STOCK MARKET ACTIVITIES, ECONOMIC GROWTH AND FIRM GROWTH:

EVIDENCE FROM CHINA

A thesis submitted for the degree of Doctor of Philosophy

by

Aimin Ni

Department of Economic and Finance

Brunel University London

Abstract

How important is the financial market for economic growth? It can be argued that from the supply perspective that a well-functioning stock market boosts economic growth by lowering the cost of the firm to access public funds for new investment opportunities to expand business and production. Another view suggests that from the demand perspective that stock markets create a wealth effect on consumption for economic growth. In turn, the growth induces more demand for financial services and so the growth of the stock market. Both the supply and the demand argument imply a positive relationship between the stock market and the economy. Exactly how the behaviour of investors in trading stocks on a stock market can affect the performance of the firm is unclear. The study of this question helps to understand how stock trading activities can affect manufacturing production and so the growth of an economy from the perspective of the micro structure of a market.

China as the largest emerging economy in the world has experienced the fastest growth of the economy and rapid development of its stock market over the last 30 years. It provides us with an excellent case to study the question on how the momentum of paper trading of shares can be transmitted to the growth of industry and firms which is a determined part of a real economy.

The thesis takes China to study the question in an attempt to discover the micro mechanism of transmission as its key contribution to the existing literature on the study of the stock market effect on economic growth. The thesis employs a fixed effects model to estimate longitudinal firm-level data comprising 2233 heterogeneous Chinese listed firms over the period 2005–2015. In our estimation, it finds how stronger stock-trading performance can induce an increase in external funding of the firm. It then shows how the improvement in a firm's financing ability will turn to improvements in inter-firm reallocations of resources towards the more productive firms. However, the presence of equity over-trading appears to hinder the growth of firm business, possibly because the negative externalities of the speculative trading outweigh the effect of the positive externalities, such as excessive volatility that creates high risk of stock investment. Overall, empirically, the thesis establishes a micro-economic structure of transmission from stock trading activities to the growth of the firm. The structure explains the importance of stock markets on economic growth from the supply perspective of an economy.

Acknowledgements

First and foremost I am in debt to my primary supervisor Dr. Bryan Mase and secondary supervisor Professor Guy Liu for their continuous support to my doctoral study and research and their patience during tough time in my Ph.D. pursuit. Their guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor and mentor for my Ph.D. study.

Besides my advisor, I would also like to express my sincere gratitude to my husband Dr. Shaomeng Li for his support and comments. Last but not the least, I would like to thank my parents, especially my father.

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Chapter 1 : Introduction

1.1 Background of the study

Over the past century, there is a body of literature that attempts to explore the relationship between financial markets and economic growth both at theoretical and empirical levels. It has focused on how much contribution that financial markets can provide for an economy's overall economic growth. However, the findings are inclusive. Schumpeter observes a positive relationship between financial market development and economic growth in 1911, economists have attempted to establish a mechanism by which the financial market's impact on the growth of a real economy, using various economic and financial data and modelling methods (Mckinnon, 1973; Shaw, 1973; Greenwood and Jovanovic, 1990; Pagano, 1993; King and Levine,1993). The relationship between economic growth and the financial system, whose components are stock markets and the banking system, have received considerable attention for decades (e.g. Beck and Levine, 2004; Capasso, 2008; Goldsmith, 1969; Keynes, 1973; Levine, 1991; Schumpeter, 1982).

As the financial sector is very broad and its growth cannot be measured using a single indicator, many economists have focused on the nature of the relationship between one sub-sector of financial markets and the growth in the real economy. One such sub-sector that has attracted a lot of interest is the stock market. There is a major strand of literature looking at the relationship between the stock market and the real sector of economy. However, no consistent results have been produced within the last century. The empirical studies by Atje and Jovanovich (1993), Korajczyk (1996), Levine and Zervos(1998) found a strong positive correlation between stock market and economic growth.

In much of the current literature on empirical research in which range from macro to micro economy, cross-country studies to industrial level, enterprise level development studies, cross-country studies are the least considered of the idiosyncratic institutional and structural characteristics within different countries. Some studies (e.g. Abel and Blanchard 1986; Schaller 1990) point out that estimation biases occur in country-level time-series data due to aggregation problems. Therefore, it is valuable for conducting empirical research on details (i.e. firm-level data and individual country or financial system). This is because it allows for greater heterogeneity and circumventing the shortcomings of more aggregated analyses.

As a developing country, the Chinese economy has experienced strong growth recently and has reached the fastest growing and the largest emerging economy in the world (Khab, He, Akram and Sarwar, 2017). Consequently, China is already a major driver of global growth. But in spite of all these hallmarks, the Chinese economy has some obstacles internally: such as a less developed financial system (Allen et al., 2005). This makes our study more interesting and influential. If we compare the banking system of China with stock markets, then we come to understand that the banking system is more important due to its larger size. It is also inefficient because it has higher overhead costs to total assets ratio (Allen et al., 2005). China's bank-dominated financial sector is famous for its inefficiency and misallocation of capital (H. Chen, 2006). In contrast to Hasan, Wachtel, & Zhou (2009) who finds that development in financial sectors affects the economy negatively, Hao (2006) advocates that development in financial sectors of China has contributed to its economic growth. According to (Allen et al., 2005), China's underdeveloped financial system does not match with its blooming economic growth. State-owned banks are dominant over the system but they still have a higher proportion of non-performing loans. Unfortunately, these institutions also have to finance state-owned enterprises which are sometimes suffering losses (Allen et al., 2005). Moreover, the Chinese stock market is not as established and developed compared to most of the economically developed

countries. Therefore, China provides a good case study for stock market activities and economic growth, especially in the real economy.

1.2 Motivation and aims

With the rapid development of financial markets, the industrial nature of some developed countries (e.g. United Kingdom, the USA), especially in the manufacturing sector, has been experiencing an unexpected decline in the last two decades. For example, the London Stock Exchange (LSE), which was established in 1761 as one of the oldest in the world, has experienced several reforms in the past. Now the London Stock Exchange has become the largest stock market in the world. By December 31, 2015, there are 2212 listed firms with the total market value of £4.3 trillion. Although the LSE has developed significantly in the past, in contrast, the UK manufacturing industry has declined significantly in terms of its share of GDP. The opposite development of the UK industry compared with LSE raises a question about whether LSE can really support industry development.

Why then is the stock market in some emerging countries still underdeveloped, but the pace of industrialisation and economic growth is high? This contrast attracts attention, because it brings doubt on a relevant view of traditional theory that financial development promotes economic growth and industrial development. The experience of the UK that has an opposite development between the stock market and the manufacturing industry is not shown in China. As the world's largest emerging economy, China has experienced rapid development of stock market and its industry.

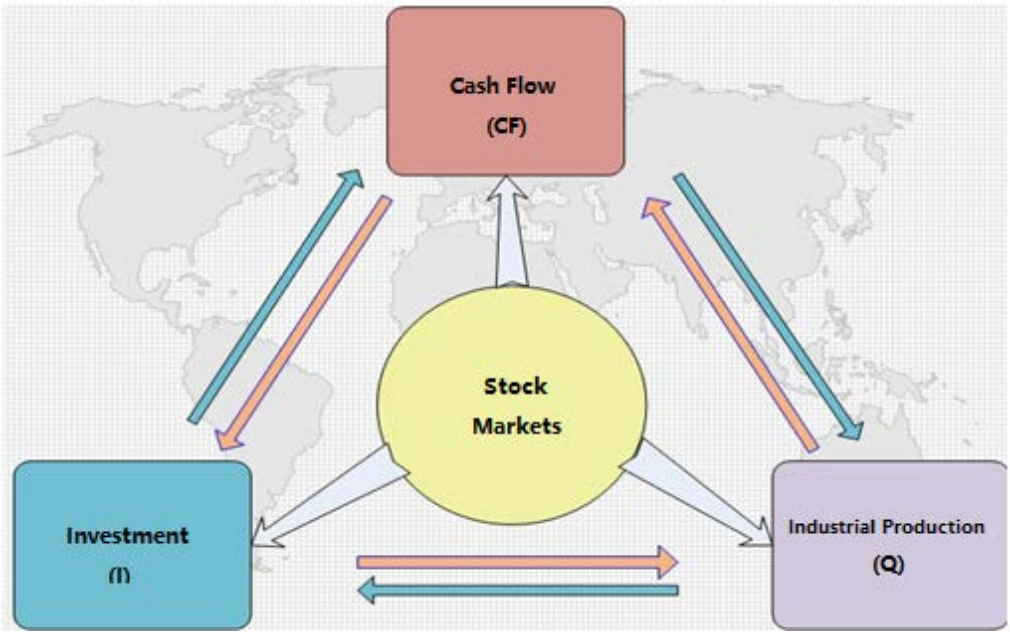
This study aims to identify and examine the micro mechanism by which stock markets shape the growth of listed firms based on empirical results. More detailed, it intends to examine the impact of stock market development on real

economy, in particular the mechanism by which stock market stimulates corporate growth, especially the "supply effect "of secondary markets, and thus reveal the micro-transmission mechanism that the stock market drives the development of the enterprise.

1.3 Research framework and assumptions

Enterprises are the main body of microeconomic and micro carriers of economic development (Geping Wang, 2014; Liming Zhang and Yating Wang, 2014). The growth of a firm is determined by three elements: cash flow, investment on non-current assets, and production (sales) scale. It is worth noting that the labour force has not been specified as a stand-alone factor in determining a firm's growth. It is considered that the impact of cash flow to an extent has already incorporated the effect of labour force. As one of the driving factors of a firm's operating activities, cash flows are closely associated with a firm's capacity of employing labour. This is because no salaries can be paid without sufficient cash flows and no employment can be materialised without salaries being paid. We assume that the above mentioned three factors are interconnected and mutually impacting each other, hence forming a triangular framework (Figure 1-1) that is inherent in the growth of a firm. As illustrated in the diagram below, cash flow, capital investment and production scale are the vertices of the triangle, and build a systemic endogenous relations of triangular frame. The stock market is the centroid of the triangle system. It is considered that the stock market as the exogenous force can influence each firm growth factors in the three vertices of the triangle. Therefore, the stock market is the centroid of the triangle system. The conjecture that stock markets are connected with the three factors, which enables us to position stock market at the centre of the triangular framework through which the above mentioned factors drive a firm's development.

Figure 1-1 Assumptions of relationship between the stock markets and enterprise development



The growth of a firm occurs primarily as a result of the interaction between the three factors. An increase of cash flow usually indicates that more capital flows into the firm, hence allowing it to utilise the surplus to increase capital investments or production, or both. For instance, with more resources in the coffers, a firm could be in a better position to accelerate its technology innovation, to employ more personnel, or to strengthen its marketing arms.

The increased cash flows, when turned into higher levels of investments and production, can further boost the firm's production scale and enhance its market competitiveness, which consequently increase profit and expand sales. It would allow the firm to access more funds and pushing it to the next operating cycle.

Capital is a key to the growth of a firm. Usually, a company increase its operating scales by using the cash flows generated from its own operations, and it can raise capital through external sources. This study assumes that the

stock market not only enables a firm to access external finances, but also provides incentives for effective use of the increased capital, because the effective use of capital can increase the market value of the firm, and thus create higher returns to investors. Therefore, it can be argued that the development and changes of stock markets can influence upon listed firms in two different but interconnected ways. Firstly, the expectation effect, which refers to the fact that stock markets fluctuations would affect shareholders' expectations on a firm's values, which further makes shareholders adjust their expectations on the firm's operating performance. The changes may also drive the diligence levels of a firm's management and thus funds can be used more effectively. Secondly, financing effect, which refers to the fact that the changes in market values of a firm as a result of fluctuations of stock markets can also prompt banks to adjust their expectations on the firm's credit risks, and as a result, the firm's capabilities of external financing would be affected. The above discussion illustrates the transmission mechanism of the development of the stock market on the growth of the enterprise. This guide process can be used the following figure to make a vivid description.

In figure 1-2, we have established a framework of how the stock market affects the three elements of firm growth (cash flow, investment and production) and the interaction among the three elements. This framework provides us with a quantitative and empirical analysis of how the stock market affects the growth of the enterprise. We need to design three empirical equations to clarify the quantitative relationship among the various elements in the above framework and to test the argument that the stock market activities will affect the growth of the enterprise.

Capital Equation: ***Capital (cash flow)*** = a + b ***Stock Markets Factors***+

c ***Production factors***+ d ***Investment factors***

Investment Equation: ***Investment in fixed assets*** = g + h ***Stock Markets Factors***+

m ***Production factors***+ n ***Capital (cash flow)***

Production Equation: ***Firm Productions*** = r + p ***Stock Markets Factors***+

k ***Investment in Fixed Assets*** +n ***Labour*** + z ***Capital (cash flow)***

The above three equations outline the quantitative relationship between the stock market activities and the development of the enterprise. Each letter is the quantitative relationship between variables. Stock markets affect the development of the enterprise by influencing the capital, investment and production of the enterprise. The three elements are endogenous variables in the enterprise system and interact with each other to form an endogenous equilibrium. The old equilibrium system will be break by the action of external forces and establish a new equilibrium system. The stock market provides an effective external force for changing this equilibrium.

In the capital equation, stock market as an external factor that affects the capital. If this kind of influence exists, it means that the stock markets bring "supply effect" of funds for firm development. In addition, the production and investment factors are added in the equation to reflect endogenous associations and mutual influences among production, investment and capital.

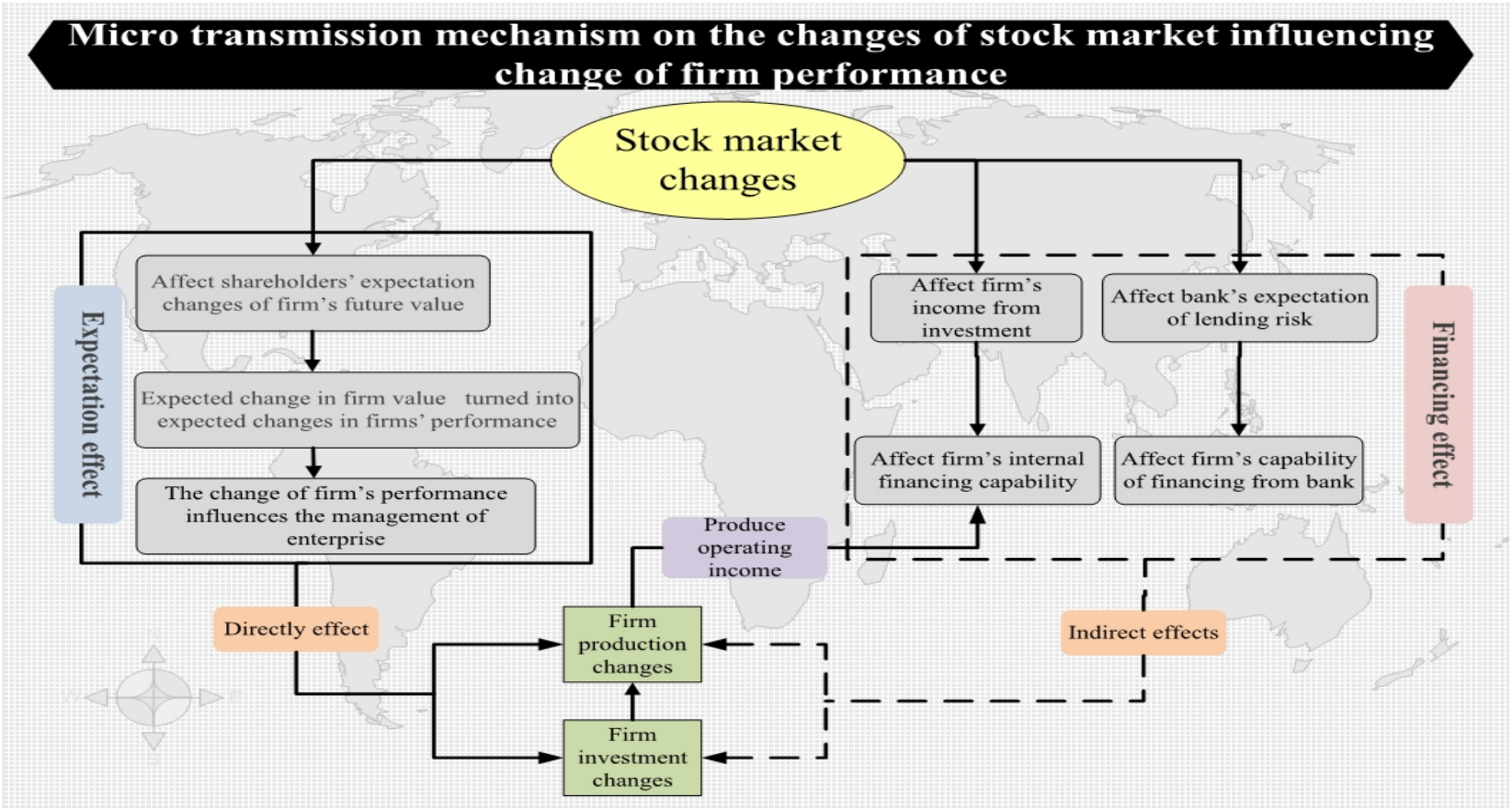
In the investment equation, capital is an essential element. Without funds, there is no investment. Another explanation element in the equation is production, because the development of production will stimulate the investment desire of enterprises. As an external factor, stock markets would affect firm investments from two aspects: firstly, an indirectly effect from capital to investment; secondly, stimulate business investment desire directly.

In the production equation, labour and investment in fixed assets are essential elements to determine productions. The liquidity or working capital of an enterprise is the third fundamental determinant. This is because capital helps firms to acquire raw materials and wage-labour. As an external factor, stock markets would firstly influence firms' financing ability to affect firms' capital and investment, secondly it would provide incentive value for enterprises. By expanding production, increasing revenue and raising value, the increase of

market value will further stimulate enterprises and expand their scale so as to make the enterprises develop continuously.

This theoretical expectation shows how the effects of capital markets activities are transmitted to firms. In short, the market activities would have an impact on the development of the enterprise, and the following empirical chapters will examine this argument.

Figure 1-2: Micro transmission mechanism on the changes of stock market influencing changes of firm performance.



1.4 Data

As already indicated, this study attempts to establish the influence of stock market trading activities on economic growth via firm growth in China. To investigate domestic investors' trading activities on the Chinese stock market, the sample comprises all Chinese public firms with audited and consolidated financial statements in A-share markets. A shares are issued to and traded by Chinese local investors and are listed and traded on either the Shanghai or Shenzhen stock exchanges.

As is standard in most of studies, financial institutions are excluded (e.g., all of the literature cited above) because financial firms are more subject to regulation and intrinsically different in the accounting mechanisms and the nature of operation. This study also excludes firms with less than 2 years of consecutive financial data. The study uses longitudinal firm-level data estimation. Data used in this thesis come from various sources. It starts with a list of 2233 listed companies in Wind database over the period of 2005 to 2014. Using this list, we obtain detailed financial data for all those firms. The Resset Database provides the initial public offering information from primary market, while both the financial market information and accounting information of financial statements obtained from the Guotaian Database as a complement source. Due to some observations missing at random, the data used in this study belongs to unbalanced panel data set

1.5 Major contributions

A search of the literature revealed few studies in which addresses the issue on how securities market activities affect firm development is transmitted to economic growth, which is an issue of microscopic transmission mechanism from stock market activities to economic growth. This thesis extends the literature and provides an overview of the microscopic transmission mechanism.

1.6Thesis structure and highlights

1.6.1Introduction (Chapter 1)

This chapter includes the background of the study, research motivation and aims, primary research methods, major contributions and outlines of the whole thesis structure.

1.6.2 Literature review (Chapter 2)

This chapter presents the general empirical literature review and theoretical framework for the following empirical chapters.

1.6.3 First empirical chapter (Chapter 3)

In this chapter, the relationship of stock market activities to firm financing capacity in China is investigated. The results show that stock market activities contribute to firm growth via financing. The results indicate that the activities of the primary market did control firms financial constraints to some degree. Consequently, the firm's financing environment is enhanced by the action of listing. However, the effects of stock listing or the funds raised from the Initial Public Offerings (IPO) on the improvement of financial constraints appear from the first year after IPO instead of the IPO year, and the effects gradually weaken in the following years. Similarly, the trading activities on the secondary market show that the stock price is positively associated to firms' external cash flow, while showing negatives insignificance for firms' internal cash flow.

1.6.4 Second empirical chapter (Chapter 4)

The purpose of this chapter is to determine the effects of both primary and secondary stock market activities on firm investment. The results are in agreement with assumptions and show a significant effect. In the primary activities, the multiple effects of IPO on average lasts for approximately 4 years, after which firms' investment gradually return to its pre-IPO level. Changes in stock prices, ownership structure and stock liquidity from secondary stock market activities, have an impact on listed firm's investment. The results show that the price of shares of listed companies, the proportion of large shareholders and stock liquidity of listed companies have not only impacted on firm investment directly, but also affects investment activities via cash flow indirectly.

The results indicate that the stock market not only enables a firm to access external finances and ease firm financial constraints, but also the improvement would provide more cash flow for firms investment. In addition, it also provides incentives for effective use of the increased capital, because the effective use of capital can increase the market value of the firm, and thus create higher returns to investors.

1.6.5 Third empirical chapter (Chapter 5)

In this chapter, the aim is to assess whether secondary stock market activities directly promote firm production development, and if so, what is the microscopic transmission mechanism between them. Overall, results show that the secondary stock market activities affect enterprise production development directly. This is because stock markets are not only able to incentive firms' capital flow to value-creating production projects but also indicate firm development via capital value, which provides incentive value for the development of enterprises.

1.6.6 Conclusion and Implication (Chapter 6)

The last chapter summarises the major findings, contributions of the thesis, implications for the Chinese stock market, its limitations, and provides recommendations for future research.

Having presented the structure of the thesis, the next chapter will provide the general empirical literature review and theoretical framework for the following empirical chapters.

Chapter 2 : Literature Review

2.1 Introduction

Research into financial development and economic growth has a long history. To date, there is a vast amount of research related to financial markets and economic growth (Ang, 2008; Banos, Meslier, Nys, & Sauviat, 2011; Beck and Levine, 2004; Bojanic, 2012; Boulila and Trabelsi, 2004 ; Calderon and Liu, 2003; Gochoco-Bautista, Sotocinal, & Wang, 2014; Graff, 2003; Jedidia, Boujelbene, & Helali, 2014; Levine and Zervos, 1998 ; Naceur and Ghazouani, 2007; Ngare, Nyamongo, & Misati, 2014; Peia & Roszbach, 2015; Pradhan, Arvin, & Norman, 2015; Pradhan, Zaki, Chatterjee, Maradona, & Dash, 2015; Samargandi, Fidrmuc, & Ghosh, 2015).

Researchers argue that countries with well-developed financial systems have great potential for future economic growth, for example, large banks, growing stock markets, and other active financial markets (Anwar and Cooray, 2012; Gochoco-Bautista, Sotocinal and Wang, 2014; Jedidia, Boujelbene and Helali, 2014; Samargandi, Fidrmuc and Ghosh, 2015; Yang & Yi, 2008). This chapter reviews the theoretical and empirical finance–growth nexus, with an emphasis on the role of the stock market.

The literature provides extensive empirical evidence and indicates different views on the existence of a relationship between financial development and economic growth through various aspects. Schumpeter (1911) first introduced a serious discussion on the relationship between financial development and economic growth. Subsequently, there is a growing body of literature and debate about this relationship (Blackburn & Hung, 1998; Beck & Levine, 2004; Beck et al., 2000; Berthelemy & Varoudakis, 1996; Craigwell, Downes, & Howard, 2001; Dritsakis & Adamopoulos, 2004; Fase & Abma, 2003; Fung 2009; Greenwood & Smith, 1997; Gregorio & Guidotti, 1995; Herwartz & Walle, 2014; Hsueh, Hu, & Tu, 2013; King & Levine, 1993a,b; Rajan & Zingales, 1998; Thornton, 1994; Uddin, Shahbaz, Arouri, & Teulon, 2014).

Three broad groups of studies can be identified that have examined the effects of access to finance on growth of firms across the world. The first group of studies were early findings that combined firm-level data with broad macroeconomic indicators of financial development for a cross-section of countries to examine the relationship between a more developed financial sector and firm performance. Such studies included Demirguc-Kunt and Maksimovic (1998), Beck et al., (2008), Beck et al., (2006) and Demirguc-Kunt et al. (2006). The second group of studies are country-specific studies which also combined firm data with financial development. Butler and Cornaggia (2007) and Girma et al. (2008) fall into the second category. The broad consensus from these studies is that better developed financial systems foster the growth of firms. The third group of studies make use of recent firm-level data, especially from the World Bank, which relies on responses from firms on various constraints to doing business and on their accessibility to financial markets. This has given rise to new studies which make use of strictly firm level data to examine how access to finance and other constraints affect firm performance. Beck et al. (2006), Ayyagari et al. (2008), Aterido and Hallward-Driemeier (2010), and Aterido et al. (2011) have all examined this new line of research.

Thus far, it has been demonstrated that the growing importance of stock markets in developing countries around the world, which result in a new avenue of research is open to financial development and economic growth (Arestis, Demetriades and Luintel, 2001). Existing empirical research has overwhelmingly substantiated the debate existing on the relationships between the development of the stock market and economic growth. A great number of theoretical and empirical studies have explored the sources of economic growth at both national and provincial levels (e.g., Borensztein & Ostry, 1996; Chen & Feng, 2000; Chow, 1993; Chow & Li, 2002; Wu, 2000; Yu, 1998), and ongoing debate is mainly concerned with which source, factor accumulation or productivity improvement, is the key growth-driving factor. However, unfortunately, the role of financial development in economic growth has until recently often been ignored, with a conspicuous lack of studies being undertaken to theoretically examine and empirically determine this.

In summary, the majority of the empirical studies were conducted based on macroeconomic level (cross-sectional, time series and panel data) and micro-economic level (firm and industry data). These studies mainly differ in data coverage in terms of the estimation methods, the choice of the explanatory variables, and the sample of countries and time periods. These studies have suggested a connection between the financial market and economic growth, especially, stock market development. However, what remains unclear is the issue of how securities markets activities affect the firm development is transmitted to economic growth, which is an issue of microscopic transmission mechanism from the stock market to economic growth. China is the focus of this study and China has been shown to be generally less financially developed than countries in other regions. The aim of this study is to attempt to investigate the issue to understand how improved and better functioning financial markets will enhance the growth of Chinese firms.

2.2 A focus on the contribution of financial development to economic growth

The role of financial development on economic growth has received considerable attention. Financial markets contribute to economic efficiency by diverting financial funds from productive to productive uses (Durusu-Ciftci, Ispir, & Yetkiner, 2017). Thus, financial markets are a key factor in producing strong economic growth.

There are two theories that relate to the role of financial development on economic growth: endogenous growth theory and Neo-classical growth theory . For endogenous growth theory, Demirguc-Kunt and Levine (1996) and Jensen and Murphy (1990) argue that financial markets influence economic growth through changes in incentives for corporate control. Durusu-Ciftci et al. (2017) conclude related studies of endogenous growth theory and divide into five main strands: financial systems allocation (Bencivenga and

Smith, 1991; Greenwood and Jovanovic, 1990; Pagano, 1993; Wu, Hou, and Cheng, 2010), financial intermediation efficiency (Arestis, Demetriades, & Luintel, 2001; Rousseau and Wachtel, 2000), portfolios diversification (Levine, 1991 and Saint-Paul, 1992) and new technologies (Greenwood and Smith, 1997).

The underlying assumption of the Neo-classical growth theory is that financial intermediaries can provide evaluation and monitoring services more efficiently than individuals. The new growth theory argues that financial intermediaries and markets appear endogenously in response to market incompleteness and, hence, contribute to long-term growth. Financial institutions and markets, which arise to mitigate the effects of information and transaction cost frictions, influences decisions to invest in productivity-enhancing activities through evaluating prospective entrepreneurs and funding the most promising ones.

The role of financial development on economic growth has received considerable critical attention at an empirical level. However, there are conflicting views concerning the role that the financial system plays in economic growth. The origins of this role of financial markets may be traced back to Schumpeter (1911). The author highlights the importance of the banking system in economic growth and claims that the banking system plays an important role in the savings allocation of, innovation encouragement and the productive investments funding.

Early works, such as Goldsmith (1969), McKinnon (1973) and Shaw (1973) put forward considerable evidence and showing a significant contribution of financial development in economic growth. As the first study that documents a positive correlation between financial development and growth, Goldsmith (1969) provides an in-depth and significant rigorous analysis of the relationship between financial and economic development. His findings provide important theoretical work and evidence on the effect channels between financial markets and economic development mutually. Ross Levine

(1997) reviewed a large amount of empirical studies for the relationship between the financial sector and long-run economic growth (e.g. Goldsmith, 1969; Levine, 1991; Aghion and Peter Howitt, 2008; Merton and Bodie, 1995), and argued that financial development is able to reduce productive cost, mobilises savings, identify better investment opportunities, boost technological innovation and enhance the risk taking capacity of investors.

However, there are other studies argues a negative or insignificant impact of financial markets on economic growth (Snigh, 1997; Naceur and Ghazouani, 2007; Kar et al., 2011; Narayan and Narayan, 2013), mainly in developing countries. For example, Narayan and Narayan (2013) find no evidence that neither the financial sector nor the banking sector contributes to growth for the Middle Eastern countries. Moreover, Nili and Rastad (2007) found that financial development has a net dampening effect on investment for oil economies.

2.3 Causality between financial development and economic growth

As above, early empirical studies focused on the role of financial development in economic growth. An issue of causality between financial development and economic growth has received considerable critical attention amongst economists in recent years. To date, numerous scholars explore whether finance development plays a causal role or merely follows economic growth. This is because the direction of causality between financial development and economic growth is crucial and has significantly different implications for development policy. Most studies have confirmed that there is an interrelation between finance and economic growth (Hassan, Sanchez, & Yu, 2011; Menyah et al., 2014; Pradhan, Dasgupta, & Samadhan, 2013; Rousseau & Wachtel, 2000). However, they have different views on the direction of causality between financial development and economic growth.

Patrick (1966) provided a hypothesises for two possible patterns in directions of causality between financial development and economic growth: supply-leading and demand-following hypothesis. Both the supply-leading and demand-following arguments imply a positive relationship between financial development and economic growth. The supply-leading hypothesis refers to a causal relationship from financial development to economic growth. Numerous studies support the supply-leading phenomenon and have shown the importance of financial development (Calderón & Liu, 2003; Christopoulos & Tsionas, 2004; Claessens & Laeven, 2005; Kar, Nazlıoğlu, & Ağır, 2011; Levine & King, 1993; Levine, Loayza, & Beck, 2000; McKinnon, 1973; Senhadji & Khan, 2003). They also note that the case of supply-leading also means the creation of financial institutions and markets increases the supply of financial assets, liabilities and related financial services and thus leads to economic growth. Namely that, a more financially liberal environment enables investors to reduce risks via financial markets more easily, thus lowering the cost of capital, raising the desire of investors to invest, and ultimately leading to economic growth (Bekaert and Harvey, 2000; Bekaert et al., 2005). Some studies further argue that more developed financial markets promote economic growth by mobilising savings and facilitating investment, while in some less developed countries who lack financial institutions is simply expressed by the lack of demand for their services (Goldsmith, 1969; Gurley & Shaw, 1955; Jung, 1986).

In contrast, the demand-following hypothesis posits a causal relationship from economic growth to financial development. Patrick (1966) notes that the financial sector leads and provides more sophisticated services to investors and savers in the real economy. Here, an expansion of financial sector might induce as the real economy grows. That is, economic growth might encourage financial sectors to provide better services, which growth caused financial development (Hsueh, Hu, & Tu, 2013). According to the demand-following phenomenon, Odhiambo (2014) states that the lack of financial growth is a

manifestation of a lack of demand for financial services. Therefore, as the real side of the economy develops, its demands for various new financial services materialise, and these are met rather passively from the financial side (Boulila and Tramelsi, 2002; Crichton and De Silva, 1989; Shan and Wilson, 2001).

Furthermore, Patrick (1966) firstly introduced a bi-directional relationship between financial development and economic growth based on the above two competing hypotheses, which means financial development and economic growth reinforces each other. The new hypothesis notes that there are two stages. Stage I, supply-leading financial development induces real capital formation in the early stages of economic development. Innovation and development of new financial services opens up new opportunities for investors and savers and, in so doing, inaugurates self-sustained economic growth (Calderón & Liu, 2003). Stage II, As financial and economic development proceeds the supply-leading characteristics of financial development diminish gradually and are eventually dominated by demand-following financial development.

Since Patrick, numerous studies have attempted to test the causal relationship between financial development and economic growth (Christopoulos & Tsionas, 2004; Howells, Soliman, & Caporale, 2004; Levine et al., 2000; Nieuwerburgh, Buelens, & Cuyvers, 2006). However, the findings are ambiguous.

Levine et al. (2000) conducted causality tests between financial intermediation and economic growth to examine the effect of financial development on economic growth using traditional cross-sectional, instrumental variable procedures and generalised method-of-moments (GMM) for dynamic panel data analysis by examining data from 71 countries between 1960 and 1995. Both econometric approaches confirmed there is a strong positive relationship between the exogenous component of financial intermediary development

and economic growth. The authors further investigated whether cross-country differences help explain differences in financial development, and found that the cross-country differences in legal and accounting systems help to explain the differences. The argument suggests that legal and accounting reforms are able to boost and accelerate financial development through strengthening creditor rights, contract enforcement, and accounting practices. In addition, they also ascertained which channel through financial intermediary development is related with growth. Evidence supports that the primarily channel is total factor productivity growth instead of savings and physical capital accumulation.

Christopoulos and Tsionas (2004) conducted both the techniques of unit–root tests and panel cointegration to examine the direction of causality between financial development and economic growth in long run. They investigated the relationship between financial depth, defined as the level of development of financial markets, and growth in 10 developing countries and confirmed that there is indeed a structural and fairly strong long run relationship. This relationship is single equilibrium, that is, the long-run causality runs from financial development to economic growth. The only cointegrating relation of their results implies no evidence of bi-directional causality.

Howells et al. (2004) examined the causality between stock development, bank development and economic growth by using VAR procedures developed by Toda and Yamamoto (1995) and a data set of seven countries between 1977 and 1998. Caporale and Pittis (1997) indicated that the omission of a relevant variable from a system might invalidate causality inference. Howells et al. (2004) argued that earlier studies that did not include stock market development as a variable might have produced misleading results. The results of Granger causality analysis denotes that the causal relationship between stock market development and economic growth exists among five out of seven countries. Their findings further indicate that a well-functioning

stock market can foster economic growth in the long run by increasing the capital accumulation speed and allocating resource better.

Similarly, by conducting both Granger causality and cointegration analysis, Nieuwerburgh et al. (2006) analysed the long-run relationship between stock market development and economic growth for Belgium. That is, they use a new data set of stock market development indicators to argue that whether financial market development substantially affected economic growth. The indicator of stock market development is measured by total market capitalisation and economic growth is measured as a logarithmic difference of GDP per capita. Their results represent both descriptive and quantitative evidence and suggest that financial market development caused economic growth in Belgium at least for the period under study for the consideration (1832-2002), which is in line with Patrick (1966)'s supply-leading theory. In addition, the authors emphasised that stock market development was a better forecaster of economic growth than bank-based development. Collectively, financial development is an important determinant of economic growth, and particularly the availability of stock market-based financing for firms (Nieuwerburgh et al., 2006).

In contrast, the results of Zang and Kim (2007) contradict the evidence from above studies. No evidence was found to support a positive unidirectional causal link from financial development indicators to economic growth, while a substantial indication that economic growth precedes subsequent financial development was found, which implies the demand-following argument of Patrick (1966).

In addition, some studies indicate there is a bi-directional causality between financial development and economic growth, that is, financial development encourages economic growth and economic growth helps to develop financial systems, which provide further evidence for Patrick (1966)'s two-way

hypothesis. Demetriades and Hussein (1996) conducted causality tests between financial development and real GDP from 16 countries using time series techniques. Results show different causality patterns across countries. There is limited evidence to support the notion that finance is a leading sector for economic growth and few countries' economic growth systematically causes financial development. On balance, Demetriades and Hussein (1996) argued that evidence supports the view that a positive bidirectional relationship between financial development and growth. Evidence also indicates that results are very much country specific. Therefore, the authors further denoted that there is no fully acceptance of either "growth follows finance" or "growth leads finance". Other researchers also established a positive bi-directional causal relationship between financial development and growth (Blackburn & Victor, 1998; Khan, 2001; Luintel & Khan, 1999). Moreover, Khan (2001) stated that when borrowing is limited, producers with access to financial intermediary loans obtain higher returns, which creates an incentive for others to undertake technology necessary to access investment loans, which in turn reduces financing cost and increases economic growth.

However, Kar et al. (2011) argued that direction of causality seems to be sensitive to country and financial development indicator specific. The authors examined six financial development indicators of financial development for the Middle East and North African (MENA) countries from the period 1980–2007. Their empirical results show that findings support both demand-following and supply-leading hypotheses; however, there is no clear consensus on the direction of causality between financial development and economic growth due to evidence being based on a country specific.

Overall, some studies have confirmed the existence of a causal relationship running from financial development to economic growth (Eng and Habibullah, 2011; Lucas, 1988; Mukhopadhyay, Pradhan, & Feridun, 2011; Stern, 1989), while a few studies have also found evidence of causality from economic growth to financial development (Odhiambo, 2014; Boulila and Tramelsi, 2002;

Waqabaca 2004). Other studies have found bi-directional causal relationship (Demetriades and Hussein, 1996; Blackburn & Hung, 1998; Khan, 2001; Luintel & Khan, 1999).

Overall, the first view is a “supply-leading” hypothesis which highlights that financial market development leads to economic growth. Resources from surplus spending units are channelled into financial markets for usage by deficit spending units (Jung 1986). While Goldsmith (1969) argues that the transmission mechanism for this view is through capital efficiency. Shaw (1973) also emphasises the role of financial markets to mobilise savings and investment to fund economic growth. The second view known as the “demand-following” hypothesis posits that financial development is a by-product of economic growth and that an expanding economy stimulates demand for financial services (Patrick, 1966). The third view combines the first two theories and assumes a bi-directional relationship. According to Greenwood and Jovanovic (1990), the costly development of financial systems requires sufficient resources which are provided by economic growth. The establishment of the system to boost growth through savings mobilisation and increased rate of return on investments. The fourth view as propounded by Robinson (1952) and made popular by Lucas (1988) is contrary to the earlier views and argues for non-causality between finance and growth. They contend that any relationship between financial development and economic growth has been overstated and any relationship that may exist is insignificant.

Hence, currently there is no consensus among economists on the nature of this relationship, and the existing empirical studies on the relationship between financial development and economic growth do not provide conclusive evidence on the nature and direction of this relationship.

2.4 Different groups and approaches

Early studies deploy some of the frameworks and concepts of macroeconomics to explore the place of the financial market in the economy (Goldsmith, 1969; Schumpeter, 1934). These studies have been macroeconomic in nature, while in later years, micro-economic behaviour has also been considered. The macro level studies include country-level evidence, while micro level studies contain industry-level and firm-level evidence.

A large body of early empirical studies on financial development and growth at macro level are mainly using cross-sectional approaches. For instance, Goldsmith, (1969), King and Levine (1993a, 1993b), Gregorio & Guidotti, (1995) and Levine and Zervos (1998) have found that the level of financial development is a good predictor of economic growth. The findings of these cross-country analysis studies mostly neglect the issue of causality and the time-series properties of the data. Furthermore, other researchers argue that conclusions based on cross-country analysis are sensitive to the selected countries, estimation methods, data frequency, functional form of the relationship, and proxy measures chosen in the study (see Hassan and Bashir, 2003; Khan and Senhadji, 2003; Chuah and Thai, 2004; Al-Awad and Harb, 2005). Doubts were raised about the reliability of cross-country regression analysis (e.g., Beck, Levine, & Loayza, 2000; Gregorio & Guidotti, 1995; King & Levine, 1993; Levine, 2002).

There are mainly three approaches in testing for the correlation between financial development and economic growth in country-level. One approach is to test the hypothesis on a group of countries by using either cross-section or panel data techniques (King and Levine 1993, La Porta, Lopez-de-Silanes, Sheifer and Vishny, 1997, Levine 1998). Another approach is to present industry-level or firm-level evidence that measures this correlation (Rajan and Zingales 1998, Demirgüç-Kunt and Maksimovic, 1998). The third approach is to test the hypothesis for a particular country using time series techniques (Kar and Pentecost 2000).

On the firm level, Fowowe (2017) indicated that previous studies can be concluded into three broad groups. Early studies, for example, Demirguc-Kunt and Maksimovic (1998), Beck et al., (2006, 2008) and Demirguc-Kunt et al. (2006) can be collected into the first group. They combined firm-level data with broad macroeconomic indicators of financial development for a cross-section of countries to examine the relationship between a more developed financial sector and firm performance.

The second group of studies are country-specific studies which also combined firm data with financial development. Such studies include Butler and Cornaggia (2007) and Girma et al. (2008). The broad consensus from these studies is that better developed financial systems foster the growth of firms.

The third group of studies make use of recent firm-level data, especially from the World Bank, which relies on responses from firms on various constraints to doing business and on their accessibility to financial markets. This has given rise to new studies which make use of strictly firm level data to examine how access to finance and other constraints affect firm performance. Such studies include Beck et al. (2005), Ayyagari et al. (2008), Dinh et al. (2012), Aterido and Hallward-Driemeier (2010), and Aterido et al. (2011).

This last group of studies forms the central focus of this study. Existing studies into the effects of financing constraints and access to finance on the performance of firms have largely made use of data across a broad spectrum of developed and developing countries. This study focuses exclusively on Chinese stock markets which have been shown to be generally less financially developed than developed countries. The study will therefore enhance in understanding on how improved and better functioning financial markets will enhance the growth of Chinese firms.

2.5 Different markets

Rudra P. Pradhan, Arvin, Bahmani, Hall, and Norman (2017) stated that there are four main forces in the financial markets can drive higher economic growth. Firstly, banking sector development and economic growth (Christopoulos & Tsionas, 2004; Tang, 2005; Naceur and Ghazouani , 2007; Wu, Hou, and Cheng, 2010; Menyah et al., 2014; Pradhan et al., 2014). Berthelemy and Varoudakis (1996), and King and Levine (1993b) show that bank development may well be an important determinant of economic growth. A number of authors further demonstrated that the banking sector development contributes to economic growth by either raising the efficiency of capital accumulation and, in turn, 'the marginal productivity of capital (Goldsmith, 1969) or raising the savings rate and thus, the investment rate (McKinnon, 1973; Shaw, 1973). Secondly, bond market development and economic growth (Fink et al., 2006; Matei, 2013; Pradhan et al., 2016; Puente-Ajovin & Sanso-Navarro, 2015). As stated in World Bank 2006, bond market development contributes economic growth in size, access, efficiency and stability of the financial system (R. P. Pradhan et al., 2015). Thirdly, insurance market development and economic growth (Avram et al., 2010; Chen et al., 2012; Han et al., 2010; Lee et al., 2013; Pradhan et al., 2015 ; R. P. Pradhan et al., 2015). The insurance market activities are able to manage different risks more efficiently, mobilise domestic savings (Ward and Zurbruegg, 2000), foster efficient capital allocation and promote financial stability (Skipper, 2001). Therefore, at the micro level, the insurance market activities provide safety net and security for both individuals and businesses. At the macro level, premiums from insurance markets provide funds for usage by financial markets and spillover effects on other financial markets (Abdul and Nicholas, 2016). Fourthly, stock market development and economic growth (Akinlo & Akinlo, 2009; Kar et al., 2011; Pradhan et al., 2013, 2014). With respect to stock markets, the various ways through which they affect economic growth have been noted in the literature. Firstly, stock markets mobilise domestic savings; secondly, engender efficient allocation of

capital to productive investments; thirdly, stock markets provide opportunities for share ownership thereby providing individuals with a relatively liquid means of sharing risks; fourthly, provide investment outlets for both domestic and foreign investments.

Overall, banking markets are an early development industry, stock markets come next, while, the bond markets and insurance markets are a late development industry (Borensztein, 2008; Hou, Cheng, & Yu, 2012). Although, as a critical aspect of financial markets, the bond market and insurance market have grown in importance to become a central theme in finance in the recent years (Fabella and Madhur, 2003; Felman et al., 2014; Herring and Chatusripitak, 2001; Kahn, 2005; Mieno, Nagano, Takayasu, Takeda, & Nagai, 2009), the inclusion of bond market and insurance market development in economic growth enhancing process is having a low coverage and has largely been ignored compared to other markets.

Moreover, the general observation from the empirical studies presented thus far, have focused on banking market and stock market development in both developed and developing economies. A number of studies examined the simultaneous impact of both markets development on growth (Beck and Levine, 2004; Levine and Zervos, 1998; Arestis et al., 2001; Cheng, 2012; Wu et al., 2010). The majority of studies show that both stock markets and banks positively influence economic growth. But Arestis et al. (2001) concluded that the positive effect of the banking system is even more powerful. Other studies (e.g. Guglielmo, Peter and Alaa, 2004; Rioja and Valev, 2004, 2014) have emphasised the role of the banking sector as the only organised capital market in most developing countries. It has neglected the potential role of stock markets for efficient capital allocation and risk sharing in a liberalised financial market. However, stock markets are active in emerging markets. The stock market is extremely complicated this paper intends explore this area in greater detail through research.

2.6 The role of stock market in economic growth

As above, most studies focus attention on financial development. Stock market development is a sub-sector of the financial sector development.

There is a substantial strand of literature looking at the relationship between the stock market and the real sector of economy. Literature states that the stock market is one of the determinants of the steady-state level of per capita growth (Cooray, 2010; Durusu-Ciftci et al., 2017). There is no general consensus in the empirical literature regarding the existence and nature of relationship between the stock market and the real economy (Pan and Mishra, 2016). While, many empirical studies (Atjeand Jovanovich, 1993; Korajczyk, 1996; Levine and Zervos, 1998) support the argument that there is a strong positive correlation between stock market and economic growth.

Previous theoretical contributions suggest that stock markets development is an important ingredient for growth (Atje & Jovanovic, 1993; Tachiwou, 2010). Atje and Jovanovic (1993) indicate that stock market development may be a leading indicator of economic growth. The stock market denotes as an important part of the free market economy. On the market, companies can access capital by exchanging the ownership of the firm with investors. Stock market liquidity helps promote lower transaction costs, which makes it easier for investors and savers to sell assets frequently and buy whenever they want to change their portfolio and also keep control of their savings (Bencivenga, Smith and Starr, 1996; Levine, 1997). Simultaneously, firms have permanent access to capital raised through equity issues. Greenwood and Smith (1997) argue that large stock markets can lower the cost of mobilising savings and thereby facilitate investment in the most productive technologies which may affect productivity growth. Productivity growth is a measure related to economic profits and work in productivity growth emphasises positive spillovers from technological innovation (Chun, Kim and Morck, 2008), stock

markets to some extent influence productivity growth and ultimately affect economic growth. However, stock liquidity may impede firm innovation which affects productivity growth which is a measure related to economic profits.

In terms of raising capital, stock markets enable firms to acquire much-needed capital quickly. As the expansion of stock markets, the increase of liquidity will bring incentives for agents to acquire more resources for firms. This is because they can benefit from the information. Therefore, Merton (1987), Spears (1991) and Paudel (2005) point out that if a stock market is large and has sufficient liquid, positive implications applied to capital allocation by benefiting from this valuable information. Greenwood and Smith (1997) also suggest that it can promote specialisation, reduce the cost of mobilising savings and ultimately accelerate the rate of economic growth. Similarly, stock markets can attract more investment by agglomerating savings, which can finance a feasible productive project, boost economic efficiency and accelerate long-run growth by easing resource mobilisation (Mishkin 2001; Caporale et al., 2004).

Besides the improvements in the monitoring of investments, liquid stock markets can increase incentives to get firms information and improve corporate governance (Holmstrom and Tirole, 1993). In their analysis of over 2000 CEOs at the level of the enterprise, Jensen and Murphy (1990) found that stock markets enhance corporate control through mitigating the principal-agent problem. However, due to the presence of information asymmetry between managers and investors, Stiglitz (1985) argues that stock market liquidity will not enhance incentives for acquiring information about firms. Therefore, the takeover threat will not be a useful mechanism for exerting corporate control, which implies that stock market development will not importantly improve corporate governance. Moreover, greater stock market development encourages the diffusion of ownership and welfare-reducing changes in ownership and management, which impedes effective corporate

governance (Shleifer and Vishny, 1986; Shleifer and Summers, 1988; Bhide, 1993).

A certain stream of literature shows that the overdevelopment of stock market will hinder economy development. Adams Smith (1819) stated that the moral corruption of banks disturbed the economic equilibrium which impaired national wealth. Bencivenga and Smith (1991) and Bencivenga, Smith and Starr (1995) conclude that the development of financial markets can improve and enhance the information system mechanisms of financial markets, which lead to the average transaction cost of the whole financial market can to some extent be reduced. In addition, the developed endogenous growth model of King and Levine (1993) suggests that higher returns on the improved resource allocation may decrease saving rates and then further depress the economic activity. Similarly, Jappelli and Pagano (1994) argued that the liberalisation of mortgage and consumer credit markets eased liquidity constraints in countries, which slows the saving and economic growth rate.

However, a number of scholars found no evidence to show that the stock market is significantly related to economic growth. Using a similar data set and approach with Levine and Zervos (1998), Zhu, Ash and Pollin (2002) find that the way Levine and Zervos (1998) control for data outliers is incomplete and thus it not robust enough to alternative specifications. Therefore, they suggest that when one properly controls for outliers, stock market liquidity no longer exerts any statistically observable influence on GDP growth. The same result is also obtained by Favara (2003). He finds a result indicates that financial development does not have a significant effect on economic growth by using both the instrumental variable regression and the generalised moments method (GMM) for dynamic panel estimation.

2.7 The role of Chinese stock markets in economic growth

There is a large strand of literature looking at the relationship between the stock market and the real sector of economy. The existing literature indicates

that the nature of the relationship between stock markets and economic growth differs from one country to another and also probably varies between countries, when they are at different levels of economic growth (Pan and Mishra, 2016). Why then is the stock market in some emerging and pioneer countries still underdeveloped, but yet the level of industrialisation and economic growth is as impressive as more developed ones? In the light of above arguments, it seems that the best way to study the relationship between the stock market and the economy is to analyse this data on a country-by-country basis.

As one of the largest emerging and developing economies, China has its uniqueness. Chinese stock markets contain three stock exchanges: the Shanghai Stock Exchange, the Shenzhen Stock Exchange, and the Hong Kong Stock Exchange. There are four types of equity shares issued by Chinese mainland companies: A , B and H and N shares. Domestic China A-shares are listed on the mainland in the Shanghai or Shenzhen Stock Exchanges which are not fully accessible to international investors. The original reason for the segmentation of the Chinese stock market was to protect it against high volatility in world markets and to control Chinese companies against foreign investors. Nowadays there are plans to eventually merge Class A and B shares in the future, but no exact timetable exists. Therefore, to identify the trading activities on the Chinese stock market, only Class A shares should be included in the research data set.

The most commonly used indicators of existing literature are the measures used to proxy for stock market size and the size of the real economy which is also one potential reason why existing literature is ambiguous about this research question (Pan and Mishra, 2016). There are two reasons provided: Firstly, China is a Communist nation, which is different from most other economies. Secondly, China has experienced rapid development of stock market and its industry which is different with other developed countries.

2.8 Conclusion

Although a few studies exist on the finance–economic growth puzzle, few have considered the issue on how the momentum of paper trading of shares can be transmitted to the growth of industry and firms which is a determined part of a real economy. For most of the studies on stock markets in China, the emphasis has been on testing for market efficiency, development of the stock markets and the impact of economic variables on stock markets.

The objective of this chapter was to point out the contradictory views regarding the effect of financial development and the stock market on economic growth with reference to the empirical analysis approaches on both a macroeconomic and microeconomic level. Given all that has been discussed so far, while the literature historically focused on the linkage between financial market and economic growth, there is an expanding interest in the impact of stock markets on economic growth. Although the above existing studies provide evidence on the linkages between the stock market and economic growth, but it is far from definitive. A considerable amount of literature, which covered from cross-country to country specific to firm-level studies, has been conducted. The weakness of cross-country studies is hardly identify the idiosyncratic institutional and structural characteristics within different countries. Therefore, other scholars (Abel and Blanchard 1986; Schaller 1990) point out that country-level time-series data may result in estimation biases due to aggregation problems. And firm-level data and individual country or financial system can be especially valuable in allowing for greater heterogeneity and circumventing the shortcomings of more aggregated analyses.

In general, theoretical models and empirical analyses have provided conflicting predictions and implications about the repercussions for overall financial development of economic performance due to the extraordinary economic achievement in China - this offers a great opportunity to address issues of how securities market affect firm development and ultimately can be transmitted to economic growth.

Since most recent literature is less conclusive on this issue, this thesis will endeavour to be instructive and complementary to the existing literature in microscopic transmission mechanism between the stock market to economic growth.

In summary, this study will provide further evidence on this relationship by introducing microscopic transmission mechanism from stock market to economic growth to discover that stock market development promotes firm performance and ultimately contributes to economic growth.

Chapter 3 : Does stock market contribute to the growth of real economy via capital supply?

3.1Introduction

To examine the transmission mechanism between the stock market and firm growth, we start by investigating the relationship between the stock market and firm financing. Thus far, numerous studies explore the relationship between financial market development and various economic outcomes. However, the fact that the stock market creates the supply effect has only received relatively limited research. Enterprises expand the scale not only by using accumulate funds generated from operations but also by external financing for more external funding to invest and develop its own. The stock market is a means by which firms can obtain external financing. Thus, to explore how stock market activities affect firm growth and ultimately turn into economic growth, access to external finance is a key determinant of a firm financing capacity to develop.

In this chapter, we will explore how the stock market influences the capital supply of listed firms. We will then suggest that the effect of the stock market on firm growth is a fund pulling effect: in the sense that funds from stock market would drive rise in the level of firm growth. We consider that the changes of the stock market will affect the corporate lending risk expectation of banks to a certain extent, and this change will further influence firm's external financing ability, which further affect firm's productions and investment. The Different natures of the primary and secondary stock markets provide different supply effects of capital. The initial public offering (IPO) activities in the primary stock market provide capital to firms, which ease a firm's financial constraints to a certain extent. However, few studies provide empirical evidence to examine the time effects of the impact of a stock market listing on financial constraints.

Despite the fact that China is one of the fastest growing economies and has a rising importance in the global economy, its economic reforms and financial markets intergration only date back to 1978. Unlike other stock markets, the strict regulations on initial public offering and refinancing are still followed today, which gives rise to the relatively high uncertainty of corporate equity financing. In 2005, there was a big change in the institutional setting of the Chinese stock market, namely, split share structure reform. Prior to this reform, state shareholders mainly held restricted shares that could not be freely traded in the stock market in the same way as shares held by private shareholders. Ding et al. (2013) indicate that the reform has improved the corporate transparency of Chinese listed firms through their share price informativeness, which means the environment of Chinese stock market has changed and enhanced since 2005. Thus, it is necessary to discover how the Chinese stock market influences capital supply for newly structured reformed public firms, which is the reason why our sample selection is based on the split share structure reform in 2005.

Our results indicate that the firm's financing activities in primary stock market ease its financial constraints not in the current period, but appears from the first year after IPO and the degree is gradually weakened (reduced from 0.00525, 0.00319 to 0.00221). The research in this chapter intends to develop the ideas expressed in current literature and fill in the missing gaps. Meantime, the activities of the primary market relieve the issue of asymmetric information and lower the cost of external financing, which provides useful information to the investors on the secondary market. Our study not only examines whether secondary stock market trading activities affect firms' cash flow, but also differentiates the two sources of cash flows (cash flow from external and internal), thus this enables us to examine the market's impact on both sources separately. We control the factors that are likely to influence corporate cash flows including investments that might stimulate a firm's demand for cash flows, production development that may increase the supply of cash flows,

total assets that determine a firm's size effect and debt ratio that possibly affects the supply of cash flows. The results show a significant and positive effect of the stock price on cash flow via external cash flow[1]. This is because the increase of the stock price would enhance a firm's borrowing capacity and loans are one of the most important sources of firm external financing. Our results also show a positively relationship between ownership structure and firm cash flow which proved that an increase of the controlling shareholder ownership concentration could promote a firm's financing capacity through equity. Additionally, the existing literature about the correlation between the liquidity of listed companies and the cash flow of the enterprise at micro level is limited, and there is also very little research literature on the negative correlation between those two. Through the macro-economic level analysis, Choi and Cook (2006) found that there is a negative correlation between corporate cash flow and liquidity of market capital by examining Japan's data. Our results show a negative relationship at micro level which extend the current literature on stock market liquidity to corporate cash flow.

The reminder of this chapter is structured as follows. Following this introduction, it begins by laying out the empirical evidence and theoretical dimensions of the research, and then the described data and the approach used in this study to assess the impact that stock markets had on the growth of firms. The fourth section presents the findings of the research, while the last part highlights the major findings and implications.

3.2 Empirical evidence

Thus far, previous studies have explored how the impact of financial market development affects economic growth by easing financial constraint

[1] This study divides the total cash flow into two parts: cash flow from internal and cash flow from external.

due to lower cost of external financing. Extant research provides several pieces of evidence consistent with this prediction.

Carpenter and Petersen (2002) emphasize that financially constrained firms obtain less funds and at a higher cost than unconstrained firms do. The financial market development eased financing constraints, which in turn decreased the cost of external financing, increase external funds and cash flow and ultimately improved firm growth.

Rajan and Zingales (1998) use industry-level data to show that industries that are reliant on external financing exhibit greater growth in financially developed countries. They argue that well a developed financial market will help firms deal with problems of moral hazard and adverse selection, which will help firms reduce cost of raising money from outsiders. And indicate that industries with this inherent need for external finance will be relatively advantaged in responding to growth opportunities at all times in countries with well-developed financial institutions. Meantime, industrial sectors that are relatively more in need of external finance develop disproportionately faster in countries with more-developed financial markets.

Consistent with the findings of King and Levine (1993) and Rajan and Zingales (1998), Demirguc-Kunt and Maksimovic (1998) explored a sample drawn from thirty developing and developed countries and found that firm growth financed by long-term external debt and equity is positively associated with the level of a country's financial development. In other words, the stock market and the large banking sector are also associated with externally financed firm growth.

Following Demirguc-Kunt and Levine (1996), Love (2013) use the same index[2] to measure stock market development. The authors provide evidence that financial development impacts on growth by reducing constrains utilising firm-level data, and taking advantage of the cross-country variation in financial market development. The study has shown that financial development affects firms' investment through its impact on firms' costs of capital, which support the view that financing constraints decrease with financial market development. In addition, the findings also highlight that large firms are disproportionately less disadvantaged in less financially developed countries than small firms.

Another perspective has been adopted by several studies that explore the relation between financial developments and financing constraints by focusing on financial liberalisation. Bekaert and Harvey (2000) and Henry (2000) address issues of firm financing constraint by focusing on financial liberalisations. They found a significant decrease in the cost of equity capital after financial liberalisations which ease the financing constraints. Laeven (2003) found consistent evidence by using different methodologies.

To study the impact of financial development on financial constraints, various studies have used cash flow sensitivity of cash as a measurement of financial constraints (e.g. Almeida et al., 2004), and point out that holding cash can be costly and hence firms with a "trade-off" between low return earned on liquid assets and the benefit of minimizing the need for costly external financing (Kim et al., 1998).

Capital market imperfections are believed to be very present in China (Paulet and Rowley, 2017). Since China has only recently begun reforming its financial system, some studies particularly focus on the Chinese market.

[2] market capitalization to GDP, total value traded over the GDP, and total value traded to market capitalization

Poncet, Steingress and Vandenbussche (2012) explored financial constraints in China by using a unique micro-level data set (more than 20,000 Chinese firms) over the period 1998–2005. Their findings indicate that private Chinese firms face severe financial constraints. Firstly, private Chinese firms are credit constrained while state-owned firms and foreign-owned firms in China are not; Secondly, geographical and sectoral presence of state firms aggravates financial constraints for private Chinese firms.

From the perspective of the stock market, Schoubben and Hulle (2011) indicate that listed firms are likely to face less financing frictions (i.e. firms with financing constraints) in comparison to unlisted firms. Other studies, such as Beck et al. (2006), Giannetti (2003), and Holod and Peek (2007) also emphasise that stock listing will ease firms' financing constraints. Garcia and Mira's (2014) complement previous studies and further explain that unlisted firms face a higher cost to gain new financing which makes it more difficult than listed firms. Other studies have also demonstrated that company listing can help firms access to external financing (Faure-Grimaud and Gromb, 2004; Huyghebaert and Van Hulle, 2006). In addition, Dreyer and Gronhaug (2004) and Rudd et al. (2008) extend the understanding of how a stock listing could provide firms with a competitive advantage.

Large bodies of literature have investigated the relationship between equity financing and stock returns, while very little studies have focused on the relationship between the capacity of a firm to raise external funds and stock returns (Fonseka, Samarakoon and Tian, 2012). Fonseka et al. (2012) examine the relation between equity financing capacity and subsequent stock returns in China and found a negative relation in China. There are two reasons the authors are provided: firstly, the capacity for rights and public offers is reliably negatively related with future returns for firms that met regulatory criteria. Secondly, the capacity for rights offers is strongly negatively related with returns for firms that met the criteria and applied for

approval, and for firms that issued equity after meeting the criteria and obtaining approval.

The results of Cabral and Mata (2003) and Angelini and Generale (2008) showed that firms that use capital market financing are larger to start with and grow faster than nonusers which indicates that there is no convergence in firm size. Bollard et al., (2013) found consistent results by analysing firms from India.

Thus far, numerous empirical studies have attempted to study the impact of company listing on firm performance and provide evidence of a decline in post-issue operating performance in different markets such as USA (Jain and Kini, 1994), China (Wang, Xu and Zhu, 2004), Indonesia (Andriansyah and Messinis, 2015), Italy (Pagano, Panetta and Zingales, 1998) and Japan (Cai and Wei, 1997). Other authors suggest that different motives may be critical to post-IPO firm performance.

Autore, Bray and Peterson (2009) have shown that the operating performance of IPO firms chooses debt or working capital financing is not as good as those who choose investment. Additionally, Subrahmanyam and Titman (1999) argue that the allocation of fixed assets is essentially growth financing, while working capital financing is not. Andriansyah and Messinis (2015) state that the allocation of fixed assets investment and working capital investment are two of the biggest portions of IPO proceeds and the fixed assets investment takes more than twice as many as the working capital financing. Therefore, a thorough understanding of fixed assets investment underlying the initial public offerings is important from the firm’s growth viewpoint.

3.2.1Theoretical background

To argue whether stock market development affects a firm's ability to exploit growth options, it is necessary to identify firms that have an external financing need and, if possible, examine whether their growth depends on the development of the stock market (Demirguc-Kunt and Maksimovic, 1998). The stock market can be split into two main sections[3]: the primary market and the secondary market. New securities are first sold through initial public offerings (IPO) in the primary market. Once new issues have been sold in the primary, all subsequent trading activities will take place in the secondary market. Therefore, two channels offer financing sources for firms: acquiring one-time funds through company listing from the primary market and then receive further funds from trading activities in the secondary market. The following research will split the sample into two different markets. Overall, based on previous studies and theories, we will examine how long the impact of the stock market listing on financial constraints will last in the primary stock market, and how secondary stock market trading activities affect firm cash flow and which sources will be the channel both external and internal.

From a theoretical perspective, financial development may ease financial constraints. Underlying the Modigliani and Miler theorem in 1958, finance is irrelevant for real investment decisions in a perfect capital market (without financial frictions). Thus, there is no divergence between a firm's internal and external costs of funds in the perfect capital market.

Capital market is imperfection; firms have to look for an external resource if there is not enough internal funds to support its investment (Fazzari, Hubbard and Petersen, 2000). Therefore, firms who are external dependent are more subject to the asymmetric information and probably to financial constraint. In an imperfect capital market, asymmetric information would lead to a firm facing a cost premium for external finance and thus it is difficult to access to

[3] https://www.investopedia.com/terms/s/stockmarket.asp

external capital. If a firm has restricted access to external capital, that is, if firm with financing constraints demands for liquidity or liquidity management may become a key issue for corporate policy. Traditionally, the corporate policy is focused on corporate investment demand (Hubbard, 1998; Lamont, 1997). In other words, financially constrained firms behave as if they have low discount factors (i.e., a high cost of capital) and tend to postpone investment to next period (Love, 2003). In detail, cash flows contain valuable information about a firm's investment opportunities (Alti, 2003), that is, the needs of firm's external financing depend on the magnitude of its internal cash flows relative to its investment opportunities (Demirguc-Kunt and Maksimovic, 1998). Additionally, the capacity of the firm assets to generate cash flows exclusively demonstrated a firm's market value which has highlighted in the seminal study of Modigliani and Miller (1958).

Researchers indicate that better access to lower cost external financing is one of the most significant advantages of financial development. Financial markets can help a firm overcome problems of the moral hazard and adverse selection, thus firm's cost of raising money from outsiders will decrease. The decrease in financing constraints allows firms to invest according to their growth opportunities and improves capital allocation (Love, 2003). In other words, lower cost of external financing will encourage firms obtain more cash flows from outsiders. Therefore, companies who rely more on external financing can better sustain growth in more financially developed areas.

In view of all that has been mentioned so far, it is possible to see that stock market activities would affect corporate financing ability via the primary market, funds raised from company listing can ease the firm's financial constraints and thereby improve the firm's financing environment. In addition, when and how the funds that are raised from IPOs ease firms' financial constraints need to be clarified, and whether secondary market trading activities influence firm cash flow and enhance financing capacity.

3.3 Model Specification, methodology and Variables

3.3.1Specification of model and methodology

Modelling the relationship between stock market development and financial constraints in the primary market can help us understand if firms are listed on the stock market does this ease their financial constraints and how the increasing external funds from stock market further affect firm growth. More clearly, on the primary market, we need to examine whether and how IPOs affect firm's financing constraints, and whether it increases a firm's external funds and affects firm financing environment in the following years. At the same time, this chapter tests whether the impact of secondary market trading activities can significantly affect firms' cash flow and enhance financing capacity.

Models in Primary Market:

$$\boldsymbol{FS_{it} = e^{\lambda_0} IPO^{\lambda_1+\lambda_2+\lambda_3+\lambda_4+\varepsilon_{it}}} \quad (1)$$

Where, FS_{it} is the financial constraints, IPO is the amount of funds that firms raised, λ_0 is constant term, $\lambda_1 - \lambda_4$ represent the coefficient for the impact of IPOs on the financial constraints of the listed firms in the year of IPOs, one year after IPOs, two years after IPOs and three years after IPOs respectively, and ε_{it} represents the disturbance term.

Based on previous studies, we incorporate a number of variables to control for various firm-specific characteristics. Firm size, debt ratio and ownership structure are added as control variables. Panel data is widely used in empirical economics. Such data allows researchers to control for unobservable, time invariant individual-level heterogeneity that, according to economic theory, may be related to covariates (Bester and Hansen, 2009).

We attempt to model the relationship between IPOs raised funds and financial constraints by using fixed effects models (FE). F-test is applied to control for individual effects and unobserved specific firm characteristics. Year dummies are also applied to the regression since time effects are found to be significant.

***Models in Secondary Market**:*

To test whether and how firms' cash flow is affected by secondary stock market activities, we placed restrictions on how the independent variables enter the cash flow equations.

Capital Equation:

$$\textit{Capital (cash flow)} = a + b\ \textit{Stock Markets Factors} + c\ \textit{Production factors} + d\ \textit{Investment factors} \quad (2)$$

In this model, stock price, ownership structure and stock liquidity are stand for stock market factors. Investment and development of production as explanatory factors of cash flow in the model to reflect endogenous associations and mutual influences among them.

In order to migrate “the possibility of simultaneity or reverse causality bias (Steinberg and Malhotra, 2014)” and minimise or avoid problems of endogeneity (Baccini and Urpelainen, 2014; Lehoucq and Perez-Linan, 2014), and also in order to clarify the causal relationship in the examination, all independent variables are lagged by one phase and explained the current changes with the events that occurred in the previous period.

It is controlled other factors that may affect the cash flow of the enterprise. For example, the impact of investment as a driving force on demand for cash flow, the impact of sales on the supply of cash flow, the effect of total assets on the scale of cash flow, the supply effect of debt ratio on cash flow changes. In addition, the dynamic inertia of the cash flow from the previous period to the cash flow of the current period has also been controlled by our calculation. Firm size and debt ratio are used to incorporate a number of variables to

control for various firm-specific characteristics. Overall, by controlling these variables, we will be able to effectively isolate the impact of the stock market on firms to validate and estimate.

The equation can be expanded as follows:

$$\boldsymbol{CF_{it} = \alpha_0 + \alpha_1 SP_{it-1} + \alpha_2 OS_{it-1} + \alpha_3 LQ_{it-1} + \alpha_4 I_{it-1} + \alpha_5 Q_{it-1} + \alpha_6 Size_{it-1} + \alpha_7 DebtRatio_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}} \quad (3)$$

Where α_0 and ε_{it} represent constant and disturbance term respectively; $\boldsymbol{\gamma_i}$ and $\boldsymbol{\delta_t}$ are firm-specific and time-specific effects, respectively; $\boldsymbol{SP_{it-1}}$ is the annually average stock price of firm ***i*** in year ***t-1***; $\boldsymbol{OS_{it-1}}$ represents the ownership structure concentration of firm ***i*** in year ***t-1;*** $\boldsymbol{LQ_{it-1}}$ is stock liquidity of firm ***i*** in year ***t-1;*** those three variables indicate the trading activities on the secondary stock market. As the explanatory factors of cash flow, $\boldsymbol{I_{it-1}}$ and $\boldsymbol{Q_{it-1}}$ represent the investment and development of production of firm ***i*** in year ***t-1;*** $\boldsymbol{CF_{it}}$ is cash flow of firm ***i*** in year ***t***. $\boldsymbol{I_{it-1}, Q_{it-1}, Size_{it-1}, DebtRatio_{it-1}}$ are control variables that we used to control other factors that may affect the cash flow. All variable definitions are in next section.

To further investigate which kind of cash flows are affected by stock market, we classified the nature of cash flow into cash flows from external[4] and cash flows from internal[5].

$$\boldsymbol{ECF_{it} = \alpha_0 + \alpha_1 SP_{it-1} + \alpha_2 OS_{it-1} + \alpha_3 LQ_{it-1} + \alpha_4 I_{it-1} + \alpha_5 Q_{it-1} + \alpha_6 Size_{it-1} + \alpha_7 DebtRatio_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}} \quad (4)$$

$$\boldsymbol{ICF_{it} = \alpha_0 + \alpha_1 SP_{it-1} + \alpha_2 OS_{it-1} + \alpha_3 LQ_{it-1} + \alpha_4 I_{it-1} + \alpha_5 Q_{it-1} + \alpha_6 Size_{it-1} + \alpha_7 DebtRatio_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}} \quad (5)$$

[4] This is the cash inflow from company external, cash inflow from financing activities

[5] This is the cash inflow from company internal, cash inflow from operating activities, net cash flow from investing activities, purchase of fixed assets, purchase of debt or other entities securities, loan to others

Hausman (1978) test is applied to the panel data in order to verify fixed nature of the unobservable individual effects. Our data set belongs to unbalanced panel data where certain years, some data are missing (Baltagi, 2005; Cameron and Trivedi, 2005). An unbalanced panel data set is one in which individuals may be observed different numbers of observations. The least squares dummy variable (LSDV) estimator is commonly applied for unbalanced panel data and represented fixed effects if the model includes individuals' dummy variables.

Alternatively, as a substitution of a factor of stock markets activities, abnormal returns are applied as a replacement of stock prices. The index, that is, the difference between the return on the stock of listed companies and the average yield on the stock exchange.

The regression model is as follows:

$$\boldsymbol{CF_{it} = \beta_0 + \beta_1 ABR_{it-1} + \beta_2 OS_{it-1} + \beta_3 LQ_{it-1} + \beta_4 I_{it-1} + \beta_6 Q_{it-1} + \beta_6 Size_{it-1} + \beta_7 DebtRatio_{it-1} + \gamma_i + \delta_t + \varepsilon_{it}} \quad \textbf{(6)}$$

Where β_0 and ε_{it} represent constant and disturbance term respectively; $\boldsymbol{\gamma_i}$ and $\boldsymbol{\delta_t}$ are firm-specific and time-specific effects, respectively; $\boldsymbol{ABR_{it-1}}$ represents abnormal returns of firm ***i*** in year ***t-1***; $\boldsymbol{SP_{it-1}}$ is the annually average stock price of firm ***i*** in year ***t-1***; $\boldsymbol{OS_{it-1}}$ represents the ownership structure concentration of firm ***i*** in year ***t-1;*** $\boldsymbol{LQ_{it-1}}$ is stock liquidity of firm ***i*** in year ***t-1;*** As the explanatory factors of cash flow, $\boldsymbol{I_{it-1}}$ and $\boldsymbol{Q_{it-1}}$ represent the investment and production of firm ***i*** in year ***t-1*** respectively***;*** $\boldsymbol{CF_{it}}$ is cash flow of firm ***i*** in year ***t***.

3.4 Measurement of variables

Further detailed specification of variables are discussed below.

Financial Constraints (FC)

Previous studies mainly focus on investment-cash flow measurement to investigate financial constraints and identify that this measurement is a good measure of financial constraints (Chang et al., 2006; Kaplan and Zingales, 1997; Fazzari et al., 2000). However, to avoid problems associated with the investment-cash flow literature, Almeida et al. (2004) use cash flow sensitivity of cash to test for financial constraints. They indicate that cash is a financial variable; it is difficult to argue that the explanatory power of cash flows over cash policies could be ascribed to its ability to forecast future business conditions. The sensitivity of cash holdings to cash flow varies systematically with proxies for financing frictions is therefore more powerful and less ambiguous evidence of the role of financial constraints than what investment–cash flow sensitivities can provide. Following the idea of Almeida et al. (2004), we use changes of cash holding to present financial constraints. I parameterize FC as financial constraints, namely, a function of the stock of liquid assets, specifically stock of cash and marketable securities scaled by total assets (Khurana, Martin and Pereira, 2006). One theoretical justification for this measure appears in the Myers and Majluf (1984) model, where the amount of cash holdings, which the author call “financial slack”, has direct effect on investment in the presence of asymmetric information. Financial constraints is able to expressed as follows:

$$Financial\ Constraints_{it} = \Delta cash\ holdings_{it}$$

$$= \frac{(Cash_{it} - Cash_{it-1}) + (markatable\ securities_{it} - markatable\ securities_{it-1})}{Total\ Assets_{it}}$$

IPOs

In the primary market, an unlisted company can raise money by issuing debt or equity to public and thus turn into a listed firm. This raised amount is named as IPOs. By following previous literature regarding IPO values, IPO funds can be defined as the amount that firm received during Initial public offering process and subtract underwriters' fees (Gulati and Higgins, 2003; Zimmerman, 2008; Mousa and Reed, 2013, Mousa et al., 2013; Mousa, Wales and Harper, 2015).

Cash Flow

The central issue regarding finance for the firm is its composition between internal and external sources. While retained earnings and depreciation are the main components of internal finance, debt and equity are the two components of external finance. Almeida et al. (2004) argue that the variations in operating cash flows (a proxy for the availability of internal funds) affect changes in cash holdings for financially constrained firms. They find operating cash flows to have a positive and statistically significant impact on changes in cash holdings for firms classified as being ex ante financially constrained.

We define the cash flow as net income plus depreciation and amortized expenses and scaled by beginning period capital (equals to property plant and equipment, net of depreciation minors capital expenditure and plus depreciation and amortized expenses).

We use total annual cash inflow (CF) per share to measure cash flows of listed firms and further decompose the overall sample into external cash inflow per share (ECF) and internal cash inflow per share (ICF) to further identify the impact of stock price changes, ownership structure changes and stock liquidity changes, which are caused by secondary market trading activities, on listed firms’ cash flow.

$$CF_{it} = \frac{Total\ Cash\ Inflow_{it}}{Total\ number\ of\ Shares_{it}}$$

$$ECF_{it} = \frac{External\ Cash\ Inflow_{it}}{Total\ number\ of\ Shares_{it}}$$

$$ICF_{it} = \frac{Internal\ Cash\ Inflow_{it}}{Total\ number\ of\ Shares_{it}}$$

where external cash inflow is defined as the net cash flow from financing activities plus dividend payment, redemption of long term debt and repurchase of capital stock. Internal cash inflow is defined as net cash flow from operating activities added back the payments of dividends, tax and interest plus the net cash flow from investing activities added back the purchase of fixed assets, debt or other entities' securities and loan to others units.

In order to make results more accurate and clear, we take the logarithm of CF_{it} , ECF_{it}, ICF_{it}. This is because in the case of inconsistencies in the magnitude of the independent variables, logarithms can be used to eliminate the situation that the order of magnitude differs large. In addition, it also can eliminate heteroscedasticity and make non-linear relationship between variables into a linear relationship, which is convenient to do parameter estimations (Manning, 1998).

Stock Prices (SP)

Economic theory (Durusu-Ciftci, Ispir, & Yetkiner, 2016) suggests that there should be a strong link between economic activity and security prices, given that the stock price is the discounted present value of the firm’s payout. The yearly average share price refers to the average price of listed firms in the year. All share price data are directly from database. At the same time, in the empirical calculation, we take logarithm of the variables.

Ownership Concentration (OW)

Trading activities on stock market lead to changes in corporate stock shareholding structure, therefore, the ownership concentration is also an index of stock market activities in this study.

We use the percentage of shares held by the largest 10 shareholders to the total number of shares issued by the company to measure the concentration ratio of shareholding. The formula is given as follows:

$$OS_{it} = \frac{Number\ of\ shares\ held\ by\ top\ 10\ shareholders_{it}}{Total\ number\ of\ shares\ issued_{it}}$$

In order to make the results more clearly, we take the logarithm of the OS_{it} as a measure of the concentration of listed companies stock index variable.

Equity liquidity (LQ)

Equity liquidity is an important measure of trading activities on stock market. Currently there is a substantial body of literature on the measure of liquidity and in total there are four different methods being employed (Rico von Wyss 2004).

Price method

The measurement of liquidity based on prices is derived from the market width (spread) of liquidity. Overall, there are three measures being considered: bid-ask spread, price improvement and price auto-correlation model (M.K. Datar, 2000; Siniša Bogdan et al., 2012; Rico von Wyss, 2004).

The most commonly used method is Bid-Ask Spread. Siniša Bogdan et al., (2012) indicate this is a natural measure of liquidity. On the quota-driven stock market, market makers as the driving force of liquidity need to quote both ask price and bid price to purchasers and sellers. There are two ways of measuring the spread. The absolute bid-ask spread, namely the absolute

value of the difference between ask price and bid price, and the relative bid-ask spread, which is measured as the absolute bid-ask spread divided by average best ask-bid price (Marshall, Nguyen and Visaltanachoti, 2011). Other measures such as effective spread, realised spread, positioning spread, price improvement and price auto-correlation model also prevail.

Trading volume

The most commonly used measure among trade volume methods is turnover rate. Two formulae can be used to calculate turnover rate. By the first and more common one, turnover rate is measured as trading volume (measured in number of shares) divided by total number of shares outstanding, it is called aggregate turnover AT (Lo and Wang, 2000). The second formula dictates that turnover rate is the ratio trading volume in monetary terms over total market capitalisation. Turnover rate is used to measure the market liquidity by the number (or the value in monetary terms) of shares traded within a certain time period relative to the total number (or the value) of shares available to trade on the market. Its inverse can also be used to measure the time during which a security is held. Hence a higher turnover rate is associated with securities changing hands more frequently, and more frequent exchange of securities is associated with shorter time it takes for transactions take place.

The other methods to measure market liquidity include market depth and success rate, but there are two problems with the measurement based on trading volume. Firstly, it ignores the impact of price changes, the primary measure of liquidity. Secondly, trading volume is correlated with price volatility, but the latter in turn discourages market liquidity (Datar, 2000).

Combination of trading volume and price

The third method involves measuring the relationship between trading volume and stock price changes. Under this method, high levels of price volatility caused by small volumes of trading exhibit poor market liquidity and vice versa.

The commonly used measures include Amivest Ratio indicating changes in trading volume (in monetary terms) as a result of 1% change in prices, and Martin Ratio, the ratio of daily price fluctuations over daily trading volume under the assumption that price changes are steadily distributed within the trading period (Nielsson 2009).

Time method

One of the important features of trading is its timeliness; hence the length of time needed to execute a transaction can also be used to gauge market liquidity. Two measures are available. Firstly, execution time, namely the time interval from when an order arrives to when an order is executed. Secondly, trading frequency, e.g. the number of times a security changes hands within a given period of time. The advantage of time method is its simplicity but it suffers from drawbacks. Firstly, the execution time for a price restricted order is closely correlated with its prices; secondly, trading frequency is associated with market volatility; and thirdly, it ignores the impact of price changes.

Another measure based on the time method is market elasticity, the length of time required from when a price starts to change to when a new equilibrium price emerges. Market elasticity is created to measure the pace by which price fluctuations caused by trading activities come to an end. Currently there is no uniform method to measure market elasticity. One way of measuring it is to calculate the difference between current best ask price (bid price) and the next best bid price (ask price).

Alternatively one can also use the difference between prices of two consecutive orders to estimate market elasticity. Under the assumption that there is no change in fundamental values of a stock (in the absence of the impact of newly emerged information), prices tend to fluctuate around the fundamental values in a random manner. Therefore a small deviation between the prices of two consecutive orders indicates that shorter length of time is needed for stock price to bounce back to its fundamental values and a higher level of market elasticity.

Based on the discussion above, we will adopt relative trading volume, a stock's average annual trading volume relative to total market-wide trade volume, which is defined as follow:

$$Stock\ Liquidtiy_{it} = \frac{\frac{V_{it}}{M_{it}}}{\frac{\overline{V_t}}{\overline{M_t}}}$$

Where V_i is the trading volume of stock *i* on secondary market in year *t*, M_{it} the market capitalisation of firm *i* in year *t*, $\overline{V_t}$ the total market-wide trading volume on secondary market in year *t,* and $\overline{M_t}$ the total market capitalisation of all listed firms on the market in year *t*.

Abnormal return (ABR)

A firm's abnormal return refers to the difference between the stock return of a firm and the average return on the entire market. In the form of a formula, abnormal return may be expressed as follows:

$$ABR_{it} = R_{it} - MR_t$$

Where ABR_{it} is the abnormal return of stock i in year t, R_{it} is the return of stock i in year t, MR_t is the market average return in year t.

Investment

Demirguc-Kunt and Maksimovic (1996) point that firms' cash flows and their optimal investment levels are endogenous. Thus, investment can be an explanatory factor of firm cash flow. Following previous studies of investment in China, fixed assets investment can be treated as the capital investment of real economy firms (Zhang and Zou, 1996; Zhang, 2002; Goldstein and Lardy, 2004; Qin and Song, 2009).

To measure a firm's investment in fixed assets we use annualised change in fixed assets, the difference between amount of fixed assets in current accounting year and that in previous year from annual reports of the company. Capital investment is defined as follows.

$$I_{it} = K_{it} - K_{i(t-1),} \qquad t = 2005,2006, \dots,2015$$

Where I_{it} is the total amount of investment of firm *i* in year *t,* K_{it} is fixed assets of firm *i* in year *t,* $K_{i(t-1)}$ is fixed assets of firm *i* in year *t.*

Development of production

We use the annualised change of total sales from main businesses as the key measure of a firm's development of production and the data are directly collected from the annual reports of all listed firms from 2005 to 2015.

$$Q_{it} = S_{it} - S_{i(t-1),} \quad t = 2005,2006, \dots,2015$$

Where Q_{it} is the development of production of firm *i* in year *t,* S_{it} is the total sales of firm *i* in year *t,* $S_{i(t-1)}$ is total sales of firm *i* in year *t.*

Firm Size

By studying the questions of how firm boundaries affect the allocation of resources and what determines firm boundaries, scholars realized the important of firm size (Coase,1937; Klein et al., 1978; Grossman and Hart, 1986; Dang and Li, 2013). From empirical corporate finance studies, firm size (or size effect) is commonly used as an important, fundamental firm characteristic, and even matters in determining the dependent variables (Frank and Goyal, 2003; Rajan and Zingales,1995; Vijh and Yang, 2012; Dang and Li, 2013). As a common measurement, total asset is considered as a firm size indicator in empirical analysis.

Debt ratio

Debt ratio is defined as total liability to total assets. Debt ratio generally measures a company's financial leverage that has an important role in monitoring managers thus reducing agency cost arising from the conflict between mangers and shareholders and even possibly affects the supply of cash flows (Jensen and Meckling, 1976; Jensen, 1986; Stulz, 1998). From the perspective of investor, it is able to reflect the ability of firm's solvency in future, firm's borrowing capacity and financial flexibility. Companies with higher levels of debt ratio are considered as highly leveraged and more risky for lenders. If the value is less than 0.5, most of the company's assets are financed through equity, on the contrary, are financed through debt (Hillier et al., 2010).

3.5 Data

To analyse the impact of stock market on firm financing and ultimately on the economic growth, a comprehensive dataset was assembled covering firms' activities in both primary and secondary market. The data used in this chapter comes from three sources: the Resset Database provides the initial public offering information from primary market, while both the financial market information and accounting information from financial statements comes from Guotaian Database, and Wind database as a complement source. The sample comprises all Chinese public firms with audited and consolidated financial statements in A-share market that includes both Shanghai and Shenzhen stock exchanges.

As is standard in most prior studies, financial institutions are routinely excluded (e.g., all of the literature cited above) because of financial firms are more subject to regulation and intrinsically different in the accounting

mechanisms and the nature of operation. Meanwhile, we exclude all “special treatment (ST)” firms that have negative net profits for at least two consecutive years to indicate their extraordinary risks and eliminate the noise impact (Jiang and Wang, 2008; Pistor and Xu, 2005). Moreover, following previous studies, all firms with a status of inactive have been eliminated. Sample descriptive statistics for the full sample and the correlation matrix are presented in Table 3-1 and Table 3-2. Our full sample includes 2233 listed firms that are active since the start year of Chinese stock market (1990). From the minimum and maximum value of variables in Table 3-1, we found that some variables have extremum. In order to reduce the effect of outliers, we have followed the study of Banker et al., (2016) and winsorized all variables at 0.5% in both top and bottom of the distribution.

The stock market has been divided broadly into two: primary market and secondary market. To eliminate survivorship bias, following Jose and Francisco (2014), the sub-sample of primary market is constructed with at least four consecutive years of observations. Our original primary market sub-sample contains data from manufacturing firms for the period spanning 1990 and 2015. However, considering the effect of stock market reform in 2005, we select the firms that go public from 2005 as our main data set of regression in primary market. The original sub-sample of primary market plays a supplementary role in robustness test. The original sub-sample of secondary market contains 2233 real economy listed firms for the 11 years period spanning 2005 and 2015.

Table 3-2 shows the correlation matrix of main variables in both primary and secondary market. The table shows a correlation matrix for all measures. With the independent variables, the maximum correlation of primary market study is 0.2322 and secondary market research is at 0.2136 for firm size. This suggests that the problems of both excessive statistic correlation and multi-potential multicollinearity do not exist.

Table 3-1 Sample Descriptive Statistics for the full sample (N = 2233)

Variable	Obs	Mean	Std. Dev.	Min	Max
year	58058			1990	2015
Stock ID	58058			2	603999
IPO funds	57824	7.77e+08	2.93e+09	270000	6.68e+10
Financial Constraint	28765	0.0188258	0.2190744	-29.10018	4.396418
Cash Flow	28771	1.18e+08	1.44e+09	-4.12e+10	6.92e+10
Stock Price	18707	13.36434	13.07674	0.53	249.74
Liquidity	14543	2.61114	2.705289	0.0114935	16.05351
Ownership Concentration	20875	.2067253	0.156962	0.014925	0.791774
Development of production	20084	7.98e+09	6.52e+10	-5733172	2.88e+12
Investment	30772	2.27e+09	1.70e+10	0	7.33e+11
Size	58058	4.44e+09	3.64e+10	0	2.40e+12
Debt Ratio	19951	0.5945775	6.548755	-0.2033024	877.2565

Table 3-2 Correlation Matrix of main variables

	IPO funds	FC	CF	SP	LQ	OC	DP	I	Size	Debt Ratio
IPO funds	1.0000									
Financial Constraint	0.0026	1.0000								
Cash Flow	0.2031	0.2322	1.0000							
Stock Price	0.0031		0.0806	1.0000						
Liquidity	-0.0952		-0.0605	-0.3300	1.0000					
Ownership Concentration	0.2425	0.0202	0.0587	0.0774	-0.2786	1.0000				
Development of production	0.5413		0.1585	-0.0218	-0.0707	0.1943	1.0000			
Investment	0.5671		0.1220	-0.0450	-0.0811	0.2164	0.8422	1.0000		
Size	0.7096	-0.0091	0.2136	-0.0333	-0.0915	0.2238	0.8968	0.8583	1.0000	
Debt Ratio	-0.0072	-0.0176	0.0032	-0.0540	0.0107	0.0029	0.0063	0.0060	0.0096	1.000

3.6 Empirical Results and Analysis

3.6.1Primary stock market listing activities

To evaluate the impact of primary stock market activities on firm financial constraints, the study starts to use panel data fixed effects models to examine models discussed in section 2. Table 3-3 shows the regression results for the static model that are based on the fixed effects estimator and results of base model. Using the equation (1), we are able to quantify the impact of a firm's IPO on its post-IPO financial constraints in each period.

The results in column (2) of Table 3-3 indicate that on the current IPO year, the IPO raised funds are positively and significantly to the financial constraint at 1% level, while, it becomes negatively significant relate with financial constraint from the first year after IPO. For control variables, the signs of coefficients are same as the base model. The negative effects numerical grow smaller after IPO (reduce from 0.00525, 0.00319 to 0.00221). These results illuminate that the funds raised in IPO cannot improve firm's financial constraint in the year of IPO, and the improvement only appears from the first year after IPO. However, this improvement is not stable and shows a decline trend, which means frictions that still prevent firms.

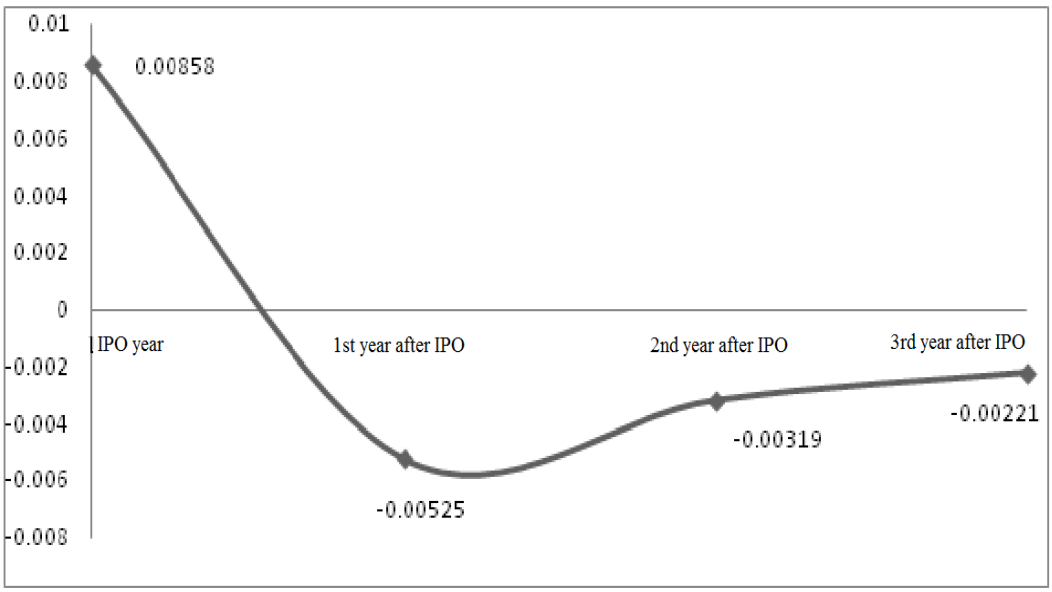
Overall, equity financing activities on the primary market can improve firms' financial constraint at a certain degree, which clearly confirms the financing environment is improved. This improvement emerges from the first year after IPO and gradually weakened.

Table 3-3: The impact of IPO raised funds on firm financial constraints

VARIABLES	(1) Financial Constraints	(2) Financial Constraints
IPO year		0.00858***
		(22.032)
1st year after IPO		-0.00525***
		(-16.979)
2nd year after IPO		-0.00319***
		(-12.136)
3rd year after IPO		-0.00221***
		(-9.392)
size	0.06237***	0.04554***
	(10.291)	(8.552)
debt ratio	-0.20087***	-0.05981***
	(-10.172)	(-3.191)
ownership structure	0.02232***	0.05928***
	(0.865)	(2.616)
Constant	-1.29591***	-1.00105***
	(-9.459)	(-8.589)
R-squared	0.22	0.53
Firm fixed	YES	YES
Year dummy	YES	YES
F-stat	153.2	153.2
adj.R	0.433	0.433
Number of pooled observations	6006	6006
Number of firms	988	988

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 3-1 : The coefficient of the relation bewteen primary market activity and firm financial constraints



Source: Data collect from Table 3

3.6.2 Secondary stock market trading activities

To evaluate the impact of secondary stock market activities on firm growth via cash flow, the study starts to use panel data methodology to examine models discussed in section 2. Also, Hausman (1978) test is applied to the panel data in order to verify fixed nature of the unobservable individual effects. Fixed-effect regression coefficients estimated with levels of critical significance in brackets. The least squares dummy variable (LSDV) estimator is also applied for our unbalanced panel data and represented fixed effects since the model includes individuals' dummy variables.

3.6.3 Stock price and total cash flow

We start our empirical analysis by examining model (3) and (6) that represent stock prices and abnormal returns, respectively. The results of model (3) in the following table suggest that there is a significant positive association

between share prices (yearly average share prices) and changes in the firms' cash flows and the results are consistent across all samples.

The differences between Table 3-4 and Table 3-6 is that Table 3-4 shows results of fixed effect regression and Table 6 states results of least squares dummy variable (LSDV) estimator. As referred above, Hausman (1978) test is applied to the panel data in order to verify fixed nature of the unobservable individual effects. Additionally, our data set belongs to unbalanced panel data where certain years, the data category is not observed (Baltagi, 2005; Cameron and Trivedi, 2005). Therefore, the least squares dummy variable (LSDV) estimator is also applied for unbalanced panel data since it would better represents fixed effects if the model includes individuals' dummy variables. Overall, most of the significance of results is consistent, except that firm size shows insignificant relate with cash flow.

Furthermore, the significant and positive relationship also exists between share prices and listed firm's external cash flows, with the result increasingly significant as time elapse. This can be attributed to the firms' improved capabilities of obtaining loans – an important source of external financing – as a result of the rise in share prices. This finding has provided evidence that rising share price does positively impact upon a firm's external cash inflows. By contrast, the impact of share prices on the firms' internal cash flows is insignificant. The first equation shows that the coefficient for total cash flows is 0.054, suggesting that the listed firms' total cash flows increase by 0.054% for every 1% rise in share prices. These results are consistent with our expectations.

Table 3-4: Impact of Secondary Market Trading Activities on Firm total Cash Flow, External Cash Flow and Internal Cash Flow

Independent Variables	Dependent Variables					
	CF_{it}		ECF_{it}		ICF_{it}	
	(1)	(2)	(3)	(4)	(5)	(6)
SP_{it-1}	0.0539**		0.118***		0.0334	
	(2.84)		(4.29)		(1.80)	
OS_{it-1}	0.307***	0.320***	0.320***	0.335***	0.292***	0.303***
	(4.59)	(4.80)	(3.30)	(3.44)	(4.44)	(4.60)
LQ_{it-1}	-0.0546***	-0.0693***	-0.0628***	-0.103***	-0.0419***	-0.0515***
	(-5.30)	(-8.00)	(-4.21)	(-8.39)	(-4.14)	(-6.09)
I_{it-1}	0.0623***	0.0623***	0.168***	0.169***	0.0308**	0.0285*
	(5.22)	(5.20)	(9.87)	(9.85)	(2.69)	(2.48)
Q_{it-1}	0.394***	0.398***	0.174***	0.186***	0.452***	0.456***
	(26.48)	(26.73)	(8.31)	(8.83)	(30.91)	(31.00)
$size_{it-1}$	0.336***	0.325***	0.377***	0.371***	0.247***	0.235***
	(16.83)	(15.85)	(13.26)	(12.67)	(12.80)	(11.81)
$Debt\ Ratio_{it-1}$	0.251***	0.264***	0.378***	0.386***	0.127***	0.140***
	(10.90)	(11.37)	(11.42)	(11.49)	(5.71)	(6.18)
AB_{it-1}		-0.0135		-0.0343		-0.0185
		(-1.03)		(-1.79)		(-1.44)
Constant	-34.31*	-31.75	-1.668	3.188	-38.29*	-37.05*
	(-1.96)	(-1.83)	(-0.06)	(0.12)	(-2.12)	(-2.07)
$R^2\ within$	0.378	0.381	0.196	0.195	0.363	0.366
$R^2\ between$	0.815	0.8219	0.371	0.363	0.872	0.877
$R^2\ overall$	0.668	0.674	0.323	0.320	0.693	0.698
Hausman-test:Chi2	1558.69	1546.60	2250.00	2173.11	2304.92	2280.27
Number of samples	1387	1384	1407	1405	1410	1406
Observations	9153	9062	9734	9635	9938	9835

***, **, * denotes significance at the 1%, 5% and 10% level, respectively. The regression uses unbalance panel data.

Table 3-5 Impact of Secondary Market Trading Activities on Firm total Cash Flow, External Cash Flow and Internal Cash Flow in Subsample

Independent Variables	CF_{it}				ECF_{it}				ICF_{it}			
	2005-2009		2010-2015		2005-2009		2010-2015		2005-2009		2010-2015	
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
SP_{it-1}	0.0243 (0.70)		0.0530* (2.18)		0.0815 (1.57)		0.126*** (3.70)		0.00341 (0.10)		0.0298 (1.26)	
OS_{it-1}	0.425* (2.05)	0.403 (1.93)	0.296*** (4.21)	0.304*** (4.34)	0.681* (2.19)	0.732* (2.30)	0.290** (2.90)	0.299** (2.99)	0.128 (0.61)	0.0800 (0.38)	0.296*** (4.28)	0.308*** (4.46)
LQ_{it-1}	-0.0379* (-2.15)	-0.0463** (-2.87)	-0.0370** (-2.81)	-0.0499*** (-4.40)	-0.0314 (-1.19)	-0.0527* (-2.20)	-0.0437* (-2.35)	-0.0797*** (-5.04)	-0.00821 (-0.46)	-0.0101 (-0.61)	-0.0341** (-2.67)	-0.0431*** (-3.91)
I_{it-1}	0.0704** (2.72)	0.0697** (2.68)	0.0430* (2.44)	0.0412* (2.34)	0.0894* (2.33)	0.0880* (2.27)	0.124*** (5.03)	0.124*** (5.01)	0.0249 (0.94)	0.0187 (0.71)	0.0160 (0.97)	0.0128 (0.77)
Q_{it-1}	0.154*** (6.65)	0.153*** (6.59)	0.332*** (17.82)	0.331*** (17.91)	0.0850* (2.54)	0.0870* (2.56)	0.136*** (5.36)	0.144*** (5.67)	0.211*** (8.97)	0.206*** (8.68)	0.360*** (19.72)	0.361*** (19.82)
$size_{it-1}$	0.290*** (8.25)	0.279*** (7.88)	0.250*** (10.45)	0.209*** (8.41)	0.130* (2.52)	0.138** (2.62)	0.282*** (8.50)	0.234*** (6.78)	0.247*** (7.07)	0.231*** (6.50)	0.198*** (8.60)	0.163*** (6.79)
$Debt\ Ratio_{it-1}$	0.0908** (2.83)	0.0880** (2.72)	0.280*** (9.10)	0.302*** (9.81)	0.123** (2.64)	0.122** (2.58)	0.449*** (10.32)	0.471*** (10.79)	0.0612 (1.92)	0.0609 (1.88)	0.144*** (4.87)	0.165*** (5.55)
AB_{it-1}		-0.0255 (-0.72)		-0.00885 (-0.63)		-0.0325 (-0.61)		-0.00922 (-0.46)		0.00634 (0.18)		-0.0189 (-1.37)
Constant	0.944 (1.81)	0.996 (1.94)	-34.93* (-2.03)	-32.11 (-1.90)	-0.438 (-0.57)	-0.167 (-0.22)	-5.325 (-0.21)	0.976 (0.04)	1.276* (2.42)	1.408** (2.71)	-37.60* (-2.12)	-36.40* (-2.07)
$R^2\ within$	0.180	0.173	0.334	0.336	0.083	0.083	0.154	0.151	0.185	0.179	0.325	0.327
$R^2\ between$	0.3425	0.3554	0.055	0.0627	0.067	0.071	0.275	0.296	0.593	0.586	0.043	0.045
$R^2\ overall$	0.226	0.236	0.225	0.245	0.004	0.052	0.266	0.273	0.347	0.353	0.202	0.208
Hausman-test:Chi2	1788.19	1755.86	1215.52	1274.03	2010.71	1658.07	1684.92	1727.98	1847.32	1765.73	1564.70	1549.46
Number of samples	935	931	1372	1366	963	961	1397	1391	971	967	1408	1403
Observations	2974	2929	6179	6133	3195	3147	6539	6488	3210	3159	6728	6676

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-6: Impact of Secondary Market Trading Activities on Firm total Cash Flow, External Cash Flow and Internal Cash Flow in Subsample **(LSDV)**

Independent variable	2005-2015		
	Dependent variable : CF_{it}	Dependent variable : ICF_{it}	Dependent variable : ECF_{it}
	(1)	(2)	(3)
SP_{it-1}	0.00437*	-0.0134	0.0678*
	(2.49)	(-0.76)	(2.53)
OS_{it-1}	0.175***	0.184***	0.167*
	(3.72)	(3.90)	(2.36)
LQ_{it-1}	-0.00528*	-0.00677**	-0.0225***
	(-2.57)	(-2.74)	(-3.62)
I_{it-1}	0.174***	0.138***	0.241***
	(14.14)	(11.50)	(12.98)
Q_{it-1}	0.0828***	0.0422*	0.149***
	(4.33)	(2.29)	(5.19)
$Size_{it-1}$	-0.0111	-0.0181	0.0187
	(-1.04)	(-1.72)	(1.16)
$Debt\ Ratio_{it-1}$	0.293***	0.218***	0.345***
	(11.88)	(9.01)	(9.35)
AB_{it-1}	8.45	6.31	3.075
	(1.56)	(1.04)	(0.07)
Constant	0.00512	-0.0134	0.0678*
	(0.29)	(-0.76)	(2.53)
R^2	0.110	0.106	0.053
Firm fixed	YES	YES	YES
Year dummy	YES	YES	YES
F-stat	37.73	23.72	23.04
adj.R	0.0339	0.0126	-0.00891
Number of pooled observations	7945	8580	8339

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

3.6.4 Shareholding structure and cash flows

The percentage of shares held by the 10 largest shareholders is employed to measure the concentration level of shareholding. An increase in shareholding concentration seems to contribute to the improvement of corporate performance which is consistent with existing literature (Lipinga, Yub and Gongmengc, 2006; Chen et al., 2005). We conjecture that the improved corporate performance is achieved through a mechanism by which more concentrated shareholding enhances the firm's capabilities of raising capital.

Equations (1)-(6) in Table 3-4 indicate the strong positive impact of increased shareholding concentration level on firms' cash flows: there is 0.3% increase in the firms' cash inflows for every 1% rise in the shareholding concentration level. In other words, increasing the percentage of shares held by the 10 largest shareholders contributes to the rise in cash flows. There are two possible explanations to this finding. One is that major shareholders inject cash to listed firms by holding more of their own companies' shares. Junfeng Li et al. (2011) found that there was a significantly positive announcement effect when shareholding concentration increase by examining China data bewteen 2008 and 2010. Therefore, it is consider that the other reason might be that major shareholders increasing shareholding might send a positive signal about their expectations of the development of investee companies to the capital market, which further improves the firms' capabilities of securing loans.

Furthermore, it has also been found from the results in the tables that the significance of the positive impact of shareholding concentration on firms' cash inflow tends to strengthen with the elapse of time. This might suggest that the banks' loan-decision-making is increasingly affected by shareholders' expectations on the performance of firms, which is consistent with the view of Shleifer and Vishny (1997) that the increase of shareholding concentration bring an incentive effect that the relatively concentrated equity made the

major shareholders have the motivation and ability to supervise the management of the company, so as to enhance the company's value.

3.6.5 Liquidity and corporate cash flows

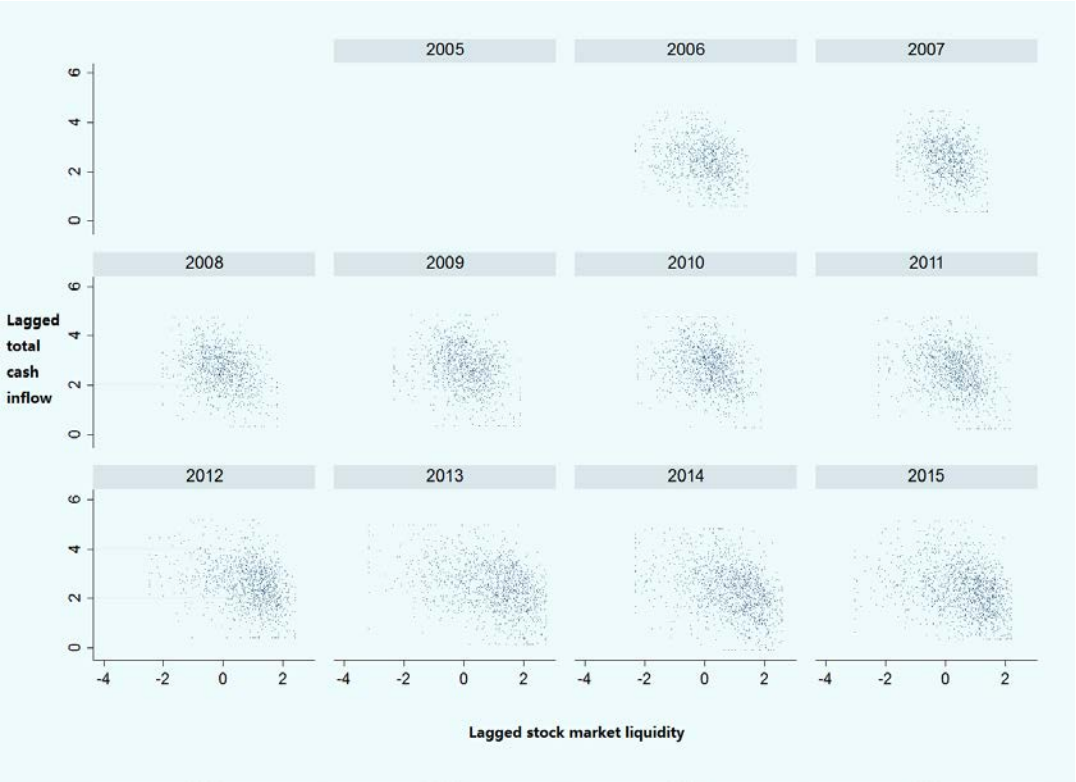
Negative correlation between liquidity of shares and corporate cash flows has been recorded in this study. This finding seems to contradict with the expectations of the conventional capital markets theory, which suggests that high level of liquidity reflects effective flow of capital among firms. It is the effective flow of capital that provides highly performing firms with more capital resources and thus helps them deliver faster growth.

Baker and Stein (2004) suggest that liquidity could be a sentiment indicator. In their model, high liquidity stocks are overvalued which is why they trade at a premium and have lower expected returns in the future, which also bring a explanation for our results. On the other hand, liquidity also pressurises poorly-performing firms and forces them to improve their performance, and large shareholders and managements would ease the agency problem (Jensen and Meckling, 1976) to improve firm value, which hence contributes to the development of real economy. As far as the growth of firms is concerned, whilst the capital market theory places emphases on the positive impact of liquidity on performance of listed firms, the negative impact of liquid however has not been given sufficient attention to. For instance, the excessively frequent changing-hands of shares might cause uncertainty to corporate governance, thus hampering the growth of listed firms. On whether the positive impact of liquidity on the corporate cash flows outweighs the negative impact or vice versa, the results from our empirical research seem to have revealed an answer: the negative impact outweighs the positive impact.

Conventional theory considers that liquidity will positively affect firm performance, because stock shares are the currency which commands both cash flow and control rights, the tradability of this currency plays a central role in the governance, valuation, and performance of firms (Fang, Noe and Tice, 2009). Due to our results contradicting with the conventional theory, we have

repeatedly reviewed our tests taking various methods. For example, we have used scatter plots, a straightforward and reliable statistical tool, to examine the results. From Figure 3-2, we can observe the negative correlation between liquidity of shares and firms' cash flows. This result holds irrespective of whether cash inflows or cash outflows is used and irrespective of whether the overall sample and or the sub-samples are taken.

Figure 3-2 Total Cash Inflow and Stock Liquidity



This negative correlation has prompted us to think of a question: are there any studies that have recorded the significant negative correlations between the two in the existing literature or are there any studies that have provided reasonable explanations to the phenomenon? Currently there is little literature about the correlation between the liquidity of shares and firms' cash flows, let alone the studies recording the negative correlation. The studies we can find are focused upon the impact between equity liquidity and cash flow on the micro economic level. For example, Choi and Cook (2006), using the data collected from Japanese firms, find the negative correlation between cash flows at the corporate level and liquidity of capital at the market level.

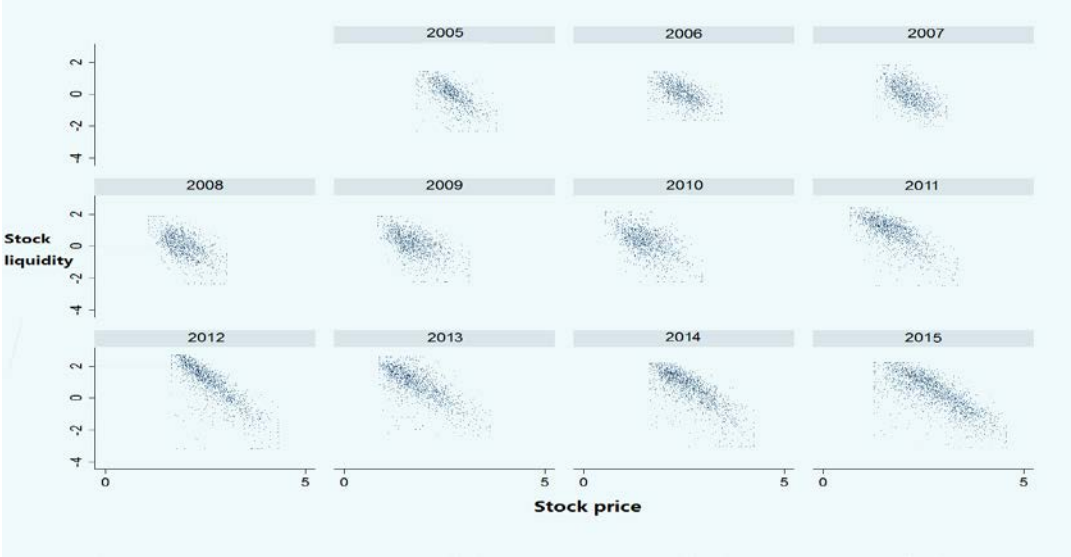
We have attempted to provide explanation to the negative correlation between liquidity of shares and cash flows of listed firm from three different perspectives.

Firstly, the negative impact of liquidity on changes in external corporate cash flows. Our investigations suggest that external cash flows of the firms under our study are mainly from bank loans. Therefore, an inference can be drawn that the impact of shares' liquidity on firms' external cash flows is just the impact on the firms' capabilities of securing bank loans. More specifically, the impact can be interpreted as follows:

a) *Risk expectations.* With the liquidity of a firm's shares excessively high, banks would adjust their expectations on the firm's exposure to risks, because the unexpected increased liquidity to an extent indicates the growing uncertainty over the firm's growth in the future. It is the rising uncertainty that leads banks to adjust their expectations on futures values of the firm. Accordingly the bank would be more cautious to lend funds to the firm, thus further affects the firm's capabilities of obtaining bank loans.

b) *Firm values.* In an attempt to analyse the impact of the liquidity of shares on firm values we have also run the scatter plot using the liquidity and share prices of the listed firms from the panel data. From Figure **3-3**, it can be found that the liquidity of shares is significantly negatively correlated with share prices in China. In other words, lower stock price would have higher stock liquidity. Campbell, Grossman, and Wang (1993) indicate that the risk-averse market makers require payment for accommodating heavy selling by liquidity traders. This cost of providing liquidity is reflected in the temporary decrease in price accompanying heavy sell volume. Lower stock price would decrease a firm's capabilities of securing the equity-backed loans. Consequently less external funds flow into the firms. This knock-on effect is called the effect of firm values.

Figure 3-3 Stock liquidity and stock price



Secondly, the negative influences of liquidity on changes in internal corporate cash flows.

a) *Income effect*. In China it is not unusual that a listed firm has its own subsidiary, a special purpose vehicle (SPV) to manage the firm's investing and financing affairs on behalf of the parent company. The primary purpose of these SPVs, whose major shareholders are the listed firms, is to earn returns on investing in the shares of their parent companies. Since they are the subsidiaries of listed firms, the income earned by these SPVs also flow back into parent firms. Therefore with the values of listed firms on the decline, the SPVs could only earn lower returns. Therefore listed firms' internal cash flows from their investing arms fall as a result of the declining share prices of parent firms.

b) *Rent-seeking.* To better explain the impact of shares' liquidity on firms' cash flows we have distinguished the companies whose share prices are on the increase (share prices at the end of the year are higher than those at the beginning of the year) from those whose share are the on the decline (share prices at the end of the year are lower than those at the beginning of the year) in the period between from 2010 to 2015. For each category of firms, it

distinguishes the companies whose 10 largest shareholders increases their shareholding from those 10 largest shareholders decrease their shareholding. Using panel data, it carries out the investigations into the impact of share's liquidity on cash inflows of four different types of firms.

Table 3-7 shows the results of the rise and fall of stock prices and ownership concentration classification. As shown in Table 4, for the firms whose shareholding concentration is on the decline, liquidity has no significant impact on the firms' cash flows; however, for the firms whose shareholding concentration is on the rise, liquidity has significant negative impact on firms' total cash flows, regardless of for the companies whose share prices are rising or falling. In particular, the negative impact of liquidity on the firms' internal cash flows is strikingly significant for the companies that have recorded an increasing of shareholding concentration.

The above results reveal the rent-seeking behaviour of majority shareholders. The fall in shareholding concentration sends the signal that majority shareholders are pocketing back cash by selling their own shares. If equity is sold to outsiders the internal cash flows would not be undermined by the decrease in shareholding concentration. By contrast, if the increase in shareholding concentration is caused by majority shareholders who purchase their own equity from market to strengthen control over the listed firms by the funds raised internally, then the firms' internal cash flows will be negatively affected. In this case, the firms will suffer loss of internal cash flows. And the takeover action of majority shareholders will promote the increase of liquidity.

From the incentive point of view, when a listed firm's share prices are on the rise, it is likely that the firm will be motivated to increase the holding of its own shares to create returns by using firms' available funds. The rise in share prices not only encourages listed firms to hold and purchase more of their own shares, but also stimulates other investors' speculative activities, thus

increase liquidity of the shares (). As a result, listed firms suffer from loss of cash flows for a short period of time and this explains the negative impact of liquidity on corporate cash flows when a firm's share prices are on the rise.

Furthermore when share prices drop, majority shareholders, in order to stabilise share prices, would inject funds into their own shares on the secondary market in the hope that share prices will stabilise as a result of market confidence being restored through their increased shareholding. In the case where listed firms increase the holding of their own shares using their own funds, the liquidity of shares would increase at the expense of the firms losing cash flows.

To sum up the interpretation on the negative correlation between liquidity and the internal cash flows of the listed firms, our further investigations seem to suggest that the negative correlation occurs when majority shareholders use internal cash flows to increase shareholding in order to strengthen their control over the firm, seek for higher investment returns, or stabilise share prices. All of these can be seen as the rent-seeking activities of majority shareholders at the cost of the firms' internal resources. In other words, liquidity affects share prices and fluctuations of share prices provide the motivations for rent-seeking, e.g. increasing shareholding using the firms' internal funds.

3.6.6 Abnormal returns and corporate cash flows

The fourth measure to gauge the impact of trading activities on the secondary markets on the growth of firms is abnormal returns. To examine whether abnormal returns delivered by listed firms affect the corporate performance, we have attempted to utilise abnormal return in a model absent from stock prices to explain the changes in the firms' financing. Our results show that the coefficient of abnormal return is not significant in the regression, which is consistent with Keith, He and Kao (1992).

Table 3-7: Secondary stock market trading activities and firm cash inflow

Change of ownership structure / Independent Variable: change of stock price	CF_{it}				ECF_{it}				ICF_{it}			
	rise decline (1)	rise rise (2)	decline rise (3)	decline decline (4)	rise decline (1)	rise rise (2)	decline rise (3)	decline decline (4)	rise decline (1)	rise rise (2)	decline rise (3)	decline decline (4)
$Size$	0.367***	0.420***	0.353*	0.226**	0.406***	0.435**	0.310	0.101	0.287***	0.259*	0.349*	0.247***
	(7.89)	(3.63)	(2.17)	(3.06)	(5.90)	(2.91)	(1.17)	(0.95)	(6.38)	(2.47)	(2.44)	(3.33)
SP_{it-1}	0.0591	0.276**	0.130	-0.0333	0.204**	0.360**	0.110	0.0913	0.0440	0.285**	0.148	-0.103
	(1.22)	(2.67)	(0.59)	(-0.45)	(2.81)	(2.72)	(0.31)	(0.85)	(0.93)	(3.04)	(0.81)	(-1.31)
$Debt\ Ratio_{it-1}$	0.241***	0.166	0.395	0.381***	0.421***	0.407*	1.529**	0.709***	0.160**	0.215	-0.207	0.0770
	(3.93)	(1.17)	(1.38)	(4.12)	(4.50)	(2.32)	(3.21)	(5.36)	(2.77)	(1.72)	(-0.84)	(0.81)
I_{it-1}	0.0424	0.0682	-0.256	-0.0179	0.0954	0.153	-0.330	0.132	0.0439	0.0831	-0.165	-0.0166
	(1.21)	(0.78)	(-1.97)	(-0.33)	(1.83)	(1.53)	(-1.59)	(1.71)	(1.37)	(1.11)	(-1.68)	(-0.31)
Q_{it-1}	0.344***	0.139	0.639***	0.334***	0.125*	0.0312	0.281	0.0450	0.311***	0.198**	0.829***	0.417***
	(8.88)	(1.78)	(3.89)	(5.99)	(2.25)	(0.33)	(1.10)	(0.60)	(8.60)	(2.70)	(5.89)	(7.05)
OS_{it-1}	0.00626	0.203	0.798	0.270	0.183	0.138	0.232	0.268	0.0199	0.101	0.591	0.120
	(0.05)	(0.76)	(1.31)	(1.25)	(0.89)	(0.40)	(0.23)	(0.85)	(0.15)	(0.41)	(1.12)	(0.52)
LQ_{it-1}	-0.0901**	-0.128*	0.0858	-0.0267	-0.0452	0.0273	-0.121	-0.0304	-0.0616*	-0.127*	0.182	-0.0537
	(-3.24)	(-2.09)	(0.72)	(-0.65)	(-1.17)	(0.37)	(-0.69)	(-0.54)	(-2.29)	(-2.22)	(1.80)	(-1.23)
Constant	0.334	-0.199	7.327**	2.206	-1.665	-2.772	8.416	-1.600	0.293	-0.411	4.315*	2.215
	(0.47)	(-0.12)	(2.67)	(1.93)	(-1.54)	(-1.33)	(1.87)	(-0.96)	(0.45)	(-0.27)	(2.13)	(1.91)
$R^2\ within$	0.474	0.283	0.460	0.393	0.222	0.127	0.376	0.264	0.473	0.283	0.519	0.316
$R^2\ between$	0.696	0.518	0.001	0.451	0.208	0.215	0.037	0.098	0.685	0.464	0.051	0.341
$R^2\ overall$	0.658	0.522	0.000	0.412	0.224	0.221	0.025	0.125	0.632	0.471	0.065	0.307
Hausman-test:Chi2	320.30	96.07	32.35	229.32	428.18	107.96	78.83	251.34	408.88	152.47	115.82	261.88
Number of samples	1144	865	935	953	1186	905	505	1003	1221	933	530	1013
Observations	2084	1238	553	1371	2210	1314	579	1447	2265	1363	613	1479

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

3.7 Robustness Test

To undertake robustness test, we have utilised the one-year lag of observations and then applied cross-sectional regressions on the data. In econometrics first-order difference is one of the means of identifying dynamic impact during a short period of time. Our study has detected significant impact of trading activities on secondary market on the growth of listed firms. To test robustness of this result, we propose to apply the OLS regressions on the models that are used to examine the impact of trading activities on secondary market on cash flows, investing activities and production on the yearly basis. The data used for regressions are the yearly cross-sectional data that are processed by first-order difference. We then compare the results obtained from these regressions with the finding established earlier on to see if the former are consistent with the latter. If not, it indicates that our studies might suffer from robustness deficiency.

The results from our robustness tests suggest that there is significant association between stock prices and corporate internal cash flows. In the sample containing the 10-year data we run regressions on cross-sectional data for every year and the results from 9 out of 10 years indicate no significant impact. In contrast, our robustness tests have detected the positive impact of stock prices on firms' external cash flows. In particular, the results from the 10-year panel data show that the marginal impact of stock prices on external cash flows exhibits positive parameters across the entire 10-year period, with 2 years showing significance. Similar to this, increasing shareholding concentration has also been found to be positively associated with external cash flows.

Furthermore, liquidity of shares is found to have negative impact on both internal and external cash flows across nearly all the yearly cross-sectional data, with most of the years showing significance.

In summary, the results of robustness tests that involve the yearly cross-sectional data reveal that the impact of stock market on cash flows is consistent with the results obtained using the overall data. This further suggests that empirical results supporting our arguments are robust and reliable.

Table 3-8 Cross-sectional regression of total cash flow via stock price

Cross-sectional regression

Dependent variable：CF_{it}										
Independent variable	2006 (1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)	2015 (10)
SP_{it-1}	0.00547 (0.07)	0.0389 (0.55)	-0.102 (-1.58)	-0.0899 (-1.71)	-0.117** (-2.74)	-0.0429 (-1.09)	0.00853 (0.20)	-0.0564 (-1.06)	0.0441 (1.07)	0.0519 (1.14)
OS_{it-1}	-0.118 (-0.28)	0.775 (1.67)	0.497 (0.65)	0.576 (0.84)	0.515 (0.89)	0.464 (1.94)	0.506*** (3.62)	0.498** (2.93)	0.215 (0.91)	0.819*** (4.33)
LQ_{it-1}	-0.0570 (-1.64)	0.0109 (0.30)	-0.0588 (-1.95)	-0.0445 (-1.70)	-0.0681** (-3.00)	-0.0634** (-2.93)	-0.00966 (-0.37)	-0.0246 (-0.95)	-0.0188 (-0.75)	0.0731** (2.71)
I_{it-1}	0.0237 (1.08)	0.0465* (2.32)	0.0346* (1.97)	0.0491*** (3.42)	0.0260* (2.10)	0.0438*** (3.78)	0.0322* (2.47)	0.0519*** (4.12)	0.0234 (1.94)	0.0352** (2.88)
Q_{it-1}	0.578*** (10.48)	0.615*** (11.62)	0.618*** (10.85)	0.529*** (9.67)	0.693*** (15.64)	0.680*** (13.09)	0.648*** (11.76)	0.664*** (13.35)	0.741*** (17.19)	0.514*** (12.72)
$size_{it-1}$	0.456*** (6.11)	0.476*** (5.97)	0.524*** (6.25)	0.438*** (5.09)	0.641*** (8.82)	0.581*** (7.52)	0.374*** (4.81)	0.153** (2.98)	0.370*** (6.11)	0.604*** (11.20)
$Debt\ Ratio_{it-1}$	0.258** (3.24)	0.185* (2.44)	0.114 (1.43)	0.330*** (4.00)	0.000805 (0.01)	0.0861 (0.96)	0.527*** (5.96)	0.562*** (7.23)	0.398*** (5.12)	0.329*** (4.05)
Constant	-0.145 (-0.26)	-0.686 (-1.39)	-0.151 (-0.36)	-0.522 (-1.70)	-0.270 (-1.02)	-0.835*** (-3.39)	-0.486 (-1.71)	-0.759* (-2.46)	-0.689* (-2.50)	-0.887** (-2.90)z
R^2	0.649	0.662	0.690	0.711	0.760	0.778	0.717	0.699	0.722	0.696
Observations	616	704	800	854	908	969	989	1049	1101	1163

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-9 Cross-sectional regression of total cash flow via abnormal return

Cross-sectional regression

Dependent variable：CF_{it}										
Independent variable	2006 (1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)	2015 (10)
OS_{it-1}	-0.0609 (-0.14)	0.497 (1.06)	0.611 (0.78)	0.567 (0.81)	0.221 (0.37)	0.510* (2.19)	0.511*** (3.66)	0.537** (3.19)	0.107 (0.46)	0.682*** (3.60)
LQ_{it-1}	-0.0555* (-2.06)	-0.00193 (-0.07)	-0.0231 (-1.00)	-0.0244 (-1.08)	-0.0428* (-2.16)	-0.0459* (-2.39)	-0.00161 (-0.07)	-0.00479 (-0.29)	-0.0297 (-1.54)	0.0392* (2.00)
I_{it-1}	0.0209 (1.07)	0.0401* (2.36)	0.0530*** (3.36)	0.0554*** (3.49)	0.0338** (2.76)	0.0469*** (4.14)	0.0350** (2.73)	0.0523*** (4.19)	0.0227 (1.94)	0.0386*** (3.42)
Q_{it-1}	0.576*** (10.49)	0.589*** (11.14)	0.595*** (10.19)	0.519*** (9.20)	0.699*** (14.70)	0.672*** (12.77)	0.628*** (11.15)	0.655*** (12.91)	0.701*** (15.53)	0.512*** (12.89)
$size_{it-1}$	0.455*** (6.19)	0.476*** (5.97)	0.480*** (5.69)	0.385*** (4.42)	0.599*** (8.33)	0.564*** (7.33)	0.366*** (4.84)	0.139** (2.70)	0.355*** (5.87)	0.556*** (9.11)
$Debt\ Ratio_{it-1}$	0.261** (3.25)	0.208** (2.69)	0.135 (1.70)	0.358*** (4.30)	-0.0143 (-0.18)	0.0997 (1.10)	0.546*** (6.13)	0.571*** (7.33)	0.425*** (5.46)	0.415*** (5.10)
AB_{it-1}	-0.0243 (-0.31)	0.330*** (3.40)	-0.0858 (-0.66)	0.00621 (0.08)	-0.0588 (-0.74)	0.102 (1.03)	0.0874 (1.62)	0.00705 (0.28)	0.339** (3.05)	0.0847*** (3.44)
Constant	-0.0820 (-0.22)	-0.508 (-1.53)	-0.773* (-2.50)	-0.790* (-2.50)	-0.587* (-2.42)	-0.951*** (-4.23)	-0.473 (-1.91)	-0.923*** (-3.73)	-0.640** (-2.69)	-0.837*** (-3.70)
R^2	0.648	0.667	0.705	0.710	0.758	0.779	0.718	0.702	0.724	0.715
Observations	614	700	768	847	903	964	989	1045	1101	1131

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-10 Cross-sectional regression of total external cash flow via stock price

Cross-sectional regression

Dependent variable：ECF_{it}										
Independent variable	2006 (1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)	2015 (10)
SP_{it-1}	0.113 (0.95)	0.129 (1.18)	0.0211 (0.22)	-0.0109 (-0.15)	-0.111 (-1.72)	0.00631 (0.10)	0.137* (2.14)	-0.0178 (-0.24)	0.118* (2.03)	0.0775 (1.13)
OS_{it-1}	-0.778 (-1.25)	0.468 (0.66)	1.953 (1.75)	-0.852 (-0.90)	-0.857 (-0.95)	0.408 (1.07)	0.519* (2.50)	0.749** (3.16)	0.162 (0.49)	0.784** (2.74)
LQ_{it-1}	-0.0771 (-1.49)	-0.0401 (-0.72)	-0.0340 (-0.77)	-0.130*** (-3.61)	-0.0965** (-2.74)	-0.0349 (-0.99)	0.0539 (1.40)	-0.00508 (-0.14)	0.0806* (2.27)	0.130** (3.19)
I_{it-1}	0.0181 (0.56)	0.0973** (3.23)	0.0559* (2.21)	0.0948*** (4.89)	0.0899*** (4.82)	0.117*** (6.36)	0.0871*** (4.56)	0.104*** (6.03)	0.0887*** (5.32)	0.0531** (2.92)
Q_{it-1}	0.236** (2.93)	0.330*** (4.09)	0.160 (1.95)	0.119 (1.59)	0.400*** (5.89)	0.321*** (3.82)	0.380*** (4.75)	0.380*** (5.54)	0.462*** (7.58)	0.324*** (5.37)
$size_{it-1}$	0.590*** (12.69)	0.600*** (13.03)	0.701*** (16.72)	0.770*** (21.08)	0.905*** (23.80)	0.892*** (22.59)	0.867*** (21.56)	0.910*** (24.77)	0.982*** (26.92)	1.117*** (28.61)
$Debt\ Ratio_{it-1}$	0.113 (0.95)	0.129 (1.18)	0.0211 (0.22)	-0.0109 (-0.15)	-0.111 (-1.72)	0.00631 (0.10)	0.137* (2.14)	-0.0178 (-0.24)	0.118* (2.03)	0.0775 (1.13)
Constant	-0.204 (-0.25)	-1.807* (-2.39)	-0.746 (-1.21)	-1.482*** (-3.53)	-1.638*** (-4.06)	-2.447*** (-6.14)	-1.876*** (-4.44)	-2.025*** (-4.68)	-2.242*** (-5.83)	-1.743*** (-3.75)
R^2	0.278	0.286	0.332	0.422	0.458	0.455	0.437	0.468	0.491	0.502
Observations	679	760	850	906	961	1034	1049	1107	1166	1222

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-11 Cross-sectional regression of total external cash flow via abnormal return

Cross-sectional regression

Dependent variable：ECF_{it}										
Independent variable	2006 (1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)	2015 (10)
OS_{it-1}	-0.733 (-1.17)	0.353 (0.49)	1.670 (1.43)	-0.397 (-0.41)	-0.926 (-1.00)	0.385 (1.03)	0.503* (2.42)	0.724** (3.10)	0.0294 (0.09)	0.694* (2.38)
LQ_{it-1}	-0.107** (-2.74)	-0.0761 (-1.70)	-0.0442 (-1.31)	-0.124*** (-4.12)	-0.0777** (-2.59)	-0.0313 (-1.03)	-0.00616 (-0.19)	-0.00277 (-0.13)	0.0362 (1.39)	0.0835** (2.98)
I_{it-1}	-0.000254 (-0.01)	0.0787** (3.04)	0.0533* (2.31)	0.105*** (4.92)	0.0957*** (5.19)	0.118*** (6.57)	0.0750*** (3.97)	0.102*** (5.91)	0.0825*** (5.08)	0.0586*** (3.38)
Q_{it-1}	0.224** (2.79)	0.337*** (4.15)	0.165 (1.90)	0.146 (1.90)	0.435*** (5.97)	0.311*** (3.64)	0.391*** (4.75)	0.369*** (5.27)	0.442*** (6.89)	0.330*** (5.45)
$size_{it-1}$	0.594*** (12.87)	0.614*** (13.44)	0.691*** (16.02)	0.762*** (20.90)	0.899*** (23.84)	0.897*** (23.04)	0.879*** (22.03)	0.919*** (25.14)	0.999*** (27.34)	1.131*** (29.34)
$Debt\ Ratio_{it-1}$	-0.0546 (-0.48)	0.0946 (0.63)	0.0369 (0.19)	-0.164 (-1.44)	-0.173 (-1.42)	0.131 (0.82)	-0.0683 (-0.84)	0.0265 (0.78)	0.286 (1.81)	0.0890* (2.33)
AB_{it-1}	-0.733 (-1.17)	0.353 (0.49)	1.670 (1.43)	-0.397 (-0.41)	-0.926 (-1.00)	0.385 (1.03)	0.503* (2.42)	0.724** (3.10)	0.0294 (0.09)	0.694* (2.38)
Constant	-0.107** (-2.74)	-0.0761 (-1.70)	-0.0442 (-1.31)	-0.124*** (-4.12)	-0.0777** (-2.59)	-0.0313 (-1.03)	-0.00616 (-0.19)	-0.00277 (-0.13)	0.0362 (1.39)	0.0835** (2.98)
R^2	0.274	0.284	0.325	0.425	0.460	0.455	0.435	0.474	0.491	0.510
Observations	677	756	817	897	956	1028	1049	1102	1166	1187

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-12 Cross-sectional regression of total internal cash flow via stock price

Cross-sectional regression

Dependent variable：ICF_{it}										
Independent variable	2006 (1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)	2015 (10)
SP_{it-1}	-0.0377 (-0.47)	0.131 (1.92)	-0.0556 (-0.88)	-0.0295 (-0.59)	-0.110* (-2.41)	-0.0184 (-0.48)	-0.00392 (-0.08)	-0.0793 (-1.45)	0.0314 (0.83)	0.0426 (0.98)
OS_{it-1}	-0.790 (-1.53)	0.766 (1.43)	0.177 (0.20)	1.669* (2.15)	0.425 (0.59)	0.0831 (0.30)	0.540** (3.13)	0.586** (2.93)	0.263 (1.03)	0.705*** (3.45)
LQ_{it-1}	-0.0582 (-1.36)	0.0489 (1.18)	-0.0276 (-0.81)	0.0316 (1.07)	-0.0763** (-2.65)	-0.0614* (-2.47)	-0.00890 (-0.27)	-0.0515 (-1.74)	-0.0115 (-0.42)	0.0855** (2.96)
I_{it-1}	0.00556 (0.20)	0.0287 (1.23)	-0.000882 (-0.04)	0.0165 (1.02)	0.000457 (0.03)	0.00383 (0.29)	0.0224 (1.44)	0.0284 (1.96)	0.0104 (0.81)	0.0255* (1.97)
Q_{it-1}	0.871*** (12.69)	0.978*** (15.98)	0.970*** (14.77)	0.885*** (14.54)	0.975*** (17.64)	1.025*** (17.56)	0.935*** (13.91)	0.991*** (17.00)	0.905*** (19.73)	0.656*** (15.15)
$size_{it-1}$	0.847*** (31.47)	0.928*** (38.64)	0.954*** (42.94)	0.992*** (48.58)	0.969*** (50.17)	0.978*** (56.65)	0.969*** (45.68)	0.958*** (45.13)	0.988*** (53.59)	0.924*** (47.67)
$Debt\ Ratio_{it-1}$	-0.0377 (-0.47)	0.131 (1.92)	-0.0556 (-0.88)	-0.0295 (-0.59)	-0.110* (-2.41)	-0.0184 (-0.48)	-0.00392 (-0.08)	-0.0793 (-1.45)	0.0314 (0.83)	0.0426 (0.98)
Constant	0.279 (0.43)	-0.675 (-1.23)	0.260 (0.55)	-0.159 (-0.47)	0.221 (0.69)	-0.0959 (-0.35)	-0.312 (-0.92)	-0.316 (-0.92)	-0.459 (-1.60)	-0.599 (-1.87)
R^2	0.677	0.737	0.758	0.779	0.783	0.818	0.745	0.728	0.776	0.736
Observations	667	756	859	928	977	1069	1076	1137	1196	1273

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-13 Cross-sectional regression of total internal cash flow via abnormal return

Cross-sectional regression

Dependent variable：ICF_{it}										
Independent variable	2006 (1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)	2015 (10)
OS_{it-1}	-0.703 (-1.35)	0.498 (0.92)	0.244 (0.27)	1.414 (1.79)	0.0177 (0.02)	0.120 (0.45)	0.548** (3.19)	0.641** (3.23)	0.176 (0.69)	0.514* (2.51)
LQ_{it-1}	-0.0467 (-1.39)	-0.00129 (-0.04)	-0.00409 (-0.15)	0.0359 (1.42)	-0.0370 (-1.49)	-0.0552* (-2.52)	0.00343 (0.13)	-0.0204 (-1.08)	-0.0223 (-1.07)	0.0459* (2.18)
I_{it-1}	0.00882 (0.36)	0.00486 (0.24)	0.0111 (0.61)	0.0121 (0.68)	0.00733 (0.49)	0.00427 (0.33)	0.0258 (1.68)	0.0317* (2.20)	0.00943 (0.76)	0.0259* (2.15)
Q_{it-1}	0.871*** (12.67)	0.970*** (15.78)	0.956*** (14.33)	0.861*** (13.76)	0.956*** (16.15)	1.027*** (17.23)	0.917*** (13.36)	0.992*** (16.57)	0.880*** (18.18)	0.657*** (15.36)
$size_{it-1}$	0.843*** (31.73)	0.937*** (39.65)	0.974*** (44.39)	0.989*** (49.37)	0.959*** (50.71)	0.976*** (58.48)	0.968*** (47.00)	0.949*** (45.42)	0.994*** (54.86)	0.932*** (50.30)
$Debt\ Ratio_{it-1}$	-0.0707 (-0.73)	0.285* (2.53)	-0.191 (-1.28)	0.107 (1.16)	0.0447 (0.46)	-0.0148 (-0.13)	0.0849 (1.29)	-0.0151 (-0.52)	0.216 (1.79)	0.0927*** (3.48)
AB_{it-1}	-0.703 (-1.35)	0.498 (0.92)	0.244 (0.27)	1.414 (1.79)	0.0177 (0.02)	0.120 (0.45)	0.548** (3.19)	0.641** (3.23)	0.176 (0.69)	0.514* (2.51)
Constant	-0.0467 (-1.39)	-0.00129 (-0.04)	-0.00409 (-0.15)	0.0359 (1.42)	-0.0370 (-1.49)	-0.0552* (-2.52)	0.00343 (0.13)	-0.0204 (-1.08)	-0.0223 (-1.07)	0.0459* (2.18)
R^2	0.676	0.738	0.777	0.777	0.782	0.818	0.745	0.727	0.776	0.751
Observations	664	752	824	919	972	1063	1076	1133	1196	1236

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-14 Cross-sectional regression （difference）of total cash flow via stock price

Cross-sectional regression（difference）

Dependent variable：CF_{it}									
Independent variable	2007 (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)
SP_{it-1}	0.0336 (0.59)	-0.134 (-1.91)	-0.0237 (-0.48)	-0.114* (-2.44)	0.00669 (0.09)	0.0199 (0.35)	0.0452 (0.80)	0.0403 (0.87)	0.0481 (0.89)
OS_{it-1}	0.426 (1.73)	0.242 (0.80)	0.152 (0.37)	0.278 (0.78)	-0.419* (-2.10)	0.263* (2.46)	0.210* (2.22)	0.0588 (0.44)	0.159 (1.10)
LQ_{it-1}	-0.0113 (-0.34)	-0.0109 (-0.41)	-0.0415 (-1.54)	-0.0257 (-1.02)	-0.0144 (-0.57)	0.0267 (1.04)	-0.0132 (-0.49)	-0.00806 (-0.30)	-0.0206 (-0.52)
I_{it-1}	0.0232 (0.52)	0.0441 (0.97)	0.0836* (2.14)	0.0426 (1.02)	0.0491 (1.16)	0.0226 (0.52)	0.0363 (1.28)	-0.0233 (-0.52)	-0.114* (-2.43)
Q_{it-1}	0.0328 (0.98)	0.0167 (0.54)	0.0229 (0.69)	0.102*** (3.51)	0.0140 (0.45)	0.0422 (1.08)	0.00686 (0.19)	-0.0383 (-1.16)	-0.108*** (-4.08)
$size_{it-1}$	0.0470 (0.63)	0.102 (1.43)	-0.116 (-1.55)	0.242*** (3.63)	0.234** (3.01)	0.0706 (1.03)	-0.287*** (-6.02)	-0.0387 (-0.71)	-0.0863 (-1.33)
$Debt\ Ratio_{it-1}$	0.154* (2.28)	0.157* (2.37)	0.152* (2.05)	-0.122 (-1.69)	-0.0650 (-0.77)	0.265** (3.28)	0.512*** (6.91)	0.310*** (3.92)	0.489*** (5.99)
Constant	0.00255 (0.12)	0.0413 (1.62)	0.0645*** (3.63)	-0.0710*** (-4.13)	-0.160*** (-9.71)	-0.00873 (-0.35)	-0.135* (-2.53)	-0.173*** (-4.04)	-0.0398 (-0.90)
R^2	0.030	0.031	0.017	0.044	0.032	0.032	0.081	0.017	0.053
Observations	613	714	813	845	895	980	992	1012	1076

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-15 Cross-sectional regression （difference）of total cash flow via abnormal return

Cross-sectional regression（difference）

Dependent variable：CF_{it}									
Independent variable	2007 (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)
OS_{it-1}	0.424 (1.72)	0.283 (0.92)	0.204 (0.49)	0.249 (0.70)	-0.414* (-2.07)	0.262* (2.43)	0.209* (2.21)	0.0418 (0.32)	0.167 (1.15)
LQ_{it-1}	-0.0146 (-0.46)	0.0117 (0.48)	-0.0388 (-1.48)	-0.00953 (-0.40)	-0.0155 (-0.66)	0.0211 (0.83)	-0.0235 (-0.92)	-0.0382 (-1.60)	-0.0300 (-0.81)
I_{it-1}	0.0252 (0.57)	0.0509 (1.13)	0.0806* (2.02)	0.0419 (1.01)	0.0471 (1.11)	0.0213 (0.49)	0.0342 (1.21)	-0.0267 (-0.59)	-0.115* (-2.47)
Q_{it-1}	0.0328 (0.98)	0.0125 (0.40)	0.0302 (0.88)	0.0995*** (3.34)	0.0140 (0.43)	0.0421 (1.07)	0.00733 (0.20)	-0.0150 (-0.45)	-0.107*** (-4.01)
$size_{it-1}$	0.0455 (0.61)	0.0920 (1.30)	-0.129 (-1.73)	0.223*** (3.33)	0.238** (3.06)	0.0738 (1.08)	-0.282*** (-5.95)	-0.0348 (-0.65)	-0.0830 (-1.28)
$Debt\ Ratio_{it-1}$	0.151* (2.24)	0.179** (2.71)	0.165* (2.22)	-0.115 (-1.59)	-0.0765 (-0.91)	0.262** (3.24)	0.508*** (6.87)	0.300*** (3.82)	0.490*** (6.01)
AB_{it-1}	0.00568 (0.11)	-0.0745 (-1.21)	-0.0517 (-0.92)	-0.0748 (-1.85)	-0.00952 (-0.18)	-0.0123 (-0.24)	-0.000203 (-0.01)	-0.0620** (-2.69)	0.0149 (0.62)
Constant	-0.00850 (-0.36)	0.0727*** (4.54)	0.0704*** (4.89)	-0.0341* (-2.58)	-0.160*** (-12.95)	-0.0119 (-0.31)	-0.0948*** (-4.25)	-0.185*** (-10.31)	-0.00401 (-0.23)
R^2	0.030	0.029	0.019	0.041	0.031	0.032	0.080	0.023	0.053
Observations	611	710	780	836	891	975	992	1009	1075

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-16 Cross-sectional regression （difference）of total external cash flow via stock price

Cross-sectional regression（difference）

Dependent variable：ECF_{it}									
Independent variable	2007 (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)
SP_{it-1}	0.0374 (0.39)	-0.0109 (-0.09)	0.116 (1.48)	-0.0832 (-1.07)	0.110 (1.03)	0.0276 (0.33)	0.200* (2.51)	0.162** (2.63)	0.0884 (1.08)
OS_{it-1}	1.249** (3.04)	0.303 (0.58)	0.0492 (0.08)	0.215 (0.36)	-0.604* (-2.03)	0.518*** (3.31)	0.309* (2.31)	-0.0437 (-0.25)	-0.103 (-0.47)
LQ_{it-1}	0.0311 (0.57)	-0.0204 (-0.45)	-0.0123 (-0.29)	0.00908 (0.22)	-0.0567 (-1.48)	0.0676 (1.79)	-0.0205 (-0.55)	0.0744* (2.06)	0.0402 (0.68)
I_{it-1}	0.0187 (0.25)	0.0760 (1.00)	0.200** (3.20)	0.0784 (1.12)	0.106 (1.63)	0.106 (1.69)	0.0737 (1.86)	0.104 (1.72)	-0.0735 (-1.04)
Q_{it-1}	0.155** (2.79)	0.0570 (1.07)	0.0109 (0.21)	0.153** (3.15)	-0.0418 (-0.88)	0.0139 (0.25)	-0.0236 (-0.46)	-0.0295 (-0.67)	-0.0502 (-1.26)
$size_{it-1}$	-0.266* (-2.12)	-0.292* (-2.41)	-0.212 (-1.79)	0.325** (2.97)	0.450*** (3.93)	-0.0697 (-0.70)	-0.469*** (-7.12)	-0.163* (-2.30)	0.0436 (0.44)
$Debt\ Ratio_{it-1}$	0.157 (1.39)	0.119 (1.10)	-0.0258 (-0.22)	-0.254* (-2.18)	-0.316* (-2.48)	0.423*** (3.58)	0.758*** (7.33)	0.391*** (3.68)	0.609*** (5.06)
Constant	0.0262 (0.76)	0.120** (2.76)	0.0713* (2.55)	-0.190*** (-6.61)	-0.136*** (-5.44)	-0.00769 (-0.21)	-0.189* (-2.53)	-0.00273 (-0.05)	-0.154* (-2.30)
R^2	0.053	0.012	0.016	0.029	0.048	0.033	0.089	0.025	0.028
Observations	651	752	846	889	945	1035	1035	1060	1122

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-17 Cross-sectional regression （difference）of total external cash flow via abnormal return

Cross-sectional regression（difference）

Dependent variable：ECF_{it}									
Independent variable	2007 (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)
OS_{it-1}	1.270** (3.08)	0.313 (0.59)	0.124 (0.19)	0.242 (0.40)	-0.627* (-2.09)	0.497** (3.15)	0.300* (2.23)	-0.108 (-0.61)	-0.105 (-0.48)
LQ_{it-1}	0.0198 (0.37)	-0.0191 (-0.46)	-0.0129 (-0.31)	0.0191 (0.48)	-0.0677 (-1.89)	0.0434 (1.17)	-0.0568 (-1.61)	0.0151 (0.47)	0.0385 (0.68)
I_{it-1}	0.0188 (0.25)	0.0802 (1.05)	0.212*** (3.35)	0.0830 (1.18)	0.107 (1.65)	0.102 (1.63)	0.0654 (1.65)	0.0991 (1.63)	-0.0712 (-1.01)
Q_{it-1}	0.151** (2.73)	0.0516 (0.96)	-0.00262 (-0.05)	0.161** (3.21)	-0.0467 (-0.95)	0.0193 (0.34)	-0.0254 (-0.49)	0.00147 (0.03)	-0.0536 (-1.34)
$size_{it-1}$	-0.267* (-2.13)	-0.299* (-2.46)	-0.232* (-1.99)	0.284* (2.57)	0.465*** (4.06)	-0.0573 (-0.57)	-0.447*** (-6.83)	-0.141* (-2.00)	0.0521 (0.53)
$Debt\ Ratio_{it-1}$	0.159 (1.41)	0.126 (1.17)	-0.0194 (-0.17)	-0.245* (-2.09)	-0.333** (-2.62)	0.412*** (3.48)	0.749*** (7.22)	0.356*** (3.35)	0.607*** (5.06)
AB_{it-1}	-0.0541 (-0.65)	0.0314 (0.30)	0.144 (1.63)	-0.0761 (-1.12)	0.0678 (0.86)	-0.0857 (-1.12)	0.0211 (0.65)	-0.0295 (-0.95)	0.0533 (1.46)
Constant	0.0376 (0.95)	0.127*** (4.63)	0.0571* (2.53)	-0.162*** (-7.24)	-0.156*** (-8.21)	-0.0546 (-0.96)	-0.0242 (-0.77)	-0.132*** (-5.47)	-0.0874*** (-3.38)
R^2	0.054	0.013	0.019	0.028	0.048	0.034	0.084	0.019	0.029
Observations	649	748	811	879	941	1029	1035	1056	1121

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 3-18 Cross-sectional regression （difference）of total internal cash flow via stock price

Cross-sectional regression（difference）

Dependent variable：ICF_{it}									
Independent variable	2007 (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)
SP_{it-1}	0.142* (2.33)	-0.104 (-1.47)	-0.0208 (-0.38)	-0.0830 (-1.58)	0.00569 (0.08)	0.000645 (0.01)	-0.102 (-1.70)	0.0748 (1.58)	0.150** (2.77)
OS_{it-1}	-0.00958 (-0.03)	-0.0254 (-0.07)	0.655 (1.25)	0.0769 (0.17)	-0.348 (-1.45)	0.167 (1.30)	0.298** (2.63)	0.370* (2.37)	0.270 (1.62)
LQ_{it-1}	0.0388 (0.94)	0.0212 (0.69)	0.0107 (0.31)	-0.0640 (-1.94)	-0.00177 (-0.06)	0.00992 (0.31)	-0.0317 (-1.01)	0.0343 (1.12)	0.0457 (1.04)
I_{it-1}	0.0349 (0.62)	-0.0625 (-1.18)	-0.0784 (-1.56)	0.0274 (0.53)	0.0107 (0.21)	-0.0823 (-1.58)	0.0827* (2.46)	-0.0437 (-0.83)	-0.105* (-1.97)
Q_{it-1}	0.0202 (0.49)	0.0296 (0.83)	0.0417 (1.01)	0.111** (2.96)	0.00708 (0.19)	0.113* (2.44)	0.0141 (0.33)	-0.0522 (-1.37)	-0.164*** (-5.42)
$size_{it-1}$	0.217* (2.33)	0.353*** (4.26)	0.0246 (0.26)	0.509*** (6.05)	0.292*** (3.46)	0.265** (3.20)	-0.363*** (-6.59)	-0.0211 (-0.33)	-0.0840 (-1.26)
$Debt\ Ratio_{it-1}$	0.0260 (0.31)	0.254*** (3.32)	0.375*** (3.99)	-0.149 (-1.65)	0.103 (1.10)	0.0873 (0.91)	0.175* (2.03)	0.204* (2.22)	0.361*** (3.93)
Constant	0.0306 (1.25)	0.0216 (0.79)	0.0582** (2.75)	-0.0561** (-2.69)	-0.175*** (-9.53)	-0.0134 (-0.47)	-0.0367 (-0.65)	-0.175*** (-3.92)	-0.0940* (-2.12)
R^2	0.026	0.064	0.034	0.072	0.033	0.026	0.062	0.011	0.050
Observations	660	772	871	918	972	1064	1064	1093	1170

***, **, * denotes significance at the 1%, 5% and 10% level, respectively..

Table 3-19: Cross-sectional regression （difference）of total internal cash flow via abnormal return

Cross-sectional regression（difference）

Dependent variable：ICF_{it}									
Independent variable	2007 (1)	2008 (2)	2009 (3)	2010 (4)	2011 (5)	2012 (6)	2013 (7)	2014 (8)	2015 (9)
OS_{it-1}	-0.0877 (-0.28)	0.0755 (0.21)	0.825 (1.53)	0.0991 (0.22)	-0.363 (-1.50)	0.167 (1.29)	0.307** (2.71)	0.338* (2.17)	0.281 (1.67)
LQ_{it-1}	0.0186 (0.46)	0.0449 (1.56)	0.0126 (0.38)	-0.0529 (-1.73)	0.000183 (0.01)	0.00635 (0.21)	-0.0272 (-0.91)	-0.0100 (-0.36)	0.0106 (0.25)
I_{it-1}	0.0367 (0.65)	-0.0629 (-1.19)	-0.0943 (-1.82)	0.0249 (0.49)	0.0101 (0.20)	-0.0865 (-1.66)	0.0854* (2.55)	-0.0458 (-0.87)	-0.115* (-2.16)
Q_{it-1}	0.0220 (0.53)	0.0263 (0.73)	0.0538 (1.25)	0.105** (2.78)	-0.00216 (-0.06)	0.119* (2.57)	0.0208 (0.48)	-0.0204 (-0.53)	-0.160*** (-5.23)
$size_{it-1}$	0.219* (2.35)	0.350*** (4.25)	0.0284 (0.30)	0.490*** (5.81)	0.296*** (3.54)	0.272*** (3.31)	-0.372*** (-6.84)	-0.0113 (-0.18)	-0.0864 (-1.29)
$Debt\ Ratio_{it-1}$	0.0158 (0.19)	0.271*** (3.56)	0.369*** (3.89)	-0.141 (-1.57)	0.0897 (0.96)	0.0835 (0.87)	0.173* (2.01)	0.186* (2.04)	0.376*** (4.10)
AB_{it-1}	0.101 (1.62)	-0.111 (-1.55)	-0.0904 (-1.26)	-0.0751 (-1.46)	0.0409 (0.66)	-0.0328 (-0.53)	-0.0493 (-1.82)	-0.0687* (-2.54)	0.0363 (1.32)
Constant	-0.0473 (-0.36)	0.0403* (4.54)	0.0628*** (4.89)	-0.0265 (-2.58)	-0.179*** (-12.95)	-0.0347 (-0.31)	-0.0981*** (-4.25)	-0.213*** (-10.31)	0.0180 (-0.23)
R^2	0.022	0.065	0.037	0.072	0.033	0.027	0.062	0.015	0.045
Observations	656	768	837	908	967	1058	1064	1088	1169

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

3.8 Conclusion

In this chapter, the relationship of stock market activities to firm financing capacity in China is investigated. Our results clearly show that stock market activities contribute to firm growth via financing.

The results indicate that the activities of the primary market did improved firms' financial constraints, in other words, firms' financing environment is enhanced by the action of listing. Similarly, the trading activities on the secondary market show that the stock price is positively and significantly related to firm external cash flow, while insignificance for internal cash flow. This is because the increase of the stock price would enhance a firm's lending capacity and loans are one of the most important sources of firm external financing. According to the mainstream current literature, the increasing of the controlling shareholder ownership concentration brings an incentive effect that can promote firm value (Shleifer and Vishny, 1986; McConnell and Servaes, 1990; Earle and Estrin, 1996; Claessens, 1997; Xu and Wang, 1997; Gedajlovic and Shapiro, 2002; Joh, 2003). Our results evidenced this promotion and further contributed to classify the achievement channel of microscopic transmission mechanism for performance improvement: it is acting on a firm's financing capacity through equity. Numerous studies have attempted to study stock market liquidity to capital flow at macroeconomic level (e.g Choi and Cook, 2006), while a limited number of scholars focus on the relationship between stock liquidity and corporate level cash flow. Our study extends the literature and provides interpretations for the negative and significant relationship of stock market liquidity to firm cash flow.

To a certain degree, it argues that the enhancement of cash flow from stock market will further affect firm investment. This microscopic transmission mechanism will be discussed and empirically certify it in the next chapter.

Chapter 4 : The impact of stock market activities on firm investment

4.1Introduction

The previous chapter demonstrated that stock market activities of the primary market eased firms' financial constraints and its financing environment, which relieved the issue of asymmetric information and lowered the cost of external financing and this provided useful information for the investors on the secondary market. Trading activities of the secondary market significantly enhances firms financing capacity and eventually affects firms' cash flow. The results provided evidence of our assumption that the stock markets, as an external factor, provide a “money supply effect” on firm development.

In this chapter, the impact of stock markets on economic growth will be analysed from a perspective view of firm investment. It will be argued that the enhancement of cash flow from the stock market will further affect firms investment. This microscopic transmission mechanism will be discused and empirically certified in the following sections.

To date, relatively few studies have indicated the impact of stock markets on firm investment; however, a considerable amount of literature has investigated virtually the opposite relationship that is the impact of firms' investment on the stock price. The way that firms allocate capital across investment projects is a fundamental question in corporate finance. Other than the investment-internal resources relation, the investment-external resources relationship is also one of the most important topics in this literature. At the time of writing, a number of studies, ranging from cross-country to country-specific to industry level, to firm level, have undertaken a great deal of empirical research on the stock market and investment. These studies strengthened research interest in

assessing the significance of the stock market on economic growth, it has been recognised that it can promote the development of the stock market by easing financing constraints, reducing transaction costs, improving corporate governance structure, capital investment and growth.

It is worth noting that the stock market as an exogenous factor can affect a firm's investing activities in two different ways. Firstly, the stock market might provide capital to satisfy a firm's investment needs. A company gains capital through its financing activities on the primary market. Increased cash flowing into the company as a result of a successful IPO is bound to stimulate the firm's investing activities in the post-IPO period. However, currently, there are limited empirical studies investigating how significant the impact is and how long the impact lasts. In particular, the existing literature has barely touched on the 'investment multiples' delivered by the extra funds raised through the firm's IPOs. This study is to take one step forward by hopefully filling this gap. Secondly, the stock market may also stimulate a company's demands for further investments due to its motivation effect. It is clear that the stock market not only enables a firm to access external finances and ease firms' financial constraints, but also the improvement brings more cash flow to enable investment. In addition, it also provides incentives for the effective use of increased capital, because the effective use of capital can increase the market value of the firm, and thus create higher returns for investors.

In China, research in the area of stock market development and firm-level investment has not been as extensive as in the west. This is partly because of the government effectively managed the investment spending until recently and a general lack of Chinese firm-level data (Feng Xiao, 2009). Other researchers, such as Allen at al., 2005, debate whether the feature of many Chinese listed firms, state, city, or regional government as one of the primary controlling shareholders, would be a reason for the poor efficiency of the firms. Therefore, we consider that the research on stock market activities and firm

investment would provide more implications for China’s current economic growth, especially after Chinese stock market reform in 2005.

The results are in agreement with our assumptions and show a significant effect of stock market activities on firms' investment. The results of the primary market indicate that firms obtain financial support from the capital market via primary market financing, and this support will stimulate the investment of after IPO to a certain degree. These multiple effects of IPO on average lasts approximately 4 years, after which the firm’s investment gradually goes back to its pre-IPO level. The results of the secondary market indicate that the changes in firm stock price, ownership structure and stock liquidity from trading investing activities would lead to a significant influence of firm investment. Contrasted to liquidity, stock price and ownership structure show positively significance to investment.

Given this background of relatively limited evidence, this chapter takes a step back, identifies the difficulties to overcome in ascertaining whether the stock market affects firm investment, and then applies a modified methodology of Morck et al. (1990) that can tackle these difficulties. The rest of the chapter is organised as follows. In section 2, the related literature is reviewed, and the research question is stated. In section 3, the data is described, as are the methodology and variables that we used. In section 4, we run a number of panel regressions and report the main empirical results and analysis. Section 5 is the conclusion part of this chapter.

4.2 Related Literature

From the standpoint of neoclassical investment theories, the ability to raise equity capital provides the firm with financing flexibility and enables it to exploit any emerging profitable investment opportunities that will lead to future cash flow growth and increased shareholder wealth.

4.2.1Primary market

Economists tend to focus exclusively on secondary market indicators such as market liquidity, market capitalisation, and composite index returns as measures of stock market development. This is unfortunate as Zuravicky (2005) indicates that the stock market is considered the most effective channel for company's capital gain. Levine (2005) further classified that the primary market contributes to capital mobilisation and allocation, while the secondary market has other functions. IPO is the first step that a public firm needs to acquire funds from the investments of initial investors. A company receives capital through its financing activities on the primary market. Increased cash flowing into the firm as a result of a successful IPO will simulate the firm's investing activities in the post-IPO period. The stock market provides external capital for firms and increases the available funds for future investment.

Demirguc-kunt and Levine (1996), Levine and Zervos (1998) and Lee (2012) argue that early studies overlook primary market indicators such as capital raised and the number of listed firms. From the perspective of the primary market, some previous studies have focused on the factors that affect the ability of firms to raise external capital. For example, Bernanke and Gertler (1989) and Kiyotaki and Moore (1997), studies how adverse selection or moral hazard problems affect primary financial markets.

Some other studies, from the perspective of investment, mainly focus on the returns earned by investors on IPOs in both short-run and long-run. They attempted to present and analyse evidence on short-run underpricing or why some IPO firms have substantial positive and others have substantial negative long-run buy-and-hold abnormal returns or the long-run underperformance of IPOs (e.g. Loughrana et al., 1994; Hunt-McCool et al., 1996; Alonand Paul, 1997; Bradley and Jordan, 2002; Loughran and Ritter, 2002; Nurwati et al., 2007; Chorruk and Worthington, 2010).

Compared to western countries, China's studies (Cheng and Gao, 2000) indicated the uniqueness of the Chinese stock market that make it different from other markets: share issuing is an important way of socialisation and corporatization of state-owned enterprises in market-economic reform, therefore, the IPO progress is affected by the original owner's (the government) decision. Similarly, scholars, such as Yin and Wang, 2008; Xie, 2010, also found large underpricing magnitude in the Chinese IPOs market persisted after full circulation and mixed results in long-run performance (Chi and Padgett, 2005). Wei et al. (2003) and Wang (2005) stated that the decreasing and negative performance of post IPO Chinese firms indicated a number of problems for China that seem to encumber its privatisation efforts.

An emerging market learns from the developed market. China has many of the typical characteristics of an underdeveloped and inefficient capital market. This leads to the debtors and shareholders favouring deficient legal protection (Xiao, 2006); China's banking regulations are imperfect and the banking system is not efficient (Allen, Qian and Qian, 2007); significant involvement of political authorities in firm governance and an absence of mechanisms for the transfers of firm control (Aivazian et al., 2005).

Overall, the studies presented thus far provide evidence that a firm can obtain financial support from the capital market through IPO in the primary market and this activity stimulates firms' investment after IPO. In addition, literature also shows that China's experience is not typical of emerging markets and needs to perform specific analysis. In General, a successful IPO is likely to stimulate firm demand for further investments and the firm would take advantage of the increased funds to purse value-maximising investment activities. We argue that the IPO effect occurs not only in the current year, but also lasts in the years to come. In other words, the impact of a firm's financing on its investment strategy is a dynamic and continuous process which diminishes as time elapses. This is because a firm's investment strategy, in particular the strategy on capital investment, is usually based on a multiple-year period. However, limited empirical studies focus on whether that long-lasting impact exists, duration of the stimulating effect of IPO. In particular the existing literature has hardly touched on the "investment multiples" delivered by the extra funds raised through the firm's IPOs. This study is to take one-step forward by filling this gap and clarifying the following questions:

1) whether that long-lasting IPO effects exists, if yes, then
2) How long will the stimulating effect last?
3) What is the value of the investment multiplier effect?

4.2.2 Secondary market

Conventional theory suggests that a firm raises capital through issuing shares on the primary market and utilises the incoming funds to expand its production capacity or invert in new profit-making projects. Therefore, as long as the shares issued are not purchased back by the listed firm in a short period of time, the amount of the firm's investment will increase with more cash flowing into the firm.

Where the stock price from the company's existing models are focused on learning the business from which the case study of its own shares, rather than

in the case where they are from their peers to learn (see, for instance, Subrahmanyam and Titman (1999) ; Foucault and Gehrig, 2008; Edmans, Goldstein, and Jiang, 2015; Dow, Goldstein, Guembel, 2015). Price summary of these different pieces of information, and can further reflect the accurate assessment of company value. Real decision-makers will understand that information and use it to guide their decisions, which further thereby affecting the company's cash flow and value (Baumol, 1965). Specifically, managers may learn from prices when making other decisions, such as investment, as shown by Dow and Gorton (1997), Subrahmanyam and Titman (1999), Chen et al. (2007) and Bakke and Whited (2010). Therefore, managers might learn additional information about growth opportunities in a particular activity from the stock prices of firms focused on this activity.

Empirical evidence of the information role of the stock market in determining investment is mixed. The mainstream literature suggests a positive significant relationship between investment and stock price (Barro, 1990; Morck et al., 1990; Blanchard et al., 1993; Chen et al., 2007). In an early study, Fischer and Merton (1984) found evidence to support a positive independent relationship between stock prices and investment by primarily examining US data. They considered that when the stock market valuation reduces the cost of equity capital, firms would increase investment until the marginal product of capital is equal to the reduced cost of capital. Similarly, Chen et al. (2007) hold the view that the stock market provides a significant informative function for firms' investment by using firm-level data. Conversely, Strong and Meyer (1990) argue that the stock price of firms undertaking investment spending with discretionary cash flow experience negative performance. A broader perspective has been adopted by Baker et al. (2003) who argue that the investments of different firms respond to the stock market differently due to their particular financial constraints.

Historically, research investigating the factors associated with how the stock market affects investment has focused on different levels. Regarding the

specific link between stock markets and investment activities, country level research method is widely used in an early stage and results are mixed. Studies widely draw on the q theory of investment, where net investment depends on the q ratio. In Panageas' (2005) model, investors have heterogeneous beliefs and short sales are restricted which cause the shadow value of capital (marginal q) to contain a speculative bubble. Classical q theory implies that investment depends on marginal q and therefore, passively, on this speculative bubble (Bakke and Whited (2010). By using the q ratio and stock returns to measure stock market variables, Morck et al. (1990) demonstrated that the stock market variables cannot explain the future aggregate investment in the US. However, Barros' (1990) study of the US stock market and investment, on an aggregate level, found stock market variables can largely explain or predict the subsequent investment even after controlling for fundamentals. On the other hand, some firm-level studies also show that there is a very limited effect of the stock market on investment (Morck, Shleifer, and Vishny, 1990; Blanchard, Rhee, and Summers, 1993).

Scholars, such as Manning (2003), Zhu et al. (2004) and Xiao (2009), state that cross-country analysis can easily dismiss the institutional and structural characteristics of different countries, this is because cross-country analysis always focuses on the average effect on many economies instead of the individual effect. Therefore, we argue that, evidence based on detailed, specific countries and firm-level analysis can provide apposite implications for individual countries and also allow for greater heterogeneity and circumvent the shortcomings of more aggregate analysis.

This study therefore sets out to assess the effect of secondary stock market activities on firms' investment by using stock price, ownership structure, stock liquidity and stock returns as a complement. We suggest that an increase in stock prices on the secondary market has a positive impact on a firm's capabilities in raising capital, in that rising share prices encourage the firm to increase investment and potentially improve corporate performance, thus

allowing it to deliver higher growth. Finally, based on our empirical results, we will try to find the microscopic transmission mechanism from the stock market to firm investment.

4.3 Empirical test model, variables measurement and data

4.3.1Regression models

Due to the fact that the stock market consists of both primary markets and secondary markets, the impact of the former on the development of listed firms may differ from that of the latter. We therefore plan to adopt different models in an attempt to distinguish the primary market from the secondary market.

4.3.2Primary market

The main function of the primary market is to facilitate firms to raise capital through IPOs. Post-IPO firms must take advantage of the increased funds to pursue value-maximising investment activities. Therefore, a successful IPO is likely to stimulate the company's demands for further investments. This impact occurs not only in the current year, but also lasts in the years to come, since a firm's investment strategy, in particular the strategy on capital investment, is usually based on a multiple-year period. Despite the discussion above, there is little evidence on whether that long-lasting impact exists and how long it lasts. To examine the duration of the stimulating effect of IPO and the investment multiplier effect brought from the capital market, the following investment equation has been devised to investigate the association between the amount of funds raised through IPO and the firms' investment amounts within a post-IPO period of four consecutive years:

$$I_{it} = e^{\lambda_0} IPO^{\lambda_1+\lambda_2+\lambda_3+\lambda_4+\varepsilon_{it}} \quad (0.1)$$

Where I_{it} is the investment amount of firm i in year t; IPO is the amount of funds raised through IPO; λ_0 is constant in the regression model; $\lambda_1, \lambda_2, \lambda_3, \lambda_4$ are the coefficients for the impact of IPO on the investment of the listed firm in

the year of IPO, one year after IPO, two years after IPO and three years after IPO respectively; and ε_{it} represents the disturbance term.

Using the equation, we are able to quantify the impact of a firm's IPO on its post-IPO investment amounts in each period and then sum up the quantified impacts, the total of which then serves the purpose of a *multiple* to measure the aggregate impact of an IPO on corporate investment across the entire period under study. In other words, the *multiple* indicates how much the total amount of investment is stimulated by each *yuan*[6] raised through an IPO.

4.3.3 Secondary market

To investigate the impact of the stock market on listed firm's investment activities, we also introduce two explanatory factors for the firm investment, capital and production scale. This is because no investment can materialise without capital being raised and spent, which shows capital is a fundamental factor determining the growth of a firm. The other explanatory variable in the equation is production as an increase in the development of production can stimulate a firm's demands for investments. It is worth noting that the stock market as an exogenous factor can impact upon a firm's investing activities in two different ways. Firstly, the stock market might provide capital to satisfy a firm's investment needs. Secondly, the stock market may also stimulate a company's demands for further investments due to its motivation effect. A higher market value incorporated into the growth of a firm is usually associated with a higher level of the firm's desire to increase its production scales and to achieve even higher growth. This chapter takes the method of least squares dummy variable estimator method to analyse the sample consisting of Chinese listed firms spanning from 2005 to 2015.

To test whether and how firm investment is affected by secondary stock market activities, we modified the model of Morck et al. (1990). Few

[6] Unit of Renminbi

restrictions and explanatory variables are added and some dummy variables are replaced. In order to migrate “the possibility of simultaneity or reverse causality bias (Steinberg and Malhotra, 2014)” and minimise or avoid problems of endogeneity (Baccini and Urpelainen, 2014; Lehoucq and Perez-Linan, 2014), all independent variables except control variables are logged by one year. Our model is more focused on fundamental trading activities on the market instead of abnormal returns, however, abnormal returns are also examined as a complementary.

There are three explanatory elements in the investment equation. The first element is cash flow (CF), this is because cash flow is the basic condition that affects firm investment development. Firms are unable to make investments without funds. The Second element is production (Q), because the development of production will stimulate firms' investment desire. Cash flow, investment and production are related to each other in the firm's business system. There is a systematic endogenous relationship among them. The third element is the stock market (SP, OS, LQ), which is an external factor of enterprise systems. The effect is mainly reflected from two aspects: firstly, an indirect effect, from the stock market to cash flow and then transmits to investment; secondly, to stimulate business investment desire directly. This is because the stock market is able to bring "incentive effect" for firms seek to maximise value. The more business development is reflected in the market value, the more incentive to expand the production scale by investment and ultimately develop enterprises faster.

Overall, our modified new equation has been established as follows

$$I_{it} = \alpha + \beta_1 CF_{it-1} + \beta_2 Q_{it-1} + \gamma_1 SP_{it-1} + \gamma_2 \mathrm{OS}_{it-1} + \gamma_3 \mathrm{LQ}_{it-1} + \delta_1 \mathrm{size}_{it} + \delta_2 DR_{it} + \varepsilon_{it} \quad (0.2)$$

$$I_{it} = \alpha + \beta_1 CF_{it-1} + \beta_2 Q_{it-1} + \gamma_1 \mathrm{ABR}_{it-1} + \gamma_2 \mathrm{OS}_{it-1} + \gamma_3 \mathrm{LQ}_{it-1} + \delta_1 D\mathrm{EQ}_t + \delta_2 \mathrm{size}_{it} + \delta_3 DR_{it} + \varepsilon_{it} \quad (0.3)$$

To avoid serial correlation of the residuals in the regressions and the problem of heteroscedasticity, we normalized I, CF and Q by the capital stock at beginning year (Xiao, 2009), which is expressed as follows:

$$\left(\frac{I}{K}\right)_{it} = \alpha + \beta_1\left(\frac{CF}{K}\right)_{it-1} + \beta_2\left(\frac{Q}{K}\right)_{it-1} + \gamma_1 SP_{it-1} + \gamma_2 \mathrm{OS}_{it-1} + \gamma_3 \mathrm{LQ}_{it-1} + \varepsilon_{it} \quad (0.4)$$

$$\left(\frac{I}{K}\right)_{it} = \alpha + \beta_1\left(\frac{CF}{K}\right)_{it-1} + \beta_2\left(\frac{Q}{K}\right)_{it-1} + \gamma_1 \mathrm{ABR}_{it-1} + \gamma_2 \mathrm{OS}_{it-1} + \gamma_3 \mathrm{LQ}_{it-1} + \delta_1 D\mathrm{EQ}_t + \varepsilon_{it} \quad (0.5)$$

Based on prior studies, we run all regressions in changes rather than levels because “residuals in the levels regressions are serially correlated. For example, in the firm-level data, the “fixed effect” is the dominant in the investment-level equations, and there is little information about what drives year-to-year changes in investment from these equations (Morck et al., 1990, pg 170).”

4.4 Variable measurement

Due to the similarity of variable definition with last chapter, we only present a table of variables' measurement (Table 4-1).

Table 4-1: Table of variables measurement

Variable	Symbol	measurement
Investment	I	annualised change in fixed assets, the difference between amount of fixed assets in current accounting year and that in previous year from annual reports of the company
Funds raised via IPO	IPO	The variable of IPO funds raised defined as the total amount of the new public firm acquired from primary market during initial public offering.
Stock price	SP	The yearly average share price refers to the average price of listed firms in the year. All share price data are directly from database.
Cash flow	CF	Annualised changes in cash flow
Development of Production	Q	Annualised changes of total sales
Equity liquidity	LQ	$Stock\ Liquidtiy = \frac{\frac{V_{it}}{M_{it}}}{\frac{\overline{V_t}}{\overline{M_t}}}$ Where V_i is the trading volume of stock *i* on secondary market in year *t*, M_{it} the market capitalisation of firm *i* in year *t*, $\overline{V_t}$ the total market-wide trading volume on secondary market in year *t,* and $\overline{M_t}$ the total market capitalisation of all listed firms on the market in year *t*.
Ownership structure	OS	The percentage of shares held by the largest 10 shareholders to the total number of shares issued by the company to measure the concentration level of shareholding.
abnormal return	ABR	the difference between the stock return of a firm and the average return on the entire market

4.5 Data

To analyse the impact of the stock market on firms' financing and eventually on the economic growth, a comprehensive dataset was assembled covering firms' activities in both the primary and the secondary market. The data used in this chapter is similar to the last chapter, thus the data statistic is no longer described in detail.

Table 4-2: Data statistic

Panel A: Primary market

Variable	Obs	Mean	Std. Dev.	Min	Max
year	26130.00			1990	2015
Stock ID	26130.00			333	603999
Investment	5902.00	1.96E+09	5.69E+09	3667839	3.29E+10
IPO funds	25922.00	1.31E+09	4.25E+09	3.87E+07	6.68E+10
Size	26130.00	3.71E+09	4.42E+10	0	2.40E+12
DR	6697.00	0.391844	0.201845	0.001631	1.848179
Ownership Concentration	7897.00	0.272459	0.180635	0.014925	0.791774

Panel B: Secondary market

Variable	Obs	Mean	Std. Dev.	Min	Max
year	24563			2005	2015
Stock ID	24563			2	603999
I/K	18921.00	0.671791	0.786063	-0.36326	4.962543
SP	18707	13.09442	11.14559	2.07	63.14
LQ	14543	2.61114	2.705289	0.011494	16.05351
OW	20875	0.206725	0.156962	0.014925	0.791774
CF/K	21915	0.044444	0.208592	-0.56768	0.826316
size	20008	1.66918	1.389567	-0.42828	5.220669
DR	19951	0.594578	6.548755	-0.2033	877.2565

4.6 Empirical results

Conventional theory suggests that a firm raises capital through issuing shares on the primary stock market and utilises the incoming funds to expand its production capacity or invest in new profit-making projects. Therefore, as long as the shares issued are not purchased back by the listed firm in a short period of time, the amount of the firm's investment will increase with more cash flowing into the company.

However, there are mixed thoughts on the association between trading activities at the market level and investment activities at the corporate level. One school of thought suggests that an increase in share prices on the secondary market has positive impact on a firm's capabilities in raising capital, in that rising share prices encourages the firm to increase investment and potentially improve corporate performance, thus allowing it to deliver higher growth. Other people suggest that the impact of the secondary market on listed firms, is far less significant than that of the primary market due to the enclosing nature of the former relative to the latter. Compared with the primary market where firms raise capital through IPOs, the secondary market performs the sole function of facilitating stocks to change hands. However, increasing stock liquidity may not necessarily lead to the improvement of corporate performance. Due to the possibility that some listed firms may use the funds raised through IPOs from the primary market to pursue purely speculative activities on the secondary market, those companies might consequently suffer from a shortage of funds within a certain period of time, a phenomenon called 'corporate anaemia', which to an extent adversely affects the performance of listed companies. In China, Jianlibao plc is a typical example of a company suffering from this issue.

Using various regression models, we have carried out the investigations into the impact of both the primary market and the secondary market on listed firms from the perspectives of investments at the corporate level.

4.6.1 The impact of financing activities on primary market on listed firms

The issue of how a firm's financing on the primary market stimulates corporate investment has been discussed in the previous section. The main function of the primary market is to facilitate firms to raise capital through IPOs. Post-IPO firms must take advantage of the increased funds to purse value-maximising investment activities. Therefore, a successful IPO is likely to stimulate the company's demands for further investments. In establishing Equation (1.1), we argue that the impact of a firm's financing activities within a period of time on its investing activities occurs not only in the current period, but can also last into the next period, or even further. Therefore, the impact of a firm's financing on its investment strategy is a dynamic and continuous process which diminishes as time elapses. Using Equation (1.1), we are able to quantify the impact of a firm's IPO on its post-IPO investment amounts in each period and then sum up the quantified impacts, the total of which then serves the purpose of a *multiple* to measure the aggregate impact of an IPO on corporate investment across the entire period under study. Therefore, the *multiple* indicates how much the total amount of investment is stimulated by each *yuan* raised through an IPO.

Table 4-3 reports the quantified impact of an IPO on a firm's investment. Our results show that there is a significant increase in the investment amount at the corporate level following a successful IPO, but the greatest increase does not occur in the first year; instead, it takes place in the next year after IPO, and then the quantified impact gradually declines in the subsequent years until it eventually disappears (illustrate in Figure 1). Note that we run the tests based on both linear and non-linear models. In performing the non-linear tests, we find that the impact of an IPO on corporate investment tends to become insignificant in the 3rd year subsequent to the flotation. This suggests

that the marginal impact of a firm's listing on corporate investment can last four years, starting from the year of floatation. For each *yuan* a listed firm raises through IPO, there is an increase of 0.28 *yuan* in investment during the first year. In the second year the increase amounts to 0.74 *yuan*; in the third year 0.42 *yuan;* and in the fourth year 0.34 *yuan*. Adding up all the above quantified marginal impact in each year subsequent to the IPO, we reach a total of 1.8 *yuan*, and this clearly is the multiple to measure the aggregate impact of an IPO on the firm's investment. Obviously, for each yuan raised through an IPO, approximately 1.8 yuan is subsequently used for further investments.

The results shown in Table 4-3 can be better illustrated by Figure (1). In the diagram, the *x*-axis represents the time line and the *y*-axis the amount of corporate investment. The longer the curve runs along the time line, the longer the stimulation effect of a firm's financing on its subsequent investment lasts, and vice versa. The trend of the curve in the diagram suggests that the multiple effect of an IPO on average lasts approximately 4 years, after which the firm's investment amount goes back to its pre-IPO level.

The results of Table 4-3 shows that all the symbols and significances of coefficient are consistent in two samples (firms listed from 2005 and firms listed from 1990). However, the coefficients for the sample of the IPO year started from 1990 shows a lower value than IPO year after reform in 2005, which indicates that there is significant influence of share structure reform in 2005 for primary market financing activities.

Overall, Figure 4-1 illustrates there are three stages for the impact of the primary market financing on firm fixed investment: financing preparing stage, early stage (IPO year) and the late stage financing shock in which includes the increasing period (stage I) and the decreasing period (Stage II).

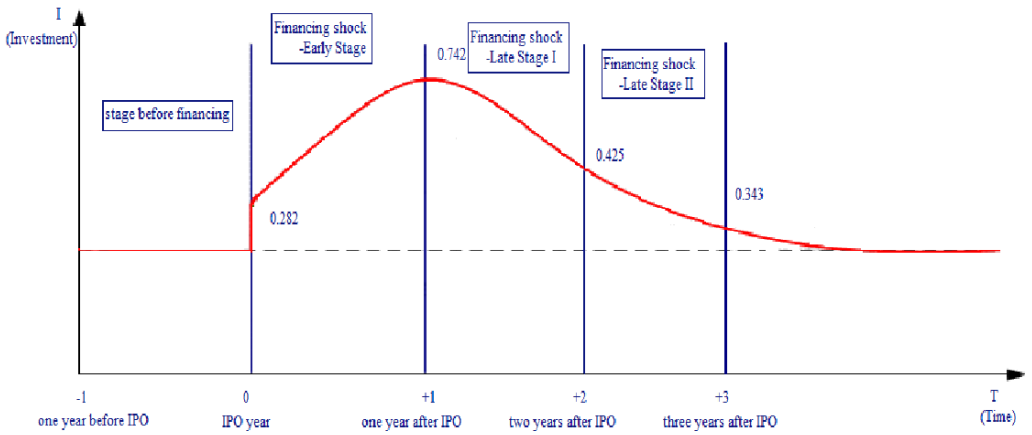
Table 4-3: The impact of IPO raised funds on firm investment

	Firm Investment			
	IPO year>=2005		IPO year >=1990	
	(1)	(2)	(3)	(4)
IPO year		0.282***		0.165***
		(2.662)		(5.059)
1st year after IPO		0.742***		0.441***
		(5.942)		(10.906)
2nd year after IPO		0.425***		0.327***
		(6.316)		(10.409)
3rd year after IPO		0.343***		0.286***
		(4.868)		(7.771)
size	0.18512***	0.16289***	0.18845***	0.19436***
	(5.723)	(4.993)	(13.299)	(13.698)
debt ratio	0.25259**	0.42232***	-0.00494***	-0.00490***
	(2.288)	(3.377)	(-15.591)	(-15.171)
ownership structure	-0.00344	0.10798	0.57119***	0.50968***
	(-0.022)	(0.672)	(8.077)	(7.130)
Constant	4.11658***	3.74803***	4.45565***	4.54472***
	(5.507)	(5.024)	(13.742)	(14.013)
R-squared	0.20	0.21	0.17	0.18
Firm fixed	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES
F-stat	13.30	13.30	44.85	44.85
adj.R	0.0451	0.0451	0.0658	0.0658
Number of pooled observations	4546	4546	17063	17063
Number of firms	781	781	2009	2009

Robust t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Figure 4-1: Empirical results based on theoretical assumption in primary market



4.6.2 The impact of trading activities on secondary market on corporate investment

Corporate investment is the second factor determining the growth of a firm. This section is set to discuss the impact of trading activities on the stock market on the firm's investment. The empirical model, which has been established in Equation (2) to capture the impact of stock markets on corporate investment, seems to suggest that fluctuations of share prices and the changes of shareholding structure and liquidity, resulting from trading activities on the stock markets, would ultimately affect the investment of listed firms. Table 44 reports the results of our studies on the above arguments.

The results obtained from the preliminary analysis of investment, cash flow and production development show a positive and significant relationship. This

means that the increase of cash flow and production development (sales) can raise the investment of listed firms. The transmission mechanism can be explained in two ways: firstly, the increase of production development (sales) can give rise to more internal funds to make investment accordingly, in the meantime, cash flow also changes the estimate of the mean level of productivity and hence affects investment, which is an indirect effect; secondly, the increase of cash flow can provide a direct effect for firm investment by provide funding support. The empirical analysis of the indicators of the secondary stock market activities are discussed as follows.

Table 4-4：Impact of Secondary Market Trading Activities on Firm Investment in full sample and subsamples (fixed effect regression)

Independent Variables	Dependent Variables					
	2005-2015		2005-2009		2010-2015	
	(1)	(2)	(3)	(4)	(5)	(6)
SP_{it-1}	0.0650***		0.0310*		0.0540**	
	(4.51)		(2.24)		(2.75)	
OS_{it-1}	0.155***	0.142**	0.0748	0.127	0.135**	0.109*
	(3.59)	(3.08)	(0.58)	(0.73)	(2.73)	(2.16)
LQ_{it-1}	-0.0265***	-0.0415***	0.00648	0.00317	-0.0436***	-0.0449***
	(-3.33)	(-5.88)	(0.53)	(0.23)	(-4.55)	(-5.45)
Q_{it-1}	0.0507***	0.0600***	0.0274	0.0337	0.0364**	0.0430**
	(4.57)	(4.91)	(1.73)	(1.70)	(2.71)	(3.10)
CF_{it-1}	0.0961***	0.120***	0.0770**	0.101**	0.0854***	0.111***
	(6.58)	(7.14)	(3.27)	(3.15)	(4.26)	(5.27)
AB_{it-1}		-0.0142		0.0366		-0.0149*
		(-1.89)		(1.88)		(-1.98)
Constant	0.249	8.615***	15.34***	16.66***	6.516	13.02***
	(0.02)	(24.03)	(19.84)	(15.99)	(0.50)	(30.17)
R^2 $within$	0.332	0.273	0.237	0.153	0.223	0.204
R^2 $between$	0.889	0.879	0649	0.557	0.558	0.788
R^2 $overall$	0.751	0.751	0.460	0.418	0.639	0.669
Hausman-test:Chi2	3420.67	2580.74	2025.97	813.34	2923.47	2578.69
Number of samples	1408	1319	973	860	1406	1315
Observations	11007	9864	4099	4020	6908	5844

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 4-5: Impact of Secondary Market Trading Activities on Firm Investment in full sample and subsamples (LSDV)

The least squares dummy variable（LSDV）

Independent variable	Dependent variable: I_{it}					
	2005-2015 (1)	2005-2015 (2)	2005-2009 (3)	2005-2009 (4)	2010-2015 (5)	2010-2015 (6)
SP_{it-1}	0.0300**		0.0125*		0.0501**	
	(2.65)		(2.24)		(2.71)	
OS_{it-1}	0.00422*	0.00372*	0.0467	0.0182	0.00308*	0.00251*
	(2.36)	(2.08)	(0.95)	(1.12)	(2.15)	(2.26)
LQ_{it-1}	-0.00197	-0.00908	-0.00177	-0.00128	-0.00176	-0.00216
	(-0.32)	(-1.57)	(-0.13)	(-1.29)	(-0.45)	(-1.08)
Q_{it-1}	0.00283*	0.00295*	0.00097	0.00191	0.00623*	0.00199*
	(2.62)	(2.53)	(0.73)	(0.13)	(2.42)	(2.51)
CF_{it-1}	0.0866***	0.0861***	0.0657**	0.0703*	0.0866***	0.0871***
	(12.27)	(12.12)	(3.42)	(2.12)	(11.31)	(12.67)
AB_{it-1}		0.000881		0.001282		0.000741
		(0.14)		(0.09)		(0.07)
Constant	8.357	5.131	5.122	4.187	4.425	5.481
	(0.44)	(0.27)	(0.29)	(1.16)	(0.31)	(0.17)
R^2	0.73	0.79	0.38	0.43	0.42	0.51
Firm fixed	YES	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES	YES
F-stat	37.73	23.72	23.04	23.50	31.19	23.72
adj.R	0.0219	0.0236	0.0341	0.0284	0.0213	0.0274
Number of pooled observations	7651	6242	3130	2172	4521	4070

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

4.6.2.1Stock prices and corporate investment

Much of the current literature on the relationship between the stock price and investment pays particular attention to the effect of investment on the stock price, they emphasised that better investment opportunities will significantly enhance the informativeness of the stock price (Chen, 2005; Foucault and Gehrig, 2006; Ferreira, 2007). Few studies have focused on converse side that the effect of the stock market on investment. Share price contains valuable information and is used to guide decision makers' actions in the real economy (Chen, Goldstein & Jiang, 2007; Bakke and Whited, 2010). It is therefore important to understand the effect of the stock price on firm investment.

The results in Table 4-4 seem to suggest that there is significant positive correlation between share prices and firms' investment. This finding is consistent to the conclusions recorded in current mainstream literature. Following the results, we can infer that investors' trading activities on the secondary market would affect investment on a corporate level.

As can be seen in the table, the coefficient between the stock price and firm investment is 0.065 in the full sample, which indicates that 1% stock price increments will result in a 0.065% increase in firm investment. Additionally, the influence level of the stock price to firm investment has risen during the time interval, a rise from 0.031 to 0.054 by using fixed effect regression (Table 44) and 0.0125 to 0.0501 by LSDV (Table 45). This increase implies that the Chinese government has built a successful policy of share structure reform in 2005 and continuously try to perfect its stock market.

The mechanism by which the investment of listed firms is affected by stock prices can be interpreted as follows. The increase in share prices tends to boost confidence of the listed firm, which will be ultimately carried on to investment final decisions and thereby encouraging firms to undertake investing activities. Furthermore, rising share prices also contribute to the improvement of the firms' cash flows. Therefore, the rise of the stock price not only has a direct positive impact on the business investment, but also indirectly has a positive effect on firms' investment capacities through the impact on listed corporate cash flow.

4.6.2.2 Shareholding structure and corporate investment

There are two things that are unique to the Chinese stock market: multiple ownership structure and high ownership concentration, which is different from other developed markets' characteristics. Changes in ownership structure are relatively small in the developed countries' mature securities markets. The vast majority of listed firms are restructured from state-owned enterprises, which leads to the ownership concentration still in an ongoing changing process. In addition, interleaving with the immaturity of the Chinese stock market, changes of the listed firms' ownership concentration becomes even more complex. Therefore, the analysis of the listed firms' ownership concentration issue must adapted to China's specific characteristics.

As can be seen from the Table 4-4, the coefficient between ownership concentration and firm investment is 0.155 in the full sample, which indicates that 1% ownership concentration increments will result in a 0.155% increase of firm investment. Additionally, two divided sub samples in Table 4-5 shows that the influence level of ownership concentration to firm investment has undergone a process of rise during the time interval, a rise from insignificant to significant.

Our results suggest that ownership concentration positively affects not only on corporate cash flows, but also significantly upon firms' investment. This effect is gradually increasing as time elapses within the full sample. This finding is consistent with the theoretical expectations that the more equity that shareholders own and the more investment and concerns will be involved. The results further emphasise and reveal that investment decisions play a transmission mechanism role between ownership and value (Jensen and Mecking, 1976), which indicates that ownership structure influences firm investment and further turns into an impact on firm market value.

4.6.2.3 Stock Liquidity and corporate investment

The level of stock liquidity directly affects the efficiency of the stock market resources allocation, is an important symbol of the vitality of the stock market (Levine and Zervos, 1998). Table 4-4

states that the liquidity of shares negatively and significantly correlate with investments carried out by listed firms. The result is similar to last chapter's analysis of cash flow. It is also consistent with the assumption in the literature review chapter (chapter two). In referring to the chapter, there is a special significance of studying the effect of stock liquidity to corporate investment in China. In the context of shareholder structure reform [7], investigations among stock liquidity, corporate investment and firm value can examine the effectiveness of the Chinese stock market reform in 2005. Prior to reform, the dominance and dual share class [8] ownership structure of the Chinese stock market lead to a greater inconsistency between major and minority shareholders' benefit, which denotes a significant difference of mechanism with western countries' mature capital markets. Post reform, benefits of major and minority shareholders are consistent. However, the long term repressed trading needs of prior non-tradable shareholders gave rise to a strong motive to convert those shares to cash, which is also differs in the case in mature

[7] which is also named as reform of non-tradable shares; the purpose of reform is to eliminate the differences of Circulation System between tradable and non-tradable shares and balance benefits of related shareholders.

[8] refers to controlling shareholders and non-controlling shareholders. The controlling shareholders have absolute decision-making power but without tradable shares. The non-controlling shareholders own tradable shares but without balanced oversight authority. Firm's cash flow and controlling right are separate.

markets. Therefore, the Chinese stock market's special characters should be considered while analysing the effect of stock liquidity to corporate investment and firm value.

From the perspective of agency costs, the rise of stock liquidity leads to an increase in shareholder's incentive to monitor managers due to heavy costs (Shleifer and Vishny, 1986; Bhide, 1993). This is also because the firms' weakening capabilities of raising capital resulting from the increase in liquidity of shares lowers the firm's willingness to undertake investments. Furthermore, stock liquidity also influences corporate investment in an indirect manner, which has been elaborated in the previous chapter. To specify, the changes in liquidity of shares prompts banks to adjust their expectations on the firms' exposure to risks. This adjustment would affect the firms' capabilities of securing loans and further affect the firms' investment decisions.

4.6.2.4 Cash flows and corporate investment

Substantial empirical evidence documents that cash flow is an important determinant of investment spending. Cash flows, as the supply base of investment, impact on a firm's investing activities in a positive manner. In the existing literature, economists come to the conclusion that the impact of corporate cash flows on investment diminishes as time elapses through their analysis on the data from the Western countries. They argue that the corporate investing activities arenot determined by cash flows and most cash flows are used in production activities.

Analysing the data from 2005 to 2015, we find that the firms' one year lagged cash flows are significantly positively correlated with the corporate investment during the period concerned. This further suggests that a sufficient degree of cash flows tend to motivate firms to undertake investment in China.

The results from Table 4-4 also suggest that the impact of cash flows on investment is rather steady and does not diminish as time elapse. This finding, contrary to the results obtained from other studies, leads us to conclude that the use of cash flows by Chinese firms is not restricted to production, but also used for investment.

4.6.2.5 Abnormal returns and corporate investment

As mentioned in last chapter, an abnormal return is the fourth measurement of the effect of investors trading activity in the secondary market to enterprise development. To examine whether there is an influence of listed firm's abnormal returns on the firm's operating performance, abnormal returns is separately to explain listed firm's investment activities by using a model without stock price.

By regression analysis, there is no significant impact found on corporate investment activities, which is consistent with the results in last chapter.

4.7 Robustness

Cross-sectional regressions are usually used to describe the relationship between explained and explanatory variables at a point in time. In this case, to undertake the diagnostic checking, we applied cross-sectional regressions for both the original data and the data that are processed by first-order difference. As the first-order difference is one of the means of identifying dynamic impact during a short period of time in econometrics and statistics. Table 4-6 and Table 4-8 present the impact of the stock price on firm investment in each single year from 2005 to 2015, while Table 4-7 and Table 4-9 display results of abnormal returns. In the sample containing the 10-year data we run regressions on cross-sectional data, most of the results are consistent with the primary results in section 4.6.2 and the rest of results show no conflict significance.

To summarise, the results of robustness tests that involve the yearly cross-sectional data reveal that the impact of the stock market on investment is consistent with the results obtained by using the overall data. This further suggests that empirical results supporting our arguments are robust and reliable.

Table 4-6:Cross-sectional regression of firm investment via stock price

Dependent variable: I_{it}											
Independent variable	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
SP_{it-1}	0.0554	0.00305	0.0289	0.0844*	0.0470	0.0581***	0.0876**	0.163***	0.171***	0.161***	0.217***
	(0.82)	(0.05)	(0.57)	(1.96)	(1.54)	(5.65)	(3.04)	(4.88)	(4.09)	(4.48)	(5.01)
OS_{it-1}	0.00462	0.0587**	0.0628	0.0266*	0.0221	0.00832*	0.0724	-0.0140	0.0744**	0.132**	0.326**
	(0.05)	(2.86)	(0.90)	(1.93)	(0.34)	(2.13)	(0.88)	(-0.20)	(2.52)	(2.85)	(4.12)
LQ_{it-1}	-0.00638	-0.0583	-0.0533*	0.0344	0.0203	0.00123	0.0480	-0.0287	-0.0356	-0.0567**	-0.0384**
	(-0.20)	(-1.87)	(-2.16)	(1.57)	(0.97)	(0.07)	(1.84)	(-1.11)	(-1.92)	(-2.89)	(-3.13)
Q_{it-1}	0.127**	0.108**	0.108*	0.149***	0.108**	0.187***	0.0506	0.213***	0.0212	0.0441	0.0135*
	(2.80)	(2.63)	(2.51)	(3.46)	(2.84)	(4.49)	(0.93)	(5.00)	(0.72)	(1.67)	(2.15)
CF_{it-1}	0.0929***	0.0901***	0.0724***	0.0394*	0.0490**	0.0729***	0.0308	0.0739***	0.0632***	0.00734	0.00734***
	(3.52)	(3.86)	(3.54)	(1.98)	(2.59)	(4.06)	(1.24)	(3.33)	(3.76)	(0.46)	(3.54)
Constant	1.744*	1.155	-0.411	-1.110*	-0.120	-0.0893	-0.587	1.485**	1.259***	0.799*	0.367**
	(2.25)	(1.73)	(-0.71)	(-2.35)	(-0.27)	(-0.21)	(-1.05)	(2.83)	(3.53)	(2.20)	(3.16)
R^2	0.657	0.722	0.781	0.793	0.809	0.827	0.728	0.760	0.843	0.854	0.718
Observations	658	748	829	895	969	1042	1030	1077	1170	1233	1356

***, **, * denotes significance at the 1%, 5% and 10% level, respectively

Table 4-7: Cross-sectional regression of firm investment via stock abnormal return

Dependent variable: I_{it}											
Independent variable	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
OS_{it-1}	0.0112	0.0225	0.0251	-0.0529	-0.0259	0.0523	-0.0950	0.0418	0.119*	0.0112	0.0247
	(0.14)	(0.31)	(0.35)	(-0.81)	(-0.38)	(0.62)	(-1.35)	(0.84)	(2.56)	(0.14)	(0.46)
LQ_{it-1}	-0.0442	-0.0642**	-0.0174	-0.0399*	-0.0569***	-0.0261	-0.0657***	-0.0645***	-0.0702***	-0.0442	-0.0390
	(-1.63)	(-3.19)	(-0.88)	(-2.26)	(-3.39)	(-1.23)	(-4.10)	(-4.52)	(-4.72)	(-1.63)	(-0.71)
Q_{it-1}	0.103*	0.0871	0.166***	0.159***	0.203***	0.0390	0.260***	0.0675*	0.0646*	0.103*	0.094*
	(2.37)	(1.92)	(3.49)	(4.02)	(4.68)	(0.68)	(5.78)	(2.18)	(2.36)	(2.37)	(2.20)
CF_{it-1}	0.0568*	0.0630**	0.0446*	0.0518**	0.0705***	0.0544*	0.0576*	0.0545**	0.0157	0.0568*	0.0492*
	(2.32)	(3.00)	(2.14)	(2.77)	(3.89)	(2.20)	(2.57)	(3.16)	(0.98)	(2.32)	(1.98)
AB_{it-1}	0.0176	0.0567	0.0584	-0.107**	-0.00355	0.0716	-0.0278	-0.00761	-0.0149	0.0176	0.0097
	(0.37)	(0.96)	(1.04)	(-2.66)	(-0.07)	(1.33)	(-1.31)	(-0.48)	(-0.98)	(0.37)	(0.21)
Constant	0.827	-0.214	-0.698	0.722	0.217	0.260	1.845***	1.479***	0.874**	0.827	0.532
	(1.43)	(-0.43)	(-1.38)	(1.61)	(0.51)	(0.48)	(3.98)	(4.38)	(2.74)	(1.43)	(0.82)
R^2	0.733	0.790	0.791	0.819	0.833	0.719	0.762	0.845	0.859	0.733	0.827
Observations	637	736	799	903	945	1010	1018	1066	1128	637	985

***, **, * denotes significance at the 1%, 5% and 10% level, respectively

Table 4-8: Cross-sectional regression of firm investment via stock price (difference)

Dependent variable: I_{it}									
Independent variable	2006	2007	2008	2009	2010	2011	2012	2013	2014
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SP_{it-1}	0.00793	0.0433	0.0459	0.0271	0.0235	0.0273	0.0895**	0.0439	0.0490
	(0.23)	(0.88)	(1.40)	(0.89)	(0.47)	(0.54)	(2.72)	(1.88)	(1.79)
OS_{it-1}	0.0573	-0.0135	0.142	0.0301	-0.0442	-0.244	-0.0441	0.0688	0.0488
	(0.40)	(-0.08)	(0.67)	(0.15)	(-0.25)	(-1.51)	(-0.66)	(1.09)	(0.69)
LQ_{it-1}	0.0319	-0.0111	0.0373*	-0.0118	-0.0296	-0.0256	-0.0627***	0.0413**	0.0311
	(1.68)	(-0.61)	(2.05)	(-0.72)	(-1.66)	(-1.15)	(-4.03)	(3.10)	(1.63)
Q_{it-1}	-0.0507*	0.00124	0.000191	-0.0138	0.0121	-0.0459	-0.0368	0.00351	-0.0123
	(-2.49)	(0.06)	(0.01)	(-0.69)	(0.53)	(-1.29)	(-1.62)	(0.19)	(-0.76)
CF_{it-1}	0.0641**	0.0241	0.0448	0.0262	0.00185	0.0317	0.0256	0.0228	0.0264
	(2.80)	(0.95)	(1.72)	(1.14)	(0.07)	(0.85)	(1.16)	(1.10)	(1.37)
Constant	0.0988***	0.106***	0.0672***	0.0681***	-0.0117	-0.0830***	0.181***	0.123***	0.124***
	(7.94)	(6.25)	(6.06)	(6.45)	(-1.04)	(-3.66)	(5.73)	(5.85)	(5.62)
R^2	0.023	0.005	0.011	0.005	0.006	0.006	0.020	0.012	0.006
Observations	600	710	796	868	894	962	970	1023	1081

***, **, * denotes significance at the 1%, 5% and 10% level, respectively

Table 4-9: Cross-sectional regression of firm investment via abnormal return (difference)

Dependent variable: I_{it}									
Independent variable	2006	2007	2008	2009	2010	2011	2012	2013	2014
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
OS_{it-1}	0.0655	0.0374	0.226	0.0137	0.0178	0.229	0.0555	0.0814	0.0292
	(0.45)	(0.20)	(1.05)	(0.07)	(0.10)	(1.43)	(0.83)	(1.28)	(0.41)
LQ_{it-1}	0.0325	-0.0187	0.0308	-0.0195	-0.0307	-0.0315	-0.0594***	-0.0316**	0.0138
	(1.74)	(-1.09)	(1.72)	(-1.26)	(-1.84)	(-1.45)	(-4.07)	(-2.59)	(0.76)
Q_{it-1}	-0.0504*	-0.00441	-0.00198	-0.00936	0.0154	-0.0466	-0.0309	0.00432	-0.0101
	(-2.48)	(-0.20)	(-0.08)	(-0.45)	(0.65)	(-1.30)	(-1.36)	(0.22)	(-0.62)
CF_{it-1}	0.0635**	0.0251	0.0543*	0.0319	0.00417	0.0351	0.0255	0.0248	0.0280
	(2.81)	(1.00)	(2.00)	(1.41)	(0.16)	(0.94)	(1.16)	(1.19)	(1.45)
AB_{it-1}	0.0158	0.0833	0.0417	-0.0169	-0.0106	-0.00121	-0.0423**	0.00670	0.00268
	(0.54)	(1.94)	(1.10)	(-0.65)	(-0.29)	(-0.03)	(-3.16)	(0.57)	(0.22)
Constant	0.0908***	0.102***	0.0621***	0.0632***	-0.0158	-0.0755*	0.124***	0.0834***	0.160***
	(6.49)	(10.27)	(6.83)	(8.03)	(-1.94)	(-2.31)	(10.08)	(9.55)	(19.88)
R^2	0.023	0.009	0.012	0.005	0.005	0.006	0.023	0.009	0.003
Observations	598	706	765	859	889	957	970	1018	1080

***, **, * denotes significance at the 1%, 5% and 10% level, respectively

4.8 Conclusion

The purpose of the current study was to determine the effects of both primary and secondary stock market activities on firm investment. Our results are in agreement with our assumptions and show a significant effect. The current findings add to a growing body of literature on research of stock market activities and firm growth via investment. The existing literature has hardly touched on the 'investment multiples' delivered by the extra funds raised through the firm's IPOs, while this study serves as a base for future studies by filling this gap. In addition, this chapter contributes to identifying and classifying the influence of secondary stock market activities on firm growth.

In the primary activities, the multiple effect of IPO on average lasts approximately 4 years, after which the firm's investment gradually returns to its pre-IPO level. Changes in the stock price, ownership structure and stock liquidity, which are resulting from secondary stock market activities, have impact on listed firm's corporate investment. The results show that the price of shares of listed companies, the proportion of large shareholders and stock liquidity of listed companies have not only a direct impact on corporate investment, but also indirectly affect investment activities by cash flow which is financing activities.

To sum up, results indicate that the stock market not only enables a firm to access external finances and ease firm financial constraints, but also the improvement brings more cash flow to investment. In addition, it also provides incentives for effective use of the increased capital, because the effective use of capital can increase the market value of the firm, and thus create higher returns to investors.

Chapter 5 : The impact of stock market activities on real economy growth via production development

5.1 Introduction

The main purpose of the stock market is to provide a financing service for listed companies in order to provide funds for enterprise development. This chapter attempts to investigate the most important part of national entity economy (i.e. non-financial listed firms' production development) to understand the microscopic transmission mechanism of the stock market on firm production development, thereby contributing to enterprises growth. The objective of this study is to provide an improvement of stock market development and policy innovation for the Chinese government and companies.

Recalling the assumed transmission mechanism: as a starting point, set cash flow from external financing will enable enterprises to receive an increase of cash flow from the stock market and use these newly added funds for investment or development of production. For example, they will be able to invest in technological innovation, expansion of labour enrolment and strengthen marketing. The new funds injection on investment and production will give rise to an expansion of production scale and an improvement of market competitiveness, which further enhances enterprises' sales. The increased sales will bring more capital inflows, which will turn into the next new cycle. In previous empirical chapters, the transmission mechanism with respect to cash flow and investment have been investigated and demonstrated. As production development is one of the key factors of company growth - this chapter will study the impact of stock market activities on real economy growth via production development. It assumes that the activities on the secondary market can promote enterprises' development of production, this is because the stock market will be not be only able to incentivise capital flow to value-creating programs but will also reflect firm

development by using capital value, which provides value incentives for the development of enterprises.

The main finding is that the secondary stock market activities have a significant effect on firm production development. For explanatory variables, both investment and cash flow have a positively significant influence on firm production development. There are three indicators for secondary stock market activities[9], both the stock price and liquidity show similar results as previous empirical chapters that had positively and negatively significant influence on dependent variables, respectively. The results indicate that the production-related share price exhibits the economic rationality of Chinese security investment and the usefulness of market information. The results in the last two chapters reinforce a higher level of liquidity of shares results in poorer cash flows and weaker investment and both cash flow and investment primarily determines the firm's development of production in the real economy. Thus, the negative impact of liquidity on production is consistent with rational expectations. A unique result of the other indicator of stock market activities (i.e. ownership structure) emphasises that no direct 'driving effect' of shareholding concentration on the development of corporate production is found.

However, refer to the positively significant influence of investment and cash flow in the regression and the positively significant influence of ownership concentration on both investment and cash flow in last two chapters, an indirect effect states that the changing of ownership structures can affect corporate production through its impact on a firm's cash flow and investment. Overall, the results reinforce the microscopic transmission mechanism between stock market activities and corporate production.

[9] stock price, stock liquidity and ownership structure

The remaining part of this chapter is divided into five sections. Section 5.2 reviews related literature and presents theoretical foundations for the stock market and production development. Section 5.3 describes data, models and estimation methodology. Section 5.4 reports results analysis. Section 5.5 is the conclusion and illustrates the most outstanding results and future implications.

5.2 Related Literature

Over the past decade, most international studies have emphasised that the stock market, as the representative of financial markets, has had a significantly positive impact on the country's overall economic development. However, some studies have debated that although the GDP growth rate is indeed an important indicator of a country's overall economic development. The activities of the stock market, to a certain extent, contributes to GDP growth, which is referred to as "financial relevance ". Due to the existence of this financial relevance, current international economic and financial literature draws the significant positive correlation between stock market development and economic growth, and thus, there is not a great deal of practical significance besides the financial relevance. As an important part of the country's overall economic development, the real economy is the underlying of the stable operation of a market. Meanwhile, enterprises production development is the underlying of a real economy. The Word Bank and previous studies (Brandt, Biesebroeck and Zhang, 2012) considered that economic growth is caused by the development of production instead of the accumulation of capital or labour. Therefore, it is important to explore the extent to how finance fosters growth by directly promoting enterprises production development.

Numerous scholars have attempted to evaluate the impact of the financial market on economic growth. Demirgüç-Kunt and Levine (2008) identified

empirical studies into four categories: single country studies, pure cross-country research, cross-country and time-series dimensions and microeconomic studies. Among them, various studies have focused on cross-country and country level research and discussed improvement in productivity. Total factor productivity (TFP) is a common variable to measure productivity in both cross-country and country level research. Somewhat surprisingly, a limited group of authors have examined the effect of finance on productivity of the firm level by including financial variables in a Cobb-Douglas production function.

Levine and Zervos (1998) investigated stock market development and economic growth by using cross-country level data. They measure the increase of productivity as long-term economic growth, and their results demonstrate the positive impact of stock market development on productivity growth. However, their studies are restricted to a generalised country level research. Additionally, they also discovered that both the liquidity of the stock market and the development of banking show significant growth in regressions, which highlights the different financial services between stock markets and banks.

Similarly, Beck, Levine and Loayza (2000) carried out investigations into the effect of differential levels of financial development on the sources of economic growth. The study uses traditional cross-section, instrumental-variable procedures and dynamic panel techniques analysis to gain insights into cross-country differences in legal and accounting systems. Their results suggest that productivity growth is the main reason why finance affects economic growth.

Using country-level data, Butler and Cornaggia (2010) demonstrated that productivity is an important factor that can explain the causes of finance for economic growth. Although the measurement of productivity is in agricultural

yields, their findings did show a positive relationship between access to external finance and output. They used a triple differences testing approach to analyse US corn production data over the period 2000-2006, and found those counties with the lowest access to finance bank deposits were unable to increase their corn yields as much as others, while counties with strong bank deposits increased production the most.

Using Cobb-Douglas production function and TFP, Dabla-Norris et al. (2012) analysed a firm level, cross-industry and cross-country dataset from 63 countries. It has conclusively been shown that, especially in high-tech sectors, financial development has a positive and significant effect on economic growth by enhancing innovation and further turn into an improvement of productivity and production development.

Given all that has been mentioned so far, macroeconomics literature regarding cross-country and country-level research feature those studies mainly seek to explore explanations or factors for differentials of productivity across countries (e.g., Banerjee and Moll, 2010). A number of studies have also also provided microeconomic evidence and focus on different markets or a particular sector. For example, financial frictions, credit market imperfections (Erosa, 2001; Amaral and Quintin, 2010; Buera et al., 2011), credit constraints (Udry, 2012) and the agricultural sector (Adamopoulos and Restuccia, 2014). Chemmanur, Krishnan and Nandy (2011) focused on private firms and highlighted factors that are associated with the effect of private financing on innovation and turn into enterprises productivity. They argue that private financing (venture capital) provides financing improvement and an increase of firm scale, which further gives rise to increase in output and revenue.

In view of all that has been discussed so far, most of these studies have considered aggregate financial conditions over long periods of firm-level production development to reveal a correlation between various measures of

financial development and long-run growth. However, at the firm level, it has been demonstrated that there is a significant impact of finance on company investment in fixed capital (Fazzari et al., 1988) and firm labour input (Nickelland Nicolitsas, 1999) in which are core elements of the production development.

Ferrando and Ruggieri (2015) analysed firm financial conditions on corporate production at a firm level and developed an indicator of financial constraints and applied it to production equation to assess the direct impact of access to finance to firm-level productivity for production development. Their results have found both negative and significant effects in most sectors across Euro-area countries during the period 1990-2011.

Therefore, companies need to ease financial constraints to improve production development. Firms finance physical investment and innovative projects by accessing external finance for their needs. As stated in the first chapter, the stock market made the right decision in easing financial constraints. Consequently, further studies regarding the impact of stock market on production development would be worthwhile. Despite this, a limited number of studies have investigated this association in a relatively intuitive way.

Using micro panel datasets, Hsu, Tian, and Xu (2014) examined the development of both equity and credit markets on economic growth via productivity by focusing on the high-tech sector at the firm level. A fixed effects identification strategy was adopted to analyse data from 32 countries over the period 1976 to 2006, and the results show that production development and innovation is better supported in developed equity markets at firm-level and industries that are more dependent on external finance.

Choi, et al. (1999) point out that macroeconomic factors are not the precise way to explain the movement of the stock price in the secondary market. Previous studies found certain evidence that industrial production can explain stock price significance. For example, from the perspective of stock volatility, Errunza and Hogan (1998) have confirmed the relationship by analysing data from European countries. Certain historical studies draw attention to single country analysis and found a positive and significant relationship in individual countries (e.g. Perry Sadorsky， 2003). However, relatively few historical studies have explored the opposite side that using stock market factors to explain changes in production development, which is also the research purpose of this chapter.

Some other studies (Olley and Pakes, 1996) suggest that investment can be used as an explanatory variable or proxy variable for firm productivity. To a certain degree, investment denotes the value of property, plant, and equipment (PPE) which are bought by firms for production purposes. Similarly, Valentino Piana (2001) suggests that investment can potentially enhance a firm's productivity by a lower employment in which the per unit output needed less labour. Additionally, firms can obtain extra value added for production if an investment is involved in improvement or innovation of products.

Theoretically, there is a positive relationship between the financial market and economic growth, which illustrates that the developed financial system has better results than others do. Generally, when comparing developed countries and developing countries, they have persistent differences in production development due to a mix of repression of financial factors. Prior works provide some relative explanations, such as issues in poor management practices (Bloom and Van Reenen, 2010), imperfect market policies and regulations (James Tynout, 2000), low level of product innovation and poor delegation of decision-making (Bloom et al., 2010). While, China has exhibited high growth rates over the past three decades, especially in the

level of industrialisation and the economic growth is as impressive as developed countries. However, the characteristic of China’s financial system is defined as poorly developed (Allen，Qian and Qian, 2005). Therefore, it would be worthwhile to study further. Coupled with the special characteristics of the Chinese stock market, this study may helps investors or governments to realise the implications and transmission mechanism between external finance from stock market and China’s real economy growth.

Overall, due to the importance of production development in the real economy, this chapter will study the impact of stock market activities on the real economy growth via production development. There will also be an examination of the impact of access to external finance on product development as a candidate explanation to help bridge current literature gap. One question that needs to be asked, however, is whether stock market activities directly promote firm production development, if so, what is the transition mechanism?

5.3 Data and Methodology

5.3.1 Methodology

As noted above, the aim is to link the stock market to firm production and to highlight the role of cash flow and investment. High technical performance of products is the fundamental factor of production and firms' development. For example, equipment and production process are based on advanced technology that depends on investment and capital. Thus, cash flow and investment are the two fundamental factors determining production, and production development (i.e. expansion of production scale) is a key measure of firm growth. In addition, it will be argued that trading activities on the capital market can also encourage listed firms to expand their productions, because not only does it serve as a mechanism of channelling capital towards the value creating projects and firms, but it also ‘prices’ the a firm’s growth by market values.

Empirical regressions in preceding chapters have provided a statistical framework for our investigations. To analyse the role of production further, we will introduce Cobb-Douglas production function as the basic carrier to examine whether securities' investing and trading activities can directly affect corporate production levels.

The Cobb-Douglas production function, is simply referred to as the production function, firstly invented by the American mathematician C.W.Cobb and Economist Paul H. Douglas in 1928. This mathematical model is usually used to predict the system of national and regional industrial or the production of large firms and analyse the way to develop firm production. The Cobb-Douglas production function is as follows:

$$Y = \mathrm{A(t)} L^{\alpha} K^{\beta} \mu$$

where, Y is production output in which is generally measured by industrial net output; $\mathrm{A(t)}$ is comprehensive technical level; L represents the number of labour input (unit normally in person); K represents capital investment and generally refers to net fixed assets (unit normally in billion or ten thousand Yuan), α is the elasticity of labour output and indicates the rate of output value changes caused by changes in labour output; β represents the elasticity of capital output and indicates the rate of output changes caused by changes in capital investment. μ represents the effect of random disturbances and the value is always below than one.

This chapter uses the turnover from the main business as the measure of firms' production levels due to the fact that there is no report on manufacturing firms net output in our database. The growth rate of employee numbers is used to serve as the proxy for changes in labour input. The change in capital input is measured by the growth rate of net fixed assets. The way that the variables are defined might mitigate the potential impact of multicollinearity on regressions.

Based on the Cobb-Douglas production function, fixed assets and labour, which are the basic indicators of the impact of the production development, are added into econometric production regression. Apart from incorporating the Cobb-Douglas function into our regression equation, this chapter also has inserted the three stock market variables into the equation: stock price, extent of shareholding of large shareholders, and liquidity. In addition, working capital is also involved, which refers to cash flow of listed firms is a variable affecting production. The Measurement regression equation is as follows:

$$Q_{\mathrm{it}} = g_0 + g_i + g_t + g_1 SP_{it-1} + g_2 OS_{it-1} + g_3 Lq_{it-1} + g_4 CF_{it-1} + g_5 K_{it-1} + g_6 Lab_{it-1} + \varepsilon_{it}$$

Where, g_i and g_t are firm specific and time specific, respectively; Q_{it} is the firm production of firm *i* in year *t*; SP_{it-1} represents average stock price of firm *i* in year *t-1*; OS_{it-1} represents the ownership structure of top ten shareholders' concentration of firm *i* in year *t-1*； Lq_{it-1} is stock liquidity of firm *i* in year *t-1; CF_{it-1}* represents working capital (i.e. cash flow) of firm *i* in year *t-1; K_{it-1}* is net fixed assets of firm *i* in year *t-1,* which denotes investment in previous empirical chapters *; Lab_{it-1}* is the growth rate of labour of firm *i* in year *t-1; ε_{it}* is specified as error term.

As mentioned in previous chapters, in order to test the fourth measurement of the stock market (i.e. the impact of abnormal returns of listed companies on the ability of corporate finance), abnormal returns are used in the regression model without using the variable of stock price to explain the development of corporate production separately. Measurement regression equation as follows:

$$Q_{\mathrm{it}} = h_0 + h_i + h_t + h_1 ABR_{it-1} + h_2 OS_{it-1} + h_3 Lq_{it-1} + h_4 CF_{it-1} + h_5 K_{it-1} + h_6 Lab_{it-1} + \varepsilon_{it}$$

Where，ABR_{it-1} represents the abnormal returns of firm i in year t-1.

Similarly, this chapter uses two regression equations (as mentioned above) to analyse both the full time sample (2005-2015) and the two sub samples (2005-2010; 2011-2015) to examine the impact of the stock market development on the listed companies' production development.

5.3.2Data and variables measurements

Unlike the first two empirical chapters, this chapter only refers to the secondary stock market. Apart from variables that are similar to previous chapters (i.e. abnormal return, stock price, top ten shareholders ownership structures, firm stock liquidity, cash flow and fixed assets), data refers to the information of listed firms' labour and is collected from the Thomason Reuter Database. As mentioned in previous chapters, financial data is collected from the Guotaian Database, and the Wind database in China. Due to the nature of different data sources, this chapter involves database merging. We need to merger financial data with manufacturing data. Firstly, in order to check the similarity of the company name and the stock code in both databases, and find that the ticker symbol of the Thomason Reuter database can be rescheduled and matched to the stock code of the Guotaian and the Wind database. Secondly, data Analysis and statistical software (i.e. STATA) is used to merge the financial and manufacturing data.

Due to the similarity of variable definition with previous chapters, only the table of variables' measurement is presented in this chapter (Table 5-1).

Table 5-1: Table of variables measurement

Variable	Symbol	measurement
Stock price	SP	The yearly average share price refers to the average price of listed firms in the year. All share price data are directly from database.
Equity liquidity	LQ	$Stock\ Liquidtiy = \frac{\frac{V_{it}}{M_{it}}}{\frac{\overline{V_t}}{\overline{M_t}}}$ Where V_i is the trading volume of stock *i* on secondary market in year *t*, M_{it} the market capitalisation of firm *i* in year *t*, $\overline{V_t}$ the total market-wide trading volume on secondary market in year *t,* and $\overline{M_t}$ the total market capitalisation of all listed firms on the market in year *t*.
Ownership structure	OS	The percentage of shares held by the largest 10 shareholders to the total number of shares issued by the company to measure the concentration level of shareholding.
Cash flow	CF	Annualised changes in cash flow
Development of Production	Q	Annualised changes of total sales
Investment	K	annualised change in fixed assets, the difference between amount of fixed assets in current accounting year and that in previous year from annual reports of the company
Labour	Lab	The number of employee of listed firms
abnormal return	ABR	the difference between the stock return of a firm and the average return on the entire market

5.4 Empirical evidence and analysis

The Table 5-2 and Table 5-3 below both illustrates the impact of secondary market trading activities on firm production in full sample (2005-2015) and subsamples (2005-2009 and 2010-2015). The differences between these two tables is that Table 5-2 shows results of fixed effect regression and Table 5-3 shows the results of least squares dummy variable (LSDV) estimator. As referred to in the first empirical chapter, the Hausman (1978) test is applied to the panel data in order to verify the fixed nature of the unobservable individual effects. Additionally, our data set belongs to unbalanced panel data where certain years, the data category is not observed (Baltagi, 2005; Cameron and Trivedi, 2005). Therefore, the least squares dummy variable (LSDV) estimator is also applied for unbalanced panel data since it would be better to represent fixed effects if the model includes individuals' dummy variables. Overall, most of the significant results are consistent, while the results of the abnormal return show an insignificant result with the method of LSDV, which is consistent with previous empirical chapters. The following sections will present empirical analysis between each individual indicators and dependent variable.

Table 5-2: Impact of Secondary Market Trading Activities on Firm Production in Full Sample and Subsamples (fixed effect regression)

Independent Variables	Dependent Variable: $\mathbf{Q_{it}}$					
	2005-2015		2005-2009		2010-2015	
	(1)	(2)	(3)	(4)	(5)	(6)
CF_{it-1}	0.364***	0.360***	0.106**	0.104**	0.185***	0.180***
	(19.88)	(19.74)	(3.28)	(3.23)	(8.50)	(8.30)
SP_{it-1}	0.0620***		0.0875**		0.0332*	
	(3.90)		(3.24)		(2.06)	
OS_{it-1}	0.0285	0.0364	-0.00996	-0.0223	-0.00174	0.00795
	(0.43)	(0.55)	(-0.05)	(-0.11)	(-0.03)	(0.13)
LQ_{it-1}	-0.112***	-0.114***	-0.0882***	-0.0908***	-0.106***	-0.110***
	(-13.24)	(-13.46)	(-5.50)	(-5.70)	(-11.08)	(-11.47)
I_{it-1}	0.227***	0.227***	0.193***	0.192***	0.173***	0.172***
	(24.81)	(24.77)	(9.51)	(9.46)	(15.41)	(15.32)
Lab_{it-1}	0.371***	0.372***	-0.0134	-0.0117	0.210***	0.212***
	(10.36)	(10.39)	(-0.18)	(-0.15)	(5.58)	(5.62)
AB_{it-1}		0.0404**		0.109**		0.00872
		(3.07)		(3.11)		(0.71)
Constant	17.94	26.37	16.11***	16.18***	17.83	21.94
	(0.99)	(1.46)	(40.49)	(40.57)	(1.16)	(1.44)
R^2 $within$	0.586	0.586	0.381	0.381	0.459	0.458
R^2 $between$	0.494	0.494	0.451	0.449	0.499	0.420
R^2 $overall$	0.526	0.525	0.369	0.367	0.471	0.455
Hausman-test:Chi2	1308.36	39.91	763.86	850.44	1402.62	1367.43
Number of samples	1404	1071	919	841	1401	1146
Observations	10665	10332	3889	3811	6776	6521

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 5-3: Impact of Secondary Market Trading Activities on Firm Production in Full sample and Subsamples (LSDV)

Dependent Variable：$\mathbf{Q_{it}}$						
Independent Variables	2005-2015 (1)	2005-2015 (2)	2005-2009 (3)	2005-2009 (4)	2010-2015 (5)	2010-2015 (6)
$\boldsymbol{CF_{it-1}}$	0.231 (1.88)	0.228 (1.83)	0.231 (1.88)	0.228 (1.83)	0.231 (1.88)	0.228 (1.83)
$\boldsymbol{SP_{it-1}}$	0.0342* (2.24)		0.0342* (2.24)		0.0342* (2.24)	
$\boldsymbol{OS_{it-1}}$	0.0242 (0.60)	0.0257 (0.64)	0.0242 (0.60)	0.0257 (0.64)	0.0242 (0.60)	0.0257 (0.64)
$\boldsymbol{LQ_{it-1}}$	-0.0304*** (-3.80)	-0.0404*** (-5.38)	-0.0304*** (-3.80)	-0.0404*** (-5.38)	-0.0304*** (-3.80)	-0.0404*** (-5.38)
$\boldsymbol{I_{it-1}}$	0.0965*** (9.04)	0.0944*** (8.81)	0.0965*** (9.04)	0.0944*** (8.81)	0.0965*** (9.04)	0.0944*** (8.81)
$\boldsymbol{Lab_{it-1}}$	0.0511* (2.32)	0.0525* (2.37)	0.0511* (2.32)	0.0525* (2.37)	0.0511* (2.32)	0.0525* (2.37)
$\boldsymbol{AB_{it-1}}$		-0.00289 (-0.33)		-0.00289 (-0.33)		-0.00289 (-0.33)
Constant	5.819 (0.23)	2.351 (0.09)	5.819 (0.23)	2.351 (0.09)	5.819 (0.23)	2.351 (0.09)
R^2	0.63	0.59	0.63	0.59	0.63	0.59
Firm fixed	YES	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES	YES
F-stat	28.35	24.52	28.35	24.52	28.35	24.52
adj.R	0.0286	0.0363	0.0286	0.0363	0.0286	0.0363
Observations	7683	7622	7683	7622	7683	7622

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

5.4.1 Stock price and production development

The results in Table 5-2 and Table 5-3 show evidence from a different perspective on the microeconomic. More precisely, this chapter shows an alternative way that the impact of stock price on firm production development.

As illustrated Table 5-3, the average stock prices of listed firms are found to be significantly and positively associated with turnover from the main businesses. One of the plausible interpretations of this result lies in ‘share price motivation’. Higher share prices tend to raise shareholders’ expectations on a firm’s future growth, which further influences the diligence of managers, thus incentivising them to work harder and boosting the firms’ performance. In addition, rising share prices also enable banks to adjust their expectations on firm values, yielding firms’ enhanced capabilities of raising bank loans and speeding up the firm’s growth ability.

Furthermore, the one year lagged share price is found to be significantly and positively correlated with the turnovers during the current period also illustrates a perspective from market expectations. This indicates that, in the Chinese stock market, investors’ expectations on improvement in future firm performance have already driven share prices to rise. When a firm meets its expected performance targets, the association between the one-year lag of share prices and the production level during the current year reflects that expected performance is consistent with the actual performance, since share prices convey the information on investors’ expectations on a firm’s future performance. This production-related share price exhibits the economic rationality of Chinese security investment and the usefulness of market information therefore a stronger association between share prices and production indicates a higher level of economic rationality of investment.

5.4.2 Ownership structure and production development

There are relatively few historical studies in the area of firm ownership structure and firm production development. This studies empirical regression provides evidence from both the direct and indirect aspects, which extend current literature.

The results in Table 5-3 show an insignificant relationship between ownership structures and firm production development, which indicates that the direct 'driving effect' of shareholding concentration on development of corporate production has yet to be established in this study. However, the indirect effect of changing shareholding concentration on production still exists through its impact on firm's cash flow. In the first empirical chapter, a positive and significant relationship between ownership structure changes (shareholding concentration) and cash flow is emphasised. Moreover, the empirical evidence in this chapter of which can be found from Table 5-3 reporting a positive and significant association between the one-year lags of cash flows and corporate production. Considering all of this evidence, it seems that the shareholding concentration or ownership structure did affect firm production development but in an indirect manner.

5.4.3 Stock liquidity and production development

In this chapter, Table 5-2 and Table 5-3 show similar results with previous chapters: stock liquidity has been found to be significantly and negatively associated with corporate production. This result indicates a direct effect, which presents a major finding. In addition, in the real economy, cash flow and investment are essentially determined by a firm's development of production. In previous empirical chapters, it has been demonstrated that both cash flow and investment are negatively and significantly affected by stock liquidity in the secondary market, and the micro transmission mechanism has been discussed. The findings suggest that a higher level of liquidity of shares

results in poorer cash flows and weaker investment. Given that, both of which are the factors underlying production and thus the negative impact of liquidity on production is consistent with rational expectations, which denotes that a high liquidity level undermines cash flows and investment. Following these discussions, it further infers that the negative impact of liquidity on corporate production results from the combination of three effects: the firm value effect, the risk expectation effect and the rent-seeking effect, all of which stems from liquidity.[10].

Nevertheless, the highly significantly negative impact of liquidity on production includes both the direct and indirect effect. Moreover, it can further establish a companionship inference that excessive liquidity level impedes the development of the real economic. The findings extend current literature, and further provide some implications for the current Chinese stock market and firm production development.

5.4.4 Firm Capital and production development

In this chapter, firm capital can be broken down into two elements: working capital measured by cash flow (cash and cash equivalents) and fixed capital measured by net fixed assets. The empirical results in Table 5-2 and Table 5-3 indicate that both working capital and fixed capital are significantly and positively associated with corporate production. An increase in working capital by 1% yields the rise of firm turnover by 0.364% and an increase in fixed capital by 1% drives the turnover up by 0.227%. Adding both up, an increase in the firm's capital by 1% contributes to approximately 0.6% growth of production, suggesting that the marginal growth of production on capital is 60%. Therefore, 60% of the production growth of Chinese listed firms is attributable to capital. This finding is consistent with results of the existing

[10] In the first empirical chapter, it has attempted to provide explanation to the negative correlation between liquidity of shares and cash flows of listed firm from two different perspectives in which is external and internal corporate cash flows: (E1)risk expectations (E2) firm values; (I1) income effect (I2) rent seeking

empirical studies that have shown that in the Cobb-Douglas Production Function on average capital contributes 60% of production growth. Furthermore, we have advanced this finding by recording that, in China's listed firms, the contribution of cash and cash equivalents as working capital exceeds that of fixed assets by approximately two thirds. Therefore, the importance of the stock market, which plays overarching roles in providing listed firms with cash flows, in promoting the growth of corporate production cannot be clearer.

The conventional Cobb-Douglas Production Model suggests that corporate production is determined by capital and labour, and capital usually refers to fixed assets, such as property, plant and equipment (PPE). However, in reality these two elements, standing alone, cannot facilitate production because in the absence of working capital an enterprise cannot employ labour, arrange supply or organise production, and ultimately will fail to make the use of plant, property and equipment. In reality, there are abundance of examples where firms go into liquidation or even bankruptcy due to lack of cash, all pointing to the fact that importance of working capital in production is by no means secondary to that of fixed assets and labour. Consequently, working capital is the third fundamental factor underlying production, as production simply cannot occur in a firm without sufficient cash, irrespective of how much PPE and labour the firm owns. Following the reasoning above, we further argue that, because working capital plays a key role in facilitating production, trading activities on the secondary market can significantly influence corporate production.

5.5 Robustness Test

This chapter has examined the impact of trading activities on the secondary market on corporate production using the yearly cross-sectional data and found that results from the yearly data are consistent with those from the overall data, in particular, with the positive impact of share prices on corporate production showing major significance in many years. Meanwhile, the negative impact of liquidity of shares on corporate production also exhibits significance in some of the years. However, our robustness tests have failed to detect any significant impact of shareholding concentration on corporate production in the yearly cross-sectional data. This seems to suggest the influence of shareholding structure on corporate production does exist in general but appears to be less significant in comparison with that of liquidity as shown in the yearly data.

It is worth noting that the association between working capital and corporate production exhibits significance across nearly all the yearly cross-sectional data. This has strengthened the results obtained from the overall data showing the importance of working capital in facilitating corporate production. It further suggests that a third factor that working capital can and should be incorporated into the Cobb-Douglas Production Function.

To summarise, with the results from our robustness tests consistent with those from the overall data, we conclude that correlation between the stock market and corporate production does exist.

Table 5-4:Cross-sectional regression of firm investment via stock price

Dependent Variable： $\mathbf{Q_{it}}$											
Independent Variables	2005 (1)	2006 (2)	2007 (3)	2008 (4)	2009 (5)	2010 (6)	2011 (7)	2012 (8)	2013 (9)	2014 (10)	2015 (11)
CF_{it-1}	0.665*** (13.25)	0.815*** (17.61)	0.851*** (18.56)	0.840*** (20.42)	0.806*** (19.32)	0.740*** (20.24)	0.822*** (22.02)	0.712*** (19.84)	0.598*** (17.18)	0.543*** (16.07)	0.578*** (18.22)
SP_{it-1}	-0.0679 (-0.49)	0.0614 (0.58)	0.540*** (3.73)	0.791*** (7.86)	0.191 (1.95)	-0.00811 (-0.06)	0.332*** (3.62)	0.424*** (5.29)	0.0851 (1.43)	0.315*** (4.29)	0.341*** (5.37)
OS_{it-1}	-0.574 (-0.88)	-0.164 (-0.22)	0.630 (0.46)	2.687* (2.22)	-0.305 (-0.25)	0.632 (1.53)	0.259 (1.16)	0.157 (0.63)	0.527 (1.45)	0.912 (1.19)	0.451 (1.37)
LQ_{it-1}	-0.0867 (-1.95)	0.0408 (0.84)	0.0543 (1.31)	-0.00213 (-0.06)	-0.120** (-3.02)	-0.168*** (-4.76)	-0.0770* (-2.14)	-0.0653** (-2.61)	-0.111*** (-3.79)	-0.128*** (-4.48)	-0.136*** (-2.91)
I_{it-1}	0.520*** (16.75)	0.478*** (17.68)	0.491*** (18.42)	0.387*** (14.89)	0.461*** (19.53)	0.483*** (23.59)	0.448*** (22.81)	0.424*** (24.45)	0.458*** (26.78)	0.452*** (27.31)	0.461*** (27.89)
Lab_{it-1}	-0.406 (-1.92)	-0.363* (-2.15)	-0.291 (-1.64)	-0.255 (-1.77)	-0.260*** (-4.13)	0.378* (2.21)	0.578*** (3.59)	0.437** (3.23)	0.566*** (3.95)	0.301*** (3.79)	0.430*** (4.19)
Constant	8.402*** (14.11)	8.897*** (17.02)	8.802*** (16.83)	11.09*** (21.62)	9.499*** (20.68)	9.206*** (22.79)	9.922*** (25.44)	10.53*** (30.40)	10.60*** (30.66)	10.80*** (31.66)	10.84*** (30.37)
R^2	0.502	0.522	0.535	0.592	0.600	0.603	0.607	0.618	0.597	0.596	0.582
Observations	660	740	802	829	858	1041	1044	1079	1164	1213	1235

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 5-5: Cross-sectional regression of firm investment via abnormal return

Dependent Variable： $\mathbf{Q_{it}}$											
Independent Variables	2005 (1)	2006 (2)	2007 (3)	2008 (4)	2009 (5)	2010 (6)	2011 (7)	2012 (8)	2013 (9)	2014 (10)	2015 (11)
CF_{it-1}	0.665*** (13.21)	0.818*** (17.70)	0.853*** (18.62)	0.846*** (20.61)	0.807*** (19.45)	0.745*** (20.35)	0.825*** (22.07)	0.716*** (20.02)	0.598*** (17.28)	0.542*** (16.00)	0.714*** (21.73)
OS_{it-1}	-0.580 (-0.89)	-0.272 (-0.37)	0.508 (0.37)	2.656* (2.20)	-0.820 (-0.68)	0.589 (1.42)	0.267 (1.19)	0.137 (0.55)	0.528 (1.46)	0.935** (3.27)	0.422 (1.17)
LQ_{it-1}	-0.0857 (-1.94)	0.0390 (0.80)	0.0491 (1.19)	-0.00131 (-0.03)	-0.114** (-2.90)	-0.153*** (-4.27)	-0.0772* (-2.14)	-0.0738** (-3.05)	-0.109*** (-3.71)	-0.139*** (-4.82)	-0.124*** (-3.93)
I_{it-1}	0.520*** (16.66)	0.477*** (17.66)	0.487*** (18.18)	0.373*** (14.07)	0.463*** (19.79)	0.484*** (23.66)	0.448*** (22.79)	0.421*** (24.34)	0.458*** (26.80)	0.451*** (27.24)	0.437*** (28.91)
Lab_{it-1}	-0.407 (-1.92)	-0.372* (-2.20)	-0.273 (-1.54)	-0.264 (-1.84)	0.255*** (4.06)	0.373* (2.18)	0.561*** (3.48)	0.430** (3.19)	0.566*** (3.95)	0.301*** (4.08)	0.441*** (2.96)
AB_{it-1}	-0.0510 (-0.40)	0.214 (1.34)	0.904*** (3.98)	1.112*** (8.21)	0.512*** (3.53)	0.219 (1.20)	0.307*** (3.53)	0.216*** (5.98)	0.254 (1.59)	0.151*** (4.04)	0.254** (3.15)
Constant	8.374*** (3.58)	8.879*** (4.27)	8.791*** (3.77)	11.33** (2.65)	9.427*** (3.99)	9.172*** (4.58)	10.21*** (4.26)	11.01*** (4.13)	10.50*** (3.52)	11.08*** (3.93)	10.74*** (4.16)
R^2	0.502	0.523	0.536	0.595	0.604	0.604	0.607	0.621	0.597	0.596	0.565
Observations	651	720	767	820	853	1041	1034	1043	1052	1148	1203

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 5-6: Cross-sectional regression of firm investment via stock price (difference)

Dependent Variable： $\mathbf{Q_{it}}$									
Independent Variables	2006 (1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)
$\boldsymbol{CF_{it-1}}$	0.0576 (1.81)	0.129*** (4.02)	0.136*** (3.49)	0.0846* (2.45)	0.0993** (3.21)	0.113** (2.88)	0.00125 (0.04)	-0.0313 (-1.30)	-0.0248 (-1.11)
$\boldsymbol{SP_{it-1}}$	0.121* (2.44)	-0.144* (-2.29)	0.0617 (1.19)	-0.0434 (-0.93)	0.0429 (0.74)	0.0431 (0.79)	-0.120* (-2.57)	0.0635* (2.06)	0.144*** (3.83)
$\boldsymbol{OS_{it-1}}$	-0.0453 (-0.23)	-0.0248 (-0.09)	0.369 (0.85)	0.530 (1.45)	-0.426* (-2.56)	0.251* (2.56)	-0.113 (-1.48)	-0.0837 (-0.98)	0.191 (1.89)
$\boldsymbol{LQ_{it-1}}$	-0.00548 (-0.19)	-0.0624** (-2.70)	-0.0424 (-1.48)	-0.0604* (-2.33)	-0.0124 (-0.57)	-0.00150 (-0.06)	-0.0765*** (-3.46)	-0.00233 (-0.13)	0.0414 (1.53)
$\boldsymbol{I_{it-1}}$	0.165*** (5.26)	0.152*** (4.16)	0.0700 (1.84)	0.104** (2.86)	0.219*** (6.97)	-0.0304 (-0.77)	0.0404 (1.76)	0.111*** (3.73)	0.0543 (1.80)
$\boldsymbol{Lab_{it-1}}$	0.0375 (0.59)	-0.0728 (-1.34)	0.0817 (1.28)	0.0388 (1.85)	0.0226 (0.96)	0.112 (1.57)	0.0773 (1.44)	0.173*** (3.78)	-0.0243 (-0.46)
Constant	0.170*** (9.68)	0.0924*** (4.17)	0.165*** (9.16)	0.0527** (3.05)	0.0910*** (6.88)	0.267*** (11.04)	0.211*** (4.73)	0.102*** (3.63)	0.127*** (4.08)
R^2	0.067	0.068	0.040	0.042	0.096	0.028	0.025	0.037	0.020
Observations	604	720	798	812	798	974	971	1034	1081

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

Table 5-7: Cross-sectional regression of firm investment via stock price (difference)

Dependent Variable： $\mathbf{Q_{it}}$									
Independent Variables	2006 (1)	2007 (2)	2008 (3)	2009 (4)	2010 (5)	2011 (6)	2012 (7)	2013 (8)	2014 (9)
$\boldsymbol{CF_{it-1}}$	0.0644* (2.01)	0.122*** (3.77)	0.187*** (4.66)	0.0929** (2.75)	0.102** (3.30)	0.118** (2.99)	0.00328 (0.11)	-0.0232 (-0.94)	-0.0189 (-0.84)
$\boldsymbol{OS_{it-1}}$	-0.115 (-0.57)	-0.103 (-0.36)	0.487 (1.11)	0.628 (1.71)	-0.445** (-2.65)	0.244* (2.47)	-0.0974 (-1.28)	-0.106 (-1.19)	0.179 (1.72)
$\boldsymbol{LQ_{it-1}}$	-0.0147 (-0.52)	-0.0371 (-1.61)	-0.0614* (-2.20)	-0.0604* (-2.45)	-0.0176 (-0.87)	-0.0153 (-0.62)	-0.0698*** (-3.39)	-0.0261 (-1.53)	0.0241 (0.93)
$\boldsymbol{I_{it-1}}$	0.163*** (5.15)	0.160*** (4.23)	0.0520 (1.34)	0.0953** (2.60)	0.218*** (6.91)	-0.0310 (-0.78)	0.0401 (1.74)	0.110*** (3.61)	0.0528 (1.73)
$\boldsymbol{Lab_{it-1}}$	0.0397 (0.62)	-0.0836 (-1.50)	0.0824 (1.29)	0.0344 (1.62)	0.0237 (1.00)	0.111 (1.53)	0.0761 (1.42)	0.178*** (3.84)	-0.0236 (-0.45)
$\boldsymbol{AB_{it-1}}$	0.0943* (2.18)	-0.0372 (-0.66)	0.0164 (0.28)	-0.0951* (-2.42)	0.0205 (0.49)	-0.0195 (-0.38)	-0.0529** (-2.77)	-0.0149 (-0.96)	0.0584*** (3.45)
Constant	0.102*** (5.00)	0.130*** (9.59)	0.157*** (10.76)	0.0732*** (5.66)	0.0834*** (8.54)	0.268*** (7.43)	0.132*** (7.98)	0.0530*** (4.31)	0.240*** (21.02)
R^2	0.066	0.059	0.053	0.048	0.094	0.028	0.026	0.033	0.017
Observations	595	700	763	803	793	967	970	1007	1065

***, **, * denotes significance at the 1%, 5% and 10% level, respectively.

5.6 Conclusion

In this investigation, the aim was to assess whether secondary stock market activities directly promote firm production development, and if so, what is the microscopic transmission mechanism between them. For individual indicators, the stock price shows a positive significant impact on firm development, which indicates that the production-related share price exhibits the economic rationality of Chinese security investment and the usefulness of market information. The stock liquidity shows similar findings with previous empirical chapters that significantly negative with firm production development. Previous empirical chapters suggest that a higher level of liquidity of shares results in poorer cash flows and weaker investment. Given that, both of which are the factors underlying production and thus the negative impact of liquidity on production is consistent with rational expectations, which denote that a high liquidity level undermines cash flows and investment and further reduces the level of firm production development. Unlike previous results, indicator of ownership structures show an insignificant effect and indicate that there is no direct ‘driving effect’ of shareholding concentration on development of corporate production. In the real economy, cash flow and investment primarily determined the firm’s development of production. Combine the positive and significant results of cash flow and investment with production development, an indirect effect is found. The changing of ownership structures can affect corporate production through its impact on the firm’s cash flow and investment.

Overall, the secondary stock market activities did affect corporate firm production development directly. This is because the stock market will be not only able to incentive capital flow to value-creating production projects but also reflects firm development by using capital value, which provides value incentive for the development of enterprises.

Chapter 6 : Conclusions and implications

Clearly, it is critical for policymakers to understand the relative costs and benefits of financial market development for the promotion of industrial development. Corporate managers also need to understand these costs and benefits when they raise funds from the stock market for business growth. For academic research, the view is prevalent that a stock market can promote economic growth via, first, the wealth-creation effect, and secondly, the access to public funds from a primary market to finance business expansion. However, apart from tax revenues raised in the economy, the current literature is very limited in understanding how stock trading activities on the secondary market can affect the growth of non-financial industry and so the economy. Particularly, how the growth of sales and the performance of the firm can be affected by stock trading of its shares on the secondary market in terms of transmission mechanism at a micro level has not been clear. This limit calls for research, which challenges the thesis.

For given the challenge, we take China as a case to study the issue since China is the largest emerging economy in the world with both the fastest growth of the economy and the rapid development of the stock market. . We developed a firm-level analysis which allows us to understand how firms are affected by stock trading of their shares through employment of two econometric strategies of estimation. The first, the fixed-effect panel model, is taken specifically for addressing the stock market-growth nexus at a micro level after control of the specific firm effect on the relationship. The second, as a consistency check used a cross-sectional test to address the issue of the causality. We collected a data set that includes 2233 Chinese listed companies from 2005 to 2015 for our empirical study of the effect of the stock market on the growth of industry against two markets: the primary market and the secondary market.

In the primary market, going public infuses a significant amount of external funds to the firm directly. This infusion should lead to more capital investment that supports business growth after the IPO. Indeed, it is found that the post-IPO increases firm investment significant. Against this finding, we ask a question on how long the impact can last and how much improvement it can make. Our estimated results show that the effect of IPO on investment only lasts for four years with a diminishing pattern over time. During this 4 -year period, the marginal investment with respect to public funding from IPO is 0.28 in the first year due to preparation of projects, 0.74 in the peak in the second year, gradually decreasing to 0.42 in the third year and ending up with 0.41 in the fourth year. As a result, the overall multiplier impact of the IPO on investment is 1.8 by adding all four marginal effects over the 4 years after the IPO. This multiplier effect suggests that once the IPO is made, public firms' investment can grow on average to 1.8CNY for every unit of capital raised from the primary market during the first 4-year period after IPO.

With respect to the secondary market, it is commonly understood that company's performance isa credible signal to the market that will affect the willingness of potential investors to invest in a firm accordingly. To the contrary, will this causation run from investment and trading activities in the secondary market for the growth of the firm? The study answered this question empirically and tried to shed some light on the role of the secondary stock market in affecting the growth of the firm. The estimated results have shown a way through which it affects the growth of a firm. Firstly, it is found that trading and investment activities in the secondary market which lead to the change in stock price are positively related to the three determinates of the firm on growth: the cash flow, investment and output. For instance, every 1% increase in stock price will lead to a growth of 0.05% on cash flow, 1% on investment and 0.06% on output, contemporarily. The increase in stock price shows a significant effect on "pulling" these three determinates up. Secondly, the change of ownership through equity trading reveals a significant causality relationship between cash flow and investment but not the output. As

ownership of top the 10 shareholders grow by 1%, there will be a 0.3% increase the cash flow and a 0.15% increase in investment simultaneously.

This study also illustrates alternative views about the role the stock market plays on the growth of the firm. The stock market may hinder the growth of the firm when the market becomes excessively liquid in trading the shares of the firm. In general, the more liquid markets make investment less risky and more attractive because they allow investors to sell or buy the equity of the firm easier and at a right price. The high liquidity reduces the risk of investment and so risk premiums, which in turn reduces the price of the share since the risk premiums are a part of share price (Amihud et al 2015). If banks link the credit risk of their loans to the expected value of the stock, then a drop in the share price can raise the risk and so create a negative effect on the firm in raising loan finance from banks. Moreover, the great stock market liquidity may hinder shareholders from playing a meaningful role in monitoring firm operation as a dilution of stock ownership and an increase agency costs which reduce firm performance.

Findings of this study explain a micro mechanism of transmission on how the momentum of the stock trading on the capital market can be transmitted to the growth of the firm in the non-financial industry. The mechanism turns the economic value of share stocks and investment trading activities to the "facilitator" in support of the growth of the firm. For a firm, cash flow, investment and productive output are three key factors in determining the growth of the firm, and they form an endogenously systematic triangular relationship in which they reciprocally and contemporarily affect each other. Once this systematic relationship is formed, the firm will internally run to a state of equilibrium, which stabilises the firm in balancing the systematic change in these three determinates that affect the growth of the business. When an external force comes to break the equilibrium, the process to re-

balance the three determinates into new equilibrium creates new momentum for the growth of the firm. Clearly, the secondary stock market plays an important role as an external force in generating shocks needed for the growth of the firm. If we regard the three endogenous determinates of the growth of the firm as three vertices of a triangle, the stock market then can be seen as the centroid of the triangle system. The change of the stock trading on the market in the centroid will generate an external shock on the equilibrium. The change from one equilibrium to another will bring a new stage of business development and so a new growth of the firm. This “triangular theory of the interaction of the three business-growth determinates with the stock market as a central source of an external shock” offers a good explanation to the micro mechanism of the spillover effect of the stock market including its secondary market trading on the growth performance of the firm.

In order to play the "supply effect" of the stock market in a positive role in promoting industrial enterprises and real economy growth, this study suggests a policy implication that China needs to develop the stock market in a way that can provide a robust and effective actuation to enhance corporate value and performance. The findings of the thesis provide straightforward policy implication: Firstly, introduce long-term strategic investors or capital into the stock market for a purpose of stabilising the value of the firm via reduction or control of the excessive trading on equity.

Secondly, stamp duty or stock transaction fee shall be discriminated further between the long-term investors and the short-term speculative investors. For the speculative investors, the duty or fees shall be raised more for enhancement of disincentives to their excessive short-term trading of shares. For long-term investors, the trading costs shall be lowered as incentives for them to hold shares longer. Application of the discriminative-fee or discriminative stamp duty policy can facilitate the stabilization of the value of stocks, which will reduce excessive liquidity of the share trading and then benefit the firms to grow their business.

Thirdly, a development plan for strategic investment funding should be established in the stock market. The strategic funding should enter the market orderly, and the amount of the funding should be correlated with GDP growth rate or industrial production growth rate synchronously. This suggested pace of the funding pumped to the market can control the bubble expectation of the market, making the market be more healthily sustainable for the growth of the economy.

At present, the Chinese stock markets have reverted to a commensurate scale that fits the development of the real economy, which provides a good foundation to implement above policies in the Chinese stock market.

The scope of this study was limited in terms of data selection. Since the study was limited to the specific Chinese stock market, it was not possible to generalise the results to other economies. It is recommended that further research shall be undertaken to other economies to classify different types of stock markets further. Additionally, further investigation and experimentation via numerical simulation are strongly recommended. It can help us further understand the overall impact of stock market trading activities on the good-producing sector of the economy.

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