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硕士学位论文

论系统性风险因子对金融脆弱性的条件性影响

On the Conditional Effects of Systemic Risk Factors on
Financial Fragility

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摘要

以最近的金融危机为背景，本文研究了不同金融结构下银行风险因子对系统性风险的影响，对金融体系系统性风险与金融结构的相关文献进行了补充。本文使用结构活动性指数作为金融结构的主要衡量指标，基于 28 个国家从 2007 年至 2009 年的面板数据与固定效应模型进行研究发现，银行风险因子对金融体系系统性风险的影响取决于金融体系的结构：金融结构越偏向市场，银行规模对金融体系系统性风险的贡献越小；反之，金融结构越偏向银行，银行规模对金融体系系统性风险的影响越大。此外，在银行偏向型的金融结构中，银行资本量与金融体系系统性风险负相关；但在市场偏向型的金融结构中，银行资本量与金融体系系统性风险正相关。使用结构规模指数进行稳健性检验，前述结论仍然成立。本文的研究启示在于，当金融监管层制定风险管理政策时，应考虑到不同金融结构下银行风险因子对金融体系系统性风险的异质性影响。

关键词：系统性风险；银行危机；金融结构；银行脆弱性

ABSTRACT

This research contributes to the literature on systemic risk and financial structure by analyzing the effects of bank risk factors on systemic risk conditional on banks' underlying financial system structure to find bank factors that specifically determine risk in each financial system during the recent global financial crisis. The study adds new insight to the systemic risk debate by investigating whether banks' contribution to systemic risk varies systematically with the structure of the financial system. In order to carry out the analysis, panel fixed effects model is employed. Structure activity index is used as the main measure of financial structure while structure size index is used to assess the robustness of the main results. I analyze data of financial institutions in 28 countries from 2007 to 2009 and the results show that the effects of bank risk factors on systemic risk vary systematically with banks' underlying financial system structure. I provide evidence that the more market-based a bank's financial system is, the lower its size contributes to overall systemic risk and the more bank-based a bank's financial system is, the higher its size contributes to overall systemic risk. In addition, the more bank-based a bank's financial system is, the less its capital contributes to overall systemic risk. However, the more market-based a bank's financial system is, the higher its capital contributes to overall systemic risk. The findings of the study are relevant to supervisory authorities and policy makers in making decisions about the banking system in different financial systems.

Key words: Systemic Risk; Banking Crisis; Financial Structure; Bank Fragility

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CHAPTER 1 BACKGROUND OF THE STUDY

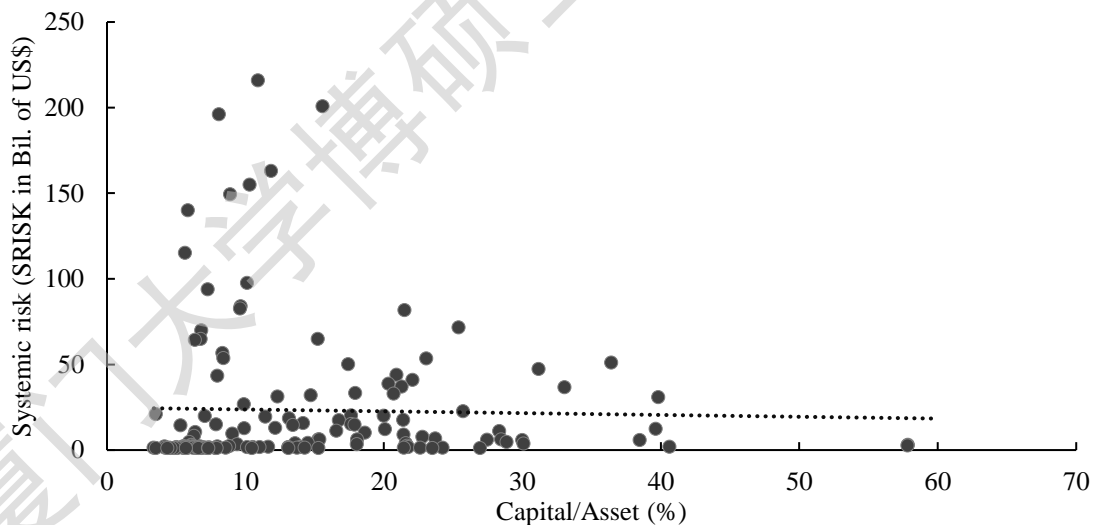
1.1 Introduction

Following the great depression of 1929, the 2007/08 financial crisis is considered as one of the worst economic disasters. Although the cause of the recent financial crisis cannot be linked to a particular event, its effect almost led to the collapse of the banking system of some advanced economies such as the US and the UK. Systemic risk has received a lot of attention from policy makers following the financial crisis and the collapse of Lehman brothers in September 2008. Systemic risk refers to the risk that a large proportion of a financial system will fall into distress, which may affect the real economy as a whole (Zhou, 2013). It is also worth noting that undercapitalization of financial institutions can inflict substantial adverse externalities on the economy; this is one lesson we can learn from the recent financial crisis (Brownlees and Engle, 2016). A financial system, which is undercapitalized, will not be in the position to supply enough credit for business activities to progress, but a financial system with banks that are well-capitalized can survive periods of financial distress or crisis (Figure 1). Figure 1 shows that there is an inverse relationship between systemic risk (SRISK) and banks' capital. SRISK is a measure of systemic risk and is defined as the expected capital shortfall of a financial institution conditional on a severe market decline. The financial crisis has led to discussions on the role of bank size as a determining factor of systemic risk (Figure 2). Figure 2 shows that SRISK is positively related to bank size. This argument occurs due to the major role large banks played during the 2007/08 financial crisis and the fact that the size of large banks have greatly increased over the years (Figure 3) and also large banks are more exposed to risky market activities (Laeven et al., 2016).

These concerns give rise to some questions that need to be taken into consideration as they will help inform policy makers in their decision making process. There is an ongoing differing discussion and debate on large banks; the Basel Committee for instance structures the pillars of Basel III framework, which reinforces the capital framework for banks. The restructuring improves the quality and transparency of the capital base of large banks. There is also an introduction of macroprudential fundamental structure in capital framework to aid in reducing

systemic risk coming up from financial institutions' interconnection (Bank for International settlements, 2010).¹ Others, such as Liikanen (2012) and Vickers (2011) advocate that there should be limits on the size of banks and constraints on risky activities that these banks undertake. In addition, the Dodd-Frank Act in the US was passed in 2010 to prevent excessive risk-taking by financial institutions in order to avoid the events that resulted in the 2008 financial crisis from occurring again. In view of all these, there is also a debate that the imposition of these limitations on bank size and constraints on bank activities may affect the resource apportionment of banks and prevent them from being more efficient in allocating resources (Aiyar et al., 2014). In my opinion, this may adversely affect the banking system and economy at large. Instead of imposing limitations on individual bank size, Farhi and Tirole (2012) suggest that attention should rather be on lowering too big to fail subsidies by means of enhanced resolution and provisional capital requirements.

Figure 1: Systemic Risk (measured by SRISK) and Bank Capital

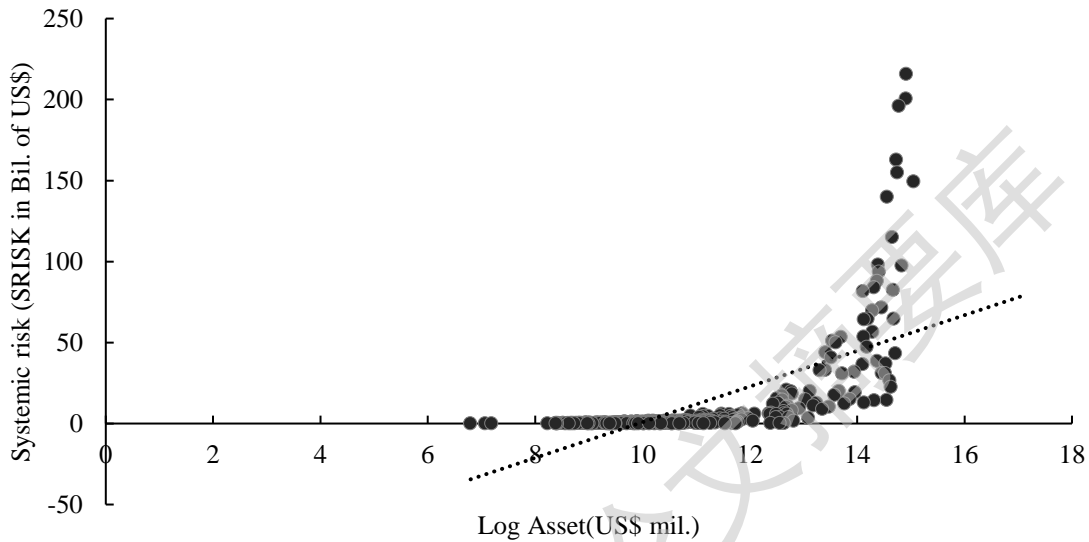


Note: Figure 1 displays systemic risk (measured by SRISK) and bank capital (ratio of capital to asset expressed in percentage) of selected international banks. Data are for the period 2007 to 2009.

Source: Bankscope, Datastream and author's calculation.

¹ Macroprudential policy aims at preventing and mitigating risk of the financial system as a whole (systemic risk). The macroprudential policy helps to strengthen the resilience of the financial systems and enhance the financial activities in order to ensure that financial services are effectively provided to the real economy.

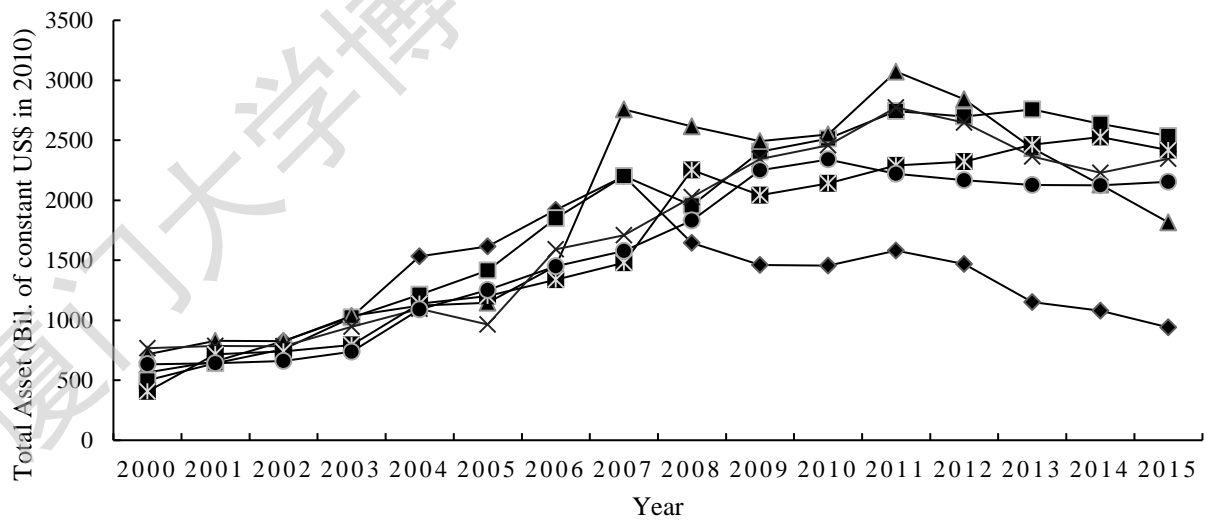
Figure 2: Systemic Risk (measured by SRISK) and Bank Size



Note: Figure 2 displays systemic risk (measured by SRISK) and bank size (measured by Log Asset in million US\$) of selected international banks. Data are for the period 2007 to 2009.

Source: Bankscope, Datastream and author's calculation.

Figure 3: Growth in the Size of Selected International Large Banks



◆ UBS Group ■ HSBC Holdings ▲ Deutsche Bank
 × Mitsubishi UFJ Group ✕ JP Morgan Chase & Co. ● Bank of America

Note: Figure 3 displays the growth in size of selected international large banks (measured by total asset in billions of constant US\$ in 2010) in different countries from 2000 to 2015.

Source: Bankscope and author's calculation.

Daniel Tarullo, US Federal Reserve Governor, indicates that financial institutions are systemically important if their inability to fulfil their responsibilities to creditors would lead to unfavorable effects on the financial system and the economy at large.² Therefore, identifying these Systemically Important Financial Institutions (SIFIs) is essential as their failure to perform their financial obligations may cause a lot of harm to the economy. The Financial Stability Board (2010) describes Global SIFIs as financial institutions whose size, involvement in market activities and interconnectedness are such that their collapse would result in substantial distraction in the world financial system and have adverse effects on lots of banks and the economy as a whole.³

The systemic risk of large banks in various countries has been studied comprehensively, but further study needs to be done as a result of the structure of a bank's domicile financial system (market- or bank-based) in which these banks operate in order to draw a more concise conclusion. Market-based financial system is a financial system where securities market play key role together with banks in terms of mobilizing society's funds, utilizing corporate control, and enabling risk management whereas in a bank-based financial system, banks play a central role in mobilizing saving, allocating capital, overseeing the investment decisions of corporate managers and facilitating risk management (Demirgüç-Kunt and Levine, 1999). Antoniou et al. (2008) discuss that literature normally uses what happens in one particular country as a phenomenon that is likely to happen in other nations. Meanwhile these economies have virtually different financial system structures. Goldsmith (1969) in one of his seminal books explained financial structure as "the mixture of financial instruments, markets, and institutions operating in an economy".⁴ Goldsmith (1969) studied how the financial structure affects the development of an economy. However, the study was not able to provide evidence since there was not enough data. Most authors in studying financial structure (the extent to which a nation's financial system is either bank- or market-based)

² Regulatory Restructuring, Testimony before the Committee on Banking, Housing, and Urban Affairs, US Senate, Washington, DC, July 23, 2009.

³ The Financial Stability Board and the Basel Committee are undertaking structured plans to identify institutions that are systemically important and regulate them with such policies including risk based capital requirement impositions.

⁴ Goldsmith (1969) sought to find the emergence of financial systems, analyzing the extent to which the systems may impact the economic growth and assess how financial structure can influence the economic development.

often rely on comparative analysis among countries such as Germany, Japan, United Kingdom and United States. Beck et al. (2000) indicate that the limited sample of countries is not enough to make generalizations since these economies are likely to have the same rates in terms of long-run growth. Levine (2000) suggests that a study on the comparative relevance of bank- and market-oriented financial systems should employ broader sample countries, as this would enable the empirical study to obtain evidence on both financial systems.

Demirgüç-Kunt and Maksimovic (1998) show that both market- and bank-based financial systems have systematically different impact on economic development and this implies that the two financial systems offer different services to an economy. Boot and Thakor (2000) discuss the relative benefits which banks have in decreasing the market tensions connected with funding shorter-term, lesser risk and well-collateralized undertakings while markets are comparatively more effectual in designing plans to fund innovative, longer-term and higher risk investment projects. Allen and Gale (2000) also study financial structure and indicate that the financial services offered by banks differ from those provided by markets. According to Allen and Gale (2000), bank-based financial systems provide worse cross-sectional risk sharing as compared to market-based financial systems. Concerning systemic risk there may be different outcomes as well, since the financial services provided in market-based systems differ from those provided in bank-based systems.

As proxies for systemic risk I use an established measures of systemic risk, SRISK and MES proposed by Brownlees and Engle (2016) and Acharya et al. (2010) respectively. I use MES as a second measure of systemic risk in order to check the robustness of the results. Structure activity index is used as the main measure of financial structure while structure size index is used to assess the robustness of the main results. In order to carry out the analysis, panel fixed effects model is employed. By employing bank-level data of 28 countries, this research investigates the effects of bank risk factors on systemic risk conditional on banks' underlying financial system structure during the 2007-2009 financial crisis. I also analyze the impact of bank risk factors on systemic risk during the 2007-2009 financial crisis. In other words, this study enables me to examine whether specific factors of banks that determine risk systematically vary with banks' underlying financial system structure. The financial crisis is used to represent distress in the

banking system that enables the magnitude as well as true nature of systemic risk to be revealed (Laeven et al., 2016). Financial crisis period is defined as the period from 2007 to 2009, which takes into consideration the global financial crisis.

Using full sample countries, the results show that the effects of bank risk factors on systemic risk vary systematically with banks' underlying financial system structure. I provide evidence that the more market-based a bank's financial system is, the less its size contributes to overall systemic risk and the more bank-based a bank's financial system is, the higher its size contributes to overall systemic risk. In addition, the more bank-based a bank's financial system is, the lower its capital contributes to overall systemic risk. However, the more market-based a bank's financial system is, the higher its capital contributes to overall systemic risk. The study further provides evidence that systemic risk increases with bank size and is inversely related to bank capital.

1.2 Research Objectives

This research analyzes the effects of bank risk factors on systemic risk conditional on banks' underlying financial system structure. I measure the contribution of banks to the global systemic risk depending on the banks' financial system. The study further examines the impact of bank risk factors on systemic risk during a period of financial crisis in order to specifically recognize bank factors that determine risk. The precise objectives include:

- I. To examine whether the effects of bank risk factors on systemic risk are systematically different depending on a bank's financial system structure during the 2007-2009 financial crisis.
- II. To examine the effect of bank risk factors on systemic risk during the 2007-2009 financial crisis.

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