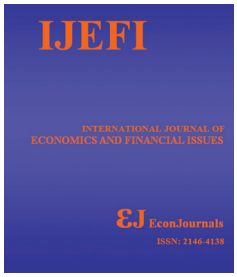

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# Cash Flow Sensitivity of Cash: A Cross Country Analysis

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**ABSTRACT**

Using a large panel of 5086 firms from 7 European countries, namely Belgium, France, Germany, Italy, Netherland, Sweden and UK over the period of 1981 to 2010, we made attempt to see the effect of financial constraints on international corporate policies based on their liquidity demand. Controlling for firm size, investment opportunities and alternative sources and competing uses of funds, a firm's decision to change its cash holdings is found to be positively and significantly related with internal cash flows. Our results further reveal that constrained firms like to save relatively more cash out of their cash inflows, whereas the unconstrained firms do not maintain any such significant cash hoarding behavior. The observed relationships prevail for the whole sample, within each countries and remain consistent across different estimation procedures and alternative financial constraint criteria. Our results thus point to the fact that average firms in our sample face constrained access to external finance due to financially imperfect and incomplete markets.

**Keywords:** Asymmetric Information, Financial Constraints, Cash Hoarding
**JEL classifications:** C26, D92, G14, L21

## 1. INTRODUCTION

Two significant areas of study in corporate finance are the effects of financial constraints, and the financial management process of firms. These two issues, although often studied separately, are fundamentally linked (Almeida et al., 2004). The investment decision at the firm level is influenced by a mixture of internal and external factors Stein (2003). Firms whose investment is limited because of a lack of internal resources and a lack of access to external financing are referred to as financially constrained (FC) (Cleary, 1999; Kaplan and Zingales, 2000). Despite the link between financial constraints and corporate liquidity demand, the literature that examines the effects of financial constraints on firm behavior traditionally focuses on corporate investment demand (Hubbard and Palia, 1999). This approach focuses on comparing the empirical sensitivity of investment to cash flow across groups of firms sorted by various proxies of financial constraints, but has been criticized on a number of grounds by recent research (Schiantarelli, 1996; Hubbard, 1998; Lensink et al., 2001; Bond and Van Reenen, 2007; Quader, 2013). The forcefulness of the suggestion proposed by Fazzari et al., (1988) has been challenged on a hypothetical foundation by Kaplan and Zingales (1997), Cleary et al. (2007), and Almeida, Campello, and Weisbach (2002), while the robustness of cross-sectional outline presented in their empirical work has been questioned by (Kaplan and Zingales, 1997), Cleary (1999) and Erickson and Whited (2000). The cross-sectional patterns reported by Fazzari et al. (1988) can be consistent with a model with no financing frictions which casts doubt on the very meaning of the empirical cash flow sensitivities of investment reported in the literature. Instead, the use of cash flow sensitivities of cash which is based on the premise that a firm's propensity to save cash out of cash inflows should be related to the financial constraint it faces can avoid some of the problems associated with the investment-cash flow literature (Almeida et al., 2004) and hence, is claimed to be a more powerful and convincing measure of the existence of financial constraints.

Since the onset of the financial and the sovereign debt crisis, investment in the euro area countries has been reduced and the crisis has not yet recovered (Giavazzi and Spaventa, 2010) and significant attention has been devoted to macroeconomic imbalances (Gros, 2012). However, research on firms' financing policy to manage internal and external capital has not received

its deserved attention in the academic debates and in the policy management of the Euro area. Prior research involving this issue was largely focused on US corporations through the 1970s and 1980s, but started to appear on other countries by the early 1990s. Audretsch and Elston (2002) find higher cash flow investment sensitivity of liquidity constrained German firms during 1970-1986, while Fohlin (1998) confirms such sensitivity for German firms during the 1903-1913 time period. In a comparative study between firms in Belgium, France, Germany and the UK, Bond et al. (2003) present evidence that the investment of UK firms is comparatively more sensitive to cash flow fluctuations. On the other hand, Aggarwal and Zong (2006) show most firms in four largest industrialized countries, i.e., US, UK, Japan and Germany face constrained access to external finance due to financially imperfect and incomplete markets as a result of which investment levels are significantly positively influenced by the levels of internal cash flows. The strength of this relationship is also found to increase with the degree of financial constraints faced by these firms. While these studies show that FC firms have higher investment- cash flow sensitivities, our study attempts to detect financial constraints by comparing the cross-sectional variations in cash flow sensitivity of cash at the firm level which is novel. For this we use an unbalanced panel of 5086 firms from 7 European countries, namely Belgium, France, Germany, Italy, Netherland, Sweden and UK over the period of 1981 to 2010. We believe that our study adds significant contribution to the contemporary literature by improving our understanding of international liquidity management; the interrelation between financial constraints and cash accumulation policies of non-US firms to be specific. Our different model specifications strive to confront the challenges in examining the effects of capital market imperfections by considering the following: (i) Whether firms show a positive tendency to save cash out of cash inflows; (ii) whether FC and unconstrained firms show different propensity to save cash (iii) whether there is any international differences between constrained and unconstrained firms in terms of their cash hoarding behavior.

After controlling for firm size, investment opportunities and alternative sources and competing uses of funds, we find that a firm's decision to change its cash holdings is positively and significantly related with internal cash flows. We further find that constrained firms like to save relatively more cash out of their cash inflows, whereas the unconstrained firms do not maintain any such significant cash hoarding behavior when we split our overall sample into FC and unconstrained categories using a financial constraint index from multiple discriminant analysis. We find such results prevail for the whole sample, within each country and consistent across different estimation procedures and alternative financial constraint criteria.

The rest of the paper is structured into different sections as follows. Section 2 is a brief literature survey, Section 3 describes the empirical methodology, Section 4 introduces the data, variable definitions and descriptive statistics, Section 5 presents the empirical results along with robustness analysis and finally Section 6 concludes the paper.

## 2. LITERATURE REVIEW

Carpenter and Guariglia (2008) stated that the relationship between investment and cash flow has had a turbulent history. It was widely studied during the 1950s and the 1960s (Hirshleifer, 1958; Meyer and Kuh, 1966; Kuh, 1963). Yet cash flow subsequently all but disappeared from the investment literature until its revival in the 1980s following the development of models of asymmetric information and an empirical breakthrough by Fazzari et al. (1988). They estimated investment equations as a function of Tobin's Q and cash flow using firm-level data. They found that cash flow tends to have a bigger effect on the investment of firms more likely to face financial constraints and interpreted this as evidence for the existence of information driven capital market imperfections. The free cash flow theory of Jensen (1986) suggests that managers have an incentive to build up cash to increase the amount of assets under their control and to gain discretionary power over the investment decision of the firm.

Market-oriented financial systems where arm's length lenders offer funds through commercial paper, corporate bond and equity markets, are more likely to show greater sensitivity to cash flow. Relationship-oriented systems are likely to foster closer and more transparent arrangements that allow them to exercise greater scrutiny over borrowers, and as a result investors will be less sensitive to internal sources of funds. An excellent discussion of the principal differences between the two structures is given in Rajan and Zingales (2003). The evidence in Allen and Gale (2000) indicates that Germany and the UK are good examples of the polar cases on the wide spectrum of financial systems in Europe. In the UK, market capitalization as a percentage of gross domestic product (GDP) is some three times that of Germany and corporate control is exercised by the financial markets rather than banks, in contrast to Germany. Nevertheless bond markets are much less well developed in Germany and the UK versus the US. Although firms in both countries rely heavily on internal funds, and the development of market finance has been significant in the period 1995-2004 even in Germany (Rajan and Zingales, 2003), the impact of these systems could affect the sensitivity of investment to cash flow. Analysis of these economies to internal funds at the margin is expected to show investment will be more sensitive to internal funds (cash flow) for countries where the financial system is relatively market-based, and vice versa, if the financial system is the driving force behind the importance of cash flow.

Current studies try to gain a better understanding by focusing on the causes of cash flow sensitivity (Pawlina and Renneboog, 2005; Degryse and De Jong, 2006). In particular, the asymmetric information problem of Myers and Majluf (1984) suggests that firms may suffer from under investment when the acquisition of external financing is costly. In that case, investment outlays will depend on the availability of internally generated resources, resulting in positive investment-cash flow sensitivity. Not only extra equity may become excessively costly, but information asymmetry may also hamper firms in obtaining additional debt (Stiglitz and Weiss, 1981; Greenwald et al., 1984). Watson and Wilson (2002) show that a financial pecking order among firms will be most apparent when information asymmetry between insiders

and outsiders is greater, leading to higher costs associated with external financing. As this problem increases with investment opportunities, it is typically argued that cash flow sensitivity should be higher for firms with high investment opportunities Fazzari et al. (1988). Next to asymmetric information, firms are also affected by the agency problem of free cash flow. At least in the case of listed firms, where management and ownership tends to be separated, over investment of free cash flow (Jensen, 1986) can cause a positive relationship between cash flow and investment. This problem is likely worse for firms with little investment opportunities.

Almeida et al. (2004) empirically estimate the cash flow sensitivity of cash using a large sample of US manufacturing firms over the 1971-2000 period and find robust support for their theory. They hypothesize that constrained firms should have a positive cash flow sensitivity of cash, while unconstrained firms' cash savings should not be systematically related to cash flows. Lin (2007) examines the role of operating cash flow in firm cash policies using an unbalanced panel of 988 Taiwanese firms. The main findings are as follows: (i) both FC and unconstrained firms display positive cash flow sensitivity of cash, (ii) the estimated cash flow sensitivity of cash for FC firms is significantly higher than that of FC firms in the USA, (iii) firms that have ever issued public debt save more cash out of their operating cash flow than firms that have never issued public debt, and (iv) omitting net debt and equity issuances from the cash regression produces downward-biased cash-cash flow sensitivity estimates. Marina and Niehausb (2011) also find that FC firms increase their cash holdings as their cash flow increases, but unconstrained firms do not consistently show similar behavior. They also find that higher cash flows, on average, increase the likelihood of hedging for FC firms. D'Espallier et al., (2008) evaluate two models commonly used for measuring financial constraints in their ability to discriminate between constrained and unconstrained firms. Their findings suggest the superiority of the cash flow sensitivity of investment (CFSI) model over the Communication for Social Change model for a sample of manufacturing SMEs in Belgium.

Riddick and Whited (2009) demonstrate that there is a negative relation between the cash flow fluctuation and the amount of the held cash. In other words, when a company's cash flow is positive, cash holding variation is negative. On the other hand, if a company faces a negative cash flow, the variations in the retained cash will be positive. Bao et al., (2012) also affirm the above conclusion. In addition, they contend that the cash flow sensitivity of cash is asymmetric to cash flow. All the results support their hypotheses that firms have different levels of responses to their cash holdings when facing positive and negative cash flows. Akguc and Choi (2013) highlight that public firms hold more cash than private firms in Euro-zone countries than in non-Euro countries, indicating greater precautionary demand for cash by public firms in Euro countries. They also find that firms in countries with better shareholder protection hold less cash.

This paper follows the approach of Almeida et al. (2004), but uses a large panel of 5086 firms from 7 European countries, namely Belgium, France, Germany, Italy, Netherland, Sweden and UK over the period of 1981-2010 and strives to find whether there is any significant inter and intra country difference in the cash hoarding behavior of the firms facing varying degree of financial constraints in our sample.

## 3. METHODOLOGY

Due to the emerging criticism about the ability of the CFSI to capture financial constraints on both empirical and theoretical grounds, Almeida et al., (2004) provided cash flow sensitivity of cash as an alternative measure to capture the same. This new measure predicts the change in cash and marketable securities out of the amount of cash flow generated by firms. According to their suggestions, there should be a strong positive relation between cash flow and changes in cash holdings for FC firms. As these firms cannot rely on external financing source, they prefer to hoard cash in order to avail positive investment opportunities. In contrast, unconstrained firms should not display any such relation. To test this argument using our cross country panel data, we will use the following model specification relating changes in cash holdings to cash flows, corporate investments, size and some additional explanatory variables such as working capital and short-term debt that control for competing uses of funds based upon the specification of Almeida et al. (2004).

$$\Delta\text{Cash holdings}_{it} = \beta_0 + \beta_1 \text{Cashflow}_{it} + \beta_2 \text{Tobin's Q}_{it} + \beta_3 \text{Size}_{it} + \beta_4 \text{Expenditures}_{it} + \beta_5 \Delta\text{NWC}_{it} + \beta_6 \Delta\text{Short Debt}_{it} + f_i + \tau_t + v_{it} \quad (1)$$

Here, the dependent variable is changes in the holdings of cash and marketable securities to total assets and our concern lies on its response to a shock to cash flows, captured by $\beta_1$ in the above equation which is predicted to be higher for FC firms. We also control for size because of standard arguments of economies of scale in cash management. As the theory suggests that a constrained firm's cash policy should be influenced by the attractiveness of future investment opportunities, we include Tobin's Q as proxy for firms' future growth opportunities. The expected sign of its coefficient is positive for constrained firms and unsigned for unconstrained firms. A firm's decision to change its cash holdings may also depend on a number of sources and uses of funds, therefore, we include capital expenditures (Expenditures), changes in non-cash net working capital (NWC), and changes in short-term debt (ShortDebt). All of these three additional variables are scaled by assets. As firms can draw down on cash reserves in a given year in order to pay for investments, we expect $\beta_4$ to be negative. We control for the change in NWC and changes in short term debt as these can be substitutes for or may compete for the available pool of resources (Fazzari and Petersen, 1993).

As testing the implications of our model requires separating firms according to the extent of the financing frictions they face, we need to partition our sample using a plausible proxy for financial constraint status and estimate the above model separately on the sub-samples to distinguish the cash hoarding pattern of the FC and unconstrained firms. In this study, we employ multiple discriminant analysis to classify firms into groups according to a beginning-of-period financial constraint index $Z_{FC}$ following Aggarwal and Zong

(2006). They followed Cleary(1999)'s approach of computing such index, but used a different set of variables in the discriminant function to overcome some limitations of Cleary's procedure. The computed financial constraint index is similar to Altman's Z factor for predicting bankruptcy (Altman, 1968; Altman et al., 1977). The first step in discriminant analysis is to establish two or more mutually exclusive groups according to some explicit group classification and we use fixed charge coverage ratio (FCCR) as the grouping criteria. Ten percent of top and bottom companies are used in this paper to identify the extreme sets of companies with the highest and the lowest levels of financial constraints. Coefficient values for each independent variable of the following equation are estimated so that the calculated $Z_{FC}$ values best distinguish firms between the two groups.

$$Z_{FC} = \beta_1 CR + \beta_2 \text{Cash holdings} + \beta_3 OPM + \beta_4 \text{Sales Growth} + \beta_5 DR \quad (2)$$

Where current asset is the current ratio (CR), cash holdings is cash and short term investment scaled by net fixed assets, operating profit margin (OPM) is the net income margin, DR is debt ratio (long-term debt/total assets, sales growth is change in net sales in 2 consecutive years (net sales at time t-net sales at time t-1)/ net sales at time t-1). $Z_{FC}$ value is calculated for each year for all firms to reflect that the variables used in the calculation are likely to be different in each period. Firms are then sorted into FC (FC), partially FC (PFC), and non-FC (NFC) firms using the average Z scores of firms for the 3-year period as financial constraint levels are likely to be consistent with the longer term policies of companies and tend not to change drastically in the short. The bottom 25% of the companies ranked by their average $Z_{FC}$ values are categorized as FC, the middle 50% as PFC, and the top 25% as NFC.

In all our estimations of equation 1, we need to account for firm-fixed effects in order to control for possible simultaneity biases stemming from unobserved individual heterogeneity. Besides, we must account for the endogeneity of financial and investment decisions. Therefore, we prefer to use a fixed effect instrumental variables (FEIV) approach. Our set of instruments includes lags of the level of fixed capital (net plant, property, and investment to total assets), lagged NWC, and lagged short-term debt as well as fixed time effects following the rationale proposed by Fazzari and Petersen (1993) and Almeida et al. (2004).

## 4. DATA

We have collected data from the Worldscope Database currently owned by Thomson Reuters which describes the database as the financial industry's premier resource of most comprehensive and accurate financial data on public companies resided outside of the United States of America[1]. We excluded all banks, life and non-life insurance, real estate, general financial, equity and non-equity investment instrument companies according to the FTSE/Dow Jones Industrial Classification Benchmark codes which are adopted by the database as its standard global classification tool codes as they follow different accounting practices. We also dropped all the observations with unexpected signs, like negative revenue, assets or investment and all the other observations with missing values for the required variables. Then we deleted all the firms with <3 consecutive years of observations for any of the required variables. Some firms operating for relatively longer period still have gaps in their panels, but have multiple three consecutive observations in them. Finally, the dataset we use in our estimations is an unbalanced panel of 5086 firms from thirty five different sectors in seven European countries, namely United Kingdom, Germany, France, Belgium, Netherland, Sweden and Italy with a minimum of three to a maximum of 30 consecutive years of observations and a total of 53938 firm years. As we allow both entry and exit of firms over time, our estimations using this unbalanced panel data are expected to be free from any potential selection and survivor bias. All regression variables are winsored at the 1% and 99% level to omit extreme outliers. The latter rule is expected to eliminate observations reflecting very large mergers, extraordinary firm shocks, coding or severe measurement errors and is applied as a common procedure in the contemporary finance literature, e.g. Hovakimian and Titman (2006). Table 1 reports means and distributional information for all the regression variables we use in this paper.

Table 1 gives mean and distributional information for all the regression variables for which data is collected from the Worldscope Global Database for the 5086 European firms over the period 1981 to 2010. All financial variables are deflated with a GDP deflator and all regression variables are winsored at the 1% and 99% level to get rid of the extreme outliers.

Tobin's Q is calculated as the ratio of market value of assets to the book value of assets. Market value is estimated as book value of total assets minus book value of equity plus market capitalization and book value of total asset is simply the value of total assets. The natural logarithm of total sales and the natural logarithm of the number of years a firm appears in the database are used as proxies for firm size and firm age respectively. Financial slack (Fslack) is calculated as ratio of cash and short term investment to total assets; cash flow as the ratio of funds from operation to total assets; fixed charge (FCCR) as the ratio of interest expense on debt and other fixed charges to earnings before interest, taxes, fixed charges and depreciation and investment is calculated as the ratio of capital expenditure or additions to fixed assets to total tangible assets. NWC is non-cash NWC and StDebt is short term debt, both scaled by total assets. CR is current asset to current liability, OPM, SGrth is calculated growth in total sales between 2 consecutive periods and $Z_{FC}$ is the predicted financial constraint index from the discriminant analysis.

Mean and standard deviation of FCCR is higher than all the other variables stated in the Table 1. The FCCR is especially helpful to see a company's dependency on outside capital and it indicates whether a drop in profits may leave the company unable to pay its bills. The standard deviation of SGrth, OPM and $Z_{FC}$ are also quite high with mean of OPM and $Z_{FC}$ being negative. The mean of cash

1 The data definitions and other information about the contents of the Worldscope database are contained in http://extranet.datastream.com/Data/Worldscope/index.htm.

**Table 1: Summary statistics**

| Variable | Mean | SD | Minimum | Q1 | Median | Q3 | Maximum | N |
|---|---|---|---|---|---|---|---|---|
| Fslack | 0.12 | 0.14 | 0 | 0.03 | 0.08 | 0.17 | 0.70 | 53938 |
| CshFlow | 0.06 | 0.13 | –0.61 | 0.04 | 0.08 | 0.12 | 0.32 | 53938 |
| CR | 1.72 | 1.29 | 0.27 | 1.05 | 1.39 | 1.93 | 8.81 | 53938 |
| Size | 11.89 | 2.15 | 7.45 | 10.36 | 11.64 | 13.22 | 17.63 | 53938 |
| DR | 0.12 | 0.13 | 0 | 0.02 | 0.09 | 0.18 | 0.61 | 53938 |
| FCCR | 16.05 | 109.78 | –426.27 | 1.19 | 4.29 | 11.13 | 756.39 | 53938 |
| Exp | 0.06 | 0.06 | 0 | 0.02 | 0.04 | 0.08 | 0.33 | 53938 |
| TbnQ | 1.65 | 1.15 | 0.59 | 1.04 | 1.30 | 1.79 | 8.17 | 53938 |
| OPM | –3.10 | 47.68 | –372.22 | 0.32 | 4.84 | 9.90 | 37.06 | 53938 |
| SGrth | 14.08 | 41.33 | –58.21 | –2.95 | 6.62 | 19.23 | 266.05 | 48446 |
| NWC | 0.16 | 0.22 | –0.50 | 0.02 | 0.15 | 0.30 | 0.74 | 53938 |
| StDebt | 0.09 | 0.1 | 0 | 0.02 | 0.06 | 0.13 | 0.50 | 53938 |
| $Z_{FC}$ | –0.39 | 39.31 | –340.71 | 1.03 | 5.46 | 10.46 | 51.77 | 48446 |

SD: Standard deviation

**Table 2: Summary statistics by financial constraint categories**

| Variables | FC | | PFC | | NFC | |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD |
| Fslack | 0.141 | 0.168 | 0.102 | 0.105 | 0.142 | 0.15 |
| CshFlow | –0.058 | 0.178 | 0.089 | 0.056 | 0.109 | 0.112 |
| CR | 1.797 | 1.641 | 1.59 | 0.940 | 1.856 | 1.414 |
| Size | 11.129 | 2.067 | 12.207 | 2.068 | 11.973 | 2.207 |
| DR | 0.111 | 0.137 | 0.12 | 0.115 | 0.132 | 0.141 |
| FCCR | –29.757 | 99.257 | 20.652 | 79.763 | 41.243 | 138.889 |
| Exp | 0.052 | 0.062 | 0.058 | 0.05 | 0.072 | 0.069 |
| TbnQ | 1.618 | 1.37 | 1.375 | 0.652 | 2.052 | 1.393 |
| OPM | –33.894 | 77.709 | 4.929 | 2.941 | 7.023 | 44.234 |
| SGrth | 3.852 | 48.689 | 10.464 | 24.427 | 31.524 | 53.252 |
| NWC | 0.123 | 0.272 | 0.164 | 0.188 | 0.182 | 0.229 |
| StDebt | 0.118 | 0.13 | 0.09 | 0.09 | 0.069 | 0.082 |
| Z | –29.943 | 69.758 | 5.548 | 2.568 | 17.271 | 6.727 |

FCCR: Fixed charge coverage ratio, OPM: Operating profit margin, CR: Current ratio, DR: Debt ratio, SD: Standard deviation, NFC: Non-financially constrained, PFC: Partially financially constrained, FC: Financially constrained

flow is 0.06; however there are firm years with negative cash flows in our sample. Table 2 reports summary statistics of the regression variables individually for three financial constraint categories and Table 3 presents the same for 7 countries. Unsurprisingly, the average NFC companies have healthier positions in terms of cash flow, FCCR, OPM and SGrth than their FC counterparts. Average $Z_{FC}$ for Belgium, Germany, Sweden and UK are negative and so is their OPM. Not noticeable difference in terms of cash flow and size is seen amongst average firms in the seven countries.

Table 2 gives mean and distributional information for all the regression variables separately for the FC, PFC and NFC categories. All financial variables are deflated with a GDP deflator and all regression variables are insured at the 1% and 99% level to get rid of the extreme outliers.

Table 3 gives mean and distributional information for all the regression variables separately for the seven countries separately. All financial variables are deflated with a GDP deflator and all regression variables are insured at the 1% and 99% level to get rid of the extreme outliers.

Table 4 shows the correlations among the 10 variables and the $Z_{FC}$ values. Similar to Cleary (1999)'s findings, we find evidence that net income margin has the highest correlation and current ratio and financial slack has negative correlation with $Z_{FC}$ values. The strong positive correlations of cash flow and FCCR with the $Z_{FC}$ value are also in line with Cleary's findings.

Table 4 shows the correlations among our 10 variables of interest and the $Z_{FC}$ values from the multiple discriminant analysis.

## 5. EMPIRICAL RESULTS

Regression results for equation 1 are presented in Table 5 where the explanatory variables are added sequentially in different models and model 6 is the full version of our chosen specification. All these models have been estimated using OLS including a full set of sector and year dummies as regressors and clustering by company id has been used to get robust standard errors. Model 7 is also estimated for the overall sample, but here cash flow variable has been interacted with different country dummy variables which allow the estimated cash flow coefficient to differ across observations in the different countries. The larger coefficients indicate greater influence of internal cash flows on cash hoarding behavior. As expected, the regression coefficients for cash flow are positive and significant not only for the overall samples in model 6, but also for each country in model 7. These results show that the firms' cash saving policies are influenced positively and significantly by their cash generating capacity after controlling for firm size, investment opportunities and alternative sources and competing uses of funds. This clearly points to the fact that firms in our sample like to hoard cash out of their operating cash flows which indicates that most firms operate in imperfect and incomplete markets with limited and costly access to external finance. When comparing the regression coefficients for different countries, not much variation in the propensity to save cash out of internally generate cash flows are observed internationally. The estimated cash flow coefficient is found highest for Sweden (0.197) and lowest for Netherland (0.095) and those of other countries lie in between 0.11 and 0.15. The coefficient of capital expenditure has negative sign supporting the fact that a firm can use its cash reserves in a given year in order to pay for investments. The positive sign of TbnQ indicates that an average firm cash policy is influenced by the attractive investment opportunities in future.

**Table 3: Summary statistics by countries**

| Variables | Belgium | | France | | Germany | | Italy | | Netherland | | Sweden | | UK | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Fslack | 0.124 | 0.138 | 0.135 | 0.128 | 0.13 | 0.149 | 0.118 | 0.118 | 0.096 | 0.11 | 0.161 | 0.162 | 0.117 | 0.139 |
| CshFlow | 0.063 | 0.13 | 0.067 | 0.098 | 0.061 | 0.128 | 0.063 | 0.079 | 0.094 | 0.088 | 0.046 | 0.153 | 0.059 | 0.148 |
| CR | 1.723 | 1.292 | 1.595 | 0.977 | 2.237 | 1.746 | 1.585 | 1.027 | 1.515 | 0.717 | 1.98 | 1.462 | 1.582 | 1.178 |
| Size | 11.889 | 2.155 | 12.209 | 2.105 | 12.063 | 1.995 | 13.013 | 1.68 | 12.685 | 2.096 | 14.501 | 2.042 | 11.208 | 2.012 |
| DR | 0.122 | 0.129 | 0.132 | 0.121 | 0.112 | 0.127 | 0.133 | 0.12 | 0.137 | 0.121 | 0.132 | 0.137 | 0.116 | 0.133 |
| FCCR | 16.053 | 109.783 | 18.255 | 93.42 | 12.232 | 101.269 | 16.598 | 89.987 | 17.96 | 75.733 | 10.319 | 138.596 | 16.923 | 121.423 |
| Exp | 0.061 | 0.06 | 0.054 | 0.053 | 0.065 | 0.063 | 0.051 | 0.053 | 0.066 | 0.05 | 0.049 | 0.049 | 0.064 | 0.063 |
| TbnQ | 1.65 | 1.154 | 1.491 | 0.942 | 1.564 | 1.014 | 1.347 | 0.713 | 1.575 | 1.06 | 1.961 | 1.42 | 1.774 | 1.29 |
| OPM | –3.105 | 47.683 | 0.853 | 32.105 | –5.637 | 39.527 | –0.267 | 39.561 | 4.087 | 18.432 | –12.834 | 71.439 | –3.955 | 55.742 |
| SGrth | 14.076 | 41.335 | 10.415 | 31.163 | 9.44 | 36.256 | 10.262 | 32.341 | 10.797 | 31.738 | 16.773 | 45.625 | 18.037 | 47.52 |
| NWC | 0.161 | 0.224 | 0.167 | 0.208 | 0.224 | 0.24 | 0.147 | 0.207 | 0.153 | 0.178 | 0.205 | 0.214 | 0.132 | 0.225 |
| StDebt | 0.089 | 0.10 | 0.096 | 0.087 | 0.093 | 0.111 | 0.127 | 0.104 | 0.091 | 0.098 | 0.065 | 0.082 | 0.082 | 0.099 |
| Z | –0.395 | 39.307 | 2.094 | 27.269 | –3.423 | 34.647 | 1.105 | 33.901 | 5.058 | 14.618 | –8.214 | 60.843 | –0.247 | 44.849 |

FCCR: Fixed charge coverage ratio, OPM: Operating profit margin, CR: Current ratio, DR: Debt ratio, SD: Standard deviation

**Table 4: Correlation**

| Variables | CshFlow | CR | DR | FCCR | Exp | TbnQ | OPM | SGrth | Fslack | Size | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CshFlow | 1.0000 | | | | | | | | | | |
| CR | –0.0555* | 1.0000 | | | | | | | | | |
| DR | –0.0214* | –0.1801* | 1.0000 | | | | | | | | |
| FCCR | 0.3769* | 0.0201* | –0.1124* | 1.0000 | | | | | | | |
| Exp | 0.1719* | –0.1018* | 0.0910* | 0.0057 | 1.0000 | | | | | | |
| TbnQ | –0.0707* | 0.1142* | –0.0666* | 0.0759* | 0.0718* | 1.0000 | | | | | |
| OPM | 0.5989* | –0.2501* | 0.0637* | 0.3208* | 0.0356* | –0.1837* | 1.0000 | | | | |
| SGrth | 0.0378* | 0.0067 | 0.0009 | –0.0134* | 0.0951* | 0.1666* | –0.0365* | 1.0000 | | | |
| Fslack | –0.1361* | 0.5405* | –0.2121* | 0.0522* | –0.1050* | 0.2899* | –0.2912* | 0.0518* | 1.0000 | | |
| Size | 0.2383* | –0.1114* | 0.2564* | 0.0196* | –0.0000 | –0.1844* | 0.2072* | –0.0553* | –0.1107* | 1.0000 | |
| Z | 0.5973* | –0.2127* | 0.0560* | 0.3074* | 0.0516* | –0.1549* | 0.9981* | 0.0237 | –0.2615* | 0.2020* | 1.0000 |

FCCR: Fixed charge coverage ratio, OPM: Operating profit margin, CR: Current ratio, DR: Debt ratio, *Indicates significance at 5% level

**Table 5: Estimation results**

| Dependent variable | | | | | | | |
|---|---|---|---|---|---|---|---|
| ΔCash holdings | M1 | M2 | M3 | M4 | M5 | M6 | M7 |
| CashFlow | 0.192*** | 0.192*** | 0.190*** | 0.206*** | 0.202*** | 0.141*** | |
| | (0.003) | (0.003) | (0.007) | (0.007) | (0.003) | (0.003) | |
| TobinQ | | 0.003*** | 0.003*** | 0.004*** | 0.004*** | 0.004*** | 0.004*** |
| | | (0.000) | (0.001) | (0.001) | (0.000) | (0.000) | (0.000) |
| Size | | | 0.001*** | 0.000 | 0.000 | 0.001*** | 0.001*** |
| | | | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| Expenditures | | | | –0.218*** | –0.213*** | –0.111*** | –0.112*** |
| | | | | (0.009) | (0.007) | (0.007) | (0.007) |
| ΔShortDebt | | | | | –0.055*** | 0.285*** | 0.285*** |
| | | | | | (0.005) | (0.006) | (0.006) |
| ΔNWC | | | | | | 0.366*** | 0.366*** |
| | | | | | | (0.003) | (0.003) |
| CashFlowBel | | | | | | | 0.132*** |
| | | | | | | | (0.016) |
| CashFlowFr | | | | | | | 0.151*** |
| | | | | | | | (0.008) |
| CashFlowGer | | | | | | | 0.166*** |
| | | | | | | | (0.006) |
| CashFlowIt | | | | | | | 0.114*** |
| | | | | | | | (0.015) |
| CashFlowNeth | | | | | | | 0.095*** |
| | | | | | | | (0.014) |
| CashFlowSw | | | | | | | 0.197*** |
| | | | | | | | (0.012) |
| CashFlowUK | | | | | | | 0.130*** |
| | | | | | | | (0.004) |
| Constant | –0.003 | –0.007 | –0.013 | 0.003 | 0.001 | –0.014 | –0.010 |
| | (1287.891) | (1286.263) | (291.780) | | (1274.041) | (1148.533) | (1147.815) |

*Contd...*

**Table 5: *Contd...***

| Dependent variable | | | | | | | |
|---|---|---|---|---|---|---|---|
| ΔCash holdings | M1 | M2 | M3 | M4 | M5 | M6 | M7 |
| N | 48446 | 48446 | 48446 | 48446 | 48446 | 48446 | 48446 |
| $r^2a$ | 0.080 | 0.081 | 0.081 | 0.097 | 0.099 | 0.268 | 0.269 |

Standard errors are clustered at the firm level. ***, ** and * indicate significance at the 1%, 5% and 10%, level respectively and standard errors are in parentheses

**Table 6: Estimated results of equation 1 using OLS, FE and FEIV**

| Dependent variable | | | | | | |
|---|---|---|---|---|---|---|
| ΔCash holdings | OLS | FE | FEIV | OLS | FE | FEIV |
| CashFlow | 0.141*** | 0.130*** | 0.121*** | | | |
| | (0.003) | (0.004) | (0.005) | | | |
| TobinQ | 0.004*** | 0.005*** | 0.005*** | 0.004*** | 0.005*** | 0.005*** |
| | (0.000) | (0.001) | (0.001) | (0.000) | (0.001) | (0.001) |
| Size | 0.001*** | 0.013*** | 0.013*** | 0.001*** | 0.013*** | 0.013*** |
| | (0.000) | (0.001) | (0.001) | (0.000) | (0.001) | (0.001) |
| Expenditures | –0.111*** | –0.130*** | –0.114*** | –0.112*** | –0.130*** | –0.113*** |
| | (0.007) | (0.009) | (0.010) | (0.007) | (0.009) | (0.010) |
| ΔNWC | 0.366*** | 0.364*** | 0.404*** | 0.366*** | 0.364*** | 0.406*** |
| | (0.003) | (0.004) | (0.008) | (0.003) | (0.004) | (0.008) |
| ΔShortDebt | 0.285*** | 0.278*** | 0.314*** | 0.285*** | 0.277*** | 0.315*** |
| | (0.006) | (0.006) | (0.009) | (0.006) | (0.006) | (0.009) |
| CashFlowBel | | | | 0.132*** | 0.069** | 0.057* |
| | | | | (0.016) | (0.035) | (0.035) |
| CashFlowFr | | | | 0.151*** | 0.130*** | 0.119*** |
| | | | | (0.008) | (0.013) | (0.013) |
| CashFlowGer | | | | 0.166*** | 0.131*** | 0.120*** |
| | | | | (0.006) | (0.009) | (0.010) |
| CashFlowIt | | | | 0.114*** | 0.083*** | 0.072** |
| | | | | (0.015) | (0.028) | (0.028) |
| CashFlowNeth | | | | 0.095*** | 0.076*** | 0.066*** |
| | | | | (0.014) | (0.025) | (0.025) |
| CashFlowSw | | | | 0.197*** | 0.267*** | 0.260*** |
| | | | | (0.012) | (0.019) | (0.020) |
| CashFlowUK | | | | 0.130*** | 0.124*** | 0.116*** |
| | | | | (0.004) | (0.006) | (0.006) |
| Constant | –0.014 | –0.110** | –0.112** | –0.010 | –0.107** | –0.110** |
| | (1148.533) | (0.046) | (0.046) | (1147.815) | (0.046) | (0.046) |
| N | 48446 | 48446 | 48446 | 48446 | 48446 | 48446 |
| Ng | | 5086 | 5086 | | 5086 | 5086 |
| $r^2o$ | | 0.212 | 0.217 | | 0.213 | 0.218 |
| $r^2b$ | | 0.290 | 0.293 | | 0.289 | 0.292 |
| $r^2w$ | | 0.250 | 0.248 | | 0.251 | 0.249 |
| $Sigma_u$ | | 0.047 | 0.047 | | 0.047 | 0.047 |
| $Sigma_e$ | | 0.077 | 0.077 | | 0.077 | 0.077 |
| Rho | | 0.274 | 0.274 | | 0.274 | 0.275 |
| $chi^2p$ | | | 0.000 | | | 0.000 |
| $F_fp$ | | | 0.000 | | | 0.000 |

***, ** and * indicate significance at the 1%, 5% and 10%, level respectively and standard errors in parentheses, NWC: Net working capital, FEIV: Fixed effect instrumental variables

Table 5 shows the estimated results using OLS which includes a full set of sector and year dummies as regressors.

Our two model of interest as explained above are re estimated again using fixed effect and FEIV technique to control for firm fixed effect and erogeneity of the regressors and results are reported in Table 4 with robust standard errors. The fixed time specific effects are similarly controlled for by including year dummies as regressors. This do not make any qualitative change to our previous results and the cash hoarding behavior as explained above are found to prevail in our fixed effect and fixed effect 4 regression. However, the magnitudes of our coefficient of interest, fi1 decrease in all the cases except for Sweden. Other explanatory variables retain coefficients of similar magnitude, sign and significance almost.

Table 6 shows the estimated results of equation 1 using OLS, FE and FEIV. OLS estimates include a full set of sector and year dummies as regressors, FE estimates include a full set of year dummies as regressors, FEIV estimates include a full set of year dummies both as regressors and instruments. In addition to these, FEIV includes lags of the level of fixed capital (net plant, property, and investment to total assets), lagged NWC, and lagged short-term debt as instruments.

**Table 7: Discriminant**

| Dependent variable | | | | |
|---|---|---|---|---|
| ΔCash holdings | All | FC | PFC | NFC |
| CashFlow | 0.121*** | 0.129*** | 0.087*** | 0.035 |
| | (0.005) | (0.015) | (0.018) | (0.028) |
| TobinQ | 0.005*** | 0.009*** | 0.004** | 0.003** |
| | (0.001) | (0.002) | (0.002) | (0.001) |
| Size | 0.013*** | 0.032*** | 0.008*** | 0.011*** |
| | (0.001) | (0.003) | (0.001) | (0.002) |
| Expenditures | –0.114*** | –0.179*** | –0.091*** | –0.096*** |
| | (0.010) | (0.030) | (0.016) | (0.019) |
| ΔNWC | 0.404*** | 0.370*** | 0.347*** | 0.430*** |
| | (0.008) | (0.014) | (0.013) | (0.017) |
| ΔShortDebt | 0.314*** | 0.256*** | 0.268*** | 0.363*** |
| | (0.009) | (0.019) | (0.015) | (0.022) |
| Constant | –0.112** | –0.413*** | –0.078*** | –0.074** |
| | (0.046) | (0.041) | (0.013) | (0.035) |
| N | 48446 | 12112 | 24223 | 12111 |
| Ng | 5086 | 3150 | 3982 | 2722 |
| $r^2o$ | 0.217 | 0.194 | 0.142 | 0.165 |
| $r^2b$ | 0.293 | 0.165 | 0.145 | 0.107 |
| $r^2w$ | 0.248 | 0.289 | 0.181 | 0.281 |
| $Sigma_u$ | 0.047 | 0.092 | 0.048 | 0.067 |
| $Sigma_e$ | 0.077 | 0.109 | 0.058 | 0.065 |
| Rho | 0.274 | 0.415 | 0.411 | 0.516 |
| $chi^2p$ | 0.000 | 0.000 | 0.000 | 0.000 |
| $F_fp$ | 0.000 | 0.000 | 0.000 | 0.000 |

***, ** and * indicate significance at the 1%, 5% and 10%, level respectively and standard errors in parentheses

**Table 8: Robustness**

| Dependent variable | Independent variables | | | | | | |
|---|---|---|---|---|---|---|---|
| ΔCash holdings | CashFlow | TobinQ | Size | Expenditures | ΔNWC | ΔShortDebt | Constant |
| 1. Size | | | | | | | |
| FC | 0.135*** | 0.008*** | 0.035*** | –0.180** | 0.359*** | 0.229*** | –0.311*** |
| | (0.015) | (0.002) | (0.003) | (0.025) | (0.014) | (0.021) | (0.034) |
| PFC | 0.096*** | 0.007*** | 0.013*** | –0.107*** | 0.354*** | 0.274*** | –0.120*** |
| | (0.012) | (0.001) | (0.001) | (0.015) | (0.012) | (0.014) | (0.025) |
| NFC | 0.044** | 0.005*** | 0.010*** | –0.068*** | 0.441*** | 0.421*** | –0.138*** |
| | (0.020) | (0.001) | (0.002) | (0.020) | (0.020) | (0.024) | (0.023) |
| 2. Age | | | | | | | |
| FC | 0.137*** | 0.010*** | 0.054*** | –0.198** | 0.388*** | 0.284*** | –0.621*** |
| | (0.021) | (0.002) | (0.005) | (0.028) | (0.014) | (0.020) | (0.062) |
| PFC | 0.099*** | 0.004*** | 0.018*** | –0.124*** | 0.339*** | 0.258*** | –0.198*** |
| | (0.013) | (0.001) | (0.002) | (0.019) | (0.012) | (0.016) | (0.019) |
| NFC | 0.039** | 0.004*** | 0.008*** | –0.103*** | 0.396*** | 0.323*** | –0.063** |
| | (0.016) | (0.002) | (0.001) | (0.023) | (0.020) | (0.024) | (0.025) |
| 3. KZ index | | | | | | | |
| FC | 0.245*** | 0.006*** | 0.031*** | –0.205** | 0.410*** | 0.319*** | –0.213*** |
| | (0.026) | (0.002) | (0.003) | (0.052) | (0.016) | (0.030) | (0.47) |
| PFC | 0.097*** | 0.003** | 0.012*** | –0.099*** | 0.383*** | 0.271*** | –0.115*** |
| | (0.017) | (0.001) | (0.001) | (0.015) | (0.012) | (0.014) | (0.014) |
| NFC | 0.025* | 0.003 | 0.010*** | –0.061*** | 0.283*** | 0.217*** | –0.128*** |
| | (0.014) | (0.002) | (0.002) | (0.018) | (0.016) | (0.018) | (0.023) |

***, ** and * indicate significance at the 1%, 5% and 10%, level respectively and standard errors in parentheses, NFC: Non-financially constrained, PFC: Partially financially constrained, FC: Financially constrained

Table 7 presents the results obtained from the estimation of our baseline regression model after we classify our total sample into constrained and unconstrained categories using the predicted $Z_{FC}$ index from the multiple discriminant analysis. Total three estimated equations using FEIV with robust standard errors for FC, PFC and NFC are reported and firms in all three categories display positive sensitivities of cash to cash flow. However, the sensitivities are found to decrease monotonically from constrained to unconstrained category and becomes statistically insignificant as well for the financially unconstrained firms. The sensitivity estimates is 0.129 for FC firms, 0.087 for partially constrained firms and 0.035 for NFC firms and all are statistically significant at better than the 5% level except for the unconstrained firms. These estimates suggest that for each dollar of additional cash flow, a

**Table 9: Country specific**

| Dependent variable | Independent variables | | | | | | |
|---|---|---|---|---|---|---|---|
| ΔCash holdings | CashFlow | TobinQ | Size | Expenditures | ΔNWC | ΔShortDebt | Constant |
| 1. Belgium | | | | | | | |
| FC | 0.121*** | 0.009*** | 0.032*** | –0.179** | 0.370*** | 0.256*** | –0.413*** |
| | (0.015) | (0.002) | (0.003) | (0.030) | (0.014) | (0.019) | (0.041) |
| NFC | 0.035 | 0.003** | 0.011*** | –0.096*** | 0.430*** | 0.363*** | –0.074** |
| | (0.028) | (0.001) | (0.002) | (0.019) | (0.017) | (0.022) | (0.035) |
| 2. France | | | | | | | |
| FC | 0.134*** | 0.013** | 0.022*** | –0.223*** | 0.293*** | 0.251*** | –0.359*** |
| | (0.033) | (0.006) | (0.008) | (0.072) | (0.032) | (0.044) | (0.091) |
| NFC | –0.047 | 0.006*** | 0.022*** | –0.139** | 0.452*** | 0.398*** | –0.229** |
| | (0.064) | (0.003) | (0.007) | (0.059) | (0.044) | (0.051) | (0.086) |
| 3. Germany | | | | | | | |
| FC | 0.121*** | 0.014** | 0.022*** | –0.110** | 0.264*** | 0.205*** | –0.282*** |
| | (0.027) | (0.007) | (0.007) | (0.051) | (0.025) | (0.029) | (0.076) |
| NFC | –0.008 | 0.008** | 0.012 | –0.015 | 0.333*** | 0.236*** | –0.158 |
| | (0.081) | (0.004) | (0.010) | (0.074) | (0.058) | (0.090) | (0.117) |
| 4. Italy | | | | | | | |
| FC | 0.132* | –0.033** | 0.008 | 0.0305 | 0.311*** | 0.241*** | –0.110 |
| | (0.079) | (0.002) | (0.009) | (0.110) | (0.057) | (0.058) | (0.123) |
| NFC | 0.061 | –0.003 | 0.038*** | 0.010*** | 0.487*** | 0.515*** | –0.451*** |
| | (0.107) | (0.004) | (0.012) | (0.049) | (0.057) | (0.091) | (0.154) |
| 5. Netherland | | | | | | | |
| FC | 0.105* | –0.017 | 0.027* | –0.232 | 0.134** | 0.139* | –0.257 |
| | (0.057) | (0.015) | (0.015) | (0.232) | (0.066) | (0.073) | (0.164) |
| NFC | –0.081 | 0.014* | 0.025** | –0.180 | 0.432*** | 0.196 | –0.284** |
| | (0.231) | (0.007) | (0.011) | (0.142) | (0.069) | (0.118) | (0.140) |
| 6. Sweden | | | | | | | |
| FC | 0.277*** | 0.019* | 0.081*** | 0.115 | 0.620*** | 0.500*** | –1.054*** |
| | (0.079) | (0.011) | (0.019) | (0.179) | (0.090) | (0.133) | (0.245) |
| NFC | 0.126 | 0.012*** | –0.002 | –0.092 | 0.518*** | 0.536*** | 0.010 |
| | (0.123) | (0.004) | (0.005) | (0.084) | (0.104) | (0.116) | (0.077) |
| 7. United Kingdom | | | | | | | |
| FC | 0.124*** | 0.008*** | 0.040*** | –0.289*** | 0.428*** | 0.280*** | –0.489*** |
| | (0.022) | (0.003) | (0.005) | (0.048) | (0.020) | (0.032) | (0.065) |
| NFC | 0.073*** | –0.000 | 0.008*** | –0.121*** | 0.436*** | 0.368*** | –0.046 |
| | (0.034) | (0.002) | (0.003) | (0.022) | (0.021) | (0.026) | (0.038) |

***, ** and * indicate significance at the 1%, 5% and 10%, level respectively and standard errors in parentheses, FC: Financially constrained, NFC: Non-financially constrained, NWC: Net working capital

constrained firm will save around 13 cents, while unconstrained firms do nothing. The Q-sensitivity of cash is always positive and significant, which shows that firms like to save cash to avail good investment opportunities in future. The coefficients for firm size, short term debt and NWC are positive, while those of the investment expenditures are negative. The coefficients of these regressors carry expected signs and are in line with previous studies.

Table 7 shows FEIV results of equation 1 separately for the whole sample, FC, PFC and NFC groups separated using a predicted financial constraint index $Z_{FC}$ from multiple discriminant analysis. The estimates include a full set of year dummies both as regressors and instruments and in addition, lags of the level of fixed capital (net plant, property, and investment to total assets), lagged NWC, and lagged short-term debt as instruments.

Besides the $Z_{FC}$, we also use three other financial constraint proxies to partition our sample. We construct an index of firm financial constraints based on results in Kaplan and Zingales (1997) (which we call the "KZ index") by applying the following linearization to the data and separate firms according to this measure.

KZ Index = –1.002 * Cash flow + 0.283 * Tobin's Q + 3.139 * Leverage – 39.368 * Dividends – 1.315 * Cash holdings (3)

The other two categories we use are size and age. Our earlier results are found robust in all these three cases. The cash flow sensitivity of cash estimates reveal the same patterns reported in Table 8. The sensitivity estimates are all positive and highly significant for constrained firms which make our earlier findings robust. Coefficients for the other regressors attract the signs as previous ones.

Table 8 shows FEIV results of equation 1 separately for the whole sample; FC, PFC and NFC groups separated using a size, age and KZ index. The estimates include a full l set of year dummies both as regressors and instruments and in addition, lags of the level of fixed capital (net plant, property, and investment to total assets), lagged NWC, and lagged short-term debt as instruments.

We also attempt to examine the cash flow coefficients for the FC versus the NFC groups in each country and the estimation result are presented in Table 9. We omit the regression result for the PFC groups, but report the results for other two groups at

the opposite ends. The divergence of cash saving behavior we found for the whole sample are also found in each countries on their own, i.e. significantly high cash flow sensitivity of cash for FCs and insignificant on the part of the NFCs. This finding is consistent with the view that irrespective of the countries, there are systematic differences between constrained and unconstrained firms in terms of the way they devise their cash hoarding policies. Such differences manifest the presence of financial constraint due to capital market imperfection.

Table 9 shows FEIV results of equation 1 for the FC and NFC groups separated using a predicted financial constraint index ZFC from multiple discriminant analysis for each of the seven countries separately. The estimates include a full set of year dummies both as regressors and instruments and in addition, lags of the level of fixed capital (net plant, property, and investment to total assets), lagged NWC, and lagged short-term debt as instruments.

## 6. CONCLUSION

This paper makes an important contribution to the contemporary literature by examining the differential cash saving tendency for firms facing different financial constraint status to see the effect of capital market imperfection on international corporate policies. Due to the prolonged debate started with Fazzari et al. (1988) and Kaplan and Zingales (1997) on the ability of investment cash flow sensitivity to capture financial constraints, we have taken up the proposition of Almeida et al. (2004) and rely on cash flow sensitivity of cash to capture the same but in a cross country setting for the first time. Our estimated results from all our model specifications consistently indicate a substantially greater and significantly positive cash saving tendency out of internally generated cash flow for firm years belonging to the most FC categories which are most likely to face more severe asymmetric information related problems. However, the unconstrained firms do not follow any such systematic behavior. Such relationship based on our whole sample remain evident for each of the seven countries as well when analyzed separately which conforms the fact that irrespective of the countries, there are systematic differences between constrained and unconstrained firms in terms of the way they devise their cash hoarding policies. The results suggest important policy implications for FC European firms which should be taken into consideration while managing their working capital and hoard a stock of internal funds to be used as a less costly alternative to external financing for availing profitable investment opportunities. This can potentially get them out of constraint financial status and allow them to enjoy the benefit of a potential positive income shock through their real activities. Our results can guide future researchers to adopt similar investigations on the developing markets and may also influence the managerial decision regarding cash accumulation policy.

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