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Firms' financing constraints: a multivariate approach

Using SAFE and Amadeus data

EUROPEAN CENTRAL BANK
EUROSYSTEM

Overview

# Main characteristics of SAFE

Sponsors	• ECB • European Commission
Sample design	• Quota: 30% each of micro, small and medium; 10% large firms • Part of the sample - rotational panel
Timeliness	• Surveys in March (ECB wave) and September (joint wave) • Results published in one month
Sample size	• 7,500 for ECB waves - limited euro area • 15,000 for joint waves - extended EU
Representativeness	• Since 2010, 11 largest euro area countries • Limited coverage EE, CY, LU, LV, MT, SI, SK
Enrichment with the Amadeus balance sheet data	• Matching based on tax ID, name, postal code, city and country • About 75% of companies could be matched

Disentangling the whole process of indebtedness for firms

- A long way from willing to use external financing to actually obtaining one

- Based on SAFE results, wave 10 - 2013H2:
  - 52% of firms have been interested in obtaining external financing in the past 6 months *(applying)*
  - 7% of firms renounce to ask for external financing because of possible rejection *(censored)*
  - 9% of firms were turned down for at lease one product after applying *(constrained)*

  - Note: 'turned down' is not straightforward: it could be rejection, refusal due to cost too high, or strong limitation in the amount of credit finally obtained
  - Among 'products' we consider: i) bank loan, ii) bank overdraft, credit line or credit cards overdraft iii) trade credit, iv) other

Evolution between 2009H1 and 2013H2

Countries: AT, BE, DE, ES, FI, FR, GR, IE, IT, NL, PT (EA11)
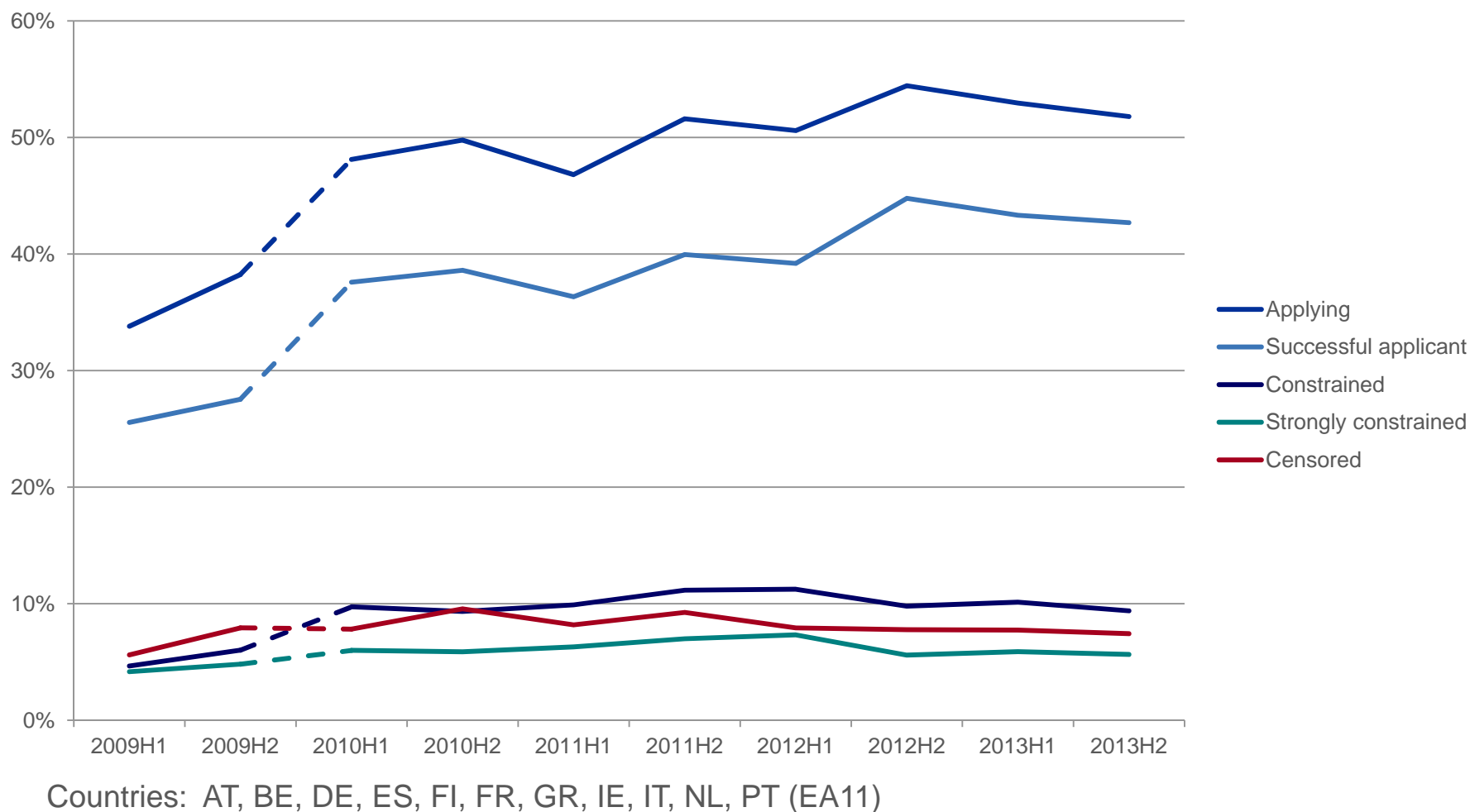
4 different products

- Bank loan (new or renewal)
- Bank overdraft, credit line or credit cards overdraft
- Trade credit
- Other external financing

Correlation between application for the 4 products

	Bank loan	Bank overdraft	Trade credit	Other sources
Bank loan	1.00			
Bank overdraft	0.45	1.00		
Trade credit	0.26	0.27	1.00	
Other sources	0.26	0.24	0.17	1.00

Which covariates could we use?

Variables	# NAs	% of observations
Cash holdings	**11,194**	**49%**
Cash flow/ Total assets	**12,165**	**53%**
Leverage	**13,810**	**60%**
Unit labour cost	14,085	62%
Trade credit	14,538	64%
Trade debt	14,497	63%
Profit margin	16,341	72%
Current liabilities	14,287	63%
Stock	14,415	63%
Turnover	15,516	68%

Results of logit models – country fixed effects

Coefficient	Applying	Successful (at least once)	Constrained	Self censored
AT	0.49	**0.05**[*]	**10.88**[***]	>0.01
BE	**0.62**[**]	**0.04**[***]	**20.57**[***]	3.53
DE	*Ref.*	*Ref.*	*Ref.*	*Ref.*
ES	0.95	**0.02**[***]	**16.32**[***]	**5.08**[***]
FI	0.52	0.09	1.37	0.54
FR	1.03	**0.01**[***]	**18.70**[**]	**7.06**[***]
IT	**1.42**[**]	**0.03**[***]	**11.85**[***]	**3.78**[***]
PT	**0.45**[***]	**0.01**[***]	**12.88**[***]	**9.03**[***]

Results of logit models – sector and size fixed effects

Coefficient	Applying	Successful (at least once)	Constrained	Self censored
Industry	*Ref.*	*Ref.*	*Ref.*	*Ref.*
Construction	**1.32*****	0.88	**1.28***	1.24
Trade	0.98	**1.26***	0.94	0.84
Services	0.99	0.92	1.11	1.12
Less than 10	*Ref.*	*Ref.*	*Ref.*	*Ref.*
From 10 to 49	**1.43*****	**1.69*****	0.93	**0.63*****
From 50 to 249	**1.77*****	**2.00*****	0.89	**0.53*****
250+	**1.93*****	**2.74*****	1.03	**0.28*****

Results of logit models – financial statements

Coefficient	Applying	Successful (at least once)	Constrained	Self censored
Cash holdings	0.18***	4.38***	0.19***	0.36
Cash flow/ Total assets	0.21***	42.55***	0.01***	0.02***
Leverage	3.86***	0.35***	2.43***	3.51***
Time fixed effect	yes	yes	yes	yes
Interaction country-time	yes	yes	yes	yes
# obs.	7,997	4,656	4,749	4,434

Results of logit models – financial statements

- Trade-off between number of observations and number of covariates

- Add more covariates in the model to assess more financial effects

Results of logit models – financial statements

Coefficient	Applying	Successful (at least once)	Constrained	Self censored
Cash holdings	**0.18*****	2.18	0.74	1.25
Cash flow/ Tot. assets	1.39	**38.80*****	**0.03*****	**0.03*****
Leverage	**4.99*****	**0.36*****	**2.90*****	**2.74****
Unit labour costs	1.08	**1.26****	**0.74*****	1.03
Total assets	1.01	**1.14****	1.00	0.99
Trade credit	**2.17****	0.90	0.68	0.79
Trade debt	1.35	**2.32*****	**0.49*****	**0.52***

Results of logit models – financial statements (cont.)

Coefficient	Applying	Successful (at least once)	Constrained	Self censored
Profit margin	**0.26*****	2.14	0.09	2.41
Time fixed effect	yes	yes	yes	yes
Interaction country-time	yes	yes	yes	yes
# obs.	**3,962**	**2,386**	**2,425**	**2,269**

Next steps

- Adding more interactions variables to the model specification

- Implementing bivariate probit for constraints and self censorship
  - We find no significant difference between the two models

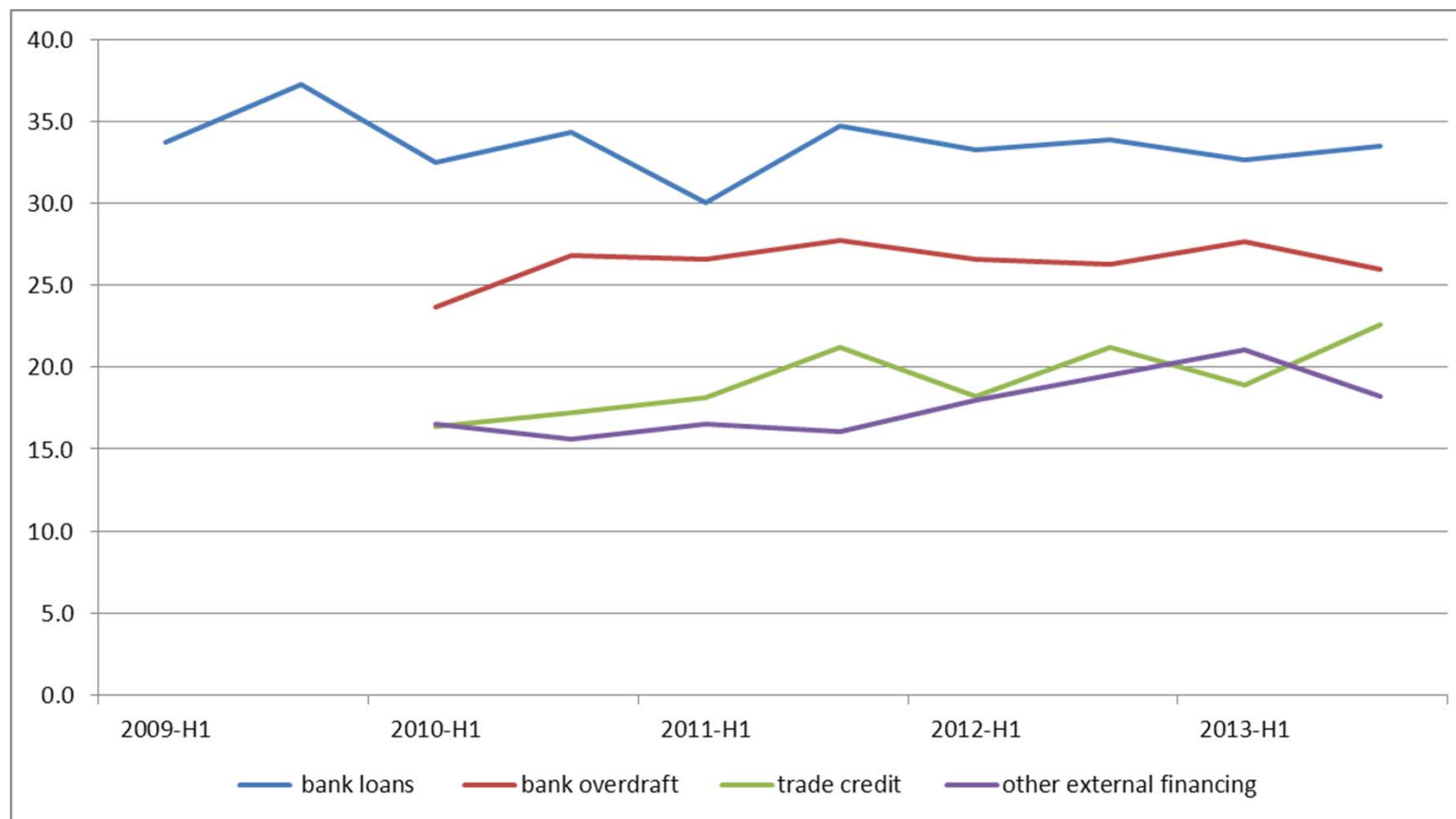- Try a SUR specification for investigating independence between the two specifications

Thank you!

Application by product, EA aggregates

(weighted percentages)

Annex: definitions and concepts

- A firm is considered as 'applying' if it answered 'Applied' or 'Did not apply because of possible rejection' to question 7A for at least one product

- A firm is considered as 'successful applicant' if it is applying and answered 'Got everything' or 'Got most of it' to question 7B for at least one product

- A firm is considered as 'constrained' if it is applying and answered 'Got a limited part of it', 'Refused because of cost too high' or even 'Was rejected' to question 7B

Annex: definitions and concepts (cont.)

- A firm is considered as 'strongly constrained' if it is constrained and is never successful for any of the products

- A firm is considered as 'censored' if it answered 'Did not apply because of possible rejection' to question 7A

Annex: definitions and concepts (cont.)

Q7A. For each of the following ways of financing, could you please indicate whether you: applied for them over the past 6 months,; did not apply because you thought you would be rejected; did not apply because you had sufficient internal funds; or did not apply for other reasons? [PROMPT IF NEEDED: Other external financing includes loans from other lenders, equity or debt issuance, leasing, factoring, etc., but excludes overdrafts, credit lines, bank loans and trade credit]

[READ OUT – ONE ANSWER PER LINE]

APPLYING

- Applied 1
- Did not apply because of possible rejection 2
- Did not apply because of sufficient internal funds 3
- Did not apply for other reasons 4
- [DK/NA] 9

CENSORED

d)	Bank overdraft, credit line or credit cards overdraft	1 2 3 4 9
a)	Bank loan (new or renewal; excluding overdraft and credit lines)	1 2 3 4 9
b)	Trade credit	1 2 3 4 9
c)	Other external financing	1 2 3 4 9

Annex: definitions and concepts (cont.)

Q7B. If you applied and tried to negotiate for this type of financing over the past 6 months, did you: receive all the financing you requested; receive only part of the financing you requested; refuse to proceed because of unacceptable costs or terms and conditions; or have you not received anything at all? [PROMPT IF NEEDED: Other external financing includes loans from other lenders, equity or debt issuance, leasing, factoring, etc., but excludes overdrafts, credit lines, bank loans and trade credit]

SUCCESSFUL

- Applied and got everything 1
- Applied and got most of it [BETWEEN 75% AND 99%] ....
- Applied but only got a limited part of it [BETWEEN 1% AND 74%] 6
- Applied but refused because cost too high 3
- Applied but was rejected ....
- [DK] 9

CONSTRAINED

d) Bank overdraft, credit line or credit cards overdraft 1 3 4 5 6 9
a) Bank loan (new or renewal; excluding overdraft and credit lines) 1 3 4 5 6 9
b) Trade credit 1 3 4 5 6 9
c) Other external financing 1 3 4 5 6 9

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