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The Impact of Credit Crunch on Firm Financing in Transition Economies: Does Size Matter?

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Summary

✓ Aims and Objections

- ❑ Using 2002-2009 BEEPS data, our study investigates how various firm characteristics and institutional settings affect firms' perception of financial constraints and their investment decisions.
  - ➢ Perception of financial constraints
  - ➢ Firm's financial structure
- ❑ It also analyses implications of the 2007-2009 financial crisis for the firms' financing, attempting to disentangle these effects for small vs. large firms

✓ Main contribution

- ❑ Our key results of the difference in perception of financial constraints between small and large firms being largely eliminated or even reversed appear to challenge the conventional models, assuming higher sensitivity of the SME sector to crises...

Theoretical Considerations

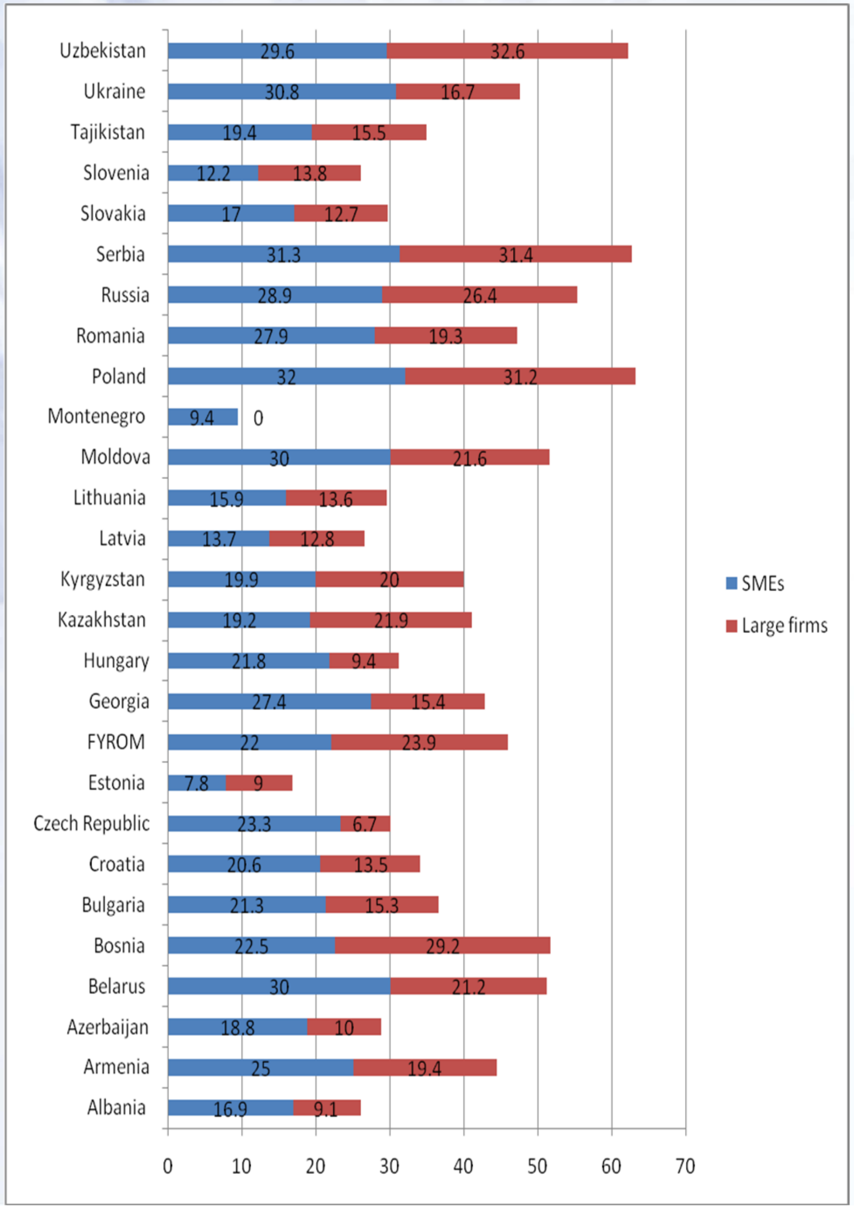
- Smaller businesses typically tend to rely on their own equity and informal finance, and they exhibit a moderately low level of formal external financing (Bates 1997; Ravid and Spiegel 1997; Nuyghebaert 2001; Bygrave 2003; Korosteleva & Mickiewicz 2010).
- SMEs face tighter liquidity constraints in terms of external financing due to higher informational asymmetries associated with their activities, the low value of their assets to serve as collateral, the high cost of monitoring small businesses given a small scale of their investment projects.

Are Transition Economies any Different?

- Neither own funds nor informal finance were widely available in the early transition
- Small *de novo* firms are severely restricted in their access to the formal credit market (Pissarides 1998, 1999, 2001; Pissarides *et al.* 2003; Klapper et. al. 2002).
- Scarce use of equity finance and low level of inter-firm trade financing is also a feature common for transition economies (Klapper et. al. 2002; Pissarides 1998, 2001).

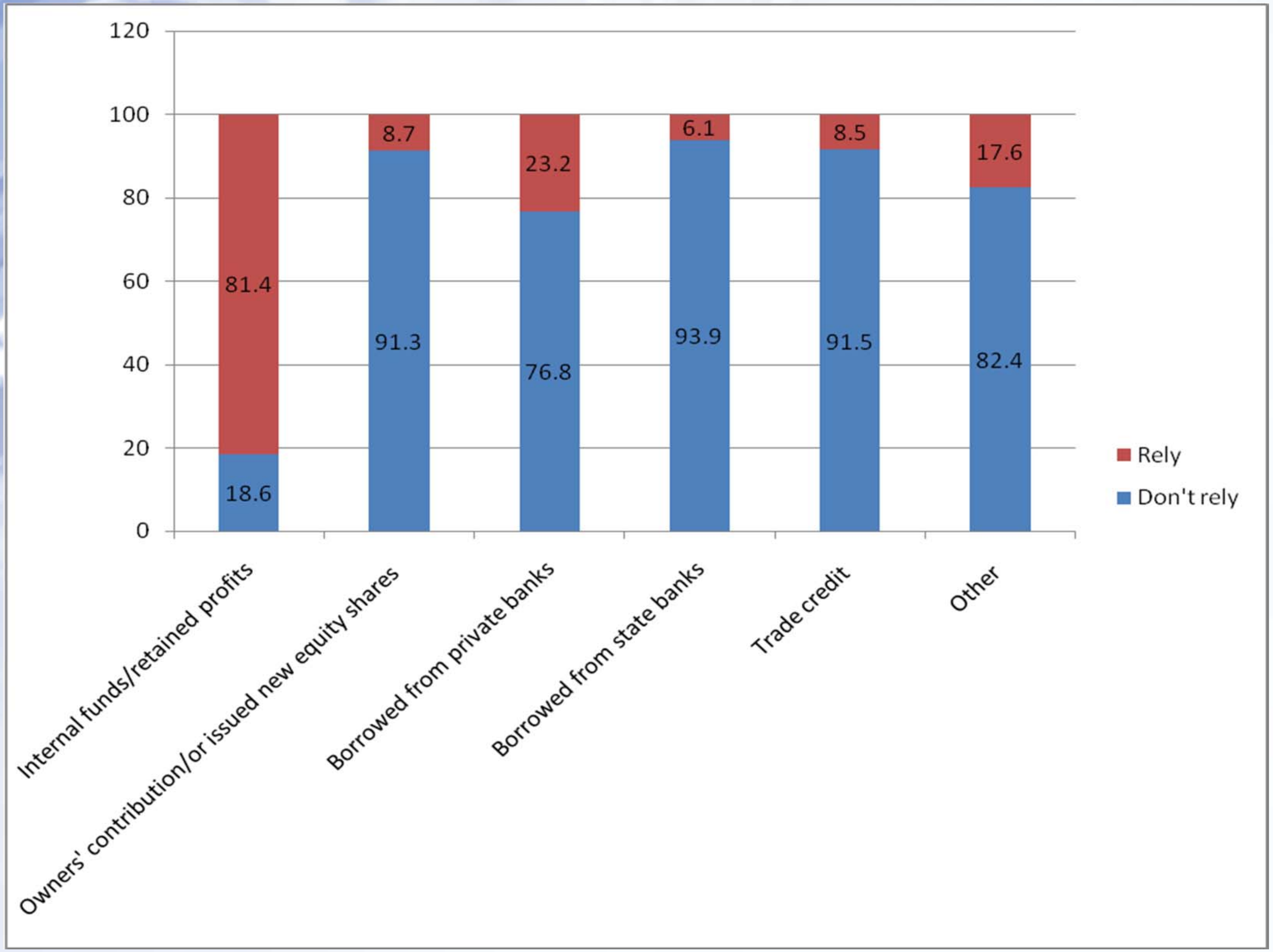
Perception of financial constraints by firms

(Source: 2002-2009 BEEPS data)



Sources of financing SMEs' investments

(Source: 2002-2009 BEEPS data)



Theoretical considerations (cont.)

- During economic slowdowns bank lending diminishes for SMEs further forcing some of them to go out of business (Tornell & Westermann 2005).
- At the same time larger firms generally use more finance and tend to rely more on external funding, so they may be hit by the financial contraction harder.
- Larger firms are also less flexible and it is costly for them to restructure and downsize

Hypotheses

I. Size of the enterprise and the effect of crisis

- H1: SMEs face tighter constraints in terms of external financing
- H2: The difference between small and large firms in their reliance on bank finance diminishes during the crisis years
- H3: During crisis SMEs are to be more flexible to rely more on other sources of finance, including trade credit and owners' contributions

Hypotheses (cont.)

II. Firm- and industry-level factors

- H1: Industry-level pressure on a firm from competitors to develop a new product may increase a firm's chances of obtaining a bank loan (Isachenkova and Rodionova 2010)
- H2: International product certification is also likely to facilitate a firm access to bank loans
- H3: Foreign firms are less likely to use private loans and rely more on retained funds and intra-company funds transfers in the case of MNEs
- H4: A firm's export orientation is expected to increase the reliance on bank lending

Hypotheses (cont.)

III. Institutional environment

- H1a: Property rights protection facilitates access to external funding, and it disproportionally benefit smaller firms (Acemoglu & Jonhson 2005; Beck et al. 2004).
- H1b: A better property rights system is also expected to make firms to reinvest their own earnings in the business (Johnson et al. 2002)
- H3: More sizable financial sector is expected to be positively related to the use of external finance via easing up borrowing constraints (Barth et al. 2006; Beck et al. 2005; 2006; 2008)

Data and Methodology

- We use the 2002-2009 Business Environment and Enterprise Performance Survey data of 23,786 firms covering 26 transition economies from CEE and Central Asia.
- We use a number of estimators to obtain robust results
  - ➢ A probit model to determine a firm's perception of financial constraints. The effect of the crisis is determined in two ways:

    (1) Introduction of the interaction term between crisis and SME variables. Here, we calculate a marginal effect for the interaction term using Norton, Wang and Ai (2004) procedure to account for the model nonlinearity.

    (2) Splitting a sample into two and running a probit model separately for SMEs and larger firms.
  - ➢ A binary outcome selection model without excluding restrictions (Sartori 2003) and SURE tobits to model firm financing choices (for detailed discussion see Isachenkova and Rodionova 2010)

Dependant Variables

DEPENDENT variables:				
Probit model:				
Perception of financial constraints	1=firm perceives financial constraints as major or very severe, 0 otherwise	.24	.42	22,827
Binary-outcome selection model with excluding restrictions:				
Use of Equity vs. Debt conditional upon decision to invest	0=firm did not undertake any investment projects; 1=firm undertook an investment project which was financed via retained profits or owners issuing new equity (equity); 2 – firm undertook an investment project and its purchase of fixed assets was funded through borrowing, trade credit or other sources of finance (debt).	1.14	.80	16,897
SURE tobit model:				
Retained profits	Retained profits as a % of firm financing of fixed assets	66.05	40.71	16,028
Private loan	Private loan as a % of firm financing of fixed assets	13.38	28.32	14,782
Trade credit	Trade credit as a % of firm financing of fixed assets	3.58	14.66	15,803
Private/contributed equity	Private/contributed equity as a % of firm financing of fixed assets	4.24	17.78	15,793
Informal funding	Money from family, friends and other money lenders as a % of firm financing of fixed assets	10.12	25.69	14,815

Correlation matrix

Variables	Percep. of financial const-nts	Use of Equity vs. Debt	Retained profits	Private loan	Informal finance	Trade credit	Private equity	SME	Crisis	Property rights	Formal Finance	GDP pc ppp	GDP growth
Perception of financial constraints	1												
Use of Equity vs. Debt	0.01	1											
Retained profits	-0.08	-0.32	1										
Private loan	0.04	0.54	-0.21	1									
Informal finance	0.05	0.24	-0.23	-0.00	1								
Trade credit	0.04	0.37	-0.11	-0.07	0.07	1							
Private equity	0.02	0.02	-0.26	0.04	-0.00	0.07	1						
SME	0.04	0.13	0.01	0.15	-0.01	-0.05	0.01	1					
Crisis	0.06	-0.19	-0.06	-0.06	-0.20	0.11	0.13	0.01	1				
Property rights	0.02	0.09	0.09	0.12	0.06	-0.01	0.03	0.01	-0.05	1			
Formal finance	-0.02	-0.14	0.09	0.09	0.01	-0.00	0.09	0.02	0.22	0.52	1		
GDP pc ppp	-0.00	0.10	-0.11	0.04	0.07	-0.02	0.09	0.00	-.09	0.51	0.52	1	
GDP growth	-0.05	0.02	0.07	-0.06	-0.01	-0.01	-0.05	0.01	-0.21	-0.45	0.19	-0.21	1

Table 1.1: Perception of Financial Constraints: probit estimation results and marginal effects

dependent: **Perception of financial constraints as major**	probit results		probit marginal effects	
	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.
SME	0.214***	0.060	0.052***	0.013
crisis	0.989***	0.162	0.34***	0.06
SME_x_Crisis	-0.354**	0.139	-0.081**	0.027
Age of firm	-0.001	0.001	-0.000	0.000
Age of firm squared	0.000	0.000	0.000	0.000
International product certification	-0.026	0.021	-0.007	0.006
Foreign ownership	-0.005***	0.001	-0.001***	0.000
Export orientation			-0.000	0.000
Privately owned from inception	0.034	0.039	0.009	0.010
Time spent on dealing with government regulations	0.005***	0.001	0.001***	0.000
Pressure to innovate originates from domestic competition	0.066***	0.016	0.018***	0.004
Pressure to innovate originates from foreign competition	0.044***	0.014	0.012***	0.004
Pressure to innovate originates from customers	0.076***	0.017	0.020***	0.004
Domestic credit as % of GDP	-0.002	0.003	-0.000	0.000
Property Rights	0.061	0.092	0.016	0.024
GDP per capita	-0.000	0.000	-0.000***	0.000
GDP growth	-0.003	0.010	-0.000	0.003
Constant	-1.618**	0.656	-	-
Industrial controls	Yes		Yes	
Country controls	Yes		Yes	
Number of obs	11,846		11,846	
Wald chi2 (48)	755.12		755.12	
Pseudo R2	0.072		0.072	

Note: **** significant at 0.001; *** significant at 0.01;** significant at 0.05;* significant at 0.1. For the interaction term of SME and crisis the marginal effect is different from the one reported in the table above. After controlling for non-linearity, the coefficient of the interaction term at mean is equal to **-0.100**; standard error is equal to 0.048 and z statistic is equal to -2.04 indicating significance at 0.01 level. Source: BEEPS 2002-2009.

Table 1.2: Binary outcome selection model without excluding restrictions

VARIABLES	Selection	Outcome
Dependent variable: The use of debt vs. equity conditional on a firm's investment decision		
SME	-0.546***	-0.137**
	(0.110)	(0.061)
crisis	1.063***	0.060
	(0.285)	(0.162)
SME_x_Crisis	-0.067	-0.305**
	(0.176)	(0.133)
Age of firm	0.002	-0.001
	(0.002)	(0.003)
Age of firm squared	-0.000	0.000
	(0.000)	(0.000)
International product certification	0.213***	0.115***
	(0.030)	(0.021)
Foreign ownership	0.002**	-0.002***
	(0.001)	(0.001)
Export orientation	0.003***	0.003***
	(0.001)	(0.001)
Privately owned from inception	-0.005	-0.023
	(0.051)	(0.042)
Time spent on dealing with government regulations	0.003**	0.005***
	(0.001)	(0.001)
Pressure to innovate originates from domestic competition	0.040*	0.040**
	(0.020)	(0.017)
Pressure to innovate originates from foreign competition	0.030	0.022
	(0.018)	(0.015)
Pressure to innovate originates from customers	0.042**	0.043**
	(0.021)	(0.018)
Domestic credit as % of GDP	-0.010	-0.011***
	(0.006)	(0.004)
Property Rights	-0.466***	0.328***
	(0.179)	(0.096)
GDP per capita	-0.001***	-0.000***
	(0.000)	(0.000)
GDP growth	0.036	-0.007
	(0.029)	(0.017)
Constant	9.082***	-1.959***
	(1.392)	(0.690)
Industrial controls	Yes	Yes
	Yes	Yes
Country controls		
Number of obs	7,587	7,587
Wald chi2 (48)	946.03	946.03

Table 1.3: SURE tobits results for Financing Choices.

	Retained profits	Private Loan	Private Equity	Trade Credit	Informal Finance
	Coef.	Coef.	Coef.	Coef.	Coef.
SME	15.13***	-28.26***	5.820	-7.28	3.918
	(5.08)	(5.60)	(16.23)	(7.21)	(5.63)
Crisis	8.922	-54.83***	12.22	51.697**	-98.16
	(15.61)	(17.86)	(45.46)	(20.927)	(28.71)
SME_x_crisis	-15.28	29.03**	54.40	11.41	-12.15
	(13.48)	(14.08)	(38.94)	(18.03)	(26.98)
Age	0.249	-0.085	-0.505	-0.055	-0.335***
	(0.107)	(12.04)	(0.336)	(0.155)	(0.125)
Age squared	-0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
International Product Certification	-6.003***	9.453***	-4.296	4.219	6.697***
	(1.928)	(2.146)	(6.004)	(2.84)	(2.15)
Foreign Ownership	0.156***	-0.086	-0.031	0.0334	-0.008
	(0.048)	(0.056)	(0.148)	(0.070)	(0.052)
Export orientation	-0.270***	0.242***	0.052	0.272***	0.067
	(0.058)	(0.064)	(0.178)	(0.084)	(0.065)
Privately owned from inception	4.29	-3.059	-11.92	-12.70**	9.615
	(3.72)	(4.321)	(11.58)	(5.41)	(4.155)
Time spent on dealing with government regulations	-0.473***	0.183	0.721**	0.381**	0.522
	(0.113)	(0.127)	(0.315)	(0.160)	(0.134)
Pressure to innovate originates from domestic competition	-5.214***	3.768**	-3.536	5.305**	6.197***
	(1.546)	(1.82)	(4.785)	(2.346)	(1.723)
Pressure to innovate originates from foreign competition	-1.988	4.248***	5.629	2.809	0.973
	(1.321)	(1.54)	(4.075)	(1.976)	(1.45)
Pressure to innovate originates from customers	-2.690*	1.82	-2.908	-1.247	2.911*
	(1.582)	(1.86)	(4.927)	(2.329)	(1.766)
Domestic credit as % of GDP	-0.402	0.832**	-0.585	-0.969**	-0.153
	(0.323)	(0.394)	(0.803)	(0.459)	(0.386)
Property Rights	-1.281	22.79**	-14.494	11.964	-18.72**
	(8.482)	(10.284)	(23.683)	(11.849)	(9.55)
GDP growth	2.503***	-1.041	-3.779	-1.219	-1.486
	(0.972)	(1.539)	(4.027)	(1.299)	(1.017)
GDP per capita	0.001	0.004	0.003	-0.001	-0.003
	(0.002)	(0.003)	(0.007)	(0.003)	(0.003)
Constant	150.87	-242.14***	-368.97***	-232.908***	-36.26
	(60.09)	(73.33)	(130.83)	(84.90)	(65.76)
Industrial controls	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes	Yes
Number of obs	8,836	8,798	8,794	8,795	8,802
Pseudo R2	0.019	0.0314	0.0982	0.0256	0.027

Table 2.1: Perception of Financial Constraints: probit estimation results and marginal effects for a splitted sample

Dependent: **Perception of financial constraints as major**	**probit effects**		**probit marginal effects**		**probit effects**		**probit marginal effects**	
	Small firms				Large firms			
	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.	Coef.	Robust Std. Err.
Crisis	0.569***	0.109	0.183***	0.040	1.77***	0.38	0.554***	0.129
Age of firm	-0.002	0.001	-0.000	0.000	-0.001	0.006	-0.000	0.001
Age of firm squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
International product certification	-0.018	0.023	-0.005	0.006	-0.085	0.059	-0.016	0.011
Foreign ownership	-0.005***	0.001	-0.001***	0.000	-0.004***	0.002	-0.001***	0.000
Export orientation	-0.000	0.001	-0.000	0.000	-0.002	0.002	-0.000	0.000
Privately owned from inception	0.044	0.041	0.012	0.011	-0.040	0.127	-0.008	0.024
Time spent on dealing with government regulations	0.005***	0.001	0.001***	0.000	0.006	0.004	0.001	0.000
Pressure to innovate originates from domestic competition	0.064***	0.017	0.017***	0.005	0.095*	0.056	0.018***	0.011
Pressure to innovate originates from foreign competition	0.038***	0.014	0.010***	0.004	0.103	0.054	0.020*	0.010
Pressure to innovate originates from customers	0.078***	0.018	0.021***	0.005	0.082	0.063	0.016***	0.012
Domestic credit as % of GDP	-0.001	0.003	-0.000	-0.000	-0.012	0.011	-0.002	0.002
Property Rights	0.045	0.095	0.012	0.026	0.10	0.354	0.019	0.068
GDP per capita	-0.000	0.000	-0.000***	0.000	-0.000**	-0.000	-0.000**	0.000
GDP growth	-0.003	0.011	-0.001	-0.003	-0.013	0.042	-0.002	0.008
Constant	-1.28		-		-5.58		-	
Industrial controls	Yes		Yes		Yes		Yes	
Country controls	Yes		Yes		Yes		Yes	
Number of obs	10,792		10,792		1,018		1,018	
Wald chi2 (48)	645.17		645.17		1337.48		-	
Pseudo R2	0.070		0.067		0.16		0.16	

Table 2.2: Binary outcome selection model without excluding restrictions for a sample of SMEs only

VARIABLES	Selection	Outcome
Dependent variable: The use of debt vs. equity conditional on a firm's investment decision		
Crisis	.932***	-.315***
	(0.239)	(0.119)
Age of firm	0.002	-0.001
	(0.002)	(0.003)
Age of firm squared	-0.000	0.000
	(0.000)	(0.000)
International product certification	0.217***	0.135***
	(0.031)	(0.023)
Foreign ownership	0.002***	-0.001*
	(0.001)	(0.001)
Export orientation	0.003***	0.003***
	(0.001)	(0.001)
Privately owned from inception	-0.016	-0.042
	(0.053)	(0.045)
Time spent on dealing with government regulations	0.003*	0.006***
	(0.001)	(0.001)
Pressure to innovate originates from domestic competition	0.040*	0.036**
	(0.021)	(0.018)
Pressure to innovate originates from foreign competition	0.026	0.013
	(0.019)	(0.016)
Pressure to innovate originates from customers	0.034	0.046**
	(0.0216)	(0.019)
Domestic credit as % of GDP	-0.008	-0.011***
	(0.006)	(0.004)
Property Rights	-0.448**	0.393***
	(0.182)	(0.101)
GDP per capita	-0.000***	-0.000***
	(0.000)	(0.000)
GDP growth	0.035	-0.007
	(0.029)	(0.018)
Constant	8.47***	-2.496***
	(1.42)	(0.728)
Industrial controls	Yes	Yes
	Yes	Yes
Country controls		
Number of obs	6,865	6,865
Wald chi2 (48)	848.22	848.22

Table 2.3 SURE tobits results for Financing Choices for a sample of SMEs only

	Retained profits	Private Loan	Private Equity	Trade Credit	Informal Finance
	Coef.	Coef.	Coef.	Coef.	Coef.
Crisis	-4.260	-35.18**	120.79***	120.793***	-112.89***
	(11.98)	(15.05)	(35.13)	(35.13)	(21.77)
Age	.19	0.003	-.276	-0.276	-0.419***
	(0.14)	(0.158)	(0.415)	(0.415)	(0.160)
Age squared	-0.0001	0.000	0.000	0.000	0.000
	(0.0000)	(0.000)	(0.000)	(0.000)	(0.000)
International Product Certification	-7.15***	11.75***	-2.782	-2.783	5.707**
	(2.20)	(2.49)	(6.79)	(6.79)	(2.44)
Foreign Ownership	0.16***	-0.104	-0.091	-0.091	-0.014
	(0.055)	(0.067)	(0.172)	(0.172)	(0.059)
Export orientation	-0.272***	0.285***	0.0003	0.007	0.093
	(0.066)	(0.074)	(0.001)	(0.203)	(0.073)
Privately owned from inception	5.05	-6.41	-14.37	-14.37	7.64*
	(4.16)	(4.94)	(12.85)	(12.85)	(4.64)
Time spent on dealing with government regulations	-0.510***	0.239*	0.522	0.459***	0.530***
	(0.124)	(0.142)	(0.348)	(0.174)	(0.146)
Pressure to innovate originates from domestic competition	-5.79***	4.92**	-3.943	6.647	5.172***
	(1.70)	(2.05)	(5.256)	(2.588)	(1.872)
Pressure to innovate originates from foreign competition	-0.696	3.95**	4.082	2.056	.302
	(1.43)	(1.69)	(4.379)	(2.122)	(1.559)
Pressure to innovate originates from customers	-2.73	0.471	-1.557	-0.607	3.24*
	(1.71)	(2.05)	(5.334)	(2.516)	(1.907)
Domestic credit as % of GDP	-0.352	1.12**	0.736	-1.111**	-0.443
	(0.356)	(0.449)	(1.023)	(0.500)	(0.425)
Property Rights	-3.62**	18.86*	-119.39***	16.903	-21.27**
	(9.10)	(11.25)	(43.36)	(12.732)	(10.18)
GDP growth	2.70***	0.233	2.184	-1.589	-1.84*
	(1.04)	(1.84)	(5.168)	(1.394)	(1.09)
GDP per capita	0.000	0.003	-0.013	0.001	-0.002
	(0.003)	(0.003)	(0.009)	(0.004)	(0.003)
Constant	180.35***	-249.07***	417.48	-281.04	-3.83
	(64.46)	(80.29)	(290.06)	(91.50)	(69.84)
Industrial controls	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes	Yes
Number of obs	7,973	7,939	7,935	7,936	7,942
Pseudo R2	0.019	0.03	0.104	0.027	0.027

Empirical Findings

(1) Firm size and the effect of crisis

- Smaller businesses are generally invest less in fixed assets, and if they do invest they tend to rely more on retained profits
- SMEs generally feel more financially constrained and tend to rely less on external debt, but in the period of the crisis this difference b/n smaller and larger firms is largely erased or even reversed.
- The difference in the use of private loans between smaller and larger businesses diminishes during the crisis years.
- Under crisis SMEs also tend to increase their reliance on other sources of finance such as trade credit and contributed equity

Cont.

(2) Firm- and industry-level characteristics

- International certification makes the firm invest more and also rely more on debt finance
- Firms with foreign ownership rely less on private debt but more on equity
- Export-oriented firms invest more and tend to have a higher reliance on debt, incl. private bank borrowing
- Older firms tend to rely less on private loans
- Pressure from domestic competition and customers on firms to innovate makes a firm likely to invest more and rely more on debt

Cont.

(3) Institutional level

- Higher domestic credit makes SMEs more reliant on private loans and less on trade credit
- Better protection of property rights also facilitates access to debt and increases a share of private debt in total SME financing, while decreasing reliance on informal finance.
- Odd perhaps, we also find that a property rights system is negatively associated with private equity and retained profits, unless explained by the informality feature of SMEs.

Main conclusions

- Although smaller businesses generally feel more financially constrained in accessing external in the situation of crisis this difference in perception of financial constraints between smaller and larger firms is not only largely eliminated, but the result is even reversed.
- SME are more flexible in that they also rely on other sources of finance such as trade credit and private/contributed equity, which may make them more flexible than large firms during the years of crisis.
- These results appear to challenge the conventional business cycle models, assuming higher sensitivity of the SME sector to crises.

Thank You

Questions are welcome