

Chapter 6

Role of Credit Constraints on Product Quality: A Case Study of Turkey

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ABSTRACT

We analyze firms' investment on R&D in an imperfectly competitive setting. Our focus is on cost asymmetries in a duopoly model. The baseline model setting assumes firms invest in a quality ladder type of R&D process with probabilistic returns and have to borrow both at the innovation stage and the production stage. We find that if the firm is more efficient than the rival, effort on R&D will decrease less upon facing a common interest rate. We test our theoretical predictions using World Bank's Business Environment and Enterprise Performance Surveys (BEEPS, 2002, 2005) for Turkey.

1. INTRODUCTION

The focus of this study is credit constraints and how they affect the innovation behavior of firms. Since innovation is a major channel for growth, financing innovation has been starting to gain much attention recently. This is more difficult than other types of investments. First, there is lack of collateral value of R&D which restricts the use of debt. Second, R&D is a non-rival, partially excludable good so firms need

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to protect proprietary information (Brown et al., 2009). As a result, firms may face adverse selection and moral hazard problems which drives a wedge between the costs of internal and external finance sources. The problem becomes more serious for new firms and for innovative firms (Hall, 2009). These problems cause R&D levels to be lower, leading to lower growth rates (Brown et al., 2010). Rajan and Zingales (1998) argue that better developed financial markets help to overcome this wedge. Thus, industries that rely more on external finance benefit more from financial development. They assume that the U.S. can be taken as a country with relatively low frictions. In such a country, the use of external finance will capture technological characteristics of a sector which are exogenous for the individual firms. They find that external finance dependent firms have relatively higher growth rates in countries that have more developed financial markets. Chor and Manova (2011) show that such financially vulnerable sectors become more sensitive to cost of capital during crisis periods.

This issue is particularly important for developing countries which want to catch up with developed ones. For these countries, credit markets may not function properly due to a number of reasons. One is that information systems are undeveloped, which makes it hard to enforce contracts. Another reason is that borrowers are more likely to default since they are poor and under economic pressure. A third reason is that because of political pressures, borrowers are protected from lenders (Banerjee and Duflo, 2005). Banerjee and Duflo (2005) argue that one of the consequences of poorly functioning credit market is that even if two firms face the exact same technological options, they may choose very different methods of production if their starting capital opportunities differ. This in turn may result in one of the firms being more technologically advanced. As a result, interest rates, total factor productivity, and the marginal product will not be equalized across borrowers within the same local capital market. If for example, marginal product of capital for a firm is higher than the interest rate, a firm would like to borrow more than what is available. Thus, it will be credit constrained.

The literature has taken different approaches to study the effects of credit constraints on investment in general. Egger and Keuschnigg (2011) use a multi-country two sector model to investigate the relationship between innovation, finance and trade. They assume that firms in the innovative sector are credit-constrained since these are highly productive and have large investment opportunities but little internal assets as a result of prior R&D spending. They show that trade protection of the innovative sector, R&D subsidies, and financial sector development boost national welfare. Silva and Carreira (2011) find that firms that do not invest in R&D and those that do not receive public funding are financially constrained, i.e. they are not able to raise the necessary funds for their investments and growth. They take the approach

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