Bankruptcy, Investment, and Financial Constraints: Evidence from the Czech Republic*

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Abstract

Using the investment–cash flow sensitivity to analyze financial constraints over the period 2006–2011 in the Czech Republic, we find that healthy companies were financially constrained both before and after the 2008 crisis. There is robust evidence that both the cash flow and the level of debt have a positive and significant impact on the investment rate. Although companies going bankrupt had significantly higher levels of external debt and bank loans, they did not manifest any investment–cash flow sensitivity in the pre-crisis period, which indicates that they were probably not financially constrained at all. After the 2008 crisis, companies that would later declare bankruptcy began to become financially constrained as well.

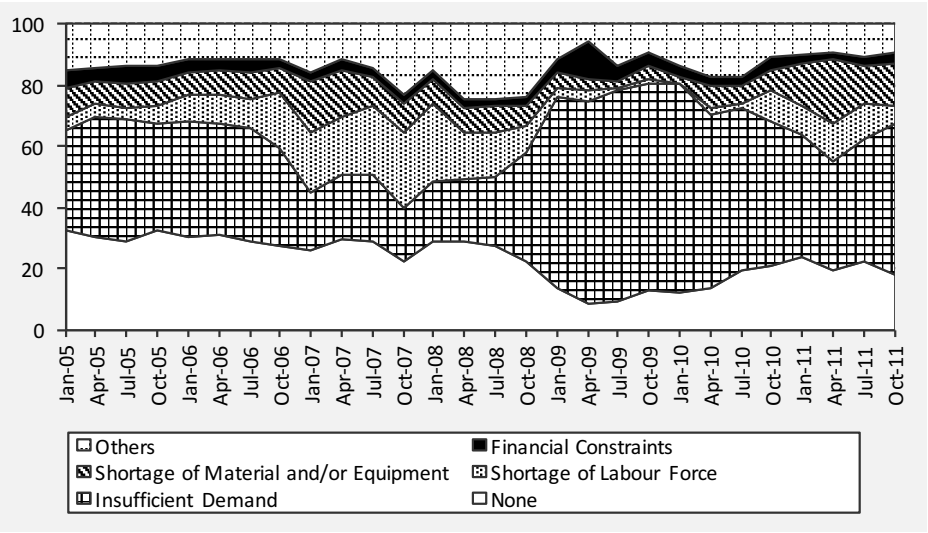
Keywords: Bankruptcy, cash flow, financial constraints, investment, post-transition economy

JEL Codes: D22, D92, E22, G32

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An online appendix with additional material is available at http://jirischwarz.eu/constraints.

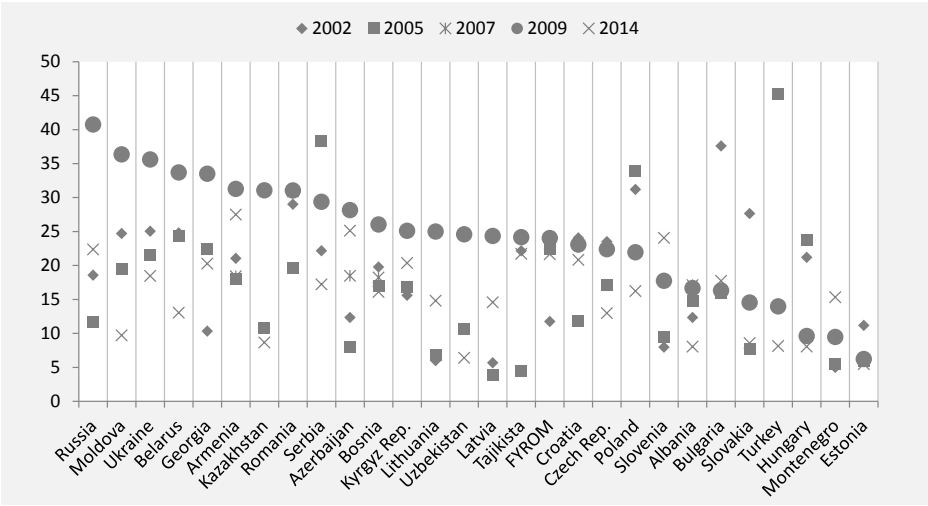
Appendix A Additional figures and tables

Figure A1: Barriers to growth in industry



Source: Czech Statistical Office, authors' calculations.

Figure A2: BEEPS: Finance as a major or severe obstacle



Notes: The figure depicts the share of companies that assess finance as a major or severe obstacle to their business growth. Finance as an obstacle varied in 2009 significantly across countries: from 6% in Estonia to 41% in Russia. In the Czech Republic, 24% of firms noted in late 2008 and early 2009 that finance is a major or severe barrier to their growth. Even though this share was very stable over the 2000s, we observe a temporary increase in the 2009 survey in the majority of countries.
Source: BEEPS, authors' calculations.

Table A1: Robustness check: turnover, all companies

Dependent variable: Investment rate	(1)	(2)	(3)
Investment rate$_{(t-1)}$	0.100	0.16	0.10
	(0.70)	(0.69)	(0.70)
Squared investment rate$_{(t-1)}$	-0.00097	-0.00086	-0.00097
	(0.0020)	(0.0020)	(0.0020)
Turnover$_{(t-1)}$	6.92***	7.13***	6.93***
	(1.01)	(0.94)	(1.01)
Cash flow$_{(t-1)}$	0.058***	0.063***	0.058***
	(0.012)	(0.011)	(0.012)
External debt$_{(t-1)}$	0.0080***	0.0083***	0.0080***
	(0.0022)	(0.0023)	(0.0022)
Bankrupt at some point		-0.43	
		(0.33)	
(Cash flow)$_{(t-1)}$×(Bankrupt at some point)		-0.100*	
		(0.052)	
Bankrupt the following year			-0.78
			(0.55)
(Cash flow)$_{(t-1)}$×(Bankrupt the following year)			0.060
			(0.063)
Constant	1.16**	1.00**	1.16**
	(0.55)	(0.50)	(0.55)
Number of instruments	37	39	39
AB test for AR(2) in first diffs p-value	0.26	0.38	0.26
Sargan test p-value	0.12	0.11	0.12
Hansen test p-value	0.35	0.29	0.35
Observations	295303	295303	295303
Sample	2006–2011	2006–2011	2006–2011

Notes: Heteroskedasticity and autocorrelation consistent standard errors are in parentheses. All of the specifications include the year and industry fixed effects. All of the variables are normalized by the respective firm's capital stock (fixed assets).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Robustness check: turnover, subsamples

Dependent variable: Investment rate	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Investment rate$_{(t-1)}$	-0.51	-0.48	0.96**	0.95*	-0.013	0.0070	0.32	2.28
	(0.66)	(0.65)	(0.49)	(0.49)	(0.47)	(0.39)	(0.62)	(2.73)
Squared investment rate$_{(t-1)}$	0.0011	0.00071	-0.0035*	-0.0035*	-0.00072	-0.0015	-0.0011	-0.0060
	(0.0018)	(0.0017)	(0.0019)	(0.0019)	(0.0020)	(0.0016)	(0.0015)	(0.0068)
Turnover$_{(t-1)}$	5.85***	5.83***	7.63***	7.63***	7.01***	6.70***	5.84***	7.42***
	(1.34)	(1.27)	(1.06)	(1.06)	(1.05)	(1.03)	(1.43)	(2.23)
Cash flow$_{(t-1)}$	0.073***	0.068***	0.055***	0.055***	0.060***	0.049***	0.060***	0.066**
	(0.016)	(0.016)	(0.013)	(0.013)	(0.013)	(0.012)	(0.017)	(0.028)
External debt$_{(t-1)}$	0.0066*	0.0062*	0.010***	0.010***	0.0077***	0.0063***	0.011***	0.015**
	(0.0035)	(0.0033)	(0.0025)	(0.0025)	(0.0026)	(0.0022)	(0.0042)	(0.0058)
Bankrupt at some point	0.19		-1.29***		-0.86*		-0.17	
	(0.47)		(0.39)		(0.51)		(0.40)	
(Cash flow)$_{(t-1)}$×(Bankrupt at some point)	-0.15**		-0.0027		-0.032		-0.037	
	(0.077)		(0.036)		(0.055)		(0.035)	
Bankrupt the following year		-0.60		-0.70*		-0.56		-1.60
		(0.83)		(0.37)		(0.65)		(2.35)
(Cash flow)$_{(t-1)}$×(Bankrupt the following year)		0.16***		-0.036		0.082		-0.0061
		(0.051)		(0.029)		(0.056)		(0.072)
Constant	1.30**	1.38***	0.39	0.39	1.25**	1.63***	0.99**	-0.26
	(0.53)	(0.50)	(0.33)	(0.33)	(0.51)	(0.50)	(0.40)	(1.76)
Number of instruments	36	36	36	36	39	39	39	39
AB test for AR(2) in first diffs p-value	0.50	0.16	0.34	0.33	0.39	0.051	0.49	0.59
Sargan test p-value	0.99	0.99	0.14	0.14	0.89	0.93	0.12	0.98
Hansen test p-value	0.47	0.42	0.58	0.58	0.12	0.34	0.89	1.00
Observations	120773	120773	174530	174530	170478	170478	124825	166903
Sample	2006–2008	2006–2008	2009–2011	2009–2011	1–19 empl.	1–19 empl.	20+ empl.	20+ empl.

Notes: Heteroskedasticity and autocorrelation consistent standard errors are in parentheses. All of the specifications include the year and industry fixed effects. All of the variables are normalized by the respective firm's capital stock (fixed assets).

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Robustness check: instrumenting with lags 2–3, all companies

Dependent variable: Investment rate	(1)	(2)	(3)
Investment rate$_{(t-1)}$	-0.37	0.073	-0.37
	(0.91)	(0.60)	(0.91)
Squared investment rate$_{(t-1)}$	0.00030	-0.00061	0.00031
	(0.0024)	(0.0019)	(0.0024)
Change in sales$_{(t)}$	0.020***	0.021***	0.020***
	(0.0040)	(0.0035)	(0.0040)
Cash flow$_{(t-1)}$	0.095***	0.11***	0.095***
	(0.019)	(0.013)	(0.019)
External debt$_{(t-1)}$	0.024***	0.026***	0.024***
	(0.0040)	(0.0023)	(0.0040)
Bankrupt at some point		-0.13	
		(0.34)	
(Cash flow)$_{(t-1)}$×(Bankrupt at some point)		-0.12**	
		(0.055)	
Bankrupt the following year			-0.44
			(0.41)
(Cash flow)$_{(t-1)}$×(Bankrupt the following year)			0.056
			(0.068)
Constant	1.56*	1.13**	1.57*
	(0.84)	(0.47)	(0.84)
Number of instruments	33	35	35
AB test for AR(2) in first diffs p-value	0.38	0.52	0.38
Sargan test p-value	0.98	0.97	0.98
Hansen test p-value	0.90	0.87	0.90
Observations	305249	305249	305249
Sample	2006–2011	2006–2011	2006–2011

Notes: Heteroskedasticity and autocorrelation consistent standard errors are in parentheses. All of the specifications include the year and industry fixed effects. All of the variables are normalized by the respective firm's capital stock (fixed assets).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A4: Robustness check: instrumenting with lags 2–3, subsamples

Dependent variable: Investment rate	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Investment rate$_{(t-1)}$	-0.80	-1.56	1.24***	1.23***	-0.15	-0.14	0.30	0.59
	(0.77)	(1.34)	(0.46)	(0.46)	(0.45)	(0.47)	(0.50)	(0.72)
Squared investment rate$_{(t-1)}$	0.0020	0.0036	-0.0043**	-0.0043**	-0.00069	-0.0012	-0.00058	-0.0014
	(0.0022)	(0.0031)	(0.0017)	(0.0017)	(0.0017)	(0.0019)	(0.0014)	(0.0018)
Change in sales$_{(t)}$	0.023***	0.021***	0.020***	0.020***	0.016***	0.015***	0.035***	0.028***
	(0.0044)	(0.0050)	(0.0041)	(0.0041)	(0.0034)	(0.0036)	(0.0074)	(0.0054)
Cash flow$_{(t-1)}$	0.11***	0.094***	0.10***	0.10***	0.096***	0.086***	0.11***	0.097***
	(0.017)	(0.023)	(0.014)	(0.014)	(0.013)	(0.016)	(0.019)	(0.017)
External debt$_{(t-1)}$	0.021***	0.018***	0.029***	0.029***	0.023***	0.022***	0.026***	0.029***
	(0.0028)	(0.0052)	(0.0026)	(0.0026)	(0.0020)	(0.0029)	(0.0034)	(0.0036)
Bankrupt at some point	0.57		-1.36***		-0.43		0.33	
	(0.56)		(0.43)		(0.50)		(0.46)	
(Cash flow)$_{(t-1)}$×(Bankrupt at some point)	-0.15**		-0.047		-0.16***		-0.015	
	(0.066)		(0.032)		(0.046)		(0.027)	
Bankrupt the following year		0.25		-0.44		-0.26		-1.18
		(1.45)		(0.38)		(0.78)		(1.01)
(Cash flow)$_{(t-1)}$×(Bankrupt the following year)		0.16***		-0.062***		0.090		-0.069*
		(0.055)		(0.023)		(0.060)		(0.036)
Constant	1.44**	2.09*	0.23	0.23	1.78***	1.99***	0.64**	0.54
	(0.57)	(1.10)	(0.37)	(0.37)	(0.47)	(0.55)	(0.32)	(0.47)
Number of instruments	32	32	32	32	35	35	35	35
AB test for AR(2) in first diffs p-value	0.73	0.37	0.47	0.46	0.038	0.040	0.33	0.29
Sargan test p-value	0.93	0.94	0.99	0.99	0.97	0.99	0.98	1.00
Hansen test p-value	0.50	0.66	0.84	0.84	0.42	0.56	0.41	0.90
Observations	124379	124379	180870	180870	172045	172045	133204	175493
Sample	2006–2008	2006–2008	2009–2011	2009–2011	1–19 empl.	1–19 empl.	20+ empl.	20+ empl.

Notes: Heteroskedasticity and autocorrelation consistent standard errors are in parentheses. All of the specifications include year and industry fixed effects. All of the variables are normalized by the respective firm's capital stock (fixed assets).

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A5: Robustness check: OLS & FE, all companies

Dependent variable: Investment rate	Firm & year FE	Sector & year FE	OLS without FE
Investment rate$_{(t-1)}$	-0.18***	-0.0049**	-0.0035
	(0.011)	(0.0023)	(0.0023)
Squared investment rate$_{(t-1)}$	0.000077*	0.000014	0.000011
	(0.000041)	(0.0000094)	(0.0000094)
Change in sales$_{(t)}$	0.020***	0.021***	0.021***
	(0.0034)	(0.0030)	(0.0030)
Cash flow$_{(t-1)}$	0.10***	0.090***	0.090***
	(0.011)	(0.0086)	(0.0086)
External debt$_{(t-1)}$	0.029***	0.018***	0.018***
	(0.0021)	(0.0013)	(0.0013)
Bankrupt at some point		0.060	0.086
		(0.30)	(0.30)
(Cash flow)$_{(t-1)}$×(Bankrupt at some point)	-0.22*	-0.098*	-0.098*
	(0.12)	(0.057)	(0.057)
Constant	0.17**	0.59***	0.81***
	(0.072)	(0.12)	(0.029)
Observations	305249	305249	305249
Sample	2006–2011	2006–2011	2006–2011

Notes: Robust standard errors are in parentheses. The variance is clustered at the firm level in the second and the third specification. All of the variables are normalized by the respective firm's capital stock (fixed assets).
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A6: Robustness check: FE, subsamples

Dependent variable: Investment rate	(1)	(2)	(3)	(4)	(5)	(6)
Investment rate$_{(t-1)}$	-0.0033	-0.0034	-0.0066***	-0.0066***	-0.0068***	-0.0024
	(0.0047)	(0.0047)	(0.0020)	(0.0020)	(0.0022)	(0.0050)
Squared investment rate$_{(t-1)}$	0.000015	0.000016	0.000014***	0.000014***	0.000012**	0.000015
	(0.000021)	(0.000021)	(0.0000053)	(0.0000053)	(0.0000054)	(0.000020)
Change in sales$_{(t)}$	0.023***	0.023***	0.019***	0.019***	0.017***	0.031***
	(0.0042)	(0.0042)	(0.0042)	(0.0042)	(0.0032)	(0.0071)
Cash flow$_{(t-1)}$	0.10***	0.099***	0.081***	0.081***	0.092***	0.085***
	(0.013)	(0.013)	(0.012)	(0.012)	(0.0099)	(0.017)
External debt$_{(t-1)}$	0.016***	0.017***	0.019***	0.019***	0.019***	0.014***
	(0.0018)	(0.0019)	(0.0018)	(0.0018)	(0.0015)	(0.0024)
Bankrupt at some point	0.61		-0.73**		-0.34	0.48
	(0.43)		(0.34)		(0.39)	(0.46)
(Cash flow)$_{(t-1)}$×(Bankrupt at some point)	-0.15*		-0.026		-0.11*	-0.031
	(0.082)		(0.031)		(0.068)	(0.025)
Bankrupt the following year		-0.013		-0.98***		
		(0.68)		(0.17)		
(Cash flow)$_{(t-1)}$×(Bankrupt the following year)		0.12***		-0.058***		
		(0.042)		(0.017)		
Constant	0.67***	0.68***	0.35***	0.35***	0.82***	0.75***
	(0.15)	(0.15)	(0.13)	(0.13)	(0.17)	(0.16)
Observations	124379	124379	180870	180870	172045	133204
Sample	2006–2008	2006–2008	2009–2011	2009–2011	1–19 empl.	20+ empl.

Notes: Robust standard errors are in parentheses. The variance is clustered at the firm level. All of the specifications include the year and industry fixed effects. All of the variables are normalized by the respective firm's capital stock (fixed assets).

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$