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On the determinants of credit rationing: Firm-level evidence from transition countries

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A B S T R A C T

Using survey data for firms from Eastern European transition economies we investigate the determinants of credit rationing. Our rationing definition incorporates firms whose loan application was rejected, but also 'discouraged' potential borrowers. We employ a bivariate probit with censoring, approach that accounts for the underlying selectivity since rationed firms are a subset of those without a loan. We include firm-specific attributes related to the alleviation of informational asymmetries, and therefore expected to affect credit rationing. We find that credit rationing depends on firm size, profitability, sales growth, ownership type, legal status, sectoral heterogeneity and the country-specific level of domestic credit.

1. Introduction

Asymmetry of information in the loan market may be *ex ante*, generated by the lender's difficulty to distinguish between 'good' and 'bad' borrowers when deciding which loan applications should be granted, and/or *ex post* due to the lender's imperfect and costly monitoring of borrower's actions. Jaffee and Russell (1976) and Stiglitz and Weiss (1981) demonstrate that when adverse selection and moral hazard problems between borrowers and lenders remain unresolved, may lead to an equilibrium credit rationing.[1] Essentially, in such equilibrium there is excess demand for credit, and lenders find it optimal

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[1] It should be noted that there is also a literature advocating that credit rationing does not emerge as an equilibrium outcome or that it is of low empirical relevance (Bester 1985; Riley, 1987; De Meza and Webb, 2006).

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to allocate credit by rationing, rather than charging a higher interest rate that would clear the market. Due to adverse selection increasing the loan rate is sub-optimal, because it leads to a deterioration of applicants' pool and thereby reduces bank's profits. Consequently, there is a demand segment for which the shadow value of obtaining an extra dollar of loan would be higher, and therefore may even be willing to pay above the prevailing interest rate but still denied access to credit. One of the most important side effects of credit rationing is that a set of investment projects, even though exhibiting a sufficiently positive Net Present Value, may not be funded on the basis of loan applicants' characteristics that are thought as signaling a 'bad' loan. The consequences of such an outcome may hinder production, employment and business fixed investment and are especially intensified when the firm is more reliant on external credit (Greenwald et al., 1984; Fazzari et al, 1988; Gertler, 1988; Hubbard, 1998; Bernanke and Gertler, 1990, 1995).

The purpose of this paper is to shed light on the firm-level determinants of credit rationing, taking into account the selective nature of the "credit approval" procedure. Essentially, one has to take into account that credit rationed firms are a non-random draw from the group of firms without a loan. Moreover, our analysis identifies credit rationed firms, as those who needed a loan but whose application was either rejected or they were discouraged from applying for a loan, although they need it. In order to empirically investigate the determinants of credit rationing we rely on firm-level data from Eastern European transition economies, which may be considered as a natural laboratory for studying credit rationing given that informational asymmetries are expected to be more acute since their capital markets are less mature (Egerer, 1995; Gros and Suhrcke, 2000; Erol, 2005).

In particular, we employed the EBRD-World Bank Business Environment and Enterprise Performance Survey III (BEEPS-III) which is a micro (firm-level) database corresponding to a questionnaire completed by approximately 9500 firms from 26 transition countries. Respondents provided detailed information regarding whether they had an outstanding loan and if not the reasons for not obtaining credit. This information allowed a direct identification of credit rationed firms that permits an explicit connection between rationing and potential borrower profile. This distinction is of special importance because from a methodological point of view the empirical investigation of credit rationing is usually constrained by the difficulty to identify potential borrowers that are indeed credit rationed. Using direct measures of credit rationing we overcome the problems associated with the utilization of indirect indicators regarding the classification of firms as being more or less likely to be credit rationing e.g., the impossibility to verify the selected indicators' actual ability to reflect rationing and the possibility that these indicators embody other, unrelated to rationing, information (Angelini et al., 1998).

For estimation purposes, we apply a bivariate probit with censoring to jointly model loan demand and the rationing mechanism. We advocate the appropriateness of a bivariate model since the sample of credit rationed firms is not based on a random draw from the underlying population. In addition, motivated by economic theory and past empirical evidence we investigate whether the probability of credit rationing is related to firm-level attributes that may signal a potential borrower's ability to repay debt and to alleviate informational asymmetries faced by banks (i.e., the investment opportunity set, age, size, gender of principal owner, use of external auditing, and the application of International Accounting Standards-IAS). Nevertheless, it should be pointed out that although the particular dataset offers relatively rich information that assists in overcoming misspecification issues due to the cross-sectional variations of firm-attributes, it does not guarantee the avoidance of spurious estimates due to unobserved heterogeneity originated from the lack of longitudinal data. This implies that we were not able to conduct an explicit causal analysis and thus our estimates are interpreted as correlations.

According to our results, the likelihood of being credit rationed is lower for firms with higher sales growth, higher profitability and size. In contrast, the probability of rationing increases when the firm's principal owner is female. We also found that firms maintaining a savings account, which proxied banking relationships, were associated with a higher likelihood of rationing. Also, firms operating in Mining witness the highest probability of being rationed while those in Real Estate and Hotels the lowest. Moreover, our results show that firm-specific credit rationing is affected by macro credit conditions, proxied by domestic credit to the private sector.

These findings suggest that the tendency of firms with specific characteristics to be out of the credit market could be more harmful in the presence of exogenous demand shocks, since our results indicate