Credit rationing and investment decisions in imperfect financial market

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Abstract

The paper investigates investment decisions of Slovak firms and influence of financial market imperfections on these investments. We consider the distorted and low supply of bank debt in the late 90´s as a main market imperfection affecting the investment decisions of firms. This fact is even more important if we take into account that in transition countries credit is one of the most important sources of financing. The reform in banking sector in 1999 aimed on increasing of funds´ availability. This paper uses a sample of about 1.000 non-financial firms, observed annually between 1996 and 2005 to explore time variation in investment process. We begin with a survey of the relevant literature on investment and credit rationing. Further we develop an empirical model derived from classical accelerator model of investment demand. Afterwards, the time period is divided in two sub periods 1996 – 2000 and 2001 – 2005 to investigate the underlying hypothesis. The results suggest that the reform changed some important firm characteristics and confirmed some theoretical assumptions.

Key words

credit rationing, investment decisions, financial market imperfection

1 Introduction

The effects of financial market imperfections on firms´ investment decisions and on their capital structure choice are closely related. Different models and empirical studies show that firms´ investment decisions are heavily affected by informational failures in financial markets that in turn determine different costs of alternative financing methods. Generally, these models focus on the fact that informational failures generate a wedge between internal and external finance. External finance can be rationed or it can simply be more costly than internal finance. In any case, the imperfect substitutability between financing methods affects the amount of funds which firms have access to and, as a consequence, it also affects firms´ investment decisions.

In the paper we present the results of an empirical investigation of investment behaviour in Slovak firms during the 1999 banking sector reform. For financial market in Slovakia the year 1999 is considered to be the threshold separating pre-reform and post-reform periods. In the pre-reform period the business environment in Slovakia was characterised by the relatively small amount of funds available for financing business. In Slovakia as well as in many Central European countries bank debt is the dominant financing vehicle for funding the development of corporations. But in this period the financial sector provided insufficient financing for firms, as funds were absorbed by government for investment and consumption, followed by a strong crowding-out effect. This process also produced high interest rates.

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The situation on Slovak financial market described above suggests the possibility that Slovak firms faced the situation called credit rationing – the process of making credit less easily available or subject to high interest rates.

2   Theory and evidence on credit rationing

We can distinguish between two main approaches in the theory of credit rationing and investment decisions. First one is represented by informational asymmetry problem and second by presence of agency cost.

The effects of asymmetric information in the credit market are analysed in the pioneering work by Stiglitz and Weiss (1981). According to this approach, information is asymmetrically distributed between buyers (firms) and sellers of credits (banks) and the outcome can be the (partial) failure of the credit market in which an inefficient level of loans is offered. The **informational asymmetry** derives from the fact that the entrepreneurs have private information on the profitability of investment projects. These have the same expected return but differ in terms of risk.

Bank can use the interest rate as a screening device in order to sort out good borrowers from bad ones. This brings a twofold effect: (1) adverse selection effects because as the interest rate rises, good borrowers may drop out of the market, increasing the average riskiness of the loans, and (2) moral hazard effect – when the borrowers have the possibility of undertaking different types of projects, the interest rate can affect their behaviour. An increase in the interest rate reduces the effective return on successful projects and this may induce borrowers to choose riskier projects.

Responding to above mentioned problem we can ask the question: If firms are credit rationed, why don´t they resort to equity to finance their investment? It is clear that different financing methods are strictly complementary, since they are the outcome of the capital structure choice of the firm. Therefore, credit rationing must be accompanied by some sort of equity rationing to have an effect at the aggregate level. This possibility is explored by Greenwald et al. (1984). They suggest that informational problems that affect the credit market may intensify when a firm is financed with equity producing negative signals for the market.

The negative signal associated with equity issues may thus imply that the cost of equity can become prohibitively high for some firms, while firms using equity issues may experience a drop in their market value. These two factors imply that, in the presence of the need to raise external capital, firms will strongly prefer debt, introducing in this way a bankruptcy risk that can significantly affect their behaviour.

Another approach has its origin in the papers by Bernanke and Gertler (1989 and 1990). They develop a general equilibrium framework within which they determine endogenously the institutional structure of financial markets. The volume of external sources is considered to be derived and authors concern mainly with costs of these sources with particular focus on **agency cost.** The agency cost approach focuses therefore on post-contractual asymmetric information.

Bernanke and Gertler also show that financial market imperfections can generate an amplification mechanism of the shocks that hit the economy and can also generate endogenous cycles (see also Bacchetta and Caminal, 1995). Moreover, the resulting dynamics are non-linear in the sense that the effects of imperfections depend on the sign, size and timing (phase of the cycle) of the shock.

Both approaches differ in the way they introduce asymmetric information. In the first approach, asymmetric information between the two parties is precontractual: in the credit

market firms are assumed to have ex ante more information about the profitability of their investment projects, and in the equity market managers have ex ante superior information about the profitability of the firms. This in turn implies that investment projects and firms are ex ante different. The agency cost approach, instead, focuses on postcontractual asymmetric information: investment projects are ex ante identical, since the distribution of possible outcomes is the same for all projects. Ex post, however, projects have different effective returns because during the contractual relationship there is the possibility for the borrower to undertake actions that are unobservable or costly observable by the lender. Because of this postcontractual informational asymmetry, the relationship between lenders and borrowers is interpreted as a standard agency relationship where more attention is paid to the form of the contract.

At the empirical level, following the seminal work by Fazzari et al. (1988), the relevance of financial sector for corporate investment decisions has been commonly investigated by adding financial indicators to empirical specifications derived from a real investment model, and testing that financial factors are more important for firms that a-priori can be considered likely to be credit constrained.

3 Data and model

The analysis examines company accounts and the model uses a sample of 1 135 non-financial firms, observed annually between 1996 and 2005 to explore time variation in financial structure. Data are taken from annual reports of Slovak companies with assets over 50 mil. SKK.

For analysis of investment decisions we used the accelerator model of investment demand with main variables: investment (I), capital (K), output - sales (Y) and cash-flow (CF). Capital is defined as beginning-of-period net fixed assets, and (gross) investment is the change in net fixed assets plus depreciation.

In the investment accelerator model, investment is determined by setting the marginal product of capital equal to marginal cost. For a given technology, the optimal level of the capital stock can be obtained, and investment fills the gap between the optimal and current capital stock. Under a number of simplifying assumptions, the demand for capital can be expressed as a function of the level of output and the user cost of capital. After series of modifications the final equation characterizing the investment accelerator model is as follows:

$$\left(\frac{I}{K}\right)_{i,t} = \beta_0 + \beta_1 \left(\frac{I}{K}\right)_{i,t-1} + \beta_2 \left(\frac{Y}{K}\right)_{i,t} + \beta_3 \left(\frac{Y}{K}\right)_{i,t-1} + \beta_4 \left(\frac{CF}{K}\right)_{i,t-1} + \varepsilon_{i,t}$$

This equation reflects firms´ investment demand and implicitly assumes perfectly elastic credit supply or, in the case of an emerging market, a soft budget constraint. When it is used to characterise the investment behaviour of a market economy, the estimated coefficients for the financial indicators are interpreted as a measure of the sensitivity of investment to financial constraints.

The original model of investment accelerator is for the purpose of analysis extended. To test for the presence of financial constraints the basic specification can be augmented with lagged cash-flow or other indicators of firms´ financial positions.

4 Results and conclusions

Our empirical strategy consists in estimating cash-flow augmented accelerator model described above in the whole sample of firms. For investment decisions we estimated impact of particular factors by regression equations. In Table 1 we introduce standardized beta

coefficients to evaluate individual influence of exogenous variables on dependent variable. Coefficients with low or no statistical significance are in italic.

Year	I/K_{t-1}	Y/K_t	Y/K_{t-1}	CF/K_{t-1}
1	2	3	4	5
1996	0,659502679	-0,06223763	*0,029094683*	-0,36927483
1997	1,079838299	*0,007781365*	-0,155689977	*-0,0444416*
1998	1,189831919	-0,10954635	*-0,343623301*	*0,01044462*
1999	0,504947244	*0,062831116*	*-0,013713871*	*-0,14543127*
2000	0,458320158	*-4,90687554*	-4,595931288	0,30762107
2001	1,442061245	-0,22961553	-0,799516795	0,1859622
2002	1,081147153	-0,03961337	-0,447437969	0,14222283
2003	1,772476527	-0,13057835	-0,155072384	0,22291054
2004	2,184971953	1,068581295	-2,052563582	0,21546029
2005	3,949039762	0,322708839	0,812329999	3,1565342

Table 1 Results of investment regression model

From results in Table 1 we can estimate that in whole investigated period previous investment activities (I/K_{t-1}) have positive impact on investment in following period and are statistically significant (column 2). This is in line with anticipated and expected acceleration effects. Increasing effectiveness of credit process is evident after 2000.

Coefficient sales – sales in current period (Y/K_{t-1}) – in columns 3 and 4, report in prereform period statistically insignificant values. This can be explained by insignificance of sales and output intensity and that these variables play no important role in financing decisions. Similarly in postreform period are some coefficients statistically significant but with negative values.

While testing the significance of cash-flow, the basic hypothesis is accepted the presence of soft budget constraints. The results show that firms are subject to these constraints with approach to external sources regardless of their profitability.

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Summary

Prideľovanie úveru a investičné rozhodovanie na nedokonalom finančnom trhu. Článok skúma investičné rozhodovanie podnikov a zasadzuje ho do podmienok existencie nedokonalostí finančného trhu a z toho vyplývajúceho fenoménu tzv. prideľovania úveru. Ako rozhodujúca nedokonalosť podmieňujúca vznik situácie prideľovania kapitálu je chápaná absencia dostatočnej ponuky úverov v druhej polovici deväťdesiatych rokov. Hypotéza je formulovaná nasledovne: Nedokonalý finančný trh obmedzuje investičné aktivity firiem a nevytvára podmienky pre ich rozvoj. Túto hypotézu potom testujeme pomocou modelu investičného akcelerátora s použitím údajov slovenských firiem v rokoch 1996 – 2005. Medzníkom je rok 2000, keď sa predpokladá začiatok vplyvu účinkov reformy bankovníctva na Slovensku (v roku 1999) a danú nedokonalosť odstránila. Ako podstatný záver možno konštatovať, že výsledky testu hypotézu potvrdili a umožňujú tak tvrdiť, že nedokonalý finančný trh podstatne ovplyvňuje finančné rozhodovanie firiem.