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Investment and financial constraints in transition economies: micro evidence from Poland, the Czech Republic, Bulgaria and Romania

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Abstract

We investigate to what extent firm investment in transition countries is sensitive to internal finance. We find that firms in Bulgaria and Romania are less sensitive to internal financing constraints, in contrast to firms in Poland and the Czech Republic. A likely explanation is that Bulgaria and Romania experience a stronger persistence of soft budget constraints than the other two more advanced countries.

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1. Introduction

One of the key components in models of firm restructuring in transition economies refers to the investment decision that firms need to make (e.g. Blanchard, 1997). At the start of transition it became clear that most firms had to invest heavily to modernize their obsolete capital stock. However, the external conditions such as the functioning of capital markets and the presence or absence of soft budget constraints are of crucial importance to achieve such strategic restructuring. In particular, if

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soft budget constraints (SBC) persist (i.e. the government or other institutions bail out loss making firms), restructuring may be postponed (Kornai, 1999; Dewatripont et al., 2000). In their 1999 transition report, the EBRD has indeed documented the continuation of soft budget constraints in most of the transition economies, not through direct subsidies, but rather via indirect ways, such as tax arrears or ‘preferential’ bank loans.

In this paper we use a unique panel of more than 4000 manufacturing firms consisting of comparable data for Poland, the Czech Republic, Bulgaria and Romania between 1994 and 1999 to investigate the role of financial constraints on the investment behavior of firms.

Section 2 introduces the methodology. Section 3 describes the data set and discusses the estimation results. Section 4 concludes this paper.

2. Background, empirical model and estimation issues

The standard accelerator model of investment, assuming perfect capital markets, relates investment to the output performance in firms.¹ Financial variables should have no impact on the investment decision of firms as internal and external finance are perfect substitutes in perfect capital markets. However, in the context of transition economies where capital markets are just emerging and in the face of substantial information asymmetries, the assumption of perfect capital markets is harder to defend.

There are only a handful of papers that study the investment behavior of firms in transition countries. Lizal and Svejnar (2002) and Anderson and Kegels (1997) analyze investment in firms in the Czech Republic in the 1990s, while Budina et al. (2000) analyze investment of Bulgarian firms over the period 1993–1995.

The empirical equation that we seek to estimate has the following standard specification:

$$\frac{I_{it}}{K_{it-1}} = \alpha_i + \alpha_1 \frac{Q_{it}}{K_{it-1}} + \alpha_2 \frac{CF_{it}}{K_{it-1}} + \epsilon_{it} \quad (1)$$

where I stands for gross investment defined as the change in the real capital stock plus depreciation, Q is the growth of real sales of the firm, CF is the real cash flow of the firm, K is the level of the real capital stock (proxied by tangible fixed assets), subscript i refers to firm i and subscript t refers to year. We normalize by the capital stock to control for size effects. We deflated all nominal values with the producer price index. The parameter α_i represents an unobservable firm level fixed effect that may be correlated with the other explanatory variables and ϵ_{it} is a white noise error term.

As in other studies, the growth in real sales in Eq. (1) proxies for the investment opportunities. The coefficient α_2 captures the sensitivity of firm level investment with respect to the internal financing of the firm and is the coefficient of interest.

To control for the unobserved firm level fixed effect and possible measurement error we will estimate Eq. (1) in first differences or

¹Some of the most successful empirical investment models are based on the traditional acceleration principle, which links the demand for capital goods to the level or change in firm’s output or sales (e.g. Abel and Blanchard, 1986; Fazzari et al., 1988).

$$\Delta \frac{I_{it}}{K_{it-1}} = \alpha_1 \Delta \frac{Q_{it}}{K_{it-1}} + \alpha_2 \Delta \frac{CF_{it}}{K_{it-1}} + \Delta \epsilon_{it} \tag{2}$$

We will estimate Eq. (2) with the general methods of moments technique using instrumental variables as it is conceivable that higher investment leads to higher changes in sales and higher cash flows. We also include year dummies to control for unobserved common aggregate shocks.

Arellano and Bond (1991) demonstrate that in a first difference model as in Eq. (2) good instruments are the values of the endogenous explanatory variables dated $t - 2$ and at earlier dates as they are not correlated with the contemporaneous first differenced error term. As the panel progresses an increasing number of instruments can be used which increases the efficiency of the estimates.

3. Data and results

We use data from company accounts recorded in the AMADEUS database.² To be included in AMADEUS companies must comply with at least one of the following criteria: (i) turnover greater than 10 million EUR; (ii) number of employees greater than 150; (iii) total assets greater than 10 million EUR. We examine the time period 1994–1999, a period for which AMADEUS has a large coverage of firms. We trace firms for at least three consecutive years and Table 1 gives an overview of the structure of the panel and the number of firms in each country.

Summary statistics of the relevant variables such as employment, investment, growth of real sales and cash flow are reported in Table 2. We can already note that firms in Bulgaria and Romania, the two slow reformers, have on average lower investment rates and lower growth rates in real sales.

The regression results are reported in Table 3. In the first column we report the unconstrained model, while in the second column we report the liquidity constrained model. The Sargan test of over-identifying restrictions does not reject the validity of the instruments, nor is there any second

Table 1
Structure of the panel

Years of observation	Number of firms			
	Poland	Czech Republic	Bulgaria	Romania
3	251	221	268	196
4	148	379	293	551
5	55	444	621	983
Total number of firms	454	1044	1182	1730

²AMADEUS is a Pan-European financial database, created and distributed by the Bureau Van Dijk on CD-ROM, containing information on medium and large public and private companies. The data are collected by local information providers and Bureau Van Dijk makes them consistent to facilitate cross-country comparisons. For Bulgaria are provided by Creditreform Bulgaria OOD; for Czech Republic—by Albertina Data; for Poland—by InfoCredit; and for Romania—by Romanian Chamber of Industry and Commerce.

Table 2
Summary statistics

	Poland		Czech Republic		Bulgaria		Romania	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
<i>E</i>	514	978	504	1034	386	761	743	1391
<i>I/K</i>	0.049	0.186	0.132	0.290	0.017	0.475	-0.108	0.467
<i>Q/K</i>	0.327	1.847	0.437	3.210	-0.176	1.984	0.113	9.913
<i>CF/K</i>	0.307	0.767	0.170	0.628	0.198	3.654	0.357	3.566

E: number of employees; *I*: gross fixed investment, including depreciation, over beginning of period capital; *Q/K*: change in real sales over beginning of period capital; *CF/K*: real cash flow over beginning of period capital.

order serial correlation (SOC). The estimated coefficient, α_1 , of the change in real sales controlling for investment opportunities, is positive in all countries and similar in magnitude to what has been reported in previous studies for transition economies. This suggests that the accelerator model is not a bad approximation for describing investment behavior in transition economies.

We next turn to the discussion of liquidity constraints in column (2). The coefficients on the cash flow take different values for the different countries in our sample. While for Poland and the Czech Republic, α_2 is highly significant and positive this is not the case for Bulgaria and Romania. For Bulgarian firms we find a relatively low coefficient of 0.025 that is statistically significant only at the 10% critical level. This compares to a coefficient of 0.07 for both Polish and Czech firms. For Romanian firms there is no statistically significant effect of cash flows on investment. Thus firms in Poland and the Czech Republic seem to be credit constrained, a result often observed in western

Table 3
Dependent variable: *I/K*^a

	Poland		Czech Republic		Bulgaria		Romania	
	I	II	I	II	I	II	I	II
<i>Q/K</i>	0.020	0.038	0.018	0.010	0.040	0.016	0.012	0.007
	(6.932)	(6.753)	(1.610)	(2.027)	(1.767)	(2.099)	(1.783)	(2.273)
<i>CF/K</i>		0.067		0.070		0.025		0.004
		(4.596)		(4.105)		(1.597)		(0.376)
Number of firms	454	454	1044	1044	1182	1182	1730	1730
Number of observations	1620	1620	4399	4399	5081	5081	7710	7710
Sargan test	0.413	0.822	0.980	0.593	0.210	0.308	0.204	0.132
SOC	1.476	1.487	1.053	0.991	1.277	1.267	1.741	1.634

Two step robust *t*-statistics in brackets, *Q/K* and *CF/K* are instrumented using all available moment restrictions from $t-2$ and before. All equations include year dummies. The Sargan test is χ^2 distributed, *P*-values are reported, *P*-values below 0.05 would suggest a rejection of the validity of the instruments at the 5% critical level. The second order serial correlation test (SOC) follows a Normal distribution, a value above 2 or below -2 would suggest the presence of second order serial correlation at the 5% critical level.

^a GMM IV estimates.

Table 4
Dependent variable: I/K^a

	Poland		Czech Republic		Bulgaria		Romania	
	I	II	I	II	I	II	I	II
Q/K	0.028 (7.146)	0.039 (7.171)	0.016 (1.904)	0.020 (3.348)	0.035 (2.553)	0.033 (2.251)	0.017 (2.201)	0.021 (5.517)
CF/K		0.054 (5.411)		0.058 (11.05)		0.031 (1.792)		0.007 (1.048)
Number of firms	422	422	901	901	1081	1081	1474	1474
Number of observations	856	856	2655	2655	2248	2248	3433	3433
Sargan test	0.467	0.247	0.401	0.433	0.467	0.179	0.232	0.263
SOC	1.043	1.324	1.174	1.340	1.119	1.124	1.475	1.469

As in Table 3.

^a GMM IV estimates (only firms with positive investment rates).

market economies as well. Furthermore, credit constraints seem to be far less present in the least advanced transition countries, Bulgaria and Romania. It is unlikely that this is a reflection of perfect capital markets, given the many uncertainties and the early stage of financial reforms characterizing these two countries. The alternative explanation is that soft budget constraints prevail in Bulgaria and Romania, which implies that firms are not operating under liquidity constraints. When access to credit is facilitated through preferential lending under a variety of patterns, investment becomes less sensitive to internal firm financing.

Finally, as a robustness check of the sensitivity of our results to outliers, we have re-estimated every country regression for a sample excluding firm-years with negative investment to capital ratios. The results are presented in Table 4 and show to be qualitatively the same as the results for the full sample.

4. Conclusion

This paper uses comparable firm level data for four transition economies, two fast reformers and two slow reformers, to analyze the impact of internal financial constraints on firm's investment behavior. For the fast reformers we find, as in well-developed market economies, that firms are liquidity constrained in their investment decisions. However, in the slowly reforming economies, we find that such constraints are less important. This is unlikely to be a reflection of the presence of perfect capital markets, rather it is likely to be a reflection of the presence of soft budget constraints in these countries.

A further exploration of how soft budget constraints influence firm's restructuring and performance is not only important in transition economies, but also in well-developed market economies, where soft budget constraints may exist.

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