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Financial Flexibility and Investment Ability of Firms across the euro area and the UK

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Disclaimer: The views expressed are my own and do not necessarily reflect those of the ECB or the Eurosystem.

What is financial flexibility?

- It refers to the ability of firms to respond to unexpected changes in cash flows and investment opportunity set
- Survey studies suggest that managers are concerned with the ability to secure additional financing when deciding on capital structure
- Companies may adopt a conservative leverage policy to maintain “substantial reserves of untapped borrowing power”

Why do we care?

- Financial flexibility is very important in enabling the companies to undertake investment in the future, when asymmetric information and contracting problems might otherwise force them to forego profitable growth opportunities

Previous studies and our approach

1. Financial Flexibility (FF) can be achieved in alternative ways:
   - Marchica-Mura, 2010; Denis-McKeon, 2012: capital structure;
   - Ang-Smedema, 2011; Brown-Petersen, 2011: cash management
   - Arslan-Ayaydin et al., 2014: leverage and cash holding
   - Kahl et al., 2014: commercial paper

2. Survey evidence: FF is primary driver of leverage choices (e.g., Graham-Harvey, 2001; Bancel-Mittoo, 2004; Brounen et al., 2006)

➢ *All policies create an "**intertemporal dependence**" between financial and investment decisions*

Our analysis:

1. New evidence on how the value of FF attained through a conservative leverage policy varies across firms and countries that face different degrees of expected financial constraints
2. New evidence that FF status might help companies to reduce the negative impact of exogenous liquidity shock as severe as the most recent financial crisis

Definitions: Financial Flexibility status

FF dummy is equal to one if a firm shows a low leverage policy for a number of consecutive years.

Intuition:

- the demand for financial flexibility is an unobservable factor that depends on manager's assessment of growth opportunities.
- in a capital structure model, it can be indirectly captured by the negative deviations between the actual level of leverage and the estimated target leverage (the residuals).

Policy vs Transitory change:

deviations to be larger than 5% (alternatively 10%)

negative deviations for at least 3 years – FF3 (alternatively 4 and 5 years – FF4, FF5)

In our sample more than 15% of firms are financially flexible.

Three questions:

1. Which companies benefit the most from being financially flexible?

2. Does the value of being financially flexible differ across firms and countries?

3. Does the financial flexibility status provide a buffer during unexpected liquidity shocks?

Our empirical investigation

Two stages:

1. Identification of low leverage and financially flexible firms
   - Leverage function
   - Financial flexibility status dummy (FF)

2. Value of financial flexibility
   - Investment model augmented by FF

1. Firms characteristics (private/public; size, age)
2. Euro area versus UK
3. Before / After the crisis

Data

- Accounting data for all companies are from Amadeus with data available during 1995-2014.

- Amadeus covers European private and publicly traded companies without any size restriction.

- Data quality tests:

– requirement of at least 3 consecutive (year) observations to compute our measure of FF.

- Final sample:

– 13.487.838 firm-year observations with 3.344.517 unique firms across 7 euro area countries and the UK

  - The euro area countries cover almost 84% of the total gross fixed capital formation

Sample characteristics

	No firms	No obs	% Private	Size	Age
Belgium	59297	227271	99.69	7.87	21.12
Finland	83033	271165	99.63	6.2	16.01
France	1179167	5439526	99.89	5.96	14.22
Germany	53732	176699	96.88	9.1	26.82
Italy	844315	3324154	99.93	7.08	15.43
Portugal	239924	691221	99.96	6	15.21
Spain	818139	3140841	99.95	6.58	12.3
UK	66910	216961	97.4	8.91	23.73
Total	3344517	13487838			
Sample mean			99.2	7.21	18.1

Source: Amadeus BvD, authors' calculations.

Descriptive statistics

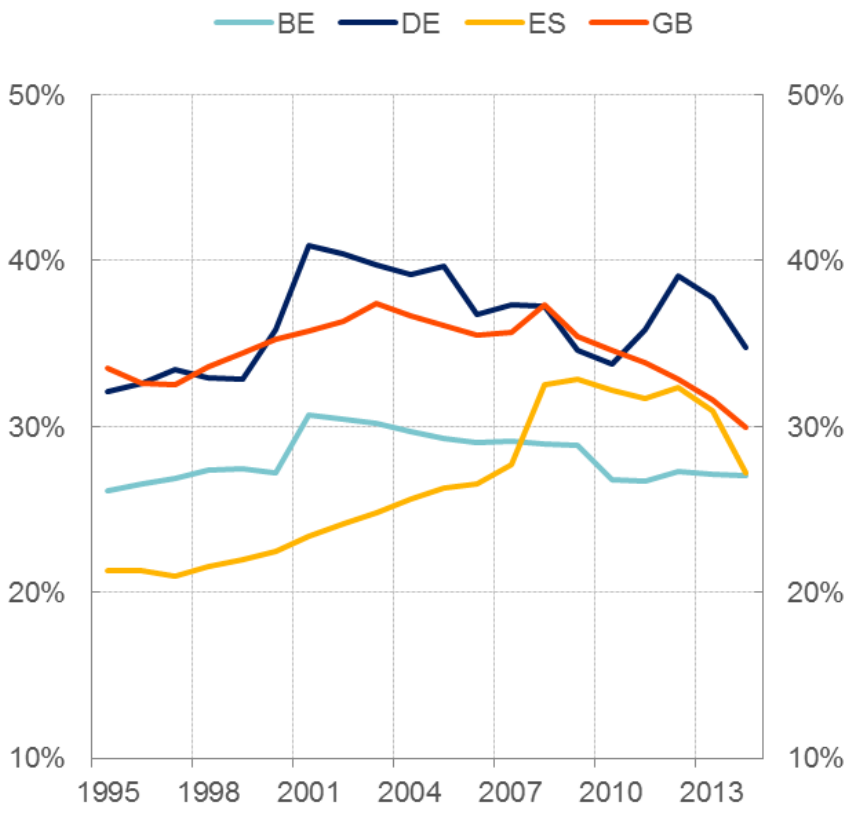
	positive leverage			All		
	mean	median	sd	mean	median	sd
Leverage	0.23	0.17	0.21	0.16	0.08	0.2
Sales growth	0.15	0.03	0.89	0.16	0.03	0.92
Size	6.78	6.55	1.78	6.53	6.34	1.78
Tangibility	0.24	0.16	0.25	0.22	0.13	0.24
Profitability	0.1	0.09	0.14	0.1	0.09	0.16
Ndts	0.05	0.03	0.04	0.04	0.03	0.04
Tax	0.23	0.23	0.41	0.24	0.23	0.42
Cash	0.13	0.06	0.16	0.16	0.08	0.19

	Mean	Median	sd	Min	Max
capital expenditures to capital stock	0.18	0.09	0.24	0	2.67
cash flow over capital stock	0.64	0.28	1.42	-2.27	9.23
sales growth	0.04	0.03	0.23	-0.99	0.57

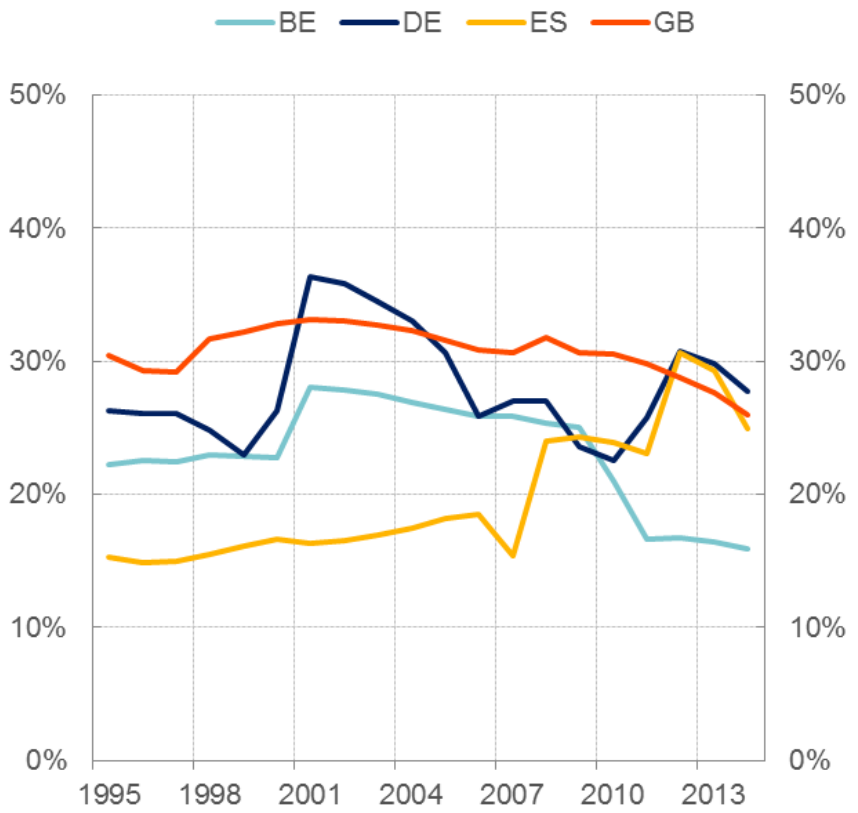
Source: Amadeus BvD, authors' calculations. Simple averages for the period 1995-2014.

Leverage across countries (i)

With positive leverage



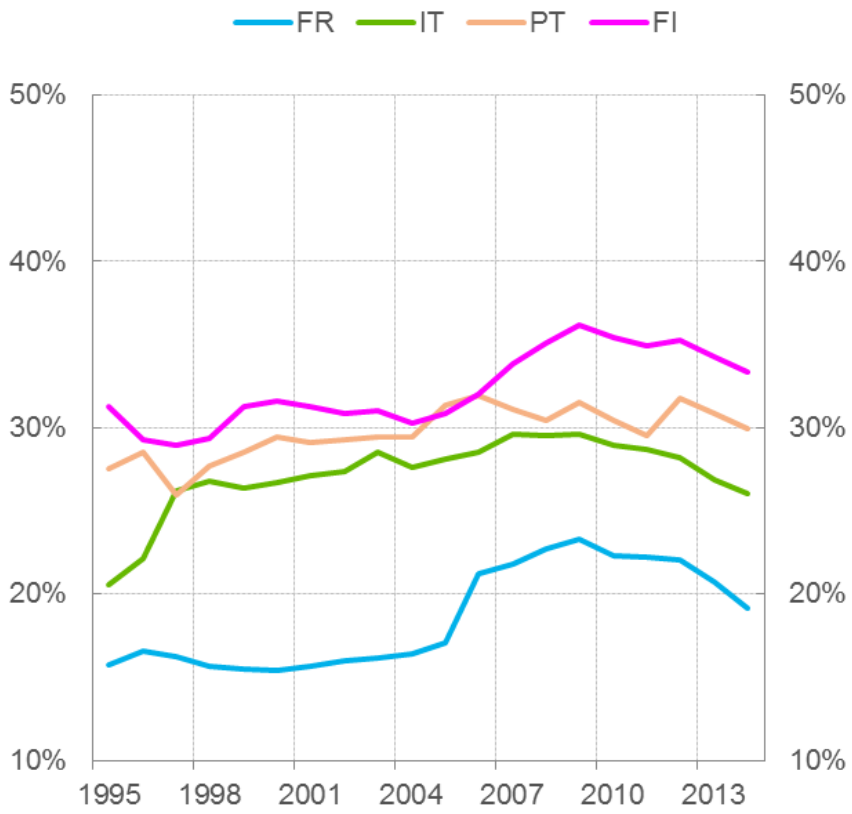
All firms



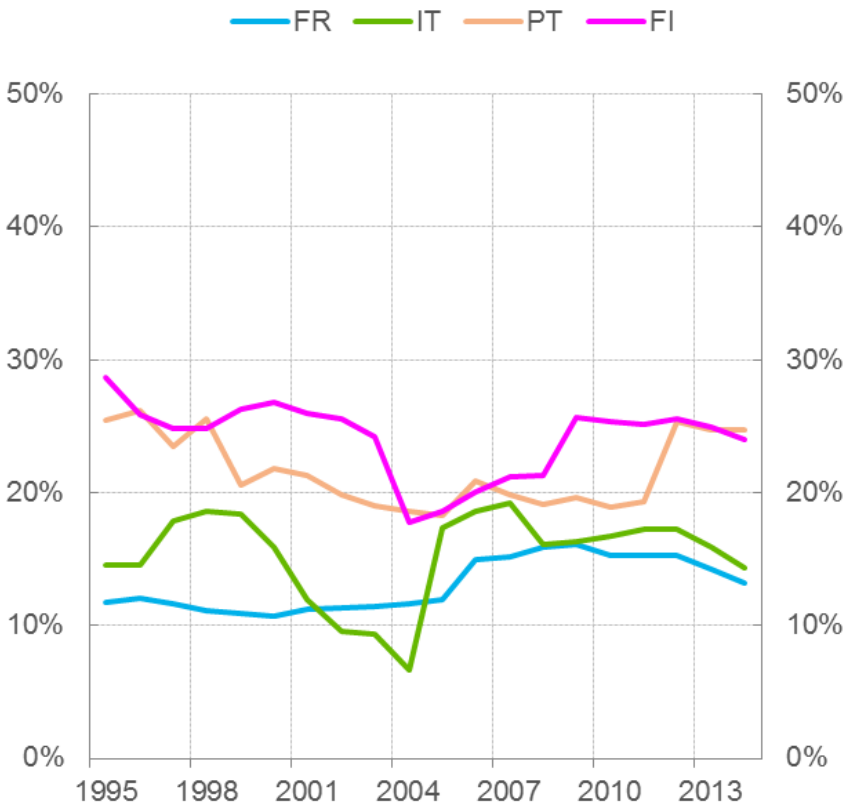
Source: Amadeus BvD, authors' calculations. Simple averages.

Leverage across countries (ii)

With positive leverage

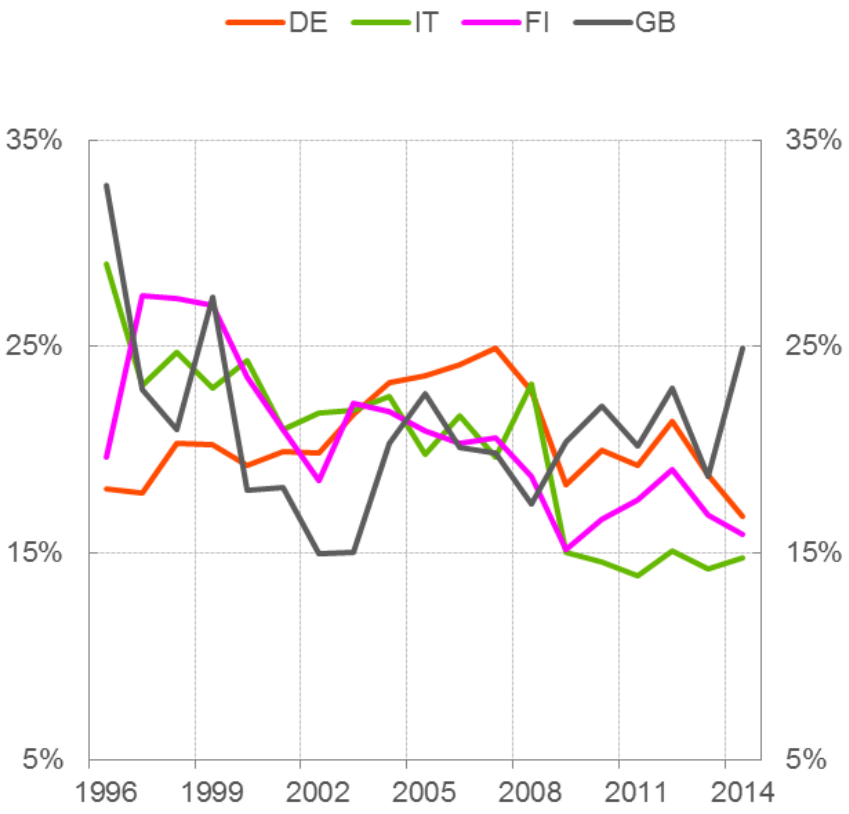


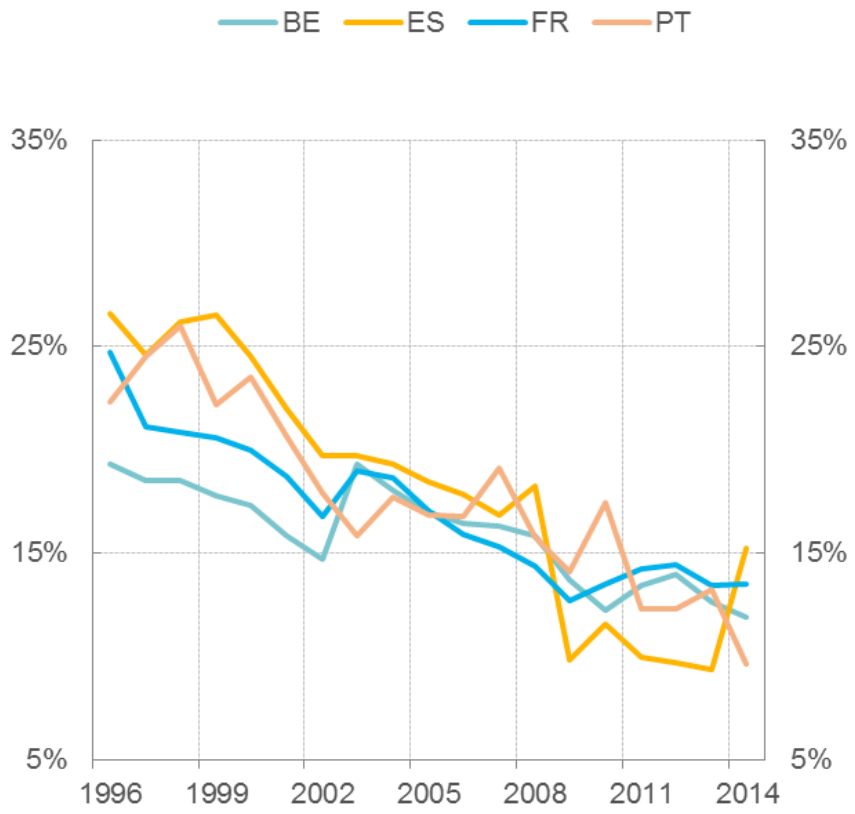
All firms



Source: Amadeus BvD, authors' calculations. Simple averages.

Investment across countries





investment is defined as the ratio of capital expenditure to the beginning-of-year capital stock. Capital stock is constructed using the perpetual inventory method.

Source: Amadeus, authors' calculations. Simple averages.

To capture the targeting behaviour of firms

$$Leverage_{ict} = \beta_0 Leverage_{ict-1} + \sum_{k=1}^{K} \beta_k X_{kict} + \eta_i + \eta_t + \nu_{ict}$$

As in Flannery and Rangan, 2006, control variables are:

Sales growth
Size
Tangibility
Profitability
Taxation
Ndts (Depreciation)
Cash

Baseline estimation: leverage function

	Belgium	Germany	Spain	Finland	France	UK	Italy	Portugal
Leverage t-1	0.734***	0.387***	0.736***	0.681***	0.498***	0.581***	0.544***	0.530***
Sales Growth	0.072***	0.015	0.026***	0.046***	0.055***	0.021***	0.025***	0.034***
Size	0.004***	-0.014***	0.004***	-0.001	-0.005***	0.003*	0.016***	0.006***
Tangibility	0.134***	0.150***	0.068***	0.099***	0.196***	0.059***	0.091***	0.053***
Profitability	-0.048**	-0.127***	0.082***	-0.01	0.096***	-0.093***	-0.025***	-0.008
Ndts	-0.195***	-0.02	-0.258***	-0.023	-0.149***	0.08	-0.032*	-0.203***
TAX	0.007	0.008	0.012*	0.133***	-0.003	-0.033	0.004	-0.008
Cash	-0.027***	-0.160***	-0.029***	-0.098***	-0.057***	-0.118***	-0.126***	-0.135***
Observations	161196	120512	2142004	174143	4119428	143616	2447026	421676
N of firms	48291	45958	662006	60292	1088356	54483	802169	178060
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes. GMM system estimator.
* indicates significance at the 10% level; ** at the 5% and *** 1% level.

How do we define financial flexibility status?

Following Faulkender, Flannery, Hankins and Smith (2012)

Low-leverage (LL) firms have a negative deviation between actual and predicted leverage

We expect the systematic component of deviation due to unobserved effect of financial flexibility:

- deviations larger than 5%

Financial flexible dummy (FF) takes value 1 if LL firms for at least 3 consecutive years

- for robustness checks: up to 5 years

Financially flexible firms at country level

	FF3	FF4	FF5
Belgium	11.8%	8.1%	5.8%
Finland	9.4%	5.4%	3.3%
France	19.9%	12.9%	8.6%
Germany	10.4%	12.9%	8.6%
Italy	12.9%	7.9%	4.8%
Portugal	7.2%	4.1%	2.3%
Spain	15.2%	9.5%	5.9%
Euro area	15.6%	9.8%	6.3%
UK	9.8%	5.5%	3.5%

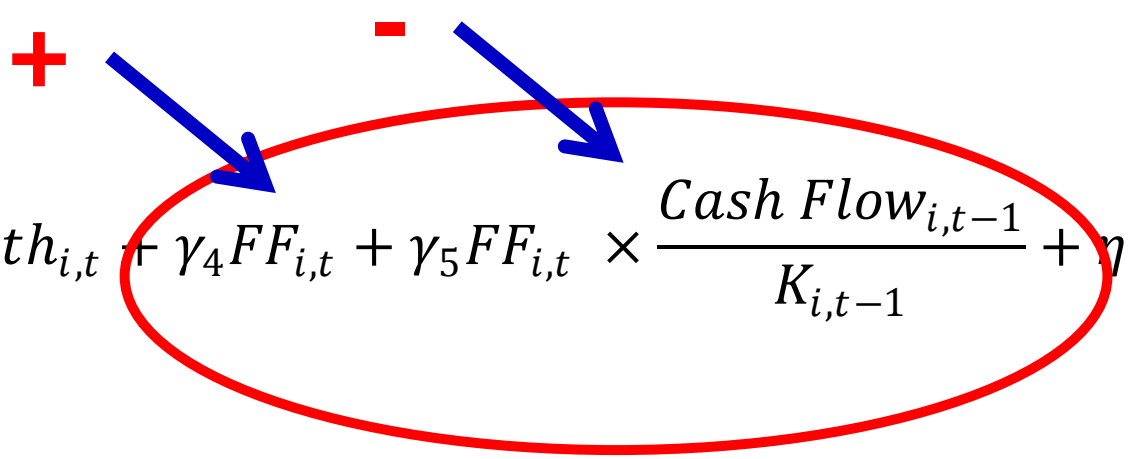
We define a firm as LL (lower-levered) if the negative deviation between actual and predicted leverage is larger than 5%. FF3, FF4 and FF5 are dummies that take the value of 1 when we observe at least three, four or five consecutive periods respectively in which the firm is classified as LL.

Financially flexible firms by ownership, size and age

	Private	Public	Small	Medium	Large	Young	Established	Mature
FF3	15%	26%	10%	14%	19%	7%	11%	19%
FF4	10%	18%	6%	8%	13%	3%	6%	12%
FF5	6%	13%	3%	5%	9%	1%	3%	8%

We define a firm as LL (lower-levered) if the negative deviation between actual and predicted leverage is larger than 5%. FF3, FF4 and FF5 are dummies that take the value of 1 when we observe at least three, four or five consecutive periods respectively in which the firm is classified as LL.

$$\frac{\Delta\ Gross\ PPE_{i,t}}{K_{i,t-1}} = \gamma_1 \frac{\Delta\ Gross\ PPE_{i,t-1}}{K_{i,t-1}} + \gamma_2 \frac{Cash\ Flow_{i,t-1}}{K_{i,t-1}} +$$



$$\gamma_3 Sales\ Growth_{i,t} + \gamma_4 FF_{i,t} + \gamma_5 FF_{i,t} \times \frac{Cash\ Flow_{i,t-1}}{K_{i,t-1}} + \eta_i + \eta_t + \nu_{i,t}$$

We test whether FF firms have enhanced investment ability and a lower sensitivity of investment to cash flow.

Given their spare debt capacity, FF companies should be able to raise external funds to finance their projects and be less dependent on their internal resources.

Investment model : baseline regression

	FF3	FF4	FF5
I (t-1)/K (t-1)	0.071***	0.071***	0.070***
Cash Flow (t-1)/K (t-1)	0.062***	0.062***	0.063***
Sales growth	0.085***	0.091***	0.099***
FF dummy	0.028***	0.026***	0.028***
Cash Flow (t-1)/K (t-1) X FF dummy	-0.025***	-0.025***	-0.024***
Observations	3448402	3448402	3448402
No of firms	996047	996047	996047
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Economic impact:	**6.8 %**	**6.0 %**	**7.2 %**

Notes. GMM-DIFF estimator.
* indicates significance at the 10% level; ** at the 5% and *** 1% level.

Investment model : Country regressions

	BE	FI	FR	DE	IT	PT	ES	UK
I (t-1)/K (t-1)	0.109***	0.028***	0.050***	0.150***	0.099***	0.072***	0.086***	0.100***
Cash Flow (t-1)/K (t-1)	0.046***	0.061***	0.062***	0.038***	0.040***	0.044***	0.064***	0.059***
Sales growth	0.047***	-0.025**	0.084***	0.041***	0.055***	0.017***	0.034***	0.184***
FF dummy	0.021***	0.020***	0.021***	0.019***	0.022***	0.021***	0.044***	0.019***
Cash Flow (t-1)/K (t-1) X FF dummy	-0.026***	-0.004	-0.018***	-0.021***	-0.047***	-0.042**	-0.043***	-0.005
Observations	68961	53934	1745485	31086	735906	80828	692230	39972
No of firms	17658	17109	458618	11022	237577	29433	208790	15840
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic impact:	**6.3%**	**8.8%**	**3.9%**	**2.5%**	**0.2%**	**3.3%**	**13.6%**	**6.8%**

Notes. GMM-DIFF estimator.
* indicates significance at the 10% level; ** at the 5% and *** 1% level.

Which firms consider more valuable financial flexibility ?

Those firms with

1. higher expected asymmetric information
2. more contracting problems

We divide the data in subsamples: private versus public, small versus large and young versus mature firms.

We expect private, small and young firms to ***value*** the financial flexible status more.

In other words, **private, small and young firms that are financially flexible should invest more than same types of firms but not-FF**.

Investment model : private/public, size and age

	Private	Public	Small	Medium	Large	Young	Established	Mature
I (t-1)/K (t-1)	0.071***	0.128***	0.026***	0.065***	0.111***	0.063***	0.069***	0.081***
Cash Flow (t-1)/K (t-1)	0.062***	0.032***	0.055***	0.064***	0.055***	0.046***	0.044***	0.050***
Sales growth	0.084***	0.170***	0.110***	0.071***	0.079***	-0.017	-0.051***	-0.002
FF dummy	0.028***	0.025***	0.041***	0.023***	0.026***	0.019***	0.025***	0.024***
Cash Flow (t-1)/K (t-1) X FF dummy	-0.025***	-0.020***	-0.037***	-0.020***	-0.026***	-0.012***	-0.023***	-0.028***
Observations	3438699	9477	854435	997943	1226224	894453	901211	1113951
No of firms	994103	1945	324991	327437	308500	428576	333997	287357
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Economic impact:	**6.8%**	**6.6 %**	**10 %**	**6.1 %**	**5.5 %**	**6.2 %**	**6.2 %**	**3.5%**

Notes. GMM-DIFF estimator.
* indicates significance at the 10% level; ** at the 5% and *** 1% level.

Robustness tests

Results hold across all these tests:

1. Net leverage :
   - Leverage is defined as net of cash

2. High cash holding (Arslan-Ayaydin, 2014) :
   - Leverage function without cash holding
   - Financial Flexible firms :
     - Low-leverage (LL) firms as before and
     - Firms show above average industry-adjusted cash levels in the same years

3. Firms with zero leverage (Bessler et al., 2013)

4. Alternative FF status: 4, 5 years, 10% deviation;
5. Agency costs of equity: sales/assets in leverage function
6. Institutional settings

Investment model : Leverage and cash holding policy

	New FF3 Net Leverage	New FF3 High Cash Holding	New FF3 Zero leverage
I (t-1)/K (t-1)	0.071***	0.070***	0.070***
Cash Flow (t-1)/K (t-1)	0.062***	0.063***	0.066***
Sales growth	0.095***	0.096***	0.112***
new FF	0.021***	0.022***	0.036***
Cash Flow (t-1)/K (t-1) X New FF	-0.025***	-0.030***	0.012
Observations	3448402	3448402	3448402
No of firms	996047	996047	996047
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Economic impact:	**2.7%**	**1.6%**	**24.8%**

Notes. GMM-DIFF estimator.
* indicates significance at the 10% level; ** at the 5% and *** 1% level.

Three questions:

- ✓ Which companies benefit the most from being financially flexible?
- ✓ Does the value of being financially flexible differ across firms and countries?

3. Does the financial flexibility status provide a buffer during unexpected liquidity shocks?

Investment, leverage and cash holding before and during the crisis

	No of firms	Pre-crisis	During crisis	Δ Mean During- Pre	P-val of diff
			Investment ratio		
Not FF firms	6609095	0.20	0.15	-0.05	0
FF firms	476036	0.16	0.12	-0.04	0
All sample	7085131	0.20	0.15	-0.05	0
			Leverage		
	No of firms	Pre-crisis	During crisis	Δ Mean During- Pre	P-val of diff
Not FF firms	6609095	0.15	0.18	0.026	0
FF firms	476036	0.07	0.07	-0.004	0
All sample	7085131	0.15	0.17	0.022	0
			Cash holding		
	No of firms	Pre-crisis	During crisis	Δ Mean During- Pre	P-val of diff
Not FF firms	6609095	0.16	0.18	0.02	0
FF firms	476036	0.19	0.22	0.04	0
All sample	7085131	0.16	0.18	0.02	0

			Leverage >0		
	No of firms	Pre-crisis	During crisis	Δ Mean During- Pre	P-val of diff
Not FF firms	4824301	0.21	0.25	0.044	0
FF firms	323344	0.10	0.11	0.007	0
All sample	5147645	0.20	0.24	0.040	0

Investment model taking into consideration the crisis

	All sample	BE	FI	FR	DE	IT	PT	ES	UK
FF dummy	0.024***	0.005	0.011	-0.019***	-0.003**	-0.062***	0.022	0.034***	0.027***
Cash Flow (t-1)/K (t-1) FF X FF dummy	-0.026***	-0.017**	-0.029***	-0.006***	-0.025***	0.01	-0.101**	-0.034***	-0.037***
FF dummy X crisis	0.006***	0.042***	0.037**	0.095***	0.031***	0.137***	0.018	0.040***	-0.006
Cash Flow (t-1)/K (t-1) X FF dummy X crisis	0.009***	-0.006	0.024**	-0.021***	0.014***	-0.057***	0.03	-0.012	0.042***
Observations	3448402	68961	53934	1745485	31086	735906	80828	692230	39972
No of firms	996047	17658	17109	458618	11022	237577	29433	208790	15840
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

All period	**4.2%**	**6.8%**	**9.8%**	**6.9%**	**1.7%**	**5.0%**	**5.8%**	**15%**	**5.2%**
Crisis=1	**10.8%**	**23%**	**22.6%**	**32.6%**	**9.6%**	**28.4%**	**7.9%**	**28.7%**	**11.7%**
Crisis=1 & values crisis	**12.8%**	**26.1%**	**26.3%**	**38.1%**	**10%**	**32.6%**	**8.1%**	**49.8%**	**12.2%**

Notes. GMM-DIFF estimator. * indicates significance at the 10% level; ** at the 5% and *** 1% level.

Conclusions

- Our evidence sheds more light on (one of) the mechanisms through which firms tackle potential financial frictions that may otherwise hamper their development

- The value of financial flexibility attained through a conservative leverage policy changes across firms and countries
  - an average company that maintains a low leverage policy for 3 years can increase its capital expenditures by around 7%.

- Evidence that firms benefit more from being financially flexible when:
  - private, smaller and younger

Thank you

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