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# Channels of cash savings: international evidence

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## Abstract

**Purpose** – The purpose of this paper is to examine cash savings from six potential sources of cash: net equity issues, net debt issues, internally generated cash flows, asset sales, changes in short-term debt, and changes in net working capital.

**Design/methodology/approach** – The authors use both fixed effects and dynamic panel-data estimations to examine cash savings by using a sample of firms from 72 countries for the period 1991-2010.

**Findings** – The authors observe that net equity issue is the largest source of new funds while cash savings rates are highest for asset sales, changes in net working capital, and net equity issues. Constrained firms have higher total savings rates than unconstrained companies. The authors also find that savings rates are positively related to whether firms perform R&D, multinational status, and protection for creditors and investors.

**Originality/value** – The results suggest that firms usually use multiple channels when they increase their savings as opposed to relying only on one channel.

**Keywords** Equity issues, International financial markets, Cash savings, Debt issues, Precautionary motive

**Paper type** Research paper

## 1. Introduction

This study examines cash savings from six potential sources of cash: net equity issues, net debt issues, internally generated cash flows, asset sales, changes in short-term debt, and changes in net working capital. We examine the magnitude of these savings rates, the relationships among the rates, and the effects of both firm-and country-level factors on saving rates.

Cash management has received a lot of attention in recent years. Part of the reason for this is the fact that cash and short-term investments represent a big part of a firm's balance sheet and the ratio of cash and short-term investments to total assets continues to get larger and larger. In our sample of firms for the period 1991-2010, the mean cash ratio (cash and short-term investments to lagged total assets) is 18.9 percent. Perhaps more importantly, the cash ratio has steadily increased. In 1991 this ratio was 12.9 percent and by 2010 it had increased to 20.5 percent, a 59 percent increase.

The problem with having a large amount of cash is that these assets earn a relatively small rate of return. In theory, investing in real assets should earn a much higher return. Also, in some cases, management may use the cash unwisely by spending it on unnecessary perks or worse still, expropriating it.



There has been a fair amount of literature devoted to understanding the determinants of cash holdings. Opler *et al.* (1999) and Dittmar *et al.* (2003) provide a detailed review of this literature. A more recent literature deals with a firm's desire to save cash.

Empirically, a number of studies have examined cash savings from one particular channel. Khurana *et al.* (2006) observe that the sensitivity of cash to cash flows is greater for firms residing in less developed financial economies than from more developed economies. Almeida *et al.* (2004) report a positive sensitivity of cash from cash flows for constrained firms but an insignificant relationship from unconstrained firms. Kim and Weisbach (2008) examine the cash sensitivity to equity issues and find that firms on average save 49 (53.4) cents per dollar from IPOs (SEOs).

A few studies have examined cash savings from multiple sources. McLean (2011) shows that cash savings from equity issues has increased dramatically from 23 cents per dollar in the 1970s to 60 cents per dollar during the period 1999-2008, a fact he attributes to increasing precautionary motives. None of the other sources of cash savings he studied exhibit the same time trend as equity issues. McLean (2011) also observes that when equity issuance costs are low, firms save more cash. Empirically, McLean and Zhao (2011) study the share issuance-cash savings relationship worldwide and find that this association is stronger when access to equity financing is greater.

We examine a number of hypotheses concerning factors affecting savings rates. We test if financially constrained firms save more than unconstrained firms. We ask whether good protection for suppliers of funds influence the savings rates. Furthermore, we explore the impact of a number of other firm-level variables (R&D, multinational status, and market-to-book (MB) ratios) and a country-level variable (whether a firm resides in a market or bank-based country) to see the effects of these variables on the savings rates. Our test of these variables is richer than previous studies because we look at the savings rates for the six channels (net equity issues, net debt issues, cash flow, asset sales, changes in short-term debt, and changes in net working capital) together instead of just looking at only one of these channels. Examining the six channels simultaneously allows us to see whether cash savings from one channel are usually associated with increases in other channels or whether changes in one channel are largely independent of changes in the other channels. Thus, a contribution of our paper is examining the decomposition of changes in savings.

Our main results can be summarized as follows. We observe first that the greatest source of cash saving is net equity issues while asset sales, changes in net working capital, and net issues have the highest savings rates. Changes in short-term debt do not have a positive savings rate. Instead changes in short-term debt appear to act as a substitute for cash savings. Savings rates are higher for financially constrained firms than for unconstrained firms. We see that firms save more in countries that have lower protection for creditors and minority shareholders. We also observe that savings rates depend positively on R&D expenditures and whether firms are multinational. Our results can be interpreted as evidence that firms increase their savings when they worry about whether they will have enough funds to cover future investments or essential activities which is consistent with a broad precautionary motive for saving.

The rest of the paper proceeds as follows: in Section 2, we develop hypotheses, in Section 3, we discuss data sources and our empirical design, in Section 4, we present our results, and finally, in Section 5, conclusions are offered.

## 2. Hypotheses

Firms that expect to raise external capital easily in the future do not have to worry now about saving for the future. On the other hand, firms that think they will have difficulty in raising future capital might consider saving now and forgoing marginally current profitable investments in order to fund future investment possibilities that might be more profitable. This is the argument that Almeida *et al.* (2004) make and suggest, therefore, that the cash flow sensitivity of cash should be positive for constrained firms but be insignificant for unconstrained firms. We extend this argument to other potential sources of funds. Constrained firms will probably have trouble raising funds now and also in the future. If they are lucky enough to be able to raise funds now they might consider, for example, in issuing more stock or more debt than they need now and then save the extra proceeds:

*H1.* Constrained firms will save more than unconstrained firms.

We next look at firm specific attributes that may influence savings rates. Our general principle is that future activities that are critical to a particular firm like R&D must be continued and resources need to be saved now in order to insure that these activities will be done in the future. For many firms R&D cannot be stopped and then restarted without the real possibility that the firm's leading scientists may seek employment elsewhere or that the firm will fall behind its leading competitors in the race for innovation:

*H2.* Firms with R&D expenditures will save more than firms with no R&D expenditures.

Similarly firms with very good investment opportunities in the future risk losing a lot of money if they do not undertake these opportunities. As a result, they will want to save additional money now in order to make sure that they can partake in these endeavors in the future:

*H3.* Firms with good investment opportunities will save more than firms with worse investment opportunities.

Pinkowitz *et al.* (2012) observe that US multinationals have increased abnormal cash holdings during the 2000s, a significant increase relative to foreign multinationals and other US firms. These authors are unable to provide a precise reason for this increase. At first glance it might appear that multinationals might have lower savings rates. Like multidivisional firms, multinationals provide diversification benefits and thus could have lower cash levels than other firms. Duchin (2010) shows that multidivisional firms have significantly less cash than stand-alone firms because they are diversified in their investment opportunities. On the other hand, multinationals by definition are involved in so many areas (products and locations) and face so much uncertainty that they may need extra precautionary funds. Furthermore, US multinationals can easily have more cash if they are trying to avoid additional taxes on repatriated income (Foley *et al.*, 2007) since the US Government allows multinationals to defer taxes on certain foreign income until it is actually repatriated back to the USA. We follow the lead of Pinkowitz *et al.* (2012) in the following hypothesis:

*H4.* Multinationals will save more than domestic firms.

We examine whether the market structure of countries has an impact on savings rates. In particular, we look at whether a firm resides in a market or a bank-based country.

Economists have debated extensively which system (market or bank-based) better promotes economic growth (see Beck and Levine, 2002 and Allen and Gale, 1999). We address a narrower question; whether there is any difference in the savings rates between these two systems. Rajan and Zingales (2001) argue that in bank-based systems, financing of firms occurs with a close relationship with banks, while in market-based systems, there is a wide range of potential lenders and financing available, which creates a competition in raising funds by firms, and in turn requires more information disclosure. According to proponents of market-based systems, this higher level competition and disclosure in the market-based financial system provide lower effective cost of financing than in a bank-based financial system (see Anderson and Gupta, 2009). Therefore, we conjecture that firms from bank-based countries would want to save more when they raise any type of financing to be able to avoid higher costs for future capital raising:

*H5.* Firms from bank-based countries will save more than firms from market-based countries.

We also look at the effect of investor and creditor protection on cash savings. In countries where protection is stronger, suppliers of capital should be more willing to lend and companies should, in general, believe that capital will be more accessible now as well as in the future. This greater accessibility of capital should allow firms residing in countries with greater protection of creditors and investors to save less:

*H6.* Firms residing in countries with less protection for creditors and investors will save more than firms located in countries with greater protection for creditors and investors.

### 3. Data sources and models

We gather financial data from *Worldscope* from 1991 to 2010 for 72 countries. Following the usual practice, financial firms and utilities are eliminated due to the regulatory influence on these firms. We winsorize our data for two reasons. First, *Worldscope* makes occasional reporting errors and second, there are significant outliers in our data. As a result, the top and bottom 5 percent of the values for a particular variable are set equal to the 95 and 5 percent levels, respectively for that variable.

Similar to McLean (2011) we initially estimate pooled time-series cross-sectional regression on yearly change in cash holdings over the period 1991-2010 from the following equation:

$$\text{ChCash}_{it} = a + b_1 \text{Net\_Issue}_{it} + b_2 \text{Net\_Debt}_{it} + b_3 \text{Cflow}_{it} + b_4 \text{AssetSales}_{it} \\ + b_5 \text{ChNWC}_{it} + b_6 \text{ChStDebt}_{it} + b_7 \text{LnSize}_{it} + b_8 \text{FD}_{it} + e_{it}$$

where  $\text{ChCash}_{it}$  is the change in cash and short-term investments from period  $t-1$  to  $t$  divided by total assets at time  $t-1$ ,  $\text{Net\_Issue}_{it}$  is the difference between new equity issues and redemptions at time  $t$  scaled by total assets at time  $t-1$ ,  $\text{Net\_Debt}_{it}$  is the difference between long-term borrowings and reductions in borrowing at time  $t$  scaled by total assets at time  $t-1$ ,  $\text{Cflow}_{it}$  is the cash flow for period  $t$  divided by total assets for period  $t-1$ ,  $\text{AssetSales}_{it}$  are the sales of property, plant and equipment scaled by total assets at time  $t-1$ ,  $\text{ChNWC}_{it}$  is the change in net working capital adjusted for cash and short-term debt scaled by total assets at time  $t-1$ ,  $\text{ChStDebt}_{it}$  is the change in short-term debt (short-term debt and the current portion of long-term debt) from period

$t-1$  to period  $t$  scaled by total assets at time  $t-1$ ,  $\text{LnSize}_{it}$  is the natural logarithm of total assets in US dollars, and  $\text{FD}_{it}$  is a country-level index of financial development composed of two components – a stock market development index and a financial intermediary index (see Table I for precise definitions).

We use net equity issues and net debt issues instead of the corresponding gross issues because the firm gets to use only the net numbers, for example, to acquire investments or save cash. If the firm issues ten million dollars in debt and then redeems three million dollars in debt, it has only seven million to use after the

Variable	Definition
CashRatio	Ratio of cash and short-term investments to total assets $(\text{Cash and short-term investments})_t / (\text{Total assets})_{t-1}$
ChCash	Change in cash $((\text{Cash and short-term investments})_t - (\text{Cash and short-term investments})_{t-1}) / (\text{Total assets})_{t-1}$
Gross_Issue	Ratio of gross stock issues (new equity issues) to total assets $(\text{Net proceeds from sale or issue of common and preferred stocks})_t / (\text{Total assets})_{t-1}$
Net_Issue	Ratio of net stock issues (new equity issues – repurchases) to total assets $((\text{Net proceeds from sale or issue of common and preferred stocks})_t - (\text{Stocks purchased, retired, converted, redeemed}))_t / (\text{Total assets})_{t-1}$
Gross_Debt	Ratio of gross debt issues to total assets $(\text{Long-term borrowings})_t / (\text{Total assets})_{t-1}$
Net_Debt	Ratio of net debt issues to total assets $((\text{Long-term borrowings})_t - (\text{Reduction in long-term debt}))_t / (\text{Total assets})_{t-1}$
CFlow	Cash Flows $(\text{Net income} + \text{depreciation, depletion, and amortization expense})_t / (\text{Total assets})_{t-1}$
AssetsSales	Disposal of Fixed Assets: The amount a company received from the sale of property, plant and equipment
ChNWC	Change in Net Working Capital Change in (current assets – cash) – change in (current liabilities – short-term debt)
ChStDebt	Change in short-term debt $((\text{Short-term debt and current portion of long-term debt})_t - (\text{Short-term debt and current portion of long-term debt})_{t-1}) / (\text{Total assets})_{t-1}$
LnSize	Size The natural logarithm of total assets in US dollars
FD	Financial development index The sum of stock market development index and financial intermediary development index and it is standardized to have a mean of 0 and a standard deviation of 1. For details see Khurana <i>et al.</i> (2006).
Financial constraint	Small and young vs large and old Classification is based on firms at the bottom and top 1/3 of observations based on age and size
R&D	R&D Intensity $(\text{Research and development expenditures})_t / (\text{Total assets})_{t-1}$
MB	Market-to-Book Ratio $(\text{Market value of common equity})_t / (\text{Book Value of common equity})_t$
Multinational status	Multinationals as firms with a ratio of foreign sales to total sales of at least 25% and domestic firms as companies with a corresponding percentage of less than or equal to 1 percent
Financial structure	Classification of countries based on bank-based and market-based financial structure
Law origin	Classification of countries based on civil or common law systems

**Table I.**  
Definitions  
of variables

redemptions, not ten million dollars. In those cases the firm is simply rolling over the debt (replacing old debt with new debt).

We use size to account for the possibility that there could be economies of scale in cash management. A country's financial development is included as a control due to Khurana *et al.* (2006) finding that cash savings from cash flows decrease with greater amounts of financial development.

## 4. Results

### 4.1 Descriptive statistics

Table II provides descriptive statistics for firm year observations for first, the entire sample, second, US firms, third, non-US firms, fourth, firms from bank-based countries and fifth, firms from market-based countries. US firms account for about 36 percent of all observations and firms from market-based countries represent 77 percent of the sample.

Our dependent variable is the yearly change in cash and short-term investments scaled by total assets in the previous year. The mean (median) change for the entire sample is 2.2 (0.2) percent. All four subsets (US, non-US, market-based, and bank-based) of the sample have mean changes of at least 1.7 percent, indicating that firms from around the world, as well as from different economic regimes, are generally increasing their percentage of cash and short-term investments.

Net equity issues (gross issues – redemptions) are positive for the entire sample with a mean (median) of 7.1 (0.0) percent. We find that means for net equity issues and gross equity issues are similar, implying that equity repurchases are not large in comparison to gross equity issues.

Table II reveals a substantial difference between gross debt issues and net debt issues. The mean for net debt (1.5 percent) is only 21 percent of the mean for gross debt (7.3 percent) suggesting that the great majority of debt that is issued simply replaces existing debt.

The findings indicate that in terms of mean numbers, the greatest source of new capital is net equity issues (7.1 percent). This is followed by the change in net working capital (1.7) percent by net debt issues (1.5 percent), by the change in short-term debt (1.1 percent), by cash flow (0.7 percent), and by asset sales (0.6 percent). Table III provides mean values of those sources and the change in cash across sample countries.

### 4.2 Coefficient estimations for cash savings from the different channels

Table IV provides estimates of the coefficients for cash savings from net equity issues, net debt, cash flow, asset sales, changes in short-term debt, and changes in working capital (minus cash and short-term debt). Panel A in Table IV presents pooled time-series cross-sectional estimates with country, industry, and year fixed effects while Panel B gives firm and year fixed effects estimates. We present first (column 1) in each panel the estimates for the entire period (1991-2010). The results indicate that cash savings rates in the aggregate are positive for all sources except from changes in short-term debt. Short-term debt would appear to be a substitute for cash (see Almeida *et al.* (2004)).

Looking at the estimates from column 1 in Panel A from Table IV, the coefficients for cash savings are largest for asset sales (0.40), net equity issues (0.37) and the change in net working capital (0.29). The coefficients from net debt and cash flow are both a little under 0.15.

**Table II.**  
Descriptive statistics

	Summary statistics for all observations											
	All sample ( $n = 256,530$ )		US firms ( $n = 92,012$ )		Non-US firms ( $n = 164,518$ )		Bank-based ( $n = 58,031$ )		Market-based ( $n = 197,873$ )			
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
<i>CashRatio</i>	0.189	0.104	0.222	0.108	0.171***	0.103***	0.169	0.117	0.195***	0.098***	0.195***	0.098***
<i>ChCash</i>	0.022	0.002	0.023	0.001	0.021***	0.003***	0.017	0.003	0.023***	0.002**	0.023***	0.002**
<i>Gross_Issue</i>	0.075	0.000	0.107	0.005	0.057***	0.000***	0.024	0.000	0.090***	0.002***	0.090***	0.002***
<i>Net_Issue</i>	0.071	0.000	0.100	0.001	0.055***	0.000***	0.022	0.000	0.085***	0.000***	0.085***	0.000***
<i>Gross_Debt</i>	0.073	0.002	0.089	0.000	0.064***	0.004***	0.064	0.012	0.075***	0.000***	0.075***	0.000***
<i>Net_Debt</i>	0.015	0.000	0.017	0.000	0.013***	0.000***	0.010	0.000	0.016***	0.000***	0.016***	0.000***
<i>CFlow</i>	0.007	0.072	-0.068	0.063	0.048***	0.075***	0.073	0.072	-0.013***	0.071***	-0.013***	0.071***
<i>AssetsSales</i>	0.006	0.000	0.005	0.000	0.006***	0.000***	0.006	0.001	0.006***	0.000***	0.006***	0.000***
<i>ChNWC</i>	0.017	0.003	0.023	0.003	0.014***	0.003***	0.009	0.001	0.020***	0.004***	0.020***	0.004***
<i>ChStDebt</i>	0.011	0.000	0.012	0.000	0.011*	0.000***	0.008	0.000	0.012***	0.000***	0.012***	0.000***
<i>LnSize</i>	5.051	5.117	4.725	4.801	5.233***	5.250***	6.031	6.017	4.763***	4.768***	4.763***	4.768***
<i>R&amp;D</i>	0.023	0.000	0.043	0.000	0.012***	0.000***	0.014	0.000	0.026***	0.000***	0.026***	0.000***
<i>MB</i>	2.195	1.492	2.553	1.792	1.995***	1.372***	1.908	1.394	2.279***	1.533***	2.279***	1.533***

**Notes:** This table reports the mean and median values of selected variables for the entire sample and for various other samples. Definitions of the variables are given in Table I. Stars indicate significant differences between US and Non-US firms or between bank and market-based countries. \*, \*\*, \*\*\*: Statistical significant at the 10, 5, and 1 percent levels, respectively



Country	<i>n</i>	<i>ChCash</i>	<i>Net_Issue</i>	<i>Net_Debt</i>	<i>CashFlow</i>	<i>AssetsSales</i>	<i>ChNWC</i>	<i>ChStDebt</i>
Argentina	514	0.019	0.009	0.009	0.089	0.003	0.023	0.017
Australia	11,819	0.031	0.163	0.016	-0.070	0.007	0.019	0.009
Austria	457	0.010	0.019	0.014	0.081	0.009	0.014	0.011
Bahrain	15	0.041	-0.005	0.002	0.192	0.001	-0.015	0.002
Belgium	730	0.014	0.027	0.006	0.086	0.008	0.005	0.003
Bermuda	337	0.035	0.111	0.034	0.013	0.012	0.028	0.013
Brazil	1,824	0.069	0.044	0.034	0.081	0.002	0.089	0.046
Bulgaria	2	-0.052	0.021	0.044	0.063	0.000	-0.020	0.032
Canada	9,751	0.030	0.134	0.017	0.001	0.004	0.018	0.008
Cayman Isl.	84	0.029	0.091	0.036	0.040	0.009	0.030	0.011
Channel Isl.	13	0.014	0.042	-0.002	0.089	0.000	0.012	-0.002
Chile	1,342	0.014	0.020	0.013	0.103	0.005	0.008	0.010
China	5,781	0.046	0.049	0.026	0.085	0.003	0.045	0.021
Colombia	255	0.016	0.016	0.017	0.086	0.005	0.013	0.009
Czech Republic	91	0.012	0.000	0.007	0.084	0.001	0.024	0.009
Denmark	1,640	0.008	0.025	0.012	0.083	0.007	0.009	0.009
Egypt	241	0.029	0.021	0.008	0.157	0.003	0.013	0.011
Estonia	20	0.023	0.082	0.011	0.103	0.012	-0.008	0.001
Finland	1,455	0.009	0.018	0.005	0.094	0.009	0.008	0.006
France	5,531	0.014	0.020	0.008	0.078	0.006	0.013	0.008
Germany	3,875	0.013	0.031	0.008	0.073	0.008	0.007	0.006
Greece	464	0.014	0.032	0.032	0.070	0.010	0.028	0.017
Hong Kong	8,749	0.038	0.074	0.018	0.021	0.008	0.013	0.012
Hungary	217	0.012	0.029	0.011	0.084	0.010	0.011	0.010
Iceland	42	0.026	0.056	0.061	0.061	0.009	0.064	0.042
India	8,192	0.019	0.034	0.036	0.097	0.006	0.012	0.022
Indonesia	3,121	0.023	0.026	0.008	0.067	0.006	0.021	0.022
Ireland	1,149	0.030	0.087	0.023	0.028	0.006	0.016	0.007
Israel	822	0.028	0.048	0.018	0.063	0.004	0.013	0.009
Italy	2,253	0.010	0.023	0.009	0.062	0.005	0.017	0.012
Japan	1,9611	0.006	0.007	0.001	0.057	0.005	-0.005	-0.001
Jordan	93	0.012	0.004	-0.004	0.125	0.003	0.003	0.013
Korea (South)	8,136	0.022	0.035	0.023	0.054	0.008	0.025	0.020
Kuwait	162	0.031	0.035	0.039	0.100	0.005	0.056	0.030
Liechtenstein	7	0.027	-0.001	0.022	0.141	0.000	0.046	0.020
Lithuania	9	0.019	-0.003	0.030	0.194	0.015	0.066	0.029
Luxembourg	166	0.039	0.039	0.015	0.105	0.006	0.034	0.010
Malaysia	8,516	0.013	0.021	0.009	0.053	0.007	0.015	0.014
Mexico	1,537	0.015	0.021	0.015	0.086	0.003	0.013	0.013
Morocco	84	0.008	0.003	0.020	0.141	0.008	0.037	0.013
The Netherlands	2,678	0.016	0.038	0.012	0.098	0.007	0.017	0.010
New Zealand	807	0.007	0.030	0.014	0.092	0.007	0.004	0.007
Norway	1,490	0.024	0.057	0.026	0.074	0.009	0.014	0.009
Oman	69	0.037	0.007	0.019	0.181	0.000	0.050	0.013
Pakistan	891	0.021	0.012	0.012	0.116	0.004	0.027	0.022
Peru	440	0.026	0.015	0.014	0.139	0.004	0.020	0.015
Philippines	1,671	0.016	0.025	0.010	0.034	0.004	0.011	0.009
Poland	552	0.025	0.053	0.019	0.102	0.009	0.004	0.014
Portugal	545	0.004	0.016	0.024	0.075	0.005	0.027	0.017

(continued)

Table III.  
Sample countries  
and cash saving

Country	<i>n</i>	<i>ChCash</i>	<i>Net_Issue</i>	<i>Net_Debt</i>	<i>CashFlow</i>	<i>AssetsSales</i>	<i>ChNWC</i>	<i>ChStDebt</i>
Qatar	84	0.028	0.049	0.047	0.135	0.006	0.011	0.019
Romania	5	-0.032	0.000	0.029	0.138	0.000	-0.034	-0.002
Russia	289	0.038	0.036	0.045	0.143	0.004	0.040	0.023
Saudi Arabia	285	0.018	0.027	0.020	0.124	0.005	0.010	0.010
Singapore	5,227	0.024	0.043	0.011	0.062	0.009	0.007	0.011
Slovakia	26	0.004	0.005	-0.002	0.092	0.005	0.004	0.000
Slovenia	77	-0.004	0.003	0.024	0.056	0.006	0.011	0.016
South Africa	2,918	0.023	0.033	0.012	0.122	0.007	0.018	0.012
Spain	941	0.014	0.020	0.019	0.086	0.008	0.019	0.011
Sri Lanka	217	0.019	0.024	0.013	0.101	0.006	0.022	0.024
Sweden	2,139	0.013	0.041	0.009	0.073	0.006	-0.001	0.002
Switzerland	1,940	0.011	0.016	0.003	0.082	0.006	0.006	0.003
Taiwan	6,632	0.027	0.016	0.017	0.090	0.005	0.007	0.012
Thailand	4,187	0.011	0.024	0.006	0.089	0.004	0.013	0.014
Turkey	776	0.041	0.024	0.021	0.106	0.007	0.017	0.034
Untd. Arab. Em.	81	0.025	0.038	0.024	0.108	0.003	0.011	0.011
UK	25,801	0.022	0.089	0.009	0.017	0.006	0.018	0.008
USA	86,314	0.023	0.103	0.017	-0.077	0.005	0.023	0.012
Venezuela	159	0.021	0.002	0.006	0.091	0.004	0.020	0.020
Vietnam	17	0.104	0.035	0.071	0.210	0.000	0.138	0.034
Virgin Islands	26	0.045	0.139	-0.004	0.033	0.001	0.063	0.022
Zimbabwe	139	0.146	0.052	0.017	0.120	0.019	0.012	0.084
Total	256,530	0.022	0.071	0.015	0.007	0.006	0.017	0.011

**Table III.** Notes: This table reports mean values of selected variables. Definitions of the variables are given in Table I

Panels A and B also examine the impact of the recent economic crisis on savings rates. We present estimates for each period separately (during the crisis in column 3 and before the crisis in column 4). We also create a dummy variable that equals 1 when the observation occurs between 2007 and 2010 and equals 0 if the observation does not. We then interact the dummy with each of the sources of funds. These results are reported in column 2. We employ an *F*-test to see if the coefficients in total have changed as a result of the economic crisis. The results of the *F*-tests that the sum of the coefficients (labeled  $\beta_1$ - $\beta_6$ ) for the six interaction variables is not significantly different from zero suggest that savings rates in total did increase as a result of the economic crisis. The savings rate for the change in net working capital was the only channel that had a significant negative coefficient. It is likely that firms increased their savings rates in total because economic prospects were dim during this period and firms saved more than they anticipated. In results not reported, we redid this analysis using different time periods (e.g. just the years 2008-2009) to represent the economic crisis and our findings were similar.

So far we have not considered the possibility that cash savings could be affected by past cash savings decisions. If firms have an optimal level of cash then unusually large increases in cash might be expected to be followed, on average, by smaller or even negative increases in cash the following year.

As a result we estimate cash savings rates using a linear dynamic model developed by Arellano and Bover (1995) and Blundell and Bond (1998). Table V reports our results. All of the independent variables are considered exogenous. In columns 1 and 3 we allow for one lag of the dependent variable while in columns 2 and 4 three lags as covariates. In columns 3 and 4 we also test to see if the economic crisis affected the cash savings rates.

	1991-2010	2007-2010	1991-2006	
<i>Panel A: estimates with country, year and industry effects</i>				
Constant	-0.016 (0.008)**	-0.017 (0.007)**	-0.025 (0.014)*	-0.024 (0.009)***
Net_Issue	0.366 (0.003)***	0.368 (0.003)***	0.364 (0.006)***	0.366 (0.003)***
Net_Debt	0.131 (0.004)***	0.126 (0.004)***	0.150 (0.009)***	0.127 (0.004)***
CashFlow	0.144 (0.002)***	0.141 (0.002)***	0.157 (0.004)***	0.140 (0.002)***
AssetsSales	0.397 (0.019)***	0.387 (0.020)***	0.465 (0.046)***	0.383 (0.020)***
ChNWC	0.286 (0.003)***	0.290 (0.004)***	0.267 (0.006)***	0.290 (0.004)***
ChStDebt	-0.444 (0.007)***	-0.448 (0.007)***	-0.436 (0.014)***	-0.447 (0.007)***
LnSize	0.001 (0.000)***	0.001 (0.000)***	0.001 (0.000)**	0.001 (0.000)***
FD	0.000 (0.001)	0.001 (0.000)**	0.003 (0.002)	-0.002 (0.001)***
D2007-10		-0.002 (0.001)**		
Net_Issue × D2007-10 ( $\beta_1$ )		-0.002 (0.006)		
Net_Debt × D2007-10 ( $\beta_2$ )		0.020 (0.010)**		
Cflow × D2007-10 ( $\beta_3$ )		0.016 (0.004)***		
AssetsSales × D2007-10 ( $\beta_4$ )		0.079 (0.048)		
ChNWC × D2007-10 ( $\beta_5$ )		-0.021 (0.007)***		
ChStDebt × D2007-10 ( $\beta_6$ )		0.006 (0.015)		
Adjusted R <sup>2</sup>	0.338	0.336	0.31	0.346
Observations	235,069	235,069	43,207	191,862
F-test ( $\beta_1$ ) + ( $\beta_2$ ) + ( $\beta_3$ ) + ( $\beta_4$ ) + ( $\beta_5$ ) + ( $\beta_6$ ) = 0		3.51*		
Country	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Year	Yes	No	Yes	Yes
Firm	No	No	No	No
<i>Panel B: estimates with firm and year effects</i>				
Constant	-0.063 (0.004)***	-0.066 (0.003)***	-0.269 (0.029)***	-0.075 (0.004)***
Net_Issue	0.400 (0.003)***	0.400 (0.003)***	0.429 (0.012)***	0.396 (0.004)***
Net_Debt	0.149 (0.005)***	0.144 (0.005)***	0.171 (0.018)***	0.144 (0.005)***
CashFlow	0.130 (0.003)***	0.128 (0.003)***	0.120 (0.013)***	0.126 (0.004)***
AssetsSales	0.642 (0.025)***	0.607 (0.027)***	0.895 (0.103)***	0.639 (0.028)***
ChNWC	0.285 (0.004)***	0.292 (0.004)***	0.269 (0.011)***	0.295 (0.004)***
ChStDebt	-0.457 (0.008)***	-0.462 (0.008)***	-0.477 (0.027)***	-0.466 (0.008)***
LnSize	0.011 (0.001)***	0.011 (0.001)***	0.050 (0.006)***	0.012 (0.001)***
FD	-0.003 (0.001)***	-0.004 (0.001)***	0.005 (0.003)	-0.006 (0.001)***
D2007-10		-0.006 (0.001)***		
Net_Issue × D2007-10 ( $\beta_1$ )		-0.003 (0.007)		
Net_Debt × D2007-10 ( $\beta_2$ )		0.020 (0.012)*		
Cflow × D2007-10 ( $\beta_3$ )		0.014 (0.005)***		
AssetsSales × D2007-10 ( $\beta_4$ )		0.174 (0.058)***		
ChNWC × D2007-10 ( $\beta_5$ )		-0.030 (0.008)***		
ChStDebt × D2007-10 ( $\beta_6$ )		0.003 (0.019)		
Adjusted R <sup>2</sup>	0.357	0.356	0.327	0.378
Observations	235,069	235,069	43,207	191,862
F-test ( $\beta_1$ ) + ( $\beta_2$ ) + ( $\beta_3$ ) + ( $\beta_4$ ) + ( $\beta_5$ ) + ( $\beta_6$ ) = 0		8.34***		
Country	No	No	No	No
Industry	No	No	No	No
Year	Yes	No	Yes	Yes
Firm	Yes	Yes	Yes	Yes

**Notes:** This table reports pooled time-series cross-sectional estimates for the change in cash (*ChCash*). Panel A reports the results by controlling for country, year and industry effects, and panel B reports the results by controlling for firm and year fixed effects. *D2007-10* is a dummy variable that takes a value of 1 for the years 2007-2010 and 0 for the other years. Year dummies are excluded in models where a dummy for the crisis years is introduced. Standard errors reported in parentheses are clustered at the firm-level. Definitions of the other variables are given in Table I. \*\*\*, \*\*, \* Statistical significance at the 10, 5, and 1 percent levels, respectively

**Table IV.** Cash savings for the entire period and before and after the crisis period

<i>LAG1.ChCash</i>	-0.069 (0.004)***	-0.092 (0.006)***	-0.069 (0.004)***	-0.096 (0.006)***
<i>LAG2.ChCash</i>		-0.034 (0.004)***		-0.040 (0.004)***
<i>LAG3.ChCash</i>		-0.013 (0.003)***		-0.018 (0.003)***
<i>Net_Issue</i>	0.316 (0.004)***	0.336 (0.006)***	0.305 (0.005)***	0.319 (0.006)***
<i>LAG1.Net_Issue</i>	-0.021 (0.003)***	-0.016 (0.004)***	-0.024 (0.003)***	-0.018 (0.004)***
<i>Net_Debt</i>	0.087 (0.006)***	0.078 (0.007)***	0.083 (0.006)***	0.072 (0.007)***
<i>LAG1.Net_Debt</i>	-0.004 (0.004)	-0.010 (0.005)*	-0.004 (0.004)	-0.008 (0.005)
<i>CashFlow</i>	0.096 (0.004)***	0.113 (0.005)***	0.097 (0.004)***	0.116 (0.005)***
<i>LAG1.CashFlow</i>	-0.007 (0.003)*	-0.006 (0.004)	-0.005 (0.003)	-0.001 (0.004)
<i>AssetsSales</i>	0.737 (0.029)***	0.717 (0.033)***	0.703 (0.031)***	0.684 (0.036)***
<i>LAG1.AssetsSales</i>	-0.016 (0.028)	-0.054 (0.030)*	-0.031 (0.028)	-0.071 (0.030)**
<i>ChNWC</i>	0.294 (0.004)***	0.291 (0.005)***	0.305 (0.004)***	0.306 (0.005)***
<i>LAG1.ChNWC</i>	0.012 (0.004)***	0.004 (0.004)	0.013 (0.004)***	0.006 (0.004)
<i>ChStDebt</i>	-0.527 (0.009)***	-0.521 (0.010)***	-0.540 (0.009)***	-0.541 (0.012)***
<i>LAG1.ChStDebt</i>	-0.01 (0.007)	-0.004 (0.009)	-0.011 (0.007)	-0.005 (0.009)
<i>LnSize</i>	0.085 (0.002)***	0.085 (0.003)***	0.082 (0.002)***	0.081 (0.003)***
<i>LAG1.LnSize</i>	-0.088 (0.002)***	-0.082 (0.003)***	-0.090 (0.002)***	-0.085 (0.003)***
<i>FD</i>	0.002 (0.001)	0.001 (0.001)	0.004 (0.001)***	0.003 (0.001)***
<i>LAG1.FD</i>	0.002 (0.001)*	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)*
<i>D2007-10</i>			-0.009 (0.001)***	-0.008 (0.001)***
<i>Net_Issue × D2007-10 (β<sub>1</sub>)</i>			0.038 (0.008)***	0.039 (0.010)***
<i>Net_Debt × D2007-10 (β<sub>2</sub>)</i>			0.014 (0.014)	0.018 (0.015)
<i>Cflow × D2007-10 (β<sub>3</sub>)</i>			0.01 (0.007)	0.004 (0.008)
<i>AssetsSales × D2007-10 (β<sub>4</sub>)</i>			0.102 (0.070)	0.079 (0.074)
<i>ChNWC × D2007-10 (β<sub>5</sub>)</i>			-0.037 (0.009)***	-0.048 (0.010)***
<i>ChStDebt × D2007-10 (β<sub>6</sub>)</i>			0.036 (0.021)*	0.056 (0.023)**
<i>Observations</i>	195,077	138,288	195,077	138,288
<i>F-test (β<sub>1</sub>) + (β<sub>2</sub>) + (β<sub>3</sub>) + (β<sub>4</sub>) + (β<sub>5</sub>) + (β<sub>6</sub>) = 0</i>			4.72**	3.53*

**Notes:** This table reports Arellano-Bover/Blundell-Bond linear dynamic panel-data estimation for the change in cash (ChCash). Standard error reported in parentheses are derived based on generalized method of moments (GMM) estimation. D2007-10 is a dummy variable that takes a value of 1 for the years 2007-2010 and 0 for the other years. Definitions of the other variables are given in Table I. \*, \*\*, \*\*\*Statistical significance at the 10, 5, and 1 percent levels, respectively

**Table V.**  
Linear dynamic  
panel-data estimation

The lags of the cash variable are all negative and significant. Our estimates for the coefficients of the six cash channels are roughly similar in magnitude to the ones in Panels A and B in Table IV. The coefficients on the lags of the six channels are all negative and often significant with the exception of the coefficients on the lags of the change in net working capital which are positive. The coefficients on the contemporaneous variables for the six channels are all much bigger than the coefficients for the lag variables. Finally, our results suggest that the savings rates, in total, increased during the economic crisis.

#### 4.3 Tests of the hypotheses

We next examine our hypotheses and these results are presented in Panels A-F of Table VI. To test our hypotheses we use fixed effects regressions. In each panel we give the results from three equations. The first equation is our basic equation for testing our hypotheses. In this equation, we focus on the estimated coefficients of the interaction terms between the dummies representing the variables (characteristics) in our hypotheses and the sources of cash savings. The last two equations in each panel

	Panel A: the role of financial constraints			Panel B: the role of R&D		
	Combined sample	Constraint	Unconstraint	All observations	Positive RD	Zero and missing
Constant	0.03 (0.030)	-0.126 (0.009)***	-0.087 (0.013)***	-0.059 (0.003)***	-0.112 (0.006)***	-0.043 (0.003)***
Net_Issue	0.279 (0.027)***	0.390 (0.009)***	0.259 (0.027)***	0.361 (0.004)***	0.466 (0.005)***	0.355 (0.004)***
Net_Debt	0.061 (0.015)***	0.180 (0.026)***	0.113 (0.012)***	0.114 (0.005)***	0.231 (0.010)***	0.112 (0.006)***
CashFlow	0.174 (0.015)***	0.084 (0.010)***	0.176 (0.015)***	0.106 (0.004)***	0.156 (0.006)***	0.110 (0.004)***
AssetsSales	0.401 (0.071)***	0.873 (0.154)***	0.422 (0.066)***	0.593 (0.031)***	0.703 (0.050)***	0.578 (0.032)***
Ch1NWC	0.444 (0.018)***	0.234 (0.011)***	0.454 (0.019)***	0.295 (0.007)***	0.292 (0.007)***	0.296 (0.005)***
ChSI/Debt	-0.617 (0.031)***	-0.448 (0.029)***	-0.628 (0.030)***	-0.458 (0.009)***	-0.481 (0.016)***	-0.457 (0.010)***
LnSize		0.041 (0.004)***	0.010 (0.002)***	0.011 (0.001)***	0.018 (0.001)***	0.007 (0.001)***
FD	-0.002 (0.001)	-0.018 (0.004)***	0.002 (0.001)**	-0.004 (0.000)***	-0.009 (0.001)***	0.00 (0.001)
CHARACTERISTIC	-0.106 (0.060)*			-0.021 (0.001)***		
Net_Issue x CHARACTERISTIC ( $\beta_1$ )	0.125 (0.028)***			0.092 (0.006)***		
Net_Debt x CHARACTERISTIC ( $\beta_2$ )	0.150 (0.017)***			0.094 (0.007)***		
Cflow x CHARACTERISTIC ( $\beta_3$ )	-0.065 (0.017)***			0.063 (0.005)***		
AssetsSales x CHARACTERISTIC ( $\beta_4$ )	0.457 (0.149)***			0.028 (0.053)		
Ch1NWC x CHARACTERISTIC ( $\beta_5$ )	-0.206 (0.020)***			-0.006 (0.008)		
ChSI/Debt x CHARACTERISTIC ( $\beta_6$ )	0.194 (0.039)***			-0.008 (0.016)		
Adjusted R <sup>2</sup>	0.408	0.357	0.347	0.362	0.394	0.351
Observations	39,648	19,913	19,633	235,069	87,348	147,721
F-test ( $\beta_1 + \beta_2 + \beta_3 + \beta_4 + \beta_5 + \beta_6 = 0$ )	16.45***			21.84***		

  

	Panel C: the role of market-to-book ratio (MB)			Panel D: the role of multinational status		
	Combined sample	High MB	Low MB	All observations	MNC	Domestic
Constant	-0.076 (0.004)***	-0.113 (0.007)***	-0.049 (0.007)***	-0.071 (0.005)***	-0.051 (0.008)***	-0.087 (0.006)***
Net_Issue	0.257 (0.008)***	0.472 (0.005)***	0.253 (0.009)***	0.378 (0.006)***	0.413 (0.008)***	0.375 (0.006)***
Net_Debt	0.142 (0.007)***	0.180 (0.011)***	0.142 (0.011)***	0.137 (0.007)***	0.159 (0.010)***	0.133 (0.010)***
CashFlow	0.120 (0.005)***	0.145 (0.007)***	0.126 (0.007)***	0.124 (0.006)***	0.196 (0.008)***	0.120 (0.007)***
AssetsSales	0.699 (0.044)***	0.561 (0.062)***	0.711 (0.050)***	0.584 (0.051)***	0.622 (0.047)***	0.585 (0.055)***
Ch1NWC	0.257 (0.006)***	0.305 (0.008)***	0.260 (0.007)***	0.261 (0.007)***	0.359 (0.009)***	0.259 (0.007)***
ChSI/Debt	-0.406 (0.013)***	-0.519 (0.017)***	-0.413 (0.015)***	-0.458 (0.015)***	-0.537 (0.016)***	-0.458 (0.016)***
LnSize	0.013 (0.001)***	0.019 (0.001)***	0.008 (0.001)***	0.013 (0.001)***	0.006 (0.001)***	0.018 (0.001)***
FD	-0.003 (0.001)***	-0.008 (0.001)***	0.001 (0.001)	-0.004 (0.001)***	-0.001 (0.001)	-0.006 (0.001)***
CHARACTERISTIC	-0.003 (0.001)**			-0.013 (0.003)***		

(continued)

Channels of cash savings

Table VI. Decompositions of cash savings by firm or country characteristics

Table VI.

$Net\_Issue \times CHARACTERISTIC (\beta_1)$	0.203 (0.008)***			0.039 (0.009)***			
$Net\_Debt \times CHARACTERISTIC (\beta_2)$	0.028 (0.007)***			0.017 (0.007)**			
$Cflow \times CHARACTERISTIC (\beta_3)$	0.024 (0.006)***			0.066 (0.009)***			
$AssetsSales \times CHARACTERISTIC (\beta_4)$	-0.195 (0.063)***			0.041 (0.065)			
$ChNWc \times CHARACTERISTIC (\beta_5)$	0.027 (0.008)***			0.089 (0.010)***			
$ChSIdebt \times CHARACTERISTIC (\beta_6)$	-0.088 (0.019)***			-0.069 (0.020)***			
Adjusted $R^2$	0.374	0.444	0.255	0.349	0.407	0.322	
Observations	146,729	74,422	72,307	130,435	59,011	71,424	
$F\text{-test } (\beta_1) + (\beta_2) + (\beta_3) + (\beta_4) + (\beta_5) + (\beta_6) = 0$	0.01			6.90***			
<i>Panel E: the role of financial structure</i>							
	All observations	Bank	Market	All observations	Civil	Common	
Constant	-0.016 (0.007)**	-0.018 (0.008)**	-0.018 (0.008)**	-0.016 (0.007)**	-0.011 (0.007)	-0.019 (0.008)**	
$Net\_Issue$	0.364 (0.003)***	0.422 (0.010)***	0.364 (0.003)***	0.362 (0.003)***	0.402 (0.009)***	0.363 (0.003)***	
$Net\_Debt$	0.122 (0.004)***	0.169 (0.010)***	0.120 (0.005)***	0.122 (0.005)***	0.154 (0.008)***	0.120 (0.005)***	
$CashFlow$	0.136 (0.002)***	0.206 (0.009)***	0.135 (0.002)***	0.134 (0.002)***	0.199 (0.007)***	0.132 (0.002)***	
$AssetsSales$	0.405 (0.022)***	0.318 (0.038)***	0.396 (0.023)***	0.412 (0.024)***	0.346 (0.032)***	0.400 (0.025)***	
$ChNWc$	0.286 (0.004)***	0.344 (0.009)***	0.286 (0.004)***	0.284 (0.004)***	0.338 (0.008)***	0.283 (0.004)***	
$ChSIdebt$	-0.451 (0.008)***	-0.482 (0.017)***	-0.451 (0.008)***	-0.461 (0.008)***	-0.455 (0.014)***	-0.461 (0.008)***	
$LnSize$	0.001 (0.000)***	0.00 (0.000)	0.001 (0.000)***	0.001 (0.000)***	-0.001 (0.000)***	0.001 (0.000)***	
$FD$	0.001 (0.000)*	0.001 (0.001)	0.00 (0.000)	0.001 (0.000)	0.001 (0.001)*	0.00 (0.000)	
$CHARACTERISTIC$	-0.018 (0.005)***			-0.016 (0.004)***			
$Net\_Issue \times CHARACTERISTIC (\beta_1)$	0.059 (0.009)***			0.045 (0.008)***			
$Net\_Debt \times CHARACTERISTIC (\beta_2)$	0.028 (0.007)***			0.019 (0.006)***			
$Cflow \times CHARACTERISTIC (\beta_3)$	0.073 (0.008)***			0.071 (0.007)***			
$AssetsSales \times CHARACTERISTIC (\beta_4)$	-0.150 (0.039)***			-0.117 (0.037)***			
$ChNWc \times CHARACTERISTIC (\beta_5)$	0.054 (0.009)***			0.048 (0.008)***			
$ChSIdebt \times CHARACTERISTIC (\beta_6)$	-0.030 (0.017)*			0.01 (0.015)			
Adjusted $R^2$	0.337	0.376	0.333	0.338	0.373	0.332	
Observations	235,037	41,818	193,219	235,037	60,538	174,499	
$F\text{-Test } (\beta_1) + (\beta_2) + (\beta_3) + (\beta_4) + (\beta_5) + (\beta_6) = 0$	0.64			3.59***			

**Notes:** This table reports pooled time-series cross-sectional estimates for the change in cash (ChCash) by controlling for firm fixed effects. All estimates include the dummy for the crisis years (2007-2007) and its interactions with the sources of cash, but the coefficients of those variables are not reported to save space. Standard errors given in parentheses are clustered at the firm level. Definitions of variables are given in Table I. \*, \*\*, \*\*\*: Statistical significance at the 10, 5, and 1 percent levels, respectively

present the separate results dependent on whether the observation is included in the dummy variable. All regressions include tests of the impact of the economic crisis but these results are not reported in order to save space.

*4.3.1 Savings rates of financially constrained and unconstrained firms.* We first examine whether savings rates for financially constrained firms are higher than for unconstrained firms (*H1*). To distinguish between financially constrained and unconstrained firms, we classify firms as constrained (unconstrained) if they are both young and small (old and large). Specifically a firm is designated as constrained (unconstrained) if it is in the bottom (top) third of firms according to age and also according to size. Firms can move from one group to another if circumstances change. Hadlock and Pierce (2010) compare various measures to detect firms that are financially constrained and conclude that these two measures (size and age) are the best indicators.

In Panel A, we use all firm observations that belong to either the small/young group or the large/old group and the dummy variable is equal to 1 if the observation is part of the small/young group. The results in Panel A suggest that constrained firms (small and young firms) save more (higher total savings rates) than unconstrained firms. The *F*-test for the combined effect of the six channels is significant at the 1 percent level in column 1.

As an alternative to using size and age, we examine whether a firm has a debt rating. In unreported results, we find that the total savings rate for firms that do not have a debt rating (constrained firms) is greater than the total savings rate for firms that have a debt rating (unconstrained).

*4.3.2 R&D expenditures.* In Panel B of Table VI we conduct tests to see whether firms that engage in R&D save more cash than firms that do “no” R&D. We examine this question by interacting variables for the sources of funds with R&D. We classify firms into two groups: first, those who report zero R&D or who have missing values for R&D in a given year and second, those who report positive values for R&D in a given year. Firm observations that report a positive value for R&D represent the dummy variable.

The results in Panel B indicate that firms that do R&D save more cash than firms that do “no” R&D. The *F*-test on the sum of all six coefficients is significant at the 1 percent level. We repeated our analysis using only observations where the firm explicitly reported a number for R&D (missing R&D numbers were excluded) and the results were the same.

*4.3.3 MB.* We use MB ratios as proxies for investment opportunities. We analyze only firm observations in the top and bottom tercile. We create a dummy variable in Panel C that equals 1 when the MB ratio is in the top third of all observations and equals zero otherwise.

The *F*-test in Panel C shows that firms with high MB ratios save the same as firms with low MB ratios. Our evidence is not consistent with the idea (*H3*) that firms with better investment opportunities save more than firms with worse investment opportunities.

MB ratios have also been used as indicators of market timing. High MB ratios would then indicate that firms that have high valuations might issue equity to take advantage of these high valuations. The savings rate from net issues would be higher because firms were issuing equity not only for current needs but also to take advantage of the high valuations. Our results (significant positive coefficient on Net Issue  $\times$  MB,  $\beta_1$ ), then, are consistent with a market timing explanation for saving from net issues. Kim and Weisbach (2008) provide evidence for this hypothesis using a sample of IPOs and SEOs.

*4.3.4 Multinational status.* In this section we examine whether multinationals save more or less than domestic firms. We define multinationals as firms with a ratio of foreign sales to total sales of at least 25 percent and domestic firms as companies with a

corresponding percentage of less than or equal to 1 percent. Firms with foreign sales percentages between 1 and 25 percent are excluded from this analysis, as we want to have a big distinction between domestic and multinational firms.

In Panel D we create a dummy variable that equals 1 when the firm is defined to be a multinational firm and 0 when the firm is a domestic firm. Multinationals save more than domestic firms. The  $F$ -test is significant (at the 1 percent level).

*4.3.5 Market-based countries vs bank-based countries.* We next examine whether market structure (market-based or bank-based) affects firms' savings rates. In Panel E the dummy variable equals 1 for firms residing in bank-based countries and 0 for firms in market-based countries. The  $F$ -test is not significant and suggest that firms in bank-based countries have similar savings rates, in total, as firms in market-based ones.

*4.3.6 Investor protection.* We look next at whether firms from countries that provide better protection to investors and creditors save less than firms residing in countries that offer less protection. Common law countries are presumed to have greater investor protection for both creditors and outside investors as well as have better enforcement mechanisms (La Porta *et al.*, 2008). As a result in Panel F, we construct a dummy variable that equals 1 if the firm is located in a civil law country and 0 otherwise.

The findings indicate that firms in civil law countries have higher savings rates in total than firms in common law countries. The  $F$ -test is significant at the 5 percent level.

#### *4.4 Individual savings coefficients*

In the previous section we analyzed the net (overall) effect of the coefficients from the six savings channels. In this section we explore the individual savings coefficients. Based on our results from the panels of Table VI, firms always increased their savings from new issues and net debt according to our hypotheses and only once did the savings rate from cash flow decrease according to our hypotheses (Panel A). However, the savings rates from asset sales, changes in working capital and changes in short-term debt sometimes increased and sometimes decreased in line with our hypotheses. Our results show that firms use a variety of channels to increase their cash savings as opposed to using only one channel.

#### *4.5 Impact of size and financial development on changes in cash and short-term investments*

The coefficient for size has generally a significant positive sign in our study, implying that larger firms generally increase cash and short-term investments more than smaller firms. These results are similar to those reported for US firms in McLean (2011). Financial development has a mixed impact on the ability of firms to increase their cash and short-term investments.

#### *4.6 Non-US results*

US companies account for 36 percent of all observations. It is important to see if our findings are being driven by the US observations. As a result, we redo Panel B of Table IV with only non-US observations and in unreported results, our findings mirror those of Panel B in Table IV.

### **5. Conclusions**

The purpose of our paper is to examine savings rates from six sources – net equity issues, net debt issues, cash flow, asset sales, changes in net working capital, and changes in short-term debt. Previous research has tended to examine only one channel



of savings at a time. Our research, in contrast, examines these six channels at the same time and this is a major contribution of our study.

We find that the biggest source of new funds is net equity issues. Another contribution of our paper is our finding that savings rates are highest for asset sales, net equity issues, and changes in net working capital. The savings rate for the change in short-term debt is negative implying that short-term debt acts as a substitute for cash.

We observe that constrained firms have higher savings rates in total than unconstrained firms. Our findings are consistent with the hypothesis that constrained firms worry about the possibility of not being able to fund future investments and thus save more now to minimize this problem.

We find that savings rates depend positively on R&D, multinational status, and whether firms reside in civil law countries. Overall our results suggest that firms that have critical activities or important opportunities in the future save more now to make sure they can perform those activities later.

Like many international research investigations, one limitation of our study is that our financial data suffers from the fact that countries have different accounting rules and practices that sometimes make comparisons difficult. *Worldscope* tries to minimize this issue.

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### Further reading

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