



## Does financial development volatility affect industrial growth volatility?

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### ABSTRACT

This paper investigates whether volatility of financial development plays a role in determining industrial growth volatility. Three key findings emerge. First, overwhelming evidence supports the view that more volatile financial development raises the industrial volatility in sectors that rely more on external liquidity. Second, the positive effect of financial volatility on industrial volatility mainly works through the increase in fluctuations of the growth of real value added per firm and the number of firms, with the former effect more prominent. Third, both the volatilities of the banking sector and the stock market positively associate with higher industrial growth volatility, which contrasts sharply with the finding in the literature that financial structure generally does not matter.

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### 1. Introduction

The theoretical and empirical growth literature has extensively explored the effect of financial development on economic growth. Theoretically, financial intermediaries and financial markets mitigate the costs of acquiring information, enforcing contracts, and making transactions. That is, the development of financial systems changes the incentives and constraints facing economic agents through producing information and allocating capital, monitoring firms and exerting corporate governance, ameliorating risk, pooling saving and easing exchange, with positive ramifications on economic growth (e.g., Acemoglu & Zilibotti, 1997; Bencivenga & Smith, 1991; Greenwood & Jovanovic, 1990; Khan, 2001; King & Levine, 1993a).

Empirically, cross-country studies (e.g., Beck & Levine, 2004; Goldsmith, 1969; King & Levine, 1993b; Levine, Loayza, & Beck, 2000; Levine & Zervos, 1998; McCaig & Stengos, 2005) offer strong and robust evidence supporting the view that both well-functioning banking systems and better-developed stock markets independently spur economic growth. That is, banking systems and stock markets provide different, but complementary, growth-enhancing financial services to the economy. Tadesse (2002) argues that market-based systems outperform bank-based systems among countries with developed financial sectors and that bank-based systems outperform market-based systems among countries with underdeveloped financial sectors. Levine (2002), however, finds that after controlling for overall financial development, cross-country comparisons do not suggest that distinguishing between bank-based and market-based financial systems matters as a first-order concern in understanding the process of economic growth. Using industry-level data, Beck and Levine (2002) confirm that greater financial development accelerates the growth of financially dependent industries. Financial structure per se, however, does not help explain the

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differential growth rates of financially-dependent industries across countries. Considering firm's access to external finance, Demirgüç-Kunt and Maksimovic (2002) find that firms do not grow faster in either market-based or bank-based financial systems. That is, the overall level of financial development matters for economic growth, rather than the development of a specific component of the financial systems. See Levine (1997, 2005), Ang (2008) and Beck (2009) for detailed survey on the finance-growth nexus.

Recently, Gehring (2013) finds that financial liberalization generates a strongly positive effect on productivity growth, investment, and economic growth for the EU members. Thumrongvit, Kim, and Pyun (2013) examine the effects of bond markets as a third key component of the financial system on economic growth. They find that government bonds positively relate to economic growth, while the effects of corporate bonds change from negative to positive as domestic financial structures expand in size and diversity. Cecchetti and Kharroubi (2012), however, argue that more finance does not always produce better outcomes, because the financial sector competes with the rest of the economy for scarce resources. They find that financial sector size exhibits an inverted U-shaped effect on productivity growth. That is, further enlargement of the financial system beyond a certain point can reduce real growth.

Policy makers identify output growth stability as one of several macroeconomic policy objectives (Mishkin, 2009; Yellen & Akerlof, 2006). Thus, in addition to the growth effect of financial development, another strand of the growth literature focuses on assessing whether financial sector development influences growth volatility as well.<sup>1</sup> Theory offers ambiguous predictions about the effect of financial development on growth volatility. For example, Bernanke and Gertler (1989) and Kiyotaki and Moore (1997) argue that financial constraints on firms can play a key role in the propagation of the business cycle and can eventually lead to higher oscillations. Accordingly, well-developed financial systems, by removing or alleviating financial constraints, can dampen output volatility. Bacchetta and Caminal (2000), Aghion, Bacchetta, and Banerjee (2004), and Morgan, Rime, and Strahan (2004) show that the ultimate (positive or negative) effect of financial development on volatility depends on real or monetary shocks, intermediate versus early and later stages of a country's financial development, and credit supply or demand shocks, respectively.

The existing cross-country empirical evidence on the finance–volatility relationship also proves mixed, at best. Denizer, Iyigun, and Owen (2002) find that countries with better developed financial systems experience smaller fluctuations in per capita output growth. Acemoglu, Johnson, Robinson, and Thaicharoen (2003) assert that the volatility effect of financial development diminishes once one controls for institutional variables. Beck, Lundberg, and Majnoni (2006) conclude that no robust relationship exists between financial development and aggregate economic volatility. Bekaert, Harvey, and Lundblad (2006) establish that financial liberalization often results in lower (consumption) growth volatility. Levchenko, Ranciere, and Thoenig (2009) find strong evidence that financial liberalization increases output volatility. Ćorić and Pugh (2013), however, demonstrate that foreign direct investment stabilizes output growth during the era of the Great Moderation.

Larrain (2006) and Raddatz (2006) implement the methodology of Rajan and Zingales (1998, hereafter, RZ) to revisit the effect of financial development on industrial growth volatility, using cross-country, cross-industry (firm) data. In contrast to the conventional cross-country studies, the RZ cross-country, cross-industry approach brings several advantages to the analysis: increases the degrees of freedom, thus, improving the precision of the estimated coefficients; addresses the issue of omitted variables; and provides a causal interpretation of the effect of financial development on sectoral volatility. Additionally, the RZ model also permits the identification of the channels through which financial development affects growth volatility.

Specifically, Larrain (2006) employs the RZ specification to examine whether better access to bank credit decreases or increases growth volatility. The ambiguous effect depends on whether firms face more financial constraints during output contractions (i.e., more credit decreases volatility) or expansions (i.e., more credit increases volatility). By regressing industrial volatility (the standard deviation of the detrended output of industry  $j$  in country  $k$ ) onto the interaction of external dependence (in  $j$ th industry) and financial development (in  $k$ th country) along with other controls, Larrain (2006) finds a significantly negative coefficient on the interaction term, arguing that lower volatility output occurs in sectors with higher external dependence and in countries with better financial development. Raddatz (2006) uses the same framework to investigate whether financial development leads to a larger reduction in output volatility in industries with high liquidity needs. By regressing industrial volatility onto the interaction between liquidity needs and financial development, Raddatz shows that financial development reduces the volatility of industries that require large amounts of liquidity. That is, financial development reduces growth volatility through external financial dependence in Larrain (2006) and liquidity needs in Raddatz (2006).

This paper complements Larrain (2006) and Raddatz (2006) and evaluates for a given level of financial development, whether the volatility of financial development affects industrial volatility. In this respect, many extant theoretical and empirical studies document that macroeconomic variability or uncertainty relates to economic activity.<sup>2</sup> For instance, Pindyck (1991) asserts that inflation uncertainty, increasing the uncertainty of the potential returns of investment projects, contributes to lower investment and output growth. Dotsey and Sarte (2000) find that, although inflation adversely affects long-run growth, inflation uncertainty increases average growth rates through a precautionary saving motive. Ramey and Ramey (1995) show that countries with higher growth volatility experience lower economic growth, and Hnatkovska and Loayza (2005) verify this negative relationship between macroeconomic volatility and long-term economic growth. Fountas, Karanasos, and Kim (2006) confirm that inflation

<sup>1</sup> Many adverse effects occur because of higher output growth volatility such as lower economic growth (Aghion, Angeletos, Banerjee, & Manova, 2010; Kose, Prasad, & Terrones, 2005, 2006; Ramey & Ramey, 1995), worsened income distribution (Breen & Garcia-Peñalosa, 2005), and higher output and employment costs (Benigno & Ricci, 2011). A successful macroeconomic policy to stabilize or reduce growth volatility depends on knowing the sources of that volatility.

<sup>2</sup> In this paper, we use volatility, variability, and uncertainty (of financial development) interchangeably.

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