A Literature Review of Financial Development Relieving Enterprise Financing Constraints on R&D

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Abstract. The aim of this paper is to sort out and review the literature on the microscopic promotion of financial development and technological progress, and further summarize the research status of the financial development to relieve enterprise R&D financing constraints. It is pointed that financial development is indeed able to promote technological progress through relieving R&D financing constraints of enterprise from three different perspectives, such as financial development functions, investment-cash flow and other perspectives. Based on the systematical analysis of research achievements, the deficiencies of existing researches and prospects are provided for future researches. The contribution of this paper is not only a necessary reference for the future research in this field, but also has an important theoretical value and practical significance for the long-term sustainable development of the economy in the future.

Introduction

Technological progress is the first impetus to the economy, the core of economic growth and the driving force of economic and social development. The connection between financial development and technological progress was firstly brought out in 1912 by Schumpeter who thought the core of economic development is credit service to firms provided by financial institutions. But he did not reveal the nature of financial development is how to promote technological progress nor empirical studies confirm this conclusion. Therefore, many economists embark on in-depth studies of its function mechanism and implementation mechanism. For example, Deng Honghui and Su Jirong (2011) use the dynamic panel data model to carry on the regression analysis to the Chinese sample data, the result shows that the financial development has the significant promotion effect to the technological progress by decomposing technological progress into technology innovation and technical efficiency [1]. Wang Wei and Zheng Yueming (2013) confirm the existence of this effect, and point out that because of the imbalance of Chinese regional financial development, the effect differs from region to region [2].

With the rapid economic development, increasingly complex financial architecture, problems faced in the process of technological progress tends to diversity, however, only from macro-level (national and regional level) the issue has not fully been explained, so it is necessary to deeply study the specific implementation mechanism of promoting technological progress from the micro perspective (industry or enterprise level).

The Origin of the Problem

Myers and Majluf (1984) deny the “perfect capital market” hypothesis proposed by Modigliani and Miller (1958), and emphasize that the market information asymmetry leads to higher costs of external financing than internal financing. Until the concept of financing constraints was proposed by Fazzari, Hubbard and Petersen in 1988, the existence of financing constraints was proved through the introduction of financing factors in the investment model. And they also found a
positive correlation between the intensity of financing constraints and the sensitivity of investment-cash flow.

Based on information asymmetry, the agency theory is put forward that information asymmetry will adversely affect the effective monitoring of the principal to the agent by Jensen and Meckling (1976). Hence, the principal will develop strict covenants and regulations to strengthen the management and supervision of the agent, resulting in agency costs. Furthermore, the problems of adverse selection and moral hazard in capital market cause financing constraints when the agent subjects to internal financial constraints to obtain funds through external financing.

In the process of enterprise growth, because the financing capacity and funds demand at various stages have different characteristics, there are financing constraints, financial gap and other problems, severely restricted the development of enterprise. Therefore, to study how to reduce the degree of financing constraints to the development of an enterprise and even a country’s economic development has an important theoretical significance and practical significance.

**The Formation of Enterprise R&D Financing Constraints**

From a macro perspective, the process of technological progress consists of research and development (R&D), technological innovation, new technological diffusion, optimization and upgrading of industrial structure and industrial technology, etc. From the micro level, it consists of innovative conception, project identification, research and development (R&D), pilot test, technological and innovative industry production, the stage of industrialization and market-oriented stage. Financial support is an important factor in all stages, especially in R&D activities as the starting phase (Keller, 2004). On the other hand, it is obvious that a country’s R&D level represents the national core competitiveness which is measured by the scale and intensity of R&D activities internationally, so increasing R&D input is necessary to improve the level of enterprise technology to promote sustainable economic development.

Edward B. Robert (1995) has been conduct several researches on enterprise of which R&D investment spending over 100 million dollars in America, Europe and Japan. He finds that increasing R&D intensity can bring profits, which further emphasizes the importance of R&D investment. However, as a special strategic investment, R&D investment is also facing financing constraints because of its long cycle, high adjustment costs, and highly asymmetric information (e.g., see the discussions in Himmelberg and Petersen, 1994; Barth and Lasznik, 1999). Adverse selection and moral hazard occur when the market for financing, as well as R&D cannot provide an effective asset mortgage as a fixed asset. All these issues illustrate that R&D is facing more severe financing constraints than the general investment.

Since high knowledge-intensive and technology-intensive high-tech enterprises are, they need to continuously invest a lot of funds in research and development to produce a large number of scientific and technological achievements. Thus many scholars have focused their attention on them, and conduct researches on R&D financing constraints in different ways.

As a result of enterprise’s own funds are the major sources in the basic research stage of R&D, it is found that high-tech enterprises have higher R&D investment-cash flow sensitivity and noted the priority of internal financing [3]. Cash flow for young, small-scale high-tech firms have greater impact on R&D than mature large-scale firms (see the surveys by Czarnitzki and Hottenrott, 2011; Lu Xin, Zheng Yangfei and Li Jianming, 2013) [4,5].

With further research, Tang Qingquan and Xiao HaiLian (2012) draw Kamien and Schwartz’s (1978) methods to subdivide R&D investment into conventional innovation investment and exploratory innovation investment from the heterogeneity of enterprise R&D perspective. Respectively for analysis, the two kinds of investments are both positively related to internal cash flow, and exploratory innovation investment is more sensitive.
The Mitigation of Financial Development on Enterprise R&D Financing Constraints

Zhou Yean (1999) reported that financial repression will deepen the degree of financing constraints, and it is not conducive to the growth of enterprise. Thus, it is concluded that improving the level of financial development through financial liberalization and financial deepening continuously will be the better way to broaden the financing channels and increase the supply of external funding, so as to alleviate financing constraints.

According to early researches, financial deepening does have a positive effect on alleviating financing constraints, but financial liberalization does not have the effect through the analysis of Ecuadorian enterprises [6]. It is pointed out that the financial liberalization makes the reduction of the preferential credit and welfare subsidies for small firms, resulting in the problem of the enterprise financing constraints has not been effectively alleviated. In general, financial liberalization failed to significantly relieve the financing constraints, but when the firm size factor added consideration, found that the mitigation effect of financial liberalization for small firms is more significant than large firms (e.g., Laeven, 2003). Beck (2002) also stressed the importance of the level of financial development, particularly the bond market and stock market developed level, and noted that developed market has greater mitigation effect on financing constraints.

Thus it can be seen, a highly unified conclusion has not yet been given. It is necessary to try to further investigate the mitigation effect of financial development on enterprise R&D financing constraints from different aspects.

Analyzing the mitigation effect from the perspective of financial development functions

Merton and Bodie (2005) proposed complete financial development functions, including information processing, risk management, project management, and mobilization of savings and trade facilitation. Many related studies have shown that developed financial markets can overcome information asymmetry problems and easily get more related information about R&D activities to reduce financing costs by processing information [7]. For instance, Zingales and Rajan (1998) through multinational study find that the overall economic growth and investment efficiency is low in less-developed countries, while enterprise can more easily collect and obtain investment information and reduce the costs of processing information to enhance the ability of external financial management in the high level of financial development countries.

In addition, more optimal portfolio can be provided by developed financial market to diversify investment risks and optimize resource allocation, to ensure the high return of investment projects at the same time to reduce the risk. It is obvious that it can increase the supply of R&D funds and relieve enterprise R&D financing constraints. Moreover, to reduce the risk of moral hazard and adverse selection problems can spur investors’ willingness to invest and redistribute savings reasonably to reduce transaction costs, so as to alleviate the pressure of enterprise financing.

Another problem existed in market is agency problem which generates the cost differences between supervision and agency. The reasonable financial system arrangement can effectively supervise the managers to make the interests of shareholders and managers tend to be consistent and avoid the risk behavior of the managers because of the pursuit of high profit returns. Therefore, enhancing the effective management will inspire the willingness of investors to invest in the meanwhile, so as to alleviate financial constraints. In the country with higher level of financial development, the problem of agency is alleviated, and the difficulty of R&D financing is reduced. On the contrary, the less developed financial market is, the more serious the agency problem is. And it eventually leads to the low innovation ability and slow development of the economy as a whole (e.g., Beck, 2002).

Analyzing the mitigation effect from the perspective of investment-cash flow

The internal funds as an indication of future investment opportunities, is an important factor in R&D investment. Having sufficient cash reserves not only helps enterprise grasp the opportunity of innovation investment, but also in time to deal with the problems of insufficient investment and
financing gap in the enterprise, and make full use of the hedging effect on the investment-cash flow sensitivity.

Love (2003) used the Euler investment equation to study the existence of external financing constraints, which makes the enterprise rely heavily on internal funds, resulting in the increasing of investment-cash flow sensitivity and sub-optimal investment level. And raising the level of financial development can increase the external supply of funds, reduce enterprise investment-cash flow sensitivity and improve the level of enterprise investment and its effectiveness. Islam and Mozumdar (2007) confirmed the conclusion of Love (2003) by further study and proclaimed that financial development and enterprise external financing constraints exist a significant negative correlation. It is obvious that the lower the level of financial development is, the more severe external financing constraints are, and the greater investment-cash flow sensitivity is.

More recently, Kuang Xuewen (2011) used the similar methods which adding cross multiply items of financial development and internal cash flow in FHP model to divide sample firms into different groups and come to different conclusions about the relationship between the financial development and the external financing constraints of enterprise [8]. To be specific, for financing constraints firms, to raise the level of financial development can significantly reduce the investment-cash flow sensitivity, ease external financing constraints and improve the level of investment. On the contrary, for non-financing constraints firms, financial development and corporate financing constraints are positively correlated. Yuming Gui and Pan Hongbo (2008) studied of the Chinese state-owned listed companies and come to the opposite conclusions that the higher the level of financial development is, the smaller the size of loans of state-owned enterprise is, and the shorter the duration of the loans is, which is due to the nature of the state-owned enterprises and noted that government intervention makes loans to banks and enterprises are inefficient.

Analyzing the mitigation effect from other perspectives

Zhang Jie (2011) studied the effect from the support of financial system to R&D investment perspective, and the results showed that financial development bring significant negative effect on R&D before 2004, but after 2004 this negative effect gradually disappeared, indicating that raising the level of financial development can expand R&D financing channels and sources of funding. Xie Weimin and Fang Hongxing (2011) through the financial development regionalization empirical investigation of regional financial development easing enterprise R&D financing constraints, the results indicated that through improving the market allocation of resources and buffering market frictions, financial development makes enterprise to obtain the source of R&D funds more widely and reduce the degree of R&D financing constraints, especially for smaller companies and private property control of enterprise.

Based on financial development functions, Wang Shanhui (2013) from the cost and quantity of two aspects of the financial development of enterprise R&D financing constraints explained the mitigation effect microscopically [9]. The results show that financial development can increase the quantity of R&D and reduce the costs of R&D investment, and point out that different ownership and growth stages of firms exhibit significant differences in the mitigation effect, which private firms and young firms’ investment spending on R&D is more susceptible to financial development. With the increasing development of science and technology, the fusion of finance and technology is given to alleviate enterprise external financing constraints on R&D effectively [10]. That is, the higher the level of financial development of science and technology is, the greater the marginal efficiency of R&D investment is.

Conclusions

In summary, the improvement of the level of financial development is conducive to reducing the market frictions and optimizing resource allocation, but also can reduce financing costs on R&D, improve firms’ financing abilities and broaden the financing channels. For this reason, it can relieve
firms’ R&D financing constraints, and increase the investment in scientific and technological innovation, as well as promote technological progress and economic growth of the whole economy.

At present, there are some limitations in the study of the impact of financial development on R&D financing constraints of the above three perspectives. Firstly, various functions of financial development are indeed able to overcome the obstacles in the process of technological progress, but only based on the functional perspective of the research is not able to explain a variety of functions to play a role in what way, and how to relieve the financing constraints on R&D from the firm’s internal or external. Secondly, from the perspective of investment-cash flow, the internal factors of R&D financing constraints are revealed, and the sensitivity of investment to cash flow is a bridge between financial development and R&D financing constraints. Finally, from other perspectives, such as enterprise ownership structure, enterprise scale, regional financial support level and so on, the analysis of the mitigation effect with combination of internal and external is the complement and extension of the above two perspectives. In contrast, the integration analysis of multiple factors is more inclusive and persuasive.

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References


