Aalto University
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Precautionary Cash Savings and Equity Issuances - European Evidence

Finance

Master's thesis

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Abstract
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PRECAUTIONARY CASH SAVINGS AND EQUITY ISSUANCES – EUROPEAN EVIDENCE

PURPOSE OF THE STUDY

The purpose of this study is to analyze the role of precautionary cash holding motive in explaining increased cash ratios within European firms during period 1995 – 2010. Financial literature discusses the explanatory role of several cash holding motives but recently it has been especially the precautionary motive that has received the strongest support among practitioners. Whereas firms have both internal and external sources for cash, in this study I investigate which of these sources has been the most common source for cash savings. Moreover, the role of equity issuances – and their interaction between precautionary motives – is examined empirically in detail.

DATA

The data used in the study consists of active and non-active public companies within EU15 countries. Due to their distinctive nature, utilities and companies in financial sector are excluded from the sample. Time period for study is 1995 – 2010 and additional sub-period of 1995 – 2006 is also widely used in order to exclude the effects of recent financial crisis from time trend tests. Primary source for data is Thomson ONE Banker Worldscope database. The final sample includes a total of 41,144 firm-year observations.

RESULTS

I find evidence on significantly increased cash ratios for sample firms during period 1995 – 2006 and that there is a clear positive connection between the scope of precautionary motives and cash holdings. Together with increasing cash holding, firms have not increased their leverage correspondingly which has led to decreased net debt levels for the sample. I further conclude that increase in cash ratios is mainly financed with equity issuances as they are by far the main source for cash savings when compared to other alternatives. Finally, and most importantly, empirical tests show that within-firm increase in precautionary motives cause within-firm increase in the amount of cash saved from equity issuances.

KEYWORDS

Precautionary motive, cash holdings, share issuances

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SUOJAAVAT KASSAVARANNOT JA OSAKEANNIT – TUTKIMUS EUROOPPALAISISTA YRITYKSISTÄ

TUTKIELMAN TAVOITTEET

Tämän tutkielman tavoitteena on tutkia, kuinka motiivi pitää suojaavia käteisvarantoja pystyy selittämään kasvaneita kassasuhteita eurooppalaisten yritysten taseissa vuosien 1995 – 2010 aikana. Aihetta käsittelevä kirjallisuus on aiemmin tunnistanut useita eri motiiveja selittämään sopivan kassasuhteen määräytymistä, mutta viime aikoina erityisesi suojaavan käteisvarannon motiivi on saanut eniten tukea aihetta käsittelevissä artikkeleissa. Lisäksi tärkeänä tutkimuskysymyksenä on, mistä rahoituslähteistä saamiaan käteisvaroja yritykset käyttävät tavallisimmin kasvattaakseen käteisenä rahana olevia säästöjään. Tutkimuksen kannalta oleellisimpia tavoitteita on selvittää, säästävätkö yritykset enemmän osakeanneista saamistaan tuotoista silloin kuin yritysten motiivit kasvattaa suojaavia käteisvarojaan kasvavat.

LÄHDEAINEISTO

Tutkimuksessa käytetty lähdeaineisto koostuu aktiivisista ja ei-aktiivisista listatuista EU15-maiden yrityksistä. Julkiset laitokset ja rahoituslaitokset on jätetty tutkimuksen ulkopuolelle. Empiirisen tutkimuksen aikajakso sisältää vuodet 1995–2010 ja lisäksi lyhyempää jaksoa 1995–2006 on myös käytetty poistamaan edellisen finanssikriisin vaikutukset trenditesteistä. Ensisijainen lähde havainnoille on Thomson ONE Banker Worldscope – tietokanta. Näiden rajoitusten myötä lähdeaineiston koko on 41,144 yritys-vuosi-havaintoa.

TULOKSET

Löydän tukea oletukselle, jonka mukaan yritykset of merkittävästi kasvattaneet kassasuhteitaan vuosien 1995–2006 aikana, ja että yritykset joilla on suurempi motiivi pitää suojaavia käteisvaroja myös tekevät näin. Vaikka yritykset ovat selvästi kasvattaneet kassojaan, velan määrä ei ole kasvanut vastaavassa määrin ja tämän seurauksena aineistossa olevien yritysten nettovelka on pienentynyt tutkitulla aikavälillä. Lisäksi totean, että osakeannit ovat merkittävin lähde kasvaneille käteissäästöille, sillä muiden lähteiden rooli kassan kasvattamiseen on selkeästi osakeanteja pienempi. Lopuksi, tutkimuksen kannalta tärkeimpiä tuloksiani on todeta, että suojaavan käteisvarantomotiivin kasvaessa yritykset myös kasvattavat osakeanneista saatujen tuottojen säästämistä.

AVAINSANAT

Suojaavat käteisvarannot, kassasuhde, osakeannit

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1. INTRODUCTION

Firms need to have a sufficient level of cash at all times in order to keep their operations running. The definition of sufficient level is, however, probably different for each firm, industry and even country. Therefore, different kinds of motives for cash holdings must be influencing the decisions to hold cash as its most liquid form instead of investing it at a better return. Different main motives have been a topic in economics literature already since Keynes (1936) who presented the transaction motive and precautionary motive to better explain the rationale behind certain firm´s cash ratio. More recently, for example tax and agency theories have been constructed to create more comprehensive framework for cash holding decisions. Whatever the motive, there has been significant increase in cash ratios during last few decades (see Bates, Kahle and Stulz, 2009).

Opler, Pinkowitz, Stulz and Williamson (1999) show in their widely cited study that highest cash ratios are held by firms with strong growth opportunities and volatile cash flows. More recently, Bates, Kahle and Stulz (2009) show that U.S. companies have doubled their cash ratios during the time period 1980 – 2006. Adding to research by Opler et al., Bates, Kahle and Stulz conclude that the increase in cash holding seems to be the highest for firms with high R&D expenditures, high idiosyncratic industry risk and for non-dividend payers. All these features refer to increase in precautionary motives, i.e. firms need to save higher levels of cash in order to prepare themselves against unexpected costs and investments in the future. Accordingly, if firms have not taken precautionary actions into account, they might be unable to take positive-NPV investments, keep their product development running or even face difficulties to meet their liabilities. Because increase in precautionary motives has received the strongest support in explaining the increased cash holdings recently, it receives the main focus in this thesis as well.

As firms seem to hold more cash on their balance sheets as they used to, it is interesting to investigate the sources where these additional cash savings are retrieved from. One reason could be that firms are more profitable than before, and consequently, they are able to put more cash aside from their increased cash flows. Or, they might be more willing or more solvent to take additional debt and save the proceeds from debt issuances. Moreover, these

alternatives would be the ones that firms would prefer according to traditional pecking order theory. However, as recently investigated by McLean (2011), firms tend to issue equity in order to increase their cash holdings. Moreover, McLean points out that share issuance – cash savings are further motivated due to decreased internal cash flows and stable leverage levels within U.S. companies.

McLean (2011) presents an interesting theory about share issuances. First, share issuances seem to be main source for cash savings. Second, increase in precautionary motives is correlated with increase in equity issuances. And third, cash savings instead of investments or capital restructurings are stated to be the main motivation to issue equity in the first place. Therefore, study by McLean presents a fresh perspective for cash holdings and share issuance literature, thus creating new research questions for further study. By combining the recent studies by Bates, Kahle and Stulz (2009) and McLean (2011), I construct a theoretical framework for investigating whether precautionary motives have been driving the increase in cash ratios and whether these potential cash increases are mainly financed by share issuances or by other cash sources. I contribute to above mentioned research papers by conducting empirical tests in European context and including recent financial crisis to primary sample. Hence, results retrieved in the empirical part of this thesis report whether findings made by prior literature can be generalized when several countries with different characteristics are included to research.

1.1. Research Objectives

My research objective is to test the main findings made by Bates, Kahle and Stulz (2009) and McLean (2011) using European dataset. First two research questions presented in this section are hence targeted to examine the basis for further study, i.e. by investigating the potential increase in cash holdings and possible relation between precautionary motives and cash holdings. Three last research questions focus more on McLean's findings by investigating the role of share issuances as source for cash savings and their relation to precautionary motives. Objectives of my empirical work aim to find answers for research questions presented next.

1. *Are European firms holding more cash and are they more leveraged than they used to?*

All else equal, dramatic development of information and financial technology during last 30 years should have led to a reduction in corporate cash holdings. Firms can hedge their cash flows and positions more and more efficiently as more types of derivatives have become available. This in turn should have led to lower precautionary demand for cash. However, in presence of e.g. agency theory, taxes and potential changes in firm characteristics, the demand function for cash is more complex. Bates, Kahle and Stulz (2009) show that U.S. firms have more than doubled their cash ratios since the beginning of 1980s. They argue that this increase is mainly due to increased precautionary motives for cash holdings. My aim is to show that similar kind of increasing trend in cash ratios is present for European firms as well. Moreover, as cash has important implications for the understanding of the firm's leverage, I argue that average net debt within my sample has decreased and this is due to increased cash holdings, not because of decreased debt holdings.

2. *Is there relation between cash holdings and precautionary motives?*

The second question focuses on precautionary motive and its relation to cash holdings. Opler, Pinkowitz, Stulz and Williamson (1999); and Bates, Kahle and Stulz (2009) use three measures for precautionary motives, arguing that firms with high industry cash flow volatility, high R&D expenditures and low dividend payments face highest motives to hold precautionary cash savings. In addition to these three proxies, McLean (2011) constructs a first principal component from cash flow volatility, R&D and dividends in order to capture the precautionary component of these proxies to one index. In order to bring support for the precautionary motive theory, I strive to show that firms with higher precautionary motives have higher cash ratios.

3. *What internal and external cash sources firms are using for cash savings?*

Third question relates to different cash sources and firms' propensity to save cash proceeds from different cash sources. I use similar regression equation used by Kim and Weisbach (2008), Hertzel and Li (forthcoming), and McLean (2011) in order to investigate the savings rates for each cash sources that are available for a firm to raise cash from. Cash sources are divided to internal cash flows, i.e. cash flow from operations and cash flow from non-

operational activities, and to external cash sources, i.e. debt and equity issuances. The objective in this thesis is to show that, correspondingly to McLean (2011), share issuances are the main source for cash savings.

4. *Is there a relation between precautionary motives and amount of cash saved from share issuances?*

Question 4 combines the results from previous research questions. If precautionary motives have explanatory power on cash changes, and share issuances are the main cash source for cash savings, then it might be possible that within-firm changes in precautionary motives can cause within-firm changes in cash savings from share issuances. McLean (2011) reports that each precautionary motive measure affects within-firm decisions to issue shares for cash savings. By using firm- and year-fixed regression model as in McLean, the objective in my thesis is to show that changes in within-firm precautionary motives: cash flow volatility, R&D expenditures, dividend payments, and their overall effect, cause changes in within-firm savings from share issuances.

5. *Are shares primarily issued for investment purposes or for cash savings?*

Final question discusses the primary motivation for share issuances. Kim and Weisbach (2008) conclude that one motivation for equity issuances is to finance R&D and capital expenditures, but they find also strong support for market timing, meaning that firms issue equity in order to take advantage of favorable market valuation. McLean (2011) on the other hand challenges the market timing theory as a motivation for equity issuances. This is because he does not find a positive relation between cash savings from share issuances and overvaluation, and hence McLean divides share issuance motives to investment and cash savings motives. The aim in this paper is to test whether share issuances are primarily motivated by cash savings or is investment motive a more common driver for issuing equity.

1.2. Scope and Limitations of the Thesis

The sample used in this thesis is limited by geography, time and company status. Research includes only publicly listed companies that are registered to some EU15 country. Moreover, financial companies and utilities are excluded from the research due to their specific nature,

different accounting practices, and potential government control. Time period under investigation includes years from 1995 to 2010, thus including also years of recent financial crisis that ignited in 2007. Due to abnormal time period of 2007 – 2010 at the end of sample period, I additionally use widely a sub-period of 1995 – 2006 in order to research my hypotheses within normal economic conditions. Sample observations are received from financial statements data. In order to include a company in the final sample, it needs to have data in the Thomson ONE Banker's Worldscope database which is the primary data source used in this thesis.

This thesis mainly follows and combines most of the main findings in two recent studies by Bates, Kahle and Stulz (2009) and McLean (2011). However, the scope of research focuses on precautionary motives theory in explaining corporate cash holdings. Therefore, for instance, agency theory and market timing theory that have not received as much support in these two papers are left out from the empirical part of this thesis. In addition, the potential relation between precautionary motives and share issuance - cash savings is emphasized. Hence, the interaction between debt issuances and precautionary motives is not empirically investigated.

1.3. Main Findings

I report that European firms have clearly increased their cash holdings during period 1995 - 2010. Increase has been the strongest for smallest firms, non-dividend payers, and for negative-income firms. In addition, firms that have high precautionary motives have increased their cash holdings more than firms with low precautionary motives. I further show that during the same period firms have kept their leverage levels at steady levels on average, and therefore increased cash holdings have pushed net debt levels down from the level in 1995.

When comparing different internal and external cash sources, I find evidence that share issuances have been the main source for cash savings. Moreover, equity issuance is the only cash source that has significantly increasing time trend in cash savings during the sample period. Therefore, I conclude that the increase in cash holdings is mainly financed with external equity. As firms seem to save a large portion of their share issuance proceeds, I investigate whether cash savings is the main motivation for issuances over the investment

motivation. Empirical tests bring more support for the cash savings motivation, and therefore investments seem to be only the secondary motivation for raising external equity.

The most important empirical tests in the thesis examine the interaction between precautionary motives and savings from share issuances. When running a regression with firm- and year-fixed effects, I find that within-firm increases in precautionary motives lead to within-firm increases in share issuance – cash savings. Thus, the main conclusion is that precautionary motives have significant effect on the amount of cash saved from share issuance proceeds.

1.4. Structure of the Thesis

The rest of the paper proceeds as follows. Section 2 presents the literature about cash holding motives and theory around share issuances. Section 3 discusses the hypotheses of the study. Section 4 describes data sample and main variables. Section 5 discusses the main methodology used in empirical part. Section 6 presents the results from empirical tests and regressions, and Section 7 concludes.

2. LITERATURE REVIEW

In this section, I review the most relevant academic research influencing the theoretical framework of this study. First, I focus on cash holding motives in Section 2.1., in which research papers investigating transaction, precautionary, tax, and agency motives for cash holdings are introduced. From the viewpoint of my study, precautionary motives are in the core of investigation and other motives are left outside the empirical scope of this thesis. Therefore, I stress that also other motives have been argued to have strong evidence in explaining cash holding decisions but precautionary motive was selected to detailed investigation due to the recent focus it has received by academic literature. Second, Section 2.2. reviews academic literature about share issuance theories. Specifically, the Modigliani-Miller (MM) theory, trade-off theory, pecking order theory, managerial entrenchment theory, market timing theory and precautionary share issuances theory are introduced. Again, precautionary share issuances theory is emphasized in later parts of my study as I empirically investigate the connection between development of precautionary motives and their influence on share issuance cash – savings in Section 6 of this thesis.

2.1. Motives for Cash Holdings

The first part of literature review introduces the main theories for cash holding motives. Next sub-sections review research papers that have been widely cited within the context of transaction motive, precautionary motive, tax motive, and agency motive, respectively.

2.1.1. The Transaction Motive

Probably the most obvious reason for cash holdings is the transaction motive. It is beneficial for a firm to be able to pay transactions in time and take advantage of possible cash discounts included in terms of certain transactions. Keynes (1936) was the first one to distinguish

different motives for cash holding. He names transaction motive[1], precautionary motive and speculative motive (which will not be discussed here) as the main reasons in explaining the need for cash. According to transaction motive, firms (and individuals as well) hold cash in order to bridge the interval between the time of incurring business costs and that of the receipt of the sale proceeds. Furthermore, transaction motive holds strongly if cash holding is associated with cheaper transaction costs than financial non-cash assets (Keynes, 1936).

Baumol (1952) was among the first practitioners to analyze the rational level of cash balances by constructing a simple model for transactions' demand for cash at a minimal cost. His contribution was to integrate inventory theory to monetary theory because cash is similar to an inventory of a commodity in a sense that it can be given up at the appropriate moment, serving as its holder´s part of the bargain in an exchange. Furthermore, in his framework, transaction motive is named as a reason for holding cash in the first place because holding all liquid assets e.g. as short-term loans have always some transaction costs ("broker fee") in case they need to be transformed to cash. Baumol's study created grounding for more complex and realistic models that are better applicable for business firms with highly volatile needs for cash in different periods (see e.g. Miller and Orr, 1966).

A more recent empirical study by Shleifer and Vishny (1993) shows that transaction motive can affect the cash holdings decisions depending on the structure of a firm´s balance sheet. Accordingly, a firm with fewer liquid and easily sellable assets might have higher cash ratio because it might be unable to sell assets in order to meet the requirements of the creditor. However, in case of financial distress the firm would have other alternatives as well; it could try to reschedule its debt, or raise new equity. In a context of transaction motive, however, the alternative of asset sales has again the factor of transaction costs included. Furthermore, agency conflicts can cause transaction costs when owners of the company don't see new investment as profitable as the management does. In this case, it would be too costly for the management to raise new equity to finance the investments and consequently higher level of cash is held on the balance sheet (see Myers and Majluf, 1984).

[1] Keynes further divides transaction motive to income motive and business motive.

2.1.2. The Precautionary Motive

As mentioned in previous section, Keynes (1936) was the first one to introduce the definition for precautionary motive. According to his argument, cash is held in order to prepare for unexpected costs or investment opportunities. Furthermore, cash fixes the value of transaction in money terms as the corresponding liability is set on fixed money terms as well. More recent literature has investigated from many perspectives on how precautionary motives influence on cash balance decisions within a sample of fundamentally different kinds of firms.

Opler, Pinkowitz, Stulz and Williamson (1999) show strong evidence for precautionary cash holdings as their study concludes true some of the most general assumptions around the theory within. First, firms with strong growth opportunities, firms with riskier cash flows and small firms hold higher cash-to-assets ratios than other firms. Second, large firms and firms with high quality credit ratings that have the best ability to access capital markets, tend to have smaller cash ratios than other firms. Finally, precautionary motive receives strong support from the fact that management of a firm accumulates excess cash whenever it has the possibility to do so.

Precautionary motive is also concluded to be influencing strongly on increased cash ratios during the last few decades (see Bates, Kahle and Stulz, 2009). Bates, Kahle and Stulz show that the average cash-to-assets ratio more than doubles for U.S. industrial firms during the time period 1980 – 2006. Increase in cash ratios is the largest for firms that do not pay dividends, firms that have recently gone public and firms within industries that experience the highest increase in idiosyncratic volatility. Main reasons for increased cash ratios are explained by fallen inventory levels, increased cash flow risk, decreased capital expenditures and increased R&D expenditures[2]. In general, three proxies are widely used to measure precautionary motives: R&D expenditures, industry cash flow volatility and dividends (see e.g. Opler et al, 1999 and Bates, Kahle and Stulz, 2009). In addition, an index of the three proxies mentioned is used in McLean (2011). Bates, Kahle and Stulz conclude that change in firm characteristics explains the increased cash ratios over the sample period and that precautionary motive to hold cash is a critical determinant of the demand for cash.

[2] Inventory as part of net working capital substitutes for cash, thus having negative relation between cash; cash flow risk increases the motive to hold more cash in case of adverse cash flows; capital expenditures create assets that can act as a collateral and thus they could increase debt capacity and decrease demand on cash; R&D measure growth opportunities and also, R&D expenditures are usually kept smooth with high cash ratios (see e.g. Brown and Petersen, 2011).

2.1.3. The Tax Motive

A more recent research among motives for cash holdings is based on the tax motive. The tax motive refers to lack of incentives to repatriate earnings from foreign subsidiaries and businesses. Foley, Hartzell, Titman and Twite (2007) discuss that most U.S. affiliates' taxes are equal to the difference between foreign income taxes paid and tax payments that would be due if foreign earnings were taxed at the U.S. rate, and they can be deferred until earnings are repatriated. Therefore, U.S. multinational corporations are better off by retaining earnings abroad and hold them as cash if there are no rational investment opportunities on sight. Main empirical findings in Foley et al. (2007) are that 1) U.S. multinationals that would perceive highest tax consequences by repatriating foreign earnings have higher cash balances, 2) and affiliates in countries with lowest tax rates hold more cash than other affiliates of the same parent company.

In their study, Bates, Kahle and Stulz (2009) also look into the tax motive and empirically compare if there have been significant differences between the change in cash holdings of companies with no foreign income and companies that do have foreign earnings. They conclude that findings in Foley et al. (2007) can't explain the increase in cash ratios, as there is no difference between the increase in cash holdings among firms with foreign income and firms without foreign income. Instead, while the average cash ratio increases from 14.3% to 25.3% during time period of 1980 – 2006 for firms without foreign taxable income, the cash ratio for firms with taxable foreign income increases from 10.8% in 1990 to 20.2% in 2006 [3] (see Bates, Kahle and Stulz 2009). Thus, increase in tax motive does not seem to be the reason behind increased cash ratios.

2.1.4. The Agency Motive

Agency theories are widely investigated in corporate financial literature and agency problems as motive for greater cash holdings has been discussed and studied initially by Jensen (1986). The motives of management and shareholders might differ, and in the context of cash

[3] Towards the end of sample period, U.S. firms were allowed to repatriate cash held in foreign countries at a lower tax rate in order to decrease negative incentives to repatriate cash from foreign affiliates (Bates et al. 2009).

holdings, managers might want to retain high cash balances on firm's balance sheet although it would be more beneficial for shareholders to pay out the extra cash as dividends. According to Jensen (1986), conflicts of interest between shareholders and managers over payout policies are especially severe when the organization generates substantial free cash flow. Consequently, extra cash might lead to managerial inefficiencies if management decides to invest the free cash flow to projects with negative net present values. Therefore, within this framework, firms with the highest agency problems would have higher cash ratios.

More recent studies have empirically tested Jensen´s hypotheses and agency motive has received strong support from many practitioners. Dittmar, Mahrt-Smith and Servaes (2003) have investigated a wide data set from 45 countries to conclude that firms doing business in countries with poor investor protection and high level of agency problems have significantly higher cash holdings compared to countries where agency problems are of less importance. Pinkowitz, Stulz and Williamson (2003) are in line with Dittmar et al. (2003) and contribute by examining the dollar value of cash in countries with different levels of investor protection. Again, Pinkowitz et al. (2003) is consistent with agency theory and conclude that a dollar value of cash in countries with poor investor protection (and high level of agency problems) is only about 65% of the dollar value of cash in countries with good protection of investor rights.

However, from the point of view of increased cash ratios, Bates, Kahle and Stulz (2009) don't find evidence that increase in agency motive could explain higher cash ratios. Accordingly, they don´t find empirical support for the argument that cash ratios would increase more for firms with higher agency problems or that value of cash would fall during their sample period 1980 - 2006.

2.2. Share Issuances and Capital Structure

The second part of literature review deals with share issuance motives and their context within capital structure decisions. Especially, research papers discussing the Modigliani-Miller theory, trade-off theory, pecking order theory, managerial entrenchment theory, market timing theory, and precautionary share issuances theory are reviewed in next sections.

2.2.1. The Modigliani-Miller Theory

In order to describe an overview about share issuance motives, the original and heavily simplified capital structure theory by Modigliani and Miller[4] (1958) can't be bypassed. M-M presented four propositions in order to create a theory discussing decisions about capital structure and shareholder value. *Proposition 1* suggests that the value of a firm is the same regardless of whether it finances itself with debt or equity, but the rate of return on equity grows linearly with the debt ratio (or leverage) in *Proposition 2*. *Proposition 3* presents the irrelevance of dividend policy as the assumption is that the distribution of dividends does not change firm's market value. Finally, *Proposition 4* suggests that in order to decide an investment, a firm should expect a rate of return at least equal to the weighted average cost of capital, no matter where the finance would come from.

As such, M-M is a framework that was presented in order to create a starting point for further study. Thus, the assumptions in M-M were not realistic and therefore the framework has been widened in order to construct empirical studies with real-life elements that were lacking in M-M. The most common elements that are used in order to fix the failures in M-M include variables such as taxes, transaction costs, bankruptcy costs, agency conflicts, adverse selection, lack of separability between financing and operations, time-varying financial market opportunities, and investor clientele effects (Frank and Goyal, 2007).

[4] The study by Modigliani and Miller (1958) is widely referred to with abbreviation M-M in economic literature. I use also this abbreviation in this thesis.

2.2.2. Trade-off Theory

The M-M theorem and especially the addition of corporate tax shields in the model (Modigliani and Miller, 1963) worked as a trigger for trade-off theory. This is because, according to M-M, the optimal capital structure would include 100% of debt and no equity because tax shield was presented but no offsetting costs of debt (Frank and Goyal, 2007). A firm financed entirely with debt is definitely more probable to face bankruptcy costs compared to otherwise similar firm with no debt.

The trade-off theory asserts that a firm's security issuance decisions move its capital structure toward an optimum that is determined by a trade-off between the marginal costs (bankruptcy and agency costs) and benefits (debt tax shields and reduction of free cash flow problems) of debt (Dittmar and Thakor, 2007). Therefore, firms ought to have an optimal capital structure that it actively maintains by debt and share issuances whenever needed. In this context, firms that face decreasing share price perceive effectively an increase in leverage ratio, and this should in turn lead to a share issuance.

Empirical studies have not found supporting evidence for trade-off theory. This is mainly because firms are proven to issue equity rather than debt when stock prices are high and not the other way around as suggested in trade-off theory (see e.g. Baker and Wurgler, 2002).

2.2.3. Pecking Order Theory

Pecking order theory was constructed after it was early noticed that the explanatory power of trade-off theory was concluded to be low in empirical studies. As described in Myers (1984), unlike the trade-off theory suggests there is no optimal capital structure in the pecking order theory. Moreover, Myers notes that the crucial difference between pecking order theory and the static trade-off theory is that, in the modified pecking order story, observed debt ratios will reflect the cumulative requirement for external financing which has cumulated over an extended period.

In Myers and Majluf (1984), managers are assumed to have the best perception of the firm's true value, which is actually the case in real life as well. Due to this fact, rational investors

discount the value of firm's stock price when managers decide to issue equity instead of debt. Therefore, managers avoid equity issuances whenever possible in order to avoid the discount in firm's stock price. As a conclusion and according to pecking order theory, firms prefer internal funds, then risky debt and finally equity as a source for investments. Moreover, if there are no positive NPV investments on sight, firms tend to retain profits and in this way build financial slack in order to avoid the need for external financing in the future.

Also pecking order theory has gained a lot of controversial discussion from practitioners mainly because firms seem to issue equity even though they would have the possibility to use internal funds or debt instead (see e.g. Baker and Wurgler, 2002). Myers (1984) suggests that high growth firms reduce leverage in order to avoid raising equity in the future when new investment opportunities arise. Therefore, the primary source for reducing leverage would be to retain earnings and in this way to increase the equity in the balance sheet. However, Baker and Wurgler show that firms with high market-to-book ratios reduce leverage through issuing equity, not by retaining earnings. Moreover, unlike suggested in Myers (1984), leverage seems to be much more dependent by past values of market-to-book instead of future investment opportunities (see Baker and Wurgler, 2002).

2.2.4. Managerial Entrenchment Theory

According to the definition by Weisbach (1988), managerial entrenchment occurs when managers gain so much power that they are able to use the firm to supplement their own interests rather than the interests of shareholders. In presence of high managerial entrenchment, capital structure decisions are motivated mostly by the interests of the managers instead of optimizing the value for shareholders.

Zwiebel (1996) constructs a dynamic theory of capital structure based on managerial entrenchment. In this model managers decide on optimal capital structure in the beginning of each period with the motivation to enable empire-building, and with the restriction that the firm does not become an attractive target for takeovers. Therefore, debt restricts managers through the threat of bankruptcy that is the most unwanted outcome for entrenched managers. However, managers find it useful to employ debt while it serves as a voluntary self-constraint which allows managers to avoid control challenges (Zwiebel, 1996).

In a sense, managerial entrenchment theory resembles market timing theory, which is discussed in the next section. As discussed in Baker and Wurgler (2002), in the context of dynamic theory of capital structure based on managerial entrenchment, equity finance is seen practical in case of high firm valuations and good investment opportunities, but at the same it allows managers to become entrenched. Further, entrenched managers may be unwilling to rebalance the capital structure by issuing debt in later periods which in turn is harmful for original shareholders who face the decreased return on invested equity. Moreover, the decrease in shareholder value due to entrenched managers is widely acknowledged, and trends towards more and more sophisticated levels of corporate governance might lead to decreased emphasis on managerial entrenchment in future studies (see e.g. Bebchuk, Cohen and Ferrel, 2004).

2.2.5. Market Timing Theory

Market timing theory presents a widely supported and investigated suggestion for share issuance motives and reasoning for capital structure. As Baker and Wurgler (2002) explain the theory in one sentence: "*capital structure evolves as the cumulative outcome of past attempts to time the equity market*". Therefore, market timing theory does not assume that there should necessarily be an optimal capital structure towards which a firm is heading with its decisions about share and debt issuances. Instead, current capital structure is based on past decisions to issue or repurchase shares depending on how management's view has differed from the market's view of firm's share price.

For instance, Graham and Harvey (2001) have studied the effect of share price on equity issuances. They find clear evidence that managers don't want to issue equity if they think it is undervalued due to information asymmetry, and if they feel equity issuance is required they prefer to issue after information release that will increase share price. Moreover, the same study brings support for the claim that managers believe they can time the market. Also, Baker and Wurgler (2002) conclude that the market timing theory best explains their results on capital structure decisions.

Widely popular market timing theory is questioned very recently by McLean (2011). In presence of market timing, firms should increase their share issuance-cash savings when the firm is perceived to be overvalued by the managers. However, McLean finds challenging

evidence as his conclusion is that share issuance – cash savings are not related to post-issuance stock returns.

2.2.6. Precautionary Share Issuances Theory

A totally new point of view for share issuance motives is constructed by McLean (2011). McLean shows that firms save large portion of their proceeds from share issuances as cash, and that precautionary motive for cash holdings best explains the need for share issuances. Moreover, during the time period 1971 – 2008 the cash savings ratio from share issuance proceeds increased from 23% to 60% and correspondingly increasing precautionary motives are able to explain this trend. The demand for share issuance – cash savings by firms is explained by decreasing internal cash flows that are insufficient to meet the requirements of precautionary cash savings. As proxies for precautionary motives, McLean uses R&D spending, industry cash flow volatility, dividend payments, and their first principal component. Trends in these proxies match the trend in propensity to save share issuance proceeds as cash.

The study by McLean is also comprehensive in a sense that it contributes to share issuance literature in three areas. First, precautionary cash savings are stated as a motivation for share issuances. Second, results are inconsistent with market timing theory, thus having a controversial view on current trend in share issuance literature (as discussed in previous section). Third, increase in share issuances during economic expansions is explained by precautionary cash demand because high-precautionary firms show the highest increase in share issuances during expansions. Further, McLean contributes to cash savings literature by challenging the perceived source for precautionary savings. That is, already since 1985, share issuances have been the main source for precautionary cash savings instead of internal cash flows as prior studies have assumed.

3. HYPOTHESES

In this thesis, I expect to find significant evidence on increased cash ratios within the time period 1995 - 2010 for the sample of data from publicly listed EU15 firms that are described in Section 4. Furthermore, I expect that share issuances have been the main source for cash savings recently and having increasing trend. At the same time, I expect that increase in precautionary motives can significantly explain both the increase in cash ratios as well as savings from share issuances.

In order to investigate these assumptions, I have constructed two set of hypotheses. First set of hypotheses (H1A and H1B) follows closely the study by Bates, Kahle and Stulz (2009) to examine whether cash ratios have increased within the investigated time period. Also, the development of net debt is investigated. The second set of hypotheses (H2, H3, H4 and H5) follows the study by McLean (2011) by investigating whether share issuances have been the main source for cash savings, and whether cash savings is the primary motivation for share issuances over investment motive. Most importantly, interaction between precautionary motives and share issuance – cash savings is examined. Each hypothesis empirically investigated in this thesis is presented next.

H1A. European firms have increased their cash ratios during time period 1995 – 2006

Bates, Kahle and Stulz (2009) find that cash ratios for U.S. firms have increased dramatically during last few decades. Accordingly, I investigate if the same is true for European firms during period 1995 – 2006. Years of recent financial crisis (2007 – 2010) are included in the overall assessment but their effect on time trend tests is excluded. Investigating the potential increase in cash ratios creates a starting point for further study behind the reasons of this development. In addition to investigating the sample as an aggregate, I further study the development of cash ratios by delineating firms by selected firm characteristics. First, firms are divided to quintiles by their size in order to study if development of cash ratios has been similar for all size groups. Then, firms are divided to sub-groups by their IPO-status (IPO within five years), dividend payment status (dividend payers vs. non-dividend payers) and accounting performance (positive net income vs. negative income) in order to examine if cash

ratios have changed more for firms with some of these specific characteristics. The effect of precautionary motives on cash ratios is further investigated separately in *Hypothesis 2*.

H1B. Firms have decreased their net debt levels during time period 1995 – 2006

Net debt is a component which is constructed by subtracting cash from total debt. Therefore, I also examine the development of net debt to see whether changes in cash ratios have moved together with similar changes in leverage. If this is the case, then net debt would have remained at a rather steady level during the sample period. However, Bates, Kahle and Stulz (2009) report that as firms have significantly increased their cash ratios, leverage levels have remained at a steady level. Consequently, the average net debt ratio has dramatically decreased from positive 16.4% in 1980 to negative value of -1.0% in 2006 in their sample of U.S. firms. In order to see if this is the case also with European firms, I include brief investigation of leverage levels to my empirical study. If my results are similar to those in Bates, Kahle and Stulz, I can conclude that firms have not financed increased cash ratios by debt and that decreasing their net debt levels might have been one motivation for increasing their cash ratios.

H2. Firms with highest precautionary motives have highest cash ratios

In *Hypothesis 2*, I move on to investigate the relation between precautionary motives and cash holdings. Following McLean (2011), I construct four different proxies for precautionary motives*: Cash flow volatility, Dividends, R&D* and *PREC*. McLean argues that firms with high industry cash flow volatility and R&D expenditures, and low dividends are more exposed to precautionary motives of holding cash. In other words, these firms need to hold more cash in order to be prepared for worse-than-expected financial results and keeping their R&D continuously running. Moreover, non-dividend payers are generally perceived to be financially more constrained and are therefore forced to hold higher cash balances compared to firms that pay dividends (see e.g. Han and Qiu, 2007). *PREC* is a first principal component of three before-mentioned proxies, which is meant to capture the precautionary component in each of these three measures. Therefore, the first part of assessing the effect of precautionary motives on cash holding, and later on share issuance-cash savings, is to examine whether sample firms that have highest values of *PREC* hold more cash.

H3. Share issuances are the main source for cash savings

Prior studies have assumed that internal cash flows are the main source for cash savings (see e.g. Almeida, Campello and Weisbach, 2004[5]; and Han and Qiu, 2007). However, McLean (2011) reports that share issuances have actually been the main source for cash saving for U.S. firms already since 1985. McLean argues that this is mainly due to relatively decreased internal cash flows on the one hand, and increased precautionary motives on the other. Increased need for external financing sources has not affected U.S. firms' leverage levels as McLean reports that firms do not usually save significant portion of debt proceeds. Therefore, I investigate whether cash is saved mostly from share issuances or is there different behavior observed for European firms compared to their U.S. counterparties, which would mean that major source of cash savings would be either internal cash flow or debt financing. The scope of cash savings for each cash source is examined by multiplying the amount of capital raised with savings rate that is constructed using regression model described in Section 5.

H4. Within-firm increases in precautionary motives cause increases in within-firm share issuance cash – savings

McLean (2011) finds increasing and significant trends for both share issuance - cash savings and precautionary motives for U.S. firms during sample period 1971 – 2008. Thus, as both variables have observable unit root, they might be cointegrated and could have explanatory power for each other. Further, McLean finds that within-firm changes in each precautionary motive proxy (*Cash flow volatility, Dividends, R&D* and *PREC*) cause within-firm changes in share issuance – cash savings. More specifically, within-firm increases in *Cash flow volatility*, *R&D* and *PREC*, and within-firm decreases in *Dividends* are shown to increase within-firm savings from share issuances. This is basically the main result in McLean's empirical research and therefore I duplicate his firm- and year-fixed effects regression model to conclude whether there is similar causality between within-firm precautionary motives and share issuance – cash savings for European data sample.

[5] In their study, Almeida et al. (2004) conclude that financially constraint firms have positive cash flow sensitivity of cash, meaning that they save more when cash flows are higher. However, the alternative of share issuances is not discussed.

H5. Cash savings is the main motive for share issuances

Final part of my empirical research investigates whether investments or cash savings are the main motivation for issue shares in general. Again, I follow McLean (2011), who argues that cash savings have been the main motivation for share issuances and that the investment motivation has had decreasing trend over cash savings motivation. To investigate this behavior in European context, I construct two measures to assess the primary motivation behind share issuances. First, I investigate whether firms would have been able to run their operations and make the planned investments also without usage of share issuance proceeds. Second, I examine if firms that issue shares have usually abnormally high investments that year compared to average investment on the whole sample period. Thus, if firms would have been able to undertake their investments without the help of share issuances, and if firms usually have no abnormal investments during the year of issuances, I can conclude that cash savings have been the main motivation for share issuances over the investment motivation.

3.1. Summary of Hypotheses

Research questions and their null hypotheses grounded on prior financial literature are reported on Table 1 below.

Table 1 Summary of Research Questions and Hypotheses

This table summarizes main research questions and hypotheses of the thesis. Five research questions are presented in the column on the left and null hypothesis answering to research question on the right column.

Research question	Hypotheses
1. Are European firms holding more cash and are they more leveraged than they used to?	**H1A** European firms have increased their cash ratios during time period 1995 - 2006.
	H1B Firms have decreased their net debt levels during time period 1995 - 2006.
2. Is there relation between cash holdings and precautionary motives?	**H2** Firms with highest precautionary motives have highest cash ratios.
3. What internal and external cash sources firms are using for cash savings?	**H3** Share issuances are the main source for cash savings.
4. Is there a relation between precautionary motives and amount of cash saved from share issuances?	**H4** Within-firm increases in precautionary motives cause increases in within-firm share issuance - cash savings.
5. Are shares primarily issued for investment purposes or for cash savings?	**H5** Cash savings is the main motive for share issuances.

4. DATA

Data is retrieved from Thomson ONE Banker using Worldscope database whenever possible in order to construct variables consistently. This thesis is constructed on European context using the data of publicly listed active and non-active firms from EU15[6] countries. For the purpose of this thesis, I exclude all financial institutions because their motive for cash holdings may be to meet capital requirements rather than having similar economic reasons as other companies. Also utilities are excluded because their cash holdings can be affected by governmental regulation and are therefore incomparable to other private companies. The primary sample period consists from years 1995 to 2010 and secondary sample period of 1995 to 2006 is used in time trend tests in order to exclude the effect of recent financial crisis during 2007 – 2010. The beginning year of 1995 is selected due to data availability. Some basic data is easily found from Worldscope even before 1995 but there are many data items that are properly reported only after the beginning of 1990s.

4.1. Sample Construction

I start by gathering all publicly listed active and non-active EU15 companies from Thomson ONE Banker. All companies with SIC codes 6000-6999 (financial companies) and 4900-4999 (utilities) are excluded from the sample due to reasons described earlier. After these limitations, sample includes a total of 4,352 unique companies of which 476 companies are excluded due to lack of data. Thus, the baseline sample size is 3,876 companies which is a sufficient amount for the purpose of this study. Because also non-active companies are included, the sample includes many companies that do not have observations for each year for period 1995 – 2010. As expected, the amount of observations increases steadily towards the end of the period. Due to both data availability and increase in listed companies, the amount of firm-year observations increases from 873 in 1995 to 3,316 in 2010. However, each year has sufficient amount of observations in order to receive reliable results from regressions and other statistical tests. Total amount of firm-year observations during time period 1995 – 2010

[6] EU15 includes the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

is 41,144. Distribution of observations during sample period is depicted in Figure 1. Amount of firm-year observations by country are presented in Appendix 1.

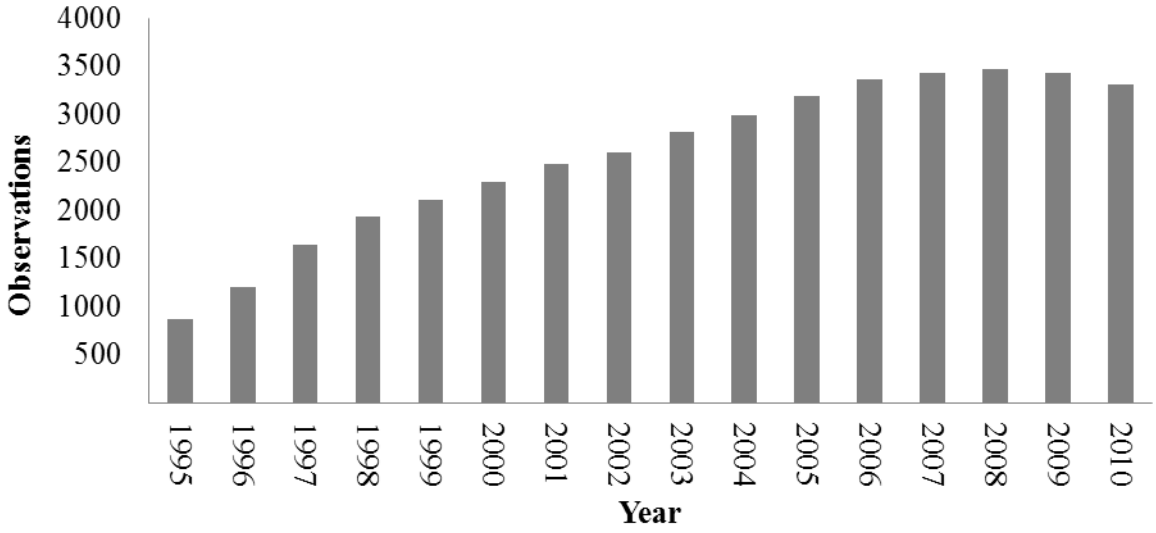


Figure 1 Distribution of Observations

Data sample consists of 3,876 unique publicly listed active and non-active companies from EU15 countries during time period 1995 – 2010. Amount of yearly observations increases towards the end of sample period. The sample consists of 41,144 firm year observations.

Table 2 below defines the main variables used in the empirical part of this thesis. All variables are constructed from two or more data items retrieved from Worldscope database. The dependent variable in regression models used in this thesis is *ΔCash*, which is the absolute change in firm's cash ratio during one financial year. Therefore, if a company did not report at least two consecutive annual cash levels, it was excluded from the final sample. *Issue, Debt, Cash flow* and *Other* are the four cash sources companies have and they are all divided by lagged total assets in order to make them comparable between companies. My decision to use consistently lagged book value of total assets is derived from McLean's (2011) convention. *Cash flow volatility, Dividends, R&D* and *PREC* represent the set of precautionary motive variables. *Assets* is a control variable constructed by taking a natural logarithm of book value of lagged total assets. All four cash sources and four precautionary motives are further discussed in Sections 4.2.1. and 4.2.2., respectively.

Table 2 Variable and Data Item Definitions

Table defines main variables constructed from data items that are retrieved from Thomson ONE Banker Worldscope database. Most variables are made comparable by dividing with book value of total assets at the beginning of year (lagged assets). *Cash flow volatility* and *Assets* are presented as natural logarithms, and *PREC* is the first principal component of the three precautionary motive proxies (*Cash flow volatility, Dividends* and *R&D*).

Variable	Definition
Cash ratio	Cash and cash equivalents scaled by lagged book value of assets.
Δ Cash	Difference between cash ratio at the end of year (t) and cash ratio at the beginning of the year (t-1).
Issue	All cash proceeds from share issuances that result in cash flow to the firm scaled by lagged book value of assets.
Debt	Cash proceeds from debt sales scaled by lagged book value of assets.
Cash flow	Net income plus amortization & depreciation scaled by lagged book value of assets.
Other	Cash proceeds from other cash sources than *Issue* , *Debt,* or *Cash flow,* scaled by lagged book value of assets. Includes sale of investments and sale of property, plant and equipment.
Assets	Natural logarithm of lagged book value of assets.
Cash flow volatility	Natural logarithm of average cash flow volatility of companies within same two-digit SIC code. Measured over the past five years, minimum of three observations required.
Dividends	Paid cash dividends scaled by lagged book value of assets.
R&D	Research & development cost scaled by lagged book value of assets. Marked as zero if not reported.
PREC	The first principal component of *Cash flow volatility* , *Dividends* and *R&D.*
PrecProxy x Issue	Interaction term constructed by multiplying a firm-specific precautionary motive proxy (*Cash flow volatility, Dividends, R&D,* or *PREC*) by firm-specific value for *Issue* .

I have no limitations considering the size, age, nor turnover of sample companies. As mentioned, companies are made comparable by scaling with lagged total assets. However, in order to remove outliers from the sample, I winsorize each variable at 1% level before running any statistical tests.

4.2. Variable Construction

The dependent variable used in regressions at the empirical part of this thesis is *ΔCash*, which is the difference between cash at the ending of the year (t) and cash at the beginning of the year (t-1) scaled by book value of total assets at the beginning of the year (t-1). Main explanatory variables can be divided to two groups: cash sources and precautionary motive proxies. The construction of these variables is discussed in next two sections. All variables used in empirical regressions in Section 6 are generated following the methods used by McLean (2011). Furthermore, if some data values (such as R&D expenditures or other income that are not reported by all companies) are missing from companies that are active in that particular year, these values are consistently assumed to be zero.

4.2.1. Cash Sources

A company can have both internal and external sources of cash and even this kind of simple split between cash sources could be used in order to examine their effect on changes in cash ratios. However, internal cash sources can be further divided to operational and non-operational cash flows. Similarly, external cash sources can be divided to equity and debt issuances.

Issue is an item in cash flow statement and it represents cash proceeds from equity sales. It is the amount of euros received from share issuances during the financial year, scaled by lagged total assets. Thus, it does not distinguish between different types of equity issuance proceeds but all issuances are included as long as they create cash flow for the company. For instance, mergers financed with stock are excluded as they do not result cash proceeds. Because *Issue* is scaled by total assets at the beginning of the year, the sample does not include any cash proceeds from initial public offerings (IPOs) due to a technical reason. For example, if a company was publicly listed (i.e. it arranged an IPO) during 1995, its issue proceeds should have been scaled by assets at the end of 1994. However, Thomson ONE Banker reports data items only since the company has become public and therefore there would be no total assets reported for the company at the end of 1994. On the other hand, *Issue* is not limited to seasoned equity offerings only but it includes also any other equity sale that results for a cash

proceed to the company. For this reason, different kinds of equity sales are not distinguished but all share issuance proceeds are treated similarly in the scope of this thesis.

Debt is cash proceeds from debt sales scaled by lagged total assets. Thus, there is no difference whether the issued debt is short-term or long-term in nature. It is derived from balance sheet as the difference of total debt at the end of year and total debt at the beginning of year. As *Debt* represents specifically cash *inflows* for the company, it should not have a negative value and therefore all negative differences are marked as zero, indicating that the company has not made debt sales during the year. Debt sales as a cash flow statement items were largely missing in Thomson ONE Banker and that is why the variable is constructed using balance sheet items. Moreover, this method is a simple way to include increase of all kinds of debts: whether it is an increase of short-term credit line or long-term debt issuances.

Cash flow is derived from income statement as net income plus depreciation and amortization, scaled by lagged total assets. Thus, all internally generated operational turnover is not classified as cash flow because (usually) a majority of this income is not available for free use for the company but large part of turnover is used to cover different kinds of costs that generate the income. In other words, cash flow in this context means the amount of internally generated cash that is the result of company's operations, i.e. net income. Depreciation and amortization are added to net income because they do not have real effect on cash flow but their effect on net income is derived from balance sheet. There are also other manners to construct the cash flow variable. For example, Bates, Kahle and Stulz (2009) define it as EBITDA minus interest, taxes, and common dividends. However, my definition for internal cash flow follows the one by McLean (2011).

Other represents all other cash sources that are not included in *Issue, Debt,* or *Cash flow*. Thus, it basically includes cash inflows from sales of investments and sales of plant, property and equipment. *Other* is reported as income statement figure "other income" in Thomson ONE Banker and scaled by lagged total assets. Due to its nature, *Other* is more extraordinary cash source than other three cash sources. It includes cash inflows that are received from non-operational business transactions that don't usually occur every financial year.

4.2.2. Precautionary Motive Proxies

Financial literature has agreed on three proxies that are able to capture the existence and scope of precautionary motives within individual companies: industry cash flow volatility, R&D expenses and dividends (see e.g. Opler et al. 1999, and Bates, Kahle and Stulz, 2009). In addition, McLean (2011) has created an index of the three above mentioned proxies in order to capture the precautionary motives of individual company to a one index called *PREC*. Following McLean, I also create four different proxies to measure precautionary motives of sample firms.

Cash flow volatility is the natural logarithm of industry cash flow standard deviation (cash flow is defined in Table 2). First, natural logarithm of cash flow volatility over the last five years is calculated for each individual company for each sample year, a minimum of three observations is required. Then, outliers are excluded by winsorizing at 1% level. Next, companies are divided to industries by first two digits of their SIC codes. Finally, yearly industry cash flow volatility is retrieved by taking the average of industry firms' cash flow volatility within two-digit SIC code industry classes. The reasoning of using cash flow volatility as a precautionary motive proxy is that companies within industries that have more unreliable cash flows (i.e. higher *Cash flow volatility*) tend to hold higher amounts of cash in order to be prepared for low cash flows during bad years.

Dividends is paid cash dividends scaled by lagged total assets. To notify, rationale for using dividends as precautionary motive proxy is not all straightforward. Bates, Kahle and Stulz (2009) conclude that non-dividend payers hold more cash than dividend payers and that their cash ratios have been increasing recently. Moreover, Fazzari et al. (1988) and Han and Qui (2007) state that firms that do not pay dividends are financially more constraint than dividend payers and that is the reason why they hold higher precautionary cash savings. On the other hand, reason not to pay dividends might occur also if a firm is growing fast and needs to have precautionary cash savings in order to make new investments whenever appropriate. Thus, the decision not to pay dividends is not automatically related to financial constraints, but more on future prospects. Even though many papers have supported the use of dividends as precautionary motive proxy, McLean (2011) treats dividends with caution. This is because the relation between dividends and cash holdings can exist also mechanically: if a firm decides not to pay dividends, then it will have more cash compared to decision to pay dividends, all else equal (McLean, 2011). Thus, *Dividends* is a proxy that needs to be interpreted carefully

while its explanatory power in relation to cash holdings might be ambiguous, but at the same time it is also interesting to compare findings in empirical part to recent studies that are made in U.S. context.

R&D is research and development costs scaled by lagged total assets. Firms that spend more on R&D are observed to hold higher levels of cash (Opler et al. 1999, and Bates, Kahle and Stulz, 2009). This is because R&D-intense firms have usually more valuable investment opportunities on sight and that is why they need to be prepared to utilize them by keeping precautionary cash holdings. As argued in case of *Dividends*, McLean (2011) again points out the obvious: R&D actions spend cash and therefore R&D and cash holdings might have negative relation as well. However, both Opler et al. and Bates, Kahle and Stulz have shown that generally R&D spending is associated with higher cash holdings and that *R&D* as precautionary motive proxy is well justified. As it is noted in studies executed in U.S. context, most companies don't report any R&D expenses during financial year. Same lack of data is present for European firms in Thomson ONE Banker and therefore majority of R&D observations are forced to be marked as zero.

Following McLean (2011), I construct one additional precautionary motive proxy called *PREC* from three above-mentioned precautionary motive proxies. *PREC* is the first principal component of *Cash flow volatility*, *Dividends* and *R&D*. In other words, each of three proxies is likely to contain both precautionary motives component and component that is not connected to precautionary motives. *PREC* is thus created in order to capture the common precautionary component in each of these proxies (see e.g. Jolliffe, 2005[7]). Due to the nature of proxies discussed in earlier paragraphs, *PREC* is expected to be higher for firms with high industry cash flow volatility, low-dividend payers and firms with high R&D spending. *PREC* is also constructed using only *Cash flow volatility* and *R&D* due to the ambiguous interpretation of *Dividends* as a precautionary motive. This method however results to similar findings compared to *PREC* where *Dividends* is included[8]. Therefore, I decided to report only the results using the *PREC* that is constructed using all three precautionary motive proxies. *PREC* is calculated for the whole sample (i.e. all firm-year observations) at one time in order to make the first principal component comparable for each year and each firm. In order to a single firm to retrieve a value for *PREC*, it needs to have observation for all its components.

[7]Brief definition of principal component analysis is stated e.g. in Jolliffe (2005): "*The central idea of principal component analysis is to reduce the dimensionality of a data set consisting of a large number of interrelated variables, while retaining as much possible of the variation present in the data set*."

[8] These two alternative methods for constructing the first principal component have a correlation of over 0.800.

In other words, if observation for *Cash flow volatility*, *R&D*, or *Dividends* is missing, *PREC* cannot be calculated. However, as mentioned earlier, if firm does not report e.g. R&D during a financial year, it is assumed to be zero. Otherwise the limited availability of R&D observations would dramatically decrease the amount of observations for *PREC* as well. The construction of *PREC* results for first principal components (or eigenvectors) of 0.701, 0.619 and -0.354 for *Cash flow volatility*, *R&D* and *Dividend*s, respectively. Thus, signs for eigenvectors are as expected as increase in *Cash flow volatility* and *R&D* have positive effect on *PREC* (positive components) and *Dividends* has negative effect (negative component).

4.3. Summary Statistics

Main variables used in empirical part and their statistics are reported in Table 3. As defined in Table 2, most of these variables are ratios, scaled by lagged book value of assets but there are some exceptions as well. *Cash flow volatility* and *Assets* are natural logarithms, *PREC* is the first principal component of *Cash flow volatility*, *Dividends* and *R&D*. Mean values for variables and amount of observations by country are presented in Appendix 1.

Table 3 Summary Statistics for Data Sample

Table reports summary statistics for main variables defined earlier in Table 2. Sample consists of 3,876 unique companies during time period 1995 – 2010 with 41,144 firm year observations.

Variable	Mean	Std Dev	25th percentile	Median	75th percentile
Cash ratio	0.151	0.17	0.035	0.09	0.201
Δ Cash	0.038	0.288	-0.026	0.001	0.039
Issue	0.062	0.312	0.000	0.000	0.003
Debt	0.030	0.089	0.000	0.000	0.005
Cash flow	0.058	0.179	0.024	0.081	0.136
Other	0.028	0.044	0.003	0.013	0.033
Cash flow vol.	-2.601	0.609	-3.082	-2.614	-2.102
Dividends	0.015	0.025	0.000	0.004	0.021
R&D	0.017	0.049	0.000	0.000	0.003
PREC	0.000	0.874	-0.695	-0.113	0.560
Assets (Log)	18.624	2.112	17.149	18.465	19.990
Total Assets (M€)	1023.966	3304.429	23.609	90.681	429.016
Cash (M€)	168.158	878.619	1.758	8.595	40.636

5. RESEARCH METHODS

This section describes the main research methodology constructed to empirically investigate the theory-based hypotheses presented in Section 3, thus following the principals of hypothesis-deductive research model. Throughout this thesis I am following the methods used by Bates, Kahle and Stulz (2009) and McLean (2011). However, in case there are differences on how some methods are conducted in these two papers in order to measure the same feature, I use the method chosen by McLean. Next, I present the regression model for measuring cash savings rates; method to assess unit roots; the application of Fama-MacBeth regression model; the firm-fixed effects regression model; and correlation matrix for independent variables used in regressions.

5.1. Regression Model for Cash Savings Rates

External and internal cash sources available for a firm were classified to four categories in Section 4: *Issue, Debt, Cash flow* and *Other.* For the purpose of investigating the *Hypothesis 3* presented in Section 3, amount of cash saved from each cash sources needs to be explored. First step is to construct yearly cash savings rates from each cash source. In other words, the explanatory power of different cash sources in explaining the change in cash is investigated by following regression model:

$$\Delta Cash_i = \alpha + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} + \beta_5 Assets_{it} + \varepsilon_{it}, \quad (1)$$

where *i* denotes specific year within sample period 1995 – 2010. Thus, parameter estimates from yearly regression are interpreted as cash savings rates for each cash source.

Second, yearly mean values for cash sources are calculated in order to investigate and compare the scope of cash received from each source. Finally, the amount of cash saved from each cash source is calculated by combining the results from first two steps:

$$\textit{Amount of cash saved}_{i,k} = \textit{Cash savings rate}_{i,k} \; x \; \textit{Mean value of cash raised}_{i,k}\,, \qquad (2)$$

where *i* denotes specific year within sample period 1995 – 2010, and *k* stands for specific cash source. Using this method, I am able to report the yearly amounts of cash saved (scaled by total assets) from each cash source.

5.2. Unit Root Assessment

Possible time trends during the sample period for cash sources and precautionary proxies are investigated in empirical part of this paper. Especially, relation between precautionary motives and share issuances receive comprehensive focus. Therefore, regression model is constructed in order to investigate whether variables have experienced statistically significant increase or decrease during sample period. Thus, time series for specific variable is concluded to have a unit root if it has a significantly increasing or decreasing time trend. Unit root test enables the investigation of potential cointegration between variables. Time trends are examined with following regression equation:

$$\mu_{ki} = \alpha + \beta_1 \, \text{Time}_i + \beta_2 \, \text{AR} + \ldots + \beta_n \, \text{AR}\,, \qquad (3)$$

where μ_{ki} denotes yearly mean value for variable *k* at time *i*, *Time* denotes for time coefficient marked as 1 for year 1995 and 12 for year 2006, and AR denotes for autoregressive lag term(s). In trend tests, I exclude years 2007 – 2010 from the sample as the effect of financial crisis usually deteriorates the potential trend in a variable that could be present during normal economic conditions. Therefore, unit root assessment includes 12 observations from years 1995 – 2006. While the time series is rather short in order to result statistically significant time trends, I also depict development of variables with graphical presentation for robustness. Despite the limitation of my time series observations, I receive mostly similar time trends for variables compared to McLean (2011).

In his paper, McLean (2011) has used consistently 4 autoregressive lag terms because partial autocorrelation for each of the variables used in his time trend regressions are stated to become close to zero within four lags. However, the same is not true with the data sample I am using but the amount of autoregressive lag terms varies from zero to four. The amount of

autoregressive lag terms is chosen by testing which amount of lag terms is enough to get rid from (possible) partial autocorrelation within each variable. When it comes to cash sources - i.e. *Issue*, *Debt*, *Cash flow*, and *Other - Issue* is the only one that has no autocorrelation between observations considering the yearly amounts of capital raised. On the other hand, all precautionary motive proxies, i.e. *Cash flow volatility*, *Dividends*, *R&D* and *PREC*, have at least some autocorrelation between observations as expected. The addition of autoregressive lag terms always decreases the significance of the test compared to regression without any lag terms. Therefore, time trend tests for precautionary motive proxies are somewhat ambiguous as graphical presentation and regression model might suggest different conclusions. This is due to limitation of time series observations as discussed earlier.

I use Durbin-Watson's test score for autocorrelation in time trend regressions. Autocorrelation is controlled the better the closer the Durbin-Watson score is the value of 2.0. In case the test score is much lower than two, there is positive serial correlation between observations, i.e. observations are close to each other, and when the score is much higher than two, the opposite is true, i.e. observations are negatively autocorrelated. Durbin-Watson test score is always between 0 and 4 and all my trend regressions have a Durbin-Watson score between 1.51 and 3.11.

5.3. Fama-MacBeth Regression

Regression model presented first in Fama and MacBeth (1973) is used in my thesis to investigate the persistence of cash savings rates. Originally, the Fama-MacBeth regression is used for asset pricing models and its suitability for many corporate finance settings are questioned due to higher autocorrelation in corporate finance context compared to asset pricing. As recently discussed in Petersen (2009), Fama-MacBeth method works well when residuals are correlated within a year but not across firms.

I follow McLean (2011) to construct Fama-MacBeth regression for persistence of cash savings rates. The aim is to show whether firms maintain cash savings rates from different cash sources, or could it be that firms only save cash proceeds during the year of issuance but spend the cash quickly in the subsequent years. The process is two-stepped. First, equation (1) is run for each sample year separately four times with four different dependent variables:

$\Delta Cash$, $\Delta Cash_{t+1}$, $\Delta Cash_{t+2}$ and $\Delta Cash_{t+3}$. Second, mean values from yearly coefficients, t-statistics, and R-squared scores are reported as final results.

5.4. Firm- and Year-fixed Effects Regression Model

In panel data setting, each firm has multiple observations over different periods. As discussed for example in Li and Prabhala (2007), firm-fixed effects can control the unobservable attributes that are fixed over time. Firm-fixed effects models are widely used in other corporate finance studies as well (see e.g. Palia, 2001; Schoar, 2002; and Mullainathan and Scharfstein, 2001). Furthermore, McLean (2011) states that firm-fixed effects model, and the interaction term within, provides a conservative estimate to test whether changes over time in one variable cause changes over time in another.

From four cash sources, specifically share issuances receive most focus in the latter part of this thesis. The possible interaction between precautionary motives for cash holdings and share issuance – cash savings is examined in detail by widening regression (1) to a form which includes both firm and year-fixed effects:

$$\Delta Cash_i = \alpha_i + a_t + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} + \beta_5 Assets_{it} + \beta_6 PrecProxy_{it} + \beta_n PrecProxy_{it}\ x\ Issue_{it} + \varepsilon_{it}, \quad (4)$$

where α_i is each firm's own intercept given by the firm-fixed effect in the model. *PrecProxy* is *Cash flow volatility*, *Dividends*, *R&D*, or *PREC*. Thus, the coefficient for *PrecProxy x Issue* represents an interaction term between a precautionary proxy and share issuance - cash savings. The interpretation of interaction term is that, if statistically significant, within-firm changes in precautionary motive cause changes in within-firm share issuance – cash savings. Results from this regression model are in the core of this thesis as they conclude whether *Hypothesis 4* presented in Section 3 is supported.

5.5. Correlation Matrix

In this section, I discuss the correlations between independent variables that are used in regressions run in Section 6. Correlations between all independent variables are presented in Table 4.

Issue does not have high absolute correlations between any precautionary proxies: *Cash flow volatility, Dividends, R&D* nor *PREC*. To emphasize, even though I examine the possible interaction between changes in precautionary motives and share issuances, the lack of correlation between these proxies is irrelevant[9]. This is because specifically their interaction explaining *ΔCash* is in the main focus, i.e. does increase in a precautionary motive proxy cause increase in cash savings received from share issuances.

Table 4 Correlation Matrix for Independent Variables

This table presents Pearson correlations between each independent variable. Highest absolute correlations are observed between precautionary motive proxies. In all regression models, precautionary motive proxies are used as independent variables in separate regressions. *PREC* has positive correlation between *Cash flow volatility* and *R&D* and negative correlation between *Dividends*. The sample consists of 41,144 firm year observations during period 1995 – 2010.

	Issue	**Debt**	**Cash flow**	**Other**	**Assets**	**CF vol.**	**Dividends**	**R&D**	**PREC**
Issue	1								
Debt	0.029	1							
Cash flow	-0.171	0.025	1						
Other	0.031	0.010	0.025	1					
Assets	-0.090	0.109	0.178	-0.033	1				
CF vol.	0.071	-0.013	-0.090	0.010	-0.230	1			
Dividends	-0.07	0.027	0.299	-0.041	0.119	-0.059	1		
R&D	0.079	0.003	-0.039	0.013	-0.042	0.097	0.031	1	
PREC	0.116	-0.017	-0.201	0.029	-0.236	0.782	-0.373	0.593	1

As expected, *Issue* is negatively correlated with *Cash flow*: firms with steady and positive cash flows need not to issue as much equity in order to secure sufficient amount of cash in

[9] And, considering their role as explanatory variables low correlation is expected.

their balance sheets. *Cash flow* has positive, though very low correlation with *Debt*. In this context, it can be interpreted that even though positive-cash-flow firms may not need as much debt financing, they usually have better access to external financing and can hence also utilize leverage in order to increase their returns on equity.

What is interesting in correlations between precautionary motive proxies is that all three components of *PREC* have low correlation between each other. Thus, it seems that a firm with precautionary motive to hold excess cash has usually one primary factor that creates the need for precautionary cash holdings. For *Cash flow volatility, Dividends* and *R&D*, the highest correlation of 0.097 is observed between *Cash flow volatility* and *R&D*. On the other hand, the three precautionary proxies are highly correlated with *PREC* since it presents the first principal component of *Cash flow volatility*, *Dividends* and *R&D*. Furthermore, proxies have expected signs with *PREC*: firms with high industry cash flow volatility, low dividends and high R&D expenditures were stated to have more precautionary motives for cash holdings in Section 4.2.2. Finally, it is notable that *Cash flow volatility* has the highest correlation of 0.782 with *PREC*, which indicates that it is the most dominant proxy explaining *PREC* in my sample data.

6. RESULTS

This part reviews my empirical findings and discusses the evidence for the hypotheses presented in Section 3. Section 6.1. investigates whether there have been some dramatic changes in cash ratios and net debt levels for European firms during time period 1995 – 2010. Section 6.2. further analyses which firm characteristics seem to be typical for firms with high cash holdings, and relation between precautionary motives and cash savings is introduced. Section 6.3. reports the role of different cash sources for cash savings purposes. Section 6.4. tests the persistence of cash savings rates among different cash sources on a four-year window. Section 6.5. reports the most important empirical evidence of this thesis by examining the interaction between precautionary motives and share issuance – cash savings. Finally, Section 6.6. briefly tests whether cash savings or investments seem to be the primary motivation for share issuances in general.

6.1. Increase in Cash Ratios

I start my empirical part by examining whether there has been actual increase in cash ratios during the sample period. Bates, Kahle and Stulz (2009) found significant increasing trend in both average and median cash ratios for U.S. firms during 1980 – 2006 and thus same kind of development is expected with my dataset. Further, I examine whether firms have decreased their net debt by increasing cash ratios. Bates, Kahle and Stulz report that firms have decreased their net debt levels and this can be due to decreased debt levels, increased cash holdings, or both.

Table 5 reports annual averages and medians for cash ratio, leverage and net leverage for my sample of 41,144 firm year observations. Columns 2 and 3 depict yearly average and median values for cash ratios, respectively. Both columns indicate increasing trend for cash ratio until 2007 – 2009 when there is a clear dip in cash held by sample firms. Cash ratios start to recover in 2010 as both average and median values perceive an increase compared to 2009. As discussed in Section 5.2., the recent global financial crisis has obvious effect on results

and thus period 1995 to 2006 is later examined separately in order to eliminate abnormal time period from the sample.

Average cash ratio has increased from 1995 to 2006 by 48.7% (from 11.5% to 17.1%) and increase for median cash ratio is 25.6% (from 8.2% to 10.3%). Even with natural decrease in cash holdings during recent financial crisis, the increase in average cash ratios from 1995 to 2010 is 35.7%, and 24.4% for the median, indicating clear upward trend in cash ratios. Furthermore, statistical significance of trend is measured in unreported tests for years 1995 - 2006. Correcting with autoregressive lag terms, slope coefficient for average cash ratio indicates annual increase of 0.22% during 12 year time period with nearly significant t-value of 1.48. Slope for median cash ratio shows yearly upward trend of 0.12% with t-value of 1.64 being significant at 10% level[10]. Trends does not seem to be very significant statistically but it must be reminded that rather short time period makes significance tests sensitive to adverse observations. For example, there is also a decrease of cash ratios during the beginning of 2000s which drops the significance of mainly upward trend during time period as a whole.

Next, I examine the effect of cash on net debt levels in order to see whether changes in net debt are more due to changes in cash or changes in leverage levels. Columns 4 and 5 show average and median values for leverage, respectively. Leverage is measured as total debt divided by lagged total assets. When looking at time period 1995 – 2006, it can be seen that average leverage has remained at rather steady level being 20.7% in 1995 and 19.6% in 2006 thus indicating small 5.3% decrease during 12 years. Median leverage has decreased relatively more: from 19.1% in 1995 to 16.6% in 2006 representing total decrease of 13.1% during same time. Although leverage has perceived slight decrease in time period 1995 – 2006, there is no clear observable trend in leverage for sample firms. This is because unreported time trend tests have t-values below one for both average and median leverage time series. In addition, financial crisis doesn't seem to have had significant effect on leverage levels as average leverage is basically at the same level in 2010 as it was in 1995. Therefore, it can be stated that firms have not made significant changes in leverage levels during sample periods.

Net leverage, or net debt, is measured as total debt minus cash and cash equivalents divided by lagged total assets. Average and median net leverages for sample data are presented in columns 6 and 7. Again, I start by examining the results before financial crisis. Average net

[10] Trends are significant at 1% level if not using autoregressive lag terms.

leverage has decreased as much as 68.8% from 9.3% in 1995 to 2.9% in 2006. Decrease has been slightly smaller for median values; it has decreased from 10% to 6.5% at the same time period thus indicating a drop of 35%. Decrease in net debt is due to increase in cash holdings because I concluded in previous paragraphs that there has been upward trend in cash ratios but leverage, as other variable constructing net debt, has remained steady during the same time period. Slope coefficient for time trend in average net leverage indicates significant yearly decrease of 0.37% with t-value of 1.79. Slope coefficient for median net leverage is insignificant, though clearly negative as well.

Table 5 Average and Median Cash Ratios and Leverage Ratios from 1995 to 2010

Table shows yearly average and median values for cash ratio, leverage and net leverage for all sample firms. Cash ratio is firm's cash and cash equivalents divided by lagged total assets. Leverage is firm's total debt divided by lagged total assets. Net leverage is total debt minus cash and cash equivalents divided by lagged total assets. The sample consists of 41,144 firm year observations during period 1995 – 2010.

Year	Avg Cash Ratio	Median Cash Ratio	Avg Leverage	Median Leverage	Avg Net Leverage	Median Net Leverage
1995	0.115	0.082	0.207	0.191	0.093	0.100
1996	0.123	0.079	0.202	0.188	0.082	0.097
1997	0.137	0.090	0.201	0.182	0.067	0.086
1998	0.139	0.085	0.209	0.187	0.073	0.098
1999	0.150	0.087	0.206	0.183	0.060	0.091
2000	0.165	0.091	0.198	0.174	0.035	0.078
2001	0.150	0.081	0.213	0.195	0.066	0.104
2002	0.148	0.081	0.222	0.201	0.077	0.117
2003	0.153	0.088	0.222	0.193	0.073	0.104
2004	0.164	0.096	0.206	0.171	0.046	0.071
2005	0.169	0.101	0.198	0.163	0.033	0.072
2006	0.171	0.103	0.196	0.166	0.029	0.065
2007	0.161	0.095	0.202	0.174	0.045	0.078
2008	0.149	0.085	0.224	0.195	0.079	0.109
2009	0.152	0.098	0.219	0.193	0.070	0.095
2010	0.156	0.102	0.209	0.181	0.056	0.084

To summarize, European firms held clearly more cash in 2006 than they did in 1995. Financial crisis displays strongest during 2007 – 2009 when firms were forced to decrease their cash holdings. On the other hand, there have not been any significant changes in leverage levels during more steady time period of 1995 – 2006. However, financial crisis forced firms to increase their debt levels probably because internal cash flows decreased with decreasing aggregate demand. As a result of increased cash holding and rather steady leverage levels, average net leverage has decreased significantly. This conclusion made with my European data sample is in line with findings of Bates, Kahle and Stulz (2009) who made the same observation with U.S. data. Next, the effect of selected firm characteristics is discussed in context of cash holdings.

6.2. Pervasiveness of Increased Cash Holdings

In previous section, I concluded that as an aggregate sample European firms have perceived increase in cash ratios since 1995 and that their net debt levels have decreased due to this increase in cash holdings. Next, I examine if certain kind of firms have had higher increase in cash ratios than others. More specifically, firm size, IPO status, dividend payment status, accounting performance and scope of precautionary motives as firm characteristics are investigated in more detail.

6.2.1. Firm Size and Increase in Cash Holdings

I argue that firm size should have effect on firm's cash holdings. Usually, largest firms operate in more saturated business environments and can therefore better predict the sufficient level of needed cash for each year. Moreover, even if largest firms usually have smaller cash ratios, their absolute cash holdings are much higher than for smaller companies. Next I investigate whether increase in cash ratios as stated in previous section is due to increase in particular size classes, or have all firms been increasing their cash ratios regardless the firm size. In order to execute this investigation, I divide sample firms every year to quintiles by book value of total assets. Average cash ratios for each size quintile and each year are presented in Figure 2.

Figure 2 depicts clearly that increase in cash holdings within sample firms comes mainly from the smallest size quintiles. Actually two largest size quintiles seem to have no increasing trend whatsoever but they have maintained very steady amount of cash on their balance sheets throughout the entire time period. On the other hand, the increase in cash ratios for the two smallest size quintiles has been very aggressive. For comparison, average cash ratio for smallest size quintile, i.e. Q1, was 12.4% in 1995 and 28% in its peak year in 2006, thus representing an increase of 125.8% only within 12 years. At the same time period, average cash ratio for largest size quintile Q5 remained basically at the same level being 11.6% in 1995 and 10.7% in 2006 (not reported in tables).

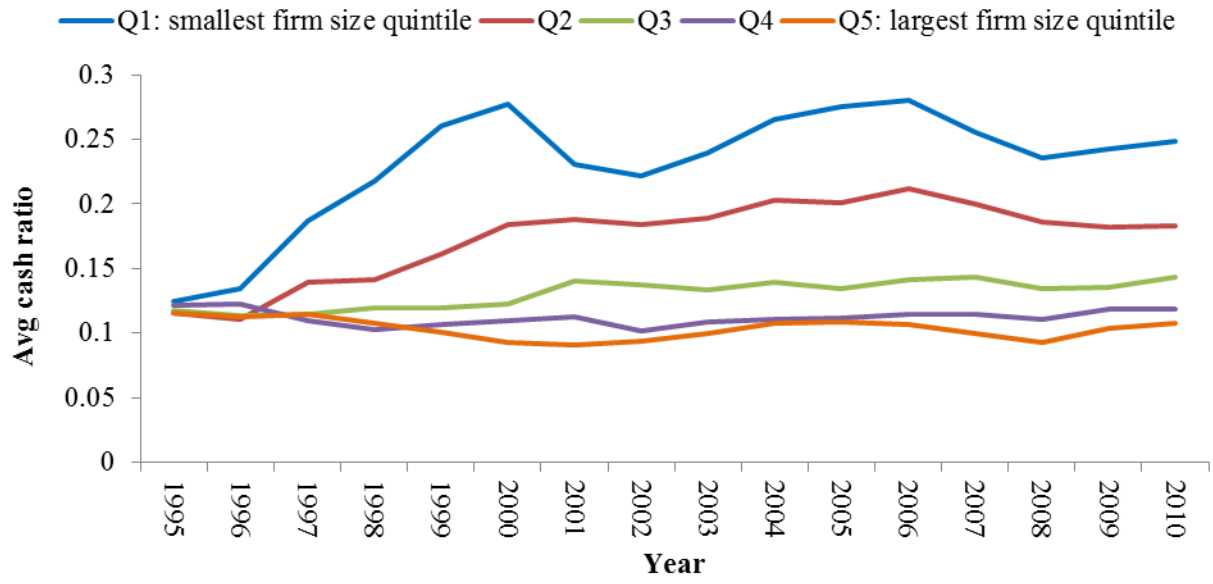


Figure 2 Average Cash Ratios by Firm Size Quintile from 1995 to 2010

Figure depicts yearly average cash ratios for all sample firms by firm size quintiles. Average cash ratio is shown in the vertical axis and it is calculated as cash and cash equivalents divided by book value of total assets. Firms are divided to size quintiles by their book values of total assets. Q1 nominates the quintile for smallest firm sizes and Q5 nominates the quintile for largest firm sizes. The sample consists of 41,144 firm year observations during period 1995 – 2010.

Interestingly, all size quintiles had cash ratios very close to each other in the beginning of sample period. This can be explained with smaller amount of observations in the beginning of data sample as depicted in Figure 1. Smallest size quintile perceives rather dramatic dip in cash holdings after year 2000 due to dot-com bubble and high investment era following it. Also the financial crisis in 2007 shows clearly for the smallest size quintiles. On the other hand, largest firms did not seem to perceive any dramatic changes in cash holdings during the economic downturn.

Figure 3 supports the evidence shown in Table 5 by depicting that together with increased cash savings, firms have decreased their net debt levels. As mentioned in Section 6.1. firms have kept their debt levels at a rather steady stage and this seems to be the case despite the size of a firm. This is why Figure 3 is almost like a mirror image compared to Figure 2: as cash holdings for smallest firms increase, net debt decreases when leverage remains steady. Q1 and Q2 firms actually have negative net debt during most of the time period due to high cash savings. Therefore, the main conclusion here is that especially smaller firms have decreased their net debt levels by holding larger amounts of cash.

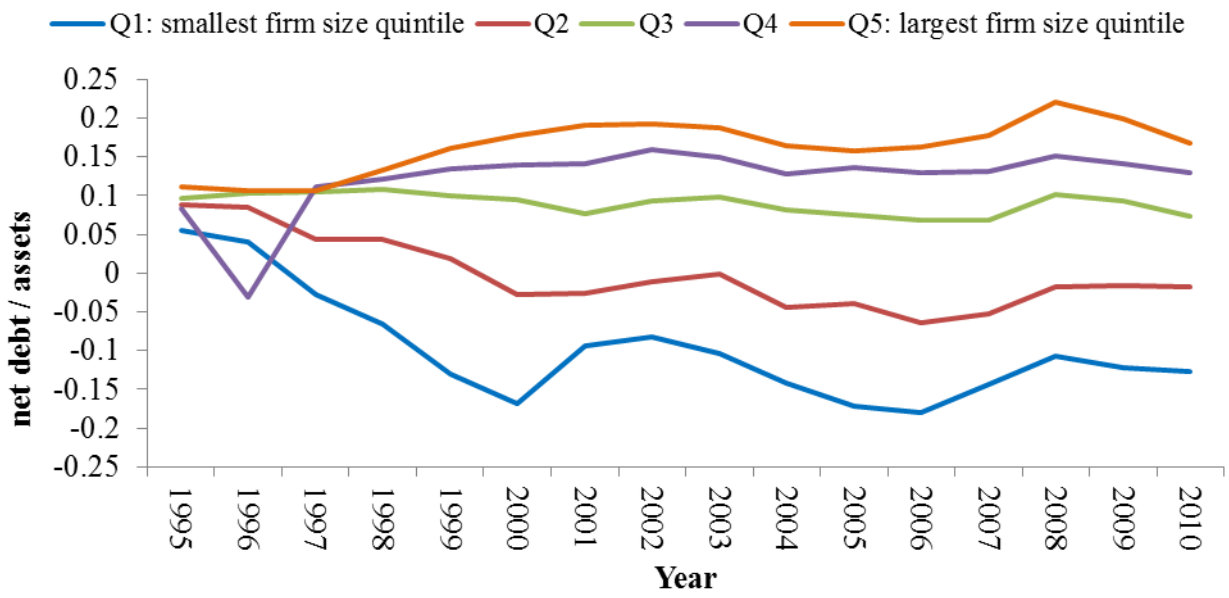


Figure 3 Average Net Debt Ratios by Firm Size Quintile from 1995 to 2010

Figure depicts yearly average net leverage values for all sample firms by firm size quintiles. Average net leverage is shown in the vertical axis and it is calculated as total debt minus cash and cash equivalents divided by book value of total assets. Firms are divided to size quintiles by their book values of total assets. Q1 nominates the quintile for smallest firm sizes and Q5 nominates the quintile for largest firm sizes. The sample consists of 41,144 firm year observations during period 1995 – 2010.

6.2.2. IPO Status, Dividend Payments, Accounting Performance and Cash Holdings

All sample firms are distinguished annually by their status of new issues (or IPOs), dividend status and accounting performance, and yearly average cash ratio for each group is reported in Table 6. One reason for increased overall cash holdings during time period might be the surge of IPO activity at late 1990s and beginning of 2000s. Moreover, as discussed in Bates, Kahle and Stulz (2009), IPO firms issue seasoned equity within few years after the initial offering more often than non-IPO firms. A firm is classified as IPO-firm if it conducted its initial public offering within the last five years, and non-IPO firm otherwise.

As shown in Table 6, IPO-firms have larger cash ratios compared to non-IPO firms throughout the whole sample period. There has been clear increase in cash holdings for both IPO-classes from 1995 to 2006, and decrease during recent financial crisis. Increase has been

68.9% (from 15.1% to 25.5%) for IPO-firms and 28.6% (from 11.9% to 15.3%) for non-IPO firms before financial crisis. Statistically, after controlling with autoregressive lag terms, both IPO groups have naturally positive trends. However, trend is actually more significant for non-IPO firms with t-value 1.87, while t-value for IPO-firms' time trend is only 1.29. Surprisingly low significance of time trends is due to rather low time period and the effect of decreased cash holdings for both IPO classes during the beginning of 2000s. Considering results discussed here, I conclude that increase in cash holdings is not mainly due to increased capital raising activities of IPO-firms because increased time trend is observed for non-IPO firms as well. This conclusion is in line with results found in Bates, Kahle and Stulz (2009).

Fama and French (2001) find that U.S. firms' propensity to pay dividends has declined dramatically after the peak year in 1978. They also conclude that dividend payers are more profitable and about 10 times larger than non-dividend payers. Non-dividend payers are in addition characterized to spend more on investments and R&D, and have higher P/B ratios compared to dividend payers (Fama and French, 2001). In addition, as discussed already in Section 2.2.6. firms that are not paying dividends are stated to have greater precautionary motives for additional cash holdings. Firm is categorized in dividend payer group if it has paid common dividend that year, and as a non-dividend payer otherwise. Average yearly cash ratios for both dividend status groups are presented in columns 4 and 5 of Table 6.

Average cash ratio for dividend payers has remained very stable during the whole time period, and not even the recent financial crisis has had large negative effect on cash holdings among dividend payers (on the contrary, dividend payers have slightly increased their cash holdings after year 2008). Even though having some small fluctuation during 1995 – 2006, the average cash ratio for dividend payers remains basically at the same level and thus no statistically significant time trend is observed in non-tabulated time trend regressions. On the other hand, average cash ratio for non-dividend payers has doubled from 11% in 1995 to 22.7% in 2006. Time trend test shows an average yearly increase of 0.79% in average cash ratio for non-dividend payers with significant t-statistic of 3.81. Again, these findings considering dividend payment status and increase in cash holding are similar to Bates, Kahle and Stulz (2009). Significant increase in cash holdings for non-dividend payers but not for dividend payers is also in line with the precautionary motive theory tested more thoroughly later in this thesis.

Columns 6 and 7 in Table 6 depict yearly average cash ratios for firms with negative and positive income. Accounting performance is measured with net income and the underlying assumption is that firms with negative income are more financially constrained than firms with positive income. Negative income firms exhibit very rapid increase in cash holdings during end of the 1990s and average cash ratio more than doubles in 5 years from 13% in 1995 to 26.7% in 2000. During the latest decade, the average cash ratio for negative income firms fluctuates a bit but local maximum is once again in year 2006, i.e. just before the financial crisis. Time trend for cash holdings of negative income firms is positive but statistically insignificant due to decrease in cash ratios during first years of 2000s.

Table 6 Average Cash Ratios by Selected Firm Characteristics

Table reports yearly average cash ratios delineated by new issue status, dividend status and accounting performance. Firm is assigned to IPO subsample if it has executed its initial public offering within prior five calendar years and to Non-IPO subsample otherwise. Firm is assigned to Dividend Payer subsample if it paid common dividend during financial year and to Non-Dividend Payer subsample otherwise. A firm is classified by accounting performance to negative and non-negative income firms by its net income. T-statistics for differences in the average cash ratios between new issues, dividend status and accounting performance subsamples are reported in Appendix 2. Sample consists of 41,144 firm year observations during period 1995 – 2010.

	New Issues		Dividend Status		Accounting Performance	
Year	IPO Firms	Non-IPO Firms	Dividend Payers	Non-Dividend Payers	Negative Income Firms	Non-Negative Income Firms
1995	0.151	0.119	0.122	0.110	0.130	0.117
1996	0.170	0.127	0.119	0.144	0.169	0.119
1997	0.176	0.130	0.124	0.172	0.202	0.129
1998	0.170	0.132	0.124	0.177	0.203	0.129
1999	0.199	0.131	0.125	0.199	0.217	0.136
2000	0.236	0.123	0.118	0.244	0.267	0.135
2001	0.220	0.112	0.111	0.212	0.210	0.125
2002	0.207	0.125	0.112	0.194	0.191	0.128
2003	0.216	0.136	0.120	0.193	0.193	0.138
2004	0.236	0.149	0.127	0.207	0.228	0.144
2005	0.254	0.155	0.126	0.222	0.238	0.148
2006	0.255	0.153	0.125	0.227	0.252	0.145
2007	0.231	0.144	0.121	0.214	0.234	0.140
2008	0.203	0.137	0.118	0.197	0.181	0.139
2009	0.207	0.144	0.131	0.183	0.167	0.150
2010	0.216	0.151	0.136	0.184	0.186	0.149

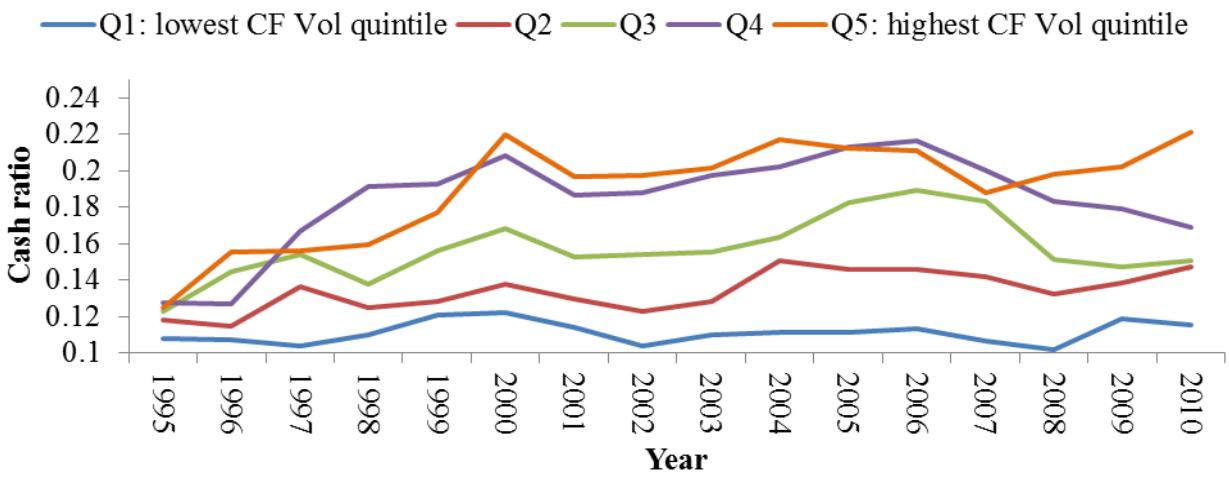
Also positive income firms perceive some, although rather small, increase in cash holdings from 11.7% in 1995 to 14.5% in 2006. Time trend is again positive but statistically insignificant. These results show that increase in cash holdings has been especially fast for firms with negative income firms but firms with positive net income have also been increasing their cash savings. Compared to Bates, Kahle and Stulz (2009), my results are very much in line with their findings, even though due to much longer time period, they were able to find statistically more significant time trends for increased cash holdings for both income sub-groups, but especially for negative income firms.

6.2.3. Precautionary Motive Proxies and Cash Holdings

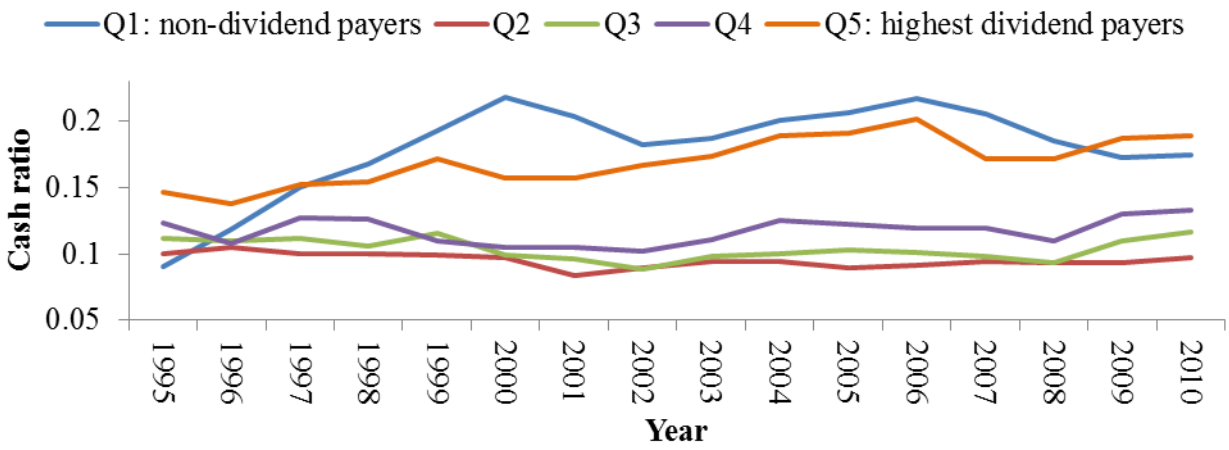
Next, I move on to examine the effect and scope of each precautionary motive proxy on cash holdings. According to McLean (2011), firms with high *PREC* tend to hold more cash compared to firms with lower *PREC* score. Literature suggests that firms with high industry cash flow volatility, high R&D expenses and low dividend payments have the highest precautionary motives, i.e. the highest *PREC* score, to hold excess amounts of cash on their balance sheets. Therefore, I investigate whether this hypothesis holds with my data sample by investigating each proxy separately in Figure 4. In this section, the levels of cash holdings for different precautionary motive proxy quintiles are discussed whereas trends for each proxy are examined further in Section 6.5.1.

Panel A of Figure 4 depicts yearly average cash ratios for sample firms by C*ash flow volatility* quintile. There is clear difference between cash holdings among firms within lowest and highest *Cash flow volatility* quintiles. Furthermore, cash ratios seem to increase rather steadily when moving on from lower quintile to a higher quintile. Only difference to this development is on the 4th and 5th quintile as firms within Q4 have at times higher cash ratios than firms within the highest cash flow volatilities. Thus, increase in cash flow volatility seems to increase cash holdings when cash flow volatility is rather low. At higher levels of cash flow volatility, firms have already high cash ratios and hence increase in cash flow volatility does not have as much significance on cash holdings.

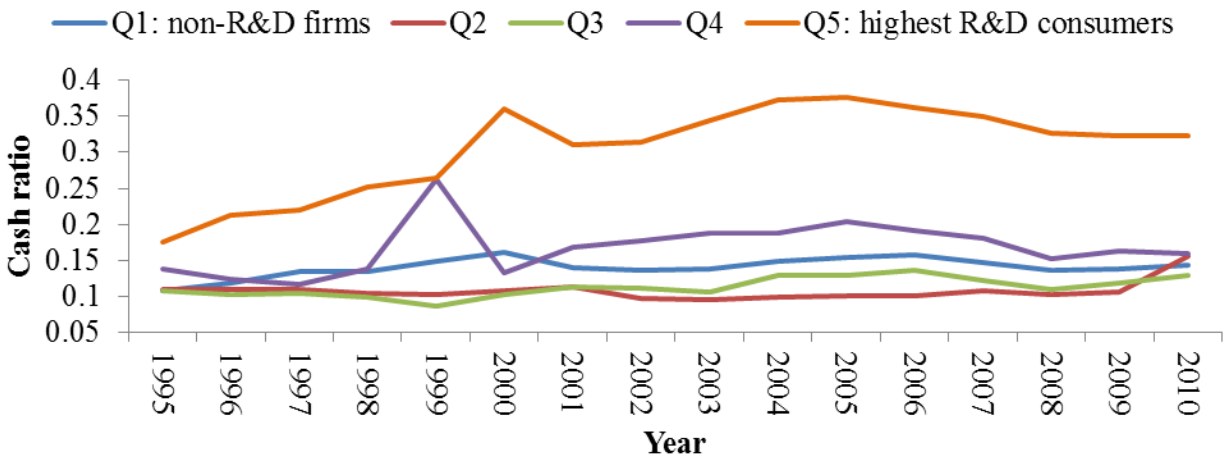
A. Cash flow volatility and cash holdings



B. Dividends and cash holdings



C. R&D and cash holdings



D. PREC and cash holdings

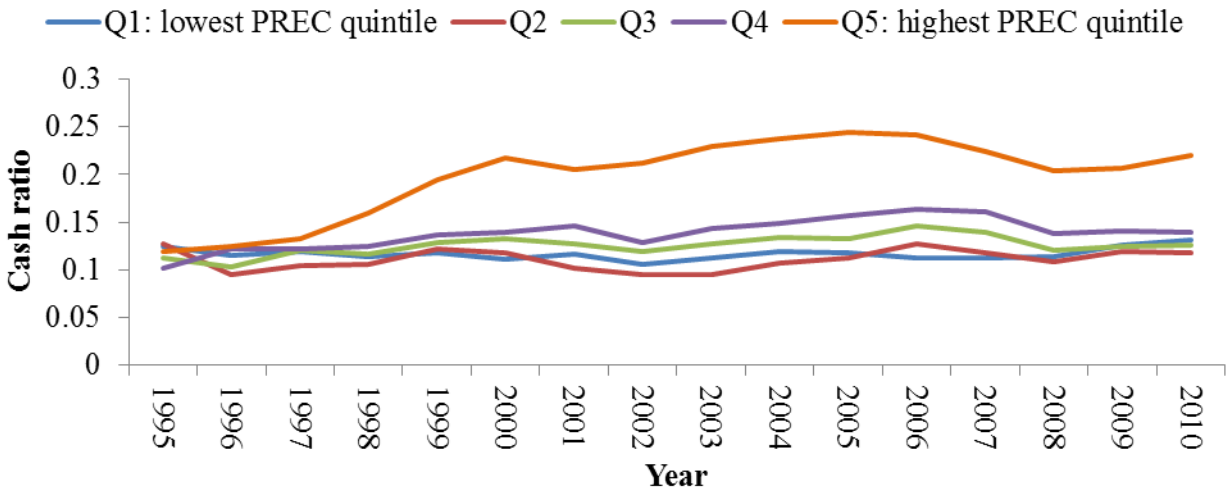


Figure 4 Average Cash Ratios by Exposure to Precautionary Motives

Figure depicts yearly average cash ratios for all sample firms by precautionary motive quintiles for *Cash flow volatility*, *Dividends*, *R&D* and *PREC*. Cash ratio is calculated as cash and cash equivalents divided by lagged total assets. Panel A depicts the relation between the scope of cash flow volatility and cash holdings. *Cash flow volatility* is the average cash flow volatility within each firm's two-digit SIC code, measured over the past five years (at least three years). Panel B depicts the relation between the dividend payments and cash holdings. *Dividends* is paid common dividends divided by lagged total assets. Panel C depicts the relation between R&D expenditures and cash holdings. *R&D* is research and development expenditures divided by lagged total assets. Panel D depicts the relation between *PREC* and cash holdings. *PREC* is the first principal component of *Cash flow volatility*, *Dividends* and *R&D*. Figure reports that cash ratios are the highest for firms with highest industry cash flow volatility, non-dividend payers, highest R&D consumers and firms with highest *PREC*. The sample consists of 41,144 firm year observations during period 1995 – 2010.

Firms are divided yearly to quintiles by their level of dividend payments in Panel B of Figure 4. Q1 represents all firms that do not pay any common dividend on specific year, thus including more observations than other quintiles. Main result here is that non-dividend payers hold generally more cash than dividend payers as cash ratio for Q1 is higher than for other quintiles, except for the two first and last years of sample period. On the other hand, results are not entirely straightforward. The rationale for using dividend payment status as precautionary motive proxy is that firms who do not pay dividends are probably financially more constrained and hence hold higher levels of cash. However, firms that pay the highest dividends tend to hold almost as much cash scaled to their assets as non-dividend payers (compare Q1 and Q5 in panel B of Figure 4). Thus, this can be interpreted in a way that highest dividend paying firms are financially in very good shape and that is why they can also afford to pay high dividends.

Yearly average cash ratios for sample firms by *R&D* quintile are presented in Panel C of Figure 4. Q1 represents all firms that do not report any R&D expenses, and as noted before, this quintile includes the majority of sample firms. Therefore, I don't put much emphasis on Q1 at this stage, because firms within this quintile probably base their cash holding decisions in many other factors besides their R&D expenses and potential precautionary motives due to it. Quintiles 2 to 5 give more information about R&D – cash holdings relation. From Q2 to Q4 firms seem to steadily increase their cash holdings as they spend more on R&D. After Q4, there is a high leap to Q5 meaning that firms that invest to R&D the most have clearly higher cash ratios than other companies. This evidence, even with high amount of firms that do not report any R&D activity, supports clearly the hypothesis that R&D-intensive companies hold more cash.

Panel D concludes the results discussed above by depicting the relation between precautionary motive index *PREC* and cash holdings. At lower PREC quintiles Q1 to Q4 there is no notable difference in amount of cash holdings, however supporting the assumption that firms with lower precautionary motives hold lower amounts of cash. Quintile 5 on the other hand, is clearly above other quintiles especially after 1997. This suggests that firms with highest *PREC* hold more cash than other firms. To summarize, the overall observation is that firms with higher precautionary motives, measured as separate proxies or *PREC* index, hold more cash than firms with lower motives for precautionary cash holdings throughout the sample period.

6.3. Savings from Cash Sources

In this section, I investigate yearly development of different cash sources: *Issue, Debt, Cash flow* and *Other*. I am interested to examine the popularity of different cash sources among my sample firms and to see if there have been some significant trends in their usage. Main results discussed here are depicted in Tables 7 and 8 and Figure 5. As reported in Section 6.1., the sample of European firms have increased their cash holdings and therefore it is in interest to examine which cash sources are mainly used to accumulate more cash on balance sheet.

6.3.1. Yearly Cash Savings Rates

I start by determining yearly cash savings rates for each cash source. In other words, I examine how much each cash source has increased company's cash ratio on average. To conduct this, I use the regression model (1) introduced in Section 5.1. :

$$\Delta Cash_i = \alpha + \beta_1 Issue_i + \beta_2 Debt_i + \beta_3 Cash\ flow_i + \beta_4 Other_i + \beta_5 Assets_i + \varepsilon_i . \quad (1)$$

This regression is run separately for each sample year and coefficient estimates for cash sources are presented in Panel A of Table 7. Coefficients are interpreted as cents (or percentages) saved from each euro received as cash from a cash source. For example, cash savings rate for *Issue* is 0.362 in 1995, which means that on average firms saved 36.2 cents from each euro they received as cash flow from share issuances. The rest of issuance proceeds have been used for other purposes during the fiscal year when the issuance was executed. As tabulated in Panel A of Table 7 and illustrated in Panel A of Figure 5, firms have highest cash savings rates for proceeds received from *Issue* almost throughout the whole period.

Savings rate for *Debt* is rather close to zero the whole time as its peak value is only 3.6 cent for each euro in 2002. Moreover, on average, savings rate from debt proceeds has been negative every other year during sample period. Interpretation for this is that when firms have issued debt, they have basically spent it during the fiscal year when the issuance is executed. In addition, they have used cash from other sources as well, thus decreasing their cash ratio compared to beginning of the fiscal year. *Debt* has significantly negative savings rate of -0.248 in 2000 which differs greatly from results by McLean (2011). That is, McLean shows that *Debt* has actually its (positive) peak value of 0.091 in year 2000 when IT bubble was

Table 7 Cash Savings Rates, Capital Raised and Amount of Cash Saved by Cash Sources

Table reports yearly values of cash savings rate, amount of capital raised and amount of cash saved from each cash source. Panel A reports the percentage of cash saved from each euro received as cash proceed from the four cash sources. Savings rate is the parameter estimate received from following regression that is run for each year separately, and where $\Delta Cash_i$ is the dependent variable:

$$\Delta Cash_i = \alpha + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} + \beta_5 Assets_{it} + \varepsilon_{it}, \quad (1)$$

$\Delta Cash_i$ is the difference between cash at the end of the year (t) and at the beginning of year (t-1) divided by total assets at time t. *Issue* is cash proceeds from share issuances divided by lagged total assets. *Debt* is cash proceeds from additional debt divided by lagged total assets. *Cash flow* is net income plus amortization and depreciation divided by lagged total assets. *Other* includes all other cash sources, including the sales of assets and investments, divided by lagged total assets. *Assets* is the natural logarithm of lagged total assets. Panel B reports the yearly average values for *Issue, Debt, Cash flow* and *Other*, and it therefore represents the amount of capital raised from each cash source. Panel C reports yearly average values of cash saved (divided by lagged total assets) from each cash source. It is constructed by multiplying the yearly savings rate of a cash source in Panel A with the amount of capital raised from the same cash source at that year in Panel B. t-Statistics are reported in parentheses. * = significant at 10%; ** = significant at 5%; and *** = significant at 1%. The sample consists of 41,144 firm year observations during the period 1995 – 2010.

Panel A: Cash savings rates

Year	R^2	Intercept	Issue	Debt	Cash flow	Other
1995	0.143	-0.022	0.362***	0.022	0.168***	-0.058
		(1.01)	(9.61)	(0.17)	(6.31)	(0.32)
1996	0.151	0.037*	0.368***	0.005	0.045**	0.152
		(1.79)	(13.87)	(0.08)	(2.06)	(1.27)
1997	0.126	0.131***	0.344***	-0.012	0.241***	0.250*
		(4.49)	(10.85)	(0.12)	(9.23)	(1.84)
1998	0.073	0.267***	0.286***	-0.044	0.244***	0.369**
		(6.49)	(7.14)	(0.66)	(7.79)	(2.14)
1999	0.017	0.455***	0.163***	-0.087	-0.005	0.327
		(5.49)	(2.77)	(0.80)	(-0.08)	(1.03)
2000	0.414	0.395***	0.494***	-0.248***	-0.336***	0.301
		(3.58)	(33.60)	(2.22)	(7.18)	(0.98)
2001	0.332	-0.069**	0.548***	0.000	0.239***	0.112
		(2.46)	(33.41)	(0.01)	(13.17)	(1.12)
2002	0.174	-0.046***	0.276***	0.036	0.230***	0.048
		(2.75)	(14.07)	(1.23)	(19.11)	(0.84)
2003	0.212	-0.040**	0.387***	-0.025	0.227***	0.109*
		(2.54)	(24.42)	(0.95)	(18.91)	(1.92)
2004	0.380	0.053**	0.442***	-0.006	0.212***	-0.004
		(2.54)	(41.28)	(0.21)	(15.52)	(0.06)
2005	0.541	0.022	0.549***	0.014	0.265***	0.202**
		(0.78)	(57.80)	(0.52)	(15.05)	(2.33)

Table 7 (continued)

Panel A: Cash savings rates

Year	R^2	Intercept	Issue	Debt	Cash flow	Other
2006	0.471	0.041	0.544***	-0.028	0.335***	0.128
		(1.33)	(53.05)	(0.96)	(17.89)	(1.30)
2007	0.35	-0.054**	0.464***	-0.03	0.209***	0.349***
		(2.02)	(42.15)	(1.30)	(11.78)	(4.03)
2008	0.210	-0.107***	0.360***	0.029*	0.248***	0.098
		(6.26)	(25.11)	(1.59)	(20.04)	(1.35)
2009	0.204	-0.078***	0.368***	0.044*	0.241***	0.090
		(5.40)	(23.46)	(1.64)	(20.62)	(1.37)
2010	0.465	-0.032**	0.502***	-0.008	0.189***	-0.030
		(1.88)	(52.09)	(0.34)	(15.08)	(0.54)
Mean	0.266	0.060	0.404	-0.021	0.172	0.153

Panel B: Capital raised

Year	Issue	Debt	Cash flow	Other
1995	0.014	0.039	0.104	0.020
1996	0.024	0.048	0.104	0.024
1997	0.023	0.067	0.113	0.027
1998	0.027	0.081	0.104	0.027
1999	0.037	0.091	0.091	0.029
2000	0.208	0.096	0.056	0.032
2001	0.045	0.062	0.037	0.028
2002	0.024	0.040	0.030	0.028
2003	0.030	0.034	0.035	0.028
2004	0.068	0.039	0.057	0.031
2005	0.112	0.072	0.053	0.034
2006	0.121	0.075	0.055	0.030
2007	0.093	0.073	0.055	0.028
2008	0.040	0.062	0.032	0.023
2009	0.031	0.023	0.020	0.021
2010	0.058	0.032	0.036	0.024
Mean	0.060	0.058	0.061	0.027

Table 7 (continued)

Panel C: Cash saved from each source of cash				
Year	**Issue**	**Debt**	**Cash flow**	**Other**
1995	0.005	0.001	0.018	-0.001
1996	0.009	0.000	0.005	0.004
1997	0.008	-0.001	0.027	0.007
1998	0.008	-0.004	0.025	0.010
1999	0.006	-0.008	0.000	0.009
2000	0.103	-0.024	-0.019	0.010
2001	0.025	0.000	0.009	0.003
2002	0.007	0.001	0.007	0.001
2003	0.012	-0.001	0.008	0.003
2004	0.030	0.000	0.012	0.000
2005	0.061	0.001	0.014	0.007
2006	0.066	-0.002	0.018	0.004
2007	0.043	-0.002	0.011	0.010
2008	0.014	0.002	0.008	0.002
2009	0.011	0.001	0.005	0.002
2010	0.029	0.000	0.007	-0.001
Mean	0.027	-0.002	0.010	0.004

heavily affecting the financing decision of U.S. companies. Moreover, it seems that European firms have had lower propensity to save *Debt* proceeds in general compared to U.S. firms who were reported to have positive average savings rate for *Debt*[11] (McLean, 2011). Steep decrease in savings rate for *Debt* at 2000 is offset by dramatic year-to-year increase in *Issue*'s savings rate which triples from 1999 to 2000. To sum up, firms seem to issue debt in order to finance short-term operations and investments, not for the purpose of cash savings.

Firms have remained their cash savings rate from internal cash flow at a rather steady level if years 1999 – 2000 are excluded. Similarly to *Debt*, large dip in savings rate for *Cash flow* is

[11] There seems to be difference in average *Debt* savings rates between European sample used in this thesis and the U.S. sample used in McLean (2011). During the period 1971 – 2008, McLean reports 11 yearly average values that are below zero. During period 1995 – 2008 U.S. firms had only three negative average savings rates, whereas I report eight negative average savings rates for the same period for European firms.

probably due to high investment phase in the turn of the decade. According to traditional pecking order theory (Myers and Majluf, 1984), firms should first use internal cash sources to finance investments before debt and equity. This theory seems to hold at least when interpreting Panel A of Figure 5: during high investment boom in year 2000, firms have used all their internal cash flows during that year to finance growth and they have also needed to spend all proceeds from debt issues as already discussed. Therefore, in order to balance this deficit in cash savings, firms have saved a large portion of share issuance proceeds.

Savings rate from *Other* fluctuates heavily during the whole time period. However, generally firms seem to save much of the proceeds they receive from sale of investments etc. Savings rate probably changes according to size of random cash flows. In other words, firms probably save the larger portion of cash proceeds the larger the one-time cash flow is. This can be seen again in year 2000 when many firm received also income from selling investments and large share of this income was not spent immediately.

To conclude, compared to other cash sources, firms save clearly much larger portion from share issuance proceeds. Average savings rate from issuance proceeds is 40.4% whereas only 17.2% of internal cash flow proceeds are used to increase cash holdings during period 1995 - 2010[12]. Propensity to save debt issuance proceeds is basically zero, even negative on average. Same evidence can be seen from significance of different cash sources on $\Delta Cash$: *Issue* coefficient has on average a t-value of 27.78, compared to *Debt*, *Cash flow* and *Other* that have average t-values of 0.80, 12.49 and 1.40, respectively. Thus, it is clear that firms have the highest propensity to save issue proceeds over other cash sources. However, high savings rate might not have significant economic meaning if amount raised from share issuances is very small. Therefore, amounts raised from each cash source are investigated in the following section.

[12] Year 2000 has large negative effect on average savings rates for *Debt* and *Cash flow*. Nevertheless, *Issue* has higher savings rate each year compared *Debt* and *Issue*. *Other* has the highest savings rate in 1998 and 1999, however, *Other* is a more random cash source than *Issue*, *Debt* and *Cash flow* and therefore it is not further discussed here.

6.3.2. Yearly Sources of Cash

Panel B of Table 7 reports yearly mean values for *Issue, Debt, Cash flow* and *Other*[13]. Same results are also graphed in Panel B of Figure 5. In other words, mean values for cash sources represent average cash proceeds scaled by lagged total assets and therefore this method shows information about how much firms have raised money from different sources each year.

Issue has perceived a dramatic increase from 0.014 in 1995 to 0.121 in 2006, after which it again decreased during financial crisis. As expected, highest value of 0.208 for *Issue* is observed in year 2000 when IT companies were able to raise substantial amounts of cash from share issuances. Therefore, year 2000 also increases the average for the whole sample period, because if year 2000 was excluded, the mean of 0.060 would decrease to 0.050.

Debt has been basically rather steady cash source for sample firms throughout the time period preceding financial crisis as it fluctuates between 0.034 and 0.096 during 1995 – 2006 time period. As it is the case with *Issue*, *Debt* has its peak value of capital raised in year 2000. Mean for yearly values is 0.058, i.e. 5.8% of assets.

Cash flow shows that firms are generating less cash internally. Average value for cash flow is 0.103 in 1995 – 1999 but only 0.046 in 2000 – 2006. However, for the whole sample period, the average value of 0.061 is very close to *Issue* and *Debt*. *Other* is clearly the smallest and steadiest cash source in terms of capital raised. Moreover, financial crisis seems not to have very high effect on *Other*. To summarize, firms have been using *Issue*, *Debt* and *Cash flow* for raising capital surprisingly evenly when interpreting the average values for the whole time period.

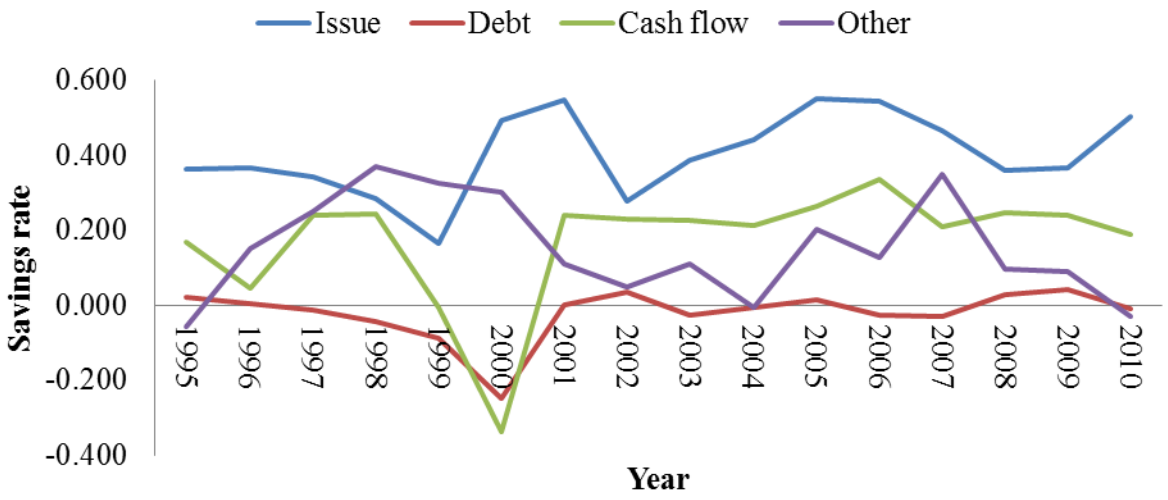
6.3.3. Yearly Amounts of Cash Saved

Results in Panel C of Table 7 are generated from values in Panels A and B and data is also plotted in Panel C of Figure 5. Panel C reports the yearly amounts of cash saved as percentage of lagged total assets for each four cash sources. Panel A reported yearly cash savings rates and Panel B described yearly mean values for capital raised scaled by lagged total assets.

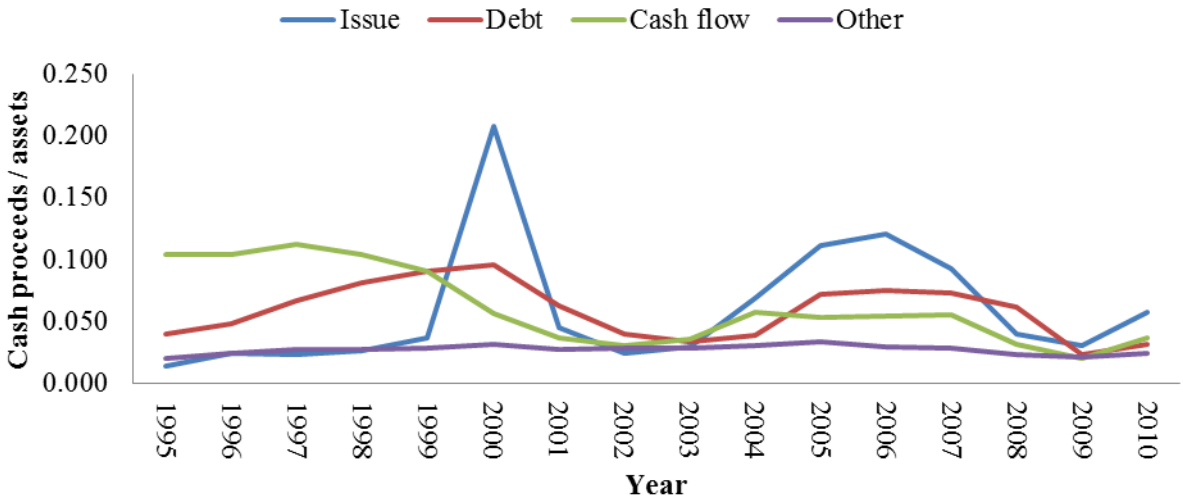
[13] Mean values in the last row of panel B in Table 7 are average values of yearly means. Therefore, figures on the last row differ from mean values presented earlier in summary statistics table (Table 3) that treats the sample as a whole.

Thus, yearly amount of cash saved is received from multiplying yearly cash saving rate by amount of capital raised. For example, for average firm in 1995, cash savings from share issuance is equal to 0.362 x 0.014 = 0.005, i.e. 0.5% of its assets.

A. Cash savings rates



B. Capital raised



C. Cash saved

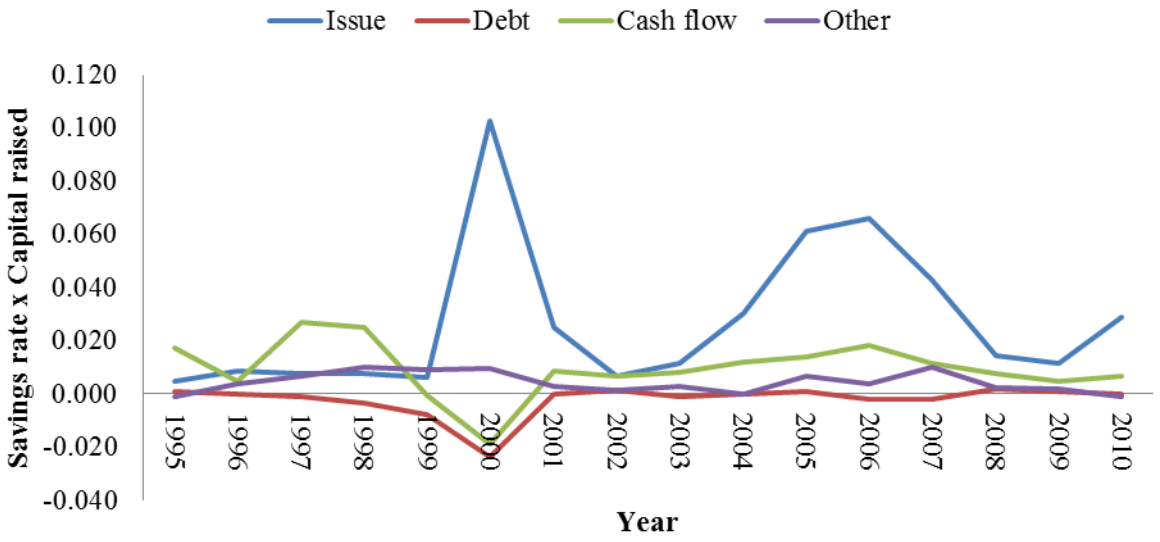


Figure 5 Graphical Presentation of Table 7

Figure depicts developments of cash savings rates, amounts of capital raised and amounts of cash saved from each four cash sources during the period 1995 – 2010. Panel A plots the coefficients received from the following regression model that is run separately for each sample year:

$$\Delta Cash_i = \alpha + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} + \beta_5 Assets_{it} + \varepsilon_{it},$$

where *Issue* is cash proceeds from share issuances divided by lagged total assets. *Debt* is cash proceeds from additional debt divided by lagged total assets. *Cash flow* is net income plus amortization and depreciation divided by lagged total assets. *Other* includes all other cash sources, including the sales of assets and investments, divided by lagged total assets. *Assets* is natural logarithm of lagged total assets. Panel B depicts yearly average values for *Issue*, *Debt*, *Cash flow* and *Other*. Panel C plots the yearly amounts of cash saved from each four cash sources. Amount of cash saved is a product of measures in Panel A and Panel B. Panel C shows that *Issue* has been the primary cash source for cash savings since year 2000. The sample consists of 41,144 firm year observations during the period 1995 – 2010.

Most important finding in Panel C is the increased cash saving from *Issue* during the time period. Compared to savings of 0.5% per assets in 1995, the figure has increased to 6.6% per assets in 2006, i.e. over 13 times larger in 12 years. Moreover, the average cash savings was 0.7% in period 1995 – 1999 but as high as 4.3% in 2000 – 2006, and still 3.3% if peak year 2000 is excluded.

As cash savings from *Issue* have increased clearly, *Debt* has remained close to zero all the time and savings from internally generated cash have seemed to be decreasing. Cash saved from cash flow is at the same level, in 1.8%, at 1995 and 2006. However, 1990s average for *Cash flow* is 1.5% per assets, whereas cash savings have halved in 2000 – 2006 to 0.7% per assets.

When examining the average amount of cash saved to total assets for the whole sample period, *Issue* is clearly the main source for cash savings with mean value of 2.7% compared to values of -0.2%, 1.0% and 0.4% for *Debt*, *Cash flow* and *Other*, respectively. Thus, on average, firms have saved more cash from *Issue* than from other cash sources altogether during the period 1995 – 2010.

6.3.4. Statistical Tests for Cash Source Time Trends

In Section 6.1., I concluded that there has been statistically significant increase in median cash ratios for European firms. In Sections 6.3.1. – 6.3.3. I discussed the development and scope of cash saving rates, capital raised and amount of cash saved for each cash source. In this section, I follow McLean's (2011) method by reporting statistical tests for time trends showed in Panels A – C of Table 7 and in Figure 5. Time trend tests reported here are done for time period 1995 – 2006 thus excluding the effect of financial crisis, which would distort the assessment of long term trend[14]. This development can also be seen from Figure 5, which shows that many increasing trend lines turn to decreasing after year 2006.

Table 8 reports estimates of trends in the time series that are reported in Table 7. Each variable is regressed on time variable, which is equal to one in first sample year 1995, and 12 in year 2006 which is considered as the last year before financial crisis. Variables are regressed with zero to four autoregressive lag terms depending on their partial autocorrelation. With these assumptions, parameter estimate *Trend* is estimation for average yearly increase (decrease) in dependent variable.

Main result in Panel A of Table 8 is that *Issue* is the only cash source that has had increasing trend in cash savings rate. Estimation for *Trend* means that cash savings rate from share issuance proceeds has increased on average 1.8% every year from 1995 to 2006. T-statistics shows that this increase is significant at 5% level. In turn, *Debt*, *Cash flow* and *Other* have no statistically significant trend in savings rates during the same time period.

Panel B reports that none of the cash sources in terms of capital raised has perceived a trend that would significantly differ from zero. However, t-statistics for *Issue* is again the highest

[14] Tests were run for whole time period 1995 – 2010 as well but results were mostly insignificant and thus are not reported here.

and almost significant, thus indicating that firms have increased their share issuance - cash collection more than raising capital from other sources. Moreover, trends for *Debt* and *Cash flow* have negative (although insignificant) coefficients, which supports the evidence already discussed in Section 6.3.2., i.e. firms have not increased their debt issuances although internal cash flows have decreased. Thus, decreasing internal cash flows have been replaced by issuing equity instead of increasing leverage.

Table 8 Time Trend Tests for Cash Sources

Table reports statistical time series tests for yearly average cash savings rates, capital raised and amount of cash saved for each four cash sources, as reported in Table 7 and Figure 5. Cash savings rates represent the coefficients received from the following regression model that is run separately for each sample year:

$$\Delta Cash_i = \alpha + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} + \beta_5 Assets_{it} + \varepsilon_{it},$$

where *Issue* is cash proceeds from share issuances divided by lagged total assets. *Debt* is cash proceeds from additional debt divided by lagged total assets. *Cash flow* is net income plus amortization and depreciation divided by lagged total assets. *Other* includes all other cash sources, including the sales of assets and investments, divided by lagged total assets. *Assets* is natural logarithm of lagged total assets. Time trend coefficient is received by regressing each cash source variable on a time variable and sufficient amount of lag terms in order to control for autoregression. Panel A reports trends in the yearly averages of cash savings rates, Panel B reports trends in the yearly averages of capital raised from each cash source, and Panel C reports trends for amounts of cash saved from each cash sources. t-Statistics are reported in parentheses. * = significant at 10%; ** = significant at 5%; and *** = significant at 1%. Durbin-Watson statistics are reported at the bottom of each table. The test sample excludes the effects of recent financial crisis on potential time trends, and includes 27,487 firm-year observations during the period 1995 – 2006.

Panel A: Trends in cash savings rates

	Issue	**Debt**	**Cash flow**	**Other**
Trend	0.018**	0.001	0.017	-0.012
	(2.00)	(0.15)	(1.13)	(0.52)
Constant	0.279***	-0.038	0.046	0.271
	(4.16)	(0.77)	(0.42)	(1.08)
Lag 1				0.224
				(0.63)
Lag 2				0.412
				(0.78)
Lag 3				-0.661*
				(1.80)
Years	12	12	12	12
Durbin-Watson	1.94	1.57	1.76	3.11

Table 8 (continued)

Panel B: Trends in cash sources				
	Issue	**Debt**	**Cash flow**	**Other**
Trend	0.007	-0.004	-0.003	0.001
	(1.61)	(1.24)	(1.18)	(0.99)
Constant	0.013	0.158***	0.059	0.035**
	(0.40)	(2.90)	(1.49)	(2.01)
Lag 1		0.133	1.226***	0.094
		(0.26)	(4.09)	(0.18)
Lag 2		-0.228	-0.741**	-0.480
		(0.35)	(2.22)	(0.82)
Lag 3		-0.196		0.038
		(0.30)		(0.09)
Lag 4		-0.663		
		(1.10)		
Years	12	12	12	12
Durbin-Watson	2.00	2.66	2.58	2.22

Panel C: Trends in cash saved				
	Issue	**Debt**	**Cash flow**	**Other**
Trend	0.004*	0.000	-0.000	-0.000
	(1.79)	(0.28)	(0.20)	(0.66)
Constant	0.000	-0.004	0.012	0.010
	(0.01)	(0.92)	(1.49)	(1.23)
Lag 1				0.155
				(0.39)
Lag 2				0.274
				(0.49)
Lag 3				-0.588
				(1.39)
Years	12	12	12	12
Durbin-Watson	2.02	1.60	1.51	2.95

Panel C reports the main findings of this section in explaining the main source for increased cash holding. Namely, as shown in Panel C, *Issue* is the only cash source that has perceived increasing time trend for the amount of cash saved during investigated time period 1995 – 2006. Slope coefficient for *Trend* is 0.004 which means that, on average, firms have increased the amount of cash saved from share issuances (scaled by lagged total assets) by 0.4% each year. T-statistics for *Issue* trend is 1.79 and thus significant at 10% level. Cash savings from *Debt*, *Cash flow* and *Othe*r, have remained statistically at the same level during time period 1995 – 2006 as none of these sources have any trends significantly different from zero.

6.4. Persistence of Cash Savings

In previous sections, I concluded that firms have high propensity to save cash proceeds received from equity issuances. In this section, I further examine whether these savings are temporary or persistent. Panel A of Table 7 reported that average cash savings rate for yearly sample period share issuances was 0.404 when dependent variable was *ΔCash* (i.e. $cash_t$ – $cash_{t-1}$ divided by $assets_{t-1)}$. However, it could be that firms issue shares to finance projects that unfold over several years and *Issue* in equation (1) would represent savings for earmarked investments, not for precautionary savings. In order to investigate this possibility, I calculate savings rates from *Issue* and other cash source coefficients for a longer time window.

Panel A of Table 9 reports Fama and MacBeth (1973) regressions using the same method as in Panel A of Table 7 but this time using additional dependent variables $\Delta Cash_{t+1,}$ $\Delta Cash_{t+2}$ and $\Delta Cash_{t+3,}$ that measure differences between cash at time t+1, t+2 and t+3, and cash at beginning of year (t-1). Results for dependent variable *ΔCash* are also further reported here for comparison and figures are the same as means in Panel A of Table 7[15].

Results in Panel A of Table 9 show that *Issue* coefficient does not shrink as the time goes by. On the contrary, despite a very small decrease between *ΔCash* and $\Delta Cash_{t+1,}$ the coefficient actually increases significantly for years t+2 and t+3. Cash savings rate for *Issue* is 0.404 for the financial year of the issue, and increases to 0.515 for the financial year t+3 after issuance year. Therefore, the conclusion is that cash proceeds saved from share issuances are not only persistent, but are also increased during subsequent years of the issuance. Hence, savings from share issuances are not just temporary savings for earmarked investment projects unfolding in several years after the issue, but firms tend to save high portion of cash proceeds for precautionary purposes.

At the same setting, *Debt* has no significant coefficient at any point of time which means that savings rate from debt proceeds are not significantly different from zero. This suggests that debt proceeds are mainly used very quickly for financing short-term operations and investments as concluded before.

[15] T-statistics reported by cash sources for *ΔCash* differ from the average yearly t-statistics that were discussed in Section 6.3.1. T-values reported in Table 9 are calculated from yearly Fama-MacBeth means and their standard deviations (not reported).

Table 9 Fama-MacBeth Regressions for Persistence of Savings Rates by Cash Sources

Panel A reports results from Fama-MacBeth (1973) regressions in order to report the persistence of cash savings rate within each four cash sources. Cash savings rates represent the coefficients received from the following regression model that is run separately for each sample year:

$\Delta Cash_i = \alpha + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} + \beta_5 Assets_{it} + \varepsilon_{it}$,

Dependent variable $\Delta Cash_i$ is the difference between cash at the end of years t, t+1, t+2 and t+3 and cash at the beginning of year t-1. *Issue* is cash proceeds from share issuances divided by lagged total assets. *Debt* is cash proceeds from additional debt divided by lagged total assets. *Cash flow* is net income plus amortization and depreciation divided by lagged total assets. *Other* includes all other cash sources, including the sales of assets and investments, divided by lagged total assets. *Assets* is natural logarithm of lagged total assets. Panel B reports the average values of changes in cash for issue quartiles and *Issue* groups are formed each year. Issue quartile 1 includes all zero-issuers and quartiles 2, 3 and 4 include firms with positive *Issue* values, and quartile 4 includes the firms with highest *Issue*. Panel C is constructed similarly to Panel B but now the changes of Log(Assets) within *Issue* groups are investigated. t-Statistics are reported in parentheses. * = significant at 10%; ** = significant at 5%; and *** = significant at 1%. The sample consists of 41,144 firm year observations during period 1995 – 2010.

Panel A. Coefficient estimates

	Δ Cash	**Δ Cash $_{t+1}$**	**Δ Cash $_{t+2}$**	**Δ Cash $_{t+3}$**
Intercept	0.060	0.368***	0.608***	0.750***
	(1.41)	(2.79)	(3.59)	(8.47)
Issue	0.404***	0.399***	0.477***	0.515***
	(14.63)	(9.88)	(6.74)	(6.26)
Debt	-0.021	0.058	0.078	0.036
	(1.22)	(1.35)	(1.38)	(0.98)
Cash flow	0.172***	0.154*	0.240***	0.339***
	(4.35)	(1.77)	(4.02)	(6.85)
Other	0.153***	0.228**	0.325*	0.309*
	(4.51)	(2.23)	(1.94)	(1.81)
Assets	-0.004**	-0.037*	-0.030***	-0.037***
	(2.32)	(1.72)	(3.69)	(4.57)
R^2	0.27	0.16	0.10	0.07
Years	16	15	14	13

Table 9 (continued)

Panel B: Growth in cash across issue groups				
Issue quartile	**Δ Cash**	**Δ Cash $_{t+1}$**	**Δ Cash $_{t+2}$**	**Δ Cash $_{t+3}$**
1	0.020	0.065	0.096	0.120
2	0.001	0.017	0.029	0.045
3	0.097	0.152	0.200	0.220
4	0.173	0.222	0.290	0.297
Difference	0.153***	0.157***	0.193***	0.177***
	(23.05)	(17.56)	(15.77)	(15.20)
Panel C: Growth in assets across issue groups				
Issue quartile	**Δ Assets**	**Δ Assets$_{t+1}$**	**Δ Assets$_{t+2}$**	**Δ Assets$_{t+3}$**
1	0.117	0.491	0.642	0.899
2	0.064	0.177	0.315	0.483
3	0.135	0.385	0.590	0.829
4	0.554	1.044	1.612	2.055
Difference	0.437 ***	0.553 ***	0.970 ***	1.156***
	(31.02)	(18.61)	(20.19)	(19.77)

When it comes to internal cash sources, firms have significant and mostly increasing savings rates for cash proceeds received from *Cash flow* and *Other*. Especially, coefficient for *Cash flow* increases relatively even more than it does for *Issue*, since it nearly doubles from 0.172 in first regression to 0.339 in fourth regression. However, savings rate for internal cash sources are always lower than the coefficient for *Issue* in all four regressions. As reported earlier in Panel B of Table 7, firms raise basically the same amount of cash from share issuances as they generate from internal cash flow (mean for capital raised scaled by lagged assets was 0.060 for *Issue* and 0.061 for *Cash flow* during the sample period). Therefore, as the savings rate for *Issue* is larger than for *Cash flow* also throughout the three years window after the cash is raised, I can conclude that *Issue* is the main source for precautionary cash savings.

In order to further investigate the cash accumulation of share issuers in the years subsequent to the issuance year, I sort firms into four *Issue* groups every year in Panel B of Table 9. *Issue* quartile 1 includes all firms that do not make share issuances on particular year, and quartile 4 includes the firms with highest share issuances scaled by their assets. The average values for

the three *Issue* groups that make issuances are 0.001, 0.010 and 0.489 (not reported in the tables), which tells that only the firms in highest *Issue* quartile make large issuances. For quartiles 2 and 3, the issuances are very small compared to their assets. Moreover, average cash flows for all *Issue* quartiles from 1 to 4 are 0.064, 0.080, 0.099 and -0.051, respectively. Therefore, non-issuers and small issuers have clearly positive internal cash flows on average, whereas largest issuers are usually unable to produce positive cash flows internally.

Results reported in Panel B of Table 9 show that largest issuers accumulate significantly more cash compared to non-issuers in issuance years, and increasingly in subsequent years after the issuances. However, it is notable that all *Issue* quartiles accumulate cash constantly as each group has larger and positive changes in cash year after year when compared to cash balances at time t-1. Panel B reports the absolute differences between *Issue* quartiles 1 and 4 in the last row, and shows that difference between high-issuers and non-issuers increases as the change is cash measurement horizon increases to t+2. Difference decreases a bit between $\Delta Cash_{t+2}$ and $\Delta Cash_{t+3.}$ Thus, the overall conclusion here is that largest issuers constantly accumulate more cash compared to non-issuers.

Literature suggests that the reason for high-issuers' continuous and high cash accumulation is due to target cash to assets ratios that firms want to maintain for precautionary reasons, or equity might be increased in order to retain the optimal capital structure (see e.g. Myers, 1984; Bradley, Gregg and Kim, 1984; and Opler et al., 1999). In this setting, firms would need more cash if their assets were growing fast due to firm's high growth phase. Panel C of Table 9 supports this argument as high-issuers have significantly higher growth in assets compared to non-issuers. Further investigation of target cash ratios is out of the scope of this study, but results discussed in this section show some characteristics that are familiar for high-issuers: they accumulate high amounts of cash; they are usually fast growing firms in terms of their total assets; and have usually negative cash flows.

6.5. Precautionary Motives and the Share Issuance – Cash Savings Relation

In previous section, I concluded that firms have had increasing trend in savings rate for share issuance proceeds. Next, I investigate whether precautionary motive proxies have experienced similar trends and could therefore explain the increase in share issuance cash savings. To conduct this test, I first depict the development of each precautionary motive proxy graphically and then run statistical tests to conclude whether proxies have significant trends during the sample period.

6.5.1. Statistical Tests for Precautionary Motive Time Trends

Figure 6 depicts yearly average values for each precautionary motive proxy for whole sample during years 1995 – 2010. Statistical time trends tests with autocorrelation lag terms are reported in Table 10. Trend test from Panel A of Table 8 for *Issue*-cash savings rate is further reported in the first column for comparison; if a precautionary proxy has had a significant trend during the period it could support the potential cointegration with increased share issuance – cash savings. Results in Table 10 are calculated for average values during 1995 – 2006 in order to make tests consistent with results in Table 8.

Average (logarithmic) cash flow volatility is -3.26 in 1995 and peaks at -2.30 in 2004, which indicates that cash flow volatility has increased during the sample period. However, *Cash flow volatility* has remained at seemingly steady level during 2000s and therefore trend is not very clear. Statistical test in third column of Table 10 shows that *Cash flow volatility* has had positive trend with coefficient 0.047. T-value for time trend is 1.42 and is therefore not quite significant at 10% level. However, compared to tests for other proxies, *Cash flow volatility* seems to have most significant trend and might therefore be the best proxy to correlate with increased share issuance – cash savings.

Dividend payments have clearly decreased during 1990s but remained rather steady thereafter. On average, firms paid yearly dividends of 2.47% scaled by total assets during 1995 – 1999, whereas the average figure has been 1.52% during 2000s. Fourth column in Table 10 reports that, regardless clear decrease of dividend payments after 1990s, there is no significant time trend for *Dividends*. Coefficient for time trend is negative but low t-value of 1.03 shows no statistical significance in the trend.

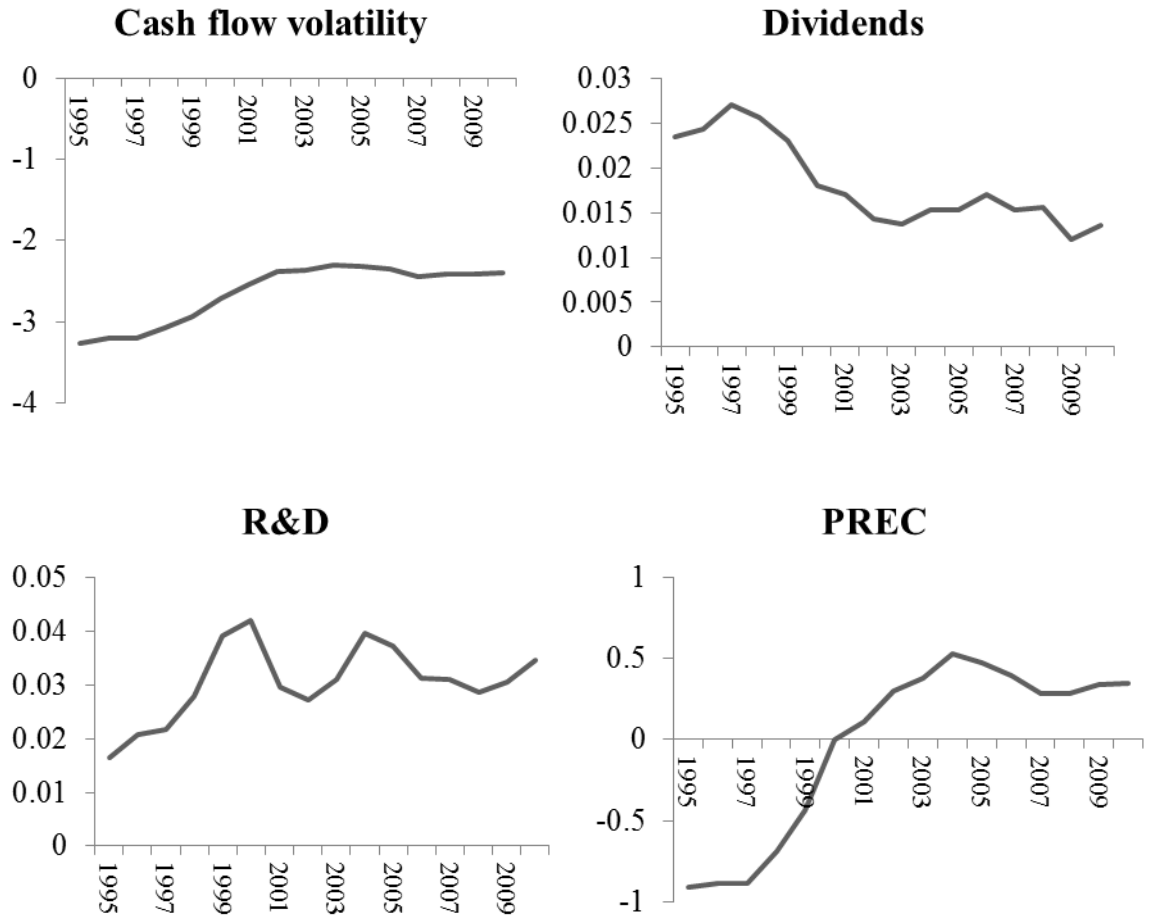


Figure 6 Yearly Average Values for Precautionary Motive Proxies

Figure describes the development of yearly mean values for each precautionary motive proxy. *Cash flow volatility* is the average cash flow volatility within each firm's two-digit SIC code, measured over the past five years (at least three years). *Dividends* is paid common dividends divided by lagged total assets. *R&D* is research and development expenditures divided by lagged total assets. *PREC* is the first principal component of *Cash flow volatility*, *Dividends* and *R&D*. The sample consists of 41,144 firm year observations during the period 1995 – 2010.

Graphic depiction for *R&D* in Figure 6 does not provide a clear picture whether firms have had continuously increasing trend in R&D expenditures. Although average *R&D* has clearly increased during the end of 1990s, it has been fluctuating up and down during the 2000s. Average *R&D* has increased from 0.016 in 1995 to peak value of 0.042 in 2000. At 2006, value for R&D expenses to total assets was again decreased to 0.031. Fifth column of Table 10 reports that there is no observable trend in average *R&D* values. Coefficient for time trend is just slightly positive with low and insignificant t-value 1.06.

Average yearly values depicted for *PREC* in Figure 6 supports the development of three precautionary proxies discussed above. There seems to be rather steep slope for *PREC* during 1990s because of increase in *Cash flow volatility* and *R&D* and corresponding decrease in *Dividends* at the same time. Value for *PREC* is -0.91 in 1995 and peaks at 0.53 in 2004, and decreases thereafter. Thus, investigating only time period 2000 – 2006, the trend for *PREC* is not as clearly increasing as it was for 1990s. Even with mostly increasing average values during 1995 – 2006, statistical test does not still report any significant increasing time trend for *PREC*. Although coefficient for trend is as high as 0.051, very low t-value of 0.62 does not support statistically significant time trend for the dependent variable.

Table 10 Time Trend Tests for Precautionary Motive Proxies

Table reports statistical time series tests for yearly average values for each precautionary motive proxy. *Cash flow volatility* is the average cash flow volatility within each firm's two-digit SIC code, measured over the past five years (at least three years). *Dividends* is paid common dividends divided by lagged total assets. *R&D* is research and development expenditures divided by lagged total assets. *PREC* is the first principal component of *Cash flow volatility*, *Dividends* and *R&D*. Time trend coefficient is received by regressing each precautionary motive proxy on a time variable and sufficient amount of lag terms in order to control for autoregression. t-Statistics are reported in parentheses. * = significant at 10%; ** = significant at 5%; and *** = significant at 1%. Durbin-Watson statistics are reported at the bottom of the table. The sample excludes the effects of recent financial crisis on potential time trends, and includes 27,487 firm-year observations during period 1995 – 2006.

	***Issue* coefficient**	**Cash Flow Volatility**	**Dividends**	**R&D**	**PREC**
Trend	0.018**	0.047	-0.001	0.001	0.051
	(2.00)	(1.42)	(1.03)	(1.06)	(0.62)
Constant	0.279***	-1.923*	0.015	0.022***	-0.387
	(4.16)	(1.95)	(1.34)	(2.81)	-0.55
Lag 1		0.934***	1.099***	0.103**	1.217***
		(3.86)	(2.94)	(2.13)	(3.17)
Lag 2		0.194	-0.658*	-0.620**	-0.618
		(0.53)	(1.86)	(1.96)	(1.43)
Lag 3		-0.700**			
		(2.47)			
Years	12	12	12	12	12
Durbin-Watson	1.94	2.32	2.43	1.64	2.55

Results discussed above don't report significant support on trends in precautionary proxies. Even though graphical descriptions in Figure 6 suggest a presence of unit root for some proxies, statistical tests controlled with autoregressive lag terms state otherwise. *Cash flow*

volatility is basically the only proxy that had almost significant t-value. Moreover, because *Dividends* and *R&D* have clearly insignificant time trends, t-value for *PREC* is also very low. In order to further examine the possible relation between different precautionary proxies and share issuance – cash savings, I run regressions for their interaction terms in next section.

6.5.2. Fixed Effects Regression for Precautionary Motive – Share Issuance Interaction

Thus far, I have assessed share issuance – cash savings and precautionary motives separately. In Section 6.3.4., I concluded that European firms have increased their cash savings from share issuances but no significant trend was found for savings from other cash sources. However, in the previous section results reported in Table 10 don't bring much support for the hypothesis that precautionary motives had increased significantly and could therefore explain the increase in share issuance – cash savings. In other words, cointegration between precautionary motive proxies and share issuance – cash savings received somewhat ambiguous support in the previous section. In this section, I further investigate the interaction between *Issue* coefficient and precautionary motive proxies in order to find concluding evidence for the hypothesized relation between precautionary motives and cash savings from share issuances.

In order to test the hypothesis that increased precautionary motives would have caused the increase in share issuance – cash savings, I re-estimate Equation (1) in panel regression with firm- and year-fixed effects. Furthermore, interaction term between *Issue* and each precautionary motive proxy is added to the model thus widening Equation (1) to Equation (4) as presented in Section 5.3:

$$\Delta Cash_i = \alpha_i + a_t + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} +$$
$$\beta_5 Assets_{it} + \beta_6 PrecProxy_{it} + \beta_n PrecProxy_{it}\ x\ Issue_{it} + \varepsilon_{it}, \qquad (4)$$

where α_i represents each firm's own intercept. As explained for example in Mullainathan and Scharfstein (2001), Zhou (2001) and McLean (2011), the framework of firm-fixed effects relies on within-firm changes over time in explanatory variables to explain within-firm changes over time in the dependent variable (i.e. *ΔCash).* Therefore, the coefficient of

interaction term $PrecProxy_{it}$ *x* $Issue_{it}$ tests if changes in firm's precautionary motives cause changes in firm's cash savings from share issuances over time.

Results for the regressions presented in Equation (4) are reported in Table 11. In addition to *PREC*, separate regressions are run for *Issue* interaction terms between *Cash flow volatility*, *Dividends* and *R&D* as well in order to examine the effect of changes in different precautionary motives on share issuance – cash savings within firms. Table 11 reports the results for the period 1995 – 2006 and including years 2007 – 2010 to calculations doesn't dramatically change the results (not reported). Addition of financial crisis however decreases the significance of all interaction terms and especially interaction term *R&D x Issue* is statistically insignificant if period 2007 – 2010 is included, whereas its coefficient is significant at 10% level for period 1995 – 2006. In order to fully support the *Hypothesis 4* presented in Section 3, interaction term should be positive for *Cash flow volatility*, *R&D* and *PREC*, and negative for *Dividends*.

Regression (2) in Table 11 reports the interaction term for *Issue* and *Cash flow volatility*. Its coefficient is positive 0.250 with significant t-value 3.37. Therefore, result shows that increased industry cash flow volatility increases firm's propensity to save larger amount of proceeds received from share issuances. Negative, although not significant coefficient for *Cash flow volatility* indicates that increased cash flow volatility decreases firm's cash holdings as such.

Interaction term for *Dividends* is presented in regression (3). Coefficient for *Dividends* is negative -0.327 as expected although insignificant: firm that increases its dividend payments holds more cash. As discussed, firm that is able to pay higher dividends is usually in good financial health and therefore has no need to hold as high cash buffers compared to non-dividend payers. Surprising result is reported for the sign of coefficient of *Dividends x Issue* interaction term. Positive coefficient of 0.991 for the interaction term indicates that when firms increase their dividend payments, they also increase their cash savings from share issuances. However, interaction term has a very low t-value of 0.39 and hence the conclusion is that changes in dividend payments have no significant effect on share issuance – cash savings on a firm-level. Moreover, as discussed by McLean (2011) the reasoning behind dividends as precautionary motive as such is somewhat ambiguous.

Table 11 Precautionary Motives and Share Issuance – Cash Savings

Table reports the results from firm- and year-fixed effects for the following regression model:

$\Delta Cash_i = \alpha_i + a_t + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} + \beta_5 Assets_{it} + \beta_6 PrecProxy_{it} + \beta_n PrecProxy_{it}\ x\ Issue_{it} + \varepsilon_{it}$,

where α_i represents each firm's own intercept. *Issue* is cash proceeds from share issuances divided by lagged total assets. *Debt* is cash proceeds from additional debt divided by lagged total assets. *Cash flow* is net income plus amortization and depreciation divided by lagged total assets. *Other* includes all other cash sources, including the sales of assets and investments, divided by lagged total assets. *Assets* is natural logarithm of lagged total assets. *PrecProxy* stands for precautionary motives: *Cash flow volatility, Dividends, R&D* and *PREC. Cash flow volatility (CF Vol)* is the average cash flow volatility within each firm's two-digit SIC code, measured over the past five years (at least three years). *Dividends* is paid common dividends divided by lagged total assets. *R&D* is research and development expenditures divided by lagged total assets. *PREC* is the first principal component of *Cash flow volatility*, *Dividends* and *R&D*. *PrecProxy x Issue* is an interaction term between a precautionary motive proxy and *Issue*. Standard errors are estimated by clustering on firm. t-Statistics are reported in parentheses. * = significant at 10%; ** = significant at 5%; and *** = significant at 1%. The sample excludes the effects of recent financial crisis, and includes 27,487 firm-year observations during period 1995 – 2006.

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Issue	0.505***	1.179***	0.396**	0.387***	0.477***
	(8.86)	(6.14)	(2.38)	(3.23)	(7.82)
Debt	-0.040	0.061	0.078*	0.118	-0.025
	(1.21)	(0.93)	(1.89)	(1.15)	(0.73)
Cash Flow	0.103	0.093	0.295***	0.071	0.082***
	(0.91)	(1.36)	(3.58)	(0.33)	(0.67)
Other	0.190**	0.071	0.396**	0.554	0.168*
	(2.03)	(0.39)	(2.21)	(1.40)	(1.67)
Assets	0.012**	0.013	0.015	0.076*	0.011*
	(2.09)	(1.41)	(1.33)	(1.64)	(1.89)
CF Vol		-0.032			
		(1.59)			
CF Vol x Issue		0.250***			
		(3.37)			
Dividends			-0.327		
			(1.38)		
Div x Issue			0.991		
			(0.39)		
R&D				0.089	
				(0.18)	
R&D x Issue				1.130*	
				(1.85)	
PREC					-0.021*
					(1.85)
PREC x Issue					0.055***
					(2.61)
R^2	0.18	0.49	0.55	0.21	0.16

Regression (4) in Table 11 reports results for *R&D x Issue* interaction. Coefficient of 1.130 for the interaction is clearly positive and significant at 10% level. Thus, increased R&D expenditures have similar kind of positive effect on share issuance – cash savings as *Cash flow volatility*: firms seem to gather more cash from issuance proceeds in order to secure continuous R&D efforts. Coefficient for *R&D* is not statistically significant from zero indicating that increase in *R&D* as such does not lead to increase in individual firm's cash balance.

Final column in Table 11 summarizes the results discussed above by showing positive and significant coefficient for *PREC x Issue* interaction term. Thus, even though interaction for dividends and share issuances got an unexpected (though insignificant) sign, *PREC* suggests that firms with increased industry cash flow volatility and R&D expenditures perceive increase in share issuance – cash savings. The unexpected sign of *Div x Issue* decreases the t-statistics of *PREC*'s interaction term somewhat, and usage of dividends as precautionary motive proxy does not receive support in light of these results.

As a robustness check, I have run similar tests to Table 11 in Appendix 3 using four geographically restricted sub-samples (France, Germany, UK and Nordics) in order to investigate whether interaction terms behave similarly in different sub-markets. Most consistent variables are *Cash flow volatility* and *PREC* that have positive and thus expected interaction term with *Issue* for each sub-sample. *R&D x Issue* has positive (but insignificant) coefficient only for the Nordics sub-sample and other sub-samples have against-expected and negative coefficient for the interaction term. Moreover, *Dividends x Issue* has negative coefficient for all other samples but Nordic, which further suggests that Nordic countries differ from central European countries when it comes to precautionary motive – share issuance interaction. Still, the main conclusion is that *PREC x Issue* coefficients are positive for each sub-sample and thus *Hypothesis 4* is supported. To summarize, usage of *R&D* and *Dividends* as precautionary proxies should be argued with caution and considering the characteristics of the sample. Furthermore, *Cash flow volatility* seems to be the most consistent variable of the three proxies. Finally, construction of the first principal component *PREC* succeeds apparently well in capturing the common precautionary motive in each proxy.

This is because *PREC* is able to produce similar results for each sub-sample regardless varying result within two out of three individual precautionary proxies.

6.6. Primary Motivation for Share Issuances

Results discussed earlier in the empirical part of the thesis have shown that firms have increasingly been saving cash received from share issuances during sample period and that within-firm increases in precautionary motives cause within-firm increases in share issuance – cash savings. In Section 6.3.1, I reported that during the whole sample period, firms saved on average 40.4% of their issuance proceeds as cash and peak value for cash savings was as high as 54.9% in 2005. Next, I further investigate the main motivation for share issuances. More specifically, I test whether firms issue shares primarily for investment purposes and after that issue extra shares to generate precautionary cash savings; or is the primary motivation for share issuances the purpose of cash savings. I further emphasize that other motives for equity issuances, such as market timing explanation (see Kim and Weisbach, 2008), are left out of the scope of this thesis. Moreover, measures constructed next following McLean (2011) result in simplified explanations for equity issuance motives and more sophisticated proxies would be in order to more thoroughly investigate this topic.

Three different measures in order to investigate motives for equity issuance are constructed following McLean (2011). Sample includes now all firms that have positive *Issue* values during sample period 1995 – 2010, i.e. non-issuers are excluded. First measure is *Cash-Issue*, which is simply cash at the beginning of the year minus share issuance cash proceeds during the financial year. Thus, if a firm has a positive value for *Cash-Issue*, it means that the firm would have had positive cash balance at the end of the year even with a full usage of received share issuance proceeds during the year. Negative *Cash-Issue* on the other hand indicates that the firm would have run out of cash if it had been forced to spend all issuance proceeds during financial year, and consequently the main motivation for share issuance would have been investment purposes instead of cash savings.

Second measure is *Abnormal investment*, which is this financial year's investment, i.e. the sum of R&D, capital expenditures and cash-financed acquisitions scaled by lagged total assets, minus the average yearly investment for the firm during the entire sample period. Thus, because average yearly investment is calculated from entire period, it includes also the years when firm did not issue shares. Consequently, if a firm had a positive *Abnormal investment* during the issuance year, then it might be that investment played some role in firm's share issuance decision. But as discussed in previous paragraph, it might have been

possible for the firm to finance its investment and operations even with *Abnormal investment* being positive if *Cash-Issue* that year has been positive.

Table 12 Tests for Primary Share Issuance Motive

Table reports results of the motivations for share issuance using three different measures. Sample includes only the firms with non-zero values for *Issue*. *Cash-Issue* is cash and cash equivalents minus cash proceeds from share issuance that year. *Abnormal investment* is firm's yearly sum of cash investment (including R&D, capital expenditures and cash-financed acquisitions) divided by total assets, minus the firm's average value of yearly cash investment during the whole time period 1995 – 2010. *Log(Issue/Investment)* is the natural logarithm of share issuance proceeds divided by cash investment. Panel A reports the yearly average percentage of firm with *Cash-Issue* > 0, *Abnormal investment* > 0 and the mean value of *Log(Issue/Investment).* t-Statistic in Panel A shows whether means for *Cash-Issue* > 0 and *Abnormal Investment* > 0 are significantly different from 0.50. Panel B reports time trend tests for the three share issuance motive measures. Time trend coefficient is received by regressing each measure on a time variable and sufficient amount of lag terms in order to control for autoregression. t-Statistics are reported in parentheses. * = significant at 10%; ** = significant at 5%; and *** = significant at 1%. Durbin-Watson statistics are reported at the bottom of the table. The sample of non-zero issuers includes 16,433 firm-year observations during period 1995 – 2010.

Panel A: Mean values			
	% of firms with Cash - Issue > 0	**% of firms with Abnorm. investm. > 0**	**Log(Issue/Inv.)**
Mean	0.766***	0.505	-2.174
t-statistic	(28.96)	(0.2)	n/a
Panel B: Time trends			
Time	-0.004*	-0.005	0.070**
	(1.94)	(1.01)	(2.29)
Intercept	0.796***	0.402***	-2.574***
	(44.98)	(3.23)	(2.98)
Lag 1		0.988***	0.081
		(4.28)	(0.28)
Lag 2		-0.686***	
		(3.06)	
Years	16	16	16
Durbin-Watson	1.41	2.06	1.92

The final measure is the natural logarithm of share issuance proceeds scaled by investments, where investment is again the sum of R&D, capital expenditures and cash-financed acquisitions scaled by lagged total assets. As reported already in Section 6.3.1., share issuance

– cash savings perceived an increase during the sample period 1995 – 2006. Therefore, *Log(Issue/Investment)* should have also increased over time as the portion of shares issued for investment purposes should have been declining. In this sense, *Log(Issue/Investment)* acts as a robustness test for increased share issuance – cash savings findings.

Average yearly percentage of issuers that have positive values of *Cash-Issue* and *Abnormal investment* are reported in Panel A of Table 12. Result shows that 76.6% of issuers have *Cash-Issue* values greater than zero. Therefore, approximately three out of four issuers within sample period could have been able to finance their operations and investments also without the use of share issuance proceeds. This result strongly supports the hypothesis that cash savings would be the primary motivation for share issuances over investment motivation.

Panel A further reports that 50.5% of firms had abnormal investments during the year of issuance. T-statistic of 0.2 indicates that this figure does not statistically differ from 50%, i.e. half of the issuers had abnormal investments during issue year, and other half had lower-than-average investments at the same year. Combined with the result received from *Cash-Issue* calculation, I conclude that issuers are not characterized with particularly high investments but operations and investments would have been able to be financed with current cash savings. Therefore, cash savings, compared to investment motive, has been the primary motive for share issuances.

Panel B in Table 12 reports time trends for each measure[16]. Negative time trend coefficient for *Cash-Issue* shows that more firms have been conducting share issuances larger than their current cash savings towards the end of the time period. However, decrease in average figure is mainly due to rather steep decrease in the 1990s. Average amount of positive *Cash-Issue* issuers was 82.9% in 1995 and decreased to 67.5% by 2000. On the other hand, measure gave average percentages of 77.3% and 76.0% in 2001 and 2010, respectively (not reported). Therefore, firms have not lately been increasing the size of issues when compared to current cash holdings. Trend for issuers with *Abnormal investments* is also negative but statistically insignificant. Time trend for *Log(Issue/Investment)* is positive and significant at 5% level, which supports the earlier findings that firms have been investing decreasing portion of their issuance proceeds and used increasing portion to precautionary cash savings.

[16] Unlike other time trend tests in the thesis, I use here the sample period which includes also the years of the recent financial crisis. This is because sample includes only issuing firms and financial crisis did not seem to deteriorate time trends in unreported tests. Tests were run for each measure also for time period 1995 – 2006 and they don´t significantly differ from results reported in Table 12.

7. SUMMARY AND CONCLUSIONS

The purpose of this study was to investigate the connection between precautionary cash savings and share issuances. Grounding for this thesis is based on two recent research papers that both have contributed to previous literature on many levels, and mainly focusing on the precautionary motive on cash holdings. First one by Bates, Kahle and Stulz (2009) reports that cash ratios have more than doubled for industrial firms during last three decades. The second primary research paper followed in this thesis is by McLean (2011) who shows that firms are increasingly saving equity issuance proceeds. The connection between these two papers lies within the argument that namely precautionary motives have been driving the increase in cash ratios and that intense share issuance – cash savings are a result for higher need of precautionary cash savings. My contribution to existing literature is to use European dataset in order to investigate whether similar conclusions can be done for a more diverse market. Usage of data from EU15 countries enables to conclude whether hypotheses are supported in general when sample includes countries with different characteristics.

Dataset used in empirical part of this thesis included all active and non-active publicly listed firms in EU15 countries in period 1995 – 2010. In addition, a sub-period of 1995 – 2006 was widely used to exclude the effects of recent financial crisis on time trends. Main variables used in empirical tests included four proxies for precautionary motives (i.e. industry cash flow volatility, R&D expenditures, dividend payments, and their first principal component) and four proxies for internal and external cash sources (i.e. debt issuance, equity issuance, operational cash flow and non-operational cash flow).

Primary dependent variable used in the regressions was $\Delta Cash$ as my principal aim was to investigate the effect of different precautionary and cash source proxies on cash savings. Moreover, time trends for theses proxies were statistically tested in order to estimate whether share issuances and precautionary motive measures had similar development that would create evidence for potential unit roots during sample period. Finally, firm- and year-fixed regression model was used in order to investigate within-firm effect of interaction between precautionary motives and share issuances on cash savings.

7.1. Empirical Conclusions

I find that European firms have significantly increased their cash ratios during period 1995 – 2006 as the average cash ratio in 2006 is almost 50% higher than respective figure in 1995. In addition, I observe a significant increasing time trend for median cash ratios for this time period which concludes that firms have constantly been increasing their cash holdings on average. The increase in cash holding has further decreased the level of net debt within my sample as I conclude that, together with increasing cash ratios, firms have kept their leverage more or less fixed.

In order to conclude the presence of precautionary cash holdings, I examine how the scope of different precautionary proxies interacts with cash holdings. The general result is that firms within highest quintile of each precautionary proxy – *Cash flow volatility, R&D, Dividends* and *PREC* – have dramatically higher average cash ratios than their counterparties on the lowest quintile. This conclusion is especially strong for *PREC*, which is the first principal component of *Cash flow volatility, R&D* and *Dividends*. In other words, increase in *PREC* at lower quintiles does not have strong effect on cash holdings, but as *PREC* increases to highest quintile, it has very strong positive effect on cash holdings.

Traditionally, firms have thought to use equity issuance to finance their investments. However, I find supporting evidence for McLean's (2011) findings by concluding that share issuances are the primary source for cash savings. First, savings rate for *Issue* is clearly higher compared to other sources, i.e. *Debt, Cash flow* and *Other*. Second, firms raise roughly the same amount of capital from *Issue, Debt* and *Cash flow* on average. Finally, the conclusion is that the amount of cash saved from share issuances is clearly higher than from any other cash source. Moreover, I find that cash savings retrieved from equity issuance proceeds are persistent, i.e. they are not used for ear-marked investments in following years of the issuance. More specifically, when it comes to investment motive in context of equity issuance, I find stronger support for the motive that shares are issued for precautionary cash savings purposes rather than for financing investments.

Table 13 Summary of Empirical Results

Table reports the empirical findings and conclusions for each hypothesis presented in Section 3.

Hypothesis		Empirical Evidence
H1A	*European firms have increased their cash ratios during time period 1995-2006.*	**Strong support.** Average cash ratio has increased by 48.7% from 1995 to 2006. Median cash ratio has increased by 26% at the same time. Moreover, time trend for median cash ratio is stastically significant at 10% level even with a rather short time period. Cash ratios have increased most for small firms, non-dividend payers, negative income firms and firms with highest *PREC*.
H1B	*Firms have decreased their net debt levels during the sample period 1995-2006.*	**Strong support**. Average net leverage has decreased by 69.1% from 1995 to 2006. Median net leverage has decreased by 35.6% at the same time. In addition, time trend for average net leverage is negative and statistically significant at 10% level. Net debt has increased most for smallest firms. Decrease in net debt is due to increased cash ratios and steady leverage levels during the period.
H2	*Firms with highest precautionary motives have highest cash ratios.*	**Moderate support.** This holds most of the times. However, firms with highest *Cash flow volatility* don't always hold highest cash ratios. In addition, hypthesis suggests that highest dividend payers should hold least cash, which is not the case. When comparing only dividend-payers and non-dividend payers, the hypothesis holds. For *R&D* and *PREC*, hypothesis receives strong support.
H3	*Share issuances are the main source for cash savings.*	**Strong support.** The average savings rate from *Issue* was 0.404 during period 1995 - 2010. Rates for *Debt, Cash flow* and *Other* were, -0.021; 0.172; and 0.153, respectively. At the same time, firms used *Issue* for capital raising approximately as much as they used *Debt* and *Cash flow*. Subsequently, average amount of cash saved (scaled by assets) from *Issue* during the period was 0.027. This is more than firms saved from *Debt, Cash flow* and *Other* together.
H4	*Within-firm increases in precautionary motives cause increases in within-firm share issuance - cash savings.*	**Moderate support.** Hypothesis holds for interaction between *Cash flow volatility* x *Issue*, *R&D x Issue*, and *PREC x Issue*. Namely, within-firm increases in these precautionary motives cause within-firm increases in share issuance-cash savings. Result for interaction between *Dividends x Issue* was unexpected: within-firm dividend payments and within-firm share issuance-cash savings had positive (although insignificant) relation when the theory suggests that the relation should be negative.
H5	*Cash savings is the main motive for share issuances.*	**Moderate support**. *Cash-Issue* measure supports the hypothesis as 76.6% of issuers had a *Cash-Issue* larger than zero during the period 1995 - 2010. *Abnormal Investment* >0 measure was not significantly different from 50%. Therefore, half of the issuers had larger-than-average investments during the year of share issuance. Thus, results received from *Abnormal Investment* measure don't bring additional evidence for hypothesis.

The interaction between each precautionary motive proxy and *Issue* is tested in firm- and year-fixed regression model. I conclude that within-firm increase in precautionary motives cause within-firm increase in share issuance – cash savings. However, the results are not as expected for each precautionary proxy as *Dividends* does not seem to have similar effect on share issuance – cash savings as would be expected according to theoretical framework of the thesis. Thus, the usability of *Dividends* as a precautionary motive proxy is questioned and its additional value in explaining firm's total precautionary motive for cash holdings receives ambiguous support. After running robustness checks for four different sub-markets, I conclude that *Cash flow volatility* is the most consistent individual proxy for precautionary cash holdings. In addition, construction of the first principal component works well when several proxies (that are expected to have both precautionary component and component that is not relevant) are used to capture firm's total precautionary motive for cash holdings.

All tested hypotheses and corresponding empirical main findings are presented in Table 13 on previous page.

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APPENDICES

Appendix 1 Summary Statistics by Sample Country

Country-specific mean values for main variables defined in Table 2. In addition, euro-denominated statistics for Total Assets and Cash are presented in order to depict the size of sample firms. Sample consists of 3,876 unique companies during time period 1995 – 2010 with total of 41,144 firm year observations.

	N	Cash ratio	Δ Cash	Issue	Debt	Cash flow	Other
Austria	730	0.155	0.037	0.030	0.016	0.078	0.026
Belgium	1,100	0.135	0.032	0.041	0.024	0.088	0.031
Denmark	1,240	0.177	0.026	0.051	0.022	0.071	0.025
Finland	1,327	0.148	0.022	0.026	0.045	0.102	0.018
France	6,903	0.155	0.038	0.032	0.029	0.078	0.018
Germany	6,892	0.168	0.051	0.048	0.024	0.062	0.049
Greece	2,686	0.083	0.016	0.014	0.025	0.065	0.015
Ireland	581	0.214	0.046	0.108	0.036	0.040	0.003
Italy	2,165	0.130	0.034	0.034	0.018	0.057	0.025
Luxembourg	225	0.126	0.049	0.043	0.061	0.091	0.009
Netherlands	1,492	0.132	0.031	0.060	0.043	0.093	0.021
Portugal	618	0.062	0.015	0.020	0.108	0.069	0.026
Spain	1,069	0.095	0.019	0.014	0.029	0.090	0.015
Sweden	2,806	0.188	0.048	0.089	0.019	0.032	0.021
UK	11,310	0.183	0.042	0.115	0.036	0.031	0.015
Total Sample	**41,144**	**0.151**	**0.038**	**0.062**	**0.030**	**0.058**	**0.028**

	CF vol.	Dividends	R&D	PREC	Assets (Log)	Cash (M€)	Assets (M€)
Austria	-2.756	0.012	0.018	-0.136	19.164	95.192	984.958
Belgium	-2.542	0.014	0.017	0.077	19.084	81.213	1173.171
Denmark	-2.627	0.014	0.025	0.095	18.575	82.222	776.220
Finland	-2.685	0.034	0.031	-0.174	19.058	136.301	1173.326
France	-2.600	0.011	0.014	0.031	18.585	237.799	2430.717
Germany	-2.607	0.012	0.018	0.059	18.441	209.557	2316.922
Greece	-2.737	0.013	0.003	-0.298	18.466	26.156	296.638
Ireland	-2.553	0.010	0.016	0.068	18.984	165.030	1181.470
Italy	-2.631	0.012	0.006	-0.122	19.539	256.383	2532.397
Luxembourg	-2.459	0.023	0.002	-0.126	20.179	303.143	3877.086
Netherlands	-2.639	0.018	0.015	-0.092	19.407	398.044	4132.424
Portugal	-2.828	0.011	0.000	-0.414	19.435	86.596	1130.493
Spain	-2.650	0.015	0.003	-0.226	19.899	247.406	3255.352
Sweden	-2.568	0.019	0.023	0.075	18.215	109.079	937.800
UK	-2.537	0.018	0.021	0.085	18.280	116.559	1387.893
Total Sample	**-2.601**	**0.015**	**0.017**	**0.000**	**18.624**	**1023.966**	**168.158**

Appendix 2 t-Statistics for Differences in New Issues, Dividend Status and Accounting Performance Sub-Samples

Table reports t-statistics for yearly differences in the average cash ratios between new issues, dividend status and accounting performance sub-groups (figures reported in Table 6). * = significant at 10%; ** = significant at 5%; and *** = significant at 1%. Firm is assigned to IPO subsample if it has executed its initial public offering within prior five calendar years and to Non-IPO subsample otherwise. Firm is assigned to Dividend Payer subsample if it paid common dividend during financial year and to Non-Dividend Payer subsample otherwise. A firm is classified by accounting performance to negative and non-negative income firms by its net income. Sample consists of 41,144 firm year observations during the period 1995 -2010.

	New Issues		Dividend Status		Accounting Performance	
Year	IPO Firms	Non-IPO Firms	Dividend Payer	Non-Dividend Payer	Negative Income Firms	Non-Negative Income Firms
1995	(1.13)		(0.49)		(0.44)	
1996	(1.89)*		(1.27)		(1.98)**	
1997	(2.24)**		(2.65)***		(3.12)***	
1998	(1.99)**		(3.04)***		(3.42)***	
1999	(3.76)***		(4.27)***		(3.97)***	
2000	(6.50)***		(7.43)***		(6.83)***	
2001	(6.53)***		(6.25)***		(5.02)***	
2002	(4.96)***		(5.33)***		(3.94)***	
2003	(4.60)***		(4.85)***		(3.45)***	
2004	(4.76)***		(5.33)***		(5.08)***	
2005	(5.18)***		(6.46)***		(5.49)***	
2006	(5.81)***		(7.10)***		(6.68)***	
2007	(5.32)***		(6.70)***		(6.00)***	
2008	(4.12)***		(5.70)***		(2.82)***	
2009	(3.61)***		(3.76)***		(1.20)	
2010	(3.29)***		(3.36)***		(2.44)**	

Appendix 3 Precautionary Motives and Share Issuance – Cash Savings: Tests for Selected Countries

Table reports results for firms in France, Germany, UK and Nordics from firm- and year-fixed effects for the following regression model

$$\Delta Cash_i = \alpha_i + a_t + \beta_1 Issue_{it} + \beta_2 Debt_{it} + \beta_3 Cash\ flow_{it} + \beta_4 Other_{it} + \beta_5 Assets_{it} + \beta_6 PrecProxy_{it} + \beta_n PrecProxy_{it}\ x\ Issue_{it} + \varepsilon_{it},$$

where α_i represents each firm's own intercept. *Issue* is cash proceeds from share issuances divided by lagged total assets. *Debt* is cash proceeds from additional debt divided by lagged total assets. *Cash flow* is net income plus amortization and depreciation divided by lagged total assets. *Other* includes all other cash sources, including the sales of assets and investments, divided by lagged total assets. *Assets* is natural logarithm of lagged total assets. *PrecProxy* stands for precautionary motives: *Cash flow volatility*, *Dividends*, *R&D* and *PREC*. . *Cash flow volatility* is the average cash flow volatility within each firm's two-digit SIC code, measured over the past five years (at least three years). *Dividends* is paid common dividends divided by lagged total assets. *R&D* is research and development expenditures divided by lagged total assets. *PREC* is the first principal component of *Cash flow volatility*, *Dividends* and *R&D*. *PrecProxy x Issue* is an interaction term between a precautionary motive proxy and *Issue*. Standard errors are estimated by clustering on firm. t-Statistics are reported in parentheses. * = significant at 10%; ** = significant at 5%; and *** = significant at 1%. Panel A reports results for France with 4,695 observations during period 1995 – 2006. Panel B reports results for Germany with 4,840 observations during period 1995 – 2006. Panel C reports results for UK with 7,280 observations during period 1995 – 2006. Panel D reports results for Nordic EU15 countries including Denmark, Finland and Sweden with 3,539 observations during period 1995 – 2006.

Panel A: France

	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Issue	0.555***	1.517***	0.456***	0.950***	0.477***
	(8.08)	(2.84)	(4.57)	(4.15)	(9.02)
Debt	0.134*	0.226***	0.177**	0.493**	0.148**
	(1.90)	(2.63)	(2.25)	(2.43)	(2.08)
Cash Flow	-0.157	0.236	0.367***	0.288***	-0.172
	(0.35)	(1.45)	(2.66)	(2.93)	(0.36)
Other	0.230	0.473	0.121	-0.056	0.235
	(1.06)	(1.01)	(0.50)	(0.12)	(1.06)
Assets	0.004	0.024	0.015	0.068**	0.003
	(0.31)	(1.37)	(1.02)	(2.26)	(0.28)
CF Vol		-0.000			
		(0.02)			
CF Vol x Issue		0.389*			
		(1.69)			
Dividends			-0.743*		
			(1.67)		
Div x Issue			-2.493		
			(0.50)		
R&D				0.042	
				(0.07)	
R&D x Issue				-0.765	
				(0.67)	
PREC					0.025
					(1.12)
PREC x Issue					0.132***
					(3.65)
R^2	0.13	0.31	0.24	0.01	0.13

Panel B: Germany					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Issue	0.519***	1.268***	0.842***	0.450***	0.518***
	(3.92)	(4.00)	(21.64)	(3.60)	(4.02)
Debt	(-0.058	0.088	-0.169**	-0.733**	-0.066
	(0.70)	(0.38)	(1.98)	(1.96)	(0.76)
Cash Flow	0.072	0.110	0.110	-0.986	0.031
	(0.60)	(0.56)	(0.63)	(1.54)	(0.49)
Other	0.207	-0.239	0.433	0.449	0.783
	(1.61)	(0.56)	(1.04)	(0.79)	(1.38)
Assets		0.024	0.035	0.218*	0.017
		(0.70)	(0.83)	(1.81)	(1.29)
CF Vol		-0.032			
		(0.87)			
CF Vol x Issue		0.256**			
		(2.22)			
Dividends			-0.427		
			(1.17)		
Div x Issue			-4.018***		
			(5.47)		
R&D				4.233	
				(1.56)	
R&D x Issue				-3.841**	
				(2.53)	
PREC					-0.039***
					(2.93)
PREC x Issue					0.003
					(0.13)
R^2	0.21	0.65	(0.59)	0.25	0.21

Panel C: UK					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Issue	0.243***	0.917*	1.825	0.207***	0.232**
	(3.11)	(1.64)	(1.63)	(7.17)	(2.46)
Debt	-0.094	-0.005	0.033	0.309	-0.086
	(0.61)	(0.02)	(0.13)	(1.48)	(0.46)
Cash Flow	0.039	0.088	0.159	0.160	-0.031
	(0.21)	(0.56)	(1.50)	(0.73)	(0.13)
Other	-0.211	0.586	0.351	-3.537**	-0.165
	(0.26)	(0.91)	(0.96)	(2.56)	(0.19)
Assets	0.044	-0.022	-0.013	0.090**	0.056
	(1.08)	(0.86)	(0.79)	(2.46)	(1.19)
CF Vol		0.090*			
		(1.65)			
CF Vol x Issue		0.262			
		(1.22)			
Dividends			-1.416**		
			(2.08)		
Div x Issue			-59.831		
			(1.08)		
R&D				0.857	
				(1.45)	
R&D x Issue				-1.160***	
				(2.77)	
PREC					0.008
					(0.26)
PREC x Issue					0.081
					(0.72)
R^2	0.05	0.43	0.15	0.01	0.04

Panel D: Denmark, Finland and Sweden					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Issue	0.493***	0.503***	0.101	0.273	0.433***
	(6.13)	(4.20)	(1.45)	(1.25)	(5.28)
Debt	-0.104*	0.077	0.144**	-0.009	-0.093
	(1.84)	(1.34)	(1.97)	(0.09)	(1.60)
Cash Flow	0.190	0.130	0.640***	0.420**	0.122
	(1.49)	(1.47)	(5.11)	(2.11)	(0.87)
Other	0.529**	0.386	0.073	-0.194	0.415*
	(2.27)	(1.53)	(0.18)	(0.26)	(1.90)
Assets	0.004	0.007	0.008	-0.062*	0.008
	(0.31)	(0.50)	(0.50)	(1.69)	(0.61)
CF Vol		-0.082**			
		(2.51)			
CF Vol x Issue		0.025			
		(0.74)			
Dividends			-0.482**		
			(2.14)		
Div x Issue			4.83***		
			(3.10)		
R&D				0.171	
				(0.79)	
R&D x Issue				0.765	
				(1.52)	
PREC					-0.030*
					(1.65)
PREC x Issue					0.078***
					(2.72)
R^2	**0.22**	**0.63**	**0.26**	**0.193**	**0.18**