

# Cash Holdings and Market Share Growth. European Evidence

Finance  
Master's thesis  
Heini Lehtinen  
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**Aalto University**  
**School of Economics**

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## **CASH HOLDINGS AND MARKET SHARE GROWTH. EUROPEAN EVIDENCE**

### **PURPOSE OF THE STUDY**

The purpose of this thesis is to study whether a firm's high cash holdings can lead to future market share gains in the product markets. I study the cash holdings and market share changes in the industry-related terms. I am also interested in finding differences in the impact between countries and industry and rival characteristics. Last, I study how the cash holdings have impacted the market share changes in the recent financial crisis from 2008-2009.

### **DATA**

My data consist of financial statement data from European public firms. I use data from 22 European countries. All the observed firms are manufacturing companies denoted with SIC codes from 2000 to 3999. The time period of the study is from 1990 to 2009. For the study of the recent financial crisis I use data from 2008 to 2009. All the data is retrieved from Thomson One Banker.

### **RESULTS**

I use the instrumental variable approach to avoid reversal causality between the cash holdings and future market share changes. From the total observed time period I find no evidence for cash holdings to improve a firm's market share in the following years. Neither the industry or rival characteristics make difference for the results. When I estimate the cash holdings impact on future market share changes in the recent financial crisis, I find significant evidence. For example, a one standard deviation from the industry-average cash holdings increases the future market share with 1.6 percent during a financial crisis.

### **KEYWORDS**

Cash, cash holdings, market share, manufacturing firms, financial crisis

## **CASH HOLDINGS AND MARKET SHARE GROWTH. EUROPEAN EVIDENCE**

### **TUTKIELMAN TAVOITTEET**

Tämä pro gadu- tutkielman tarkoituksena on tutkia voivatko yrityksen korkeat kassavarat johtaa markkinaosuuden kasvuun tuotemarkkinoilla tulevaisuudessa. Tutkin kassavaroja ja markkinaosuuden muutosta muuttujilla, jotka ovat suhteessa kunkin teollisuudenalaan. Tarkoituksena on myös tutkia pätevätkö samat tulokset myös riippuen maasta, jossa yritys toimii, ja teollisuuden alan ja kilpailijoiden piirteistä. Lopuksi pyrin selvittämään miten yrityksen kassavarat ovat vaikuttaneet markkinaosuuden kasvattamiseen viimeisessä talouskriisissä vuosina 2008 ja 2009.

### **LÄHDEAINEISTO**

Lähdeaineistoni koostuu tilinpäätöstiedoista Eurooppalaisista julkisista yrityksistä. Käytän tutkimuksessa yritysten tietoja 22 eurooppalaisesta maasta. Kaikki havainnoidut yritykset ovat tuotantoyrityksiä, jotka on määritelti SIC koodein 2000-3999. Tutkimuksen aikaperiodi on vuodesta 1990 vuoteen 2000. Viimeisimmän talouskriisin tutkimiseen käytän dataa vuosilta 2008 ja 2009. Kaikki lähdetieto yrityksistä on Thomson One Banker- palvelusta.

### **TULOKSET**

Käytän instrumental variable- metodia välttääkseni vastakkaisen kausaalisuuden yrityksen kassavarojen ja tulevan markkinaosuuden välillä. Koko tutkitusta ajanjaksosta en löydä tuloksia, jotka tukisivat hypoteesia yrityksen kassavarojen ja tulevan markkinaosuuden kasvattamisen välillä. Myöskään yrityksen kotimaa, teollisuuden ala tai kilpailijoiden piirteet eivät vaikuta tuloksiin. Kun tutkin yrityksen kassavarojen vaikutusta markkinaosuuden kasvattamiseen viimeisen talouskriisin ajalta, löydän tuloksia, jotka tukevat hypoteesia. Esimerkiksi, yksi keskihajonnan muutos teollisuudenalan keskimääräisistä kassavaroista kasvattaa yrityksen tulevaa markkinaosuutta 1.6% taloudellisen kriisin aikana.

### **AVAINSANAT**

Kassa, yrityksen kassavarat, markkinaosuus, tuotantoyritykset, talouskriisi

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## 1. Introduction

Industrial US corporations have increased their cash balances almost by doubling them from 1980's to the first decade of the 21<sup>st</sup> century. They have achieved cash ratios strong enough to be able to pay off all of their debt obligations (see Bates, Kahle and Stulz (2009)). This has not succeeded without a notice from the stakeholders. Activists have been stalking companies that hoard cash, and have started to view them with suspicion.<sup>1</sup> The agency costs related to cash holdings have lead shareholders to doubt the real value of their investments. But a change in this setting happened in the fall of 2008, at the peak of the recent financial crisis, when the game to find money started. Even the most solid companies had to participate in the rivalry to stay in product markets.

In their survey of credit constraints, Campello et al. (2010) find that the cash ratios of constrained firms fell by one-fifth during one year in the recent financial crisis (from Q4 2007 to Q4 2008). For the unconstrained firms the loss was non-existent. These firms with felling cash ratios had to change their financials and operations by cutting in investments, technology, marketing and employment. But “for the lucky hoarders, this is the time to feel both smug and predatory” was stated.<sup>2</sup> For example, Microsoft held enough cash to survive a year without any sales. They had a potential even to support suppliers in financial troubles. A survey of Citigroup showed that cash hoarders outperform better than indebted firms even though they have lagged them before. The outperformance has been around 7%.<sup>3</sup>

After the crisis the attitude towards cash holdings is no longer so self-evident. Thus, the crisis can give us new proof of economic patterns which are applicable for firms' cash management in the future. The strategic significance of cash holdings, which has increased in importance after the financial crisis, has not been very thoroughly studied in financial literature. For example, Fresard (2010) is the first one to find evidence the real effect of cash holdings on product market outcomes. He suggests that firms holding more

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<sup>1</sup> “All you need is cash“, Economist, 20<sup>th</sup> November 2008.

([www.economist.com/node/12637043?story\\_id=E1\\_TNGPSDQP](http://www.economist.com/node/12637043?story_id=E1_TNGPSDQP))

<sup>2</sup> “All you need is cash“, Economist, 20<sup>th</sup> November 2008.

([www.economist.com/node/12637043?story\\_id=E1\\_TNGPSDQP](http://www.economist.com/node/12637043?story_id=E1_TNGPSDQP))

<sup>3</sup> “Desperately seeking a cash cure”, Economist, 20<sup>th</sup> November 2008.

([www.economist.com/node/12636353?story\\_id=E1\\_TNGPGPVP](http://www.economist.com/node/12636353?story_id=E1_TNGPGPVP))

cash than their industry on average are able to increase their future industry-related market share. It is important to know what kind of strategic dimensions cash holdings can give to a firm in different economic situations, in order to improve its performance and increase its value in the eyes of the owners. In his analysis of competitive advantage Porter (1980) lists the excess cash reserves as one of the top tools for a firm to signal its power of staying in a market.

The literature on cash holdings and product market performance has been fragmented. Before Fresard's (2010) study they had not been discussed under any strategic focus. The past discussion of cash holdings has attempted to understand which determinants lead firms to increase their cash ratios and how they affect firm performance. In connection with the product markets, cash holdings have been less in focus, and instead, the main drivers for product market outcomes have been capital structure and leverage. Several implications of debt on firm performance have been empirically studied and evidence both for and against debt's influence in improvement of product market outcomes have been recorded (see e.g. Campello (2006)).

Finance literature has suggested several determinants for cash holdings. Haushalter (2007) suggests that the cash holdings are a result of three factors, namely a firm's financing, investment opportunities and product markets. Opler et al. (1999) support this with empirical evidence: strong growth opportunities, riskier activities and small firms tend to hold more cash in relation to non-cash assets. Bates, Kahle and Stulz (2009) record doubling cash ratios for the US industrial firms. They suggest that the main driver, according to the top management, has been the increasing risk of the cash flows in the course of the years. This means that the precautionary motive of cash holdings, first stated by Keynes (1936), has played an important role. In addition, Jensen's (1969) free cash flow theory (agency theory) drives cash balances. The conflict between managers and shareholders gets tougher especially when a firm generates excess cash flows and the probability of damaging overinvestment increases (Chen et al. (2011)).

Are these increasing cash balances, then, in optimal use from the shareholders' point of view? If the case is that the riskier business environment has lead firms to increase their liquidity the cash piles should be used strategically and efficiently. It would be valuable to understand what strategic and value enhancing dimensions the cash holdings possess. If

the top management understands the meaning of the high cash ratio, it can give relevant guidance in firms' financial planning, behavior in competitive markets and forecasting to prepare for potential future shocks in the economic environment and product markets. Evidence of implications to firm performance and behavior has been suggested. Harford (1999) finds, in line with the free cash flow hypotheses, that the excess cash leads to unsuccessful acquisition activities. Mikkelsen and Partch (2003) suggest that firms with high cash holdings use them in asset growth which does not necessary lead to improved performance in sales. Fresard (2010) finds evidence that the higher cash holdings relative to rivals improve the firm performance measured with return on assets.

In addition to the performance aspect, cash holdings are related to competition and predation in product markets. A firm incapable to react to changes in product markets can end up being predated out of the market. For example, cash holdings can enable a firm to respond quickly to new opportunities by constructing entry barriers and allow it to monopolize the market in a situation where an entrant is trying to create competition (Baskin (1987)). Besides, cash rich firms aim to enforce their financially constrained competitors out of the product market by mediating their competitors' cash flow (Bolton and Scharfstein (1990)). The model of Bolton and Scharfstein (1990) shows how a firm's ability to finance investments and decrease the financial distress with internally generated funds can mitigate the risk of predation and lead to success on the product markets. My interest in this thesis is to find new evidence of cash holdings and product markets in the light of the theories and previous literature presented above.

### **1.1. Motivation**

I argue that the implications of cash holdings should be available for firms, so that they can use the cash holdings as a strategic tool in product market actions and improve firm performance to create value for shareholders. As Haushalter et al.(2007) comment more research should focus on strategic and competitive advantage following from the cash holdings. The purpose of my thesis is to contribute to the implications of cash holdings in product markets, and to empirically test whether Fresard's (2010) findings are applicable worldwide. Following Fresard (2010), I hypothesize that high cash holdings lead to future market share gains. My aim is to test whether the relative to rivals cash holdings can give a strategic tool for firms to improve their performance in the product markets relative to

rivals. The improvement is measured as the industry-related market share increase. To test the hypothesis, I use European data to find the empirical connection.

My thesis follows the theoretical frame of Fresard (2010). First, I will study the link between cash holdings and future industry-related market share growth. My will concentrate on the relation with one- and two-years lagged cash holdings. I use the instrumental variable approach to manage the endogeneity bias relating to cash holdings and market share growth, and instrument the cash holdings with *Tangibility* and one- and two-year lagged cash holdings. With the instrumented cash holdings, I test the impact on future market share growth.

Secondly, I run the basic estimation with subsamples including French, German and British data. Fresard (2010) uses a sample from the Compustat database to study cash holdings effect with the American data. In this thesis I use heterogeneous European data to test whether there are any country specific differences in the effect. I try to discover whether the estimation with the subsamples follows the same pattern as the hypothesis with the total sample.

Third, I study the cash holdings implications on market share growth with different rival and industry characteristics. I anticipate the results to show that a positive magnitude of cash holdings on market share growth depends on the competitors' financial status. The same trend should follow when the industry is highly competitive. I test whether the magnitude of the cash holdings impact differs in the subsamples where the rivals' financial distress is either high or low, and where the industry is either highly competitive or concentrated. To confirm that the competition between the firms is defined correctly, I study whether the industries operating and competing globally give similar results compared to industries operating only locally. My aim is to find out whether locally operating industries which are not part of the global competition change the results I find from the total sample.

Finally, I hypothesize that, in the frame of the recent financial crisis, firms which had high cash holdings before the crisis should show strong market share growth now that the crisis settles down. This is also Fresard's (2010) concluding argument in his study, and I find it relevant to study. He run a quasi-natural experiment in his study and suggests that when

the economy faces intensification in the product markets those with high cash holdings will perform better. Studying the time period of the recent financial crisis should provide results supporting the argument that the causal link between cash and market share growth is applicable in a shocking situation in the economic environment.

I test the cash holdings effect with a sample of financial statements data from European public firms. The finance literature of cash holdings mainly focuses on American data and it is valuable to see whether the evidence applies, in Europe too. The European data might reflect different management behavior of cash piling and the use of cash holdings. The sample consists of 3770 firms from 22 European countries. All the sample firms operate in manufacturing industries. I use such a wide data sample to be able to create reliable industries denoted with SIC codes.<sup>4</sup> Every industry year must include at least five industry year observations. The time period of the study is from 1990 to 2009. This period includes economic booms as well as downturns, and it gives me the opportunity to study how the cash holdings effect applies in the recent financial crisis. I am able to study the time of the recent financial crisis in 2008 and 2009, and how the pre-crisis cash holdings have influenced the product market outcomes when the net loans to large firms decreased heavily (see e.g. Ivashina and Scharfstein (2010)).

## **1.2. Main findings**

I find divergent evidence for cash holdings impact on market share growth. For the total sample period, I find no evidence of cash holdings impact on industry-related market share increase. Instead, my findings for the baseline estimation for the total time period suggest that a firm's size has a negative impact on the future market share increase, in contrast to Fresard's (2010) findings. The results also support the previously suggested notion that leverage supports positive outcomes in the product market performance in the short term, but in a longer time period, leverage destroys the positive development.

I find support for my main hypothesis when I study the time period, the years 2008 and 2009 of the recent financial crisis. The industry-related market share changes seem to be explained significantly with the two-year lagged cash holdings, i.e. the cash holdings in

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<sup>4</sup> SIC codes are discussed in Section 4.1.1. Sample construction.

the end of the years 2006 and 2007. The positive impact is significant with additional control variables. The negative size impact holds also in this time period. Leverage holds its positive impact but loosens the significance of its impact.

My findings from the subsamples of French, German and British data are in line with the results from the total sample for the full time period. They do not indicate any strong impact of high cash holdings to future market share growth. The results for the different countries diverge only slightly, as the coefficients for the cash holdings do not differ between the countries and are close to zero. I find differences in the control variables compared to the baseline estimation with the total data.

The results on rival's and industry characteristics do not differ from the results of the basic estimation. The estimated impact of cash holdings to future industry-related market share increase is not significant and not in line with Fresard's (2010) results. My findings do not support the hypothesis that firms operating in an industry where rivals are more financially constrained would benefit more from the cash holdings impact. The same applies for the industry concentration. My research of the two subsample groups created, based on the globalization of their operations, yield similar results. It cannot be argued that the cash holdings impact on market share growth is dependent on the level the firm and its competitors operate globally. My subgroups of the most and least global industries do not at all yield positive and significant results; in contrast there is slight evidence that the locally operating industries might suffer from high cash holdings if they aim to improve their market share.

### **1.3. The structure of the thesis**

This thesis follows the subsequent structure: In Section 2, I discuss the recent literature of the determinants of cash holdings and its implications in the product market outcomes, as well as the effect of debt. In Section 3, I construct the hypotheses of cash holdings effect, in Section 4, I describe the data and the empirical methods used in the study and in Section 5, I report and analyze the empirical findings. Section 6 is dedicated to conclusions and suggestions for further study.

## **2. Literature review**

The following literature review introduces of recent studies of capital structure, cash holdings and product market dynamics. The objective is firstly to show how the determinants of product market outcomes have been studied from the debt and cash perspectives, and secondly that there is further need for research on the strategic meaning cash holdings in the product market competition. The literature related to cash holdings can be divided into studies of the determinants of cash holdings and other studies concentrating influence of the capital structure on product market performance. Since little has been written on the impact of cash holdings on product market outcomes so far, I find it relevant to first briefly review the relation between debt and product market performance. The review is organized as follows: first I discuss how debt and financial distress interrelate with product market actions and outcomes, then I review the literature which has discovered empirical findings on the determinants of cash holdings, in the end I discuss how cash holdings can be used in a strategic way to improve firm performance in product markets.

### **2.1. Debt and product market performance**

In this section, I discuss the recent and some of the most important studies on the empirical relation between debt and financial distress to product market behavior and firm performance. These studies increase our knowledge by providing new results in the field of debt, and they follow the previous literature on capital structure and its implications on firm performance, financing costs and firm valuation (see e.g. Campello(2006)). Before the newest studies of the impact of cash holdings on product market behavior were published leverage seemed to be the interpretive factor for the product market outcomes (see e.g. Opler and Titman (1994) and Campello (2003, 2006)). These results are reviewed in the following sections.

#### **2.1.1. Financial distress and predation**

The risk of underinvestment leading to a loss of investment opportunities and market share to product market rivals is referred to as predation risk (Haushalter et al., 2007). Bolton and Scharfstein (1990) were one of the first ones to add new knowledge of how information and incentive problems in the capital markets can determine outcomes in the

product markets. Their model of predation and financial distress confirms how important internally generated funds are if positive results in the product market competition are to be achieved.

Bolton and Scharfstein (1990) show how financial distress can be costly for a firm in the product markets if its weakened condition induces an aggressive response from the competitors which seize the opportunity to gain market share. In Bolton and Scharfstein's (1990) theory the financing contracts, which can terminate financing if a firm performs poorly, tempt competitors into the market to ensure the poor performance and an exit from the market when the contract ends. Bolton and Scharfstein (1990) focus closely on the "deep-pockets" theory of predation where cash rich firms aim to force the financially constrained competitors out of the product market by mediating the competitors' cash flow. This theory emphasizes the importance of the capital structure and internal financing of firms in order them to be able to defend themselves against predation. It also serves as a motivator to actively invest into the company's strategies to stay in the competition. Because it is easier for the financially solid companies to defend their market positions, they can try to lower the new-comer's cash flow with different strategies, e.g. decreasing prices, investing in advertising etc., to prey it out of the markets.

This predation risk model shows how a firm's ability to finance investments with internally generated funds, and thus decrease the financial distress, can mitigate the risk of predation and lead into success on the product markets. On the other hand, a firm needs to have the ability to create financial contracts with better chances for the refinancing decision in order to avoid the unfavorable situation of predation from competitors.

### **2.1.2. Debt's two-fold impact on product market performance**

Most of the studies on the impact of capital structure on product markets focus on leverage's impact on company performance (see e.g. Jensen (1989), Opler and Titman (1994), Campello (2003) and Campello (2006)). The studies also confirm the indirect costs of financial distress (e.g. Bolton and Scharfstein, 1990), and point out financial distress' significance. The results show consistency both with the favorable impacts of debt and its negative influence. There has not been any clear consensus of which impact is the most relevant.

Debt can improve the performance of a company because managers are placed in a position where they have to make choices to maximize the value of the company. When companies have such debt levels that they cannot meet their debt service they are forced to rethink their strategy and structures. The management is forced to adopt value-creating processes by cutting costs, disposing unprofitable assets and restructuring their investment programs. (Jensen, 1989) This mitigates agency problems, as well, and improves company performance. Bolton and Scharfstein (1990) conclude their study of optimal financial contracts by stating that external financing comes with costs and benefits. External finance can discipline the management, but it also makes the firm vulnerable in its product markets due to predation risk.

Opler and Titman (1994), for example, report of the negative impacts of debt. They study indirect costs of financial distress by focusing on industries experiencing economic distress and downturn. Their results show that when there is an industry downturn highly leveraged companies lose significantly more market share than their competitors that are more conservatively financed. The firms in the top decile of an industry facing output contractions are more heavily affected by sales decrease than the companies in the bottom decile. The sales decline is 26 % more for the top leveraged firms. The results are more significant on firms with high R&D expenditure (production of special products) and on those operating in more concentrated markets. These results confirm that the decreasing sales growth cannot be caused only by the managers narrowing the operations, rather it is due to competitive actions in the product market and to customer reactions.

Campello (2003) studies the effects of capital structure on product market outcomes for a large cross-section of industries from a several-year time period. His focus is on the changes of industry-related sales growth, and especially, on the differences in responses to firm sales-leverage sensitivity when there are changes in the macroeconomic conditions. The difficult causality between the company's financial structure and competitive performance, and the unobservable factors in the market environment, are handled by using shocks to mitigate the potential reversal causality, and to simulate an exogenous impact. The results are provided on firm and industry level. Campello's (2003) results show that debt financing has a negative impact on the industry-related sales growth when rivals are relatively unlevered during recession, but not during booms. For example,

a 1% decrease in gross domestic product (GDP) has a greater impact on a firm which relies more on debt financing than the industry on average, when the industry is less leveraged. When the industry, in general, is more leveraged the impact disappears.

On the other hand, Campello (2006) reports results that contradict the previous research on the implications of debt financing on product market outcomes. This study suggests that the outcomes can be *both* positive and negative, implying that moderate debt taking boosts relative-to-rivals sales growth, and higher debt levels lead to hurting product market performance. Firms having clearly higher debt levels than their industry on average expand their industry-related sales relatively more than others in future years. This “leverage effect” faces anyway a threshold; after passing it the effect only leads to sales underperformance.

Campello (2006) also notes different results for industries having dissimilar concentration. If a leader firm, in concentrated markets, has a higher leverage than the industry on average expanding sales with increased leverage levels is no longer possible. On the contrary, the less leveraged leader has a higher potential to increase sales through increasing debt levels.

## **2.2. Determinants of cash**

In the finance discussion cash has been highlighted in several topics, such as cash holdings valuation (see e.g. Pinkowitz and Williamson (2004) and Faulkender and Wang, (2006)), firm performance (see e.g. Mikkelsen and Partch (2003)), and, most recently, as a strategic tool to compete with in the product markets (Fresard, 2010). It is valuable not only to understand the relevance of cash for these topics, and especially for the product markets, but also to understand what the motives behind them are. Earlier literature has tried to determine what drives companies to increase their cash ratios in front of the investors and other stakeholders in the markets. The challenge is that managers and shareholders view the costs and benefits differently (Opler et al. (1999)). In their study of product market’s influence on cash holdings, Haushalter et al. (2007) conclude that cash holdings are an equilibrium outcome from several determinants which relate to a firm’s financing, investment opportunities and the product markets. In addition, management that maximizes shareholder wealth should set the firm’s cash holdings at such a level that the

marginal benefit of cash holdings equals their marginal cost. These three factors are mingled with the determinants of cash holdings described in the literature, as above. In the following sections, I describe the main determinants and discuss how they are potentially linked with product market behavior.

### **2.2.1. Transaction motive**

One of the first motives for cash holdings has been stated by Keynes (1936) who divided the motives into two factors: the transaction motive and precautionary cash holdings. Behind Keynes' (1936) idea of the transaction motive are the saved costs of liquidating assets to make transactions. If an illiquid company has to raise capital from external markets to make transactions, it suffers from extra costs which the liquid competitor can save. The transaction motive also reflects the potential situation of a company not being able to invest in upcoming investment opportunities due to lack of liquid assets and costly external capital.

Myers and Majluf (1984) argue that managers may refuse to issue new equity to take new investment projects because the old shareholders might not see the investment possibility as valuable as the management due to asymmetric information. It might be optimal for the company to reserve extra cash levels to be able to meet the investment opportunities without issuing new stock. This can be seen as a result of the precautionary cash holdings motive but also as a transaction motive to be able to carry out investments without any loss of value of the equity.

### **2.2.2. Precautionary motive**

Keynes (1936) was first who argued for the precautionary motive. He defined precautionary motive as a firm's or individual's need for cash to hedge against sudden expenditure caused by upcoming investments opportunities and unexpected purchases. The precautionary motive for corporate cash holdings has not been modeled widely, and most of the studies (such as Almeida et al. (2004) and Han and Qiu (2007)) have focused on showing how cash flow volatility affects a firm's decisions of cash holdings (see e.g. Opler et al. (1999)).

In Opler et al.'s (1999) study of the determinants and implications of cash holdings, the evidence is consistent with the arguments for the precautionary motives. They discover that the companies that have to strive more to find external financing tend to hold more cash than those with freer access to capital markets (larger firm, and/or higher credit ratings). They suggest that management accumulates cash if it has the opportunity to do so, and the motive is the precautionary motive. Opler et al. (1999) suggest that further research should be conducted to find out whether management can avoid making changes in the firm policies and operations in difficult economic times if it has had the possibility to increase cash levels to cover future difficulties. They also state that if this is the case it would not be surprising that the management is less concerned of increasing cash levels than the shareholders might be.

Han and Qiu (2007) base their study on the previous work of Almeida et al. (2004) and the early arguments from Keynes (1936) on the precautionary cash holdings. They analyze how financial distress impacts on precautionary corporate cash holdings. Their study is based on testing the argument that a financially constrained firm cannot make additional future investments without reducing current investment because it has already used all the external financing. The firm has to hold more cash to be able to invest more in the future. This reflects the precautionary cash holdings: when the future cash flows are volatile the company has to increase cash holdings by cutting current investments. Han and Qiu (2007) find empirical evidence for these arguments. Their results apply only to the financially constrained companies, though; there is no systematic relationship between cash holdings and cash flow volatility of unconstrained firms.

While studying the increasing cash holdings of the US industrial firms Bates, Kahne and Stulz (2009) find out that the firm's cash holdings increase because they become riskier. This is in line with the Lins et al.'s (2010) survey where the Chief Financial Officers answered that holding non-operational cash is thought to guard against future cash flow shocks in bad times. They also argue that the precautionary demand for cash should have decreased due to new derivatives available for companies to hedge their operations.

### **2.2.3. Free cash flow theory**

Jensen's (1986) free cash flow theory (also referred to as the agency theory), even though it is not an empirically tested factor for high cash holdings, relates essentially to a company's cash holdings anyway. Managers are dealing with different views of their company. Managers have plans for value creating investments, but on the other hand shareholders might want to receive excess cash as dividends or share repurchases if they cannot see the investment plans as valuable as the managers. According to Jensen (1986), the conflicts between the stakeholders are especially severe when the firm generates cash holdings that substantially exceed the needed funds to finance projects with positive net present value.

Chen et al. (2011) argue that free cash flows can be used as a proxy for the potential damage caused by overinvestment. Managers of high free cash flows can finance projects with internal funds and this way escape the monitoring of the capital markets. The risk of the funds being invested in a damaging way increases. Chen et al.(2011) suggest that shareholders' rights matter most in reducing the cost of equity capital when the agency problem of free cash flow is severe. This implies that the free cash flow dilemma does not lead only to potential damages of overinvestment but also to abnormally high cost of capital.

### **2.2.4. Firm-specific factors**

It is important to understand how different kinds of firm specific factors, as a result of a dynamic environment, contribute to the levels of cash holdings in companies. Haushalter et al. (2007) suggest that three factors affect the cash holdings: a firm's financing, its investment opportunities and the product markets. In addition, Taimisto (2010) concludes from the earlier theories that cash holdings are less of a strategic choice and more of a result of a dynamic and endogenous process. In this part of the literature review, I review studies of firm specific factors which contribute to the level of cash holdings.

Opler et al. (1999) study firm specific factors which increase or decrease liquid assets, cash and marketable securities on a firm's balance sheet. They suggest that firms with strong growth opportunities and riskier activities, and small firms, tend to hold more cash

in relation to non-cash assets. Firms having better access to the capital markets, i.e. large firms and firms with higher credit ratings, seem to hold lower levels of cash than total non-cash assets. These results support the argument that firms holding large amounts of excess cash have gained them through accumulating internal funds. This is in line with Chudson's (1945) study which shows that cash-to-asset ratios tend to be higher for profitable companies. In addition, John's (1993) results support the arguments that companies with higher financial distress costs, high market-to-book ratios and low tangible asset ratios tend to hold more cash on their balance sheet.

Almeida et al. (2004) highlight the importance of financial distress in the cash holdings discussion as they present a theory of cash flow sensitivity. They argue that for constrained firms the probability to save out of cash flow is high, while the cash savings of unconstrained firms should not be systematically related to cash flows. Constrained firms choose optimal cash policy for balancing the profitability of current and future investments by saving a certain amount of cash flows. The results in the study of Almeida et al. (2004) confirm their hypothesis. In the results, the tendencies also vary across business cycles since constrained firms retain more cash from their cash flows following negative macroeconomic shocks. Again, the unconstrained firms do not show this tendency.

### **2.2.5. Predation risk**

Predation risk, the risk of underinvestment leading to a loss of investment opportunities and market share to product market rivals, was already referred to in the first part of the literature review of debt and the impact of financial distress on product market behavior. In addition to the direct impacts that can be seen on the product markets, predation risk also has its influence on firm cash holdings. Cash holdings can be viewed as a hedge against the potential losses which might occur on the product markets due to the risk. (see e.g. Haushalter et al.(2007)).

Bolton and Scharfstein (1990) created a model of optimal financial contracting to minimize the potentiality of predatory threat. In addition, they suggest with empirical results that the threat of predatory pricing and actions lead companies to increase their cash levels to be able to react to competitors' predatory behavior. This applies when a

firm is in financial distress and has difficulties with refinancing. Bolton and Scharfstein's (1990) model suggests that the degree to which firms can finance investment with internally generated funds is an important determinant of product-market success.

Froot et al.'s (1993) results also support the precautionary theory of cash holdings. When external financing is costly a shock which decreases the cash flows can leave an unhedged firm unable to finance its investment opportunities and thus lead the firm to suffer from the predation risk. If the investment opportunities are interdependent on a certain product market the unhedged firm risks losing market share to competitors that are able to seize on the investment opportunities due to higher internal funds.

Haushalter et al. (2007) investigate the relation between the role of predation risk and corporate financial policy decisions. They focus on the policy decisions by studying how derivatives and cash holdings are used to hedge against product market threats. They base their research on previous studies which show that the cash holdings have the benefit of reducing the predation risk of a firm (see e.g. Opler et al. (1999), Harford et al. (2003), Almeida et al. (2004) and Acharya et al. (2004)). Haushalter et al.'s (2007) results show that firms are more likely to increase their investment level when investing decreases on the industry-level, provided that the firms have larger cash reserves and the interdependence of their investment opportunities with rivals is greater. The results are in line with Froot et al. (1993), and the results suggest that when the interdependence of investment opportunities is high, both within and between industries, a firm's cash holdings increase. Due to predation risk, a firm's cash holdings are also positively related with the industry's Herfindahl-Hirschman (HHI) index<sup>5</sup> and the four-firm concentration index which describe how fierce the competition in the industry or market is.

To conclude, corporate policies, such as holding high cash levels, can reduce firms' predation risk, i.e. risk of underinvestment leading to losses of market share and investment opportunities. When a firm operates in a highly competitive market it faces threats of predation and need cash to hedge against the potential threat. In this study I aim to show that this literature and empirical findings still hold.

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<sup>5</sup> The Herfindahl-Hirschman index is discussed in Section 4.

### **2.3. Cash holdings and firm performance**

The strategic aim in any business is to bring value to shareholders by improving the firm performance. The strategic setting in any business or industry is to create competitive advantage for the firm compared to competitors. One way to describe the competitive setting is to refer to Porter's (1980) five forces which construct a basis for business analysis. A firm should be able to 1) fight against new entrants in the industry, 2) fight against new products in the markets, 3) fight against suppliers' bargaining power, 4) fight against customers' bargaining power and 5) fight against rivalry between firms in the same industry or sector. A firm capable of creating a strategy to fight against these forces will need cash to perform it.

The finance scholars have empirically studied how firms holding high cash levels use them and how the levels impact on the firm performance and growth. Fresard (2010) is the first one to empirically study the strategic impact of cash holdings on a firm's and its rivals' product market performance. Although he shows a significant causal link between past cash holdings and future industry-related market share increase, he does not go further to find out the precise channels which are used to gain market share in the product markets.

Fresard (2010) also points out the difficulty of linking cash to product market behavior, as it is not always clear whether it is the endogenous or exogenous portion of cash that explains the market share growth. He uses asset tangibility and lagged cash levels to force the exogenous portion of cash to explain the market share growth. Furthermore, the quasi-natural experiment of variation in industry-level import tariffs mitigates the concerns that product market performance drives observed cash levels. The results show that firms with more cash on hand perform significantly better when their industry experiences an exogenous intensification of product market competition. The effect of cash seems to be twice as good if a firm operates in competitive markets as opposed to concentrated markets. Fresard (2010) shows with import tariff changes that a firm with more cash on hand performs significantly better when its industry experiences an exogenous shock in product market competition.

In the following two subsections, I will review relevant literature which has empirically studied firms with high cash holdings in order to find evidence of how the cash holdings are used. I will also present how the high cash holdings are supposed to impact on firm performance in the future. These factors might provide ideas regarding the channels that firms use in order to improve positions in the product markets through cash holdings.

### **2.3.1. Cash, performance and growth**

Mikkelson and Partch (2003) study the performance of firms holding persistent high cash levels. They also take a look at how firms, with more than 25 percent of their assets in cash, use their cash holdings. The results show that the investment expenditure of the firms with high cash levels is significantly higher than those of a comparison group (similar industry/SIC code and lower cash levels). The annual scaled investment expenditures are greater than in the comparison group of firms with temporary high cash holdings of the same size and industry. The median R&D expenditures are also higher for these firms what supports the arguments that high cash firms have higher growth opportunities and that assets do not support high levels of debt financing. In contrary to the results of Harford (1999) which suggests that high cash holdings lead to value-decreasing acquisitions, the acquisition activity, according to Mikkelson and Partch (2003), is not that strong for firms holding persistently high cash levels. Nevertheless having high cash levels, not necessarily persistent high cash levels, at some point leads a firm to unusually high acquisition expenditure. Mikkelson and Partch (2003) conclude that high cash firms tend to use the cash holdings in asset growth although it does not lead to any unusual growth in sales.

Fresard (2010) concludes his study with an estimation of how cash holdings affect firm value and its operational performance. Fresard (2010) focuses only on cash holdings impact on return on assets. His results show that relative-to-rivals cash holdings enhance operating performance. The estimate indicates that the effect on return on assets, measured as EBITDA per total assets, is significant.

Harford (1999) studies corporate cash holdings and acquisition activity and suggests that more is spent on acquisitions when a firm has more excess cash. His underlying hypothesis is that the imperfections in the capital markets are costly enough for firms to

find it optimal to save for larger expenditures, e.g. acquisitions. Harford's (1999) results suggest, in consistency with the free cash flow hypothesis, that the acquisition activity of these firms is nevertheless value decreasing. It is reflected in a negative stock price reaction following the acquisition announcement, and the performance of the combined firm is poor afterwards. This suggests that acquisition activity might not explain the improved product market performance. Harford (1999) focuses on the performance from the cash flow point of view so his study does not provide information on whether acquisitions improve the future market share development. Haushalter et al. (2007) suggest likewise that a firm's investment behavior depends on its cash holdings. If firms have higher cash reserves and there is greater interdependence in their investment opportunities with rivals, they are more likely to increase investment when industry-level investment decreases.

Opler et al. (1999) also studied the implications of cash holdings and concluded that the expenditure patterns of high excess cash firms do not indicate that the firms would use their excess cash quickly up. They find only little evidence of a short-run impact of excess cash on capital expenditures, acquisitions and payments to shareholders. This implies that a firm experiencing a large increase in excess cash rather keeps it than spends it on a short-term basis. According to Opler et al. (1999), the excess cash is used rather to cover losses than spent on new projects. The study seeks for patterns of spending for the firms with excess cash. Opler et al. (1999) find that the capital expenditure increases with the increase of excess cash for companies with both high and low market-to-book values, although the increase in the expenditure is smaller than the cash holdings increase for firms with high market-to-book value. Opler et al. (1999) conclude that even when the firms holding excess cash have only poor investment opportunities they still have higher capital expenditure and spend more on acquisitions.

### **2.3.2. Cash in product market competition**

Many studies of the impact of debt on product market behavior and the use of cash holdings relate to investments and to the ability for making acquisitions in different market conditions (see e.g. Haushalter et al. (2007), Froot, et al. (1993), Campello (2006)). In a situation of interdependent investment opportunities with competitors, independent financing choices that determine the exposure of investment opportunities

can be strategically beneficial (Campello, 2006). Froot, Scharfstein and Stein (1993) also argue that firms which can finance investments with internal funds can try to gain market share by increasing investment when changes in industry conditions force rivals to underinvest.

Baskin (1987) studies the oligopolistic model and the meaning of cash holdings in product market competition. In the model, liquid assets are “employed both to signal commitment to retaliate against market encroachment and to enable firms to rapidly preempt new opportunities”. He suggests two ways how liquidity can be advantageous in the markets: passive preemption and warfare. In the first, passive preemption, cash holdings enable a firm to respond quickly to new opportunities by constructing entry barriers and allow it to monopolize the market in a situation where an entrant is trying to create competition with investments into specialized assets. In order to preempt the competition, the first market holder will need to invest sunk costs to press the price level so low that the entrant has to exit the market. In the second strategy, warfare, cash holdings are used to back up the expected losses caused by the increased competition where the competitor’s cost-benefit calculus is changed with e.g. price decreases. Baskin (1987) concludes that liquid assets are important because of their ability to speed actions up in the competitive moves.

Campello (2006) introduces potential policies to improve firm performance, such as capital outlays, research and development spending, plant or store location, improvements in distribution network, advertising targeted against rivals and the employment of more productive workers. As Campello (2006) concludes, the next step should be to identify the precise product market strategies where the cash holdings are used strategically with the knowledge of a firm’s and its rivals’ financial situation.

#### **2.4. Management view on cash balance**

The CEO of Stora Enso, Jouko Karvinen, states in the Annual Report 2009 that Stora Enso was able to face the challenges of the recent financial crisis in 2009 because they focused on cash flow, already before the year 2009 had started and the worst was coming. The firm managed to increase the cash flows by minimizing operational costs through effective working capital management and reduction of capital expenditure. The CEO of Danone, Franck Riboud, states in the company’s Annual Report 2009 that the cash target

for 2010 was going to be a 10% increase in the firm's cash holdings. The purpose of the target remains unknown. "Due to the uncertain conditions on international capital markets, we increased our liquidity levels at the beginning of 2009", is said in the Review of the Financial Year 2009 of BMW Group. These comments from the management reflect the fact that cash is a precautionary tool for facing the upcoming difficulties.

Haushalter et al. (2007) refer to findings of Froot (1990) who reported the way Intel had defended its high cash balance. Intel's top executives said that it was "an important competitive weapon and, because the economy was in a recession, that cash was king". This corroborates the precautionary motive which seems to cause the behavior of the top management of large firms (see e.g. Lins et al. (2010)). The surveys of Graham and Harvey (2001) and Bancel and Mittoo (2002) suggest that CFOs consider financial flexibility, i.e. having enough internal funds to finance future investments, the primary determinant of their policy decisions.

Lins et al. (2010) find support for the precautionary motive of cash holdings from the management perspective. They study the determinants of cash holdings by conducting a survey on chief financial officers from 29 countries. Lins et al. (2010) ask whether firms use lines of credit or cash holdings to hedge against risks. The survey is mainly interested in non-operational cash holdings which are not observable in the financial statements. The results show that non-operational cash is held to protect against future cash flow shocks in bad times, while credit lines are held to give firms the option to exploit future business opportunities in good times. Excess cash is held for the purpose of insuring against future cash flow shortfalls. The study also reveals that less than half of the cash held on firm balance sheets are for non-operational purposes. This indicates that studies on high levels of cash holdings should try to construct models for examining the non-operational part of the holdings and the determinants for the operational need for cash.

Campello et al. (2010) survey 1050 Chief Financial Officers in the US, Europe and Asia to examine how credit constraints affected firm spending behavior during the financial crisis in 2008. Interpretation of the results will naturally highlight the importance of cash holdings. The results show that over half of the CFOs confessed their firms had to postpone planned investment during the crisis. 86 percent of the CFOs said that their attractive investment opportunities were restricted during the time. Campello et al. (2010)

discover that financially constrained firms were forced to burn a sizable portion of their cash holdings during the crisis. The firms planned to cut more from investment, technology, marketing and employment, compared to unconstrained firms, during the crisis. Referring both to Campello et al. (2010) and Fresard (2010), one could assume that those unconstrained firms which hold more cash in a relation to the industry in the beginning of the crisis, would end up as the winners after the financial downturn.

### 3. Hypotheses

In this thesis, I expect to find evidence of the effect of cash holdings and industry-related market share growth. The aim is to explore whether there is a significant relation between a firm's industry standardized cash holdings and its industry-related future market share increase. Fresard (2010) has shown that the evidence of this connection between cash holdings and product market outcomes is significant. I replicate Fresard (2010) by hypothesizing according to his results that this relation also applies with European data. I will study this with the following hypotheses.

Firstly, I will test the underlying baseline relation of cash holdings and industry-related market share increase. The more a firm holds cash on its balance sheet, compared to the industry average cash ratios, the more the firm should create gains in market share, relative to other competitors in the industry. The cash holdings are examined in a relation to total assets.

**Hypothesis 1.** High industry-related cash holdings lead to future industry-related market share growth.

Second, I test whether the country of origin of a firm characterizes the cash holdings impact. Fresard's (2010) study is completed with a sample of data from the Compustat tapes. The data describes firms originating in the US and leaves out the question whether the phenomenon could be related to any country-specific factors. My sample is constructed from European firms what gives me an opportunity to study whether there are differences between countries. I hypothesize that the cash holdings effect stated in

Hypothesis 1 holds true regardless of the firm's country of origin. I test this with data from France, Germany and the UK.

**Hypothesis 2.** High industry-related cash holdings lead to future industry-related market share growth regardless of a firm's country of origin.

To control whether the industry and cross industry specific factors affect the competitive effect of cash holdings, I follow Fresard (2010) and study what the effect of the competitors' financial strength and the industry's concentration is. I expect the decrease in a rival's financial strength to yield more pronounced results for cash holdings. A similar impact should be visible when the competition toughens. I divide the sample into quartiles, first according to the competitors' financial strength (*Size, Age and Payout policy*). Next, I test whether the industry conditions alter the effect of cash holdings; I will divide the sample according to the industry characteristics of *Industry concentration (HHI)* and *Similarity of operations* (defined with capital-labor ratio). I use these characteristics to measure how concentrated an industry is and how tight the competition is. The variables are explained in detail in Section 4. The following hypotheses depict the expectations.

**Hypothesis 3.1.** The weaker the competitor's financial status is the stronger is the impact of cash holdings on the industry-related market share growth. (*Rival's characteristics*)

**Hypothesis 3.2.** The higher the competition in an industry is the stronger is the impact of cash holdings on industry-related market share growth. (*Industry characteristics*)

The definition of market share in Fresard's (2010) study makes it doubtful of whether the sample, constructed for the study, describes the sales development in the sample industries well enough. The firms in Fresard's (2010) study are both large and small firms which operate in different markets: some operate globally with European and Asian firms some only with other local and small players. Porter (1980) examines strategy formulation in global industries. He defines a global industry as one in which a firm's strategic position in one country is affected by its position in other countries. In this study, I defined the markets according to industries; based on their 3- or 4- digit SIC codes (industry classification). I want to test whether this composition of industries misleads the results.

An error is possible as the data includes firms operating both in local and global markets. The division between globally and locally operating firms in my study is made referring to Korbin's (1991) index of transnational integration of industries which describes the proportion of the intrafirm flows of international operations. The methodology of the subsample construction is explained in Section 4.

**Hypothesis 3.3.** The cash holdings impact on future industry-related market share growth is stronger among industries operating globally than locally operating industries.

If the effect of cash holdings stated in the first hypothesis applies the implications should have been strongly present in the recent financial crisis. Fresard (2010) concludes his study by arguing that his results should be applicable in this time period. He suggests that those companies that managed to increase their cash holdings before 2008 should have found a stronger position in the product markets after the crisis. Byoun and Xu (2011) indicate in their working paper that firms that relied on internal funding prior to the crisis have increased their market share compared to their competitors dependent on external finance during the crisis. I expect Hypothesis 1 to apply for the time period I am studying and that it provides stronger results for cash holdings impact.

**Hypothesis 4:** Given the conditions in the recent financial crisis, the cash holdings effect on future industry-related market share growth is stronger than in a normal time period.

#### 4. Data

The data is retrieved from the Thomson ONE Banker Worldscope financial data base and Datastream. The main variable figures are retrieved from Worldscope and the inflation rates by country from Datastream. The study concentrates on public companies and includes data of European firms which operate in manufacturing industries defined with SIC codes from 2000 to 3999<sup>6</sup>. The data is retrieved by country and comprises countries

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<sup>6</sup> SIC codes are created by the US government and meant to describe homogenous markets. The US Securities and Exchange Commission defines the SIC codes in the following link <http://www.sec.gov/info/edgar/siccodes.htm>. The codes are specified with four digits describing specified industries and production. See Clarke's (1989) study of how well the SIC codes identify firms with similar characteristic variables.

which are members of the European Union and/or the European Economic Area, 22 countries, altogether (see Appendix I). The firms are both active and non-active public companies. The data consist of observations from a time period of 1990 to 2009.

#### 4.1. Sample construction

To construct the data, I first retrieve all active and non-active firms from all the 22 European countries. I then restrict the sample to include only those firms which operate in a manufacturing industry specified with a primary SIC code between 2000 and 3999. The primary SIC codes are appointed by Thomson One Banker to best describe the firm's group operations. If a firm is lacking the primary SIC code I exclude it from the sample. This leaves me with 4029 European firms. As most of the variables in the analysis are relative to total assets, I exclude all the firms which lack figures for total assets in the total time period from 1990 to 2009. In addition, all firms lacking figures for cash and sales are excluded. The figures are retrieved in euros from the data base and adjusted with inflation

**Table I**  
**Definition of Variables and Data Items**

Table I describes the data items in Worldscope used to create the variables and for the analysis of the cash holdings effect. The variables are stated in the left hand column, their description in the middle and the Worldscope data item on the right hand column. All the variables are constructed from P/L, Balance Sheet or Cash Flow statements.

Variable	Description	Data item in Worldscope
Total Assets	Total Assets	TotalAssets
Sales	Sales	Sales
Size	Natural logarithm of Total Assets, $\ln(\text{TotalAssets})$	TotalAssets
$\Delta$ MarketShare	$(\text{Sales}_t - \text{Sales}_{t-1}) / \text{Sales}_{t-1}$ minus industry-year average sales increase	Sales
Cash	$(\text{Cash} + \text{Short-Term Investments}) / \text{Total Assets}$	CashAndSTInvestments
Leverage	$(\text{Long-Term Debt} + \text{Current Portion of LT Debt}) / \text{Total Assets}$	TotalLTDebt+ CurrentPortionOfLTDebt
Tangibility	$0,715 * \text{Receivables} + 0,547 * \text{Inventories} + 0,535 * \text{Fixed Capital}$	TotalReceivables, TotalInventories, TotalPropPlantEquipNet
Acquisitions	Amount spend in acquisitions(cash) / Total Assets	NetAssetsFrAcquisitionsCFStmt
Market-to-Book	$\text{Market value of equity} + \text{book value of assets} - \text{book value of equity} - \text{deferred taxes} / \text{total assets}$	CommonSharesOutstanding*PriceFYE, TotalAssets, TotalCommonEquity, DeferredTaxesBalSht
Age	Nbr. of years preceeding the observation year when the firm has a stock price in the Worldscope.	PriceFYE
Payout ratio	Paid dividends/net income	DividendPayout,
Capital-labor ratio	$\text{TotalPropPlantEquipGross} / \text{Employees}$	Employees, TotalPropPlantEquipGross

to equate the 1995 price level. The inflation adjustment is made with country specific Consumer Price Indexes and the indexes are retrieved from the Datastream.

In Table I, I describe the Worldscope definitions for the data items used in the analysis to compute the dependent and independent variables. The calculation of the dependent and independent variables is explained in the Section 4.2.1., including the variables in Table I. I organize the sample by industry according to the Primary SIC codes, in order to study the competitive aspect of cash holdings in relation to industry characteristics. The SIC codes describe the industries with 4-digit specifications. I define the industries for my sample according to 3- and 4- digits. At this point, there must be at least three firms per industry. If there is less the firms are classified according to the industry in which their biggest segment operates or according to a more general industry specification (less significant digits in the SIC code). If there are more than one hundred firms in one industry according to 3 digits I divide the industry into smaller industries according to 4 digits and apply the procedure described above to allocate all firms into an industry. This industry classification gives me 151 industries with specification of 3- or 4-digits, with a minimum of three firms per industry, 26 firms per industry, on average.

I apply observation criteria to sales, assets, debt, cash and book values of equity to analyze a coherent sample. Following Fresard's (2010) way of constructing his sample I exclude firm-years where the sales or assets are less than one million euros. These small firms usually face extensive asset and sales increase or decrease that might bias the results. Leaving these firms out decreases the selection bias because smaller firms in the beginning of their life span can increase their operations with an abnormal speed or they operate in a smaller geographical area where they compete only with local markets. I also exclude observations with debt and cash ratios over one and negative book values of equity. After this specification I am left with 149 industries, with a minimum of three firms per industry, 25 firms per industry, on average. Excluding all the extreme observations, according to the criteria described above, leaves me 3770 firms.

#### **4.2. Summary statistics of data**

In this section, I describe the characteristics of my sample data and the variables I use to study the cash holdings impact on market share growth. Table II summarizes the

observations of the main sample. It forms a panel data that is created from 3770 firms before any observation winsorizing, but includes all the other criteria set for the sample during the sample construction. The sample is clearly smaller compared to Fresard's (2010) study of US data. The amount of observations of Acquisitions and Leverage especially is clearly smaller. These observations reduce the amount of firm-year observations in the final analysis of the empirical relation. The sample deviates in some statistics from Fresard's (2010) US data. The average sales growth (0.06) and cash levels (0.12) in my sample are lower than in Fresard (2010) (0.14 and 0.19, respectively). The firms in my European sample are clearly more leveraged, with an average value of 0.19 (0.14, respectively). The amount of net cash flow spend in acquisitions to total assets follows a similar level in both samples, being 0.06 in both studies. The average of assets in European firms seems to be higher than in the US sample. My median assets are 100 million euros compared to Fresard's (2010) assets of 59 million dollars, on average.

**Table II**  
**Summary Statistics of the Sample**

Table II describes the summary statistics of the main features of the sample including 3770 firms from 22 European countries. The data items follow the criteria set in the sample construction. *Total Assets* and *Sales* are a minimum of one million euros in a firm-year, and *Sales growth* includes observations with growth less than 200%. *Leverage* and *Cash* are restricted to less than one. The sample period is from 1990 to 2009, and the sales growth observations begin in 1991. The sample consists of firms in manufacturing industries defined with 3- or 4-digit SIC codes from 2000 to 3999.

	Nbr. Of Observation	Average	25th percentile	Median	75th percentile	St.dev
Total Assets ( <i>€Millions</i> )	39,753	1 361	30	100	405	7 610
Cash	38,077	0.12	0.03	0.07	0.16	0.15
Sales Growth	34,787	0.06	-0.07	0.03	0.15	0.28
Leverage	13,616	0.19	0.07	0.16	0.28	0.28
Acquisitions	9,479	0.06	0.01	0.02	0.07	0.12
Market-to-Book	36,020	6.92	1.04	1.36	2.34	65.71

My focus in this thesis is to analyze the cash holdings impact on market share growth also during the recent financial crisis. In Table III, I present the cash levels and sales growth figures for the industries included in the study (with a 2-digit specification) for three different time periods, from 1990 to 1999, from 2000 to 2009 and the financial crisis, from 2008 to 2009. My sample statistics in Table III are in line with the findings of Bates, Kahle and Stulz (2009) who report that US industrial firms have increased their cash levels during the last two decades. In my European sample, the average increase in cash

**Table III**  
**Industry Statistics of the Sample**

Table III presents summary statistics of *Cash* and *Sales growth* for three different time periods, from 1990 to 1999, from 2000 to 2009 and from 2008 to 2009. All the figures are average values. *Sales* are a minimum of one million euros in a firm-year and *Sales growth* includes observations with growth less than 200%. *Cash* is restricted to less than one. The sample period is from 1990 to 2009 and the sales growth observations begin in 1991. The sample consists of firms in manufacturing industries defined with 3- or 4-digit SIC codes from 2000 to 3999. The number of observations is in parentheses below each figure.

Industry	<i>Cash to Total Assets</i>			<i>Sales Growth</i>		
	1990- 1999	2000- 2009	2008- 2009	1991- 1999	2000- 2009	2008- 2009
2000 Food and Kindred Products	0.10 (2,081)	0.09 (2,233)	0.08 (436)	0.05 (1,846)	0.05 (2,201)	0.00 (446)
2100 Tobacco Products	0.20 (48)	0.19 (66)	0.18 (14)	0.06 (39)	0.05 (59)	0.11 (12)
2200 Textile Mill Products	0.08 (790)	0.07 (607)	0.08 (106)	0.01 (700)	-0.05 (594)	-0.18 (102)
2300 Apparel and Other Finished Products Made from Fabrics	0.11 (586)	0.12 (628)	0.12 (110)	0.05 (491)	0.04 (610)	-0.03 (105)
2400 Lumber and Wood Products (no Furniture)	0.09 (286)	0.08 (379)	0.07 (74)	0.08 (244)	0.07 (361)	-0.06 (72)
2500 Furniture and Fixtures	0.10 (343)	0.11 (315)	0.11 (62)	0.09 (290)	0.02 (314)	-0.09 (60)
2600 Papers and Allied Products	0.09 (755)	0.08 (724)	0.07 (143)	0.07 (655)	0.02 (694)	-0.06 (137)
2700 Printing, Publishing and Allied Industries	0.13 (925)	0.13 (1,125)	0.12 (207)	0.09 (799)	0.04 (1,115)	-0.06 (223)
2800 Chemicals and Allied Products	0.15 (1,780)	0.18 (2,487)	0.17 (501)	0.08 (1,527)	0.08 (2,276)	0.02 (496)
2900 Petroleum Refining and Related Products	0.06 (201)	0.09 (209)	0.12 (43)	0.03 (175)	0.13 (192)	0.03 (43)
3000 Rubber and Miscellaneous Plastic Products	0.11 (529)	0.10 (505)	0.09 (95)	0.06 (457)	0.05 (482)	-0.06 (99)
3100 Leather and Leather Products	0.15 (116)	0.13 (115)	0.14 (25)	0.01 (99)	0.06 (112)	0.06 (25)
3200 Stone, Clay, Glass and Concrete Products	0.11 (1,093)	0.08 (845)	0.08 (141)	0.04 (960)	0.03 (834)	-0.07 (141)
3300 Primary Metal Industries	0.07 (928)	0.08 (849)	0.09 (164)	0.05 (793)	0.05 (822)	-0.16 (164)
3400 Fabricated Metal Products, Except Machinery and Transport Equipment	0.10 (864)	0.13 (774)	0.13 (161)	0.03 (766)	0.05 (722)	0.00 (145)
3500 Industrial and Commercial Machinery and Computer Equipment	0.13 (2,233)	0.14 (2,836)	0.15 (547)	0.08 (1,921)	0.07 (2,673)	-0.04 (543)
3600 Electronic and Other Electrical Equipment and Components, except Computer	0.13 (1,650)	0.17 (2,596)	0.16 (528)	0.11 (1,416)	0.08 (2,513)	-0.03 (531)
3700 Transportation Equipment	0.11 (1,064)	0.11 (1,093)	0.10 (220)	0.08 (927)	0.07 (1,020)	-0.06 (213)
3800 Measuring, Analyzing and Controlling Instruments; Photographic, Medical etc.	0.15 (1,012)	0.18 (1,615)	0.15 (312)	0.12 (844)	0.10 (1,546)	0.04 (323)
3900 Miscellaneous Manufacturing Industries	0.12 (332)	0.12 (439)	0.13 (85)	0.08 (282)	0.05 (417)	-0.02 (80)
Total sample	0.11 (17,616)	0.13 (20,461)	0.13 (3,974)	0.07 (15,230)	0.06 (19,557)	-0.03 (3,963)

holdings between the two observed decades was 13%. In most of the observed industries, the cash holdings were lower during the recent financial crisis compared to the average during 2000 to 2009. Industries requiring heavy investments, especially such as wood, paper, printing, chemicals, rubber, electronics and measuring, and analyzing and controlling equipment, have suffered from declining cash piles.

Most of the industries that lost cash during the crisis suffered most also in terms of sales figures. The average sales growth in my sample for the years 2008 and 2009 was -0.03. The average sales increase in my sample in a slightly longer period during the recession, from 2007 to 2009, was only 0.002. The strongest fall in sales took place after the year end of 2007. Therefore, my focus on analyzing the financial crisis is the cash holdings impact on market share growth occurring from January 2008 to December 2009.

## 5. Research methods

In this section, I describe how the dependent and independent variables are constructed. I focus especially on the instrumental variable approach which is used to tackle the reversal causality potentially captured in the link between cash holdings and market share growth. I review the methods to analyze the impact of rival and industry characteristics on the empirical relation of cash holdings and market share growth. In the end, I summarize the statistics for the dependent and independent variables and present the regression model for the analysis.<sup>7</sup>

### 5.1. Dependent variable

The dependent variable,  $\Delta MarketShare$ , describes the industry-related market share change. As the size of a certain market or industry, measured in sales, is not known I study how the market share of a firm changes in relation to average sales increase of its industry. I expect to find a relation between the relative to rivals cash holdings and the relative to industry market share change. As the market share change cannot be measured I measure instead the change of a firm's sales between two sequential firm-years compared to the average change between the corresponding two sequential industry-years. At this point, when I form the variables, I require at least five firms per an industry-year to

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<sup>7</sup> The data has been analyzed and studied with Microsoft Excel 2007 and EViews7.

create an industry, and to avoid unnecessary noise in standard deviations that might bias values for the dependent variables. I also run my baseline estimation (specified in Section 5.6.) with a minimum of 15 firms per industry for result comparison purposes.

The following equation describes the methodology used to calculate the dependent variable  $\Delta MarketShare$ :

$$\Delta MarketShare_{i,t} = \frac{Sales_{i,t} - Sales_{i,t-1}}{Sales_{i,t}} - \frac{Sales_{k,t} - Sales_{k,t-1}}{Sales_{k,t}}, \quad (1)$$

where  $i=1,..n$  denotes the observed firm,  $t=1,..n$  the time and  $k=1,..n$  the observed industry.  $Sales_{i,t}$  is the total sales of a firm  $i$  in a year  $t$ , and  $Sales_{k,t}$  the total sales of an industry  $k$  (defined with 3- or 4-digit SIC codes) in a year  $t$ .

Even after applying different criteria for the sample, described in Section 4.1., the variables such as  $\Delta MarketShare$ , might still include extreme values of outliers which impact the results heavily. I revalue those extreme values which lie outside the range of 99% of the observations by winzorizing them. Instead of excluding the figures I revalue them with the values of the end of the 99% range of the observations; this means that all the observations which lie outside the range are given the exact value of the end of the 99% range. This procedure minimizes the outliers to create noise to the variables and research results. I apply winsorizing to the dependent and independent variables for the basic estimation (see Section 5.6) of cash holdings impact on future market share growth to get more reliable results.

## 5.2. Cash holdings

### 5.2.1. Instrumental variable (IV) approach

The causal link between cash holdings and market share might be biased due to endogeneity factors. An independent variable, *Cash*, might be correlated with an error term in my regression model. Reversal causality might also exist, e.g. the level of cash holdings on the balance sheet might be driven by the market share position of a firm in an industry. There might also exist other external factors driving the cash levels, such as collateral demands from the debt providers and managerial preferences which up to a

certain level might not have anything to do with a firm's cash levels or the strategic use of cash holdings. Because these kind of factors are not observable in the study and cannot be controlled I have to tackle them with econometric methods.

In my study any controlled experiments to tackle endogeneity bias are difficult to run, so there must be another way to control them. Following Fresard (2010), I use the instrumental variable (IV) approach to enforce the exogenous portion of cash, the actual cash holdings which are not driven from any unobserved error term, to explain the improvement in the product markets. In the instrumental variable approach, the cash holdings are estimated with instruments that correlate with the original explanatory variable and that do not suffer from the same endogeneity bias. I apply Fresard's (2010) estimation and use asset tangibility (*Tangibility*) and two lagged values of cash holdings ( $Cash_{t-1}$  and  $Cash_{t-2}$ ) to instrument the cash holdings. The specification follows Berger et al (1996), and it is a multiple regression model estimating coefficients for the different instruments. I use the estimated coefficients to calculate the final z-scored cash holdings for the final regression. I allow firm ( $\alpha_i$ ) and time ( $\eta_t$ ) fixed effects in the instrumental variable approach. The instrumented cash holdings are estimated with the following equation:

$$CashIV_{i,t} = \alpha_i + \eta_t + \beta_1 * Tangibility_{i,t} + \beta_2 * Cash_{i,t-1} + \beta_3 * Cash_{i,t-2} + \varepsilon_{i,t}, \quad (2)$$

where *Tangibility* is defined with receivables, inventories and fixed capital) as described in Table I. The estimation of *Tangibility* follows Berger et al. (1996) who estimated the coefficient for the variables in order to find the relations between book value and exit value for the major asset classes when operations are discontinued. These coefficients provide the tangibility of these assets if they were to be liquidated. The *Tangibility* is defined with following factors;  $0.715 * Receivables + 0.547 * Inventories + 0.535 * Fixed Capital$ .

My instruments apply reasonably well to explain the cash holdings. The coefficients for the instruments are presented in Table V with the regression results of the instrumented cash holdings and market share growth.

### 5.2.2. Z-scored cash holdings

I study the instrumented cash holdings relative to rivals to depict the competitive effect of cash holdings. The competitive edge is determined in relation to the industry's cash holdings. I expect the competitive advantage to appear when a firm which has cash holdings outside the standard deviation of the industry's cash holdings can increase its market share (Fresard (2010)). If a firm has higher cash holdings than the industry on average its competitive advantage might not unfold if the cash holdings are still within the standard deviation of the industry cash holdings.

I standardize (z-score) the instrumented cash holdings so that I can examine the relation between the relative to rivals cash holdings and the industry-related cash holdings. I follow MacKey and Phillips (2005) and Fresard (2010) in this standardization. I deduct the *average* cash holdings of the industry,  $IVCash_{k,t}$ , from the firm's instrumented cash holdings,  $IVCash_{i,t}$ . I then divide the margin with the standard deviation of the industry cash holdings,  $\sigma IVCash_{k,t}$ . The industries are defined with the 3- or 4-digit SIC codes and the industry averages and standard deviations calculated for each industry-year. The following equation defines the method explained for standardizing the cash holdings:

$$zCash_{i,t} = \frac{IVCash_{i,t} - IVCash_{k,t}}{\sigma IVCash_{k,t}}, \quad (3)$$

where  $k=1,2,..n$  denotes the industry,  $i=1,2,..n$  the firm and  $t=1,2,..n$  the year. In every year there must be at least five firms to create an industry in order to control the noise in the standard deviations.

### 5.3. Control variables

In the first set of control variables, I study whether adding *Size*, *Leverage* or past market share changes,  $\Delta MarketShare$ , change the cash holdings impact on market share growth. *Size* is denoted as the natural logarithm of total assets and *Leverage* as the long-term plus the current portion of the long-term debt. The past market share changes are defined according to the method for the dependent variable. The definitions are presented in Table I (Section 4.1.) with other data definitions.

With the additional control variables I measure whether *Acquisitions* or *Market-to-Book* ratios change the setting with the cash holdings on market share growth. The acquisitions are defined as the net assets from acquisition in the cash flow statement scaled by total assets. *Acquisitions* can be a way to expand a firm's operations and improve performance (see e.g. Healy, Palepu and Ruback, (1992)). I want to test whether acquisitions diminish the impact of cash holdings when I control the regression with the net amount spent in acquisitions in the two previous years. *Market-to-Book* ratio indicates the expectations set for a firm by the financial markets. The variable is constructed by adding the book value of assets to the market value of equity and deducting the book value of equity and deferred taxes. To get the ratio, I divide the market value of assets with the book value of total assets. If the investors' expectations set in a share price, and accordingly in the market-to-book ratio, are correct and indicate future growth and improvement the control variable should have a positive coefficient and indicate future market share growth. The definitions of *Acquisitions* and *Market-to-Book* are also presented in Table I (Section 4.1).

#### **5.4. Industry characteristics**

In this section, I describe the methods I use to study whether the cash holdings impact on future market share growth depends on the industry characteristics, from financial strength of rivals or competitive nature of the industry. In all the examinations I use subsamples to study whether there are differences in the impact of cash holdings.

I use firm *Size*, *Age* and *Payout policy* to describe the financial strength of rivals. The three definitions measure how strong financial constraints the firms in the industry have. *Size* corresponds to the natural logarithm of total assets as before. *Age* is defined by the preceding continuous firm-years before the firm has a year-end share price in the Thomson One Banker Worldscope database. *Payout policy* is defined as the payout ratio. I sort the total sample into subsamples of the first and fourth quartiles based on these characteristics and their magnitude. I run the baseline estimation for all the subsamples to test whether the impact of cash holdings differs between them.

I analyze the effect of the industry competition (concentration) with similar methods as with the rival characteristics. I create subsamples according to the industry competition (concentration) defined by the Herfindahl-Hirschman index (*HHI*)<sup>8</sup> and the *Similarity of operations* specified with the capital-labor ratio. I calculate the Herfindahl-Hirschman index for every industry  $k$  for every year  $t$  with the following equation;

$$HHI_{k,t} = \sum_{i=1}^I \left( \frac{Sales_{i,t}}{\sum_{i=1}^I Sales_{i,t}} \right)^2 \quad (4)$$

For a year  $t$ , the firm-year sales are divided by the total sales of an industry and the remainder is squared. The sum of the squares describes the concentration of the industry. The Herfindahl-Hirschman index classifies industries with indexes higher than 0.18 as highly concentrated and those with an index lower than 0.10 as competitive. Fresard (2010) also uses the guidelines given by the Department of Justice of the US and forms the subsamples according to the limits. My total sample is constructed from highly concentrated industries: for the total sample the median Herfindahl-Hirschman index is 0.33 and the average figure 0.41 (see Table IV). Because the sample is so strongly concentrated in all industries I do not create subsamples with the limits of 0.10 and 0.18. Instead, I use the first and fourth quartiles of the industries which are ranked based on the index, to create the subsamples.

Forming the subsamples by the *Similarity of operations* I follow Fresard's (2010) setting. I rank the industries according to their *Similarity of operations* measured by the capital-labor ratio. The *Similarity of operations* describes how similar the industries are in terms of technological structure. If the capital-labor ratios of the firms in an industry are close to each other, i.e. firms organize their operations in a similar way, the competition is harder. The proxy value for the similarity is low when the difference between firms is small. I divide a firm's *Fixed capital* by the number of *Employees* multiplied by thousand and deduct the median industry-year capital labor ratio from each firm's value. I then divide the difference by the range of maximum and minimum value in the industry to make the values comparable across industries. The following equations summarize the methods:

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<sup>8</sup> Herfindahl-Hirschman index named by economists by Orris C. Herfindahl and Albert O. Hirschman is widely used to assess the level of competition. It is used e.g. in the European Union to assess competition situation changes in the product markets due to mergers and acquisitions.

$$\text{Capital-labor ratio}_{i,t} = \frac{\text{Fixed Capital}_{i,t}}{\text{Employees}_{i,t} * 1000} \quad (5),$$

$$\text{Similarity of operations}_{k,t} = \frac{\text{Capital-labor ratio}_{i,t} - \text{Capital-labor ratio}_{k,t}}{\text{Capital-labor ratio}_{k,t,max} - \text{Capital-labor ratio}_{k,t,min}} \quad (6)$$

The smaller the proxy for the similarity is the more similar are the operations in the industry. I expect the similarity to reflect competition in the industry and to indicate a higher probability of losing market share (Fresard (2010)). Cash holdings should show more pronounced results in this subsample than in the subsample where the competition is minimal.

## 5.5. Summary statistics of variables

**Table IV**  
**Summary Statistics of the Variables**

Table IV presents summary statistics for the variables used in the baseline estimation presented in Section 5.6., and for the analysis of industry characteristics. The observations are firm-year observations, except for *Industry concentration (HHI)* and *Similarity of operations* which are industry-year observations.  $\Delta\text{MarketShare}$  and  $z\text{Cash}$  are computed with a minimum of five firm-year observations in each industry-year. The sample period is from 1990 to 2009,  $\Delta\text{MarketShare}$  figures begin in 1991 and  $z\text{Cash}$  figures in 1992. The sample consists of firms in industries defined with 3- or 4-digit SIC codes from 2000 to 3999.

Variables	Nbr. Of Observation	Average	25th percentile	Median	75th percentile	St.dev.
$\Delta\text{MarketShare}$	34 787	0.00	-0.12	-0.02	0.08	0.26
Tangibility	39 753	0.36	0.25	0.38	0.49	0.15
$z\text{Cash}$	26 798	0.00	-0.70	-0.33	0.57	0.97
Acquisitions	9 479	0.06	0.01	0.02	0.07	0.12
Market-to-Book	36 020	6.92	1.04	1.36	2.34	65.71
Age	37 636	6.98	0.00	0.00	6.00	4.71
Payout ratio	19 634	0.35	0.20	0.31	0.47	0.22
HH Index	2 917	0.41	0.24	0.33	0.54	0.26
Similarity of operations	2 858	0.67	0.55	0.71	0.83	0.23

Table IV summarizes the main statistics for the dependent and independent variables, in addition to the sample criteria for the industry characteristics. *Size* and *Leverage* are presented already in Table II. The observations are firm-year observations except the

*Herfindahl-Hirschman index (HHI)* and *Similarity of operations* which are industry-year observations.

## 5.6. Regression model

The main focus of this thesis is to examine whether there is an empirical relation between the lagged, relative to rivals cash holdings and future industry-related market share growth. I follow Fresard (2010) and form a regression model to empirically test the baseline estimation and the previously presented hypotheses:

$$\Delta MarketShare_{i,t} = \alpha_i + \eta_t + v(zCash_{i,t-1}) + \beta' X_i + \varepsilon_{i,t} \quad (7),$$

where  $i$  and  $t$  represent the firm and the year, respectively. The change in the market share,  $\Delta MarketShare$ , is estimated in relation to the industry sales increase, as described in Section 5.1. The market share changes thus represent the industry-related market share changes where the market is constructed from firms operating in the same industry, defined with 3- or 4-digit SIC codes. The firm's cash holdings,  $zCash$ , are assessed with the instrumental variable (IV) approach and standardized with the industry standard deviations. The main attention in my study is on  $v$ , the coefficient for the standardized cash holdings.  $X_i$  represents different control variables which capture other direct sources of product market performance and market share growth, such as *Size*, *Leverage* and past market share growth,  $\Delta MarketShare$ . Additional control variables are *Acquisition* spending and *Market-to-book* ratio.

What makes the regression analysis and the sample challenging are the unobserved variables and error terms which might correlate with the explanatory variables included, in addition to the cash holdings, and impact the dependent variable. This makes it difficult to employ a simple regression model, such as the OLS (Ordinary least square method). To analyze my sample, which is in a panel data form, I use a fixed effects model. The fixed effects model can be used when one cannot expect there is no unobserved time- or cross-section (firm) specific variables or any error terms which might correlate with the used explanatory variables ( $zCash$  or other control variables).

The error terms in the regression model might encapsulate all the unobserved variables which are cross-section specific and not changing over time. There might be country, industry or legislation specific effects that impact the observed firm. To estimate the cross-section specific effects, dummy variables can be used with a least squares dummy variable (LSVD) method. As it is not practical to write down all the dummy variables for every firm in the regression model they are written in the equation as one unobserved variable changing by a firm,  $\alpha_i$ , but not over time. This allows the intercept to change according to the cross-section. One has to eliminate the intercept though, so as to avoid a dummy variable trap due to the sum of dummies being one in every observation. Also the dummy variables cannot be solved due to multicollinearity. As the time period of my sample is long and it includes changes in the economic environment I allow time fixed effects, as well. The method for the time fixed effects is the same as with the firm fixed effects and for the sake of convenience I note the change in the intercept due to time with  $\eta_t$ .

## **6. Empirical results**

My empirical findings are reviewed in this section. In section 6.1., I first present the results for the cash holdings impact on market share growth for the baseline estimation of the total sample. I then run the analysis focusing on three countries, namely France, Germany and the UK, to depict the differences between these countries. Next, I examine how industry characteristics change the cash holdings impact. The latter part, Section 6.2., reviews the findings of the cash holdings for the time period of the recent financial crisis, 2008-2009.

### **6.1. Cash holdings effect on market share growth**

#### **6.1.1. Baseline estimation**

This part of the empirical results is the core study of the thesis. I test the instrumented cash holdings effect on future market share growth (Hypothesis 1). The results are shown in Table V where the coefficients for the cash holdings are presented. Due to the endogeneity bias I use the instrumental variable approach to elicit the exogeneous part of the cash holdings impact on future industry-related market share growth. This reduces the

potential bias of reversal causality between market share increase and cash holdings, and any potential impact of error terms in the regression model to market share growth. In the instrumental variable approach, I explain the cash holdings with *Tangibility* and lagged cash ratios from the two previous financial years (see Fresard (2010) and Berger, Ofek and Swary (1996)). *Tangibility* defines cash holdings but does not impact market share growth directly. I allow the firm and time period effects and use the cash instruments to construct the cash holdings for the regression model (7).

The specification (2) for the instrumented cash holdings yields significant coefficients for *Tangibility* and one-year-lagged cash holdings. The explanation power of the estimation is 0.771. The coefficients of the instruments are presented on the right hand side in Table V. Like Fresard (2010) in his estimation, I, too, find a negative relation between *Tangibility* (-0.295) and a positive one with one-year lagged *Cash* values (0.398). The two-year lagged cash holdings do not give a statistically significant explanation for the current cash ratios. In the regression I allow cross-section (firm) and time fixed effects to explain the cash ratios. Using the resulting specification I produce the instrumented cash holdings variables for every firm in every time period, including the firm and period effects, respectively.

The instrumented cash holdings are used to standardize the cash holdings to bring the industry-related competitive edge of the cash holdings into effect. What motivates the standardization is to find out whether those firms that have higher cash ratios than the industry on average and that are not in the dispersion of the industry cash ratios have a competitive advantage. I am most interested in those firms that not only have high cash ratios compared to their average peers in the industry but also have a competitive edge of cash ratios being outside the standard deviation of the industry's cash ratios. Every industry standard deviation must be comprised of at least five firm-year observations so that the analysis is coherent and biased deviations can be avoided.

The results seem to indicate that the cash holdings effect presented in Fresard's (2010) study does not hold worldwide. My data suggests that there is no significant relation between the relative to rivals cash holdings and the future industry-related market share growth. In contrast to Fresard's (2010) positive and significant connection between the variables, I propose that if there is any relation between them it is negative for the one-

**Table V**  
**The Impact of Cash Holdings on Future Market Share Growth**

Table V describes the baseline estimation of the cash holdings impact on industry-related market share growth. The dependent variable,  $\Delta MarketShare$ , is the industry-related market share change. The main independent variable,  $zCash$ , is instrumented to avoid circular causality between cash holdings and market share changes, and standardized to reflect the competitiveness compared to the industry. The coefficients for the instruments are presented in Column 6. The baseline estimation is presented in columns 1, 2 and 3. In columns 4 and 5 the estimation is run with a minimum of 15 firm-year observations per industry for robust purposes. The table presents other control variables such as *Size*, past *Leverage* and past  $\Delta MarketShare$ . The firm- and time-fixed effects are allowed. The time period is from 1990 to 2009. I denote 1%, 5% and 10% significance level with \*\*\*, \*\* and \*, respectively. The *t*-statistics are presented in brackets under the coefficients.

	IV cash holdings effect			No. Of Firms	No. Of Firms	Cash instruments	
	(1)	(2)	(3)	>15	>15		(6)
$zCash_{t-1}$	-0.004		-0.004	-0.002		Tangibility <sub><i>t</i></sub>	-0.295***
	[-1.198]		[-1.220]	[-0.502]			[-51.913]
$zCash_{t-2}$		0.003	0.004		0.005	Cash <sub><i>t-1</i></sub>	0.398***
		[1.055]	[1.429]		[1.019]		[69.884]
Size <sub><i>t-1</i></sub>	-0.081***	-0.001	-0.074***	-0.084***	-0.094***	Cash <sub><i>t-2</i></sub>	-0.005
	[-8.786]	[-0.575]	[-7.486]	[-5.677]	[-5.891]		[-0.951]
Leverage <sub><i>t-1</i></sub>	0.092**	0.078**	0.083**	0.098	0.151**		
	[2.371]	[2.014]	[2.130]	[1.599]	[2.328]		
Leverage <sub><i>t-2</i></sub>	-0.063*	-0.108***	-0.056	-0.074	-0.121*		
	[-1.664]	[-2.783]	[-1.457]	[-1.227]	[-1.858]		
$\Delta MarketShare_{t-1}$	-0.003	0.183***	-0.008	-0.029	-0.022		
	[-0.252]	[13.768]	[-0.600]	[-1.433]	[-1.026]		
$\Delta MarketShare_{t-2}$	-0.101***	0.041***	-0.100***	-0.108***	-0.098***		
	[-7.974]	[3.200]	[-7.615]	[-5.489]	[-4.724]		
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes		Yes
Period-fixed effects	Yes	Yes	Yes	Yes	Yes		Yes
No. Of Obs.	7,084	6,686	6,469	3,221	2,946		30,383
R <sup>2</sup>	0.361	0.262	0.358	0.393	0.378		0.771
J- statistic (p-value)							

year lagged cash holdings and positive for the two-year lagged figures. Thus, the coefficients for one- and two-year lagged cash holdings differ in signs. Both of them are still insignificant. The robust check with a minimum of 15 firm-year observations per industry each year supports the original results of columns (1) to (3) in Table V. The negative and insignificant coefficient for the one-year lagged cash holdings and the opposite effect from the two-year lagged cash holdings both hold.

My results seem to suggest, thus far, that there is no significant evidence for or against the hypothesis that relative to rival cash holdings impact the industry-related market share growth. My findings are not significant but they indicate that the potential positive impact of cash holdings to future industry-related market share growth derives from the two-year lagged cash holdings. Mikkelsen and Partch (2003) propose that high cash firms tend to use their cash holdings in asset growth. However, this does not lead to any unusual growth in sales in the subsequent year. This could suggest that the actual impact of high cash holdings cannot be seen directly in the following financial year; instead the benefit of the use of the relative to rivals cash holdings is seen further in the future. Thus, the results are not suggesting any holding evidence for or against the hypothesis of cash holdings impact (Hypothesis 1). At this point, the Hypothesis 1 cannot be accepted or rejected, but the two-year lagged cash holdings are worth to focus on, based on the current findings.

Contrary to Fresard's (2010) results, I report partly opposite coefficients for the control variables. Even though I use the same control variables as Fresard (2010) in his estimations, the results are surprising. The effect of firm *Size* on future market share growth is negative on one percent significance level, -0.081 in Table V. The result holds with the sample of a minimum of 15 observations for industry averages and deviations for robust purposes. My interpretation is that it is more challenging for larger firms to improve their market shares than for smaller firms. The growth potential is logically larger for smaller firms entering markets. Smaller firms either increase their market share rapidly in order to gain a footing in the competition or they lose their grip of the market entrance and fall. It is more difficult for larger and more stable firms to suddenly change their market position. They would need acquisitions or other investments to enlarge operations. If an economical shock that changes the business environment took place the impact of firm *Size* would be more blurred. I will focus on this in Section 6.2. where the recent financial crisis will be studied.

Besides the size effect the one-year-lagged debt ratio,  $Leverage_{t-1}$ , also turns out to have a significant impact on future industry-related market share growth. In column (1) of Table V, I report that one-year lagged  $Leverage$  increases the future industry-related market share. The one-year-lagged  $Leverage$  has a positive coefficient of 0.092 which is significant at one percent significance level. The positive impact, either significant or not, holds for all the estimations in Table V. Fresard (2010) reports similar results of the positive impact of  $Leverage_{t-1}$ , and significantly negative ones for  $Leverage_{t-2}$ . My findings support this setting as I report a negative impact of two-year lagged  $Leverage$  in all the estimations. The coefficients are significant in columns (1) to (3). The results are in line with Campello (2006) who finds positive implications of moderate debt taking for industry-related market share growth. However, he suggests that the debt has a threshold and its effect turns negative after passing this threshold. Campello's (2006), Fresard's (2010) and my results support Jensen (1989) and Bolton and Scharfstein (1990) who suggest that debt disciplines the management to improve firm performance and realize value enhancing operations.

My results seem to indicate inconsistent results for the impact of past  $\Delta Market Share$  on future market share growth: they are both for and against it. Fresard (2010) reports a positive impact of one-year past market share improvement and a negative one for two-year past figures. My findings are partly in line with his. I find both positive and negative results for one-year past market share; all the coefficients for the two-year past figures are significant. In columns (1) and (3) to (5) in Table V, the two year past market share explains the future market share development negatively at one percent significance level. In the estimation of column (2), the result is contradictory and significantly positive. Based on these findings, it is difficult to draw conclusions on the real nature of past market shares in the development of the future ones.

The two-year lagged cash holdings show positive but not significant results in Table V. I run the baseline estimation again for the two-year lagged cash holdings with additional control variables (Table VI). My primary interest is whether the results for cash holdings in Table V remain similar in Table VI when I include *Acquisitions* and *Market-to-Book* ratio to control the changes in future market share growth.

**Table VI**  
**The Impact of Cash Holdings on Future Market Share Growth**  
**With Additional Control Variables**

Table VI describes the baseline estimation of the cash holdings impact on industry-related market share growth with additional control variables. The dependent variable,  $\Delta MarketShare$ , is the industry-related market share change. The main independent variable,  $zCash$ , is instrumented and standardized as in Table V. In columns 1 and 2, the baseline estimation is presented with  $zCash_{t-2}$  and additional control variables, *Acquisitions* and *Market-to-Book*. In columns 4 and 5, the estimations are run with a minimum of 15 firm-year observations per industry for robust purposes. The firm- and time-fixed effects are allowed. The time period is from 1990 to 2009. I denote 1%, 5% and 10% significance level with \*\*\*, \*\* and \*, respectively. The *t*-statistics are presented in brackets under the coefficients.

	IV cash holdings effect		No. Of Firms	No. Of Firms
	(1)	(2)	>15	>15
$zCash_{t-2}$	0.009 [1.589]	0.004 [1.350]	0.017* [1.889]	0.003 [0.623]
Size $_{t-1}$	-0.003 [-1.039]	-0.071*** [-7.146]	-0.103*** [-3.156]	-0.099*** [-6.056]
Leverage $_{t-1}$	-0.076 [-1.037]	0.107*** [2.619]	0.001 [0.008]	0.178*** [2.656]
Leverage $_{t-2}$	-0.004 [-0.059]	-0.104** [-2.539]	-0.034 [-0.272]	-0.139** [-2.017]
$\Delta MarketShare_{t-1}$	0.166*** [6.911]	-0.011 [-0.836]	0.000 [0.004]	-0.021 [-0.961]
$\Delta MarketShare_{t-2}$	0.029 [1.235]	-0.092*** [-6.994]	-0.070* [-1.779]	-0.089** [-4.236]
Acquisitions $_{t-1}$	0.284*** [4.010]		0.465*** [4.024]	
Acquisitions $_{t-2}$	-0.036 [-0.553]		0.222** [2.123]	
Market-to-Book $_{t-1}$		-0.000** [-2.108]		-0.001*** [-2.973]
Market-to-Book $_{t-2}$		0.000 [1.526]		0.001* [1.733]
Firm-fixed effects	Yes	Yes	Yes	Yes
Period-fixed effects	Yes	Yes	Yes	Yes
No. Of Obs.	2,069	6,420	888	2,831
R <sup>2</sup>	0.366	0.356	0.429	0.382

The results for the two-year cash holdings in Table VI are similar to the results in Table V: all the coefficients are positive but most of them do not show that cash holdings have a significant impact. Only when I run the estimation with a minimum of 15 observations per industry (in column (3)), controlling with past *Acquisitions*, I find the cash holdings to impact the future market share growth positively at a 10 percent significance level. A one

standard deviation increase in cash holdings relative to rivals increases the market share by 1.7%. The results for the past *Acquisitions* are mainly positive. The one year past *Acquisitions* improve the market share significantly. In columns (1) and (3), the *Acquisitions* do not change the setting for the cash holdings but the main change is the coefficient of *Leverage*. The significant and positive impact of one-year lagged *Leverage* is missing in columns (1) and (3). The same impact is missing in the estimations where I use *Market-to-Book* ratio as the additional control variable. I find positive coefficients for the one year past *Acquisitions* both from the estimation in column (1) and from the robust check in column (3). They are 0.284 and 0.465, respectively and both of them are significant with a one percent significance level. For the two-year past figures my findings differ from the one-year past figures. Focusing on the same estimations, I first find insignificant negative results and then positive ones but with a 52% lesser impact. These results are in line with Mikkelsen and Partch (2003) and Harford (1999) who propose that the impact of acquisitions turns negative with the two-year lagged figures. Fresard (2010) reports differing signs for the coefficients of past *Acquisitions*, also, but both signs have a significant impact in his findings. The explanatory power of the estimation also increases when I make the past acquisitions to explain the future market share development, from 0.262 to 0.366.

Fresard (2010) discovers that controlling the impact of cash holdings on market share development does not have any implications if past *Market-to-Book*- ratios are added into the analysis. My estimations for the coefficients of two-year lagged cash holdings hold positive and insignificant when I add past *Market-to-Book* figures. The variable does not change the impact of past *Leverage* like the *Acquisitions* did. Based on these results *Market-to-Book* ratios have almost zero effect for the future market share growth. One year past ratios in estimations (2) and (4) are significantly negative but close to zero (-0.000 and -0.001, respectively). The findings for the two-year past figures are positive but they lose their significance. The coefficients are still close to zero, 0.000 and 0.001. These results imply that the expectations set for the firms in my sample did not realize in the market share development in the future. The situation is different in Fresard's (2010) study where the ratios indicate positive development for market share growth.

My findings vary compared to what Fresard (2010) finds from his data: the standardized cash holdings do not show the expected positive sign for  $zCash_{t-1}$ , and the coefficients for

$zCash_{t-2}$  in Table V are not significant at either 10%, 5% or 1% level. There is some weak evidence for the two-year lagged cash holdings in Table VI. This may result from many things. First, our samples differ in size, especially when it comes to the leverage observations. We both have used our own judgment in industry construction and specification. Second, Fresard (2010) uses a sample of 105 4-digit industries, I have used a sample of 149 3-or 4-digit industries. I construct my sample of industries that have a minimum of three firms. In the estimations I use variables that are constructed from at least five observations for industry averages and deviations. Fresard (2010) requires industry-years with at least 10 firm-year observations of cash, assets and sales. The industry construction is one of the most important cornerstones in this study and the sizes of the industries impact the industry-related figures both in market share increase and in standardized cash ratios. The industry construction with the SIC digits is a challenging task when it comes to describing the real competition.

Third, the results might also be biased due to the original data source and its industry definitions for the firms observed. In my study I keep the SIC codes constant during the examination period because the primary SIC codes in the Thomson One Banker Worldscope hold during the period. It remains unclear whether Fresard (2010) adjusts the SIC codes for the firms observed every year and ranks the industries again. Fourth, in general, the description of the industry in which each firm observed operates might not tell the whole truth of because the primary SIC codes are usually determined by the biggest business unit sales of the firm. A significant part of the firm operations can be ignored. It would be interesting to see whether the cash holdings impact per business segment could be explained. Fifth, the difference of the time period could account for some arguments for the differences in the findings. My time scale runs from 1990 to 2009 but Fresard (2010) has gathered his sample from earlier time periods, starting from 1976 running to 2006.

The last potential explanation for why the results differ might be the industry characteristics or the varying intensity of competition in different industries and markets. Fresard's (2010) sample includes US based firms from the Compustat tapes. I retrieve data from 22 European countries and this increases the heterogeneity of the sample. Fresard's (2010) results might give specific information only on American firms and reflect an underlying management culture of cash holdings and American competition.

The global vs. local industry aspect is also missing in Fresard's (2010) study. Bates, Kahle and Stulz (2009) find that the cash balances of industrial US corporations have almost doubled since the 1980's. This might be related with the cash holdings effect.

### **6.1.2. Cash holdings effect in France, Germany and the UK**

In this section, I run the baseline estimation with three subsamples constructed from one of the biggest European countries: France, Germany and the UK. The results in Section 6.1.1 did not show any significant positive implications that cash holdings might have in future industry-related market share growth. I now hypothesize that the cash holdings impact stated in Hypothesis 1 holds regardless of the firm's country of origin (Hypothesis 2). The results in Section 6.1.1., show that cash holdings have a major impact on market share growth, so I now expect the coefficients for the country-specific estimations to show no significant findings. Still, I hypothesize that the effect should not be dissimilar in different countries and, based on Section 6.1.1, that it should not apply in any of the countries.

It is worth to test the hypothesis with different countries as the heterogeneity of European countries in my sample is wide and I do not control the country specific fixed effects in the baseline estimation in Section 6.1.1. During the time period observed, from 1990 to 2009, notably many of the East European countries have undergone major changes in their economic environment and financial legislation. Changes in foreign exchange currencies and joining the European Union could have influence the country specific effects.

In this section I take France, Germany and the UK into focus as the data availability and quality of these countries is better. All these countries have experienced the changes mentioned above in their economies, as well. The three countries represent a more developed financial environment during the time span I will study, but they also differ from each other. The U.K can be classified as an Anglo- American country where firms have lower debt levels (Borio (1990)) and agency costs and bankruptcy costs are higher (Edward and Nibler (2000)). The countries can also differ in legislation, corporate governance, shareholder protection, ownership structure and cash holdings.

Ferreira and Vilela (2004) study the cash holdings of EMU countries and find that firms operating in countries with more developed capital markets tend to hold less cash. This is contrary to the agency costs view and consistent with view that firms build up cash for precautionary reasons. According to the features of their data Ferreira and Vilela (2004) find that the ownership concentration is doubly higher in Germany than in France. The creditor rights are also higher in Germany than in France. On the contrary, in France the shareholder protection is higher based on an anti-director rights index created by La Porta et al. (1998). Guney et al. (2007) find similar results on ownership control and add that the concentration is substantially lower in the UK where both the creditor rights and anti-director rights outpace both France and Germany.

To estimate the coefficients for the cash holdings, I use the same instrumented and standardized cash holdings as in Section 6.1.1. (Table V). I then create the subsamples per country of France, Germany and the UK for the time period of 1990 to 2009. I test both the one- and two-year lagged cash holdings impact on future market share growth with the same control variables as in Table V. I allow the firm- and time-fixed effects in the regressions. The results are presented in Table VII.

The findings for one- and two year lagged cash holdings in Table VII almost fully replicate the results in Table V for all the countries. The lagged standardized cash holdings do not show any meaningful positive impact on future industry-related market share in Germany and the UK. I find negative results for them for one-year lagged cash holdings, and positive ones for the two-year cash levels. Neither is significant. For France, the coefficient for the one-year lagged cash holdings is positive, though lacking in significance. The two-year lagged cash holdings of France thus differ and show weak evidence of the potential impact of cash holdings effect. The coefficient for the  $zCash_{t-2}$  is 0.014 and significant with only a 10% level. Thus, the results for the coefficients of cash holdings mostly follow the pattern of baseline estimation in Table V. The one-year lagged cash holdings do not indicate any clear impact on the market share growth but the two-year lagged cash holdings show weakly positive impact on future industry-related market share growth.

**Table VII**  
**The Impact of Cash Holdings on Future Market Share Growth in France, Germany and the UK**

Table IX describes the baseline estimation of the cash holdings impact on industry-related market share growth in France, Germany and UK. The dependent variable,  $\Delta MarketShare$ , is the industry-related market share change. The main independent variable,  $zCash$ , is instrumented and standardized as in Table V. In columns 1, 2 and 3 the baseline estimations for  $zCash_{t-1}$  are presented. In columns 4, 5 and 6 the estimations are run with  $zCash_{t-2}$ . The table presents other control variables such as *Size*, past *Leverage* and past  $\Delta MarketShare$ . The firm- and time-fixed effects are allowed. The time period is 1990 to 2009. I denote 1%, 5% and 10% significance level with \*\*\*, \*\* and \*, respectively. The *t*-statistics are presented in brackets under the coefficients.

	France		Germany		U.K.	
	(1)	(2)	(3)	(4)	(5)	(6)
$zCash_{t-1}$	0.001 [0.175]		-0.010 [-0.970]		-0.001 [-0.188]	
$zCash_{t-2}$		0.014* [1.867]		0.002 [0.189]		0.007 [1.069]
$Size_{t-1}$	-0.068*** [-3.245]	0.001 [0.256]	-0.059* [-1.738]	-0.001 [-0.206]	-0.113*** [-6.360]	0.003 [1.042]
$Leverage_{t-1}$	0.147* [1.679]	-0.056 [-0.597]	-0.317** [-2.144]	0.016 [0.122]	0.164** [2.019]	0.171** [2.463]
$Leverage_{t-2}$	-0.172** [-1.959]	-0.038 [-0.409]	0.187 [1.205]	-0.067 [-0.531]	-0.216*** [-2.716]	-0.215*** [-2.993]
$\Delta MarketShare_{t-1}$	0.003 [0.095]	0.208*** [6.785]	0.030 [0.605]	0.282*** [6.095]	0.010 [0.413]	0.119** [4.973]
$dMarketShare_{t-2}$	-0.057* [-1.663]	0.079*** [2.691]	-0.088** [-2.007]	-0.000 [-0.002]	-0.095*** [-4.100]	0.040* [1.702]
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Period-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
No. Of Obs.	1,126	1,102	586	541	2,085	1,954
R <sup>2</sup>	0.360	0.277	0.429	0.347	0.373	0.261

The country specific estimations support my previous findings that the phenomenon is not worldwide but I cannot conclude that it would not be country dependent. Fresard (2010) finds strong evidence to support the hypothesis but I find no results significant enough among the biggest European economies, such as France, Germany and the UK. As the minor differences between the countries still exist they must relate to some cultural aspects. The features usually seen in Anglo-American countries cannot explain the differences in the results between Fresard's (2010) findings and mine as such, because the UK has been usually classified as an Anglo-American country according to its characteristics. Either the general level of the cash holdings compared between Fresard's (2010) data and my findings does not explain the different results in the country-specific point of view. Both the European and the US data are treated so that the industry-related measures are studied, both cash holdings and market share changes.

The findings with the control variables in the country specific analysis (Table VII) are partly in line with the results in Table V. The impact of *Size* holds for all the countries in columns (1), (3) and (5) though only weakly for Germany, with a 10% significance level. The negative impact of *Size* disappears for France and the UK when I study the two-year lagged cash holdings instead of the one year lags. For Germany it holds but loses significance substantially.

The other control variables show differing indications compared to Table V and Table VI in Section 6.1.1. The results in baseline estimation (Table V) indicated that the one year lag of leverage has a positive impact on future market share improvement but in longer-term leverage turns out to be detrimental for firm performance. The impact of leverage in the country-specific regressions follows partially the results. The findings in columns (1), (5) and (6) present results of estimations for France and the UK where the one-year lagged *Leverage* shows positive impact for the future industry-related market share growth. The leverage loses its impact when the time period spans from  $t+1$  to  $t+2$ . All the results are significant in these estimations. The results are weakest for France. Thus, the results of these three estimations support the main findings from the total sample as well as Campello's (2006) findings where the leverage impact holds for one year but a prolonged high leverage hurts firm performance. For Germany, the setting holds insignificantly when I examine the two-year lagged cash holdings (see column (4) in Table VII). The

findings from the German data contradict the French and British sample. The coefficients are not in line and show a significant negative impact on the one-year lagged cash holdings, indicating that firms based in Germany suffer in short-term from high debt ratios.

The results for the impact of the past market share on future market share development are very fragmented in the country-specific estimations. In columns (1), (3) and (5), for all the countries, the estimations show how the past market share improvements hold their one-year momentum, though not significantly, and indicate a significantly negative impact when I examine the two-year lagged cash holdings. This pattern follows Fresard's (2010) results though not with equivalent significance. The results in Table VII are contradictory, though, as I also find significantly positive impact from both past market shares for Germany and France when I study the two-year lagged cash holdings. I miss for any conclusions of the past market share in the country-specific analysis as the results are so diverge.

To conclude all the country specific estimations, the results in Table VII support the doubt of the cash holdings impact on product market development to be any worldwide phenomenon. None of the countries report a strongly significant impact of the cash holdings to market share growth and they do not differ enough among each other to enable me to draw any meaningful country-specific conclusions. There is no strong evidence of any cash holdings effect on future market share growth. Still, I rely on these findings from French, German and British subsamples as they represent the data I use most comprehensively in this thesis. They also represent both typical Western European countries and an Anglo-American country.

### **6.1.3. Industry characteristics on cash holdings effect**

In this section, I focus on studying how the characteristics in and between industries and rivals impact the cash holdings effect on product market outcomes. My aim is first to replicate Fresard (2010) and to test whether the power of the impact differs depending on the competitiveness of an industry and the financial strength of competitors in it. Second, I test the empirical setting in Fresard's (2010) research from the perspective of industry globalization. In contrast to his study, where the data is covered as one entirety without

separating the industries and firms which operate globally or only in the US market, I study whether the globalization of the industry alters the impact of cash holdings on market share growth.

### **Industry and rival characteristics**

First, I test whether the cash holdings effect depends on the industry and rival characteristics as described in Hypotheses 3.1 and 3.2. Fresard (2010) reports significantly differing results for subsamples formed by the rivals' financial strength (*Size, Age and Payout policy*) and the industry's competitiveness (*Industry concentration and Similarity of operations*). His results confirm the hypothesis that when rivals are financially weaker the cash holdings effect is significantly stronger, i.e. high cash holdings lead to future industry-related market share increase with the expense of the rivals. He reports likewise strong results when the industry is less concentrated according to the Herfindahl-Hirschman- index and when the *Similarity of operations* is high in the industry. The more competitive the market is the more useful the cash holdings should be strategically. This setting is closely related to predation. Supporting the impact of rival characteristics, Bolton and Scharfstein (1990) find that while suffering from financial constraints a firm might end up as a target of predation leading to cash rich firms trying to drive a firm out of the markets. A firm with high cash holdings can defend itself better against having to exit a market.

Table VIII presents the findings of rival and industry characteristics. In Panel A, I first examine how the rival characteristics impact the cash holdings effect. I divide my total sample in every industry-year to "high" and "low" industries according to the financial strength of rivals measured with the industry's average *Size, Age and Payout ratio*. I form the subsamples I will observe from the first and fourth quartiles. I run the baseline estimation for the subsamples to depict whether the cash holdings impact differs between the samples. My findings for the subsamples in Table VIII, Panel A, are in line with the results of standardized cash holdings in Section 6.1.1. I find both positive and negative results for the impact in the subsamples. However, the findings do not show any significant coefficients in any of the subsamples, and therefore there is no evidence that cash holdings have a positive impact on the industry-related market share growth (Hypothesis 1).

**Table VIII**  
**The Impact of Rivals' Financial Strength and Industry Characteristics**  
**in Cash Holdings Impact on Market Share Growth**

Table VII describes the baseline estimation of the cash holdings impact on market share growth in different subsamples according to rivals and industry characteristics. The dependent variable,  $\Delta MarketShare$ , is the industry-related market share change. The main independent variable,  $zCash$ , is instrumented and standardized as in Table V. The sample is grouped according to industry rivals' *Size*, *Age* and *Payout policy* in Panel A, and according to the *Industry concentration* (Herfindahl-Hirschman index) and *Similarity of operations* (industry adjusted capital labor ratio) in Panel B. The coefficient for  $zCash_{t-1}$  is presented for each group. The firm- and time-fixed effects are allowed. The time period is 1990 to 2009. I denote 1%, 5% and 10% significance level with \*\*\*, \*\* and \*, respectively. The  $t$ -statistics are presented in brackets under the coefficients. The number of observations are found under the  $t$ -statistics.

	Low	High
$zCash_{t-1}$	Panel A	
Rival's size	-0.003 [-0.394] 1,772	-0.004 [-0.901] 1,722
Rival's age	0.002 [0.346] 1,772	-0.003 [-0.472] 1,772
Rival's payout policy	-0.000 [-0.013] 1,762	-0.003 [-0.445] 1,772
	Panel B	
Industry concentration (HHI)	0.003 [0.475] 1,772	-0.010 [-1.531] 1,772
Similarity of operations	-0.018** [-2.569] 1,771	-0.010 [-1.556] 1,772

The impacts of cash holdings are just slightly more negative in the subsamples which comprise of the industries where the rivals' financial strength is weaker. In the subsample of *Size*, I report coefficients of -0.003 and -0.004 for the "low" and "high" subsamples, respectively. When I measure the financial strength with *Age*, the years before the years observed when a firm has a noted share price; I find a positive impact of cash holdings for the subgroup of younger firms, 0.002. However, the coefficient is not significant and I cannot conclude that cash holdings would give any strategic benefit for younger firms. The *Payout policy*, the payout ratio, seems to indicate similar results as *Size*;

insignificantly negative impact in both subsamples with a slightly less negative coefficient for the more financially constrained subsample.

I take a similar approach in Panel B where I first group the industries according to their competitiveness measured with the Herfindahl- Hirschman- index. I place the industries in the lowest quartile measured with the HH index to the “low” subsample and the industries in the highest quartile to the “high” subsample. I create the subsamples of the similarity of operations by positioning the industries with the proxy for lower *Similarity of operations* in the “low” quartile and the industries with the proxy for the higher *Similarity of operations* in the “high” quartile. The industries in the “high” quartile represent industries where the operations are most similar in their technological structure and where the capital labor ratios of the firms are close to each other. This means firms organize their operations in a similar way that leads to tougher competition. I expect the cash holdings to have a stronger impact on industries where the competition is higher, i.e. the industries where the *Industry concentration (HHI)* is low and the *Similarity of operations* is higher.

Concerning the *Industry concentration (HHI)*, I find the cash holdings impact to be in the right direction, though weakly. The subsample of higher competition has a positive impact of cash holdings, 0.003, and the concentrated industries negative one, -0.010. The results are not significant in either subsample so it remains unclear whether there is a significant difference in the impacts of cash holdings in the subsamples. In the subsamples of *Similarity of operations* the coefficients for the relative to rivals cash holdings are both negative. The “low” subsample is the one where firms’ operations, in terms of their technological structure, are fragmented. These firms’ attempts to improve their future market share suffer from the high cash holdings. I find a significantly negative coefficient for the subsample, -0.018, with a 5% significance level. This result is in contrast to most of my findings which do not suggest that cash holdings would significantly hurt a firm’s market share growth.

The results in Table VIII do not provide any firm evidence for either rejecting or accepting Hypotheses 3.1. and 3.2. Bolton and Scharfstein (1990) found that financial distress can be costly in the product markets if a firm’s weakened condition induces an aggressive response from competitors that want to seize the opportunity to gain market share. This indicates that high cash holdings should act as a defensive strategic tool to

compete with and that its effect on e.g. future market share improvement should be stronger when the rivals are in a weaker condition. My findings are in conflict with this argument as they suggest that it cannot be proved that the rivals' condition plays an important role on any potential cash holdings effect.

The findings seem to be in contrast with other studies which suggest that the industry competition has an influence on the cash levels (see e.g. Haushalter (2007) and Campello (2006)). I suggest that the cash hoarding strategy of cash loses its efficiency if the competitiveness of an industry or the weak financial strength of competitors does not play a role in the cash holdings effect. This is supported by Fresard (2010) and Haushalter (2007). The predation risk and cash holdings can also be questioned. Froot et al. (1993) argued that if the investment opportunities are interdependent on certain product markets the un-hedged firms risk losing market share to competitors who are able to take on the investment opportunities with their higher internal funds. My findings do not support this theory due to the lack of significant evidence.

### **Global and local industries**

Second, I extend the study of industry characteristics to examine whether the global and local industries both produce equally strong results for the cash holdings effect. Both my sample and the US sample in Fresard's (2010) study are treated with the assumption that all firms belonging to an industry, according to a 3- or 4-digit SIC code; automatically compete in the same product markets. I take this assumption into focus and hypothesize that when industries are classified according to their SIC codes the firms in the industries might not necessarily compete with each other both locally, internationally and globally. Certain industries might be clearly global where the firm's strategic actions in one country are affected by its operations and competitors' actions in another country (Porter, 1980). Thus, even though the firm is located in one country its product markets might be worldwide. Kobrin (1991) argues that transnational integration appears when the benefits of integration across borders exceed the costs of a limited recognition of national social and political differences. The benefits result from specialization, interchange and scale. The definition for a global industry is based on the significance of the competitive advantage of international operations.

With the arguments mentioned above I conclude that not necessarily all industries are such that firms belonging to them can or do compete with each other. In certain industries the operations might be local and the firms might not compete of same customers or even in same geographical markets. Their strategic actions might differ substantially from those of the global industries. This raises the question of whether the sample and its industries are treated correctly.

Next, I want to test whether the main hypothesis of the impact of cash holdings on future market share increase holds stronger in the subsample of global industries. To do this, I construct subsamples of the industries which operate globally and locally. When the locally operating industries are left out the actual competition in an industry is more realistic and correctly defined. The firms that operate locally might disturb in the original results for the total sample. I also run the baseline estimation with a sample including industries which operate locally to find whether the results differ from the sample of global industries.

I create the subsamples based on the index formed by Kobrin (1991). He studies 56 industries and creates the index by measuring the proportion of intrafirm international sales. The reasoning is based on the argument that the integration should be based on intrafirm exchanges of people, technology, raw materials, components and finished goods. He argues that the flows of different components are embodied in the flows of products and creates the index based on the intrafirm international sales. I base my subsample of global industry of the most transnationally integrated firms according to Kobrin's (1991) classification, and to the local subsample accordingly. I match the industries of Kobrin (1991) with my sample defined with 3- and 4-digit SIC codes. The subsamples following Kobrin's (1991) classification are presented in Appendix II.

In Table IX, the baseline estimations for the subsamples of global and local industries are presented. I hypothesize that the cash holdings effect in global industries should be stronger than in the local industries due to the better specification of firms in a product market (Hypothesis 3.3.). My assumption that Fresard (2010) has treated his sample misleadingly without controlling the differences of the local and global industries has conflicting evidence. The results in Table IX show that the cash holdings effect of one-year lagged standardized cash holdings among locally competing industries is

**Table IX**  
**The Cash Holdings Impact on Future Market Share Growth in Global and Local Industries**

Table VIII describes the baseline estimation of the cash holdings impact on industry-related market share growth for subsamples of industries operating globally and locally. The dependent variable,  $\Delta MarketShare$ , is the industry-related market share change. The main independent variable,  $zCash$ , is instrumented and standardized as in Table V. The table presents other control variables such as *Size*, past *Leverage*, past  $\Delta MarketShare$ , *Acquisitions* and *Market-to-Book*. The firm- and time-fixed effects are allowed. I denote 1%, 5% and 10% significance level with \*\*\*, \*\* and \*, respectively. The *t*-statistics are presented in brackets under the coefficients.

	Global industries					Local industries				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$zCash_{t-1}$	-0.003 [-0.521]		-0.006 [-0.970]			-0.009* [-1.857]		-0.010* [-1.984]		
$zCash_{t-2}$		0.001 [0.141]	0.000 [0.015]	0.002 [0.181]	-0.000 [-0.006]		0.007 [1.456]	0.005 [0.916]	0.012 [1.332]	0.008 [1.501]
$Size_{t-1}$	-0.093*** [-5.461]	-0.073*** [-4.075]	-0.068*** [-3.792]	-0.115*** [-3.053]	-0.071*** [3.895]	-0.032* [-1.865]	-0.032* [-1.791]	-0.038** [-2.071]	-0.096*** [-2.721]	-0.058*** [-3.146]
$Leverage_{t-1}$	0.093 [1.204]	0.157** [2.016]	0.165** [2.126]	0.144 [0.934]	0.173** [2.150]	0.088 [1.300]	0.057 [0.796]	0.057 [0.829]	-0.206 [-1.461]	0.072 [0.957]
$Leverage_{t-2}$	-0.012 [-0.152]	-0.064 [-0.830]	-0.077 [-1.013]	-0.161 [-1.036]	-0.099 [-1.228]	-0.030 [-0.453]	-0.054 [-0.771]	0.022 [0.328]	0.103 [0.694]	-0.066 [-0.893]
$\Delta MarketShare_{t-1}$	0.021 [0.923]	0.009 [0.370]	0.008 [0.351]			-0.096*** [-3.851]	-0.091*** [-3.525]	-0.096*** [-3.642]		
$\Delta MarketShare_{t-2}$	-0.096*** [-4.280]	-0.091*** [-4.014]	-0.104*** [-4.548]			-0.156*** [-6.723]	-0.147*** [-6.056]	-0.144*** [-5.758]		
$Acquisitions_{t-1}$				0.547*** [3.730]					0.370** [2.575]	
$Acquisitions_{t-2}$				0.262** [1.982]					0.032 [0.261]	
$Market-to-Book_{t-1}$					0.000 [0.443]					-0.000 [-0.327]
$Market-to-Book_{t-2}$					-0.000 [-0.579]					0.001 [0.751]
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Period-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Of Obs.	2,105	1,989	1,949	502	1,937	2,045	1,900	1,813	632	1,795
R <sup>2</sup>	0.413	0.408	0.405	0.508	0.384	0.345	0.328	0.330	0.385	0.318

significantly negative, -0.009(column (6)). But among globally operating industries the significance is missing. The coefficient is nonetheless negative, -0.003 in column (1). The two-year lagged cash holdings do not show any significant impact on the future market share growth in either of the subsamples (see column (2) for global industries and (7) for local industries). The results do not support the findings of Fresard (2010) for the cash holdings impact in either of the subsamples. My findings are not significant enough to support my hypotheses that the cash holdings impact is more intensely present among globally operating industries (Hypothesis 3.3.).

The control variables indicate similar impacts as in Section 6.1.1. on the market share growth in both of the subsamples. The *Size* of the firm indicates a negative impact on the future market share growth in both of the subsamples. The findings are consistent through all estimations and are statistically significant for all of them. The *Leverage* impact follows a similar path in all the subsample estimations, as in Section 6.1.1. The one-year lagged *Leverage* shows positive results in all estimations except one. Hence, for the global industries I find significant impact in estimations (2) and (3), 0.157 and 0.165 respectively. The impact on local industries is not significant, although it is mostly positive. This might reflect the differences in the size of the firms in local industries and their fewer possibilities to raise debt finance and use leverage as a strategic tool. For the two-year lagged *Leverage* I find a negative coefficient in almost all estimations, although it is not significant.

The past market share impact on the future market share development shows a strong difference between the subsamples. In the globally operating industries, the results are partially in line with Fresard's (2010) findings. The one year past performance does show a positive but not a significant impact. The two-year past performance shows significant negative implications. On the other hand, firms in locally operating industries seem to suffer from the positive past performance. The findings imply that both the one and two year lagged market share growth has negative consequences for the future market share growth.

*Acquisitions* seem to lead the market share growth in both of the classified industries, especially the acquisitions made in the previous year. My findings seem to indicate a positive impact of 0.547 and 0.370 for the global and local industries, respectively. Kobrin

(1991) argues that what is actually global in a firm's operations is the underlying technology and economic activity. The national markets will at some point get too small on the way of growth. This implies that the locally operating industries are not seeking huge technological growth; instead, they most probably grow by acquiring their competitors. This might explain the *Acquisitions*' impact in both of the subsamples. *Market-to-Book* ratios seem to be irrelevant in both of the subsamples for the market share development and do not provide any further insight for the cash holdings impact between the compared industry characteristics.

My analysis of the differences between globally and locally operating industries does not provide evidence for my assumption of Fresard's (2010) misleading treatment of his US sample. The primary interest of finding stronger results for the cash holdings impact among the globally operating industries does not receive supportive evidence. My findings leave the question of the industry characteristic open and I am not able to either reject or accept the hypothesis I have stated (Hypothesis 3.3.).

## **6.2. Cash Holdings Effect in a Financial Crisis**

The recent financial crisis that started in 2007, hit the world economy with more strength than any had done in one hundred years. The crisis ended up tightening the credit supply for several years and in the end reduced the consumers' confidence in the economy around the world. The crisis has been a target of deep analysis in the financial markets, and it has brought a new perspective for testing financial models in the recent financial academic literature. All the time, new evidence is found of both the financial status of the economy and its participants, as well as of the economic occurrences. In this section, I study cash holdings and market share growth in the light of the recent financial crisis. My focus is to examine the relation between the cash holdings before the crisis (before the beginning of 2008) and market share changes during 2008 and 2009. I first briefly review some academic findings of the period and then run the baseline estimation from Section 6.1.1. I will do both by using the previously used control variables and by controlling the estimation with past *Acquisitions*. I conclude this section with a discussion of my findings in the light of the recent literature of the financial crisis and its implications.

The recent financial crisis changed the cash levels on firms' balance sheets drastically, and the actions of firms concerning investments and product market behavior changed accordingly. Campello et al. (2010) conclude from their survey of Chief Financial Officers worldwide that the cash holdings of financially distressed firms fell about one fifth in one year ending to the peak of the crisis in the end of 2008. They also suggest that these firms managed to burn another 15% of their cash holdings during the crisis in 2009. The decreased cash levels also had an impact on investments during the period. Duchin et al. (2010) study corporate investment activity, measured in capital expenditure, in the edge of the financial crisis. They find that the crisis created a shock where the investments declined by 6.4% following the onset of the crisis in 2007. The decline was most drastic for firms which had low cash reserves or high short-term debt before the crisis. A one-standard deviation increase in cash reserves before the crisis mitigated the decline by 58% compared to the decline for a zero-cash firm. Duchin et al.'s (2010) findings on the importance of internal resources for corporate investment during the subprime crisis are consistent with previous models, e.g. with Campello's (2003) results. Campello (2003) suggests that firms which rely more heavily on external financing are more likely to reduce their investment in market share building during downturns and that the competitive outcomes resulting from such actions are jointly determined by the firm's and by its rival's capital structures. Hence, the interest for cash holdings and other ways to improve the position in product markets is even more important because the investment activity is clearly lower during the crisis.

One of my motivations to focus on this time period is that the product market outcomes during the crisis are yet extensively unexplored. My objective is to bring some light in this topic with data from the crisis period and from the perspective of competition between European firms. Fresard (2010) concluded his study by stating that he's results should be visible after the financial crisis ends and the winners and losers of the downturn are known. The cash holdings should have a heavier impact when the conditions of the surrounding environment change for all the competitors in product markets. A working paper of Byoun and Xu (2011) indicates that firms that relied on internal funding prior to the crisis in 2007 have increased their market share relative to their competitors dependent on external financing during the crisis. This is the only pre-investigation of this time period that relates to my topic of cash holdings. I expect to find results supporting Byoun and Xu's (2011) current findings and the expectations of Fresard (2010).

Because I want to study whether the predictions of Fresard (2010) and Byoun and Xu (2011) hold with my European sample, I run a time series for the baseline estimation (equation (7)) to study the market share growth in years 2008 and 2009. I use the standardized relative to rivals cash holdings defined in Table V and focus on the relation of one-, two-, and three-year lagged cash holdings, i.e. cash holdings in the end of 2005, 2006 and 2007. In Table X, I present the results of the pre-crisis cash holdings impact on product market outcomes during the crisis.

**Table X**  
**The Impact of Cash Holdings on Market Share Growth**  
**during the Financial Crisis from 2008 to 2009**

Table X describes the baseline estimation of the cash holdings impact on industry-related market share growth in the recent financial crisis. The dependent variable,  $\Delta MarketShare$ , is the industry-related market share change. The main independent variable,  $zCash$ , is instrumented and standardized as in Table V. The industry-related market share changes,  $\Delta MarketShare$ , are measured from years 2008 and 2009. The table presents other control variables such as *Size*, past *Leverage* and past  $\Delta MarketShare$ . The firm- and time-fixed effects are allowed. The time period is from 1990 to 2009. I denote 1%, 5% and 10% significance level with \*\*\*, \*\* and \*, respectively. The *t*-statistics are presented in brackets under the coefficients.

	IV cash holdings effect				
	(1)	(2)	(3)	(4)	(5)
$zCash_{t-1}$	-0.002 [-0.289]	0.018* [1.943]	0.022** [2.300]		
$zCash_{t-2}$		0.028*** [3.168]	0.037*** [3.672]	0.021*** [2.869]	0.016** [2.516]
$zCash_{t-3}$			0.017* [1.850]	0.012 [1.377]	
$Size_{t-1}$	-0.129** [-2.553]	-0.120** [-2.377]	-0.117** [-2.335]	-0.126** [-2.503]	-0.126** [-2.514]
$Leverage_{t-1}$	0.173* [1.663]	0.172* [1.669]	0.188* [1.823]	0.177* [1.707]	0.166 [1.606]
$Leverage_{t-2}$	0.116 [0.994]	0.112 [0.964]	0.124 [1.072]	0.126 [1.089]	0.117 [1.005]
$\Delta MarketShare_{t-1}$	-0.431*** [-10.383]	-0.425*** [-10.321]	-0.423*** [-10.270]	-0.425*** [-10.304]	-0.427*** [-10.342]
$\Delta MarketShare_{t-2}$	-0.349*** [-9.218]	-0.349*** [-9.271]	-0.349*** [-9.304]	-0.350*** [-9.284]	-0.349*** [-9.265]
Firm-fixed effects	Yes	Yes	Yes	Yes	Yes
Period-fixed effects	Yes	Yes	Yes	Yes	Yes
No. Of Obs.	1,467	1,467	1,467	1,467	1,467
$R^2$	0.715	0.720	0.721	0.719	0.718

I allow the firm and time fixed effects as before. Additional control variables are used to control the cash holdings influence on future industry-related market share growth. I expect them to reflect both the previous results in Section 6.1.1. and the economic situation of the time period.

In Table X, column (5), my findings differ partly from the results of the baseline estimation in Section 6.1.1. Yet, they support the findings of Byoun and Xu (2011) and the expectations of Fresard (2010). I find results for the two-year lagged cash holdings which show a positive and significant impact for the future industry-related market share improvement. The two-year lagged cash holdings show a 1.6% increase in the market share with a 5% significance level when the cash holdings increase by one standard deviation from the industry average before the crisis. I find all the lagged cash holdings, one-, two- and three-years, to have a positive and significant impact on market share during the crisis. The economic interpretation for the estimation (3) in Table X is that a one standard deviation increase in cash holdings in relation to rivals in the same industry in year  $t-1$  and  $t-2$  leads to a 5.9% market share growth between  $t$  and  $t-1$ . When I control the two-year lagged cash holdings with the three year figures (column 4), one standard deviation in cash holdings in year  $t-2$  leads to a 2.1% increase in market share between years  $t$  and  $t-1$ . The result is significant with a 1% percent significance level.

My regression estimate for the one-year lagged cash holdings (column 1) is in line with the baseline estimation in the previous sections. I do not find any significantly positive results; instead, the results indicate that the one-year lagged cash holdings alone do not alone have any impact on market share growth. The sample yields a slightly negative coefficient for  $zCash_{t-1}$ . Fresard's (2010) results and his prediction for the financial crisis are not supported with the one-year lagged cash holdings, but the two-year lagged cash holdings support the expectations strongly. To summarize, my results in Table X predict that the product market performance during the recent financial crisis was highly dependent on the cash balances firms carried before the crisis started, especially the ones in the end of 2006 and 2007.

I find positive impact for *Leverage* in all of the estimations, also for the two-year lagged cash holdings. This is in contrast with my earlier findings in the previous sections. The impact of one-year lagged *Leverage* is significant only with the 10% significance level in

columns (1) to (5). The leverage loses its minor significance in a year but it does not turn negative as in my previous findings. The results support the argument that firms that had more leverage on their balance sheet in the beginning of the crisis have not suffered from the tightened credit supply during the crisis as much as others. For the firm *Size*, my results seem to indicate a negative and significant impact on market share growth as before. The results are significant at a 5% significance level in all my estimations (columns (1) to (5) in Table X).

Besides the leverage, the past market shares also reflect the nature of the financial crisis, as I expect them to. For both the one- and two-year lagged industry-related market share increases lead to negative changes in the future, as presented in all columns (1) to (5) in Table IX. This reflects the contraction of the economic activity during the crisis. In my European sample the median sales growth from the end of 2007 to the end of 2009 was only -0.1%. The results support this trend. The explanatory power of my estimations also increases when I apply the regression model for this time period, producing an explanatory power of a minimum of 0.7. for each estimation. In general, the results in Table X indicate that cash holdings have had a positive and significant impact on short-term industry-related market share growth whereas the leverage effect has lost its significance, but not its positive impact during the crisis. My findings strongly support accepting the hypothesis that cash holdings have a stronger impact during an economic downturn than in a longer time period in general (Hypothesis 4).

The acquisition activity during the crisis dropped drastically and that has been also empirically shown. Duchin et al. (2010) report the decline in investments to be most sharp for firms which had low cash reserves or high short-term debt before the crisis. Campello et al. (2010) find, through their survey for CFOs worldwide, that all kinds of firms are likely to use internal sources of funding for their investment when the access to external capital markets is limited. The firms consider their internal sources as a way to finance future investments when they face a negative credit supply shock. The CFOs also indicated that they are likely to postpone or cancel the investment plans in this kind of economic situation. For example, 86% of the financially constrained firms report a disability to invest in positive NPV projects in the recent financial crisis (Campello (2010)). The crisis has also received opposing arguments in the field of investments. The recent working paper of Byoun and Xu (2011) report that the market share increase of the

independent finance firms during the crisis is related to their abnormal investment activity. Based on these results I continue the examination of cash holdings and market share growth in the financial crisis. I run the estimations for the financial crisis period and now control the cash holdings impact with past *Acquisitions*. I expect the cash holdings to hold their impact regardless of the acquisitions. I also anticipate the acquisition activity not to play an essential role in the future industry-related market share improvement based on Duchin et al.'s (2010) results.

The results in Table XI support my expectations. I find that the relative to rivals cash holdings still has a significant impact for the future market share growth during the crisis regardless of controlling the impact with *Acquisitions*. In Table XI, the two-year lagged cash holdings hold their significantly positive impact in all the estimations when I control them with both the one- and two- year past acquisitions. The impact holds with a 1% significance level. In columns (1) and (2), a one standard deviation increase in cash holdings relative to rivals in year  $t-2$  yields a 6.9% and 6.5% increase in market share in year  $t$ , respectively. The impacts are 4.5% and 4.4% in columns (3) and (4), when I leave the one-year lagged cash holdings out of the regression. Acquisitions do not to have a major influence on the market share growth during the crisis. In columns (2), (3) and (4) I report a positive, but not nearly a significant impact for acquisitions. The acquisitions are not in a key role in the market share improvement during the crisis and they do not change the findings of the cash holdings already explored in Table X, either.

My previous findings on *Size*, *Leverage* and past market share,  $\Delta Market Share$ , partly hold when I control the estimations with past *Acquisitions*. Differences compared to Table X depend on the timing of the past *Acquisitions*,  $t-1$  or  $t-2$ . In columns (1) and (3) *Size* has a negative and significant impact on the market share change what confirms the results in Table X. With a 1% significance level I find *Size* to decrease the market share in both estimations. In columns (2) and (4), *Size* has a significant and positive impact which might reflect the past *Acquisitions* in  $t-2$  with a delay. The past market shares again reflect the general trend of diminishing sales during the crisis. Both one and two year past market share growth has a negative outcome for the future development in market share. The impacts are significantly negative with 1% significance level in all estimations. The results for *Leverage* are fragmented. I find positive and significant results in estimations

(1) and (3). Otherwise the impact of *Leverage* is insignificant and shows both positive and negative impacts.

**Table XI**  
**The Impact of Cash Holdings on Market Share Growth during**  
**the Financial Crisis 2008 to 2009 with Acquisitions**

Table XI describes the baseline estimation of the cash holdings impact on industry-related market share growth in the recent financial crisis with *Acquisitions*. The dependent variable,  $\Delta MarketShare$ , is the industry-related market share change. The main independent variable,  $zCash$ , is instrumented and standardized as in Table V. The industry-related market share changes,  $\Delta MarketShare$ , are measured from years 2008 and 2009. The table presents *Acquisitions* in addition to other control variables such as *Size*, past *Leverage* and past  $\Delta MarketShare$ . The firm- and time-fixed effects are allowed. The time period is from 1990 to 2009. I denote 1%, 5% and 10% significance level with \*\*\*, \*\* and \*, respectively. The *t*-statistics are presented in brackets under the coefficients.

	IV cash holdings effect			
	(1)	(2)	(3)	(4)
$zCash_{t-1}$	0.039** [2.365]	0.030* [1.917]		
$zCash_{t-2}$	0.069*** [4.011]	0.065*** [3.722]	0.042*** [3.227]	0.044*** [3.220]
$zCash_{t-3}$	0.040** [2.151]	0.040** [2.143]	0.027 [1.484]	0.032* [1.741]
$Size_{t-1}$	-0.229** [-2.508]	0.298** [3.104]	-0.253*** [-2.765]	0.280*** [2.908]
$Leverage_{t-1}$	0.614*** [3.221]	-0.348 [-1.642]	0.589*** [3.060]	-0.338 [-1.586]
$Leverage_{t-2}$	-0.158 [-0.701]	0.196 [0.842]	-0.099 [-0.438]	0.278 [1.209]
$\Delta MarketShare_{t-1}$	-0.480*** [-5.859]	-0.541*** [-7.123]	-0.488*** [-5.891]	-0.531*** [-6.959]
$\Delta MarketShare_{t-2}$	-0.361*** [-4.498]	-0.389** [-5.832]	-0.364*** [-4.493]	-0.387*** [-5.752]
$Acquisitions_{t-1}$	-0.004 [-0.024]		0.016 [0.090]	
$Acquisitions_{t-2}$		0.002 [0.014]		0.003 [0.017]
Firm-fixed effects	Yes	Yes	Yes	Yes
Period-fixed effects	Yes	Yes	Yes	Yes
No. Of Obs.	626	608	626	608
R <sup>2</sup>	0.760	0.783	0.754	0.779

The results in Table XI emphasize the meaningful role of cash holdings in a financial crisis. My findings provide evidence that cash can have an impact on the market share

growth during a time when the acquisition activity decreases drastically. Firms prefer to use cash to advance their position in the product market. This is done through improvements in operations rather than investing in acquisitions or other investment targets with a positive net present value during a crisis. This is supported by the findings in Table V which do not give support for cash holdings but for acquisitions to contribute to the future market share growth during longer time periods. Instead, the findings in Table X and Table XI give differing results for cash holdings and acquisitions with significant findings for cash holdings and insignificant ones for acquisitions during the crisis. Firms having more cash in their balance sheet than their industry peers are willing to use them to ensure and even to improve their market share during a downturn.

My findings regarding the financial crisis are in line with the expectation that firms with internal resources are less affected by the financial crisis. Byoun and Xu (2011) suggest that there is a shift of market share from the firms dependent on external finance to the firms handling with internal finance. Their coefficient estimates for the internal finance dependent firms are significantly positive, indicating that these firms gain more market share relative to their external finance dependent competitors during the crisis. Their and my results support the predatory theory of financially sound firms acting to drive their financially weaker peers out of the markets.

The results also support other theories related to cash holdings. It seems that the findings from the financial crisis also support the precautionary motive for cash holdings. Lins et al. (2010) argued based on their survey that Chief Financial Officers hold non-operational cash for precautionary purposes to defend their firms against unexpected shocks. My findings in both Table X and Table XI indicate that precautionary cash holdings are a sound way to hedge against economic shocks affecting the product market position. This supports Fresard's (2010) argument that cash holdings have a substantial strategic dimension.

## 7. Conclusions

### 7.1. Results

The purpose of my thesis is to find new evidence of the implications of cash holdings. My primary focus is to study whether the relative to rivals cash holdings have any significant impact on future industry-related product market growth. I study this hypothesis in four dimensions. In addition to studying the impact in general, I focus on what the impacts of country of origin, industry characteristics and the recent financial crisis to the cash holdings effect are. I use data of 22 European countries for the analysis. I replicate the methods of Fresard (2010) who for the first time focuses on the strategic effects of cash holdings on product market outcomes.

My findings partially support the assumption that the lagged cash holdings improve a firm's future industry-related market share. I find that during the recent financial crisis a one standard deviation increase in the two-year lagged relative to rivals cash holdings increases the market share in 2008 and 2009 between 1.6% to 6.9% (see Tables X and XI). The significantly positive impact holds when I control it with one- and three-year lagged cash holdings and other control variables, such as *Size*, *Leverage*, past  $\Delta MarketShare$  and *Acquisitions*. The impact of cash holdings on the market share growth during the whole study period of 1990 to 2009 does not seem to provide as strong evidence. For the whole period observed in my baseline estimation I find no significant evidence for the cash holdings. My findings indicate, though without any significance, that one year lagged cash holdings interact negatively, and the two-year lagged cash holdings positively with the future market share changes. The results differ also depending on the control variables I use.

Studying the cash holdings impact from the point of view of country of origin and industry characteristics also gives weak results. The results for the baseline estimation in a separate analysis for France, Germany and the UK do not provide any strong evidence of the cash holdings impact in either of the countries. I find only weak evidence, at a 10% significance level, of the two-year lagged cash holdings for France. They seem to improve the future market share growth by 1.4% per a standard deviation increase in the relative to rivals cash holding. The industry characteristics do not lead to differing results for the cash holdings. Neither the rivals' financial constraints nor the industry concentration play

an important role in defining the cash holdings effect. My results in any of the opposite subsamples of these measures do not give evidence that the cash holdings impact the future industry-related market share growth. Based on my data it cannot be verified whether the industry's intensity of competition or the rivals' financial constraints affect the potential relation of cash holdings and market share development. My focus on the differences between global and local industries does not provide any new insight on the cash holdings impact either. The findings for the global and local industry subsamples do not show evidence for the relation of cash holdings and market share growth. My hypothesis that the globally operating industries show the effect more clearly is not supported. Table XII summarizes my hypotheses and the results of the empirical analysis.

**Table XII**  
**Summary of the Hypotheses and Results**

Table XII summarized the hypotheses and the results. The hypotheses are presented in the Section 3 and the results presented in Section 6. All the empirical results are studied with econometric regression methods with panel data from a European sample of 22 countries.

Hypothesis	Results
1. High industry-related cash holdings lead to future industry-related market share growth	No evidence
2. High industry-related cash holdings lead to future industry-related market share growth regardless of a firm's country of origin	No evidence
3.1. The weaker the competitor's financial status, the stronger the impact of cash holdings on the industry-related market share growth ( <i>Rival's characteristics</i> )	No evidence
3.2. The higher the competition in an industry, the stronger the impact of cash holdings on the industry-related market share growth ( <i>Industry characteristics</i> )	No evidence
3.3. The cash holdings effect on future industry-related market share growth is stronger among industries operating globally than locally operating industries	No evidence
4. Given the conditions in the recent financial crisis, the cash holdings effect on future industry-related market share growth is stronger than in a normal time period	Accept

The implications of my thesis for the cash holdings literature are two-fold. First, I conclude from the analysis of the empirical results that the cash holdings impact on future

market share growth does not, as such, represent a worldwide phenomenon. This is supported by the lack of evidence for the impact in the European sample for the total study period from 1990 to 2009. My results are weak and not plausible enough to support earlier findings. Fresard's (2010) results of the strategic effect of cash holdings must originate from some country specific factors or other factors not present in my data. Second, although my results for the cash holdings impact on future market share growth in general are fragmented and weak, I find valuable results for the time period of the recent financial crisis. I provide new evidence for the discussion of the recent financial crisis in the light of precautionary cash holdings and predation risk. My findings suggest that the hoarding strategy of cash for precautionary purposes has its benefits during a credit crisis. Keynes (1936), Lins et al. (2010) and Campello (2010) argue that firms hold cash for precautionary purposes against unexpected shocks in cash flows. My results support the efficiency of this strategy and give relevance for the motive. The results also contribute to the literature on predation risk. As the relative to rival cash holdings lead to industry related market share improvement during the crisis a firm can realize a cash holdings strategy where it aims to drive other participants out of the product market competition during a downturn. This aspect of the cash holdings supports the findings of e.g. Bolton and Scharfstein (1990), Froot et al. (1993) and Haushalter (2007).

## **7.2. Limitations of the study**

The main limitations of my study relate to my European data features and methods which might cause the contradictory results. The partly fragmented results might be due to features in the data and the methods I use for the creation of the industries. My European sample consists of firms which are more leveraged than those of Fresard's (2010) US data. My sample also lacks of the amount of observations that Fresard (2010) has in his research. The difference is important because it diminishes the firm-observations and changes the data setting so that the regression model has fewer observations to use for the formation of time- and fixed effects. If these effects are assessed incorrectly enough the estimates for the coefficients of the explanatory variables can be miscalculated also.

The other important limitation is the method used for the creation of the industries to estimate the industry-related variables,  $\Delta Market Share$  and  $\Delta Cash$ . Fresard (2010) follows a principle of industries defined with SIC codes at the 4-digit level. My industries are

based on 3- or 4-digits to better represent the data and to create enough industries with a required amount of firm-observations in them. I require a minimum of five firm-year observations for the industry-related variables. Although this small amount of observation might cause some unwelcomed noise in the results, my findings in the robust check, with a minimum of 15 firm-year observations per industry, do not change the insignificance of the results. The primary SIC codes used for the analysis are defined by the data source, Thomson One Banker system. The determination of the SIC codes for multi-divisional firms might also lead to errors in the industry formation and in the description of the real competition among firms. It remains open also whether Fresard (2010) has used fixed SIC codes for the firms throughout the examination period as I do. This affects the industry formation greatly.

### **7.3. Suggestions for further research**

The outcomes of my study bring in light many aspects of cash holdings and product markets which propose further investigation of the subject. As the results are two-folded between the general outcomes of the cash holdings impact and the findings from the recent financial crisis, the future studies should focus on two main topics. First, the differences in the results raise questions of the optimal level of cash holdings to control for agency problems, and of the efficiency of the cash holdings. My results suggest that there is no evidence that the relative to rivals cash holdings would lead into any significant market share growth in general. Still, I find that in a downturn the cash holdings are valuable for product market outcomes. Hoarding cash is not useful according to my analysis but it is worth it if the economy faces a recession or limitations in credit supply. For the future discussion it would be worth to analyze the optimal level of cash, given these results.

Second, I suggest that further attention should be paid on the recent financial crisis from the product markets' point of view. The significant impact of cash holdings on market share growth during the credit crisis is worth to unfold. My study is confined to find out whether the relation exists at all and further studies could focus on finding the actions that firms take to use the cash holdings in order to ensure their product market success. As the recession serves also a good timing to launch new innovations and change consumer

behavior<sup>9</sup>, it would be fruitful to discover the behavior of the cash piling survivors in the financial crisis more deeply.

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<sup>9</sup> See “Desperately seeking a cash cure”, *Economist*, 20<sup>th</sup> November 2008.  
([www.economist.com/node/12636353?story\\_id=E1\\_TNGPGPVP](http://www.economist.com/node/12636353?story_id=E1_TNGPGPVP))

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**Appendix I**  
**Country Split of the Sample**

The sample is constructed from public firms from 22 European countries which are members of the European Union or the European Economic Area. All firms of these countries have observations from sales, assets and cash.

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Country	Nbr. Of Firms
Austria	82
Lithuania	15
Latvia	14
Belgium	76
Bulgaria	13
Czech Republic	1
Denmark	91
Finland	96
France	515
Germany	532
Greece	136
Hungary	21
Iceland	4
Ireland	34
Italy	191
Luxembourg	14
The Netherlands	114
Norway	106
Poland	154
Portugal	40
Slovakia	20
Slovenia	2
Spain	91
Sweden	231
Switzerland	154
The United Kingdom	1023
Total	3770

## Appendix II

### Global and local industries

The Appendix II presents the industries used to study the difference between the local and global industries. The subsample construction is relating to the industry classification of Korbin (1991) according to the index of transnational integration. The first and last quartiles of the transnationally integrated industries are used for the samples of global and local industries. The SIC codes for these industries are matched for the sample construction.

Global industries	SIC Code
Computers	3 570
Motor vehicles	3710
Medical instruments	3840
Photographic equipment	3860
farm machinery	3520
Communications equipment	3660
Apparel	2300
Industrial chemicals	2810, 2860
Non-ferrous metals	3330, 3340, 3350, 3360
Screw machine products	3450
Engines	3510
Metalworking machines	3540
Electronic components	3610, 3620, 3640, 3650, 3670
Scientific measuring instruments	3820
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Local industries	SIC Code
Paper boxes	2650
Leather products	3100
Ferrous metals	3310, 3320
Fabricated metals	3410, 3420, 3440, 3450, 3470,
Preserved fruits and vegetables	2030
Dairy products	2020
Grain mill products	2040
Beverages	2080
Machinery (except electrical)	3530, 3550, 3560, 3590
Other food products	2050
Forgings	3460
Plumbing	3430
Pulp and paper	2610, 2620
Household appliances	3630