. Significant were found for the interaction effect between firm category, downsizing frequency (-), downsizing lead time (+) and return on equity. Also, significant were found for the interaction effect between firm category, downsizing timing (-), downsizing frequency (+) and sales growth. As last, significant were found for the association between downsizing scope and asset growth (-) and the interaction between firm category, downsizing scope (+) and asset growth.

Research limitations/implications: The direct effect of downsizing on firm profitability and growth are found to be insignificant or equivocal in this research. Evidence suggests that significant differences do exist for small- and medium-sized enterprises compared to large firms when looking at the interaction with downsizing characteristics and firm profitability and growth. However, no clear pattern is found. Therefore, future research should address small- and medium-sized enterprises using larger sample sized and alternative research methodologies to explore possible differences between the examined firm categories.

Practical implications: Differences between small- and medium-sized enterprises do exist. Managers of entities should consider the characteristics of their organization and the planned characteristics of the downsizing process to reach an optimal outcome on firm profitability and growth.

Originality: Focus on small- and medium-sized enterprises, longitudinal dataset, identifying downsizers using social plans, assessing effects on both firm profitability and growth.

Keywords: *downsize, small- and medium-sized enterprises, firm performance, growth, profitability, downsizing timing, scope, frequency and lead time*.

Index

Chapter 1 Introduction

1.1 Introduction

The phenomenon of downsizing has been an increasingly topic of interest for media and scholars alike in the last couple of decades. The concept of downsizing, often referred to as employee downsizing or workforce downsizing, originated from the U.S. in the early 1980s. The process of downsizing consists of reducing the scale of a firm's operations by laying off employees and/or selling assets (Espahbodi, John, and Vasudevan, 2000). Many U.S. corporations started implementing a downsizing strategy in response to economic downfall (Gandolfi, 2008). This strategy was thought to be a temporary phenomenon (Guthrie & Datta, 2008). However, downsizing became an increasingly popular strategy of choice, even for firms that were not experiencing difficult economic times (Gandolfi, 2008). As the phenomenon of downsizing started in the U.S., downsizing has been most prominent in western countries (Data, Guthrie, Basuil, and Pandy, 2010). But, more recently, also Asian firms have been found implementing downsizing strategies to cope with global competitive economic pressure (Chu & Siu, 2001; Yu & Park, 2006). This is interesting as Asian firms normally provided employees with lifetime employment security. It can thus be noted that the practice of downsizing is not limited to a specific type of company, country or even culture. In other words, employee downsizing has become an essential element of corporate strategy and organizational life over time (Espahbodi et al., 2000). Or as quoted by Datta et al. (2010, p. 287): '*Downsizing has been a constant and regular feature of the new working world and will continue to be*'

Many firms carry out downsizing in response to situations involving demanding declines from a weakening economy, competitive pressures, changes in industry, and technological advances (Shah, 2000; Datta & Basuil, 2015). Firms implement downsizing strategies assuming to have a (immediate) positive effect on firm performance or on their ability to compete (Cascio, Young, and Morris, 1997; Guthrie & Datta, 2008). Although this line of thought is common under managers (Datta & Basuil, 2015), the academic literature shows that there is still no consensus among researchers about the effect of downsizing on firm value (Data et al., 2010; Datta & Basuil, 2015). Appendix A provides an overview of academic papers addressing the relation between downsizing and firm performance. This overview clearly shows that the assumed positive relation is equivocal at best.

Academic research on downsizing has centered on either environmental or organizational characteristics leading to downsizing or on outcomes of the downsizing process for which research focuses on individual or organizational outcomes (Datta et al., 2010) (Appendix B). This thesis focuses on the organizational outcomes of the downsizing practices. In order to examine downsizing outcomes the concept of downsizing is defined as a '*planned elimination of positions or jobs*´ in line with the definition suggested by Cascio (1993, p. 96). This definition is incorporates the element of planning,

which indicates that downsizing is a conscious strategy implemented by firms. Also, downsizing measured as a simple headcount reduction in firms. Downsizing is seen in this regard as simple reductions in employee headcount (Cascio, 1993). Although, downsizing can also involve reductions in physical assets and capital (Data et al., 2010). However, academic literature almost exclusively addresses downsizing through employee reductions. This thesis therefore also focuses on the effects of employee downsizing on firm performance using a broad definition in order to enhance the comparability with the current academic literature.

In this thesis downsizing is studied from a contingency perspective. The contingency theory states that '*there is no one best way to organize, and that any one way of organizing is not equally effective under all conditions*' (Ginsberg & Venkatraman, 1985, p. 421). In other words, the perspective used in this thesis argues that there is not one best way to downsize and that is it not equally effective under all conditions. Bruton, Keels, and Shook (1996) explicitly note that downsizing can be beneficial if the firm matches the downsizing program with its particular situation. This thesis therefore searches for conditions or contexts in which downsizing has a more beneficial effect on firm performance. In order to examine different conditions and contexts, this thesis studies a sample of firms which are from a different region and firm type than examined in general in empirical downsizing research. Also, associations between different downsizing implementation characteristics and firm performance are examined. Using this approach this thesis therefore adds to the current body

First of all, empirical studies examining the effect of downsizing on firm performance generally use data from large, public listed companies (Appendix A). One reason for this focus could be that employee reductions in large companies gain the most media coverage and are thus more popular to study. Another reason is that more data is available of large companies employing a downsizing strategy. Also, most studies examine data from U.S. companies. Studies examining downsizing practices in non-U.S. countries are limited. Brauer and Laamanen (2014) note that downsizing studies often use similar samples characterized by region, company type and time period specific. This thesis adds to this research gap in two ways. First, this thesis researches Dutch companies which operate in a non-U.S. context. And second, this thesis specifically focuses on small- and medium-sized enterprises (SMEs) which are largely ignored in the downsizing literature (Appendix A). However, the lack of including small- and medium-sized enterprises into empirical datasets limits the downsizing literature related to the influence of downsizing on firm performance. Small- and medium-sized enterprises are an important part of (the European) economy (European Commission, 2005; Audretsch, Thurik, Verheul, and Wennekers, 2002; Rostek, 2015) and also often engage in downsizing activities. Also, small- and medium-sized enterprises are argued to differ from larger businesses, even sometimes called a different species (Shuman & Seeger, 1986). For example, small- and medium-sized enterprises are often associated with entrepreneurship, rather than large firms. This type of firm behavior concentrates on opportunities rather than resources

(Thurik & Wennekers, 2004). Using a contingency perspective this thesis includes small- and medium-sized enterprises in order to find differential effects from downsizing between the large firms, which are incorporated in most empirical research, and small- and medium-sized enterprises, and to fill this research gap.

Another element of this research following a contingency approach is that downsizing is examined through different downsizing implementation strategies. A downsize process can have different characteristics which are examined through the timing of the implementing the employee reductions (Love & Nohria, 2005; Brauer & Laamanen, 2014), the scope in which the downsizing implementation affects the organization (Cameron, 1994; Love & Nohria, 2005), the frequency of implementing a downsizing strategy (De Meuse, Bergmann, Vanderheiden, and Roraff, 2004), and the lead time or length of the downsizing process after implementation (Cameron, 1994; Aalbers & Dolfsma, 2014). This thesis examines whether downsizing incorporating certain characteristics, or in other words implementations strategies, has differential effects on firm performance.

In summary, using a contingency approach this thesis examines specific conditions and/or contexts in relation to downsizing to explore whether differential effects on firm performance can be found. Specifically, small- and medium-sized enterprises are incorporated and focused on in this research and the effect of several downsizing implementation strategies are examined. This is research examines differences between large firms and small- and medium-sized enterprises and combines it with differential effects stemming from downsizing implementation strategies.

1.2 Objective & research problem

In the existing literature it is often pointed out that research findings on the effect of downsizing are equivocal. Some findings suggest that employee reductions lead to performance improvements (Bruton et al., 1996; Chen, Mehrotra, Sivakumar, and Wayne, 2001; Espahbodi et al., 2000; Kang & Shivdasani, 1997; Palmon, Sun, and Tang, 1997; Yu & Park, 2006), others suggest an deleterious effect (Cascio et al., 1997; De Meuse, Vanderheiden, and Bergmann, 1994; De Meuse et al., 2004; Guthrie & Datta, 2008). Another group of studies suggests benefits from employee reductions, but only after a longer period of time (±2 to 3 years after downsizing) (Espahbodi et al,. 2000; Kang & Shivdasani, 1997; Palmon et al., 1997; Perry & Shivdasani, 2005). This thesis explores the effect of downsizing on firm performance focused specifically on small- and medium-sized enterprises in the Netherlands. Small- and medium-sized companies are compared to large firms, which are generally used as research object in the downsizing literature (Appendix A). Also, the effects of downsizing on firm performance is explored through several downsizing characteristics studied in the academic literature.

The objective of this thesis is to contribute to the current literature, focusing on the underexposed small and medium-sized enterprises over a longer period of time after the downsizing event. Small and medium-sized enterprises have not yet received any attention in relation the practice downsizing and its relation on firm performance, to the best of my knowledge. To achieve the objective of the thesis, first the direct effect of downsizing in general on small- and medium-sized enterprises and large firms is explored. Then, the association between downsizing timing, scope, frequency, lead time and firm performance are explored including firm category (SME or large firm) as a moderating variable. To structure the objective of this thesis the following research question is used:

How does downsizing affect the firm performance of small- and medium-sized enterprises in the Netherlands?

To provide a clear answer to this research question several sub-questions are used. First of all, it is important to make clear what the relation is between downsizing and firm performance for the whole sample used in this thesis including downsizers and non-downsizers. Thus, the first sub-question is:

What is the relation between downsizing and firm performance?

The following sub-question relates to the downsizing characteristics of the downsizing strategy used by firms. Different downsizing characteristics are expected to lead to different outcomes of the downsizing process. Therefore the following sub-question is formulated:

How are downsize timing, scope, frequency, and lead time associated with firm performance?

The last sub-question then links the topic of downsizing to small- and medium-sized enterprises. Using this sub-question it is explored if there are any significant differences between small- and medium-sized enterprises and large firms that perform a downsize strategy. Small- and medium-sized enterprises and large firms are viewed in this regard as two different firm categories. Therefore, the following sub-question is formulated as follows:

How does firm category moderate the effects of downsize characteristics on firm performance?

1.3 Scientific relevance

Findings concerning the effect of downsizing on organizational performance are '*equivocal with very little agreement among researchers on the efficacy of employee downsizing to create value*' (Datta & Basuil, 2015, p. 197). This thesis contributes to these ambiguous findings by examining small and medium-sized enterprises, which current literature leaves yet unexplored. Small and medium-sized enterprises are argued to differ from large enterprises in that they often have a more entrepreneurial spirit (Thurik & Wenneker, 2004), and differ in that they are limited in resources and business practices. The findings in this thesis suggest that there are differences between small- and medium-sized enterprises and large firms when looking at the influence of the different firm categories on the effect of downsizing characteristics on firm performance. This thesis also adds to the current body of knowledge by exploring several contingencies in the form of downsizing implementation strategies.

This includes the effect of the timing, scope, frequency, and lead time of the downsizing process on firm performance which consists of both firm profitability and firm growth measures. In addition, longitudinal data is collected to examine the effects on firm performance over three years after downsizing. Examining more years after downsizing enables this thesis to study the downsizing over a longer period after downsizing in which contingencies might influence firm performance instead of examining a short period only. Based on the contingency approach this thesis provides a broad view on the differences between small- and medium-sized enterprises and large firms when looking at the downsizing strategy.

1.4 Societal relevance

'*Micro, small and medium-sized enterprises (SMEs) are the engine of the European economy. They are an essential source of jobs, create entrepreneurial spirit and innovation in the EU and are thus crucial for fostering competitiveness and employment*' (European Commission, 2005).

It is clear that employee layoffs is a common topic in the media and will be in the future, as employee downsizing spreads over the world by firms coping with increasing global pressures. Downsizing does not only take place in large firms, but also small firms incidental have to cope with layoffs. An example is the wave of layoffs in small firms (<50 employees) after changes in the Dutch law targeting severance pay (Troost, 2015). For Europe in specific, the quote above, written in a guide for small- and medium-sized enterprises published by the European Commission, exemplifies why small- and medium-sized enterprises are important to examine in the topic of organizational performance and downsizing. '*With a majority of studies indicating that downsizing does not, on average, result in anticipated benefits, managers need to pay greater attention to the circumstances under which downsizing might be appropriate*' (Datta and Basuil, 2015, p. 217). This thesis can provide a basis for managers of small- and medium-sized enterprises in the Netherlands in specific and managers of small- and medium-sized enterprises in general to decide if workforce reduction would be profitable, and what circumstances might be appropriate.

1.5 Thesis outline

To provide a clear presentation of this study the thesis is structured as follows. First of all, the literature review is described in chapter two. This chapter addresses as first the overarching approach taken into account in this research, the contingency approach. Other concepts discussed are downsizing, small- and medium-sized enterprises, downsizing implementation strategies, firm performance and the effect of downsizing on firm performance. In chapter three the methodology used to structure the analytical procedures are described. Chapter four provides the results of the analytical procedures performed. And as last, in chapter five conclusions are drawn based on the results of chapter four, followed by a discussion and suggestions for future research.

Chapter 2 Literature review

In this chapter an overview is presented of the theoretical concepts used in this thesis. First, the contingency approach used in this study is elaborated on. Then, the contingency approach is described in light of radical change processes. Next, the concept of downsizing is described and a definition is proposed. After that, small- and medium enterprises are described in paragraph 2.3. Paragraph 2.4 introduces several downsizing implementation strategies. The following paragraph introduces the outcome variable of this study: firm performance. And in the last paragraph, the effect of downsizing on firm performance is elaborated on in combination with the development of the hypotheses underlying this research.

2.1 Contingency approach

At the end of the 1960s and beginning of the 1970s an increasing amount of studies focused on normative models and theories with respect to conducting research. These normative models and theories especially focused on the strategy formulation process. This was in contrast with previous research which mainly focused on describing strategy formulation processes (Hofer, 1975) rather than providing normative models and theories. These normative models and theories still have a great impact on the structure of research conducted in organizational based research. The most prominent theory in the management literature and related disciplines is the contingency theory. In strategic management research the contingency approach is a generally accepted thought and practice (Bruton et al., 1996). A fundamental assumption of the contingency theory is that '*there is no one best way to organize, and that any one way of organizing is not equally effective under all conditions*' (Ginsberg & Venkatraman, 1985, p. 421). Extended to strategic context, this means that '*there is no universal set of strategic choices that is optimal for all businesses, irrespective of their resource positions and environmental context*' (Ginsberg & Venkatraman, 1985, p. 421). In relation to small- and medium-sized enterprises this theory is particularly useful as the term small- and medium-sized enterprises is used to define a broad of small-scale business activities in the formal and informal sectors. Contingency theory thus argues that there is not a single best way to organize downsizing for small- and medium-sized enterprises as a group. Rather, the effect of downsizing is dependent on context and firm-specific characteristics. Using this perspective a causal relation can be examined between downsizing and small- and medium-sized enterprises performance, controlling for firm-specific characteristics and context.

Another perspective that could be used to structure this research would be the resource based view (RBV). The RBV emphasizes internal attributes and allows researchers to reframe the relationships between strategy and structure by analyzing the organizational structure as a valuable resource and a source of competitive advantage. Furrer, Sudharshan, Thomas, and Tereza Alexandre (2008) studied firm performance in a new industry context using both RBV and generic strategy theories. They found that firms that had similar resource configurations still experienced varying performance. Another

important finding was that also firms that were closely related in terms of strategy experienced varying performance. In other words, this study finds evidence of the contingency theory in relation to organization structure and strategy. Most firms experience different outcomes although they might be similar in resources or strategy. Another important remark is that small- and medium-sized enterprises are often related to entrepreneurship. Entrepreneurship being a type of organizational behavior were opportunities are more important than resources (Thurik & Wennekers, 2004). This entrepreneurship is implicitly taken into account in this thesis by structuring downsizing in a reactive or proactive form (opportunity related) as examined by Brauer and Laamanen (2014) and Love and Nohria (2005). Therefore, the RBV view fits to a lesser extent to this research than the contingency theory.

To exemplify the argument to use a contingency approach, several studies using a contingency approach can be found in the literature specific on the topic of downsizing and firm performance (Bruton et al., 1996; Guthrie & Datta, 2008; Love & Nohria, 2005; Brauer & Laamanen, 2014). Bruton et al. (1996) explicitly note that they do not advocate downsizing as a universally good practice, rather it can be beneficial if the firm has matched its downsizing program with its particular situation. Also, other studies, which all examine moderating factors (e.g. loss status, industry, slack) between downsizing and firm performance, make explicitly clear that they use contingency theory as their overarching framework (Guthrie & Datta, 2008; Love & Nohria, 2005; Brauer & Laamanen, 2014).

2.1.1 Contingency and radical change

The concept of downsizing influences both organizational structure and organizational strategy. Organization can use downsizing as a strategy which involves the disruption of the current organizational structure. An important contingency factor on firm performance identified in the academic literature is the how organizations implement the downsizing strategy (Love & Nohria, 2005; Brauer & Laamanen, 2014). Downsizing can be used as a proactive strategy or reactive response, dependent on the situation of the company (context). The timing of downsizing is thus proven to be of importance when addressing downsizing. When employees have more time to respond to organizational disruptions downsizing is found to provide better effects on firm performance. Another important contingent variable addressed in the downsizing literature is the magnitude of downsizing (Brauer & Laamanen, 2014). Brauer & Laamanen (2014) identify that the magnitude of downsizing influences the disruption of routines within the firm which consequential provide differential effects on firm performance.

In summary, academic literature has shown equivocal findings of the effect of downsizing on firm performance. A lot of variables, as downsizing response and magnitude of downsizing described earlier, influence the effect of downsizing on firm performance. It can thus be argued that it is difficult to provide a generic strategy for downsizing in which firms can obtain the highest outcomes. Therefore, the

contingency theory is adopted in this research. This approach assumes that there is no one best way to organize. Consequently, this thesis takes firm and context dependent variables in account in relation to the effect of downsizing on firm performance.

2.2 Downsizing

It is undeniable that downsizing has been a topic of interest for the media since it first emerged in the early 1980s. Downsizing has become commonplace in American businesses over the last decades. Everybody can call images to mind of news headers flashing workforce layoffs of some large company. Also in the Netherlands news articles about layoffs are found frequently. Recent layoffs including companies as V&D, DSM and ING. An extensive quantity of research papers on downsizing has grown over time parallel with the widespread media coverage of downsizing in practice. This has led to several perspectives on downsizing from economic and social standpoints (Datta et al., 2010), and a wide range of management and organizational theories (Gandolfi, 2008).

McKinley, Zhao, and Rust (2000) describes economic, institutional and social-cognitive reasons for implementing downsizing. A fundamental assumption of the economic view is that firm executives seek to operate efficiently with minimum cost, implying that management thinks that firm goals can still be reached with fewer employees (Cascio et al., 1997). When coupled with advice from popular business books and journals to "cut out the fat" and to get "lean and mean", senior executives might well find the lure of downsizing to be irresistible (Cascio & Young, 2003). Institutional theory (DiMaggio & Powell, 1983) is well grounded in the organizational change literature and states that firms have to cope with pressures exerted on them from outside institutions. Downsizing is in the perspective of the institutional theory becoming an institution which is increasingly socially legitimate. Firms will copy the behavior of other firms, e.g. downsizing, to become more social legitimate, relating to the concept of isomorphism (DiMaggio & Powell, 1983). Another perspective, as suggested by McKinley et al. (2000), is downsizing due to social-cognitive reasons. The socio-cognitive perspective views downsizing from an individual-level, instead on organizational level as the institutional theory. McKinley et al. (2000) argue that managers' models view downsizing as beneficial as the 'downsizing is effective' schema has become institutionalized through collectivization and reification.

2.2.1 Defining downsizing

A single definition of downsizing, agreed upon by researchers, does not exist (Gandolfi, 2008), although various elements of downsizing can be found across the current literature. It is clear that downsizing refers at least to a '*contraction or shrinkage in the size of a firm's workforce*' (Gandolfi, 2008, p.4). Another element found in definitions of downsizing, often referring to the definition of Cascio (1993), is intentionally implementing or planning the reduction in workforce (Guthrie & Datta, 2008; Chadwick, Hunter, and Walston, 2004; Brauer & Laamanen, 2014; Macky, 2004; Love & Nohria, 2005; Yu & Park,

2006). Although empirical studies provide equivocal findings so far, various influential papers also include in their definition that organizations intentionally implement downsizing strategies to improve their situation. This improvement then refers to firm or organizational performance (Yu & Park, 2006; Datta et al., 2010; Datta & Basuil, 2015; Love and Nohria, 2005), or in particular organizational efficiency, productivity, and/or competitiveness (Cameron, 1994). Yu & Park (2006) include in their definition the perspective of the workforce noting that downsizing is an involuntary employment adjustment. Another important element of downsizing can be found in the article of Chen et al. (2001). They define downsizing as '*a permanent termination of a significant number of employees…*' (Chen et al., 2001, p. 172). In this definition is explicitly mentioned that downsizing is about permanent layoffs and that the size of the layoff should be significant to call it downsizing. This is important to mention, as most studies operationalize downsizing firms within these confines, but don't mention it in their definition. Some studies also mention that downsizing doesn't only include the reduction of the employee workforce, but also includes other factors. For example, Cameron (1994) notes that downsizing also affects the costs and work processes of a firm, which can include eliminating functions and cutting hierarchical levels (Macky, 2004). These practices are also applicable to small- and medium-sized enterprises. However, it is important to note that these practices are dependent on the limitation of (human) resources in smaller firms. For example, sometimes cutting hierarchical levels is simply not possible. Espahbodi et al. (2000) add that downsizing can also include selling assets only or in combination with workforce reduction. Some authors include specific actions which can be taken to reduce the workforce such as hiring freezes, normal or induced attrition (Brauer & Laamanen, 2014) and early retirement incentives (Macky, 2004). And as last, studies focused on large industrial firms often relate downsizing with reducing organizational slack, or getting the organization 'lean and mean' by cutting the 'fat', which are in this case superfluous employees (Love & Nohria, 2005). However, if 'cutting the fat' is also prominent in small- and medium-size enterprises is still unclear. Therefore, this study might give some insights about the downsizing activities of small- and medium-sized enterprises and their effect on firm performance.

The definition of downsizing used in this thesis reflects the definition of Cascio (1993, p. 96). Downsizing is examined as a '*planned elimination of positions or jobs*'. Note that the element of an improved position is excluded from this definition. This is decided consciously as an improved position following a downsizing implementation has not been empirically proved to be the case in all situations. This does not mean that organizations cannot strive to improve their situation using a downsizing strategy. Also taken into account, but not mentioned in the definition, is the permanent and significant characteristics of the elimination of positions or jobs. These elements are not included in the definition as permanent and significant should then be further clarified before it could be used in the definition, which is described in chapter 3.

2.3 Small- and Medium-sized enterprises

Researchers agree that small- and medium-sized enterprises play an important role in transition and developing countries (Rostek, 2015). Also, high-income countries benefit from contributions from small- and medium-sized enterprises, as empirical research points out that small- and medium-sized enterprises contribute up to 65% of total employment and in general over 55% of the gross domestic product (GDP) (Rostek, 2015). The European Commission (2005) states in a report issued about the definition of small- and medium-sized enterprises that small- and medium-sized enterprises are the engine of the European economy. They are seen as an essential source of jobs and innovation in the EU. Adding to the economic developments around the recent economic crisis, Rostek (2015) states that there is growing recognition of the role that small- and medium-sized enterprises play in sustained global and regional economic recovery.

This paragraph places small- and medium-sized enterprises in the context of downsizing and performance studies. The concept of small- and medium-sized enterprises is elaborated on to provide some understanding what small- and medium-sized enterprises are exactly, why they are important to study and how small- and medium-sized enterprises are currently placed in the existing literature on downsizing and firm performance.

2.3.1 Defining small- and medium-sized enterprises

The term small- and medium-sized enterprises incorporates a wide variety of firms, meaning that it defines a scope of various smaller-scale business activities in both formal and informal sectors (Uzor, 2011). The broad range of the term small- and medium-sized enterprises makes it difficult to capture it in clear boundaries (Rostek, 2015). Across countries, and (financial) institutions, various quantitative and qualitative criteria are used to capture the concept of small- and medium-sized enterprises (OECD, 2005), of which quantitative criteria are most common (Rostek, 2015). Most common quantitative criteria are market share, management and ownership structure, number of employees, or economic measurements as assets, debt and equity. Qualitative criteria define the functional characteristics of the small enterprises such as the nature of technology, organization and management skills (Rostek, 2015).

Total employees is one of the most common quantitative variables used to define small- and medium-sized enterprises. The International Finance Corporation (IFC)[1] examined the definition of small- and medium-sized enterprises, including micro-organizations, used in 132 economies over the world in developed and developing countries and found a range between 19 and 500 employees as upper bound

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[1] IFC, a member of the World Bank Group, is the largest global development institution focused exclusively on the private sector in developing countries (About IFC, n.d.).

for the definition of small- and medium-sized enterprises (Kushnir, Mirmulstein & Ramalho, 2010). However, the largest number of countries set the upper limit between 200 and 250 employees (Rostek 2015; Kushnir et al., 2010). In the Netherlands the main influencing institution contributing to the definition of small- and medium-sized enterprises is the European Union. The Dutch government as well government affiliated instances as the central bureau of statistics (CBS) refer to the definition set by the European Commission (EC). This definition uses 250 employees as upper threshold.

Other variables, which are often used, identified by IFC are industry, annual turnover and investment (Kushnir et al., 2010). The EC definition states that next to the upper threshold of 250 employees small- and medium-sized enterprises should have an annual turnover of 50 million or an annual balance sheet total of 43 million (European Commission, 2005).

In light of the research object of this thesis, Dutch small- and medium-sized enterprises, the definition of the EC is most suitable[2]. The Dutch government uses the same definition to identify small- and medium-sized enterprises and shape the entrepreneurial environment. Using this particular definition increases the generalizability of this research and as such this definition is used to identify small- and medium-sized enterprises in the Netherlands. Until this point, only the upper thresholds of the definition are described. The EC provides a framework in which the categories of micro-, small- and medium-sized enterprises are distinguished, stated in the following figure:

Enterprise category	Headcount: annual work unit (AWU)	Annual turnover	*or*	Annual balance sheet total
Medium-sized	< 250	≤ €50 million		≤ €43 million
Small	< 50	≤ €10 million		≤ € 10 million
Micro	< 10	≤ €2 million		≤ €2 million

Figure 1: The new thresholds of SMEs (European Commission, 2005)

2.4 Downsizing implementation strategies

It is important to clarify how downsizing can be implemented in organizations. This distinction is important in determining the scope of this concept in this thesis, but it has also been of great influence in the definition of downsizing in the current literature.

The first one to identify different types of implementation strategies for downsizing was Cameron (1994). He distinguished three downsizing strategies of which the first one is labeled as *workforce reduction*. Workforce reduction strategies are characterized by a quick elimination of headcount or

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[2] Entered into force 1 January 2005.

reducing the number of employees in the workforce. This strategy is executed top-down in a short moment of time. According to Cameron (1994) the main advantage of this strategy, in addition to providing an immediate shrinkage, is to capture the attention of members of the organization to the serious condition that exists, to motivate cost savings in day-to-day work, and to create readiness in the organization for further change. The disadvantage of this strategy is that it is difficult to predict exactly who will be eliminated and who will remain. This can offset positive effects by eliminating the wrong employees who hold a crucial/important/central position in the company. The second strategy is *work redesign*. This strategy reduces work by eliminating certain functions, hierarchical levels, groups, divisions, or products, which are then redesigned/merged with other parts of the company (not the same as divesting). Because the organizational structure is simplified, a higher degree of efficiency can be achieved. Work redesign pays off in the medium-term, in opposition of workforce reduction, which is clearly focused on short-term payoff. The last strategy identified by Cameron (1994) are *systematic strategies*. Systematic strategies differ fundamental from the other two strategies, because they take place on a continuous bases. These systematic strategies involve redefining downsizing as a way of life, an ongoing process, and a basis for continuous improvement, rather than as a program or target. Because a systematic strategy requires a long-term perspective, immediate (or medium-term) improvement will not be generated. Important to note is that the three downsizing strategies of Cameron (1994) are not mutually exclusive. Thus, combinations of short-term and long-term oriented implementations and the impact on organizational structure are viewed as possible.

Cameron (1994) distinguished mainly two elements in the structuring of the downsizing implementation strategies: the extent or scope of the downsizing strategy and if the organization is either short-term or long-term oriented when implementing the downsizing strategy. Another important remark about downsizing is that not only which of the downsizing implementing strategies is chosen should be taken into account, but also if the implementation is a defensive reaction or a proactive strategy (Cameron, 1994). Downsizing can be a defensive reaction to economic decline or a way to enhance organizational performance as part of the company's strategy. Although both should lead to increased organizational performance (Cameron, 1994), the reason for downsizing can have serious implications for the downsizing process itself.

Several articles can be found in more recent academic literature which address similar implementation strategies or downsizing characteristics as Cameron (1994) which impact the relation between downsizing and firm performance. These articles often explicitly take a contingency approach into account to examine particular situations or moderating factors on the influence of downsizing on firm performance. These implementation strategies or characteristics can thus be seen as contingencies that can influence the downsizing success (Love & Nohria, 2005). First of all, the timing of the downsizing implementation is theorized to have an impact on firm performance (Love & Nohria, 2005; Brauer &

Laamanen). In line with Cameron (1994) they argue that downsizing can be used either in a proactive or reactive sense. Downsizing can be implemented when performance has decline, reactive, or when performance has not declined, proactive. Another contingency based on Cameron (1994) is if the downsizing is scoped in a narrow or broad sense (Love & Nohria, 2005). Downsizing implementations can affect a variety of organizational elements. For example, downsizing implementations can affect employee numbers only or include organizational structural redesign. Both can impact the organization in different ways depending on the situation. Therefore, the scope of the downsizing strategy is argued to be of importance when assessing the impact of downsizing on firm performance. Another contingency found in the academic literature is the frequency of implementing a downsizing strategy (De Meuse et al., 2004). Implementing a downsizing strategy multiple times in a row affects how downsizing is implemented and has an impact on firm performance. De Meuse et al. (2004) argue that managers are more inclined to use a downsizing strategy as downsizing itself becomes a more socially legitimate practice. Therefore, downsizing can be used more frequently while the effectiveness is not evident. And as last, the length of time put in to the downsizing process, or lead time, is theorized to affect firm performance (Aalbers & Dolfsma, 2014). Downsizing implementation strategies which take a long-term approach (Cameron, 1994) or take a longer time to implement the strategy (Aalbers & Dolfsma, 2014) implement the intended changes to the organization more gradual. This is theorized to influence the organizational performance on the long term and gives the organization more opportunity to cope with the changes.

2.4.1 SME downsizing implementation strategies

Downsizing implementation strategies as described by Cameron (1994) are focused on large firms. However, it is important to address if these implementation strategies are also applicable to small- and medium-sized enterprises. The strategic management literature does not address this topic. Human resource studies provide a more fruitful basis. This stream of theory emphasizes that there are significant differences between human resource practices in large firms, and small and medium-sized enterprises. Cassel, Nadin, Gray, and Clegg (2002) explored human resource practices in small- and medium-sized enterprises and found that there is a large diversity in HR practices among small- and medium-sized enterprises. One important remark is that small- and medium-sized enterprises do not always incorporate formal HR strategies. Also, when an HR strategy is used, there often exist a lot of ambiguities about HR policies and management directors are found to intervene regularly. Heneman, Tansky, and Camp (2000) examined human resource practices in growing small- and medium-sized enterprises and found that it is important for entrepreneurial firms to develop high-potential employees that perform multiple roles under various stages of and align them with organizational culture. In other words, it is probably more difficult for such small- and medium-sized enterprises to lay off employees, as developing skills and aligning culture takes time. Cardon and Stevens (2004) provided a literature review on managing human resources in small organizations and state that small- and medium-sized enterprises are indeed

different than large firms in terms of human resource practices and the management of people may thus not be similar to large firms. However, also the human resource theory still lacks an empirical base to develop sound theory and data about topics related to downsizing and to understand how small and emerging firms handle performance management and organizational change (Cardon & Stevens, 2004).

One interesting model for 'rightsizing' strategies for small- and medium-sized enterprises is provided by Chu and Siu (2001). These authors researched small- and medium-sized enterprises in Hong Kong and their responses to the Asian economic crisis. First of all, they identified that the most common strategy used by small- and medium-sized enterprises to cope with the crisis was retrenchment. Retrenchment consist of the options to downsize or downscope (reducing business). An important remark is that small- and medium-sized enterprises generally do not downscope as they have limited resources. Chu and Siu (2001) then identify three stages of rightsizing (Appendix D). The first stage happens before the actual major employee cuts. In this stage small- and medium-sized enterprises often freeze hiring and restrict overtime to cope with the downturn in the environment. In the second stage, the actual major employee cuts happen. Then when firms have survived this stage, it possible to recover when firms act proactively and professional in managing their human resources. An overview of possible actions is provided in Appendix D. However, this study provides evidence of small- and medium-sized enterprises in economic downturn in Hong Kong. Also, the possibility that downsizing is used proactively up front (before stage 2) is not taken into account. In summary, empirical evidence on downsizing implementation strategies for small- and medium-sized enterprises is still lacking, especially for small- and medium-size enterprises in the Netherlands.

2.5 Firm performance

Traditionally, the measurement of firm performance has always been based on accounting-based figures for both small- and medium-sized enterprises and large firms (McKiernan & Morris, 1994). Most studies examining firm performance (of small- and medium-sized enterprises) have focused on firm profitability as main performance indicator (Lu & Beamish, 2006; McKiernan & Morris, 1994). Other commonly used output measure are growth, and in some studies productivity (McKiernan & Morris, 1994). Firm growth is argued to be especially important for small- and medium-sized enterprises (Lu & Beamish, 2006). McKiernan and Morris (1994) add to this notion that financial performance is only a part of overall performance. They emphasize the importance of firm growth measurements stating the argument that small- and medium-sized enterprises tend to concentrate on means rather than ends in their operations. Measuring ends alone can thus be questionable.

When focusing on the downsize literature and firm performance similar performance measurements can be identified. Datta et al. (2010) identified several streams in the downsizing literature of which organizational outcomes of downsizing is applicable to this topic. This category is further divided into

research on market based outcomes, accounting returns and other outcomes as efficiency/productivity, creativity, reputation, growth in sales, changes in R&D and advertising. Studies that examine market based outcomes measure how downsizing affects shareholder wealth. Studies researching the relationship between employee downsizing and firm profitability use accounting numbers as return on investment (ROA) and return on equity (ROE). Appendix B presents an overview of studies examining the relationship between downsizing and firm performance other than market based outcomes. In this overview common outcomes found are ROA, ROE, ROS and other productivity ratios related to sales, labor productivity and R&D. Academic literature focusing on small- and medium-sized enterprises still lacks studies examining the relationship between downsizing and firm performance. Small- and medium-sized enterprises literature, however, does show that growth and profitability are important concepts when assessing small- and medium-sized performance (McKiernan & Morris, 1994; Lu & Beamish, 2006).

2.6 The effect of downsizing on firm performance

The existing literature on the effect of downsizing on firm performance is equivocal at best. Some authors indicate a positive effect of the reduction of workforce on firm performance, while others suggest a deleterious effect (Appendix A). Although empirical literature, based on large firms, often find no significant or a deleterious effect from downsizing on firm performance, some studies present a positive effect in the longer run. Espahbodi et al. (2000) relate this positive effect to the increased focus of organizations in their organizational practices. Kang and Shivdasani (1997) provide similar arguments stating that the divesture of unprofitable operations, reduction in labor expenses and eliminating negative synergies could lead to positive effects in the long run. However, the strategic change management literature gives some insights in how firms respond to changes in general. Gilbert (2005) describes that organizations often fail to change their resources and processes in responds to their (technological) environment. Even when the need of change is apparent. Firms find it difficult to change their ways and often need time to adjust to the situation at hand. In line with this reasoning and empirical evidence thus far it can be assumed that it is more probable for firms to experience a deleterious effect of downsizing than a positive one.

In order to assess the effect of downsizing on small- and medium-sized enterprises it is first examined how downsizing relates to firm performance comparing downsizers and non-downsizers in general. Comparing downsizers and non-downsizers gives insight in the effect of downsizing for Dutch firms overall. It also adds evidence to the equivocal findings in prior literature. Therefore, the following hypothesis is formulated:

H1: 'Downsizing firms are associated with lower firm performance than non-downsizing firms'

Small- and medium-sized enterprises are argued to differ significantly from large firms and represent a broad range of enterprises. Shuman and Seeger (1986) state that it has been well argued that smaller businesses and larger businesses are different species. Empirical findings on relationships between downsizing and firm performance based on samples of large firms do not thus not necessarily apply to small- and medium-sized enterprises. One major stream of research addresses the topic of entrepreneurship. Entrepreneurship is defined as *all business that are new and dynamic, regardless of size or line of business, while excluding businesses that are neither new nor dynamic, as well as, all non-business organizations'* (Acs & Audretsch, 2006). It is clear that this definition refers to organizations which are addressed as small- and medium-sized enterprises in the definition of the European Commission. An important element of such firms is that they are actively opportunity-seeking (Rostek, 2015). Entrepreneurial small- and medium-sized enterprises must be able to respond quickly and efficiently to market signals to take advantage of trade and investment opportunities (Rostek, 2015). These kind of small- and medium-sized enterprises need to be competitive and productive (OECD, 2004). Another element of entrepreneurial firms is that they often are innovative. Ghauri and Kirpalani (2015) summarize four attributes of an entrepreneur based on academic literature. These are innovation capability, internal focus of control (meaning that entrepreneurs are self-reliant), risk-taking tendency and energy level.

So small- and medium-sized enterprises can be very dynamic and innovative. Some of these firms are even internationally oriented, which can be a source of greater organizational performance (Acs & Audretsch, 2006). But on the other side of the coin, small- and medium-sized enterprises are also often relatively limited in resources in comparison with large firms. Rostek (2015) states that small- and medium-sized enterprises do not always have the ability to independently develop the necessary range of strategic information and responses due to lack of knowledge and skills; financial, technical, human and organizational resources; qualified personnel; and the number of generated and gathered resource of data. Caloghirou, Protogerou, Spanos, and Papgiannakis (2004) examined industry- versus firm-specific effects on performance and found that firm factors have a clear impact on profitability, much more than industry effects. Firm factors were measures using dynamic capabilities, which concept is developed in the strategic change management literature (Teece, 2007). Dynamic capabilities are the capabilities of firms to explore their competitive environment while also be able to exploit it (Boumgarden, Nickerson, and Zenger, 2012). Coordination/integration, learning and transformation were used to represent idiosyncratic firm endowments (Caloghirou et al., 2004). Important about this remark is that firm factors as dynamic capabilities can thus influence firm performance for a large part. As previous stated, small- and medium-sized enterprises do not have always the ability to develop such capabilities as they lack sufficient resources. When addressing downsizing it could then be expected that small- and medium-sized enterprises will be less capable to cope with downsizing events than large

firms. Therefore, it is expected that when small- and medium-sized enterprises will experience a lower performance than large firm when implementing a downsizing process.

Therefore, the following hypothesis is formulated in line with the previous hypothesis to assess whether differences in performance after downsizing can be found comparing small- and medium-sized enterprises with large firms in general. This results in the following hypothesis:

H2: 'Small- and medium enterprises are associated with a lower firm performance after downsizing than large firms'

After assessing the influence of downsizing on firm performance and the difference between downsizing small- and medium-sized enterprises and large in general, it is examined whether differences exist between small- and medium-sized enterprises and large firms when looking at the effects of downsizing implementation strategies on firm performance. These contingencies are important to examine when addressing the relation with firm performance. Examining differential effects for small- and medium-sized enterprises and large firms adds to the current body of knowledge as this is not examined yet. Together the differences between small- and-medium-sized enterprises and large firms on the effects of implementation strategies on firm performance give a broad view of the effect of downsizing on the firm performance of Dutch small- and medium-sized enterprises using a contingency approach. The downsizing timing, scope, frequency, and lead time are therefore examined.

In the development of the hypotheses it is taken into account that small- and medium-sized enterprises can be innovative and flexible when reacting to their environment. In the academic literature important effects on firm performance are attributed to the fact if downsizing is implemented proactively or in reaction to economic downturn (Love & Nohria 2005; Brauer & Laamanen 2014). Brauer and Laamanen (2014) and Love and Nohria (2005) studied the moderating influence of industry and slack on firm performance. They found that in addition to those moderators conducting downsizing proactively contributes to higher performance. Also, Chu and Siu (2001) found that a proactive attitude led to recovery after the employee cut in the specific relation to small- and medium-sized enterprises. It can be argued that small- and medium-sized enterprises often are more entrepreneurial oriented than large firms and proactive downsizing might thus be more prominent in small- and medium-sized enterprises. Therefore, it is important to assess whether the proactive or reactive orientation of downsizing is indeed more pronounced in small- and medium-sized enterprises than large firms. Therefore, the following hypothesis is structured as follows:

H3: 'Firm category significantly moderates the relation between downsizing timing and firm performance'

Love and Nohria (2005) make an distinction between firms that downsize in a narrow or broad scope in line with the study of Cameron (1994). Multiple implementation strategies for downsizing can exist which in turn influence the relation between downsizing and firm performance. The study of Chu and Siu (2001) suggests that retrenchment, or in other words downsizing in a narrow sense, is the most common strategy for small- and medium-sized enterprises as downsizing in a broad sense (downscoping) is often not possible. small- and medium-sized enterprises might therefore experience less positive results from downscoping as they are not able to downscope is a similar extensive way as large firms can due to a lack of resources. However, empirical evidence is limited. Therefore, the influence of firm category on the relation with firm performance is explored using the following hypothesis:

H4: 'Firm category significantly moderates the relation between downsizing scope and firm performance'

De Meuse et al. (2004) studied downsizing using a long-term perspective and found that the frequency of downsizing activities impacted firm performance. More specific, firms that downsize more often are found to have a lower financial performance than firms that do not. This effect is theorized from an institutional theory perspective. The practice of downsizing is becoming taken for granted and socially legitimate. Therefore, managers might be more inclined to use this practice in responds to environmental uncertainty as downsizing becomes more accepted. In turn, downsizing appears to be used more often while the evidence of its effectiveness is not evident (De Meuse et al., 2004). Therefore, frequent downsizing is theorized to lower the financial performance of companies. To explore whether such effect might be different for small- and medium-sized enterprises and large firms, the following hypothesis is structured:

H5: 'Firm category significantly moderates the relation between downsizing frequency and firm performance'

Aalbers and Dolfsma (2014) explored the effects of reorganizing socially on firm performance. An interesting finding was that the length of reorganization had a positive significant result on firm performance. Aalbers and Dolfsma (2014) suggest that it might be related to employees who feel like they have more control of the situation or have more time to adjust. This relates to the strategic change theory, which suggests that time gives organizations the opportunity to cope with change. Similar lines of reasoning are argued by Cameron (1994). Cameron (1994) distinguishes several downsizing strategies of which one is focused on workforce downsizing only and takes a rapid-hit approach. This approach is focused on short-term results. However, other approaches can be used based on more gradual changes in the form of organizational redesign or strategic changes. These approaches are focused on the long-term and takes a more social approach than short-term workforce reduction. The length of time of the downsizing process might thus have a significant influence on firm performance.

It is therefore explored whether there are significant differences between small- and medium-sized enterprises and large firms using the following hypothesis:

H6: 'Firm category significantly moderates the relation between lead time of the downsizing process and firm performance'

2.7 Summary

In this chapter an overview is provided of the current relevant academic literature on the topic of downsizing and firm performance. From a contingency perspective and with the use of the theory described, several hypotheses are developed. The following figure provides an overview of the hypotheses proposed:
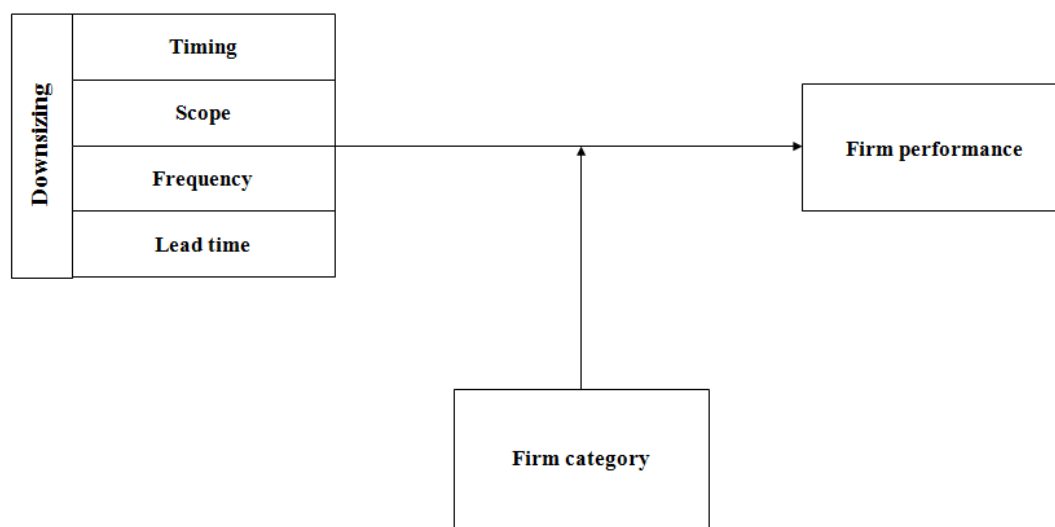
Figure 1: Conceptual model

The first hypothesis assesses the relation between downsizing in general and firm performance. In addition the differential effects of firms categorized as SME or large firm are examined in hypothesis 2. Hypothesis 3 to 6 address similar relations, but then specific for contingencies which are related to downsizing and found in the academic literature. Together these hypotheses provide an overview of the differences between small- and medium-sized enterprises and large firms on the topic of downsizing in relation to firm performance.

Chapter 3 Methodology

This chapter provides an overview of the research method and statistical procedures used this study. First of all, the overall research method is discussed. Then, the variables used in this study are described. After that, the sample development is described. And as last, the research models used for the statistical procedures are elaborated on.

3.1 Research method

The goal of this research is to test the relation between downsizing and firm performance for firms in the Netherlands, in particular differences between small- and medium-sized enterprises and large firms are explored. A quantitative research approach is best suited as firm performance is a quantifiable dependent variable and a relation between firm performance and a variety of independent variables is tested (Vennix, 2010). This involves the testing of empirical observations to test if theory about the association between downsizing and firm performance can uphold (Field, 2013).

The association between downsizing and firm performance is studied over a period of three years after the start of the downsizing process to incorporate suggestions found in the academic literature that downsizing can have different associations with performance over time when a longer time-frame is used (Kang & Shivdasani, 1997; Espahbody et al., 2000). Therefore, this study incorporates a larger time-frame by collecting longitudinal data in addition to cross-sectional data typically used in ordinary least squares regressions. Also, data is included about firms that downsize between the years 2002-2016. This means that data is collected for different years depending on the firm specific start of the downsizing process for each firm. The sample is therefore structured as panel data, which consists of longitudinal data about the research objects over a certain period of time (Vennix, 2010). In order to statistically test the hypotheses panel data regressions are used.

3.2 Variables description

3.2.1 Dependent variables

The outcome variable in this study is firm performance. Firm performance is generally examined in the downsize literature using variables indicating firm profitability as return on assets (ROA) and/or return on equity (ROE). In addition, firm growth is taken into account as outcome variable in line with McKiernan & Morris (1994) and (Lu & Beamish, 2006) who argue that growth is an important concept when assessing small- and medium-sized enterprises in addition to profitability. Therefore, sales growth and asset growth are added as proxy variables for firm performance.

Firm profitability

The most commonly used measure for firm performance in the academic literature addressing downsizing is return on assets (De Meuse et al., 1994; Bruton et al., 1996; Cascio et al., 1997; Palmon et al., 1997; Espahbodi et al., 2000; Chalos & Chen, 2002; Cascio & Young, 2003; Love & Nohria, 2005; Perry & Shivdasani, 2005; Yu & Park, 2006; Guthrie & Datta, 2008; Brauer & Laamanen, 2014). Return on assets is a standard accounting measure and reflects the profitability of a firm relative to the amount of money invested in the firm. It is thus an indicator of how efficiently the invested money in the firm is used (Yu & Park, 2006). The standard measurement of return on assets used in relation to downsizing is the operating income before depreciation, interest, and tax divided by total assets (Cascio et al., 1997). However, in this study return on assets is calculated using net income, which includes depreciation, interest, and tax. The reason for using net income is that data about operating income was not always available for small- and medium sized firms. Therefore, net income is used to not further restrict the sample size. In addition, incidental influences of depreciation, interest, and tax are limited by including multiple years of performance measurements in the dataset. Return on assets is measured as follows:

$$Return\ on\ assets\ (t) = \frac{net\ income(t)}{total\ assets\ (t)}$$

Another firm profitability measure used in this study is return on equity. Return on equity is a similar concept as return on assets, but focuses on the actual return to the owners. According to De Meuse et al. (1994), it is the best measure to test whether layoffs help increase the rate of financial return to its owners, which is the basic purpose of a firm. Return on equity is also often used as outcome variable when addressing the effect of downsizing on firm performance (De Meuse et al., 1994; Palmon et al., 1997; Espahbodi et al., 2000; De Meuse et al., 2004). Return on equity is measured as follows:

$$Return\ on\ equity\ (t) = \frac{net\ income\ (t)}{total\ equity\ (t)}$$

Firm growth

Firm growth is another dimension of firm performance which is theorized to be of importance for small- and medium-sized enterprises in particular (McKiernan & Morris, 1994; Lu & Beamish, 2006). In order to capture firm growth the measures sales growth and asset growth are used. Sales growth provides an overview of the annual growth rate of sales. Total assets is calculated as the annual growth rate of total assets. The formula of both measurements are as follows:

$$Sales\ growth\ (t) = \frac{sales\ growth\ (t) - sales\ growth\ (t-1)}{absolute\ value\ of\ sales\ growth\ (t-1)}$$

$$Asset\ growth\ (t) = \frac{asset\ growth\ (t) - asset\ growth\ (t-1)}{absolute\ value\ of\ asset\ growth\ (t-1)}$$

3.2.2 Independent variables

A variety of independent variables are examined in this research to find out whether they have any significant effect on the firm performance. First of all, the strategy of downsizing is formulated as an independent variable. This variable is used in the first research model described in the following paragraph. In addition, several characteristics of downsizing are described, which are the timing of downsizing, the lead time of the downsizing process, the frequency of the downsizing strategy, and the scope of the downsizing process. And as last, the independent variables firm category and long-term performance are described which are used as indicators for firm category and year after downsizing.

Downsizing

First of all, downsizing takes the central role in this study related to firm performance. Therefore, downsizing is used as an independent variable to indicate whether a firm does are does not implement a downsizing strategy. Several ways to identify downsizing firms are used in the academic literature. Two common ways are to identify downsizing firms by a certain percentage of workforce reduction (Bruton et al., 1996; Cascio et al., 1997; Suárez-Gonzáles, 2001; Chalos & Chen, 2002; Cascio & Young, 2003; Love & Nohria, 2005) or by looking at firm announcements (De Meuse et al., 1994; Palmon et al., 1997; Espahbodi et al., 2000; Chen et al., 2001; De Meuse et al., 2004; Chadwick et al., 2004; Said, Le Louarn, and Tremblay, 2007; Guthrie & Datta, 2008; Brauer & Laamanen, 2014). Other studies identify downsizing firms by using a survey (McElroy, Morrow, and Rude, 2001; Yu & Park, 2006). Love and Nohria (2005) argue that annual firm-level employment changes might not truly indicate downsizing as firms often acquire and divest businesses, especially large multi-business firms. Therefore, announcement might be a more valid indicator. However, in this study downsizing is identified in a unique manner which is highly reliable. Downsizing firms are identified by using social plans. A social plan describes the services provided to employees in case of a collective dismissal of employees (>20 employees) when reorganizing. This is legally required. However, social plans can also be produced by firms which dismiss less than 20 employees. In this case the social plan in not legally required. Downsizing firms are indicated using a binary code, in which the value 0 indicates a non-downsizing firm and the value 1 indicates a downsizing firm.

Timing

The proactive or reactive timing of downsizing as suggested by Love and Nohria (2005) are taken into account in this research. Love and Nohria (2005) measure timing using the change in the firm's market capitalization in the year before downsizing. Market capitalization is the market value of equity plus long-term debt. The market value of equity is the amount of common stock times the market value of the common stock. Love and Nohria (2005) use this measure as the equity market captures a broad range of current and anticipated changes in the firm's performance situation. In other words, the market value

captures some anticipated future events. The timing is then classified as reactive when firms experience a decline and proactive when firms do not experience a decline in market value (Love & Nohria, 2005; Brauer & Laamanen, 2014). In this study the timing of downsizing cannot be indicated by using market valuation as small- and medium-sized enterprises are often private firms and thus do not have stock publicly listed on the stock market. However, timing is also indicated by looking at the levels of financial distress of companies, e.g. declining versus not declining performance. To indicate the financial distress of companies the average is taken of the change in a variety of performance measures available between the year before downsizing and the downsizing year itself. Firms with a negative average are classified with declining performance and firms with a positive average as not declining performance. Reactive and proactive downsizing is then indicated by giving firms with declining performance the value of 0 and firms with no declining performance the value of 1. The formula for calculating the timing of downsizing is as follows:

$$Timing$$
$$= the\ average\ of\ change\ in\ (return\ on\ equity +\ sales\ growth +\ asset\ growth$$
$$+\ net\ income)between\ the\ year\ before\ downsizing\ and\ the\ year\ of\ downsizing$$

The performance variables used consist of the dependent variables in this research while return on assets is substituted for net income. The reason to exclude return on assets is because the changes in total assets (asset growth) and net income together capture the changes in return on assets. Also, return on assets the year before downsizing is also used as a control variable to indicate the level of prior firm performance in general. Using return on assets in this formula thus seemed unnecessary.

Lead time

Lead time indicates the time the downsizing process takes from start to end. The lead time is measured using data from the social plans. The social plans indicate a starting and ending time for the reorganization process. This time is indicated per month. The lead time of the downsizing process is thus based on the time in months as indicated in the social plans.

Frequency

Frequency refers to the number of times downsizing is used by a company. The frequency of downsizing is assessed by counting the number of social plans for a company using the sample of social plans which is available.

Scope

The scope of downsizing is assessed similar to the method used by Love and Nohria (2005). Love and Nohria (2005) assessed downsizing scope using dichotomous numbering assigning firms that downsize in a narrow manner the value 0 and firms that downsizing in a broad way the value 1. Downsizing is determined to be narrow when the scope of downsizing is restricted to personnel reductions. Downsizing

is viewed as broad when it involved organizational redesign. The following table provides an overview of indications of a broad scope used in this thesis.

Table 1. Broad scope classification

Structural or process changes	Restructuring
	Reorganization
	Process redesign
	Reduction in hierarchical levels, functions or divisions
Changes in the firm's strategic domain	Focus on core business
	Narrowing product lines

3.2.4 Control variables

In order to measure the effects of downsizing on firm performance correctly it is important to control for variables that might affect these relations. Academic literature on downsizing identifies several control variables which are accounted for in empirical research. Common control variables are previous firm performance (Guthrie & Datta, 2008; Espahbodi et al. (2000); Love & Nohria, 2005; Brauer & Laamanen, 2014), firm size (Guthrie & Datta, 2008; Yu & Park, 2006; Palmon et al., 1997; Brauer & Laamanen, 2014; Lu & Beamish, 2006), asset change (Guthrie & Datta, 2008; Love & Nohria, 2005; Brauer & Laamanen, 2014 Espahbodi et al., 2000), level of unionization (Guthrie & Datta, 2008; Yu & Park, 2006; Chadwick et al., 2004) and magnitude of the employee reduction (De Meuse et al., 2004; Love & Nohria, 2005; Espahbodi et al., 2000). Guthrie and Datta (2008), examining the moderating effect of industry between downsizing and firm performance in large firms, also identified strategy as a control variable. The control variables performance prior to downsizing, firm size, magnitude of downsizing, and industry are used in this thesis. Asset change is omitted due to lack of available data, especially for smaller firms, when measured as the percentage change in the total value of property, plant, and equipment (Guthrie & Datta, 2008) and due to high correlation with firm size and asset growth when measured as percentage changes in total assets (Love & Nohria, 2005). Level of unionization and strategy are omitted due to lack of data.

Performance prior to downsizing

Controlling for the performance of firms prior to downsizing is one of the most used control variables in downsizing literature (Appendix B). The most common method used is to compare the -1 year of downsizing performance with the performance after the downsizing event. Using performance prior to downsizing as a benchmark assures that all changes in performance due to downsizing are taken into account. Performance prior to downsizing is measured by the return on assets the year before downsizing.

Firm size

Firm size is an important factor to control for as it may influence HR policies as well as firm performance (Guthrie & Datta, 2008). Other studies, however, implicate that size is not a significant factor (Bruton et al., 1996). Espahbodi et al. (2000) explain that they control for firm size, because firms normally downsize after growth beyond their optimal size and experience deterioration in performance. Also, small- and medium-sized enterprises focused literature identifies firm size as a control variable (Lu & Beamish, 2006). Small- and medium-sized enterprises differ in size from 1 to 250 employees (European Commission, 2005). Even within certain typologies of small- and medium-sized enterprises large differences in firm size can exist. Therefore, it is expected that firm size could lead to different results in firm performance. Firm size is measured by the natural logarithm of total assets.

Magnitude of downsizing

Several studies described the effect of the magnitude of downsizing on firm performance (De Meuse et al., 2004; Love & Nohria, 2005). Arguing that the relative magnitude of downsizing does not have a significant influence on the firm performance. However, firms that cut the highest proportions of their workforce had a significant deterioration of their operational indebtedness (Saïd et al., 2007). De Meuse et al. (2004) state that companies laying off more than 10% of their workforce significantly under-performed. Espahbodi et al. (2000) argue that a higher number of workforce reduction leads to decreased costs and thus improve performance. Although they also note that large workforce reductions can have a detrimental effect. Controlling for the magnitude of downsizing can thus reduce its influence on the relation between downsizing and firm performance. Magnitude of downsizing can be measured by taking the difference in total employees between the downsizing year and year before downsizing.

Industry

As last, industry is taken as a control variable to control for industry related effects. This is a standard control variable in management research on the firm level and generally used in the downsizing literature (Appendix A).

3.2.3 Moderator variable

Firm category

The purpose of this research is to examine the differential effects of downsizing for small- and medium-sized enterprises and large firms. In order to capture this effect, firm category is used as a moderator variable. The interaction effect of firm category and downsizing, timing, scope, frequency, and lead time can provide some insights in how SME's and large firms differ in relation to firm performance. Firm category is structures dichotomous where 0 indicates small- and medium-sized enterprises and 1 indicates large firms.

Table 2. Overview variables

Dependent variables

Firm performance	Return on assets (ROA)	Net income/total assets
	Return on equity (ROE)	Net income/total equity
	Sales growth	Sales (t) – sales (t-1) / the absolute value of sales (t-1)
	Asset growth	Total asset (t) – total asset (t-1) / the absolute value of total assets (t-1)

Independent variables

Downsizing	Implementation of downsizing strategy	0 = no
		1 = yes
Timing		0 = reactive
		1 = proactive
Scope	Manner of implemented downsizing strategy: narrow or broad	0 = narrow
		1 = broad
Lead time	Total extent of time of downsizing	Measured in months
Frequency	Frequency of implementing downsizing strategy over time counted by number of social plans available	Number

Moderator variable

Firm category	Firm classification distinguishing between SME's and large firms.	0= SME
		1 = Large firms

Control variables

Performance prior to downsizing	Performance the year before downsizing	ROA(t-1)
Firm size	Natural logarithm of total assets	Natural logarithm (total assets (t))
Magnitude of downsizing	Magnitude of employee layoff relative to year -1	(# employees (t-1) - # employees (t))/ # employees (t-1). (magnitude is positive for decreasing employee levels)
Industry	Industrial code (SIC)	2-digit SIC code

3.3 Development of the sample

In order to research the relation between downsizing a comprehensive dataset is necessary. First of all, a set of social plans were retrieved which are used in ongoing research at the Radboud University and includes downsizing firms between 1994-2015. In turn, data was retrieved from the ORBIS database which provided data about balance sheet items, profit and loss statement items and number of employees through the period of 2005-2015. At this point the dataset included 522 firms of all sizes. The next step consisted of the determination of the first downsizing activity and corresponding year for each firm by using the social plans. After determining the right moment of downsizing it became possible to collect the right data for the years around the downsizing event and include them in the dataset. At this point the dataset included a lot of missing data on important balance sheet and profit and loss statement items as well general data as the amount of employees. Additional data was then sought using the ORBIS and AMADEUS database. However, this provided little additional data. Eventually, COMPANY.INFO was

used to collect data about the relevant firms by using annual reports and overviews on key financial data. The remaining data was on the lead time, scope, and frequency of downsizing was determined by examining the social plans.

Atlas TI

Social plans were used in order to determine whether firms adopted a narrow or broad approach to downsizing. The social plans of the first downsizing event were scrutinized. This is a different information source than used by prior research which determines the scope of downsizing (narrow/broad) through assessing announcement text which indicate employment reductions (Love & Nohria, 2005). However, social plans can be argued to be a richer source of information than announcements as they include all agreements on the downsizing process used in the internal organization. Announcements do not necessarily include all relevant information as they are generally media sensitive. Therefore, this research examines social plans as they are a more objective and comprehensive than firm announcements. The method used to examine the social plans is similar to Love and Nohria (2005). The authors as well a research assistant independently examined the announcements for indications of a broad downsizing scope. The results were then compared with each other to get a robust assessment. In this thesis the social plans are also examined for indications of a broad downsizing scope. As the research of Love and Nohria (2005) indicates, assessing the scope of downsizing involves some degree of judgment. Therefore, an additional quantitative approach is incorporated to structure the examining of the social plans to mitigate the potential bias of judgment. The program Atlas TI is used to structure this method. First of all, all documents were scrutinized using a word cruncher. The output provided an overview of the diversity of words used in the social plans. From this overview the words were selected that can indicate a broad downsizing scope using the indications of a broad scope as suggested by Love and Nohria (2005). Then these words were transformed into codes to identify the indications of the downsizing scope in the social plans (Appendix E). As last, the codified social plans were examined to determine whether the downsizing firm does or does not incorporate a broad approach in their downsizing efforts.

Finally, data was collected for non-downsizing firms using ORBIS which was used to structure a control group. The control group is determined by collecting data about Dutch companies which operate in the same industry as the downsizing firms using a 2-digit SIC code. Also, firms were selected which had at least six years of data available between 2000-2016 as the data about downsizing firms is collected for the same period. As last, a sample of firms was collected semi-randomly to match approximately a similar amount and type of industry and firm size (SME and large). An overview of the collected dataset is provided in Appendix F.

3.4 Research models

To empirically test the hypotheses formulated in the literature review section several research models are constructed. The first model tests what the effect of downsizing is on firm performance using a panel data regression. This model provides an overview what the overall association is between downsizing and firm performance using a three-year window after the downsizing implementation. In addition, the second model is used to examine downsizing firms only and the effects of firm specific downsizing characteristics.

Research model 1: Panel data regression

$Firm\ valuation$

$$= \beta 0 + \beta 1\ Downsize + \beta 2\ Firm\ category + \beta 3\ Firm\ category * Downsize$$
$$+ \beta 4\ Firm\ size + \beta 5\ Prior\ performance + \beta 6\ Magnitude$$
$$+\ \beta 7\ Industry\ controls$$

Where:

Firm valuation	Return on asset, return on equity, sales growth, asset growth.
Downsize	Indicates whether a firm implements a downsize strategy. Takes the value of 1 when downsizing and the value of 0 when downsizing is not implemented.
Firm category	Indicates whether a firm is characterized as a SME or a large firm. The value of 0 indicates a SME and the value of 1 a large firm.
Firm category*Downsize	Is the interaction effect between the firm category and if the firm downsizes or not.
Firm size	Is the natural logarithm of total assets.
Prior performance	Is the return on assets the year before downsizing.
Industry controls	Indicator variable for SIC (2-digit) industry classifications.

Research model 2: Panel data regression

$Firm\ valuation$

$$= \beta 0 + \beta 1\ Timing + \beta 2\ Scope + \beta 3\ Frequency +\ \beta 4\ Lead\ time$$
$$+ \beta 5\ Firm\ category + \beta 6 Long - term\ performance + \beta 7\ Firm\ category$$
$$* Timing + \beta 8\ Firm\ category * Scope + \beta 9\ Firm\ category * Frequency$$
$$+ \beta 10\ Firm\ category * Lead\ time + \beta 11\ Firm\ size + \beta 12\ Magnitude$$
$$+ \beta 13\ Prior\ performance + \beta 14\ Industry\ controls$$

Where:

Firm valuation	Return on asset, return on equity, sales growth, asset growth.

Timing	Indicates whether a firm downsizes proactive or reactive. Takes the value of 0 when reactive and 1 when proactive
Scope	Indicates whether a firm downsizes in a broad or narrow sense. Takes the value of 0 when narrow and 1 when broad.
Frequency	Is the number of downsizing events from the first downsizing practice till now.
Lead time	Is the extent of time in which the downsizing process is conducted, measured in months.
Firm category	Indicates whether a firm can be categorized as either SME or large firm. Takes the value of 0 for SMEs and the value of 1 for large firms.
Long-term performance	Is used to make a distinction between short-term and long-term performance. It is a dichotomous variable using the value of 0 to indicate short-term performance (year 1 after downsizing) and the value of 1 for long-term performance (2 and 3 years after downsizing).
Firm category*Timing	Is the interaction effect between firm category and timing.
Firm category*Scope	Is the interaction effect between firm category and scope.
Firm category*Frequency	Is the interaction effect between firm category and frequency.
Firm category*Lead time	Is the interaction effect between firm category and lead time.
Firm size	Is the natural logarithm of total assets.
Magnitude	Is the value of the difference between number of employees in the downsizing year and number of employees in the year before downsizing, divided by the number of employees in the year before downsizing.
Prior performance	Is the return on assets the year before downsizing.
Industry controls	Indicator variable for SIC (2-digit) industry classifications.

Chapter 4 Results

This chapter provides the results of the analytical procedures performed. First of all, an overview of the data sample is provided using descriptive statistics and the correlation matrix. After that, the dataset preparations are discussed testing the data for the relevant assumptions. In the following paragraph the results of the panel data regressions are described. And as last, an overview is provided of the results.

4.1 Descriptive statistics

The descriptive statistics provide an overview of the data used in the research models. Descriptive statistics are used to explore how the data looks like and if there are any potential problems. Also, descriptive statistics can be used to a basic overview between certain groups (Hair, Black, Babin, and Anderson, 2010). In this case the descriptive statistics are used to provide an first view of the differences between firms that downsize reactive and proactive as formulated in research model 3 (table1). The variable 'downsize' of research model 1 is not included as it is a non-metric variable (binary). In addition, Appendix G provides another descriptive statistics table categorizing groups in small, medium, and large firms.

Table 3. Descriptive statistics research model 1

Variables		Mean	Median	Std. Dev.	Min	Max	Obs.
Downsizing firms							
Dependent variables	ROA	-.0198714	.0176954	.2231685	-2.5956	.347744	339
	ROE	.0681024	.0768804	2.270313	-30.1765	17.15272	339
	Sales growth	.0136687	. .0001914	.3158895	-.9799541	2.495776	336
	Asset growth	.0065273	-.0016382	.2903516	-.7745943	2.585724	340
Control variables	Firm size	18.25325	17.89898	2.027282	14.57912	23.84726	340
	Prior performance	-.0378324	.0068137	.1946816	-1.299404	.34775	369
	Magnitude	.0760867	.0955414	.3741903	-3.201681	.6	369
Non-downsizing firms							
Dependent variables	ROA	.0953447	.0460997	.5330424	-.8616077	7.686995	218
	ROE	.0261243	.0021142	.3378618	-2.01993	2.01884	222
	Sales growth	.4914061	.0368274	5.189508	-.9953025	76.6138	222
	Asset growth	.0680356	.0329643	.307679	-.7605022	2.291655	222
Control variables	Firm size	18.80905	18.3441	2.084735	11.07119	24.52638	222
	Prior performance	.1000495	.0408247	.2245862	-.2513794	1.457363	219
	Magnitude	-.1461605	-.0089767	.6707025	-4.5625	.7847082	195
Total panel data							
Dependent variables	ROA	.0252222	.0269824	.3799191	-2.5956	7.686995	557
	ROE	.0514908	.0057727	1.776646	-30.1765	17.15272	561
	Sales growth	.2037363	.0122639	3.286359	-.9953025	76.6138	558
	Asset growth	.0308242	.0112223	.2985659	-.7745943	2.585724	562
Control variables	Firm size	18.4728	18.11378	2.066294	11.07119	24.52638	562

Prior performance	.0135216	.0223094	.2166653	-1.299404	1.457363	588
Magnitude	-.0007541	.0584418	.5076637	-4.5625	.7847082	564

Note: all categorical variables (firm category and industry) are left out of the descriptive statistics table as they provide no relevant information (non-metric scales). Also, a positive magnitude means that the number of employees have been cut. A negative magnitude consists of an increase of employee workforce.

Several remarks can be made reviewing table 3. First of all, at a first glance it seems that downsizing firms have a lower firm profitability as well firm growth on average. Also, downsizing firms seem to have lower performance a priori than non-downsizing firms in the same year. In addition, magnitude indicates that downsizing firms have indeed on average a decrease of 7% in workforce. Non-downsizing firms have experienced on average an increase in workforce of 14%.

Other remarks relating to research model 2 can be made when grouping the descriptive statistics into small, medium, and large firms (Appendix G). The descriptive statistics then show that large firms experience on average positive performance and growth after downsizing while medium firms mainly experience negative results, and small firms only experience an increase in sales and assets. The data also suggests that small firms have the highest frequency of downsizing (2.25 on average) which take the least amount of time (11.06 months). Medium firms show a moderate lead time (12.70 months) with the lowest frequency (1.74) compared to small and large firms. Large firms then put the largest extent of time in downsizing (19.11 months) with an average frequency of (1.73). As last, the descriptive table suggests that small firms conduct downsizing with the largest magnitude of layoffs on average (18%), medium firms (10%), and large firms the lowest amount (4%).

It is also important to check the correlations between variables used in the variables. A correlation matrix is therefore provided in table 4 and 5. Correlations indicate an association between two variables which can have a value between -1 and +1 (Field, 2013). The correlation matrix is useful for getting a rough idea what the associations are between predictor and outcome variables (Field, 2013). A remark is that high correlations can also exist between independent variables, which could indicate multicollinearity problems which are assessed in the following paragraph. Correlation values represent a small effect when values are ±0.1, medium when ±0.3 and large when ±0.5 in line with Field (2013). An important remark is that categorical variables are excluded from the correlation matrix. Only the correlation between metric variables can be interpreted. Therefore, industry is left out of both the correlation matrixes.

Table 4: Correlation matrix research model 1

#	Variable	1	2	3	4	5	6	7	8	9
1	ROA	1.0000								
2	ROE	-0.0616	1.0000							
3	Sales growth	0.0039	0.0024	1.0000						
4	Asset growth	0.2544	0.0277	0.0617	1.0000					
5	Downsize	-0.1959	0.0046	-0.0762	-0.0922	1.0000				
6	Firm category	0.0973	0.0570	0.0383	0.0596	-0.0964	1.0000			
7	Firm size	0.1903	0.0406	0.0573	0.1446	-0.1290	0.6736	1.0000		
8	Magnitude	-0.0475	0.0043	-0.4267	-0.0735	0.1992	-0.2284	-0.1896	1.0000	
9	Prior performance	0.3683	-0.0981	0.0014	0.0239	-0.3032	0.0597	0.1854	-0.0833	1.0000

The correlation matrix in table 4 shows small correlations for the most part (below 0.3). However, firm size is highly correlated with firm category. This is as expected as firm category is an indicator variable whether a firm is categorized as an SME (takes the value of 0) or a large firm (takes the value of 1) and is based on both the number of employees as well total assets. Also, prior performance shows a moderate correlation with the independent variable downsize (-.3032) which indicates downsizing (value 1) and non-downsizing firms (value 0).

Table 5: Correlation matrix research model 2

#	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	ROA	1.0000													
2	ROE	0.0049	1.0000												
3	Sales growth	0.0925	-0.0242	1.0000											
4	Asset growth	0.2611	-0.0008	0.2716	1.0000										
5	Timing	-0.0192	-0.1232	-0.1067	-0.0998	1.0000									
6	Scope	0.0670	-0.0207	0.0282	0.1473	0.0256	1.0000								
7	Lead time	0.0937	0.0553	-0.0280	-0.0096	0.0968	0.1216	1.0000							
8	Frequency	-0.1315	0.0552	0.0473	0.0769	-0.0685	0.0352	-0.1026	1.0000						
9	Firm category	0.1742	0.1160	-0.0135	0.0583	-0.1000	0.1841	0.2590	0.0640	1.0000					
10	Long-term performance	-0.0558	0.0123	0.0429	0.0309	0.0131	-0.0082	0.0076	0.0199	0.0042	1.0000				
11	Firm size	0.2049	0.0530	0.1481	0.2038	-0.0032	0.1106	0.2332	0.1905	0.6418	-0.0006	1.0000			
12	Magnitude	-0.0556	-0.0184	-0.1511	-0.1775	-0.1612	-0.2696	-0.1650	0.0288	0.0119	-0.0051	-0.1579	1.0000		
13	Prior performance	0.1515	0.1556	-0.0137	-0.0363	-0.1234	0.0447	0.1932	0.1120	0.0946	0.0115	0.1557	-0.0316	1.0000	

The correlation matrix of table 5 shows similar results to table 4. Only small correlations are found between all independent variables. However, firm size is highly correlated with firm category (.6418) as is found in table 4.

4.2 Dataset preparation

In order to conduct appropriate panel regressions which reflect the true relations between variables as close as possible, it is important to check the underlying assumptions (Field, 2013). Violated assumptions can have serious implications for the results of the statistical procedures performed. Several

tests are performed to mitigate the potential bias due to assumption violation. First of all, it is assessed if there are any problematic missing values for the variables used in the research model. Then outliers, or extreme values, are examined which can change the direction of the association between variables. Then tests are performed to find whether a fixed or random effects model is appropriate for the panel regressions. After that, the panel data is checked for autocorrelation and heteroscedasticity. Also, the assumption of multicollinearity is examined. And as last, the assumptions of normality and linearity are assessed to find whether transformations of variables are necessary.

Missing data

The first test examines the extent of missing values found in the dataset. Most important, it is assessed whether the extent of missing values in a certain variable is ignorable. The variables which include missing variables are tabulated in Appendix H. A rule of thumb used when assessing missing values is that under the 10 percent of missing values for an individual case or observation can generally be ignored (Hair, Black, Babin, & Anderson, 2010). In this case only the variable downsizing scope has 30% missing values. Normally, downsizing scope should therefore be excluded from the analysis. However, downsizing scope is still analyzed as it is an important variable in the analysis.

Outliers

The variables are also tested on outliers. Outliers are *observations with a unique combination of characteristics identifiable as distinctly different from the other observations'* (Hair et al., 2010, p. 64). Outliers cannot be categorized as either beneficial or problematic, rather they have to be examined in the context of the analysis and the information they provide (Hair et al., 2010). The descriptive table showed some potential outliers for the dependent variables and magnitude. In additional graphical representations of the variables were constructed using avplots (Appendix I). The graphical representations indeed show some values that are distinctly different from the others, which might not be problematic. However, a priori knowledge of the dataset indicates that that the dependent variables and magnitude of downsizing are in some cases distorted through additional mergers next to the downsizing process. Therefore, all dependent variables and magnitude are winsorized at the 99 percentage (Appendix I).

Fixed effects vs. random effects model

Panel data regressions can either be conducted using a fixed or a random effects model. Fixed effect models assume that the effects of the independent variables act identically across firms (Love & Nohria, 2005). Fixed effects models therefore only model within-firm variation, which means that time-invariant variables are excluded from the model. Random effects models assume that independent variables do not act identically across firms, which allows to model time-invariant variables. In this research random effects models are used despite the fact that the hausman test indicates that a fixed effects model would

be appropriate for the models with ROA, sales growth, and asset growth as dependent variables ($a<.05$) (Appendix J). The reason is that time-invariant variables are included in the model as the timing, scope, lead time, and frequency of downsizing which would be excluded in a fixed effects model. Also, random effects models allows for the use of time-invariant control variables as industry.

Autocorrelation

The assumption of autocorrelation is important to assess when time series analysis is performed. Autocorrelation tests whether the standard errors are biased due to serial correlation. This means that the standard error of a variable correlates with itself over time and can cause the results to be less efficient (Drukker, 2003). The xtserial command is used in stata to perform Woolridge test for autocorrelation in panel data (Appendix K). Results show that there is autocorrelation in the research models with ROA or ROE as dependent variable.

Heteroscedasticity

The assumption of homoscedascity is related to the dependence relation between variables. It assumes that the dependent variable exhibits equal levels of variance across the range of predictor variables (Hair et al., 2010). If this dispersion is unequal the relationship is said to be heteroscedastic. As a result of heteroscedasticity predictions can be better at some levels of the independent variables than others. This can make the hypothesis tests either too stringent or too insensitive. The assumption of homoscedasticity examined using likelihood ratio tests (Appendix L). The tests indicate that all models violate the assumption of homoscedasticity. Therefore, the option vce(robust) is used in the panel regressions to mitigate the potential bias due to heteroscedasticity problems. This option creates estimates of the standard errors that are robust to the fact that the error term is not identically distributed.

Multicollinearity

Another potential problem exists when the assumption of multicollinearity is violated. Ideally, independent variables are not highly correlated with each other but with the dependent variable (Hair et al., 2010). A violation of the assumption means that two independent variables are highly correlated with each other, in which case it might be appropriate to leave one or the other out of the research model. Multicollinearity is assessed through the variance inflation factor (VIF). The results are argued to be problematic if the VIF value becomes higher than 10 or 1/VIF becomes lower than 0.10. Appendix M shows the results of the multicollinearity tests which indicates that firm size (logasset) violates the assumption in research model 2. This violation can be related to the high correlation with the firm category (SME or large) as indicated in the correlation matrix. Therefore, firm size is excluded for the most of the models run in relation to research model 2. To test for robustness, one model is run which include firm size to look at its influence in the model.

Normality

Linear models assume that the errors in the model are normally distributed (Field, 2013). Which means that the shape of the error distribution for individual metric variables is normally distributed (Hair et al., 2010; Field, 2013). The violation of normality can have severe effects on the statistical tests as the normal distribution of errors is required for the F and t statistics (Hair et al, 2010). The assumption of normality is particular important for smaller samples as a larger sample size reduces the detrimental effect of a violation of normality. The normality tests performed show some significant kurtosis and skewness in the error terms (Appendix N). However, the panel data regressions used are mainly based on categorical variables. Therefore, these tests might show some biased results. In addition, the metric variables in the research model are examined using a graphical representation in the form of a P-Plot. The variable magnitude shows signs of a flat distribution. However, transforming the variable does not solve the problem. Also, both Field (2013) and Hair et al. (2010) state that the effects may be ignorable if the sample size includes 200 or more observations. The panel data regressions performed in the following paragraph have a minimum of 231 observations per variable. Therefore, no transformations were used in the panel regressions as described in the following paragraph.

Linearity

The dataset is also checked for the assumption of linearity. Linearity is assumed in linear models as correlations only represent the linear association of variable (Hair et al., 2010). Non-linear effects are thus not measured in linear models. Therefore, including non-linear variables would provide an underestimation of the actual strength of the relationship (Hair et al., 2010). To assess the assumption of linearity graphical partial residual pots are examined. As no clear non-linear patterns were found, no further procedures were performed.

4.3 The effect of downsizing on firm performance

The first panel regression model examines the effect of downsizing on each dependent variable using a 3-year window after the downsizing implementation year. The following results are found:

Table 6: Random effect panel regression: downsizing and profitability

Research model 1			Random effects panel regression					
Dependent variables		ROA				ROE		
Model	1	2	3	4	5	6	7	8
Constant	.0461308***	-.1179904	0261243	.295887	.0378046	.3550385	.2280969	.2428607*
	(0.000)	(0.478)	(0.468)	(0.231)	(0.506)	(0.422)	(0.119)	(0.079)
Downsize	-.0715239***	-.0151453	-.01734	-.0288976	.1015875*	.0366999	.0376973	.0100008
	(0.000)	(0.400)	(0.305)	(0.467)	(0.075)	(0.577)	(0.572)	(0.952)
Firm category	.0191163	-.0560494	-.0135159	-.0249366	-.0163084	.0100294	-.0087203	-.035376
	(0.310)	(0.153)	(0.648)	(0.542)	(0.827)	(0.943)	(0.943)	(0.778)
Firm category*Downsize				.0165553				.0393837
				(0.745)				(0.847)
Firm size		.0184788*				-.0080308		
		(0.073)				(0.775)		
Prior performance		.2853558***	.2934809***	.2924865***		-.6163721*	-.6197675*	-.6224837*
		(0.000)	(0.000)	(0.000)		(0.076)	(0.076)	(0.072)
Magnitude		.010597	.0086554	.0090088		.0114156	.0124506	.0134381
		(0.659)	(0.715)	(0.702)		(0.808)	(0.792)	(0.777)
Industry		Included	Included	Included		Included	Included	Included
Overall R-squared	0.0568	0.4029	0.3980	0.3983	0.0042	0.1505	0.1504	0.1505
N	557	530	530	530	561	531	531	531

*All models are panel data random effects (RE) regression models. Model 1, 2, 3, and 4 include ROA as dependent variable. Model 5, 6, 7, and 8 include ROE as dependent variable. Model 1 and 5 only include the independent variables. Model 2 and 6 include all independent and control variables. Model 3 and 7 exclude firm size due to multicollinearity issues. Model 4 and 8 include the interaction effect between firm category and downsize. Significance is indicated with stars, which indicate the following significance levels: *<10%, **<5%, and ***<1%. The control variable industry is included in model 2, 3, 4, 6 7, and 8. However, including all the different industries in the model would take up a lot of space. Industry is reported to be included instead of incorporating it in the table to provide a clear overview.*

Table 6 provides the results of the panel data regressions related to research model 1 and firm profitability. A negative association can be found between downsizing and return on assets and a positive association between downsizing and return on equity. These results are however not significant. Therefore, no conclusions can be drawn. The interaction between firm category and downsizing is positive for both return on assets and return on equity. This indicates that larger firms (value of 1) positively moderate the effect of downsizing on firm profitability. However, these results are also not significant.

Table 7: Random effect panel regression: downsizing and growth

Research model 1				Random effects panel regression				
Dependent variables	Sales growth				Asset growth			
Model	1	2	3	4	5	6	7	8
Constant	.1070473***	.0634644	.367177***	.3505327***	.045305*	-.6078376***	.1263262***	.2428607*
	(0.002)	(0.779)	(0.000)	(0.000)	(0.073)	(0.001)	(0.008)	(0.079)
Downsize	-.1017273***	-.0559744	-.0584792*	-.0268663	-.0549296*	-.0263324	-.0324748	.00209
	(0.003)	(0.120)	(0.090)	(0.670)	(0.012)	(0.344)	(0.204)	(0.973)
Firm category	.0131067	-.0485057	-.0036485	.0265733	.0190676	-.126106***	-.0201285	.0133102
	(0.674)	(0.339)	(0.924)	0.711)	(0.444)	(0.005)	(0.558)	(0.797)
Firm category*Downsize				-.0449539				-.049177
				(0.592)				(0.489)
Firm size		.0192082				.0463***		
		(0.150)				(0.000)		
Prior performance		.0882549	.095914*	.0990441*		.0142627	.0304642 *	.0337793 *
		(0.103)	(0.088)	(0.081)		(0.887)	(0.755)	(0.727)
Magnitude		-.0777549**	-.0801953**	-.0813378**		-.0459678	-.0510687	-.0523361
		(0.011)	(0.013)	(0.014)		(0.138)	(0.126)	(0.134)
Industry		Included	Included	Included		Included	Included	Included
Overall R-squared	0.0201	0.2204	0.2171	0.2175	0.0131	0.1972	0.1773	0.1505
N	558	528	528	528	562	532	532	531

All models are panel data random effects (RE) regression models. Model 1, 2, 3, and 4 include sales growth as dependent variable. Model 5, 6, 7, and 8 include asset growth as dependent variable. Model 1 and 5 only include the independent variables. Model 2 and 6 include all independent and control variables. Model 3 and 7 exclude firm size due to multicollinearity issues. Model 4 and 8 include the interaction effect between firm category and downsize. Significance is indicated with stars, which indicate the following significance levels: *<10%, **<5%, and ***<1%. The control variable industry is included in model 2, 3, 4, 6 7, and 8. However, including all the different industries in the model would take up a lot of space. Industry is reported to be included instead of incorporating it in the table to provide a clear overview.

Table 7 provides the results for the panel data regressions related to research model 1 and firm growth. Downsizing is found to be negatively associated with sales growth. Downsizing is also negatively associated with asset growth. However, in model 8 the association becomes positive. The results are thus not robust, and also not significant. Therefore, no conclusions can be drawn. The interaction effect of firm category on downsizing is negative for both sales growth and asset growth. This means that large firms experience lower growth than SMEs in relation to downsizing. However, both results are insignificant. So no conclusions can be drawn.

4.3 The effect of downsize characteristics on firm performance

In total four panel data regressions are tabulated in this paragraph. Table 8 provides the results of the regressions including return on assets as the dependent variable. Table 9 includes return on equity as dependent variable, table 10 sales growth and table 11 asset growth.

Table 8: Random effect panel regression: Downsize characteristics and firm performance

Research model 2				Random effects panel regression: dependent variable = ROA				
Model	1	2	3	4	5	6	7	8
Constant	-.0275452	-.7271565*	-.1847054	-.1865418	-.0883921	-.1866633	-.2075165	-.1016764
	(0.402)	(.054)	(0.196)	(0.232)	(0.610)	(0.193)	(0.322)	(0.682)
Timing	-.0170206	.0326824	.035516	.0361598	.0269429*	.0390963	.0356673	.0198325
	(0.423)	(0.535)	(0.503)	(0.744)	(0.641)	(0.446)	(0.506)	(0.873)
Scope	.0041838	-.0285796	-.0185187	-.0192226	-.1338953	-.0122638	-.0204163	-.1328028
	(0.832)	(0.648)	(0.765)	(0.757)	(0.120)	(0.854)	(0.748)	(0.157)
Frequency	-.0056826	-.0072337	.0073293	.0076293	-.0051089	.0173532	.0077876	.00265
	(0.484)	(0.801)	(0.790)	(0.785)	(0.875)	(0.638)	(0.778)	(0.949)
Lead time	.001054*	.0016055	.0026256	.0026331	.002886*	.0024925	.0043244	.0042397
	(0.077)	(0.351)	(0.155)	(0.155)	(0.082)	(0.167)	(0.747)	(0.754)
Firm category	.0419052	.070756	.1119265*	.1125738	.0605518	.1436494	.1329778	.0960874
	(0.122)	(0.363)	(0.081)	(0.222)	(0.387)	(0.234)	(0.450)	(0.640)
Long-term	-.0073788	-.012297	-.0130626	-.0131972	-.014338	-.0132298	-.013258	-.0147174
performance	(0.635)	(0.475)	(0.453)	(0.450)	(0.407)	(0.449)	(0.449)	(0.401)
Firm category				-.00035				.0123841
*Timing				(0.998)				(0.925)
Firm category					.1588392			.1611599
*Scope					(0.249)			(0.272)
Firm category						-.0184412		-.0143815
*Frequency						(0.719)		(0.782)
Firm category *Lead							-.0017068	-.0014508
time							(0.901)	(0.916)
Firm size		.0304232*						
		(0.077)						
Magnitude		.2031155	.1470285	.1472278	.175495	.1469441	.1532734	.179054
		(0.120)	(0.271)	(0.268)	(0.245)	(0.293)	(0.281)	(0.270)
Prior performance		-.3673511	-.2563455	-.2584384	-.3468651	-.2554778	-.2582366	-.3570815
		(0.110)	(0.232)	(0.258)	(0.126)	(0.215)	(0.233)	(0.114)
Industry		Included	Included	Included	Included	Included	Included	Included
Overall R-squared	0.0418	0.3598	0.3543	0.3592	0.3615	0.3550	0.3542	0.3617
N	234	234	234	234	234	234	234	234

*All models are panel data random effects (RE) regression models. Model 1 includes all independent variables. Model 2 includes all independent variables as well all control variable. Model 3 excludes firm size due to multicollinearity reasons. Model 4, 5, 6, and 7 include each interaction effect of firm category on the relation between timing, scope, frequency, and lead time and the dependent variable. Model 8 consists of the full model, including all interaction effects. Significance is indicated with stars, which indicate the following significance levels: *<10%, **<5%, and ***<1%. The control variable industry is included in all models except model 1. However, including all the different industries in the model would take up a lot of space. Industry is reported to be included instead of incorporating it in the table to provide a clear overview.*

Table 8 provides the results of regression in line with research model 2, including return on assets as dependent variable. The results show robust positive results for the relation between timing and return on assets. This means that downsizing proactively has a positive association with return on assets. However, these results are not significant so no conclusions can be drawn. The scope of downsizing is found to have a negative association with return on assets. This finding is remarkable as it would mean

that broadly scoped downsizings would have a negative impact on return on assets, even when addressing a three-year time window. This is not in line with theory as suggested by Cameron (1994) or prior empirical evidence (Love & Nohria, 2005). However, no conclusions can be drawn as the results are insignificant. Lead time shows a positive association with return on assets, which means that spreading the downsizing process over a longer period of time has a positive effect on return on assets. However, the results are not significant. Downsizing frequency shows no robust and insignificant results. The interaction effect between firm category and timing, frequency, and lead time has a negative association. This means that the effects are more positive for SMEs than for large firms. However, the results are insignificant. The interaction effect of firm category and downsizing scope is positive meaning that larger firms experience more positive results in relation to downsizing scope than SMEs. This result is however insignificant.

Table 9: Random effect panel regression: Downsize characteristics and firm performance

Research model 2	Random effects panel regression: dependent variable = ROE							
Model	1	2	3	4	5	6	7	8
Constant	-.1181857	1.452116	.0389495	.3335699	.4172031	.0221224	.9724946	1.505878***
	(0.319)	(.0.194)	(0.948)	(0.634)	(0.454)	(0.967)	(0.158)	(0.004)
Timing	-.1716059**	-.2416332	-.2492313	-.690498	-.283824*	-.1853361	-.2348648	-.3180486
	(0.045)	(0.194)	(0.186)	(0.147)	(0.093)	(0.217)	(0.219)	(0.363)
Scope	-.1475126*	-.0445521	-.0729594	-.0743047	-.6415897	.0685014	-.0332783	-.4462843
	(0.092)	(0.842)	(0.745)	(0.728)	(0.187)	(0.739)	(0.876)	(0.334)
Frequency	0559889	.11527	.0770427	.056846	.0275441	.286376**	.074165	.2280112*
	(0.311)	(0.377)	(0.546)	(0.633)	(0.826)	(0.029)	(0.572)	(0.053)
Lead time	.0027086	.0032903	.0006671	.0006422	.0018093	-.0022923	-.076104***	-.0863918***
	(0.319)	(0.529)	(0.887)	(0.877)	(0.731)	(0.579)	(0.000)	(0.000)
Firm category	.1530665	-.1288937	-.2345634	-.4907249	-.4325947**	.4370052	-1.16091***	-.8564798**
	(0.224)	(0.589)	(0.274)	(0.233)	(0.018)	(0.258)	(0.000)	(0.028)
Long-term performance	0744631	.0630412	0653062	.0675081	.0557524	.0647986	.0688934	.0599874
	(0.361)	(0.524)	(0.509)	(0.498)	(0.572)	(0.512)	(0.487)	(0.545)
Firm category *Timing				.5219278				.135212
				(0.280)				(0.727)
Firm category *Scope					.7482552			.7336653
					(0.126)			(0.127)
Firm category *Frequency						-.3924533***		-.3898205***
						(0.007)		(0.003)
Firm category *Lead time							.0774312***	.0859656***
							(0.000)	(0.000)
Firm size		-.0791835						
		(0.227)						
Magnitude		-.2076518	-.121578	.1472278	.095705	-.0664328	-.3147393	-.241604
		(0.556)	(0.881)	(0.268)	(0.776)	(0.880)	(0.334)	(0.487)
Prior performance		.8276571	.2824645	-.2584384	.0836736	.5217515	.4774052	-.0106877
		(0.194)	(0.482)	(0.258)	(0.925)	(0.488)	(0.494)	(0.990)
Industry		Included	Included	Included	Included	Included	Included	Included
Overall R-squared	0.0366	0.2128	0.2080	0.2119	0.2131	0.2216	0.2140	0.2343

All models are panel data random effects (RE) regression models. Model 1 includes all independent variables. Model 2 includes all independent variables as well all control variable. Model 3 excludes firm size due to multicollinearity reasons. Model 4, 5, 6, and 7 include each interaction effect of firm category on the relation between timing, scope, frequency, and lead time and the dependent variable. Model 8 consists of the full model, including all interaction effects. Significance is indicated with stars, which indicate the following significance levels: *<10%, **<5%, and ***<1%. The control variable industry is included in all models except model 1. However, including all the different industries in the model would take up a lot of space. Industry is reported to be included instead of incorporating it in the table to provide a clear overview.

The results provided in table 9 include return on equity as dependent variable. The results show a negative relation between the timing of downsizing and return on equity. This means that downsizing proactively has a negative impact on return on equity. However, the results are insignificant. Downsizing scope is also found to have a negative association with return on equity which means that a broad downsizing scope leads to lower return on equity than having a narrow scope. The results are however insignificant. Both frequency and lead time are found to have a positive association with return on equity, which becomes significant when the interaction effect with firm category is included. This means that large firms have a significant negative influence on the effect of frequency and a significant positive effect of lead time on return on equity.

Table 10: Random effect panel regression: Downsize characteristics and firm performance

Research model 2   **Random effects panel regression: dependent variable = Sales growth**

Model	1	2	3	4	5	6	7	8
Constant	-.0076374	-1.749707***	-.0029506	.3058395	-.0175728	.0019577	.2624591	.4595764
	(0.894)	(.0.009)	(0.990)	(0.273)	(0.941)	(0.994)	(0.531)	(0.130)
Timing	-.029619	-.0919007	-.0874626	-.5024044***	-.0869876	-.0959633	-.0830666	-.5938048***
	(0.473)	(0.138)	(0.137)	(0.007)	(0.142)	(0.137)	(0.134)	(0.003)
Scope	.0075369	-.0292379	.0153981	.037341	.0507268	-.0040258	.0265946	.0612982
	(0.864)	(0.753)	(0.866)	(0.610)	(0.829)	(0.967)	(0.761)	(0.564)
Frequency	.010323	-.0098299	.0301984	.0090198	.0321073	.0018745	.0294078	-.0548413
	(0.577)	(0.859)	(0.519)	(0.825)	(0.470)	(0.978)	(0.528)	(0.308)
Lead time	-.0000616	-.0012766	.0017996	.0021056	.0017322	.0021016	-.0201711	-.0066055
	(0.970)	(0.682)	(0.469)	(0.349)	(0.510)	(0.406)	(0.490)	(0.685)
Firm category	-.0216097	-.2399056***	-.1287751	-.3907701***	-.1204746	-.2163842	-.3923806	-.7318603***
	(0.666)	(0.004)	(0.136)	(0.010)	(0.246)	(0.149)	(0.261)	(0.003)
Long-term performance	.0192361	.0175819	.0133412	.0136429	.0135141	.0132701	.0139587	.0139373
	(0.525)	(0.614)	(0.707)	(0.701)	(0.703)	(0.709)	(0.695)	(0.697)
Firm category *Timing				.4771091**				.5635764***
				(0.013)				(0.007)
Firm category *Scope					-.0436866			-.0718095
					(0.849)			(0.564)
Firm category *Frequency						.0518563		.1158303*
						(0.500)		(0.093)
Firm category *Lead time							.0221898	.0094287
							(0.444)	(0.567)

	1	2	3	4	5	6	7	8
Firm size		.095574***						
		(0.004)						
Magnitude		.02111	-.1657297	. -.2160044	-.1724138	-.1707124	-.2439899	-.2817518*
		(0.912)	(0.472)	(0.256)	(0.478)	(0.426)	(0.235)	(0.059)
Prior performance		-.2591212	.1668678	-.1055257	. .2006879	.1863593	.1514954	-.0641381
		(0.530)	(0.603)	(0.687)	(0.656)	(0.572)	(0.608)	(0.794)
Industry		Included	Included	Included	Included	Included	Included	Included
Overall R-squared	0.0076	0.3585	0.3148	0.3403	0.3148	0.3168	0.3206	0.3519
N	231	231	231	231	231	231	231	231

*All models are panel data random effects (RE) regression models. Model 1 includes all independent variables. Model 2 includes all independent variables as well all control variable. Model 3 excludes firm size due to multicollinearity reasons. Model 4, 5, 6, and 7 include each interaction effect of firm category on the relation between timing, scope, frequency, and lead time and the dependent variable. Model 8 consists of the full model, including all interaction effects. Significance is indicated with stars, which indicate the following significance levels: *<10%, **<5%, and ***<1%. The control variable industry is included in all models except model 1. However, including all the different industries in the model would take up a lot of space. Industry is reported to be included instead of incorporating it in the table to provide a clear overview.*

Table 10 provides the results for the panel data regressions with sales growth as dependent variable. Timing is found to have a negative association with sales growth. This means that downsizing proactively leads to lower sales growth when compared to downsizing reactively. This effect becomes highly significant (-.5938048) when the interaction effect of firm category on timing is included. The association between scope of downsizing and sales growth is positive however insignificant. Also, downsizing frequency is found to have a positive association with sales growth. However, this effect is again insignificant. The results relating to lead time are both not robust as well insignificant. The interaction effect between firm category and timing is positively significant (.477) at the 5%. This means that large firms have a significant positive effect on the relation between the timing of downsizing and sales growth relative to SMEs.

Table 11: Random effect panel regression: Downsize characteristics and firm performance

Research model 2				Random effects panel regression: dependent variable = Asset growth				
Model	1	2	3	4	5	6	7	8
Constant	-.0743172	-2.009338***	.0417703	.0974322	.2502652	.038333	.1202726	.3903381
	(0.151)	(0.003)	(0.851)	(0.725)	(0.305)	(0.853)	(0.696)	(0.198)
Timing	-.0132556	-.0749777	-.0663627	-.1557577	-.0854622	-.0559567	-.064618	-.1679967
	(0.715)	(0.405)	(0.360)	(0.307)	(0.227)	(0.439)	(0.367)	(0.239)
Scope	.0627554	-.0624889	-.0158895	-.0183025	-.2942583***	.0052068	-.0138749	-.2906862***
	(0.126)	(0.549)	(0.855)	(0.837)	(0.001)	(0.955)	(0.875)	(0.009)
Frequency	.017124	-.0317855	.0217786	.018202	-.0054291	.0538378	.0218226	.0107459
	(0.334)	(0.629)	(0.618)	(0.684)	(0.907)	(0.140)	(0.622)	(0.804)
Lead time	-.0000827	-.0046058	-.0007545	-.0007697	-.0001708	-.0012082	-.0074081	-.0066344
	(0.955)	(0.243)	(0.792)	(0.791)	(0.947)	(0.678)	(0.696)	(0.712)
Firm category	.0193476	-.2175044*	-.0703389	-.1203607	-.1799657*	.0326583	-.1493869	-.2420446
	(0.645)	(0.063)	(0.470)	(0.430)	(0.059)	(0.809)	(0.531)	(0.316)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Long-term performance	.0176471 (0.609)	.0178373 (0.645)	.0151771 (0.709)	.0154061 (0.706)	.0113276 (0.781)	.0150145 (0.713)	.0152505 (0.709)	.0116065 (0.778)
Firm category *Timing				.10725 (0.498)				.1083581 (0.437)
Firm category *Scope					.3754109*** (0.007)			.3904919** (0.011)
Firm category *Frequency						-.0600175 (0.353)		-.0402241 (0.542)
Firm category *Lead time							.0067173 (0.720)	.0062294 (0.727)
Firm size		.1143427*** (0.000)						
Magnitude		.0365383 (0.776)	-.1789402 (0.281)	-.1952607 (0.225)	-.1091023 (0.519)	-.1802819 (0.329)	-.2022642 (0.249)	-.1461532 (0.401)
Prior performance		.5277915 (0.200)	-.1011947 (0.686)	-.1506074 (0.490)	-.3161612 (0.160)	-.0970906 (0.667)	-.1065105 (0.672)	-.3757454* (0.062)
Industry		Included	Included	Included	Included	Included	Included	Included
Overall R-squared	0.0229	0.2896	0.2635	0.2651	0.2750	0.2663	0.2639	0.2794
N	234	234	234	234	234	234	234	234

All models are panel data random effects (RE) regression models. Model 1 includes all independent variables. Model 2 includes all independent variables as well all control variable. Model 3 excludes firm size due to multicollinearity reasons. Model 4, 5, 6, and 7 include each interaction effect of firm category on the relation between timing, scope, frequency, and lead time and the dependent variable. Model 8 consists of the full model, including all interaction effects. Significance is indicated with stars, which indicate the following significance levels: *<10%, **<5%, and ***<1%. The control variable industry is included in all models except model 1. However, including all the different industries in the model would take up a lot of space. Industry is reported to be included instead of incorporating it in the table to provide a clear overview.

Table 11 provides the results of the panel data regressions using asset growth as a dependent variable. The timing of the downsizing process is found to have a negative but insignificant relation to asset growth. Downsizing proactively has thus a negative but insignificant relation with the growth of total assets. The scope of the downsizing process is also found to have a negative relation with asset growth. This effect becomes significant (-.2906862) when the interaction effect with firm category is included. The results of downsizing frequency are not robust and lead time shows negative but insignificant results. The interaction effect of firm category and downsizing scope is found to be positive and highly significant (.007). This means that large firms experience more positive effects from downsizing broad relative to SMEs.

4.4 Summary

In the previous paragraph the results for the panel regressions are described separately for each dependent variable. Table 7 provides an overview of the results of the regressions for the variables of interest including all dependent variables.

Table 12: Overview results panel data regressions

Research model 1				
Model	**ROA**	**ROE**	**Sales growth**	**Asset growth**
Downsizing	Negative	Positive	Negative	Negative
	insignificant	*insignificant*	*insignificant*	*insignificant*
Firm category	Positive	Positive	Negative	Negative
*Downsizing	*insignificant*	*insignificant*	*insignificant*	*insignificant*
Research model 2				
Model	**ROA**	**ROE**	**Sales growth**	**Asset growth**
Firm category	Negative	Positive	**Positive**	Positive
*Timing	*insignificant*	*insignificant*	***moderately significant***	*insignificant*
Firm category	Positive	Positive	Negative	**Positive**
*Scope	*insignificant*	*insignificant*	*insignificant*	***highly significant***
Firm category	Negative	**Negative**	Positive	Negative
*Frequency	*insignificant*	***highly significant***	*insignificant*	*insignificant*
Firm category	Positive	**Positive**	Positive	Positive
*Lead time	*insignificant*	***highly significant***	*insignificant*	*insignificant*

The first hypothesis constructed in the literature review is as follows:

Hypothesis 1: Downsizing firms are associated with lower firm performance than non-downsizing firm

This hypothesis is fully rejected as the results related to the effect of downsizing on firm performance are insignificant. The second hypothesis is stated as follows:

Hypothesis 2: Small- and medium enterprises are associated with a lower firm performance after downsizing than large firms

This hypothesis is fully rejected as no significant results are found. The third hypothesis is as follows:

Hypothesis 3: Firm category significantly moderates the relation between downsizing timing and firm performance

This hypothesis is partially rejected. No significant are found for the moderating effect of firm category on return on assets, return on equity or asset growth. However, firm category significantly and positively moderates the effects of timing on sales growth. This means that larger firms are found to have a significantly more positive sales growth than SMEs when downsizing proactively. The fourth hypothesis is stated as follows:

Hypothesis 4: Firm category significantly moderates the relation between downsizing scope and firm performance

This hypothesis is partially rejected. No significant associations are found for return on assets, return on equity, or sales growth. A highly significant positive moderating effect is found in relation to asset growth. This means that large firms have a significant higher asset growth when downsizing with a broad scope. The fifth hypothesis is stated as follows:

Hypothesis 5: Firm category significantly moderates the relation between downsizing frequency and firm performance

This hypothesis is partially rejected. No significant results were found for the regressions including return on assets, sales growth, and asset growth as dependent variables. A highly significant negative interaction effect is found in relation to return on equity. This means that being a large firm significantly lowers the effect of a high downsize frequency compared to SMEs. The sixth and last hypothesis is stated as follows:

Hypothesis 6: Firm category significantly moderates the relation between lead time of the downsizing process and firm performance

This hypothesis is partially rejected. No significant results were found for the regressions including return on assets, sales growth, and asset growth as dependent variables. A highly significant positive interaction effect is found in relation to return on equity. This means that being a large firm significantly positively influences the effect of a longer lead time of the downsizing process compared to SMEs.

Chapter 5 Conclusion

5.1 Conclusion

This thesis studies the phenomenon of downsizing. Downsizing being defined as the '*planned elimination of positions or jobs*' (Cascio, 1993, p. 96). This study takes on the perspective of the contingency theory. The strategy of downsizing is therefore viewed as context-dependent. The research objective of this study, in line with the contingency theory, is to examine whether firms categorized as small- and medium-sized enterprises experience different effects of downsizing on firm performance than firms categorized as large firms. In particular, it is examined whether being a small- and medium-sized enterprise or a large company influences the relation between the timing, scope, frequency, and lead time of the downsizing strategy and firm performance. Firm performance is measured on multiple performance indicators: ROA, ROE, sales growth, and asset growth. The latter two indicate firm growth which is argued to often be importance focus point of small- and medium- enterprises rather than financial returns (Lu & Beamish, 2006). In order to study these differential effects a sample of Dutch firms, consisting of 51 small- and medium-sized enterprises and 72 large firms which execute the downsize strategy between 2002-2016, are examined. First of all, longitudinal panel data was collected for a 6 year period around the implementation of the downsizing strategy using performance data and social plans produced by the downsizing organizations. In addition, data was collected for a control group of non-downsizers to assess whether downsizing has a significant effect on firm performance. The results of this research show no significant effect of downsizing on any of the performance indicators. Also, no significant association was found when directly examining the relation between firm category and firm performance. However, the following significant results were found. First of all, the results show that large firms have more sales growth after downsizing proactively. Second, large firms are find to have higher asset growth when downsizing with a broad scope. Also, large firms are found to have a lower downsizing frequency than small- and medium-sized enterprises which has a positive effect on return on equity. And as last, it is found that large firms have a more positive effect of a longer lead time of the downsizing process than small- and-medium-sized enterprises.

5.2 Discussion

The results of the analyses conducted do not provide evidence for most the hypothesized relations. Some significant results are found relating to the moderating effect of firm category. However, these results are not found to be robust on all performance indicators. First of all, downsizing firms were expected be associated with a lower firm performance than non-downsizing firms. This thesis finds no significant difference between downsizers and non-downsizers. This was not expected as numerous studies find either a significant positive or negative relation between downsizing and firm performance (Appendix A). The study of Chalos & Chen (2002) also finds insignificant or equivocal results of the influence of downsizing on firm performance. They find that only firms that specifically refocus their revenue

streams, or in other words refocus their activities, find positive results of downsizing. Firms that downsize due to cost cutting or divesting do not experience positive results. This could indicate that when addressing the whole range of downsizing firms, without diversifying between reasons for downsizing, no significant differences are found on average. The sample used to measure the effect of downsizing in general does not differentiate between the reasons for downsizing, therefore, it could be expected that on average no significant effect is found. Another reason for the insignificant results could be due to self-selection problems. In particular for small- and medium-sized enterprises it was difficult to collect all necessary performance data. Firms with little available data were excluded from the sample which could lead to the selection of firms that consistently publish their financial numbers over a long period of time (minimum of six years in this sample). This could mean that firms were included that already perform better or are of higher 'quality' than firms that are not able to provide performance data over such length of time. The potential problem of self-selection could lead to a lessened impact of downsizing on average on those firms as they are performing well on average. Also, the economic crisis years are included in the sample used. It could be that the economic crisis had a large impact on the profitability and growth of the firms relative to the downsizing strategy itself. Therefore, no significant association is found between downsizing and firm performance.

Small- and medium-sized enterprises were expected to be associated with lower firm performance after downsizing than large firms as they are expected to be less able to cope with downsizing events than large firms mainly due to the lack of resources. The results indicate a similar association, however, the results are not significant. This could indicate that in general small- and medium-sized enterprises do not perform significantly different when performing a downsizing strategy. However, when looking at the interaction effect between the firm categories and downsizing characteristics significant effects are found. The interaction between the timing of the downsizing process (proactive/reactive) is found to be of significant influence on the sales growth of companies. This means that large companies have significant more sales growth than small- and medium-sized companies after downsizing. A reason for this finding could be that large firms are in general better able to downsize in order to refocus their resources and generate more sales when compared to small- and medium- sized companies. However, timing is not found to significant influence other growth factors as asset growth or profitability factors as return on assets or return on equity. Another finding is that large firms are better able to generate asset growth when downsizing with a broad scope. This means that large firms are better able to grow their assets when downsizing including a reorganization of their resources instead of an employee cut only. This is in line with the hypothesized relation. However, the interaction with downsizing scope is not found to influence firm profitability or sales growth. A remarkable finding is that no explored interaction between firm category and downsize characteristic is significant for return on assets, which is the main profitability indication used in downsizing research in general. However, it is found that the interaction between firm category and downsizing frequency is highly negative for return on equity. This means

that when downsizing is used more frequently in an organization it is highly more negative for large firms that for small- and medium-sized entities. Large firms are often found to have more equity in form of shares than small- and medium-sized entities. Downsizing multiple times might impact the value of the shares negatively as it could be a sign of distress. Therefore, it could be expected that this relation is more prominent for large firms. However, firm category is not found to significantly impact either return on assets or growth indicators related to downsizing frequency. As last, firm category is also found to have a significant positive effect on the relation between downsizing lead time and return on equity. This means that large firms have a higher positive impact on return on equity when downsizing over a longer period of time. This result could also be expected as large firms more often have shares outstanding than small- and medium-sized enterprises. Downsizing over a long period of time, is theorized to have a positive impact on the downsizing outcome due to more gradual changes or due to a more social approach (Cameron, 1994; Aalbers & Dolfsma, 2014). This theorized relation might also be reflected in the value of the outstanding shares as a more spread out downsizing process is viewed as more positive than a short one or one with a rapid-hit approach. Therefore, large firms could be found to have a higher return on equity when downsizing with a longer lead time.

5.3 Limitations & future research

The study conducted in this thesis knows several limitations which should be addressed. First of all, the sample of this study consists of only 123 downsizing firms of which 51 are small- of medium sized and 72 are large sized. In addition, a control sample of 74 non-downsizing firms is used. This sample size is only limited which affected the statistical procedures of this research. Future research should strive to collect data of a larger sample to have more statistical power. Also, it was difficult to collect performance data for small- and medium-sized enterprises. It could be the case that only performance data was available for firms which were performing better in general and therefore more inclined to make data about their performance publicly available. In that case the effects of downsizing would be less prominent in this research. Collecting data about a larger sample of small- and medium-sized enterprises can mitigate this problem in future research. Also, most data was available of firms downsizing around the year 2009-2010. These years are known as economic crisis years in the Netherlands. It could be that the performance of firms were impacted for a large part by this crisis instead of the downsizing strategy itself. Future research should acknowledge such influences and include other years for the sample or control for this influence. A unique methodology of identifying downsizing firms is used in this research by using social plans. These plans are set up when firms are planning to eliminate positions or jobs. In this research these plans are used to indicate whether a firms downsizes or not. However, no differentiation is made to indicate the reason for downsizing. To exemplify, firms which downsize for divesting reasons and firms that downsize to reduce costs are both taken into account in this research without differentiating. Later on, downsizing process characteristics as the timing, scope, frequency, and lead time are taken into account. But they do not substitute the reason for downsizing in the first

place. Therefore, when taking all firms together other results might be found than when firms are studied specifically for their reason for downsizing. In line with the study of Chalos & Chen (2002), future research might take this classification into account when addressing downsizing firms. Another limitation relating to the data is the procedure of categorizing firms into proactive or reactive downsizing firms. Previous studies suggested that the timing of the downsizing strategy can influence the outcome of the downsizing process indicated by the market capitalization in the year before downsizing (Love and Nohria, 2005; Brauer and Laamanen, 2014). The market capitalization is measured by the market value of the total common stock plus long-term debt and reflects anticipated changes in the firms' performance situation. However, small- and medium-sized enterprises in general do not have outstanding common stock. Therefore, in this study the a self-made assessment of the firms timing is made which indicates a general change in the performance of the firms (declining/increasing) in the year before downsizing using the average change in ROE, net income, sales growth and asset growth. Although this assessment indicates changes in the average performance of the firms it is focused on past performance and does not include future anticipations as market capitalization does. Therefore, future research might invent other formulas to indicate proactive and reactive downsizing which are closer related to market capitalization which includes forward looking information and are appropriate for small- and medium-sized enterprises. Another limitation of this research is the identification of downsizing scope. Whether the downsizing scope is broad or narrow is assessed using a similar method as Love and Nohria (2005). This method consists of identifying indications of downsizing scope in downsizing announcements, or in this case social plans, and an amount of judgment. The judgement of downsizing scope in this research is conducted by only one researcher and might therefore be biased. Future research might take this into account and use multiple professional judgements to mitigate the problem of biased judgement or use other methods which are more objective. In summary, this research did find significant interaction effects between firm category, downsizing characteristics (downsizing timing, scope, frequency, and lead time) and firm performance. However, no clear pattern is found. Therefore, it might be fruitful in future research to explore the differences between the firm categories in depth using larger samples and alternative research methodologies. Also, qualitative research might shed some light on the differences in downsizing between small- and medium- enterprises and large firms which could be used as input for more focused quantitative testing.

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Appendix A

Table A. Overview studies which examine the relation between downsizing and firm performance, based on (Datta et al., 2010; Datta & Basuil, 2015)

Effect	Source and date	Country	Sample	Variables	Findings
Employee reductions lead to performance improvements	Bruton, Keels, & Shook (1996)	U.S.	100 Fortune 500 companies that reduced workforce by at least 3% (1985-1987). Regression analysis using data from Compustat.	**Outcome**: ROA change, change in R&D spending **Explanatory**: Workforce reduction; prior Financial health	• Extent of workforce reduction was not a factor in explaining post-downsizing ROA. • Workforce reductions produce benefits regardless of the firm's prior financial health. • Also, no relationship is found between industry and post-downsizing performance. • Downsized firms reduced their R&D spending, which improved financial performance that persisted for 4 years after downsizing.
	Chen, Mehrotra, Sivakumar, & Yu (2001)	U.S.	349 layoff announcements (1990-1995) reported in the *WSJ*. Archival data from CRSP and Compustat. Wilcoxon signed-rank test.	**Outcome**: CARs for the (-1, 0) window, changes in ROA, operating earnings/sales, cost of goods sold/sales, sales and administrative expenses/sales, sales/employee, capital expenditure/employee **Explanatory**: Layoff vs. nonlayoff firms	• Downsizing announcement was associated with significant negative CARs of -1.30% in the 2-day (-1, 0) period. • ROA, operating earnings/sales and sales/employee for layoff firm median was greater than that of the industry adjusted mean for the periods 0 to 3 years after layoff. • Cost of goods sold/sales was lower for layoff firms. • No significant differences were observed for sales & administrative expenses/employee. • Relative to non-layoff firms, layoff firms had greater improvements in both ROA and operating margins/sales in the 3-year post layoff period.

				• Labor productivity (sales/employee) in layoff firms increased faster than those in non-layoff firms.
Espahbodi, John, & Vasudevan (2000)	U.S.	118 firms that announced employee downsizing (1989-1993) in *WSJ* or *NYT*. Analysis comparing downsized and control firms using data from Compustat using parametric *t* tests and Wilcoxon signed-rank test.	**Outcome**: Raw operating performance, industry adjusted operating performance, matching firm adjusted operating performance, ROA, ROE, current ratio, total asset turnover, changes in labor costs as a % of sales, R&D as a % of sales, cost of sales/sales **Explanatory**: Downsizing announcements	• Downsizing resulted in increased raw and industry adjusted operating performance and also matched-firm adjusted performance (between year prior to downsizing and the third and fourth year after downsizing, respectively). • Downsized firms relative to control firms (a) exhibited higher ROE (but not ROA), (b) had a lower current ratio, and (c) had reduced firm R&D and advertising intensity in the third and fourth years following downsizing.
Kang and Shivdasani (1997)	Japan	92 Japanese firms that experience significant performance declines (1986-1990)		• Weak positive change in ROA from y=0 (Layoff year) to y+3 among layoff firms
Palmon, Sun, & Tang (1997)	U.S.	140 layoff announcements 1982-1990 (57 citing declining demand and 83 efficiency considerations) reported in *WSJ* and *New York Times* (*NYT*). Event study and subgroup analysis using market model and data from CRSP and Compustat databases.	**Outcome**: CARs in (–1, 0), (–1, +1) and (–1, +10) day windows, profit margin (income/sales), ROA ROE, real sales (sales deflated by the producer price index) for the years –3 to +3 with "0" being the layoff year. **Explanatory**: Layoffs motivation (a) declining demand and (b) efficiency enhancement	• Layoffs motivated by declining demand were associated with negative Cumulated Abnormal Returns (CARs) in the (–1, 0), (–1,+1) and (–1, 10) day windows, while those motivated by efficiency enhancement had positive CARs in the (–1, 0) and (–1, +1) day windows. • Declining demand layoffs did not have a significant impact on profit margin, ROA, ROE, or real sales. • Efficiency enhancing layoffs were associated with increased profit margins between Years –1 and +3 and Years –2 and +3, increased ROE between Years –1 and +2, increased ROA between Years –2 and +2 and between Years –

					2 and +3. Such layoffs also resulted in increased real sales between Years −2 and +2.
	Yu & Park (2006)	Korea	258 publicly traded firms in Korea (1997-1999). OLS regression of survey data and archival firm data from KIS-FAS database.	**Outcome**: ROA change between pre- and post-downsizing periods, asset turnover (sales/average total assets), operating income/employee, sales/employee, value-added/employee **Explanatory**: Downsizing **Moderator**: Loss status (1 = loss in the 3 years prior to downsizing; 0 = otherwise)	• Downsizing was positively associated with ROA, asset turnover, and operating income to total assets. • However, there were no effects on productivity (neither sales/employee nor value added per employee). • Downsizing resulted in a positive and significant improvement in ROA among firms that had no losses in the 3 years prior to downsizing. • No significant relationships were observed in the context of other measures for either loss-making or non–loss making firms.
Such improvements occurred 2 to 3 years after downsizing, reinforcing the view that benefits from employee reductions, if any, are experienced only in the long term	Espahbodi, John, & Vasudevan (2000)		118 firms that announced employee downsizing (1989-1993) in *WSJ* or *NYT*. Analysis comparing downsized and control firms using data from Compustat using parametric *t* tests and Wilcoxon signed-rank test.	**Outcome**: Raw operating performance, industry adjusted operating performance, matching firm adjusted operating performance, ROA, ROE, current ratio, total asset turnover, changes in labor costs as a % of sales, R&D as a % of sales, cost of sales/sales **Explanatory**: Downsizing announcements	• Downsizing resulted in increased raw and industry adjusted operating performance and also matched-firm adjusted performance (between year prior to downsizing and the third and fourth year after downsizing, respectively). • Downsized firms relative to control firms (a) exhibited higher ROE (but not ROA), (b) had a lower current ratio, and (c) had reduced firm R&D and advertising intensity in the third and fourth years following downsizing.
	Kang and Shivdasani (1997)	Japan	92 Japanese firms that experience significant performance declines (1986-1990)		• Weak positive change in ROA from y=0 (Layoff year) to y+3 among layoff firms
	Palmon, Sun, & Tang (1997)		140 layoff announcements 1982-1990 (57 citing declining demand and 83 efficiency considerations)	**Outcome**: CARs in (−1, 0), (−1, +1) and (−1, +10) day windows, profit margin (income/sales),	• Layoffs motivated by declining demand were associated with negative CARs in the (−1, 0), (−1,+1) and (−1, 10) day windows, while those

			reported in *WSJ* and *New York Times* (*NYT*). Event study and subgroup analysis using market model and data from CRSP and Compustat databases.	ROA ROE, real sales (sales deflated by the producer price index) for the years –3 to +3 with "0" being the layoff year. **Explanatory**: Layoffs motivation (a) declining demand and (b) efficiency enhancement	motivated by efficiency enhancement had positive CARs in the (–1, 0) and (–1, +1) day windows. • Declining demand layoffs did not have a significant impact on profit margin, ROA, ROE, or real sales. • Efficiency enhancing layoffs were associated with increased profit margins between Years –1 and +3 and Years –2 and +3, increased ROE between Years –1 and +2, increased ROA between Years –2 and +2 and between Years –2 and +3. Such layoffs also resulted in increased real sales between Years –2 and +2.
	Perry & Shivdasani (2005)	U.S.	94 nonfinancial firms in the U.S. that downsized in 1993 after financial decline (at least 33% drop in pretax income). Analysis conducted using archival data from Compustat, Execucomp database, *WSJ*, Dow Jones Retrieval Service.	**Outcome**: ROA change between the year of employee reduction and the following 2 years **Explanatory**: Employee downsizing Moderator: Outside boards	• There were no significant ROA changes in firms that engaged in employee reduction between the year of downsizing and the subsequent 2 years. • Among firms with outside boards that reduced employment, there was a significant positive change in ROA between the year of employment reduction and 2 years following the reduction. • Employment reductions made in firms with inside boards had a negative but non-significant change in ROA for the same period.
Employee downsizing has a deleterious effect on organizational profitability	Cascio, Young, & Morris (1997)		722 employee downsizing occurrences in 537 companies (1980-1994). Archival data from Compustat.	**Outcome**: Change in ROA between year prior to downsizing and 0, 1, 2 years (0 = downsizing year); Stock returns in 0, 1, 2 years **Explanatory**: Employment downsizers (employment decline > 5% but < 5% in	• Change in ROA for employment downsizers was negative in both the downsizing year and the following year. It was also significantly worse than for stable employers. • Employment downsizers had a significantly lower mean stock return than stable employers

Study	Country	Sample/Method	Variables	Findings
		assets); stable employers (less than 5% change in both employment and assets)		in the year of downsizing; however, such returns were significantly higher than stable employers in the year following downsizing.
Cascio & Young (2003)		657 employment change occurrences (1982-2000). Analysis using Compustat data	**Outcome**: Change in ROA between base year $t = -1$ to years $t = 0$, 1, 2, and stock returns in years 0, 1, and 2 (where 0 was the downsizing year) **Explanatory**: Employment downsizing (companies where the decline in employment was greater than 5%)	• Relative to base year, the ROA of employment downsizers declined in Years 0 and 1 and rose slightly in Year 2. However, by the end of Year 2, the change in ROA for employment downsizers was lower than stable employers. • Employment downsizers had a significantly lower mean stock return than stable employers in the year of the downsizing. • There were no significant differences between the two in Years 1 and 2 following downsizing.
De Meuse, Vanderheiden & Bergmann (1994)	U.S.	17 Fortune 100 firms with layoff announcements in 1989-data from the Forbes annual survey of Fortune 500 firms. OLS regressions and subgroup analysis	**Outcome**: Profit margin/sales, return on asset (ROA), return on equity (ROE), asset turnover, market-to-book ratio **Explanatory**: Percentage layoff (as a % of total employees)	• Compared with control firms, layoff firms in the first and second years following layoffs had lower profit margin on sales, ROA, ROE, and market-to-book ratio. • No significant difference was observed for asset efficiency
Suárez-González (2001)		297 large Spanish firms (141 downsizers and 156 non-downsizers). Archival data from *Fomento de la Producción* and from Dun and Bradstreet.	**Outcome**: Labor productivity 1994-1996 (sales/employee), Return on sales 1994-1996 **Explanatory**: Employee downsizing (reduction of workforce by at least 5% between 1989-1994)	• Downsizers had significantly lower return on sales in the post downsizing period than non–downsizing firms. • There were no significant differences between downsizers and non-downsizers in the labor productivity following downsizing.
De Meuse, Bergmann, Vanderheiden, & Roraff (2004)	U.S.	Layoff announcements by 78 Fortune 100 firms (1989-1996) reported in *Work Place Trends* and *WSJ*. Comparison of layoff and no layoff firms using	**Outcome**: Profit margin (profits/sales), ROA, ROE, asset efficiency (sales/assets), market-to-book ratio **Explanatory**: Extent of downsizing (announced reductions divided by the	• Compared with non–layoff firms, those that engaged in layoffs had significantly lower profit margins, market to book ratios, ROA, and ROE in the announcement year and in the 2 subsequent years.

			financial data from *Fortune Survey* and *Forbes 500*.	total number of employees in the company) during 1989-1996	• There were no significant performance differences between firms that laid off less than 3% and those that laid off 3% or more employees. • Firms that laid off 10% or more underperformed those that laid off a lower percentage of employees along profit margins, ROA, ROE, and market to book in the 3 years following layoffs.
Guthrie & Datta (2008)	U.S.	144 non-diversified U.S. firms (1998-2000). Survey data from HR managers in these firms. OLS regression using firm and industry data from Census and Compustat.	**Outcome**: ROA **Explanatory**: Employee downsizing measured as a dichotomous variable (1 = *if employment reduction exceeded 5% between 1998 and 1999,* 0 = *otherwise*). **Moderator**: Industry R&D intensity, demand instability, capital intensity and growth	• There was a negative association between workforce downsizing and post downsizing firm ROA. • The negative effect of downsizing on performance was magnified by industry R&D intensity and industry growth. • The negative relationship between downsizing and firm performance was also more pronounced in industries with lower capital intensity. • No significant moderating effect was observed for industry demand instability.
McElroy, Morrow, & Rude (2001)	U.S.	31 subunits of a national financial services company. Survey and organizational record data. Partial correlation analysis.	**Outcome**: Performance (basis points of profit/ loan) over 2 years (year of downsizing—Year 1 and the following year—Year 2) **Explanatory**: Employee reduction (i.e., dismissals, voluntary turnover, and reduction in force turnover)	• Employee reductions brought about by redundancy had significant negative performance consequences that extended into Year 2. I • Involuntary turnover (dismissals) was negatively related to customer satisfaction and to Year 2 costs per loan. • Reduction in force turnover was negatively related to Year 1 profitability, customer

					satisfaction, Year 2 profitability, Year 2 productivity, and cost per loan.
	Said, Le Louarn, & Tremblay (2007)	U.S. and Canada	140 downsizers and 99 stable employers in the U.S. and Canadian manufacturing sector (1990-1996). ANOVA with repeated measures using data from Compustat.	**Outcome**: Labor productivity (log of sales/employees), operational indebtedness (liabilities/total assets) in the 3 years following downsizing **Explanatory**: Employee downsizing (at least 5% employee reduction)	• Results of repeated measures analysis revealed that firms that substantially cut their workforce did not obtain a significant improvement of their performance. • They also found that firms cutting the highest proportions of their personnel showed a significant deterioration of their operational indebtedness.
Studies which find insignificant or equivocal results	Chalos & Chen (2002)	U.S.	Univariate t tests. Employee downsizing in 365 Fortune 500 firms (1993-1995) identified using *WSJ*. Event study using market model and regression analysis based on data from CRSP and Compustat.	**Outcome**: CARs on Day 0 and (-1, +1), change in ROA, sales productivity, cost of goods sold, efficiency, operating cash flow per employee **Explanatory**: Proportion of downsized employees (employees downsized/total number of employees), Type of downsizing (revenue refocusing and cost cutting)	• Studies the effect of different downsizing announcements: revenue refocusing, cost cutting and plant closing. • Finds positive effects for revenue refocusing, insignificant for production cost cutting and weak negative evidence for plant closing. • Revenue refocusing downsizing announcements were associated with positive Cumulated Abnormal Returns (CARs) on Day 0 but not in cost-cutting downsizings. • Revenue-refocusing and cost-cutting downsizings both resulted insignificant increases in ROA, sales productivity, and operating cash flow per employee, but not in cost-of-goods-sold efficiency. • Proportion of downsized employees was not associated with CARs for (-1, +1); however, CARs for downsizing announcements of revenue refocusing were significantly more positive than those of cost cutting announcements.

Table B. Overview studies including moderators examining the relation between downsizing and firm performance

Effects	Source and date	Country	Sample	Variables	Findings
Benefits associated with downsizing were greater in broadly scoped and proactive downsizings and when downsizings firms were characterized by high levels of slack	Love & Nohria (2005)	U.S.	Downsizing in Fortune 100 firms (1977-1993) identified using on *WSJ* and *NYT* and several wire services. Pooled time series regression analysis using Compustat data.	**Outcome**: ROA market (based on market valued assets), ROA book (based on book valued assets) **Explanatory**: Downsizing **Moderator**: Absolute slack (SG&A expenses) and relative absorbed slack (SG&A expenses relative to similar firms), downsizing scope (broad = s*tructural/process changes and changes in strategic domain of firm*; narrow =*otherwise*), downsizing timing (proactive or reactive)	• Downsizing did not directly act on post downsizing performance. • High absorbed-slack firms exhibited better post downsizing performance than low-absorbed-slack firms. • Relative absorbed slack is not significantly associated with post downsizing performance. • Broadly scoped downsizings were associated with better post downsizing performance than narrowly scoped downsizings. • Proactive downsizings experienced better post downsizing performance than reactive downsizings.
Although downsizing resulted in improved return on assets (ROA) among firms that did not experience losses in the 3 years prior to downsizing, no such improvements occurred among loss-making firms	Yu & Park (2006)		258 publicly traded firms in Korea (1997-1999). OLS regression of survey data and archival firm data from KIS-FAS database.	**Outcome**: ROA change between pre- and post-downsizing periods, asset turnover (sales/average total assets), operating income/employee, sales/employee, value-added/employee **Explanatory**: Downsizing **Moderator**: Loss status (1 = loss in the 3 years prior to downsizing; 0 = otherwise)	• Downsizing was positively associated with ROA, asset turnover, and operating income to total assets. • However, there were no effects on productivity (neither sales/employee nor value added per employee). • Downsizing resulted in a positive and significant improvement in ROA among firms that had no losses in the 3 years prior to downsizing. • No significant relationships were observed in the context of other measures for either loss-making or non–loss making firms.

Examined the moderation role of industry conditions on the downsizing-performance relationship and concluded that the negative effects of downsizing on organizational performance were more pronounced in industries characterized by high R&D intensity, growth, and low capital intensity	Guthrie & Datta (2008)	U.S.	144 non-diversified U.S. firms (1998-2000). Survey data from HR managers in these firms. OLS regression using firm and industry data from Census and Compustat.	**Outcome**: ROA **Explanatory**: Employee downsizing measured as a dichotomous variable (1 = *if employment reduction exceeded 5% between 1998 and 1999*, 0 = *otherwise*). **Moderator**: Industry R&D intensity, demand instability, capital intensity and growth	• There was a negative association between workforce downsizing and post downsizing firm ROA. • The negative effect of downsizing on performance was magnified by industry R&D intensity and industry growth. • The negative relationship between downsizing and firm performance was also more pronounced in industries with lower capital intensity. • No significant moderating effect was observed for industry demand instability.
In a study of downsizing in hospitals, it was found that HR policies and practices (e.g. advance notice, extensive communication, provision of benefits) had a positive effect on (perceptions of) downsizing success and financial performance	Chadwick, Hunter, & Walston (2004)		114 acute care major hospitals. Ordered logit and OLS estimations using survey data from hospital CEOs and other upper managers.	**Outcome**: Managerial perception of downsizing success, cash margin (ratio of free cash available for a hospital's use to the total hospital net revenues) **Explanatory**: Workforce downsizing (workforce reduction of at least 15%), Strategic HR practices: (a) advance notice given to downsized employees, (b) benefits offered after downsizing in the form of extended insurance coverage (1 = *yes*, 0 = *no*); (c) planned redesign of work structures; (d) consideration for employee morale	• Consideration for employees was positively associated with perceived success of the downsizing initiative. • However, the effect on cash margin was not significant. • More extensive advance notice or benefits coverage had no significant effect on perceived success of downsizing. • More advanced notice was significantly and positively related to cash margin in the year of downsizing. • Provision of extended insurance coverage to laid-off employees was negatively associated with cash margin ($p < .05$). • The effects of consideration for employees and advance notice emerged as significant over time. • Planned redesign was positively associated with perceived success but had a neutral-to-negative effect on cash margin.

Examines the relation between the magnitude of downsizing and ROA. Magnitude of downsizing has a U-shaped relationship with firm performance magnified by proactive downsizing. Small scale downsizing leads to elimination of operational inefficiencies without disrupting routines. Medium-scale has more problems with survivor effects. Large scale downsizing has a more positive effect than medium scale, because survivors expend more cognitive and practical effort in rethinking and re-creating organizational routines.	Brauer and Laamanen (2014)	Various-Europe	73 firms in Europe listed in STOXX (1996–2006) with at least 5 % employee downsizing	**Outcome**: ROA **Explanatory**: magnitude of workforce downsizing (% of total employees) **Control**: past firm performance, firm size, for, diversification, slack, asset change, number of divestitures, number of acquisitions, industry.	• U-shaped relationship between magnitude of downsizing and ROA. • Relationship magnified by proactive downsizing

Appendix B

Figure 1
An Integrative Model of Employee Downsizing

1. ENVIRONMENTAL FACTORS

a. Macroenvironmental factors
 • Economic environment
 • Institutional environment
b. Industry factors
 • Type
 • Demand growth/instability
 • Technological and capital intensity
 • Competition

2. ORGANIZATIONAL FACTORS

a. Firm attributes (firm performance, other characteristics, reputation)
b. Strategy (M&A level and type, diversification level, business strategy)
c. Governance (board characteristics, ownership structure); CEO characteristics
d. HR Policies and employee attributes (HIWP/HCWP, unionization, employee compensation)

STREAM I   STREAM II

3. EMPLOYEE DOWNSIZING

a. Downsizing decision
 • Occurrence, level, severity, adoption, timing
 • Motivation
 • Type (permanent, temporary)
b. Downsizing process
 • Communication, trust, fairness (procedural/distributive), empowerment, supervisor and peer support
c. Survivor characteristics
 • Work ethic, self-esteem, job insecurity
 • Attachment with peers

STREAM III   STREAM IV

4. INDIVIDUAL OUTCOMES

a. Job Involvement, job satisfaction, loyalty, motivation, commitment and self-esteem
b. Trust and justice perceptions, work environment changes, conflict, employer-employee relations
c. Turnover intent and absenteeism
d. Work performance

5. ORGANIZATIONAL OUTCOMES

a. Market based outcomes
b. Accounting returns
c. Other outcomes (efficiency/productivity, creativity, reputation, growth in sales, changes in R&D and advertising)

⟶ Direct effect   ------▶ Moderating effect   —·—·—▶ Feedback effect

Appendix C

THE NEW THRESHOLDS (Art. 2)

Enterprise category	Headcount: Annual Work Unit (AWU)	Annual turnover	or	Annual balance sheet total
Medium-sized	< 250	≤ €50 million (in 1996 € 40 million)	or	≤ €43 million (in 1996 € 27 million)
Small	< 50	≤ €10 million (in 1996 € 7 million)	or	≤ €10 million (in 1996 €5 million)
Micro	< 10	≤ €2 million (previously not defined)	or	≤ €2 million (previously not defined)

Appendix D

Table 1 *Stages for SMEs' rightsizing strategy*

Stage	Focus	External/internal environment	Turnaround response	Major human resources practices
1	Restricting	Bad	Retrenchment	Moderate downsizing
2	Trimming	Worst	Retrenchment	Drastic downsizing & wage cut
3	Proactive	Improving	Recovery	Rightsizing

Chu and Siu: *Coping with the Asian economic crisis*   855
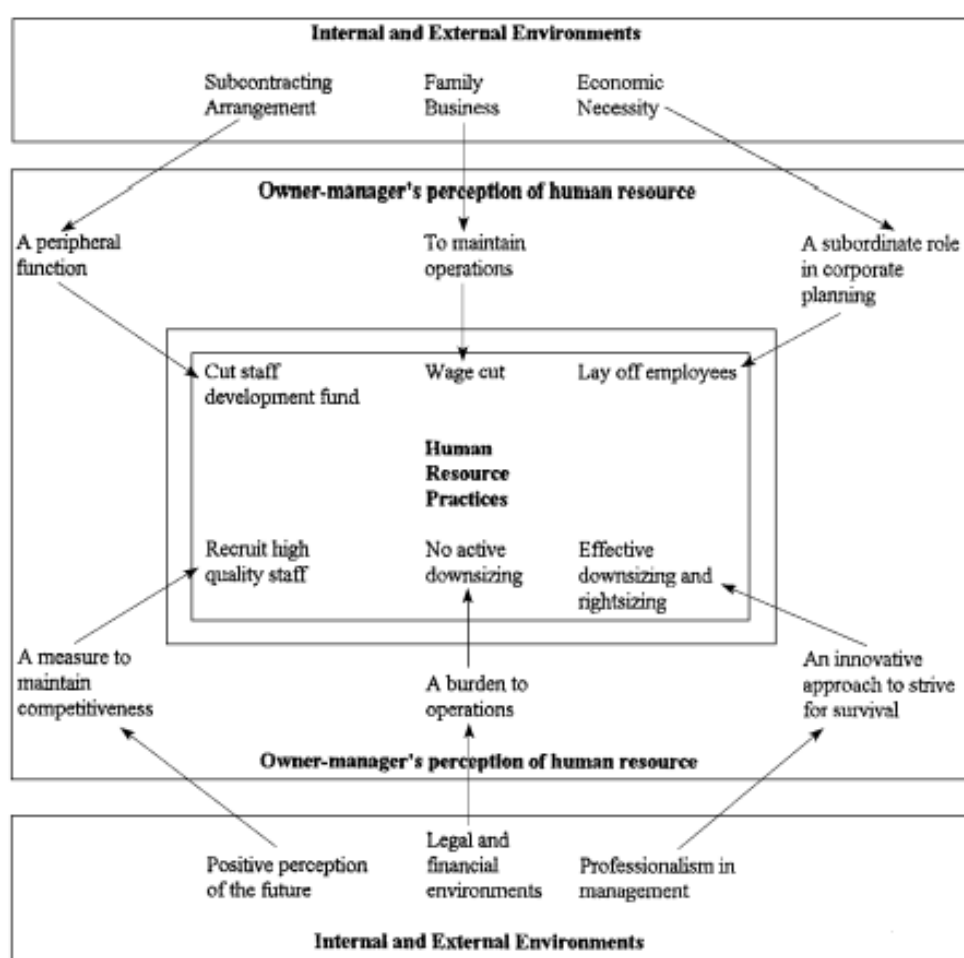
Figure 1 *The relationship among the human resource practices of SMEs, the internal and external environments and the perception of the owner-managers*

Appendix E

Love and Nohria (2005)		Search strategy	
Broad scope classifications	**Indications**	**Dimensions**	**Indicators**
(1) Structural or process changes	Restructuring	**Adjustments & implementations** aanpassen|aanpassing*|getransformeerd|gewijzigd*|implementatie*|implementeren|ingrijpen*|verander*|verbeter*|verbreden|verbreding|wijzig*|verplaats*	Aanpassen, aanpassing, aanpassingen, getransformeerd, gewijzigd, gewijzigde, implementatie, implementatieplan, implementatieplannen, implementeren, ingrijpen, ingrijpend, ingrijpende, veranderd, veranderde, veranderen, veranderende verandering, veranderingen, veranderingsproces, verandert, verbeterde, verbeteren, verbetering, verbeteringen, verbetert, verbreden, verbreding, wijzigen, wijzigende, wijziging, wijzigingen, wijzigt, wijzigen, verplaatsen, verplaatsing, verplaatsingen
		Structuration/replacements/reclassifications constructie|*herplaats*|geplaatst*|herinrichting|*structurer*|structuur|herzien*	Constructie, geherplaatst, geplaatst, geplaatste, herindeling, herinrichting, herplaats, herplaatsbaar, herplaatsbare, herplaatsen, herplaatsing, herplaatsingen, herplaatsingprocedure, herplaatsingproces, herplaatsingsprocedure, herstructureren, herstructurering, herstructureringen, herverdeling, herzien, herziening, herzieningen, herzienings, structuur
	Reorganization	**Reorganizations** deelreorganisaties|*reorganis*|organisatie*|reorganize*	Deelreorganisaties, gereorganiseerd, organisatieaanpassing, organisatieaanpassingen, organisatiestructuur organisatieverandering, organisatieveranderingen, organisatiewijziging, organisatiewijzigingen, organisatiewijzing, organisatiewijzingen, reorganisatie, reorganisatieplan, reorganisatieplannen, reorganisatieproces, reorganisaties, reorganize, reorganized, reorganiseert, reorganiseren, reorganiserend, reorganiserende, reorgarisatie
	Process redesign	**Efficiency** effectief|effectieve|effective|effectuer*|effici*|improvement|knelpunten|streamline|stroomlijning **Up-dating/streamlining** geactualiseerd|geautomatiseerd*|gestandaardiseerd*|hernieuw*	Effectief, effectieve, effective, effectueren, effectuering, efficiency, efficiencyverbeteringen, efficient, efficient, efficiënter, efficiëntere, efficiëntie, efficiëntieslag, improvement, knelpunten, streamline, stroomlijning geactualiseerd, geautomatiseerde, gestandaardiseerde, hernieuwd, hernieuwde
	Reduction in hierarchical levels, functions or divisions	**Functions** bevoegd*|functie*|taak|taakinhoud|takenpakket	Bevoegd, bevoegde, bevoegdheden, bevoegdheid, functieaanbod, functieverandering, functieverval, functievervulling, functiewijziging, functiewijzigingen, taak, taakinhoud, takenpakket

(2)	Changes in the firm's strategic domain	Focus on core business	**Focus** focus|keractiviteit*|kernkwaliteit*|kerntaken	Focus, kernactiviteit, kernactiviteiten, kernkwaliteiten, kerntaken,
		Narrowing product lines	**Business Lines** bedrijfs*|branche*|business|klantsegment|marktsegment|organisatieonderdeel|organisatieonderdelen|productie*|resource*	Bedrijfsactiviteiten, bedrijfsmiddelen, bedrijfsonderdeel, bedrijfsonderdelen, bedrijfsorganisaties, bedrijfsorganisatorisch, bedrijfsorganisatorische, bedrijfsruimte, bedrijfssluiting, bedrijfstak, bedrijfstaken, bedrijfsvestiging, bedrijfsvoering, bedrijfsvoortgang, branche, branches, business, klantsegment, marktsegment, organisatieonderdeel, organisatieonderdelen, productiefunctie, productieprocessen, resource, resources
(3)	General indications	Direction	**Limitations/reductions** beperk*|gereduceerd|ingekrompen|ingeleverd|ingeschaald*|intrekk*|krimp*|lastenreductie|minimaliser*|terugbrengen	Beperken, beperking, beperkingen, beperkt, beperkte, beperkter, gereduceerd, ingekrompen, ingeleverd, ingeschaald, ingeschaalde, intrekken, intrekking, krimp, krimpen, lastenreductie, minimaliseren, minimalisering, terugbrengen
			Close down afsluit*|afwikkeling|beindiging|closing|gestaakt|gestopt|neerleggen|opgeheven|opgehouden|opgeschort|opgezegd|opheffem|schorten|sluit*|stop|stopgezet|stoppen|stopt|stopzet*|uitbested*|uitbesteed*|verdwijn*|verval*|wegnemen|wegval*	Afsluit, afsluiten, afsluiting, afwikkeling, beindiging, closing, gestaakt, gestopt, neerleggen, opgeheven, opgehouden, opgeschort, opgezegd, opheffen, schorten, sluit, sluiten, sluiting, stop, stopgezet, stoppen, stopt, stopzetten, stopzetting, uitbesteden, uitbesteding, uitbesteed, uitbesteedt, verdwijnen, verdwijnt, verval, vervallen, vervalt, wegnemen, wegval, wegvallen
			Integrations/mergers *ïntegreerd*|*koppel*|onderverdeeld|overgedragen|overgeheveld|overgenomen|overgeplaatst*|overname|overneemt|overnemende|samengaan|samenval*|samenvoeg*|verbonden	Geïntegreerd, geïntegreerde, gekoppeld, gekoppelde, onderverdeeld, overgedragen, overgeheveld, overgenomen, overgeplaatst, overgeplaatste, overname, overneemt, overnemende, samengaan, samenvallen, samenvalt, samenvoegen, samenvoeging, verbonden
		Corporate level strategy	**Concern** concern*|deelneming*	Concernlocaties, concernverband, deelneming, deelnemingen
			Centralization centralisatie|gecentraliseerd*|	Centralisatie, centralisatiemogelijkheden, gecentraliseerd, gecentraliseerde
			Planning gepland*|plan|plannen|planning|proactie*|program*|strategie|strategisch|strategy	Gepland, geplande, plan, plannen, planning, proactief, proactieve, program, programma, programmaonderdelen, strategie, strategisch, strategische, strategy
			Facilities huisvesting|standplaats*	Huisvesting, standplaats, standplaatswijziging
			Expanding acquisitiewerkzaamheden|oprichten|oprichting|uitbouwen|uitbreid*	Acquisitiewerkzaamheden, oprichten, oprichting, uitbouwen, uitbreiden, uitbreiding,

Continuity

continu*|doorstart|voortbestaan|voortzett*

Continueren, continuering, continuiteit, continuïteit, continuïteitsverwachting, doorstart, voortbestaan, voortzetten, voortzetting

Appendix F

Overview dataset

Downsizing firms

Industry	N	Industry	N	Industry	N	Year of downsizing	N
Mining and quarrying of nonmetallic minerals, except fuels	1	Fabricated metal products, except machinery and transportation equipment	7	Wholesale trade, durable goods	7	2002	1
Building construction-general contractors and operative builders	4	Industrial and commercial machinery and computer equipment	6	Wholesale trade, nondurable goods	1	2003	4
Heavy construction other than building construction-contractors	1	Electronic and other electrical equipment and components, except computer equipment	7	Eating and drinking places	2	2004	5
Food and kindred products	3	Transportation equipment	1	Depository institutions	2	2005	3
Textile mill products	4	Measuring, analyzing and controlling instruments; photographic, medical and optical goods; watches and clocks	3	Real estate	5	2006	14
Lumber and wood products, except furniture	1	Miscellaneous manufacturing industries	1	Holding and other investment offices	14	2007	6
Paper and allied products	5	Railroad transportation	2	Hotels, rooming houses, camps, and other lodging places	1	2008	9
Printing, publishing and allied industries	4	Motor freight transportation and warehousing	4	Business services	3	2009	45
Chemicals and allied products	7	United States postal service	1	Miscellaneous repair services	1	2010	9
Petroleum refining and related industries	1	Water transportation	3	Health services	1	2011	10
Rubber and miscellaneous plastics products	4	Transportation services	3	Engineering, accounting, research, management, and related services	4	2012	12
Stone, clay, glass and concrete products	3	Communications	2			2013	5
Primary metal industries	**2**	Electric, gas and sanitary services	**2**				
					123		**123**

Category	
Micro	**0**
Small	2
Medium	49
Large	72
	123

Non downsizing firms

Industry	N	Industry	N	Industry	N	Base year	N
Mining and quarrying of nonmetallic minerals, except fuels	0	Fabricated metal products, except machinery and transportation equipment	4	Wholesale trade, durable goods	4	2002	0
Building construction-general contractors and operative builders	4	Industrial and commercial machinery and computer equipment	2	Wholesale trade, nondurable goods	2	2003	1
Heavy construction other than building construction-contractors	2	Electronic and other electrical equipment and components, except computer equipment	2	Eating and drinking places	0	2004	1
Food and kindred products	4	Transportation equipment	1	Depository institutions	0	2005	0
Textile mill products	2	Measuring, analyzing and controlling instruments; photographic, medical and optical goods; watches and clocks	1	Real estate	2	2006	1
Lumber and wood products, except furniture	1	Miscellaneous manufacturing industries	1	Holding and other investment offices	6	2007	2
Paper and allied products	3	Railroad transportation	1	Hotels, rooming houses, camps, and other lodging places	1	2008	0
Printing, publishing and allied industries	2	Motor freight transportation and warehousing	3	Business services	3	2009	18
Chemicals and allied products	7	United States postal service	1	Miscellaneous repair services	1	2010	23
Petroleum refining and related industries	1	Water transportation	1	Health services	1	2011	19
Rubber and miscellaneous plastics products	2	Transportation services	1	Engineering, accounting, research, management, and related services	3	2012	9
Stone, clay, glass and concrete products	1	Communications	2			2013	0
Primary metal industries	1	Electric, gas and sanitary services	1				
					74		**74**

Category	
Micro	1
Small	2
Medium	18
Large	53
	74

Appendix G

Variables		Mean	Median	Std. Dev.	Min	Max	Obs.
Small firms							
Dependent variables	ROA	-.1195697	-.001824	.4416948	-2.5956	.295917	42
	ROE	-.2720793	.0718479	5.134357	-30.1765	8.62312	42
	Sales growth	.0306667	.0281399	.2245648	-.4985483	.7505353	42
	Asset growth	15.55647	15.6278	.5251218	14.57912	16.55725	42
Independent variables	Lead time	11.0625	10.5	4.609916	3	24	48
	Frequency	2.25	1	2.128829	1	8	48
Control variables	Magnitude	.1806773	.1680272	.112087	.03125	.4142012	48
	Firm size	15.55647	15.6278	.5251218	14.57912	16.55725	42
Medium firms							
Dependent variables	ROA	-.0241374	.0235537	.2207558	-1.26807	.303856	91
	ROE	.0739777	.0698296	1.500052	-11.7593	5.44	91
	Sales growth	- .018159	-.0298326	.2700733	-.7374814	1.014935	90
	Asset growth	-.0113985	-.0170993	.2689533	-.7745943	1.649637	91
Independent variables	Lead time	12.69697	12	6.814532	3	36	91
	Frequency	1.441176	1	.6975705	1	4	99
Control variables	Magnitude	.1038807	.1387687	.5960669	-3.201681	.6	102
	Firm size	16.86186	16.89489	.6158395	15.48284	19.11971	102
Large firms							
Dependent variables	ROA	.00234	.0203339	.1384268	-.814282	.347744	206
	ROE	.2002234	.0789311	1.479167	-3.04198	17.15272	206
	Sales growth	.0081882	.0047712	.3498702	-.9799541	2.495776	204
	Asset growth	.0099117	.0010753	.3029042	-.6531686	2.585724	207
Independent variables	Lead time	19.11111	15.5	12.9997	3	70	216
	Frequency	1.736111	1	1.029695	1	5	216
Control variables	Magnitude	.0402176	.0681408	.2549128	-1.4819	.5477032	219
	Firm size	19.41209	19.31554	1.689774	15.09087	23.84726	207
Total panel data							
Dependent variables	ROA	-.0198714	.0176954	.2231685	-2.5956	.347744	339
	ROE	.0681024	.0768804	2.270313	-30.1765	17.15272	339
	Sales growth	.0136687	.0001914	.3158895	-.9799541	2.495776	336
	Asset growth	.0065273	-.0016382	.2903516	-.7745943	2.585724	340
Independent variables	Lead time	16.29752	12	11.2961	3	70	363
	Frequency	1.721311	1	1.18388	1	8	366
Control variables	Magnitude	.0760867	.0955414	.3741903	-3.201681	.6	369

Firm size	18.25325	17.89898	2.027282	14.57912	23.84726	340

Note: timing, scope, and industry are left out of the descriptive statistics as they are categorical variables which are difficult to interpret in a descriptive statistics table. Also, note that the micro firms are not included in the descriptive statistics as they are left out as the control group is not included in the relevant analyses.

Appendix H

```
. mdesc narrowbroad leadtime frequence roa roe growthsales growthasset logasset
```

Variable	Missing	Total	Percent Missing
narrowbroad	111	369	30.08
leadtime	6	369	1.63
frequence	3	369	0.81
roa	30	369	8.13
roe	30	369	8.13
growthsales	33	369	8.94
growthasset	29	369	7.86
logasset	29	369	7.86

Figure 1: variables that incorporate missing values

Appendix I
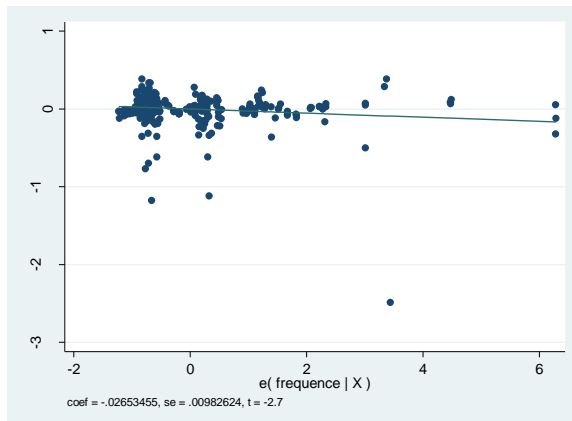
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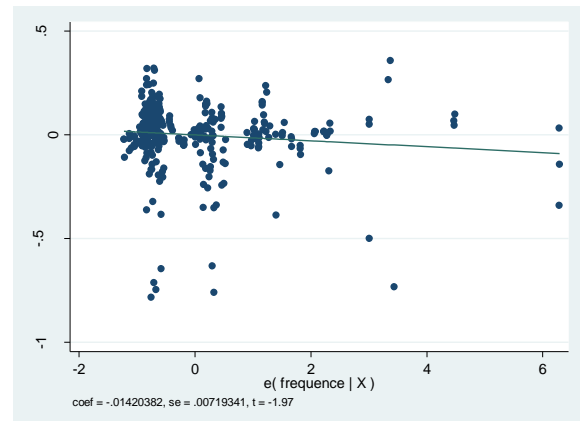
Avplot: ROA winsorized at the 99 percentage

Avplot: ROE

Avplot: ROE winsorized at the 99 percentage
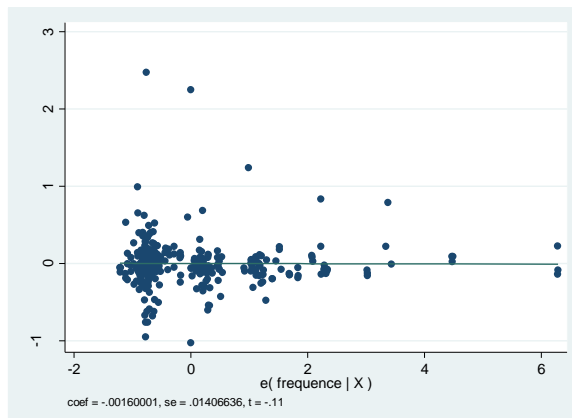
Avplot: Sales growth
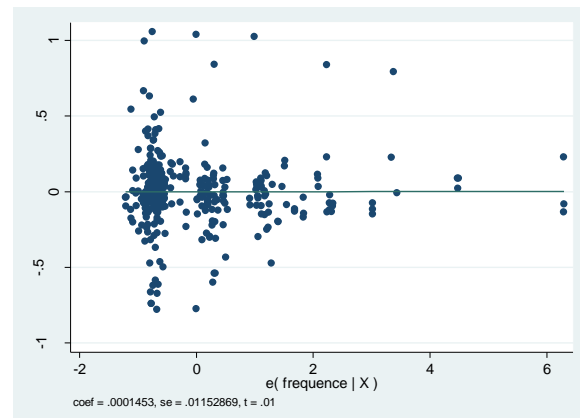
Avplot: Sales growth winsorized at the 99 percentage
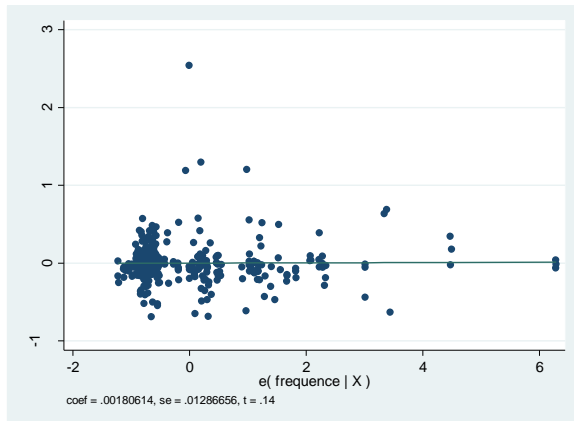
Avplot: Asset growth
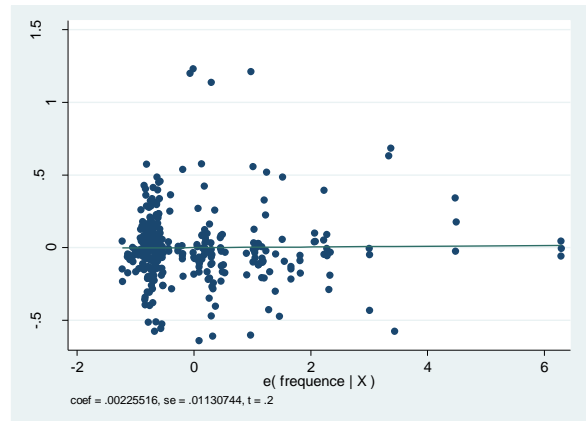
Avplot: Asset growth winsorized at the 99 percentage
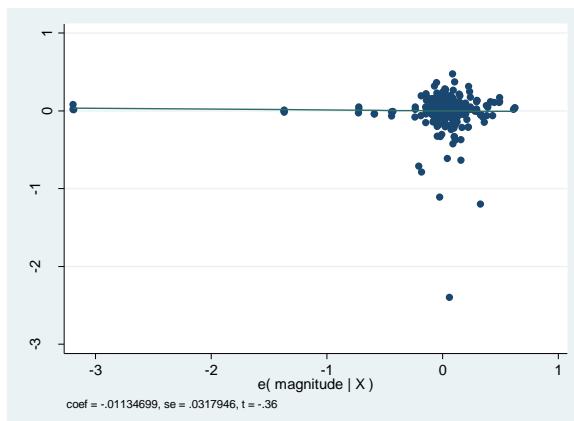
Avplot: Magnitude
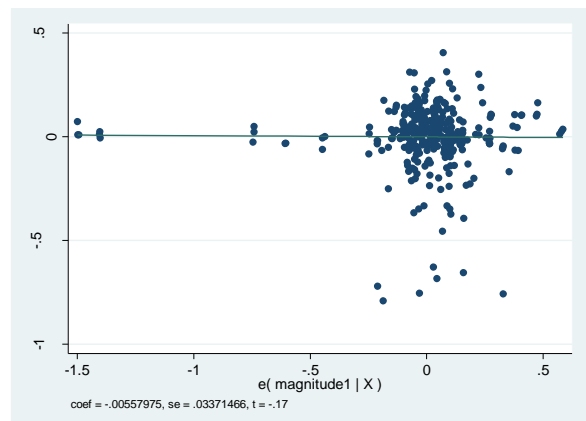
Avplot: Magnitude winsorized at the 99 percentage

Appendix J

```
. hausman fe re, sigmamore

                    ── Coefficients ──
                    (b)           (B)           (b-B)        sqrt(diag(V_b-V_B))
                    fe            re            Difference   S.E.

       longterm   -.0207711    -.0238088      .0030377       .0051362
       logasset    .2507947     .046307       .2044877       .0703893

                       b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

       Test:  Ho:  difference in coefficients not systematic

                    chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                            =        9.88
              Prob>chi2 =       0.0072
```

Figure 1: Hausman test, dependent variable ROA

```
. hausman fe re, sigmamore

                    ── Coefficients ──
                    (b)           (B)           (b-B)        sqrt(diag(V_b-V_B))
                    fe            re            Difference   S.E.

       longterm    .0034363     .0154403     -.012004        .025978
       logasset   -.3154939    -.0749099     -.240584        .3560161

                       b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

       Test:  Ho:  difference in coefficients not systematic

                    chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                            =        0.47
              Prob>chi2 =       0.7911
```

Figure 2: Hausman test, dependent variable ROE
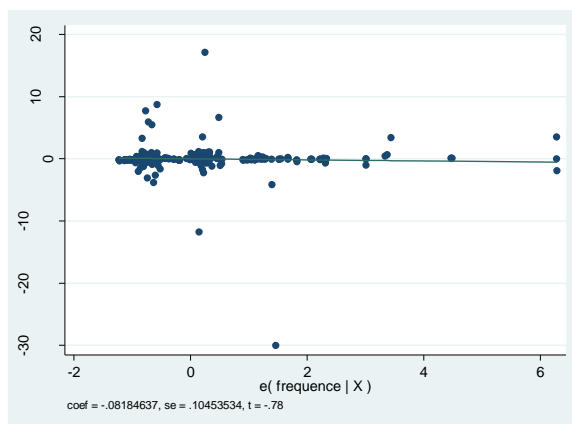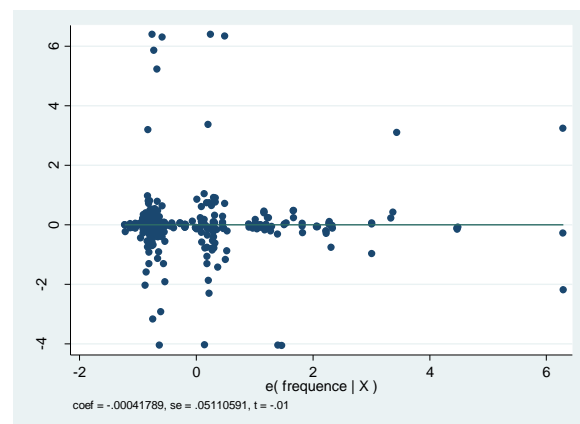
```
. hausman fe re, sigmamore

                    ── Coefficients ──
                    (b)           (B)           (b-B)        sqrt(diag(V_b-V_B))
                    fe            re            Difference   S.E.

       longterm    .0333511     .0243163      .0090348       .004632
       logasset    .3475765     .0854029      .2621736       .0950627

                       b = consistent under Ho and Ha; obtained from xtreg
            B = inconsistent under Ha, efficient under Ho; obtained from xtreg

       Test:  Ho:  difference in coefficients not systematic

                    chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                            =        7.62
              Prob>chi2 =       0.0222
```

Figure 3: Hausman test, dependent variable sales growth

```
. hausman fe re, sigmamore

                        —— Coefficients ——
                    (b)          (B)          (b-B)      sqrt(diag(V_b-V_B))
                    fe           re         Difference          S.E.

      longterm      .04111      .023598      .017512          .0070238
      logasset    .6616172    .0788519      .5827652          .0988863

                     b = consistent under Ho and Ha; obtained from xtreg
              B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

                chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                        =        35.77
              Prob>chi2 =       0.0000
```

Figure 4: Hausman test, dependent variable asset growth

Appendix K

Autocorrelation

```
. xtserial roa timing longterm category narrowbroad frequence magnitude1 leadtime logasset

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      71) =      4.297
           Prob > F =      0.0418
```

Figure 1: Woolridge test, dependent variable ROA

```
. xtserial roe timing longterm category narrowbroad frequence magnitude1 leadtime logasset

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      71) =     13.268
           Prob > F =      0.0005
```

Figure 2: Woolridge test, dependent variable ROE

```
. xtserial growthsales timing longterm category narrowbroad frequence magnitude1 leadtime logasset

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      70) =      0.283
           Prob > F =      0.5962
```

Figure 3: Woolridge test, dependent variable sales growth

```
. xtserial growthasset timing longterm category narrowbroad frequence magnitude1 leadtime logasset

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,      71) =      0.266
           Prob > F =      0.6079
```

Figure 4: Woolridge test, dependent variable asset growth

Appendix L

Heteroscedasticity

```
Coefficients:  generalized least squares
Panels:        homoskedastic
Correlation:   no autocorrelation

Estimated covariances      =          1       Number of obs      =        234
Estimated autocorrelations =          0       Number of groups   =         83
Estimated coefficients     =          9       Obs per group: min =          1
                                                              avg =   2.819277
                                                              max =          3
                                              Wald chi2(8)       =      20.50
Log likelihood             =   32.66759       Prob > chi2        =     0.0086
```

roa	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
timing	-.0074926	.0277845	-0.27	0.787	-.0619492	.0469639
longterm	-.017748	.0287754	-0.62	0.537	-.0741468	.0386508
category	.0173967	.0409561	0.42	0.671	-.0628759	.0976693
narrowbroad	.0197495	.0300243	0.66	0.511	-.0390971	.0785961
frequence	-.03677	.0135844	-2.71	0.007	-.0633949	-.0101451
magnitude1	.0026867	.049391	0.05	0.957	-.0941179	.0994913
leadtime	.0002562	.0012945	0.20	0.843	-.002281	.0027934
logasset	.0239972	.0095528	2.51	0.012	.005274	.0427204
_cons	-.4008624	.1615498	-2.48	0.013	-.7174943	-.0842305

```
. local df = e(N_g) - 1

. lrtest hetero . , df(`df')

Likelihood-ratio test                          LR chi2(82) =     671.90
(Assumption: . nested in hetero)               Prob > chi2 =     0.0000
```

Figure 1: Heteroscedasticity test, dependent variable asset ROA

```
Coefficients:  generalized least squares
Panels:        homoskedastic
Correlation:   no autocorrelation

Estimated covariances      =          1       Number of obs      =        234
Estimated autocorrelations =          0       Number of groups   =         83
Estimated coefficients     =          9       Obs per group: min =          1
                                                              avg =   2.819277
                                                              max =          3
                                              Wald chi2(8)       =       9.50
Log likelihood             =  -344.9092       Prob > chi2        =     0.3022
```

roe	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
timing	-.2643769	.1394984	-1.90	0.058	-.5377888	.009035
longterm	.0230906	.1444738	0.16	0.873	-.2600728	.3062541
category	.3749699	.2056299	1.82	0.068	-.0280574	.7779972
narrowbroad	-.1308274	.1507441	-0.87	0.385	-.4262805	.1646257
frequence	.0641461	.0682036	0.94	0.347	-.0695306	.1978228
magnitude1	-.1541506	.2479792	-0.62	0.534	-.6401808	.3318790
leadtime	.0042969	.0064994	0.66	0.509	-.0084417	.0170355
logasset	-.0377357	.0479622	-0.79	0.431	-.1317399	.0562685
_cons	.4409403	.8110988	0.54	0.587	-1.148784	2.030665

```
. local df = e(N_g) - 1

. lrtest hetero . , df(`df')

Likelihood-ratio test                          LR chi2(82) =     874.93
(Assumption: . nested in hetero)               Prob > chi2 =     0.0000
```

Figure 2: Heteroscedasticity test, dependent variable asset ROE

```
Coefficients:   generalized least squares
Panels:         homoskedastic
Correlation:    no autocorrelation

Estimated covariances       =           1          Number of obs       =          231
Estimated autocorrelations  =           0          Number of groups    =           81
Estimated coefficients      =           9          Obs per group: min  =            1
                                                                   avg  =     2.851852
                                                                   max  =            3
                                                   Wald chi2(8)        =        17.13
Log likelihood              =   -38.98227          Prob > chi2         =       0.0288
```

growthsales	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
timing	-.0723908	.0380233	-1.90	0.057	-.1469152	.0021336
longterm	.0284535	.0395186	0.72	0.472	-.0490016	.1059087
category	-.1145921	.0563906	-2.03	0.042	-.2251157	-.0040685
narrowbroad	.0107037	.0413908	0.26	0.796	-.0704206	.0918281
frequence	.0013651	.0185232	0.07	0.941	-.0349397	.03767
magnitude1	-.0962665	.0673977	-1.43	0.153	-.2283635	.0358305
leadtime	-.0014336	.0017639	-0.81	0.416	-.0048908	.0020236
logasset	.037759	.013101	2.88	0.004	.0120815	.0634366
_cons	-.587182	.2218474	-2.65	0.008	-1.021995	-.1523691

```
. local df = e(N_g) - 1

. lrtest hetero . , df(`df')

Likelihood-ratio test                              LR chi2(80) =     396.93
(Assumption: . nested in hetero)                   Prob > chi2 =      0.0000
```

Figure 3: Heteroscedasticity test, dependent variable asset sales growth

```
Coefficients:   generalized least squares
Panels:         homoskedastic
Correlation:    no autocorrelation

Estimated covariances       =           1          Number of obs       =          234
Estimated autocorrelations  =           0          Number of groups    =           83
Estimated coefficients      =           9          Obs per group: min  =            1
                                                                   avg  =     2.819277
                                                                   max  =            3
                                                   Wald chi2(8)        =        21.48
Log likelihood              =   -50.91502          Prob > chi2         =       0.0060
```

growthasset	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
timing	-.066331	.0397126	-1.67	0.095	-.1441662	.0115042
longterm	.0233097	.041129	0.57	0.571	-.0573016	.103921
category	-.08983	.058539	-1.53	0.125	-.2045642	.0249043
narrowbroad	.0739512	.042914	1.72	0.085	-.0101587	.1580611
frequence	.0040973	.0194163	0.21	0.833	-.0339579	.0421526
magnitude1	-.084529	.070595	-1.20	0.231	-.2228927	.0538346
leadtime	-.0014761	.0018503	-0.80	0.425	-.0051026	.0021503
logasset	.0420256	.0136539	3.08	0.002	.0152644	.0687868
_cons	-.7101539	.2309045	-3.08	0.002	-1.162719	-.2575894

```
. local df = e(N_g) - 1

. lrtest hetero . , df(`df')

Likelihood-ratio test                              LR chi2(82) =     416.15
(Assumption: . nested in hetero)                   Prob > chi2 =      0.0000
```

Figure 4: Heteroscedasticity test, dependent variable asset asset growth

Appendix M

```
. vif, uncentered

    Variable |      VIF       1/VIF
-------------+----------------------
     logasset|     6.29    0.159018
     category|     3.84    0.260404
     downsize|     3.10    0.322836
        pyroa|     1.12    0.893745
   magnitude1|     1.11    0.903206
-------------+----------------------
     Mean VIF |     3.09
```

Figure 1: VIF values research model 1

```
. vif, uncentered

    Variable |      VIF       1/VIF
-------------+----------------------
     logasset|    13.74    0.072788
     category|     4.60    0.217294
     frequence|    4.35    0.229807
     leadtime|     3.64    0.274995
     longterm|     2.79    0.358617
       timing|     1.88    0.532150
  narrowbroad|     1.85    0.541773
   magnitude1|     1.14    0.874816
-------------+----------------------
     Mean VIF |     4.25
```

Figure 2: VIF values research model 2

Appendix N

```
Tests for skewness and kurtosis                 Number of obs      =      234
                                                 Replications       =       50

                            (Replications based on 83 clusters in name)

              Observed    Bootstrap                        Normal-based
                 Coef.    Std. Err.       z     P>|z|     [95% Conf. Interval]

 Skewness_e    -.0016497    .0011111    -1.48    0.138    -.0038275     .000528
 Kurtosis_e     .0062742    .0009646     6.50    0.000     .0043837    .0081648
 Skewness_u     .0000995    .0003263     0.31    0.760    -.0005399     .000739
 Kurtosis_u    -.0000714    .0000629    -1.13    0.257    -.0001947     .000052

 Joint test for Normality on e:          chi2(2) =   44.52    Prob > chi2 = 0.0000
 Joint test for Normality on u:          chi2(2) =    1.38    Prob > chi2 = 0.5018
```

Figure1: Normality, dependent variable ROA

```
Tests for skewness and kurtosis                 Number of obs      =      234
                                                 Replications       =       50

                            (Replications based on 83 clusters in name)

              Observed    Bootstrap                        Normal-based
                 Coef.    Std. Err.       z     P>|z|     [95% Conf. Interval]

 Skewness_e     .3480607    .3358525     1.04    0.300    -.3101982     1.00632
 Kurtosis_e    20.67384     3.652416     5.66    0.000    13.51524    27.83245
 Skewness_u    -.2174497    .0452855    -4.80    0.000    -.3062076   -.1286918
 Kurtosis_u    -.5428635    .0737663    -7.36    0.000    -.6874428   -.3982842

 Joint test for Normality on e:          chi2(2) =   33.11    Prob > chi2 = 0.0000
 Joint test for Normality on u:          chi2(2) =   77.22    Prob > chi2 = 0.0000
```

Figure2: Normality, dependent variable ROE

```
Tests for skewness and kurtosis                 Number of obs      =      231
                                                 Replications       =       50

                            (Replications based on 81 clusters in name)

              Observed    Bootstrap                        Normal-based
                 Coef.    Std. Err.       z     P>|z|     [95% Conf. Interval]

 Skewness_e     .0044767    .002664      1.68    0.093    -.0007447    .0096981
 Kurtosis_e     .0336924    .0039789     8.47    0.000     .0258939    .0414908
 Skewness_u    -.0014223    .0011565    -1.23    0.219    -.0036891    .0008444
 Kurtosis_u     .0001219    .0005766     0.21    0.833    -.0010083     .001252

 Joint test for Normality on e:          chi2(2) =   74.53    Prob > chi2 = 0.0000
 Joint test for Normality on u:          chi2(2) =    1.56    Prob > chi2 = 0.4591
```

Figure3: Normality, dependent variable sales growth

```
Tests for skewness and kurtosis                 Number of obs      =      234
                                                 Replications       =       50

                            (Replications based on 83 clusters in name)

              Observed    Bootstrap                        Normal-based
                 Coef.    Std. Err.       z     P>|z|     [95% Conf. Interval]

 Skewness_e     .007198     .0040657     1.77    0.077    -.0007706    .0151666
 Kurtosis_e     .0418527    .0029759    14.06    0.000     .03602      .0476854
 Skewness_u    -.0028593    .0007234    -3.95    0.000    -.0042772   -.0014414
 Kurtosis_u    -.0011988    .0001684    -7.12    0.000    -.0015289   -.0008686

 Joint test for Normality on e:          chi2(2) = 200.93    Prob > chi2 = 0.0000
 Joint test for Normality on u:          chi2(2) =  66.27    Prob > chi2 = 0.0000
```
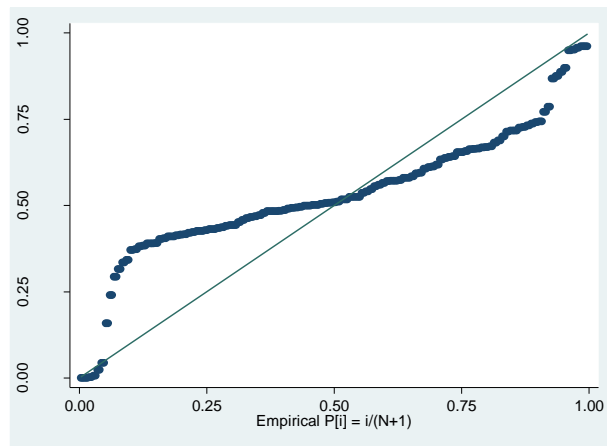
Figure4: Normality, dependent variable asset growth

Figure 5: P-plot magnitude