



Economic growth, volatility and their interaction: What's the role of finance?



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ABSTRACT

This paper examines the relation between financial depth and the interaction of economic growth and its volatility. We use a sample of 52 countries for the period 1980–2011, and our main finding is that, at moderate levels of financial depth, further deepening increases the ratio of average growth to volatility; however, as financial depth increases, this relation reverts, and the rise in volatility overcomes that of economic growth. This result is obtained both in the medium and long run; however, the peak of the relation seems to be lower in the medium run (around 40%–55% of domestic credit/GDP) than in the long run (around 75%–99%). This suggests that increasing the level of domestic credit may intensify relative volatility in the medium term, but still raise relative long-term growth before the long-run threshold is achieved.

1. Introduction

In the early 2000s, there was a growing consensus that finance had a substantial role in fostering economic growth. Basically, financial institutions allocate private and public savings across firms and individuals. Better financial development would lead to more efficient allocations, and thus to economic growth. Despite that, the idea that this relationship is not quite so straightforward started to gain support, especially after the dawn of the global financial crisis. What is the influence of financial development on economic growth? Does finance smooth the economic system's engine, helping to reduce business cycle fluctuations, or does it increase the variation of economic growth around its trend?

This paper examines the relation between financial depth and the interaction of economic growth and its volatility. Our main finding is that, at moderate levels of financial depth, further deepening increases the ratio of average growth to volatility; however, as financial depth increases, this relation reverts, so that the rise in volatility overcomes that of economic growth.

Our work builds upon four connected bodies of literature. The preliminary literature proposed that well-developed financial systems are associated with faster economic growth, but did not yet have the tools to properly evaluate that proposition.¹ Levine (2005) summarizes this argument in the five main functions of financial systems: producing information about investment opportunities; monitoring the enterprises that receive financial resources; helping risk management; pooling savings, thus allowing the

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¹ In fact, this idea exists since the late nineteenth century, for example in the works of Bagehot (1873), Schumpeter (1934) and Gurley and Shaw (1955).

capitalization of large-scale investment projects; and facilitating the exchange of goods and services.

The first empirical study trying to evaluate the causal relation of financial development with economic growth was King and Levine (1993).² They employed three main measures of development of financial intermediaries and, besides GDP per capita growth, used capital per capita growth and productivity growth as dependent variables to assess the channels through which finance influences economic growth. Their results indicated that there was a positive relation between the financial development indicators and the growth indicators, and the initial financial development was a good predictor for subsequent long-run growth. Related works, such as Levine and Zervos (1998), expanded the scope of financial development measures, including stock market development indicators, and found similar results.

The second strand of literature states a positive causal relation from financial development to economic growth. The most influential works were Levine et al. (2000) and Beck et al. (2000), who used instrumental variables cross-section regressions and dynamic panel GMM methods to reevaluate the work of King and Levine (1993). The instrumental variable used for financial development was the country's legal origin, following LaPorta et al. (1998). The authors found that the exogenous component of financial development has a positive impact on GDP and productivity growth, but not on capital accumulation and the savings rate.

Aghion et al. (2005) took a different approach to analyze the finance-growth nexus. Most studies (at least implicitly) assume that financial development may affect the steady-state growth rate; nonetheless, Aghion et al. (2005) suggested that financial development might speed up convergence to steady-state without altering steady-state growth itself. To check that, they used a cross-country regression similar to Levine et al. (2000), adding an interaction term between the initial level of relative per capita GDP and the financial development indicators. The results support their hypothesis.

Meanwhile, some studies started to propose that the impact of finance on growth might vary according to the level of financial development. Rioja and Valev (2004) reproduced the work of Levine et al. (2000), but split the sample into three regions with low, medium and high financial development. That way, they noticed that the impact of increasing financial development was small in the region with low financial development, but strong in the medium region. Seven and Yetkiner (2016) also split the country sample, but according to the country's income level. They analyzed the separate impact of bank and stock market development, and found that banking development is beneficial to growth in low- and middle-income countries, but harmful in high-income ones. Conversely, stock markets favor growth in middle- and high-income countries. Loayza and Ranciere (2006) tried to link the financial development literature to the financial crisis literature³ which affirms that indicators of credit can be used as predictors of crises, and therefore have a negative influence on economic growth. They used a Pooled Mean Group method and panel data to detach the long- and short-run responses of economic growth to *private credit*, and confirmed that this relation is positive in the long run. Despite this, the opposite occurs in the short run, so that financial development may be associated with financial volatility and crises.

After that, several works started exploring a possible non-monotonic relation between finance and growth, originating the third main related line of work. Cecchetti and Kharroubi (2012) employed a pooled OLS method and quadratic financial development variables, and found that the growth of GDP per worker can be expressed as an inverted U function of financial development, with a peak at around 100% of GDP for private credit and 90% for bank credit. Law and Singh (2014) applied a dynamic panel threshold regression to test the existence of a threshold of financial development with different effects on economic growth below and above it. For private credit, they observed a threshold at about 88% of GDP and an inverted V relation, so financial development beyond that level would hinder economic growth. Arcand et al. (2015) utilized semi-parametric estimations and dynamic panel GMM with squared *private credit*, and obtained similar results, also with a peak near 100% of GDP. Sahay et al. (2015) created a financial development index comprising both financial institutions and markets and three dimensions of financial development: depth, access, and efficiency. Using dynamic panel GMM and the index quadratic term, they reached analogous outcomes, showing that a high financial development index harms economic growth.

Finally, the fourth strand of literature studied the impact of financial development on economic growth volatility, measured by the standard deviation of GDP per capita growth. Easterly et al. (2001) found weak evidence of a U-shaped effect of private credit on growth volatility. However, the subsequent literature mainly proposed a linear relation of financial development and volatility, and found this relation to be negative. Beck et al. (2006) tried to evaluate how financial development influences the impact of real and monetary volatility on growth volatility. They found that higher private credit may reduce and increase the impacts of real and monetary volatility, respectively, especially if stock markets are underdeveloped. Furthermore, Beck et al. (2014) used a new measure of financial development to separate the effects of the financial systems' intermediation and non-intermediation activities (such as market making, advisory services and insurance, among others) on economic growth and growth volatility. Their main result is that financial intermediation increases growth while reducing volatility in the long run, but these effects become weaker when considering a shorter and more recent time horizon. Nevertheless, non-intermediation activities don't affect growth or volatility in the long run and may increase volatility in the medium run. Mallick (2014) decomposes growth volatility into business-cycle and long-run components, and finds that the development of financial intermediaries reduces business-cycle volatility, but has no effect in the long run.

We extend the previous literature by taking into account a non-linear relation of financial development on growth volatility, and find robust evidence that there is likewise "too much finance" in this case. Besides that, we also employ a new measure to evaluate the interaction of economic growth and its volatility, and find a non-linear relation between financial development and this variable. This means that, as finance gets deeper, growth volatility will increase faster than the average growth itself.

² Previous studies, such as Goldsmith (1969), found a positive correlation between finance and growth, but didn't establish a causal relation.

³ Such as Kaminsky and Reinhart (1999).

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