NHH

Relative Firm Performance and the Financial Crisis of 2008

An empirical study on how relative firm performance changes over the business cycle, and how relative firm performance is related with the impact of, and responses to, the crisis.

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Abstract

The purpose of this thesis is to study how recessions affect firm performance within industries, and how firm performance is related to the impact of and responses to the crisis. First, we investigate how recessions affect aggregate performance, stability and the competitive dynamics within industries in the Norwegian economy. This is done by measuring relative firm performance over the business cycle. Second, we examine the relationship between firm performance before, during and after the Financial Crisis, with both the impact of the crisis, and how firms respond to the crisis. Our analysis will be performed using both accounting data on Norwegian firms between 1999 and 2013, and results from a survey conducted by STOP in 2010 amongst Norwegian firms on the Financial Crisis. We also include a brief analysis of the business cycles in the Norwegian economy during the period from 1999 to 2013, using quarterly GDP data from SSB.

Our main findings are: i) The impact of the Financial Crisis on the stability of relative performance differed vastly between industries. In some industries the stability of firm performance decreased over the crisis, while in other industries the stability increased. ii) The Financial Crisis seems to have changed the competitive dynamics within some industries. In other industries the competitive dynamics seems to be consistent during and after the Financial Crisis as the period before the crisis. iii) There seems to be no relationship between firm performance before the crisis, and how firms were impacted and responded to the crisis. iv) Low performing firms during and after the crisis were more negatively impacted, and saw measures related to cost-cutting strategies as relatively more important, compared to high performing firms.

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Introduction

The Global Financial Crisis of 2008 is a recent example of an exogenous economic shock that struck national economies around the world. The downturn in the Norwegian economy became serious in the last quarter of 2008 (Cappelen & Eika, 2010), when the disturbance that had been present in the financial markets around the world turned into a full-fledged economic crisis with the bankruptcy of Lehman Brothers in September. Changes in the Norwegian economy was mainly caused by a decrease in exports, due to the international downturn, and a decrease in demand amongst domestic consumers (Cappelen & Eika, 2010). Reactive expansive financial policies contributed to softening the impact of the crisis in Norway, making Norway one of the countries in the western world to be least affected by the crisis. The Financial Crisis still had a negative impact on the Norwegian economy, which can be seen from the development in GDP. Norwegian firms were mostly affected from 2008 to 2010, and as many as two thirds suffered from a reduction in demand (Lien & Knudsen, 2012).

Sustainable competitive advantage has been at the core of the strategy field for several decades. The concept has been used to explain why firms are different in regards to performance, and how these differences in performance can be sustained. The idea that competitive advantage can be sustainable has been challenged by among others D'Aveni (1994) with his concept of hyper-competition, where only temporary advantages are possible. There has been a gap in the strategy field when it comes to studying how business cycles, and particularly recessions, affect the sustainability of competitive advantage. In recent years the STOP program at NHH has tried to fill this gap with several contributions on the topic. In our thesis we seek to further build upon the research made by Lasse Lien and Eirik Sjåholm Knudsen, and the STOP program.

Crises affect average firm performance negatively (Geroski & Gregg, 1993), but can affect individual firms differently. A crisis can change how individual firms perform compared to their competitors, possibly changing the stability in relative performance within industries. Firms being negatively impacted by a crisis will probably try to reduce the impact of the crisis by responding with various measures.

Research Question

The purpose of our research is to investigate how relative firm performance within industries changes over the Norwegian business cycle, and especially over the Financial Crisis of 2008. Additionally, we want to study how relative firm performance before, during, and after the crisis is related to both the impact of the crisis, and how firms responded to the crisis. Our research question is as follows:

"How was the competitive dynamics within industries in Norway affected by the Financial Crisis of 2008, and how is firm performance related to the impact of, and responses to, the crisis?"

Structure

This thesis consists of five chapters, in addition to references and appendices. In the first chapter, Introduction, we give a short overview of the study and formulate our research question. In the second chapter, Theory, we position our study within a theoretical context. The main theoretical concepts presented are different sources to competitive advantage, sustainability of competitive advantage, business cycles, and competitive dynamics. Based on these theoretical concepts we will formulate the hypotheses we seek to answer. In the third chapter, Methodology, we will present our methodological choices, our sources of data, and the tools used in our analyses. Issues related to validity and reliability will be presented when appropriate throughout the chapter. In the fourth chapter, Analysis, we interpret and analyze the results from our research. In the fifth and last chapter, Concluding Remarks, we summarize our findings, discuss the limitations of our study, and give suggestions for future studies.

Theory

Introduction

This chapter will unveil the theoretical foundation along with the suggested hypotheses. First, theory on Variance Decomposition Analysis will be presented to identify the sources of variation in firms' performance. Second, we seek to explain how differences between firm performance can arise through the Activity Based Theory, Industrial Organization, and the Resource Based View. Third, we investigate the subjects of sustainability and Hyper-Competition to see if differences in performance can last. Fourth, we introduce business cycles and recessions to see how changes in the environment can change the performance of firms both abruptly and over time. Fifth, we discuss Competitive Dynamics to get an understanding of how interactions between firms in an industry work. Last, we derive our hypotheses with basis in the presented theory.

The Big Questions in Strategy

Since the early twentieth century scholars have tried to answer two big questions within the strategy field (J. B. Barney & Arikan, 2001): 1) Why do some firms perform better than others? 2) How can differences between firm performance persist over time? When looking for the sources to variation in performance, the two prime candidates are industry and resources. This can also be seen as a reflection of external or internal capabilities. Both of these sets of capabilities was structured into the SWOT-matrix (Weihrich, 1982). The model matches the firm's internal Strengths and Weaknesses, with its external Opportunities and Threats. In the development of the strategy field, these two sides have later been split into the Resource Based View which focuses on internal capabilities, and Industrial Organization that looks at the positioning of firms within their environments. These two views differ in what they see as the main sources for firm variation in performance and competitive advantage, but they have a common goal in trying to understand how sustainable competitive advantage is created. The question of sustainability of competitive advantage and firm performance is ever more complicated. Competition is accelerating over time, and the competitive landscape of today and tomorrow might not support sustainability the same way as in earlier years (D'Aveni, 1994).

Variance Decomposition Analysis

The research stream on Variance Decomposition Analysis (VDA) tries to deconstruct the variance in firm performance, using accounting data to quantify the relative importance of different sources to competitive advantage. This stream of research started with Schmalensee's seminal article "*Do markets differ much?*" (1985), where he decomposed the variance of firm performance on his sample accounting data from manufacturing companies in 1975. He wanted to find an estimate of the importance of industry in explaining competitive advantage. Schmalensee (1985) found in his analysis that firm effects was nonexistent, and that industry effects accounted for 19,59% of the variance in firm performance. 80,41% of the variance in firm performance could not be explained either by industry or firm effects. This prompted the conclusion that industry was important, but far from the only thing that mattered.

In the eighties the dominant unit of analysis in strategy was the industry. This stemmed from the assumption that the most important market imperfections arose from the collective conduct and circumstances of firms (Rumelt, 1991). The contrary view was that these market imperfections could better be explained by the actions and resources on the business-unit level. Schamlensee's study (1985) was innovative, but limited in that it only used data from a single year. In the article "*How Much Does Industry Matter?*" Rumelt (1991) conducted a new variance decomposition analysis, using data from four years (1974-1977). He accounted for business cycle effects, and stable and transient business-unit effects. He found that industry effects where small at only 8,32%, and that business-unit effects accounted for as much as 46,37%. This supported his view that business-unit effects were the most important, and that differences between business-units were greater than the differences between industries.

Porter wrote an answer to Rumelt (1991) together with McGahan in the article "*How Much Does Industry Matter, Really?*" (1997), where the limitations of Rumelt (1991) and Schmalensee's (1985) samples of only manufacturing industries were addressed. Porter and McGahan (1997) constructed a more elaborate analysis covering all sectors of the American economy (excluding finance), which they later re-performed in 2002. They used a dataset that covered a 14-year period, and because of its length reflected multiple business cycles. They found that industry effects explained 9,6% of the variance in firm performance in their data,

while business-unit effects explained 37,7% and corporate effects explained 12% (McGahan & Porter, 2002). The main finding from this study was that all of these effects were significant, and varied across industries. The most important effect in determining firm performance was concluded to be business-unit effects. The differences in the results from the earlier studies are explained by that manufacturing possibly represents an outlier industry, where industry-effects may be of lesser importance. Furthermore, McGahan and Porter (1997) found that industry effects are more persistent over time than business-unit effects. This increases their relative importance, which they confirm later in the article "*The persistence of Shocks to Profitability*" (1999).

The advantages of VDA is the robustness of its findings, since it does not stipulate causality. Research on VDA has been important because it establishes the relative importance of industry, corporate, and business effects on firm performance (McGahan & Porter, 2002). A weakness in VDA-research lies in the use of SIC codes to define industries. It may be that industries based on SIC codes are too broadly defined to truthfully reflect industry effects (McGahan & Porter, 2002; Rumelt, 1991). VDA finds the relative importance of the various sources of performance, but says nothing about how performance is improved, and how superior performance can be attained and made sustainable.

In the following section different views on how competitive advantage is built and sustained over time will be presented.

Industrial Organization

"The essence of formulating competitive strategy is relating a company to its environment" (Porter, 1980).

In Industrial Organization (IO) a firm's environment is most of all dependent on the industry it operates in. The key aspect for a firm is to select an industry with a benign environment, and find a valuable position within this industry. Forces originating outside the environment of the industry are assumed to hit all members of the industry equally, however, such forces are only important indirectly through the different abilities of firms to mitigate their impact (Porter, 1980). IO is part of the positioning school, and views strategic formation as an analytical process. Porter established the positioning school as a dominant school in the field

of strategic management with his book "*Competitive Strategy*" published in 1980 (Mintzberg, Ahlstrand, & Lampel, 2009).

Figure 1: Porter's Five Forces

Bargaining Power of Suppliers

Threat of New Entrants → Industry Rivalry ← Threat of Substitutes

Bargaining Power of Buyers
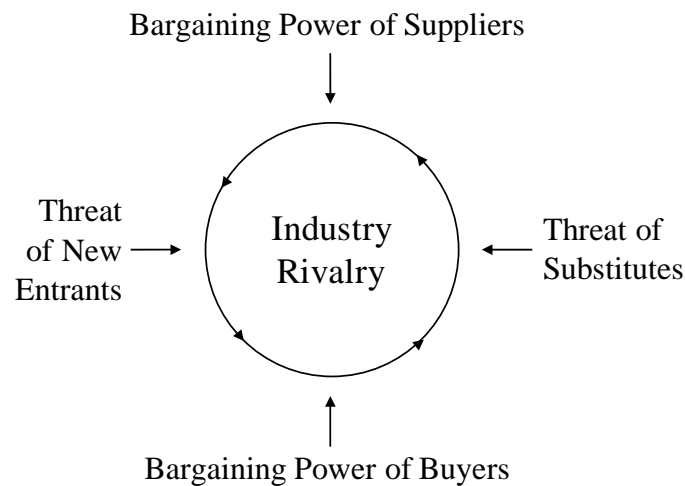
The roots to competition in an industry is its underlying economic structure. This structure goes beyond current competitors and can be split into the five competitive forces in Porter's framework (1985). These are: 1) *Bargaining power of suppliers*. Suppliers want to capture as much value as possible, and can do so through raising prices or reducing quality. If the industry has few alternatives, suppliers can extract the profits from the industry. 2) *Bargaining power of customers*. Customers want to capture as much value as possible through demanding lower prices or better services. 3) *Threat of substitution*. The firms in an industry competes indirectly with industries producing possible substitute products. This caps the prices the industry can demand without the risk of losing market share to substitutes. 4) *Threat of new entrants*. Entrants bring new capacity to the industry, and desire market shares. This can reduce prices and inflate costs for the incumbents. The threat of entry is tightly connected to the industry's barriers of entry. 5) *Rivalry amongst competing firms*. Rivalry in an industry occur when firms feel pressured, or see opportunities for increased market share and improvement of their position. It can be understood that the intensity of rivalry is greatly influenced by the four abovementioned forces.

The strength of the five forces varies greatly between industries, and together they determine the available profits within an industry (Porter, 2008). Due to the five forces being industry determined, knowledge of their strength can be used by firms to evaluate where and how they

can be most competitive, and shield themselves from the negative impact of the five forces (Porter, 1979).

The core assumption in the positioning school is that companies who operate in the same industry are similar in the set of strategically relevant resources they control, and thus follow similar strategies (Porter, 1981). Resources used to implement strategies are assumed to be highly mobile, and thus available to all firms. As a result of this, competitive advantage is acquired by a superior position in one of the following generic strategies: Cost leadership, differentiation or focus (Porter, 1985). Cost leadership is about achieving the lowest production cost within an industry, whereas a differentiation strategy seeks to increase customer's willingness to pay through uniqueness. A focus strategy targets a narrow market or niche, where either a cost leadership or differentiation strategy can be achieved (Porter, 1985).

Porter (2008) finds that industries are relatively stable, and that changes in industry profitability are persistent over time. The underlying structures of industries change constantly at a slow pace, but sometime change can happen abruptly. This means that over the business cycle the intensity of the different competitive forces might vary (Porter, 2008).

Critique of Industrial Organization

A shortcoming of the positioning school, and IO, is the strong focus on value capture at the expense of value creation. Furthermore, there is a strong bias towards external factors, which goes at the expense of internal capabilities (Mintzberg et al., 2009). IO has its focus on formal analysis under relative stable conditions, which may not fit into the rapidly changing business environments of today. Some researchers have questioned the relevance of the analytical approach of Porters Five Forces in today's competitive business environment, as many important factors have changed considerably since the time when the theory was formulated (Teece, Pisano, & Shuen, 1997). As mentioned earlier, there are various views on how much industry effects explain the variation in firm performance.

Activity Based Theory

Activity Based Theory (ABT) uses activities as the basis for its analysis when explaining the variation in profitability between firms. A firm can be seen as the sum of its activities. One of the core assumptions in ABT is that some sets of activities are better than others. These are identified when activities possess a high degree of complementarity and complexity, making them more challenging to imitate. In order to identify the performance of a firm, a comprehension of the interconnectedness of a firm's choices regarding its activities, policies, structure, capabilities and resources must be established (Siggelkow, 2001).

In order for a firm to outperform its rivals, it must manage two important things. First, it must generate greater value for its customers and/or deliver the same value as its competitors at a lower price. Second, the firm needs to be able to preserve this difference to remain competitive (Porter, 1996). Firms' advantages or disadvantages are in reality created by a large set of different activities linked together. The difference between two firms that serves the same customers arise from the systematic differences in the activities these firms perform to serve their customers.

Porter (1996) suggest to visualize how different combinations of activities work, using the production-possibility curve (Figure 2). The figure's curve shows the maximum value, or the highest Operational Effectiveness (OE) a firm can achieve when producing a specific product or service at a set cost.

Figure 2: The Production Possibility Curve
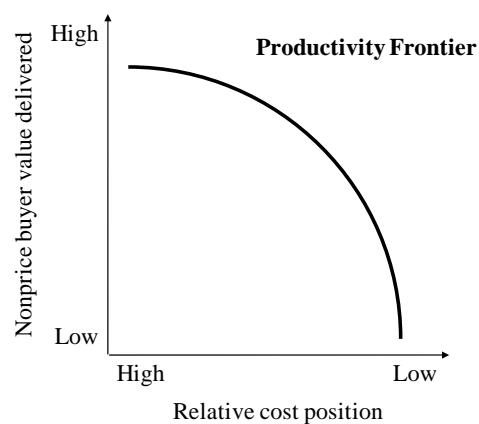
When firms compete on OE they try to do similar activities as their rivals, but in more optimal ways. Over time the curve will shift outwards, as developments in technology and new knowledge make it possible for firms to perform their activities even more efficiently. The most efficient firms will find themselves closer to the productivity frontier, while less efficient firms are situated further away, leftward of the curve. In reality it is nearly impossible for a firm to reach the productivity frontier, since the perfect combination of activities always are unknown.

OE is an important dimension to compete on to gain superior profitability, but is usually insufficient in itself (Porter, 1996). This is due to advantages, that are only based on superior efficiency, are notoriously difficult to preserve. Preservation is a major challenge as advantages are quickly eroded through imitation by competitors. This is facilitated by consultants and academics sharing best practice solutions. OE-competition create absolute increases in operational effectiveness, moving the productivity frontier outwards, but no firms are relatively better off in the longer term (Porter, 1996).

OE is not enough to achieve superior performance, and therefore an additional component is required, namely strategy. Strategic positioning is described as performing the same activities as rivals in different ways, or pursuing different activities (Porter, 1996). OE moves a firm closer to the productivity frontier, while strategic positioning determines the preferred position on the curve. A strategic position cannot be attained without facing choices related to trade-offs. Thus, determining the activities not to pursue becomes an important part of a firm's strategy.

Strategic positioning can be illustrated in a performance landscape (Levinthal, 1997), portraying positions in the markets by the topography in a multidimensional space (Siggelkow, 2001). The landscape can be, and probably is, distinctly shaped based on the industry. It can consist of a single global peak, that represents a set of activities that dominates all other positions in the landscape. Usually it consists of several local peaks, that represents superior sets of activities in different respective areas. Firms seeks to position themselves at a peak, as these represent superior positions in their local areas. Additionally, the landscape can exhibit smoothness or ruggedness depending on how it is composed (Levinthal, 1997). If the performance landscape exhibits smoothness, neighboring points in the landscape are likely to

encompass similar fitness values, having a high degree of correlation with each other. If the performance landscape is rugged the opposite will be true. Neighboring points will have different fitness values and a low correlation. In the performance landscape a rugged peak will be visually steeper than a smooth peak, which will be rounder and less steep.

Figure 3 shows an example of how a performance landscape can change between two different periods when measured on three dimensions.

Figure 3: Performance Landscape (Siggelkow, 2001)
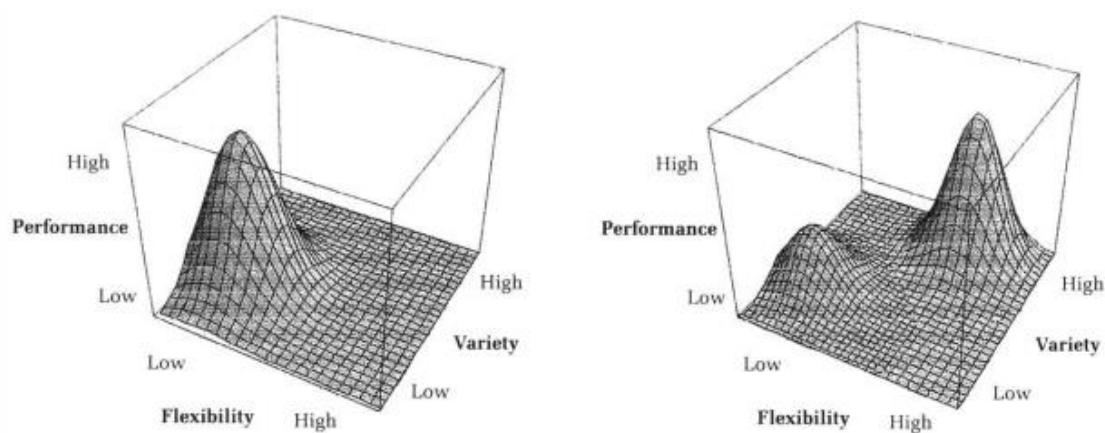
Porter (1996) defines fit as the consistency between activities that reinforces each other. This consistency among activities, or internal fit as it is labelled by Siggelkow (2001), is represented by a peak in the performance landscape. Thus, it becomes paramount to identify the combination of activities that maximizes complementarity in a given position. If a firm achieves a high degree of interconnectedness, or correlation between their activities, imitation of activities by rivals become more challenging. These instances are signified by a steeper peak in the performance landscape. An increased number of connected activities also make imitation more difficult, i.e. if competitors have a 90% chance of correctly imitating any given activity, they will only have a 66,66% chance of imitating four activities that are interconnected (0,9^4). If the landscape is rugged, failure of imitating even a single activity can lead to a dramatically worse position than the position held by the firm being imitated. Interconnected activities can in turn make it difficult to respond to environmental changes, as it becomes difficult changing individual activities independently of others (Siggelkow, 2001).

The height of any point in the performance landscape represents external fit (Siggelkow, 2001). Higher lying points represent higher external fit than lower lying points. Changes in in the environment can change the topography of the performance landscape. This might change the external fit of any given position in the landscape.

Environmental changes can have a negative impact on internal fitness, external fitness or both. The Change Framework presents different scenarios that can occur when firms experience reduced fitness (Siggelkow, 2001).

Figure 4: Change Framework

		External Fit	
		No Change	Change
Internal Fit	No Change	No change	Fit-conserving change
	Change	Benign Fit-destroying change	Detrimental Fit-destroying change

The following four scenarios are presented in the framework: 1) *No Change*. Internal and external fit is unaffected, which means that the environmental change had no relevance for the firm. 2) *Fit-Conserving Change*. Internal fit is unaffected, but external fit has decreased. The consistency of the firm's activities is intact, but the value of its strategic position has decreased. 3) *Benign Fit-Destroying Change*. External fit is unaffected, but internal fit is lowered. The value of the firm's strategic position is intact, but the consistency of activities is reduced. 4) *Detrimental Fit-Destroying Change*. Both internal and external fit are lowered. The firm finds itself positioned at a lower elevation, and away from local peaks in the landscape.

The distinction between Fit-Conserving Change, where the firm still populate a peak even though it has decreased in height, and Benign Fit-Destroying Change, where the firm no longer occupies a peak, becomes important (Siggelkow, 2001). With Fit-Destroying Change it

is clear to the management that something must be done, which increases the likelihood of a quick response. Benign Fit-Conserving Change is more problematic, as it keeps the internal logic of the firm's activities intact, even though the firm's performance is suffering.

If a firm finds itself in an unfortunate position, as a result of changes in the performance landscape, it can either engage in a local search or a long jump (Levinthal, 1997). In a smooth landscape, neighboring points are highly correlated, which makes local search for close peaks in the landscape viable. In a rugged landscape local search is difficult, making a long jump or reorientation of activities necessary. A firm making a long jump must first do an assessment of possible peaks to relocate to, before identifying the changes needed to move to the desired position. The further away the firm wish to relocate, the more noise will influence the assessment of the proposed target (Levinthal, 1997). Noise is thought of as the skewed assessment of a given point's true fitness value in the performance landscape, due to knowledge imperfections (Levinthal, 1997). If a firm misses its intended peak, but land in its vicinity, it can apply a local search in an effort to optimize its position.

Activities can be seen as a link between positioning and resources, as resources must be employed through activities that results in higher value or lower costs than competitors for them to be valuable (Sheehan & Foss, 2009). In the following section we will give an overview of the Resource Based View.

The Resource Based View

In the Resource Based View (RBV) the sources to competitiveness of firms lie in their internal resources and competences, instead of being a result of a market position or activities. The ideas of the RBV-school have its roots in Penrose's book "*The Theory of the Growth of the Firm*" from 1959. Penrose looked at firms internally to analyze their ability for growth, making several important contributions to RBV. She observed that the bundle of productive resources available to firms varied greatly, and that firms are highly heterogeneous even though they belong to the same industry. Importantly, she broadened the definition of productive resources to include more than simply material resources, i.e. management team and entrepreneurial skills. She further recognized that even with a wider definition of resources, there might still be unknown sources of heterogeneity (J. B. Barney & Arikan, 2001). These ideas were later refined and developed by Birger Wernerfelt (1984) in his article

"A Resource-Based View of the Firm" that coined the name for RBV (Mintzberg et al., 2009). Wernerfelt defined a resource as anything that can be thought of as a strength or a weakness to a firm (Wernerfelt, 1984). The primary contribution of Wernerfelt's work was to recognize the implications competition for resources has on the process of developing product market strategies (J. B. Barney & Arikan, 2001).

Resources for product market strategies are traded in strategic factor markets, and the profits of these strategies depends on the costs of their needed resources (J. B. Barney, 1986). If a strategic factor market is perfectly efficient, there can be no rents from product market strategies, as all potential benefits are already reflected in the prices of the needed resources (J. B. Barney, 1986). If strategic factor markets can be perfect, theories on imperfect product market competition is insufficient in explaining economic rents. This view contradicts Porter's notion in IO, that the selection and positioning of a firm in an attractive market explains superior performance. For the most part markets are rarely, if ever, perfectly competitive, making superior performance possible. The only way a firm can achieve superior performance, according to Barney (1986), is through luck or superior information about the internal resources and capabilities of the firm. This is in effect semi-strong market efficiency in the sense that only inside information (in addition to luck) lead to superior performance. Some resources, such as reputation and brand name, cannot be bought, they must be accumulated and are therefore more likely to be heterogeneous and sustainable (Dierickx & Cool, 1989).

It was with the article *"Firm Resources And Sustained Competitive Advantage"* (J. Barney, 1991) that RBV became a fully-fledged theory (Mintzberg et al., 2009). In this article Barney defines competitive advantage as employing value creating strategies not employed by competitors. Sustained competitive advantage is the same as competitive advantage, but requires being able to keep competitors from imitating the strategy and achieving the same benefits (J. Barney, 1991). To be able to gain a sustainable competitive advantage a firm needs resources that are strategic and offer sustained benefits. Barney (1991) presents four criteria that must be met for a resource to be strategic: It must be valuable, rare and in demand, difficult to imitate, and it must not have any obvious substitutes. Peteraf (1993) questioned if it was enough to possess strategic resources to be able to achieve sustained competitive advantage. To answer this, Peteraf (1993) presented four conditions that needed

to be met in order to transform strategic resources to sustained competitive advantage; 1) *Heterogeneity*. Firms are seen as bundles of resources that competes with each other and the composition of these bundles must vary. 2) *Ex ante limits to competition*. Having a unique bundle is not enough to achieve sustained competitive advantage. There must also be barriers in place that prevents other firms from developing the same bundle of resources. 3) *Ex post limits to competition*. There needs to be barriers that prevent other firms from imitating the resource bundle of a firm that has achieved competitive advantage for the advantage to be sustainable. 4) *Resource immobility*. The supply of the strategic resource has to be, to some degree, inelastic. If a resource is imperfectly mobile it is more valuable for the firm that holds it than it is to other firms, making the resource costly to develop or attain for competitors. A problem with competitive advantage, or core capabilities, is that they can turn into core rigidities. Some capabilities have a cultural value component, and these can lead to path dependency. If an organization needs to change to meet new demands, these rigidities can hinder that process even though they in general have been beneficial (Leonard-Barton, 1992). This in turn can make it more difficult to adjust to environmental changes, and possibly make a competitive advantage into a disadvantage.

Sustainability

When a firm has achieved a competitive advantage it becomes a goal in itself to keep the advantage as long as possible. Within IO the sustainability of a competitive advantage derives from the careful selection of industry and positioning within this industry. In IO a firms seeks, as mentioned above, to find a position with high barriers to entry, few substitutes, weak buyers and suppliers, and limited rivalry. Within RBV a firm achieves sustained competitive advantage through developing or acquiring resources that are valuable, rare, difficult to imitate, and non-substitutable. Both of these theories are rooted in a world that is inherently stable (D'Aveni, Dagnino, & Smith, 2010). Some researchers have questioned whether the world really is stable, and to what degree sustainable advantage is possible when the world is not stable (D'Aveni et al., 2010; Wiggins & Ruefli, 2002, 2005).

Sustainable advantage cannot be everlasting, and with escalating competition and technological advances in most industries, the duration of sustainable advantage has shortened (Wiggins & Ruefli, 2005). The speedier version of "normal" competition, where competitive

advantage is only temporary, is denoted as hyper-competition (D'Aveni et al., 2010). This form of competition is characterized by rapid competitive movements, where firms must move fast to create advantages, and hinder advantages of competitors (D'Aveni, 1994). It can be speculated that advances in information technology increases the competition through easily available competitive information, dramatically shortening a firms response time (Wiggins & Ruefli, 2005).

Ruefli and Wiggins (2002) found that competitive advantage is possible to achieve, but that it is exceedingly rare. In most industries they found some firms that achieved over 10 years of superior performance. In one industry they even found a single firm that had achieved over 50 years of superior performance. Although long-lasting superior performance exists, it is probably not achievable for most firms. It is also unlikely that lasting superior performance can be achieved through imitation or adaption of available knowledge. Additionally, persistent resource heterogeneity and sustained superior performance as measured by accounting data does not necessarily imply heterogeneity in initial stocks, as it could be assumed from RBV. It could very well be the result of a random walk process (Denrell, 2004).

Hyper-competition focuses on temporary advantage, and a constant disruption of the status quo. When a firm gets ahead it should aim to stop any competitor who is behind (D'Aveni, 1994). In hyper-competition, one important tactic for a firm is the self-cannibalization of its own advantages. This is to be able to pre-empt the market in coming up with the next advantage (D'Aveni, 1994). Firms can respond to a hyper-competitive environment by seeking many temporary advantages that can be put together into a competitive advantage over time (D'Aveni et al., 2010).

Business Cycles

The economy is not always in a stable state. It goes through many different phases over time, presenting both opportunities and problems for firms. Changes in the environment, both cyclical and permanent, have an impact on a firm's positioning in the performance landscape where it competes, and thus its performance. The business cycle depicts fluctuations of economic growth around a historical trend (Hamilton, 1989). These fluctuations have historically been far from stable, as the economy has alternated between periods of high

economic growth and periods of slow, or even negative growth (Sørensen & Whitta-Jacobsen, 2010). Periods of growth, where the economy expands, is repeatedly disrupted by periods of slow growth, or recessions, where the economy contracts. There are many ways of defining a business cycle. A classic description of business cycles was given by Burns & Mitchell in their seminal work on the subject from 1946 (Sørensen & Whitta-Jacobsen, 2010):

"Business cycles are a type of fluctuations found in the aggregate economic activity of nations that organize their work mainly in business enterprises; a cycle consists of expansions occurring at about the same time in many economic activities, followed by similarly general recessions, contractions, and revivals which merge into the expansion phase of the next cycle; this sequence of changes is recurrent but not periodic; in duration business cycles vary from more than one year to ten or twelve years; they are not divisible into shorter cycles of similar character with amplitudes approximating their own".

Burns and Mitchell's portrayal of business cycles emphasize some important characteristics: Business cycles consist of expansions and contractions. They are recurring, but not periodic. They are persistent, and lasts longer than shorter fluctuations, such as seasonal change. Lastly, they happen in market economies as a result of co-movements of multiple economic activities.

The main ways of identifying business cycles are the American and the European way. The American way is grounded in the methods used by the National Bureau of Economic Research (NBER), and is based on several indicators from the American economy, such as income-, employment-, and production data. In Europe and Japan business cycles are typically estimated by comparing the strength of GDP growth to the long-term trend in the economy (Benedictow & Johansen, 2005). The long-term trend component indicates the potential production in an economy, and can be estimated using the Hodric Prescott-filter (HP-filter), which have become a standard method in the literature on business cycles (Benedictow & Johansen, 2005). The deviation between actual production and potential production presents the production gap, which gives the cyclical component in the economy. The business cycle is identified by looking at how the cyclical component fluctuates around the trend component.

There are several ways to classify the phases of a business cycle. One way is to simply divide between recessions, where the output gap is negative, and booms, where the output gap is positive (Gartner, 2009). Benedictow and Johansen (2005) presents a more elaborate framework where they distinguish between American cycles and European cycles. The American standard divide the business cycle into three phases: expansion, recession and recovery. The European standard splits the business cycle into four phases: expansion, slowdown, downturn and retrieval. The recessionary stage of a business cycle is comprised of the downturn phase and the retrieval phase. Figure 5 depicts the movement of GDP around the historical trend, along with the different ways to classify the various phases of the business cycle.

Figure 5: The Business Cycle
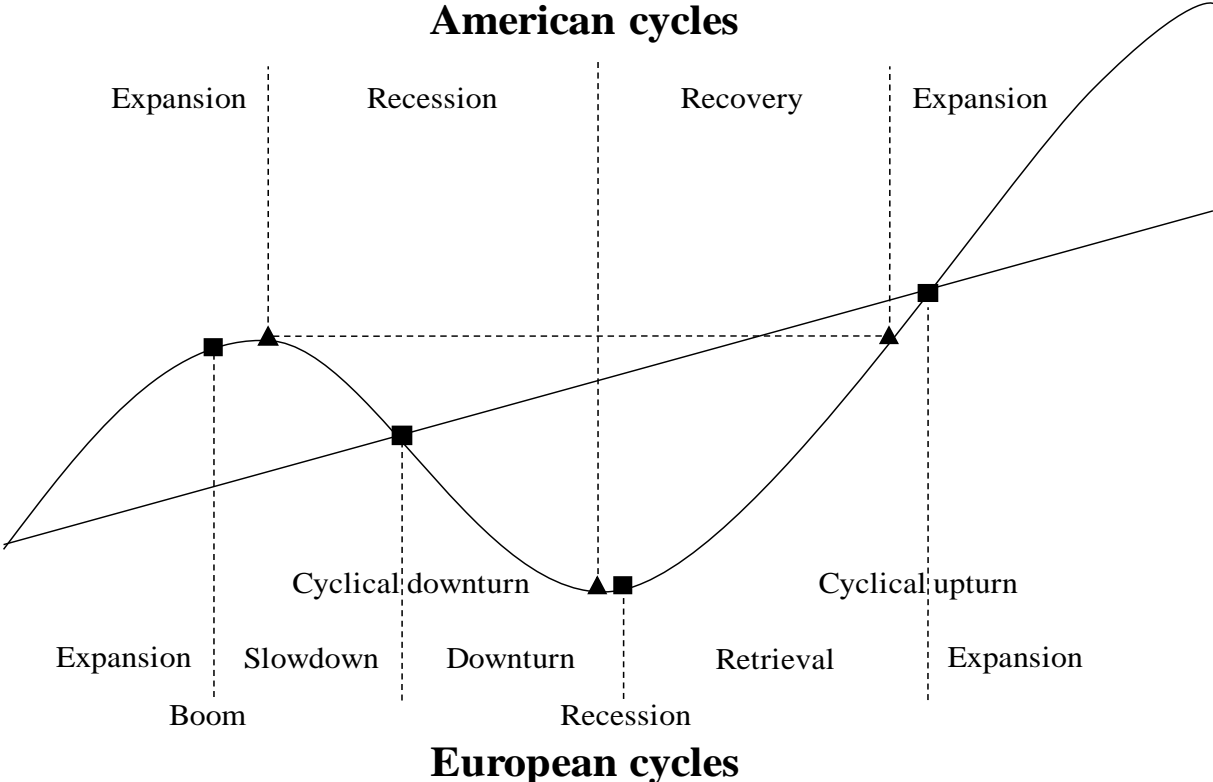
Sørensen and Whitta-Jacobsen (2010) presents the following rules of thumb to identify the troughs and peaks of a business cycle. First, a peak must be followed by a trough, and a trough must be followed by a peak. Second, both the expansion phase and the contraction phase must last minimum two quarters. Third, a business cycle can't be shorter than five

quarters. Business cycles do not follow a specific repeating pattern, but they are recurring and have the same basic shape. Thus, business cycles are similar to each other, but not necessarily comparable, neither in volatility or length (Sørensen & Whitta-Jacobsen, 2010).

Recessions

As a part of business cycles, recessions are a periodically recurring factor in all market economies. Recessions can be caused by environmental shocks, such as financial crises, trade wars, or dramatic changes in property prices. Environmental shocks are exogenous for the majority of incumbent firms in an industry. Changes in the environment cause an immediate negative (positive) performance effect disrupting the normal competitive process for most of the firms in an industry (Knudsen, 2014). In a recession the economy is experiencing a negative output gap, where it operates beneath the underlying trend. Recessions, or environmental shocks, can be different in their origins and their severity. There are, however, two common features that firms face during a recession (Aghion, Angeletos, Banerjee, & Manova, 2010) (Lien, Knudsen, & Baardsen, 2016). First is reductions in the aggregate demand firms are competing for. Second is the worsened availability of equity capital and credit. Environmental shocks can temporarily change the preferences of investors and customers, thus changing the performance landscape during a crisis (Lien et al., 2016). This means that a firm may find the value of its position in the performance landscape to be vastly different during a crisis, compared to the past. Environmental shocks have an important characteristic in that they usually are temporary (Reinhart & Rogoff, 2009). Firms face the dilemma of adapting to the environmental shock, or wait until the crisis passes. This is a source of increased uncertainty for firms, as it is unknown when the crisis will end.

A crisis does not hit all industries or firms equally. The demand of certain industries may be more or less sensitive to recessions (Lien, 2010). For example; while the demand for computers probably decreases during a crisis, it can be expected that the demand for toilet paper is fairly stable. Individual firms possess heterogeneous stocks of resources (Agarwal, Barney, Foss, & Klein, 2009), and will because of this be affected differently by changes in demand. The effects of a crisis on firm performance are not empirically straightforward to measure. Figure 6 by Knudsen (2014) illustrates how changes in firm performance during a crisis can be broken down into smaller parts.
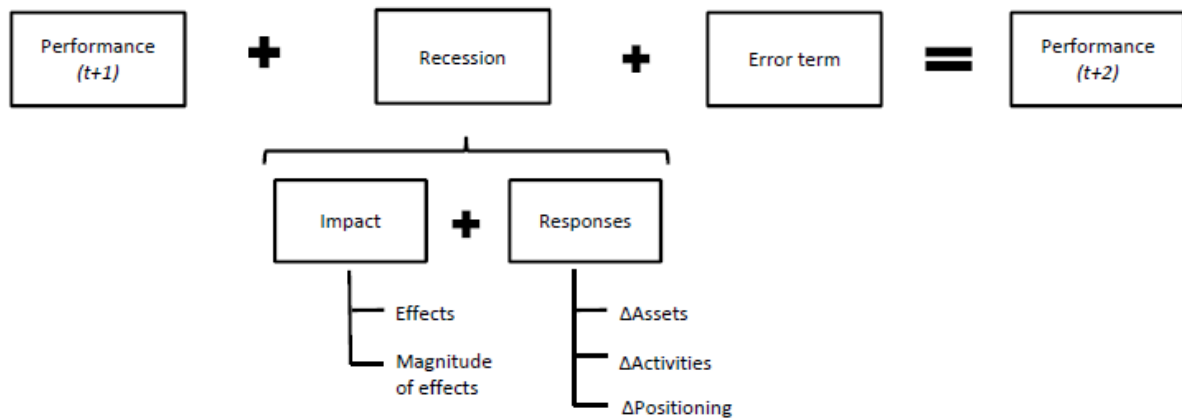
The model shows several elements that might change performance in t+2 for an individual firm. First is the performance before the crisis. Second is the impact of the crisis on the firm. Third is the firm's response to the crisis. Last is the error term, which encompass all effects other than the recession that may affect firm performance during the period. This means that a firm can potentially reduce, or nullify, the impact of the recession through its response. The response-effect is very difficult to control when only using accounting data, but can be measured through the use of surveys (Knudsen, 2014).

Competitive Dynamics

Competitive dynamics are created by actions and reactions amongst the firms in an industry (Ketchen, Snow, & Hoover, 2004). The dynamics of these moves and counter moves reflect firms' pursuit of profit. If an action is successful in creating a competitive advantage, and/or increasing a firm's profits, this endeavor will prompt a reaction from rivals. This can either be an attempt of blocking the action or imitating it. A competitive action can be defined as a move that intends to capture market shares from competitors, or reduce their expected returns (Chen, 1996). A competitive response can be defined as an action with the goal of protecting or increasing a firms' market share or profit (Chen, 1996). Current outcomes of competitive dynamics shape competitive behavior in the future (Ketchen et al., 2004). Research on competitive dynamics explores how actions of firms affect their rivals competitive advantage and performance (Smith, Ferrier, & Ndofor, 2001).

Competitive dynamics have its origin in Schumpeter's theory on creative destruction from 1950 (Smith et al., 2001). In a creative destruction process an extraordinary profit is generated by a first moving firm, where gains from this action motivates rivals to compete with the first mover, and thus undertake reactions to overtake the leader and to pursue the same gains. Schumpeter argued that, as a result of this process, no firm was safe from the competition of the market (Smith et al., 2001).

Ketchen (2004) divides the body of research on competitive dynamics into six different streams. These are; competitive Action and Response, First-Mover Advantage, Co-Opetition, Multipoint Competition, Strategic Groups, and Regional Clusters. Competitive Action and Response forms the basis on which the other streams are built upon. The different streams are interrelated, and can be a source for competitive advantage when organized in a coherent way (Ketchen et al., 2004).

The environment of competitive dynamics depends, to a high degree, on characteristics of the industry a firm operates in (Ferrier, 2001). There are several measures of an industry's structure that influence the level of competitive activity (Smith et al., 2001). Examples are growth rate, concentration, and entry barriers. A high level of growth makes value creation easier, and as a result value capture becomes less important (Ferrier, 2001). Concentration can reduce competition, as it can lead to oligopolistic behavior. Entry barriers reduce the threat of entry, making the industry more stable for its incumbents. There are also differences between industries. In some industries competitive actions have traditionally been less likely aimed at eroding the strategy of competitors (Ketchen et al., 2004). For example, this has allowed the oil and pharmaceutical industry to traditionally be particularly profitable. This implies that environmental changes can have an effect on competitive dynamics.

Hypotheses

In this section we will formulate our hypotheses, with basis in the presented theory. Our first four hypotheses will be linked to how competitive dynamics are affected by the Financial Crisis. Our last two hypotheses will be based on whether there is any relationship between firm performance, and the impact of and responses to the crisis.

Recessions have a negative effect on demand in the economy, and the availability of equity capital and credit. We expect this to have a negative impact on firm performance. We propose the following hypothesis:

Hypothesis 1: Average profitability within industry decreases during the Financial Crisis of 2008.

Firms are endowed with heterogeneous stocks of resources. As resources enable different strategies, firms are able to respond to the crisis to various degrees. Firms also occupies different positions in their industries, and in the performance landscape where they compete. This create differences in how firms are impacted by the crisis, and how they respond to it. Based on this we expect the differences between firms to increase when an industry is hit by an exogenous shock. We propose the following hypothesis:

Hypothesis 2: Differences between profitability of firms increases within industry during the Financial Crisis of 2008.

Recessions can change the performance landscape through temporary variations in demand, and availability of equity capital and credit. These changes have the potential to change both the internal and external fit of the position a firm holds in the performance landscape. We expect that stability of performance within an industry is lower during the crisis, compared to the period before and after. When there is a high degree of changes in relative performance we expect that sustainability of competitive advantages are lowered. We also expect that environmental changes, caused by a recession, affect the competitive dynamics within an industry. This can increase or decrease competition, or change the way competitive measures are performed. We propose the following two hypotheses:

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Hypothesis 3: The stability of relative performance within industry decreases during the Financial Crisis of 2008.

Hypothesis 4: The competitive dynamics within industry changed over the financial Crisis of 2008.

Changes in firm performance during a crisis comes mainly from the impact of the crisis, and how firms respond. There are disagreements to how sustainable competitive advantages are. If we believe that competitive advantages are sustainable, it would be plausible that previous performance can affect how a firm is impacted by the crisis and how it responds. We would also think that the impact and response during the crisis affects performance after the crisis. If we follow a strict hyper-competition belief in that sustainable competitive advantage does not exists, and only temporary advantages are possible, we would expect performance before the crisis to be less connected to impact and response during the crisis. We would also expect that the impact and response during the crisis would affect performance less after the crisis. We propose the following two hypotheses.

Hypothesis 5: There are no significant differences related to firm performance before, during and after the Financial Crisis of 2008 when it comes to the impact of the crisis.

Hypothesis 6: There are no significant differences related to firm performance before, during and after the Financial Crisis of 2008 when it comes to how firms respond to the crisis.

In summary, we find theoretical basis for that recessions, which causes environmental changes, have an impact on firm performance, competitive advantage, the sustainability of competitive advantage, competitive dynamics and positioning in the performance landscape. We expect this to apply to firms and industries hit by the Financial Crisis of 2008. In the following chapter we will describe how we intend to answer our hypotheses empirically.

Methodology

This chapter describes the methodological choices we will make in our study. We will start with formulating a research design, which is preparing an overall plan for how to proceed in order to answer the research question. We specify how we intend to collect data, and evaluate our data sources. Then we describe our sampling strategy, and consider the constraints of our sample, before discussing the overall reliability of our study. In the end we present the variables we will include in our model, and the various techniques for analyzing our data.

Research Design

The research design provides a framework for data collection and its analysis (Ghauri & Grønhaug, 2010). The key, when formulating the research design, is to achieve coherence all the way through the study (Saunders, Lewis, & Thornhill, 2012). This means that all the choices we make must have a clear connection to our objectives, and contribute to answering our research question empirically.

An important element to consider is the nature of the study, which is often classified into three categories; exploratory, descriptive and explanatory. Exploratory research is adequate when knowledge of the phenomena you wish to study is limited, or the research problem is badly understood. When the objective is to gain a more accurate profile of a phenomena where some knowledge already has been established, and the problem is well understood, descriptive research is appropriate. In explanatory research the emphasis is to explain the relationship between variables, and to establish causal effects.

The process of our study has been, in many ways, exploratory in nature. Our research problem has been constantly changing and developing, as our understanding of our data and its possibilities has deepened. The analyses have largely been driven by the data we had access to, and the research techniques we found appropriate to use. We started our study with loads of data, and our goal was to study firm performance in relation to exogenous shocks, such as the Financial Crisis of 2008. As a result of our exploratory process we chose to divide our study into two parts.

In the first part we look at stability of firm performance within different industries during a

business cycle. Similar research has been done in previous master theses, which have mainly looked at firm performance during a business cycle for the whole economy (Bjørkli & Sandberg, 2012; Fjelltveit & Humlung, 2012). We want to take the analysis one step further, and delve deeper into the differences between industries. We believe that studying different industries give us more defined units of analysis, compared with studying the whole economy. This part will be descriptive, as we seek to gain a more accurate profile on a phenomenon where some knowledge already has been established.

In the second part we look at whether there are any differences between firm performance, and the impact of and responses to the crisis. We will compare performance before, during and after the Financial Crisis of 2008 with its impact and firm responses to it. This part can function as a precursor to explanatory research, and will be descripto-explanatory.

The purpose of our study is to gain more insight into how exogenous shocks affect firm performance. Additionally, we want to investigate how firm performance is linked with impact and response. We find it natural to base our research on existing theory, and will develop our hypotheses through the use of established theoretical propositions. With our findings we aim to develop a deeper understanding of the connection between relative performance and environmental changes. Our study will thus have a deductive approach.

Data

Our study will be quantitative, which refers to the use of numerical data. We will use a multimethod quantitative study, which involves combining several quantitative data collection techniques and analysis procedures. The use of several data sources and analysis procedures to study the same phenomenon is referred to as triangulation. Triangulating data from different sources will make us better equipped to separate the different components that affects firm performance during a crisis.

We will collect the data using secondary data sources. This implies reanalyzing data that have already been collected for some other purposes. We consider the use of secondary data to be highly appropriate for our purposes. We will collect data from two different sources, combining registry data and survey-based secondary data. The registry data allow for a

longitudinal study, and make us able to study change over time. We will now describe our data sources and sampling strategy in greater detail.

Data Sources

The first data source is registry data obtained from the Centre for Applied Research (SNF) at NHH. The database contains accounting information and company details on all Norwegian firms from 1992 to 2013. The data is given annually to SNF from The Brønnøysund Register Centre through Bisnode D&B AS in cooperation with Menon Business Economics AS.

The second dataset is an Ad hoc survey conducted in 2010 by the Center for Strategy, Organization and Performance (STOP) at NHH. The survey was conducted to examine the effect of the Financial Crisis in 2008-2009 on Norwegian firms. A questionnaire was sent to a sample of 5 000 Norwegian firms. A total of 1 248 firms responded, yielding a response rate of 25 %.

Evaluating the Secondary Data Sources

There are several advantages using secondary data (Saunders et al., 2012). It allows more time devoted to evaluating the data, and to analyze and interpret larger datasets, instead of spending time on concerns regarding collecting primary data. It also makes it possible to undertake longitudinal studies, and to compare the analysis to previous research. Because the datasets are more permanent it can be checked relatively easily by others, and the research findings will be more open to public scrutiny (Saunders et al., 2012).

There are also some concerns regarding secondary data. One of them includes accessing the data. We were lucky to gain access to the data fairly easily, and obtained it quite early in the process. Hence, this was not a real concern for us. Another concern is assessing the suitability of the dataset. A distinction is drawn between overall suitability and precise suitability (Saunders et al., 2012).

Because the data is collected for another purpose, it might not give us everything we need to answer our research question, or meet our objectives (Saunders et al., 2012). Overall suitability involves evaluating whether measures used in the dataset matches our needs, known as measurement validity, and whether it cover the population, time period and data

variables needed (Saunders et al., 2012). We consider the overall suitability of both the registry data and the survey data to be high as it provides us with what we need to answer our research question. There are a few variables not covered in the registry data, but they are easily constructed using variables which already exist in the dataset. One example is the variable ROA.

Precise suitability involves assessing the reliability and validity of the data (Saunders et al., 2012). For secondary data this includes evaluating the credibility of the data source and examine the method by which the data were collected by the original users (Saunders et al., 2012). The registry data stems from the government body The Brønnøysund Register Centre. It is frequently corrected and revised by SNF in order to secure quality of the database (Berner, Mjøs, & Olving, 2015). It is widely used in research, and we consider this source to be credible. The survey was conducted by the STOP group at NHH, another source we consider to be credible.

Although the sources are considered to be credible, we have to consider some concerns regarding the data, as the data may contain some biases or inaccuracies. The registry data may be susceptible for measurement bias because of the changes in accounting standards, affecting how some variables are reported. This bias will be marginalized by excluding the years with different accounting standards, but it creates a limitation regarding the length of our time period. Due to incomplete reporting of accounting information and company details, some variables from the registry data contain missing information.

When collecting data using a survey there are a number of threats to reliability to consider. Participant error refers to any factor which may affect how a participant respond. The survey was done a couple of years after the recession first hit. This time lag might affect how respondents recall the crisis, and hence answer the questionnaire. Hopefully this threat to reliability is small, as the questionnaire was sent out relatively close to the recession, and that it is unlikely that memory distortions are distributed across firms in a systematic way (Knudsen, 2014). Participant bias often occurs if the respondents answer in such a way that is socially desirable. According to Knudsen (2014) the questions used in the survey are weakly linked with managerial performance during a recession, reducing the possibility of socially desirable answers. Thus, this threat to reliability is also considered to be small.

We consider the use of secondary data to be highly appropriate for our purposes. It is worth mentioning our ethical obligations when using these data. The data sets we are using are not publicly available, and it is important to secure anonymity of the individual firms included. Thus we are only using aggregate results. We will now discuss our sampling strategy.

Population

The initial population includes all Norwegian firms from 1992 to 2013. In 1992 there were a total of 88 025 firms in Norway reporting to The Brønnøysund Register Center (Berner et al., 2015). In 2013 the number of firms had increased to a total of 277 101. Although we have access to the whole population from the registry data, we find it necessary to exclude various firms using a sampling strategy to secure viable results. The sampling strategy will be described in greater detail in the coming section.

Sampling Strategy

When analyzing the registry data there is a trade-off between including as many cases as possible, and at the same time excluding cases that might cause our results to be inaccurate. Because of the size of the population, we will not have the opportunity to investigate which cases might cause inconsistencies in our analysis. As we are interested in studying competitive advantage amongst firms exhibiting competitive and profit-maximizing behavior, we want to exclude firms we expect not to have these characteristics. We have used several selection criteria to secure consistency in our data, and to exclude firms we expect will not be of relevance for our study. These criteria are similar to criteria used in previous master thesis (Bjørkli & Sandberg, 2012; Bolle & Kårbø, 2015; Brynhildsrud, 2013; Fjelltveit & Humlung, 2012; Henriksen & Kvaslerud, 2012), because we want our study to be compatible with earlier research. The same criteria were also used by Lien and Knudsen in 2010, when selecting the sample for the survey on the Financial Crisis. We consider these cut offs to be appropriate for our study. In the following we discuss our sampling criteria.

Sample Criterion 1: Exclude The Years from 1992 to 1998

The dataset includes financial data for all Norwegian firms from 1992 to 2013. During this period the accounting standards have been through several changes, affecting how the different variables are reported in the financial statements (Berner et al., 2015). Because of a new accounting act and a comprehensive tax reform in 1998, it is appropriate to exclude data from 1992 to 1998. After 2005 firms are required to report their financial statements according to International Financial Reporting Standards (IFRS). IFRS uses the same accounting variables that were introduced after 1998, and does not impose the same problems with the financial statements as before 1999 (Berner et al., 2015). Hence, we will include the time period from 1999 to 2013 in our analysis.

Sample Criterion 2: Remove Firms with Missing Information

To create a complete dataset, including both financial statements and industry- and company information on all Norwegian firms, we had to merge two datasets for all years. The two datasets are generally consistent, except they contain a different number of observations in some of the years. The reason for this is probably due to some firms going bankrupt and new firms starting up. Because we are looking at firm performance we will exclude firms that are not represented in the dataset containing the financial statements. Additionally, since we are looking at specific industries, we will not include firms with missing values on industry code from 2002 (SN2002).

Sample Criterion 3: Exclude Firms with Sales Revenues Less Than 10 MNOK

The dataset includes a lot of small firms, with very little or no income. A lot of these firms are holding companies (with no real operations) or sole proprietorships, which will not be relevant for our analysis. Including all of these firms will make our results skewed, thus we will exclude firms with sales revenue less than 10 MNOK. This criterion will be adjusted for inflation using an inflation index obtained from *Statistics Norway* (Statistics Norway, n.d.-a). We will use 2007 as the base year for all inflation adjustments.

Sample Criteria 4: Exclude Firms with Labor Costs and Social Expenses Less Than 3 MNOK

To make sure we don't include any holding companies or sole proprietorships in our sample, which might have exceeded our cutoff on sales revenue, we exclude firms with labor costs

and social expenses less than 3 MNOK. This is to make sure we exclude firms with just a few or no employees. We use the variable for labor costs and social expenses instead of number of employees, due to incomplete reporting in the latter variable. We expect labor costs and social expenses to be an indirect measure of the number of employees, as firms with few employees will have low labor costs and social expenses. This criterion is also adjusted for inflation, using 2007 as the base year. Table 1 shows the indexes we have used when adjusting for inflation.

1999	2000	2001	2002	2003	2004	2005	2006
0,8626	0,8895	0,9165	0,9283	0,9511	0,9553	0,9705	0,9924
2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	
1	1,0379	1,0599	1,086	1,0995	1,1079	1,1315	

Table 1: Inflation rates

Sample Criterion 5: Only Include Firms with Legal Forms AS, ASA, ANS and DA

The dataset includes 42 different legal forms, most of them who are not relevant for our study. We will only include firms with legal forms *Limited companies* (AS), *Public limited companies* (ASA), *General partnership* (ANS) and *General partnership with shared liability* (DA). These are the most common legal forms in Norway, and comprises the firms we are mostly interested in. Although majority of the different legal forms are excluded, the number of firms excluded are relatively low.

Sample Criterion 6: Exclude Government Owned Firms

In the dataset firms are divided into ten different ownership categories, as listed below. We will exclude firms where government ownership is greater than 50 %, because we expect these firms to behave differently than representative profit-maximizing firms. According to (Berner et al., 2015) this constitutes 1,3 % of all firms in the database, as seen on the next page.

	Ownership categories	Distribution
0	Ownership structure unknown	10,5 %
1	Publicly listed	0,1 %
2	One or more Norwegian companies has the majority	28,2 %
3	One or more persons own the company	53,9 %
4	Combination of ownership (persons, companies, government)	1,2 %
5	Government owned (< 50 %) – excluded from the sample	1,3 %
6	ASA, not publicly listed	$\approx 0,0$ %
7	Cooperative societies (COOP, agriculture, etc.)	0,2 %
9	Foreign ownership	4,4 %

Table 2: Ownership categories

A large proportion of firms, 10.5 %, have unknown ownership structure. We will include all of these firms mainly because of the large number of missing data from 2000 to 2002 regarding ownership structure.

Sample Criterion 7: Remove Firms Within Agricultural, Finance, Insurance, Health and Cultural Industries

Some industries are characterized by firms who do not exhibit competitive and profit-maximizing behavior, meaning these industries will not be of relevance for our study. Consequently, these industries are removed from our sample. Among these industries are agriculture, finance, insurance, health and culture. The Norwegian agriculture is largely subsidized by the government, while the health industry is mainly controlled by the government. Culture is also subsidized by the government, and is influenced by volunteer work. Finance and insurance industries operate with different accounting standards of revenues and profits than most other industries, and would be difficult to compare to the rest of the sample. All the excluded industries, including their industry code, are listed on the next page.

Industry code	Industry description
1	Agriculture, hunting and related service activities
2	Forestry, logging and related service activities
40	Electricity, gas, steam and hot water supply
41	Collection, purification and distribution of water
65	Financial intermediation, except insurance and pension funding
66	Insurance and pension funding, except compulsory social security
67	Activities auxiliary to financial intermediation
75	Public administration and defence, compulsory social security
80	Education
85	Health and social work
90	Activities of membership organizations n.e.c.
91	Recreational, cultural and sporting activities
92	Other service activities
99	Extra-territorial organizations and bodies
00	Unknown

Table 3: Excluded industries

Sample Criterion 8: Remove Extreme Observations Based on Standard Deviations

We consider it appropriate to remove outliers from the dataset to decrease the impact of extreme observations in our data. We will remove observations that lays outside the range of ± 3 standard deviations from the mean on the variables of operating margin and ROA. When eliminating outliers, we will create two separate data files for operating margin and ROA, and remove observations independently. In previous master thesis they have commonly used ± 2 standard deviations (Bjørkli & Sandberg, 2012; Fjelltveit & Humlung, 2012; Henriksen & Kvaslerud, 2012). For our purposes we expect ± 3 standard deviations to be appropriate, because, as we will see later, we will use ordinal data that is not as affected by outliers. We also believe a stricter trimming will remove too many observations from our datasets. Bolle & Kårbø (2015) also uses ± 3 standard deviations in their master thesis.

Sample Size

After removing firms based on the 8 criteria described above we are left with the following sample during the period from 1999 to 2013:

Criteria	1999	2000	2001	2002	2003	2004	2005	2006
None	132 116	140 248	150 048	140 969	153 789	156 769	170 928	201 404
Revenue	22 898	23 712	24 285	23 622	22 714	24 142	26 269	27 719
Labor	14 558	15 182	15 885	15 520	15 105	15 950	17 571	18 738
Features	13 279	13 596	13 959	14 177	13 539	14 270	15 423	16 523
ROA	**13 265**	**13 513**	**13 885**	**14 102**	**13 535**	**14 266**	**15 336**	**16 421**
OM	**13 216**	**13 575**	**13 883**	**14 045**	**13 425**	**14 108**	**15 323**	**16 488**

Table 4: Sample After Cut-off Criteria 1999-2006

Criteria	2007	2008	2009	2010	2011	2012	2013
None	221 815	234 213	237 947	240 758	249 190	264 261	277 101
Revenue	30 488	30 694	29 214	29 394	30 737	31 872	31 978
Labor	21 097	21 835	21 065	21 188	22 308	23 289	23 628
Features	18 617	18 061	18 171	17 566	18 708	19 355	19379
ROA	**18 487**	**18 059**	**18 168**	**17 556**	**18 625**	**19 341**	**19 263**
OM	**18 542**	**18 051**	**18 044**	**17 390**	**18 564**	**19 295**	**19 314**

Table 5: Sample After Cut-off Criteria 2007-2013

ROA describes the sample size after removing outliers on the ROA variable, while OM describes the sample size after removing outliers on the operating margin variable. The two datasets will be kept separate for our analysis as they are not consistent regarding which firms are kept in the sample after removing outliers.

Issues Concerning the Criteria

Since we are excluding data from 1992 to 1998 we will not be able to make inferences about more than one complete business cycle. Although there was an economic downturn in the beginning of 2000, the dot-com crisis, we do not include sufficient data to study the effect of

this crisis. Because economic downturns differ in nature and impact, this will lead to a limitation on being able to generalize the results to other crises, hence decreasing the external validity of our research.

As mentioned earlier we will keep firms with unknown ownership structure in the sample. This is because we would have lost a large proportion of firms if we were to exclude them. One of the main reasons there are so many firms with unknown ownership structure is because of incomplete reporting on this variable from 2000-2002. For these time-period firms where government ownership is greater than 50 % can possibly be included, but we will not be able to control for this.

The criteria on sales revenue and labor costs and social expenses may cause elements of survivor bias, because some firms are included in some years, while excluded in others. These firms have sales revenue and/or labor costs and social expenses that exceed the limit in some years, and are lower in others. The problem is particularly related to the limit on sales revenue, and affects small firms as well as poor performing firms. This problem will be amplified during the Financial Crisis. We consider the most conservative way to deal with this issue is to include firms exceeding the limits, and exclude firms with lower values, each year. Nevertheless, we have to be aware of this possible bias in our analysis.

Some firms represent an outlier on one of the variables, while not on the other. As a result, they will be excluded from the dataset with the ROA variable, and not from the dataset with the operating margin variable, and vice versa. There are several ways we could have resolved this issue. We could have removed all firms having extreme observations on one of the variables, or we could have kept them in the sample. However, we consider the most conservative choice is to create two separate datasets, and remove firms with outliers in each of the datasets individually.

When combining the survey data with the sample in the registry data, we were faced with another issue concerning the criteria. For a large proportion of firms in the survey data we were not able to retrieve information about their performance during the whole period. This was mainly because they had lower sales revenue or labor costs and social expenses than our cut-off values. As this proportion was quite large, and may cause a bias in our analysis, we

chose to retrieve this information from the original files. We did a "royal treatment" for the firms included in the survey data, allowing them to be included for all years in the sample, although some of them fell under our cut-off values in some years. The "royal treatment" data set will only be used when we are analyzing the survey data. We chose this alternative after consulting with our supervisors.

Survey

In this section we describe the survey conducted by Lien and Knudsen in 2010 on the Financial Crisis. We choose to explain the survey in greater detail, as we will use it extensively in the second part of our study. The survey consists of four parts, and includes 39 questions. A lot of these questions are divided into several sub-questions. For our study we will only be interested in some parts of the survey, as it was originally conducted for some other purposes. Further, we will only describe the parts from the survey that we are interested in. This includes questions 16, 17 and 36, as well as questions 22-28 from part 3A.

Question 16 asks respondents to consider how affected they were by the Financial Crisis and the recession that followed. It consists of five answers, which are assigned different values. A value of 1 indicate severely negatively affected, 2 very negatively affected, 3 is moderately negatively affected, 4 is not affected, and 5 indicate positively affected. Respondents are asked to compare their answer to normal market conditions. Question 17 asks respondents when they were first affected by the Financial Crisis. A value of 1 indicate spring 2008, 2 means fall 2008, 3 is spring 2009, 4 is fall 2009, 5 is spring 2010, 6 is fall 2010, and 7 indicate that the firm was not affected by the Financial Crisis. Question 36 asks about when the crisis was over for the firm. It consists of the same answers as in question 17, except a value of 7 indicate that the crisis is not yet over for the firm.

Part 3 of the survey are interested in which measures firms initiated as a result of the Financial Crisis. Part 3A asks about firms' responses to the crisis and consists of question 22 to 28. These questions involve two different scales. Questions 22 and 28 have one scale, and questions 23 to 27 have a different scale.

Question 22 asks respondents whether their focus changed on several issues as a result of the crisis. It consists of 15 sub-questions, which is to be evaluated on a 7-point scale, ranging

from -3 (less important) to 3 (more important). A value of 0 indicate no change in focus. Question 28 asks respondents whether their investments increased or decreased as a result of the crisis. It consists of 8 sub-questions, and is also to be evaluated on a 7-point scale. A value of -1 to -3 indicate reduced investments, while a value of 1 to 3 indicate increased investments. A value of 0 means no change of investments due to the crisis. In our data set these questions take a value between 1-7, with a value of 4 indicating no change.

Questions 23 to 27 ask about specific measures which firms might have done as a response to the crisis. Question 23 asks about "other strategic measures" and consists of 9 sub-questions. Question 24 asks about "cost controls" and consists of 8 sub-questions. Question 25 asks about cost control related to the workforce and consists of 13 sub-questions, while question 26 asks about skill development and organization and consists of 7 sub-questions. Question 27 asks about financial measures and consists of 10 sub-questions. All of these questions are answered either by "not executed" or evaluated on a 7-point scale on how important they were. A value of 1 indicate that the measure was not important, while a value of 7 indicate that is was important. In our data set these questions take a value between 1-8. A value of 1 indicate that the firm has not executed the respected measure. A value of 2 indicate "not important", while a value of 8 indicate "important".

All of the questions we use from the survey, including all the sub-questions, amounts to a total of 73 variables. Because of the large number of variables, we consider it necessary to conduct a factor analysis to reduce the data into a smaller set of factors. We will keep questions 16, 17 and 36 separate, as they are quite different from the other variables, and are most interesting when looked at individually. We will include all the questions from part 3A in the factor analysis, which comprises of questions 22 to 28, and totals 70 variables.

Performance Variables

According to Barney (2014): "*a firm has competitive advantage when it creates more economic value than its rivals; and economic value is the difference between the perceived customer benefits associated with buying a firm's products or services and the cost of producing and selling these products or services*." Barney points out that these definitions are deceptively simple, as the concepts are not always easy to measure directly. It is difficult to

measure both customer perceptions and total costs associated with a particular product or service. There are, however, two common approaches to measure competitive advantage. The first one uses simple accounting measures, while the second one adjusts these accounting measures to get a more accurate measure of the economic value a firm is generating (J. B. Barney, 2014).

We will use the first approach to measure competitive advantage, which includes simple accounting measures. This is the most popular approach, both because of availability and because these measures give a lot of information about a firm's operation (J. B. Barney, 2014). This approach often relies on ratio analysis. Profitability ratios, including return on total assets (ROA) and operating margin, are among the most important accounting ratios (J. B. Barney, 2014). We will use ROA and operating margin to measure competitive advantage, with the greatest emphasis being on ROA. Operating margin will be used to see whether there are big differences between the two measures.

ROA measure a firm's net return compared with the total investments in the firm, and is calculated as:

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

Operating margin reveals how much a firm has earned before interest and taxes from the cash it has generated from sales (Berk & DeMarzo, 2013). It takes into account both the costs of goods sold and additional operating expenses. It is calculated as:

$$Operating\ margin = \frac{Operating\ Result}{Operating\ Revenue}$$

There are a few limitations when using simple accounting measures which we need to be aware of. Accounting measures will to some degree reflect managerial interest and preferences (J. B. Barney, 2014). Hence, managerial discretion might significantly affect a firm's reported performance, making it difficult to link the firm's strategies with its underlying performance. Long-term investments are usually treated only as costs if they do

not generate any revenues in a given year. Because of this, most simple accounting approaches have a built-in short term bias, which do not take into account longer-term positive effects of these investments. A third limitation is that firms' intangible resources and capabilities are usually not fully valued, although they can have a significant effect on a firm's performance. Because of the limitations of simple accounting measure firm performance might be overstated or understated (J. B. Barney, 2014). This imply that some care has to be taken when using simple accounting measures to characterize firm performance.

Data Analysis

We will use the statistical software SPSS and Microsoft Excel when conducting our analysis. We will use SPSS for cleansing the data, and doing the main analysis. We will mainly use Excel to create graphs to get a better overview of our results. In the following section we describe our method for classifying business cycles, how the different industries will be identified, and our choice of industries. We will then consider the various analysis tools we will use in our study.

Classifying Business Cycles Using Hodrick Prescott-filter

The Hodrick Prescott-filter (HP-filter) can be used to estimate the long-term trend component of a time-series (Benedictow & Johansen, 2005). The trend component indicates potential production in an economy. The production gap, which is the difference between potential production and actual production, indicates the cyclical component (Benedictow & Johansen, 2005).

Estimating the trend component includes entering a parameter λ, which can be a value between zero and infinity. The choice of λ is arbitrary, but there are some recommendations derived by various researchers. In the US and for several other OECD countries, $\lambda = 1600$ is recommended when using quarterly data (Marcet & Ravn, 2004). For the Norwegian economy, $\lambda = 40\ 000$ is found to be appropriate when using quarterly data (Johansen & Eika, 2000). This value will give the best description of the cyclical fluctuations in the Norwegian economy during the last 30 years.

We will use quarterly gross domestic product (GDP) data for mainland Norway, at fixed 2013 market prices (Statistics Norway, n.d.-b). Our period will be from Q1 in 1999 to Q4 in 2013. The data will be seasonally adjusted, and transformed by the logarithm function. We will use the HP-function in Excel to create the trend component with $\lambda = 40\ 000$. The cyclical component will be obtained by subtracting the trend component from the original time-series. We will classify the business cycle based on this cyclical component.

There are some weaknesses when using the HP-filter we have to be aware of. The fact that λ is discretionary can be seen as a weakness (Benedictow & Johansen, 2005). Another problem is that potential production will be more affected by actual production at the beginning and the end of the time-series. The larger the λ, the greater this problem will be (Benedictow & Johansen, 2005).

Industry Classification

We will use Norwegian Standard Industrial Classification codes (SIC codes) from 2002 in order to divide between industries. All information about the SIC codes and industry names are taken from Statistics Norway (n.d.-c). The SIC codes are primarily a statistical standard for coding firms according to their principal activity, and comprises a five-digit number. From our data, the registered SIC codes are the only information we have to distinguish between industries, and so we will use these to identify the various industries. We will use the SIC codes on a two-, three- and four-digit level. The more digits we include when identifying industries using the SIC codes, the more specific the industry classification becomes, as each additional number specify a narrower industry definition.

There are some issues regarding the use of the SIC codes. We want the firms within each industry to be competitors. However, we cannot be confident that all firms with the same SIC code are actually competing. This might be due to the SIC codes being too broadly defined, having poor classification of a firm's principal activity, or geographical barriers preventing competition.

Another issue might be that during our time period, the SIC codes have been revised two times, first in 2002 (SN2002) and then in 2009 (SN2007) (Berner et al., 2015). In the dataset

we are given both SN2002 and SN2007. Because of the transition to SN2007 the reported SIC codes after 2008 are likely to differ from the previous years. For firms existing before and after 2008, the SIC codes have been updated, so that we have the respective SIC codes every year for both the SN2002 variable and the SN2007 variable. In SN2002 this might be missing for firms who emerged after 2008, except if there is a direct link between the two industry standards. The same goes for SN2007 for firms not existing after 2008.

We will not be able to control for these issues, but we need to be aware that they might affect our results. In our analysis we will use SN2002 as we are mainly interested in firms existing before the Financial Crisis.

Choice of Industries

In the first part of our study we are interested in looking at differences between industries. Because of the great number of industries operating in Norway we found it necessary to choose only a few industries to make the analysis more manageable. When choosing which industries to look at more closely, we used the first two digits of the SIC codes. Then we divided these industries further into three- or four digits. We will only look at three- and four-digit SIC code industries that are sufficiently large to generate significant results. We will denote the three- and four-digit SIC code industries as sub-industries of their respective two-digit SIC code industry.

When choosing the industries, we looked at all industries operating in Norway and chose the ones we found to be most interesting. One of our criteria included the number of firms within the industry, because we needed the sample to be large enough to generate valid results. Another criterion was that we wanted industries who differed on several characteristics, to see how the stability in these industries varied. The industries we ended up choosing is presented in table 6 on the next page. The quantity shows the average number of firms from 1999-2013.

SIC	Industry description	Quantity
20	Manufacture of wood and of products of wood and cork, except furniture, manufacture of articles of straw and plaiting materials	259
201	Sawmilling and planing of wood, impregnation of wood	71
203	Manufacture of builders' carpentry and joinery	159
55	Hotels and restaurants	692
551	Hotels	274
553	Restaurants	358
72	Computers and related activities	541
7221	Publishing of software	127*
7222	Other software consultancy and supply	352*

Table 6: Chosen industries

* For industries 7221 and 7222 the average is calculated from 2003-2013 due to incomplete reporting of these industries in the previous years.

The first industry, with two-digit SIC code 20, is a manufacturing industry, and was one of the industries most affected by the crisis. The industry with two-digit SIC code 55 is a service industry, and behaves differently than other industries, which we will see in the analysis. The last industry, with two-digit SIC code 72, represent an emerging industry over our time period.

Ranking Firms within its Industry

To measure firm performance, we will rank all firms from 1 to N within our sample based on ROA and operating margin. The firms are ranked descending, meaning that the top performing firm is given a rank of 1, and the worst performing firm a rank of N. The rankings are split on SIC codes, meaning each firm will be ranked within their industry. Each industry will be split on two-, three- and four-digit levels. We will use these rankings to look at the stability of relative firm performance levels within different industries over a business cycle. For simplicity, we will assume that higher rankings imply greater competitive advantage over firms with lower rankings. It is worth mentioning that a firm might choose to temporary prioritize other objectives at the expense of high performance, i.e. gaining market share.

These firms will probably gain a lower rank, although it does not necessarily mean they gain a competitive disadvantage. We need to be aware of this issue when doing our analysis.

In addition to ranking all firms on ROA and operating margin within their industry, we will place them into deciles based on their two-digit SIC code industry. We will compute a three-year average ROA and operating margin for all firms, and place the firms into deciles based on these averages. In our analysis we will include deciles on average ROA and operating margin for three different periods. The first period goes from 2005 to 2007, and are the years before the Financial Crisis. The second period contains the years when firms were most likely affected by the Financial Crisis, and goes from 2008 to 2010. The last period includes the years after the crisis was over for most firms, and goes from 2011 to 2013. We will use these deciles when investigating the survey data.

It is worth mentioning that the firms from the survey data will be placed into deciles based on the whole sample from the registry data. We will use the sample that involved "royal treatment" for the firms included in the survey data. This will make each firms' performance level more natural, although it will probably cause unequal group sizes. Another option would have been to place only the firms in the survey data into deciles based on ROA and operating margin. This would have led to equal group sizes, but performance would not have been accurate compared with the rest of the industry.

Rank Correlation Analysis

In order to analyze stability of firm performance within industries we will use Spearman Rank Order Correlation analysis. We will see how the rankings within our chosen industries correlate from year to year. In addition, we will use lags of two-, three- and four years. This way, we can see how much the rankings correlate over a two-year period, three-year period and a four-year period.

Correlation analysis in general is used to measure the linear relationship between two variables, and allow a measure of the strength and direction of this relationship (Pallant, 2005). Spearman Rank Order Correlation is the non-parametric alternative to Pearson's product-moment correlation, and is ideal when you have ranked data. Non-parametric means that it does not make assumptions about the underlying population distribution (e.g. normal

distribution). There are some general assumptions that should be checked when using non-parametric techniques. The samples need to be random and the observations independent. Independent observations mean that each case can only appear once, and they cannot influence each other (Pallant, 2005).

The output from the analysis is termed correlation coefficients, and can take a value between [-1,1]. The size of the absolute value indicates the strength of relationship between the two variables, while the sign indicates the direction. A coefficient of zero indicates no relationship between the two variables. Coefficients between 0,10 – 0,29 indicate weak correlation, 0,30 – 0,49 indicate moderate correlation, and 0,50 – 1,0 indicate strong correlation (Pallant, 2005). A negative coefficient indicates a negative correlation, which means that when one variable increases the other one decreases. A positive coefficient indicates a positive correlation, meaning that when one variable increases the other one does too.

In addition to determining the strength and direction of the relationship, we want to check the size of the sample included in the analysis, and assess the significance level. Checking the sample size involves examining whether there are a lot of missing data. Missing data will be excluded pairwise in our analysis, meaning that firms who does not exist in both years we are comparing will be excluded. This will probably cause survivor bias in our rank correlation analysis, as firms need to exist in both years to be included. This is particularly a problem with the longer lags. Assessing the significance level involves looking at the p-value. A p-value below 0,05 means that our results are statistically significant at a 95 percent confidence level, which is the most common confidence level to use (Pallant, 2005). When assessing the significance level, we need to be cautious about the fact that the sample size might influence the p-value, especially for small samples (Pallant, 2005).

Exploratory Factor Analysis

Factor analysis is a technique used to identify clusters of variables (Field, 2009). We will use exploratory factor analysis to reduce the vast number of variables from the survey data into a smaller set of factors. This will make further analyses more manageable. There are several ways to conduct factor analysis, with the most commonly used approach being principal components analysis (PCA). PCA is in fact not really the same as factor analysis, but is commonly discussed as if it is. The main difference between PCA and factor analysis is that

PCA decomposes the original data into a set of linear variates, while factor analysis derives a mathematical model from which factors are estimated (Field, 2009). We will use PCA when doing the factor analysis, as we see this approach to be the most appropriate for our purposes.

Factor analysis involves three main steps (Pallant, 2005). The first step is assessing how suitable the data is for factor analysis, which includes considering the sample size and strength of relationship among the variables. Step two involves factor extraction, which is determining the number of factors to use. Step three involves factor rotation and interpretation to see which variables 'clump together'. After the rotation it will be up to us to evaluate whether the variables should be pooled into factors from a theoretical point of view (Pallant, 2005).

There are numerous suggestions concerning how large the sample size should be, but there seems to be an agreement that a sample of 300 or more is preferable (Field, 2009). If the survey data contain a lot of missing data, it will be a problem when doing the factor analysis. To deal with this problem we will exclude participants with missing data for any variable, as long as it does not cause the sample size to be too small. Because our initial sample is quite large, we don't expect this to be an issue.

The strength of relationship among the variables can be checked by creating a correlation matrix, and look at the inter-correlations, or coefficients, between the items. The correlation matrix should include several coefficients greater than 0,3, or factor analysis may not be appropriate (Pallant, 2005). If some variables do not have any coefficients above 0,3, it can be appropriate to exclude them from the analysis (Field, 2009). There might also be an issue if the variables correlate too highly, causing a problem with multicollinearity. If some variables have coefficients above 0,8, they should be considered excluded. We can detect whether we have a problem with multicollinearity by looking at the determinant of the correlation matrix. A simple heuristic is that the determinant should be greater than 0,00001 (Field, 2009). Multicollinearity is, however, not a problem when doing PCA, but it can be a problem when doing other analyses (Field, 2009).

Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity are two different tests which can be run to assess the factorability of the data. The KMO

statistic range between 0 and 1, and a value above 0,5 is considered acceptable (Field, 2009). A significant Bartlett's test means that correlations between the variables are significantly different from zero, implying factor analysis is appropriate. However, we need to be aware that Bartlett's test will be affected by the sample size (Field, 2009).

When determining the number of factors to extract there are two conflicting needs to be considered. These are finding a simple solution with as few factors as possible and explaining as much of the variance in the data as possible (Pallant, 2005). The best technique to determine how many factors to retain is probably Horn's parallel analysis (Field, 2009). This technique involves generating many random data sets with the same characteristics as the data set being analyzed. Each factor is given an eigenvalue, which represents the amount of the total variance explained by that factor, thus indicating its importance. Then each eigenvalue is compared against the corresponding eigenvalue generated in the random data sets. Factors with eigenvalues that are greater than the corresponding 95th percentile eigenvalue from the random data sets are retained.

There are other techniques which are more commonly used than parallel analysis, such as Catell's scree test and Kaiser's criterion (Pallant, 2005). The scree test involves plotting the eigenvalues in a scree plot, to find a point where the shape of the curve changes and becomes horizontal. Kaiser's criterion recommends retaining only factors with eigenvalues above 1 (Pallant, 2005). Since parallel analysis has been shown to be the most accurate approach, we will use this technique to determine how many factors to include.

There are two main approaches to factor rotation, called orthogonal rotation (uncorrelated) and oblique rotation (correlated) (Pallant, 2005). Orthogonal rotation is often easier to interpret, but require the assumption that the underlying constructs are not correlated. Oblique rotation allow for the factors to be correlated, but are more difficult to interpret (Pallant, 2005). It might be appropriate to run the analysis using both types of rotation before deciding which approach to use (Field, 2009). We will try both approaches before deciding which rotation technique to use. We will use Varimax for orthogonal rotation and direct Oblimin for oblique rotation, as these are the recommended methods to use.

To determine which variables should make up which factors we will look at the factor loadings of each variable. Factor loadings can be both correlation coefficients, between a factor and a variable, and regression coefficients (Field, 2009). If orthogonal rotation is used, the factor loadings will be correlation coefficients and regression coefficients simultaneously. If oblique rotation is used, there will be two different sets of factor loadings shown in two different matrixes. The correlation coefficients will be shown in a structure matrix, and the regression coefficients will be shown in a pattern matrix. These coefficients will involve different interpretations, and they might show slightly different solutions (Field, 2009).

To make it easier to interpret which factor each variable loads mostly onto, we will sort the variables based on the size of their factor loadings. The variables who load onto the same factor will be displayed together. Factor loadings can take negative, as well as positive values. The sign of the factor loadings indicates which way the items relate to the factors. A negative loading implies that individuals who score high on the factor tend to score low on the variables, and vice versa. The absolute value indicates the substantive importance of a variable to a factor (Field, 2009). It is normal to use a cut-off point, at which variables with lower factor loadings are not considered significant. In very large samples, however, even small factor loadings can be considered statistically meaningful (Field, 2009).

Factor scores will be calculated for all of the factors, providing each individuals' score on the factors. The factor scores will be based on the underlying variables included in each factor. If the data contain several measurement scales, factor scores for the different factors cannot be compared (Field, 2009). There are several techniques for calculating the factor scores. The most common techniques are the regression method and the Anderson-Rubin method. The Anderson-Rubin method is recommended when you want to ensure that the factor scores are uncorrelated, as with orthogonal rotation. The regression method is best when correlations between the factor scores are accepted, as with oblique rotation (Field, 2009).

After the rotation we will consider the reliability of each factor using Cronbach's alpha. Cronbach's alpha will indicate the average correlation among all of the items included in the factors (Pallant, 2005). A factor will be considered reliable if alpha has a value greater than 0,7, which is the most suitable cut-off point (Field, 2009). When assessing Cronbach's alpha, we need to be aware the number of items have an effect on the results, and that a smaller

number of variables often lead to a low alpha (Pallant, 2005). We should also evaluate the inter-item correlations between the variables. If they all have mean inter-item correlation values between 0,2 and 0,4, the factor might be considered reliable although its alpha value is too low (Pallant, 2005). In addition to running Cronbach's alpha we need to consider whether it makes theoretical sense to combine the various variables into a factor. If our first analysis provides a solution that we do not consider appropriate, we will try removing one or several variables. Then we will conduct the factor analysis again until it provides a reasonable solution.

Analysis of Variance (ANOVA)

To analyze whether there are any differences between how firms perform and how they respond to the questions in the survey, we will perform several one-way between-groups analysis of variance (ANOVA) with post hoc tests. All of the ANOVAs are done individually on different independent variables. One-way ANOVA is used to compare the mean scores between two or more groups (Pallant, 2005). It comprises of one independent variable, or a factor, which has a number of different levels. These levels correspond to the different groups, or conditions, to be analyzed. A between-group ANOVA is used when the subjects in each of the groups differ, as in our case. In contrast, repeated-measures is used when the same subjects are measured under different conditions (Pallant, 2005).

In ANOVA, the variance between different groups is compared with the variability within each of the groups (Pallant, 2005). Dividing the variance between the groups by the variance within the groups produces an F ratio. The null hypothesis states that the means between the groups are equal. A significantly large F ratio indicates more variability between the groups than within the groups, leading to a rejection of the null hypothesis. The null hypothesis is regularly rejected on the 95 percent confidence level. To see which of the groups differ, it is needed to conduct a post-hoc test or planned comparisons (Pallant, 2005). We will perform a post-hoc test, as we are interested in comparing all the groups. Planned comparisons are used when the interest is comparing only specific groups.

When conducting the one-way ANOVAs, our independent variables will include three individual questions from the survey, as well as the factors obtained from the factor analysis. Our different groups comprise of the average deciles from the periods 2005-2007, 2008-2010

and 2011-2013 from the registry data. This imply that there are ten different groups to compare. We let μ represent the ten deciles we are comparing.

Our null hypothesis will be:
$$H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu_9 = \mu_{10}$$

The alternative hypothesis will be:
$$H_1: \mu_i \neq \mu_j \ for \ at \ least \ one \ pair \ \mu_i, \mu_j$$

As the ANOVA is a parametric test, there are four assumptions that must be met for the results to be reliable. If these four assumptions are violated the F statistic may not be reliable, although several people claim that the F will still be accurate (Field, 2009). In this case there are two types of errors that might occur. Type I error occur when the F indicates significant differences between the means, when there are no actual differences. Type II error is the opposite, that the F indicates no significant differences when a genuine difference exists (Field, 2009).

The first assumption is that the data must have normal distribution (Field, 2009). When doing an ANOVA, this implies that the distribution within each group should be normal. There are several ways to test for normality. For example, we can look at the distribution visually or perform a normality test like the Kolmogorov-Smirnov test. In big samples, with 30 or more respondents in each group, the distribution tends to be normal regardless of the shape of the data collected. When the groups have equal sizes, ANOVA can be quite robust to violations of normality. However, when group sizes are different the F might be biased (Field, 2009).

The second assumption is homogeneity of variances, which means that the variances should be equal for all groups (Field, 2009). To check whether variances are equal between the groups we will perform Levene's test, which tests the null hypothesis that the variances in different groups are equal. If the test is significant at $p < 0,05$, it implies that the variances are significantly different, and the assumption of homogeneity of variances is violated. In this case ANOVA will not be robust when group sizes are different. If the assumption of homogeneity of variances is violated, there are two alternative versions of the F-ratio to look at, which is the Brown-Forsythe F and Welch's F. These F-ratios will be robust even when

variances are unequal. Welch's F is generally preferred over Brown-Forsythe F, unless there is an extreme mean that is causing the problem(Field, 2009). We will report Welch's F if the assumption of homogeneity of variances is broken, otherwise we will report the regular F calculated by ANOVA.

The third assumption is that the independent variables should be continuous, and measured on at least an interval level (Field, 2009). This means that equal intervals on the scale must represent equal differences in the variable being measured. For example, when data in a questionnaire is measured using a point scale, it must be the case that the difference between 3 and 4 equal the difference between 5 and 6. Also, the data can be measured at a ratio level, which has the additional property that the intervals are meaningful. For example, when using a point scale, a value of 4 should indicate twice as much as a value of 2.

The fourth assumption is independence, which means that the respondents should not affect each other (Field, 2009). Hence, a firm's response to the questions in the survey should not have an impact on how other firms respond.

There are several procedures to choose from when doing the post-hoc test. Most procedures are relatively robust for small deviations from normality, but perform badly if group sizes and/or variances are unequal (Field, 2009). In our case group sizes will be unequal, and we need to choose a procedure which can cope with this situation. If we find that variances are unequal, we need to choose a procedure which can also cope with this issue. When the assumption of homogeneity of variances is violated, we will choose the Games-Howell procedure. Otherwise we will choose Gabriel's procedure. Both of these procedures are assumed to be powerful when group sizes are unequal, although Gabriel's procedure can be biased if the group sizes are very different (Field, 2009). Games-Howell can be biased if group sizes are small (Field, 2009).

One issue arises when we are using the results from the factor analysis in the ANOVA. The factor analysis provides a very different scale than the ones originally used in the survey, as we described in our presentation of the survey. The reason we are given a different scale is because of the rotation of data in the factor analysis. This makes it more challenging to gain a meaningful interpretation of the means for the various deciles. In addition to doing the

ANOVA on the various factors, we have conducted the analysis with all of the variables kept separately. We will use these results when making assumptions about the differences between the deciles.

A drawback when doing the ANOVA is that we will not be able to establish causality. Because we are operating with a time series it is, however, easier to assume a causal link. If there are any significant differences between the deciles in the period before the crisis, we can assume that firm performance before the crisis affect responses during the crisis. If there are significant differences between the deciles in the period after the crisis was over to most firms, we can assume that responses to the crisis has had an effect on firm performance after the crisis. We can make these assumptions about causality, but we have to do further analysis to conclude whether they are valid.

Evaluating the Reliability of Our Study

Reliability is concerned with whether the data collection techniques and analytic procedures will generate consistent findings if replicated on other occasions or by other researchers. It is also concerned with transparency when reporting the study. We have already evaluated the reliability of our data sources, and we expect it to be relatively high in both sources. To ensure high reliability in our analytic procedures we will strive for transparency in our report.

Analysis

In this chapter we provide the results from our different analyses. We start giving a brief analysis on the Norwegian business cycle from 1999 to 2013 using the HP-filter. Then we will provide the results from the Spearman Rank Order Correlation analysis, before giving the results from the Factor analysis. In the end we discuss the output from the ANOVAs.

Defining the Norwegian Business Cycle

To classify the business cycles during our time period we used the Hodrick Prescott-filter (HP-filter), which is regularly used within business cycle theory. We use seasonally adjusted quarterly GDP data for mainland Norway, at fixed 2013 market prices, during the period from 1999 to 2013. The figure below shows the trend component estimated by the HP-filter, as well as the cyclical component estimated by log transformed GDP data.
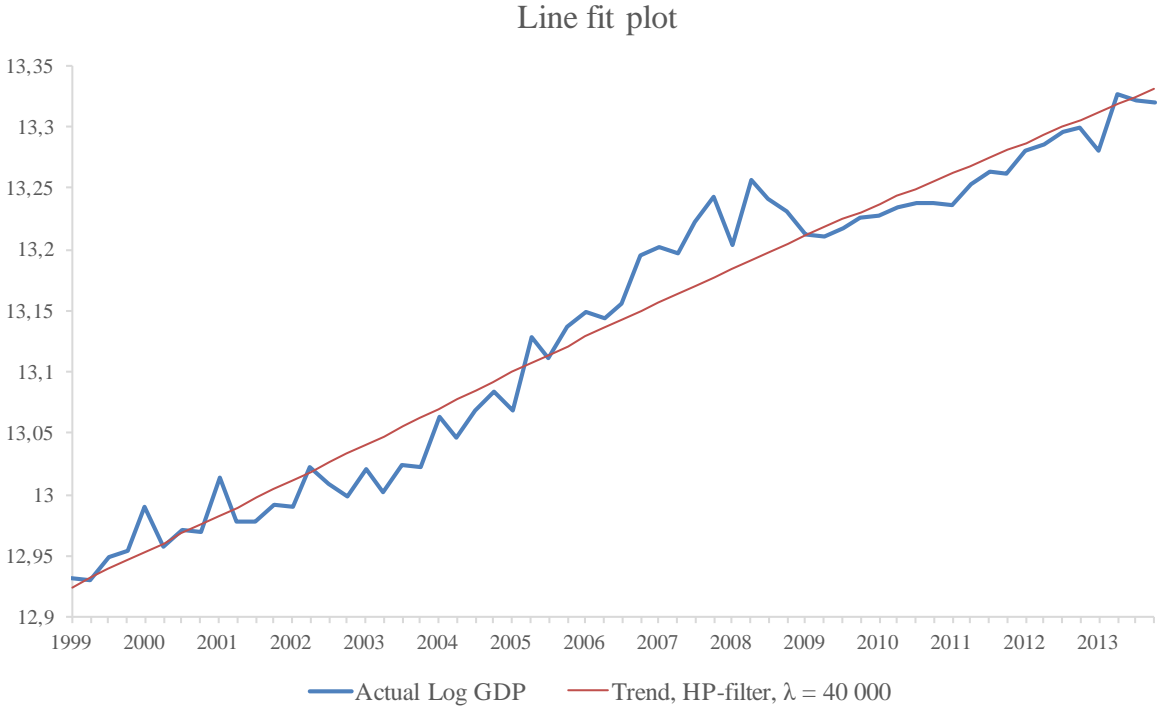
Figure 7: Line fit plot

The cyclical deviations from the trend represent the output gap in the economy. A positive output gap represents a boom, while a negative output gap represents a recession. The figure shows a negative output gap from the second quarter of 2001 until the second quarter of 2005.

Then there is a positive output gap from the second quarter of 2005 until the second quarter of 2009. From the second quarter of 2009 there is a negative output gap throughout the rest of the period, except for the second quarter of 2013. To better be able to classify the business cycles we will look at the output gap from the figure below.
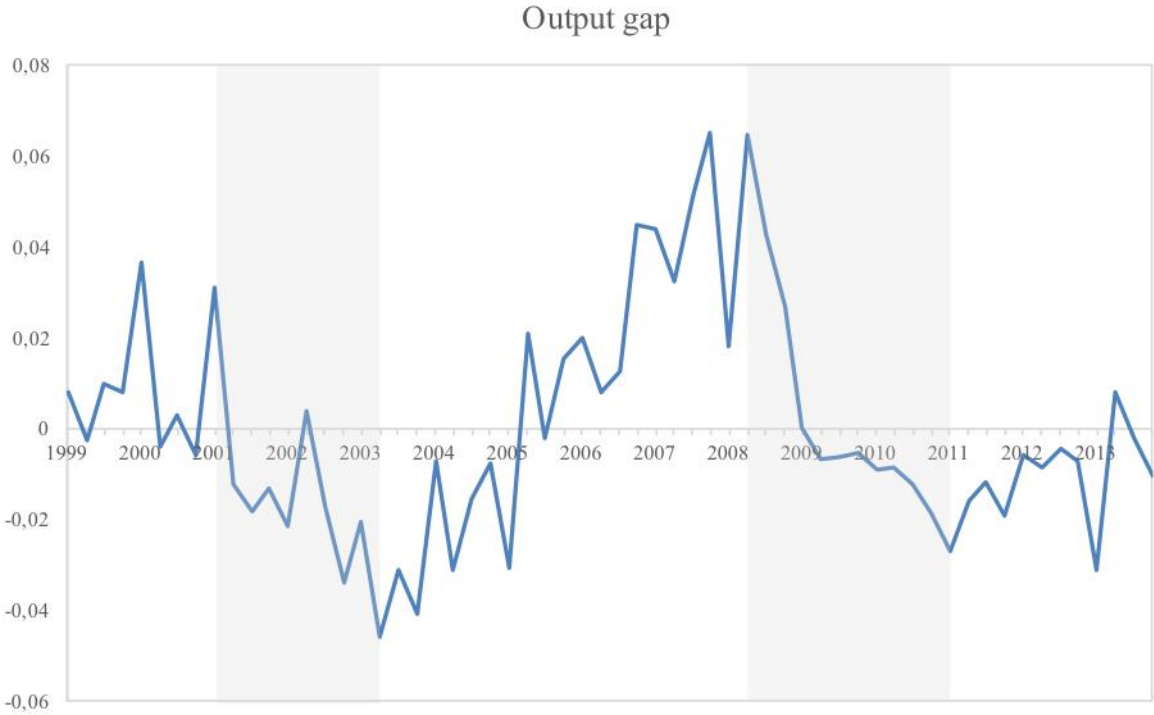
Figure 8: Output gap

A common method of defining a recession is when the contraction phase lasts for at least two consecutive quarters. From the figure we can see two consecutive drops in the output gap starting with the first quarter in 2001. This depicts the start of a recession in the Norwegian economy, which was a result of the dot-com bubble in the early 2000s. The output gap continues declining until the second quarter of 2003, and then it starts increasing. Based on this figure, we estimate that the recession, the dot-com crisis, lasted from the first quarter of 2001 until the second quarter of 2003.

The Norwegian economy is in a recovery phase from the second quarter of 2003 until the second quarter of 2005. From the second quarter of 2005 the economy is expanding. The

expansion phase lasts until the Financial Crisis hits in 2008, and represent a period with very strong real economic growth in the Norwegian economy.

From the fourth quarter of 2007 to the first quarter of 2008 we see a relatively large dip in the output gap, although it is still positive. This may be due to turbulence in the international economy in the late 2007. The economy recovers during the first quarter of 2008, before it starts declining from the second quarter of 2008. This indicate the start of the Financial Crisis, and we can see that the output gap declines rapidly in the first part of the crisis. From the second quarter in 2009 until the second quarter in 2010, the output gap is rather stable, before it makes another dip. The output gap reaches its lowest point in the first quarter of 2011. From the first quarter of 2011 the economy seems to be recovering again, although the output gap reaches an even lower point in the first quarter of 2013. In the second quarter of 2013 the output gap is positive again. As our time period only lasts until the fourth quarter of 2013, we are not able to tell when the economy starts expanding again.

In the coming analysis our main focus will be on the Financial Crisis. We will comment on the dot-com crisis when we find it appropriate. The survey was conducted after the Financial Crisis, and we do not have similar data from the dot-com crisis. Hence, for the second part of our study we will only be looking at the Financial Crisis.

Spearman Rank Order Correlation Analysis

In this section we will present a descriptive analysis on how stability of firm performance varies over the business cycle within different industries. We will look closer at three different two-digit SIC code industries in Norway, along with their largest sub-industries. The chosen two-digit SIC code industries are 20, 55 and 72, as mentioned in the methodology chapter. Our results have been obtained by ranking all firms within its industry, based on ROA and operating margin. We have performed Spearman Rank Order Correlation analysis to see how stable rankings are between different years. We have done the correlation analysis on four different lags; one-, two-, three- and four-year lags. All of the correlation coefficients are significant on at least the 0,05 level. It is important to note that, in our graphs, the correlation coefficients point backwards, i.e. a correlation coefficient on the four-year lag in 2008 represents the correlation between 2004 and 2008.

The correlation coefficients give us a measure of changes in firms' relative performance level between years. A high correlation coefficient between two years indicate that the rankings in these two years are quite similar. This means there will be relatively small changes in the rankings of individual firms. If the correlation coefficient between two years is low, we know there have been more changes in rankings of firms, indicating a low degree of stability in firm performance.

To better be able to understand changes in the correlation coefficients, we will look at the standard deviations and means of the underlying variables over the years in our data. Generally, both ROA and operating margin exhibit comparable patterns, and to prevent our analysis from becoming too extensive we will mainly use ROA when presenting the graphs. When discussing our results, we will also mention operating margin when we see it useful. When it comes to industry 551 *Hotels*, we will present graphs on both ROA and operating margin, as the two variables show very different patterns for this particular industry. All the graphs not presented in our analysis can be found in the appendix.

The hypotheses we seek to answer are:

Hypothesis 1: Average profitability decreases during the Financial Crisis of 2008.

Hypothesis 2: Differences between profitability of firms increases during the Financial Crisis of 2008.

Hypothesis 3: The stability of relative performance decreases during the Financial Crisis of 2008.

Hypothesis 4: Industries differ when it comes to stability of performance during the Financial Crisis of 2008.

Following we present our results from the Spearman Rank Order analysis, along with descriptive statistics, such as the mean and standard deviation. First, we provide a short overview of the Norwegian economy, based on our sample. Second, we present a descriptive analysis on all of our industries and sub-industries. Third, we relate our findings with our first four hypotheses.

The Norwegian economy from 1999 to 2013

Figure 9 shows average and standard deviation on ROA for the entire sample.

ROA for all industries
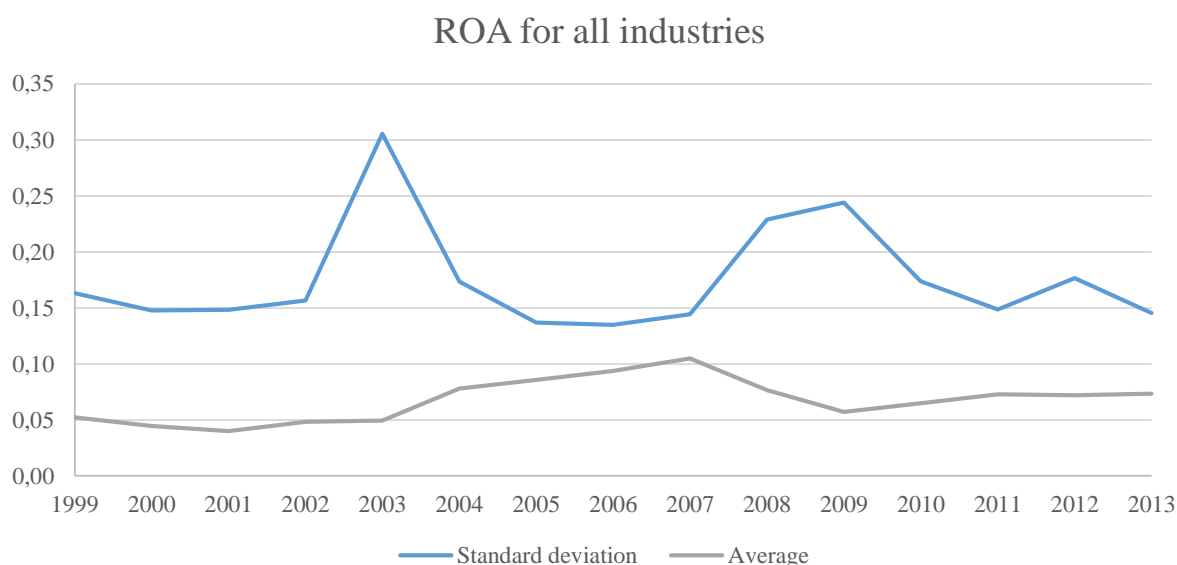
Figure 9: ROA for all industries

From the figure we see that average ROA decreases from 2007 to 2009, which is the time when the Norwegian economy was affected by the Financial Crisis of 2008. When looking at the standard deviation, we see that there are two peaks, the first one in 2003 and the second one in 2008 to 2009. We believe the first peak represents a late expression of the dot-com crisis. The second peak represents the Financial Crisis of 2008. We see that differences between performance on ROA increases when the economy is affected by a crisis. The reduced average ROA, along with the increased standard deviation, corresponds well with our findings when using the HP-filter on the Norwegian economy.

The graph illustrates the general effect of the crises on Norwegian firms, but not how various industries are affected differently. We want to look closer at selected industries, along with their sub-industries. Our main focus will be on the Financial Crisis of 2008. The different industries are selected on the grounds that they exhibit different characteristics, and were hit by the Financial Crisis in different ways and to different degrees. Following we will present our analyses on these industries, along with their sub-industries.

Industry 20 is named *Manufacture of wood and of products of wood and cork, except furniture, manufacture of articles of straw and plaiting materials*. Industry 20 is part of a family of industries where industry 02 *Forestry, logging and related service activities* is a supplier of raw materials. Industry 02 supplies the manufacturing industries 20 and 21 *Manufacture of pulp, paper and paper products; publishing and printing*. Industry 20 consists of 5 underlying three-digit SIC-code industries. Practitioners groups these five underlying industries into two sections (Espelien & Jakobsen, 2013). The first one is the manufacture of lumber. This industry section encompasses the value chain after the whole sale trade in timber and forward to the sale of lumber products. The second industry section is manufacture of wood. This section of the industry encompasses all production of goods with bases in wood, except furniture.

The three-digit SIC-code industry 201 *Sawmilling and planing of wood, impregnation of wood* makes up the greatest number of firms within the section manufacture of lumber. It is part of one of the few value chains almost entirely placed in Norway today. Despite this, the industry has an exposure towards international markets as the prices of timber is set in a global commodity market with large price fluctuations (Espelien & Jakobsen, 2013).

Three-digit SIC-code industry 203 *Manufacture of builders' carpentry and joinery* represents most of the firms within the section manufacture of wood. Manufacture of wood uses raw materials from Norwegian forestry, but also imports different types and qualities of wood from abroad (Espelien & Jakobsen, 2013). Most of the production in this industry goes toward pre-fabrication of houses, which are planned and ordered in advance.

From figure 10 it seems that average ROA and standard deviation tend to move in opposite direction. This is not true for all years, but seems to be a general tendency. This indicate that as the average performance of the industry increases, the differences between the highest and lowest performing firms tend to decrease. On the contrary, when average performance decreases, the differences tend to increase.

In 2007 average ROA was at its highest point for the entire period. It appears the entire industry did quite well during the first half of the 2000s, with average ROA increasing 187% from 2003 to 2007, almost tripling. This corresponds to the positive output gap in the Norwegian economy for the same years shown in the HP-filter analysis.

During the Financial Crisis of 2008 we see that industry 20 suffered a large reduction in average ROA of 86,7% between 2007 and 2010. Average ROA fell from its highest peak in 2007 to its lowest point in 2010. The standard deviation increased sharply from 2007 to 2008, and remained relatively high until 2011.
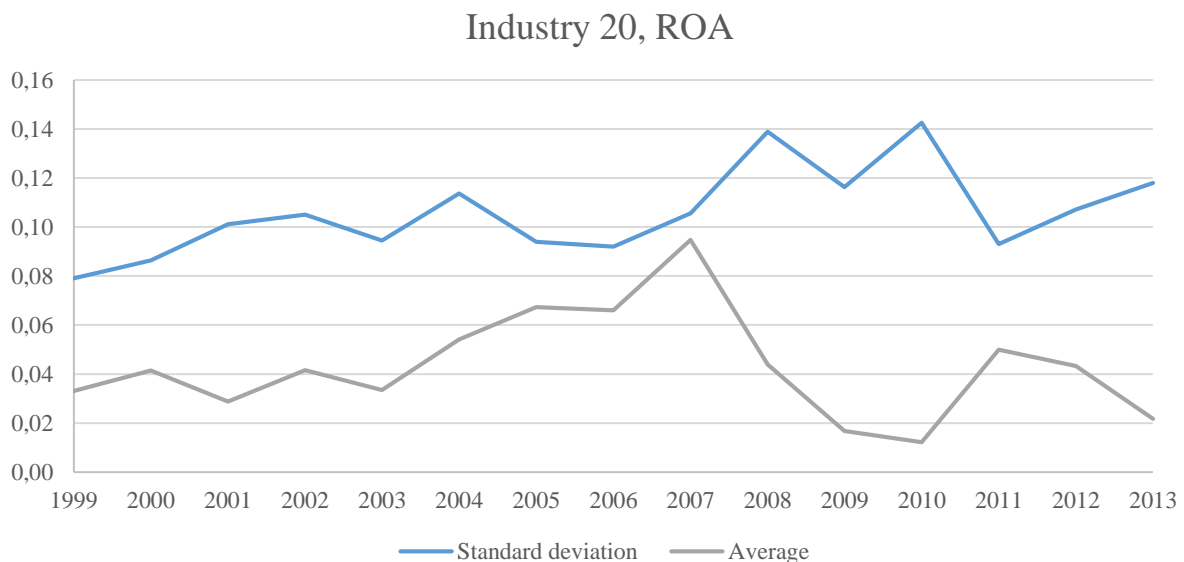
Figure 10: Industry 20, ROA

The number of firms in the industry is relatively stable, at around 250 firms throughout the period. The number of firms has a peak in 2007. This peak is particularly influenced by industry 203, which throughout the period experiences a small positive growth in the number of firms.

Total number of firms in industry 20, 201, 203 (ROA)
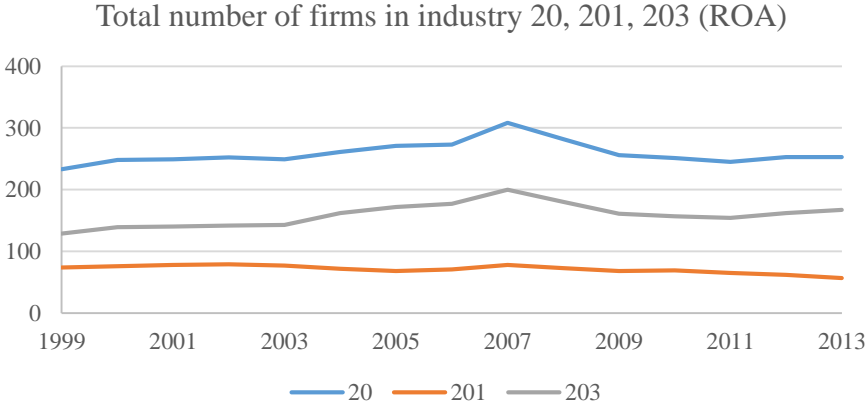
Figure 11: Total number of firms in industry 20, 201, 203 (ROA)

Figure 12 shows the correlation coefficients for the entire period. The one-year lag shows the correlations with the year before, the two-year lag two years before, and so forth. We see there is a lot of variation in stability on all lags throughout the period. Before 2008 the graphs seem to be moving almost in parallel. After 2008 the picture becomes messier.

Industry 20, Correlation between years (ROA)
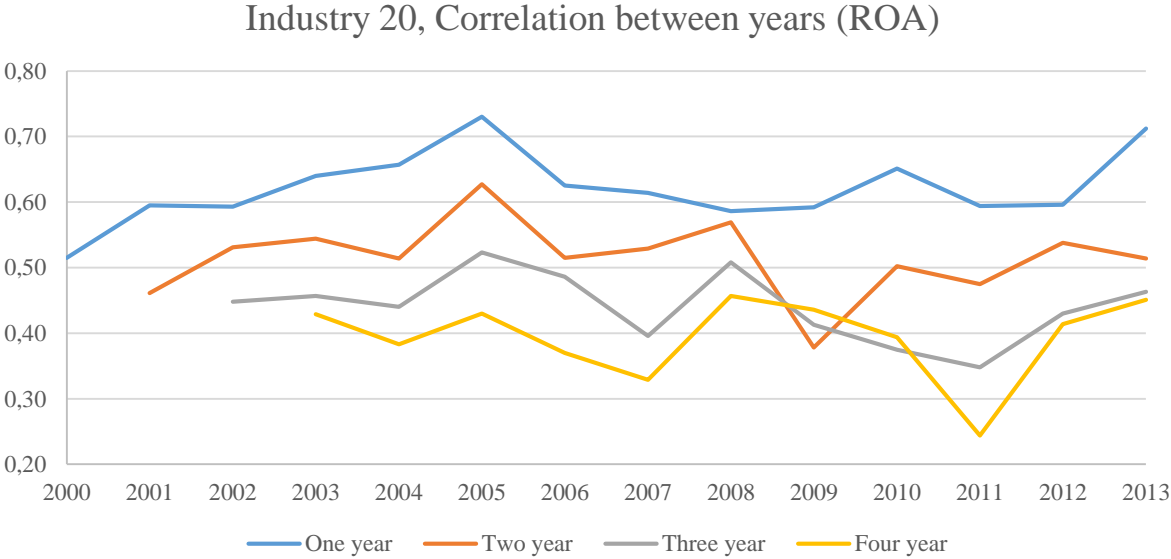
Figure 12: Industry 20, Correlation between years (ROA)

In 2005 all lags show a peak in stability. This means that relative performance levels in the industry were more stable in 2005 on all lags than in 2004. From 2005 to 2007 stability decreases, which corresponds with the increases in average ROA and the number of firms in the industry during this period. This suggests that competition increased during a time when the industry did particularly well.

The one-year lag decreases a little each year from 2005 to 2008. It starts increasing in 2008, and turns after 2010. In 2008, the first year of the Financial Crisis, we see an increase in the correlation coefficients on the two-, three-, and four-year lags. The four-year lag is at its highest point in 2008, indicating a relatively higher correlation between 2004 and 2008 compared with other periods. After 2008 the four-year lag decreases each year over the crisis, and reaches its lowest point in 2011. In 2011 the correlation coefficient between 2007 and 2011 is below 0,3, indicating weak correlation. This suggest that there have been a lot of changes in rankings on ROA over the crisis. We might expect that hardly any firm within the industry has maintained its relative performance level during this period.

The two-year lag has its lowest point in 2009. The correlation coefficient between 2007 and 2009 is a little below 0,4, which indicate moderate correlation. When assessing the two-year lag, it seems the industry experienced a small increase in stability at the beginning of the crisis, before the stability drops over the crisis. We see a similar pattern in the three-year lag where the correlation increases in 2008, and then decreases each year before it turns in 2012. The fact that both the three-year and the four-year correlation have its lowest point in 2011 indicates that the larger share of the drop in stability experienced by the industry happened after 2008.

Operating margin of industry 20 behaves very similar to ROA when it comes to stability. All the important peaks and low points are placed in the same years, and their levels are comparable. This suggests that performance on ROA and operating margin is closely connected in this industry. We will now look at the two largest sub-industries of industry 20. Analyzing a narrower industry definition gives more defined, and maybe clearer, results.

Analysis of Industry 201 Sawmilling and planing of wood, impregnation of wood

When looking at the mean and standard deviation for industry 201, the sub-industry seems to be reacting slightly different to the Financial Crisis than the less defined industry 20. Average ROA has a higher peak in 2007, while the drop in 2008 is larger than what we see for industry 20. Average ROA is at its lowest point in 2009, and starts increasing already in 2010. The standard deviation is gradually increasing from 2005, reaching its highest point in 2008. Then it drops in 2009, and remains relatively low throughout the rest of the period of our data set.
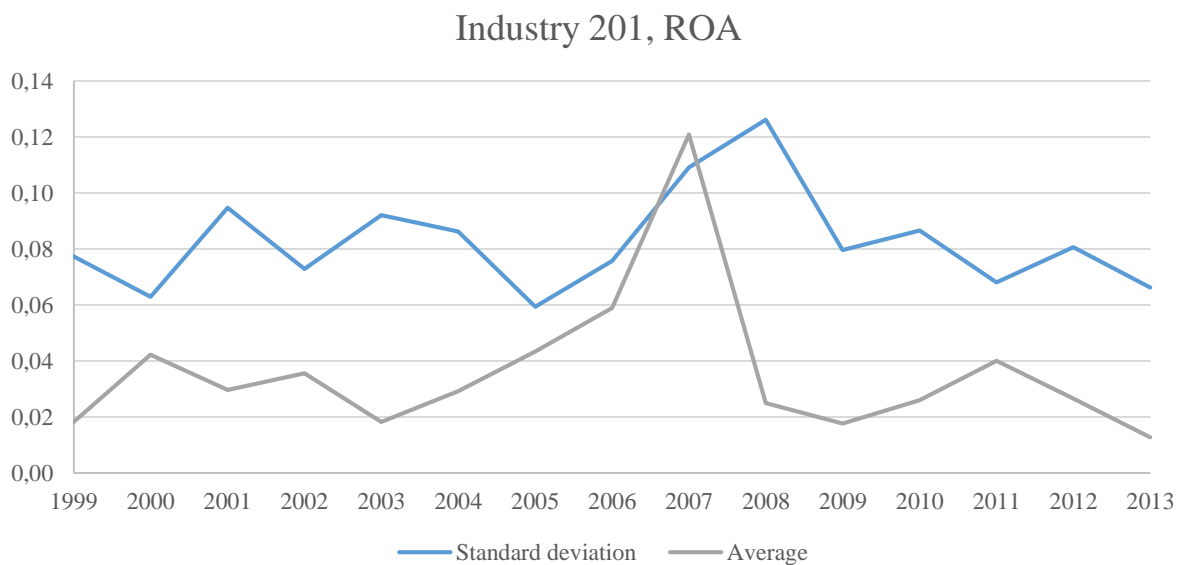
Industry 201, ROA

Figure 13: Industry 201, ROA

If we look at the correlation coefficients for industry 201, we see there are a lot of movement in the graphs, and that variations are rather large from year to year (figure 14). This applies especially for the one-year lag. The spread of the coefficients between the lags are quite small in the period before the crisis. As the crisis hits in 2008, the spread becomes much larger in the period after.

Industry 201, Correlation between years (ROA)
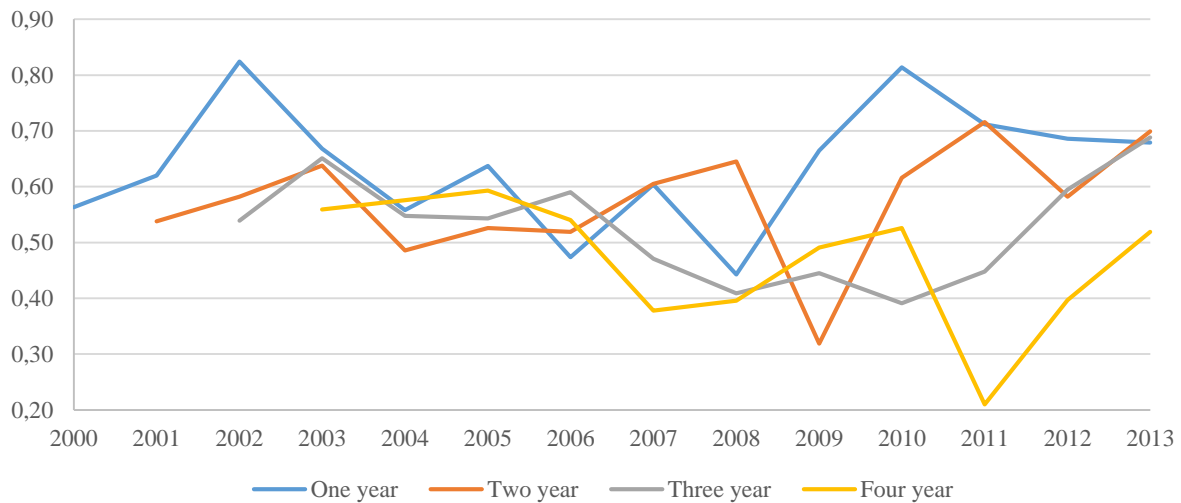
Figure 14: Industry 201, Correlation between years (ROA)

Looking at the one-year lag, we see the graph decreases slightly from 2007 to 2008, when the crisis hits. This indicate that stability is a little lower in 2008 than in 2007. In 2009 and 2010 the graph increases sharply, reaching a correlation of 0,8 in 2010. This indicate very high correlation with the previous year. In 2011 the coefficient decreases, but it seems to be stabilizing in 2012 and 2013 at a relatively high level. Based on the one-year lag it seems that the industry become more stable in the period after the crisis, compared with the period before.

The two-year lag shows a very similar pattern as the one-year lag, except that it decreases in 2009 and increases in 2010 and 2011. The two-year lag decreases more prominently in 2009, compared with the one-year lag in 2008. The four-year lag also shows a similar patter as the one-year lag, though it decreases largely in 2011, and increases in 2012 and 2013. In 2011 the correlation coefficient between 2007 and 2011 is just above 0,2, indicating weak correlation. This suggest that most firms experience a change in their performance levels over the crisis. This can also be seen on the three-year lag, but the effect is not as prominent.

If we look at the one-year correlation in 2008, the two-year correlation in 2009, the three-year correlation in 2010, and the four-year correlation in 2011, we see very clearly that they have low correlations with 2007, the year before the Financial Crisis. This suggest that the rankings change quite a lot as a result of the crisis. After this change, firms seem to stabilize around

their new relative performance levels, which can be seen from the large increases in all the correlations the year after they reach their lowest point. This may partially be explained by a shakeout, where firms who are highly unstable disappear from the industry because of bankruptcy. It is worth mentioning that some firms might fall out of the sample because they fall below our cut-off criteria, and not because they go bankrupt.

It seems the industry was with immediate effect by the Financial Crisis of 2008. The performance landscape possibly changed very quickly, assigning new values to the positions held by firms in the industry. This made stability fall drastically between 2007 and the years after the crisis hit. What is interesting is that it seems the firms in the industry quickly stabilized on their new performance levels. A possibility is that the crisis changed the performance landscape without increasing competition over the crisis.

Our results on operating margin is comparable to the results on ROA. The correlations show the same general pattern, especially during the Financial Crisis where all peaks and low points are placed in the same years as on ROA. The standard deviation on operating margin is slightly different, as the peak in 2007 does not continue into 2008 (see appendix).

Sub-Industry 203 show different patterns than industry 201, as as the effect of the crisis seems to be delayed. Industry 203 suffers a large fall in average ROA over the crisis, but the reduction happens more gradually from 2007, until it reaches its lowest point in 2010. We can see that the crisis has a large impact on the industry, as average ROA almost reaches zero in 2010. The standard deviation increases in 2008, and remains high until 2011. The heightened standard deviation indicates that differences in firm performance increases over the crisis.
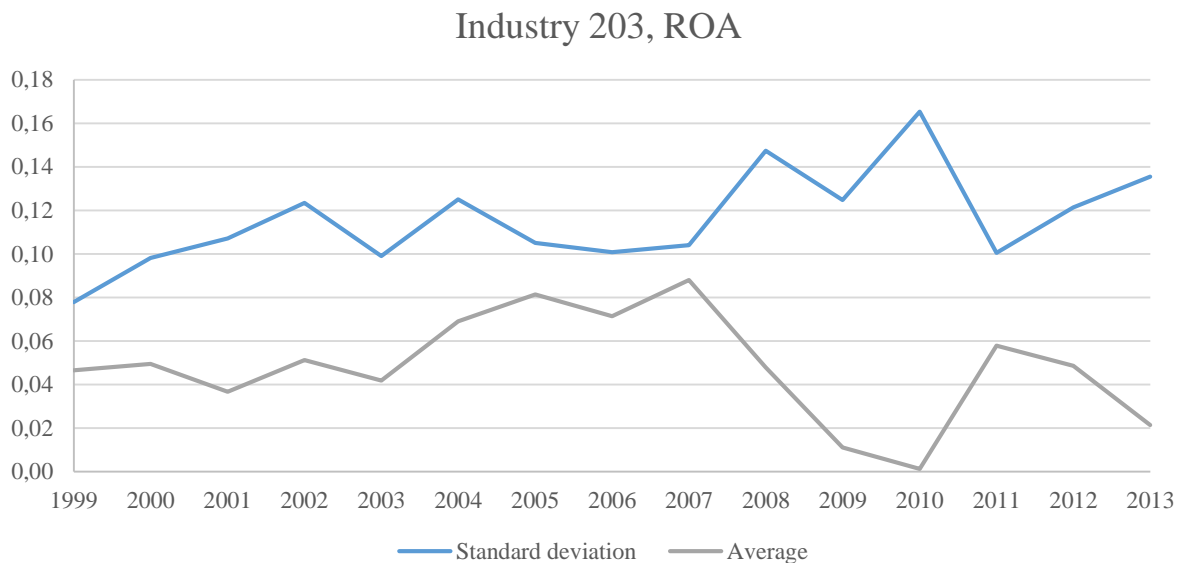
Industry 203, ROA

Figure 15: Industry 203, ROA

The production in this industry is mainly about pre-fabrication of houses, which are planned and ordered in advance. We assume that firms have contracts in place already before the crisis, which allow them to utilize their capacity for some time even after demand has decreased as a result of the crisis. This causes the effect of the crisis to be delayed, which can be seen from the more gradual decrease in average ROA over the crisis. As the contracts dry up, the effect of the crisis increases for the industry.

When we look at stability of performance, we also see that the effect of the crisis is delayed, as there are no changes in 2008 clearly indicating that the industry was hit by a crisis. In 2008 the correlation coefficients on the one-, three- and four-year lags increases slightly, while it decreases on the two-year lag. This might indicate a small increase in stability in 2008 compared to 2007, but the effect is unclear. In 2009 all the correlation coefficients decrease, indicating that the crisis has started to affect stability of firm performance in the industry.

Industry 203, Correlation between years (ROA)
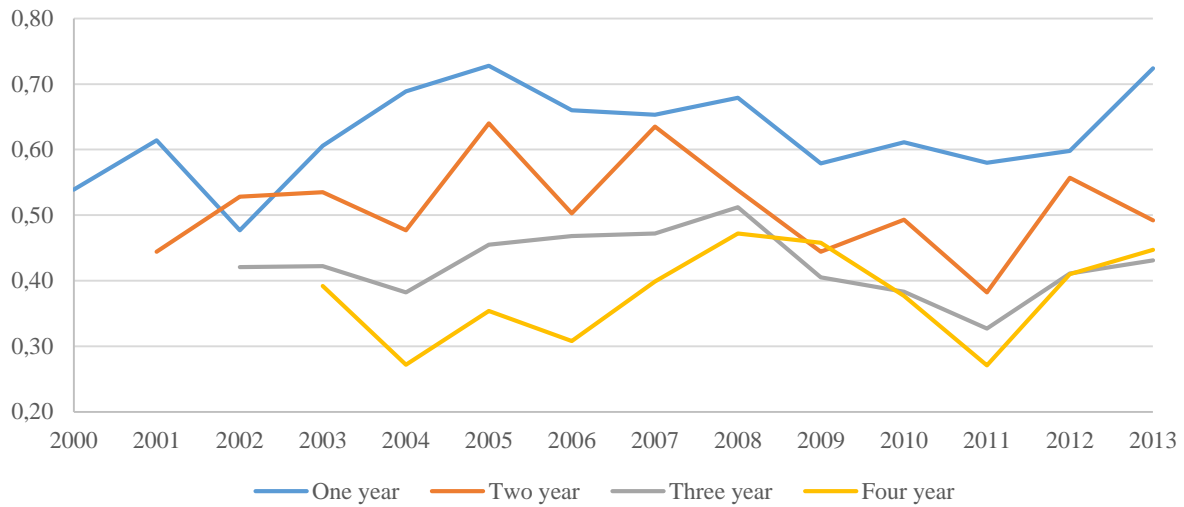
Figure 16: Industry 203, Correlation between years (ROA)

The correlation coefficients on the one-year lag remain relatively high in 2008, and start decreasing in 2009. From 2009 until 2012 the coefficients are relatively stable at a lower level than they were before the crisis. This suggest that stability was lower during the crisis compared with the period before the crisis. This might be because the performance landscape is gradually changing over the crisis, changing the value of firms positions, and in return changing the rankings. It might also be due to higher competition within the industry over the crisis.

The two-year lag correlation start decreasing after 2007, and reaches its lowest point in 2011. The three- and four-year lags start decreasing from 2008, and they both reach their lowest points in 2011. As the two-, three- and four-year lags all have their lowest point in 2011, it indicates that the largest fall in stability happened in the later part of the crisis. The four-year correlation is weak in 2011, with a correlation coefficient beneath 0,3. A weak correlation indicates that almost all firms have had their relative performance levels changed from 2007.

Operating margin of industry 203 is comparable to ROA, and generally exhibits the same patterns. The four-year correlation still has its lowest point in 2011, but the correlation is slightly stronger. This indicates that operating margin was a little more stable over the crisis than ROA, with a moderate correlation in 2011.

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Industry 55, with sub-industries 551 and 553

Industry 55 is named *Hotels and restaurants* and is part of the hospitality industry, in the service sector. The industry is characterized by that it sells tangible experience goods. The turnover development between 2002 to 2010 was very uneven. In what can be described as golden years the turnover increased by 37,8% for the whole industry between 2004 and 2008. Before these golden years the growth were very modest, and during the Financial Crisis from 2008 to 2010 it became negative (Granseth & Ohm, 2012). Industry 55 consists of 5 sub-industries, where industry 551 and 553 makes up over 80% of our sample of the industry.

Three digit SIC-code industry 551 *Hotels* is characterized by high fixed costs, and the simultaneity of production and consumption. Entrance is relatively easy in the industry, but to gain market share very high levels of capital investments are required (Granseth & Ohm, 2012). With the downturn in 2008 the volume of the hotel industry started decreasing, but this was compensated by the continuation of the positive price development from the golden years into the crisis. This enabled the industry to delay the decrease in turnover caused by the crisis to 2009. Operating margin of the hotel industry have been very low and uneven from 1999 to 2013, and have even been negative from 2000 to 2003. In the golden years, from 2004 to 2008, operating margin increased substantially and peaked at almost 5% in 2007, but fell down again during the Financial Crisis. The hotel industry was hit harder than the restaurant industry (Granseth & Ohm, 2012).

Three digit SIC-code industry 553 *Restaurants* was particularly resistant toward the Financial Crisis, and had a small positive growth in 2009 (Granseth & Ohm, 2012).

We choose not to present industry 55 in itself, as it averages out mainly the results from the two three-digit SIC code industries 551 and 553, which exhibits very different results. Following we will look directly into industry 551 and 553. Industry 551 show large differences in the results from our analysis between ROA and operating margin, and we will present graphs on both ROA and operating margin for this industry.

When looking at figure 17 we see that average ROA is negative in most years. From 2003, average ROA increases until it peaks in 2007. In 2008, the first year of the Financial Crisis average ROA starts decreasing, and from 2009 it is negative throughout the period. In 2005, when average ROA reached zero, the standard deviation decreased substantially and stayed at a fairly low level until the beginning of the crisis. This means that differences in performance decreased during a period when the industry enjoyed a positive average ROA.

The hotel industry experienced a sharp increase in standard deviation between 2007 and 2009. This corresponds to average ROA dropping below zero over the same period. The sharply increased standard deviation suggests that differences between the best and worst performers increased in the industry during the Financial Crisis.
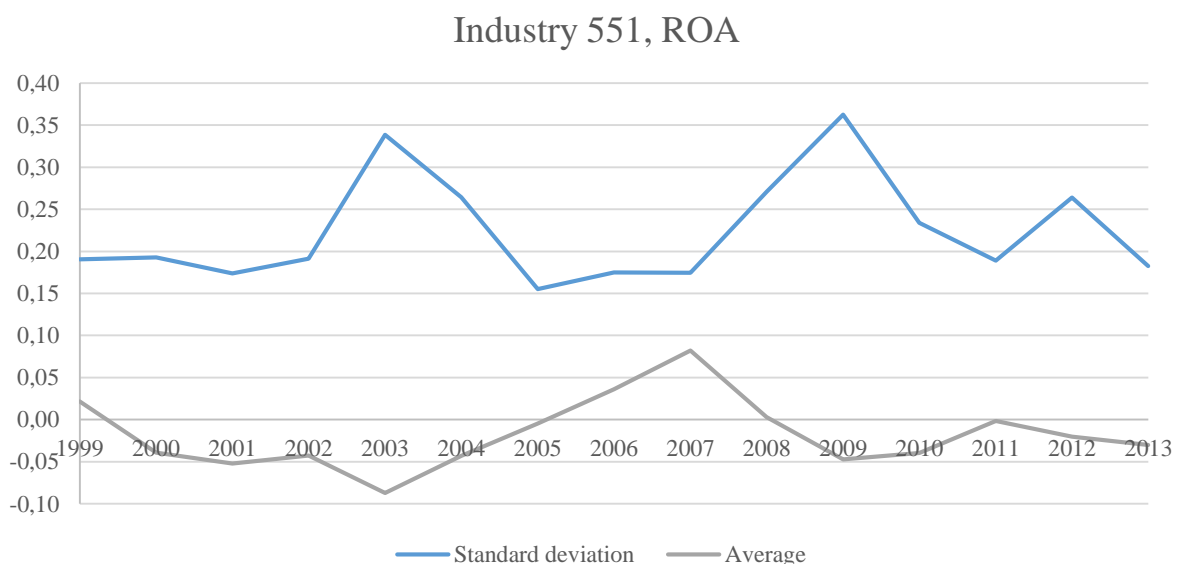
Figure 17: Industry 551, ROA

Looking at figure 18, which show average operating margin and standard deviation, there are some differences in comparison to figure 17. Average operating margin is negative from 2000 to 2003, before its starts growing and reaching a peak in 2007. Average operating margin decreases in 2008, but it does not become negative before 2013. The standard deviation is slightly heightened from 2007 to 2009, but the effect is so small that the crisis does not seem to have any special effect on differences in performance, measured on operating margin, for the hotel industry.

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For the other industries we have selected the patterns of the standard deviation are more or less comparable between ROA and operating margin, but as we can see from figure 17 and 18, this is not the case with industry 551. Average operating margin decreases during the crisis without a correspondingly large increase in the standard deviation. This means that differences in performance between firms, measured on operating margin, almost do not increase during the crisis. This can hold relative performance levels stable, while the absolute performance levels decreases. If this is the case, the members of the hotel industry will be worse off, while the relative performance levels between firms in the industry is largely unchanged. When looking at the correlation coefficients on operating margin (figure 20) we find support for this assumption, as the correlations are relatively high for all lags.
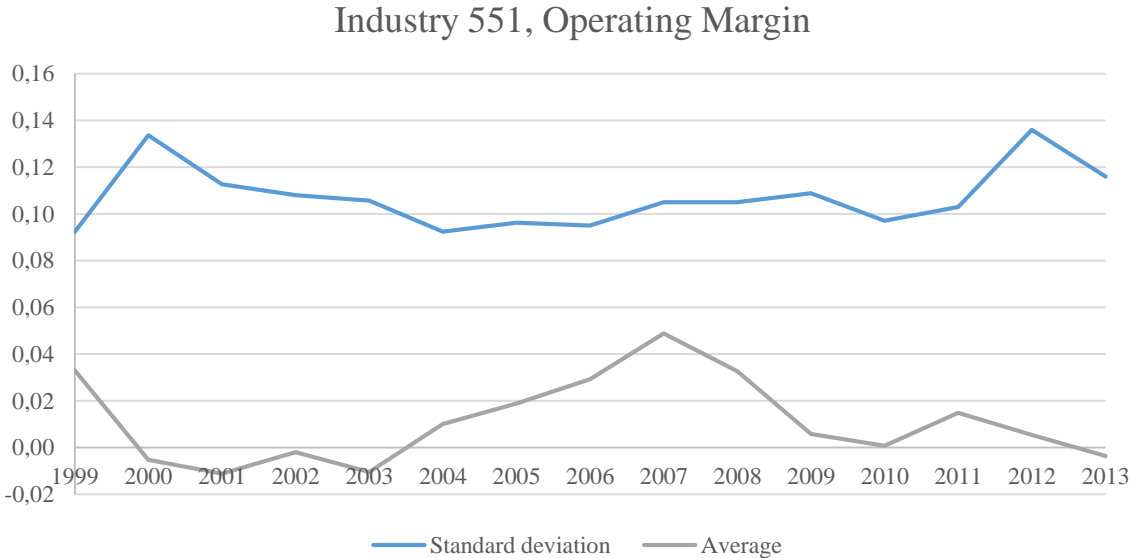
Figure 18: Industry 551, Operating Margin

If we look at the correlation coefficients for ROA (figure 19), it seems that 2007 is a turning point for the two-, three- and four-year lags. Both the three- and four-year lags have their lowest point in 2007, showing weak correlations. This means that virtually no firms in 2007 have maintained their relative performance levels from 2003 and 2004, measured on ROA. We know that the period from 2003 to 2007 was a very good period for the industry, and it seems that stability gradually decreased during this period. This suggests that competition increased over this period. One reason could be that the positive average ROA made entry more attractive, and thereby increased the competition in the industry. The competitive dynamics of the industry could also possibly have changed in a period where the aggregate

demand in the industry was high. Firms could be more willing to perform competitive actions in order to capture some of this increased demand.

Industry 551, Correlation between years (ROA)
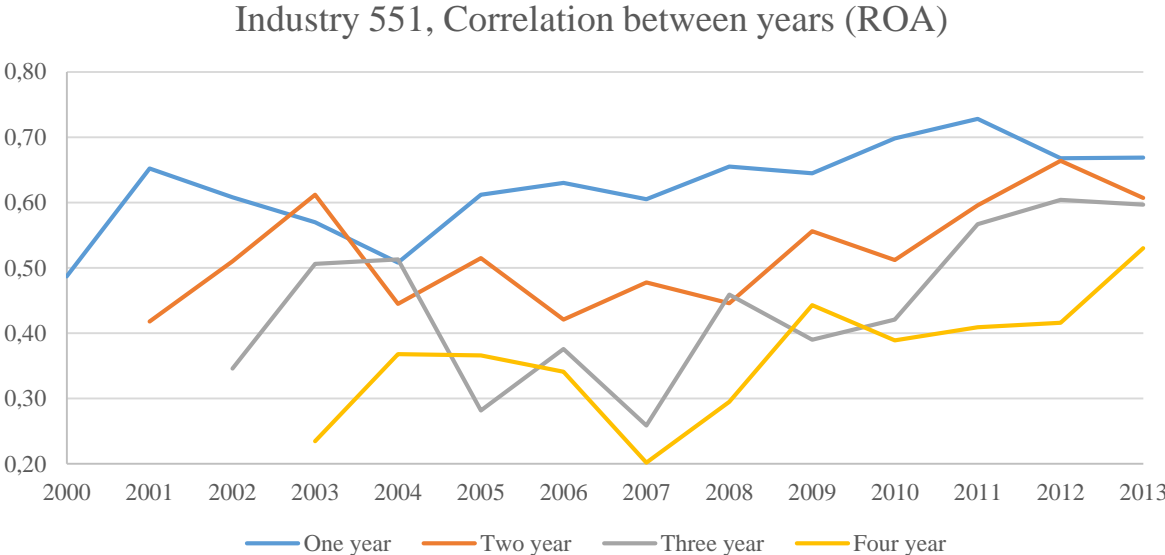
Figure 19: Industry 551, Correlation between years (ROA)

If we compare 2007 with the next four years we see that the one-year lag increases in 2008, the two-year lag increases in 2009, the three-year lag increases in 2010, and the four-year lag increases in 2011. Correlation coefficients between 2007 and the next four years range from moderate to strong. It seems that competition decreased, and that relative performance levels became more stable during the crisis. The relative performance levels were more stable at the end of the crisis, compared with the beginning. When comparing the correlations with average ROA, we can assume that reductions in aggregate demand reduces incentives for rivalry. It may also reduce the threat of entry, as the industry becomes less attractive.

The correlation coefficients on operating margin differs from the correlation coefficients on ROA in their patterns, particularly on their level of strength. The one-year lag is especially strong over the period, ranging generally between 0,7 and 0,8. It is difficult to separate out any potential effect from the Financial Crisis. This holds equally for the two-year lag, albeit at a slightly lower level. The three-year lag shows a little more variation. The correlation coefficients are strong and above 0,5 in almost all years. The exception is 2007 where the coefficient goes below 0,5, giving this year only a moderate correlation. The four-year lag has

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a larger variation than the other lags. It has its lowest point in 2007, but still have a moderate correlation. It has a strong correlation in 2008 and 2009, and keeps at a relatively high level until 2012. It drops in 2012, before increasing in 2013.
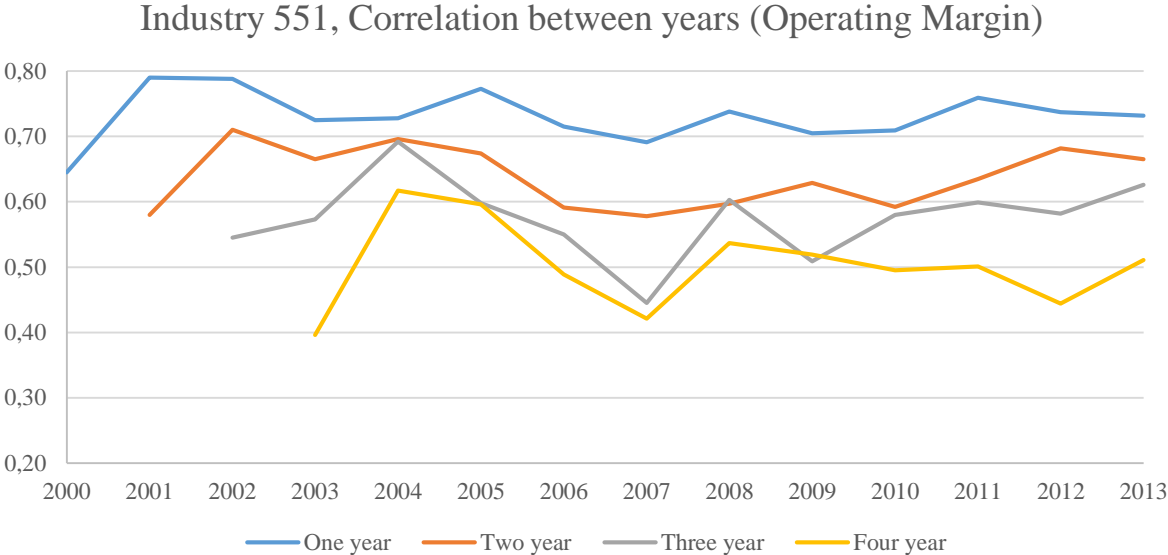
Figure 20: Industry 551, Correlation between years (Operating Margin)

While ROA seems to have a positive trend, operating margin seems to have a more neutral trend. There is a large difference in stability between ROA and operating margin for the hotel industry, especially during the Financial Crisis. If we look at 2007, we see that the correlation coefficients on the four-year lag of ROA and operating margin is 0,202 and 0,429 respectively. The difference between these two values are large, and we do not find any comparable cases in the industries we have selected. We imagine that the reason we find such large differences between ROA and operating margin within this industry, must have something to do with how these variables are constructed. There is probably some characteristic with this industry, unknown to us, that affect these variables differently. We can guess that it stems from the high levels of capital investments that are required to effectively compete within the industry.

The standard deviation on ROA for the restaurant industry have some similarities with the standard deviation in the hotel industry. The peaks are placed roughly in the same time periods, and they last for approximately the same numbers of years. The largest difference is in the height of the increased standard deviation during the Financial Crisis. The peak for the restaurant industry is heightened during the crisis, but not nearly as much as in the hotel industry.

Average ROA is considerably different from the hotel industry. Average ROA is on a higher, and more stable level, and seems to be gradually growing from 1999 to 2013. Average ROA decreases slightly in 2008 and 2009, during the Financial Crisis, and start increasing from 2010. The effect is not large, but seems to be related to the Financial Crisis, as it corresponds with a heightened standard deviation from 2008 to 2010.
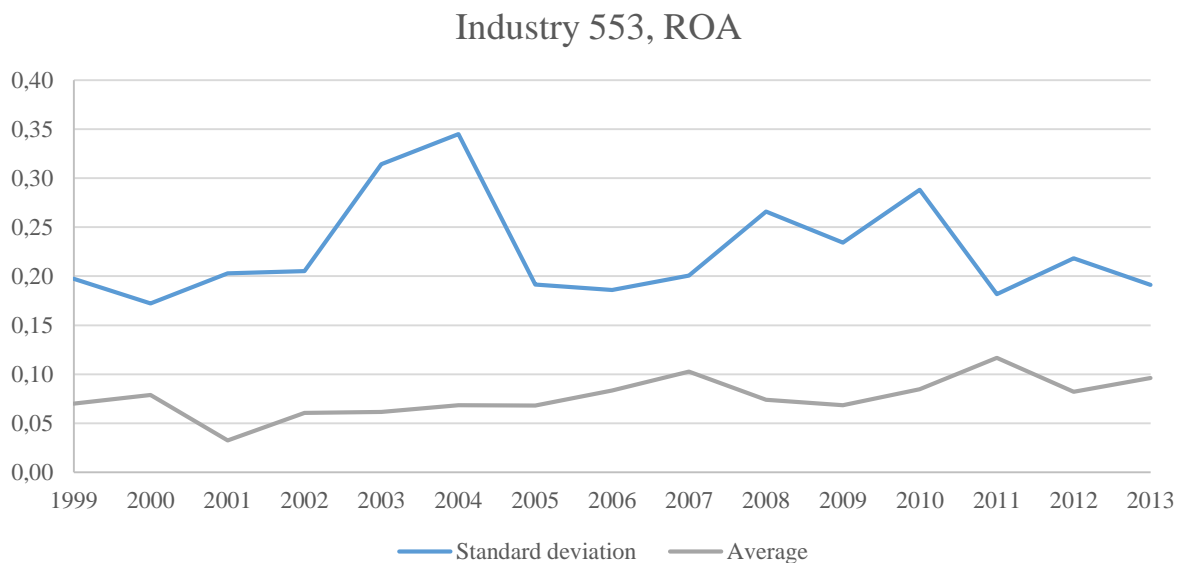
Figure 21: Industry 553, ROA

It is hard to see any clear effect from the crisis when looking at the correlation coefficients (figure 22) for the restaurant industry. The one-year lag is steadily increasing from 2006 to 2009, and have a very strong correlation in all years. It has a somewhat large fall in 2011 that corresponds to similar reductions in both the two- and four-year lags. The two-year lag has the largest variations. It shows strong correlation for all years, except 2001 and 2006. This indicates rather high stability of performance in the industry. The three-year lag is very stable,

and gradually increases over the years. It has almost strong correlations in 2008 and 2009. From 2010 and onwards the correlation becomes strong. The four-year lag has a moderate correlation for all years, until it becomes strong in 2010. The correlation is also strong in 2012 and 2013. This might indicate an increased long term stability in relative performance levels on ROA for the industry.

In 2011 we see a drop in the correlation coefficients on the one-, two- and four-year lags. This can possibly come as a result of increased competition when demand increases in the period after the crisis, but the effect is not particularly large. In the years after the crisis we see that the different lags cluster closer together as the correlation coefficients on the two-, three-, and four-year lags decreases.
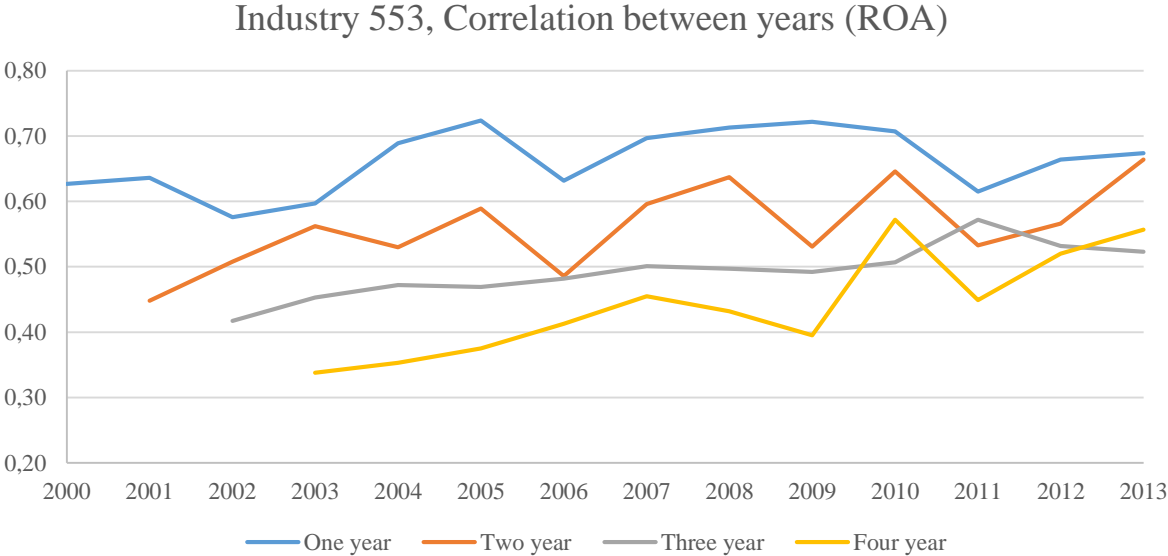
Figure 22: Industry 553, Correlation between years (ROA)

When looking at operating margin, we see that the standard deviation actually decreases in 2008, and the average only drops slightly. The correlation coefficients on operating margin is fairly similar to the correlation coefficients on ROA. The relative performance levels in the restaurant industry seem to be only mildly affected by the crisis. This confirms the view that the restaurant industry was particularly robust to the impact of the crisis.

Industry 72, with sub-industries 7221 and 7222

The name of industry 72 is *Computers and related activities*, but we will refer to it as IT-industry. The industry makes up the greater part of the ICT-sector and consists of six underlying three-digit SIC code industries, where most of the firms in our sample can be found in 722 *Software consultancy and supply*. The IT-industry was hit hard by the dot-com crisis of 2000, and have since then made major immaterial investments resulting in increased profitability (Maurseth & Holmen, 2015). The IT-industry is a knowledge industry, and has experienced a high yearly growth after the dot-com crisis, which weakened slightly following the Financial Crisis of 2008 (Maurseth & Holmen, 2015).

Industry 722 is composed of the two four-digit SIC code industries 7221 *Publishing of software* and 7222 *Other software consultancy and supply*. *Publishing of software* creates software and have very high sunk costs for development of its products. Afterwards it has a marginal cost of zero. *Other software consultancy and supply* does consultancy work and implementation of software, and differ from industry 7221 in that it sells hours.

Analysis of Industry 72 Computers and related activities

The dot-com crisis is very prominent from 2000 to 2003 in figure 23, and is characterized by a very low average ROA and a high standard deviation. A similar pattern can be seen in 2008, when the Financial Crisis hits, except that the decline in average ROA is smaller, and the effect on the industry shorter. The Financial Crisis clearly had an effect on the industry, but the effect seems relatively small compared to the dot-com crisis.
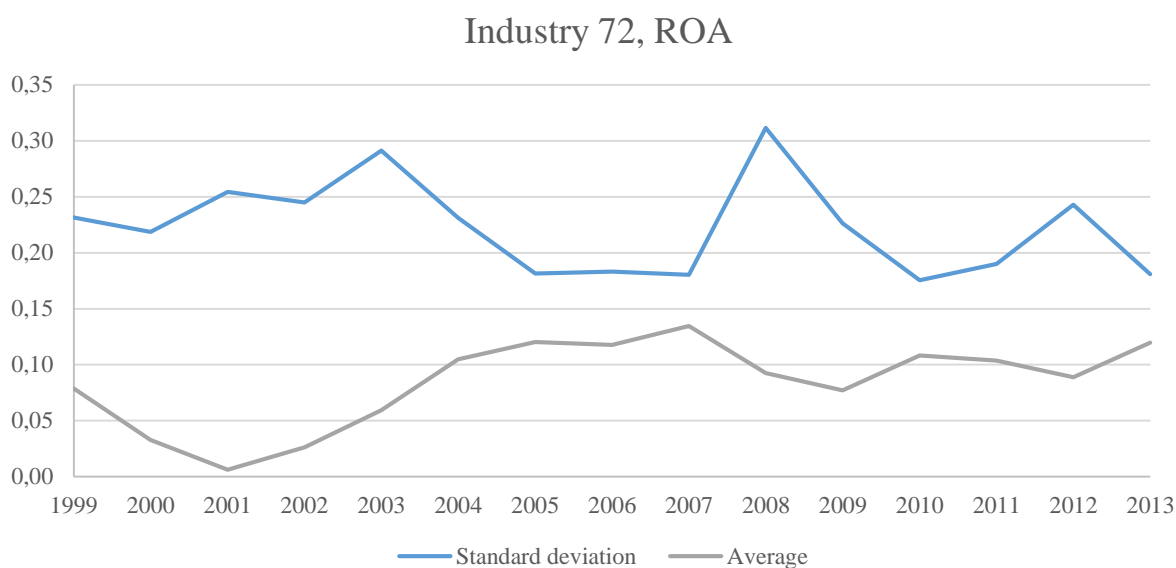
Figure 23: Industry 72, ROA

During the Financial Crisis the standard deviation increased substantially, and was in 2008 even higher than it was at any point during the dot-com crisis. The standard deviation started declining in 2009, and reached pre-crisis levels already in 2010. Differences in firm performance increased in 2008, but decreased shortly after. We can imagine that some firms needed more time than others to adapt to the environmental changes imposed by the crisis, thus increasing differences temporarily. There is a small peak in standard deviation in 2012, which is also reflected more or less in the sub industries 7221 and 7222 on both ROA and operating margin. We are not sure what created the peak in 2012, but we can speculate that it could have been a minor industry specific shock.

When looking at the correlation coefficients we see that all of the lags have their lowest point between 2001 and 2004. This clearly shows the negative effect the dot-com crisis had on the stability in performance for the industry. The Financial Crisis from 2008 to 2010 show quite

different patterns compared to the dot-com crisis. When looking at all four lags, there seems to be a general positive trend, as they are increasing over the period after the dot-com crisis. This indicate that performance in the industry is becoming more stable. Stability in firm performance increases after the Financial Crisis, however, all the lags decrease in 2013. In 2011, the four-year lag almost shows a strong correlation, with a coefficient of 0,495, and in 2012 correlation is strong, with a coefficient of 0,501. This mean that the industry was very stable over the Financial Crisis, and we can expect that fairly many firms was able to keep their relative performance levels over the crisis.
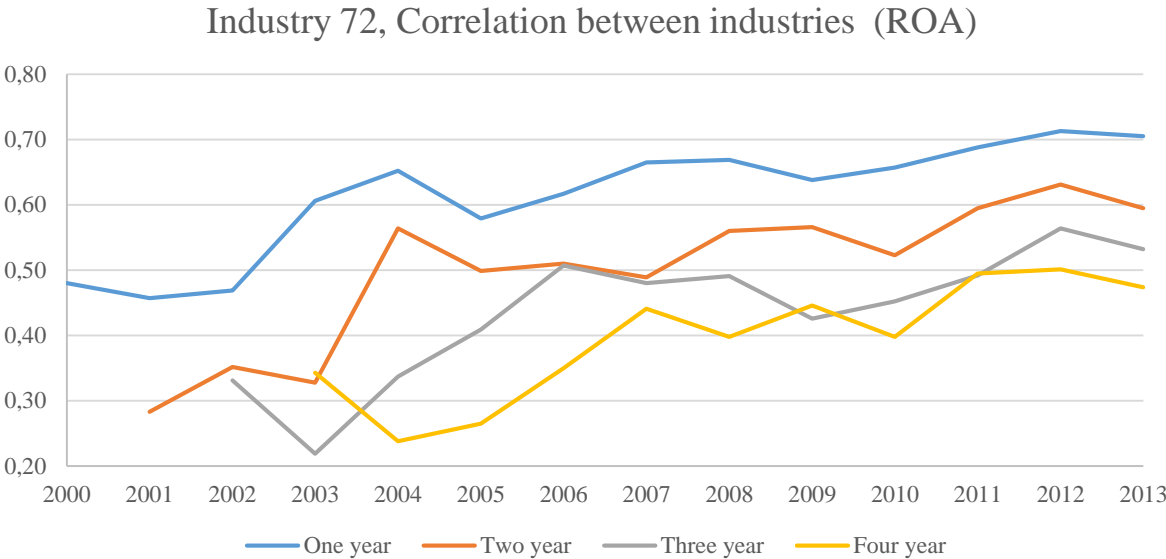
Figure 24: Industry 72, Correlation between industries (ROA)

The IT-industry experienced a high growth rate after the end of the dot-com crisis. This possibly follows from a maturing of the industry, leading to a higher degree of stability in firm performance. It may also be a result of increasing demand for the services of the industry. This can make it more attractive to focus on value creation instead of value capture. As a result, competition is possibly reduced in the industry. This fits well with the number of firms in the industry growing almost every year in our sample. In 1999 there are 370 firms, while there are around 700 firms in 2013.

The results on operating margin is comparable with the results on ROA. The peaks in standard deviation of operating margin are mostly the same as the peaks in the standard deviation of ROA, but the peak in 2008 is less pronounced.The most notable difference

between ROA and operating margin is that the first peak in the standard deviation of ROA is centered in 2003, while the first peak in the standard deviation of the operating margin is centered in 2000. We do not know why we find this difference, but we can assume it has to do with accounting practices.

We choose not to present industry 722 as it only consists of industry 7221 and 7222, which will be presented below. The effects of the dot-com crisis will not be visible for these two industries, as the industry classification on the four-digit SIC codes are incomplete before 2003.

Both industry 7221 and industry 7222 show reductions in average ROA and increases in standard deviation from 2007 to 2008. The effect of the crisis on industry 7221 is very visually clear, with a spike in the standard deviation and a reduction in the average ROA. The standard deviation of industry 7222 does not increase as much, but the fall in average ROA is deeper and longer lasting.
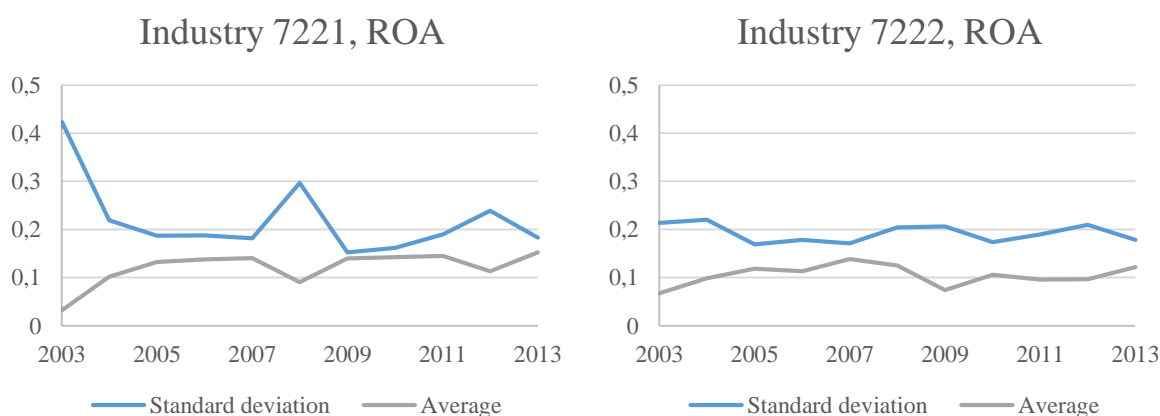
Figure 25: Industry 7221 and Industry 7222, ROA

In industry 7221 the correlation coefficients show large movements on all four lags, and often go in multiple directions (figure 26). The one-year lag shows a lot of variation from 2004 until it seem to stabilize at a high level from 2010. We also find this pattern in both the two- and three-year lags, albeit with a little less variation, and the heightened stability is placed in 2011 and 2012 respectively. The four-year lag shows moderate correlation from 2007 to 2010. In 2011, the correlation coefficient increases abruptly, indicating that the rankings from 2007, the year before the crisis, are fairly similar with the rankings in 2011.

The patterns for the correlations in industry 7222 is more stable than in industry 7221 (figure 26). All the four lags move fairly gradually, and often several years in the same direction. The effect of the crisis is not very large, but there is a reduction on all the four lags during the crisis. When we look at the correlation coefficients on the one-year lag, we see a gradual reduction from 2007 to 2010. In 2011 the correlation increases to a higher level, and remains heightened. The two-year lag has the same pattern as the one-year lag, except that it follows one year behind. The three-year lag deviates from this pattern as it starts decreasing as early as 2007, and has its lowest point in 2009. The four-year lag seems fairly stable and has its lowest point in 2010. Both the three- and four-year lags have lowest correlation in relation to the year 2006. This suggests that something happened with the rankings between 2006 and 2009.
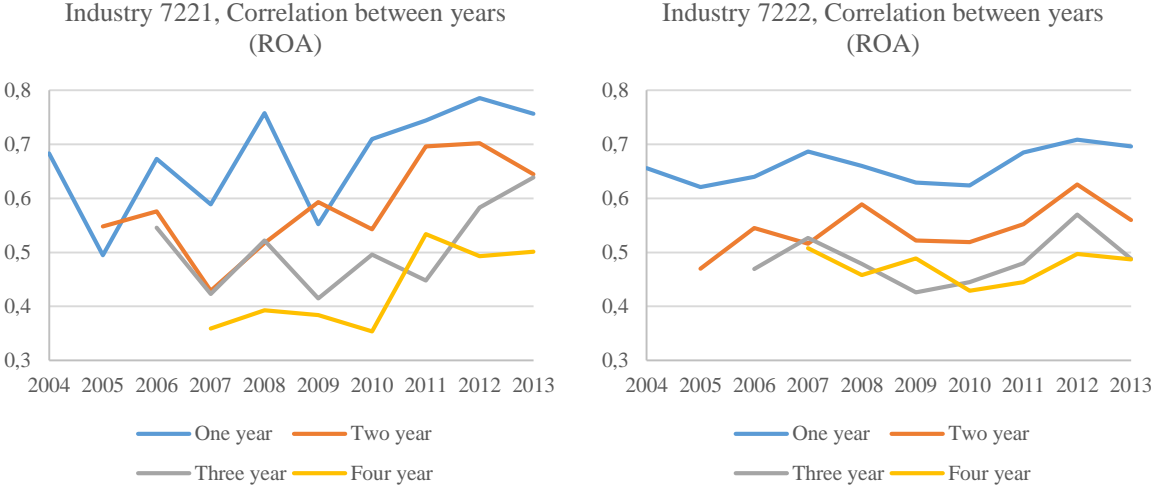
Figure 26: Industry 7221 and industry 7222, Correlation between years (ROA)

When looking at stability of firm performance in the two industries, they exhibit very different competitive dynamics. In industry 7221 there is a lot of variation in the correlation coefficients for all the four lags, which imply that the level of stability changes erratically. The correlation coefficients are more stable in industry 7222. This may indicate a more predictable level of competition in this industry. Following we will provide an explanation on why these differences might occur.

Industry 7221 develops and sells software, while industry 7222 does consultancy work and implementation of software. Industry 7221 sells a product, while industry 7222 sells hours.

We imagine that changes in performance are longer lasting in industry 7221. If a firm manage to develop new software or innovations that generates higher performance, it will take some time before competitors are able to imitate that product, or compete its benefits away. This allows the firm's improvement in performance to disrupt the stability of rankings, as the firm improves its position. In comparison, consultancy work relies a great deal on best practice. If a consultancy firm develops better processes improving performance, it will probably be quickly imitated by competitors, who will compete the benefits away. This can make the rankings in the industry more stable, as the benefits of improved performance is not necessarily reflected in improvement of relative performance.

Both industries show increase in correlation coefficients on most lags after the Financial Crisis. We do not know exactly why this is the case, but as mentioned for industry 72, increased industrial growth can possibly make value creation more attractive than value capture, thus making stability increase.

Operating margin shows fairly similar results as ROA when it comes to stability of firm performance. Industry 7221 has a lot of movements, while industry 7222 seems to move more gradually and stable.

Summary

In this section we will summarize our main findings from the Spearman Rank Order Correlation analysis. We start looking at average profitability, differences between firm profitability, and stability of firm performance. Then we comment on how the Financial Crisis of 2008 might have changed competitive dynamics within industries.

When it comes to average profitability we find it decreasing in all industries over the years of the Financial Crisis. This apply for both average ROA and average operating margin. We find large differences between industries as to how much profitability decreases during the crisis. Analysis on both ROA and operating margin support our hypothesis that average profitability decreases during the Financial Crisis of 2008.

We find a decreased standard deviation for all industries measured on ROA. For industry 20 and 55, along with their sub-industries, we find that the standard deviation is heightened from 2008 to 2010. In 2011 the standard deviation is roughly at the same level as the period before the crisis. For industry 72, along with its sub-industries, the standard deviation is heightened from 2008 to 2009, reaching the pre-crisis level in 2010. When looking at operating margin we find that the standard deviation for industry 20, along with its sub-industries, is heightened from 2008 to 2011. For industry 55, along with its sub-industries, the effect of the crisis on standard deviation is very small. For industry 72, along with its sub-industries, there is a large increase in standard deviation in 2008, but it declines already in 2009, reaching pre-crisis levels. Analysis on both ROA and operating margin confirm our hypothesis that differences between profitability of firms increases during the Financial crisis of 2008.

For industry 20 we see that stability in firm performance, measured on ROA, clearly declines during the crisis and returns to pre-crisis levels after. When looking at the sub-industries individually, we find that they differ slightly. Industry 201 show lowered stability from the beginning of the crisis, and a large increase in stability after the crisis, reaching above pre-crisis levels. The heightened stability remains high throughout our time period. Industry 203 show a delay when it comes to changes in stability, and decreases gradually towards the end of the crisis. After the crisis, stability start increasing, but not before 2012.

For industry 551 we find that stability of firm performance increases gradually over the crisis, and continue increasing in the period after the crisis. For industry 553 we find that stability increases slightly over the crisis, but the effect does not seem to be very strong. The results show small effects from the crisis. For industry 7221 stability of firm performance varies greatly during the whole period, but seem to stabilize at a relatively high level in the period after the crisis. Industry 7222 show a clear effect of the crisis, but this effect is rather small. Still, stability decreases slightly over the crisis, and increases after. Operating margin show comparable results for all industries, except industry 551. For industry 551 the pattern looks roughly similar, but operating margin show much higher stability during the whole period than ROA.

Industry 201 experienced a large and immediate effect of the Financial Crisis, which probably changed the entire performance landscape for the industry. Our results indicate that the large impact of the crisis reduced competition immediately after the industry was hit, as it seems the firms in the industry quickly stabilized on their new performance levels. The increased stability suggest that firms were more reluctant to perform competitive actions and reactions after they were hit by the crisis than before. For industry 201 we find that competitive dynamics within the industry changed as a result of the Financial Crisis of 2008. For industry 203 the effect of the crisis seems to be somewhat delayed, becoming more pronounced in the later part of the crisis. We see that stability gradually decreased over the crisis. We believe this is a result of contracts drying up, and competition gradually increasing. Our results might suggest there are temporary changes in competitive dynamics during the crisis. As we see increased stability in the period after the crisis, probably indicating weaker competition, it seems that any possible changes in competitive dynamics during the crisis do not last in the period after.

For industry 551 there seems to have been lots of competition in the period before the crisis, the so-called "golden years". It seems there were lots of action and reaction amongst firms in the industry making the rankings unstable. During the crisis competition seemed to decrease, and continued decreasing in the period after the crisis. This suggest changes in competitive dynamics as a result of the Financial Crisis of 2008. In industry 553 the effect of the crisis is very small. We cannot see any clear effect of the crisis when it comes to changes in

competitive dynamics, although the industry seems to be a little more stable in the period after the crisis.

For Industry 7221 the effect of the crisis is difficult to discern, as the variations in the correlation coefficients are very large. After the crisis, there seems to be a change as stability is increasing, and seemingly stabilizing at a higher level than before. This suggest that competition is rather low in the period after the crisis. We assume that increased industrial growth, which possibly makes value creation more attractive than value capture, might lessen competition in the industry. We believe there is a change in the competitive dynamics in this industry after the crisis, but we do not know whether this is a result of the crisis or if it is based on other aspects. Also, because we do not have data after 2013, we cannot be sure whether this effect lasts into the near future. When looking at industry 7222 we see only a small effect of the Financial Crisis. Stability decreased slightly during the crisis, and increased to pre-crisis levels after. The effect is very small, and we cannot see any clear indication of changes in competitive dynamics as a result of the Financial Crisis of 2008.

We have seen that all the industries were affected by the Financial Crisis of 2008, but the impact of the crisis differed between the industries. All industries experienced lower profitability, and an increase in the differences between higher and lower performing firms. This effect varied in strength and duration between the industries. Some industries experienced decreased stability of performance as a result of the crisis, while in other industries the stability increased. Several industries experienced a change in the competitive dynamics, either through increased or decreased competition. Our result on both ROA and operating margin were roughly similar, except the results for industry 551.

When performing Spearman Rank Order Correlation analysis on our data, we are able to look at how relative firm performance changes over time, giving us the opportunity to see how the crisis affect performance. The effect of the crisis on performance can be divided into impact and response. In the following section we will look at how impact and response is related to firm performance before, during the after the crisis.

Factor Analysis

After having conducted Spearman Rank Order Correlation analysis, to see how stability was affected by the Financial Crisis, we will examine the survey data to see how firms responded to the crisis. When analyzing the survey data, we consider it necessary to start with reducing the data set into a more manageable size. To do this we start with performing a factor analysis, or more specifically, principle component analysis.

As a starting point we included all 70 variables from part 3A of the survey in the factor analysis. As our first solution was not satisfying, regarding reliability and making theoretical sense, we removed some items and run the factor analysis again. We did the factor analysis several times, trying different solutions. We ended up including 62 of the 70 variables. Further, we discuss our results from the factor analysis and evaluate the factors we ended up with. We also deliberate on the reasons for removing 8 variables.

The first step involved assessing the suitability of the data, and included considering the sample size and strength of relationship among the variables. Our initial sample consists of 1.248 cases. After removing cases with missing information we are left with a sample size of 1.013, which will be sufficient for conducting a factor analysis. A small fragment of the correlation matrix is shown below. Only from this small fragment we can see that there are several correlation coefficients greater than 0,3. The whole correlation matrix has a great number of correlation coefficients greater than 0,3, hence our data should be suitable for factor analysis.

Correlation Matrix		22.1	22.2	22.3	22.4	22.5
Correlation	22.1	1,000	,542	,330	,628	,544
	22.2	,542	1,000	,210	,472	,471
	22.3	,330	,210	1,000	,245	,203
	22.4	,628	,472	,245	1,000	,689
	22.5	,544	,471	,203	,689	1,000

Table 7: Excerpt from the Correlation Matrix

The KMO measure and Bartlett's test of sphericity give us good reasons to presume that our data is suitable for factor analysis. We find that KMO = 0,924, which is great, and all of the variables had KMO values above the acceptable limit of 0,5. Bartlett's test of sphericity

$\chi^2(1891) = 31975{,}186$, $p < 0{,}001$, indicate that correlations between the variables are sufficiently large for PCA.

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling		,923
Bartlett's Test of Sphericity	Approx. Chi-	31975,186
	df	1891
	Sig.	0,000

Table 8: Results from the KMO and Bartlett's Test

The second step was determining how many factors to extract by doing a parallel analysis. Below is a fragment of the output from the parallel analysis, showing the eigenvalues of the 15 first factors and their corresponding random eigenvalues. We will include a factor when its raw data eigenvalue is greater than the 95th percentile random data eigenvalue. We could also have used the mean random data eigenvalue, which in this case gives the same number of factors.

```
Raw Data Eigenvalues, & Mean & Percentile Random Data Eigenvalues
       Root        Raw Data        Means         Prcntyle
     1,000000     14,499938      1,516395       1,560530
     2,000000      5,971167      1,473716       1,506698
     3,000000      3,631802      1,442121       1,470486
     4,000000      1,769618      1,414805       1,438924
     5,000000      1,687921      1,390294       1,414179
     6,000000      1,661705      1,367738       1,390269
     7,000000      1,536266      1,346035       1,366855
     8,000000      1,465708      1,325999       1,345343
     9,000000      1,370240      1,307211       1,326056
    10,000000      1,271304      1,288430       1,307005
    11,000000      1,172892      1,271294       1,288048
    12,000000      1,100676      1,253433       1,269215
    13,000000      1,075219      1,237223       1,253001
    14,000000      1,038203      1,221188       1,237718
    15,000000       ,990874      1,205382       1,221824
```

Table 9: Excerpt from the Parallel Analysis

Based on our criterion, we can see that we should retain 9 factors. After the 10th factor the random data eigenvalues become greater than the raw data eigenvalues. Hence, we will ask SPSS to extract 9 factors. These 9 factors explain 54,184 % of the variance in our data. We can also see that if we had used Kaiser's criterion, which involves retaining all factors with eigenvalues above 1, we would have extracted 14 factors. Based on Catell's scree plot

(shown on the next page) we would probably have extracted 4 factors, as that is the point where the shape of the curve changes and becomes horizontal. Based on our data, we think that 9 factors are appropriate. We think that 14 factors would have been too many, and 4 factors might not explain as much of the variance in the data as we would prefer.
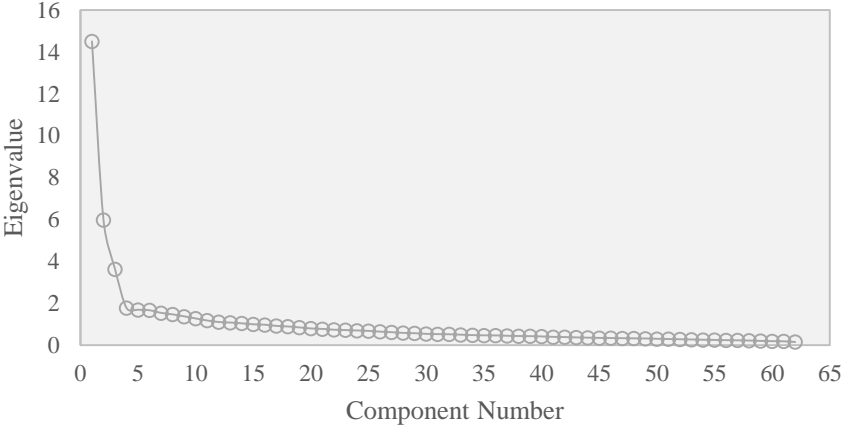
Figure 27: Scree Plot

The third step involved factor rotation, where we tried both Oblimin rotation and Varimax rotation to see which technique was the most appropriate. To decide which rotation technique to use, we can look at the Component Correlation Matrix (table 10), that shows correlations between the factors. The Component Correlation Matrix below show that some factors have coefficients greater than 0,3, implying that Oblimin rotation is the most appropriate technique, as it allows the factors to correlate. Since we use oblique rotation the factor scores will be calculated using the regression method.

Component Correlation Matrix									
Component	1	2	3	4	5	6	7	8	9
1	1,000	-,057	-,304	,250	,262	,272	-,257	-,243	-,159
2	-,057	1,000	-,020	-,121	-,168	-,092	,084	-,156	-,118
3	-,304	-,020	1,000	-,097	-,119	-,134	,173	,240	,313
4	,250	-,121	-,097	1,000	,253	,305	-,269	-,179	-,098
5	,262	-,168	-,119	,253	1,000	,278	-,221	-,178	-,097
6	,272	-,092	-,134	,305	,278	1,000	-,290	-,212	-,107
7	-,257	,084	,173	-,269	-,221	-,290	1,000	,200	,095
8	-,243	-,156	,240	-,179	-,178	-,212	,200	1,000	,228
9	-,159	-,118	,313	-,098	-,097	-,107	,095	,228	1,000

Table 10: Component Correlation Matrix

Below we present the Pattern Matrix that shows which variables to include in the various factors. This is based on how strongly a variable load onto a factor, and the variables are sorted based on their factor loadings. The Structure Matrix will be presented in the appendix.

	Component								
	1	2	3	4	5	6	7	8	9
23.4	**,642**	-,015	-,059	,016	,222	,031	-,068	,039	,166
23.2	**,568**	-,035	-,119	-,013	,036	-,003	,031	-,235	-,204
23.9	**,566**	,024	,014	,117	-,181	,089	-,190	-,014	-,165
23.1	**,557**	-,027	-,107	,011	,007	,043	,058	-,254	-,162
22.3	**,528**	,019	-,210	-,083	,279	-,045	-,110	,195	,227
23.8	**,519**	-,037	-,177	,034	-,030	,039	-,042	-,188	-,152
24.6	**,515**	-,002	-,095	,107	-,056	,124	-,113	-,178	-,019
28.4	,037	**,866**	,048	-,041	,104	-,033	-,013	,048	-,156
28.3	-,012	**,845**	,091	-,009	,103	-,068	-,009	,091	-,074
28.5	,029	**,823**	,102	-,113	,187	-,029	-,057	-,065	-,095
28.2	-,057	**,706**	-,105	,130	-,124	-,024	,073	,105	,168
28.6	-,026	**,706**	-,004	-,073	,039	,047	,020	-,364	,064
28.1	-,040	**,675**	-,073	,154	-,221	-,113	-,007	,062	,088
28.8	,115	**,512**	-,020	-,115	-,091	,150	,100	-,135	-,123
22.4	,095	-,011	**-,761**	,032	-,034	,057	-,050	-,051	,090
22.7	-,012	-,022	**-,749**	,029	,098	-,013	-,114	-,094	,076
22.5	,062	-,034	**-,745**	,028	-,060	,055	-,027	-,043	,061
22.10	-,089	-,018	**-,742**	,058	-,019	,046	,097	-,069	-,171
22.8	-,089	,020	**-,684**	,138	-,046	,010	,153	-,005	-,219
22.11	,078	-,022	**-,636**	-,010	,097	-,021	,014	-,025	-,174
22.1	,229	-,004	**-,628**	-,071	,062	,057	-,104	-,049	,080
22.2	,110	,047	**-,513**	-,017	-,123	,100	-,103	,059	-,174
22.12	,023	-,014	**-,434**	-,112	,220	-,049	-,117	-,142	-,355
26.2	-,082	-,023	-,048	**,785**	-,009	-,021	-,014	-,036	,031
26.4	-,116	-,007	-,052	**,761**	-,008	-,013	-,052	-,022	,009
24.1	,184	-,123	-,126	**,456**	,153	-,047	,058	-,073	,043
24.8	,235	,047	,050	**,436**	,019	-,003	,012	,017	-,105
24.3	,162	-,152	-,032	**,406**	,045	,082	-,133	-,068	-,014
25.11	-,016	,022	,037	**,348**	,194	,283	,032	,056	-,021
24.4	-,027	,063	,170	**,331**	,158	,274	-,128	-,026	-,069
24.5	,228	-,129	,120	**,247**	,225	,124	,037	-,081	-,232
25.1	-,051	-,035	-,020	,090	**,643**	,146	-,037	-,002	-,038
25.4	,134	-,046	-,035	,060	**,556**	,018	-,277	,046	-,024
25.3	-,037	-,069	-,042	,019	**,535**	,181	-,187	,078	-,044
25.2	-,030	,085	,053	,182	**,460**	,030	-,040	-,169	,094
25.12	,330	-,056	,044	,046	**,456**	,160	,050	-,054	-,100
22.6	,198	-,009	-,398	-,044	**,431**	-,001	-,074	,011	,012
24.2	,231	-,116	-,062	,257	**,395**	,000	,057	-,197	-,016
25.10	,122	-,045	-,094	,174	**,394**	-,064	-,138	-,102	-,041
25.13	,237	-,091	-,032	,113	**,339**	,238	,109	,042	-,049
27.3	,012	-,051	-,041	,016	-,007	**,733**	,015	,061	-,015
27.4	,044	,022	,010	-,062	-,078	**,699**	-,056	,089	-,043
27.10	-,072	-,045	-,010	-,038	,001	**,661**	,001	,004	-,061
27.1	-,121	-,028	-,028	-,023	,162	**,569**	-,013	-,099	,112
27.2	,118	-,017	-,162	,042	,230	**,449**	,125	-,066	,123
27.7	,227	,065	-,057	,167	-,165	**,389**	-,231	-,048	,080
27.6	,095	-,037	-,057	,130	-,149	**,358**	-,183	-,159	,085
25.7	-,026	-,003	,007	-,076	-,001	,019	**-,836**	-,050	,046
25.5	,006	-,073	,005	-,048	,034	-,010	**-,792**	-,002	-,046
25.9	-,111	-,038	-,056	,300	,143	-,005	**-,410**	,024	-,031
24.7	,211	,091	-,094	,220	-,117	,137	**-,391**	-,001	,011
26.1	,068	-,012	-,126	-,018	-,027	-,034	-,019	**-,793**	,000
26.3	-,037	,014	-,094	,124	-,039	-,045	-,065	**-,779**	,066
28.7	,009	,526	-,051	-,126	-,020	,026	,049	**-,581**	,043
26.5	,026	,047	,066	,110	,205	,211	-,123	**-,374**	-,157
26.7	,187	,002	,008	-,014	,281	,054	-,199	**-,366**	-,233
22.15	,062	,110	-,295	,061	-,066	-,006	-,015	,036	**-,660**
22.9	-,108	,147	-,328	-,022	,043	,024	,016	,095	**-,550**
23.7	,406	,064	,013	,183	-,101	,005	-,009	-,071	**-,540**
22.14	-,021	,022	-,419	-,024	,053	-,029	-,049	-,147	**-,528**
22.13	-,084	,049	-,351	-,061	,099	-,001	-,132	-,140	**-,461**
26.6	,069	,004	,140	,065	,184	,127	-,244	-,271	**-,312**
Eigenvalu	7,432	4,977	8,030	5,476	5,955	5,988	5,182	5,748	4,909
Alpha	,841	,870	,902	,777	,844	,733	,699	,761	,748

Extraction Method: Principal Component Analysis.   Rotation Method: Oblimin with Kaiser Normalization.

Table 11: Pattern Matrix

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We have included the eigenvalues after the rotation and Cronbach's alpha for each factor. The eigenvalues are more evenly distributed after rotation, which can be seen by comparing the eigenvalues with the raw data eigenvalues from the parallel analysis. We can see that all of the factors has a satisfying alpha, except factor 7 which has a value slightly below the limit. Still, we will keep factor 7 in our data for further analysis. We believe that factor 7 gives theoretical meaning, and correlations between the variables included in this factor are fairly high. Further, we will describe and evaluate each of the factors in greater detail. The items in each factor will be listed based on their factor loadings.

Factor 1: Lowering Prices, Increasing Sales and Reducing the Power of Suppliers
The first factor includes questions 23.4, 23.2, 23.9, 23.1, 22.3, 23.8 and 24.6. These questions involve lowering prices (22.3 and 23.4), increasing sales activities (23.1 and 23.2), and reducing the power of suppliers (23.8, 23.9 and 24.6). This factor has a Cronbach's alpha of 0,841, which is good. Correlations between items are mainly acceptably high, except for question 22.3. Removing this variable would have increased alpha slightly, to 0,845. Question 22.3 has a high correlation with 23.4, as they both include lowering prices, and we chose to keep the variable in our data. We consider this factor to be reliable and giving theoretical meaning.

Factor 2: Investments
The second factor includes questions 28.4, 28.3, 28.5, 28.2, 28.6, 28.1 and 28.8. All of these questions are about how the firm has changed its investments as a result of the crisis. Cronbach's alpha is 0,870, which is good. Correlations between all of the variables are higher than 0,3. Removing question 28.8 would have increased Cronbach's alpha slightly, to 0,872, but we chose to keep it in the data. We consider this factor to be reliable and making theoretical sense.

Factor 3: Focus on Quality, Reputation, Relations and Improvements of Processes
Factor 3 contains questions 22.4, 22.7, 22.5, 22.10, 22.8, 22.11, 22.1, 22.2 and 22.12. These are all questions about a firm's change in focus as a result of the crisis. They involve focusing more or less on issues regarding quality, reputation, relations and improvements of processes. Cronbach's alpha is 0,902, which is excellent, but we have to be aware that a high number of

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variables lead to a high alpha. As all of the variables have correlation coefficients above 0,3. We consider this factor to be quite reliable. We also consider the factor to give theoretical meaning.

Factor 4: Reducing Costs

This factor includes questions 26.2, 26.4, 24.1, 24.8, 24.3, 25.11, 24.4 and 24.5. The first two questions are about reducing training for staff and management (26,2 and 26.4). Question 24.1 is about reducing sales- and marketing costs, and 24.3 is about reducing costs for product development. 24.4 is about shutting down units, 24.5 about reducing inventories, and 24.8 is about less use of external suppliers. 25.11 is about reducing the fixed salaries. All of these questions involves reducing costs. Cronbach's alpha for this factor is 0,777, which is acceptable. Several of the variables has correlation coefficients below 0,3. Still, we accept this factor as giving theoretical meaning and being reliable.

Factor 5: Reducing Personnel Expenses

The fifth factor contains questions 25.1, 25.4, 25.3, 25.2, 25.12, 22.6, 24.2, 25.10 and 25.13. Question 22.6 is about reducing operating expenses, while question 24.2 is about reducing administrative expenses. Questions 25.1 to 25.4 is about reducing the workforce and hiring of new recruits. Question 25.10 is about reduced after-work hours, 25.12 about reducing wage increases, and 25.13 about reducing bonuses. All of these questions involve reducing personnel expenses, although question 22.6 can be assumed to involve other expenses in addition to personnel expenses. Cronbach's alpha is 0,844, which is high. Most of the correlation coefficients are above 0,3. We consider this factor to be reliable and making theoretical sense.

Factor 6: Financial Measures

Factor 6 comprises questions 27.3, 27.4, 27.10, 27.1, 27.2, 27.7 and 27.6. All of these questions are about financial measures as a response to the crisis. The variables that are kept in the data are mainly about increasing total assets. Cronbach's alpha is 0,733, which is acceptable. Many of the variables have correlation coefficients below 0,3. Still, we will accept this factor as making theoretical sense and being reliable.

Factor 7: Increasing the Use of External Workers and Suppliers

This factor contains questions 25.7, 25.5, 25.9 and 24.7. Question 25.5 and 25.7 is about increasing the use of external workers, 25.9 is about increasing the use of part time workers, and 24.7 is about increasing external suppliers. Cronbach's alpha is just below the acceptable limit for this factor, at 0,699. This might also be influenced by the number of variables, as this is the factor with the smallest number of items. Some of the correlation coefficients are below 0,3, but all the mean inter-item correlations are above 0,2. This factor is a little ambiguous, but we will keep in it our data without doing any further adjustments, as the alpha is not too low and the mean inter-item correlations are acceptable.

Factor 8: Increased Training of Staff and Reorganization

Factor 8 includes questions 26.1, 26.3, 28.7, 26.5 and 26.7. Questions 26.1 and 26.3 is about increasing training for staff and management, and 28.7 involves investments in training of staff. Question 26.5 is about reorganizing and 26.7 is about rationalizing work processes. We consider this factor to give theoretical meaning. Cronbach's alpha is 0,761, which is acceptable. The correlation coefficients are generally above 0,3, and we consider this factor to be reliable.

Factor 9: Innovation

The last factor comprises of questions 22.15, 22.9, 23.7, 22.14, 22.13 and 26.6. Questions 22.15 and 23.7 is about launching new products/services. Question 22.9 is about innovation/R&D, 22.14 about development of existing products/services, and 22.13 is about implementing new solutions. 26.6 is about rationalizing product lines. We consider this factor to make theoretical sense. Cronbach's alpha is acceptable at 0,748. With the exception of 26.6 all the variables have correlation coefficients above 0,3. Removing 26.6 would, however, not lead to a higher Cronbach's alpha, and we will keep it in the data. We consider this factor to be reliable.

In order to secure that the factors were reliable, and made theoretical sense, we saw it necessary to remove some items. The items we chose to remove from our data were the questions 23.3, 23.5, 23.6, 25.6, 25.8, 27.5, 27.8 and 27.9. We will here explain the reasons we removed these items.

Question 23.3 is about increasing sales activity towards international customers. We might expect this variable to load onto the same factor as questions 23.1 and 23.2, which are about increasing sales activity towards new and existing customers. However, when including this variable we did not get a reliable result, as the variable loaded mostly onto the same factor as question 23.7 about introducing new products/services. This factor did not have an acceptable Cronbach's alpha, leading us to remove question 23.3. The reason we chose to remove this question was because of its low mean value, of 2,02, implying that this measure was on average not considered to be important. In contrast, questions 23.1 and 23.2 had mean values of 4,39 and 4,68 respectively. Additionally, this variable only had two correlation coefficients above 0,3, correlating with questions 23.1 and 23.2.

Question 23.5 is about increasing prices. This variable was excluded from our data because it had no correlation coefficients above 0,3. It also had a very low mean value of 2,12, implying that on average this measure was not seen as important. Question 23.6 is about reducing the number of products/services. The reason we chose to remove this variable was because after removing several of the other variables, this item loaded mostly onto the same factor as question 23.7 about introducing new products/services. We considered that it did not make theoretical sense to combine these questions in the same factor. Looking at the mean values, we see that question 23.6 has a lower mean than 23.7. We assume that firms think of introducing new products/services as more important than reducing the number of products/services. Hence, we chose to remove this item.

Question 25.6 is about less use of temporary employees, and 25.8 is about less use of contract labor. These questions loaded onto the same factor. Although this factor has a satisfying Cronbach's alpha, implying the factor was reliable, we chose to remove these questions. The reason we removed them was because of their low mean values, of 1,80 and 1,82 respectively,

implying that these measures were on average not seen as being important. They also had very few correlation coefficients above 0,3.

Question 27.5 is about reducing debt, 27.8 about changing bank, and 27.9 about increased use of public support. These variables also loaded onto the sixth factor, but we chose to exclude them from our data because they did not have any correlation coefficients above 0,3. Additionally, we considered that it did not make theoretical sense to include them in the sixth factor.

Analysis of Variance (ANOVA)

After running the factor analysis, we conduct the ANOVAs to see whether there are any differences between how firms are affected by the crisis and how they respond to the crisis, based on their performance. We will do ANOVAs on all the nine factors obtained from the factor analysis. Additionally, we will do ANOVAs on questions 16, 17 and 36 kept separately.

For each of the responding firms, we will base performance on their decile rankings on ROA and operating margin, achieved within their industry. The rankings are obtained from the accounting data, and are based on the whole sample. The responses are analyzed based on a firm's average performance during three different periods. The periods will be 2005-2007, 2008-2010 and 2011-2013. The first period will be the years before the crisis. The second period will be the years we expect firms to be mostly affected by the crisis, and the third period is the years after the crisis. This way we can look at the differences between the deciles in the years before the crisis, the years during the crisis, and the years after.

Below is a table that shows how many respondents are represented in each decile based on ROA over the three periods. Decile 1 represent the top 10 % performing firms, while decile 10 represent the bottom 10 %.

Year	1	2	3	4	5	6	7	8	9	10	Total	Missing
2005-2007	86	115	145	156	176	135	154	117	80	83	1247	1
2008-2010	73	117	147	128	136	147	140	127	126	106	1247	1
2011-2013	87	113	119	109	130	129	151	106	137	118	1199	49

Table 12: Size of the Deciles on ROA

We can see that there is one case that contains missing information on ROA in all of the periods. This is probably due to a mistake when reporting this case's organizational identification number, as it is not linked with any organizations in the accounting data. In 2011 to 2013 there are 49 missing cases, which is most likely due to firms going bankrupt. We can see that all of the groups are of unequal sizes. The groups might include a few less respondents when we are conducting the ANOVA, because we will exclude cases with

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missing information. Because group sizes are different, we have to perform post-hoc tests which can cope with this issue.

The four assumptions to consider when conducting an ANOVA are normal distribution, homogeneity of variances, interval data and independent observations. When it comes to normality, we can look at the shape of the data and perform the Kolmogorov-Smirnov test. When doing the Kolmogorov-Smirnov test, we find that in most circumstances the significance values ($p < 0,05$) indicate deviations from normality. This might have an effect on the robustness of the ANOVAs, although it is often claimed that deviations from normality does not affect the F too badly. However, a sample size of 30 or more is considered to have normal distribution regardless of the shape of the data collected. As all of our groups have a sample size larger than 30, we consider that the assumption of normality is not violated.

To check the assumption about homogeneity of variances we will perform Levene's test. The test shows that on several occasions the variances are unequal, hence violating this assumption. We need to be aware of this when looking at the F-ratios and performing the post-hoc tests.

For the sake of the analysis, we will make the assumption that our dependent variables are measured on at least an interval scale, although this is not necessarily true. For question 16 we will make the assumption that the intervals between the different responses are equal. We will, for example, assume that the interval between very negatively affected to moderately negatively affected is equal to the interval between moderately negatively affected to not affected. For questions 17 and 36 each interval represents one half of the year, with the exception of the last alternative. This might cause a problem to the assumption of interval data, but we chose to treat these variables as being measured on an interval scale. We will assume that all of the factors are measured on an interval scale.

When it comes to independent observations, we think it is reasonable to assume that firms' answers to the questionnaire are not affected by how other firms respond. It might be that firms look at how competitors act as a result of the crisis, and react with similar responses. However, we assume that they will not know how important these responses are to competing

firms, and that their answers will be based chiefly on their own considerations. We consider this assumption not to be violated.

We will now discuss the output from the ANOVA. We are testing the following hypotheses that we proposed earlier:

Hypothesis 5: There are no significant differences between the deciles in any of the periods when it comes to the impact of the crisis.

Hypothesis 6: There are no significant differences between the deciles in any of the periods when it comes to how firms respond to the crisis.

As a starting point we will consider whether there are any differences between the deciles in regards to how affected firms were by the Financial Crisis, when firms were first affected, and when the recession was over for the firm. Then we consider all of the nine factors, which addresses different responses. Significance will be on the 95-percent level, meaning that all p-values above 0,05 will be treated as not significant. We have conducted the analysis on both ROA and operating margin. As our main focus is on ROA, we will only report the results for this variable. When conducting the analysis on operating margin we are given slightly different results, however, the message seems to be generally the same. Hence, we will not delve deeper into the differences between ROA and operating margin.

We tried conducting ANOVAs on the specific industries we chose for the rank correlation analysis. Because the industries were only represented by a few respondents in the survey data, containing less than 40 respondents in total for each industry, we were not able to get valid results. Hence, we will not be able to do ANOVAs on separate industries to see whether there are any differences between industries. We did, however, conduct ANOVAs on all the questions kept separately. We will comment on these results when needed, to further explain the factors. Following are the results from the ANOVAs.
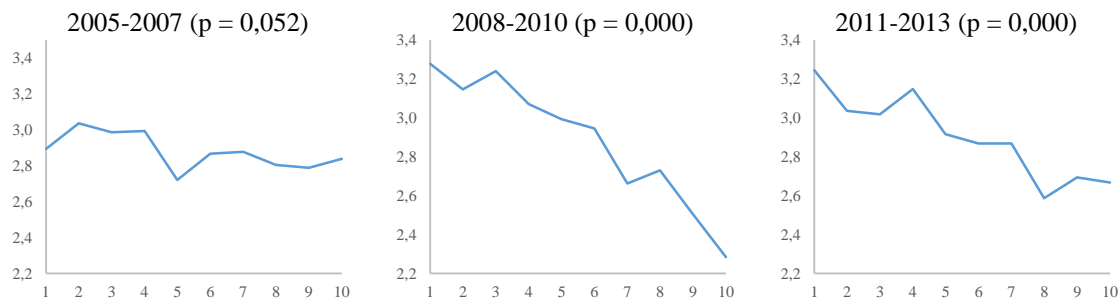
Figure 28: Average Group Values on Question 16

From the graphs we can see that the means lie within the range of around 2,3 and 3,3. A value of 2 means the firm is very negatively affected, while a value of 3 means moderately negatively affected. This imply that on average firms were moderately negatively to very negatively affected by the Financial Crisis.

When looking at the test of homogeneity of variances we find that the variances are different in all of the periods, $p < 0,05$. Hence, we will assess Welch's F instead of F from the ANOVA. In 2005-2007 Welch's F has a value of $F(9, 452,313) = 1,885$, $p > 0,05$. We conclude that differences between the deciles are not significant in the period before the crisis, although the p-value is just above the limit. When assessing Games-Howell test we find no significant differences between any of the groups. This suggests that firm performance before the crisis does not influence how affected firms are by the crisis.

In 2008-2010 Welch's F show that there are significant differences between the groups, $F(9, 475,583) = 15,882$, $p < 0,001$. When looking at the Games-Howell test we find that there are significant differences between deciles 1-4 and 7-10, 5-6 and 9-10, as well as 7-8 and 10. We can see that higher performing firms report being less affected by the crisis than lower performing firms. Because there are no significant differences in the period before the crisis, we might assume that firms who are more negatively affected by the crisis than competitors gain a competitive disadvantage. Hence, these firms might gain a lower rank as a result of the crisis, compared to their performance level before the crisis.

In 2011-2013 Welch's F still show that there are significant differences between the groups, $F(9, 468,188) = 6,086$, $p < 0,001$. Games-Howell show significant differences between deciles 1 and 7-10, 2 and 8-10, 3 and 8, and 4 and 8-10. We can clearly see that firms performing well after the crisis report being less affected. Firms performing worse after the crisis were the ones who report being most negatively affected. This suggest that how affected a firm is by the crisis influence its ranking after the crisis.

Question 17. When was the Firm First Hit by the Recession?
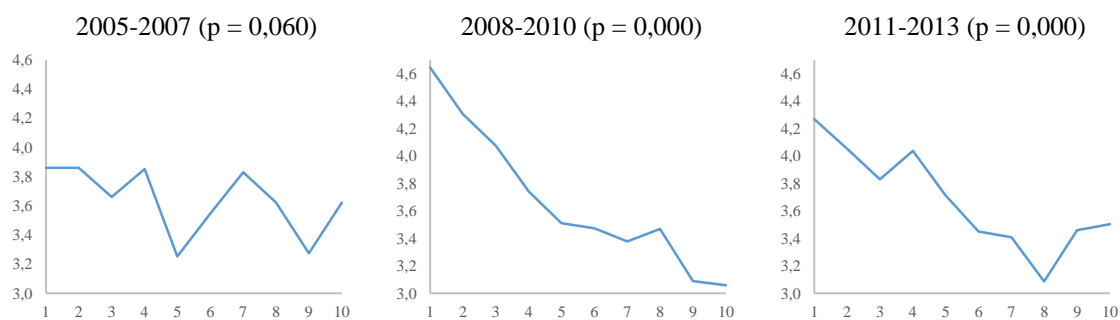
Figure 29: Average Group Values on Question 17

We can see that the means lie within the range of around 3 and 4,65. A value of 3 indicate that the firm was hit by the crisis during the spring of 2009. A value of 4 indicate the fall of 2009, and 5 indicate the spring of 2010. Firms were on average first hit by the recession in the period between the spring of 2009 and spring of 2010.

In 2005-2007 the test of homogeneity of variances is not significant, $F(9, 1225) = 1,520$, $p > 0,05$, implying that variances are equal. ANOVA show that there are no significant differences between the deciles, $F(9, 1225) = 1,826$, $p > 0,05$. This suggests that firm performance before the crisis does not influence when firms are first hit.

In 2008-2010 and 2011-2013 the tests of homogeneity of variances are significant, $p < 0,001$, implying that variances are unequal. In 2008-2010 Welch's F show that there are significant differences between the deciles, $F(9, 474,663) = 7,290$, $p < 0,001$. Games-Howell show significant differences between deciles 1-2 and 5-10, and 3 and 9-10. The highest performing firms report being hit later than the lowest performing firms in the period when most firms are expected to being affected by the crisis. As there are no differences in the period before the

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crisis, we can assume that that firms who are being affected earlier by the crisis are performing worse than those being affected later.

In 2011-2013 Welch's F is still significant, $F(9, 465,470) = 3,799$, $p < 0,001$. Games-Howell show significant differences between deciles 1-2 and 8, and 4 and 8. Again we see that the highest performing firms report being hit later than lower performing firms. This might suggest that firms who are hit earlier by the crisis gain a competitive disadvantage after the crisis.

Question 36. When was the Recession Over for the Firm?
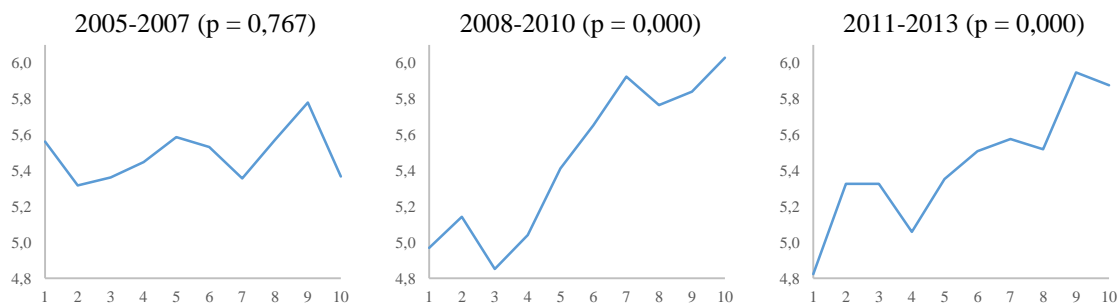
Figure 30: Average Group Values on Question 36

The means lie within the range of around 4,8 and 6. A value of 5 indicate that the crisis was over during the spring of 2010, while a value of 6 indicate that it was over during the fall of 2010. On average the recession was over for the firms during 2010.

The tests of homogeneity of variances are significant in all of the periods, $p < 0,01$, implying that the variances are unequal. In 2005-2007 Welch's F indicate that there are no differences between the deciles, $F(9, 432,054) = 0,635$, $p > 0,05$. We conclude that firm performance before the crisis do not influence when the recession is over for the firms.

In 2008-2010 Welch's F is significant, $F(9, 446,241) = 6,197$, $p < 0,001$. When assessing Games-Howell test we find significant differences between deciles 1-2 and 7, 1-2 and 10, 3 and 6-10, 4 and 7, and 4 and 9-10. In 2011-2013 Welch's F is still significant, $F(9, 437,407) = 3,585$, $p < 0,001$. Games-Howell show significant differences between deciles 1 and 9-10, and

4 and 9-10. In both periods we see that higher performing firms report that the recession was over earlier compared to lower performing firms.

Factor 1: Lowering Prices, Increasing Sales and Reducing the Power of Suppliers

2005-2007 (p = 0,016)   2008-2010 (p = 0,001)   2011-2013 (p = 0,000)
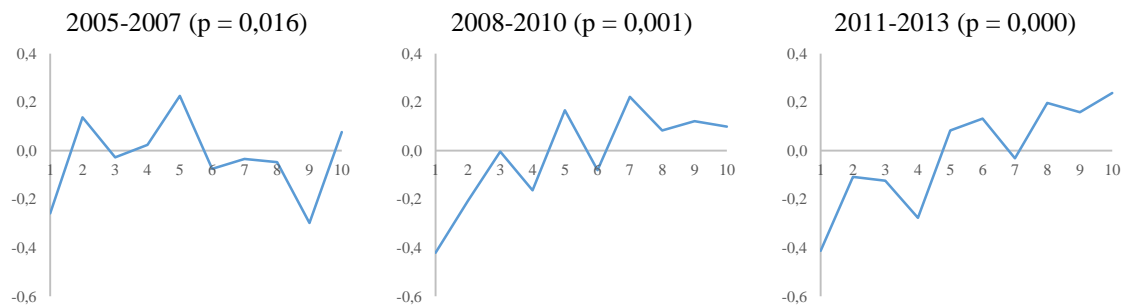
Figure 31: Average Group Values on Factor 1

For the first factor we find that the tests of homogeneity of variances are not significant in any of the periods, $p > 0,05$. This imply that variances are the same between the groups, and we will assess Gabriel's procedure as the post-hoc test.

ANOVA show that there are significant differences between the deciles in all of the periods, $p < 0,05$. In 2005-2007 there are significant differences between deciles 1 and 5, and 5 and 9. Deciles 1 and 9 have lower means than decile 5. We assume that decile 1 has a competitive advantage over decile 5, and that decile 5 has a competitive advantage over decile 9. Because it is not clear whether the differences in responses are linked with having a competitive advantage, it is problematic to assume that firm performance before the crisis really affect how firms respond to the crisis.

In 2008-2010 there are significant differences between deciles 1 and 5, 1 and 7, and 1 and 9. Decile 1 has a lower mean value than deciles 5, 7 and 9, which implies that decile 1 tend to score lower on the variables included in this factor. This might suggest that firms who are performing best during the crisis do not see it as important to take action compared with lower performing firms.

In 2011-2013 there are significant differences between deciles 1 and 5-6, 1 and 8-10, and 4 and 10. Decile 1 has the lowest mean, while deciles 8-10 has the highest mean. This imply that after the crisis, the worst performing firms tend to have higher average scores on the

variables included in this factor than the top performing firms. Hence, the firms who see lowering prices, increasing sales and reducing the power of suppliers as most important are the ones who performs worst after the crisis.

The reason we get this result might be that firms who performs poorly, as a result of the crisis, find it more necessary to respond to the crisis. However, their actions might not necessarily lead to better performance after the crisis. A different explanation might be that doing these measures, as a response the crisis, lead to worse performance after the crisis. This explanation seems implausible, but further analysis will have to be done before we can make this conclusion.

Factor 2: Investments
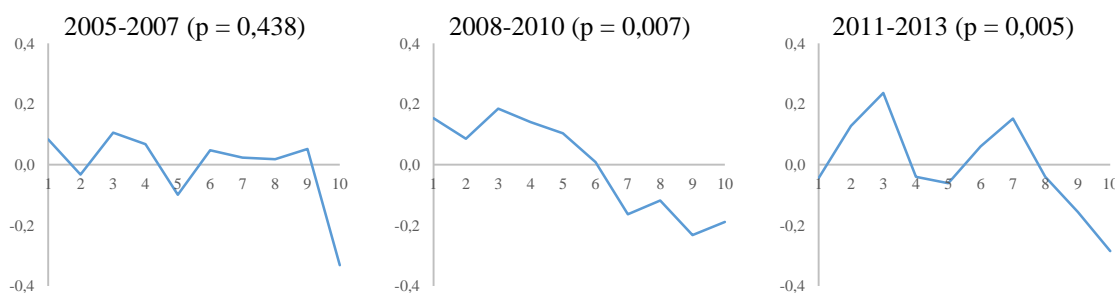
Figure 32: Average Group Values on Factor 2

When it comes to investments the tests of homogeneity of variances are significant in all three periods, $p < 0,001$, implying that variances are unequal. In 2005-2007 Welch's F indicate no significant differences between any of the deciles, $F(9, 367,545) = 1,002$, $p > 0,05$. This suggests that changes of investments are not influenced by firm performance before the crisis. In 2008-2010 Welch's F show significant differences between the deciles, $F(9, 382,697) = 2,559$, $p < 0,01$. Looking at the Games-Howell test we find significant differences between deciles 3 and 9. Decile 3 has a lower mean value than decile 9, implying that decile 3 score lower on the variables included in this factor.

In 2011-2013 Welch's F still show significant differences between the deciles, $F(9, 378,777) = 2,676$, $p < 0,01$. The Games-Howell test show significant differences between deciles deciles 3 and 10. During this period decile 3 has a lower mean value than decile 10, and hence score lower on the different variables. The analysis on this factor is a little ambiguous, as the

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greatest differences are not between the highest and lowest performing firms. It seems that firms who tend to have lower scores on the variables perform better than firms with higher scores. Still, they are not necessarily the top performing firms.

When looking at the individual variables, we see that investments are quite stable, with a slight notion towards reduction. Some variables show significant differences between the deciles in one or more of the periods, while others do not. When differences are significant we see that lower performing firms typically report higher reduction of investments than higher performing firms. This might be an issue when we are combining the questions about different investments into one factor, and we need to be aware of this limitation to our analysis. On the contrary, it might be advantageous to combine all the questions about investments because we can see how overall investments differ between the deciles.

Factor 3: Focus on Quality, Reputation, Relations and Improvements of Processes
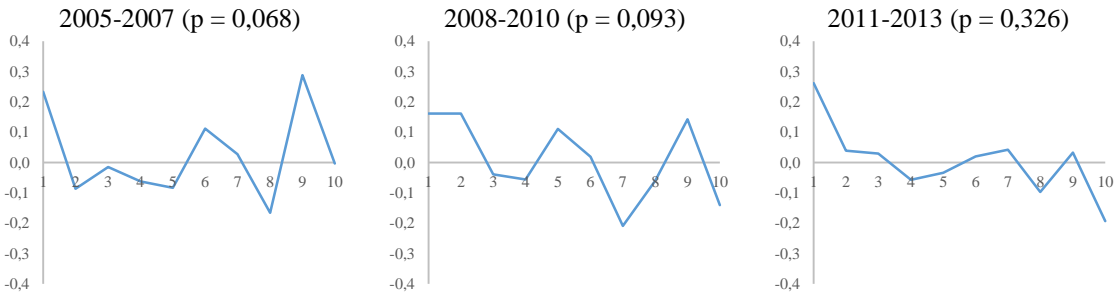
Figure 33: Average Group Values on Factor 3

For factor 3 we find that variances are unequal in 2005-2007, $F(9, 1002) = 2,136$, $p < 0,05$. According to Welch's F there are no significant differences between the deciles, $F(9, 366,661) = 1,794$, $p > 0,05$. In 2008-2010 variances are still unequal, $F(9, 1002) = 1,923$, $p < 0,05$. Welch's F show no significant differences between the deciles, $F(9, 386,682) = 1,676$, $p > 0,05$. In 2011-2013 we find that variances are equal, $F(9, 960) = 1,562$, $p > 0,05$, but still there are no significant differences between the deciles, $F(9, 960) = 1,148$, $p > 0,05$.

Our results imply that firm performance do not relate to whether firms change their focus on issues concerning quality, reputation, relations and improvements of processes. When looking at the individual variables we see that these issues have, on average, become more important

to all deciles. None of the variables show significant differences between the deciles in any of the periods. This suggest that all firms see these issues as becoming more important when hit by the crisis.

It is worth mentioning that the variables load negatively on this factor. This means that higher factor scores indicate lower scores on the variables included in this factor, compared with lower factor scores. If there were any significant differences between the deciles, we would assume that the deciles with the highest factor scores where the ones who thought these issues were the least important. As there are no significant differences, we cannot make any assumptions regarding these issues.

Factor 4: Reducing Costs
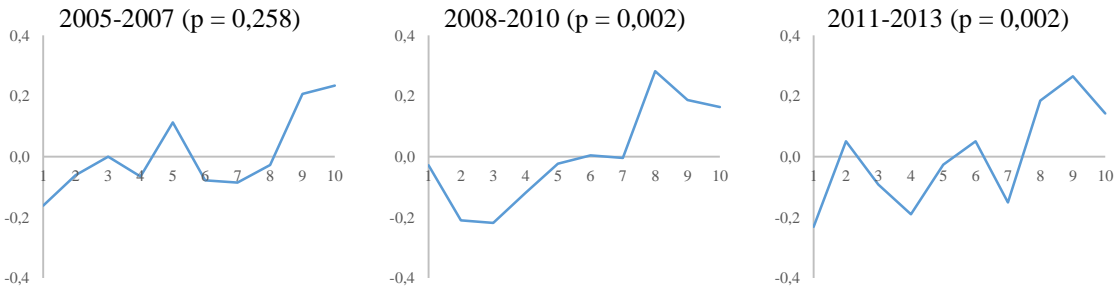
Figure 34: Average Group Values on Factor 4

When it comes to reducing costs we find that variances are significantly unequal in all of the periods, $p < 0,01$. Welch's F show no significant differences between the deciles in 2005-2007, $F(9, 365,527) = 1,259$, $p > 0,05$. This suggest that firm performance before the crisis does not influence how firms respond when it comes to reducing costs as a result of the crisis.

In 2008-2010 there are significant differences between the deciles, $F(9, 383,177) = 2,961$, $p < 0,01$. Games-Howell show that there are significant differences between deciles 2 and 8, and 3 and 8. Deciles 2 and 3 have lower mean values than decile 8. This imply that deciles 2 and 3 tend to score lower on the variables included in this factor than decile 8. This suggest that firm performance during the crisis might affect how firms respond to the crisis when it comes to reducing costs.

In 2011-2013 there are still significant differences between the deciles, $F_{(9, 381,066)} = 2,926$, $p < 0,01$. The significant differences are between deciles 1 and 9, 4 and 9 and 7 and 9. Deciles 1, 4 and 7 have lower mean values than decile 9. This imply that deciles 1, 4 and 7 tend to score lower on the variables included in this factor than decile 9. Firms who see it as less important to reduce costs, as a result of the crisis, seem to perform better after the crisis. The firms who see it as least important to reduce costs are the highest performing firms.

The results are, however, a little ambiguous. We see that deciles 2 and 3, which we expect to have a competitive advantage over decile 4, has higher mean values than decile 4, although it is not significant. We have the same situation with deciles 5 and 6, which we expect to have a competitive advantage over decile 7. Still, our results suggest that firms who see reducing costs as significantly more important experiences lower performance after the crisis.

Factor 5: Reducing Personnel Expenses
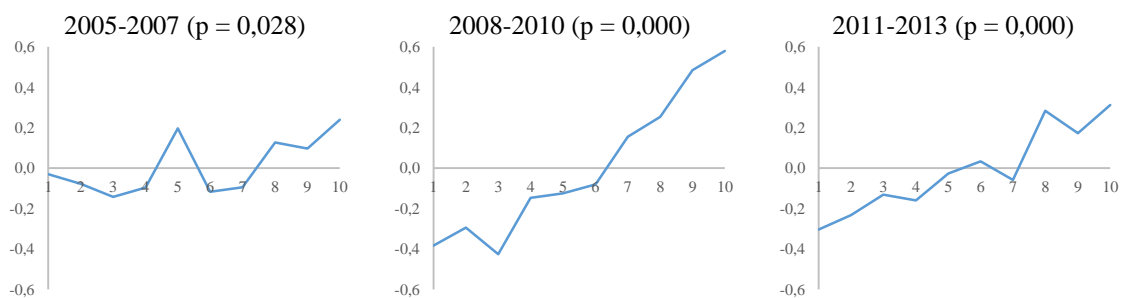
Figure 35: Average Group Values on Factor 5

In 2005-2007 the test of homogeneity of variances is not significant, $F_{(9, 1002)} = 0,752$, $p > 0,05$. This imply that variances are equal. ANOVA show that there are significant differences between the deciles, $F_{(9, 1002)} = 2,089$, $p < 0,05$. When assessing Gabriel's procedure, we find no significant differences between any of the deciles. This might be due to F not controlling the Type I error rate well, and that even when there are no differences between the means it shows significant differences. On the contrary, this might be due to Gabriel's procedure not being liberal enough, and that it shows non-significant results when a genuine difference exists, the Type II error rate. We consider it most reasonable to assume that firm performance before the crisis does not influence how firms respond when it comes to reducing personnel expenses.

In 2008-2010 we find that variances are unequal, $F(9, 1002) = 4,547$, $p < 0,001$. Welch's F show that there are significant differences between the deciles, $F(9, 386,303) = 12,706$, $p < 0,001$. The Games-Howell procedure show significant differences between deciles 1-2 and 7-10, 3 and 6-10, and 4-6 and 9-10. Higher performing firms have lower means than poor performing firms, implying they tend to score lower on the variables included in this factor. Our results indicate that during the crisis, poor performing firms see it as more important to reduce personnel expenses than higher performing firms. The lower a firm performs, the more important it becomes to reduce these expenses. Hence, we can expect that the lowest performing firms are the ones who are most likely to reduce their working stock, as well as the variable salary for their employees.

In 2011-2013 we still find that variances are unequal, $F(9, 960) = 3,085$, $p < 0,01$. There are also significant differences between the deciles, $F(9, 380,904) = 4,154$, $p < 0,001$. The Games-Howell procedure show significant differences between deciles 1 and 8-10, 2 and 10, as well as 4 and 10. Again we see that higher performing firms have lower means than lower performing firms, indicating that higher performing firms score lower on the variables. Firms who see it as least important to reduce personnel expenses are performing best after the crisis. Firms who see it as most important to take action are the ones performing worst. This might suggest that reducing personnel expenses during the crisis do not necessarily lead to better performance after the crisis. We have to do further analysis, however, to establish this causality.

Factor 6: Financial Measures

| 2005-2007 (p = 0,006) | 2008-2010 (p = 0,000) | 2011-2013 (p = 0,000) |
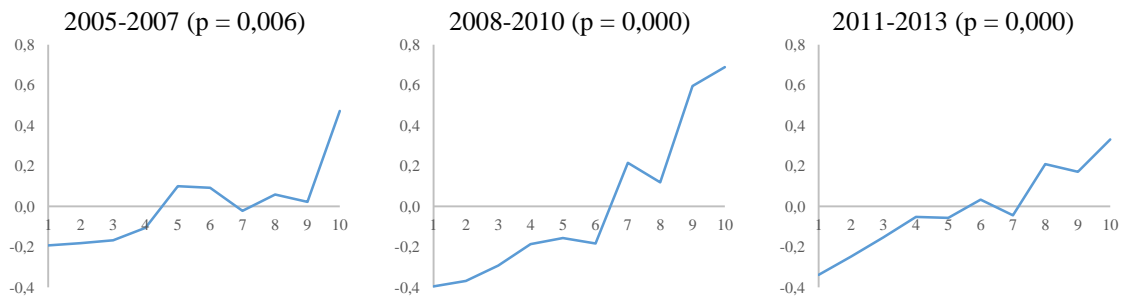
Figure 36: Average Group Values on Factor 6

When it comes to financial measures we find that variances are unequal in all of the periods, *p* < 0,001. We also find that there are significant differences between the deciles in all of the periods, *p* < 0,01. In 2005-2007 the Games-Howell procedure show that there are significant differences between deciles 1-3 and 10. Deciles 1-3 have lower mean values than decile 10, implying that they score lower on the variables included in this factor. It seems that firm performance before the crisis affect how firms respond when it comes to doing financial measures as a response to the crisis. The lowest performing firms see it as significantly more important to do these measures than the highest performing firms. This suggest that low performance before the crisis increases the probability that a firm will do financial measures, which involves increasing the supply of capital, when hit by the crisis.

In 2008-2010 the Games-Howell procedure show significant differences between deciles 1-3 and 7-10, as well as 4-6 and 9-10. Higher performing firms have lower means than lower performing firms, implying they score lower on the variables. This also imply that higher performing firms see it as less important to do financial measures compared with lower performing firms. We consider it reasonable to assume that poor performing firms see it as necessary to take actions when affected by the crisis, to try to improve their performance.

In 2011-2013 there are significant differences between deciles 1 and 6, 1 and 8-10, as well as 2 and 9-10. Again we see that higher performing firms have lower means than lower performing firms. This might suggest that a firm's action to improve its performance level does not necessarily lead to better performance after the crisis. We will have to perform further analysis to establish this causality.

Factor 7: Increasing the Use of External Workers and Suppliers
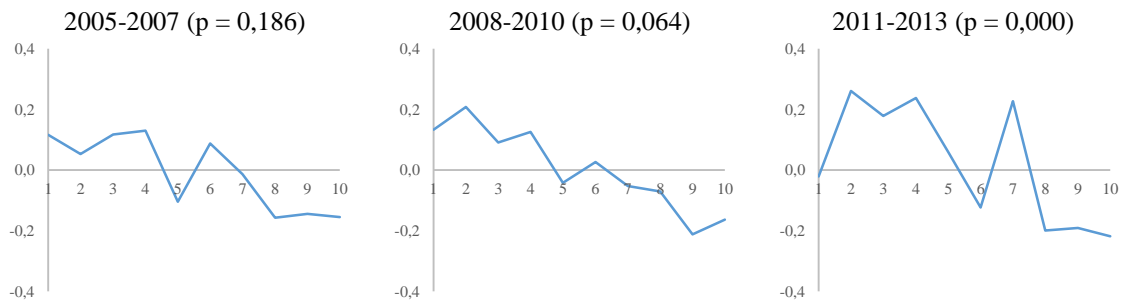
Figure 37: Average Group Values on Factor 7

For factor 7 the tests of homogeneity of variances are significant in all of the periods, $p < 0,05$, indicating a violation to the assumption of equal variances. In 2005-2007 Welch's F show no significant differences between any of the deciles, $F(9, 363,198) = 1,400$, $p > 0,05$. This suggest that firm performance before the crisis do not influence firms' responses when it comes to increasing the use of external workers and suppliers. In 2008-2010 there are still no significant differences between the deciles, $F(9, 384,167) = 1,814$, $p > 0,05$, indicating that firm performance during the crisis does not influence firms' responses either.

In 2011-2013 Welch's F indicate that the deciles are significantly different, $F(9, 378,872) = 3,952$, $p < 0,001$. The Games-Howell test show significant differences between deciles 2 and 9, and 7 and 9. Deciles 2 and 7 have higher mean values than decile 9. For this factor the variables have negative loadings. This imply that deciles 2 and 7 have lower scores on the variables included in this factor than decile 9. We assume that lower performing firms see it as more important to increase the use of external workers.

Our results are, however, a little ambiguous. We expect that decile 1 has a competitive advantage over decile 2, and that decile 6 has a competitive advantage over decile 7. Although the differences are not significant we can see that deciles 1 and 6 has lower means than deciles 2 and 7. Hence, it is problematic to make a clear assumption about how firm performance after the crisis is related to firms' scores on this factor.
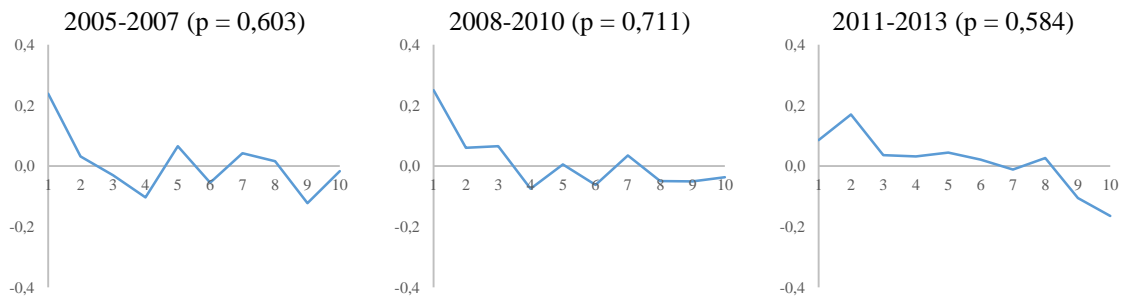
Figure 38: Average Group Values on Factor 8

For factor 8 the tests of homogeneity of variances are not significant in any of the periods, *p* > 0,05. This indicate that the variances are equal. From the ANOVA we find that there are no significant differences between the deciles in any of the periods. This suggest that reponses related to increased training of staff and reorganisation are not influenced by firm performance before the crisis. Firm performance after the crisis is also not related to firms' responses on these measures.

For this factor the variables also have negative factor loadings. This imply that firms who score high on this factor tend to score low on the variables included in this factor. When looking at the ANOVA on the individual variables, we find that when it comes to reorganization and rationalized work processes there are significant differences between the deciles in 2008-2010 and 2011-2013. Lower performing firms tend to see these measures as significantly more important than higher performing firms. When it comes to increased training of staff, all firms seem to think of these measures as being important, and we find no significant differences between the deciles in any of the periods. Based on these results we can see that our analysis might lose some information when combining the variables into factors.

Factor 9: Innovation

| 2005-2007 (p = 0,262) | 2008-2010 (p = 0,473) | 2011-2013 (p = 0,685) |
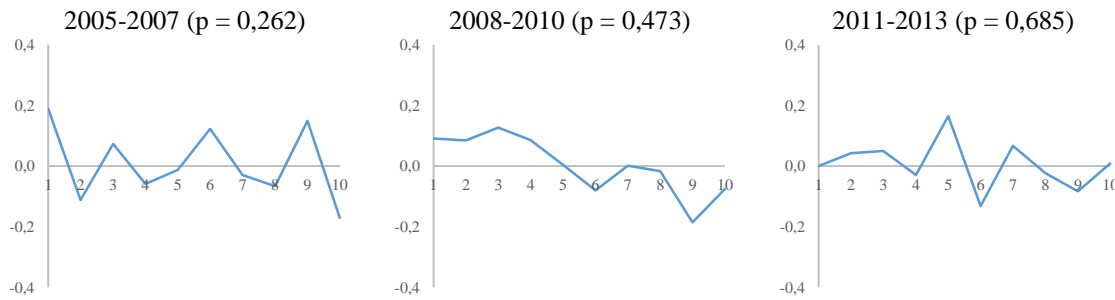
Figure 39: Average Group Values on Factor 9

When it comes to innovation we find that variances are unequal in 2005-2007 and 2008-2010, $p < 0,01$. In 2011-2013 the test of homogeneity of variances is not significant, $p > 0,05$, implying that variances are equal. In all of the periods we find that there are no significant differences between any of deciles, $p > 0,05$. This suggest that firm performance before the crisis do not influence how firms' respond to measures related to innovation. Firm's responses to these measures is also not related to firm performance after the crisis.

This factor also has negative factor loadings, implying that firms who score high on this factor tend to score low on the variables included in this factor. When looking at the individual variables, we find that most of the variables show no significant differences between the deciles in any of the periods. We also see that, on average, firms think of innovation as becoming more important as a response to the crisis, regardless of how they perform. When it comes to rationalized product lines (question 26.6) there are significant differences in 2008-2010 and 2011-2013. Lower performing firms tend to see it as more important to rationalize product lines than higher performing firms. Like for factor 8, we can see that we might loose some information when combining the variables into factors.

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Summary

Based on our results from the ANOVA we reject our null hypothesis on several occasions, and conclude that in some of the periods there are significant differences between the deciles when it comes to both impact and responses. Our results suggest that there is a relationship between firm performance, and the impact of and responses to the crisis. This applies particularly to the periods during and after the crisis. Firm performance in the period before the crisis does not seem to be related to the impact of and responses to the crisis. The exception is financial measures, which show significant differences in all periods.

When it comes to the impact of the crisis (measured by questions 16, 17 and 36), it seems that firms performing better during and after the crisis report not being as negatively affected by it, and are disturbed for a shorter period of time. Because there are no significant differences in the period before the crisis, we can assume that the impact of the crisis affects firm performance during and after the crisis. We might assume that firms who experience a greater impact of the crisis, compared with competitors, gain a competitive disadvantage, which is likely to last over the period after the crisis.

When it comes to how firms respond to the crisis, we generally find that firms performing worse during and after the crisis see it as more important to do various measures. This applies particularly to lowering prices, increasing sales and reducing the power of suppliers, reducing costs and personnel expenses, and doing financial measures. From this we expect that firms who experience lower performance as a result of the crisis try to reduce the impact of the crisis through various responses. Since there are still significant differences between the deciles in the period after the crisis, we assume that firms' responses may not necessarily lead to better performance.

When it comes to focus on quality, reputation, relations and improvements of processes there are no significant differences between the deciles in any of the periods. We get same results for increased training of staff and reorganization, as well as innovation. It seems that firms think of these responses as being equally important regardless of firm performance.
We will argue that in a broad sense the first set of responses, which show significant differences between deciles, can be seen as strategies to seek competitive advantage through cost leadership. The other set of responses, which show no significant differences between

deciles, can be seen as strategies to seek competitive advantage through differentiation. This is based on Porter's generic strategies (Porter, 1985). It is interesting to see that cost leadership strategies show significant differences between deciles, while differentiation strategies do not. Additionally, firms who think of cost leadership strategies as more important seem to be doing worse during and after the crisis. We consider it unlikely, however, that cost leadership strategies lead to competitive disadvantage. A more plausible explanation is that firms experiencing lower performance as a result of the crisis, see cost leadership strategies as more important measures to modify the impact of the crisis.

When it comes to changes of investments and increasing the use of external workers and suppliers, our results are a little ambiguous. Still, we find that lower performing firms tend to reduce their investments more than higher performing firms, as well as seeing increased use of external workers and suppliers as more important.

Based on our results we find it reasonable to assume that the crisis leads to changes in the performance landscape within industries. Because of changes in the performance landscape, firms might find themselves at a lower performance level resulting from the crisis. If firms experience a fit-destroying change, it will probably be clear to management that something must be done, increasing the likelihood of a quick response. This is probably the reason we find that lower performing firms, during the crisis, see it as more important to do various measures in response to the crisis. After the crisis we find that firms who saw measures as more important during the crisis still have lower performance, compared with those who did not see these measures as equally important. This might suggest that responses do not necessarily lead to better performance. Further analysis will have to be done before establishing this causality.

Concluding Remarks

The purpose of our study has been to gain more insight into how environmental shocks affect the competitive dynamics within different industries. Additionally, we wanted to investigate how firm performance is related to the impact of an exogenous shock, as well as firms' responses when hit by a crisis. We used accounting data for all Norwegian firms from the period between 1999 to 2013, combined with survey data conducted by the STOP program in late 2010 on the Financial Crisis. Our main focus has been on the impact of the Financial Crisis of 2008.

The motive behind our research was to make a contribution to the existing literature on how firms are affected by recessions. In this section we will summarize our main findings in relation to the research question. Then we discuss the implications of our results, and the limitations to our study. Finally, we give suggestions for future studies related to our topic, as we have seen several opportunities to further explore the issues we have studied in this theses.

Summary of Findings

The first part of our research question was concerned with competitive dynamics during a business cycle. We looked at changes in profitability and stability of firm performance within industries. We used rankings within industries on both ROA and operating margin to measure relative firm performance. To make the scope of analysis more manageable we chose to look at three different industries on a two-digit SIC code level. We divided these industries further on three- and four-digit SIC code levels. We did this because we wanted our industries to be as narrow as possible, to secure a higher likelihood that firms within the industries were actual competitors.

Our first finding was that average profitability declined in all industries during the Financial Crisis, however, the reduction and duration of impact differed between the industries. Second, we found that profitability became more volatile in all industries during the Financial Crisis. Our third finding was that stability within most industries changed during the Financial Crisis. Some industries experienced lower stability during the crisis, but most industries experienced higher stability. Fourth, we found an indication that in some industries the competitive dynamics changed over the Financial Crisis. In other industries the results were somewhat

ambiguous, and the competitive dynamics seemed to be more consistent. Our results show that there was an effect of the Financial Crisis in all industries, but there were large variations between how our chosen industries were affected.

The second part of our research question was concerned with looking at the impact of and responses to the Financial Crisis separately. We compared these effects with firm performance from three different periods through numerous ANOVAs. Our results suggested that there was no relationship between firm performance before the crisis and the impact of, and responses to, the crisis. The only exception was financial measures. We found that lower performing firms during and after the crisis reported being more negatively impacted by the crisis, and disturbed for a longer period of time, compared to higher performing firms. We also found that lower performing firms reported seeing various responses to the crisis as more important than higher performing firms. This generally involved responses we consider associated with cost leadership strategies. Responses related to differentiation strategies were found to have no differences between lower and higher performing firms.

Implications

As far as we know, there have been no previous research looking at exactly the same issues as we have done in this thesis. We consider the following issues the most interesting with our study; 1) We investigate how stability in firm performance, and the competitive dynamics within different industries, changes over the business cycle. 2) We examine whether there is any relationship between firm performance in the period before the crisis with the impact of, and responses to, the crisis. Previous research has looked at firm and industry characteristics that increases the likelihood of being affected by the crisis. There has been no research, known to us, linking impact and response with level of relative firm performance within industries before the crisis. 3) Last, we explore the relationship between firm performance during and after the crisis with the impact of, and responses to, the crisis.

Limitations

As is the case with all research, our research involves some limitations. In this section we will discuss the limitations we find to be most prevalent in our study.

We have an issue with survivor bias when conducting the Spearman Rank Order Correlation analysis. This applies particularly when we are looking at longer lags. Firms who are not included in the sample both years when performing the correlation analysis, will not be included in the analysis. For example, for a firm to be present in the four-year correlation, it has to survive for at least five years. However, firms who are not included in the analysis, because they are not present in both years, still affect the rankings in the year they are present.

There might be a limitation regarding the use of rankings based on ROA and operating margin to study firm performance. We cannot know for sure that a firm with a higher ranking always has a competitive advantage over firms with lower rankings. Firm performance can be based on several other features, and firms can have different objectives at the expense of achieving a high ROA or operating margin.

The use of SIC codes to define industries might make the industries too broad, and we cannot be sure that all firms within the same industry are actual competitors. Still, the SIC codes represent our best alternative, based on available data. We think that when we are dividing industries based on three- and four-digit SIC codes we reduce this bias somewhat, as the industries become narrower.

When doing the ANOVA, we assumed that the data was measured on at least an interval scale. As several of the questions we included in the analyses involve the choice "not executed, they are not truly symmetric and equidistant. This might pose a limitation to our analysis. We considered removing firms who answered "not executed", or making dummy variables to indicate "not executed" and "executed", would lead to a great loss of information. Thus, we chose to treat our data as interval, for the sake of the analysis.

Another limitation is that we will not be able to establish causality, lowering the internal validity of our study. Based on our results we will not be able to infer whether various responses lead to higher or lower performance in the period after the crisis. We reason that firms who find themselves in an unfortunate position as a result of the crisis, see it as more important to take on various measures. We consider it unlikely that these measures lead to lower performance, although they might not necessarily lead to better performance in the short-term.

It will be difficult to generalize our findings to other crisis and other economies, hence lowering the external validity of our study. We looked only at the Financial Crisis, and as crises differ in nature, we cannot know whether we will find consistent findings when investigating other crises. We also included only Norwegian firms in our analyses. As other economies are different in various ways, and several international economies were more affected by the Financial Crisis than Norway, we do not know if we would find consistent findings when looking at other economies. Last, we only looked at a a few industries. As we have found that industries were affected differently by the Financial Crisis, we will not be able to make generalizations to other industries.

Suggestions for Future Studies

In the end we want to give some suggestions for future research, as we feel there are still several opportunities to gain more insight into the theme of our thesis. A suggestion is to look into other industries than the ones we chose for this thesis. One might compare several industries within the same sector, for example the manufacturing sector, to see whether the same pattern of stability of firm performance occurs within similar industries. Another suggestion is to do a regression analysis to look at how impact and responses affects relative performance after the crisis. One might also do a regression analysis to further test whether performance before the crisis affects impact and responses. By doing a regression analysis, one can establish causality. This could have been done by including factors, such as the ones we used in our ANOVAs, as independent variables in the regression analysis.

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Appendix A: STOP Survey form 2010

Prosjekt	**102069**
Skjemanummer	

DEL 1: Generelle egenskaper ved bedriften og markedet før finanskrisen

For å studere finanskrisens påvirkning på bedrifter og bransjer er det viktig å finne ut hvordan situasjonen var <u>før</u> krisen slo inn høsten 2008. Vi ber deg derfor besvare følgende spørsmål med utgangspunkt i situasjonen slik den var de <u>to årene før krisen</u> inntraff, altså i tidsrommet <u>midten av 2006 til midten av 2008.</u>

Er det noen spørsmål du ikke vet det nøyaktige svaret på, ber vi deg gi et estimat.

A. Bedriften <u>før</u> krisen

1 Hvem var bedriftens viktigste kunder *før krisen?*

ANGI CA. ANDEL AV OMSETNINGEN I %.

FORDEL 100%

Offentlige . . . . `____` 1

Bedriftskunder . . . . `____` 2

Privatmarkedet . . . . `____` 3

Salg til selskaper innad i samme konsern . . . . `____` 4

Tilsammen `____` 5

2 Hvor stor andel av bedriftens omsetning var fra kunder i utlandet *før krisen?*

ANGI CA. ANDEL AV OMSETNINGEN I %.

Omsetning fra kunder i utlandet . . . . `____` 1

3 Hva var bedriftens viktigste aktiviteter *før krisen?*

ANGI CA. ANDEL AV OMSETNINGEN I %.

FORDEL 100%

Produksjon av varige goder (produkter som forbrukes over tid) . . . . `____` 1

Videresalg av varige goder (ikke-egenproduserte) . . . . `____` 2

Produksjon av ikke-varige goder (produkter som forbrukes raskt) . . . . `____` 3

Videresalg av ikke-varige goder (ikke-egenproduserte) . . . . `____` 4

Produksjon av tjenester . . . . `____` 5

Tilsammen `____` 6

4 *Før krisen,* hvor stor andel (ca.) av bedriftens salg var regulert gjennom:

ANGI CA. ANDEL I %.

FORDEL 100%

Langtidskontrakter /langvarige prosjekter (> 6mnd) 1

Korttidskontrakter/kortvarige prosjekter (1-6 mnd) 2

Salg "over disk" (< 1mnd) 3

Tilsammen 4

5 *Før krisen,* hvor stor andel (ca.) av bedriftens innkjøp var regulert gjennom:

ANGI CA. ANDEL I %.

FORDEL 100%

Langtidskontrakter/ langvarige prosjekter (> 6mnd) 1

Korttidskontrakter/ kortvarige prosjekter (1-6 mnd) 2

Kjøp "over disk" (< 1mnd) 3

Tilsammen 4

6 Hvordan var bedriften eid *før krisen?* Kryss av for de alternativene som passer

FLERE SVAR MULIG

Selvstendig børsnotert selskap .... ☐ 1,

Selvstendig, ikke-børsnotert selskap .... ☐ 2,

Datterselskap av et børsnotert selskap .... ☐ 3,

Datterselskap av et ikke-børsnotert selskap .... ☐ 4,

Utenlandsk eid/ dominert av utenlandske eiere .... ☐ 5,

Offentlig eid/ dominert av offentlige eiere .... ☐ 6,

Familieeid eller familiedominert .... ☐ 7,

Private Equity-/ Venture Capital fond er sentrale eiere .... ☐ 8,

Sentrale eiere er ansatt i bedriften .... ☐ 9.

7 Hvor mange personer (ca) var tilknyttet bedriften *før krisen?*

NOTER ANTALL

Faste ansatte 1

Midlertidig ansatte 2

Innleid personell 3

102069 002

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8 Hvor stor andel av bedriftens ansatte (faste- og midlertidig ansatte) hadde høyere utdanning *før krisen?*

ANGI CA. ANDEL I %.

FORDEL 100%

Ingen høyere utdannelse .... | | | 1

1-4-års høyere utdannelse .... | | | 2

Mer enn 4-års høyere utdannelse .... | | | 3

Tilsammen | | | 4

B. Markedsforhold <u>før</u> krisen.

Denne delen av spørreskjemaet ser på situasjonen i bedriftens hovedmarked de to årene <u>før krisen,</u> altså i tidsrommet <u>midten av 2006 til midten av 2008.</u> Med hovedmarked menes her det markedet som utgjør størst del av bedriftens omsetning.

9 Hvor stor årlig vekst (endring i markedets totale omsetning) var det i bedriftens hovedmarked *før krisen?*

ETT SVAR

<-5% .... ☐ 1

-5 - -1% .... ☐ 2

-1 - +1% .... ☐ 3

1-5 % .... ☐ 4

5-10 % .... ☐ 5

10-25 % .... ☐ 6

>25% .... ☐ 7

10 Hvor ofte...

ETT SVAR PR LINJE

	Aldri	Sjelden	Av og til	Ofte	Svært ofte	
... forekom nyetableringer i bedriftens hovedmarked <u>før krisen?</u>	☐	☐	☐	☐	☐	1
... forlot selskaper bedriftens hovedmarked <u>før krisen?</u>	☐	☐	☐	☐	☐	2

11 Hvor sterk var konkurransen på følgende områder *før krisen?*

ETT SVAR PR. LINJE

	1 Svak	2	3	4	5	6	7 Sterk	
Pris	☐	☐	☐	☐	☐	☐	☐	1
Kvalitet	☐	☐	☐	☐	☐	☐	☐	2
Produkt-/tjenestespekter	☐	☐	☐	☐	☐	☐	☐	3
Innovasjon	☐	☐	☐	☐	☐	☐	☐	4
Reklame/markedsføring	☐	☐	☐	☐	☐	☐	☐	5
Kundetilpasning av produktene/ tjenestene	☐	☐	☐	☐	☐	☐	☐	6

12 Hvor mange nære konkurrenter hadde bedriften i sitt hovedmarked *før krisen?*

NOTER ANTALL

Antall nære konkurrenter .... ☐☐☐ 1

13 Vennligst indiker hvor enig/uenig du er i følgende påstander om bedriftens produkter/tjenester *før krisen*

ETT SVAR I HVER LINJE

	1 Uenig	2	3	4	5	6	7 Enig	
I vårt hovedmarked var det stor variasjon i ulike kunders behov	☐	☐	☐	☐	☐	☐	☐	1
I vårt hovedmarked var det stor variasjon i ulike kunders betalingsvilje .	☐	☐	☐	☐	☐	☐	☐	2
I vårt hovedmarked var det store prisforskjeller mellom ulike varianter ..	☐	☐	☐	☐	☐	☐	☐	3
I vårt hovedmarked ble det tilbudt mange ulike varianter	☐	☐	☐	☐	☐	☐	☐	4

14 Hvor stor innflytelse hadde…

ETT SVAR I HVER LINJE

	1 Lav inn- flytelse	2	3	4	5	6	7 Høy inn- flytelse	
… bedriftens kunder på vilkår som pris, levering, betalingsbetingelser, osv hos bedriften før krisen?	☐	☐	☐	☐	☐	☐	☐	1
… bedriften selv på vilkår som pris, levering, betalings- betingelser, osv hos sine viktigste leverandører før krisen?	☐	☐	☐	☐	☐	☐	☐	2

15	Hvor viktig var følgende for *din bedrift* i konkurransen dens nærmeste konkurrenter *før krisen?*							

ETT SVAR I HVER LINJE

	1 Ikke viktig	2	3	4	5	6	7 Meget viktig	
Høy kunde- /brukerservice	☐	☐	☐	☐	☐	☐	☐	1
Bredt produkt-/tjenestespekter	☐	☐	☐	☐	☐	☐	☐	2
Lave priser	☐	☐	☐	☐	☐	☐	☐	3
Høy kvalitet på produkter/tjenester	☐	☐	☐	☐	☐	☐	☐	4
Kundetilpasning /skreddersøm	☐	☐	☐	☐	☐	☐	☐	5
Reduksjon av driftskostnader	☐	☐	☐	☐	☐	☐	☐	6
Kvalitetskontroll/kvalitetsstyring	☐	☐	☐	☐	☐	☐	☐	7
Merkevarebygging	☐	☐	☐	☐	☐	☐	☐	8
Innovasjon/FoU	☐	☐	☐	☐	☐	☐	☐	9
Renommébygging	☐	☐	☐	☐	☐	☐	☐	10
Bygging av langsiktige relasjoner	☐	☐	☐	☐	☐	☐	☐	11
Prosessforbedringer (optimalisering av prosesser)	☐	☐	☐	☐	☐	☐	☐	12
Implementering av nye løsninger (teknologi, systemer)	☐	☐	☐	☐	☐	☐	☐	13
Videreutvikling av eksisterende produkter/tjenester	☐	☐	☐	☐	☐	☐	☐	14
Lansering av nye produkter/tjenester ..	☐	☐	☐	☐	☐	☐	☐	15

Del 2: Effekter av finanskrisen

Denne delen undersøker hvilke effekter finanskrisen hadde på bedriften og dens hovedmarked. Vi er her opptatt av hvilke ytre press og påvirkninger bedriften/markedet ble utsatt for. Endringer som skjedde som følge av bedriftens egne tiltak skal ikke vurderes da dette vil bli behandlet i del 3

Er det noen spørsmål du ikke vet det nøyaktige svaret på, ber vi deg gi et estimat.

A. Effekter av krisen på bedriften

16	1 I hvilken grad ble/er bedriften påvirket av finanskrisen og nedgangstidene som fulgte? Vennligst vurder svaret i forhold til det du oppfatter som normale markedsforhold.

ETT SVAR

Særdeles negativt påvirket	☐ 1
Meget negativt påvirket	☐ 2
Moderat negativt påvirket	☐ 3
Ikke påvirket	☐ 4
Positivt påvirket	☐ 5

17 Når ble bedriften først *påvirket av krisen?*

Vår 2008 .... ☐ 1

Høst 2008 .... ☐ 2

Vår 2009 .... ☐ 3

Høst 2009 .... ☐ 4

Vår 2010 .... ☐ 5

Høst 2010 .... ☐ 6

Ble ikke påvirket av krisen .... ☐ 7

18 Hvordan ble din bedrift *påvirket av krisen?*

0= IKKE PÅVIRKET - ETT SVAR I HVER LINJE

	-3 Redu-sert	-2	-1	0	1	2	3 Økt	Ikke relevant	
Etterspørsel rettet mot bedriften	☐	☐	☐	☐	☐	☐	☐	☐	1
Betalingsvilje for bedriftens produkter/tjenester	☐	☐	☐	☐	☐	☐	☐	☐	2
Omsetning fra kunder i utlandet	☐	☐	☐	☐	☐	☐	☐	☐	3
Kapasitetsutnyttelse	☐	☐	☐	☐	☐	☐	☐	☐	4
Lagerbeholdning	☐	☐	☐	☐	☐	☐	☐	☐	5
Kredittilgang	☐	☐	☐	☐	☐	☐	☐	☐	6
Tap på fordringer	☐	☐	☐	☐	☐	☐	☐	☐	7
Valutakursproblemer	☐	☐	☐	☐	☐	☐	☐	☐	8
Likviditetsproblemer	☐	☐	☐	☐	☐	☐	☐	☐	9
Pris på innkjøp av varer/tjenester ..	☐	☐	☐	☐	☐	☐	☐	☐	10

19 Hvordan *påvirket krisen...*

0= IKKE PÅVIRKET - ETT SVAR I HVER LINJE

	-3 Redu-sert	-2	-1	0	1	2	3 Økt	
... medarbeidernes forståelse for endringsprosesser?	☐	☐	☐	☐	☐	☐	☐	1
... medarbeidernes vilje til å gjennomføre endringsprosesser?	☐	☐	☐	☐	☐	☐	☐	2
... samhold og fellesskapsfølelse mellom bedriften og de ansatte?	☐	☐	☐	☐	☐	☐	☐	3
... delegering av beslutningsmyndighet i bedriften?	☐	☐	☐	☐	☐	☐	☐	4
...medarbeidernes vilje til å yte ekstra innsats for virksomheten?	☐	☐	☐	☐	☐	☐	☐	5

B. Effekter av krisen på bedriftens hovedmarked

20 Hvordan *påvirket krisen* bedriftens hovedmarked?

0= IKKE PÅVIRKET - ETT SVAR I HVER LINJE

	-3 Redusert	-2	-1	0	1	2	3 Økt	
Antall konkurrenter	☐	☐	☐	☐	☐	☐	☐	1
Rivalisering mellom bedriftene	☐	☐	☐	☐	☐	☐	☐	2
Total markedsstørrelse (målt i omsetning)	☐	☐	☐	☐	☐	☐	☐	3
Antall nyetableringer	☐	☐	☐	☐	☐	☐	☐	4
Antall selskaper som forlot markedet ..	☐	☐	☐	☐	☐	☐	☐	5
Kapasitet i markedet	☐	☐	☐	☐	☐	☐	☐	6

21 Hvordan *påvirket finanskrisen...*

0= IKKE PÅVIRKET - ETT SVAR I HVER LINJE

	-3 Redusert	-2	-1	0	1	2	3 Økt	
... de viktigste kundenes innflytelse på vilkår som pris, levering, betalingsbetingelser osv. hos bedriften?	☐	☐	☐	☐	☐	☐	☐	1
...de viktigste leverandørenes innflytelse på vilkår som pris, levering, betalingsbetingelser osv. hos bedriften?	☐	☐	☐	☐	☐	☐	☐	2
...bedriftens markedsandel i dens hovedmarked	☐	☐	☐	☐	☐	☐	☐	3

Del 3: Tiltak som følge av krisen

Del 3 av spørreskjemaet undersøker <u>hvilke tiltak bedriften iverksatte som følge av krisen,</u> og hvor viktig (høyt prioritert) de ulike tiltakene var for bedriften.
Er det noen spørsmål du ikke vet det nøyaktige svaret på, ber vi deg komme med et estimat.

A. Bedriftens responser til krisen

22 Ble følgende mer eller mindre viktig for din bedrift i konkurransen med dens nærmeste konkurrenter som et *resultat av* finanskrisen?

0 = INGEN ENDRING AV BEDRIFTENS FOKUS SOM FØLGE AV KRISEN

ETT SVAR I HVER LINJE

	-3 Mindre viktig	-2	-1	0	1	2	3 Mer viktig	
Høy kunde- /brukerservice	☐	☐	☐	☐	☐	☐	☐	1
Bred produkt-/tjenestespekter	☐	☐	☐	☐	☐	☐	☐	2
Lave priser	☐	☐	☐	☐	☐	☐	☐	3
Høy kvalitet på produkter/tjenester	☐	☐	☐	☐	☐	☐	☐	4
Kundetilpasning /skreddersøm	☐	☐	☐	☐	☐	☐	☐	5
Reduksjon av driftskostnader	☐	☐	☐	☐	☐	☐	☐	6
Kvalitetskontroll/kvalitetsstyring	☐	☐	☐	☐	☐	☐	☐	7
Merkevarebygging	☐	☐	☐	☐	☐	☐	☐	8
Innovasjon/FoU	☐	☐	☐	☐	☐	☐	☐	9
Renommébygging	☐	☐	☐	☐	☐	☐	☐	10
Bygging av langsiktige relasjoner	☐	☐	☐	☐	☐	☐	☐	11
Prosessforbedringer (optimalisering av prosesser)	☐	☐	☐	☐	☐	☐	☐	12
Implementering av nye løsninger (teknologi, systemer)	☐	☐	☐	☐	☐	☐	☐	13
Videreutvikling av eksisterende produkter/tjenester	☐	☐	☐	☐	☐	☐	☐	14
Lansering av nye produkter/tjenester ..	☐	☐	☐	☐	☐	☐	☐	15

23 Hvilke av følgende strategiske tiltak gjorde bedriften i *respons* til krisen?
For hvert tiltak bedriften _utførte,_ spesifiser hvor viktig (høyt prioritert) dette tiltaket var for bedriften.

0= IKKE UTFØRT. ETT SVAR PR LINJE

	0 Ikke utført	1 Ikke viktig	2	3	4	5	6	7 Viktig	
Andre strategiske tiltak									
Økt salgsinnsats/markedsf. mot nye kunder	☐	☐	☐	☐	☐	☐	☐	☐	1
Økt salgsinnsats/markedsf. mot eksisterende kunder	☐	☐	☐	☐	☐	☐	☐	☐	2
Økt salgsinnsats/markedsf. mot kunder i utlandet	☐	☐	☐	☐	☐	☐	☐	☐	3
Redusert pris	☐	☐	☐	☐	☐	☐	☐	☐	4
Økt pris	☐	☐	☐	☐	☐	☐	☐	☐	5
Redusert antall produkter/tjenester	☐	☐	☐	☐	☐	☐	☐	☐	6
Introdusert nye produkter/tjenester	☐	☐	☐	☐	☐	☐	☐	☐	7
Etablert tettere forbindelser til samarbeidspartnere	☐	☐	☐	☐	☐	☐	☐	☐	8
Brukt nye leverandører	☐	☐	☐	☐	☐	☐	☐	☐	9

24 Hvilke av følgende tiltak for kostnadskontroll gjorde bedriften i *respons* til krisen?
For hvert tiltak bedriften _utførte,_ spesifiser hvor viktig (høyt prioritert) dette tiltaket var for bedriften.

0= IKKE UTFØRT. ETT SVAR PR LINJE

	0 Ikke utført	1 Ikke viktig	2	3	4	5	6	7 Viktig	
Kostnadskontroll									
Reduserte salgs og markedsføringskostnader ...	☐	☐	☐	☐	☐	☐	☐	☐	1
Reduserte administrasjonskostnader	☐	☐	☐	☐	☐	☐	☐	☐	2
Reduserte kostnader til produktutvikling	☐	☐	☐	☐	☐	☐	☐	☐	3
Lagt ned enheter	☐	☐	☐	☐	☐	☐	☐	☐	4
Reduserte lager	☐	☐	☐	☐	☐	☐	☐	☐	5
Reforhandlet leverandørkontrakter	☐	☐	☐	☐	☐	☐	☐	☐	6
Økt bruk av eksterne leverandører	☐	☐	☐	☐	☐	☐	☐	☐	7
Mindre bruk av eksterne leverandører	☐	☐	☐	☐	☐	☐	☐	☐	8

25 Hvilke av følgende tiltak for kostnadskontroll relatert til bemanning gjorde bedriften i _respons_ til krisen?
For hvert tiltak bedriften _utførte,_ spesifiser hvor viktig (høyt prioritert) dette tiltaket var for bedriften.

0= IKKE UTFØRT. ETT SVAR PR LINJE

	0 Ikke utført	1 Ikke viktig	2	3	4	5	6	7 Viktig	
Kostnadskontroll bemanning									
Oppsigelser	☐	☐	☐	☐	☐	☐	☐	☐	1
Frivillig avgang/sluttpakker	☐	☐	☐	☐	☐	☐	☐	☐	2
Økt bruk av permitteringer	☐	☐	☐	☐	☐	☐	☐	☐	3
Redusert antall nyansettelser	☐	☐	☐	☐	☐	☐	☐	☐	4
Økt bruk av midlertidige ansatte	☐	☐	☐	☐	☐	☐	☐	☐	5
Mindre bruk av midlertidige ansatte	☐	☐	☐	☐	☐	☐	☐	☐	6
Økt bruk av innleid arbeidskraft	☐	☐	☐	☐	☐	☐	☐	☐	7
Mindre bruk innleid arbeidskraft	☐	☐	☐	☐	☐	☐	☐	☐	8
Økt bruk av deltid	☐	☐	☐	☐	☐	☐	☐	☐	9
Redusert overtid	☐	☐	☐	☐	☐	☐	☐	☐	10
Senket lønninger (fastlønn)	☐	☐	☐	☐	☐	☐	☐	☐	11
Redusert lønnsvekst	☐	☐	☐	☐	☐	☐	☐	☐	12
Redusert bonuser	☐	☐	☐	☐	☐	☐	☐	☐	13

26 Hvilke av følgende tiltak relatert til kompetanseutvikling og organisering gjorde bedriften i _respons_ til krisen?
For hvert tiltak bedriften _utførte,_ spesifiser hvor viktig (høyt prioritert) dette tiltaket var for bedriften.

0= IKKE UTFØRT. ETT SVAR PR LINJE

	0 Ikke utført	1 Ikke viktig	2	3	4	5	6	7 Viktig	
Kompetanseutvikling og organisering									
Økt trening/kursing av ansatte (inkl. internt)	☐	☐	☐	☐	☐	☐	☐	☐	1
Redusert trening/ kurs av ansatte (inkl. internt) ..	☐	☐	☐	☐	☐	☐	☐	☐	2
Økt ledertrening/kursing (inkl. internt)	☐	☐	☐	☐	☐	☐	☐	☐	3
Redusere ledertrening/kursing (inkl. internt)	☐	☐	☐	☐	☐	☐	☐	☐	4
Reorganisering/ny organisasjonsstruktur	☐	☐	☐	☐	☐	☐	☐	☐	5
Rasjonalisert produktlinjer	☐	☐	☐	☐	☐	☐	☐	☐	6
Rasjonalisert arbeidsprosesser	☐	☐	☐	☐	☐	☐	☐	☐	7

27 Hvilke av følgende finansielle tiltak gjorde bedriften i *respons* til krisen?
For hvert tiltak bedriften *utførte,* spesifiser hvor viktig (høyt prioritert) dette tiltaket var for bedriften.

| 0= IKKE UTFØRT. ETT SVAR PR LINJE |

	0 Ikke utført	1 Ikke viktig	2	3	4	5	6	7 Viktig	
Finansielle tiltak									
Salg av eiendeler	☐	☐	☐	☐	☐	☐	☐	☐	1
Redusert utbytte	☐	☐	☐	☐	☐	☐	☐	☐	2
Reforhandlet gjeld	☐	☐	☐	☐	☐	☐	☐	☐	3
Tatt opp ny gjeld	☐	☐	☐	☐	☐	☐	☐	☐	4
Redusert gjeld	☐	☐	☐	☐	☐	☐	☐	☐	5
Redusert betalingsfrister for kunder	☐	☐	☐	☐	☐	☐	☐	☐	6
Økt betalingsfrister til leverandører	☐	☐	☐	☐	☐	☐	☐	☐	7
Skiftet bankforbindelse	☐	☐	☐	☐	☐	☐	☐	☐	8
Økt bruk av offentlige støtteordninger	☐	☐	☐	☐	☐	☐	☐	☐	9
Innhentet ny egenkapital	☐	☐	☐	☐	☐	☐	☐	☐	10

28 Hvordan endret bedriften sine investeringer som *følge av finanskrisen?*

| 0 = INDIKERER AT INVESTERINGER IKKE BLE ENDRET AV FINANSKRISEN |

| ETT SVAR I HVER LINJE |

	-3 Redu-sert	-2	-1	0	1	2	3 Økt	
Investeringer i anlegg/ maskiner /utstyr	☐	☐	☐	☐	☐	☐	☐	1
Investeringer i bygninger	☐	☐	☐	☐	☐	☐	☐	2
Investeringer i FoU	☐	☐	☐	☐	☐	☐	☐	3
Investeringer i produktinnovasjon	☐	☐	☐	☐	☐	☐	☐	4
Investeringer i prosessinnovasjon	☐	☐	☐	☐	☐	☐	☐	5
Investeringer i organisasjonsutvikling .	☐	☐	☐	☐	☐	☐	☐	6
Investeringer i trening av ansatte	☐	☐	☐	☐	☐	☐	☐	7
Investeringer i reklame/markedsføring/salg	☐	☐	☐	☐	☐	☐	☐	8

B. Bedriftens eierskap under krisen

29 Har krisen medført at (hele eller vesentlige deler av) bedriften har vært involvert i kjøp-, salg- eller fusjoner med annen virksomhet?

| ETT SVAR |

Ja .... ☐1

Nei .... (⇒ **31**) ☐2

30 Hvis ja på spørsmål 29, vennligst spesifiser. Hvis nei, gå til spørsmål 31

FLERE SVAR MULIG

	Ja, innen bedriftens hovedaktivitet	Ja, utenfor bedriftens hovedaktivitet	Nei	
Kjøpt/fusjonert med tidligere konkurrent	☐	☐	☐	1
Kjøpt/fusjonert med tidligere kundebedrift	☐	☐	☐	2
Kjøpt/fusjonert med tidligere leverandør	☐	☐	☐	3
Kjøpt/fusjonert med virksomhet som ikke er i disse kategoriene	☐	☐	☐	4
Solgt til tidligere konkurrent	☐	☐	☐	5
Solgt til tidligere kunde	☐	☐	☐	6
Solgt til tidligere leverandør	☐	☐	☐	7
Solgt til virksomhet som ikke er i disse kategoriene	☐	☐	☐	8

TIL ALLE

31 Har krisen medført at bedriften har endret hvilke aktiviteter som utføres internt i bedriften (insourcing eller outsourcing)?

ETT SVAR

Ja .... ☐ 1

Nei .... (⇒ **33**) ☐ 2

32 Hvis ja på spørsmål 31, vennligst spesifiser. Hvis nei, vennligst gå til spørsmål 33.

FLERE SVAR MULIG

	Ja, innen bedriftens hovedaktivitet	Ja, utenfor bedriftens hovedaktivitet	Nei	
Satt ut produksjonsaktiviteter	☐	☐	☐	1
Satt ut administrative/støtteaktiviteter	☐	☐	☐	2
Overtatt produksjonsaktiviteter (som før ble kjøpt)	☐	☐	☐	3
Overtatt administrative/støtteaktiviteter (som før ble kjøpt) ...	☐	☐	☐	4

TIL ALLE

33 Dersom aktiviteter er outsourcet eller solgt, vennligst indiker (sett kryss) hvor enig/uenig du er i følgende påstander om aktivitetene som ble outsourcet/solgt. Hvis ikke, gå til spørsmål 34.

ETT SVAR I HVER LINJE

	1 Uenig	2	3	4	5	6	7 Enig	
Aktivitetene hadde lave faste kostnader	☐	☐	☐	☐	☐	☐	☐	1
Bedriftens investeringer i aktivitetene kunne realiseres uten tap	☐	☐	☐	☐	☐	☐	☐	2
Aktivitetene utføres av mange bedrifter	☐	☐	☐	☐	☐	☐	☐	3
Andre bedrifter leverte disse aktiviteter i tilsvarende kvalitet	☐	☐	☐	☐	☐	☐	☐	4
Andre bedrifter leverte disse aktiviteter til tilsvarende priser	☐	☐	☐	☐	☐	☐	☐	5

C. Konkurrenters respons på krisen

34 Hvilke endringer opplevde du at bedriftens nærmeste konkurrenter gjorde i _respons til krisen?_ (0= ingen endring)

ETT SVAR I HVER LINJE

	-3 Redu-sert	-2	-1	0	1	2	3 Økt	Vet ikke	
Pris	☐	☐	☐	☐	☐	☐	☐	☐	1
Kvalitet	☐	☐	☐	☐	☐	☐	☐	☐	2
Produktintroduksjoner/ innovasjon	☐	☐	☐	☐	☐	☐	☐	☐	3
Markedsføring/ salgsinnsats	☐	☐	☐	☐	☐	☐	☐	☐	4
Produkt- /tjenestespekter	☐	☐	☐	☐	☐	☐	☐	☐	5
Fokus på nye kunder	☐	☐	☐	☐	☐	☐	☐	☐	6
Fokus på eksisterende kunder	☐	☐	☐	☐	☐	☐	☐	☐	7
Introdusert lavkostvarianter/-tilbud	☐	☐	☐	☐	☐	☐	☐	☐	8

Del 4: Veien videre

35 Tiltakene som bedriften tok som respons på krisen var gunstige på (svar på begge):

ETT SVAR I HVER LINJE

	1 Uenig	2	3	4	5	6	7 Enig	
Kort sikt (for å komme seg gjennom krisen)	☐	☐	☐	☐	☐	☐	☐	1
Lang sikt	☐	☐	☐	☐	☐	☐	☐	2

36 Når var krisen over for bedriften?

ETT SVAR

Vår 2008	☐ 1
Høst 2008	☐ 2
Vår 2009	☐ 3
Høst 2009	☐ 4
Vår 2010	☐ 5
Høst 2010	☐ 6
Ikke over enda	☐ 7

37 Hvordan tror du bedriften vil komme ut av krisen mht:

ETT SVAR I HVER LINJE

	1 Svekket	2	3	4	5	6	7 Styrket	
Markedsandeler	☐	☐	☐	☐	☐	☐	☐	1
Lønnsomhet ift konkurrenter	☐	☐	☐	☐	☐	☐	☐	2
Vekstmuligheter ift konkurrenter	☐	☐	☐	☐	☐	☐	☐	3

38	Hvor mange personer er tilknyttet bedriften i dag?			

NOTER ANTALL

Faste ansatte 1

Midlertidig ansatte 2

Innleid personell 3

39	Andre kommentarer etc.

Annet, notér _____

_____ ☐

Annet, notér _____

_____ ☐

Annet, notér _____

_____ ☐

Annet, notér _____

_____ ☐

Annet, notér _____

_____ ☐

Tusen takk for hjelpen. Send det ferdig utfylte spørreskjemaet til Synovate i den vedlagte svarkonvolutten.

Ønsker du rapport tilsendt i etterkant av undersøkelsen kan denne enkelt bestilles på www.nhh.no/KOV

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Appendix B: Average, Standard deviation, and Spearman Rank Order Correlation Analysis on Operating Margin

Operating margin all industries

Operating margin industry 20

Operating margin industry 201

Operating margin industry 203

Operating margin industry 55

Operating margin industry 553
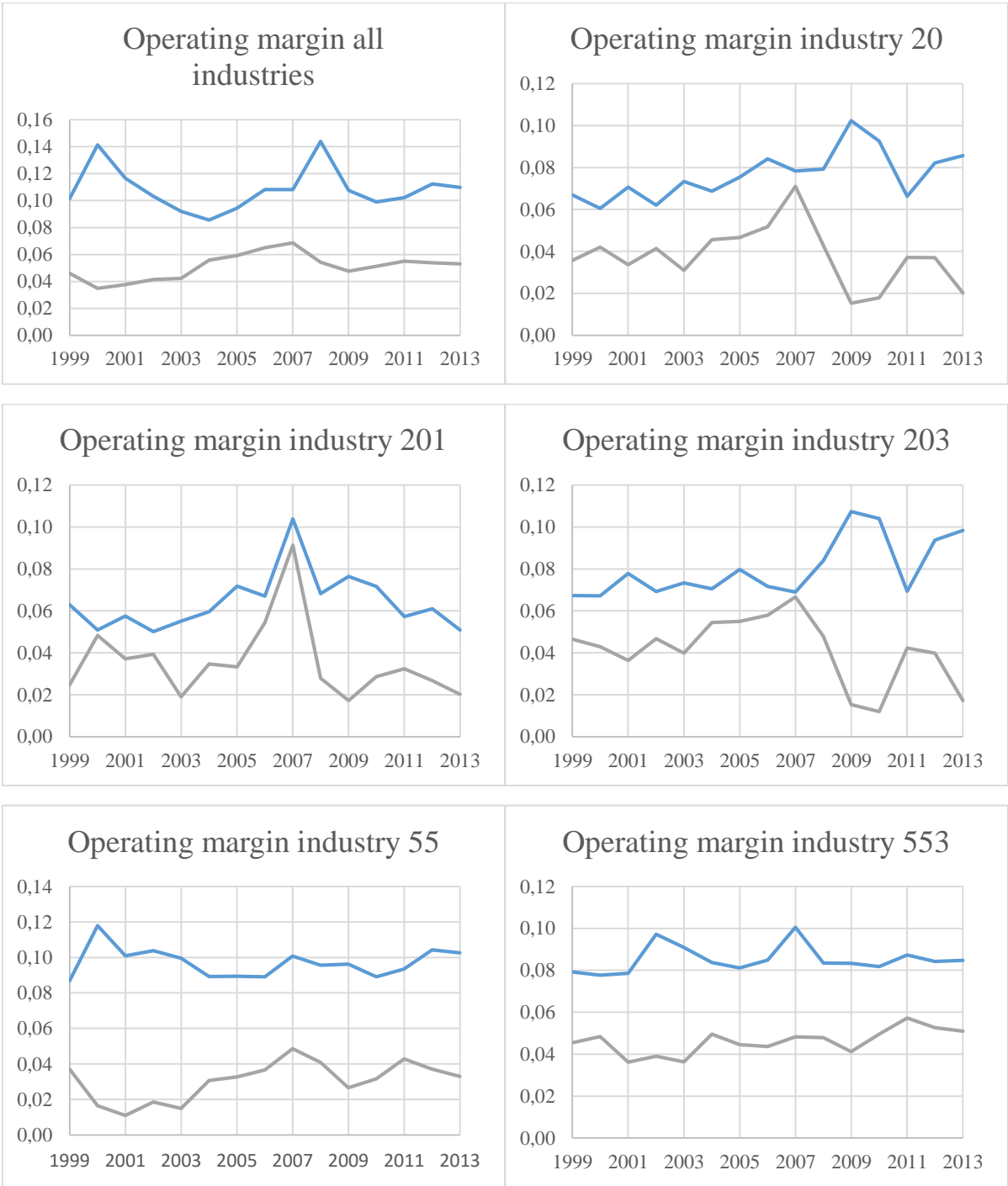
Operating margin industry 72
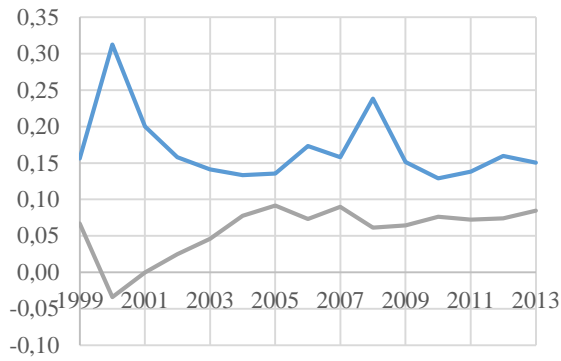
Operating margin industry 722
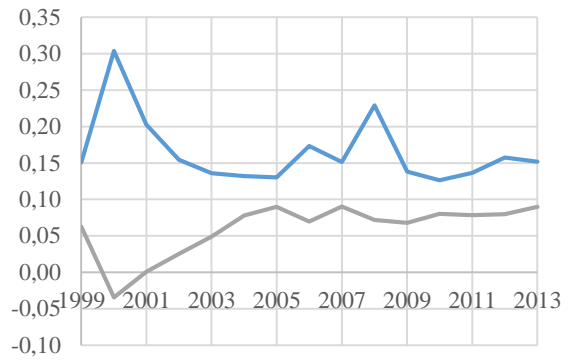
Operating margin industry 7221
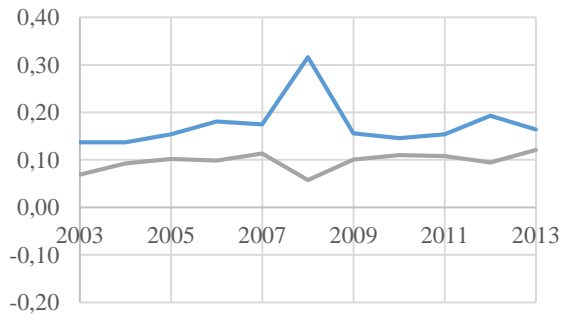
Operating margin industry 7222

Industry 20, operating margin, ranked

Industry 201, operating margin, ranked

Industry 203, operating margin, ranked

Industry 55, operating margin, ranked

Industry 553, operating margin, ranked

Industry 72, operating margin, ranked

Industry 722, operating margin, ranked
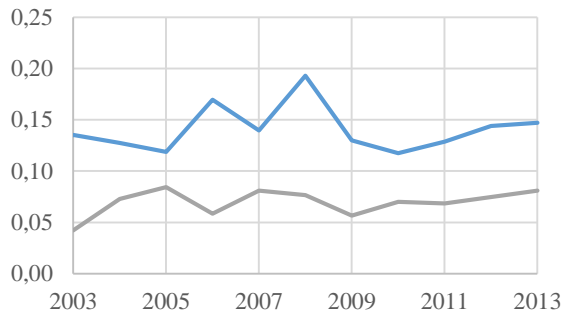
Industry 7221, operating margin, ranked
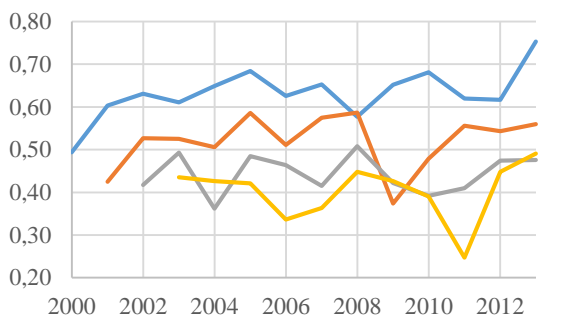
Industry 7222, operating margin, ranked
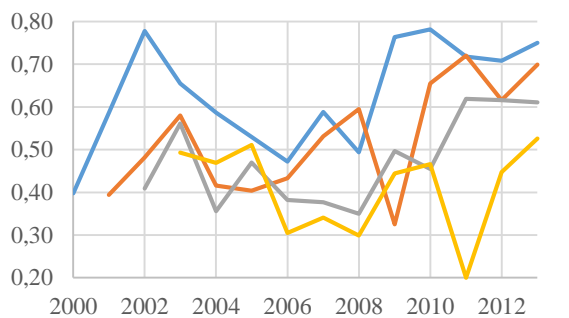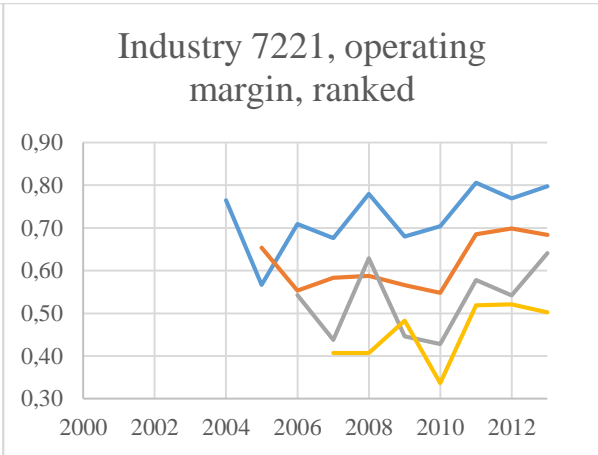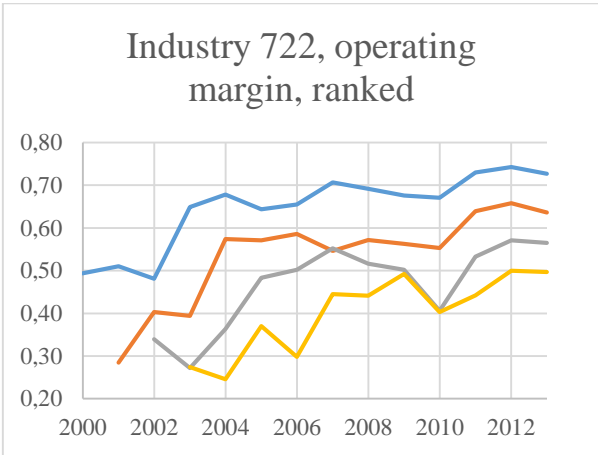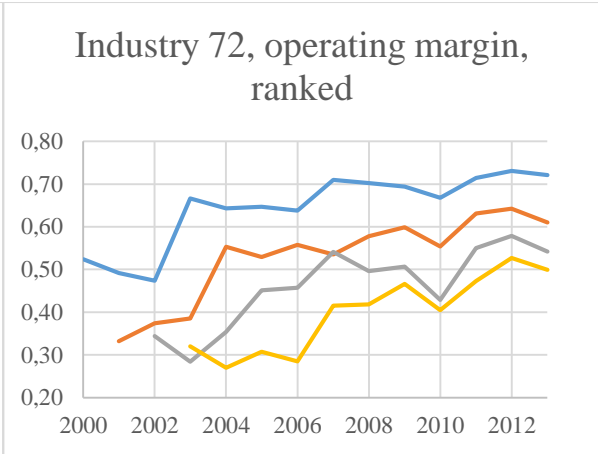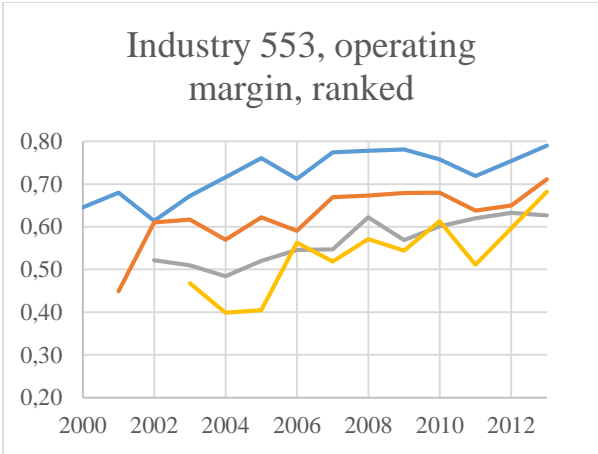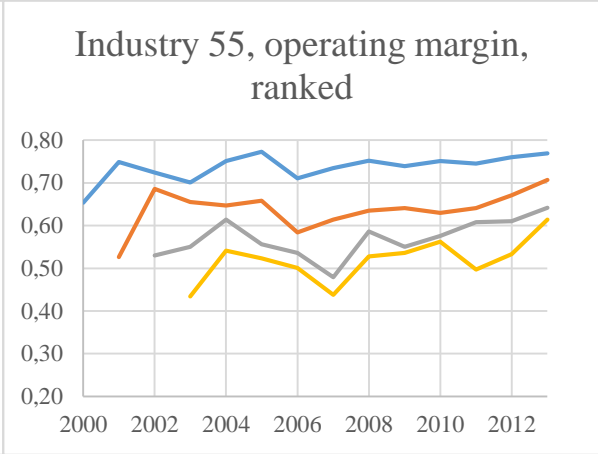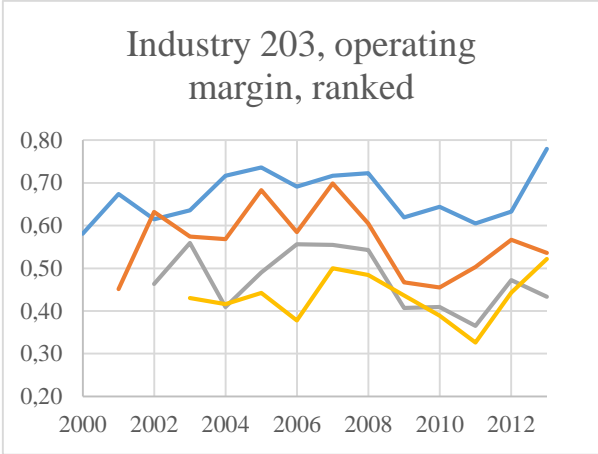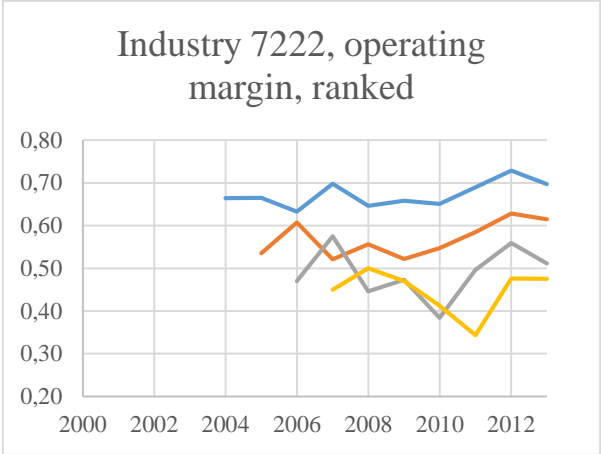
Appendix C: Structure matrix and ANOVAs on Operating Margin

					Structure Matrix				
					Component				
	1	2	3	4	5	6	7	8	9
23.4	,713	-,124	-,236	,245	,404	,275	-,283	-,153	,024
23.2	,693	-,005	-,409	,206	,255	,240	-,209	-,440	-,380
23.1	,680	,001	-,385	,224	,233	,272	-,189	-,449	-,340
23.8	,667	-,021	-,440	,250	,211	,278	-,276	-,403	-,337
24.6	,665	-,024	-,341	,333	,211	,367	-,352	-,388	-,200
23.9	,646	,005	-,248	,306	,077	,301	-,368	-,235	-,278
22.3	,575	-,106	-,291	,096	,373	,143	-,246	,019	,095
28.4	-,002	,863	-,024	-,115	-,047	-,082	,051	-,127	-,242
28.3	-,089	,828	,072	-,124	-,080	-,144	,091	-,038	-,126
28.5	,010	,821	,014	-,141	,041	-,052	-,002	-,216	-,189
28.6	,013	,756	-,078	-,087	-,037	,028	,016	-,454	-,099
28.2	-,143	,688	-,006	-,053	-,270	-,147	,165	,040	,094
28.1	-,134	,687	-,007	-,039	-,346	-,211	,108	,003	,024
28.8	,106	,565	-,117	-,115	-,118	,089	,079	-,250	-,225
22.4	,354	-,011	-,790	,154	,119	,203	-,227	-,257	-,184
22.10	,179	,033	-,777	,123	,084	,140	-,065	-,259	-,402
22.7	,287	-,028	-,776	,162	,226	,168	-,280	-,293	-,197
22.5	,305	-,023	-,762	,130	,081	,177	-,187	-,229	-,193
22.11	,320	-,001	-,726	,110	,207	,132	-,153	-,241	-,394
22.1	,460	-,022	-,710	,109	,219	,231	-,285	-,268	-,179
22.8	,140	,068	-,710	,152	,035	,085	,007	-,189	-,418
22.12	,293	,030	-,614	,070	,323	,146	-,266	-,362	-,542
22.2	,294	,068	-,602	,087	,011	,191	-,218	-,154	-,350
26.2	,129	-,108	-,096	,770	,178	,210	-,210	-,154	-,051
26.4	,102	-,091	-,099	,749	,172	,211	-,234	-,146	-,071
24.3	,369	-,223	-,178	,554	,285	,335	-,351	-,219	-,113
24.1	,367	-,196	-,230	,547	,335	,207	-,175	-,207	-,077
24.8	,340	-,013	-,094	,492	,181	,192	-,163	-,138	-,171
24.4	,166	-,029	,039	,469	,320	,433	-,302	-,175	-,115
25.11	,168	-,082	-,041	,456	,334	,412	-,165	-,090	-,077
24.5	,400	-,180	-,100	,430	,418	,351	-,202	-,244	-,290
25.1	,204	-,162	-,128	,305	,714	,360	-,243	-,167	-,123
25.4	,377	-,182	-,193	,317	,678	,309	-,458	-,162	-,128
25.3	,210	-,198	-,147	,253	,629	,380	-,355	-,097	-,117
25.12	,511	-,147	-,171	,301	,611	,398	-,212	-,251	-,206
24.2	,460	-,188	-,244	,457	,572	,297	-,220	-,359	-,162
22.6	,435	-,088	-,511	,170	,533	,232	-,274	-,212	-,185
25.10	,348	-,121	-,246	,358	,523	,214	-,328	-,272	-,170
25.2	,160	-,005	-,034	,317	,516	,228	-,200	-,270	-,003
25.13	,403	-,187	-,172	,312	,488	,409	-,135	-,130	-,136
27.3	,213	-,126	-,131	,238	,205	,733	-,204	-,101	-,088
27.4	,194	-,038	-,085	,142	,109	,669	-,219	-,067	-,096
27.10	,112	-,090	-,090	,156	,170	,640	-,172	-,121	-,113
27.1	,091	-,096	-,075	,178	,301	,593	-,193	-,195	,027
27.2	,325	-,099	-,245	,250	,391	,545	-,128	-,221	-,022
27.7	,403	,004	-,203	,361	,092	,526	-,417	-,238	-,057
27.6	,278	-,066	-,172	,305	,083	,471	-,351	-,280	-,034
25.7	,178	-,062	-,122	,152	,167	,236	-,819	-,188	-,032
25.5	,214	-,133	-,146	,185	,212	,228	-,795	-,156	-,110
24.7	,395	,028	-,250	,387	,114	,345	-,526	-,212	-,125
25.9	,124	-,125	-,142	,426	,291	,224	-,503	-,124	-,103
26.1	,283	,119	-,330	,143	,138	,163	-,197	-,826	-,223
26.3	,194	,122	-,261	,249	,125	,160	-,232	-,798	-,147
28.7	,086	,633	-,170	-,094	-,037	,047	,001	-,637	-,153
26.7	,447	,009	-,284	,261	,472	,338	-,415	-,561	-,395
26.5	,289	,043	-,166	,336	,391	,427	-,341	-,533	-,296
26.6	,303	,005	-,131	,298	,369	,360	-,417	-,446	-,403
22.15	,241	,188	-,514	,135	,042	,108	-,128	-,218	-,768
22.14	,237	,109	-,621	,104	,168	,129	-,190	-,375	-,696
22.9	,056	,205	-,451	,016	,063	,064	-,045	-,111	-,635
23.7	,524	,109	-,306	,320	,108	,211	-,200	-,317	-,633
22.13	,171	,117	-,533	,076	,194	,145	-,244	-,350	-,611

Extraction Method: Principal Component Analysis.
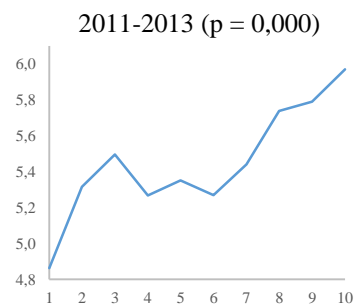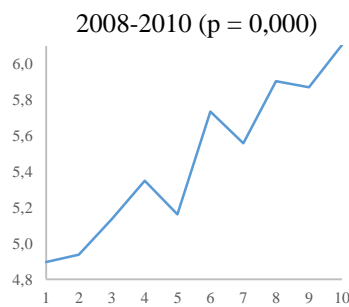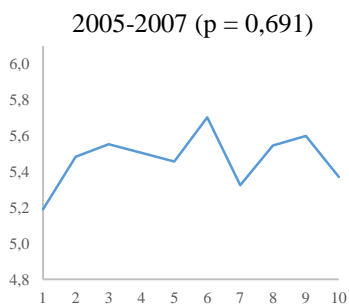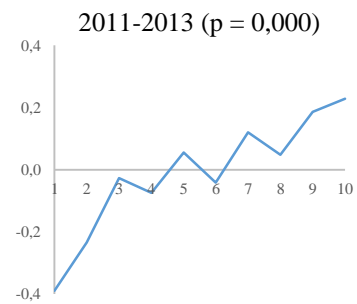Rotation Method: Oblimin with Kaiser Normalization.

Question 16

2005-2007 (p = 0,051)	2008-2010 (p = 0,000)	2011-2013 (p = 0,000)

Question 17

2005-2007 (p = 0,585)	2008-2010 (p = 0,000)	2011-2013 (p = 0,000)

Question 36

2005-2007 (p = 0,691)	2008-2010 (p = 0,000)	2011-2013 (p = 0,000)

Factor 1

2005-2007 (p = 0,927)	2008-2010 (p = 0,000)	2011-2013 (p = 0,000)

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Factor 2

2005-2007 (p = 0,108)

2008-2010 (p = 0,000)

2011-2013 (p = 0,100)

Factor 3

2005-2007 (p = 0,486)

2008-2010 (p = 0,316)

2011-2013 (p = 0,014)

Factor 4

2005-2007 (p = 0,615)

2008-2010 (p = 0,008)

2011-2013 (p = 0,065)

Factor 5

2005-2007 (p = 0,289)

2008-2010 (p = 0,000)

2011-2013 (p = 0,000)

Factor 6

2005-2007 (p = 0,001)

2008-2010 (p = 0,000)

2011-2013 (p = 0,000)

Factor 7

2005-2007 (p = 0,383)

2008-2010 (p = 0,122)

2011-2013 (p = 0,080)

Factor 8

2005-2007 (p = 0,986)

2008-2010 (p = 0,793)

2011-2013 (p = 0,231)

Factor 9

2005-2007 (p = 0,623)

2008-2010 (p = 0,736)

2011-2013 (p = 0,401)