Research paper

How does long-term finance affect economic volatility?☆

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A B S T R A C T

In an approach analogous to Rajan and Zingales (1998), we examine how the ability to access long-term debt affects firm-level growth volatility. We find that firms in industries with stronger preference to use long-term finance relative to short-term finance experience lower growth volatility in countries with better-developed financial systems, as these firms may benefit from reduced refinancing risk. Institutions that facilitate the availability of credit information and contract enforcement mitigate refinancing risk and therefore growth volatility associated with short-term financing. Increased availability of long-term finance reduces growth volatility in crisis as well as non-crisis periods.

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1. Introduction

The tendency of firms to match the maturity of their assets and liabilities is well established in the literature (Hart and Moore, 1995; Demirgüç-Kunt and Maksimovic, 1999). Firms that operate in environments where the availability of long-term finance is limited due to market failures and policy weaknesses, such as weak information infrastructures, macro and political instability, poor contract enforcement, and weak investor protection, tend to be at a disadvantage when it comes to financing their long-term investments. A firm that can only use short-term debt to finance long-term assets continually needs to roll over its credit, which introduces refinancing risk as creditors may at some point refuse to roll over their financing. Refinancing risk potentially increases firm-level economic volatility, as firms that cannot refinance their investments may be forced to prematurely sell them at reduced prices possibly inducing bankruptcy.

In this paper, we examine the relationship between long-term debt finance and economic volatility using firm-level data for a set of 47 countries over the 1995–2013 period. We consider a firm-level growth volatility variable based on accounting data, and an asset return volatility variable based on stock market data. In order to deal with the identification problem that less volatile firms may be attracting more long-term finance, we relate our measures of firm-level volatility to financial and institutional development proxies in combination with an index of a firm’s preference for long-term debt use, following Rajan and Zingales (1998). A firm’s preference for long-term debt is captured by US firms’ use of long-term debt in that industry, under the assumption that US firms are least likely to be constrained in their access to long term debt.

Our results suggest that the availability of long-term finance, be it in the form of bank loans or debt securities, reduces firm-level volatility, consistent with the notion that long-term finance mitigates refinancing risk. Refinancing risk is potentially more relevant at a time of financial crisis when bank credit is contracting. We also examine this in our analysis by splitting the overall sample period into a pre-crisis period 1995–2006, and a crisis-and-aftermath period 2007–2013. We find that the level of banking

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market development is important for reducing firm-level volatility in both periods.

In further analysis, we examine how national variation in the availability of information and the quality of legal infrastructures affects the relationship between the availability of long-term credit, as proxied by financial development, and economic volatility. We find that better information, indicated by higher accounting standards, mitigates the destabilizing influence of limited access to long-term finance. This may reflect that with better information the liquidity risk of a pre-mature termination of desiring projects diminishes, as short-term creditors will be less likely to refuse to roll over their credits because they cannot accurately assess the prospects of the project due to lack of information. In addition, we find that better legal infrastructures supporting credit markets reduce the economic volatility induced by a limited availability of long-term finance, perhaps because lower contract enforcement and bankruptcy costs reduce the likelihood of pre-mature liquidation.

Our evidence of a negative impact of the availability of long-term debt finance on firm volatility is robust to controlling for the overall dependence on external finance. Hence, our results suggest that changes in financial development that tend to lengthen the maturity of credit have a potentially beneficial economic effect in terms of lower economic volatility, independently of the overall availability of external finance.

A large body of papers finds that financial market development, and access to long-term financing, have positive growth effects. Among these, Rajan and Zingales (1998) find that financial market development causes higher growth of firms in industries with a greater dependence on external finance (see also King and Levine, 1993a, 1993b; Levine and Zervos, 1998; Beck et al., 2000; Levine et al., 2000).1 Several papers find evidence that macroeconomic stability is positively related to financial market development and long-term debt use (see Beck et al., 2008; Demirgüç-Kunt and Maksimovic, 1999; Fan et al., 2012).2 Our contribution to the literature is to examine the relationship between financial market development and economic volatility using micro, firm-level data. Our approach enables us to examine the relationship between firm-level volatility and the availability of long-term debt finance while controlling for the availability of overall external finance in some specifications.

The remainder of the paper is organized as follows. In Section 2, we discuss the literature on the relationship between external finance and economic volatility. In Section 3, we describe the data underlying the empirical analysis. In Section 4 we present empirical results on the relationship between the availability of long-term finance and firm-level volatility. Section 5 concludes.

### 2. The relationship between external finance and economic volatility

Theoretically, several papers address the rationale for external debt finance, and how it may affect firm volatility. Holmström and Tirole (1997), specifically, reason that financial intermediation occurs, because bankers can have a comparative advantage at screening and monitoring firms. Along these lines, Diamond (1984) analyzes a model where banks have a cost advantage of monitoring, if individual savers “delegate” their monitoring to them, thereby reducing aggregate monitoring costs. Financial market development potentially reduces firm risk taking, if it increases monitoring efficacy of banks and other providers of external finance.4

Short-term creditors are in a relatively better position to monitor and discipline firm risk-taking, as these creditors can refuse to roll over their credits on short notice, if they conclude that the firm is not well-managed (see Rajan, 1992; Rey and Stiglitz, 1993; Diamond and Rajan, 2001). As a consequence of more effective monitoring, external finance that is relatively short-term can reduce waste, increase efficiency and lead to lower firm volatility.

A second channel by which external debt finance may affect firm riskiness is through the moral hazard it creates regarding the firm’s risk choice. Shareholders, in particular, have the incentive to choose relatively risky activities that are debt-financed, as they will benefit from strongly positive outcomes, while they can shift the risk of very negative outcomes to their creditors (Jensen and Meckling, 1976). Increased riskiness due to moral hazard may be more pronounced in case of long-term debt, as this provides shareholders with more time to adjust the riskiness of the firm’s activities.

Through a third channel, external finance potentially increases firm riskiness, as it introduces the risk that creditors refuse to roll over their credits before a project can be profitably terminated. Diamond (1991) shows that lenders may even face incentives to liquidate viable projects. Liquidity risk is greater in the case of short-term debt as it has to be renewed relatively frequently. This can explain a preference for long-term debt on the part of firms, and increased firm volatility if long-term debt is not available when it is preferable. If long-term finance is undersupplied in a country due to reasons such as poor information or contract enforcement, firms can either reduce investment in long-term assets or bear additional liquidity risk (Aghion et al., 2010). To minimize liquidity risk as well as interest rate risk, firms often match the maturity structures of their assets and liabilities (Hart and Moore, 1995). Limited access to long-term finance inhibits maturity matching when investing long-term, possibly resulting in more volatile firm growth and returns.

In summary, theoretically the relationship between long-term debt finance and firm volatility is ambiguous, as long-term debt may reduce firm-level volatility by mitigating refinancing risk, while conversely a lower ability to monitor and increased moral hazard may lead to greater risk-taking by firms.

### 3. The data

In this study, we relate measures of firm-level volatility to firm debt maturity structure. The sample consists of firms in all sectors with the exception of financial firms and firms in the public sector, as these firms’ capital structure decisions and risk profiles are very different from other firms.

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1. More generally several papers argue that debt finance can be optimal in circumstances where it minimizes monitoring costs of firm activity (see Townsend, 1979; Gale and Hellwig, 1985; Boyd and Smith, 1994).
2. In the case of banks, generous financial safety nets and implicit and explicit bailout guarantees may reduce monitoring incentives for bank liability holders and encourage aggressive risk-taking (Demirgüç-Kunt and Kane, 2002).
3. For empirical evidence on asset and liability maturity matching by firms, see Schiantarelli and Sembenelli (1997), Jaramillo and Schiantarelli (1997), and Schiantarelli and Srivastava (1997).

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2. Our paper is also related to a recent literature that examines the effects of shocks in the availability of credit on firm-level investment. Duchin et al. (2010) show that the impact of the recent financial crisis on corporate investment was greatest for firms with low cash reserves or high short-term debt. Almeida et al. (2012) show that firms with a larger fraction of long-term debt maturity immediately after the third quarter of 2007 reduced their investment more than firms with longer remaining maturities. See also Vermoesen et al. (2013), Campbell et al. (2010, 2011), Chodorow-Reich (2014), and Duygan-Bump et al. (2015).
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