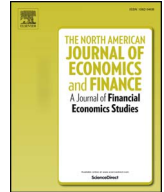


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Quantity of finance and financial crisis: A non-monotonic investigation☆

Xun Zhang^{a,b}, Zongyue He^a, Jiali Zhu^a, Jing Li^{c,d,*}^a School of Statistics, Beijing Normal University, China^b Shanghai Finance Institute, China^c National Research Center for Upper Yangtze River, Chongqing Technology and Business University, China^d School of Economics, Chongqing Technology and Business University, China

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ABSTRACT

Whether finance is beneficial to economic development remains ambiguous. There are studies arguing that finance can facilitate growth and increase stability. However, the recent global financial crisis has led some to argue that finance can decrease stability and lead to more crises. This paper constructs a non-monotonic framework of quantity of finance (measured by leverage) and financial crisis and decomposes leverage into fundamental and excess components. Using cross-country level data, the empirical results confirms that it is excess leverage, rather than fundamental leverage, that results in the increase of probability of financial crisis. Further empirical results show that excess leverage leads to a higher probability of currency crisis, asset price collapse, and banking crisis, while fundamental leverage helps alleviate the crises. This paper reconciles the two contrasting views of the relationship between finance and economic development and provides strong policy implication to pay special attention to the sudden increase of leverage, which is probably excessive, rather than fundamental leverage.

1. Introduction

The fact that finance is beneficial to economic growth is well recognized in literature (King & Levine, 1993; Levine, 2005; Rajan & Zingales, 1998). For example, finance can efficiently allocate risk to those in the best positions to manage it and therefore increases stability. Moreover, finance is proven to mobilize savings, evaluate projects, manage risk, monitor managers, and facilitate transactions (Goldsmith, 1969; McKinnon, 1973). However, the global financial crisis occurring in 2008–2009 and the economic recession that followed are also attributed to finance. There are studies arguing that, finance actually decreases stability by making the economy more prone to financial crises (Turner, 2012). Stiglitz (2010) concludes that the primary lesson of the recent crisis is that “the pursuit of self-interest, particularly within the financial sector, may not lead to societal well-being”. Krugman and Wells (2011) conclude that over the past decades, finance does not improve productive capacity of the United States and is therefore considered to be destructive.

A question is then raised: what is the real relationship between finance and economic development? The answer to this question is essential, as it points to the fundamental economic policy regarding whether to encourage financial development. For example, as one of the largest developing economies, China is progressing on its way to prosperity with its finance quantity accumulating. As indicated by a well-recognized proxy of finance quantity, China’s domestic credit to private sector to GDP ratio increases from 65.3% in

* Corresponding author at: National Research Center for Upper Yangtze River, Chongqing Technology and Business University, China.

E-mail addresses: zhangxun@bnu.edu.cn (X. Zhang), ljfcm@163.com (J. Li).

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1965 to 102% in 2008, and further to 157% in 2016,¹ ranks the 8st all over the world with data available, and is expected to continue to increase. On the one hand, the increase of finance quantity is considered as financial deepening, which is certainly beneficial to Chinese economy.² On the other hand, since domestic credit is also considered as leverage, such high level of leverage leads to wide concern in the society about whether China will be faced with a new round of financial crisis and whether China should de-leverage in order to avoid the crisis (Yu & Lu, 2016).

Therefore, a comprehensive framework of finance quantity and financial crisis is needed. In this paper, using cross-country level data, we study the relationship between quantity of finance and the recent financial crisis that occurred in 2008–2009. This contributes to literature on the relationship between finance and economic development, since financial crisis serves to hinder economic growth and if finance quantity has an impact on financial crisis, it certainly affects economic growth.

To measure the quantity of finance, it is worthy to note that a country's financial system consists of many components. Of particular importance to economic development is the quantity of credit (leverage) provided by the financial sector to the economy. On the one hand, quantity of credit can be beneficial to the economy and may even serve to reduce the probability of economic recession, as credit constraint serves as a main problem to firms in most countries (Goldsmith, 1969; King & Levine, 1993; McKinnon, 1973; Rajan & Zingales, 1998). On the other hand, the quantity of credit measures excessive risk taking and borrowing that can lead to financial instability (Minsky, 1986; Reinhart & Rogoff, 2011). Therefore, we measure the quantity of finance using the quantity of credit, that is, the ratio of private credit to the gross domestic product (GDP).

Considering different views regarding the relationship between quantity of finance and economic development, we conduct a non-monotonic investigation of leverage and the sub-prime financial crisis in 2008–2009. The main method we adopt here is to decompose leverage into the level of leverage several years prior to financial crisis and the change of leverage in subsequent years. The decomposition can be used to reconcile the two contrasting views. On the one hand, the level of leverage several years prior to financial crisis is to support the view that finance is good to economy, since it can represent the economy's fundamental leverage, or leverage at steady state. Such leverage is sustained by the economy in the long term, is believed to be beneficial to the economy, and can even reduce the probability of economic crisis. On the other hand, the change of leverage in subsequent years is to support the other view that leverage will bring in financial crisis. As stated, the level of leverage prior to financial crisis represents economy's fundamental leverage. Thus, a sudden increase of leverage is hardly believed to be sustained by the economy and can be considered as an excess leverage. The excess leverage thus only measures excessive risk of taking and borrowing that can lead to financial instability. Sachs, Tornell, and Velasco (1996) who were among the first to popularize the measure of credit and argued that it is a good proxy of banking system vulnerability, and Frankel and Saravelos (2012) who systematically studied the leading indicators of 2008–09 financial crisis both used the change of leverage to investigate the role of credit on financial crisis. Their measures of credit exactly matches our definition of excess leverage. However, they did not recognize the positive role that credit may play in economic development. Our paper fills in this gap by introducing the level of leverage several years prior to financial crisis.

A second method we adopt here is to predict fundamental leverage using economic fundamentals, such as GDP per capita and openness, and to take the residual of the prediction as excess leverage. This idea is based on Caskey, Hughes, and Liu (2012) who decomposed firm's leverage into optimal and excess components and find that excess leverage tends to drive the negative relation between leverage and future returns.

The measure of financial crisis incorporates currency crisis, asset price collapse, and banking crisis. After controlling for confounding factors that are used in the previous literature as determinants of financial crisis, we confirm that excess leverage increases the probability of financial crisis, while fundamental leverage plays the opposite role. The empirical results support our argument regarding the non-monotonic relationship between quantity of finance and financial crisis.

To ensure the robustness and refine the interpretation of the results, we also explore the mechanism that leverage affects financial crisis by investigating what kinds of financial crises that quantity of finance mainly affects. The empirical results, again, confirm that excess leverage leads to a higher probability of currency crisis, asset price collapse, and banking crisis, while fundamental leverage helps alleviates different kinds of financial crises.

The contribution of this paper is thus threefold. Firstly, this paper represents an early attempt to investigate a non-monotonic relationship between quantity of finance and financial crisis, which is very different from previous literature which only uncovers a linear and one-direction effect from quantity of finance on financial crisis and thus enriches previous studies. Secondly, the paper uses as many kinds of crises as possible, namely, currency crisis, asset price collapse, and banking crisis to confirm the empirical results and succeeds in reconciling different views regarding the relationship between finance and economic growth. Thirdly and the most importantly, the paper has a strong implications for both investors and policy makers: for investors who are predicting the probabilities of financial crisis in different countries, they should give more weight for investment on countries with the lowest growth in leverage in a short period; for policy makers, they should pay special attention to a sudden increase of leverage, rather than it level, to detect any possibility of financial crisis.

The rest of the paper is organized as follows. Section 2 presents literature review. In Section 3, we discuss data and the empirical method, introducing the non-monotonic framework of leverage on financial crisis. Section 4 provides estimation results and explores the relationship between quantity of finance and financial crisis. Finally, Section 5 concludes.

¹ Data are extracted from the World Bank.

² There are studies arguing that China's private enterprises are still with credit constraint (Song, Storesletten, & Zilibotti, 2011). However, the statement is based on a comparison with developed economies. China itself is with a high speed of financial development and with a higher level of financial deepening compared to the starting point of Reform and Opening Up in 1978, benefiting both state-owned and private enterprises.

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