The Allocation of Cash Flow by Spanish Firms: New Evidence on the Impact of Financial Frictions

Martin Farias
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Introduction

- Cash flow is one of the main sources of financing for firms
  - → Competitive uses of cash flow: Cash savings, investment, debt repayment, and dividend distribution

- Financial frictions imply costly and limited external financing
  - ⇒ The allocation of cash flow becomes a key determinant of corporate decisions

- Fazzari *et al* (1998) find that firms with financial constraints show greater sensitivity of investment to cash flow
  - → An extensive literature has tried to confirm this finding and characterize similar patterns concerning other uses of cash flow

This Paper

Questions

① **How does the allocation of cash flow change when firms face greater financial frictions?**

② **Is the relationship between financial frictions and cash flow allocation by firms heterogeneous?**

- I use data from Spanish firms from 2003 to 2019

    → I characterize the allocation of marginal cash flow among alternative uses

    → I estimate the average effect of financial frictions on the allocation of cash flow

    → I explore how the effects of financial frictions on cash flow allocation vary based on relevant firm characteristics

Main Results

❶ The Allocation of Cash Flow
From a marginal unit of cash flow, 29 cents go to cash savings, 44 to investment, 23 to debt repayment, and 4 to dividends

❷ Average Effects of Financial Frictions
On average, greater financial frictions are associated with an increase in the sensitivity of debt repayment to cash flow and with decreases in the sensitivities of the other uses

❸ Heterogeneous Effects of Financial Frictions
I document substantial heterogeneity in the effects of financial frictions on cash flow allocation across relevant firm characteristics

$\rightarrow$ The results are useful for improving the design of policies aimed at promoting investment or deleveraging by firms (e.g., the direct aid lines implemented by the Spanish government in response to the COVID-19 crisis)

Data Sources

Data Sources

- I use data from the *Central de Balances Integrada* (provided by the Bank of Spain)

    ○ Balance sheets and income statements of Spanish firms for 2003-2012

- I focus on private for-profit firms. I exclude certain sectors (e.g., Financial, Education, Health)

- I apply a set of filters to exclude observations with unreliable information

    ○ These filters verify some basic accounting identities

- I require firms to have at least 5 observations to be part of the sample

    ○ This is to ensure sufficient information to measure firm-level fixed effects

- The final sample consists of 2,919,644 observations from 341,562 firms

The Allocation of Marginal Cash Flow

The Allocation of Marginal Cash Flow

- The empirical analysis is based on a **cash flow identity**:

$$CF_t = \Delta Cash_t + Investment_t - \Delta Debt_t + Dividends_t.$$

- The basic specifications derived from this identity are:

$$\Delta Cash_{it} = \beta_1 CF_{it} + \gamma_1 X_{i,t-1} + f_{1,i} + \lambda_{1,t} + \epsilon_{1,it}$$
$$Investment_{it} = \beta_2 CF_{it} + \gamma_2 X_{i,t-1} + f_{2,i} + \lambda_{2,t} + \epsilon_{2,it}$$
$$-\Delta Debt_{it} = \beta_3 CF_{it} + \gamma_3 X_{i,t-1} + f_{3,i} + \lambda_{3,t} + \epsilon_{3,it}$$
$$Dividends_{it} = \beta_4 CF_{it} + \gamma_4 X_{i,t-1} + f_{4,i} + \lambda_{4,t} + \epsilon_{4,it}$$

- Control variables $X_{i,t-1}$: Ln(Assets), asset tangibility, leverage, sales growth
- Estimated separately by OLS (equivalent to SUR estimation)
- The $\beta's$ are **cash flow sensitivities**, and must satisfy

$$\beta_1 + \beta_2 + \beta_3 + \beta_4 = 1$$

The Allocation of Marginal Cash Flow

- From a marginal unit of cash flow, 29 cents go to cash savings, 44 to investment, 23 to debt repayment, and 4 to dividends
  - Cash flow sensitivities sum to 1
  - Estimates are in line with existing evidence (e.g., Chang *et al*, 2014)

	Dependent Variable:			
	$\Delta Cash$	Investment	$-\Delta Debt$	Dividends
	(1)	(2)	(3)	(4)
$CF_{i,t}$	0.29***	0.44***	0.23***	0.04***
	(1.3e-3)	(2.1e-3)	(2.3e-3)	(7e-4)
Controls	Yes	Yes	Yes	Yes
Fixed effects				
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	2,919,644	2,919,644	2,919,644	2,919,644
R^2	0.279	0.273	0.248	0.261

The Impact of Financial Frictions on the Allocation of Cash Flow

The Impact of Financial Frictions on the Allocation of Cash Flow: Measuring Financial Frictions

- In the absence of direct measures of financial frictions, the literature typically relies on *proxies*

- I use the *Size-Age (SA)* index created by Hadlock and Pierce (2010):

$$SA_{it} = -0.737 x Ln(Assets) + 0.043 x Ln(Assets)^2 - 0.04 x Age$$

  ○ Interpretation: Higher values of $SA_{it} \implies$ stricter financial frictions

    → Captures the idea that younger and smaller firms are more likely to face financial frictions

  ○ I verify that the SA index correlates with firm characteristics typically associated with financial constraints (e.g., leverage, cash holdings) Table

The Impact of Financial Frictions on the Allocation of Cash Flow: Average Effects

- An increase of 1 unit in the SA index is associated with
  - an increase of 6 cents in the sensitivity of debt repayment to cash flow
  - decreases of 2, 3, and 1 cents in the sensitivities of cash savings, investment, and dividends to cash flow, respectively
- The results are consistent with theories that emphasize the value firms place on financial flexibility
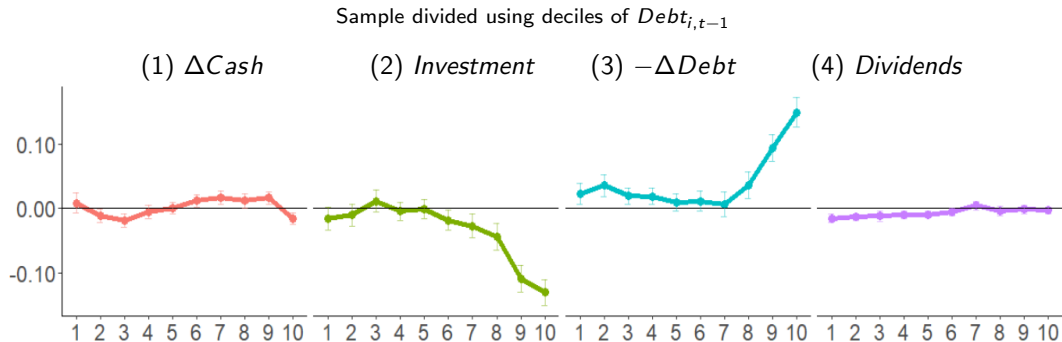
	$\Delta Cash$	Inverstment	$-\Delta Debt$	Dividends
$CF_{i,t}$	0.24***	0.33***	0.38***	0.05***
	(0.001)	(0.002)	(0.002)	(0.001)
$SA_{i,t}$	-0.23***	-0.54***	0.75***	0.02***
	(0.001)	(0.002)	(0.002)	(4e-4)
$CF_{i,t} \times SA_{i,t}$	-0.02***	-0.03***	0.06***	-0.01***
	(0.001)	(0.002)	(0.003)	(0.001)
Controls & Fixed effects	Yes	Yes	Yes	Yes
Observations	2,919,644	2,919,644	2,919,644	2,919,644
R^2	0.332	0.389	0.506	0.255

The Impact of Financial Frictions on the Allocation of Cash Flow: Heterogeneous Effects

- On average, higher values of the SA index are associated with an increase in the sensitivity of debt repayment to cash flow
  - → **Can this result be generalized to all firms?**

- I measure heterogeneity through variables that characterize the firm's condition

  - Leverage, cash holdings, capital stock, and sales growth

  - Taking each variable one at a time

    - → I divide the sample into deciles (using lags of the variable)
    - → I estimate the average effect of financial frictions on cash flow allocation in each decile
    - → I compare the coefficient associated with $CF_{i,t} \times SA_{i,t}$ across deciles

The Impact of Financial Frictions on the Allocation of Cash Flow: Heterogeneous Effects Across Leverage

- Changes in the SA index have small effects on cash flow allocation for firms in the lower deciles of leverage
- For firms in the higher deciles of leverage, changes in the SA index are associated with
  - $\rightarrow$ an increase in the sensitivity of debt repayment to cash flow
  - $\rightarrow$ a decrease in the sensitivity of investment to cash flow

Sample divided using deciles of $Debt_{i,t-1}$

(1) $\Delta Cash$ (2) $Investment$ (3) $-\Delta Debt$ (4) $Dividends$

The Impact of Financial Frictions on the Allocation of Cash Flow: Discussion about Policy Relevance

- The results are useful for improving the design of policies aimed at promoting investment or deleveraging of firms

  ○ For example, cash transfers used to guarantee the solvency of firms implemented by the Spanish government in response to the COVID-19 crisis

    → Among them, there was one program aimed at repaying debts incurred since March 2020 (payments to suppliers, utilities, wages, rents, or financial debt reduction)

- Understanding the allocation of cash flow (and the effects of financial frictions on it) is crucial to anticipate how different firms will use these transfers differently

  ○ For example, firms with high levels of leverage are more likely to use resources to repay debt

  ⇒ **This can help improve the targeting of these policies, increasing their effectiveness**

Additional Analysis

Additional Analysis

- Decomposition of cash flow into persistent and transitory components
  - All uses except debt repayment are more sensitive to the persistent component than to the transitory one `Results`

- Disaggregation of Investment into real investment, financial investment, and trade credit provision
  - All previous findings apply to real investment
  - Trade credit provision is a relevant use of cash flow `Results`

- Test of lags in the response to cash flow changes
  - Real investment and debt repayment increase with cash flow lags, at the expense of less cash savings and trade credit provision `Results`

- Test of asymmetric cash flow sensitivities
  - Firms rely heavily on external financing when facing negative cash flows `Results`

Conclusions and
remarks to statistical producers

Conclusions and remarks to statistical producers

- I use data from Spanish non-financial firms to answer two questions
  1. **How does cash flow allocation change when firms face greater financial frictions?**
  2. **Is the relationship between financial frictions and cash flow allocation heterogeneous across firms?**

- On average, greater financial frictions are associated with ↑ sensitivity of debt repayment to cash flow and ↓ sensitivities of the rest of the uses to cash flow

- I document the existence of heterogeneity in the effects of financial frictions on cash flow allocation across variables that characterize the firm's condition

- I discuss how the results are useful for improving the targeting of policies aimed at promoting investment or deleveraging of firms

Conclusions and remarks to statistical producers

- The main weakness of the analysis is the imperfect measurement of financial frictions

- Better measures of financial frictions could be derived from the information contained in other datasets such as

    ○ Survey on the access to finance of enterprises (SAFE)

    ○ Banco de España Survey on Business Activity (EBAE)

- Currently, it is not possible to merge the *Central de Balances Integrada* with SAFE or EBAE

    ○ **Being able to merge these datasets while guaranteeing confindentiality would make the *Central de Balances Integrada* a much more appealing dataset and would greatly benefit the research community**

Another Related Project

"Decoding Distress: The Behavior of Firms Preceding Bankruptcy"

❶ **What characteristics of firms predict bankruptcy filing?**

❷ **What is the typical dynamics of firms in the years leading up to bankruptcy filing?**

- I use data from Spanish firms from 2003 to 2019 (*Integrated Central Balance Sheet*)

- I estimate a model to predict the decision to enter bankruptcy

  → I identify the most important predictors: net equity, profitability, liquidity, investment, aggregate credit, among others

- I provide a graphical description of the typical dynamics of firms in the 5 years before entering bankruptcy

  → Firms enter bankruptcy only after experiencing severe financial difficulties (large reductions in profitability and net equity)

    ⇒ Consistent with the view that Spanish firms use bankruptcy as a last resort

    ⇒ **The results invite reflection on the effectiveness of the Spanish bankruptcy law in restructuring viable firms in time**

Appendix

Relationship between the Financial Frictions Index (SA Index) and Firm Characteristics

Dependent Variable	Explanatory Variable: $SA_{i,t}$			
	Period:			
	2003-2019	2003-2007	2008-2012	2013-2019
	(1)	(2)	(3)	(4)
Sales growth$_{i,t}$	-0.005***	-0.001**	-0.006***	-0.006***
	(2e-4)	(4e-4)	(5e-4)	(3e-4)
Real Investment$_{i,t}$	-0.003***	3e-4	-0.002***	-0.004***
	(1e-4)	(2e-4)	(2e-4)	(2e-4)
Cash flow$_{i,t}$	-0.003***	0.003***	-0.008***	-0.003***
	(2e-4)	(2e-4)	(3e-4)	(2e-4)
Positive Dividends$_{i,t}$	-0.056***	-0.056***	-0.054***	-0.056***
	(5e-4)	(9e-4)	(8e-4)	(6e-4)
Cash$_{i,t}$	0.004**	0.007***	0.002***	0.004***
	(4e-4)	(5e-4)	(5e-4)	(5e-4)
Debt$_{i,t}$	0.083***	0.037***	0.082***	0.105***
	(1.0e-3)	(1.1e-4)	(1.3e-4)	(1.4e-4)

Back

The Allocation of the Transitory and Persistent Components of Cash Flow

	Dependent Variable:			
	$\Delta Cash$	Investment	$-\Delta Debt$	Dividends
$TranYestory_{i,t}$	0.27***	0.43***	0.27***	0.04***
	(0.002)	(0.003)	(0.003)	(8e-4)
$PerYesstent_{i,t}$	0.31***	0.45***	0.18***	0.06***
	(0.002)	(0.003)	(0.004)	(0.001)
Controls & Fixed effects	Yes	Yes	Yes	Yes
Observations	2,919,644	2,919,644	2,919,644	2,919,644
R^2	0.278	0.274	0.247	0.261

Back

The Allocation of the Three Components of Investment: Real Investment, Financial Investment, and Provision of Trade Credit

	Dependent Variable:		
	Real Investment	*Financial Investment*	*Δ Account Receivables*
CF_t	0.23***	0.01***	0.19***
	(1.6e-4)	(4e-4)	(1.5e-4)
Controls & Fixed effects	Yes	Yes	Yes
Observations	2,919,644	2,919,644	2,919,644
R^2	0.252	0.11	40.165

Dynamic Effects in the Allocation of Cash Flow Across Competing Uses

	Dependent Variable:					
	Δ Efectivo	Real Investment	Financial Investment	Δ Account Receivables	$-\Delta$ Debt	Dividends
	(1)	(2)	(3)	(4)	(5)	(6)
CF_t	0.29***	0.23***	0.01***	0.22***	0.22***	0.04***
	(0.001)	(0.002)	(4e-4)	(0.002)	(0.002)	(7e-4)
CF_{t-1}	5e-5	0.03***	2.8e-3***	-0.11***	0.07***	0.01***
	(0.001)	(0.001)	(4e-4)	(0.001)	(0.002)	(6e-4)
CF_{t-2}	0.02***	0.01***	1e-4	-0.03***	4.6e-3***	-3.8e-3***
	(0.001)	(0.001)	(4e-4)	(0.001)	(0.002)	(6e-4)
Controls & Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,919,644	2,919,644	2,919,644	2,919,644	2,919,644	2,919,644
R^2	0.279	0.252	0.114	0.171	0.249	0.261

The Allocation of Marginal Cash Flow: Asymmetries Between Positive and Negative Flows

	Dependent Variable:			
	$\Delta Cash$	Investment	$-\Delta Debt$	Dividends
	(1)	(2)	(3)	(4)
$CF_{i,t}$	0.45***	0.49***	0.02***	0.04***
	(0.002)	(0.003)	(0.003)	(9e-4)
$NEG_{i,t}$	-4e-4	1.7e-3***	-2.0e-3**	1e-3***
	(2e-4)	(4e-4)	(5e-4)	(2e-4)
$CF_{i,t} \times NEG_{i,t}$	-0.35***	-0.10***	0.45***	-2e-4
	(0.003)	(0.005)	(0.005)	(0.002)
Controls & Fixed effects	Yes	Yes	Yes	Yes
Observations	2,919,644	2,919,644	2,919,644	2,919,644
R^2	0.289	0.274	0.255	0.261