

KDI 36th Anniversary International Conference

Financing Innovation-Oriented Business to Promote Entrepreneurship:

Experiences of Advanced Countries and
Lessons to Korea

Edited by

Dongsoo Kang



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Opening Ceremony

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Conference Program

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Preface

As today's 12th largest economy in the world, Korea has evidenced decades of phenomenal economic growth since the 1960s. With the government intervention and fostering of the so-called "*Chaebols*" groups, these large enterprises (LEs) have strengthened Korea's economic competitiveness up until the financial crisis of the 1997, as they had enjoyed considerably favorable policies compared to the Small-Medium Enterprises (SMEs). Consequently, it is noteworthy that massive domino failures of both LEs and SMEs during the crisis was marked largely by these two contributing factors: first, the large enterprises which were more or less specialized in making business models with well-developed ideas had over invested; and second, the government failed to intervene in creating a nurturing environment for SMEs. In addition to these factors, the Korean economy is evidencing a decrease in the potential growth rate, with staggering income and employment gaps spanning from the past decade. The increasing economic burdens generate far greater social and welfare complications in our country.

In the midst of this critical developmental phase-shift, the Korean government has identified LEs and SMEs as major drivers of growth along with the growing IT sector. Specifically, it must foster the transition into a more flexible economic system that can efficiently introduce market-friendly entrepreneurship policy so that innovation-oriented businesses can play a contributing role to the economic growth and dynamism. Although the efforts have been stepped up especially after the financial crisis of 1997, the results are still far reaching, as we are not able to reach majority consensus from the public in establishing a new development model.

We realized that in order to revitalize the nation's economy and society businesses must be innovated and willing to forge opportunities from risks. In accordance to this idea, SMEs' clear strength lies in its clear flexibility in terms of size, organization, and management to bring newer ideas into the current knowledge based market. Clearly, Korea must learn how to use this advantage in the context of its strength on such areas as the information technology and thriving electronic market.

It is with this regard that I hope the conference hosted by KDI on the theme of *Financing Innovation-oriented Businesses to Promote Entrepreneurship* would extensively access to and debate on the following issues: first, understanding the nature of innovation-oriented businesses and their importance in sustainable economic growth; second, exchanging the experiences regarding the financial and R&D policies related to small- and medium-sized enterprises (SMEs); and finally, recommending feasible policy suggestions to promote innovative SMEs in the context of entrepreneurship policy framework. In its focus, the conference overviews the obstacles for investing in technology-based small firms and identifies the

necessary steps for establishing a sound financial institution that would foster an innovation-oriented business.

Since the booming of its industrialization nearly three decades ago, Korea's economy have witnessed phenomenal development in the current era of knowledge-based society. Now, with the recent conclusion of the FTA with the United States, we hope that removal of trade barrier with the largest economy in the world will expedite institutional reform and contribute to the next wave of economic boom for Korea. Finally, I hope that this trade liberalization brings a challenging impetus in Korea's efforts to revitalize the SMEs sector and our economy at large.

This conference volume is edited by Dongsoo Kang, a KDI fellow who organized the conference on the April 26th, 2007. I appreciate his great efforts in successfully organizing the event and publishing the output as a conference volume. The individual authors and editors would like to express special thanks to session chairs and commentators at the conference: Joon-Kyung Kim, Suk Heun Yoon, Joo-Hoon Kim, Kyung-Mook Lim, Youn Seng Chung, Changyong Rhee and Jung-Han Koo. They provided detailed and useful comments. Along with the seminar participants, I would like to express my special thanks to the presenters who did not submit papers in this volume: John Holloway at the European Investment Fund, Christine Liu and Glynis D. Long at the Small Business Administration of the USA, Jeong-Il Kim at the Ministry of Commerce, Energy and Industry of Korea and Si Woo Kang at the Small and Medium Business Administration of Korea. However, they proposed valuable comments and opinions based on their rich experiences so that this conference is well balanced between the fields of research arena and hands-on experience. Finally, Kang, the editor of this volume, would like to thank Woojin Park, Hyun Ah Kim, John Kim and Nanhee Kim for taking care of correspondence, logistical support and editorial assistance.

I wish that this conference volume lays the ground works for addressing the Korea's major issues in terms of structuring sound policies and measures for nurturing SMEs for the sustainable growth of Korea's economy. Hopefully, it can draw in many valuable recommendations from the best practices of other nations, and interchangeably, draw out implications for constructing effective SMEs policies for the future. The judgments and views expressed in this volume, however, are the individual authors' own and do not reflect the KDI's official position.

Jung Taik Hyun

KDI President

CHAPTER 1

Introduction

Dongsoo Kang
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2005 is remembered as a remarkable turning point to many policymakers and researchers who have interests in the financing of small and medium-sized enterprises (SMEs) in Korea. It was the year that sustainability of SMEs and cost of SME financing were taken into serious account and introduced in the system. Despite numerous concerns and consequent policy measures before 2005 that reflected the efficiency of SME financial assistances, they remained as general provisions towards SMEs, namely isolated economic minorities during the rapid growth era and in the course of crisis recovery, under the theme of social redistribution. A variety of concerted efforts from most relevant government authorities to reform the SME financial assistances in 2005, however, enabled SMEs to acknowledge the real cost of capital in the public financial assistances such as credit guarantees.¹ Indeed, SMEs have been regarded as one of the reform-proof areas in Korea for their dominance in consisting of economic population which is often related to votes in political elections. It would have been almost impossible unless the pan-governmental efforts based on the empirical analyses had been made in such a concentrated fashion.

As a meaningful first step as they are, the 2005 policy changes achieved only a partial success. The government authorities were not entirely independent of realistic problems that would bring about turmoil and crunch in the transition period of reforms in credit allocations and its costs. They should be responsible for not only reforms but also the stresses caused by the changes. More fundamentally, they did not have a clear picture for the vision of overall SME financial policies in the coming era of globalization. SME is a sector to which most countries, even advanced ones, pay special attention from the standpoint of raising economic growth potential as well as supplying equal opportunities. While Korea is situated between developing and developed stages, Korea's SMEs are accustomed to the

¹ See Ministry of Finance and Economy (2005) for the SME financial policy reforms in 2005.

policies in the developing era and the government is cautious of side-effects along with the reforms. As a matter of fact, the Korean policymakers lack convincing evidence about the status and sustainability of current SME financing and understanding of a striking balance between public and private contributions in financing SMEs in the developed economic stage.

Korea Development Institute (KDI) which had participated in the 2005 reform as an analyst of the existing policy performance evaluations initiated new research efforts to propose one-step further suggestions for SME financial policies. Among various types of SMEs, KDI focuses on innovation-oriented businesses, for which draw interests from policymakers in light of widening and deepening growth potential in Korea. As other countries, Korea is making every attempt to search for a new engine of growth in a global competition regime in which prior industrial policies could not be accepted and effective. A primary interest should then be given to innovative SMEs which have advantages of hosting economic efficiency and creates markets. Due to flexibility in size, organization and management they are in an easier position to bring new ideas and to take risky attempts than large enterprises (LEs), which more or less specialize in making business models with well-developed ideas. Complementary cooperation between SMEs and LEs is thus recognized as a key factor to invigorate the dynamism of economies. In addition, innovation is closely related to job creation: innovative firms have more contribution to create jobs than conventional brick and mortar companies. Hence, innovative small businesses deserve keen interests and it is a legitimate issue how to promote innovation-oriented SMEs from the perspective of financial policymakers.

The United States have long been creative in designing and implementing policies to sponsor innovation-oriented businesses, though the main initiative comes from the private sector. Since the government's role is very limited, the private players like financial institutions, investors and markets have developed necessary infrastructure such as information gathering, evaluation, funding, recovery, etc. The government authorities just supplemented market making in the early stage and market failures such as instituting the Small Business Investment Companies (SBIC) in order to fill up the gap caused by the bank regulations. European countries which fall a bit behind the United States and have more economic weights of SMEs have tried to develop entrepreneurship policy for the last ten years. Nordic countries like Sweden, Finland and Denmark along with the United Kingdom are the leaders in this policy and most continental countries join this initiative. To date entrepreneurship policy with a focal point on innovation is one of the most important agendas in EU SME policy.

In line with these domestic needs and international trends, the theme of the conference hosted by KDI on April 26, 2007 was set as *Financing Innovation-oriented Businesses to Promote Entrepreneurship*. The scholars and policymakers in Korea and advanced countries participated in this conference and discussed the financial tools to foster innovative SMEs. Korean participants mostly provide empirical observations on the hitherto entrepreneurship of SMEs, their financing practices and government financial assistances in the case of Korea and raise the issues of interest. Foreign participants introduce best practices of SME financing over developmental stages in advanced economies and suggest policy directions to put more emphasis on the innovative efforts of SMEs and their further growth to be a large enterprises as well as dynamic environments under which entrepreneurs easily start businesses. The proposed observations, experiences and ideas are then discussed by the panel which consists of paper presenters, commentators and policymakers. This volume is the outcome of these efforts at the conference. In the rest of the introductory chapter, each paper presented at the conference is summarized.

Chapter 2 (by Thorsten Beck) begins to discuss general constraints of SMEs. This chapter surveys empirical researches showing that SMEs are more constrained by financing and other institutional obstacles than LEs. Beck uses the concept of the access possibilities frontier to explain how difficulties in managing risk and transaction costs involved in SME lending makes financial institutions and markets so reluctant to reach out to this group of enterprises, especially in developing countries. Though there exist a number of studies reporting that small firms suffer more from financing and other constraints than large firms, he stresses the policy focus shifting away from size-oriented policies towards policies that level the playing field between firms of different sizes and allow for entry of new enterprises. It is not size itself that justifies intervention, but rather the potential of small firms to grow into medium and large enterprises and to contribute to the economy and the fact that institutional and market failures create an uneven playing field between firms of different sizes. The focus should therefore be both on reforms of the business environment that affect all enterprises and foster entrepreneurship, but also on policies that can help SMEs overcome financing constraints particular to their firm size and risk with less emphasis on the subsidies to small enterprises per se.

From Chapter 3 to Chapter 5, KDI fellows present empirical evidence regarding entrepreneurship and government financial assistance policies in Korea. Chapter 3 (by Sanghoon Ahn) demonstrates the firm dynamics, in Korea, in which capital and labor are reallocated from declining to growing sectors. Using the micro data of the *Report on Mining and Manufacturing Survey*, which is a complete enumeration survey by National Statistics Office,

Ahn analyzes the entry and growth of Korean SMEs that are playing a pivotal role not only as a growing source of growth and employment in advanced countries, but also as a main platform of firm dynamics and accompanying innovation activities.

The main observations are as follows. First, as confirmed in the empirical analyses of other countries based on micro data, most of new entrants withdraw in the early period of entry. However, once new firms overcame the initial barriers to survival, the firms grew even faster than mature firms. Second, High-growth SMEs that were in top 10% in terms of average growth rate have higher productivity and more advanced labor structure, and are more active in R&D and export. Third, according to the regression analysis for firm-level employment growth, factors found to have positive effect on growth are: proportion of non-production workers by firm, R&D intensity by industry, capital equipment ratio by firm, growth rate of FDI, export, and import by industry, proportion of export to and trade with the U.S. by industry, growth rate of trade by industry, export intensity by firm and by industry, etc. Focusing on the growth factors for SMEs identified, this chapter emphasizes the importance of human resources, R&D activities, efficient financial system which enables lively investment activities by SMEs, and active opening of market in the face of internationalization of production.

Chapter 4 (by Dongsoo Kang) put forth the empirical analyses which pool the database of various public financial institutions from the SMEs' perspective and to keep track of the performance of assisted SMEs over time in Korea. As for the firms randomly sampled dynamic effects of government SME assistances such as credit guarantee, direct loan and venture capital investment are evaluated. The main findings of the analyses are as follows. First, venture capital investments have turned out to be the most effective financial assistance instruments in most performance measures: profitability, business activity and economic influence of the assisted firms over time. Their outstanding performance seems to stem from thorough examinations of private sectors on creditworthiness and future performance along with aligned incentives to investments. Second, the credit guarantees have shown quite disappointing effects on the guaranteed firms, regardless of the performance measures. This observation is consistent to the bailout conjecture that public guarantee scheme may be used to rescue financially insolvent and unviable firms. This finding could be understood as a ground for reforming the credit guarantee system which was already recommended by international organizations like IMF and OECD. Third, the effects of policy loans have been dubious: its effect on profitability is at most insignificant, while the effects on sales and economic value-added increases are significantly positive. Therefore, these loans seem

to have achieved their policy objectives since they target for mediocre SMEs that manage to create values in the economy, though not so profitable.

Chapter 5 (by Suil Lee) evaluates the role of the Korean government in the venture capital investment. Lee compares the investment behaviors of the outside funds to which the government committed capital with those of the outside funds in which the government did not participated. It is observed that, during the venture boom, the government failed in inducing investment from outside in the companies at an early stage which suffered from financing due to informational asymmetry and uncertainty to a high extent. The government also failed in guiding common stock investment. In contrast, venture capitalists' own investment proceeded apace in the opposite direction against the government's objectives even in the outside funds of its high stake. The data indicate that these types of policy failure disappeared after the venture boom, though there is little evidence that the government has succeeded in achieving its goal during the post-boom period. Indeed, the empirical analysis demonstrates that the government's participation in the venture funds has not been effective in bailing-in private venture investments toward high-tech industries during the post-boom period.

It is yet clear to pinpoint the reasons why these undesirable investment patterns, from the viewpoint of the government, take place, in particular during the boom period. One plausible scenario might be that, even though the government intended to support venture capital industry, it has no willingness to take risks on losing money in any case. As such, venture capital firms should have implicit but directed mandates and corresponding incentives to manage government-invested outside funds in a relatively safe manner, so as to invite further government investments. The risk avert venture investment behaviors could consequently be generated. If this has been the case, the fundamental reason for the unsatisfactory venture capital investment behaviors might stem from the fact that the government is to direct two incompatible objectives to venture capital industry: investing adventurous firms and not losing money. Note that the very nature of venture capital takes it for granted to run on risks of losing money for high but volatile returns. Therefore, from the viewpoint of the Korean government that has actively engaged in the fund-raising stage, it needs to take more flexible stance to allow the likelihood of losing money in order to achieve the original policy objectives of its venture capital investment. To this end, the government should instead spend more resources in selecting qualified venture capital firms, monitoring their investment activities, and evaluating the performance.

The following chapters contain the international experiences on SME financing and lessons in the advanced countries. Chapter 6 (by William

Bygrave and Andrew Zacharakis) accounts for the role of informal investment in fostering entrepreneurship using the Global Entrepreneurship Monitor (GEM) database.² In this chapter, the term *informal investment* is used in a broad sense to include not only an investment but also a loan and even a gift.³ Bygrave and Zacharakis argue that self-financing by entrepreneurs themselves and from family, friends, and strangers is fundamental to entrepreneurship. While venture capital receives a lot of attention from policymakers, the media and academics, the more important sources of startup capital come from informal investors. Important as venture capital is in the acceleration of super-star companies, it affects only a tiny number of companies. Informal investment is an essential ingredient of an entrepreneurial nation, whereas venture capital makes no perceptible difference to the overall entrepreneurial activity at the grassroots. Therefore, a nation that wants an environment in which entrepreneurs thrive and prosper must first and foremost have policies that facilitate informal investment.

Chapter 7 (by John Thompson) examines the methods of financing SMES in Europe, especially those in innovative and high technology sectors. There does not appear to be a general problem of financing SMEs in European countries. While the SME sector has satisfactory performance in most European countries, however, the innovative small- and medium-size enterprise (ISME) sector in Europe lags behind the level of the United States by a considerable margin. One of the possible factors explaining the differences in level of development of ISMEs between Europe and the United States, as well as among European countries, is the general business environment in which ISMEs operate. While there is no general problem in SMEs, there is a significant problem in finding appropriate financing for ISMEs. This does not result from a scarcity of institutional savings and there are numerous national and EU programs to support ISMEs. Moreover, there large pools of capital in private equity funds that are potentially available for investment in buyouts and restructurings or in venture capital. Low early stage rates of return, weak informal venture capital or *business angels* and unsatisfactory performance of exchanges for venture businesses, however, prevent IMSEs from getting sufficient funds.

Thompson suggests the best ways in which governments can implement policies that encourage ISME would be those that help support infrastructure for informal venture capital: in particular, non-financial

² GEM that was launched in 1997 by scholars at Babson College and London Business School has developed into one of the world's leading research consortia, concerned with improving knowledge about the relationships between entrepreneurial activity and national economic growth.

³ In contrast, the term *classic venture capital* includes money invested by professional venture capital firms in seed, early, startup, and expansion stage companies.

support to ease flows of information between entrepreneurs and investors. Business angel networks are particularly in need to non-financial support including the provision of facilities such as incubators and business parks. In early stages, information asymmetries are especially important and measure those facilitate exchanges of information among potential investors and entrepreneurs are especially useful. Finally, any financial support (tax incentives or direct public investment) should carefully target incentives so that risk is shared among the parties and that investors can keep the greater part of the upside of such investments.

Chapter 8 (by Jay Eisbruck) introduces a kind of innovative financial commodities for innovation-oriented businesses. Eisbruck reviews the basics of credit analysis and the evolution of the market for the securitization of the a variety of intellectual property (IP) asset classes – film receivables, franchise fees, trademark licensing royalties, patent licensing royalties, and music royalties. During the last few years, the securitization of various types of IP has evolved from a small niche market utilized by individual artists or thinly capitalized companies to a broader corporate financing tool used to facilitate mergers and acquisitions, stock buybacks, and risk transference to investors. Moody's has rated the overwhelming majority of these transactions, with original ratings ranging from Aaa to Ba3. Moody's expects continued growth in the market – with perhaps 10 new transactions in 2007 -- as more companies learn of the potential benefits of securitization and investors become increasingly receptive, due in part to the wider availability of historical information on asset performance. In the future, this asset class has the potential to grow dramatically due to the billions of dollars of annual revenues generated by these assets.

Proposing a new perspective to understand the relation between entrepreneurship and innovation, Chapter 9 (by Sergio Arzeni) points out that the goal in financing innovative SMEs is to progress along a financing continuum from informal finance, through various phases of formal finance, culminating in entry into the formal regulated capital markets. Arzeni focuses on a key reality that innovative SMEs require funding for a period during which they are not generating sufficient revenues to cover expenses. Moreover, even when innovative SMEs begin to generate revenue, the need to re-invest heavily in the company means that the company will have negative cash flow for prolonged periods. Thus, risk capital usually assumes that the project will require multiple rounds of injection of outside funds. Such a series of financing scheme toward innovative SMEs obviously asks for a high degree of transparency and a high degree of confidence that the outside investor will be protected.

Arzeni puts an emphasis on two drivers that lead a successful environment for fostering innovative SMEs from the financial perspective:

location and talented labor. Geographic proximity is an ingredient in building an environment conducive to innovative SME development. Investors must remain in ongoing communication with technical innovation, innovative entrepreneurs and the marketing plans of competitors. Therefore, these investors, as well as the entrepreneurs they support, tend to be located near technology clusters, concentrated in areas near universities and other research facilities. Many of these locations are not in the traditional financial centers of their own countries, suggesting that geographic proximity to entrepreneurs and researchers is more crucial than proximity to traditional providers of finance. On the other hand, the cases of Silicon Valley and cities such as Toronto or Dublin demonstrate the important contribution that the attraction of talented labor can make to the stimulation of entrepreneurship, often in knowledge-intensive sectors. Indeed, the attraction of skilled and talented workers from overseas should go hand in hand with policies to upskill the domestic workforce.

Chapter 9 also sends the messages to government policymakers based on international experiences, mostly from the advanced countries. Though surveys of potential entrepreneurs often indicate that the lack of financing is perceived as a barrier to enterprise formation, many potential investors report a scarcity of investment ready proposals. Thus, instead of allocating more funds to innovative SMEs, it is worthwhile to note that channels of communication for entrepreneurs and investors constitute a critical part of the infrastructure. In addition, government intervention should not seek to alter the basic nature of risk capital which is that entrepreneurs must persuade investors to accept high risk in the hope of obtaining high return. Project selection must be made by the private partners and the reward structure should allow the official side to obtain a reasonable return on the investment, but leaving a substantial benefit potential to the private partners.

Finally, in Chapter 10, the messages at the roundtable discussion of the conference will be summarized with editor's concluding remarks on the future SME financial policies in Korea.

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CHAPTER 2

Financing Constraints of SMEs in Developing Countries: Evidence, Determinants and Solutions

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World Bank

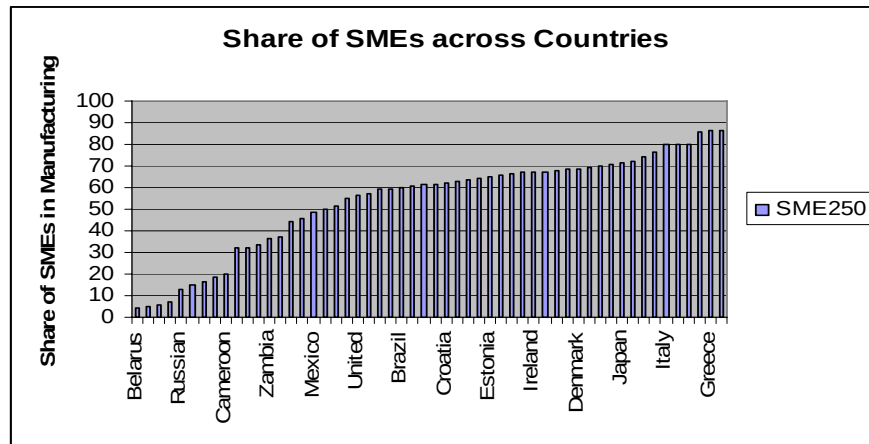
1. Introduction

Small and medium enterprises account for a large share of enterprises and a large share of overall employment in the private sector of most economies. Employment in enterprises with up to 250 employees constitutes over 60% of total employment in manufacturing in many countries (Figure 1), which justifies the statement that “SMEs are the emerging private sector in poor countries and thus form the base for private sector-led growth” (Hallberg, 2001). Cross-country evidence, however, also shows that small and medium enterprises are more constrained in their operation and growth than large enterprises and access to financial services features importantly among the constraints (Ayyagari, Demirgüç-Kunt and Maksimovic, 2006).

This paper summarizes recent empirical evidence on SMEs’ financing constraints and patterns. While offering broad cross-country comparisons, it should be noted that this paper focuses mainly on developing and emerging markets. It offers a conceptual framework to understand why financial institutions in most countries are so reluctant to reach out to these enterprises and discusses different policies and reform that can increase SMEs’ access to external finance. Based on this framework, the paper goes on to discuss government’s role in enhancing access to finance, ranging from institution building over providing regulatory frameworks to market-

* World Bank, Development Research Group. This paper is based on joint research with Aslı Demirgüç-Kunt and Augusto de la Torre and has benefited from the insights of many of my colleagues. It was prepared for the KDI conference on “Financing Innovation-Oriented Businesses to Promote Entrepreneurship.” I would like to thank conference participants and Leora Klapper for helpful comments and suggestions and Edward El-Hussainy for excellent research assistance. This paper’s findings, interpretations, and conclusions are entirely those of the author and do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

Figure 1. The Importance of SMEs across Countries



Note: This graph shows the share of employees in manufacturing across countries working in enterprises with fewer than 250 employees.

Source: Ayaagari, Beck and Demirgüç-Kunt (2007)

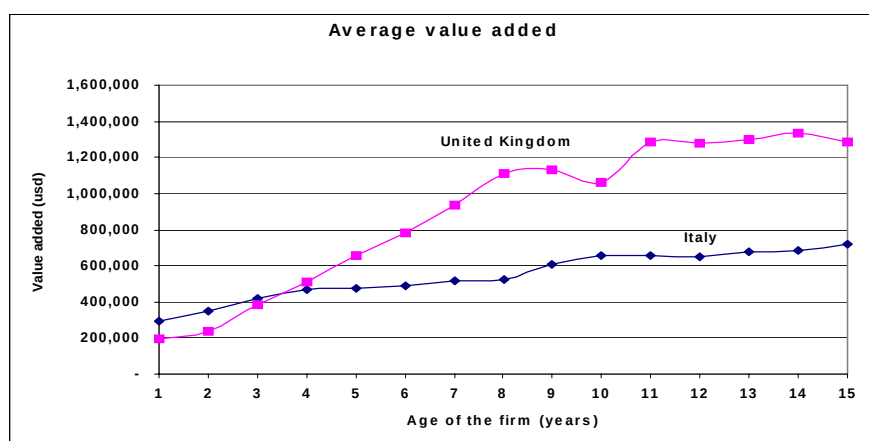
friendly activist policies, while at the same time noting potential pitfalls in governments' attempts to enhance SMEs' access to credit.

Policy efforts targeted at SMEs have often been justified with arguments that (i) SMEs are an engine of innovation and growth, (ii) they help reduce poverty as they are more labor-intensive, but (iii) they are constrained by institutional and market failures.¹ While country-level and micro-economic studies have not provided conclusive evidence on these arguments, recent cross-country evidence does not support the claim that countries with a larger share of SMEs in the manufacturing sector grow faster or see their poverty rates fall faster (Beck, Demirgüç-Kunt and Levine, 2005). Specifically, there does not seem to be any robust relationship between the share of small, medium or large enterprises and economic development. On the other hand, cross-country research has pointed to the institutional and business environment in which enterprises operate as an important factor for economic development. The business environment includes – among other elements – well-defined property rights, both between private parties and protection against government expropriation, effective contract enforcement, competitive product, labor and capital markets, and a legal framework that allows for relatively easy entry and exit of enterprises. Klapper, Laeven and Rajan (2006) show how different elements of the

¹ See Biggs (2002) for an overview.

business environment affect economic growth through the entry of new firms. Specifically, high firm registration costs hamper new firm creation and growth, while property right protection and regulations fostering access to finance are conducive to firm creation and growth. The effect of policies might also explain the absence of a robust relationship between the size of the SME sector and growth, as a comparison between Italy and the UK illustrates. On the one hand, Italy has high registration costs and many old, inefficient and slow growing SMEs, while the UK with low entry barriers has firms that enter at a lower scale than in Italy but grow more rapidly (Figure 2).

Figure 2. Italy vs. U.K.: Firm Size at Entry and Over Time



Note: This graph shows the average value added for firms at entry and over time in Italy and the U.K.

Source: Klapper, Rajan and Laeven (2006).

Taking together, this implies the policy focus shifting away from size-oriented policies towards policies that level the playing field between firms of different sizes and allow for entry of new enterprises. While small firms suffer more from financing and other constraints than large firms, it is not size itself that justifies intervention, but rather the potential of small firms to grow into medium and large enterprises and to contribute to the economy and the fact that institutional and market failures create an uneven playing field between firms of different sizes. As we will argue below, the focus should therefore be both on reforms of the business environment that affect all enterprises and foster entrepreneurship (Klapper and Quesada-Delgado, 2007), but also on policies that can help SMEs overcome financing

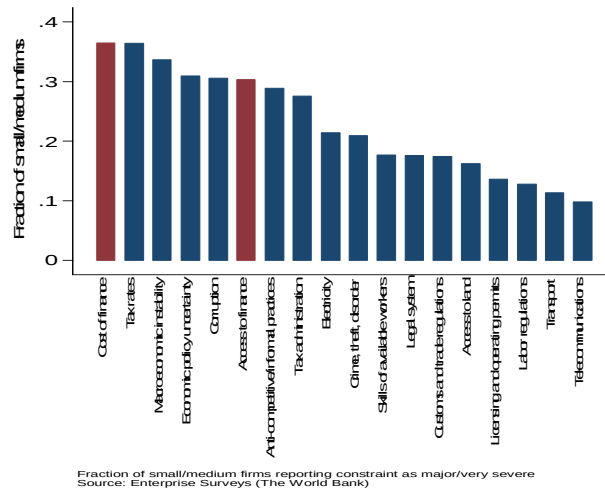
constraints particular to their firm size and risk. The focus should be less on subsidies to small enterprises per se.

The remainder of this paper is structured as follows. Section 2 summarizes recent empirical evidence on SMEs' financing constraints and patterns. Section 3 offers a conceptual framework to understand why financial institutions are reluctant to reach out to SMEs. Section 4 uses this framework to discuss policies to overcome these constraints and section 5 discusses in detail government's role. Section 6 concludes.

2. SMEs' Financing Constraints – The Evidence²

Access to and cost of finance is often ranked as one of most constraining feature of the business environment by SMEs (Figure 3). Specifically, the cost of finance is rated by over 35% of small and medium enterprises as major growth constraint in a sample of 71, mostly developing, countries, more than any other characteristic of the business environment, including tax rates and macroeconomic instability, also rated by many SMEs as major growth constraints. Access to finance is rated as major constraint by around 30% of small and medium enterprises, a similar proportion as economic

Figure 3. Growth Obstacles Reported by Small and Medium-size Enterprises



Note: This graph shows the proportion of SMEs reporting different aspects of the business environment as major obstacle to their operation and growth. Data are from the Investment Climate Surveys across 71, mostly developing and emerging, economies.

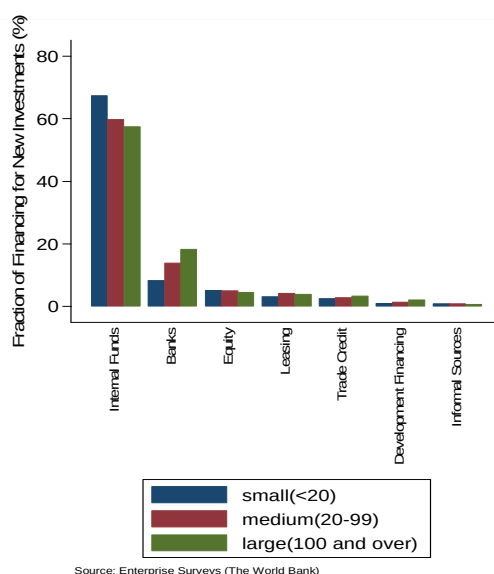
² This section builds on Beck and Demirgüç-Kunt (2006).

policy uncertainty and corruption. Further, financing is one of the few characteristics of the business environment that – together with crime and political instability - is robustly linked to firm growth, while other features have at most an indirect effect on firm growth (Ayyagari, Demirgüç-Kunt and Maksimovic, 2006).

Small firms consistently report higher financing obstacles than medium and large enterprises (Beck, Demirgüç-Kunt, Laeven and Maksimovic, 2006). Smaller, younger and domestic- (as opposed to foreign-owned) enterprises report higher financing obstacles even after controlling for other firm characteristics. The relationship is not only statistically but also economically significant. The probability that a small firm lists financing as a major obstacle (as opposed to moderate, minor or no obstacle) is 39% compared to 36% for medium-size firms and 32% for large firms.

The higher financing obstacles reported by small as compared to large firms are also reflected in financing patterns (Figure 4). While small firms finance less than ten percent of their investment needs with bank finance, large firms finance more than 20% with bank credit. Large firms have a similar, though not as strong, advantage, in trade credit and development

Figure 4. Financing Patterns Across Firms of Different Sizes

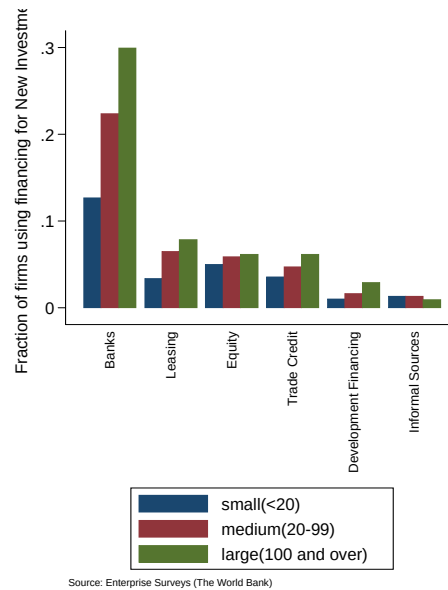


Note: This graph shows the share of investment financed from internal finance and different external financing sources. Data are from the Investment Climate Surveys across 71, mostly developing and emerging, economies.

finance, while small firms seem to finance a larger of investment with equity and informal finance, compared to large firms. Small firms also finance a significantly larger share of their new investment with internal resources than large firms. Further, small firms are less likely to use bank finance and other sources of external finance (Figure 5). While 30% of large firms use bank finance to finance new investment, only 12% of small firms do.

Small firms do not only report higher financing obstacles, they are also more adversely affected by these obstacles. As shown in Figure 6, small firms' financing obstacles have almost twice the effect on their growth that large firms' financing obstacles do (Beck, Demirgüç-Kunt and Maksimovic, 2005). The difference between small and large firms is at least as big or even bigger for some of the specific financing obstacles, such as collateral requirements, bank paperwork, interest rate payments, the need for special connections and banks' lack of lending resources. Also the lack of access to specific forms of financing such as export, leasing and long-term finance is significantly more constraining for small firms' growth than for large firms' growth.

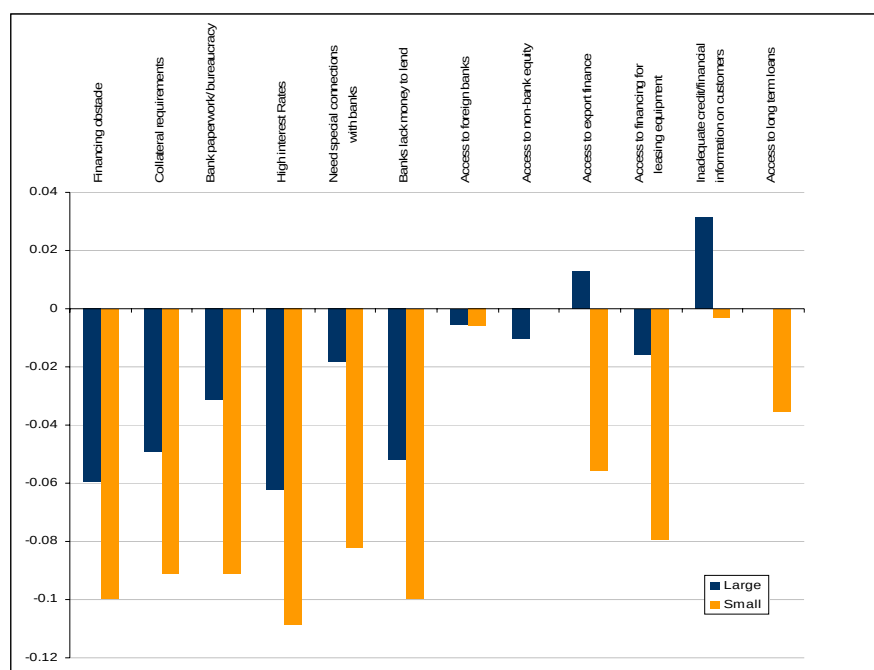
Figure 5. Use of External Financing Sources Across Firms of Different Sizes



Note: This graph shows the share of investment financed from internal finance and different external financing sources. Data are from the Investment Climate Surveys across 71, mostly developing and emerging, economies.

Quasi-natural experimental evidence confirms the importance of credit constraints for firm growth. Banerjee and Duflo (2004) analyze detailed loan information on 253 Indian SMEs' before and after they became eligible for a directed subsidized lending program and find that the additional credit resulted in a proportional increase in sales rather than a substitution for other non-subsidized credit, indicating that these firms were credit constrained before receiving subsidized credit. Similarly, Zia (2007) finds that small non-listed and non-group firms in Pakistan reduce their sales after they become ineligible for subsidized export credit, indicating the existence of credit constraints; in contrast, large, listed and group firms do not reduce their sales after losing access to subsidized credit. It should be stressed that this evidence does not support subsidized credit as a means to alleviate small firms' credit constraints – a topic to which we will return below –, but they show that small firms are constrained by their lack of access to external finance.

Figure 6. Growth Effects of Financing Obstacles Across Firms of Different Sizes



Note: This graph shows the effect of different financing obstacles on firm growth for small and large firms.

Source: Table 6, Beck, Demirgüç-Kunt and Maksimovic (2005).

Recent research also shows the importance of the business environment for firms' financing constraints and patterns. Beck, Demirgüç-Kunt, Laeven and Maksimovic (2006) show that institutional development, measured very broadly, is the most robust country-characteristic predicting cross-country variation in firms' financing obstacles, even after controlling for cross-country differences in GDP per capita. Firms in countries with higher levels of institutional development report significantly lower financing obstacles than firms in countries with less developed institutions. The positive effect of financial and institutional development can also be observed in the use of external finance. Better protection of property rights increases external financing of small firms significantly more than it does for large firms, particularly due to the differential impact it has on bank and supplier finance (Beck, Demirgüç-Kunt and Maksimovic, 2004b).

Financial and institutional development helps create a level playing field between small and large firms, while the lack of an effective financial system explains the phenomenon of the missing middle observed in many developing countries. Beck, Demirgüç-Kunt and Maksimovic (2005) show that the effect of growth obstacles on firm growth is smaller in countries with better-developed financial and legal systems. The effect of financial and legal development on the constraints-growth relationship is significantly stronger for small firms than for large firms. Financial and institutional development thus helps close the gap between small and large firms. This is also confirmed by more detailed country comparisons. For example, Sleuwaegen and Goedhuys (2002) show that smaller firms grow relatively faster in Germany than in Côte d'Ivoire, while the opposite holds for large firms. Using cross-industry, cross-country data for 44 countries and 36 industries in the manufacturing sector, Beck, Demirgüç-Kunt, Laeven and Levine (2005) show that financial development exerts a disproportionately large positive effect on the growth of industries that are naturally composed of more small firms. Their results suggest that the furniture industry (an industry with many small firms) should grow 1.4% per annum faster than the spinning industry (an industry with relatively few small firms) in Canada (a country with a well developed financial system) than in India (which has a low level of financial development). Since the average industry growth rate in their sample is 3.4%, this is a relatively large effect. This suggests that financial market development helps small firms more than large firms overcome financial market frictions thus leading to a more level playing field between firms of different sizes.

The constraining effect of financial and institutional underdevelopment also shows up in a distorted size distribution. Kumar, Rajan and Zingales (1999) find that the average size of firms in human capital-intensive and R&D intensive industries is larger in countries with better property rights

and patent protection. Similarly, Beck, Demirgüç-Kunt and Maksimovic (2006) show in a cross country sample that large firms, i.e. firms that are most likely to be able to choose the boundaries of the firm, are larger in countries with better-developed financial and legal systems. Finally, Aghion, Fally and Scarpetta (2007) find for a sample of European countries that financial development enhances new firm entry in sectors that depend more heavily on external finance and that the smallest size firms benefit the most in terms of higher entry from higher financial development. They also show that financial development promotes the post-entry growth of firms in sectors that depend more on external finance. These results suggest that agency problems between outside investors and corporate insiders keep firms smaller in countries with weak legal and financial systems. Firms thus stay smaller in countries with underdeveloped financial and legal systems. On the other hand, access to financial services can help new entrepreneurs survive beyond the first year, as evidence from Bosnia shows (Demirgüç-Kunt, Klapper and Panos, 2007) and can help enterprises innovate at a faster rate (Ayyagari, Demirgüç-Kunt and Maksimovic, 2007).

3. SMEs' Financing Constraints – A Conceptual Framework³

The empirical evidence that financing constraints and access to external finance are inversely correlated with firm size matches theoretical models that use fixed transaction costs and information asymmetries and the resulting agency problems as basis for financial market frictions (see Levine, 2005 for an overview). In the following, we will build on this theoretical literature and the empirical evidence to derive a conceptual framework explaining SMEs' financing constraints and thus set the basis for the policy discussion of the next section.

Transaction costs and information asymmetries drive the variation in access to finance across firms of different sizes. Take first transaction costs. Fixed transaction costs in credit assessment, processing and monitoring result in decreasing unit costs as the size of the loan increases. These fixed transaction costs exist at the transaction, client, institution and even financial system level. Assessing an individual loan request entails costs that are at least partially independent of the loan amount. Maintaining a client relationship over time and across different financial products, including loan, deposit and savings services, implies costs that are partly orthogonal to the number and amount of financial transactions with the client. At the level of the financial institution, fixed costs range from brick-and-mortar

³ This section builds on Beck and de la Torre (2007).

branch installations over computer system to legal services and are again partly independent of the number of clients or the size of their loans. Fixed costs might even arise on the financial system level in the form of regulatory costs and the costs of payment and settlement systems, which are up to a point independent of the number of transactions, clients and institutions in the system.

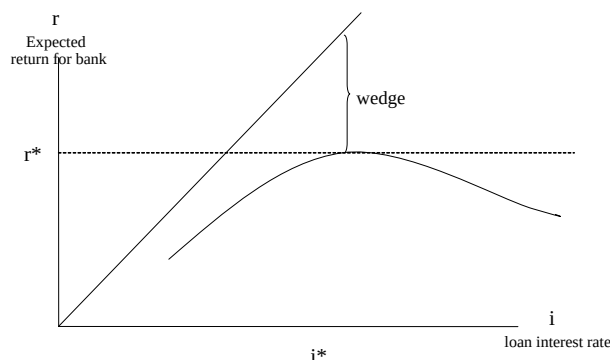
These fixed transaction costs drive a wedge between funding costs of financial institutions and the lending rate they charge borrowers. In a world of uncertain returns on investments, higher transaction costs and the resulting higher lending costs can increase the likelihood that borrowers cannot pay due to too high of a repayment burden. Rather than increasing the interest rate to the market clearing rate, financial institutions might ration at a lower interest rate than the market equilibrium rate because higher interest rates would lead to lower expected repayments (Williamson, 1987). High transaction costs do therefore not only increase the cost of borrowing, but can also restrict access to external finance for some borrower groups.

While transaction costs are restraining for all borrowers, there are arguments that they are even more constraining for small and medium enterprises. Their diverse characteristics and their relative opaqueness increases assessment and monitoring costs. Unlike other credit categories, such as consumer credit or mortgage lending, SME lending is still considered a high-cost lending product. More specifically, unlike other lending products that can be reduced to simple transactions, SME lending often still depends heavily on relationships between borrowers and lenders (Berger and Udell, 1998, 2006).

In addition to transaction costs, the outreach to small and medium enterprises is constrained by default risk. Default risk can be either borrower-specific or systemic. In the following, we will focus on the borrower-specific risk and more specifically on risks arising from asymmetric information between borrower and lenders. If the debtor is privy to information about her project or her effort and the lender may only secure this information at a prohibitively high cost, this can lead to two different sources of risk: adverse selection and moral hazard. Adverse selection refers to difficulties of choosing good credit risks ex-ante, while moral hazard refers to the inability of the lender of effectively enforcing the agreed credit contract ex-post. Although such risk can be compensated by increasing the interest rate, this would increase adverse selection and moral hazard. As the interest rate rises, this will attract riskier borrowers to the pool and will entice borrowers to undertake riskier project with a higher probability of default. The impossibility to use interest rates as screening

technology entices lenders to use non-interest screening devices such as collateral, warrants or assessment based on audited information. In its

Figure 7. Adverse Selection, Moral Hazard and Credit Rationing



ultimate consequence, however, lenders will ration credit rather than allow the interest rate to rise to the market-clearing level, as first shown by Stiglitz and Weiss (1981).

To illustrate the non-linear relationship between interest rates and credit supply due to transaction costs and agency problems, Figure 7 plots the nominal interest rate i and the return for the lender r . In a world with costs and risks, the two would be identical as illustrated by the 45° line. In a world of transaction costs and agency problems, however, there is an increasing wedge between nominal interest rate and return. As i increases, there is a higher default probability and the return to the lender therefore increases at a decreasing rate. Similarly, as i increases, the borrower pool becomes riskier, which again results in a higher default probability. Eventually, the marginal benefit of an interest rate increase due to higher revenues is equal to the marginal costs due to higher default and at higher nominal interest rates, the return to the lender decreases.

As in the case of transaction costs, SME lending is more affected by the inability to manage risks than other lending products. Compared to large firms, SMEs are commonly more opaque, less likely to be able to post collateral and often do not have audited financial statements that allow a better picture of the enterprise and its projected profits. These features of the SME lending market make the curve in Figure 7 flatter and the flexion point lower than in other lending markets.

Lenders must develop loan technologies that enable them to choose such SMEs that, for any given lending interest rate, will yield the highest risk-adjusted expected net return. To select such debtors, the creditor must

compare: (i) the all-in costs of lending to different debtors/projects; (ii) the differences in expected returns (capacity to pay) across such debtors/projects that the lender considers to be equally risky; and (iii) the differences in risks and willingness to pay across such debtors/projects that the lender considers to be of equal expected returns (or capacity to pay). The scope for optimization that the lender will have in managing lending costs and risks will be constrained by state variables, such as the contractual and informational frameworks, macroeconomic environment, technology and other characteristics of the business environment in which both lender and borrower operate, such as physical infrastructure, crime and political instability. These state variables are not only outside the reach of lenders' actions, but neither can they be changed in the short-run by policy makers. The weaker these state variables, the flatter the curve in Figure 7 and the less the maneuvering room for credit supply optimization. Given the constraints, a prudent lender will rather not offer loans at a higher interest rate if she is not reasonably sure of her ability to appropriately measure costs, sort out risks for a given expected return, and identify expected returns for a given risk. However, there is also the possibility that lenders will not maximize their lending opportunities to SMEs given by the state variables. On the other extreme, lenders might act imprudently and lend more to SMEs than sustainable under the current state variables.

Using the concept of state variables allows us to define the Access Possibilities Frontier for SME lending as a rationed equilibrium, i.e. the maximum share of viable loan applicants that could be served by financial institutions prudently given the existing state variables.⁴ To derive the frontier and thus the bankable share of loan applicants, we have to take into account both demand and supply side factors, while holding the state variables constant. The demand for loanable funds is a positive function of expected returns on investible projects and a negative function of the lending interest rate and voluntary self-exclusion. By enabling debtors to seek resources for risky projects that they would not undertake with their own money, the option to borrow gives rise to the problems of adverse selection and moral hazard discussed above, which can result in an imprudently high loan demand. While the loan supply is thus a positive function of the nominal lending interest rate, this relationship is non-linear and might turn negative beyond a threshold. Lenders will thus not satisfy all the loan demand but rather ration it at an interest rate below the market-clearing rate. This is an inevitable cost of prudence in a world of uncertainty and agency problems—some “good” debtors have to be left out in order to

⁴ While we derive the Access Possibilities Frontier for SME lending, this concept can also be applied to other lending products and markets. See Beck and de la Torre (2007) for a more detailed discussion.

minimize the set of “bad” debtors that are let in. In statistical terms, this is the trade-off between type I and type II errors.

The Access Possibilities Frontier, however, is not time-invariant, as the example of technology shows. The increasing use of IT in lending reduces processing costs and thus overall transaction costs related to lending, but can also improve risk management, through the introduction of credit scoring (Berger, Frame, and Miller 2005; Frame, Padhi and Woosley, 2004; Frame, Srinivasan and Woosley, 2001).

Given costs and risks and demand-side constraints, we can use the Access Possibilities Frontier to identify several types of access to credit problems. A first type of access problem is demand-originated and consists in too low a number of loan applicants simply because of self-exclusion resulting from cultural barriers or financial illiteracy. Alternatively, there could be a lack of profitable investment projects in the economy that deserve financing based on their expected return. A second type of access problem can arise due to supply sub-optimization that leads to credit markets settling at a point below the Access Possibilities Frontier. This can reflect, for instance, regulatory distortions or insufficient contestability that cause lenders not to fully exploit all the outreach opportunities, given the state variables. A third and very different access problem is associated with “excess access,” that is, an equilibrium above the Access Possibilities Frontier with loans being granted to a larger share of loan applicants than is prudently warranted, given the lending interest rate and the state variables. A final access problem consists of too low a prudent Access Possibilities Frontier due to deficiencies in state variables compared to countries with similar levels of economic development.

Each of these access problems calls for different policies. The first type of problems calls for demand-side measures that educate and encourage the healthy use of financial products by SMEs. A problem of profitable investment projects, on the other hand, has to be addressed through non-financial sector policies and is primarily not a problem of access to finance. The second problem calls for interventions and policies that encourage financial institutions to maximize outreach to SMEs given the contractual and macroeconomic environment, while the third problem calls for restraining measures. The final set of policies are general reforms of the business environment and institutional framework that are not specific to the SME lending market. We will discuss these different policies in the next section.

4. SMEs’ Financing Constraints – Policies

The Access Possibilities Frontier derived in the previous section allows us to discuss different policies to alleviate SMEs' financing constraints. Specifically, we will distinguish between market-developing policies that will help push out the frontier, market-enabling policies that push incumbent and new financial institutions towards the existing frontier and market-harnessing policies that prevent the financial system to move beyond the frontier towards a point of financial fragility. Let us discuss each in turn.

Market developing policies aim at improving the state variables and include reforms in the contractual and informational frameworks and macroeconomic performance. As discussed above, while these reforms are not specific to the SME lending market, they will help level the playing field between small and large enterprises. The results of such reforms can take a long-time; nevertheless they are indispensable in order for the financial system to reach a higher sustainable equilibrium and be able to provide SMEs with the necessary financial services in a commercially viable manner.

High lending interest rates may reflect doubts about fiscal solvency and a history of asset confiscation or inflation volatility, and will be often associated with crowding out of private investment due to the absorption by the government of a large share of society's financial savings. This crowding out will especially hurt small and medium enterprises that unlike large and multinational enterprises do not have recourse to alternative finance providers. Under such circumstances, the appropriate policies to foster access to credit would be those that aim at enhancing the resiliency of fiscal solvency and at establishing a credible record of low and stable inflation.

A shallow credit market with low access may also result from major shortfalls in the contractual and informational frameworks (Beck and Levine, 2005). The appropriate policies in this case would span a wide range: from titling of land property to the upgrading of laws affecting collateral repossession or execution of guarantees; from the modernization of corporate reorganization and bankruptcy proceedings to improvements in the functioning of the judiciary; from raising accounting and disclosure standards to establishing the appropriate legal framework and right incentives for the development of credit registries.

Changes in the state variables involve changes in fundamental institutions and can take a long time to materialize. To the extent that a financial system is operating below the possibilities frontier, there is room for market-enabling policies that may foster the broadening of access even in the absence of perceptible changes in state variables. Where the lack of profitable, credit-deserving investment projects is the main problem, non-financial sector policies are called for. Where the main reason for being below the possibilities frontier is the demand problem of self-exclusion, the

appropriate policies would emphasize raising financial literacy. If – as is more likely – the main problems reside with sub-optimization in credit supply, by contrast, a wider range of policy options can be considered, starting with competition policy.

While theory and some empirical work suggest that market power might entice banks to invest in long-term relationships with small and opaque enterprises as they know that they can regain the initial investment in the relationship at a later stage (Petersen and Rajan, 1995; Bonaccorsi di Patti and Dell’Ariccia, 2004), other empirical papers point to the healthy effect of competition on availability of lending to SMEs (Cetorelli and Strahan, 2004; Beck, Demirgüç-Kunt and Maksimovic, 2004a).⁵ Complicating the debate is that market structure, as for example measured by concentration ratios, is not the same as competitiveness, which is also influenced by the segmentation and contestability of a market (Claessens and Laeven, 2004). Further, state variables such as the contractual and informational frameworks can influence the competitiveness of a financial system through the ability to transfer collateral easily from one lender to another and the ability of SMEs to build up reputation capital through a credit registry.

There is mixed evidence concerning the effect of foreign bank entry on SME lending. On the one hand, firm-survey evidence suggests that firms report lower financing obstacles in countries with a higher share of foreign banks, a finding that holds across different size groups of firms (Clarke, Cull, and Martinez Peria, 2006). This positive effect can be a direct or an indirect one. Foreign banks can bring the necessary know-how and scale to introduce new transaction lending techniques. By competing with domestic banks for large corporate clients, they can also force domestic banks to go down market to cater to SMEs (de Haas and Naaborg, 2005). On the other hand, bank-level information from specific countries suggests that foreign banks are less likely to lend to small and opaque companies than domestic banks (Mian, 2006; Gormley, 2006). So, any positive effect of foreign bank entry on SME lending seems to be more indirect than direct.

Regulatory policies can be important to push the system towards the frontier of SME lending. Regulatory frameworks that enable leasing and factoring – traditional SME lending products – have featured prominently on the agenda. Leasing is an attractive financing tool for SMEs as it is based on the cash flow of the financed asset, such as machinery or vehicle, rather than reputation of the enterprise or the asset base of the enterprise, it often includes tax advantages, and it allows for easier recovery if the correct legal framework is in place. Factoring, the discounting of sales receivables, is attractive for small suppliers of large credit-worthy buyers, as it does not rely on information about the “borrower”, but rather on the obligor

⁵ See Berger et al. (2004) for an overview

(Klapper, 2006). Both leasing and factoring rely on a legal framework governing these transactions, but rely to a lesser extent on the contractual framework of a country, so that they can help push a financial system towards the frontier of SME lending, even if this frontier is low. Both transaction forms can also benefit a lot from electronic registration systems and electronic security laws, which will allow electronic processing and therefore reduction of transaction costs (Klapper, 2006, 2007).

Loan classification and provisioning rules can also affect SMEs' access to finance, through reliance less on collateral than on forward-looking assessment of payment performance. Further, Adasme, Majnoni and Uribe (2006) show that SME lending might require more provisioning but less capital, given that the distribution of losses from small loans is less skewed than that for large loans. Another regulatory issue is the equal taxation of financial products that are offered by different financial institutions, thus creating a competitive even playing field.

A third group of policies, which we define as market-harnessing, try to prevent the financial system from moving to an unsustainable equilibrium beyond the frontier due to imprudent lending. Such imprudent lending binges can arise from the same competition that market-enabling policies try to foster if not accompanied by a properly defined regulatory and supervisory framework. Indiscriminate free entry for new deposit-taking credit institutions or the intensification of competition among incumbent institutions can lead to widespread fragility, especially in the context of implicit or explicit government guarantees, poor accounting and disclosure practices, deficient early warning system and prompt corrective action regimes, and dysfunctional failure resolution frameworks. Market-harnessing policies therefore aim at keeping banks' incentives to take aggressive risks in check through a mix of measures aimed at strengthening market and supervisory discipline. The absence of too generous deposit insurance – implicit or explicit – and disclosure and transparency requirements give large creditors and depositors incentives and possibilities to monitor and discipline banks. In addition, market signals in the form of deposit interest rates, yields on subordinated debt or equity prices of publicly listed banks moving in response to risk taking and performance of banks provide additional information to bank supervisors and should be coupled with effective official intervention into institutions that the market has identified as weak. Summarizing, policy makers have to strike a fine balance between market-enabling policies that push financial institutions towards the frontier and market-harnessing policies that prevent them from moving beyond the frontier, with the balance varying from country to country.

5. SMEs' Financing Constraints – The Role of Government

The different policies discussed in the previous section seem to call for an important role of the government in the “SME-Access to Finance” debate. But what exactly government’s role is, is still subject to discussion. While research has been able to identify which government interventions have not worked over the past decades in the SME lending market, researchers are still struggling to define exactly, which policies can work under which circumstances. There is a trade-off between market failures and government failures, the tendency to remedy market failures through government interventions, which then in turn can lead to government failures. In the following we will discuss different areas of government intervention, but would like to emphasize that this is an area still being researched, with no standard answers for all countries and markets and no pre-designed policy packages ready to be taken off the shelf. What works in one country, might not work in others; a context-sensitive approach that takes into account country circumstances, is therefore called for (Honohan and Beck, 2007). Where government intervention is involved, the strength of governance arrangements might be an important factor to be taken into account.

Least controversial is the role of government in providing the contractual and informational framework and ensuring a stable macroeconomic environment. Government is the natural provider of key institutions such as legislation and court systems. Similarly, given the government’s monopoly over the issue of monetary instruments, ensuring macroeconomic stability is a natural government task. As discussed above, it is through these policies that the government can help push outwards the Access Possibilities Frontier and ensure a long-term sustainable increase in SMEs’ access to finance. While these business environment reforms do not focus specifically on SMEs, they help close the gap between firms of different sizes and level the playing field. Through these policies the government helps develop markets that can then be used by financial institutions to reach out to SMEs.

However, these markets are not always used and the financial system is likely to settle at an equilibrium below the frontier, which raises the question on government’s involvement in ensuring that the system moves towards the frontier. We already discussed market-enabling policies, such as providing regulatory frameworks for leasing and factoring and fostering competition. Some of these policies might require more active government

involvement. Improving the informational framework through the introduction of a credit information bureau is a specific area where government might have to step in. While banks might be interested in establishing systems to share negative information, incumbent financial institutions might be less interested in sharing positive information. On the other hand, positive information sharing allows SMEs to build up reputation collateral and thus fosters competition. Overcoming banks' opposition to share positive information can enhance the contestability of a financial system and might be an area where governments have to take a pro-active role.

Beyond targeting competition per se, governments can also try produce a movement towards the possibilities frontier by addressing hindrances such as coordination failures, first mover disincentives, and obstacles to risk distribution and sharing. While not easy to define in general terms, given their variety, these government interventions tend to share a common feature in creating incentives for private lenders and investors to step in, without unduly shifting risks and costs to the government (de la Torre, Gozzi and Schmukler, 2006). Three examples illustrate this approach. One is the creation by NAFIN (a Mexican development bank) of an internet-based market, which allows small suppliers to use their receivable from large credit-worthy buyers to receive working capital financing (Klapper, 2006). Another example is the Chilean program (FOGAPE) to promote lending to SMEs via the auctioning of partial government guarantees (Benavente, Galetovic, and Sanhueza, 2006). Finally, the Mexican development fund FIRA has brokered a variety of structured finance packages to finance agricultural production (e.g., shrimp, corn) to realign credit risks with the pattern of information between financial institutions and different participants in the supply chains of these agricultural products (de la Torre, Gozzi and Schmukler, 2006). While intriguing examples, it is not for sure whether risk is really not being shifted to government and taxpayers through such interventions and whether these interventions have sunset clauses that will allow the government to withdraw once its engagement is not needed anymore. There are also governance concerns stemming from a government intervention in a private market. Finally, from political economy viewpoint, such schemes might take away the pressure to implement the long-term institution building that is necessary to push out the frontier and expand SME lending sustainably in the long-term.

Partial credit guarantee (PCG) schemes feature prominently among market-activist policies.⁶ While they also exist on a private basis, governments and donors have been aggressively pushing for their establishment to overcome the limited access to bank credit SMEs face. By

⁶ For an overview of the literature on PCGs, see World Bank (2007).

providing a guarantee, such as scheme can help overcome the lack of collateral of most SMEs, but issues of appropriate pricing, funding and the institutional structure are important. While such schemes could be run on a self-sustainable basis, they often involve significant subsidies and contingent fiscal liabilities to cover losses. While it is difficult to compute such costs ex-ante, it is even more difficult to measure the benefits, which would be partially captured by additionality, i.e. the share of borrowers that would not have gained access to finance if it were not for the PCG. An even more accurate measure would be the extent to which borrowers that would have gotten access to credit in a world without market frictions, could access the credit market due to PCGs, minus the extent to which borrowers gained access through the PCG that would not have gotten access in a friction-free world. Ultimately, the cost of any government intervention has to take into account the return on each dollar of taxpayer's money in such an intervention compared to other interventions, including interventions outside the financial sector.

While the government often does not intervene directly in the market in the case of most PCG schemes – if credit assessment and monitoring is still left with the banks –, the past forty years have seen many examples of market-substituting policies to foster SME lending, with the result balance tipping heavily into the negative. Such policies include directed credit, often combined with interest rate subsidies, and the establishment of development finance institutions focused on SME lending. These policies share the problems of all government-managed financial sector programs – the trade-off between commercial and social goals results in high losses and non-sustainability of many of these programs. Undercutting market conditions results in crowding out of private providers, even where the latter would be willing to enter due to changes in the general business environment or due to technological advances. Political subversion of these programs often leads to corruption and channeling of funds to political cronies or to specific electoral groups (Cole, 2004; Dinc, 2005; Khwaja and Mian, 2005).

6. Conclusions

This paper surveyed empirical research on SMEs' financing constraints and patterns. A conceptual framework showed that transaction costs and asymmetric information between borrower and lender are the driving factors explaining the limited access to external finance by many SMEs in developing as well as developed economies. This conceptual framework allowed us to distinguish between market-developing policies such as

reforming the contractual and informational framework, market-enabling policies such as fostering competition and providing regulatory frameworks for leasing and factoring and market-harnessing policies such as the financial safety net that prevent imprudent lending booms and busts. Government has an important role in reforming the institutional environment, providing regulatory frameworks and fostering competition. International experience, however, has shown the wide-spread failure of government-owned or -managed financial institutions focusing on specific borrowers groups or directed lending programs. Less clear is the role of government in intervening through activist policies, such as credit guarantee schemes.

There is a broad research agenda going forward to better understand SMEs' financing needs in developing and emerging economies. First, it is important to better understand SME lending practices by financial institutions and identify best practices. Even more important, however, is it to understand how these practices depend on the business environment in which the financial institutions operate. Efforts are under way using bank-level surveys and interviews (De la Torre, Martinez Peria and Schmukler, 2007; Beck, Demirgüç-Kunt and Martinez Peria, 2007). Second, while we have focused mainly on the banking system – driven by the observation that banks still constitute the largest component of financial systems in the financial system of most developing and emerging markets – the role of non-bank financial institutions and financial markets, both on the debt and the equity side, has to be explored in more detail. Third, the role of technology in expanding SMEs' access to financial services has been little explored. While the introduction of credit scoring has been shown to expand SME lending in the U.S., it is not clear whether this technology can be easily applied to developing countries (Miller and Rojas, 2004). By enabling more cost-effective consumer lending, technological advances such as credit scoring or alternative delivery channels such as electronic or mobile finance, might push lenders out of the SME lending market, thus even exacerbating SMEs' financing constraints. Fourth, case studies on market-friendly activist government interventions have been undertaken, but a more rigorous impact evaluation is necessary, such as has been started for microfinance institutions (World Bank, 2007). Finally, future research will also try to understand better the impact of the institutional structure, funding and pricing of partial credit guarantee schemes on SMEs' access to finance (Beck, Klapper and Mendoza, 2007). Such research is necessary to inform policy makers about the costs and benefits of different interventions.

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CHAPTER 3

Entry and Growth of Korean Manufacturing: An Empirical Analysis Based on Micro Data

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1. Introduction

Small- and medium-sized enterprises (SMEs) are playing a pivotal role in the employment and the growth of advanced economies. In the case of advanced economies, SMEs account for over 95% of the total number of firms and more than two-thirds of private sector employment. Moreover, SMEs are considered as a main source of job creation in advanced economies, and employment share of SMEs are increasing in many developed countries (OECD[2005]).

Through entry, exit, growth and decline of firms, new healthy firms will grow and unhealthy firms will exit the markets. This process of metabolism that capital and labor are reallocated from declining to growing sectors is called 'firm dynamics' by the researchers in this field¹. The degree of 'firm dynamics' is considered as a crucial factor in maintaining the vitality and efficiency of the overall economy. Especially, 'firm dynamics' is considered as one explanation for U.S.'s outstanding performance with respect to productivity and economic growth in the era of rapid growth and dissemination of Information & Communication Technology since 1990s. As a main platform of 'firm dynamics' and accompanying innovation activities, the importance of SME sector is being highly emphasized.

In case of Korea, SMEs' employment share accounts for 85% of the whole industries and 75% of manufacturing. Also, SMEs' shares in the number of establishments, employment, production and value-added have been

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¹ For detailed discussions on various theories of firm dynamics and empirical results, please refer to Geroski (1995), OECD (1998, Ch. 4), Caves (1998), Foster et al. (1998), Bartelsman and Doms (2000), Haltiwanger (2000), and Ahn (2001).

steadily increasing over the last 20 years (Small and Medium Business Administration (SMBA), Korea Institute for Industrial Economics & Trade (KIET), Korea Development Institute (KDI) [2003]). This point is also confirmed by the analysis of micro data of the *Report on Mining and Manufacturing Survey* mainly used in this chapter. Figure 1 shows the share of SMEs with less than 300 employees within the manufacturing firms with more than five employees from 1990s, in terms of the amount of shipment and the number of employees. According to the figure, SMEs' employment share increased from 61.6% in 2003 to 77.0% in 2003, and shipment share increased from 42.7% in 1990 to 51.1% in 2003.

SMEs' shares differ across industries, which seem to reflect the technical characteristics of each industry. When we divide manufacturing industries into High-Tech, Medium-High-Tech, Medium-Low-Tech and Low-Tech, according to OECD(1997)'s classification method based on R&D intensity of OECD's average industry, while SMEs' share exceeded 88% in Low-Tech industry, the share was slightly higher than 60% in High-Tech industry in 2003, as shown in Figure 2.

Considering the changes in environment around SMEs and policy discussions in response to these changes, it is noticeable that restructuring of low-productivity sector is in progress in the face of intensification of knowledge and internationalization of production, and as a result, the importance of innovative SMEs has been widely recognized (OECD[2004a, 2004b], Joo Hoon Kim[1996], Joon-Kyung Park[1989]). Especially, it is worth paying attention to the discussion that, when considering today's technical innovation and internationalization of competition, passive policy which merely protects weak SMEs may limit the flexibility of production system and result in the decline of SME sector in the long term, and that the efficiency of the support for SMEs should be reviewed in systematic view of technical innovation policy based on long-term change of industrial structure (Joon-Kyung Park[1997]).

In order for a more specific stocktaking of the current situation of SMEs, statistical approach based on rich micro data is especially important, since the number of firms in SME sector is overwhelmingly larger than the number of large firms and SME sector includes various groups that show high level of heterogeneity. In this respect, the *Survey on actual state of SMEs* by Small and Medium Business Administration (SMBA) and Korea federation of small and medium business (Kbiz) provides highly valuable information. However, since it is a sample survey of 4,000 firms extracted from the population of about 100,000 small- and medium-sized manufacturing firms, the *Survey* has a limit in getting the full picture of 'firm dynamics'.

Figure 1. Share of SMEs in the Whole Manufacturing Industry
(in Terms of Shipment and Employment)

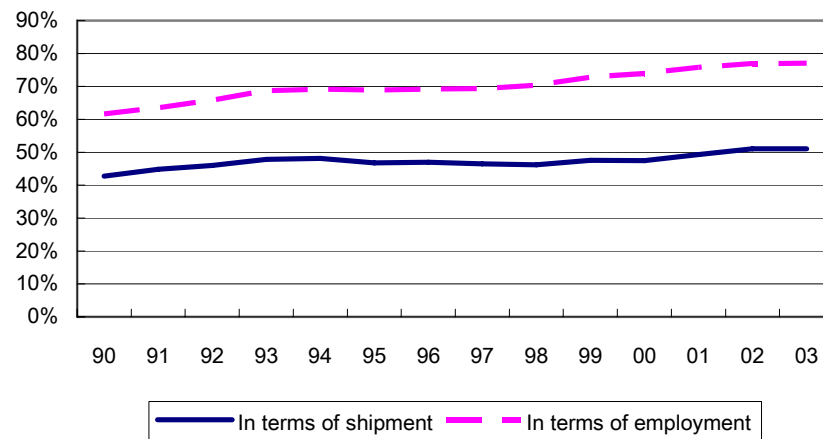
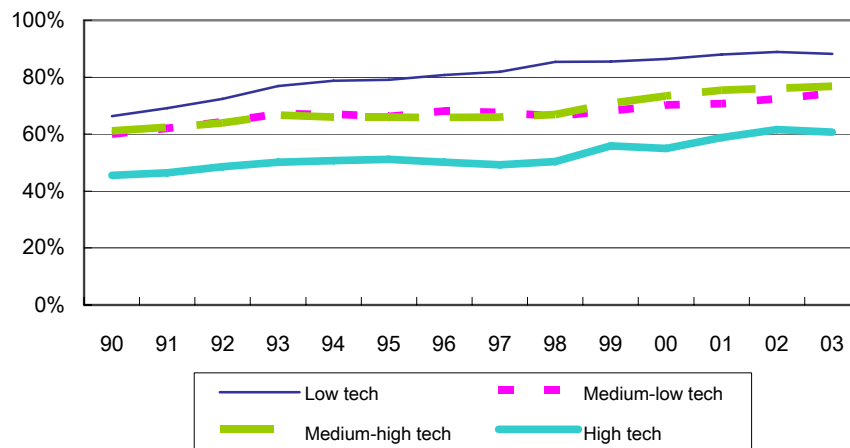


Figure 2. Share of SMEs in the Four Sub-Sectors According to Technology Level (in Terms of Employment)



The purpose of this chapter is to analyze the entry and growth of Korean SMEs in light of 'firm dynamics', using the micro data of the *Report on Mining and Manufacturing Survey*, which is a complete enumeration survey by National Statistics Office. While previous literature based on the same

data (Hahn[2000, 2003], Joh[2000]) focused on the entry and exit of manufacturing firms during the period of 1990~98, this chapter analyzed the growth as well as entry and exit of manufacturing firms, utilizing more recent data² (until 2003).

This chapter is organized as follows: In Section 2, trends in survival and growth rates of new entrants is analyzed tracking the new entry cohorts each year since 1994. In Section 3, industrial distribution and characteristics of the top 10% high-growth firms in terms of employment growth rate are analyzed. In Section 4, after reviewing the main factors of growth of SMEs in a policy perspective, through the regression analysis on employment and total factor productivity (TFP) growth rate of manufacturing firms, real impact of each factor is assessed. Lastly in Section 5, findings from the empirical analysis are summarized and policy implications are discussed.

A. Entry and Growth of New Firms

a. Method of Analysis

'Entry rate', 'exit rate', 'turnover rate', and 'growth rate' are those commonly used as measures of the activity of 'firm dynamics' in certain period and area. Also, 'survival rate' is used as a measure of how many firms entered the market in the same period survive after a certain period of time, and 'hazard rate', which is a probability that a firm survived until last period will exit the market in this period, is often considered³⁴. Below is brief definitions of each term:

² Lee (2002) and In Lee & Hong (2004) analyzed entry, exit, and growth of Korean firms using the financial statements data of 3,000 manufacturing firms which are externally audited by Korea Information Service. This research has a meaning that it catches the dynamics of various SMEs not included in the two preceding studies above. In the case of literature using the micro data of U.S., due to the data limitation, firms with less than 20 employees (Dunne et al.[1989]) and those with less than five employees (Doms et al.[1995]) were excluded from the analysis. In this study where all the manufacturing firms with five or more employees are included, we need to be careful that in case when a firm grows to have more than five employees, it is considered as a new "entry", and in the opposite case, considered as "exit". Still, when compared to the existing studies abroad, micro data of this chapter can be considered as superior (see Table A7). For a more detailed discussion on the smallest scale of micro data, refer to Ahn (2001).

³ In the analysis of firm dynamics using micro data, unit of analysis can be enterprises (firms) or establishments (plants) according to data. The Report on Mining and Manufacturing Survey used in this paper is basically a survey of establishment-/plant-level. There is no problem to call most SMEs in manufacturing sector as small- or medium-sized "establishments", since most SMEs in manufacturing are in the form of single plant for a single firm. However, we should not exclude the probability that a plant with less than 300 employees is not the only plant of an SME but one of the multiple plants belonging to a large firm. The Report on Mining and Manufacturing Survey classifies an establishment into three types: i) Single plant for a single firm, and the plant is located at the same place as the headquarter, ii) single plant for a single firm, and the plant is located at a separate place from the headquarter, iii) a plant belonging to a multi-plant establishment. Although we can include only the SMEs excluding the establishments belonging to multi-plant establishments, we analyzed the whole SMEs in this

- Entry rate: Share of new entrants into certain industry in a certain period. In other words, the ratio between the number of new entrants and the whole number of firms.
- Exit rate: Share of firms that exited from certain industry in a certain period. In other words, the ratio between the number of firms that exited the market and the whole number of firms.
- Turnover rate: Sum of entry rate and exit rate

On the other hand, when calculating entry rate, exit rate and turnover rate above, amount of production, shipment or employment instead of the number of firms are often used. For instance, entry rate can be defined as the proportion of the shipment price (employment) of firms that entered the market in a certain period in the total amount of shipment (employment) of all firms.

- Growth rate: Growth rate of a specific variable such as the number of employees, amount of production, amount of shipment, or net asset

Another method is to calculate 'survival rate' and 'hazard rate', tracking the cohort of firms that entered the market in the same period.

- Survival rate: Proportion of firms that survived in a target year among the firms that entered in a base year
- Hazard rate: Proportion of firms that exited in this year among the firms that had survived in last year, which is a conditional probability that a firm which survived in last year will exit the market in this year.

B. Results

a. Entry

Using micro data, the dynamics of new entrants can be observed. Figure 3 shows how the proportion of firms in entry cohort of each year has decreased during the period of 1994~2003. For example, in the case of the entry cohort of 1994, its proportion in each year has decreased from 22.9% in 1994 to 2.4% in 2003 (For details of the figures presented in this sub-section, refer to Table A1~Table A6).

chapter. In case of 2002, among 110,348 SMEs with five or more employees, 3,978 firms (3.6%) belonged to multi-plant establishments. For the year 2003, data classifying the type of establishments is not yet acquired.

⁴ In the analysis of firm dynamics, there are certain superiorities that establishment-level data has over firm-level data. When using firm-level data, growth of a firm can be achieved not only when the size of establishment it owns grows, but also when the number of establishments it owns increases through M&As. In the latter case, in order to analyze the pure growth of a firm itself and exclude the growth of mere external size, it is better to use establishment-level data.

Figure 3. Trend in Share of Each Year's Entry Cohort
(in Terms of the Number of Establishments)

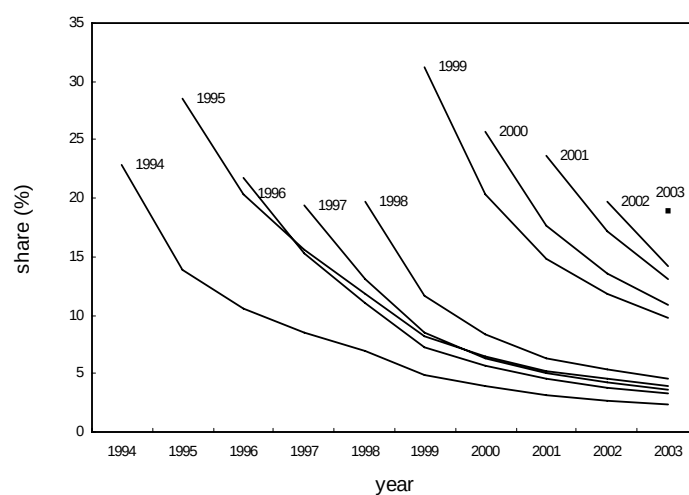
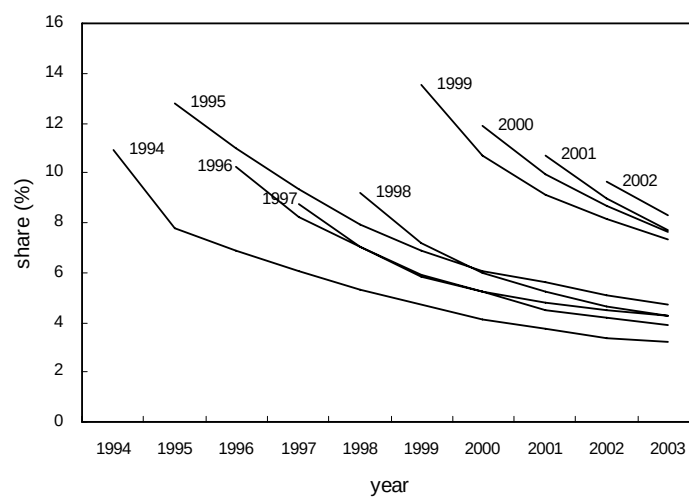


Figure 4. Trend in Share of Each Year's Entry Cohort
(in Terms of Employment)



Accordingly, Figure 4 shows the trend in share of new entry cohorts in terms of employment. The decreasing trend is clear in this figure as well. From the analysis of the share of each year's entry cohort reflected in Figure 3 and Figure 4, we can confirm the points below:

First, initial proportion of each entry cohort actually means the entry rate of the year, and the two figures above suggest that entry rate is very sensitive to economic cycle. Entry rate peaked in 1995, approached the bottom in 1996, 1997, and 1998, peaked again in 1999 when the economy recovered from the financial crisis, and has been decreasing thereafter.

Second, when comparing Figure 3 and Figure 4, the reason why the share in terms of employment is generally lower than that based on the number of firms reflects the fact that the average size of new entrants is smaller than that of the whole firms.

Third, the curves which show the share of each entry cohort are downward-sloping and the slopes decline with the lapse of time, which reflects the fact that exits intensively happen in the early stage of entry and gradually decrease as time goes on.

b. Survival and Exit

In order to analyze the exit of new entrants more specifically, look at the trend in survival rate of new entrants summarized in Figure 5. Only 13% of new entrants in 1994 and 16% in 1995 survived until 2003. The range of decline in survival rate is the biggest in the initial year of entry and it gradually narrows with the passage of time. Also, this pattern is commonly seen in new entry cohort of each year, irrespective of the entry year. For reference, the same characteristic of survival rate trend is reported in the analysis by Mata et al. (1995), which is based on the firm data of Portugal. Mata et al. (1995) also classified four type of groups according to the firm structure and entry mode, and the analysis by type of groups resulted in the same pattern of survival rate trend.

Now let's look at the hazard rate. The trend of hazard rate of new entry cohort in Figure 6 shows that the conditional probability that a firm which survived until last year will exit the market in this year decreases as time goes by. Put another way, the risk that a new firm will withdraw is bigger in the early period of entry and decreases with the passage of time. However, a special characteristic worth paying attention to is that hazard rates of entry cohorts of 1994, 1995, 1996, and 1997 all peaked in 1998, which reflects the situation that the risk of withdrawal was exceptionally high in 1998 when the shock from the financial crisis was greatest. For reference, analysis by Boeri and Bellmann (1995) who utilized data of German firms indicated that hazard rate showed "L" shape, which was high in the early period of entry and declined gradually.

Figure 5. Trend in Survival Rate of Entry Cohort of Each Year

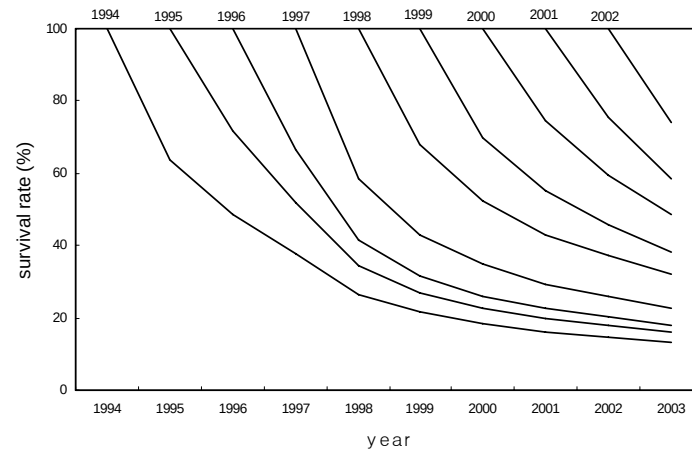
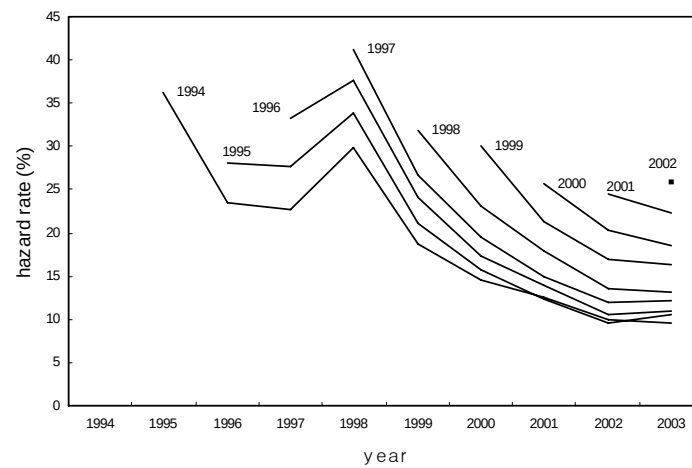


Figure 6. Trend in Hazard Rate of Entry Cohort of Each Year



As Geroski (1995) has mentioned, the fact that there are a number of early withdrawals of new SMEs is a common conclusion from empirical studies conducted in many countries, which suggests that new SMEs face high 'barriers to survival' as well as 'barriers to entry.'

c. Growth

Startups that overcame the early barriers to survival usually show faster growth than mature firms⁵. As mentioned in the introduction, 'firm dynamics' is a dynamic process in which capital and labor are redistributed from declining to growing sectors amid the growth of new firms and withdrawal of nonviable firms. From the perspective of policy, it is a crucial task to guarantee the liveliness of 'firm dynamics' and eliminate barriers to growth that SMEs with high growth potentials face. This is why we focus on figuring out the realities of SMEs' growth in this chapter.

Figure 7. Average Number of Employees of Entry Cohorts of Each Year

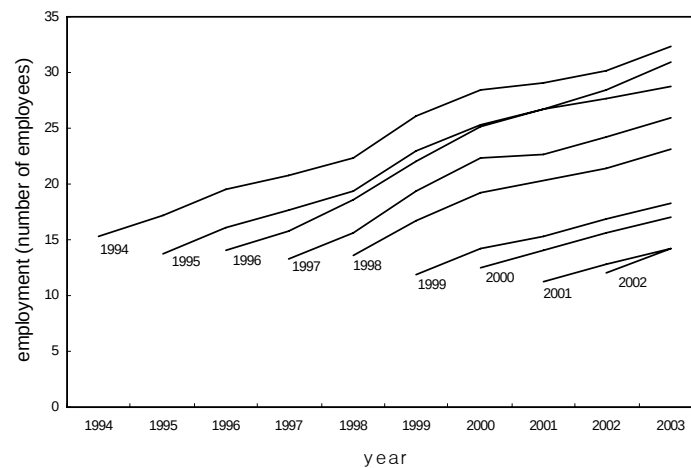
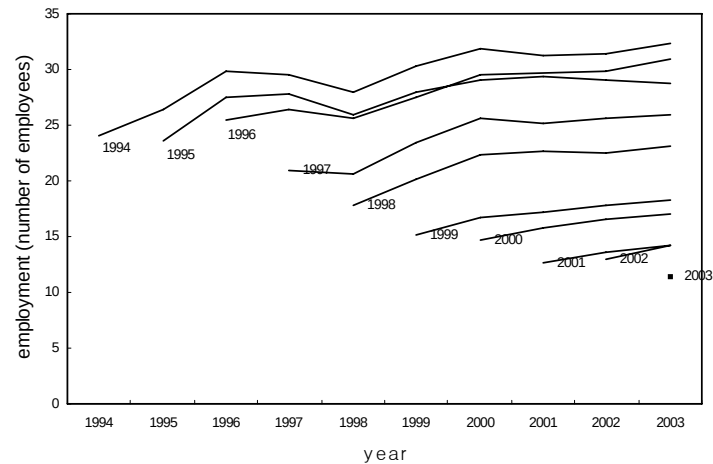


Figure 7 and Figure 8 roughly show the initial size of average entrants and growth path after the entry. Starting points of the lines in Figure 7 indicate the average sizes of entry cohorts of each year. Figure 8 reflects the fact that the average size of yearly entrants was less than 15 employees except for the year 1994 when the average size was 15.3 employees.

As shown in Figure 7, in the case of 1994 entry cohorts, average size has been grown up from 15.3 employees in 1994 to 32.3 employees in 2003. However, the whole part of this growth should not be considered solely as the result of the growth of each firm. The point that smaller firms show

⁵ As mentioned in the second footnote, from the analysis of firm dynamics using the financial statements of 3,000 manufacturing firms which are externally audited by Korea Information Service, Lee In Kwon (2002) found that as a firm grows older and bigger, its growth rate declines. This pattern is commonly found in existing literature studying the cases of OECD countries. For detailed information, refer to Ahn (2001).

Figure 8. Average Number of Employees of Entry Cohorts of Each Year
(Considering Only the Firms Survived in 2003)



higher tendency of early withdrawal should be also considered as a main reason of the increase of average size.

In order to exclude the effect of the increase in average firm size due to the exit of small firms, in Figure 8, average firm size was calculated using only the firms that survived until 2003. In this figure, the increase of the average size of each cohort is more gradual than that in Figure 7. When considering only the firms that survived until 2003, in 1994, average firm size of the startups of 1994 was 24.0 employees, which is much larger than 15.3, the average firm size of the whole startups of 1994. In other words, among the startups of 1994, the firms survived until 2003 generally had sizes bigger than the average.

Through Figure 7 and Figure 8, we could roughly figure out the firm size of average startups and their growth paths after the entry. However, in order to get more specific information on the growth of SMEs which is an aggregate of diverse groups with large homogeneity, we need to (i) identify high-growth firms utilizing the benefit of firm-level micro data and conduct a comparative analysis, or (ii) identify main factors determining the differentials in growth rates among individual firms and analyze them more specifically using statistical and econometric methods. These two types of analyses is tasks for Section 3 and Section 4, respectively.

2. Industrial Distribution and Characteristics of High-growth SMEs

A. Process of Analysis

In Section 2 above, patterns of survival and growth in early period of entry are analyzed focusing on the new entrants identified based on micro data of the *Report on Mining and Manufacturing Survey*. In this section, we first define SMEs based on the size of firms in terms of employees (firms with five or more, and less than 300 employees), select top 10% firms in terms of the growth rate of firm size as high-growth SMEs each period, and examine the characteristics of them⁶.

a. Target Period and Firms for Analysis

As it is shown in Figure 6 in Section 2, when we conduct time-series analysis of 'firm dynamics', we should allow that there was an external shock from the financial crisis of 1997~98. Since the period was highly exceptional, for a more generalized analysis, we should pay close attention when calculating the growth rates of individual firms. Taking this into account, we divided the target period into three: (i) Year 1994~97, (ii) 1997~2000, and (iii) 2000~03, and calculated firm-level growth rate of each period.⁷

Among the firms with five or more employees, those that existed in the first and the last year of each period so that their growth rate can be calculated are selected as target firms for analysis. In addition, only the firms that had less than 300 employees in the first year of each period were included. According to this standard, target firms for analysis are: (i) 44,871 firms existed in the period of 1994~97, (ii) 43,596 firms existed in the period of 1997~2000, and (iii) 58,773 firms existed in the period of 2000~03.

b. Selection Method for High-growth SMEs and the Result

Next step for the analysis was to calculate yearly average employment growth rate of each firm and each period, and to identify high-growth SMEs

⁶ For reference, in the analysis of OECD (2002a), firms with top 10% growth rate index were defined as high-growth SMEs and their characteristics were analyzed using the micro data of eight member countries. This research included SMEs in France, Italy, Netherlands, Spain, Sweden, Germany, Greece, and Quebec (Canada), and 'Mustar Index', the product of employment growth rate and amount of growth rate, was used as an indicator of growth. Range of micro data varies across countries, and the specifics are summarized in [Table A7].

⁷ In order to keep the consistency of analysis, in the regression analysis in Section 4, analysis using the same classification of periods is conducted first, and verified that the main result doesn't change when using a different method of classifying periods.

with the top 10% growth rate⁸. As a result, (i) 4,444 firms in the period of 1994~1997 (top 9.90%), (ii) 4,355 firms in the period of 1997~2000 (top 9.99%), and (iii) 5,864 firms in the period of 2000~03 (top 9.98%) were selected as high-growth SMEs.

Among these high-growth SMEs, 13,421 firms were included as high-growth SMEs once, and 609 firms were included twice. Only eight firms were continuously included as high-growth SMEs for three times, which is not so surprising when considering the existing literature overseas.

Literature review on 'firm dynamics' based on mass micro data suggests that the cases of stable long-term growth in firm-/establishment-level are very rare. A firm's growth is a process of expansion and contraction.

According to the empirical analysis by Mustar using firm-level data base of French manufacturing, only 5,000 firms existed throughout the whole analysis period of 1985~94 and showed positive employment growth rate, and only 190 firms showed continuous growth of employment every year throughout the whole period (OECD[2002a], pp. 63~64).

In next sub-section, industrial distribution and specific characteristics of high-growth SMEs selected above are introduced.

B. Analysis Results

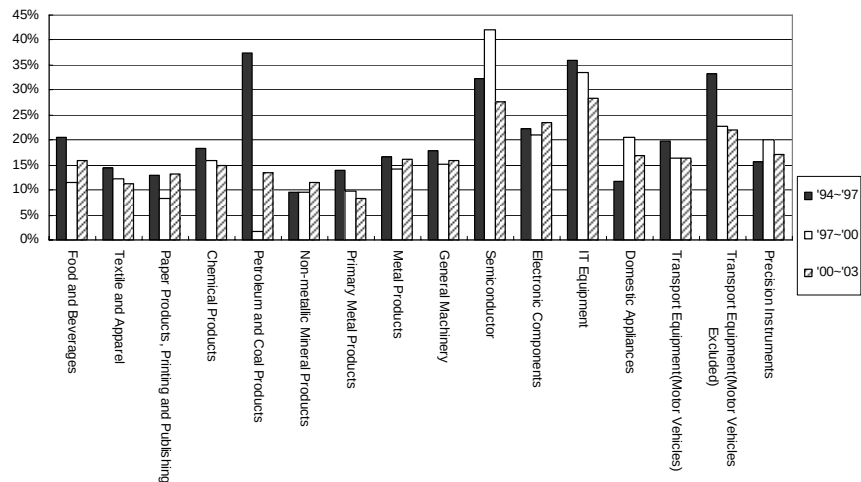
a. Industrial Distribution of High-growth SMEs

As mentioned before, high-growth SMEs are those firms with top 10% employment growth rate in each period. Therefore, if the high-growth SMEs are evenly distributed throughout industries, the proportion of high-growth SMEs in the whole SMEs will be uniform around 10%. However, as shown in Figure 9, the proportion of high-growth SMEs based on the number of firms showed large variation and industrial distribution was highly uneven. In addition, the change over time that the proportion of high-growth SMEs showed was not trivial.

In Figure 9, industries in manufacturing are arranged in order of the proportion of high-growth SMEs in 2000~2003. According to the figure, IT machinery showed the highest proportion when based on the number of establishments, and transportation equipment except for motor vehicles, semiconductors, motor vehicles, electronic component parts, and precision machinery showed high proportion of high-growth SMEs in turn. On the other hand, textile & apparel, paper & paperboard products showed

⁸ Mustar Index used in the research of OECD (2002a) has a strength in mitigating the phenomenon that SMEs are overrepresented in the groups of high-growth SMEs, since it considers the growth rate of employment and the amount of employment growth at the same time. However, in this research where SMEs are the main focus of analysis, we considered that there is no need to use Mustar Index, so we used simple employment growth rate in identifying high-growth SMEs.

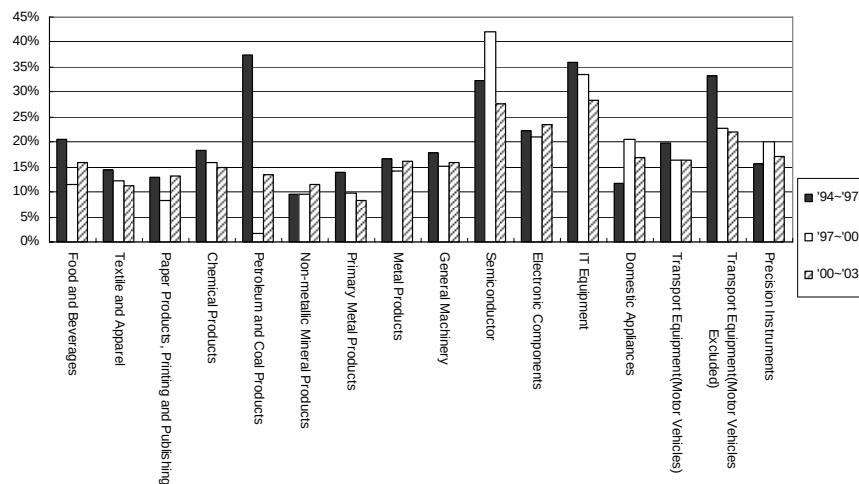
Figure 9. Proportion of High-Growth SMEs by Industry
(in Terms of the Number of Establishments)



comparatively low proportion. However, the proportion was over 5% even in these industries, which means that high-growth SMEs do not only exist in certain high-technology industries. This fact has crucial implications in policy discussions concerning the discovery and support of potential high-growth SMEs (OECD[2002a], pp.28, 62~63).

Figure 10 is the proportion of high-growth SMEs based on employment (of the last year of each period) instead of number of establishments. Comparing the two figures, first, the proportion based on employment is bigger than that based on the number of establishments, which seems to reflect the tendency that size of high-growth SMEs is bigger than that of each industry's average. Second, when arranging the industries in order of the proportion of high-growth SMEs in the period of 2000~03, the order varies from that of the 1997~2000 period. Among the industries with high proportion of high-growth SMEs, it is noteworthy that the order of motor vehicle industry changed from the fourth to seventh highest. As an explanation for this, it is conjectured that the size of high-growth SMEs in motor vehicle industry is relatively small, or high capital intensity of SMEs in the industry resulted in weak job creation effect. Similarly, primary metal products industry, which showed the fourth lowest proportion of high-growth SMEs in terms of the number of establishments, had the lowest proportion in terms of employment, and this may also be explained by the fact that the industry has relatively high capital intensity.

Figure 10. Proportion of High-Growth SMEs by Industry
(in Terms of Employment)



Regardless of the measure of the proportion, industries with high proportion of high-growth SMEs are generally export industries having comparative advantage in international markets, which suggests that export may have positive effect in the growth of SMEs. Also, the aforementioned OECD's research outcome regarding high-growth SMEs strongly suggests that export is a critical factor determining the growth of firms (OECD[2002]a, p. 68). Regarding the relationship between the internationalization of production and competition and the growth of firms, further and more diversified research to meet its importance is needed.

Other common characteristics of the industries with high proportion of high-growth SMEs are high technology intensity, high demand for skilled human resources, and relatively strong importance of innovation activities including R&D investment. Since this point also needs more specific analysis, in this chapter, variables related to export, human resources, and innovation, as main factors for growth, will be reviewed using different analysis methods.

Before conducting a more straightforward analysis of high-growth SMEs, industrial distribution of high-growth SMEs will be reviewed in connection with each industry's technology level. As mentioned in the introduction, let's classify each industry in manufacturing into High-Tech, Medium-High-Tech, Medium-Low-Tech, and Low-Tech according to technology level by

Figure 11. Proportion of High-Growth SMEs by Industry
(in Terms of Number of Establishments)

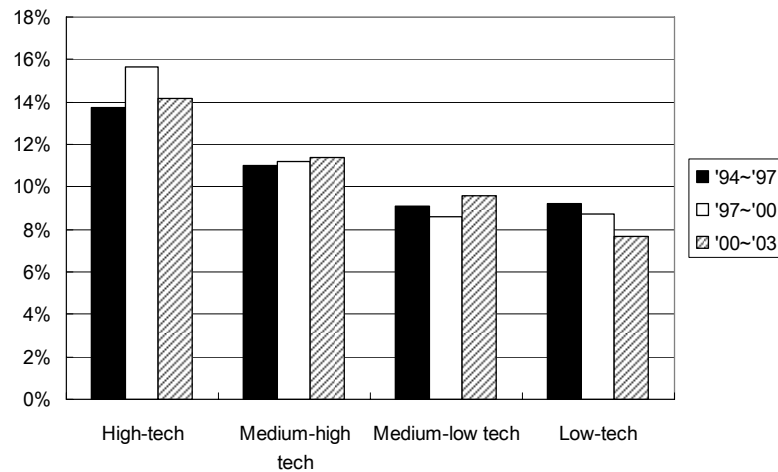
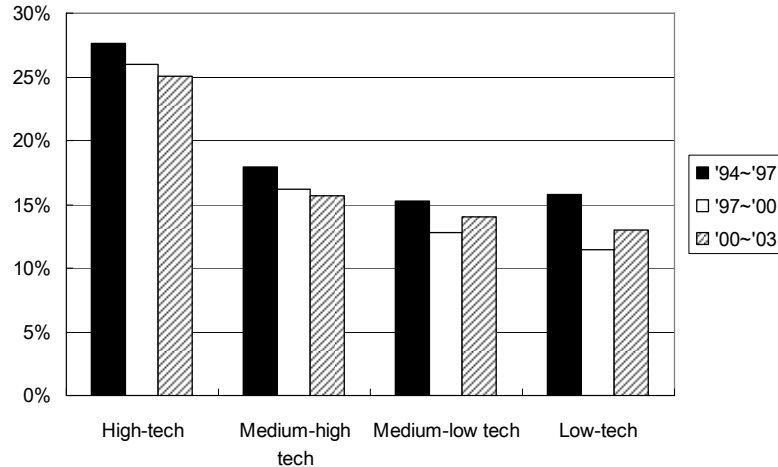


Figure 12. Proportion of High-Growth SMEs by Industry
(in Terms of Employment)



OECD (1997) based on OECD's average R&D intensity by industry, and examine the proportion of high-growth SMEs in each classification.

As we can clearly see in Figure 11 and Figure 12, proportion of high-growth SMEs was highest in the High-Tech industries and lowest in the Low-Tech industries. Also, in Figure 11, proportions of high-growth SMEs

in Medium-High-Tech and Medium-Low-Tech industries were slightly higher and lower than 15%, respectively. In other words, there seems to exist a rank-correlation almost near to 1 between technology level by industry and proportion of high-growth SMEs in Korean manufacturing sector during last 10 years.

b. Analysis of the Characteristics of High-growth SMEs

Through the analysis of industrial distribution of high-growth SMEs, we could confirm that there is a possibility that industry-level factors are critical in determining the growth of SMEs. In addition to this, if different SMEs in the same industry have different growth paths, this cannot be explained only by industry-level factors, and attempts should be made to explain this by specific firm-level factors. First of all, when comparing individual SMEs in the same industry, main factors of individual firm-level should be found considering the discriminating characteristics of high-growth SMEs.

Through the analysis of industrial distribution of high-growth SMEs, we made sure the probability that factors such as technology, human resources, R&D activities, and export may be closely related to the proportion of high-growth SMEs by industry. Then, we need to extract the variables related to the above factors in individual firm-level and check how the factors are related to the high-growth of individual firms.

In order to conduct the analysis, we computed TFP, proportion of non-production workers, R&D intensity, and export intensity in firm-level. For the calculation of TFP, we used the values computed by multilateral index method as explained in Chapter 4, and other variables are computed using the variables included in micro data of the *Report on Mining and Manufacturing Survey*. Now let's check whether these variables are significantly different for high-growth SMEs and other SMEs.

Table 1 is a summary of the result that four variables each reflecting the characteristics of individual firms are regressed to high-growth dummy variable (1 for the firm with characteristics of high-growth SMEs, and if not, 0), industry dummy variable, and year dummy variable. Industry dummy variable is included to control the inherent characteristics of each industry, and year dummy is included to control the internal characteristics of each period by macroeconomic cycle. Therefore, regression coefficient of high-growth dummy variable indicates how the dependent variables in the case of high-growth SMEs are bigger on average than in the case of the other SMEs in the same industry and period.

Table 1. Characteristics of High-Growth SMEs in Light of the Relationship with Firm-Level Variables

Dependent Variables Explanatory Variables	Total Factor Productivity (TFP)	Proportion of Non-production workers	R&D Intensity	Export Intensity
High-growth dummy	0.02153* (6.61)	0.05728* (6.30)	0.00230* (4.40)	0.00572* (3.06)
Constant term	0.55193* (20.33)	0.34352* (25.38)	0.00154 (1.57)	0.03564* (11.49)
Industry dummy	included	included	included	included
Year dummy	included	included	included	included
number of observations	104,966	146,167	147,238	88,465
Adj. R ²	0.06581	0.01843	0.00422	0.03993

Notes: Inside of () are t-ratios corrected for inequality of variance.

*: significant in the level of significance 1%

From the table above, we can see that in the case of high-growth SMEs, TFP, proportion of non-production workers, R&D intensity, and export intensity are bigger on average than other SMEs by 2.2%p, 5.7%p, 0.2%p, and 0.6%p, respectively. Also, the regression coefficients reflecting these differences between high-growth SMEs and other firms are all statistically significant in 1% significance level. To sum up, high-growth SMEs are relatively more productive, have more highly-skilled human resources, and tend to show more active R&D and export activities.

So then, what influence do the variables such as technical efficiency, human resources, innovation, and competition in international market that each of the four variables above partly reflects have on the growth of SMEs? Are there any other crucial factors for the growth of SMEs? How is the productivity affected by the main factors for growth? What policy implications can be drawn from the empirical analysis of the factors for SMEs' growth? Considering these questions, in the next section, we try to conduct a regression analysis making full use of the available firm- and industry-level statistics.

3. Review of the Factors Determining the Growth of SMEs through Regression Analysis

A. Main Direction for Analysis

Main direction for specific regression analysis is as follows: First, taking into account the industrial distribution and characteristics of high-growth SMEs discussed so far, we consider the factors determining the growth of individual SMEs both in specific firm-level and industry-level. Second, making allowances for recent trend of internationalization of production and competition, variables related to export and import or FDIs are included in the analysis. Third, by performing both the regression analysis regarding the whole firms and the regarding only large firms or SMEs, we try to figure out the characteristics specific to SMEs. Fourth, by analyzing the growth factors of individual firms and the determinants of TFP growth at the same time, we try to draw richer implications.

The reason for including the variables related to trade and FDI in the analysis of the growth factor needs to be elaborated. As confirmed above, industries with high proportion of high-growth SMEs are not only the main export industries of Korea but also those in which the internationalization of production actively advancing in the East Asian region is most apparent. In

Figure 13. Trend in FDI (Gross Investment)

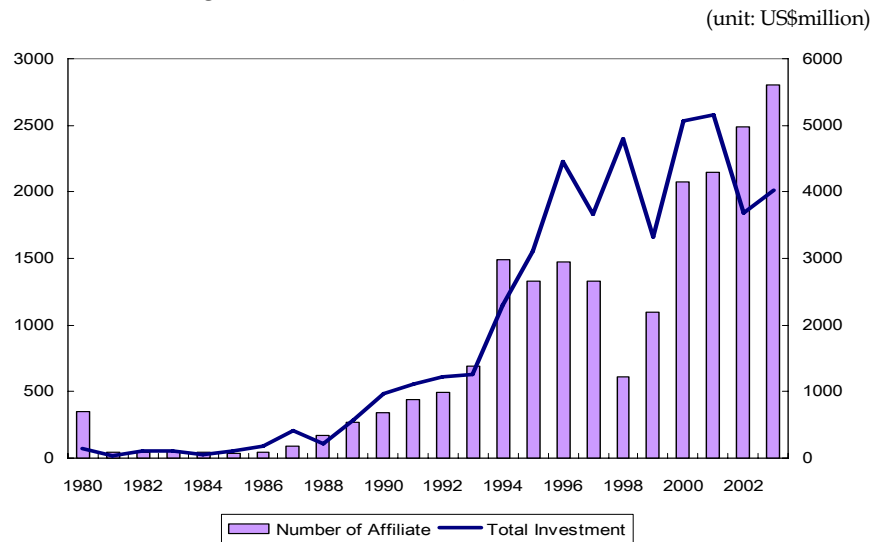
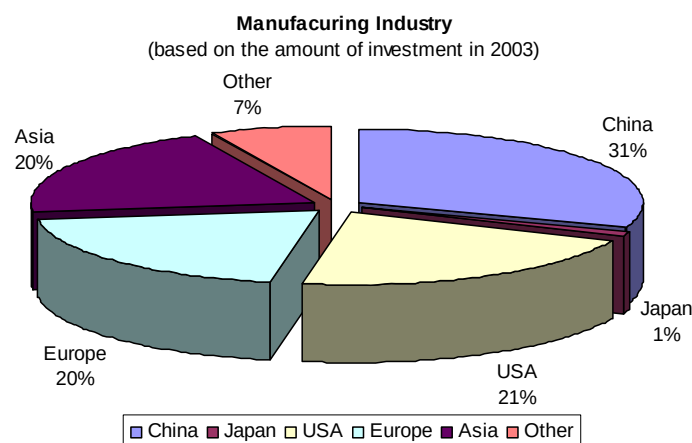


Figure 14. Regional Distribution of FDI



this process, some large firms of Korea and Japan are moving the part of their production process with high labor intensity to China. Also, not a few SMEs are moving their production facilities to China in order for a better access to market or to cut costs.

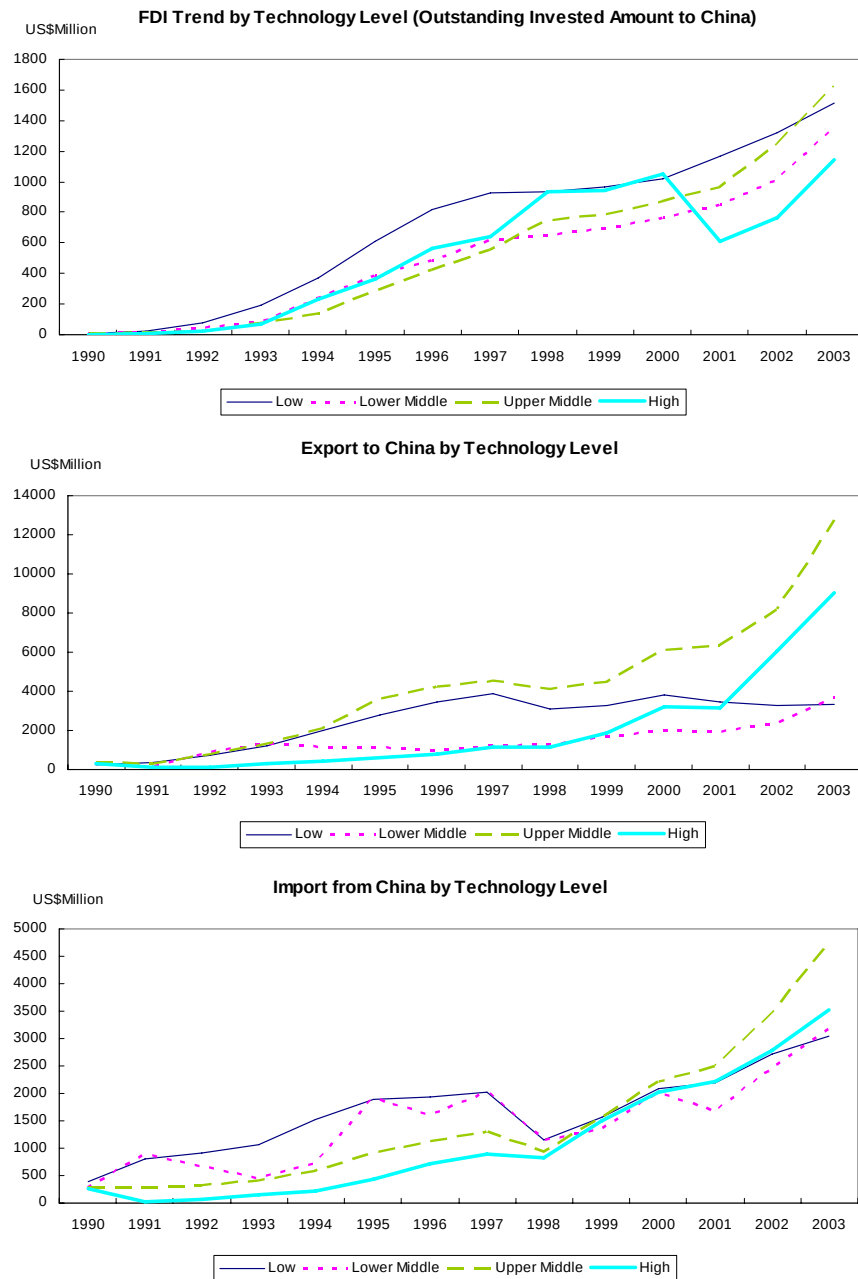
As shown in Figure 13 and Figure 14, Korea's FDI increased rapidly in 1990s, and China is Korea's largest FDI destination in 2003 in terms of current amount of FDI in manufacturing.

Similarly, when applying the OECD's method (1997) that divided manufacturing industries into four groups according to technology level, while proportions of High-Tech and Medium-High-Tech industries are exceptionally high in Korea's export to China, in case of FDI into China and import from China, proportion of Medium-Low-Tech and Low-Tech industries are maintaining high level (See Figure 15). As a result, Korean SMEs in sectors with high labor intensity are losing their comparative advantage and are threatened by the competition from China⁹.

Increase of international competition like this has made trade and FDI indispensable factors for analyzing survival and growth of Korean SMEs. Although data limitation caused difficulties in including firm-level trade and FDIs in the factor analysis of SMEs' growth, we tried to make full use of available data in the analysis in this section. Therefore, main direction for the analysis is to include variables related to FDI and trade in regression equation in the form of industry-level variables.

⁹ Results of specific analysis on this is presented in Chapter 2 of this report.

Figure 15. Trend of FDI, Export, and Import by Technology Level
(to and from China)



B. Method of Analysis

a. Regression Equation and Main Variables

In this section, we try to estimate TFP using the two basic form regression equations below. As mentioned before, in these estimation equations, we consider the firm-level variables and industry-level variables at the same time.

$$\frac{L_{i,t+1} - L_{i,t}}{L_{i,t}} = \alpha_0 + \alpha_p \cdot X_{i,t} + \alpha_l \cdot Y_{j,t} + \alpha_D \cdot D_t + \varepsilon_{i,t}$$

In this equation, dependent variable on the left side is firm's growth rate in terms of employment, and explanatory variables on the right side can be generally classified as follows:

- $X_{i,t}$: Vector of firm-level variables of firm i in year t . Here, yearly growth rate of shipment by firms, proportion of non-production workers by firms, capital equipment ratio by firms, R&D intensity by firms, and export intensity of firms are included. Proportion of non-production workers by firms is the number of non-production workers by firms reported in the *Report on Mining and Manufacturing Survey* divided by the number of production workers by firms. Capital equipment ratio by firms is the ratio of capital and labor of each firm. R&D intensity and export intensity by firms are R&D expenditure by firms and amount of export by firms, respectively, divided by amount of shipment by firms.
- $Y_{j,t}$: Vector of industry-level variables of industry j in which firm i belongs to in year t . Proportions and intensities by industry are computed by collecting the related firm-level values, aggregating the values by industries, and calculating the ratios between the aggregates. Also, variables related to FDI and trade are added. Here, growth rate of gross FDI, proportions of main countries in FDI, growth rate of export, proportions of main countries in export, import growth rate, proportions of main countries in import are included.
- D_t : Vector of year dummies.

Regression equation on TFP growth rate has a very similar structure to the above equation.

$$\ln TFP_{i,t+1} - \ln TFP_{i,t} = \beta_0 + \beta_p \cdot X_{i,t} + \beta_l \cdot Y_{j,t} + \beta_D \cdot D_t + \varepsilon_{i,t}$$

In this equation, dependent variable on the left side is log growth rate of TFP, and explanatory variables on the right side are mostly similar to the

variables explained above. The only difference is that initial TFP level by firms instead of growth rate of shipment is included as firm-level variable.

b. Data and Period for Analysis

As briefly mentioned above, firm-level data used in the regression analysis in this section is based on the micro data of the *Report on Mining and Manufacturing Survey*. The *Report* includes not only the basic information necessary for estimating TFP at firm-level, but also classifies firms with single plant and multiple plants, and contains rich data such as R&D and export amount. However, it does not include the data such as the amount of FDI and import. In addition, export data in the *Report* does not contain any information on export partner countries.

Therefore, in order to construct the industry-level variables for regression analysis, the *Overseas Direct Investment Statistics Yearbook* by Export-Import Bank of Korea (Korea Exim) and the *United Nations Commodity Trade Statistics Database* (UN Comtrade) are used as well. The *Overseas Direct Investment Statistics Yearbook* by Korea Exim classifies industries according to the industry classification code of its own (Exim code), and its sub-classification of manufacturing into 70 industries is similar to KSIC 3-digit sub-classification by Korea Standard Industry Classification (KSIC), which classifies manufacturing into 71 industries. Since the micro data of the *Report on Mining and Manufacturing Survey* (KSIC 5-digit) and UN Comtrade database have more detailed classification system, when consolidating the three kinds of data set, classification by Korea Exim was used. In other words, variables aggregated in industry-level that are used in regression analysis are all collected based on the sub-classification by Korea Exim.

As in the Section 2 and Section 3, period of year 1993~2003 was selected for analysis.¹⁰ When computing the employment growth rate and TFP growth rate, we considered the three methods below in turn:

First, applying the same method used in identifying high-growth SMEs in Section 3, we divided the period into three (year 1994~1997, year 1997~2000, and year 2000~2003), and calculated employment growth rate and TFP growth rate of each period as averages of three years in each period. In case we apply this method to our regression equation, we try to examine the impact that the various firm- and industry-level variables have on the employment and TFP growth rate in the next three years on average.

¹⁰ Nevertheless, the reason that the analysis of yearly cohorts in Section 2 was started in 1994 was that, since "entry" was defined as 'entry into database of a firm that wasn't included in the database in the previous year', delay of one year was inevitable in order to verify the entry. In case when the calculation of yearly growth rate is needed, observation of the first year, for which the computation of growth rate is impossible, is sacrificed.

Having a long time lag (in this case three years) between the point of time of explanatory variables and that of dependent variable has advantages and disadvantages at the same time. One advantage is that having a time lag makes it less unreasonable to interpret the correlation between the explanatory and dependent variables as causality. In other words, we can considerably mitigate the problem of endogeneity or simultaneity. Also, one disadvantage is that the number of observation is limited as a result of long time lag. For example, when conducting an analysis with three-year time lag with yearly data for ten years, only three periods are available for analysis. One way to overcome this problem is to calculate the average growth rate using the periods of three years but allowing the overlaps of the periods. We took the latter method in our analysis.

However, these two methods commonly have a problem. That is, a sort of 'selection bias' which is often faced when conducting an empirical analysis on 'firm dynamics', especially the growth of firms. When calculating the growth rate of firms or establishments with a big time lag, low-growth firms that exited in the period are systematically excluded in the analysis. An ideal way to solve this problem is conducting a growth regression analysis through an estimation model that explicitly considers a firm's probability to exit. A simpler method is trying to mitigate potential selection bias by making the time lag as short as possible. This is our third method. One benefit of this method is that the number of observation increases.

In the next sub-section, we try to apply the abovementioned three methods in turn.

C. Result of Analysis

Results of applying the three methods to the regression analysis of employment growth and TFP growth are summarized in Table 2 to Table 7. In each table, results in columns I and II are from the regression analysis including the whole firms, columns III and IV are results including only the firms with 300 or more employees, and columns V and VI are only for the firms with less than 300 employees.

Table 2. Regression Results for Three-Year Average Employment Growth Rate (Overlapping not Allowed)

Three year average annual employment growth rate ($L_{i,t+3}/L_{i,t}$) ^{1/3} -1	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Annual shipment growth rate(Three year average)	0.23688 *** (47.35)	0.23674 *** (47.32)	0.40914 *** (9.35)	0.41092 *** (9.29)	0.22856 *** (50.99)	0.22839 *** (50.96)
Non-manufacturing employment share by firm	0.00302 *** (5.13)	0.00302 *** (5.13)	-0.00014 (-0.07)	0.00040 (0.22)	0.00349 *** (5.46)	0.00352 *** (5.48)
Capital equipment ratio by firm	0.00012 ** (2.44)	0.00012 ** (2.44)	0.00000 (0.29)	0.00000 (0.05)	0.00012 ** (2.13)	0.00012 ** (2.13)
R&D intensity by firm	-0.04063 *** (-2.71)	-0.04087 *** (-2.74)	0.02368 (0.35)	0.01776 (0.26)	-0.03891 *** (-2.67)	-0.03912 *** (-2.70)
Export intensity by firm	0.02254 *** (7.46)	0.02268 *** (7.50)	0.03402 * (1.67)	0.02786 (1.38)	0.02127 *** (7.10)	0.02139 *** (7.14)
Size of business	-0.02967 *** (-40.59)	-0.02982 *** (-40.75)	-0.09591 *** (-9.38)	-0.09126 *** (-9.25)	-0.03535 *** (-51.48)	-0.03554 *** (-51.71)
Non-manufacturing employment share by industry	0.00077 (0.21)	0.00493 (1.48)	0.01421 (0.61)	0.01537 (0.71)	-0.00043 (-0.12)	0.00363 (1.09)
Capital equipment ratio by industry	-0.00003 * (-1.66)	-0.00002 (-1.20)	0.00000 (-0.02)	-0.00002 (-0.54)	-0.00002 (-1.46)	-0.00002 (-1.10)
R&D intensity by industry	0.24532 *** (4.42)	0.24554 *** (4.62)	0.97702 *** (3.00)	0.71688 ** (2.25)	0.24764 *** (4.43)	0.24448 *** (4.55)
Export intensity by industry	0.04777 *** (9.17)	0.04905 *** (10.09)	0.02201 (0.52)	0.01060 (0.26)	0.04828 *** (9.20)	0.05018 *** (10.25)
Outward FDI growth rate by industry	0.00636 *** (4.18)	0.00644 *** (4.50)	0.03909 *** (4.70)	0.02682 *** (3.66)	0.00535 *** (3.41)	0.00540 *** (3.66)
Share of FDI to China by industry	-0.01478 *** (-4.16)	-0.01308 *** (-3.89)	-0.05031 ** (-2.10)	-0.04763 ** (-2.05)	-0.01426 *** (-3.98)	-0.01209 *** (-3.56)
Share of FDI to the US by industry	0.00630 * (1.87)	0.00300 (0.91)	-0.04450 (-1.63)	-0.03402 (-1.27)	0.00527 (1.55)	0.00183 (0.55)
Export growth rate by industry	0.00540 * (1.94)		0.01297 (0.77)		0.00664 ** (2.37)	
Share of export to China by industry	-0.00312 (-0.56)		-0.11632 ** (-2.42)		-0.00404 (-0.72)	
Share of export to Japan by industry	0.00465 (1.02)		0.07165 * (1.95)		0.00308 (0.67)	

Three year average annual employment growth rate ($L_{i,t+3}/L_{i,t}$) ^{1/3} -1	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Share of export to the US by industry	0.02162 *** (3.64)		0.10427 ** (2.19)		0.01835 *** (3.03)	
Import growth rate by industry	0.01090 *** (2.92)		0.10027 *** (3.60)		0.01157 *** (3.08)	
Share of import from China by industry	-0.02715 *** (-5.85)		-0.04812 (-1.46)		-0.02352 *** (-5.03)	
Share of import from Japan by industry	0.01553 *** (3.95)		0.05434 (1.17)		0.01603 *** (4.12)	
Share of import from the US by industry	0.02645 *** (2.75)		-0.06015 (-0.99)		0.02987 *** (3.10)	
Trade growth rate by industry		0.02951 *** (7.03)		0.02236 (0.81)		0.03229 *** (7.65)
Share of trade with China by industry		-0.04075 *** (-8.49)		-0.07437 * (-1.76)		-0.03902 *** (-7.92)
Share of trade with Japan by industry		0.02887 *** (4.90)		0.09112 (1.62)		0.02684 *** (4.59)
Share of trade with the US by industry		0.01852 *** (2.84)		-0.00106 (-0.01)		0.01907 *** (2.90)
Constant	0.05670 *** (15.68)	0.05717 *** (17.81)	0.57803 *** (8.45)	0.57245 *** (8.90)	0.03747 *** (10.52)	0.03828 *** (12.27)
Year dummy	included	included	included	included	included	included
No. of observations	101834	101834	1457	1457	100367	100367
ADJ. R ²	0.29549	0.29553	0.71842	0.71318	0.29335	0.29346

Notes: Inside of () are t-ratios corrected for inequality of variance.

***, **, *: significant in the level of significance 1%, 5%, 10%, respectively.

Table 3. Regression Results for Three-Year Average Employment Growth Rate (Overlapping Allowed)

Three year average annual employment growth rate ($L_{i,t+3}/L_{i,t}$) ^{1/3} -1	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Annual shipment growth rate (Three year average)	0.23454 *** (62.48)	0.23442 *** (62.44)	0.39577 *** (15.52)	0.39880 *** (15.55)	0.22613 *** (64.22)	0.22599 *** (64.18)
Non-manufacturing employment share by firm	0.00219 *** (5.21)	0.00223 *** (5.28)	-0.00206 (-1.44)	-0.00161 (-1.21)	0.02282 *** (6.05)	0.00288 *** (6.17)
Capital equipment ratio by firm	0.00016 *** (4.23)	0.00016 *** (4.23)	0.00002 * (1.87)	0.00001 (1.45)	0.00017 *** (3.55)	0.00017 *** (3.56)
R&D intensity by firm	-0.00137 (-0.37)	-0.00140 (-0.38)	-0.01735 (-0.23)	-0.02478 (-0.33)	-0.00122 (-0.35)	-0.00124 (-0.35)
Export intensity by firm	0.01055 (1.54)	0.01055 (1.54)	0.02402 ** (2.26)	0.01733 * (1.65)	0.01001 (1.51)	0.01002 (1.51)
Size of business	-0.03006 *** (-48.57)	-0.03020 *** (-48.86)	-0.09387 *** (-15.91)	-0.08960 *** (-15.55)	-0.03582 *** (-60.40)	-0.03601 *** (-60.80)
Non-manufacturing employment share by industry	0.00223 (0.96)	0.00642 *** (3.00)	0.00037 (0.03)	0.00756 (0.60)	0.00012 (0.05)	0.00438 ** (2.02)
Capital equipment ratio by industry	-0.00003 ** (-2.48)	-0.00002 ** (-1.99)	0.00002 (0.65)	0.00000 (0.06)	-0.00002 ** (-2.17)	-0.00002 * (-1.83)
R&D intensity by industry	0.26371 *** (7.12)	0.24582 *** (6.92)	0.98575 *** (4.74)	0.66544 *** (3.29)	0.26037 *** (6.95)	0.24074 *** (6.69)
Export intensity by industry	0.03491 *** (10.54)	0.03776 *** (12.13)	-0.00275 (-0.12)	0.01593 (0.77)	0.03479 *** (10.57)	0.03803 *** (12.36)
Outward FDI growth rate by industry	0.00681 *** (6.95)	0.00676 *** (7.34)	0.03182 *** (6.52)	0.02108 *** (4.55)	0.00617 *** (6.01)	0.00614 *** (6.37)
Share of FDI to China by industry	-0.02062 *** (-9.16)	-0.01824 *** (-8.62)	-0.04714 *** (-3.03)	-0.04793 *** (-3.28)	-0.02044 *** (-8.97)	-0.01759 *** (-8.21)
Share of FDI to the US by industry	0.00626 *** (2.83)	0.00319 (1.46)	-0.00890 (-0.56)	-0.01174 (-0.76)	0.00530 ** (2.37)	0.00209 (0.95)
Export growth rate by industry	0.00496 *** (2.79)		-0.01349 (-1.01)		0.00608 *** (3.38)	

Three year average annual employment growth rate ($L_{i,t+3}/L_{i,t})^{1/3}-1$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Share of export to China by industry	-0.00483 (-1.34)		-0.09722 *** (-3.45)		-0.00494 (-1.35)	
Share of export to Japan by industry	0.00026 (0.09)		0.03305 (1.02)		-0.00144 (-0.51)	
Share of export to US by industry	0.02231 *** (5.74)		0.09117 *** (2.85)		0.01995 *** (4.97)	
Import growth rate by industry	0.01311 *** (5.54)		0.09192 *** (5.05)		0.01378 *** (5.76)	
Share of import from China by industry	-0.011940 *** (-6.59)		-0.04414 ** (-2.06)		-0.01571 *** (-5.30)	
Share of import from Japan by industry	0.01745 *** (6.91)		0.07464 ** (2.51)		0.01777 *** (7.09)	
Share of import from the US by industry	0.03544 *** (5.71)		-0.04012 (-0.84)		0.04041 *** (6.52)	
Trade growth rate by industry		0.03072 *** (11.66)		0.01442 (0.80)		0.03387 *** (12.78)
Share of trade with China by industry		-0.03293 *** (-10.84)		-0.07638 *** (-2.80)		-0.03054 *** (-9.56)
Share of trade with Japan by industry		0.02724 *** (7.19)		0.09792 *** (2.69)		0.02485 *** (6.62)
Share of trade with the US by industry		0.03029 *** (7.24)		0.00276 (0.06)		0.03234 *** (7.54)
Constant	0.03221 *** (11.81)	0.03197 *** (13.11)	0.55014 *** (12.46)	0.53922 *** (12.98)	0.04689 *** (17.67)	0.04681 *** (19.91)
Year dummy	included	included	included	included	included	included
No. of observations	256087	256087	3787	3787	252269	252269
Adj. R ²	0.30769	0.30775	0.71887	0.71457	0.30511	0.30523

Notes: Inside of () are t-ratios corrected for inequality of variance.

***, **, *: significant in the level of significance 1%, 5%, 10%, respectively.

Table 4. Regression Results for Yearly Employment Growth Rate

Annual employment growth rate ($L_{i,t+1}-L_{i,t}$)/ $L_{i,t}$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Annual shipment growth rate (Three year average)	0.01093 (1.42)	0.01093 (1.42)	0.07973 *** (3.13)	0.07993 *** (3.14)	0.00607 (1.36)	0.00607 (1.36)
Non-manufacturing employment share by firm	0.00885 *** (8.96)	0.00886 *** (8.98)	-0.00627 (-1.48)	-0.00541 (-1.45)	0.01054 *** (10.11)	0.01059 *** (10.14)
Capital equipment ratio by firm	0.00050 *** (5.95)	0.00050 *** (5.96)	0.00014 ** (2.30)	0.00013 ** (2.21)	0.00053 *** (5.07)	0.00053 *** (5.08)
R&D intensity by firm	0.00241 (0.26)	0.00229 (0.24)	0.24220 (0.87)	0.19616 (0.70)	0.00733 (0.81)	0.00722 (0.80)
Export intensity by firm	0.02815 *** (2.69)	0.02807 *** (2.69)	0.01612 (0.20)	-0.00835 (-0.10)	0.02658 *** (2.66)	0.02655 *** (2.66)
Size of business	-0.07451 *** (-44.25)	-0.07474 *** (-44.32)	-0.90932 *** (-5.37)	-0.87086 *** (-5.35)	-0.08596 *** (-62.07)	-0.08631 *** (-62.35)
Non-manufacturing employment share by industry	0.01471 ** (2.50)	0.02155 *** (4.05)	-0.27389 ** (-2.15)	-0.21006 ** (-2.09)	0.01115 ** (1.98)	0.01799 *** (3.53)
Capital equipment ratio by industry	-0.00009 *** (-3.89)	-0.00010 *** (-4.22)	-0.00030 (-0.72)	-0.00034 (-1.64)	-0.00008 *** (-3.21)	-0.00009 *** (-3.80)
R&D intensity by industry	0.68620 *** (8.18)	0.53617 *** (6.66)	0.62585 (0.70)	-1.05123 (-1.23)	0.75091 *** (9.04)	0.58252 *** (7.26)
Export intensity by industry	0.09140 *** (11.75)	0.07806 *** (10.95)	0.70840 *** (3.11)	0.95156 *** (3.63)	0.09282 *** (12.34)	0.07736 *** (11.23)
Outward FDI growth rate by industry	0.01343 *** (5.40)	0.01052 *** (4.30)	0.29609 *** (4.08)	0.23172 *** (3.36)	0.01105 *** (4.51)	0.00803 *** (3.45)
Share of FDI to China by industry	-0.04945 *** (-8.52)	-0.03863 *** (-7.01)	-0.26382 * (-1.78)	-0.25124 * (-1.89)	-0.04953 *** (-8.79)	-0.03807 *** (-7.18)
Share of FDI to the US by industry	-0.00838 (-1.54)	-0.01020 * (-1.91)	0.24708 * (1.66)	0.13080 (1.06)	-0.01101 ** (-2.10)	-0.01290 ** (-2.50)
Export growth rate by industry	0.01819 *** (3.05)		-0.12772 (-0.93)		0.01889 *** (4.20)	
Share of export to China by industry	-0.02844 *** (-2.88)		-0.66864 ** (-2.01)		-0.02589 *** (-2.92)	
Share of export to Japan by industry	0.01917 ** (2.32)		0.08472 (0.39)		0.01886 ** (2.38)	
Share of export to the US by industry	0.03557 *** (3.16)		0.76669 ** (2.08)		0.02870 *** (2.87)	

Annual employment growth rate ($L_{i,t+1} - L_{i,t}$)/ $L_{i,t}$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Import growth rate by industry	0.03807 *** (6.00)		0.79569 *** (3.35)		0.03952 *** (6.57)	
Share of import from China by industry	-0.00443 (-0.54)		-0.19880 (-0.75)		0.00205 (0.26)	
Share of import from Japan by industry	0.01381 * (1.78)		0.80844 * (1.70)		0.01167 * (1.85)	
Share of import from the US by industry	0.07879 *** (4.59)		0.37344 (0.89)		0.08248 *** (5.21)	
Trade growth rate by industry		0.07415 *** (9.96)		0.32164 (1.45)		0.08220 *** (11.64)
Share of trade with China by industry		-0.02921 *** (-3.47)		-0.51572 (-1.50)		-0.02073 ** (-2.54)
Share of trade with Japan by industry		-0.00335 (-0.29)		1.04462 ** (2.03)		-0.01549 (-1.59)
Share of trade with the US by industry		0.06667 *** (5.59)		0.79912 (1.37)		0.06501 *** (6.26)
Constant	0.15428 *** (18.83)	0.16112 *** (21.03)	5.51022 *** (5.40)	5.34231 *** (5.48)	0.17926 *** (27.16)	0.18773 *** (31.28)
Year dummy	included	included	included	included	included	included
No. of observations	493006	493006	5273	5273	487692	487692
Adj. R ²	0.05204	0.05207	0.44941	0.44789	0.04349	0.04356

Notes: Inside of () are t-ratios corrected for inequality of variance.

***, **, *. significant in the level of significance 1%, 5%, 10%, respectively.

Table 5. Regression Results for Three-Year Average TFP Growth Rate (Overlapping not Allowed)

Three year average annual TFP growth rate (Overlaps included) $\{\ln(TFP)_{i,t+3} - \ln(TFP)_{i,t}\} / 3$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
$\ln(TFP)_{i,t}$	-0.23784 *** (-164.64)	-0.23691 *** (-165.08)	-0.17262 *** (-14.78)	-0.16588 *** (-13.56)	-0.23927 *** (-163.23)	-0.23827 *** (-163.59)
Non-manufacturing employment share by firm	0.00576 *** (7.03)	0.00582 *** (6.98)	-0.00079 (-1.09)	-0.00077 (-1.05)	0.00662 *** (7.74)	0.00668 *** (7.65)
Capital equipment ratio by firm	-0.00005 *** (-5.36)	-0.00005 *** (-5.25)	-0.00002 ** (-2.46)	-0.00002 ** (-2.34)	-0.00005 *** (-4.46)	-0.00005 *** (-4.37)
R&D intensity by firm	0.00407 (0.93)	0.00422 (0.98)	0.04447 (0.57)	0.03863 (0.49)	0.00400 (0.92)	0.00415 (0.96)
Export intensity by firm	0.00142 (0.61)	0.00182 (0.78)	0.00162 (0.14)	0.00451 (0.40)	0.00264 (1.10)	0.00298 (1.24)
Size of business	0.00808 *** (21.73)	0.00795 *** (21.44)	0.00827 *** (2.94)	0.00689 ** (2.58)	0.00751 *** (18.31)	0.00744 *** (18.16)
Non-manufacturing employment share by industry	0.01891 *** (6.31)	0.01461 *** (5.27)	0.00625 (0.42)	0.00134 (0.09)	0.01912 *** (6.20)	0.01441 *** (5.05)
Capital equipment ratio by industry	0.00002 *** (3.01)	0.00001 * (1.77)	0.00003 (1.07)	0.00001 (0.48)	0.00002 *** (2.64)	0.00001 (1.58)
R&D intensity by industry	0.59702 *** (13.99)	0.72119 *** (17.48)	0.44549 ** (2.18)	0.49435 ** (2.50)	0.59377 *** (13.62)	0.73112 *** (17.33)
Export intensity by industry	-0.02122 *** (-5.29)	-0.00283 (-0.75)	-0.08714 *** (-3.46)	-0.09132 *** (-3.92)	-0.01849 *** (-4.56)	0.00054 (0.14)
Outward FDI growth rate by industry	0.00431 *** (3.72)	0.00707 *** (6.58)	0.00819 * (1.69)	0.00722 (1.49)	0.00374 *** (3.16)	0.00683 *** (6.20)
Share of FDI to China by industry	-0.02427 *** (-8.62)	-0.02930 *** (-11.28)	-0.05626 *** (-3.75)	-0.05922 *** (-3.88)	-0.02246 *** (-7.88)	-0.02830 *** (-10.74)
Share of FDI to the US by industry	0.00132 (0.51)	-0.00240 (-0.94)	0.01307 (0.75)	0.00250 (0.14)	0.00137 (0.52)	-0.00203 (-0.78)

Three year average annual TFP growth rate (Overlaps included) $\{\ln(TFP)_{i,t+3} - \ln(TFP)_{i,t}\} / 3$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Export growth rate by industry	-0.01034 *** (-4.51)		-0.05687 *** (-3.65)		-0.00852 *** (-3.73)	
Share of export to China by industry	0.03809 *** (8.42)		-0.02027 (-0.80)		0.03945 *** (8.61)	
Share of export to Japan by industry	-0.03403 *** (-8.48)		-0.00264 (-0.09)		-0.03542 *** (-8.78)	
Share of export to US by industry	-0.00657 (-1.34)		-0.07993 ** (-2.32)		-0.00504 (-1.01)	
Import growth rate by industry	-0.01085 *** (-3.69)		-0.02185 (-1.46)		-0.01069 *** (-3.58)	
Share of import from China by industry	0.03705 *** (9.95)		0.03176 (1.53)		0.03747 *** (9.89)	
Share of import from Japan by industry	0.01243 *** (4.17)		0.02464 (1.26)		0.01164 *** (3.86)	
Share of import from the US by industry	0.01644 ** (2.13)		-0.00072 (-0.02)		0.01509 * (1.93)	
Trade growth rate by industry		-0.01246 *** (-3.78)		-0.04802 *** (-2.72)		-0.01255 *** (-3.72)
Share of trade with China by industry		0.05059 *** (12.72)		-0.00282 (-0.10)		0.05260 *** (13.07)
Share of trade with Japan by industry		0.00358 (0.80)		-0.04425 (-1.56)		0.00485 (1.07)
Share of trade with the US by industry		0.02088 *** (3.68)		-0.08706 (-1.83)		0.02179 *** (3.80)
Constant	0.05763 *** (19.92)	0.05673 *** (22.19)	0.11041 *** (4.65)	0.13226 *** (5.81)	0.02359 *** (8.13)	0.02202 *** (8.67)
Year dummy	Included	Included	Included	Included	Included	Included
No. of observations	78211	78211	1157	1157	77046	77046
Adj. R ²	0.40897	0.40664	0.28910	0.27817	0.41115	0.40874

Notes: Inside of () are t-ratios corrected for inequality of variance.

***, **, *: significant in the level of significance 1%, 5%, 10%, respectively.

Table 6. Regression Results for Three-Year Average TFP Growth Rate (Overlapping Allowed)

Three year average annual TFP growth rate (Overlaps included) $\{\ln(TFP)_{i,t+3} - \ln(TFP)_{i,t}\}/3$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
$\ln(TFP)_{i,t}$	-0.23946 *** (-264.11)	-0.23791 *** (-264.17)	-0.19750 *** (-26.41)	-0.18831 *** (-23.88)	-0.24074 *** (-262.33)	-0.23910 *** (-262.23)
Non-manufacturing employment share by firm	0.00556 *** (10.29)	0.00564 *** (10.31)	0.00031 (0.64)	0.00015 (0.30)	0.00635 *** (11.40)	0.00644 *** (11.41)
Capital equipment ratio by firm	-0.00005 *** (-8.84)	-0.00005 *** (-8.64)	-0.00003 *** (-4.59)	-0.00003 *** (-4.48)	-0.00005 *** (-7.54)	-0.00005 *** (-7.39)
R&D intensity by firm	0.00012 (0.24)	0.00018 (0.34)	-0.00183 (-0.04)	-0.00742 (-0.17)	0.00012 (0.23)	0.00017 (0.33)
Export intensity by firm	0.00231 * (1.83)	0.00230 * (1.83)	-0.00377 (-0.51)	-0.00064 (-0.09)	0.00336 *** (2.61)	0.00327 ** (2.54)
Size of business	0.00786 *** (32.57)	0.00766 *** (31.83)	0.00512 *** (2.94)	0.00424 ** (2.51)	0.00721 *** (27.17)	0.00706 *** (26.65)
Non-manufacturing employment share by industry	0.02026 *** (10.13)	0.01732 *** (9.33)	0.00459 (0.46)	-0.00046 (-0.05)	0.02062 *** (10.02)	0.01731 *** (9.05)
Capital equipment ratio by industry	0.00003 *** (6.84)	0.00003 *** (6.17)	0.00004 * (1.90)	0.00005 *** (2.85)	0.00003 *** (6.15)	0.00003 *** (5.63)
R&D intensity by industry	0.37210 *** (13.27)	0.46508 *** (17.08)	0.40362 *** (2.72)	0.41316 *** (3.03)	0.36351 *** (12.67)	0.46880 *** (16.79)
Export intensity by industry	-0.01643 *** (-7.17)	-0.00139 (-0.65)	-0.06172 *** (-3.93)	-0.07894 *** (-5.30)	-0.01452 *** (-6.26)	0.00122 (0.57)
Outward FDI growth rate by industry	0.00242 *** (3.35)	0.00482 *** (7.14)	0.00949 *** (2.97)	0.00830 *** (2.62)	0.00185 ** (2.50)	0.00455 *** (6.58)
Share of FDI to China by industry	-0.01864 *** (-10.62)	-0.02374 *** (-14.63)	-0.04816 *** (-4.59)	-0.05198 *** (-4.89)	-0.01709 *** (-9.64)	-0.02293 *** (-13.96)
Share of FDI to the US by industry	0.00650 *** (3.86)	0.00543 *** (3.25)	0.00659 (0.60)	0.00211 (0.19)	0.00656 *** (3.84)	0.00586 *** (3.46)
Export growth rate by industry	-0.01529 *** (-10.66)		-0.05122 *** (-4.91)		-0.01359 *** (-9.50)	
Share of export to China by industry	0.04606 *** (15.94)		-0.02204 (-1.28)		0.04737 *** (16.17)	
Share of export to Japan by industry	-0.03428 *** (-13.55)		0.02072 (1.07)		-0.03598 *** (-14.15)	

Three year average annual TFP growth rate (Overlaps included) $\{\ln(TFP)_{i,t+3} - \ln(TFP)_{i,t}\}/3$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Share of export to US by industry	0.00617 ** (1.96)		-0.08523 *** (-3.86)		0.00796 ** (2.50)	
Import growth rate by industry	0.00168 (0.89)		-0.00550 (-0.55)		0.00216 (1.13)	
Share of import from China by industry	0.03156 *** (13.33)		0.02212 (1.53)		0.03187 *** (13.23)	
Share of import from Japan by industry	0.00233 (1.20)		-0.00055 (-0.04)		0.00162 (0.83)	
Share of import from the US by industry	0.01799 *** (3.60)		0.04818 (1.48)		0.01603 *** (3.17)	
Trade growth rate by industry		-0.01611 *** (-7.76)		-0.04421 *** (-3.78)		-0.01611 *** (-7.61)
Share of trade with China by industry		0.05637 *** (22.38)		-0.01523 (-0.76)		0.05847 *** (22.99)
Share of trade with Japan by industry		0.00471 * (1.66)		-0.04342 ** (-2.28)		0.00593 ** (2.06)
Share of trade with the US by industry		0.02463 *** (6.84)		-0.06666 * (-1.95)		0.02544 *** (7.01)
Constant	0.02533 *** (13.49)	0.02472 *** (14.72)	0.06705 *** (4.16)	0.08855 *** (5.56)	0.02570 *** (13.34)	0.02467 *** (14.34)
Year dummy	Included	Included	Included	Included	Included	Included
No. of observations	194952	194952	3030	3030	191897	191897
Adj. R ²	0.42301	0.42090	0.35377	0.34194	0.42478	0.42257

Notes: Inside of () are t-ratios corrected for inequality of variance.

***, **, *: significant in the level of significance 1%, 5%, 10%, respectively.

Table 7. Regression Results for Yearly TFP Growth Rate

Annual TFP growth rate $\ln(\text{TFP})_{i,t+1} - \ln(\text{TFP})_{i,t}$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
$\ln(\text{TFP})_{i,t}$	-0.55602 *** (-253.36)	-0.55051 *** (-252.30)	-0.37537 *** (-19.33)	-0.35756 *** (-18.17)	-0.55974 *** (-243.74)	-0.55405 *** (-242.58)
Non-manufacturing employment share by firm	0.01236 *** (12.22)	0.01247 *** (12.19)	0.00098 (0.91)	0.00078 (0.73)	0.01471 *** (14.23)	0.01483 *** (14.18)
Capital equipment ratio by firm	-0.00023 *** (-8.15)	-0.00022 *** (-8.10)	-0.00004 (-1.58)	-0.00004 (-1.53)	-0.00027 *** (-6.98)	-0.00027 *** (-6.94)
R&D intensity by firm	-0.00077 (-0.67)	-0.00070 (-0.61)	0.03154 (0.48)	0.01990 (0.31)	-0.00080 (-0.69)	-0.00072 (-0.63)
Export intensity by firm	0.00050 (0.19)	-0.00074 (-0.28)	-0.01707 (-1.15)	-0.01269 (-0.86)	0.00254 (0.95)	0.00117 (0.44)
Size of business	0.01607 *** (27.83)	0.01544 *** (26.88)	0.00878 ** (1.97)	0.00728 * (1.66)	0.01476 *** (23.70)	0.01420 *** (22.86)
Non-manufacturing employment share by industry	0.04988 *** (12.93)	0.04360 *** (12.26)	0.03510 * (1.94)	0.02252 (1.30)	0.04973 *** (12.55)	0.04288 *** (11.72)
Capital equipment ratio by industry	0.00001 (1.29)	0.00001 (1.14)	0.00001 (0.12)	0.00005 (1.08)	0.00001 (0.73)	0.00001 (0.65)
R&D intensity by industry	0.16238 *** (3.35)	0.30303 *** (6.29)	0.19649 (1.02)	0.06115 (0.33)	0.14689 *** (2.94)	0.30924 *** (6.24)
Export intensity by industry	0.02787 *** (5.99)	0.05281 *** (12.40)	-0.03673 (-1.16)	-0.06606 ** (-2.29)	0.03048 *** (6.43)	0.05685 *** (13.14)
Outward FDI growth rate by industry	0.00583 *** (3.78)	0.01244 *** (8.60)	0.03353 *** (4.42)	0.03094 *** (4.13)	0.00401 ** (2.53)	0.01130 *** (7.61)
Share of FDI to China by industry	-0.01877 *** (-5.27)	-0.04199 *** (-12.74)	-0.09940 *** (-4.57)	-0.11670 *** (-5.30)	-0.01525 *** (-4.23)	-0.03998 *** (-11.97)
Share of FDI to US by industry	0.01249 *** (3.65)	0.01197 *** (3.53)	0.00078 (0.03)	-0.02165 (-0.92)	0.01195 *** (3.44)	0.01193 *** (3.47)
Export growth rate by industry	-0.04491 *** (-15.20)		-0.10781 *** (-4.99)		-0.04118 *** (-13.90)	
Share of export to China by industry	0.14038 *** (23.51)		-0.01969 (-0.50)		0.14179 *** (23.49)	
Share of export to Japan by industry	-0.09018 *** (-17.79)		0.07364 * (1.95)		-0.09435 *** (-18.45)	

Annual TFP growth rate $\ln(\text{TFP})_{i,t+1} - \ln(\text{TFP})_{i,t}$	I (All)	II (All)	III (300 or more)	IV (300 or more)	V (Less than 300)	VI (Less than 300)
Share of export to the US by industry	0.11375 *** (17.74)		-0.07425 (-1.63)		0.11608 *** (17.81)	
Import growth rate by industry	0.04124 *** (10.61)		0.02502 (1.25)		0.04183 *** (10.62)	
Share of import from China by industry	0.03292 *** (6.79)		0.01636 (0.54)		0.03272 *** (6.66)	
Share of import from Japan by industry	-0.03836 *** (-9.73)		0.01850 (0.65)		-0.04020 *** (-10.10)	
Share of import from the US by industry	0.01541 (1.50)		0.09074 (1.54)		0.01088 (1.04)	
Trade growth rate by industry		-0.04104 *** (-9.57)		-0.05368 ** (-2.18)		-0.04032 *** (-9.24)
Share of trade with China by industry		0.14861 *** (28.99)		-0.03634 (-0.91)		0.15106 *** (28.96)
Share of trade with Japan by industry		0.00599 (1.02)		-0.00692 (-0.17)		0.00699 (1.17)
Share of trade with the US by industry		0.12232 *** (17.24)		-0.00853 (-0.14)		0.12243 *** (17.03)
Constant	0.09273 *** (22.68)	0.08972 *** (25.06)	0.19858 *** (4.81)	0.24137 *** (6.15)	-0.00791 * (-1.96)	-0.01036 *** (-2.92)
Year dummy	Included	Included	Included	Included	Included	Included
No. of observations	390756	390756	4442	4442	386281	386281
Adj. R ²	0.31677	0.31437	0.23055	0.22130	0.31839	0.31589

Notes: Inside of () are t-ratios corrected for inequality of variance.

***, **, *, significant in the level of significance 1%, 5%, 10%, respectively.

In the regression analysis for the growth rate of employment, growth rate of shipment (+) and the size of firms (-) are included as variables, and in the regression analysis for the growth rate of TFP, initial level of productivity (-) and the size of firms (+) are included, all of which showed the expected signs. Main points from the result of analysis are reviewed below.

a. Review of Domestic Factors

Proportion of non-production workers: This ratio was used as a proxy variable to indicate the degree of advancement of labor structure in each

industry. In case of SMEs, advancement of labor structure (increase of proportion of non-production workers at firm-level) was found to have a positive influence both to the growth of firms and increase of productivity. Advancement of labor structure of the industry to which a firm belongs was found to contribute significantly to the growth of productivity of each SME, but not to give sustained influence to the growth of each firm's employment. In the case of firms with 300 or more employees, no significant effect was found.

R&D intensity: This variable was used as an indicator of innovation of individual firms and industries. According to the results, R&D activities of SMEs showed only temporary effect on employment growth, while the effect on productivity growth was not significant. On the other hand, growth and productivity growth of both SMEs and large firms are found to get positive influence from the R&D activities of industries in which they are included.

Now let's compare the above two factors. While R&D intensity by industry was found to contribute both to the growth and productivity growth of individual firms in that industry, proportion of non-production workers by industry was found to contribute only to the productivity growth of each SMEs but not to the growth of employment. As a possible explanation for this, we may estimate that there exists a strong external effect in R&D activity, while there is a strong competition among firms in the effect of advancement of labor market.

Another noticeable point is that the increase of productivity and employment may happen at the same time or the former may not be followed by the latter. As shown in the example above, advancement of labor structure contributes to the productivity of individual SMEs but has little job creation effect, while industry-level R&D activity contributes both to the growth and productivity growth of firms. This is probably because the technology innovation through the advancement of labor structure has a labor-saving effect, while the technology innovation and dissemination through R&D activities has a labor-utilizing effect.

Capital equipment ratio: Higher capital equipment ratio of SMEs is found to have a positive effect on the growth of themselves, but no contribution to the growth of productivity was found. Irrespective of the size of firms, capital equipment ratio of industry where the firm belongs to was found to have little effect on the growth and productivity of the firm.

b. Review of International Factors

Growth rate of FDI: In the case of both SMEs and large firms, when the growth rate of FDI from the industry where the firms belong to is high,

growth and productivity growth were also high. This positive effect was bigger in the case of large firms.

Proportions of destinations for FDI: In the case of both SMEs and large firms, higher proportion of FDI to China from the industry where the firms belong to had negative effect on growth and productivity growth. This negative effect was bigger in the case of large firms.

Growth rate of export: While growth of SMEs are positively influenced by the increase of export by the industry in which they are included, productivity growth of both SMEs and large firms are negatively influenced by the growth of export.

Proportions of export partners: Firms in industries with higher proportion of export to U.S. showed higher growth rate, and SMEs with higher proportion of export to China and U.S. showed higher productivity growth rate, while SMEs with higher proportion of export to Japan showed lower productivity growth rate.

Growth rate of import: Both the growth of SMEs and large firms are positively influenced by the increase in import by industries where the firms are included. No consistent effect on the productivity growth was found.

Proportions of import partners: SMEs in industries with higher proportion of import from China showed lower three-year average growth rate but higher productivity growth rate.

Growth rate of trade: Growth rate of SMEs are positively influenced by the increase of trade in their industries. However, in respect to the productivity growth, increase of trade has negative effect both on SMEs and large firms.

Proportions of trade partners: SMEs with higher proportion of trade with China showed lower growth rate and higher productivity growth rate, while SMEs with higher proportion of trade with U.S. showed higher growth rate and productivity growth rate.

Export intensity: Both the export intensity of SMEs and those of industries had positive effect on the growth of firms, but the effect on productivity was inconsistent.

c. Factor for Growth Identified from the Regression Analysis

As a result, factors found to contribute to the growth of SMEs are; proportion of non-production workers by firm, R&D intensity by industry, capital equipment ratio by firm, growth rate of FDI, export, and import by industry, proportion of export to U.S. by industry, growth rate of trade (=export+import) by industry, proportion of trade with U.S. by industry, export intensity by firm and by industry, etc. On the other hand, factors reflecting the competition with China are found to have negative effect on the growth of SMEs; proportion of FDI to China by industry, proportion of

import from China by industry, proportion of trade with China by industry, etc.

Regression results also made possible to confirm the variables that influence the productivity growth of SMEs. Variables such as proportion of non-production workers by firm and by industry, R&D intensity by industry, FDI growth rate by industry, proportion of export to China and to U.S. by industry, proportion of import from and trade with China by industry, and proportion of trade with U.S. by industry are found to have positive effects on the productivity growth of SMEs. Meanwhile, proportion of FDI to China, export growth rate, proportion of export to Japan, and growth rate of trade by industry are found to have negative effect to the productivity growth.

4. Conclusion

In this chapter, an empirical analysis related to the entry and growth of SMEs in the manufacturing sector of Korea is conducted mainly using the data of the *Report on Mining and Manufacturing Survey* for the period of 1993~2003. Main results from the analysis are as follows:

First, the indicators related to 'firm dynamics' such as entry, exit, survival, and growth of firms are computed and analyzed. Entry rate (in terms of the number of establishments) was over 20% until the period of financial crisis, decreased consistently since the peak at 31.3% in 1999, and has been below 20% from 2002.

Second, as confirmed in the empirical analyses of other countries based on micro data, most of new entrants withdraw in early period of entry. As a result of an analysis tracking the yearly entry cohorts, survival rate of new entrants after two years from entry (in terms of the number of firms) was only 42~59%. However, once new firms overcame the early barriers to survival, the firms grew at a pace faster than mature firms.

Third, high-growth SMEs that were in top 10% in terms of average growth rate are identified. Although the high-growth SMEs are more commonly found in industries with higher technology level, they are more or less evenly found in every sector. However, cases that a firm was continuously included in high-growth SME in every period for analysis were extremely scarce. A comparative analysis of characteristics of high-growth SMEs concluded that high-growth SMEs have higher productivity and more advanced labor structure, and are more active in R&D and export.

Fourth, according to the regression analysis for firm-level growth in terms of employment, factors found to have positive effects on growth are: Proportion of non-production workers by firm, R&D intensity by industry,

capital equipment ratio by firm, growth rate of FDI, export, and import by industry, proportion of export to and trade with U.S. by industry, growth rate of trade (=export+import) by industry, export intensity by firm and by industry, etc.

Policy discussions to make an environment that supports and rears high-growth SMEs and encourages them to grow among competition are actively conducted among the policy researchers of advanced countries. Focusing on the growth factors for SMEs identified in this chapter, policy agenda for further review and discussion are as follows:

First, advancement of human resources is found to be critical in the growth of SMEs. Second, external effects of industry-level R&D activities over individual firm-level are proven to be high. However, contribution of individual firms' R&D activities to their growth is found to be limited, which means that the risks accompanying individual firms' innovation activities are considerably high. Third, as it was confirmed that capital investment by firms contribute to growth, it is necessary to establish efficient financial system which enables lively investment activities by SMEs. Fourth, trend of internationalization of production can be a threat to the growth of SMEs as well as a new opportunity. In other words, policies to encourage active opening of market and strengthened international cooperation may have a positive effect on the sound growth of SMEs. Another crucial implication from the empirical analysis in this chapter is that the effect from the increase in trade and FDI will depend on the trade partner, and its impact on productivity will show different patterns according to the status of Korean SMEs in the system of international division of labor.

Lastly, research on issues such as service sector, impact that internal organizations such as corporate governance has on firm dynamics, and external network of SMEs is reserved for further studies.

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■ Appendix

Table A1. Trend in the Proportion of Yearly Entry Cohorts
(in Terms of the Number of Establishments)

[illegible]

Table A2. Trend in the Proportion of Yearly Entry Cohorts (in Terms of Employment)

[illegible]

Table A3. Trend in Survival Rate of Yearly Entry Cohorts

[illegible]

Table A4. Trend in Hazard Rate of Yearly Entry Cohorts

[illegible]

Table A5. Average Number of Employees of Yearly Entry Cohorts

[illegible]

(Establishments Survived until 2003 only)

[illegible]

Table A7. Comparison Between the Micro Data of This Paper and the Analysis of High-Growth SMEs by OECD

	Korea	France	Canada(Quebec)	Italy	Netherlands	Spain	Sweden	Germany(MUP)
Type of Survey	comprehensive	comprehensive	sample	comprehensive	sample	sample	comprehensive	sample
Survey Area	manufacturing	manufacturing	manufacturing	manufacturing	manufacturing	manufacturing	manufacturing	manufacturing
		other industries (mining, electricity, gas, water service)	-	-	other industries (gardening, fisheries, public service, construction)	-	-	other industries (all industries in private sector)
		-	-	-	distribution industries (wholesale and retail sales, sale of motor vehicles, hotels, in-flight meal service)	-	distribution industry	distribution industry
		-	-	service industry (business service)	service industry (transport, finance, real estate, business service)	-	service industry (all industries in private sector)	service industry (all industries in private sector)

	Korea	France	Canada(Quebec)	Italy	Netherlands	Spain	Sweden	Germany(MUP)
Year	1994~2003	1985~94	1990~96	1990~95	1989~94	1990~94	1987~96	1992~95
Period	9 years (3 years×3 periods)	9 years	6 years	5 years	5 years	4 years	9 years	3 years
Standard 1: minimum size								
Point of survey	every period	starting point	starting point	starting point	starting point	starting point	starting point	starting point
Minimum size	5 employees	20 employees	20 employees	20 employees	20 employees	10 employees	20 employees	no limitation
Standard 2	survival in every period	survival in every period	survival in every period	survival in every period	survival in every period	survival in every period	including firms started in 1996 (at least 20 employees)	survival in every period

CHAPTER 4

Empirical Evaluations on the Government Financial Assistances toward SMEs in Korea

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1. Introduction

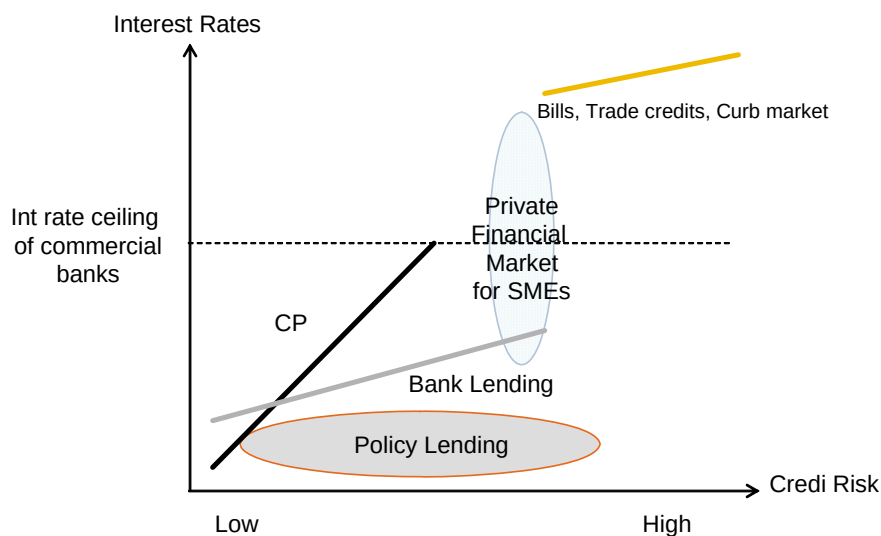
Information asymmetry between lending financial institutions and borrowing small and medium-sized enterprises (SMEs) and lack of tangible collaterals to secure creditors' confidence in borrowers' redeemability keep SMEs from mobilizing external resources with which to invest in prospective but risky businesses. The existence of fixed administrative costs in lending such as information gathering, credit evaluation, monitoring credit migration, etc., renders banks hesitant to supply funds for SMEs. Both information asymmetry and high transaction costs tend to increase as the size of business gets smaller and its age younger. These general characteristics in SME financing take place more importantly in Korea, of which the SMEs are much smaller and younger on average. For this reason the government of Korea has been involved in SMEs' financing activities in a direct and widespread manner.

After the Korean economy overcame catastrophic situations caused by the 1997 financial crisis, the public financial assistances toward SMEs have been under criticism (see IMF (2005), OECD (2005) and Kang (2005) among others). The preferential treatments for SME financing had been acquiesced during the early stage of economic development and times of crisis management, but became regarded as one of the deterrents that could constrain further and sustainable economic growth. Basically, the large role of the government in SME financial markets distort price mechanism, hence reducing efficiency of resource allocations. Inferior companies tend to receive more credit at lower costs in light of their creditworthiness and debt service capacity.

In Korea this kind of inefficiency appears due to thin private financial markets (see Figure 1). In view of the risk exposure of their projects, SMEs should have paid higher interest rates when funded in the fixed income

financial markets, but have actually mobilized abundant credits, thanks to the supply of policy loans and public credit guarantee scheme, at the comparable interest rates applicable to large enterprises of high creditworthiness. Thus, the privately run middle financial markets, where currently about 10 percent annual interest rates are imposed, are virtually missing in Korea, whereas most of SMEs should have got funded at the interest rates.

Figure 1. Thin Private Financial Markets for SMEs in Korea



To date many efforts to remedy the financial distortions have been addressed in the context of public sector reforms. Most evaluations that furnished evidence and rationale for SME financing reform have been based on the dataset held by the public financial institutions implementing government policies. This approach from the perspective of the fund suppliers, however, has limitations on drawing policy implications on the influences of government financial assistances because it infers their single-faceted or partial effects from the individually separate database. For example, a firm could borrow commercial bank lending with public credit guarantees and uncollateralized policy loans along with being invested by venture capital funds that the national pension fund participates in. In such a case, the firm's profitability seems to be influenced by all of the private and public financial intermediations. The effects of individual financial intermediations on the profitability should then be carefully decomposed,

but separate analyses using individual suppliers' database could only partially address the evaluations on the role of government financial assistant policies.

To look at more general effects, this study makes an attempt to pool the database of relevant public financial institutions from the demander's perspective and to keep track of the performances of assisted SMEs over time. The firms under investigation of this study are randomly sampled out of the SMEs which meet the data requirements and individual financial transaction records are collected with the help of the government. The empirical analyses then proceed apace, focusing on the effects of the assistant policies on the sample firms' performance measures over time. This approach has advantages, vis-à-vis other evaluation methodologies, in extracting rich policy evaluations and implications in the fact that it takes multi-faceted and dynamic features of the SME financial policies into account.

This paper is organized as follows. Section 2 introduces the government financial assistant policies to SMEs in Korea. Overall picture of SME financial markets are summarized and institutions of major public financial instruments are accounted for with basic statistics. Section 3 contains the strategy, methodologies and results of empirical analyses on the dynamic effects of the assistant policies on the recipient SMEs' business performances. Based on the cross-sectional regressions of policy loans, credit guarantees and venture capital investments on the profitability, business activity and economic value-added of the SMEs, the roles of each public financial instrument are empirically evaluated. In closing, Section 4 summarizes the results and policy implications on reforming government SME financial policies and makes remarks on the limitations of these analyses.

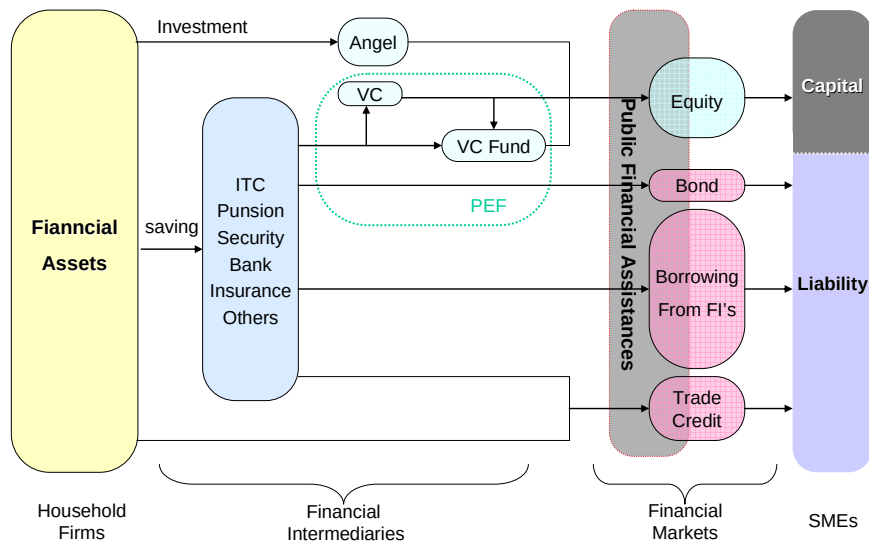
2. Institutions of Financial Assistances toward SMEs

A. Overview

Fundamentally, massive and widespread involvement of the government in SMEs' financing stems from the economic development strategies and consequent democratization processes. Korea is one of the countries that have grown most expeditiously. During the high-powered growth era, profitable investment opportunities are not rare so that high financial leverage tends to pay. Hence, public credit guarantee or risk sharing has played an instrumental role in increasing external debt financing with which firms exploit the favorable business opportunities when capital is not sufficiently accumulated and its intermediation is not

properly functioning due to the lack of efficient financial markets. However, most credits in the early period of catch-up economy had been channeled to large enterprises. It is in the mid-1970s that the generous SME financing was systematically institutionalized by the government, as the SMEs were understood as sacrificed economic entities by the so called unbalanced economic growth policies. The sympathy toward SMEs started to prevail in the late 1970s and strengthened in the wave of political democratization in the mid 1980s. In some respect, generous SME financial assistances SME credit guarantees have been recognized as a compensation for the earlier sacrifice.

Figure 2. Structure of Korea's Financial Markets for SMEs



In addition to the general rationales for necessity of public financial assistances toward SMEs in the era of rapid economic development with underdeveloped financial markets, Korea has used them as microeconomic instruments in response to macroeconomic fluctuations, especially in bad times. For example, the supply of credit guarantee had been greatly increased in the course of corporate sector restructuring after the outbreak of financial crisis in 1997 (see Figure 3 below). Unless credit guarantee had alleviated financing difficulties in the SME sector, the restructuring focused

on large companies might have brought about massive failures in the sector.²⁰

Figure 2 illustrates the current structure of Korea's financial markets to which SMEs get access. The most salient feature is massive government engagement: virtually in all financial markets the government is a major facilitator so as for financiers to supply funds to SMEs. In loan markets, government-sponsored agents provide credit guarantees and direct or indirect policy loans with eligible SMEs. When SMEs receive trade credits from other buying corporations, these bills or trade receivables are insured mostly by public credit insurance. Even in equity markets, the government and public pension funds are participating in venture capital funds with private investors. The more detailed explanations about the Korea's institutions on public financial assistances toward SMEs will be given in the following subsections.

B. Credit Guarantee

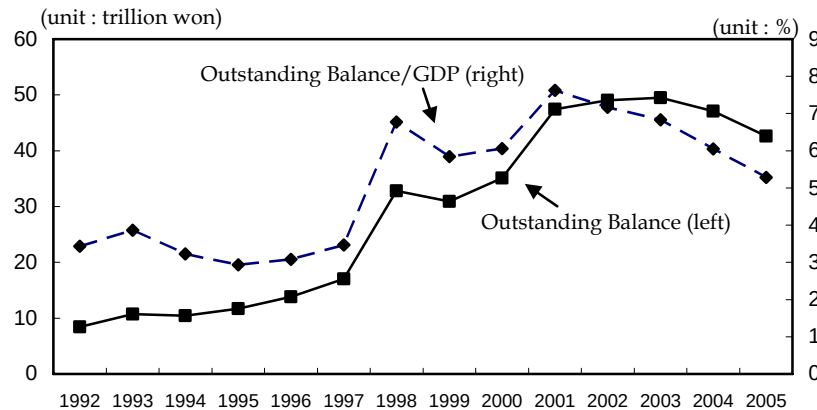
As for indirect financing instruments, the government has provided public credit guarantee schemes with the SMEs ineligible for bank loans due to lacking collaterals since 1976. This program enables them to get access to bank borrowing based on payment guarantees of the KCGF (Korea Credit Guarantee Fund or Shinbo) and KOTEC (Korea Technology Credit Guarantee Fund or Kibo). It aims, by the general principle of credit guarantee, at resolving information asymmetry between suppliers and demanders of funds in the sense that a public risk-sharing mechanism bridges the financing gap stemmed from absence of necessary credit evaluation system and expertise in financial institutions.²¹ In practice, however, the program has often been extended to subsidize SMEs to the extent that it not only resolves the premium incurred by information asymmetry but also further lowers the financing costs below, sometimes, risk-free interest rates.²² It is thus understood as a general and generous

²⁰ After the financial crisis broke out in 1997, public SME financing has been further expanded in the course of overcoming the crisis. The government strategies were to focus on restructuring large enterprises on the one hand and to rescue SMEs by advancing generous financial assistances. As a result, the government's role has become imperative in every financial market.

²¹ As Vogel and Adams (1997) argue, a variety of possible credit market imperfections do not constitute a sufficient justification for establishing a credit guarantee program. Should distortions in the credit market stem from information asymmetry, the *first best* policy would be the one that directly focuses on the main cause: supplying and upgrading information needed for financial institutions which make loans to SMEs. Credit guarantee could be at most a *second best* policy in the sense that it does not target for fundamental causes but relieves their side effects.

²² According to the founding act, KCGF aims not only to enhance the accessibility of SMEs to external financing but ultimately to contribute to balanced development of the national

Figure 3. Outstanding Balances of SME Credit Guarantees



Source: KCGF and KOTEC.

assistance towards SMEs which have presumably sacrificed in the course of economic development since the 1960s. Indeed, this program is one of the most popular and widespread public financial supports on SMEs in terms of the size of funds and the number of service-recipient firms.

At the end of 2004, the outstanding balance of credit guarantee supplied reached 42.6 trillion won, or 5.28% to nominal GDP (see Figure 3). The ratio was 7.6% at the hike of corporate sector restructuring in 2001 and then has declined ever since, but the absolute amounts of credit guarantee have started to decline significantly from 2005.²³ The sharp cut of credit guarantee amounts is the result of both international and domestic criticisms and subsequent reforms.

C. Policy Loan

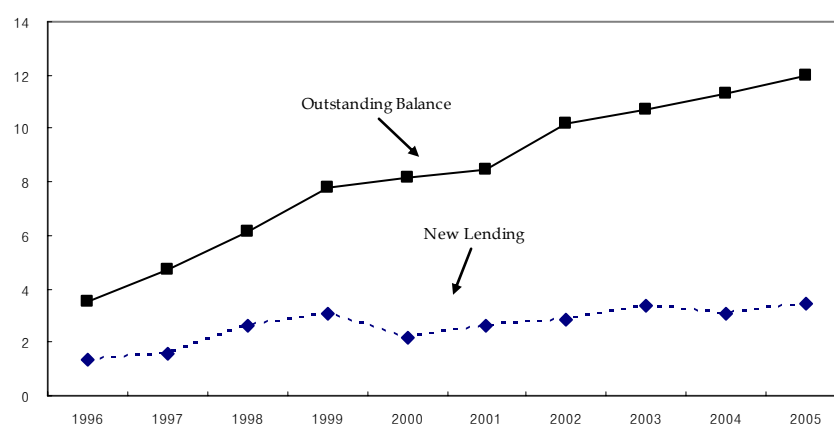
Besides the credit guarantees, the SBC (Small Business Corporation)

economy between large and small corporations. Therefore, the credit guarantee scheme is not designed to handle information asymmetry only.

²³ The Korea's credit guarantee balance relative to GDP size is one of the highest levels in the world with that of Japan. Just after the Japanese government introduced the Stability Special Guarantee Program, the outstanding balance to GDP ratio was highest at 8.5% in 1999 but it has been gradually curtailed to 5.9% at the end of fiscal year 2004. Taiwan, another major country that runs a publicly sponsored credit guarantee system, has fairly large amounts of credit guarantee to SMEs recently, but it remains less than 3% to GDP. Except for the three North East Asian countries, these ratios are normally less than 1% at most in most countries regardless of the type of credit guarantee system, either public credit guarantee or mutual credit guarantee.

supply loans either directly or indirectly to a host of SMEs at lower interest rates than available market rates. The objectives of this program are of two folds: (1) to promote equipment investments, restructuring and commercialization of new technologies; and (2) to assist start-up activities, most of which are seldom financed through private market arrangements because the anticipated returns do not meet market expectations. This type of loans is often justified by the fact that, despite low private returns, their social and economic benefits may be anticipated to exceed all corresponding costs involved.²⁴

Figure 4. Policy Lending to SMEs by SBC



Source: Small Business Corporation.

Figure 4. shows an increasing trend of policy loans supplied by SBC. As SMEs get financially distressed amid bi-polarization tendency prevails for the past several years, they do not borrow as much as needed. In addition, financial institutions which have undergone severe restructurings introduced risk management systems. Thus, they are more likely to be reluctant to advancing risky loans to SMEs. Thus, in order to lessen these financial difficulties, the government endorsed SBC to make more direct loans to SMEs. As a result, policy lending has ballooned, but most of the

²⁴ The policy loan and credit guarantee are differentiated to the extent that, in theory, the latter tackles information asymmetry, while the former concerns specific policy objectives like employment, technology development, equal opportunities to minority groups, etc. Thus, even without presence of information asymmetry, the policy loan has necessary causes. In practice, however, this dichotomy seems rather artificial. Types of market failures are not easily decomposed so as to end up with difficulties in judging what appropriate financial instruments should be to various cases. In the United States, all policy loans are provided in the form of loan guarantee from the mid-1990s.

funds are supplied to conventional types of firms with less emphasis on innovative enterprises.

D. Venture Capital Investment

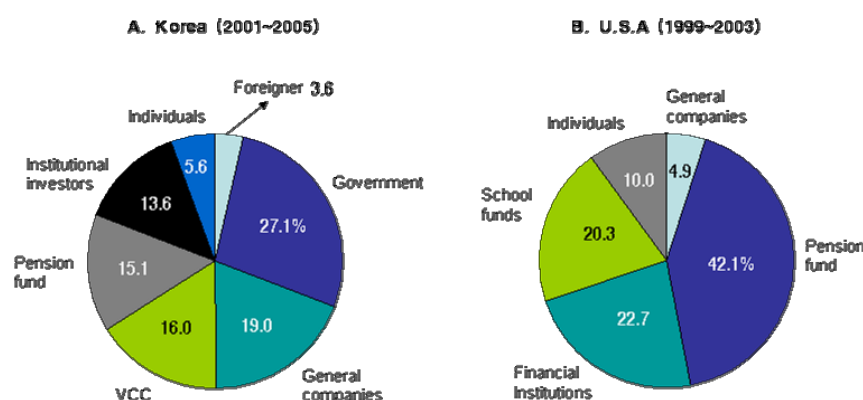
It is a venture capital that is known to invest adventurous businesses in an attempt to receive high returns by taking risks on high uncertainties of their success. The Korean venture capital industry was formulated in early 1980s when the Korea Technology Development Finance Company (KTDFC), a predecessor of the KTB Network, was established. The fact that the venture capitals at an early infancy, including KTDFC, were initiated by public agencies implies that the Korea venture capital was born and raised under the motives of industrial policies and restructuring. Having observed that many companies out of their portfolio went to public markets through IPO in several years and produced economic value-added in a new fashion, policymakers seemed to find a drive-through to open up Korea's further growth.

The venture capital company (VCC) in Korea became legally defined as a stock company registered to the Small and Medium Business Administration (SMBA) pursuant to the Support for Small and Medium Enterprise Establishment Act (SMEEA) legislated in 1986.²⁵ As a source of financing small and medium venture businesses, it is designated to invest in start-up companies in an early stage of business for a certain period of time (at least 5 years) pursuant to the act after registration to the SMBA. VCC is able to make an investment under its own name or by establishing a Venture Capital Fund (VCF) in the form of limited liability partnership. In the latter case, VCC participates in VCF as a general partner that takes legal liabilities for its management without being disturbed on daily operations, whereas limited partners supply funds and entitle the management to VCC and have a right to be reported periodically on major decision-making and performances.²⁶

²⁵ Besides the VCC, there exists another venture capital firm which is classified a credit-specialized financial business. This regulatory category includes a new technology finance company along with a credit card company, a lease company, etc. These companies, subject to financial regulation by the Financial Supervisory Service (FSS) instead of SMBA, cannot receive deposits rather issue bonds or equities to mobilize funds to invest. The new technology finance company is also allowed to establish venture funds which are eligible for the similar type of tax benefits as VCC and VCF described in subsection 3.2.2. In this monograph, only VCC and VCF are treated as venture capital in Korea. There exist statistical differences but do not lead to qualitative differences in arguments.

²⁶ These dual investment options may lead a conflict of interests. VCC tends to take more care of its own returns due to one hundred percent ownership of funds, while less care of the performances of VCF, part of which belongs to VCC. The expected results can be found in empirical studies by Kang (2007).

Figure 5. Comparison of VCF Investments Between Korea and US: Investor Breakdown



Source: KVCA Yearbook and Directory (2006); NVCA Yearbook (2004).

The institutional backgrounds for venture capitals had not guaranteed full-fledged prosperity of the industry until the late 1990s. The main reasons were as follows. On the one hand, the SMEs in 1980s and 1990s which were target companies of venture capital investments had remained as subcontractors of large enterprises. There existed few ones that possessed high technology and innovative capacities. Most of them depended on long-term equipment investments under high interest rate regime, and thus were not attractive to venture capitalists searching for high investment returns. On the other hand, the Korea's financial markets did not provide favorable environments with risk capital. Basically, the equities of venture businesses face high illiquidity. In order to make sure for stable exits, venture investors ask for well developed secondary and M&A markets in which they sell part or all of invested portfolios with low liquidity premium. Before the venture boom in the late 1990s, like most of other countries except for the United States, Korea lacked technology evaluation expertise and information sharing network, which led the absence of exit instruments from the venture capitalists' perspective. Indeed, the KOSDAQ market in which equities of technology firms are traded worked as a malfunctioning over-the-counter (OTC) market.

Venture capital began to boom around 1996. Most importantly, information and technology (IT) industry transitioned into the center of economic development. Specifically, the 1997 financial crisis provided a momentum that triggered massive industrial restructuring from brick and mortar ones to top-notch technology-based ones. Amid the so called "New

Economy” debates, this trend was further strengthened by development of global knowledge-based economy. Now that the KOSDAQ market boomed, venture capitals looked to be equipped with exit instruments, which in turn drove huge savings to tilt, without necessary evaluations, toward intrinsically risky, but presumably perceived as promising, investments.

Ensuing the NASDAQ bubble burst in 2000, the so called “no question” investments ended up with disastrous results in Korea as well. As the actual returns did not meet rosy expectations, many IT venture firms became severely distressed, and consequently, the number of technology-based companies had rare chances to go into the public. VCC and VCF have lost major exit methods out of investments so that they not only recovered the investments but also had difficulties in fund raising. More seriously, venture capitalists lost market confidence and trust. Under these circumstances, the government could not help being engaged in funding of distressed but viable venture capital companies. The government and public agencies like the National Pension Fund have participated quite extensively in fund raising of VCFs. As a result, the public share of venture capital funds is quite striking relative to that of the US. As shown in Figure 5, the government and pension funds account for 27.1% and 15.1%, respectively, of the entire venture investments. In contrast, the government direct investment in venture funds in the US is almost zero, while autonomously managed pension funds and school funds dominantly participate in the investment.

3. Evaluations on SME Financial Policies

A. Evaluation Strategy

Criticisms against appropriateness of the government intervention in SME financing have long been raised domestically but recently intensified from abroad such as IMF (2004), OECD (2005) and S&P (2005). The international organizations commonly argued that the size of Korea’s government financial assistances toward SMEs is enormous relative to GDP and bank lending, thus being partly used as bailout instruments for non-viable firms and functioned as deterrents to financial market developments. From their perspectives, the Korean policies were then understood as one of the factors retrogressive to achieve efficient resource allocations and fair distribution one step forward.

Corresponding to these bitter criticisms, not only researchers but also some government institutions made attempts to identify the problem and to measure their seriousness. Among others, Kim (2004) analyzed, using

individual firm's loan contract database, the effect of policy loans on corporate profitability and insisted that this type of financial assistances does not influence positively on improving existing firms that established quite long time ago. Rather, relatively significant and positive contributions are found in start-up companies of which the age is less than five years. However, Kim's analysis became under immediate reputation mainly initiated by government authorities which take charge of SME policies. The performance measures and methodologies were deemed inappropriate to be evaluated on the performances of the SME financial policies.

Under this mood of intensified debates between research and policy circles as well as critiques raised abroad, budgetary and supervisory administrations and government audit offices started to scrutinize the performances and to propose reform agenda in mid-2005.²⁷ The initial task was how to construct performance measures to reveal the effectiveness of SME financial assistance instruments. Both direct and indirect measures were proposed but earlier priority was decided to given to the former, since it was undecided whether the assistance actually helps SME business management in the long run.²⁸

In order to evaluate dynamic effects of the policies, it is asked to change the viewpoints from suppliers to demanders of the financial assistances. Most of previous analyses and evaluations have been done from the perspective of financial institutions, for availability of data and purposes to implement policy measures have been put more emphasis on. This methodology, however, poses the difficulties to identify dynamic and simultaneous effects of various public financial assistances on the assisted firms. A venture startup SME is eligible for policy loans of equipment and R&D investment, export financing, etc. Furthermore, this company may leverage up external financing by the help of credit guarantee scheme and invite venture capital investments mainly initiated by the related government ministries or public pension funds at the same or different time frame. Moreover, the financiers are sometimes legally allowed to share their dataset each other, thus lacking information about their client firms' itemized loan and investment contracts. Under such circumstances separate analyses based on individual dataset do not have much explanatory power to understand entire picture on policy effects. Therefore, it is suggested to

²⁷ Related government authorities such as the Ministry of Finance and Economy (MOFE), Ministry of Planning and Budget (MPB), Financial Supervisory Commission (FSS) Small and Medium Business Administration (SMBA), Board of Inspection (BAI) and Presidential Office jointly set forth a special project team to deal with the performances of public SME finances. This study is based on the data drawn at the project. The author greatly acknowledges pan-governmental data supports and coordination to the participating authorities.

²⁸ The SME financial assistances may be a medicine if they are used to soothe financial risks and drive further development or a toxicant once recipient SMEs get addicted to external assistance and ultimately lose competitiveness and viability.

merge the database of various financial assistances from the standpoint of assisted firms and to keep track of their effects on corporate performances over time.

B. Data Descriptions

This study focuses on corporate performance measures in the financial statements. Then we need to start with SMEs that have been equipped with balance sheets and income statements over time. The companies under the scrutiny are manufacturing SMEs, of which, total asset is greater than 300 million KRW. To take a closer look at policy effects over years after establishment, instead of calendar years, the firms in the analysis are to be established between 1995 and 1998. The sample firms are required to have financial statements at the 3rd, 4th and 5th years after establishment. By using the database from Korea Investors Service, Inc. (KIS), this study chooses 4,944 firms as sample SMEs. Table 1 summarizes the sample SMEs by establishment year and external auditing criteria.²⁹ Table 2 shows their industry distribution.

Table 1. Brief Snapshot of Sample SMEs

(unit: no. of firms)

	Establishment year				Total
	1995	1996	1997	1998	
Externally audited SMEs	112 (15.5%)	167 (23.2%)	209 (29.0%)	233 (32.3%)	721 (100.0%)
Non-externally audited SMEs	870 (20.6%)	953 (22.6%)	1,101 (26.1%)	1,299 (30.8%)	4,223 (100.0%)
Total	982 (19.9%)	1,120 (22.7%)	1,310 (26.5%)	1,532 (31.0%)	4,944 (100.0%)

As for the sample SMEs, we construct government financial assistances throughout the years under analysis from 1999 to 2003. Since the financial statements do not itemize types of liabilities and amounts in detail, the individual contract data should be built from fund suppliers such as public and private financial institutions. The list of related government authorities

²⁹ In Korea the firms of which total asset exceeds 7 billion KRW should be subject to external auditing by law. These firms are known to have more reliable financial statements. This study includes 4,223 relatively smaller SMEs, or 83% of the entire sample firms due to maintain moderate size of analysis. Indeed, most of SMEs are not subject to external audit so that this sampling does not seem to pose serious problems.

Table 2. Distribution of Sample SMEs by Industry

(unit: no. of firms)

Industry	Establishment year			
	1995	1996	1997	1998
Food and Beverages	26	28	38	50
Tobacco	0	0	0	1
Textiles	32	40	48	70
Wearing Apparel and Fur Articles	20	28	32	44
Leather, Luggage and Footwear	12	15	8	15
Wood and Cork Products	11	21	19	28
Pulp, Paper and Paper Products	18	15	23	39
Publishing and Recorded Media	18	16	24	30
Refined Petroleum and Nuclear Fuel	1	3	6	5
Chemicals	45	47	75	91
Rubber and Plastic Products	32	55	68	92
Other Non-metallic Mineral Products	57	58	73	67
Basic Metals	38	40	56	57
Fabricated Metal Products	86	108	118	136
Other Machinery and Equipment	229	228	263	268
Computers and Office Machinery	20	18	18	30
Electrical Machinery	88	101	99	118
Electronics	81	115	147	178
Medical, Precision and Optical Products	39	58	59	67
Motor Vehicles	57	73	62	66
Other Transport Equipment	26	22	20	24
Furniture	46	31	54	56
Total	982	1,120	1,310	1,532

Table 3. Summary of Data Sources

Data	Sources
Financial Statements	Korea Investors Services, Inc. (KIS)
Borrowing	Ministry of Finance and Economy (MOFE) Korea Federation of Banks (KFD)
Credit Guarantees	Ministry of Finance and Economy (MOFE) Korea Credit Guarantee Fund (KCGF) Korea Technology Credit Guarantee Fund (KOTEC)
Policy Loans	Small and Medium Business Administration (SMBA) Small Business Corporation (SBC)
Venture Capital Investments	Small and Medium Business Administration (SMBA) Korea Venture Capital Association (KVCA)

and agents are summarized in Table 3. Individual contract data being acquired, outstanding balances at the end of calendar year are calculated. For example, the outstanding balance of credit guarantees supplied by KCGF and KOTEC are assessed in view of maturity and redemption and double checked with KFB dataset. Individual policy loan contracts of SBA are classified according to purpose, maturity, redeeming conditions, and then converted into outstanding balance at the end of calendar year. Outstanding investment balances net of exit are calculated from VCC and VCF investments of KVCA database.

C. Basic Statistics on the Financial Assistances to Sample SMEs

The government roles in SME financing is, simply put, material and determinate as mentioned in Section 2. This fact looks even more stringent when we focus on the financing patterns of the sample SMEs. Table 4 summarizes major government financial assistances from the assisted firms' viewpoint. As SMEs keep on doing business, they tend to use more policy loans: at the third year after establishment around 21% of sampled SMEs get access to policy loans, but the ratio keeps increasing up to 34.3% at the eighth year. Not only the policy loan user ratio increases but also the average amount of policy loans per user rises as well.

In contrast, the credit guarantees supplied to SMEs seem to be more or less concentrated on early stages. At the third year, the credit guaranteed firm ratio is already 70.6% but decreases significantly after six years. The average amount of credit guarantees, however, steadily increases: at the

Table 4. Summary Statistics of Public Financial Assistances Toward the Sample SMEs

(unit: no. of firms, million KRW)

Years after establishment		3	4	5	6	7	8
Total sample firms (A)		4,944	4,944	4,944	3,412	2,102	982
Policy Loan	PL borrowing firms (B)	1,037	1,319	1,490	1,115	711	337
	PL firm ratio (B/A)	21.0%	26.7%	30.1%	32.7%	33.8%	34.3%
	Average PL amount per the borrowed	578.8	597.7	673.5	749.5	818.5	839.9
Credit Guarantee	CG using firms (C)	3491	3543	3545	2320	1297	549
	CG firm ratio (C/A)	70.6%	71.7%	71.7%	68.0%	61.7%	55.9%
	Average CG amount per the guaranteed	643.4	754.1	867.9	981.7	1,011.0	1,075.7
Venture Capital Investment	VC invested firms (D)	187	241	283	186	93	31
	VC firm ratio (D/A)	3.8%	4.9%	5.7%	5.5%	4.4%	3.2%
	Average VC amount per the invested	1,398.3	1,307.6	1,304.3	1,266.2	1,150.5	1,424.7

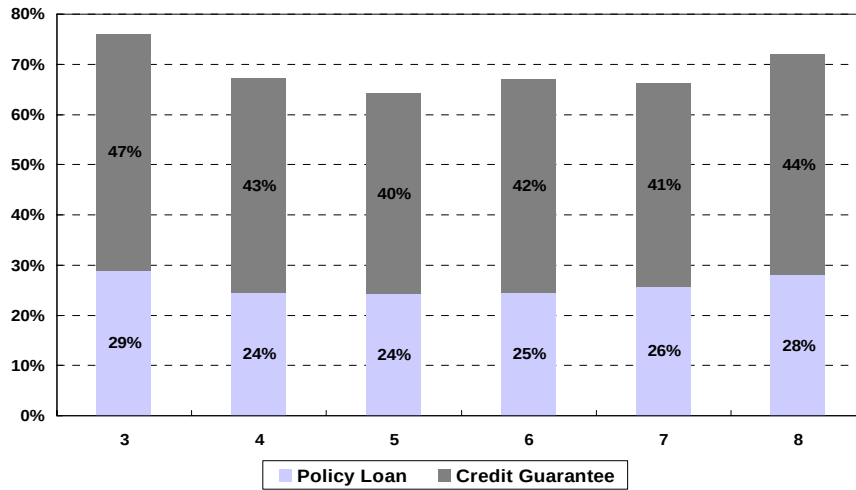
third year, 643 million KRW of credit guarantees are provided per firm but 1,076 million KRW per firm at the eighth year.

The ratio of SMEs that attract venture capital investments is quite low: throughout the periods between three and eight years after establishment, approximately 3 to 6% of the sampled SMEs are able to get access to venture capitalists. However, when they get funded from venture capitalists, the size of the funding is not negligible at all. The size of venture investments per firm outweighs that of credit guarantees and of policies loans. One interesting feature of venture capital investments is that the investments per firm look hump-shaped over the establishment years: SMEs at the early and later stages attract more money from venture capitalists than the ones at the middle stage such as the sixth and seventh years after establishment. Indeed, the SMEs at the middle stage are known to find most difficulties in fund raising.

For instance, Figure 6 shows the SMEs' dependence on government financial assistances in the balance sheet of SMEs. Throughout the years, the contribution of policy loans and credit guarantees is imperative. As for the credit guarantee or policy loan users, above 60% of the total external borrowings are intermediated based on these instruments. The dependence

persists throughout the years under analysis. Since the users of either credit guarantees or policy loans or both exceed more than 80% of the entire sample firms, about half of the total borrowings of SMEs have become feasible by the help of the government. The size of the fixed income type of government assistances relative to total borrowings has declined from three years after establishment to five years, but rather turned to increasing trend afterwards. Thus, the government not only contributes to business start-ups but also sustains their continuous expansion even after problems occurring from information asymmetry get eased.

Figure 6. Ratios of Policy Loans and Credit Guarantees to Total Borrowing (either PL or CG users only): After Establishment Year



D. Performances of SME Financial Assistances

As mentioned in the first subsection, no single measure fully explains economic effects of government financial policies on SMEs, let alone social effects. Thus, it is less arguable to advocate or criticize the roles and rationales of these assistance policies by looking at multi-faceted aspects of profitability and employment of the assisted firms and economic contributions to the overall economy. In this respect, the paper takes into the following three criteria: profitability, corporate activity and influence on the economy. These performance criteria are measured by operating profit growth, sales turnover growth and economic value-added of the assisted firms, respectively.

First, firm is an economic entity that searches for profits. Thus, public financial assistances should serve to raise corporate profitability at least in the long run. Otherwise, the assisted firms do not survive. On the other hand, however, profitable SMEs or the ones that are anticipated to make large profits in the future should not be the targeted firms of public financial assistances. Thus, this measure is quite controversial.

Second, as to SMEs, the sales turnover is very important, especially in their survival. According to various surveys conducted by major SME specialized institutions such as the Industrial Bank of Korea (1999) and Korea Federation of Small and Medium Business (2000), shrinkage in sales is the number one reason that firms get financially distressed and in the end close down business. It is noticeable that this measure depends heavily on business conditions of overall economy and/or affiliated industry as well as on corporate management.

Third, in some sense, the effect of public financial assistances on economic value-added is of most importance among the three performance measures under analysis, since policymakers should consider overall economic development, paying attention to welfare of not only capitalists but also laborers. Indeed, this measure includes the overall economic conditions, since the definition of economic value-added includes both profits attributable to capitalists and wage incomes to laborers.

Evaluating the above performance measures, we need to normalize them with a certain variable. Otherwise, the immediate effect of funding on the level would be most likely to be positive: the larger firms' business size gets due to additional funding, the greater their sales, profits and economic value added become. Normalization in this sense means measuring cost effectiveness of financial assistances.

One of the most frequently used variables for the normalization in corporate performance evaluation is the amount of sales turnover. But the sales of firms, especially SMEs, are very volatile. In this case, the changes in ratio have quite dubious interpretations. If a firm's sales shrink much faster than operating profits while managing to get positive profit level, the operation profits to sales of this firm could be higher even though its business conditions become weaker. Therefore, when doing evaluations of SME performances, it is often suggested to normalize with asset size which looks much stable. However, the performance measures with asset normalization are anticipated to be negative, because the increase of external funding, either borrowing or equity investment, leads to immediately lower the ratio normalized by assets. Thus, more attention must be paid to mid-term or long-term effects in this case.

The corresponding regression equations are constructed as follows:

$$\begin{aligned} \Delta y_{t+3}^j = & \text{const} + \alpha_1 (PL_3^j / A_3^j) + \alpha_2 (CG_t^j / A_3^j) + \alpha_3 (VC_t^j / A_3^j) \\ & + \beta_1 (PL_{t+3}^j / PL_3^j) / A_{t+3}^j + \beta_2 (CG_{t+3}^j - CG_3^j) / A_{t+3}^j + \beta_3 (VC_{t+3}^j - VC_3^j) / A_{t+3}^j \\ & + \gamma_1 \text{ind}_{-P_{t+3}} + \gamma_2 \text{ind}_{-P_3} + \gamma_3 (B_t^j / A_3^j) + \varepsilon_{t+3}^j \\ \text{where } \Delta y_{t+3}^j \equiv & P_{t+3}^j - P_3^j \end{aligned}$$

In the above equation P_t^j is one of performance measures of firm j at period t , such as ratios of operating profit, of sales turnover, and of economic value-added to total asset, respectively. Then the dependent variable is defined as the difference of performance measures of $(t+3)$ th year from the 3rd year after firm establishment, where t is chosen to be 1, 2, or 3.³⁰ This setting controls the initial performance condition of the assisted firms at the time of public financial assistance. As a matter of fact, the more profitable a firm is at the time of assistance, the higher the operating profit relative to asset will be likely to be in a few years.

The explanatory variables consist of the following three categories: initial assistance, additional assistance, and controls. Here the initial assistances, or (PL_3^j / A_3^j) , (CG_t^j / A_3^j) , (VC_t^j / A_3^j) , are policy loan, credit guarantee, and venture capital investment of the firm j at the 3rd year of establishment, respectively. The additional assistances are defined as $(PL_{t+3}^j - PL_3^j) / A_{t+3}^j$, $(CG_{t+3}^j - CG_3^j) / A_{t+3}^j$, $(VC_{t+3}^j - VC_3^j) / A_{t+3}^j$ and , which means $(t+3)$ th year outstanding balances net of 3rd year balance. Thus, depending on further funding from the government and redemption or recovery of existing funding, the additional assistances could be positive or negative.

Finally, industry performances of both base and comparing years and firm j 's ratio of external borrowing to total asset are controlled. It is expected that as the industry to which firm j belongs performs well at base and comparing years, respectively, the firm j will be more likely to do so. Then the larger the gap between comparing year level performance and the lower base year level performance of the industry is, the higher the increase of performance of firm j becomes. Thus, the sign is prone to be positive on the comparing year performance and negative on the base year performance. The ratio of external, either public or private, borrowing to total asset depends on expected profitability in the future. As a firm has more profitable investment opportunities, it tends to gear up leverage to maximize the opportunities, vice versa. Then, the coefficient sign of this control variable in the profitability regression will be positive. In the case of corporate activity and economic influence, positive effects are anticipated but not always, hence being an empirically verifiable question. Table 6 summarizes the descriptions of the variables used in the regressions.

³⁰ The base year for comparison is set to be the 3rd year after firm establishment because the availability of accounting data is at most traced back to that year.

From Table 7 to 9 it is shown the results about the effects of government financial supports on SMEs' profitability over three years after the initial assistance. Policy loans at the early stage, or until the 3rd year after establishment, influence negatively on the profitability one-year ahead and then the negative effect phase out gradually. The early venture capital investments have positive effects in three years after the money injection, while the immediate effect is at most insignificant. The early credit guarantee assistances look to have slightly negative influences on the profitability of the recipient firms.

In the case of additional assistances, venture capital investment seems to be strongly positive, additional credit guarantees have affected negatively on the operating profits of assisted firms. It is understood that the positive venture capital effect looks to reflect a selection bias that better performing firms extract more equity investment. However, the negative effect of additional credit guarantee seems to represent its bail-out flavor that public financial assistances have been extended to financially distressed firms during the periods under analysis.

The coefficient of industry control variable is as expected: the higher overall profitability of the industry to which a firm belongs has become, the lower the profitability growth of the firm has increased. The higher industry profitability at the comparing years is, the higher firm profitability becomes. Other things being equal, the sign of leverage implies that highly dependent firms on external borrowings at the initial period turn out to improve profitability better.

From 10 to 12 the effect of public financial assistances on sales growth of SMEs is reported. The early policy loan supply has increased sales turnover significantly and continuously, while the additional policy loans have negative effects on sales turnover growth. Venture capital investment at the early stage affected the sales of invested firms quite weakly, but the effect has gotten stronger as time goes by. In contrast, further equity investment of venture capitals looks neutral to sales growth. Credit guarantees both at the early and later stages have contributed to sales growth relative to asset growth negatively in all horizons. The signs of the industry control variables in sales turnover regressions look the same as in the operating profit regressions. Highly dependent firms on external borrowings at the initial period also turn out to improve sales growth more, other things being equal.

Table 5. Descriptions on Variables Used in Regressions

Variables	Notation	Descriptions
Performance Measures (P)	ROA	Operation Profit / Total assets
	SOA	Sales turnover / Total assets
	EVOA	Economic value-added / Total assets
Explanatory Variables	PL_early	Policy loans balance at the 3rd year after establishments
	VC_early	Venture capital investments balance at the 3rd year after establishments
	CG_early	Credit guarantee balance at the 3rd year after establishments
	PL_add	Additional policy loan after 3rd year of establishment
	VC_add	Additional Venture Capital investment after at the 3rd year after establishments
	CG_add	Additional Credit guarantee after at the 3rd year after establishments
Control Variables	I_Pt+3	Industry average of Performance P at t+3
	I_P3	Industry average of Performance P at t
	BOA	Borrowings / Total Assets

Table 6. Effects of Public Financial Assistances on Operating Profits: One Year Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	-0.0067*** (0.0020)	-0.0064*** (0.0019)	-0.0079*** (0.0026)	-0.0075*** (0.0027)	-0.0043 (0.0028)	-0.0053 (0.0069)	-0.0264*** (0.0075)
PL_early	0.0019 (0.0206)			0.0004 (0.0206)	-0.0023 (0.0206)	-0.0057 (0.0205)	-0.0367* (0.0207)
VC_early		-0.0352 (0.0357)		-0.0337 (0.0358)	-0.0591 (0.0362)	-0.0345 (0.0366)	-0.0128 (0.0364)
CG_early			0.0071 (0.0101)	0.0065 (0.0101)	0.0037 (0.0103)	0.0035 (0.0103)	-0.0199* (0.0105)
PL_add					-0.0729** (0.0357)	-0.0745** (0.0356)	-0.0887** (0.0353)
VC_add					-0.2073*** (0.0580)	-0.2*** (0.0578)	-0.1908*** (0.0573)
CG_add					-0.0438*** (0.0159)	-0.0425*** (0.0158)	-0.0371** (0.0157)
Ind_ROA ₄						0.4013*** (0.0820)	0.3523*** (0.0814)
Ind_ROA ₃						-0.3842*** (0.0841)	-0.3334*** (0.0836)
BOA ₃							0.0738*** (0.0085)
No. of obs	4,074	4,074	4,074	4,074	4,074	4,074	4,074
R ²	0.0000	0.0002	0.0001	0.0003	0.0066	0.0140	0.0328
Adj. R ²	-0.0002	0.0000	-0.0001	-0.0004	0.0051	0.0121	0.0304
F-value	0.01	0.97	0.50	0.46	4.51	7.22	13.76

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

Table 7. Effects of Public Financial Assistances on Operating Profits:
Two Years Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	-0.0187*** (0.0025)	-0.0167*** (0.0024)	-0.0203*** (0.0032)	-0.0199*** (0.0033)	-0.0167*** (0.0035)	-0.0266*** (0.0091)	-0.0597*** (0.0097)
PL_early	0.0332 (0.0256)			0.0293 (0.0256)	0.0286 (0.0257)	0.0266 (0.0255)	-0.0228 (0.0255)
VC_early		-0.122*** (0.0444)		-0.1176*** (0.0445)	-0.1242*** (0.0451)	-0.0848* (0.0454)	-0.0579 (0.0448)
CG_early			0.0159 (0.0125)	0.0129 (0.0126)	0.0072 (0.0129)	0.0041 (0.0128)	-0.0311** (0.0131)
PL_add					-0.0304 (0.0340)	-0.0353 (0.0338)	-0.0515 (0.0334)
VC_add					-0.0211 (0.0582)	0.0008 (0.0578)	-0.012 (0.0570)
CG_add					-0.043** (0.0168)	-0.0413** (0.0167)	-0.035** (0.0165)
Ind_ROA ₅						0.6524*** (0.0891)	0.5669*** (0.0882)
Ind_ROA ₃						-0.4473*** (0.0978)	-0.3905*** (0.0966)
BOA ₃							0.1176*** (0.0105)
No. of obs	4,074	4,074	4,074	4,074	4,074	4,074	4,074
R ²	0.0004	0.0019	0.0004	0.0025	0.0045	0.0202	0.0499
Adj. R ²	0.0002	0.0016	0.0001	0.0017	0.0030	0.0182	0.0476
F-value	1.68	7.56	1.61	3.36	3.04	10.46	21.35

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

Table 8. Effects of Public Financial Assistances on Operating Profits:
Three Years Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	0.0071*** (0.0026)	0.0064*** (0.0024)	0.0065** (0.0033)	0.0045 (0.0034)	0.0043 (0.0036)	-0.0197* (0.0105)	-0.0263** (0.0115)
PL_early	0.0108 (0.0266)			0.0126 (0.0266)	0.0070 (0.0266)	-0.0002 (0.0264)	-0.0133 (0.2690)
VC_early		0.1401*** (0.0453)		0.1426*** (0.0454)	0.2091*** (0.0474)	0.2302*** (0.0472)	0.2420*** (0.0473)
CG_early			0.0056 (0.0131)	0.0079 (0.0131)	0.0006 (0.0137)	0.0004 (0.0136)	-0.0128 (0.0141)
PL_add					0.0333 (0.0289)	0.0329 (0.0287)	0.0275 (0.0287)
VC_add					0.2546*** (0.0522)	0.2548*** (0.0518)	0.2480*** (0.0517)
CG_add					-0.0266* (0.0145)	-0.0256* (0.0145)	-0.0271* (0.0145)
Ind_ROA ₆						0.6265*** (0.0838)	0.6169*** (0.0986)
Ind_ROA ₃						-0.2288** (0.0982)	-0.2171** (0.0986)
BOA ₃							0.0298*** (0.0111)
No. of obs	3,417	3,417	3,417	3,417	3,414	3,414	3,414
R ²	0.0000	0.0028	0.0001	0.0030	0.0111	0.0295	0.0315
Adj. R ²	-0.0002	0.0025	-0.0002	0.0021	0.0093	0.0272	0.0287
F-value	0.17	9.58	0.19	3.40	6.35	12.94	11.07

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

Table 9. Effects of Public Financial Assistances on Sales: One Year Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	-0.0907*** (0.0138)	-0.0825*** (0.0130)	-0.0285 (0.0176)	-0.0415** (0.0182)	0.0135 (0.0186)	0.1853*** (0.0671)	-0.0148 (0.0699)
PL_early	0.3128** (0.1402)			0.3582** (0.1402)	0.3084** (0.1382)	0.2826** (0.1378)	0.0292 (0.1382)
VC_early		0.3136 (0.2432)		0.2663 (0.2431)	0.0515 (0.2432)	0.0659 (0.2427)	0.2383 (0.2406)
CG_early			-0.2963*** (0.0686)	-0.3031*** (0.0689)	-0.3803*** (0.0692)	-0.3727*** (0.0690)	-0.5484*** (0.0705)
PL_add					-0.9472*** (0.2396)	-0.9909*** (0.2389)	-1.0895*** (0.2361)
VC_add					-1.4043*** (0.3916)	-1.398*** (0.3906)	-1.2911*** (0.3857)
CG_add					-1.0195*** (0.1080)	-0.9852*** (0.1078)	-0.9371*** (0.1067)
Ind_SOA ₄						0.2885*** (0.0865)	0.268*** (0.0854)
Ind_SOA ₃						-0.4373*** (0.0849)	-0.3985*** (0.0839)
BOA ₃							0.5936*** (0.0569)
No. of obs	4,065	4,065	4,065	4,065	4,065	4,065	4,065
R ²	0.0012	0.0004	0.0046	0.0064	0.0364	0.0434	0.0686
Adj. R ²	0.0010	0.0002	0.0043	0.0057	0.0350	0.0416	0.0663
F-value	4.98	1.66	18.63	8.74	25.58	23.03	29.84

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

Table 10. Effects of Public Financial Assistances on Sales: Two Years Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	-0.194*** (0.0185)	-0.1853*** (0.0175)	-0.1182*** (0.0237)	-0.1432*** (0.0245)	-0.0414 (0.0254)	0.0363 (0.0956)	-0.312*** (0.0974)
PL_early	0.4717** (0.1886)			0.5341*** (0.1886)	0.4801*** (0.1856)	0.4245** (0.1844)	-0.0211 (0.1828)
VC_early		0.964*** (0.3270)		0.9171*** (0.3270)	0.7216** (0.3256)	0.7634** (0.3238)	1.0084*** (0.3174)
CG_early			-0.3428*** (0.0924)	-0.3438*** (0.0927)	-0.5551*** (0.0931)	-0.543*** (0.0927)	-0.8402*** (0.0938)
PL_add					-0.5281** (0.2457)	-0.6212** (0.2443)	-0.739*** (0.2390)
VC_add					-0.5898 (0.4210)	-0.4998 (0.4185)	-0.5541 (0.4090)
CG_add					-1.4897*** (0.1214)	-1.423*** (0.1209)	-1.353*** (0.1186)
Ind_SOA ₅						0.6518*** (0.1018)	0.5863*** (0.0995)
Ind_SOA ₃						-0.7425*** (0.0965)	-0.6578*** (0.0945)
BOA ₃							1.0588*** (0.0751)
No. of obs	4,063	4,063	4,063	4,063	4,063	4,063	4,063
R ²	0.0015	0.0021	0.0034	0.0072	0.0462	0.0602	0.1042
Adj. R ²	0.0013	0.0019	0.0031	0.0064	0.0448	0.0584	0.1020
F-value	6.25	8.69	13.75	9.75	32.76	32.48	47.14

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

Table 11. Effects of Public Financial Assistances on Sales: Three Years Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	-0.2081*** (0.0179)	-0.1881*** (0.0169)	-0.1445*** (0.0231)	-0.1810*** (0.0239)	-0.1429*** (0.0248)	0.0035 (0.0962)	-0.3783*** (0.0982)
PL_early	0.8109*** (0.1857)			0.8600*** (0.1858)	0.8103*** (0.1858)	0.7556*** (0.0185)	0.2688 (0.1829)
VC_early		1.0313*** (0.3171)		1.0330*** (0.3168)	0.9155*** (0.3309)	0.7186** (0.3295)	0.9564*** (0.3214)
CG_early			-0.2030** (0.0916)	-0.2119** (0.0916)	-0.3654*** (0.0954)	-0.3242*** (0.0950)	-0.6277*** (0.0961)
PL_add					-0.1302 (0.2020)	-0.1694 (0.2005)	-0.2699 (0.1955)
VC_add					-0.0888 (0.3659)	-0.0086 (0.3632)	-0.1924 (0.3536)
CG_add					-0.6146*** (0.1014)	-0.5106*** (0.1016)	-0.4453*** (0.0994)
Ind_SOA ₆						0.4630*** (0.0808)	0.4428*** (0.0788)
Ind_SOA ₃						-0.5982*** (0.0836)	-0.5322*** (0.0820)
BOA ₃							1.0509*** (0.0757)
No. of obs	3,413	3,413	3,413	3,413	3,410	3,410	3,410
R ²	0.0056	0.0031	0.0014	0.0105	0.0214	0.0368	0.0888
Adj. R ²	0.0053	0.0028	0.0011	0.0096	0.0197	0.0345	0.0861
F-value	19.07	10.58	4.91	12.05	12.42	16.24	33.12

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

Table 12. Effects of Public Financial Assistances on Economic Value Added: One Year Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	-0.0219*** (0.0040)	-0.0191*** (0.0038)	-0.0162*** (0.0051)	-0.0174*** (0.0053)	-0.0064 (0.0055)	-0.0379** (0.0183)	-0.1098*** (0.0196)
PL_early	0.0673 (0.0410)			0.0692* (0.0411)	0.0596 (0.0408)	0.0571 (0.0406)	-0.0314 (0.0405)
VC_early		-0.067 (0.0711)		-0.0684 (0.0712)	-0.1093 (0.0718)	-0.0414 (0.0728)	0.0164 (0.0717)
CG_early			-0.0198 (0.0201)	-0.0232 (0.0202)	-0.0353* (0.0204)	-0.0381* (0.0203)	-0.0988*** (0.0207)
PL_add					-0.2613*** (0.0707)	-0.2728*** (0.0704)	-0.306*** (0.0693)
VC_add					-0.2554** (0.1150)	-0.2197* (0.1146)	-0.1886* (0.1126)
CG_add					-0.1893*** (0.0315)	-0.1869*** (0.0314)	-0.1688*** (0.0309)
Ind_EVOA ₄						0.5391*** (0.0859)	0.4799*** (0.0845)
Ind_EVOA ₃						-0.4237*** (0.0882)	-0.3324*** (0.0874)
BOA ₃							0.2072*** (0.0167)
No. of obs	4,076	4,076	4,076	4,076	4,076	4,076	4,076
R ²	0.0007	0.0002	0.0002	0.0012	0.0156	0.0251	0.0607
Adj. R ²	0.0004	0.0000	0.0000	0.0004	0.0142	0.0231	0.0584
F-value	2.70	0.89	0.97	1.61	10.75	13.06	26.28

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

Table 13. Effects of Public Financial Assistances on Economic Value Added:
Two Years Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	-0.0513*** (0.0051)	-0.0477*** (0.0048)	-0.0453*** (0.0065)	-0.0456*** (0.0068)	-0.0311*** (0.0071)	-0.0687*** (0.0233)	-0.1643*** (0.0248)
PL_early	0.0704 (0.0521)			0.0711 (0.0522)	0.0708 (0.0521)	0.0666 (0.0519)	-0.0542 (0.0516)
VC_early		-0.1529* (0.0903)		-0.1547* (0.0905)	-0.1825** (0.0915)	-0.1182 (0.0925)	-0.0477 (0.0907)
CG_early			-0.0209 (0.0255)	-0.0259 (0.0256)	-0.0487* (0.0261)	-0.0514** (0.0261)	-0.1354*** (0.0264)
PL_add					-0.1889*** (0.0690)	-0.2087*** (0.0689)	-0.2409*** (0.0676)
VC_add					-0.0761 (0.1180)	-0.0146 (0.1180)	-0.0415 (0.1155)
CG_add					-0.1868*** (0.0341)	-0.1734*** (0.0341)	-0.158*** (0.0335)
Ind_EVOA ₅						0.5881*** (0.0985)	0.4982*** (0.0967)
Ind_EVOA ₃						-0.4129*** (0.1049)	-0.2986*** (0.1035)
BOA ₃							0.2879*** (0.0212)
No. of obs	4,076	4,076	4,076	4,076	4,076	4,076	4,076
R ²	0.0004	0.0007	0.0002	0.0014	0.0116	0.0202	0.0628
Adj. R ²	0.0002	0.0005	-0.0001	0.0006	0.0101	0.0183	0.0605
F-value	1.83	2.87	0.67	1.86	7.95	10.47	27.25

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

Table 14. Effects of Public Financial Assistances on Economic Value Added: Three Years Ahead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
const	-0.0636*** (0.0054)	-0.0582*** (0.0051)	-0.0496*** (0.0069)	-0.0556*** (0.0072)	-0.0474*** (0.0074)	-0.0986*** (0.0248)	-0.1925*** (0.0268)
PL_early	0.1731*** (0.0556)			0.1815*** (0.0557)	0.1672*** (0.0556)	0.1560*** (0.0554)	0.0374 (0.0554)
VC_early		0.0704 (0.0949)		0.0694 (0.0950)	0.1749* (0.0990)	0.2217** (0.0995)	0.2891*** (0.0989)
CG_early			-0.0462* (0.0274)	-0.0509* (0.0274)	-0.0924*** (0.0285)	-0.0930*** (0.0285)	-0.1748*** (0.0291)
PL_add					-0.0366 (0.0604)	-0.0444 (0.0601)	-0.0702 (0.0591)
VC_add					0.4808*** (0.1090)	0.5049*** (0.1085)	0.4763*** (0.1067)
CG_add					-0.1704*** (0.0303)	-0.1646*** (0.0304)	-0.1538*** (0.0299)
Ind_EVOA ₆						0.5999*** (0.0981)	0.5480*** (0.0965)
Ind_EVOA ₃						-0.3541*** (0.0969)	-0.2504*** (0.0964)
BOA ₃							0.2612*** (0.0230)
No. of obs	3,420	3,420	3,420	3,420	3,417	3,417	3,417
R ²	0.0028	0.0002	0.0008	0.0040	0.0185	0.0292	0.0266
Adj. R ²	0.0025	-0.0001	0.0005	0.0032	0.0168	0.0269	0.0246
F-value	9.71	0.55	2.85	4.62	10.72	12.80	13.28

Note: ***, ** and * are statistically significant within 1%, 5% and 10%, respectively.

From Table 7 to Table 9 the results about the effects of the government financial assistances on economic value-added over time are contained. The early stage assistance in the form of policy loans have influenced positively on increasing economic value-added in three years, but additional policy

loans have not been significantly helpful in creating values in the economy wide. The venture capital investment both at the early and later years have become positively contributed to increasing economic value added as time goes by. Once again, both initial and additional credit guarantees have affected negatively on economic value creation relative to asset growth. The signs of control variables are similar to those at the other regressions, which is as expected.

E. Policy Implications

Table 15 summarizes the empirical findings on the dynamic effects of credit guarantee, policy lending and venture capital investment on sales, profitability and economic value-added. The main results are as follows. First, credit guarantee is the worst instrument among the three policy measures. Second, venture capital investments are not so effective in the early periods, but gradually affect the overall performances of invested firms in a positive and significant manner. Third, policy lending does not significantly improve the profitability of SMEs but helps to invigorate total returns to laborer and capitalists.

Table 15. Summary of the Empirical Results

	Sales turnover	Operating profits	Economic value added
Credit Guarantee	- → -	□ → □	- → -
Policy Lending	+ → +	□ → □	□ → +
Venture Capital	□ → +	□ → +	□ → +

Note: + Positive effect; □ Statistically insignificant effect; - Negative effect.

Why have credit guarantees disappointingly affected the guaranteed SMEs' performances? In order to interpret this outcome, it is necessary to pay attention to the venture boom-bust and P-CBO incidence in which financing was offered without thorough examinations on creditworthiness of recipient firms. Credit guarantees have been generously supplied after the financial crisis, especially in 1998 and 2002. Virtually, no prudent examinations on the debt service capacity of the guaranteed firms had been made in those years. Note that the sample firms were set up just before and in the middle of venture booms, hence receiving generous financial assistances from the government. These cheap credits became sour in the

early 2000s, and were partly saved by further increases in credit guarantees such as P-CBO (see Figure 3).

The results of this study suggest that public assistances with more market discipline and flavor have yielded better outcomes. For example, venture capital investments should be further extended to create more economic values from a long-term perspective. But it is worthwhile to note that the most of financial resources to investing SMEs are concentrated on via commercial banks which tend to have a lower risk appetite in investment. In fact, the size of the current venture capital investments is quite negligibly relative to bank lending. In this sense, it is quite challenging to raise risk capitals in Korea. Despite the difficulties, banks should play more active roles in fostering SME entrepreneurship and business expansion as there is little hope that other financial institutions effectively meet the demand for SME investments. It means that banks need to change their risk tolerance toward risk capitals.

As a matter of fact, lending for research and development (R&D) and to venture companies has brought about positive results in terms of the performance measures of the SMEs. According to the analysis by the Korea Development Institute (2006), the firms which initiated R&D with the government direct loans have performed best, while the ones which borrowed under the account of SME venture enterprises loans follow next (see Table 17). The restructuring and cooperation funds, which take a majority share of entire policy loans, have not contributed to the overall performances of the borrowing SMEs.

Table 16. Performances of Policy Loans in Detail

Type of loans	Sales turnover	Operating profits	Economic value added
Restructuring	□ → -	□	□
SME Venture	- → □	+	□ → +
Cooperation	- → □	□ → +	□ → -
Export Financing	-	□	-
R&D	+	+	+

Note: + Positive effect; □ Statistically insignificant effect; - Negative effect.

Source: Korea Development Institute (2006), rearranged.

4. Summary and Concluding Remarks

This study empirically assesses the government financial assistances toward SMEs in Korea. The main findings of the analyses are as follows. First, venture capital investments have turned out to be the most effective financial assistance instruments in most performance measures: profitability, business activity and economic influence of the assisted firms over time. Their outstanding performances seem to stem from thorough examinations of private sectors on creditworthiness and future performances along with aligned incentives to investments. Second, the credit guarantees have shown quite disappointing effects on the guaranteed firms, regardless of the performance measures. This observation is quite consistent to the bailout conjecture that public guarantee scheme may be used to rescue financially insolvent and unviable firms. This finding could be understood as a ground for reforming the credit guarantee system which was already recommended by international organizations like IMF and OECD. Third, the effects of policy loans have been dubious: its effect on profitability is at most insignificant, while the effects on sales and economic value-added increases are significantly positive. Thus, these loans seem to have achieved their policy objectives since they target for mediocre SMEs manage to create values in the economy, though not so profitable.

It should be noted that the empirical analyses in this study have some limitations to draw policy implications. Due to data availability, the effects of the Korea's government financial assistances have been investigated and analyzed during the years of structural changes. The financial crisis in 1997, venture boom and bust around new millennium and credit card crisis in 2003 are not events that take place so frequently. The occurrences of structural shocks and ensuing policy responses could lead the effects of financial assistances to SMEs more complicated, ending up with various heated debates over the evaluations. This limitation of the analysis and consequent policy controversies should be better addressed in the further and more rigorous studies.

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CHAPTER 5

The Development of Venture Capital Industry and Role of Government in Korea: Venture Boom vs. Post-Boom

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1. Introduction

Korea's venture capital industry experienced a boom during the years of 1998-2000 and shrank rapidly with the abrupt ending of the boom. After the bubble burst, the industry has been in a steady recovery since 2003. Korean government has made considerable efforts to develop venture capital industry as a critical route of innovative financing since mid 1990s. The government has played an important role in the fund-raising process by directly making significant capital commitments. It also helped the exit process of venture capital investments by establishing KOSDAQ stock market in 1996, which provided venture-capital-backed companies with a window of IPO.¹ Compared with the U.S. that is a predominant country in venture capital investments, the venture capital industry in Korea is situated at an early stage and needs significant development and improvement. For instance, the venture capital investments in the U.S. amount to \$25.5 billion in 2006, which accounts for 0.19 % of the U.S. GDP. In contrast, the amount of venture capital investment in Korea is just \$0.75 billion in 2006, representing 0.095% of the GDP. The venture capital industry in Korea, vis-à-vis the U.S., also poses structural weak points. For example, the government remains as the largest investor of outside funds.² The stipulated

¹ Rin *et al.* (2000) found that the opening of stock markets targeted at entrepreneurial companies positively affects the shares of early stage and high-tech venture capital investments.

² In Korea a venture capital firm operates two different sources of funds. One is outside fund which is organized by external investors' capital commitments and the other is inside fund which is internally raised. I will explain the fund-raising and organizational structures of the venture capital industry in Korea more in detail in the next section.

life spans of outside funds are mostly five years.³ As for an exit, M&A takes up less than five percent of total venture capital investment recovery, unlike the U.S. where M&A is a dominant exit window. The organizational structure of venture capital firms has been a corporation; establishing a venture capital firm in the form of limited liability company (LLC) was not approved until 2005. These defects work as structural constraints on the development of the venture capital industry in Korea.

Among the above mentioned shortcomings of the venture capital industry, this study pays attention to the fact that Korean government is the most influential playmaker, and analyzes the role that the government has played since the late 1990s in the stages of fund-raising and venture investment. Plenty of papers investigated venture capital industry in various aspects.⁴ Among those, Lee (2003) and Rin et al. (2000) are close to this paper in that they deal with the role of government or public policy in the development of active venture capital markets. No previous research, however, has attempted to evaluate empirically the role that the government has actively taken in the stages of fund-raising and venture investment, which gives the uniqueness to this paper. For an analysis, I use the data of Korean Venture Capital Association (KVCA) on fund-raising and venture investment. The evaluation on the role of the government is then conducted for the venture boom and post-boom periods separately, taken into account possible structural changes between both periods. More specifically, in order to evaluate the role of government in raising venture capital, I measure the size of the government capital commitments and uncover how effectively the public capital commitments have attracted private capital in the venture boom and post-boom periods. Looking into the role of the government in the investment stage, I choose the following four criteria: (1) the average age of invested firms; (2) the ratio of venture investments in high-tech industries; (3) the ratio of investments in high- and

³ When organizing an outside fund, a venture capitalist stipulates an expiration date of the fund.

⁴ For a comprehensive overview of previous literature on the venture capital industry, see Gompers and Lerner (2001); for an overview of previous literature on the role of contracting, screening, and monitoring in mitigating principal-agent conflicts, see Kaplan and Stromberg (2001); for the relationship between incentive contracts and market structure in an adverse selection setting or in a moral hazard setting, see Inderst (2001), and Inderst and Muller (2002); for the syndication and staged investment, see Admati and Pfleiderer (1994), Bergemann and Hege (1998), and Brander *et al.* (2002); for the structure and governance of venture capital organization and their performance, see Gompers and Lerner (1998b) and Sahlman (1990); and for the influence of a robust initial offering market on venture investment behaviors, see Black and Gilson (1998) and Jeng and Wells (2000). Kortum and Lerner (2000) evaluated the role of venture capital in an economy's overall process of innovation and Hellmann and Puri (2000) analyzed interrelations between investor types (venture capital *vs.* other financing) and product market strategies and outcomes of start-ups. Gompers and Lerner (2004) collected their papers examining U.S. venture capital industry in the fund-raising, investing, and exiting stages. Finally, Lee *et al.* (2003) investigated the difference in investment behavior according to the sources of funds (inside funds *vs.* outside funds) in Korean venture capital industry.

medium-tech industries; and, (4) the ratio of common stock investments. I evaluate the role of the government in focusing on changes of the four variables according as the share of government capital commitments in outside funds increases.

The empirical analyses show that the government played a significant role at the fund-raising stage in both venture boom and post-boom periods. The government has provided a considerable amount of capital to venture capital firms for their venture investments. This direct role of the government in the fund-raising stage seems to have been reinforced after the boom burst. It is also found that the government has played an effective role in attracting the private investors' capital in both periods, even though the magnitude of responsiveness of the private sector to the government capital commitments declined significantly upon the demise of the venture boom.

When it comes to the investment stage, the empirical results do not convey a clear answer to the question of whether the government accomplished expected roles during the venture boom and the post-boom periods. Regarding the age of invested firms and the common stock investment, the empirical outcomes show that the government failed to induce investments in the outside funds of which the government had a larger stake toward early-staged firms and guide common stock investments during the venture boom period. This type of apparent policy failure, however, disappeared after the boom and policy improvement seems to have been made on the two criteria. When it comes to the investments in the high-tech industries, the story goes the other way around. A related empirical analysis tells us that the government has not properly increased venture investments on high-tech industries during the post-boom period, not the venture boom period. I will argue tentative reasons why the policy failures were observed in relation to the policy implications.

The remainder of this chapter is organized as follows. In Section 2, I explain the current status of the venture capital industry in Korea and its characteristics. Section 3 provides data description. In Section 4, I evaluate the role of Korean government in the fund-raising process by measuring the size of the government capital commitments itself and estimating the responsiveness of private sector to the government capital commitments in outside funds. The investigation on the investment behaviors of venture capital firms in Korea is conducted in the following section. Section 5 includes the analysis of the investment behaviors of inside and outside funds, respectively, the examination on the role of the government in the investment stage, and the comparison of investment behaviors between the inside and outside funds. Finally, Section 6 concludes the analysis by summarizing the results and suggesting a direction for future research.

2. Venture Capital Industry in Korea

In this section, first I explain the organizational structure of venture capital firm in Korea. Then I describe the current status of venture capital industry in Korea and explain its characteristics.

A. Venture Capital Firm as a Corporation

Different from the U.S., the organizational form of venture capital firms in Korea is a corporation. Shareholders of venture capital firms pay capital and employ managers and venture capitalists who will invest the paid-in capital. Besides the paid-in capital, the venture capital firms also raise outside funds. Therefore, the venture capitalists in Korea have two different sources of capital pools to invest. One is own fund or inside fund composed of paid-in capital and debt and the other is outside funds which are made by outside investors who are called limited partners.⁵ As shown in Lee et al. (2003), this organizational structure of co-management of inside fund and outside funds within a single entity contains the potential opportunistic behaviors of venture capitalists.

B. Current Status of Venture Capital Industry in Korea

Venture boom and its ending In Korea, the venture capital industry experienced a venture boom during 1998-2000. During the boom, 98 new venture capital firms were established and 281 outside funds were newly organized.⁶ Three factors contributed to the boom: ① IT boom started in 1997; ② the government's policy effort to develop the venture capital industry; ③ the establishment of KOSDAQ market as a window of new companies' IPOs. As the IT boom disappeared since 2000, however, the venture boom also ended. Many small-sized venture capital firms closed their businesses and new investment shrank abruptly in 2001 and remained at a low level since then.

Rapid growth of outside funds after the burst of boom, a main trend in the venture capital industry in Korea is the development of outside funds. The amount of outside funds per firm has increased almost four times for five years as shown in Table 1, Table 2 summarizes changes in the proportion of inside and outside funds in the total venture capital raised. In 2000 the total size of inside funds amounted to \$4.2 billion and accounted for

⁵ For clear contrast with 'outside' fund, I use a terminology of 'inside' fund instead of 'own' fund hereinafter.

⁶ Before the venture boom, there were only 50 venture capital firms. Also, only 42 outside funds were organized during the period of 1989-1997.

almost 70 percent of the total venture capital raised. The size of outside funds was just \$1.9 billion and represented only 31 percent of the total venture capital. Since then, however, the size of inside funds has shrunk and the size of outside funds increased rapidly. In 2005 the total size of outside funds amounts to \$4.6 billion and accounts for more than 70 percent of the total venture capital.

Table 1. Summary Statistics for Venture Capital Fund-raising

(unit: \$ Million)

Year	2000	2001	2002	2003	2004	2005
No. of venture capital firms	147	145	128	117	105	102
Paid-in capital per firm	11.51	11.66	12.94	13.37	15.21	14.90
Asset per firm	30.49	26.46	26.12	20.84	25.18	24.52
Outside fund per firm	12.95	16.02	22.20	27.91	39.59	45.34

Source: 2006 KVCA Yearbook.

Table 2. Trend of Venture Capital Fund-raising

(unit: \$ Billion, %)

Year	2000	2001	2002	2003	2004	2005
Inside fund	4.18 (68.7)	3.44 (59.7)	2.85 (50.0)	1.92 (37.0)	2.02 (32.7)	1.83 (28.4)
Outside fund	1.90 (31.3)	2.32 (40.3)	2.85 (50.0)	3.27 (63.0)	4.16 (67.3)	4.62 (71.6)
Total	6.09	5.77	5.70	5.19	6.17	6.45

Source: 2006 KVCA Yearbook.

This tendency of rapid development of outside funds in the fund-raising stage is also observed in the investment stage. Table 3 outlines the trend of venture capital investment since 2000. Whereas the amount of new investment from the inside funds rapidly decreased, new investment from the outside funds has steadily increased, thereby representing 83.8 percent of new investment made in 2005. Reflecting the trend in the new investment, the portion of balance of total investment accounted by the outside funds has also increased about two times during five years.

Table 3. Trend of Venture Capital Investment

		(unit: \$ Billion, %)					
Year		2000	2001	2002	2003	2004	2005
Balance of total investment	Inside fund	1.48 (64.8)	1.23 (53.0)	1.19 (46.4)	0.94 (40.5)	0.87 (34.3)	0.64 (28.7)
	Outside fund	0.80 (35.2)	1.09 (47.0)	1.38 (53.6)	1.38 (59.5)	1.67 (65.7)	1.60 (71.3)
	Total	2.28	2.32	2.57	2.32	2.54	2.24
New investment	Inside fund	1.60	0.68	0.13 (25.4)	0.11 (21.0)	0.08 (13.8)	0.12 (16.2)
	Outside fund			0.39 (74.6)	0.42 (79.0)	0.50 (86.2)	0.63 (83.8)
	Total	1.60	0.68	0.52	0.53	0.58	0.75

Source: 2006 KVCA Yearbook.

C. Characteristics of Venture Capital Industry in Korea

Significant role of government in the fund-raising Reflecting the fact that the venture capital industry in Korea is still situated at an early stage of development, the Korean government are conducting a significant role in the fund-raising of outside funds. Table 4 summarizes the capital commitments to the outside funds by partner type during the period of 2001-2005. The government is the largest investor by providing on average 27.1 percent of committed capital to each outside fund and corporations and venture capital firms follow next. This structure of fund-raising contrasts with the U.S. In the U.S., the major investors in the venture capital market are private and public pension funds, financial/insurance companies, endowments and foundations, and they represent at least 80 percent of the venture capital raised. The U.S. government only supports the fund-raising of public venture capital firms which is called SBICs (Small Business Investment Companies).

Short life span of outside funds Another characteristic of venture capital industry in Korea is that the life spans of outside funds are mainly five years. Table 5 shows a general outline of the life spans of outside funds organized during the period of 1989-2007. 480 (76.3 percent) out of 630 funds stipulate a five-year life span and only 102 funds have a life span equal to or more than seven years. This picture becomes clearer if focusing on the period of

Table 4. Capital Commitments to Outside Funds by Partner Type (2001-2005)

(unit: %)						
Government	Corporation	VC Firms	Pension Funds	Institutional Investors	Individuals	Foreign Investors
27.1	19.0	16.0	15.1	13.6	5.6	3.6

Source: 2006 KVCA Yearbook.

2000-2003. Almost 90 percent of funds organized during this period have a five-year life span. Even though this tendency has been alleviated since 2004, still 60 percent of funds are stipulating a five-year life span. A five-year life span is much shorter compared with the U.S. case in which the life spans of venture capital funds are mainly 10 years or more.

Table 5. Life Span of Outside Funds (1989-2007)

Life Span	5 years	6 years	7 years	8 years more	Total
1989-1999	70(57.4)a	20(16.4)	20(16.4)	12(9.8)	122(100)
2000-2003	327(88.9)	13(3.5)	26(7.1)	2(0.5)	368(100)
2004-2007	84(60.0)	14(10.0)	38(27.1)	4(2.9)	140(100)
Total	481(76.3)	47(7.5)	84(13.3)	18(2.9)	630(100)

Note: a. Numbers in parenthesis are the proportions of each group.

Figure 1. IPO and M&A as a Device of Exit: Comparison of Korea vs. U.S.

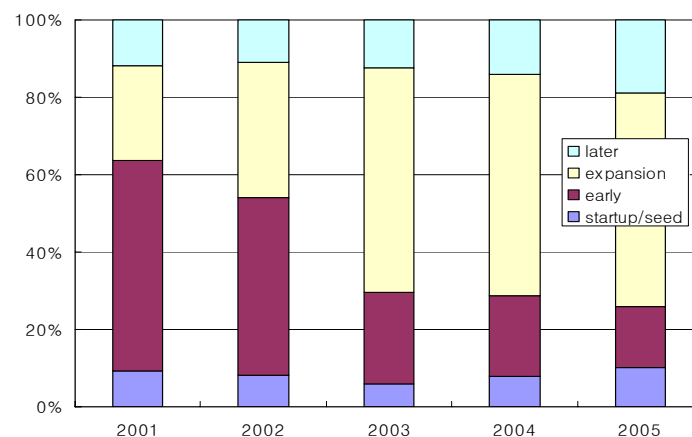


Source: NVCA homepage (<http://www.nvca.org>)

Dominant proportion of IPO as a device of exit The venture capital industry in Korea also contrasts that of the U.S. in respect to the exit device. Figure 1 compares Korea with the U.S. by the exit type of venture investment. Whereas M&A is a dominant exit window in the U.S., it represents less than five percent of total exits in Korea, which reflects the underdevelopment of M&A market. IPOs through the KOSDAQ market consist of dominant portion in the total exits of venture investment.

Increasing proportion of expansion-staged invested firms The above mentioned two characteristics of the venture capital industry in Korea, i.e., short life spans of outside funds and venture investment exiting mainly through the IPO, have a strong implication regarding the ages of invested firms. In Korea it is expected to generally take more than seven years for a newly established venture firm to offer its stock to the public.⁷ Therefore, for Korean venture capital firms who have to exit from the investment within three or four years and depend only on the IPO as an exit device, it is natural to concentrate their venture investment on expansion-staged companies whose age is more than three years. During the venture boom of 1998-2000, this structural constraint on venture investment was not serious as nowadays since an interval taken for a new venture company to go public

Figure 2. New Investment by Invested Company Stage



Note: Startup/seed stage (less than 1 year); early stage (1 - 3 years); expansion stage (3 - 7 years); later stage (more than 7 years)

Source: 2006 KVCA Yearbook

⁷ For venture invested companies who succeeded in going public, the average interval from the establishment to the IPO was 7.2 years in 2004 and 7.6 years in 2005 (2006 KVCA Yearbook).

in those days was much shorter than now. After the year of 2000, the venture boom disappeared and the interval for an IPO has increased. The structural constraint of venture capital industry in Korea became apparent and the portion of venture investment toward expansion- or later-staged companies has increased rapidly. Figure 2-2 describes this trend in the venture investment. In 2001 expansion-staged firms account for only 24.6 percent of new venture investment, but in 2005 they represent 55 percent of new investment. During the same period the proportion of new investment toward early-staged firms has promptly decreased from 54.4 percent to 15.8 percent.

3. Data

In Korea, each venture capital firm registered at SMBA (Small and Medium Business Administration) has an obligation to report full information on its businesses to the KVCA. The information on the venture capital firms' businesses collected by the KVCA includes following categories: ① information on each venture capital firm's registration date, major stock holders, composition of inside fund, and the number of employees; ② information on each outside fund such as organization date, size, life span, the number of partners, each partner's capital commitment, managerial compensation rule, performance compensation rule, the order of making up loss; ③ transaction data for each invested company such as transaction date, transaction amount, transaction type,⁸ investment type;⁹ ④ information on each invested company such as registration date, region, type of business, the number of employees, financial information including paid-in capital, sales, profit.

Among those categories, I use mainly data in the second and third categories for the analysis. Raw data from the KVCA include 164 venture capital firms, 636 outside funds, 9947 invested firms, and 39511 transactions. After excluding observations which have missing or miscoding values in main variables, 109 venture capital firms and 601 outside funds are included in the dataset for the empirical analysis in Section 4 and 100 venture capital firms, 290 outside funds, 4663 invested firms, and 12530 investments are used for the analysis in Section 5.

⁸ Transaction types include venture investment, retrieval of investment, and reduction of investment.

⁹ Venture investment is classified by its object: common stock; preferred stock; convertible bond; bond with warranty; and project financing.

Table 6. Classification of Industries

Classification	Covered Industries	KSIC Code
Ind. 1	Agriculture	01, 02
Ind. 2	Food & textile	15, 17, 36
Ind. 3	Printing & publication	22
Ind. 4	Chemicals	24
Ind. 5	Plastic & non-metal & metal products,	25, 26, 27, 28
Ind. 6	Machinery & equipment	29, 34
Ind. 7	Computer and office instrument	30
Ind. 8	Other electric machinery	31
Ind. 9	Electronic components & medical & optical & precision machinery	32, 33
Ind. 10	Wholesale & retail trade	51, 52
Ind. 11	Information & communication	64
Ind. 12	Financial & insurance services	65, 66, 67
Ind. 13	Business services	72, 73, 74, 75
Ind. 14	Recreational & culture & and sporting activities	87, 88

In Section 4, I computed the amounts of capital committed by Korean government and private investors for each of 601 outside funds. In Section 5, for each inside and outside fund I computed size, total amount of investment, total number of invested firms, concentration ratio of investment by industry and by region, average age of invested firms, ratio of money invested in high-tech industries, high- and medium-tech industries, ratio of common stock investment, and average value of shares of a fund in invested firms.¹⁰ When computing the concentration ratio of investment by industry, I classify whole industries into 14 sub-sectors based on KSIC (Korean Standard Industrial Classification) as shown in Table 6. I also divide South Korea into eight regions for the computation of the concentration ratio of investment by region.

To compare investment behaviors between inside fund and outside funds, I also computed the same variables at the venture capital firm level. Besides those computed variables, I use several dummy variables representing characteristics of venture capital firms and outside funds, huddle rates, and the composition ratio of each outside fund by partner type

¹⁰ In the paper, any 'average' value of variable is a weighted average using the amount of investment in each invested firm as a weight.

in the empirical analysis. Table 7 provides the definitions and summary statistics of main variables used in the analysis in Section 4 and 5.

4. Fund-raising and the Role of Government

In this section, I investigate the role of Korean government in the fund-raising stage. In a situation where the venture capital industry is still underdeveloped and the amount of venture capital committed by private sector is far below than needed, it may be regarded as an important role of a government to increase the amount of venture capital by committing capital for itself or providing private sector with incentives to invest venture capital. In Korea, the government has participated in lots of outside funds and committed a significant amount of capital. In many cases, Korean government also attracted private investors to the fund-raising process by increasing their expected rate of return by setting an upper limit on the rate of return for its share (and /or) by allowing its share firstly used for making up potential loss. Considering those facts, I evaluate the role of Korean government in the fund-raising process in aspects of the size of the government capital commitments and the private sector's responsiveness to the government capital commitments to the outside funds.

Table 7. Definition and Summary Statistics of Variables

	Variables	Def.	# obs.	Mean	Std.	Max	Min
Section 4 Fund-raising	privateij	Size of capital committed by private investors in outside fund j (\$ million)	208	5.85	5.91	40.5	0
	insij	Size of capital committed by institutional investor in outside fund j (\$ million)	208	1.09	2.43	15	0
	penij	Size of capital committed by pension funds in outside fund j (\$ million)	208	1.09	3.80	38	0
	corij	Size of capital committed by general corporations in outside fund j (\$ million)	208	2.26	3.26	30	0
	indij	Size of capital committed by individual investors in outside fund j (\$ million)	208	0.64	1.09	5.2	0
	goij	Size of capital committed by the government in outside fund j (\$ million)	208	4.08	4.48	40	0.3
	vcij	Size of capital committed by venture capital firm i in outside fund j (\$ million)	208	1.76	1.59	10	0
	repj	Registration date of outside fund j – registration date of venture capital firm i (year)	208	5.82	5.63	19.8	0.3
Section 5.1 Investment behavior	lengthij	Dummy, 1 if the stipulated life span of outside fund j is longer than 5 years	288	0.13	0.34	1	0
	repj	Registration date of outside fund j – registration date of venture capital firm i (year)	288	5.63	5.26	18.75	0.08
	size(O)ij	Size of outside fund j (\$ million)	286	11.57	9.33	77.60	0.99
	hrateij	Huddle rate of outside fund j (%)	288	10.96	4.76	0	30
	s_vcij	Share of venture capital firm i's commitment in the committed capital of outside fund j (%)	286	18.16	12.34	70	0
	s_golij	Share of commitment of SMBA (and Fund of funds) in the committed capital of outside fund j (%)	286	15.77	17.94	94.66	0
	hhi_inv(O)ij	Concentration ratio of investment by industry (HHI)	288	0.43	0.22	1	0.13
	hhi_reg(O)ij	Concentration ratio of investment by region (HHI)	288	0.57	0.23	1	0.24
	ave_age(O)ij	Average age of invested firms (year)	288	3.18	1.55	11.24	0.06
	r_m1(O)ij	Ratio of money invested in high-tech industries	288	0.34	0.25	0.92	0
	r_m12(O)ij	Ratio of money invested in high- and medium-tech industries	288	0.45	0.29	1	0
	r_cs(O)ij	Ratio of common stock investment	288	0.55	0.33	1	0
	share(O)ij	Average value of shares of outside fund j in invested firms (%)	260	11.89	10.48	83.33	1.24

(Table 7. Continued.)

	Variables	Def.	# obs.	Mean	Std.	Max	Min
Section 5.2 Comparison between inside funds and outside funds	ave_age(I) i	Average age of invested firms in inside fund of venture capital firm I (year)	76	2.95	0.97	5.63	0.93
	ave_age(O) i	Average age of invested firms in outside funds of venture capital firm I (year)	76	3.11	0.97	6.09	1.34
	d(ave_age) i	ave_age(I) i - ave_age(O) i	76	-0.16	1.10	2.12	-3.01
	r_m1(I) i	Ratio of money invested in high-tech industries in inside fund of venture capital firm i	76	0.33	0.17	0.78	0
	r_m1(O) i	Ratio of money invested in high-tech industries in outside funds of venture capital firm i	76	0.30	0.19	0.66	0
	r(r_m1) i	r_m1(I) i - r_m1(O) i	76	0.03	0.17	0.42	-0.44
	r_m12(I) i	Ratio of money invested in high- and medium-tech industries in inside fund of venture capital firm i	76	0.43	0.20	0.84	0.02
	r_m12(O) i	Ratio of money invested in high- and medium-tech industries in outside funds of venture capital firm i	76	0.41	0.22	0.84	0
	d(r_m12) i	r_m12(I) i - r_m12(O) i	76	0.02	0.20	0.54	-0.32
	r_cs(I) i	Ratio of common stock investment in inside fund of venture capital firm i	76	0.79	0.19	1	0.09
	r_cs(O) i	Ratio of common stock investment in inside fund of venture capital firm i	76	0.52	0.24	1	0.02
	d(r_cs) i	r_cs(I) i - r_cs(O) i	76	0.26	0.27	0.92	-0.47
	r_invi	Ratio of total size of outside funds to the size of inside fund of venture capital firm i	76	3.47	4.79	28.25	0.12

A. Size of the Government Capital Commitments

The following table shows the size of the government capital commitment and its share in outside funds made during the venture boom and after the boom. Variable *go* represents the amount of capital invested by Korean government including the SMBA and the Fund of funds. During the venture boom the government invested about \$0.3 billion and represented 16.9 percent of total outside funds. In the same period general corporations accounted for 30.1 percent of the capital raised and individual investors provided 17.2 percent. After the boom, facing with an abrupt shrink of venture capital commitments from the private sector, the government expanded its role significantly. The government participated 173 out of 309 outside funds made during the post-boom period and committed \$0.7 billion in total. This amount represented 24.4 percent of the capital raised during the same period and the government became the largest stakeholder in the outside funds. In particular, for the outside funds where the government participated, its share amounted to 38.0 percent followed by 16.5 percent of the general corporations. With the end of the venture boom, the shares of the general corporations and the individual investors in the outside funds rapidly declined. Instead, pension funds have widened their presence in the outside funds, providing 13.9 percent of capital raised after the venture boom.

Table 8. Size and Share of Government Capital Commitment

(unit: \$100 million, %)

Partner Type	Venture Boom			Post-boom		
	<i>go</i> >0[92]a	<i>go</i> =0[177]	Total[269]	<i>go</i> >0[173]	<i>go</i> =0[136]	Total[309]
Government	2.95(34.3)b	0(0.0)	2.95(16.9)	6.95(38.0)	0(0.0)	6.95(24.4)
VC firms	1.52(17.7)	1.38(15.5)	2.90(16.6)	2.63(14.4)	1.48(14.5)	4.12(14.4)
Institutional Investors	0.52(6.0)	1.79(20.1)	2.31(13.2)	2.03(11.1)	1.76(17.3)	3.79(13.3)
Corporations	2.02(23.5)	3.25(36.5)	5.27(30.1)	3.02(16.5)	3.35(32.9)	6.38(22.4)
Pension Funds	0.14(1.6)	0.10(1.1)	0.24(1.4)	2.09(11.4)	1.88(18.5)	3.97(13.9)
Individuals	0.78(9.0)	2.23(25.1)	3.01(17.2)	0.51(2.8)	1.18(11.5)	1.69(5.9)
Local Gov.	0.03(0.3)	0.02(0.2)	0.05(0.3)	0.25(1.4)	0.22(2.1)	0.47(1.6)
Foreigners	0.65(7.5)	0.14(1.5)	0.78(4.5)	0.82(4.5)	0.33(3.2)	1.15(4.0)
Total	8.61(100)	8.90(100)	17.51(100)	18.31(100)	10.21(100)	28.52(100)

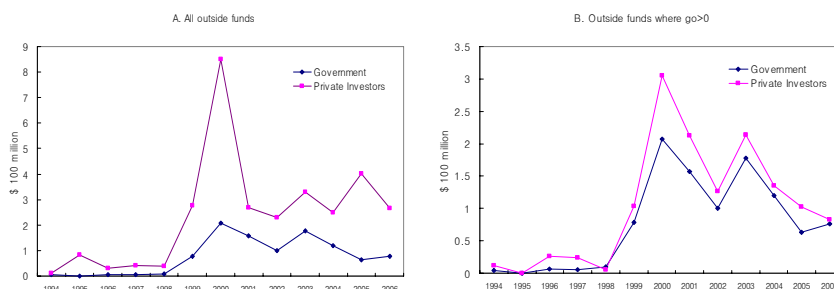
Note: a. Numbers in [] are the numbers of outside funds in each group.

b. Numbers in () are the shares of each partner type.

B. Private Sector's Responsiveness to the Government Capital Commitments

Besides committing capital for itself, the government also help venture capital firms organize outside funds by attracting private investors to the fund-raising process. One way of examining this aspect of the role of the government is to see the responsiveness of private sector's venture capital commitments followed by the government capital commitments in the outside funds. Figure 3 describes time-series movements of the size of capital commitments by the government and private investors, which are aggregated over outside funds.¹¹ Figure 3-A is drawn with all outside funds made during a given year and Figure 3-B includes only outside funds where the government participated. Figure 3-A reveals that the capital commitments from the private sector moves together with the government capital commitments and this co-movement pattern becomes more apparent when considering only outside funds in which the government participated. In Korea, when a venture capital firm forms an outside fund, he usually tries to obtain capital from the government first, and then goes to the private sector to raise private capital with a lever of capital committed by the government. Considering this common pattern of the fund-raising process, the co-movement between the sizes of capital coming from the government and the private investors shown in the figures can be interpreted as a strong positive causality relationship from the government capital commitments to the private sector's capital commitments. That is, the capital committed by the government not only directly increased the size of outside funds, but also helped venture capital firms by attracting private investors to the fund-raising process in both periods of the venture boom and post-boom.

Figure 3. Sizes of Capital Committed from Private Investors and Government



¹¹ The private investors include institutional investors, general corporations, pension funds, individual investors, and foreigners. For an analysis of the responsiveness of each private investor group to the government capital commitments in the outside funds, see Appendix.

Since Figure 3 is just describing time-series movements of the two aggregate variables without any conditioning, it might not be so convincing to draw a concrete relationship between the two variables. Therefore, I construct a regression equation explaining the size of capital commitments by the private investors for each period of the venture boom and post-boom. The regression equation for the venture boom period is as follows:

$$private_{ij} = \alpha_0 + \alpha_1 go_{ij} + \alpha_2 vc_{ij} + \alpha_3 rep_{ij} + \sum_{k=0}^2 \alpha_{4+k} industry(k)_{ij} + \alpha_7 year99_{ij} + \alpha_8 year00_{ij} + u_{ij} \quad (1)$$

where $private_{ij}$, go_{ij} , and vc_{ij} are the sizes of capital committed by the private investors, government, and venture capital firm i , respectively, in outside fund j organized by venture capital firm i ; rep_{ij} is an interval between the registration date of fund j and the registration date of venture capital firm i and is assumed to represent the reputation of venture capital firm i at the time of organizing outside fund j ; $industry(0)_{ij}$, $industry(1)_{ij}$, and $industry(2)_{ij}$ are dummy variables indicating whether venture capital firm i stipulated culture and media-related industry, bio-related industry, and IT industry, respectively, as a main target for its investment when organizing outside fund j ; and $year99_{ij}$ and $year00_{ij}$ are year dummies indicating the registration date of fund j . Finally, u_{ij} is a mean-zero stochastic term representing either measurement error or a fund-specific shock unobservable to econometricians. A regression equation for the post-boom period is also constructed in the same way as Equation (1) including year dummies of $year02$, $year03$, $year04$, $year05$, $year06$.

I estimate those equations using the outside funds where the government participated.¹² Table 9 summarizes the estimation results. For the simplicity, coefficient estimates of industry dummies and year dummies are abbreviated from the table. Regression results show that the government participation in outside funds has been an effective device attracting the private investors into the fund-raising process of outside funds. The coefficient estimate of go in the venture boom period amounts to 1.663, which means that \$1 commitment from the government induced \$1.663 commitment by private sector during the venture boom. Even though the effectiveness of the government capital commitments in attracting the private investments declined with the ending of the boom, the government

¹² In general, this kind of regression analysis is likely to be plagued by the selection bias. To deal with this problem, I construct an equation system explicitly modeling the government participation decision process to a given outside fund. Estimation results are very similar quantitatively to that of Equation (1), telling us that the selection bias problem is not so severe in the setting of Equation (1). For the simplicity of presentation, I report the estimation results of Equation (1). The estimation results from a model controlling explicitly the government decision process will be given on reader's request.

capital commitment of \$1 has been still attracting the private capital commitment of \$0.926 in the post-boom period. Another finding from the table is that the reputation of a venture capital firm organizing an outside fund is negatively related to the size of private capital commitments into the outside fund. Considering the maturity or reputation of a venture capital firm has been identified as the most significant determinant of the size of funds in previous literature on the U.S. venture capital industry,¹³ the negative coefficient of *rep* implies that the venture capital industry in Korea is not stabilized yet and still in an underdeveloped stage.

In summary, the data tell us that the government has provided a significant amount of capital to venture capital firms for their venture investments since 1999 and this direct role of the government seems to have been expanded after the venture boom. The government also played an effective role in attracting the private investors' capital in the both periods, even though the magnitude of responsiveness of the private sector to the government capital commitments declined significantly with the ending of the venture boom.

Table 9. Estimation Results of Responsiveness of Private Sector

Variable ^a	private	
	Venture Boom	Post Boom
	Coef. (t-value)	Coef. (t-value)
<i>go</i>	1.663(5.11)*** ^b	0.926(6.83)***
<i>vc</i>	-0.043(-0.12)	-0.215(-0.75)
<i>rep</i>	-0.119(-1.28)	-0.126(-2.29)**
Adj. R-squared	0.6553	0.7415
# of obs.	76	132

Note: a. Coefficient estimates of year dummies and industry dummies are abbreviated from the table.

b. ** and *** indicate a coefficient estimate is statistically different from zero at the significance level of 5% and 1%, respectively.

¹³ Gompers & Lerner (1998).

5. Investment and the Role of Government

In this section, which is the main part of the chapter, I evaluate the role of Korean government in the investment stage. At first, I analyze the investment behaviors of outside funds and, in particular, the effects of the government capital commitment on the investment behaviors, thereby investigating the role of the government in the investment stage. Then the comparison of the investment behaviors between inside fund and outside funds, which is expected to give us indirect evidence on the role of the government in the investment stage, will be conducted.

A. The Role of Government in the Investment Stage

As shown in Section 4, in a situation where the venture capital industry is still underdeveloped, the role of the government in the fund-raising stage can be clearly stipulated as increasing a fund capitalization by directly committing capital or attracting private sector's investment, and therefore it is somehow straightforward to evaluate the role played by the government in the fund-raising stage. When it comes to the investment stage, however, it is not clear to define the role of a government since investment activities are basically done by venture capitalists, not by the government. Nevertheless we may stipulate several roles for the government with respect to the investment activities if we are considering that the government has an objective of developing the venture capital industry itself rather than maximizing the rate of return from the venture investment like other limited partners. Following the definition of venture capital given in Gompers & Lerner (2001),¹⁴ I suggest the following activities as the role of a government who try to develop the venture capital industry in the investment stage, though those are not undisputable: ① the government leads venture capitalists' investment toward earlier-staged firms which are plagued by high levels of informational asymmetry and uncertainty (*ave_age*); ② the government guides more venture investment toward industries of which markets change very rapidly such as high- and medium-tech industries (r_{m1}, r_{m12})¹⁵; ③ the government induces a common stock investment of venture capitalists, thereby giving the venture capitalists incentives to

¹⁴ "Venture capital has developed as an important intermediary in financial markets, providing capital to firms that might otherwise have difficulty attracting financing. These firms are typically small and young, plagued by high level of uncertainty... Moreover, these firms... operate in markets that change very rapidly. Venture capital organizations finance these high-risk, potentially high-reward projects, purchasing equity or equity-linked stakes..." (Gompers & Lerner, 2001)

¹⁵ The classification of manufacturing industries by technology level follows OECD (2005)

engage actively in the management activities of invested firms (r_{cs}).¹⁶

The trends of the above four variables since 1998 are described in Table 11 which tabulates the results of t-test analysis for those variables. For the t-test analysis, outside funds organized during the venture boom were compared with those organized after the ending of the boom. If we assume that a major part of committed capital of an outside fund is invested within a year after the formation, the results of the t-test analysis tell us that the average of age of invested firms ($ave_age(O)$) has significantly increased and the ratio of common stock investment ($r_{cs}(O)$) decreased very significantly after the boom burst. These changing patterns are exactly in the opposite direction to the government's objectives. The ratios of investment in high-tech industries ($r_{m1}(O)$) and in high- and medium-tech industries ($r_{m12}(O)$) are not statistically different between the venture boom period and post-boom period.

Table 10. Investment Behaviors of Outside Funds: Comparison of Venture Boom vs. Post Boom

Variable	Venture boom (1998-2000)	Post venture boom (2001-)	Diff.	p-value
$ave_age(O)$	2.594	3.706	1.113	0.000
$r_{m1}(O)$	0.343	0.344	0.001	0.973
$r_{m12}(O)$	0.443	0.467	0.024	0.482
$r_{cs}(O)$	0.757	0.344	-0.413	0.000

Larger values of $ave_age(O)$ and smaller values of $r_{cs}(O)$ in the post-boom period commonly reflect the fact that venture capital firms avoided risky projects after experiencing the venture boom and its abrupt ending, which is a generally accepted view on the venture capital industry in Korea. It would be very difficult even for the government who came out to be the largest stakeholder of outside funds in the post-boom period to go against that stream of changes in the investment behaviors. Therefore, it would not be a proper way to evaluate the role of the government in the investment stage based on Table 10 comparing the investment behaviors between the two periods. A more appropriate way of evaluation of the role of the government will be to compare outside funds in which the government

¹⁶ Beside the variable $ave_age(O)$, $r_{m1}(O)$, $r_{m12}(O)$, $r_{cs}(O)$, there are another variables which are assumed to summarize the investment behaviors of venture capital firms, even though they may not be directly related to the government objective of developing a venture capital industry. Those may include the concentration ratio of investment by industry ($hhi_inv(O)$) and by region ($hhi_reg(O)$), and the average value of shares of an outside fund in invested firms ($share(O)$). In the appendix, I investigate outside funds in the aspects of those variables.

made capital commitments, and those with no government capital commitment for a given period in terms of the above four variables. If the government makes efforts in the investment stage to accomplish its goal of developing the venture capital industry, we may expect that the outside funds with the government capital commitments will have a smaller value of $ave_age(O)$ and larger values of $r_m1(O)$, $r_m12(O)$, and $r_cs(O)$ for a given period.¹⁷

Table 11. Role of Government in the Investment Stage:
Venture Boom vs. Post-boom

Variable	Period	s_go1 = 0 vs. s_go1 > 0			
		Group1 s_go1 = 0	Group2 s_go1 > 0	Diff.	p-value
$ave_age(O)$	Venture boom	2.319	3.030	0.711	0.002
	Post-boom	3.730	3.687	-0.043	0.869
$r_m1(O)$	Venture boom	0.334	0.358	0.024	0.571
	Post-boom	0.402	0.295	-0.107	0.015
$R_m12(O)$	Venture boom	0.426	0.468	0.042	0.372
	Post-boom	0.522	0.421	0.101	0.055
$r_cs(O)$	Venture boom	0.863	0.587	-0.276	0.000
	Post-boom	0.327	0.358	0.030	0.501

Hence, in order to evaluate the role of the government in the investment stage for a given period, I divided a sample into two sub-samples (Group1 and Group2) according to the value of s_go1 , the share of the SMBA and Fund of funds, of each observation, and compare the investment behaviors between the two sub-samples. Group1 consists of outside funds whose value of s_go1 is zero. Group2 are composed of outside funds whose value of s_go1 is positive. Table 11 tabulates the results of the comparison. The table shows that the government did not play its expected role and rather played in the opposite direction with respect to the variables $ave_age(O)$ and $r_cs(O)$ during the venture boom period. The average age of invested firms in Group2 is significantly higher than that in Group1. The ratio of common stock investment also has lower values when the government has stakes in outside funds. These unexpected patterns, however, disappeared after the venture boom, implying that there have been some policy improvements

¹⁷ The government may accomplish its goal by guiding venture capitalists' investment activities to the direction of its objective with implicit or explicit contracts with venture capital firms when committing capital.

regarding the variables during the post-boom period. But, the table still does not provide any pieces of evidence indicating that the government played actively its expected role in the post-boom period. The average values of $ave_age(O)$ and $r_cs(O)$ in Group2 are not statistically different from those in Group1.

When it comes to the ratios of investment in the high-tech and high- and medium-tech industries, the story goes the other way around. During the venture boom period, the group with the government capital commitments had higher values of $r_m1(O)$ and $r_m12(O)$, though the value of each variable is not statistically different between the two groups. After the boom, however, the two variables have changed in a wrong way, resulting in significantly lower values in Group2 in both variables. It may indicate that the government is not working properly in leading the venture investment toward the high- and medium-tech industries.

We should be cautious in interpreting the numbers in Table 11, however. The comparison results in the table are given without controlling any other variables which may affect the compared variables. Therefore, the differences between the two groups shown in the table may reflect other underlying effects rather than saying that the government did not play its role in the investment stage. For an instance, we may imagine the following chain of logics through which the variable s_go1 is related to $ave_age(O)$ or $r_cs(O)$: a higher level of $s_go1 \rightarrow$ a larger size of an outside fund $\rightarrow$ a bigger amount of investment per project $\rightarrow$ a higher value of $ave_age(O)$ and a lower value of $r_cs(O)$. The first correlation is true in the outside funds in the sample.¹⁸ The average size of outside funds where the government did not participated is just \$9.90 million. But, as the shares of the government increase to 0~30 percent, 30~40 percent, and more than 40 percent, the average sizes of outside funds also increase to \$11.60 million, \$12.98 million, and \$15.80 million, respectively. The second arrow is generally accepted as true, since the total number of invested firms increases with the size of a fund, but at a decreasing rate. Regarding the last arrow, a bigger amount of investment per project is usually related to relatively big-sized companies of which a venture capitalist may not have any strong incentives to engage in the management process, which directly results in a lower level of $r_cs(O)$. Also, a big-sized company is usually at the stage of expansion or later, not the early-stage, which gives us a higher level of $ave_age(O)$. Then the higher value of $ave_age(O)$ and the lower value of $r_cs(O)$ in Group2 during the venture boom period observed in Table 5-2 might reflect the above chain of causalities, rather than indicating a policy failure of the government.

¹⁸ The first arrow should not be interpreted as a causality relationship since the share of the government and the size of an outside fund are both endogenous variables which are determined simultaneously.

To address this potential problem in interpreting Table 11, for each of the four variables and for each period, I construct a linear equation as follows:

$$\begin{aligned} dep_{ij} = & \beta_0 + \beta_1 industry(0)_{ij} + \beta_2 industry(1)_{ij} + \beta_3 scd(O)_{ij} + \beta_4 rep_{ij} + \beta_5 size(O)_{ij} \\ & + \beta_6 hr_{ate}_{ij} + \beta_7 s_vc_{ij} + \beta_8 d(s_go1)_{ij} + \beta_9 length_{ij} + \sum_i \beta_{9+i} D_i + e_{ij} \end{aligned} \quad (2)$$

where $industry(0)_{ij}$ and $industry(1)_{ij}$ are dummies indicating whether the stipulated main industries of investment outside fund j are culture and media related and biotechnology related, respectively; $scd(O)_{ij}$ is a dummy indicating whether outside fund j is secondary; $size(O)_{ij}$ is a total amount of capital committed into outside fund j ; hr_{ate}_{ij} is a huddle rate of outside fund j ; s_vc_{ij} is a share of venture capital firm i in the committed capital of outside fund j ; and $d(s_go1)_{ij}$ is a dummy indicating whether a share of the SMBA and the Fund of funds is positive. $length_{ij}$ is a dummy indicating whether the stipulated life span of outside fund j is longer than 5 years. D_i 's are dummies aimed at capturing firm-specific effect. Finally, e_{ij} is a mean-zero stochastic term representing either measurement error or a fund-specific shock unobservable to econometricians.

Table 12 reports the estimation results of those equations, in particular, the net effect of $d(s_go1)$ on the investment behaviors after controlling the effects of $industry(0)$, $industry(1)$, $scd(O)$, rep , $size(O)$, hr_{ate} , s_vc , and $length$ variables. The coefficient estimate of $d(s_go1)$ in the regression of $ave_age(O)$ during the venture boom, is positive and significant at 5% significance level. This confirms the implication from Table 5-4 that the government did not play an expected role regarding ages of invested firms when it made capital commitments during the venture boom. On the contrary, after the boom, the opposite impacts of $d(s_go1)$ on the level of $ave_age(O)$ disappeared resulting in insignificant coefficient estimate of $d(s_go1)$. Instead, the dummy variable indicating whether an outside fund is secondary, the maturity of a venture capital firm organizing a fund, and the size of a fund showed up as main determinants of the average age of invested firms. The same story goes to the variable $r_cs(O)$. The estimation result tells us that the capital commitment of the government in an outside fund is lowering the ratio of common stock investment far from increasing it in the venture boom period. This opposite impacts of $d(s_go1)$ also disappeared during the post-boom period.

When it comes to the ratios of investment in the high-tech industries ($r_m1(O)$), the negative relationship between the variable $d(s_go1)$ and $r_m1(O)$ during the post-boom period found in the previous table still remains as true when controlling other variables. However, the negative relationship between the variable $d(s_go1)$ and $r_m12(O)$ during the post-

Table 12. Estimation Results of Investment Behaviors of Outside Funds (I)

Variable	ave_age(O)		r_m1(O)		r_m12(O)		r_cs(O)	
	Venture Boom	Post Boom	Venture Boom	Post Boom	Venture Boom	Post Boom	Venture Boom	Post Boom
	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)
<i>industry(0)</i>	-0.430(-1.23)	-0.417(-1.39)	-0.223(-3.20)***	-0.408(-11.37)***	-0.325(-4.22)***	-0.518(-12.41)***	-0.353(-4.86)***	-0.345(-7.48)***
<i>industry(1)</i>	-0.760(-3.54)***a	0.060(0.15)	0.308(7.53)***	-0.030(-0.27)	0.259(4.90)***	-0.138(-1.02)	0.134(2.37)**	-0.080(-0.90)
<i>scd(O)</i>		3.017(4.77)***		0.124(0.64)		0.124(0.68)		0.526(10.10)***
<i>rep</i>	0.032(1.63)	0.052(2.07)**	0.004(0.90)	-0.004(-1.02)	0.007(1.39)	0.006(1.30)	-0.001(-0.30)	-0.002(-0.31)
<i>size(O)</i>	0.012(1.15)	0.030(3.45)***	0.003(1.47)	0.003(1.79)*	0.004(1.61)	0.001(0.29)	0.002(0.82)	-0.002(-0.98)
<i>hrate</i>	0.063(2.48)**	-0.051(-1.28)	0.004(0.77)	0.005(0.68)	0.006(0.93)	0.004(0.31)	-0.003(-0.63)	0.004(0.54)
<i>s_vc</i>	-0.009(-1.15)	-0.008(-0.85)	-0.000(-0.12)	0.002(0.84)	-0.001(-0.64)	0.001(0.50)	0.001(0.79)	0.003(2.12)**
<i>d(s_go1)</i>	0.586(2.59)**	-0.020(-0.11)	0.030(0.52)	-0.063(-2.01)**	0.070(1.12)	-0.047(-1.22)	-0.241(-5.16)***	0.033(0.96)
<i>length</i>	-0.429(-1.11)	-0.302(-1.07)						
Adj. R-squared	0.7824	0.6430	0.7589	0.8012	0.7558	0.8831	0.8749	0.8510
# of obs.	122	144	125	142	125	146	122	146

Note: a. *, **, and *** indicate a coefficient estimate is statistically different from zero at the significance level of 10%, 5%, and 1%, respectively.

boom period found in the previous table does not hold any more when controlling other independent variables. The table reports that the ratios of investment of an outside fund in the high-tech and high- and medium-tech industries are basically determined by the dummy variables indicating whether the stipulated main industries of investment of the fund are culture and media related or biotechnology related.

I re-estimate Equation (2) with a substitution of $d(s_go1)$ with s_go1 in order to see how the investment behaviors of venture capitalists change according as the level of s_go1 increases.¹⁹ The estimation results are summarized in Table 5-4 and similar to the results in the previous table. As shown in the table, the average age of invested firms was increasing and the ratio of common stock investment was decreasing as the share of the government in an outside fund increased in the venture boom period. The ratio of investment in the high-tech industries decreased with an increase in the share of the government in the post-boom period. These estimation results can be interpreted as stronger evidences on a hypothesis that the government has failed in guiding the venture investments toward firms where the government targeted.

So far I evaluated the role of government in the investment stage by comparing investment behaviors of outside funds where the government committed capital and those of outside funds in which the government did not participated. The empirical outcomes indicate that, during the venture boom, the government failed in inducing the investment of outside funds toward earlier-staged companies that were suffering from a high level of informational asymmetry and uncertainty. The government also failed in guiding common stock investment. On the contrary, the investment of a venture capitalist was heading for the opposite direction to the government's objectives when the government had a larger stake in an outside fund. The data also show that these types of policy failure disappeared after the venture boom, even though there is no evidence that the government succeeded in achieving its goal in the investment stage during the post-boom period. When it comes to the variable $r_m1(O)$, the empirical analysis indicates that the government has not been working properly in increasing the venture investment toward the high-tech industries during the post-boom period.

It is not easy to figure out the reason why those undesirable investment behaviors from the viewpoint of the government are observed, in particular,

¹⁹ To see how the investment behaviors change with an increase in s_go1 , it would be more appropriate to use only outside funds whose value of s_go1 is positive in the regression analysis rather than including all observations to the analysis. However, the number of outside funds whose value of s_go1 is positive in the venture boom period is just 56, which is relatively too small for a credible estimation result. Considering this difficulty, in the paper I conduct the analysis with all outside funds even though it may not be a correct way conceptually.

Table 13. Estimation Results of Investment Behaviors of Outside Funds (II)

Variable	ave_age(O)		r_m1(O)		r_m12(O)		r_cs(O)	
	Venture Boom	Post Boom	Venture Boom	Post Boom	Venture Boom	Post Boom	Venture Boom	Post Boom
	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)
<i>industry(0)</i>	-0.389(-1.12)	-0.421(-1.40)	-0.218(-3.05)***	-0.411(-11.37)***	-0.318(-3.98)***	-0.520(-12.51)***	-0.356(-4.73)***	-0.342(-7.53)***
<i>industry(1)</i>	-0.781(-3.73)***a	0.072(0.18)	0.308(7.67)***	-0.025(-0.22)	0.257(4.90)***	-0.133(-0.97)	0.145(2.67)**	-0.086(-0.96)
<i>scd(O)</i>		2.988(4.69)***		0.116(0.57)		0.113(0.61)		0.540(10.57)***
<i>rep</i>	0.035(1.77)	0.052(2.08)**	0.004(0.92)	-0.004(-0.95)	0.007(1.40)	0.006(1.37)	-0.002(-0.58)	-0.002(-0.38)
<i>size(O)</i>	0.014(1.33)	0.030(3.55)***	0.003(1.53)	0.003(1.83)*	0.004(1.68)*	0.001(0.35)	0.001(0.65)	-0.002(-1.05)
<i>hrate</i>	0.063(2.44)**	-0.049(-1.24)	0.004(0.76)	0.005(0.62)	0.006(0.94)	0.004(0.31)	-0.003(-0.70)	0.004(0.48)
<i>s_vc</i>	-0.008(-1.03)	-0.008(-0.83)	-0.000(-0.04)	0.002(0.82)	-0.001(-0.49)	0.001(0.49)	0.001(0.60)	0.003(2.14)**
<i>s_go1</i>	0.015(2.32)**	0.001(0.20)	0.001(0.43)	-0.002(-1.88)*	0.002(1.08)	-0.001(-0.87)	-0.007(-5.14)***	0.000(0.28)
<i>length</i>	-0.388(-0.98)	-0.295(-1.04)						
Adj. R-squared	0.7799	0.6430	0.7586	0.7981	0.7554	0.8825	0.8710	0.8509
# of obs.	122	144	125	142	125	146	122	146

Note: a, *, **, and *** indicate a coefficient estimate is statistically different from zero at the significance level of 10%, 5%, and 1%, respectively.

during the venture boom period. One plausible scenario is that, even though the government wanted to develop the venture capital industry, at the same time it might not have any willingness to run a risk of losing its money during the venture boom period and possibly even after.

As stated in Section 4, the participation of the government had been crucial in raising venture capital of the outside funds during the venture boom period. In this situation, a venture capital firm may have had an incentive to manage an outside fund in which the government made a capital commitment relatively safely, thereby inviting the government to the fund-raising process successively. Then the undesirable investment behaviors are generated. If this has been a case, the fundamental reason for those undesirable investment behaviors is that the government is setting up two objectives incompatible each other regarding the venture capital industry. By nature of the venture capital itself, running a risk of losing money is a basic role required to any participants. Therefore, from the viewpoint of Korean government engaging in the fund-raising stage very actively, the government needs to be more flexible in losing its money in the investment process in order to maximize the original function of the venture capital investment. Instead, the government should put more resources in selecting qualified venture capital firms to invest its budget, monitoring the investment activities of selected venture capital firms, and evaluating their performance.

B. Comparison of Inside Funds vs. Outside Funds

In this subsection, I compare the investment behaviors between the inside and outside funds. As previously explained, these two funds are different in the aspect of funding source. Whereas the inside funds are composed of paid-in capital and debt, the outside funds are made mainly by external investors. In particular, the government has actively participated in the outside funds as a major investor in Korea. Therefore, the comparison between the two funds in regard of the investment behaviors may provide an additional measure to evaluate the role of the government in the investment stage. Following this logic, the analysis will be focused on the role of government capital commitments (*s_{go1}*) in explaining any differences between the inside and outside funds in terms of the investment behaviors.

Table 14 compares the average values of variables representing the investment behaviors between the inside funds and outside funds. Out of 100 venture capital firms in the sample, 24 venture capital firms in which either an inside fund or outside funds in total made investments in less than 10 projects are excluded from the analysis for a credible comparison. For

Table 14. Comparison of Investment Behavior:
Inside Funds vs. Outside Funds

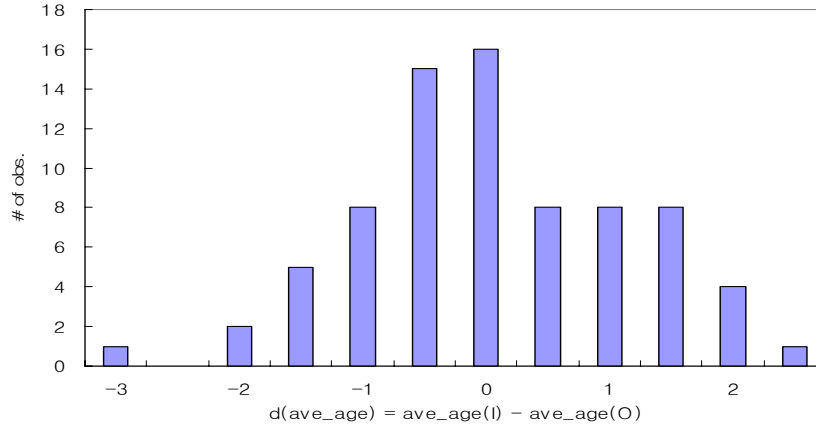
Variable		Inside funds	Outside funds	Diff.	p-value
<i>ave_age</i>		2.9493	3.1100	-0.1613	0.3087
<i>r_m1</i>		0.3239	0.2959	0.0333	0.2519
<i>r_m12</i>		0.4298	0.4056	0.0242	0.4829
<i>r_cs</i>	Full	0.7852	0.5205	0.2646	0.0000
	Group Aa	0.8356	0.6051	0.2304	0.0000
	Group Ba	0.7486	0.4590	0.2895	0.0000

Note: a. Venture capital firms established before 1998 are included in Group A and otherwise Group B.

each venture capital firm included in the analysis, I compute two weighted average values for each variable, one for the inside fund and the other for the outside funds in total. The numbers in the table are simple averages over 76 venture capital firms.

The table indicates that the investment behaviors between the inside funds and outside funds are not statistically different at the level of average value, except the ratio of common stock investment (*r_cs*). The value of *r_cs* is significantly higher in the inside funds, implying that the venture capital firms may have managed their outside funds where the government made capital commitments, more conservatively than their inside funds. This may confirm the hypothesis made in the previous subsection that the venture capital firms might need to guarantee stable returns to the government for whom any loss of money was publicly burdensome, thereby being able to successively invite the government in their fund-raising. If we divide the venture capital firms in the sample into two groups (Group A and Group B) by establishment date, the data provide another evidence on the hypothesis. Group A is composed of venture capital firms established before 1998 and Group B includes venture capital firms established after 1998. Both groups are revealing a significantly higher level of *r_cs* in the inside funds. However, the difference between the inside fund and outside funds is much bigger in the venture capital firms established after 1998 who might not have enough time to build up networking with private investors yet and therefore depended more on the government participation in the fund-raising process.

Any comparison between two average values, as conducted in Table 14, should be cautiously interpreted since an averaging process hides an actual variation at the level of observation. For example, Table 14 reports there is no significant difference in the average value of *ave_age* between the inside funds and outside funds, but there actually exists a significant variation in

Figure 4. Distribution of $d(ave_age) = ave_age(I) - ave_age(O)$ 

the value of $d(ave_age)$, the difference of ave_age between an inside fund and outside funds at the level of venture capital firm, as shown in Figure 4. This problem is repeated in every variable reported as having no significant difference between the inside funds and outside funds in the table.

Therefore, the comparison of investment behaviors between the inside funds and outside funds needs to be conducted at the firm level. For the comparison at the firm level, at first I construct four variables representing the differences in the investment behaviors between the inside funds and outside funds: $d(ave_age) = ave_age(I) - ave_age(O)$; $d(r_m1) = r_m1(I) - r_m1(O)$; $d(r_m12) = r_m12(I) - r_m12(O)$; $d(r_cs) = r_cs(I) - r_cs(O)$. Then I assume a following linear relationship to explain the variation of each difference variable at the firm level. For instance,

$$d(ave_age)_i = \gamma_0 + \gamma_1 ave_age(I)_i + \gamma_2 year(vc)_i + \gamma_3 s_vc_i + \gamma_4 s_gol_i + \gamma_5 r_inv_i + u_i \quad (3)$$

where $year(vc)_i$ is a dummy variable indicating whether venture capital firm i was established after 1998; s_vc_i and s_gol_i are the shares of venture capital firm i and the SMBA and the Fund of funds, respectively, in total amount of outside funds organized by venture capital firm i ; and r_inv_i is the ratio of total size of outside funds to the size of inside fund of venture capital firm i . u_i is a mean-zero stochastic term representing either measurement error or a fund-specific shock unobservable to econometricians. For each of other difference variables, we can construct a regression equation in the same way as Equation (3).

Table 15 tabulates the estimation results of Equation (3). In all regressions except one for the variable $d(r_m12)$, s_go1 has a statistically significant coefficient estimate. As the level of s_go1 increases, $d(ave_age)$ decreases. That is, for a given value of the average age of portfolio firms in an inside fund, the average age of portfolio firms in outside funds is increasing according as the portion of the government capital commitment in the total capital of outside funds increases. This estimation result can be interpreted as just restating a finding in the previous subsection that the government failed to play an expected role in the investment stage, even though the empirical work in this subsection does not differentiate between the venture boom period and post-boom period because of a limited number of observations. The same interpretation can be applied to the estimation results that $d(r_m1)$ and $d(r_cs)$ increase with the level of s_go1 .

Table 15. Estimation Results of Differences in the Investment Behaviors

Variable	d(ave_age)	d(r_m1)	d(r_m12)	d(r_cs)
	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)
<i>ave_age(l)</i>	0.655(7.03)***a			
<i>r_m1(l)</i>		0.323(3.34)***		
<i>r_m12(l)</i>			0.388(4.12)***	
<i>r_s1(l)</i>				
<i>r_cs(l)</i>				0.764(4.88)***
<i>year(vc)</i>	0.476(2.43)**	-0.018(-0.45)	0.047(1.03)	0.052(0.98)
<i>s_vc</i>	0.016(1.81)*	-0.002(-1.21)	-0.001(-0.53)	-0.000(-0.14)
<i>s_go1</i>	-0.023(-2.51)**	0.003(2.14)**	0.001(0.82)	0.007(3.32)***
<i>r_inv</i>	-0.045(-1.43)	0.000(0.04)	0.000(0.03)	0.019(2.65)**
<i>Cons.</i>	-2.106(-4.93)***	-0.082(-1.46)	-0.185(-2.65)**	-0.528(-3.55)
Adj. R-squared	0.4253	0.2242	0.2198	0.4368
# of obs.	74	71	71	74

Note: a, *, **, and *** indicate a coefficient estimate is statistically different from zero at the significance level of 10%, 5%, and 1%, respectively.

6. Conclusion

In the paper I evaluate the policy efforts of Korean government in developing a venture capital industry. The evaluation is conducted in the fund-raising stage and investment stage, separately. Also the empirical analyses are conducted for the venture boom period and post-boom period

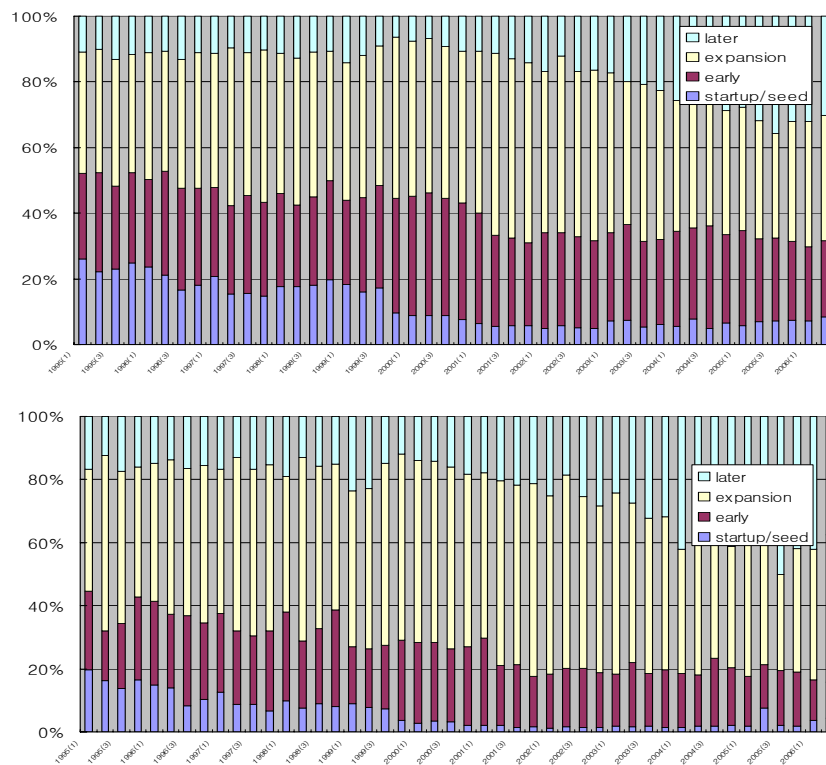
separately, considered that there might exist a structural change in the venture capital industry with the ending of the boom.

The empirical analyses show that the government played a significant role in the fund-raising stage in the both periods. The government has provided a significant amount of capital to venture capital firms for their venture investments. This direct role of the government in the fund-raising stage has been expanded after the venture boom, making the government the largest shareholder in the outside funds. The regression analyses reveal that the government capital commitment has also been an effective device to attract the private investors' capital in both periods, even though the magnitude of responsiveness of the private sector to the government capital commitments declined significantly as the venture boom ended.

Regarding the role of the government in the investment stage, the empirical results show that the government failed to induce the investments of outside funds toward earlier-staged firms and guide common stock investments during the venture boom period. The investments of a venture capitalist headed for the opposite direction to the government's objectives when the government had a larger stake in outside funds. This type of policy failure, however, disappeared after the boom and data indicate that there has been a policy improvement regarding those two criteria. When it comes to the investments in the high-tech industries, the story goes the other way around. The empirical analysis tells us that the government has not been working properly in increasing the venture investments toward the high-tech industries during the post-boom period, not the venture boom period. In the previous section, I suggested a possible scenario which could generate those policy failures observed in the investment stage. According to the scenario, the fundamental reason for those policy failures is that the government has had two objectives incompatible each other: developing a venture capital industry vs. avoiding risk of losing money. By nature of the venture capital, taking a risk on losing money needs to be regarded as a necessary premise for a government engaging in the fund-raising stage very actively. Instead, if the government wants to continue to play an active role in organizing outside funds of the private venture capital firms, it should be more concerned about selecting qualified venture capital firms, monitoring the investment activities of those firms, and evaluating their performance.

Moreover, the fact that a government has an objective of developing a venture capital industry does not directly imply that the government should participate actively in the fund-raising process of private venture capital firms. A main reason why a government tries to develop a venture capital industry is that the industry has been assumed to be a critical route of innovative financing for earlier-staged firms and those in industries of which markets change very rapidly, as implied by its name. However, the

Figure 5. Venture Capital Investment by Stage
(number of projects/dollar volume)



Note: Startup/seed stage (less than 1 year); early stage (1 - 3 years); expansion stage (3 - 7 years); later stage (more than 7 years)

Source: NVCA homepage (<http://www.nvca.org>)

reality shows that the venture capital industry has a tendency of evolving in the opposite direction while concentrating its investments on expansion- or later-staged companies. As shown in Table 6-1, this tendency can be clearly observed in the U.S. who has the most developed venture capital industry. Considering this trend, the role of Korean government of directly participating in the fund-raising process of the private venture capital firms should be in question near in future. In Section 4, the data showed that, in Korea, venture capital firms have severely relied on the government in the fund-raising stage and this dependency seems to have held up to recently. Furthermore, an empirical analysis in the same section tells us that the reputation or maturity of a venture capital firm is not working yet as a

signaling device in attracting private investors. Considering these findings, it may not be appropriate to ask the government to stop its role of providing capital to the private venture capital firms immediately. However, the government needs to make a long-term plan for developing the venture capital industry and, based on the plan, the role of government should be reconsidered. For Korean government, it would be a good alternative for the future to clearly distinguish public venture capital firms from private venture capital firms and provide only the public venture capital firms with subsidies accompanied by a clear stipulation on their investment activities, like the SBIC program in the U.S. This topic is beyond the research area of the paper, but important to explore in future research.

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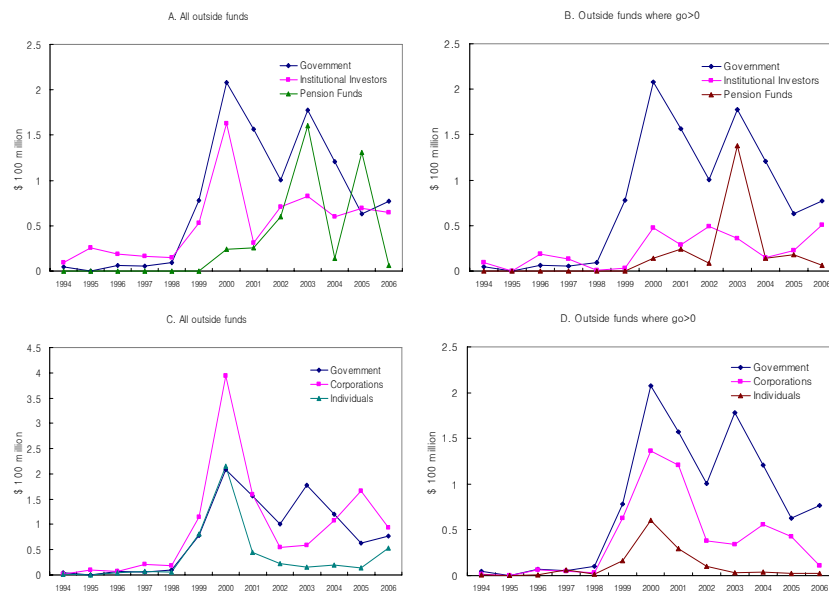
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Appendix

A. Response of Private Investors to Government Commitments

Figure A-1 describes how each private investor group responded to the government capital commitments in the outside funds. Figure A-1-A and A-1-B shows the responsiveness of institutional investors and pension funds, and Figure A-1-C and A-1-D are drawn in regards to general corporations and individual investors. These figures have a general implication that each of private investor group had moved together with the government during the venture boom period. However, after the boom, no private investor group seems to respond to the government capital commitment in a consistent way. In particular, the capital commitments from the individual investors shrank rapidly with the ending of the venture boom and have stayed at a very low level since then.

Figure A-1 Response of Private Investors to Government Commitments



In order to see if the above figures give us a correct answer on the responsiveness of each private investor group to the government capital commitment in an outside fund, I also construct a regression equation for each private investor group in the same way as Equation (1) in Section 4. Substituting for variable private_{itj}, variable ins_{itj}, pen_{itj}, cor_{itj}, and ind_{itj} are

used as dependent variables, which are the sizes of capital committed by institutional investors, pension funds, general corporations, and individual investors, respectively, in outside fund j .

Table A-1 summarizes the estimation results. Different from the implication in Figure A-1, the table shows that, during the venture boom period, there is no consistent linear relationship between the government capital commitments and the capital commitments from any private investor group. Instead, the empirical outcomes reveal that the institutional investors and pension funds responded positively to the government capital commitment during the post-boom period. These results imply that the positive responsiveness of the private investors to the government capital commitments during the venture boom period found in Section 4 may not be credited to any specific private investor group. On the contrary, the positive responsiveness of the private investors during the post-boom period could be ascribed to the institutional investors and pension funds.

B. Investment Behaviors of Outside Funds

For an overview of investment behaviors of outside funds in terms of the concentration ratio of investment by industry ($hhi_inv(O)$) and by region ($hhi_reg(O)$), and the average value of shares of an outside fund in invested firms ($share(O)$), Table A-2 tabulates the results of t-test analysis. For the t-test analysis, same as Section 5, outside funds organized during the venture boom were compared with those organized after the ending of the boom.

Table A-2 Investment Behaviors of Outside Funds:
Comparison of Venture Boom vs. Post Boom

Variable	Venture boom (1998-2000)	Post venture boom (2001-)	Diff.	p-value
$hhi_inv(O)$	0.384	0.472	0.088	0.001
$hhi_reg(O)$	0.555	0.585	0.030	0.280
$Share(O)$	10.695	13.348	2.652	0.048

Table A-1 Estimation Results of Responsiveness of Private Investor Group

Variable ^a	ins		Pen		cor		ind	
	Venture Boom	Post Boom	Venture Boom ^c	Post Boom	Venture Boom	Post Boom	Venture Boom	Post Boom
	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)
<i>go</i>	0.121(1.26)	0.362(3.21)***		0.318(1.79)*	0.227(0.85)	0.045(0.57)	0.049(0.77)	-0.003(-0.28)
<i>vc</i>	-0.103(-0.88)	-0.468(-1.84)*		0.619(1.69)*	0.089(0.27)	-0.310(-1.57)	0.098(0.79)	0.028(0.57)
<i>rep</i>	0.124(1.88)*	0.006(0.17)		-0.038(-0.79)	-0.136(-1.21)	-0.050(-1.20)	-0.035(-1.02)	0.002(0.15)
Adj. R-squared	0.1971	0.3280		0.5838	0.2637	0.1737	0.1475	0.0615
# of obs.	76	132		132	76	132	76	132

Notes: a. Coefficient estimates of year dummies and industry dummies are abbreviated from the table.

b. *, **, and *** indicate a coefficient estimate is statistically different from zero at the significance level of 10%, 5%, and 1%, respectively.

c. For dependent variable pen, the regression analysis is conducted only for the post-boom period considering that the number of outside funds where pension funds participated in during the venture boom period is too small, just six.

The results of the t-test analysis tell us that the concentration ratio of investment by industry and the average value of shares of an outside fund in invested firms have significantly increased after the boom burst. The concentration ratio of investment by region also increased even though the change is not statistically different from zero. Similar to Section 5, I also construct a linear equation for each variable as follows, and estimate those for the venture boom period and the post-boom period separately.⁵⁰

$$\begin{aligned} dep_{ij} = & \delta_0 + \delta_1 industry(0)_{ij} + \delta_2 industry(1)_{ij} + \delta_3 scd(O)_{ij} + \delta_4 rep_{ij} + \delta_5 size(O)_{ij} \\ & + \delta_6 hrate_{ij} + \delta_7 s_vc_{ij} + \delta_8 s_go1_{ij} + \delta_9 length_{ij} + \sum_i \delta_{9+i} D_i + v_{ij} \end{aligned} \quad (A-1)$$

Table A-3 summarizes the estimation results of Equation (A-1). In the regression analysis regarding $hhi_inv(O)$, except a weak positive effect of the huddle rate, the only two independent variables affecting the concentration ratio of investment by industry are $industry(0)$ and rep . In the venture boom period and post-boom period, the coefficient estimates of $industry(0)$ are commonly positive and statistically different from zero at a significance level of 1%, but the coefficient estimate in the post-boom period is much bigger.⁵¹ Furthermore, whereas only 10 out of 127 outside funds organized during the venture boom were stipulated to invest mainly to culture and media related industries, that ratio became much higher to 41 out of 149 outside funds. Also, the variable rep which represents reputation or maturity of a venture capital firm when organizing an outside fund, has a positive relationship with $hhi_inv(O)$, but the average value (6.93 years) of rep among outside funds formed during the post-boom period is much higher than that (3.99 years) during the venture boom period. Then these three differences between the venture boom period and post-boom period easily explain why the concentration ratio of investment by industry has been significantly higher during the post-boom period.

The estimation results regarding the variable share indicate that the maturity of a venture capital firm (rep), the size of a fund ($size(O)$), and the length of life span of a fund ($length$) commonly increase the average share of a fund in the total common stock issued by invested firms. But, as mentioned just before, the average value of the variable rep is much higher in the post-boom period. The average size of outside funds is also bigger in the post-boom period (\$10.05 million vs. \$13.07 million). Even though the

⁵⁰ The only difference from Equation (2) is that s_go1 , a share of the SMBA and the Fund of funds, is included as an explanatory variable instead of dummy variable $d(s_go1)$.

⁵¹ In fact, the average value of the concentration ratio of investment by industry among outside funds whose stipulated main industries of investment are culture and media related amounts to 0.724. The computed average value of $hhi_inv(O)$ among the other outside funds is just 0.352.

number of funds of which the life span is longer than five years is larger a little in the venture boom period, the difference is negligible (15 vs. 16). From these facts, we can easily expect a higher value of share in the post-boom period.

For the last, the table shows that *industry(0)* and *hrate* have positive effects on the concentration ratio of investment by region (*hhi_reg(O)*). As mentioned earlier, the higher average value of *industry(0)* in the post-boom period will imply a higher value of concentration ratio in that period. The average value of huddle rates, however, is higher in the venture boom period (12.6% vs. 9.4%), indicating a higher value of concentration ratio in the venture boom period. These two countervailing effects may be approximately cancelled out, thereby resulting the finding that the concentration ratio of investment by region is not statistically different between the two compared periods.

Table A-3 Estimation Results of Investment Behaviors of Outside Funds (III)

Variable	hhi_inv(O)			share(O)			hhi_reg(O)
	Full sample	Venture Boom	Post Boom	Full sample	Venture Boom	Post Boom	
	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)	Coef. (t-value)
industry(0)	0.361(5.89)***a	0.241(3.25)***	0.438(7.25)***	-0.531(-0.24)	3.669(1.03)	2.416(1.39)	0.344(6.92)***
industry(1)	-0.057(-1.81)*	-0.012(-0.22)	-0.088(-1.22)	-3.872(-1.37)	0.396(0.16)	1.742(0.70)	-0.091(-1.08)
scd(O)	-0.131(-0.64)		-0.168(-0.70)	0.144(0.05)		-5.609(-1.00)	0.056(1.17)
rep	0.015(2.10)**	-0.008(-0.22)	0.007(0.23)	0.910(2.22)**	0.480(2.28)**	0.482(1.77)*	-0.002(-0.23)
size(O)	-0.001(01.25)	-0.004(-1.34)	-0.000(-0.19)	0.108(2.11)**	0.222(2.57)**	-0.074(-0.43)	-0.001(-0.52)
hrate	0.004(1.27)	0.009(1.93)*	-0.000(-0.02)	-0.053(-0.31)	0.131(0.72)	-0.422(-1.87)	0.007(3.80)***
s_vc	0.001(0.65)	0.003(1.27)	-0.001(-0.46)	0.075(1.79)*	0.027(0.46)	-0.162(-2.59)**	-0.000(-0.17)
s_go1	-0.000(-0.26)	0.000(0.72)	-0.000(-0.01)	0.000(0.00)	0.016(0.19)	0.078(1.55)	-0.000(-0.67)
length				4.007(2.24)**	5.720(3.06)***	3.235(0.79)	
Adj. R-squared	0.6643	0.6687	0.7928	0.7929	0.9097	0.8595	0.7497
# of obs.	270	124	136	249	123	115	279

Notes: a, *, **, and *** indicate a coefficient estimate is statistically different from zero at the significance level of 10%, 5%, and 1%, respectively.

CHAPTER 6

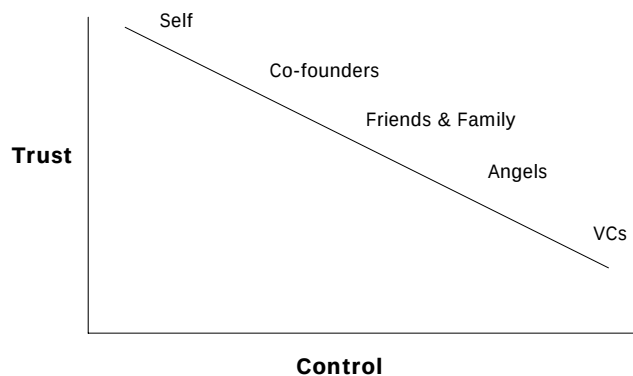
Informal Investors, Angels and Venture Capitalists: A Worldwide View

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1. The Funding Food Chain

Entrepreneurs need funding to start a new business, whether they can self fund or require external capital is typically a function of how much capital they need, the company's stage of development and available sources of capital. While venture capital receives a lot of attention from policy makers, the media and academics, the more important sources of startup capital come from informal investors. In this paper, we broadly classify informal investors as anyone other than classic venture capitalists who provide startup capital to a new company. Within the informal investors, however, there are differences in expectations. The more closely the investor knows the entrepreneur, the greater their level of trust and the lower their required control over the investment (see Figure 1). Control manifests itself in financial terms (valuation and associated return), restrictive terms (Shpherd and Zacharakis, 2001). This paper will look first

Figure 1. Trust and Control: Expectations by Investor Type



at informal investors broadly classified, then venture capitalists. It will conclude with ramifications of a worldwide capital glut on venture capital.

2. Entrepreneurs and Informal Investors

A new business searching for capital has no track record to present to potential investors and lenders. All it has is a plan—sometimes written, sometimes not—that projects its future performance. It means that it is very difficult to raise debt financing from conventional banks because they require as many as three years of actual—not projected—financial statements and assets that adequately cover the loan. Hence, almost every new business raises its initial money from the founders of the businesses themselves and informal investors: family, friends, neighbors, work colleagues, and strangers; a few raise it from lending institutions, primarily banks; and a miniscule number raise it from venture capitalists. This paper examines funding from entrepreneurs themselves, informal investors, and venture capitalists throughout the world. We will begin by looking at funding from the 4Fs: informal investors who comprise Family, Friends, and Foolhardy strangers, and Founding entrepreneurs themselves.

A. Informal Investors

Informal investors are essential for a vibrant entrepreneurial society. One of the most remarkable discoveries of GEM research is the extent of informal investing. For example, in 2006 we estimate that there were 208 million active informal investors in the 42 GEM nations and they invested \$600 billion in fledgling companies. The average annual amount invested was approximately \$3,000, which may appear to be a modest amount per company, but when a starting business, a relatively tiny sum can make a major difference in less developed regions as Muhammad Yunus first showed with Bangladeshi women entrepreneurs.

The percent of adults aged 18-64 who are active informal investors is shown in Figure 2. The prevalence rate ranges from slightly more than 0.5% in Japan to almost 16% in Peru. As might be expected most countries with high rates of entrepreneurial activity also have high informal investor prevalence rates (e.g., Peru, India, and Indonesia) and vice versa (e.g., Japan). But there are notable exceptions such as Brazil, which has a comparatively high rate of entrepreneurial activity but a low informal investor prevalence rate.¹

¹ Korea did not participate in the 2006 study, but it did participate in the 2002 study. In that year, Korea's prevalence rate was 3.8%.

Figure 2. Prevalence Rate of Informal Investors

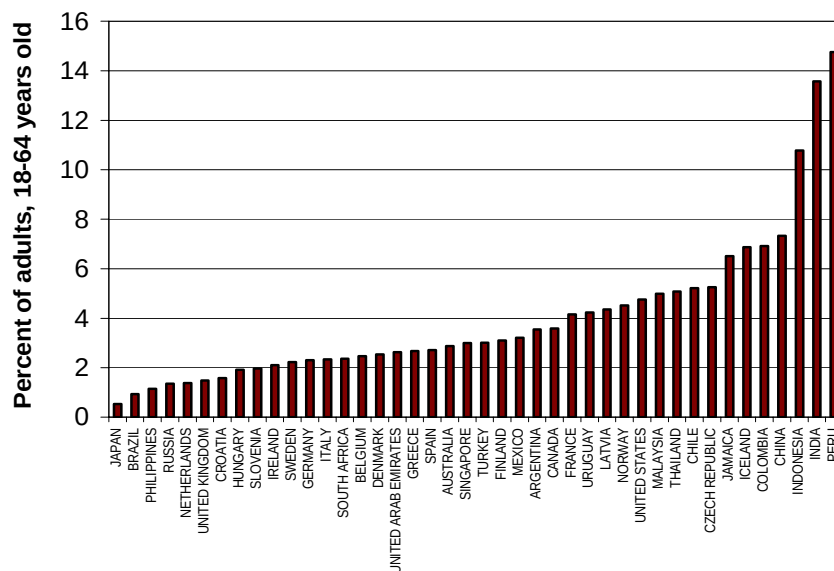


Figure 3. Total Informal Investment as Percent of GDP

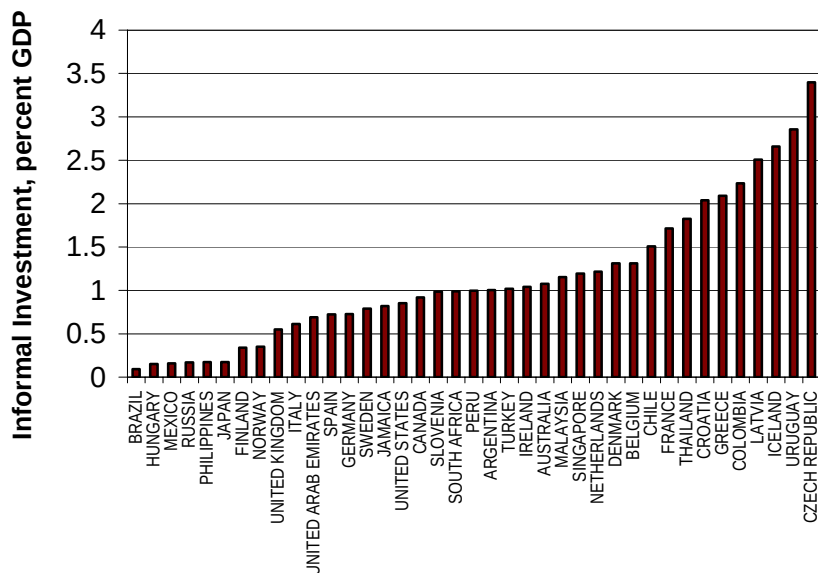
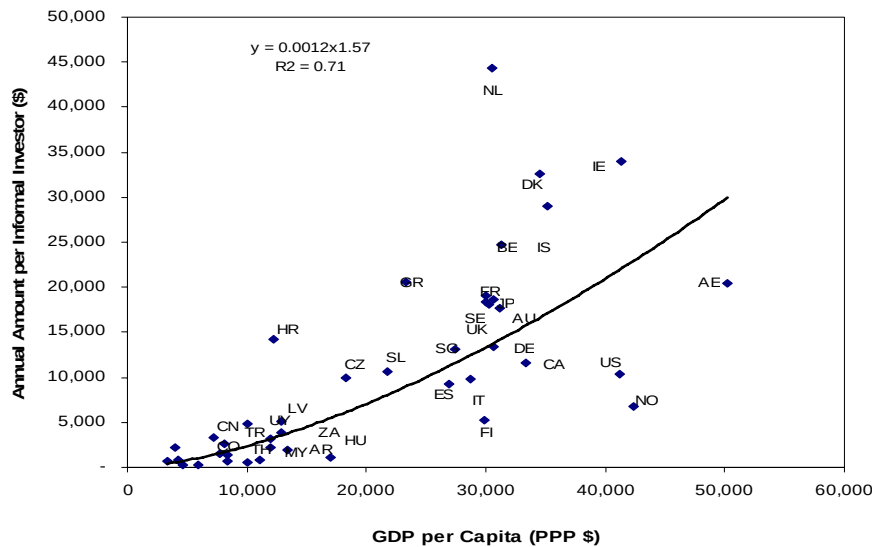


Figure 4. Annual Amount per Informal Investor vs GDP



Note: R^2 is the proportion of the variation that is explained by the trend line. An R^2 of 0.71 indicates that 71 percent of the variation in annual amount per informal investor is explained by GDP per capita.

To put the total amount of informal investment in each nation on the same basis, we measure the total amount of informal investment as a percent of GDP in each nation, Figure 3. It ranges from 0.1% in Brazil to 13% Indonesia; the average per nation is 1.8%; looked at another way it is 1.5% of the combined GDP of the 42 GEM nations. It is a sizeable amount of money that usually comes from the savings of informal investors.²

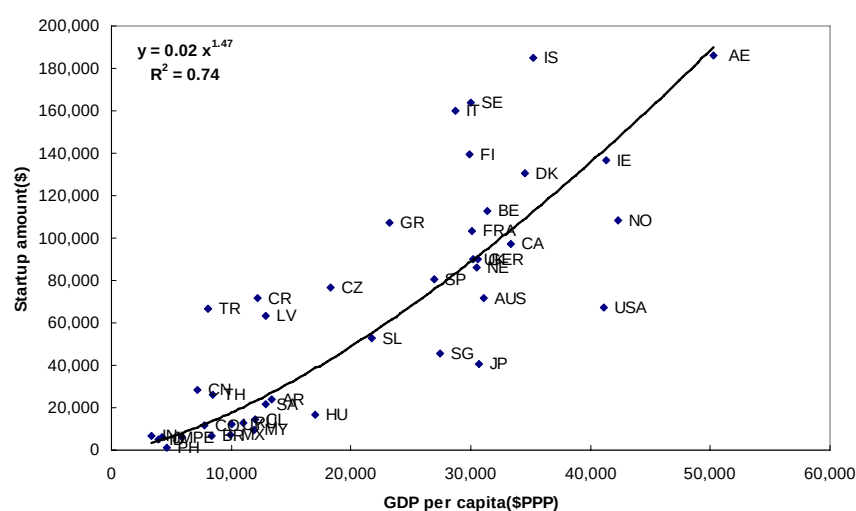
The wealthier a nation the higher the average annual amount of money that each informal investor puts into startup companies, Figure 4. The amount ranges from \$308 in the Philippines to \$44,000 in the Netherlands. The average amount of money provided by an informal investor has to be examined relative to the average amount of money that is needed to start a business, which ranges from \$843 in the Philippines to \$186,000 in the United Arab Emirates, Figure 5.

The money needed to start a business in nations that fall below the trend line in Figure 5 is less than in nations that fall above the trend line. This may partially explain why Norway has a higher rate of early-stage entrepreneurial activity than its Scandinavian neighbors, Sweden and

² In 2002, Korea's informal investment was 6.4% of its GDP.

Denmark: it costs less to get a new business started in Norway. Another interesting point is that it costs less to start a business in the nations with so-called Anglo Saxon economies (Australia, Canada, Ireland, United Kingdom, and the United States). This is consistent with the findings of the GEM High Growth Report, which found that the Anglo-Saxon group of companies has a noticeable higher rate of entrepreneurs starting companies that are expected to create 20 or more jobs.³

Figure 5. Amount of Startup Money vs GDP



Note: R^2 is the proportion of the variation that is explained by the trend line. An R^2 of 0.74 indicates that 74 percent of the variation in annual amount per informal investor is explained by GDP per capita.

B. Entrepreneurs

The founding entrepreneurs themselves generally provide more of the money to launch their new ventures than informal investors. Among the GEM nations, the entrepreneurs provide 62% of the startup funds with the remaining 38% coming from external sources. When the entrepreneur's self-funding is combined with the money from informal investors it amounts to 3.9% of the GDP of the GEM nations. Not only does this create new companies and jobs, but it also gives an immediate boost to a nation's economy because new companies immediately spend their startup money

³ Autio (2005). See www.gemconsortium.org.

to purchase goods and services and to pay wages of the founding entrepreneurs and employees if there are any. Hence, most new companies make a sizeable contribution to a nation's economy before they open their doors for business.

Entrepreneurs expected to get their external financing from multiple sources, Table 1. It shows that entrepreneurs know that the 3Fs, family, friends, and foolhardy strangers are sources of startup money. The percent of entrepreneurs who expected to get some of their startup financing from banks or financial institutions is high—in fact it ranks highest among all the sources. That number is probably so high because the respondents included nascent entrepreneurs who were still in the process of trying to start their businesses, thus it seems reasonable to assume that they were still naïve about the chances of getting a bank or other financial institution to invest in a new business. Similarly, they were probably too optimistic about the chances of getting financial support from government programs.

Table 1. Entrepreneur's Expected Sources of Financing (All GEM Nations)

Sources of Funding	Percent of Entrepreneurs
Close Family	32.9%
Other Relative	14.5%
Work Colleague	14.7%
Friend or Neighbor	15.3%
Stranger	7.3%
Bank or Other Financial Institutions	42.2%
Government Programs	19.7%
Other	12.3%

Note: Total is more than 100% as entrepreneurs cited multiple sources.

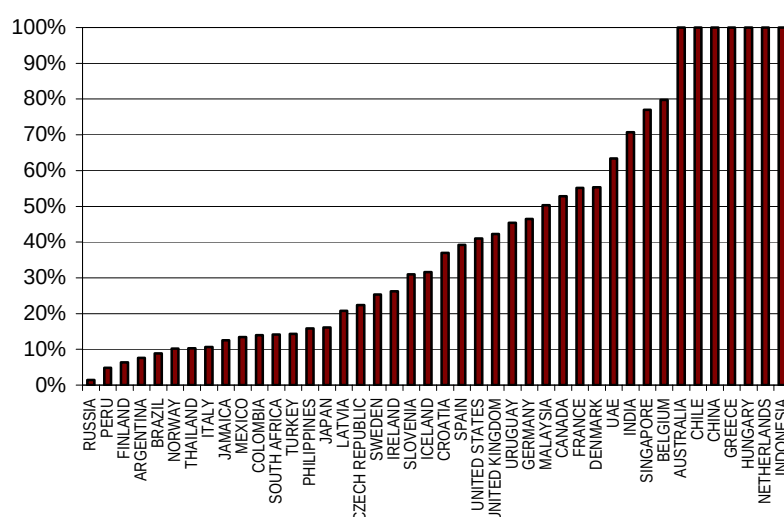
Table 2. Relationship of Informal Investor to Entrepreneur
(All GEM Nations)

Sources of Funding	Percent Total
Close Family	48.9%
Other Relative	8.4%
Work Colleague	7.7%
Friend or Neighbor	26.4%
Stranger	5.8%
Other	2.7%
Total	100.0%

When entrepreneurs expected sources of funding (Table 1) are compared with the entrepreneurs that informal investors actually invested in (Table 2) we see that entrepreneurs underestimated friends and neighbors as potential sources of money and overestimated other relatives and work colleagues. But they were approximately correct in their estimate of close relatives and strangers as potential sources.

One never ending debate in the small business arena is the so-called private equity gap, which is the shortfall in the amount of money that is available for investment in young companies. We think the GEM study of informal investment sheds some light on the debate. For each GEM nation, we knew the total amount of money that nascent entrepreneurs reported that they needed for their new ventures and we also knew the total amount of informal investment, so from that we calculated the percent of nascent businesses that could be funded annually, Figure 6. Some nations have more than enough money to fund every nascent regardless of merit. As we have pointed out in the GEM2004 Financing Report,⁴ not all nascent merit funding. It seems likely that a country with enough informal investment to fund 40% or more of all its nascent entrepreneurs probably has sufficient informal investment because the majority of new businesses never become viable in the long-term (Headd, 2001) and they fail to produce a satisfactory

Figure 6. Percent of Nascents Fundable with Available Informal Investment



⁴ Bygrave and Hunt (2004). See www.gemconsortium.org.

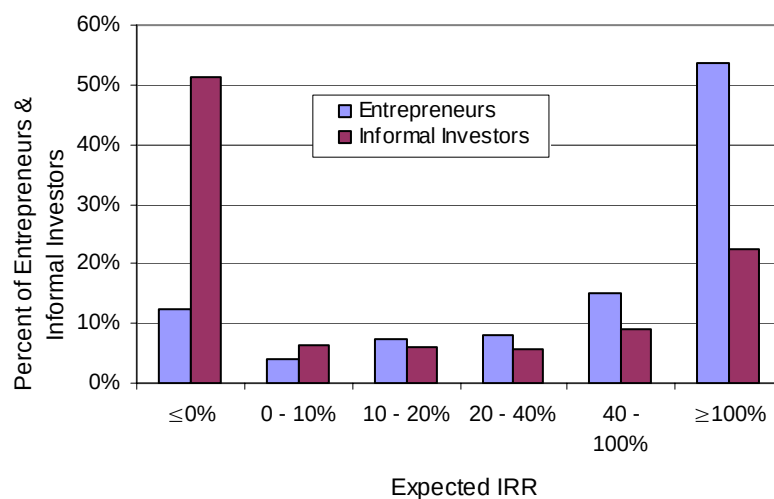
return on investment for either their owners or their investors. With the 40% criterion, slightly fewer than half of the GEM nations have sufficient informal investment overall. However, the observation that there is enough money overall does not mean that all of it is effectively invested; without doubt, some deserving entrepreneurs fail to raise money and vice-versa.

C. Expected Financial Returns

What financial return do informal investors expect? The median expected payback time, as seen is two years and the median amount returned is one times the original investment. In other words, there is a negative or zero return on investment for half the informal investments. Interestingly, the payback time and times return are the same for all types of investees except strangers. What's more the amount invested in strangers is the highest. The most likely reason is that investments in strangers are made in a more detached and business-like manner than investments in relatives and friends.

There is a big variation in the times return expected by informal investors: 34 percent expect that they will not receive any of their investment back whereas 5 percent expect to receive more 20 or more times the original investment. Likewise there is a big variation in the payback time: 17 percent expect to get their return in six months whereas 2 percent expect to get it back in 20 years or longer.

Figure 7. Expected IRR for Entrepreneurs & Informal Investors



Entrepreneurs are much more optimistic about the return on the money that they themselves put into their own ventures: 74 percent expect the payback time to be 2 years or sooner, and their median times return is 2, with 15 percent who expect 20 or more times on their original investment.

The expected IRR (compound annual return on investment) is calculated from the expected payback time and the times return for informal investors and entrepreneurs who reported both (Figure 7). The returns expected by entrepreneurs are almost the reverse of those expected by informal investors: 51 percent of informal investors expect a negative or zero return and only 22 percent expect a return of 100 percent or more; by contrast, only 13 percent of entrepreneurs expect a negative or zero return but a whopping 53 percent expect a return on 100 percent or more.

We investigated how the financial returns expected by informal investors were influenced by a number of factors. We found that expected returns are affected by altruism because they increase as the relationship distance between the investor and the entrepreneur increases (i.e., strangers expect higher returns than parents); men expect higher returns than women; entrepreneurs expect higher returns than non-entrepreneurs; expected returns increase as the amount invested increases; older persons expect lower returns than younger ones; and entrepreneurs expect higher returns on investments in their own businesses than on their investments in others' businesses (Bygrave and Hunt, 2007).

3. Venture Capital

Now we will look at the top end of the entrepreneurial financing spectrum, venture capital. Financing from the 4Fs is vital for an entrepreneurial economy. If money from the 4Fs dried up, entrepreneurship would shrivel and die. In contrast, if there was no venture capital it would not make a perceptible difference to entrepreneurial activity overall because even in the preeminent venture capital nation, the United States, fewer than 1 in 10,000 new ventures has venture capital in hand at the outset, and fewer than 1 in 1,000 businesses ever has venture capital at any time in its life. Even in the United States, a would-be entrepreneur has a greater chance of winning a million dollars or more in a lottery than getting venture capital.⁵ Nonetheless, venture capital plays an important role, some say crucial role, in the advanced economies because some of the companies in which venture capital is invested change way in which we live, work, and play, as Apple, Microsoft, and FedEx have already done and eBay, Amazon.com, and Google are now doing.

⁵ Bygrave and Zacharakis (2007), p. 397.

<Box 1> Google: A Classic Example of Funding from the 4Fs, Venture Capital, and an IPO

Google founders, Larry Page and Sergey Brin, bought a terabyte of disks at bargain prices and built their own computer housings in Larry's dorm room, which became Google's first data center. Unable to interest the major portal players of the day, Larry and Sergey decided to make a go of it on their own. All they needed was a little cash to move out of the dorm – and to pay off the credit cards they had maxed out buying a terabyte of memory. So they wrote up a business plan, put their Ph.D. plans on hold, and went looking for an angel investor. Their first visit was with a friend of a faculty member.

Andy Bechtolsheim, one of the founders of Sun Microsystems, was used to taking the long view. One look at their demo and he knew Google had potential – a lot of potential. But though his interest had been piqued, he was pressed for time. As Sergey tells it, "We met him very early one morning on the porch of a Stanford faculty member's home in Palo Alto. We gave him a quick demo. He had to run off somewhere, so he said, 'Instead of us discussing all the details, why don't I just write you a check?' It was made out to Google Inc. and was for \$100,000."

The investment created a small dilemma. Since there was no legal entity known as "Google Inc.," there was no way to deposit the check. It sat in Larry's desk drawer for a couple of weeks while he and Sergey scrambled to set up a corporation and locate other funders among family, friends, and acquaintances. Ultimately they brought in a total initial investment of almost \$1 million.

On September 7, 1998, more than two years after they began work on their search engine, Google Inc. opened its door in Menlo Park, California. The door came with a remote control, as it was attached to the garage of a friend who sublet space to the new corporation's staff of three. The office offered several big advantages, including a washer and dryer and a hot tub. It also provided a parking space for the first employee hired by the new company: Craig Silverstein, now Google's director of technology.

Excerpted from "Google History." <http://www.google.com/corporate/history.html>

Also provided a parking space for the first employee hired by the new company: Craig Silverstein, now Google's director of technology.

The founding and funding of Google (see the text box) is a good example of how high-potential startups raise their money. Sergey Brin and Larry Page maxed out their credit cards to buy a terabyte of storage that they needed to start Google in Larry's dorm room. Then they raised \$100,000 from Andy Bechtolsheim, one of the founders of Sun Microsystems, plus approximately \$900,000 from family, friends, and acquaintances. Subsequently, Google raised \$25 million from two venture capitalist firms,

and \$1.67 billion from its IPO. The company was 3 ½ years old when it raised venture capital, and 8 ½ when it had its IPO.

There is a pattern in the initial funding of Google that is repeated over and over again in almost every startup. The money comes from the 4Fs: First the founders themselves dip into their own pockets for the initial capital, next they turn to family, friends, and foolhardy investors (business angels). If their companies grow rapidly and show the potential to be super stars, they raise venture capital, then they have an initial public offering (IPO) or are acquired by a bigger company. Venture capital is very rare and IPOs are much rarer. For instance in the United States in 2005, 910 companies raised \$5.3 billion of first-round venture capital and 45 venture-capital-backed companies raised \$3.4 billion with IPOs. In comparison, approximately 3 million new companies raised \$100 billion of informal investment; and the founding entrepreneurs themselves contributed another \$200 billion or thereabouts.

a. Classic Venture Capital among GEM Nations

Approximately 59% of classic venture capital in the GEM nations is invested in companies in the U.S.A.; the second highest percentage, 7.9%, is invested in the UK.

To put comparisons among nations on an equal footing, the amount of venture capital in each nation is shown as a percentage of GDP, Figure 8. Compared with 2004, the biggest increases in classic venture capital in 2005

Figure 8. Classic Venture Capital as a Percent of GDP (2005)

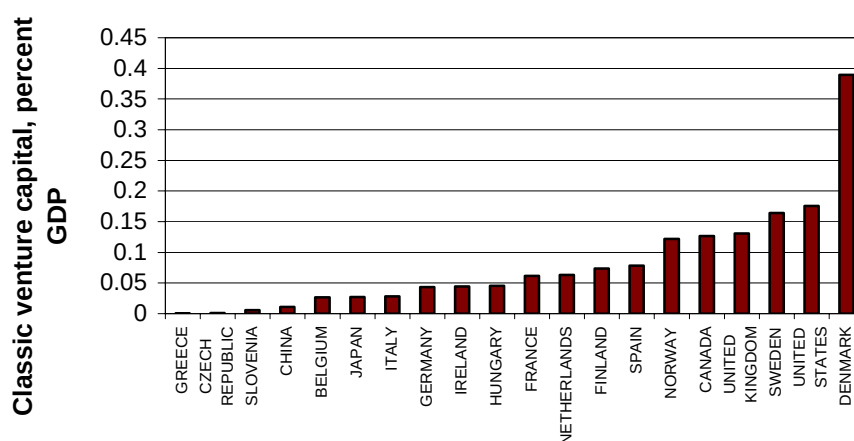


Figure 9. Amount of Classic Venture Capital: G7 Nations (2005)

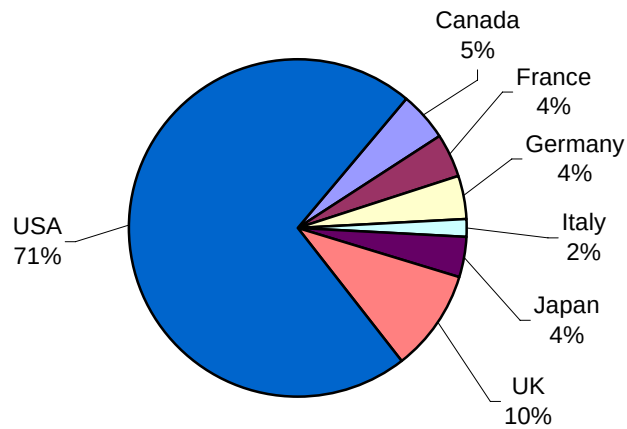
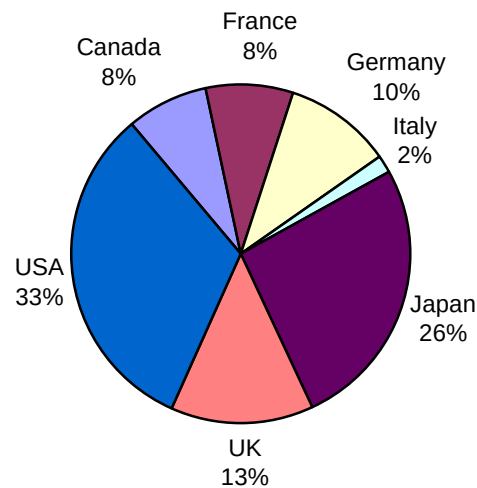


Figure 10. Number of Companies Receiving Venture Capital: G7 Nations (2005)



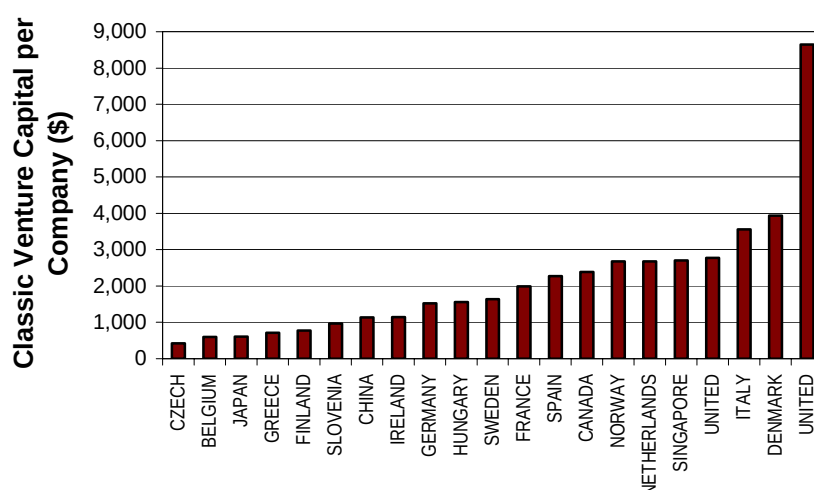
were in Denmark and the United Kingdom and the biggest decreases were in Belgium and Ireland. The United States and Canada held steady. Year-to-year comparisons can be misleading in some countries such as Greece,

the Czech Republic, and Slovenia where only a few investments are made annually.

Seventy-one percent of the amount of venture capital in the G7 nations was invested in companies in the United States, Figure 9, but only 33 percent of the companies were in the United States, Figure 10. This is because the amount invested per company was much higher in the United States.

The total amount of venture capital in a nation indicates the overall level of investing but it does not tell us anything about the potential effectiveness of the venture capital that is invested. One measure of the potential effectiveness of venture capital is the amount invested per company, Figure 11. The highest year-to-year increase was in Denmark where the average amount invested per company more than doubled to \$3.9 million; in most other European nations the average amount declined; in the United States it held steady at \$8.6 million. In general, the gap between the average amount invested per company in United States and other GEM nations widened year-to-year in 2005 after narrowing somewhat in 2004. As in previous GEM reports, we question how venture capital backed companies outside the United States can compete with similar ones in the United States when on average they have so much less capital. After all, the U.S. market is much bigger than the home market in other wealthy nations; the cost of starting a U.S. company is lower; and operating expenses are comparable—sometimes even lower in the United States.

Figure 11. Amount of Classic Venture Capital per Company



There have been some notable venture capital successes in Europe. The purchase of Skype, the fast growing Internet phone company headquartered in Luxembourg, by eBay for \$2.6 billion in 2005 gave a boost to venture capital investments in Europe. We do not yet have detailed data, but preliminary indications suggest that there was a significant increase in venture capital investment in Europe in 2006 whereas it held steady in the United States.

An interesting development in 2006 was the announcement by President Chirac that the French government was financially supporting the development of a search engine. In his 2006 new year speech at the Elysée Palace, Chirac spoke of the need to "take up the global challenge posed by Google and Yahoo!" Subsequently, he announced the development of Quaero, a Franco-German project to create a search engine. Its budget will be €450m over five years, including €90m in government subsidies.⁶ It is a stark contrast with the way in which Google and Yahoo were funded in the United States with money from the 4Fs, venture capital firms, and public stock markets. Some Europeans are concerned that by the time Quaero is operational the market will have moved on. It remains to see how it turns out, but it will be quite a challenge to compete with Google, whose annual R&D budget tops \$500 million.

4. The World-Wide Capital Glut and Its Impact on Venture Capital

Over the last decade, the amount of available capital on world markets has surged. In 2005, it was estimated at over \$11 trillion (Miller et al., 2005). This excess money is finding its way into venture capital and leading to a number of potentially troubling developments. First and foremost, the size of venture capital firms is increasing (see Table 3). More importantly, the amount under management on a per VC basis has gone from \$13M in 1997 to \$36M in 2005. That means that each VC needs to find bigger investments because his time is his most valuable resource and he can only make so many investments per year because of the time to find and conduct due diligence on each potential deal. This usually means he makes about 1-3 investments per year. Thus, VCs are investing in more later stage deals which is driving up the valuations of these deals (see Figure 12).

The higher valuations directly impact the returns that VCs earn (see Table 4). The increase competition for deals is leading to decreased returns, especially for later stage deals. It is surprising to many, that most venture capital firms fair poorly in returns (see Table 5). Only half of the venture

⁶ http://technology.guardian.co.uk/news/story/0,,1761482,00.html#article_continue.

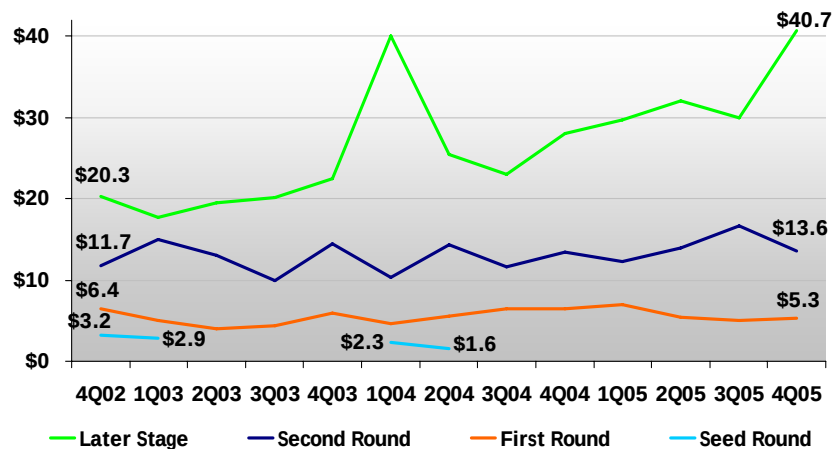
Table 3. Private Equity Performance

	1997	2003	2005
No of Firms/Funds	515/885	1,027/1,954	1,714/4,157
Professionals	4,914	10,833	11,138
Total Cap Mgt	\$64.6 B \$13m/professional	\$251.4 B \$23m/professional	\$406.8 B \$36m/professional
Avg Firm Size	\$135.3 M	\$245.7 M	\$237 M
Avg Fund Size	94.0 M	\$103.5	\$98 M
First time funds	61	38	27
Largest Fund	1,158 M	\$1,100 M	\$1,250 M

Source: VentureXpert

Figure 12. Venture Capital Investment by Stage

(unit: million dollars)



Source: Dow Jones ; Venture Source.

capital funds generate a positive return and only the top quintile generates returns that justify the high risk of the asset class. Thus, it appears that there is "too much money chasing too few high potential deals." In the shorter term, US VCs are seeking more and more international deals, especially in China and India. In the longer term, Reyes (2004) and others to predict that there will be a shakeout and reduction in the number of VC firms.

Table 4. Pooled IRR by Investment Horizon as of December 2005

Fund Type	1Yr	3Yr	5Yr	10Yr	20Yr
Seed/Early Stage VC	8.3	3.1	-10.9	41.5	20.4
Balanced VC	24.3	11.7	-3.5	18.9	14.6
Later Stage VC	6.9	8.6	-4.1	11.3	13.5
All Venture	15.6	7.5	-6.8	23.7	16.5
NASDAQ	5.2	14.2	-2.2	7.7	12.4

source: Thompson Financials' US Private Equity Performance Index Investment Horizon.

Table 5. Venture Capital Cumulative IRR as of December 2005

Percentile Group	Overall	Seed	Early	Balanced	Later
100.00 th percentile	721.04	257.82	721.04	195.22	209.16
90.00 th Percentile	38.98	25.64	51.62	32.2	31.28
80.00 th Percentile	19.69	17.08	22.59	19.36	18.45
70.00 th Percentile	13.43	10.63	13.71	13.49	13.39
60.00 th Percentile	8.62	8.46	7.25	9.17	9.52
50.00 th Percentile	4.36	3.94	2.58	5.56	5.04
40.00 th Percentile	0.78	1.73	-1.4	2.56	1.49
30.00 th Percentile	-1.81	-0.99	-6.53	0	-0.57
20.00 th Percentile	-7.28	-6.51	-11.13	-3.3	-2.75
10.00 th Percentile	-14.75	-9.77	-19.37	-11.23	-10.05
0.00 th Percentile	-100	-31.45	-47.88	-35.45	-100

Sample size: 1,164.

Source: VentureXpert

5. Concluding Comments

When entrepreneurs are starting a business, they are out of necessity very frugal, so a little startup financing goes a long way. Even in advanced economies companies start with surprisingly little, including super-stars such as Google that change the global economy. Google started up and developed its search engine with nothing more than the meager resources of two PhD students. It was more than two years old before it even had any external financing from informal investors. No doubt about it, self-financing

by entrepreneurs themselves and from family, friends, and strangers is fundamental to entrepreneurship.

Important as venture capital is in the acceleration of super-star companies, it affects only a tiny number of companies. In 2005, the number of companies receiving venture capital in all the GEM nations totaled only 11,066, compared with hundreds of millions of companies that received money from informal investors and the entrepreneurs themselves. The total amount of venture capital was \$38.6 billion, compared with \$600 billion of informal investment.

Informal investment is an essential ingredient of an entrepreneurial nation, whereas venture capital makes no perceptible difference to the overall entrepreneurial activity at the grassroots. Venture capital does, however, make a big difference in the acceleration of a few super-star companies. A nation that wants an environment in which entrepreneurs thrive and prosper must first and foremost have policies that facilitate investment by the 4Fs because every new venture must have it.

■ Appendix : Summary of GEM 2006 Study

A. Key Findings Informal Investment

- In the 42 nations participating in the 2006 GEM study, 208 million informal investors provided \$600 billion to entrepreneurs' businesses.
- The average prevalence rate of informal investors among the adult population of the GEM nations is 4.0% and the total sum of money that informal investors provide to fund entrepreneurs is equal to 1.5% of the combined gross domestic product (GDP) of those nations.
- The entrepreneurs themselves provide 62 percent of the start-up capital for their new ventures.
- When the money provided by the entrepreneurs is combined with the amount of informal investment, the sum is 3.9% of the combined GDP of the 42 GEM nations. That money goes almost immediately into the GDP as entrepreneurs spend it to pay wages and buy goods and services for their businesses.
- For all the GEM nations combined, the average amount needed to start a business is \$65,000.
- Entrepreneurs are four times as likely as non-entrepreneurs to be informal investors in another entrepreneur's business.
- Altruism influences the returns expected by informal investors. Expected returns increase as the relationship between the investor and the entrepreneur diminishes. Close relatives expect the lowest returns and strangers (angels) expect the highest returns.
- Fewer than half of the GEM nations have sufficient informal investment to meet the needs of nascent new businesses.

B. Key Findings Venture Capital

- In 2006, \$37.3 billion of classic venture capital was invested in 11,066 companies in the GEM nations.
- In 2005, 71 percent of all the classic venture capital invested among the G7 nations was in the United States. This is down from 72% in 2004 and 74% in 2003.
- Classic venture capital invested in the United States increased to \$21.6 billion in 2005 from \$21 billion in 2004.
- The amount of classic venture capital invested per company in the United States was \$8.6 million compared with an average of \$1.8 million per company in the other G7 nations.
- Denmark topped all the nations in the amount classic venture capital as a percent of GDP in 2005. Also it ranked second to the United States in the amount of classic venture capital invested per company (\$3.9 million).
- After declining for four years in the aftermath of the bursting of Internet stock market bubble, classic venture capital invested in European technology companies increased in 2005. Preliminary numbers indicate another increase in 2006.
- The sale of Skype—a venture capital backed Luxembourg company—to eBay for \$2.6 billion in 2005 gave a boost to classic venture capital investing in European information technology and communications companies.
- The number of venture capital backed IPOs in the United States fell from 83 in 2004 to 45 in 2005.

C. Key Implications

Close family members, friends, and neighbors are by far the biggest sources of informal capital for startups. Hence, entrepreneurs should look to family and friends for their initial seed capital to augment their own investments in their startups. Entrepreneurs must also understand that they

themselves will have to put up about two-thirds of the initial capital needed to launch their ventures.

Educators should put much more emphasis on financing from entrepreneurs themselves and informal investors and much less on the role played by venture capitalists — because fewer than one in 10,000 startups have venture capital in hand when they open their doors for business.

Policy makers should pay more attention to start-up capital provided by entrepreneurs themselves and informal investors and less attention to venture capital. After all, financing from entrepreneurs and informal investors pumped 3.9% into the GDP of the GEM nations combined in 2006.

Researchers should put much more effort into studying entrepreneurs themselves and informal investors as sources of entrepreneurial financing, and much less into venture capital and public stock markets.

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CHAPTER 7

Efforts to Develop Risk Capital Markets in Europe

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1. Introduction

This paper analyzes the financing for SMEs in Europe, especially SMEs in innovative and high technology sectors (ISMEs). In general, the SME sector has had a satisfactory performance in most European countries, with SMEs accounting for large shares of employment and output. Moreover, there does not appear to be a general problem of financing SMEs in European countries. Most SMEs are able to obtain adequate amounts of financing, mainly from banks, with only a modest amount of support from official programs.

At the same time, the lack of dynamism of ISMEs, especially those in high technology sectors has been a weak point in European economic performance. The ISME sector in Europe lags behind that of North America (as well as other dynamic countries, such as Israel and Korea) by a considerable margin. The lack of dynamism in ISMEs has been a matter of concern for European governments and for the European Union (EU) for several years.

This paper will first examine the general situation of SMEs and of SME financing in Europe. The paper will then turn to the special case of ISMEs and their special financing needs to determine where the causes of the lag in European performance may lie. In the first place the social and legal environment for entrepreneurship will be discussed.

Many analysts have attributed the gap between Europe and America in developing fast growing SMEs to the lack of appropriate financing mechanisms. In this connection, three weak spots in the financing of ISMEs will be considered:

- i) The informal risk capital sector, often known as "business angels"
- ii) The formal venture capital industry
- iii) Specialized "growth" equity exchanges

Subsequently, a critical review will be undertaken of policy initiatives by European governments to strengthen the competitiveness of the ISME sector. Finally, multilateral approaches, mainly from the EU, to improve official measures to support ISMEs will be discussed.

2. SMEs and SME Finance in Europe

Although many commentators characterize Europe as overly bureaucratic and lacking in entrepreneurial spirit, this perception is excessively harsh and only partly accurate at best. While there are some serious weak points in the European SME sector as well as gaps in the financing available to SMEs, the SME sector as a whole is well developed with smaller enterprises accounting for considerable shares of output and employment. In 2003 for instance 99.8% of enterprises in the EU were SMEs (i.e. with less than 250 employees). The SME sector has proven capable of generating employment at wages that are comparable to those in larger enterprises. Moreover, as will be seen below the SME sector is generally able to obtain adequate funding for its activities and thus there does not appear to be any general SME “financing gap”.

The situation of the SME sector in Europe in global comparison can be understood better by examining the data shown in Table 1, developed by the Global Entrepreneurship Monitor. The Table compares employment in SMEs to the total non-agricultural population in selected OECD countries. The data distinguish between those involved in new enterprise formation and those involved in established SMEs (i.e. those in operation for 42 months or more.) In this Table, as in most other measures of entrepreneurship Australia and New Zealand appear to be the most “entrepreneurial” countries while Japan nearly always scores low on most measures.

If countries were ranked by the share of established entrepreneurs in the population, many European countries (e.g. Greece, Switzerland, Finland, Spain and Italy) would score very high. Many of these established SMEs are family-owned. Small firms constitute 99% of manufacturing enterprises in Italy at for example. Furthermore, in many southern European countries SMEs are very important in providing employment in the manufacturing sectors (See Table 2). Conversely, relatively few persons in the United States are owners of established businesses. This conclusion is supported by data from the OECD data base on entrepreneurship which measures entrepreneurial behavior slightly differently. (See Figure 1) Note that this Figure includes data on Korea which also scores very well on entrepreneurship. At the same time, one noteworthy difference between

Table 1. Entrepreneurial Activity in Selected OECD Countries
(Per cent of non agricultural workforce engaged in each activity)

	Nascent Entrepreneurs ¹	New Business Owners b ^{2,3}	Early stage Entrepreneurs	Established owners ⁴	Total Entrepreneurs ⁵
New Zealand	9.4	10	19.4	10.8	30.2
Australia	6.5	4.7	11.2	9.6	20.8
United States	8.8	5.2	14	4.7	18.7
Iceland	8.5	2.7	11.2	7.3	18.5
Canada	6.6	3.6	10.2	7.4	17.6
Greece	5.2	1.6	6.8	10.5	17.3
Norway	4.4	5.2	9.6	7.3	16.9
Switzerland	2.6	3.7	6.3	9.7	16
Finland	3.1	1.9	5	8.6	13.6
Spain	2.4	3.4	5.8	7.7	13.5
Italy	2.9	2.3	5.2	6.4	11.6
United Kingdom	3.4	2.9	6.3	5.1	11.4
Sweden	1.7	2.5	4.2	6.3	10.5
Netherlands	2.5	1.9	4.4	5.7	10.1
Germany	3.1	2.7	5.8	4.2	10
Belgium	2.9	1.2	4.1	5.6	9.7
Austria	3	2.4	5.4	3.8	9.2
Denmark	2.4	2.4	4.8	4.4	9.2
France	4.7	0.7	5.4	2.3	7.7
Japan	1.1	1.1	2.2	5.4	7.6

Note: 1. Involved in preparations for enterprise formation

2. Owners of enterprises in operation for less than 4 years

3. a+b

4. Owners of enterprises in operation for more than 4 years

5. c+d

Source: Global Entrepreneurship Monitor (GEM)

Europe and other advanced areas is in rates of new firm creation. OECD countries in North America and Asia/Pacific (except Japan) all have higher rates of new company formation than any European country. Thus, while there are a large number of SMEs in existence in Europe, most have been in operation for some time and relatively few new business are formed each year. No doubt, the low level of company formation exerts a negative influence on the economic dynamism of Europe.

Table 2. Distribution of Employment¹ by Firm Size in Manufacturing, 2002²
(unit: %)

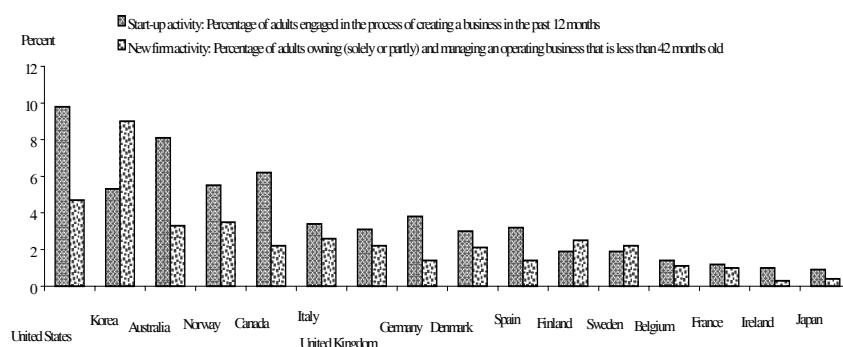
Country	Number of firm employees:			
	less than ten	10-49	50-249	250+
Australia	14.1	20.5	17.8	47.7
Austria	10.3	18.9	26.9	43.8
Belgium	11.6	18.9	23.8	45.8
Czech Republic	14.2	15.6	25.5	44.7
Denmark	7.4	18.9	26.3	47.4
Finland	9.0	14.8	22.5	53.7
France	12.0	19.0	22.3	46.7
Germany	6.7	14.5	23.7	55.1
Greece	..	26.6	34.0	39.5
Hungary	16.1	16.5	23.2	44.2
Ireland	4.4	19.2	32.3	44.2
Italy	25.5	31.0	20.8	22.8
Japan	10.8	28.4	29.9	30.9
Korea	42.9	20.7	23.2	13.3
Netherlands	9.9	23.3	30.6	36.2
New Zealand	19.1	24.2	21.4	35.3
Norway	8.7	22.9	28.3	40.1
Poland	19.4	12.8	27.9	39.9
Portugal	18.9	28.1	29.3	23.7
Slovak Republic	3.5	10.0	26.4	60.0
Spain	19.2	31.9	22.6	26.2
Sweden	11.1	15.2	20.7	53.0
United Kingdom	10.1	18.8	25.8	45.3

Notes: 1. Salaried employees for Korea and Poland.

2. Or latest year available

Source: OECD (2005), *Statistics on Enterprises by Size Class (SEC) database*. OECD, Paris. For Korea, the source data is: Korea National Statistical

Figure 1. Entrepreneurial Activity in Selected OECD Countries



Source: OECD Database

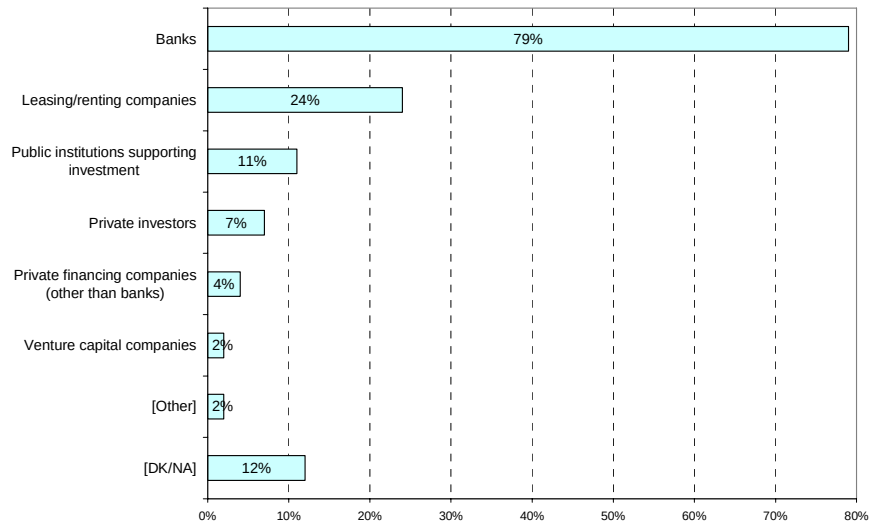
Bank-centered Finance for SMEs

To the degree that formal financial institutions provide finance, the SME sector tends to be bank-financed everywhere. This is especially true in Europe, which has traditionally had bank-dominated patterns of financial intermediation and where “universal banking” is often the rule. Under universal banking banks engage in most capital markets operations as well as deposit taking and lending. Universal banking systems often stifle the development of alternative financing channels. It should also be pointed out that SMEs typically depend heavily upon internal cash flow and supplier credit. Thus measurement of external finance gives only a partial view of firm financing.

Figure 2 shows the results of a survey undertaken by the European Union on the financing of SMEs in EU members. The data indicate that 80% of external financing comes from banks.

All forms of financial intermediation require means for the suppliers of financial resources (banks or investors) to monitor the users of financial resources and to have means to resolve principal/agent problems (i.e. to align the interests of suppliers and users of capital). In comparison to larger companies, SMEs in all markets tend to be very closely linked to the financial standing of their owners, while information asymmetries and principal/agent problems are common. Banks have traditionally sought to overcome these problems by developing long-term relationships, exchanging confidential information and obliging entrepreneurs to share risk with the lender. Among the means requirements that banks have traditionally used for risk sharing are 1) requirements for equity contributions from the owners of the company and 2) collateral.

Figure 2. Sources of Financing for EU-Based SMES



Source : EOS Gallup Europe (2005), "SME Access to Finance", *Flash Eurobarometer* 174, October, for the European Commission (Directorate-General "Enterprise and Industry").

In environments where companies tend to be thinly capitalized, where investment in equity has historically not been heavy and where standards of disclosure and transparency have not been rigorous, European banks and their SME clients tend to have tight long-standing relationships. In lending to SMEs, banks acquire private information that tends to lock these customers into a form of captive relationship, though not necessarily a one-sided one. When borrowers seek loans from the same lender over time, a repayment history accumulates and the lender forms an extensive information set based on multiple discussions with management, assessments of financial statements or other supporting documents, and re-negotiations of loan terms that can be used to refine contract terms offered under future lending agreements.

From the perspective of SME borrowers, an existing relationship has value, which may be lost if they switch to a new provider of finance that does not have the same perspective of them or their business. The lender must maximize the probability that the funds will be used for the stated purpose and, above all, the likelihood that the loan will be repaid. The decision depends on the nature of the firm, the experience and competence of its owner/manager and its track record.

Although major commercial banks are now the main source of credit to SMEs in Europe this was not always the case. During the nineteenth and early twentieth centuries, the large national banks (or universal banks) preferred to deal with governments or with the larger companies. Smaller firms tended to rely on locally based credit institutions, such as local banks, credit cooperatives or savings and loan associations.¹ These institutions often had cooperative structures and tended to bring together the most important actors in the local economy, such as tradesmen, manufacturers, farmers as well as professionals, such as lawyers (or notaries) and accountants. Credit reporting agencies were usually well placed to engage in dissemination of credit information and monitoring. Personal guarantees and recommendations were widely used and trade credit was a common form of financing. These institutions and individuals had information regarding the state of unpaid debts and about the value of collateral that was useful in making credit decisions. These institutions were distinguished in that a) they were frequently not organized in the corporate form but in some other form, often the mutual form; b) they operated on a local level.

To a significant degree these institutions offered services that were similar to those offered by banks. In addition, these institutions utilized some of the techniques used by banks such as requiring collateral from borrowers that could be pledged against loans. The growing importance of collateral (and of mortgage systems) made these institutions strong proponents of strengthening legal systems in order to protect creditor rights. Laws were enacted that favored the growth of such institutions by reserving certain activities for such institutions or giving these institutions special privileges.

The financing patterns of SMEs have evolved over time in Europe as in other areas. In the first place SME finance has tended to be absorbed into multipurpose financial institutions centered on commercial banks, while mergers have led to larger banks. Many traditional banking operations such as lending to larger corporate entities have been displaced into the capital markets. As a result banks have sought to develop areas of business that enable them to use their advantages in credit monitoring and maintaining longer term relationships with clients. This trend has encouraged banks to identify "middle market lending", i.e. SME and consumer lending, as an area in which they can earn reasonable returns from traditional on-balance sheet lending. As wholesale operations migrate to capital markets, SME finance is increasingly a task that falls on commercial banks rather than on specialized institutions.

In Europe, the majority of SMEs maintain a business relationship with just one bank (e.g. 90% in Denmark and 80% in Norway). (See Table 3).

¹ Cull, Davis, Lamoreaux and Rosenthal 2005.

However, the situation of an exclusive relationship with one bank may be contrasted with cases in which SMEs choose instead to source different products from multiple lenders, as is common in Italy and several other southern European countries.

Table 3. Number of banks used by SMEs in Italy

NUMBER	Size of Firm: Number of Employees.		
	FEWER THAN 10	10 – 49	50 – 249
Only one bank	52	39	33
2 -3 banks	38	42	31
4 or more banks	6	11	22
Do not know/NA	4	7	14

Note: may not add due to rounding.

Official Support for SME Lending

Government support programs for SMEs, which are present in all European countries, have been instrumental in facilitating the flow of resources to this sector. Convinced that there are market imperfections in the extension of credit to SMEs that are serious enough to justify government intervention, many European governments have launched programs to provide public funds to facilitate SME funding. Two main approaches are 1) development banks and b) loan guarantee programs.

Many governments have established development banks that operate on a local, regional or national basis. In Germany, for example, a number of regional and specialized banks are key lenders in the SME sector, with the Kreditanstalt für Wiederaufbau (KfW) the best known. The KfW, which operates on a national scale, is expected to earn a sufficient return to cover costs, including loan losses, and generally lends at fixed interest rates for up to six years. Part of the reason for the long-term success of the KfW loans is the procedure whereby assessment and evaluation are undertaken by private banks. The German model has generated considerable interest elsewhere in Europe partly because of the role played by state-backed banks, but also because German banks have a long history of providing long-term debt facilities to their customers, with limited use of equity.

Due to high monitoring costs, lending to SMEs is typically expensive than larger corporate loans. In addition, banks favor borrowers with collateral, rather than those with the most promising business project. The provision of collateral would be particularly difficult for start-ups and other relatively young enterprises. Consequently, governments, along with trade

associations and local entities, have launched a number of guarantee schemes: for SME lending².

Although the specifics vary among countries, there are two main types of guarantee schemes: 1) mutual guarantee associations, which are established by groups of SMEs, by business foundations, or Chambers of Commerce, often in collaboration with banks, and 2) loan guarantee funds, which are most often funded by regional or national governments. Official guarantee schemes typically involve formulas under which banks share the risk with the official guarantor and in which the interest rate paid includes a premium to compensate the authorities for the guarantee. There usually is a legislative requirement that the scheme cover costs.

The program in Italy includes both a public loan guarantee component and a mutual guarantee component. Under the Italian scheme; the default experience is lower than in the banking system and performance in general is better than the European average. Overall funds have been directed to less developed regions of the country, and the scheme has succeeded in lowering costs and increasing the flow of credit to SMEs³.

Most government credit guarantee schemes are administered by commercial banks, with lending decisions made by the banks. These support schemes are when the banker believes that the project in question is likely to be commercially viable but where collateral is insufficient. The bank may choose to propose that the SME utilize a loan guarantee scheme in which funding is made available to the business but at a higher rate of interest. The proportion of the loan which is guaranteed by the government generally varies from 60 to 90% of the loan, with the remainder of any loss absorbed by the bank.

In no European country is the SME sector as a whole heavily dependent upon official support. Banks assume the largest share of risk. Moreover, most official support programs do not represent a drain on public finances.

Summing up: A Strong SME Sector with Adequate Financing

In most European countries, there is little evidence of an overall scarcity of financing for SMEs. This has been confirmed by continuing surveys of SME finance undertaken in several countries. For example, the Bank of England Survey of SMEs for 2004 found that about 80% of SMES use external finance, but most SMEs had not sought new external finance in the preceding three years.⁴ The most common reason for not seeking new

² In the United States, the Small Business Administration provides guarantees for loans made by banks to firms that qualify under its lending program. Similar arrangements exist in Germany, Italy, Japan, Korea and the United Kingdom.

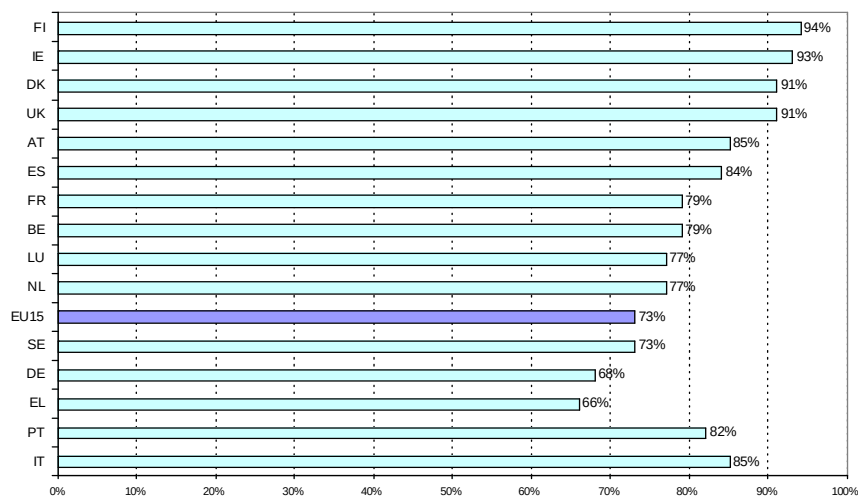
³ Zecchini and Ventura (2006).

⁴ Frazer (2004).

external finance was the absence of need. Similarly in a study undertaken for the European Commission in 2004, SME managers were asked whether they believed that financing was available in sufficient volumes to enable the company to undertake its plans, an average of 74% of respondents believed that financing was adequate. (See Figure 3). In sum, it is clear that financial intermediaries, with modest support from government, have found ways to meet most of the credit demands of the SME sector.

In the preceding section, it was asserted that SMEs do not face systematic difficulties in obtaining funding in Europe. While this statement is true in the aggregate, there are nevertheless some key sub sectors of the SME sector where Europe does appear to be underperforming. These categories, which overlap to a considerable degree, are a) new companies, b) high growth companies, c) high technology companies and d) companies requiring equity finance.

Figure 3 . Survey Results in EU Countries
“Is the company’s current financing sufficient to see project through?”



Source: EOS Gallup Europe (2005), “SME Access to Finance”, *Flash Eurobarometer* 174, October, upon the request of the European Commission (Directorate-General “Enterprise and Industry”).

3. The Special Case of ISMEs

In the preceding section, it was shown that one area where Europe plainly falls short of other advanced areas is in the rate of new company

formation. The process of new company formation, with large numbers of companies being formed and closing differs significantly between Europe and other advanced regions. The low level of new firm creation and growth may well be related to patterns of finance in the SME sector in Europe.

The category of SMEs where European performance has been clearly lagging consists of new high growth SMEs, especially those using new technology. This category of company is sometimes described as Innovative SMEs, or ISMEs. While ISMEs only account for an extremely small share of all SMEs in any country, they have the potential to yield disproportionately high benefits in creating new employment and introducing cutting-edge technology into the economy. While the established companies of Europe (and in America) are doing well in terms of growth and profitability, they are not creating many new jobs. In fact, there is a contraction in private sector employment in many European countries.

The traditional bank-centered financial system of Europe, which is well suited to providing financing to most SMEs, is ill-suited for ISMEs. ISMEs rarely can provide collateral. Their business plans are risky and hard to assess. Such firms rarely generate sufficient cash flow to service debt and their risk is too high to be suitable candidates for bank finance. Instead they will usually progress through several stages of external finance before realizing their potential. The most successful means of providing finance to these firms have been through equity under which the investor can assume a large amount of risk, but can also reap very large rewards. However, traditional equity investments, based upon publicly listed companies operating in established regulatory frameworks, have limited applicability to the companies in question⁵.

The lack of finance in forms that are usable by ISMEs is frequently perceived to be one of the explanations for the lack of dynamism in this sector in many European countries. Governments of many European countries have observed that the United States is seen to have made impressive strides, both in applying technology in the economy and of directing finance to smaller and innovative companies. Indeed, US experience often served as a model for other countries. Policies aimed at assisting risk capital have generally been coordinated with policies aimed at developing technology and entrepreneurship as well as policies to enlarge the access of ISMEs to finance.

⁵ A listed company frequently has diverse ownership with many investors buying and selling shares on an ongoing basis. They face strong legal disclosure requirements, and typically have established business models and follow mainstream models of corporate governance. Recognizing the need for standards of corporate governance adapted to the specificities of certain non-listed companies, the EVCA issued a set of standard guidelines for reporting to investors (EVCA, 2000), which was recently complemented by corporate governance guidelines for the private equity and venture capital industry (EVCA, 2005b).

Believing that the slow development of the risk capital sector is a major impediment to the growth of ISMEs, many European countries as well as the European Union have made it a high priority to develop their risk capital sectors. For example, the European Union in 1997 formulated a Risk Capital Action Plan (RCAP) designed to reduce the "risk capital gap" with the United States and thereby to enhance the competitive position of EU members in innovative technology sectors.

The concept of an ISME is comparatively easy to define in the abstract, but difficult to measure on a consistent basis, especially across countries. ISMEs are SMEs having the potential to attain exceptionally high rates of growth. A traditional SME is normally expected to achieve a stable market position within a few years after its launching. An example would be a bakery that opens in a particular neighborhood and achieves a viable market position supplying local needs. Such an entity may be able to provide a good standard of living of the entrepreneur and his workers, but the enterprise has limited growth potential. It is the kind of enterprises that is well suited for smaller scale family owned enterprises. Such an entity is likely to receive external financing from sources such as banks, suppliers credits and "quasi-banking" (leasing factoring etc.), possibly supplemented by government guaranteed credit. Such techniques can even be used for expansion, such as modernization of equipment or for opening at a second location.

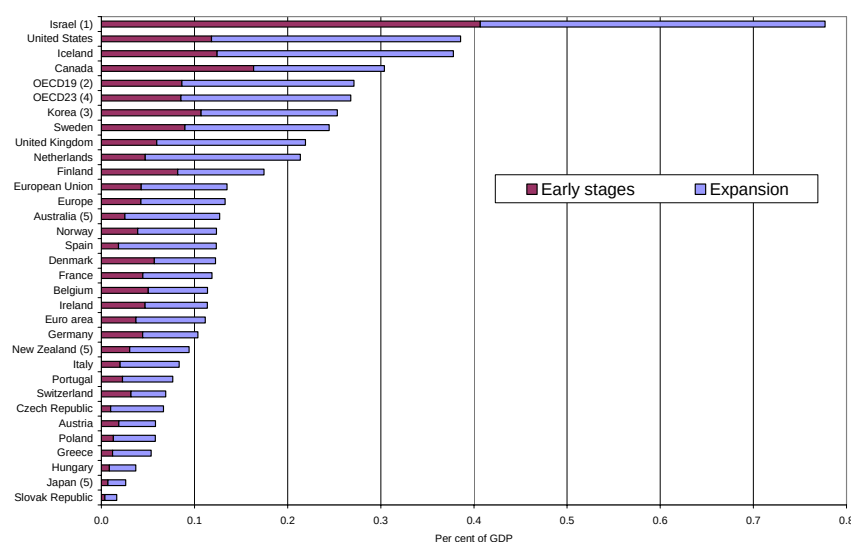
By contrast, an ISME is likely to have a new product or a new method of delivery of that product and is unlikely to reach positive cash flow early in its life cycle. Thus, an ISME has a risk return profile that is unsuitable for bank finance. A risk sharing formula that is more appropriate to high risk high return companies is needed. Such mechanisms are where a "bottleneck" in finance in Europe can be identified.

While there is no standard definition of ISMEs, most European countries have identified categories of targeted companies that are believed to be strategically important in employment creation and technology dissemination. For example, France has designated a category of company "gazelles", as deserving of official support in view of their strong capability to generate employment. This category comprises independent firms (i.e. not under the control of another enterprise) having between 5-250 employees, with at least two successive annual increases in turnover of at least 34%. France has identified 2000 such companies and has developed policy packages designed to further their development⁶. Other European countries have used other definitions and have somewhat different support measures.

⁶ France. Ministère des PME (2006).

It is not certain to what degree a slow growing ISME sector can be simply attributed to deficiencies in the system of financing. Nevertheless, a preliminary notion of the relative financing position of European countries can be gleaned by examining rates of investment in early stage venture capital. Figure 4 shows early and expansion stage venture capital investment in various countries.

Figure 4 . Venture Capital Investments by Stages
In per cent of GDP, averages 2000-2003



Notes: 1. 2000-2002.

2. Europe, Canada and United States.

3. 1998-2001.

4. Europe, Czech Republic, Hungary, Poland, Slovak Republic, Canada, and United States.

5. 1998-2001.

Source: OECD, based on data from EVCA (Europe); NVCA (United States); CVCA (Canada); Asian Venture Capital Journal (The 2000 Guide to Venture Capital in Asia).

Some other interesting inferences can be drawn from the data. In the first place several countries that had strong SMEs sectors, as measured by the share of the adult population engaged in entrepreneurial activity, did not necessarily have strong venture capital sectors. These countries would include Greece, Italy, Norway and Switzerland. Even Australia and New Zealand which were characterized as the most entrepreneurial among OECD countries did not have particularly strong venture capital sectors. On the other hand, Sweden and the Netherlands, which were not noteworthy

for their high rates of entrepreneurial activity, had some of the strongest venture capital sectors in Europe. Thus, while countries with very low levels of entrepreneurial behavior all had weak venture capital sectors, it is very difficult to draw direct linkages between overall measures of entrepreneurial activity and the prospects of success for the venture capital industry.

The explanations commonly advanced for the lag in performance in Europe generally fall into the following categories 1) general weaknesses in the environment for entrepreneurship, especially with respect to ISMEs 2) weaknesses or gaps in the methods of financing ISMEs and 3) inappropriate government policies.

In the remaining sections of this chapter, each of these issues will be examined critically and their capability to explain the gap in ISME development and ISME finance will be assessed.

4. Assessing the ISME Financing Gap in Europe

A. The Environment for Entrepreneurship and ISMEs

Clearly, an environment that is conducive to risk taking and places a high value on entrepreneurship is more likely to foster a thriving ISME sector than one which penalizes such behavior. Many critics of European social and economic policy argue that the European values as reflected in laws, regulations and practice favor egalitarian solutions while discouraging risk taking. It is often alleged that bureaucratic regulations discourage risk taking, while European regimes of social protection that reinforce job security for workers and mandate high fringe benefits add to rigidity. Overall, this judgment would appear too sweeping, since in many ways European countries have rather good records in maintaining entrepreneurship, but it does elucidate some problems in some countries.

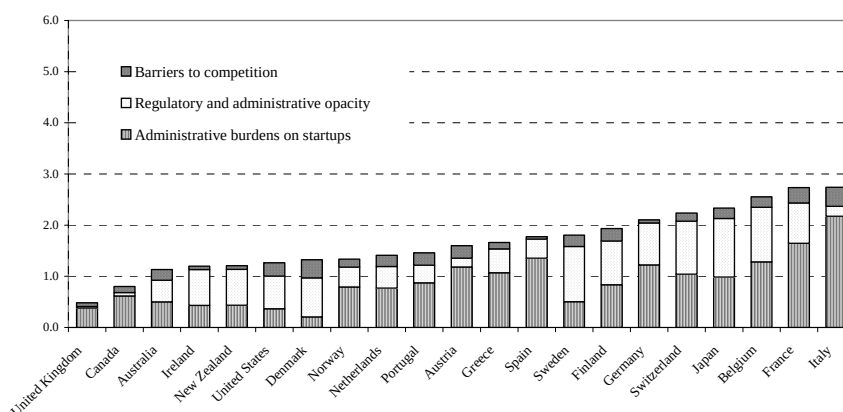
The OECD has been examining the policy framework that supports entrepreneurship for several years. Thus, the Entrepreneurship Study of 1998 summarized a considerable amount of earlier work and produced recommendations for measures through which governments can foster entrepreneurial activity⁷. Moreover, the OECD carried on a series of studies on the "new economy" during 1999-2001 to determine the degree to which the differing rates of productivity advance in Member countries could be explained by relative progress in high-technology sectors. The final New Economy Report concluded that progress in applying technology in concrete economic problems, particularly by ISMEs, was indeed a significant

⁷ OECD (1998)

determinant of performance and made recommendations generally in line with those of the earlier OECD reports⁸.

High administrative and regulatory barriers to entry are an obstacle to entrepreneurial activity in several countries. Regulations in the registration of new businesses, non-transparency of tax and other administrative compliance procedures can be burdens to firms in their start-up and early stages. Figure 5 shows OECD estimates of administrative burdens on firm formation in Member countries. Regulatory and administrative burdens were relatively low in the United Kingdom, Ireland, Australia, New Zealand and North America, but were high in Italy, France, Belgium, Italy and Japan.

Figure 5. Barriers to Entrepreneurship in OECD Countries ¹
Based on 1998 data



Note: Total venture capital investment consists of early and later stage venture capital as well as, except for the United States, buyouts. European Union 14 comprises data from Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Euro, Denmark, Sweden, and the United Kingdom. OECD 22 comprises data from European Union 14 countries as well as from Norway, Switzerland, the Czech Republic, Hungary, Poland, the Slovak Republic, Canada and the United States.

Source: OECD

Some reforms to reduce burdensome administrative regulations, particularly those afflicting smaller, technologically driven, young enterprises include more client-friendly and centralized procedures such as “one-stop shops” to bring all administrative formalities together under one roof, as well as greater use of information technology such as online registration and filing. In addition to barriers to entry, overly severe bankruptcy and insolvency regimes discourage the undertaking of risky

⁸ OECD (2001)

projects with possible high future returns. In environments that are conducive to venture capital, the successful entrepreneurs often have failed in one or more endeavors before achieving success. Bankruptcy regulations are also less stringent in North America than in most European countries and Japan.

The OECD recommendations assume that the overall thrust of policy should strike a reasonable balance among social protection, technological innovation and entrepreneurship. As the first step, member countries were advised to assure a proper macroeconomic environment, with open and competitive product and financial markets as well as systems of labor and social protection that encourage flexibility. To stimulate firm creation and entrepreneurship, governments were encouraged to take some specific policy actions. Among the main policy recommendations were:

- i) Firm entry and exit should be facilitated by reducing administrative formalities, reforming bankruptcy and insolvency procedures, utilizing employee ownership schemes, and easing exit through stock markets;
- ii) Positive attitudes towards entrepreneurship should be instilled through the education and training systems, the protection of intellectual property, and the interaction among government, university and private company research;
- iii) Access to appropriate financing should be promoted by relevant and effective government support programs.

As observed in the preceding sections, there is a significant difference between the list of countries having high levels of entrepreneurial activity and those with strong venture capital sectors. Several European countries that have well developed SME sectors including high rates of new firm formation, such as Norway, Greece and Switzerland, do not have well developed venture capital sectors. Similarly, Australia and New Zealand have some of the world's highest rates of involvement in SMEs and high rates of new company formation but lack strong venture capital industries. By contrast some countries with only modest amounts of overall entrepreneurial activity (e.g. Sweden and the Netherlands) have comparatively strong venture capital sectors. In conclusion, high rates of entrepreneurial activity may be helpful to the development of the ISME sector, but do not guarantee that this sector will flourish.

Tax Policy

The venture capital industry and business angels advocate tax regimes that reward risk taking. Areas of special concern are the taxation of capital gains, as well as the fiscal treatment of stock options and unlisted

investments. Many of the participants in the venture capital market, such as pension funds, are tax exempt, and thus tax issues are of secondary importance for them. By contrast, businesses angels, venture capitalists and entrepreneurs depend heavily on capital gains and are liable for taxes. In many newer companies, both the entrepreneurs and employees have an implicit contract in which they accept relatively low direct compensation and difficult working conditions in exchange for the possibility of reaping very high rewards should the endeavor succeed.

A number of risk capital market participants are concerned about the accounting and tax treatment of mergers. Since these operations are fairly common in early stage companies, attempts to tax mergers and other forms of corporate reorganization weigh heavily on early stage business.

Developing Regional Centers of Technology

In addition to the overall environment for entrepreneurship, there are specific characteristics that are believed to favor the development of ISMEs, especially in technology-related fields. The links between research, finance and industry are particularly significant in this regard. In some countries scientific research takes place in isolated universities or institutes and possibilities may be scarce for researchers to engage in applied research while retaining the option of returning to a research setting. Successful ISMEs, especially those in tech industries, tend to be concentrated in certain geographic locations. Those locations tend to be characterized by concentrations of research facilities in universities and institutes engaging in cutting edge research as well as technology-oriented companies. Sources of finance such as business angels and venture capital companies tend to be located in these areas as well as support services, such as lawyers accountants and consultants.

The classic "technology hotbed" is Silicon Valley, which some observers describe as an enclave of entrepreneurship drawing talent from all over the world. Business failure is seen failure as a necessary part of the process of enterprise creation, experimentation and growth. Significant amounts of start-up and pre-seed capital are available, along with a cadre of experienced entrepreneurs who are willing to give their time to identify promising new companies and to engage in coaching. The practice of "bootstrapping" is common, whereby the founding team, their families and friends make the most of their personal resources. Business angel investors are well developed and now receive money from pension funds. Investors enter the project in the knowledge that 2-3 rounds of capital injection will be necessary to launch the investment successfully.

Experts do not agree in detail what makes some regions successful centers of technological innovation and finance. However a general notion

of what experts believe constitutes the underpinning of a successful technology hotbed is found in Box 1. The list of characteristics of successful technology hotbeds is based upon an exercise undertaken by a group of venture capital experts with experience in several world markets for ISME finance⁹. The objective of the enquiry was to specify the conditions under which China could emerge as a “technology hotbed”, but the analysis of the conditions which constitute such an environment has global validity.

In a similar but more systematic effort, Robert Huggins Associates, a well known international consulting firm, produces a World Knowledge Competitiveness Index (WKCI) which compares 125 regions in North America, Europe and Asia Pacific in terms of their competitive position as centers for knowledge-based economic activity. The index uses 19 knowledge economy variables such as employment in the knowledge economy, patent registrations, R&D investment by public and private sectors, information and communication technology and access to finance. A synthesis of the results of the survey is presented in Table 4.

As expected, Silicon Valley scores the highest globally with US regions achieving the seven highest scores. In Europe, Stockholm scores highest with Nordic countries generally scoring as well as the successful high-tech centers of the U.S.A.¹⁰ However, European centers only have three places in the top 43. Other European centers generally rank less favorably and even the best European centers have scores similar to average centers in the U.S.A. It is noteworthy that most of these successful ISME locations are not in the traditional financial centers of their own countries, suggesting that geographic proximity to entrepreneurs and researchers is more crucial than proximity to traditional providers of finance.

The policy implications are not always straightforward. Many of the standard policy prescriptions for building an entrepreneurial environment can be read as recommendation a diminution of the welfare state and toleration of greater social inequality. However, Sweden, which is reputed to have a tax system and other policies designed to produce social egalitarianism that would not appear to be favorable to entrepreneurship and risk taking, scores very high on the WKCI index. It also has a comparatively well developed venture capital sector. (Some Asian regions that are now significant technology centers, such as Bangalore and Shanghai, achieved low scores on the WKCI.)

⁹ This set of criteria was developed by Ernst & Young in the context of making recommendations as to how China could emerge as a “technology hotbed.” By pooling the experience of a group of experts in venture capital with experience in Silicon Valley, Israel and Chinese Taipei, some agreement was reached on what constitutes an attractive environment for ISME finance. While the report was aimed directly at China, the characteristics identified are applicable globally. (Ernst & Young, September 2005).

¹⁰ Robert Huggins Associates (2005).

Table 4. Index of Technological Competitiveness of Major World Regions in 2005 (Europe compared to other Regions)¹

REGION	SCORE	RANK
Silicon Valley	296	1
Boston	244	2
U.S.A.	239-194	3-7
Stockholm	191	8
U.S.A.	176-151	9-19
Helsinki	148	20
U.S.A.	147-137	21-28
Paris	136	29
U.S.A.	133-125	30-43
Switzerland	123	44
Brussels	118	45
South Sweden	117	46
South Netherlands	113	50
Denmark	111	51
Norway	110	52
Baden-Württemberg, Germany	108	54
South East UK	106	55
London	106	56
Shiga, Japan	105	57
Luxembourg	103	58
Eastern UK	97	62
Bavaria, Germany	94	65

Notes: All numbers not shown are in U.S.A.

Source: Robert Huggins Associates

B. European Risk Capital

The preceding section surveyed the general economic and institutional environment for ISMEs in Europe. This section focuses more directly on risk capital. At times the challenge of financing ISMEs is framed narrowly in terms of "venture capital" or the need to develop special equity exchanges to support fast growing companies. In fact, it is more productive to frame the issue in terms of "risk capital", i.e. all forms of financing that are relevant to ISMEs. As a practical matter, most of the relevant techniques are equity or equity-related since that form of financing is best suited to high-risk high-return situations.

To be effective in any market sector, a financing technique must master the peculiar challenges in that sector regarding information asymmetry, monitoring and the distribution of risk and reward. In the preceding section

it was seen that European countries have developed a range of instruments, centered on bank credit, that are well adapted to financing traditional static or slowly growing SMEs. Once a new SME has attained a viable size and attains positive cash flow, the company utilizes a fairly standard range of products such as bank loans, asset-related finance and government programs. By contrast, the goal in financing ISMEs is to progress along a continuum that starts with informal finance, progresses through various phases of formal finance and culminates in entry into the formal regulated capital markets. In this process, finance often acts as a catalyst in developing and commercializing emerging technology and shortening product development cycles.

A key reality is that ISMEs require funding for a period during which they are not generating sufficient revenues to cover expenses. Moreover, even when ISMEs begin to generate revenue, the need to re-invest heavily in the company means that the company will have negative cash flow for prolonged periods. Thus, risk capital usually assumes that the project will require multiple rounds of injection of outside funds. Those providing funds often use the prospect of future injections of equity as a monitoring tool.

The "Financing Ladder"

In developing the market for risk capital, it is important to have a complete range of financing vehicles. Following initial funding from family and friends, business and research colleagues and possibly grants, the enterprise may obtain funding successively from seed capital funds, informal equity investment, such as "business angels" before moving on to formal venture capital. The entire process reaches its culmination when the firm "exits" as a mature company through an IPO or a trade sale.

Investment at any stage of the life cycle is frequently available only on the condition that there is some potential for the firm to advance to the next stage. Thus, providers of early stage funding are more likely to respond positively to business plans when they believe the proposal has the capability of attracting support of business angels. Business angels in turn will be encouraged if they believe that the project is a good candidate for venture capital financing. This process is most explicit in venture capital financing where it is accepted that equity will be injected into the firm in successive rounds, with the final objective of realizing an exit through a trade sale or an IPO. Without such "exit vehicles" venture capital cannot function. More generally, when gaps appear at any point in the funding continuum, the capability of the system to support the emergence of high potential firms is lessened.

Three special forms of equity are especially suited to financing such firms as they move through the financing cycle: (i) business angels or informal

equity finance provided by individuals on relatively flexible conditions, especially in early stage finance; (ii) venture capital, a more highly structured technique to provide equity to emerging high-growth companies; and, (iii) growth equity markets where a certain number of high-growth companies eventually achieve listing on specialized exchanges or specialized parts of exchanges that are reserved for high growth companies. Defects in each of these markets segments have been identified as obstacles to the financing of ISMEs in Europe.

a. Informal Equity Investment or "Business Angels"

The discrepancies between the European risk capital market and the more dynamic markets of other countries begin in the pre-venture capital phases of financing. Indeed, both in Europe and America, classic venture capitalists are increasingly concentrating on larger, later stage deals with the result that the informal equity market or "business angels" i.e. private individuals who invest their own money, play a growing role.

Business angels are usually successful cashed-out entrepreneurs who, in addition to investing their own money, contribute experience and utilize their networks of contacts in assisting unquoted small and medium sized businesses to grow. Business angels represent the first level on which the entrepreneur must deal with outside investors, and thus serve as a bridge between the earliest forms of informal investment, where it is nearly impossible to separate the act of providing capital from other aspects of starting and managing a company, and the later phases of the life of a company where the separation of functions is sharper. Business angels are active in all categories of newer companies, both those which will peak as medium-sized enterprises with modest growth potential as well as those that will qualify for formal venture capital.

Business angels have different investment criteria from venture capitalists. Business angels' methods tend to own common stock rather than preferred convertible stock, the preferred vehicle of venture capitalists. Business angels prefer to invest in companies with which they can maintain close contacts. They will also frequently ask for a seat on the board to oversee the work done by the team. Business angels increasingly form their own syndicates into which they bring other interested investors permitting investment in higher amounts. Syndication also results in risk diversification for investors and more diverse kinds of expertise. Co-investment funds are also being set up in a number of countries across Europe, for public investors to invest with angels on a regional scale.

The early stage in the life of a company, where the entrepreneur first seeks outside financing is where many analysts and policy makers perceive

a “market failure” or “financing gap” for new and risky enterprises.¹¹ However, there is considerable controversy over the nature of the alleged market failure and what the possible solutions might be. On the one hand, many surveys of potential entrepreneurs in all countries show that the lack of financing is perceived as a barrier to enterprise formation and growth. On the other hand, in countries where the business angel sector has reached a certain degree of maturity many potential investors report a scarcity of “investment ready” proposals.

In many cases entrepreneurs, especially those in technology-related fields may have strong technical backgrounds and novel ideas, but may lack the business acumen to turn ideas in marketable products. Investors on the other hand may be reluctant to commit funds until a well-articulated business plan is produced. To the degree that lack of information and unrealistic expectations are problems, the solution is ease flows of information while educating entrepreneurs as to what the different sources of finance are, and how each source of finance makes its investment decisions and what different obligations they impose on the entrepreneur.¹²

Business angels (BAs) have been well established in the US for decades. Although figures on the volume of investment is scarce due to the nature of informal investing, a leading American expert on angel investing, Jeffrey Sohl of the University of New Hampshire, estimates that in 2003 there were 300, 000 to 350, 000 business angels in the USA, investing approximately \$30 billion per annum in close to 50.000 ventures. Venture capital funds, meanwhile, invest \$30 to \$35 billion in fewer than 3,000 entrepreneurial ventures. Another well known commentator¹³ estimates that there are as many as 1 million BAs with total investment of \$ 50 billion per year. Even with the more conservative figure, business angels invest at least as much as venture capitalists, but they invest in ten times as many deals of much smaller size.

The European business angel sector is only a small fraction of the American market, although there are doubts about its exact dimensions. Serious researchers estimate that the business angel sector in Europe is only 10-15% of the size of the American market. The highest concentrations of business angel activity are found in the UK, Germany, Belgium, Sweden and France. In the UK leading experts have estimated that there are 20.000 to 40.000 business angels investing £0.5 billion to £1billion per annum in 3,000 to 6,000 companies. Between 1998 and 2003 business angels in the UK made claims for tax relief averaging € 800 annually. It is estimated that business

¹¹ For a review of the literature, see Hubbard (1998).

¹² Mason and Harrison (2001).

¹³ Ronald Peterson author of “When Venture Capitalists Say No.”

angels make eight times as many investments in start-up companies as venture capital funds.¹⁴

Whatever its exact size, the market is significant and growing. Based on the research conducted through its member networks, the European Business Angel Network (EBAN) estimates for the year 2004 the number of deals to be twice the number of deals in 1999.

There are great complementarities between business angels and the formal venture capital sector. Business angels provide support to the formal venture capital sector by seeking out and screening new projects, thereby raising the number of start-ups, increasing the deal flow for venture capital companies. Partly due to the difficulty of monitoring smaller projects and the fixed costs of due diligence, the average size of deals has tended to rise in traditional venture capital. Venture capitalists have been tending to concentrate on later stage investments and on larger scale projects (with a minimum outlay of € 2 to 3 million). This opens a market niche in which business angels often fund smaller deals. The EBAN estimates that business angels are effective in investments in the range of € 25,000 to 250,000 in continental Europe, or up to € 400,000 in the UK. Angel syndicates often pick up from there, investing up to € 2 million.

On balance, there appears to be a potentially large pool of informal investors that can be mobilized if the proper framework and incentives are in place. In many European countries this sector is plainly not living up to its potential.

Business Angels Networks

An important advance has been the emergence of well-developed channels to share information and to provide a means of introduction and contact between SMEs and potential investors. Business Angels Networks (BANs) have the potential to mobilize substantial pools of informal venture capital that were formerly fragmented and invisible, stimulate demand for equity finance that would otherwise have been latent, and facilitate investments by creating communication channels. Contacts are maintained with other sources of deal flow such as universities, government investment promotion agencies, incubators, financial institutions, lawyers and consultants. The matching of investors and entrepreneurs operates in different ways such as investment newsletters/magazines, investor forums and fairs. Many BANs utilize the internet and databases intensively and some are nearly exclusively internet based.

BANs operate typically on the regional level. In some European countries they are represented by a national federation (France Angels,

¹⁴ Mason and Harrison (2000), and Mason and Harrison (1999).

IBAN in Italy) which mainly work towards raising awareness on the topic of angel investing and the potential economic role that angels can play in filling the equity gap. In addition to nationally and regionally organized BAN there are increasingly sectoral BAN for biotech, internet, media etc, or for women investors. Some of these networks are sponsored by local governments. BANs may also be sponsored by financial institutions, stock exchanges or venture capital associations.

According to some analysts, it is very difficult for BANs to generate enough revenue to cover their own infrastructure costs. Thus, it has been suggested that the support for the infrastructure of BANs is one of the most effective ways in which public policy can be used to promote informal investments. Experience suggests that BANs are a very cost-effective way in which national or sub-national governments, sometimes in partnership with non-profit organizations or private sector organizations, can remove many of the financial and managerial problems encountered by new SMEs. However, care must be taken to ensure that such services form part of a broad package of support measures including through support of science parks and incubators as well as possible direct official equity participation.

European Business Angels Network (EBAN)

In addition to being less well developed than the private equity/venture capital sector, the business angel sector has been less well organized. For many years, there was no systematic collection of data, no directory of members, no agreement on best practices and no means to exchange information. After 1995 a group of regional development agencies and a few national angels associations began to coordinate activities began to launch activities on a European scale. The European Business Angels Network (EBAN) was created in 1999. One of the basic tasks of the EBAN is to ease communication among the various stakeholders such as the business angels themselves, universities, industry associations, governments and the EU. Additionally, the EBAN has served as a forum for the development of common positions by the BA sector throughout Europe.¹⁵

At first EBAN concentrated on developing European wide mechanisms to bring investors and entrepreneurs together. This process mostly involved transferring techniques developed in the US or the more advanced angel markets in Europe to less developed regions and sectors.

In the ensuing years activities have expanded into the following areas:

- i) Training and capacity building for new and prospective BAs

¹⁵ EBAN 2005 and EBAN 2007.

- ii) Developing “investment readiness” programs in which entrepreneurs receive coaching in improving business plans
- iii) Assistance in the formation of BA syndicates
- iv) Programs to partner funds from individual BAs and syndicates with seed funds sponsored by BA syndicates, universities local governments industry and foundations.
- v) Programs to improve communication between BAs and formal venture capitalists.

The EBAN has also developed series of policy positions to advocate measures favorable to the BA sector before national governments and the EU. The EBAN strongly advocates favorable tax treatment for BA investment, particularly a) tax deductibility for initial investments b) low tax rates on capital gains from BA investments and c) tax deductibility of any losses incurred in BA investments. Since BAs are high net worth individuals investing their own money, tax policy may well be a more powerful stimulus for BA investments than for venture capital investment.

The EBAN has developed a system to analyze and score national tax regimes based upon their impact on BA investment. The EBAN has prepared a compendium of tax incentives available to informal investors and business angels in Europe, concentrating on the income tax rate, the capital gains tax rate and special incentives available to BA investors.

b. Venture Capital in Europe

Venture capital provides a link between the ISME and institutional sources of capital. Venture capital offers investors diversification to offset the risks in other asset classes, and also holds the promise of higher absolute returns over time in order to compensate for the lesser liquidity and transparency of venture capital investments.

The venture capital firm is typically organized as a limited partnership. It brings together venture capitalists, (the general partners) who are active specialists in various industries and stages of the venture capital cycle with the investors (the limited partners.) The partnership terminates after a defined time period. The partnership will normally have a number of investments at various points of the investment cycle and revenues from exits will normally be reinvested in new ventures.

The ISME typically proceeds through several stages, from “seed” before production has begun through “early stage” and through one or more “expansion” or “development” rounds. The venture capitalist may participate at any stage of that process, although as noted above the trend increasingly is to invest later in the life cycle of the company. At the end of the process the venture capitalists aims to realize a return on the investment

through “exit.” The expectation is that the investment will be liquidated within a defined time horizon.

As already mentioned earlier this paper, investment in venture capital in Europe lags that of the USA, as well as other dynamic countries such as Canada, Israel and Korea. Some idea of the disparity can be gleaned by looking again at Figure 4 on early stage and expansion venture capital. (The data must be interpreted with caution, since European data often conflate venture capital investment with buy-outs.) Among OECD members, such investment ranges from 0.4% of GDP in countries such as Canada the United States and Iceland to barely one-tenth that size in OECD countries with less developed venture capital sectors. (Israel, which is not an OECD member, has an even larger share of venture capital in national income). This wide discrepancy has persisted even as the entire venture capital sector underwent some fairly sharp gyrations during the past decade.

The data show that, despite considerable dispersion among European countries, European countries lag the more dynamic countries of the world with respect to the development of venture capital. The United States, Canada and Korea have rates of investment in all stages of venture capital in the range of 2.5 - 4% of GDP, while the European countries with the largest venture capital sectors, such as Sweden, the Netherlands and the United Kingdom, have venture capital sectors of 2 - 2.5% of GDP. The average ratio for European countries is only slightly more than 1%, i.e. one third of the level of more dynamic countries, with several countries having considerably smaller venture capital sectors.

Clearly the low level of company formation and low levels of informal equity investment means that the European venture capital sector begins with a much smaller natural deal flow than its American counterpart. Beyond this, it is arguable that some of the structural and institutional characteristics of the venture capital industry in Europe have been unfavorable to the growth of finance to ISMEs.

The European venture capital industry does not have as large a pool of savings in appropriate forms as the United States to support venture capital. Overall institutional savings account for a smaller share of national income than in the United States, although there are a few European countries where institutional savings are high (See Table 5).

The history of the venture capital industry in the United States is closely related to the success of the U.S. industry in bringing together entrepreneurs and technicians from the reach sector with suppliers of institutional capital, especially pension funds.¹⁶

¹⁶ In the early years of the venture capital industry, university endowments, foundations and high net worth individuals were the main sources of funding for venture capital. In 1973, the U.S. Labor Department, which regulates private pensions, authorized investments in

Table 5. Financial Assets of Institutional Investors as Share of GDP in OECD Countries

	1993	1994	1995	1996	1997	1998	1999	2000	2001 ^P
Australia	36.6	35.1	40.2	44.2	51.2	53.8	63.9	67.0	67.5
Austria	0.6	0.7	1.0	1.2	1.7	2.4	3.6	3.8	3.8
Belgium	3.0	2.7	3.6	4.2	4.9	5.6	6.1	5.9	5.6
Canada	37.0	37.7	38.7	41.7	44.1	47.5	46.2	48.3	48.3
Czech Republic	-	0.1	0.5	1.5	1.3	1.6	1.9	2.2	2.5
Denmark	18.7	18.1	20.1	19.5	22.3	22.8	24.9	24.8	23.8
Finland	..	..	..	..	..	..	..	3.7	3.4
France	..	..	..	..	..	..	..	..	..
Germany	2.5	2.5	2.7	2.8	3.0	3.1	3.2	3.3	3.3
Greece	33	..	..	..	..	..	..	..	..
Hungary	-	0.01	0.1	0.3	0.7	1.3	2.2	3.1	3.9
Iceland	51.5	54.5	59.4	64.6	69.0	71.8	85.7	86.4	87.3
Italy	3.7	3.5	3.5	3.2	3.0	3.1	4.6	4.5	4.4
Japan	13.6	13.6	15.2	15.0	15.5	16.2	18.6	18.5	18.5
Korea	3.3	3.1	3.0	3.1	3.3	3.6	3.2	2.8	3.2
Luxembourg	..	..	..	..	..	..	..	..	..
Mexico	..	..	..	..	0.2	1.5	2.4	3.0	4.3
Netherlands	83.6	80.4	84.8	93.1	101.0	107.5	119.3	113.7	105.1
Norway	5.8	6.1	6.4	6.5	6.7	7.1	7.5	8.0	5.6
Poland	33	..	..	..	..	..	0.4	1.4	2.6
Portugal	5.4	6.2	8.2	9.3	10.3	10.6	11.3	11.3	11.4
Slovak Republic	..	..	..	..	..	..	..	..	..
Spain ²	..	4.8	5.0	5.7	6.4	7.2	7.7	8.4	8.2
Sweden	2.0	2.0	2.1	2.3	2.5	2.8	2.9	3.0	3.7
Switzerland ³	..	68.3	..	80.0	..	97.5	..	105.2	113.5
Turkey	..	..	..	..	..	..	..	..	..
United Kingdom	71.8	62.0	68.2	69.0	78.9	79.3	87.9	78.7	66.4
United States	50.5	50.3	57.1	60.7	66.9	71.0	73.9	69.3	63.0

In Europe, the United Kingdom, Switzerland the Netherlands and some Nordic countries have significant pension funds, but most European countries do not. In addition, pension funds (as well as insurance companies) in Europe tend to be tightly regulated with regulations often prohibiting or severely limiting severely investments in unlisted companies. In the United States, pension funds tend to invest about 5-6 per cent of their

venture capital. In the ensuing decades, pension funds have become the major supplier of funds to the venture capital industry.

assets in "alternative investments", which include venture capital as well as other instruments such as hedge funds. In the United Kingdom, which has a flexible system of pension fund regulation, the share is far lower. In the United Kingdom, the "Myners" report called attention to the low share of private equity in the portfolios of British institutions. Most other European countries have much lower levels of venture capital investment than the United Kingdom. Moreover, there are indications that even though some institutions are authorized only to invest small shares of their portfolios in venture capital, most pension funds rarely reach their ceilings.

The venture capital industry in Europe tends to be funded disproportionately by banks. Bank domination is also visible in many of the venture capital firms, which are often subsidiaries of banks. This stands in contrast to the situation in the United States where 80% of venture capital firms are independent. Many European venture capitalists have financial backgrounds rather than technology backgrounds. Independent venture capitalists usually have a stronger commitment to applying new technology in business solutions. The situation varies among European countries, with Sweden and the UK having the most independent venture capital firms. In France and Germany, by contrast, banks and corporations still dominate early-stage investing. Banks are oriented toward generating investment banking income while industrial investors are more interested in acquiring technologies that will help their established businesses than in promoting market-changing innovations.

One salient characteristic that has considerable power to explain the sluggish growth of the European venture capital industry is the low rate of return on venture capital investments, especially early stage investments in Europe. Table 6 shows the rates of return on venture capital and related forms of private equity (mainly buy-outs.) As can be seen, the rate of return on all venture capital is low and returns on early stage venture capital are actually negative, while returns on buy-outs and other forms of private equity are comparable to those in the United States. The low rate of return suggests that the market is not functioning to identify the most promising companies and to direct capital to those entities. It is sometimes observed that the number of early stage deals in Europe is actually higher than in the US, but that the average size of deals is very low, suggesting that European venture capital has difficulty in achieving adequate size and in raising follow-on tranches once good projects are identified. It might also indicate that official policies are spreading funds over a large number of companies, any of which have poor growth prospects and that the market is not functioning to identify the best growth candidates and to channel funds to those companies.

Table 6. European Private Equity Funds Formed 1980-2006
Net IRRs to Investors Investment Horizon Returns as of 31 Dec 2006

Stage	1 YR	3 YR	5 YR	10 YR	20 YR
Early Stage	1.1	2.1	-4.8	-1.2	-0.1
Development	0.4	7.2	1.2	7.2	8.6
Balanced	-9.4	15.9	5.1	11.1	10.0
All Venture	-0.7	8.7	0.5	5.5	6.6
Buyouts	26.9	13.2	7.2	13.6	13.8
Generalist	20.2	4.5	-0.8	7.2	8.3
All Private Equity	21.3	11.0	4.3	10.3	10.5

Source: EVCA

Private Equity

Closely related to venture capital is the instrument of “private equity”, which means an equity investment that is not listed on a public exchange. Venture capital is a form of private equity. Other forms of private equity comprise various forms of operations (usually buy-outs) in which a mature company is acquired, its balance sheet is restructured, and the company is possibly broken into component parts. The main difference is that venture capital deals with new companies that are taken through several stages to an ultimate exit, while other private equity deals with a broader range of companies, frequently mature companies.

In Europe in particular, many firms engage in both private equity and venture capital and the terms are often used interchangeably. Unlike the venture capital industry, which is lagging in Europe, the private equity sector has been vibrant.

European Venture Capital Association (EVCA)

The European Private Equity and Venture Capital Association (EVCA), a federation of national associations, is a well established group that has taken the lead in engaging in policy dialogue with governments and the European Community. This organization has a long history of engaging in dialogue on behalf of the private equity and venture capital industry with other stakeholders. This grouping represents the entire private equity sector in Europe and thus argues in favor of the buy-out sector of the market as well

as pure venture capital. It has generally pressed for measures to build a sound overall environment for private equity.

Legal, Regulatory and Tax Environment for Venture Capital

In order for equity investment in ISMEs to flourish, appropriate legal and organizational forms must be found to allow the venture capital process to proceed. The capability of the legally recognized vehicles for venture capital investment to enable such activity to proceed is particularly significant. The legal vehicle chosen should not be subjected to the full procedures established for public securities offerings and should be flexible enough for the general and limited partners to agree on compensation schemes and to write flexible contracts so as to minimize conflicts of interest.

Venture capitalists support the principle of tax transparency; i.e. no tax should be collected at the level of the fund, and income should be taxed as if it were received directly by the investor. Under some structures, earnings of the fund could be taxed as a capital gain at the time it is transmitted to the fund and subsequently taxed as a dividend when distributed to investors. While the specific provisions of some tax laws encourage some venture capital funds to establish operations in other jurisdictions, use of a particular country as a site for incorporation may create a permanent business establishment in the country and thus expose the company to additional tax liabilities. In addition, certain types of vehicles may be subject to investment restrictions that may preclude some venture capital investments.

After experiments with other forms over the years, the limited investment partnership has proven to be an effective vehicle for venture capital in the United States and it is used widely in the United Kingdom. Usually, the partnership has a specific life (generally 10-12 years) after which the fund is liquidated. The general partners are venture capitalists, who are active specialists in the various stages of the venture capital cycle, while the passive investors (high net worth individuals or institutional investors) are limited partners. Institutional investors find these limited partnerships attractive, since taxes are paid only by the investors but not by the limited partnership. In addition to providing for a fair distribution of risks and rewards, this structure also is tax transparent in that it avoids the double taxation of income first on the corporate level and subsequently when it is paid through to investors. Other forms of organization are used in other countries consistent with their own legal systems. Unfortunately, some countries do not have any legal forms that are well adapted to the needs of the venture capital sector. In some cases, the lack of suitable domestic structures encourages firms to establish in offshore centers.

In European countries, where a multiplicity of forms is found, funds generally contain both investors and projects in more than one country. In

such cases, the investment vehicle may be treated differently by the tax or regulatory authorities of various countries. Thus, foreign investors participating in the fund may be exposed to more taxes than those levied upon investors from the home country of the funds particularly if the vehicle was designed to conform to domestic laws. Some market participants, including the EU and the EVCA have called for a single structure recognized throughout Europe to address problems of tax transparency and investment restrictions.

In a recent analysis sponsored by the EVCA legal forms in European countries were divided into a) those that have structures that can accommodate domestic and international transactions on a transparent or tax free basis; b) those forms that have some facility to accommodate domestic transactions, but are too restrictive to be useful or where these structures could not effectively be used by foreign investors; and c) countries without any suitable structures. One recent innovation of the European Venture Capital Association (EVCA) has been to benchmark the European countries for the degree to which they have developed an adequate legal and regulatory environment for private equity and venture capital investment. The index is meant to measure:

- i) The investment climate for investee companies
- ii) The tax and regulatory environment for limited partners (investors) and fund managers
- iii) The prospects for retaining talented individuals in the industry.

The EVCA assigns a score to each country, and published country rankings as well as historical series on the index for each country.

While there are serious difficulties in installing the proper infrastructure in many European countries, the ability to operate across borders may be a significant mitigating factor. To the degree that any country lacks the necessary legal structures, it is possible to operate from other countries or offshore centers. Larger venture capital operations involve investors from more than one country and most venture capital firms are established in more than one country. Most incipient markets, especially those in Southern Europe or European transition countries, are founded by international firms with international investors being the main source of funding.

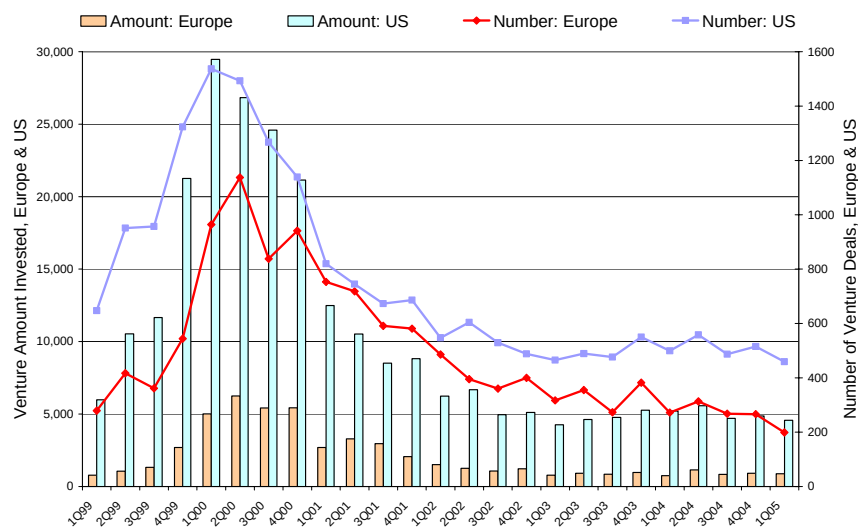
Venture Capital in Cyclical and Long-Term Perspective

It is frequently observed that the venture capital business is highly cyclical. During the expansionary phase of the cycle, funds flow into venture capital firms, which then pursue deals aggressively, pushing valuations upwards. In the contraction phase, equity prices fall, no new money enters

the sector and valuations decline. As a result, it is important for investors to avoid both the euphoria that occurs in the expansionary phases of the cycle and the panic during subsequent periods of contraction.

In the late 1990s, in large part stimulated by booming conditions in the real economy in which expenditures on information and communication technology (ICT) soared after 1995. By this time, the venture capital industry in Europe had gained some traction and the industry expanded in Europe. Venture capital funds raised in the United States rose nine-fold to \$ 93 billion between 1995 and 2000; in Europe, funds raised climbed fivefold to €€ 20 billion between 1998 and 2000. With the bursting of the bubble after 2000, activity contracted sharply. Despite these wide swings, differences in levels of private equity and venture capital in comparison to GDP remain vary large between the United States and other OECD countries (See Figure 6).

Figure 6 . Venture Capital: United States vs. Europe



Source: Thomson Financial, VentureSource / Ernst & Young.

In the post 2000 recovery from the tech boom, the European market has generally followed the global trend. However, the salient feature of European private equity is that it is becoming even more highly concentrated in buy-outs. In the buy-out sector, funds raised are now nearly twice as high as in 2000 while funds invested are 1/3 above that level.

However, venture capital is still below the level of 2000 and now represents a far smaller share of total private equity than in 2000.

Two major conclusions can be drawn about rates of return. In the first place the difference in performance between venture and private capital remain large. The top quartile of firms continues to achieve rates of return that far exceed those of average firms in both venture capital and private equity. Second, rates of return on venture capital remain substantially below those on buy-outs.

Summing Up

On balance, there may be some structural features of the European venture capital market that have probably inhibited the growth of this industry. These structural features include bank domination of finance, the lack of a common European vehicle for operating in the private equity market, a low level of institutional savings—especially in the form of pension funds and—possibly an unduly strict regulation of funds. However, the buy-out sector is also adversely affected by these developments and there is still a substantial pool of capital that supports a large volume of other private equity transactions. This suggests that the problem lies elsewhere, particularly low rates of company formation, little informal equity investments and a very low rate of return on early stage venture capital investments. The rate of return on venture capital in Europe trails that of America, both compared to investments on traditional stock or bond markets and especially in respect to other forms of private equity.

c. Exit Vehicles: Growth Equity Markets

The stage of exit is where the company, having passed through all of the developmental phases of its life cycle, leaves the realm of private equity and emerges as a public company. As discussed in the context of the financing ladder, there is a strong correlation between the ability to exit and the ability to generate business at all points in the risk capital cycle.

Exit can take several forms:

- i) Trade sales are outright, phased or partial sales of the company to a strategic investor, *i.e.* an industrial or commercial company that seeks managerial control over the company.
- ii) Private placement is the sale of the company to another financial investor who is interested in maintaining some control over the company without offering the shares to the public.

- iii) Share repurchase by the entrepreneurs. The terms under which the shares can be repurchased are usually stipulated in the financing agreement. This form of exit is considered to be the sign of a less successful operation.
- iv) Public offering. Under this technique the investor exits by selling part of their shares in a public offering. This is seen as the most successful form of exit.

The main avenue of exit at all times and places is through “trade sales”, *i.e.* sales to strategic investors. In fact, since most exits occur via trade sales, this is an area where governments might usefully review their policies toward foreign direct investment (FDI) or toward mergers and acquisitions. Since cross-border acquisitions are an integral part of the progression of ISMEs toward the stage of mature public companies, any measures that hamper the operations of the market in corporate control can impede the development of the ISME sector.

Although most exist occur through trade sales, a vigorous IPO market is beneficial for the venture capital market for several reasons: 1) to serve as a basis of valuations for companies; 2) to facilitate M&A operations; 3) to create mechanisms for the exercise of stock options and otherwise allow insiders to exit; and 4) to set standards of excellence to which all companies can aspire.

“Growth” Equity Exchanges in Europe

At several times during the past 20 years, many participants in the European risk capital markets have identified the absence of stock markets that specialize in “growth companies” as an obstacle to the development of their risk capital markets.¹⁷ The classic “growth exchange” is NASDAQ of the United States.¹⁸ Many world class companies, especially technology related companies, which would be eligible for listing on the NYSE (Microsoft, Intel, MCI, Apple Computer etc) have instead chosen to remain

¹⁷ “Growth companies” can be defined as being perceived by investors as having better-than-average growth prospects and trading at high multiples; P/E ratios tend to be high and dividend yields low. The high valuation of the company is justified by superior prospects for growth.

¹⁸ This exchange, which has been operating since 1971, was conceived as an alternative to the existing exchanges at the time, the New York Stock Exchange, the American Stock Exchange and the regional exchanges. (The US equities market has since undergone fundamental structural changes.) NASDAQ was one of the first exchanges to trade in a fully automated system without a trading floor. The NASDAQ model has been adopted in other countries, mainly those dealing in traditional equities. NASDAQ has specialised in growth companies and to have a large share of technology-intensive companies in its listings. Each NASDAQ stock has had a limited number of “market makers” who are committed to quote bid and offer prices on shares in which they have agreed to act as market makers. By the year 2000, NASDAQ had listed 4 400 companies, against 2 800 companies listed as the NYSE, although the average capitalisation was less.

on NASDAQ as their primary place of listing. Many European countries have sought to emulate the experience of NASDAQ.

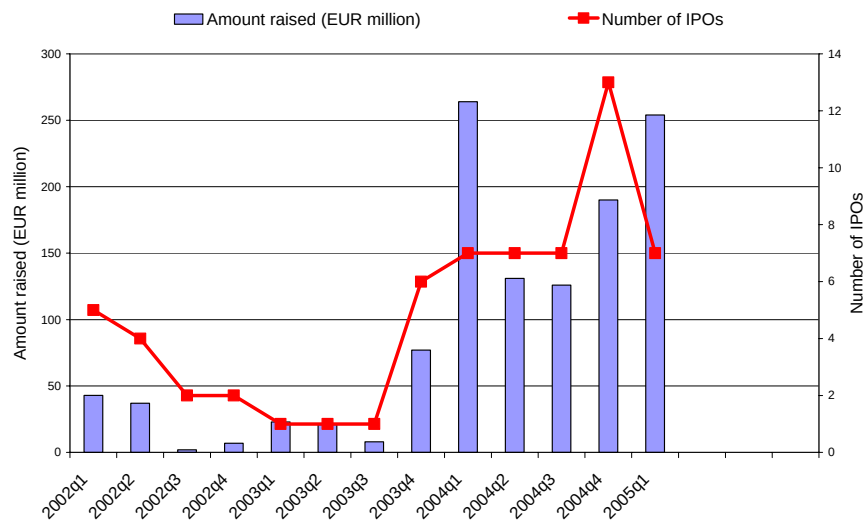
There was a first, mainly unsuccessful, wave of efforts to promote exchanges or sections of exchanges dedicated to SMEs in the 1980s. By the late 1990s, significant strides had apparently been made in constructing a second generation of stock exchanges geared to fast growing dynamic companies, with some 20 growth markets were operating in Europe at the end of 2001. The first in the second wave of European "growth equity exchanges" was the Alternative Investment Market (AIM) in London which opened in June 1995. AIM listed traditional small capitalization companies as well as "growth" companies. Some European exchanges had a traditional "second board" as well as a "growth company" board. In France, for example, the "Second Marché" functioned as a listing place for traditional small companies while the "Nouveau Marché" was set up as the "growth market."

Some international alliances were formed. Five of the growth markets in Europe (Germany, France, Italy, Belgium and the Netherlands) created a loose alliance known as the EuroNM, which was designed to merge into a pan European platform for growth stocks. Each exchange remained under national control and rules varied somewhat among countries, but the object was to achieve fuller integration with time. However, the underlying national systems differed significantly, and EuroNM was disbanded at the end of 2000. The Nordic Growth Market existed as a joint exchange alongside national growth markets in each Nordic country.

A number of platforms for trading growth equities across Europe were established. EASDAQ (the European Securities Dealers Automated Quote System) closely modeled on NASDAQ was set up in Belgium to operate throughout Europe. It was the only exchange where most listed companies were not domestic. In addition NASDAQ Europe, an international platform directly owned by NASDAQ designed to trade throughout Europe and with links to NASDAQ's global trading platform, was established. In 2001, NASDAQ Europe acquired EASDAQ.

During the pre-2000 Internet boom, investors rushed to build ITC and biotech exposure and trading on the growth exchanges soared. IPOs took place at inflated prices as many companies with highly tentative business plans and little or no history of earnings were floated prematurely. With the collapse of the IT bubble after 2000, most European growth exchanges ceased their operations or became illiquid. EASDAQ, which was acquired by NASDAQ in 2001 and re-branded as NASDAQ Europe, also met with disappointing results and was closed down in June 2003. Most of these exchanges were obliged to suspend operations after the bursting of the bubble. After stagnating for several years following the bursting of the tech

Figure 7. Amount Raised Through IPOs by European Venture-Backed Companies



Source: Thomson Financial, Venture Source/Ernst & Young

bubble in 2000, the IPO market has been staging a modest recovery in Europe. (See Figure 7)

With signs of recovery in the IPO sector reappearing, efforts to build a pan-European trading platform for growth companies resumed. In 2004, Euronext launched Alternext, a market geared to ISMEs. Also in 2004, Deutsche Börse decided to resurrect a market segment for smaller companies--two-and-a-half years after it discontinued its Neuer Markt. These, and possibly other platforms, are likely to compete to emerge as the preeminent exchange in Europe for smaller and emerging companies. There is some hypothesizing that EASDAQ, which has now been acquired by a small group of private investors, may be revived.

One recent major effort to relaunch a European growth exchange occurred in October 2005 when the London Stock Exchange announced that AIM it was launching a new modernization program. Because it avoided the excesses of the Internet bubble, prices did not collapse as on other growth markets and liquidity was sustained.

The goal of the new program is to transform AIM from its earlier position, essentially a UK-based small company market with a few overseas listings, to one with the capability to attract business from the entire

European continent. In order to achieve this, market makers and advisers will be authorized to operate from all European countries.

AIM offers smaller growing companies the benefits of public listing with reduced regulatory requirements and streamlined paperwork. AIM has a flexible admission process, with no minimum company size or financial track record, and no requirement for the percentage of shares that must be publicly held. A company wishing to list on AIM appoints a Nominated Advisor (Nomad) who guides the company through the listing process and remains available to help the company manage market issues that may arise. In addition to a Nomad, a listing company must also choose a securities house (broker) that is a member of the London Stock Exchange to be responsible for pricing and promoting trading in the company's shares. Since 2005, AIM has succeeded in attracting a sizable number of foreign listings. In 2006, 72 foreign companies listed on AIM. Analysts caution that AIM may be a useful device to raise additional capital, but it is likely to not be immediately effective as an exit strategy. The market is still thinly traded and levels of liquidity fall considerably short of those on NASDAQ.

While many European venture capitalists believe that a European platform for growth companies, whether AIM or some other exchange, is essential, many European companies still believe that the best IPO strategy is to list on NASDAQ. The trend is also observable outside Europe. Thus, Israeli companies launching IPOs have used NASDAQ as their market of choice. Similarly, in 2005 ten Chinese tech companies launched IPOs on NASDAQ.

Looking ahead, it is uncertain exactly how the global configuration of growth exchanges will evolve. NASDAQ, which has withstood every shock of the last 35 years, will almost certainly prosper—certainly as an American exchange and possibly as a global platform for new companies. It remains to be seen whether other exchanges in Europe or elsewhere will be able to emerge as a serious competitor for listing growth companies.

Most publicly led efforts to foster the emergence of “growth exchanges” in Europe have not been fruitful. In the long run the array of markets that ISMEs use as exit vehicles will ultimately reflect initiatives taken by market participants themselves. In most advanced economies the authorities have already adapted regulations sufficient to enable ISMEs to achieve listing.

It is comparatively easy to establish new exchanges when accelerated business is expected in an expansionary phase of the capital market cycle. The real test of growth markets is whether they remain active through cycles. Even when markets experience major corrections, a community of investors must remain, with intermediaries willing to provide liquidity while research and press coverage of companies continue. At the same time, it is worth

observing that with technological progress, innovation and free capital flows, trading systems are in continuing competition for order flow and listings. Thus attempts by the private sector to develop new trading platforms are likely to continue. The main role of the official sector is to avoid regulatory rigidity that hampers the functioning of the private markets.

One factor that could affect the competitive balance among exchanges is the Sarbanes-Oxley Law, which was enacted in the United States following the corporate governance abuses uncovered in companies such as Enron and WorldCom. The law increased corporate reporting requirements of listed corporations and made key executives and directors legally accountable for misdeeds undertaken by the management. Many foreign observers see the Sarbanes Oxley Law as posing burdensome reporting requirements on foreign companies, most of which operate under different legal accounting and audit regimes than in the United States. The possible liability of foreign corporate officers under American Law is another issue posed by Sarbanes Oxley. Observers report that foreign companies are weighing the requirements of the law when considering listing on American exchanges. In fact during 2006 ten U.S. companies chose to list on AIM.

A. Policies and Programs to Foster Development of Risk Capital

As the preceding discussion has made clear, European policymakers, the European Union and the European risk capital industry have been observing the relative backwardness in the risk capital sector and have been seeking to address what are perceived to be the obstacles to this sector realizing its potential.

Most European countries have put in place schemes to assist start-ups. These schemes can comprise indirect infrastructure support to business incubators or BANs or direct participation through guarantees, loans or equity investments¹⁹ In addition, governments have provided financial support in the form of loans, guarantees or equity.

Government Loans and Guarantee Schemes

Governments often provide direct loans to small firms, which are unavailable from other sources, or may offer loans on more attractive terms such as low-interest rates or long-term loans. However, debt finance cannot be a total solution to the problems of ISMEs and the capability of bankers to understand and appraise SMEs and ISMEs varies greatly among countries.

¹⁹ Baygan and Freudenberg (2000) classified government programmes into demand-side policies and supply-side policies, while OECD (2002) grouped them according to whether their influence is directly relevant to venture capital activity. For discussion on factors in design of government support program, see OECD (1997).

Another type of support is an equity guarantee for a proportion of the losses of high-risk venture capital investments. Some OECD countries, such as Austria, the Czech Republic, Denmark, Finland, Germany, the Netherlands and Sweden have equity guarantee programs, which have grown rapidly in recent years. For example, in the Netherlands, “technostar” firms can obtain equity guarantees between € 45,000 and € 227,000. The design, administration and extent of such guarantee schemes are quite varied. The schemes differ in their coverage, fees and interest rates charged, duration of the guarantee, etc. Like loan guarantee schemes, the percentage of loss that is covered must be high enough to encourage investments that would otherwise not be made, but must still leave the private sector holding enough risk as to ensure that they properly screen investments. The French equity guarantee scheme for example is seen as successful in “leveraging” private funds.

Official Equity

Nearly all European countries, including Australia, Belgium, Finland, Germany, Ireland, Korea, the Netherlands, Norway, Sweden and the United Kingdom and the have programs to provide equity investments to SMEs or ISMEs. Government participation can come either directly in the form of an equity participation in private sector venture capital firms or government participation in joint venture capital funds with a private party, a so-called “hybrid” fund. One common form of participation is through a “fund of fund” structure in which public funds are invested alongside funds from specialized private funds. Typically, the project selection is done by the private participants in the fund of funds. The risk sharing formula provides for the official participants to recoup their original investment plus a modest share of the profits, with private investors receiving most of the upside”. These schemes are often targeted to firms in a very early stage of development where the firm has difficulties in attracting private capital. As private sector involvement grows, the government phases out its programs.

Owing to the peculiar nature of venture capital, it is essential to design support programs that create the right incentives. Programs must make it possible for those with adequate information, incentives and skill to control the project selection and monitoring process. Programs must also decide in which sector of the market they are to operate. On the one hand, if the most promising projects receive funding, this may simply compete with financing that would have been available from private sources. On the other hand, excessive financing of companies with little prospect of becoming commercially viable does not serve any broader economic need. Indiscriminate provision of financing may drive down rates of return and provide insufficient reward for successful project selection.

As noted above, there is evidence that in Europe venture capital, especially in early stages, has a lower rate of return than “buy-outs” and some traditional equity investments. Venture capital can only be attractive if its reruns are higher than on those of more traditional investments. Thus, governments would be well advised to avoid programs that keep marginally profitable firms afloat and lower overall rates of return.

European Union: Risk Capital Action Plan

Noting the importance of dynamic SMEs for employment and competitiveness, the European Commission has been actively seeking to promote the development of risk capital in Europe. In 1997 the Commission launched an inquiry into the state of risk capital in the EU. The resulting Risk Capital Action Plan (RCAP) proposed a number of initiatives to be taken at community and national levels in the areas of market fragmentation, institutional and regulatory barriers to investment, taxation issues, the comparatively low rates formation of high-tech SMEs, human resources and cultural barriers to entrepreneurial activity. In Lisbon in March 2000, the EU Council called for implementation of the Risk Capital Action Plan (RCAP) by 2003. Progress in implementation has been reviewed on yearly basis. The Commission also noted a close link between the RCAP and the Financial Services Action Plan which aims at widening the range of financial services available in the EU and fostering a single market in financial services throughout the EU.

Among the major recommendations in the RCAP were:

- i) Adoption of the “prudent man (or prudent person) approach to supervision of institutional investors, especially pension funds, in order to remove regulatory obstacles to investment in private equity and venture capital.
- ii) Tax transparency, meaning tax regulations that do not subject investments in private equity partnerships to double taxation.
- iii) Favorable tax treatment of stock options.
- iv) More effective educational systems to promote entrepreneurship and improved protection of intellectual property through a European patent regime.
- v) Development of effective “exit vehicles.”
- vi) A harmonized legal structure for venture capital and private equity funds.
- vii) Fiscal incentives for investment in technology firms.

The final report on the RCAP was issued in November 2003. The report noted the important strides that had been made in developing greater

professionalism and harmonization in the risk capital industry but also highlighted areas where the market remained fragmented and

The Commission also proposed an investing in Research Action Plan aimed at increasing the share of investment in technology research from 1.9% of GDP in 2002 to 3% in 2010.

The EU has subsequently sponsored research, workshops and reports on issues such as

The development of appropriate exit mechanisms. After a series of consultative meetings and research a final report was issued in July 2005, which noted that Europe lacks a dynamic stock market for new high growth companies and that efforts to build national exchanges in the late 1990s had led to market fragmentation which could not survive the bursting of the tech bubble in 2000. The venture capital industry and the stock exchanges favor a single European growth exchange. The Report urged efforts to interest investors in companies throughout Europe, improved research coverage and the report urged positive consideration by governments of tax incentives for investment in unlisted growth companies.

Best practices in public policy to support early-stage finance. an expert group which issued a final report with identified best practices in October 2005. The group noted that there was an apparent market failure in early stage venture capital, with venture capital firms (in both Europe and America) favoring later stage investments in large size. Concerning business angels, the report called for a full range of support, including programs to pair investments by business angels with those by traditional venture capital funds and public funds.

The Group also issued reports on 1) a single European structure for venture capital funds and 2) a joint report with the United States on means to develop the global venture capital market.

5. Concluding Remarks

This paper has reviewed the record of European countries with respect to the financing of SMEs, and particularly of innovative SMEs (ISMEs). One key finding is that the overall state of development of the European SME sector compares favorably with other regions such as the USA. In Europe SMEs account for large shares of employment and income. Moreover, once they are established, SMEs have adequate access to finance, mainly from banks and supplier credits, with only modest contributions from official credit and guarantee programs. Private banks have acquired the capacity to monitor and assess the risks of lending to SMEs and consider SME lending

to be a profitable line of business. Moreover legal systems are sufficiently robust to give enable creditors to extend loans to SMEs with confidence.

A rather different picture emerges when one examines the case of ISMEs, where European countries are characterized by low levels of firm formation and difficulties in obtaining financing at several points in the life cycle of the enterprise. European rates of new firm formation, both among traditional SMEs and ISMEs; fall well below of those in more dynamic areas such as North America and Korea. This underperformance has significant negative repercussions for employment creation and for competitiveness in emerging technology sectors. Once SMEs are mature there are sufficient possibilities to obtain financing through debt instruments, but European countries fall short in providing capital in the early stage of the firm's life cycle where risk capital is most relevant.

A critical area where European performance lags global leaders is in the development of technology oriented ISMEs. The development of such ISMEs frequently occurs in specific geographic regions often known as "technology hotbeds," with Silicon Valley in the United States as the leading example. In such areas, the availability of innovative forms of financing as well as well other characteristics of the social and economic environment encourage the growth of innovative companies, often in high technology sectors. Very few areas in Europe have overall environments for innovative entrepreneurship compare favorably with the technology hotbeds of the USA. Inside Europe, the Nordic countries appear to have environments that are most conducive to the development of technology-based ISMEs.

From the financing point of view, Europe tends to lag the United States in several forms of financing for ISMEs, such as venture capital and "growth stock exchanges." However, the largest single weakness in European capability to provide finance to emerging companies is the absence of a thriving market for informal risk capital. This form of capital, often described as "business angels," is well developed the United States where an equal amount of funding is provided via this channel as through formal venture capital. Furthermore, a high volume of informal risk capital in comparatively small amounts to early stage firms expands the pool of candidates for formal venture capital.

The lack of a well developed informal equity sector represents an especially serious shortcoming for the overall development of the ISME sector because it is far easier to compensate for deficiencies in later stage finance through cross border activity. Capital can be provided by external venture capitalists and firms can be listed on foreign markets. By contrast informal risk capital is very local in nature, requiring close relations between the business angel and the entrepreneur. Therefore, when the informal risk

capital markets do not function well at early stages of the firm cycle, the result may well be a structural problem of enterprise creation.

The informal risk capital market did not develop in the United States as a result of a government initiatives but grew spontaneously over along period. European countries are now trying to develop policy packages that will compensate for this lack of spontaneous development of risk capital. A strong recommendation for public policy would be to develop strategies that give both non financial support (such as coaching, support of business parks technology clusters and business angel networks), as well as direct provision of finance in the form of loans, grants and equity investments.

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CHAPTER 8

Intellectual Property Securitization: A Rapidly Developing Financing Tool

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1. Overview

During the last few years, the securitization of various types of intellectual property (IP) has evolved from a small niche market utilized by individual artists or thinly capitalized companies to a broader corporate financing tool used to facilitate mergers and acquisitions, stock buybacks, and risk transference to investors.

Moody's has rated the overwhelming majority of these transactions, with original ratings ranging from Aaa to Ba3. Moody's expects continued growth in the market – with perhaps 10 new transactions in 2007 -- as more companies learn of the potential benefits of securitization and investors become increasingly receptive, due in part to the wider availability of historical information on asset performance.

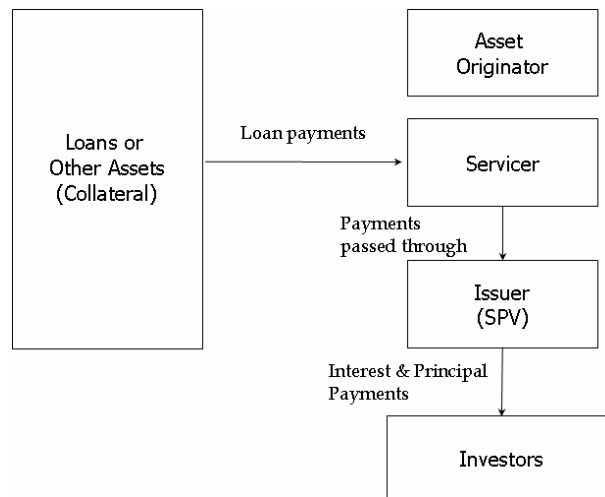
In analyzing the credit quality of those securities, Moody's adapted its general asset-backed securities analysis to the many unique characteristics of the different IP businesses. This report explains those special characteristics and how they affect the credit analysis of the transactions. It will also review developments in the securitization of the recently active IP asset classes – film receivables, franchise fees, music royalties, trademark licensing royalties, and patent licensing royalties – and suggest the likely direction of the market in the future.

IP-backed transactions are one form of future cash flow transactions. As with any future cash flow transaction, Moody's analysis draws on expertise not only with the structuring and the particular assets being securitized, but also with the overall industry of which they are part. However, one characteristic that differentiates IP transactions from other types of future cash flow transactions (such as the securitization of future cash flows generated by an oil pipeline) is that they are highly dependent on popular

tastes or technological change, adding a layer of complexity and risk to the analysis.

The transactions done to date, totaling approximately \$20 billion, represent only a thin slice of the potential IP securitization market. They also represent a tiny percentage of the total securitization market, which has completed over \$3.7 trillion over the same period. And since the use of IP continues to grow as a portion the economy as a whole, the intellectual property arena represents a vast potential market for securitization.

Figure 1. Typical Asset-Backed Structure



2. A Brief Explanation of Securitization

Securitization is the process of using the cashflows generated by an asset or pool of assets to support the issuance of debt. It is an offshoot of traditional secured debt, whose credit is supported by a lien on specific assets. With conventional secured issues the primary source of repayment remains the issuer's earning power, but in a securitization the burden of repayment is shifted away from the issuer to a designated pool of assets.

Bondholders are protected from the operating performance of the issuer through features in the securitization's structure. These include the right of bondholders to replace the issuer as manager or servicer of the assets if it has difficulties. Securitizations also use bankruptcy-remote special purpose vehicles (SPV) (see Figure 1) that prevent other creditors of the issuer from making claims on the securitized assets. These features allow

securitizations to achieve higher bond ratings than the senior secured rating of the issuer.

Securities that use this structure are generally referred to as asset-backed securities (ABS). Since the first ABS transactions were completed in the mid-1980s the market has grown dramatically. Over \$740 billion of new issuance was completed in 2000 and there is nearly \$3 trillion in outstanding securities. As the securitization market has grown, it has broadened to include a progression of new assets, with IP being one of the most innovative. The following sections describe the credit risks associated with different types of IP securitization and what can be done to mitigate them.

3. Securitized Intellectual Properties

A. Patent Licensing Revenues

Patent revenue is an IP asset class that a number of market participants are attempting to securitize. Through securitization, companies holding patents can accelerate the realization of the revenues generated by the licensing of a patented product or process, enabling them to more quickly recoup the often significant research and development costs incurred in creating the asset.

Though only a small number of patent securitizations have been completed to date, this market has huge potential. The licensing of patented technology is a \$100 billion annual business involving thousands of companies. Whether this market develops will depend on the financing needs of the holders of these patents as well as their willingness to develop transaction structures that protect against the risks of these assets. Though it is difficult to gauge the current needs of these companies, the following sections highlight the risks that will need to be addressed to complete highly-rated patent revenue securitizations. These risks include:

- Technology marketing and acceptance
- Technological obsolescence
- Licensee payment risk
- Servicing risk
- Legal risks

a. Technology Marketing and Acceptance

New products using patented technology experience a period following their introduction that determines their market demand and the ability of their owner to meet that demand. Predicting the success or failure of a new

product can be difficult and is speculative by its nature. This risk can be reduced by having licensing agreements lined up in anticipation of the granting of the patent, but even this does not guarantee the level of future sales or the abilities of the licensee and licensor to fulfill their obligations under the agreement.

As a result, it is difficult to accurately predict future revenues generated by the patent if there is no history of past revenues or performance. Patents in this stage of their lives will rarely be good candidates for highly rated securitizations. For a transaction to be completed at this early point in the product life cycle, a performance guaranty from a highly rated third party will probably be necessary.

A better candidate for securitization is a patent that has moved past this stage and has demonstrated multiple years of collected revenues from one or more licensees. The chances of success for the transaction would be further enhanced if the agreements with the licensees extend into the future and if there is demonstrable evidence that there are additional uses for the technology.

b. Technological Obsolescence

Even if the technology has gained market acceptance and has demonstrated performance in the past, there is a risk that a superior technology will be developed during the life of the securitization that makes the benefits of the patent obsolete. This risk is most acute in high technology industries, such as semiconductors and pharmaceuticals, where the pace of innovation is rapid. If this occurred, royalties generated by the patent, which are generally paid as a percentage of sales, could decline rapidly from the levels of earlier years. This risk could render historical revenues irrelevant.

To analyze this risk, Moody's evaluates the factors that might limit the asset's exposure to obsolescence during the life of the transaction:

- i) Short term of the securitization- As mentioned earlier, all new products need time to achieve market acceptance. The period when a competing patent first enters the market could provide a window during which an established patent's revenues are not threatened. If the term of the securitization is confined to this window, the risk of obsolescence is reduced.
- ii) Large cost of replacement technology- Licensees often need to make a substantial financial or marketing investment in order to bring products to market using licensed patents. That provides a high barrier to entry for potential new

products, limiting the exposure of existing patents to obsolescence. This fact could also discourage competitors from developing competing technologies, further reducing the risk.

- iii) Brand recognition-Superior technologies often have difficulty overcoming the popularity of existing brands. Therefore, patent income from products with strong brand recognition and loyalty would be more resistant to erosion from new technologies.
- iv) Alternative use-Patented technology can potentially be applied to a variety of different uses. Development of new uses reduces exposure to a technological advance in one application and expands the patent's revenue-generating potential.

In each case an analysis of the specific patent will need to be performed to determine how well each of these factors applies. In some cases involving highly technical expertise, independent industry experts may be consulted to assist in the analysis.

c. Licensee Payment Risk

Even if the patented technology gains acceptance and remains technically viable, cash flows may not reach investors if licensees default on their payment obligations. A large group of diverse, highly rated licensees mitigates this risk in a patent license fee transaction.

Another potential risk is the expiration of current license agreements during the term of the securitization. The terms of subsequent agreements can be difficult to predict which will make the level of royalties generated by these agreements difficult as well.

d. Servicing Risk

In some licensing agreements, the patent-holder has significant ongoing obligations to the licensee. For example, the licensor could be required to manufacture a necessary component of the final product or to further develop the technology over time, and/or to provide marketing or technical support. Non-compliance with any of these obligations could cause the agreement(s) to be dissolved and interrupt the revenues paid to the securitization

The licensor also needs be able to properly account for and collect the revenues. If not, revenues generated by the patent will inevitably be missed.

As in a typical securitization the best way to mitigate this risk is to hire a backup servicer to perform these obligations if the original servicer/licensor

should experience difficulties. However, it could be more difficult to find a qualified backup servicer for a patent securitization, since the technical skills needed might be difficult to replicate. Servicing risk can also be reduced by minimizing the licensor's obligations in their agreements, which would limit the impact of a possible disruption in the event of a bankruptcy.

e. Legal Risks

There are a variety of legal risks that can threaten the revenue stream generated by a patent. These include:

- i) Product Liability-Use of the patented technology could result in damage claims for environmental, personal injury, or other forms of negligence that a securitization could be responsible for.
- ii) Patent Challenge or Infringement-Challenges to the validity of the patent can be made by third parties causing all or part of it to be overturned. In addition, non-licensed entities could attempt to use the technology without paying royalties.
- iii) Expiration-By law, patents are valid for only nineteen years after the date of grant.
- iv) Bankruptcy-Other creditors of the licensor could attempt to claim patent revenues in the event of the licensor bankruptcy.

The extent of the first two of these risks can be assessed through a review of the history of the patent. If a patent has been in existence and has been generating revenues for a number of years without these problems it is less likely to experience them in the future. A long view must be taken on the risk of product liability however since it could take time for evidence to accumulate and scientific studies to be completed assessing damage and causes. Active monitoring by patent compliance specialists can also be done to reduce the risk that unauthorized use of the technology does not occur.

Even if the patent has a long history, these risks can not be eliminated completely. Here too an extensive analysis of potential liability and patent challenges by an independent industry expert might be needed to assess this risk. The use of third party insurer to cover this risk is another alternative.

Another factor that can impact the revenue streams from patent licensing is the expiration of the patents. Both the expected negative impact on the future cash flows and the increased uncertainty around those post-expiration cash flows needs to be evaluated for patents that are scheduled to expire during the life of the transaction. This risk is mitigated to the extent the securitizations hold patents whose remaining lives last well into, or exceed, the term of the transaction.

The risk of seller bankruptcy is a common one for securitization. As mentioned earlier, it is usually covered through the sale of the assets to a bankruptcy-remote special purpose vehicle (SPV). The use of a SPV is designed to insulate the assets from other creditors of the seller in the event of bankruptcy of the seller. If properly structured, this risk can be greatly reduced, if not eliminated, and allow for the rating of the securitization to be greater than that of the seller.

To date, securitization of patent licensing royalties has been limited to pharmaceuticals. Compared to other technology patents, pharmaceutical royalties are better suited to securitization due to the high barriers to entry in pharmaceuticals – largely due to the long development and regulatory approval processes for drugs. This generally makes the risk of obsolescence lower than for other types of technology patents, reducing the potential variability of future royalty payments.

f. Completed Patent Licensing Transactions

Four drug patent royalty securitizations have been publicly rated to date, two of which have been rated by Moody's. The four transactions are listed in Table 1.

Table 1. Drug Patent Royalty Securitizations

Transaction Name	Issuer	Approx \$ Size (Mil)	Approx. Cl ose	Moody's Senior Bond Rating
Biopharma Royalty Trust	Royalty Pharma	80	12/00	not rated
Royalty Pharma Finance Trust	Royalty Pharma	225	7/03	Aaa
Royalty Securitization Trust I	Pual Capital	228	12/04	Aaa
Drug Royalty Trust	Drug Royalty	60	3/05	not rated

Biopharma Royalty Trust includes the patent rights on a single drug, while the others include the rights on multiple drugs. Including multiple drugs with proven market acceptance generally provides greater diversity to the pool, reducing credit risk.

The Biopharma deal hit a performance trigger shortly after the marketer of the drug in the transaction, Zerit, frontloaded its sales into a single quarter through a practice known as "channel stuffing," i.e. where a company inflates its sales figures by forcing more products through a distribution channel than current demand. As a result, though royalties were high in that period, the excess cash flows (after covering debt service) in that period were paid out to the marketer and were unavailable to

investors to make up for shortfalls that occurred when sales declined in subsequent periods.

Royalty Pharma Finance Trust was structured to be a warehouse facility that allowed for the inclusion of additional patent interests if certain conditions were met, similar to the Iconix transaction. Due to the better-than-expected royalties generated by the drugs in the trust, and the demonstrated expertise of Royalty Pharma management in acquiring new revenue streams, the transaction has been increased several times and is now authorized to issue over \$600 million, compared with \$225 million at closing. (Performance of the Royalty Securitization Trust I to date has also been in line with Moody's expectations. No collateral additions have been made to this deal however since its structure was not built with this feature.)

Others in the medical field have seen the success of these structures and are considering securitization as a possible method to help fund the development costs of new drugs. Seminars were held in 2005 by the Milken Institute to discuss the viability of this approach. Due to the low success rate of drug research and the hard-to-predict acceptance level of newly introduced drugs, it will continue to be difficult to create structures that achieve investment grade ratings unless the structures are backed by diversified pools of assets. However, due to the high concentration in the pharmaceutical industry, there are relatively few firms with portfolios of sufficient size to obtain this pool diversification on their own.

Alternative avenues to investment grade ratings could involve pools backed by drug royalties from multiple pharmaceutical companies, or transactions guaranteed by highly rated third parties. In addition, while there have been recent discussions of a return to single drug transactions, it is likely that these deals would receive lower ratings and/or advance rates due to their concentration risk. Overall, Moody's expects growth in this sector to be modest.

B. Trademark Revenue Securitization

Trademarks, much like patents, are a right granted by the government to control the use of a logo or brand name. The risks of securitizing these rights are also similar to patents. A major difference between the two is that future revenues will be at risk in trademark deals if the image falls out of fashion or popularity as opposed to the technological obsolescence risk of patents.

Five securitizations backed by trademark licensing revenues have been rated by Moody's. Most transactions in this market have originated in the fashion and apparel industry. Details of the deals are listed in Table 2.

The focus of the credit analysis in these transactions was the extent to which the trademarks will generate sufficient future royalties to support debt service. The analysis was supported by the history of royalties (which, in these transactions, was considerable) generated by the brands and the skill of the issuer to successfully manage them going forward. Managing the trademarks properly includes creating and maintaining relationships with qualified licensees and producing effective marketing campaigns to sustain the brand's relevance with its target group(s) of consumers.

Table 2. Securitizations Backed by Trademark Licensing Revenues

Transaction Name	Issuer	Approx \$ Size (Mil)	Approx. Close	Moody's Senior Bond Rating Universal Credit Trust
1999-B	Bill Blass	25	11/99	Baa3
Candies LP (Iconix)	Candies	20	12/02	Baa3
Guess? Royalty Finance LLC	Guess	75	04/03	Baa2
MLA Multibrand Holdings LLC	BCBG	53	12/04	Baa3/Aaa
KCD IP, LLC	Private	1,800	05/06	Baa2

Ratings on these transactions are significantly higher than the underlying credit of the issuing company. This was despite significant obligations of the issuer to assist in the generation of future revenues in its role as servicer of the assets. In addition to traditional forms of asset-backed credit enhancement, all of the transactions had features that enabled it to receive significantly higher than that of the each issuer's underlying credit¹. This was despite significant obligations of the issuer to assist in the generation of future revenues in its role as servicer of the assets.

The first feature was a series of triggers built into each structure related to the financial condition of the servicer/issuer. Essentially these triggers gave investors the right to take control of the assets and place them with a backup servicer, before they lose considerable value and place future debt repayment at risk. In this case a qualified backup servicer with specialized industry knowledge was in place at closing to take over management of the assets, should the original servicer/issuer underperform expectations or fall into financial difficulty. Since the backup servicer had specialized industry knowledge, the risk of a significant drop-off in asset performance due to a servicer/issuer bankruptcy was reduced.

Secondly, the amount of debt financed in relation to the asset's appraised value, or its loan-to-value (LTV) ratio, was low enough to provide a sufficient cushion for bondholders to be able liquidate the assets in order to

¹ Bill Blass Ltd. and Candie's are unrated and Guess? is rated B1

repay the bonds if they underperform specified trigger levels. This further protects investors in the case the best efforts of the backup servicer are still unable to improve performance.

Royalties generated by the brands in all of these deals has exceeded Moody's expectations though none have been upgraded to date due to the continued reliance on the lowly rated or unrated brand managers.

The Candie's deal, which originally closed at \$20 million when it included only the Candie's and Bongos brands, has become a flexible structure for its successor company, The Iconix Brand Group Inc (Iconix). Iconix specializes in owning, licensing, and marketing a portfolio of consumer brands, which today also includes, Badgely Mishka, Joe Boxer, Rampage, and Mudd. As each brand was acquired by Iconix, it was added to the Candie's vehicle, which is now over \$150 million.

Further developments in this sector were evident in the MLA transaction. First, a portion of the debt issued in the transaction was rated Aaa due to a guarantee provided by a highly rated third party, Well Fargo Bank. Prior to this no security issued in a trademark licensing deal was rated higher than Baa2. Second, less than a year after the close of the transaction, the assets performed so strongly that they were used as security in a significantly larger corporate debt issuance that was used to pay off the securitization. Though not a guarantee of future success, both of these events demonstrate that market players gained comfort with the strength of the BCBG brand.

The most recent transaction, KCD IP, LLC, was notable for being more than 20 times as large as the next largest trademark licensing deal, indicating that strong brands with long performance histories can support large levels of debt at investment grade ratings.

C. Music Royalties

One of the first forms of intellectual property to be used as collateral to back a securitization was music royalties. The first securitized music royalty transaction – for the Jones/Tintoretto Entertainment Corporation (JTEC) -- closed in February 1997. That transaction was backed by future royalties generated by the music of pop artist David Bowie, and was rated A3 by Moody's. Since the close of the JTEC transaction, Moody's has rated a number of other deals in this asset class. (See Table 3)

The approach that Moody's has used to rate the music royalty transactions to date encompasses three broad topics:

- Asset credit quality
- Structural cash flow allocations
- Legal issues

Table 3. Music Royalty-Backed Transactions Rated by Moody's

Transaction	Artist or Company	Approx Closing Date	Rating	Placement Agent
Jones/Tintoretto Entertainment Co., LLC	David Bowie	February 1997	A3	Pullman Group
Brian Holland LP	Brian Holland	June 1998	A3	Pullman Group
Lamont Dozier LP	Lamont Dozier	June 1998	A3	Pullman Group
Edward Holland LP	Edward Holland	June 1998	A3	Pullman Group
Nick-O-Val, LLC	Ashford and Simpson	November 1998	A3 (Class A)	Pullman Group
Universal Credit Trust 1999-A	SESAC Inc.	May 1999	Aaa	CAK Universal Credit Corp.
IMH Holdings	Iron Maiden	July 1999	Baa1	Daiwa Securites
Universal Credit Trust 2000-A	Curtis Mayfield	April 2000	Baa3	CAK Universal Credit Corp.
Music Finance Corp	Chrysalis Inc.	March 2001	Private	Royal Bank of Scotland

In the following sections, we will describe the specific issues that arise in music royalty transactions under each of the broad topics.

a. Asset Credit Quality Analysis

In traditional ABS involving auto loans or credit card receivables, asset credit quality is assessed by studying a pool of loans, and determining to what extent those loans will pay as promised. This is generally done by examining historical data and current industry trends and company operations (such as underwriting and servicing) to come up with an expected loss on that pool of loans and a level of anticipated variability around those expectations.

In contrast, for music royalty-backed transactions, receivables typically do not exist at the inception of the transaction, but instead are to be generated during the life of the security. As a result, the asset quality analysis becomes a two-step process, involving analyses of both the potential amount of assets that will be generated and the extent to which the receivables will be paid once generated.

To evaluate how much revenue a particular music catalog, or portfolio of songs, could generate in the future it is necessary to first understand the nature of the assets, including the sources that will generate the revenue. The assets in music royalty transactions fall into two major categories: record sales/master royalties and music publishing royalties.

Record sales royalties are paid for the sale of a specific song or album. They are also called record master rights. Since the level of royalties depends on the number of records sold, predicting future sales is a critical part of the asset quality analysis. That analysis will depend on whether the albums are relatively new or “seasoned” and the performer’s historical market power, which affect both the expected level of sales and the uncertainty surrounding those expectations.

Music publishing royalties are paid to the writer of a song. Those royalties, which are protected by copyright law, are based on the use of songs on albums or CDs (“mechanicals”), the use in performances or broadcasts, and the use as background in TV shows, movies and commercials. In estimating the potential for future music publishing royalties, Moody’s analyzes the proven popularity of the catalogue of work and the degree to which that catalogue has been fully utilized in the past.

Historical data is an important component of the valuation of all music royalty rights. The value of the data depends on the length of time covered and the level of detail. In addition to information provided by the issuer, it can be useful to receive an independent third party valuation of a catalog by an industry expert. However, Moody’s puts all historical data in perspective through an understanding of the current environment, including an assessment of the strategies, resources, and abilities of the participants in the transaction, including the record company, the publisher, the artist(s), and the performing rights societies, which monitor and collect fees for the use of works in a catalogue.

b. Structural Cashflow Analysis

Structural cashflow analysis focuses on how the cashflow collected and losses incurred by the transaction are allocated among the parties to the transaction. In most ABS transactions this includes an analysis of the “payment waterfall,” which determines the order of distribution of the cash collected. Generally, credit quality is enhanced by waterfalls that allocate payments to bondholders first.

However, Moody’s also evaluates the cashflow allocation mechanism for its ability to provide for continuing incentives for the other participants in the transaction to continue performing necessary functions. For example, to evaluate the likelihood of maintaining an adequate level of servicing

throughout the life of the transaction, Moody's analyzes the incentives provided to the servicer by its fee structure.

Other sources of payment, such as cash reserve funds, guaranties from highly rated third parties, and subordination can provide additional credit and liquidity support to the deals. All of these traditional ABS enhancements can be included in a music royalty transaction.

In typical ABS transactions, the size of a deal is usually stated in terms of, and compared with, the amount of receivables. However, in music royalty transactions, as in all future flow transactions, there are no receivables, *per se*, at the start of the transaction. Instead, the deal is usually "sized" in terms of an estimate of the current value of the assets, often obtained from a third-party valuation. In general, the smaller the transaction relative to the value -- that is, the lower the LTV ratio -- the higher the rating possible. However, the rating will, of course, depend on numerous other factors, including the quality of the valuation.

The transaction will also be evaluated for the level of future revenue projections versus the transaction's debt service coverage. Obviously, the higher the debt service coverage above expected revenues, the better the potential rating as well.

c. Legal Analysis

As mentioned earlier, in evaluating the credit quality of any ABS deal -- including music royalty-backed transactions -- Moody's analyzes its legal structure to assess the risk that, in the event of a bankruptcy of the originator, cash flows earned by the assets may be subject to claims from creditors of the originator and diverted away from the ABS investors. This risk is particularly relevant to transactions in which bankruptcy is relatively likely, such as when the parties to the transaction have a low rating or are small, thinly capitalized entities.

As in other ABS transactions, it is also important to determine that there are no preexisting liens on the assets to be securitized. An artist's previous financial arrangements, pending lawsuits, or divorce settlements could have a bearing on this issue. These issues are typically addressed before the close of the transaction by conducting thorough lien searches.

d. Recent Developments

For the last six years the securitization for music royalties has been dormant primarily as a result of the impact on the music industry of digital downloading. During this period however, the performance of music publishing assets has held up relatively well. It is expected that for the near

to medium term any securitizations of music royalties will primarily be backed by music publishing assets.

D. Future Film Receivables

Another form of IP securitization that has gained acceptance over the past ten years is the securitization of the future revenues from previously unreleased films. Moody's has rated over \$10? billion in the term and asset-backed commercial paper markets. The ratings on these transactions have ranged from as high as Aaa to as low as Baa3.

These transactions have numerous benefits to the issuing movie studio. These include:

- The transfer of a portion of film performance risk to bondholders
- Access to an alternative and possibly lower cost of funding
- Earlier reimbursement of capital invested in the production of films
- Off-balance sheet accounting treatment

The rating approach places particular emphasis on the financial strength of the issuing studio because of its substantial ongoing obligations and the transfer of the assets is usually not a legal true sale. This analysis is layered on top of an evaluation of the historical performance of a studio's films and the likelihood that the studio will be able to achieve similar performance in the future. The structure of the transaction is also analyzed to gauge the potential benefits of structural features such as triggers.

a. Basic Structure

The basic structure of future film securitizations is as follows: From the proceeds of the offering, a pool of cash is created for the purchase of films once they are completed ("in the can") and ready for release. Since the trust only purchases films when they are in the can, the trust does not take film completion risk.

It is customary that a studio's entire future slate of completed films, subject to a loose set of eligibility criteria, is sold into the trust in order to limit its ability to "cherry-pick" the films that have a greater chance of success. The cost to the trust to purchase the film is its negative (production) cost plus corporate overhead and capitalized interest allocated to the film, subject to limits. Caps are also placed on the cost of an individual film to prevent a concentration of the trust's funds in a small number of (expensive) films.

In exchange for the purchase price, the trust receives ownership of the film and is entitled to receive all revenues generated by it. These revenues are then allocated according to the payment waterfall among debt service,

distribution expenses, and other transaction costs. Most deals have a revolving structure through which revenues on earlier films are reinvested to purchase additional films for the trust until a specified date or until an early amortization trigger is hit.

The studio is typically licensed back the marketing and distribution responsibilities for the film. Because of its past experience distributing films, the studio is generally best qualified to insure that the film is distributed and promoted properly so that revenues generated are maximized. These obligations are equivalent to servicing responsibilities in traditional asset-backed deals.

b. Asset Quality Analysis

The asset quality analysis of a future film securitization focuses on two areas:

- i) Fundamental analysis of the studio
- ii) Film performance analysis

Fundamental analysis of the studio

In contrast to most asset-backed transactions, the issuer (the studio) must continue to generate new assets following the closing date for future film securitizations. In addition to producing the films, the studio is also obligated to distribute and market the films in order to maximize their revenues. As a result, it is necessary to analyze the financial condition of the studio to determine the likelihood that it will be able to fulfill these responsibilities for the period it takes to create a diversified portfolio of films.

For studios with a rating, Moody's view of the studio's financial condition is relatively easy to determine. For unrated studios it is necessary to perform a shadow rating analysis to assess this risk. All of the six major studios, which account for approximately 2/3 of 2000 domestic box office, are divisions of larger rated entities. Their ratings are in Table 4.

Table 4. Moody's Studio Rating

Studio	Corporate Parent	Rating
Columbia	Sony Corp.	A2
Warner Brothers	AOL Time Warner	Baa1
Universal	General Electric	Aaa
20th Century Fox News Corp.	Disney	Baa3
Buena Vista	Viacom	A2
Paramount		A3

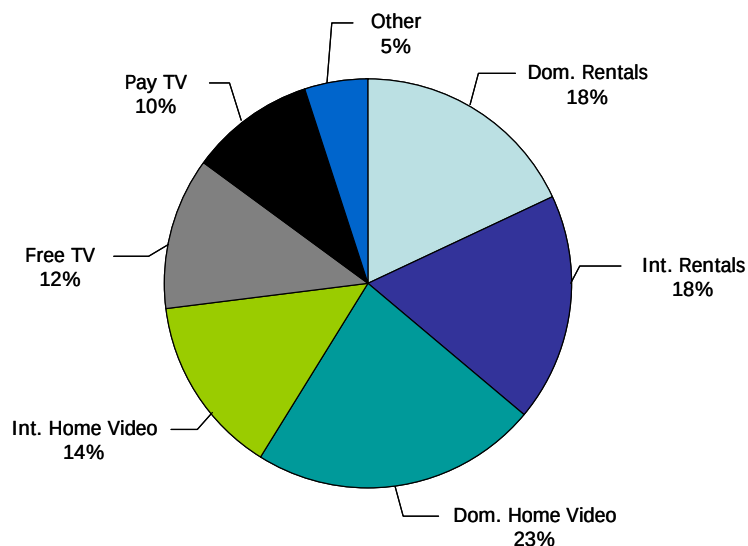
The other film studios include so-called independents like Miramax (Buena Vista) and New Line Cinema (Warner Brothers), which are actually wholly owned subsidiaries of the majors' corporate parents, as well as true independents such as DreamWorks, MGM, and Artisan. None of the independents are currently rated, but it is believed that in most cases their ratings would be below investment grade.

Because of their greater stability, well-developed film pipeline, and established distribution network, the major studios are best able to create future film securitizations that can achieve high ratings. It is not surprising that these companies were the first to enter this market and have issued the lion's share of the transactions. For unrated or lowly-rated studios it is possible to structure a future film transaction that can achieve ratings higher than that of the studio. How this can be achieved is explained below.

Film Performance Analysis

In the 1990s, as home video and cable television have become more common throughout the world, the potential revenues that can be generated by a film have increased dramatically. Though domestic box office receipts, also referred to as theatrical rentals, are often considered the barometer of a film's success, they usually equal only 15-20% of a film's lifetime revenues. The other 80-85% of total revenue generated by the exhibition of the film is

Figure 3. Average Distribution of Total Film Revenues



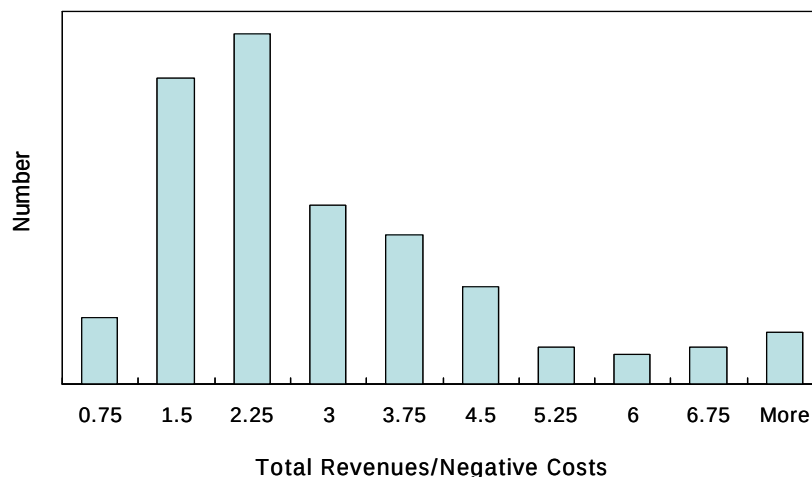
composed of international rentals, domestic and international home video, pay and free television, and non-theatricals (see Figure 3). Further revenues can be earned through various other forms of merchandising.

Because of the variety of revenue sources available it has become less difficult in recent years for a studio to recover its production cost on a film. According to the available data, the average film produced by the major studios in the 1990s has generated revenues that cover its negative costs by over 2.5x.

This high average coverage level is a key factor in lowering the risk of securitizations of future film revenues. Since the transaction finances only the film's production costs, average film performance would usually more than cover the securitization's debt service. Additional film expenses like prints and advertising (P & A) costs, which can reach over 50% of a film's negative costs, are typically funded by the studio and are generally repaid in a position that is subordinate to bondholders. This exposure to expenses and subordinated position in the cash flow structure aligns the studio's interest with that of the bondholders and provides them with a strong incentive to distribute the films properly.

Although average film performance is generally sufficient to more than cover debt service, individual film performance is highly variable, with coverage levels often falling below 1.0x and sometimes reaching above 6-7x for major blockbusters (See Figure 4). To reduce this risk, future film securitizations cross-collateralize the revenues of a portfolio of films.

Figure 4. Histogram of Sample Historical Film Performance



The benefit of this is to reduce the probability of a string of unsuccessful films with low coverage levels. If a studio can demonstrate that its performance can match the industry average, modeling of portfolios of films has found that a portfolio of approximately ten films can achieve a level of diversity that supports investment grade ratings. With smaller portfolios, there is a higher likelihood that limited number of films will all be weak performers, which increases the transaction's expected loss and lowers the rating.

This was determined by using a Monte Carlo simulation that randomly selected film revenues from a distribution created with historical data, for slates of different sizes. The revenues generated by these slates are then fed through the transaction waterfall to determine the expected loss for the pool. If the studio's performance is below average, the number of films needed to sufficiently lower film performance risk increases.

In most transactions, the portfolios of films at the start of the transaction are smaller than necessary to achieve sufficient diversification. However, in such cases Moody's will evaluate the financial stability and track record of the studio to assess the likelihood that the studio will be able to produce a sufficient number of films. Attention is also paid to the studio's production pipeline to determine the length of time it will take to create the portfolio.

c. Legal and Structural Analysis

Due to the obligation of the studio to continue to produce the films on an ongoing basis, as well as its exposure to film performance risk because of its investment in P & A costs, the transfer of the assets by the issuing studio is not deemed to be a legal "true sale." The trust does, however, receive a perfected security interest in the films and the revenues generated by them, which characterizes the transaction as a secured financing and not a securitization. In the traditional corporate finance context, the security pledge would normally enable the transaction to achieve a rating one notch above that of the issuer, but Moody's has determined that, through the use of structural enhancements in future film deals, it is possible to achieve a larger separation.

These structural protections normally take the form of a set of triggers related to both the financial condition of the studio and the performance of the included films. The triggers are designed to protect investors from a bankruptcy of the studio by increasing the likelihood that the bonds will be fully repaid prior to a potential filing.

Typical results of the triggers include early amortization events and reorderings of the priority of payments in the waterfall to reduce future payments to the studio. In addition, a clawback feature, which requires the

studio to return funds paid to it in prior periods to cover principal and interest shortfalls, can also be included.

In Moody's analysis of the transaction, the relative strength of the triggers is evaluated in combination with the film performance analysis discussed earlier to determine how much benefit they add to the final rating.

Despite the benefits that the triggers add to the credit profile of the transaction, Moody's does not believe that the risk of company bankruptcy can be completely eliminated. As a result, even with the strongest set of triggers, the rating of the transaction is still limited by the credit quality of the studio.

Film receivables were one of the first IP asset classes to be securitized, with transactions dating back to as early as 1995. The majority of these transactions have been "slate" financings, that is, transactions collateralized by portfolio of films to be released by a particular studio. Rated slate financings completed to date are listed in Table 5.

Table 5. Securitization on Film Receivables

Transaction Name	Studio	Approx \$ Size (Mil)	Approx. Close	Moody's Senior Bond Rating
Millennium Film	Fox	1,000	11/95	Aaa (wrapped)
Galaxy Film	Universal	1,100	6/97	Aaa (wrapped)
Hollywood Funding No. 5 and 6	Destination	300	10/97	Not rated
Dreamworks Film Trust	DreamWorks	425	12/97	Aaa (wrapped)
Village Roadshow Trust	Village Roadshow	900	6/98	Aaa (wrapped)
Dreamworks Film Trust II	Dreamworks	550	1/00	Aaa/Baa3
Palisades Partners	Sony	300	3/00	A1
Galaxy Film II (Universal)	Universal	1,000	5/00	Aaa (wrapped)
Village Roadshow II	Village Roadshow	1,000	2/03	Aaa (wrapped)
Melrose Investors LLC	Paramount	300	8/04	Baa2
Magic Films	Disney	300	8/05	Baa2
Marvel Funding	Marvel	450	9/05	Aaa (wrapped)
Gun Hill Road LLC	Relativity Media (arranger)	388	5/06	Baa2

In the earlier transactions (transactions 1-9 in Table 5, above) relatively little film performance risk was transferred away from the studio to investors. The transactions were designed to accelerate the recovery of a studio's costs for the production of a film, but not the repayment of prints and advertising (P & A), and the structured investors were in a senior position to the P&A payments.

With Paramount's Melrose Investors (Melrose) transaction in 2004, issuers and intermediaries began using structures that shifted greater risk to

investors. The greater risk tolerance of investors is demonstrated by the shift to “unwrapped” transactions. Wrapped transactions typically receive Aaa ratings as a result of a guarantee from a third-party insurance company. In cases where transactions are wrapped they are generally structured to achieve at least an investment grade “shadow” rating; that is, the risk faced by the insurance company is at least Baa3.

The major change in the newer transactions is that reimbursement of P & A has been shifted to the top of the cash flow waterfall, ahead of structured bondholders. The new deals also expand the way in which securitization is used in film financing. The more recent transaction not only accelerate a studio’s reimbursement of a slate’s production costs, but also serve as an additional source of funding for its ongoing business which reduces a studio’s continuing reliance on its corporate parent. As a result, a studio has the option to produce a larger number of films and/or more expensive films without having to seek additional partners, as it often needed to do in the past. In addition to the Melrose transaction, the Magic Films (Magic) and Marvel Funding (Marvel) transactions were structured in this manner.

From a credit perspective, bondholders in the newer structures face more of the performance risk of the underlying slate of films. Moving full reimbursement of P & A expenses to the top of the waterfall has increased this risk due to the much larger expense component that must be covered (approximately 2 to 4 times as large as in earlier transactions) before principal and interest payments to bondholders are paid.

Table 6. Comparison between Old and New Structures

	Old Structure	New Structure
Transaction Example	Dreamworks Film Trust	Melrose Investors LLC
Studio Rating	Unrated (unpublished rating below inv grade)	A3 (based of rating of corporate parent Viacom)
Transaction Rating	Low Investment grade (shadow rating)	Baa2
P&A Reimbursement	25% of revenues at top of Water fall, rest after bondholder P and I	100% of costs at top of waterfall
Subordination	4% equity piece	19.6% subordinated debt, 12.3% equity

This increased risk shifted the emphasis of Moody's rating analysis. In the older structures, the expected cash flow coverage of the films' revenues to the promised cash flows to investors was considerable – assuming the films were actually produced. Therefore, the constraining factor on a securitization's rating was the studio's rating, which assessed the probability it would be able to produce and market a sufficient number of films (usually in the range of 12 to 15). In contrast, in the more recent deals, the expected cash flow coverage, though significant, was not nearly as strong, and the transactions received ratings below those of the studios and have required large subordinate tranches to achieve investment grade ratings. A sample comparison of key features of these structures is shown below.

The Gun Hill Road LLC (Gun Hill) transaction also used the new structure, but in a different form. This transaction was the first film receivables transaction issued by an entity other than a studio. Gun Hill was created by Relativity Media (Relativity), a entertainment industry advisory firm, to partially finance a slate of 18 films to be produced and distributed by two studios, Sony and Universal. In contrast to prior transactions, in which an entire studio's current output was securitized, Relativity purchased selected films from a studio's overall slate that met profitability targets set by its proprietary model.

Subsequent future film securitizations involving the major studios are expected to follow the new structure used in the more recent deals, since it provides them with greater flexibility and investors have been willing to accept the higher risk inherent in these structures.

E. Franchise Fees

Franchise fee transactions are collateralized primarily by the royalties generated on sales at franchised locations of a "name" retail chain. The most common type of franchise that has been securitized to date has been Quick Service Restaurants (QSRs, also known as "fast food" restaurants). Franchise fee deals completed to date are listed in Table 7.

The Arby's deal was retired successfully in 2005, as was Quizno's and Athlete's Foot in 2006. Despite the relatively good performance of these deals, the development of the market for this asset class has been slow, due to the fact that the transactions were privately placed and relatively small. As a result, there has been a lack of information about the deals available to market players, which has made them difficult to replicate, and there has been little incentive for investors to invest the resources to understand the asset

A positive development for the long-term prospects for the asset class occurred in the Athlete's foot deal following the bankruptcy of its parent

Table 7. Franchise Fee Securitization

Transaction Name	Studio	Approx \$ Size (Mil)	Approx. Close	Moody's Senior Bond Rating
Arby's Franchise Trust	Arby's	290	11/00	Aaa (wrapped)
Athlete's Foot's I.P. Holdings	Athlete's Foot Private		08/03	Baa3
QFA Royalties LLC	Quizno's	250	03/05	Baa2
DB Master Finance LLC, Series 2006-1	Dunkin' Brands	1,700	05/06	Aaa (wrapped)
Sonic Capital LLC, Series 2006-1	Sonic	800	12/06	Aaa (wrapped)
IHOP Franchising, LLC, Series 2007-1	IHOP	200	03/07	Aaa (wrapped)
Domino's Pizza Master Issuer LLC, Series 2007-1	Dominos	1,850	04/07	Aaa (wrapped)

company, Athlete's Foot Brand Inc., in December 2004. No creditor challenged the asset-backed structure during this period and cash flows to the transaction were not disrupted. (However, the deal was downgraded to Ba2 due to the closing of a large number of company-owned stores.) This case demonstrated that the bankruptcy-remoteness of a franchise fee deal structure could survive without challenge, which could alleviate some investor concern about the effects of a potential bankruptcy of other deal sponsors, who typically are lowly rated or unrated enterprises.

The major development in 2006 in this area was the DB Master Finance LLC, Series 2006-1 transaction, which securitized the franchise fees by the Dunkin' Donuts, Baskin Robbins, and Togo's brands. Totaling \$1.7 billion in proceeds, the structure including two wrapped Aaa tranches totaling \$1.6 billion and a number of new features made possible by the strength of the included brands. The transaction replaced bank financing that had been put in place when private equity firms purchased the franchisor Dunkin' Brands from Allied Domeq, and was designed to contain many of the same features as traditional bank financings. These included: no scheduled principal amortization in the early years, the ability to issue additional debt within the securitization under certain conditions, and the lack of a named backup servicer.

Despite the added flexibility for the issuer, the transaction achieved an investment grade shadow rating, due to several risk-mitigating factors. These included:

- i) The power of the bond insurer, Ambac, as controlling party, to transfer management of the assets to a party of its choice if performance deteriorates
- ii) Performance triggers that force the deal into early amortization if the franchises perform worse than minimum specifications
- iii) Limitations on future debt issued by the parent company, reducing the risk of potential disruption at the manager of the assets.

Since the Dunkin' transaction closed there has been an increase in interest in the asset class. Three large franchisors, IHOP, Sonic, and Domino's completed similar deals within the next ten months. Moody's believes that it is likely that other franchisors will follow.

4. The Future: Pooled Transactions and Other IP Assets

All of the IP deals rated by Moody's have been backed by a single pool of collateral owned by a single individual or company; however, market participants suggest that the next step could be a transaction backed by a pool of different catalogs. Such a transaction would take a group of separate financings to owners of individual pools of collateral and pool them into a larger securitization. In theory, this structure would be similar to that used in commercial real estate transactions or collateralized loan obligations (CLOs).

These transactions could benefit from the diversity created by having a large pool of loans, which may allow the pooled transaction to achieve a rating higher than that of the ratings of the individual loans. In addition, this structure could also be used to tranche the bonds into various classes, with senior classes possibly achieving as high as a Aaa rating. Such a high rating would typically be difficult to reach if the loans were securitized separately.

Moody's believes that, in principle, IP transactions could benefit from the diversification achieved through the pooling of assets; however, this might be difficult to achieve in practice. The amount of any credit for the diversification of having loans backed by a variety of different forms of IP will be evaluated on a case-by-case basis. In addition, for meaningful credit

to be given for diversification, the pool must include a large number of loans, without significant concentration in any individual loan.

Since this asset type is not as homogeneous as corporate loans it will be necessary, at least at the inception of the market, for each loan in a pool to be evaluated on an individual basis to determine its credit quality. The credit quality can then be assessed using a CLO-like analysis. Given the current slow pace of loan origination in the market, underwriters or issuers will have to be prepared to warehouse their loans until the pool reaches the critical mass of loans that makes a pooled transaction most economical.

5. Conclusion: IP Analysis Must Be Fine-Tuned

The securitization of intellectual property assets is an area that has already included a variety of different industries and asset types. Moody's incorporates the specific risks posed by these assets into its traditional approach to rating asset-backed securities, providing a consistent way in which to analyze the asset-quality, structural cashflow, and legal risks of the securities. In many cases, these transactions are future flow transactions, which require an additional layer of analysis beyond the traditional assessment of the risks of existing receivables, to include the risks involved in generating receivables in the future.

For the foreseeable future, the analysis of each proposed transaction will be tailored to the particular asset being securitized and will need time to be properly analyzed. This article has outlined a number of the major issues that can be identified at this point and indicated how they could affect Moody's analysis. In doing so, it is hoped that the market will factor in these issues when attempting to structure transactions in what can be a sizable market covering a variety of different industries.

CHAPTER 9

Financing Innovation-oriented SMEs: A boost to Sustainable Growth and Employment

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OECD

1. Introduction

In an increasingly knowledge-intensive economy, economic development is strongly influenced by innovation performance, which relies on the generation, distribution and exploitation of knowledge. SMEs and entrepreneurship are a key source of innovation and flexibility in advanced industrialised countries, as well as in emerging and developing economies, being responsible for most net job creation and making important contributions to productivity and economic growth.

In the past two decades, many innovations that have been instrumental in transforming economic life in information and communications technology and biotechnology originated with high-growth SMEs. While there is no single blueprint, research showed that growth is closely related to a company's ability to innovate; this involves continual changes to products, processes and organisational and managerial practices (OECD, 2002). Also, high-growth firms are more R&D-intensive than less rapidly growing firms or average firms.

Governments across OECD countries recognise that innovative SMEs generate sizeable gains in income, employment, exports and productivity; and that the availability of finance is a precondition for the foundation of such firms. Indeed, in most OECD countries a lack of appropriate financing has been a hindrance to the expansion of innovative SMEs with high growth prospects (OECD, 2006). In a small number of countries, this sector has expanded significantly, with positive implications for employment and technological competitiveness, but it has lagged considerably in most OECD

* This chapter summarises in particular some key findings of recent work developed by the SME & Entrepreneurship Division of the OECD Centre for Entrepreneurship, SMEs and Local Development (CFE) for the OECD Global Conference organised in Brasilia (27-30 March 2006) by the Working Party on SMEs & Entrepreneurship on *Better Financing for Entrepreneurship and SME Growth*.

countries, producing a gap to which policy makers often attribute low job creation and sagging competitiveness. Closing this gap is an important policy challenge to sustain growth and employment.

2. Investing in Innovative SMEs

While innovative SMEs only account for an extremely small share of all SMEs in any country, they are of strategic significance for economic prospects because of their potential to yield disproportionately high benefits in creating new employment and introducing cutting-edge technology into the economy.

This sector is not comprised exclusively of high-tech firms, although many innovative SMEs will be in high-technology endeavours. Indeed, across OECD countries new firms play an important role in the process whereby research is undertaken on a basic level and, subsequently, is supplemented by further market-oriented research, product development and marketing. Small innovative firms form a special link between the research laboratory and the market.

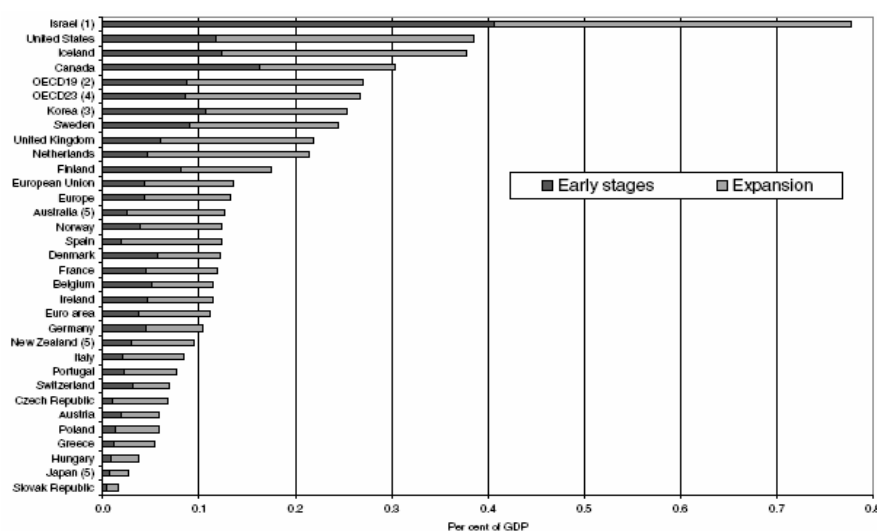
Traditional means of finance, such as bank lending, government guaranteed loans, and listing on traditional stock exchanges are only of limited relevance to new innovative small firms, which usually have negative cash flows, untried business models and uncertain prospects for success. High-growth firms are ill-suited for debt finance, at least until the middle or later stages of their life cycle. Such firms rarely generate sufficient cash flow to service debt and their risk is too high to be suitable candidates for bank credit and other forms of debt financing. The most successful means of providing finance to these firms has been through equity and quasi-equity products under which the investor can assume a large amount of risk, but can also reap very large rewards. However, traditional equity investments, based upon publicly listed companies operating in established regulatory frameworks, have limited applicability to the companies in question. A listed company frequently has diverse ownership with many investors buying and selling shares on an ongoing basis. They face strong legal disclosure requirements and follow mainstream models of corporate governance. Innovative SMEs, instead, will usually progress through several stages of equity finance adapted to their special needs.

The process of investment in innovative SMEs is sometimes referred to as venture capital, but venture capital is only part of the larger financing process and is relevant only in the relatively later stages of this process. Equity is the most commonly used form of finance for innovative SMEs; other products such as “mezzanine finance” and “hybrid products”

combining equity with other forms of investment are sometimes used. Thus, the expression risk capital seems better suited to designate the entire process of financing innovative SMEs.

The rates of development of this sector vary widely among OECD countries (Figure 1). Among OECD members, investment for early and expansion stage venture capital ranges from 0.4% of GDP in countries such as Canada, the United States and Iceland, to barely one-tenth that size in OECD countries with less developed venture capital sectors. Israel, which is not an OECD member, has the largest share of venture capital to national income. This wide discrepancy has persisted even as the entire risk capital sector underwent some fairly sharp cycles during the past decade.

Figure 1. Venture Capital Investments by Stages
In Percent of GDP, Averages 2000-2003



Notes: (1) 2000-2002; (2) Europe, Canada and United States; (3) 1998-2001; (4) Europe, Czech Republic, Hungary, Poland, Slovak Republic, Canada, and United States; (5) 1998-2001.

Source: OECD, based on data from EVCA (Europe); NVCA (United States); CVCA (Canada); Asian Venture Capital Journal (The 2000 Guide to Venture Capital in Asia).

Believing that the slow development of the risk capital sector has widespread negative consequences, many OECD countries as well as the European Union have made it a high priority to develop their risk capital sectors. For example, the European Union in 1997 formulated a Risk Capital Action Plan (RCAP) designed to reduce the "risk capital gap" with the

United States and thereby to enhance the competitive position of EU members.

3. Ascending the Financing “Ladder”

Traditional SME finance essentially seeks to finance a static or slowly growing company. Once an SME has attained a viable size and attains positive cash flow, the company utilises a fairly standard range of products such as bank loans, asset-related finance, and government programmes. Expansion can be considered using financing mechanisms such as term loans, bonds, or public listing on an exchange (or section of an exchange) specialising in smaller companies.

By contrast, the goal in financing innovative SMEs is to progress along a financing continuum from informal finance, through various phases of formal finance, culminating in entry into the formal regulated capital markets. In this process, finance often acts as a catalyst in developing and commercialising emerging technology and shortening product development cycles. A key reality is that innovative SMEs require funding for a period during which they are not generating sufficient revenues to cover expenses. Moreover, even when innovative SMEs begin to generate revenue, the need to re-invest heavily in the company means that the company will have negative cash flow for prolonged periods. Thus, risk capital usually assumes that the project will require multiple rounds of injection of outside funds.

An innovative SME investor has distinctive means of operating in comparison with other equity investors. In risk capital, the investor selects a portfolio of firms with the knowledge that there is a strong probability that many, if not most, firms will not be successful and the investment in them will be lost. At the same time, the returns on a small number of companies in the portfolio that prove to be highly successful will be sufficient to compensate the investor for individual losses. Such a system obviously needs a high degree of transparency and a high degree of confidence that the outside investor will be protected.

Sources of financing tend to evolve according to the nature of the firm and over its business life cycle, so that different problems arise as firms approach new phases and deal with newer kinds of investors. Gaps at any point in the funding cycle can leave the entire sectors in an undeveloped state. Table 1 illustrates the recourse to finance of an innovative SME during its business life cycle.

Table 1. Funding Sources of Innovative SMEs

Phase	Suppliers of Funds	Preconditions
SEED	Personal assets Family & friends "Type ii" individual investors Academic & Professional colleagues Government & university grants Endowments and foundations Seed funds	Framework for entrepreneurship Business/government/research links Government & university support for applied research
START UP	Family & friends "Type ii" individual investors Academic & professional colleagues Government & university grants Business angels Venture capital Endowments and foundations	Robust legal system Enforceability of contracts Efficient bankruptcy regime Support facilities Science parks/incubators Favourable tax environment Business angel networks
EXPANSION	Business angels Venture capital/private equity/mezzanine Finance Pension funds Endowments and foundations Corporate venturing Government Foreign venture capital	Institutional savings Sufficient volume Flexible regulation Legal framework Tax transparency
EXIT	IPO Institutional investors Retail investors Trade sale Strategic investors(M&A) Private equity	"Growth" exchanges Environment for M&A
PUBLIC LISTING	Institutional investors Retail investors	Legal and regulatory framework for investment

Source: The SME Financing Gap, OECD (2006).

Like SMEs, most innovative small firms initially depend upon informal financing raised by the entrepreneur or his/her family, friends and business or academic associates before turning to outside sources of finance. Usually, the company has no financial statements and no track record, and hence, financing from traditional sources is scarce. Funds provided by governments as grants or through seed capital funds can be partnered with other suppliers of early stage funding such as those supplied by universities,

endowments and local authorities. Funds are mostly used for development of product prototypes and feasibility studies.

Government programmes that make grants available to encourage very early stage applied research leading up to proof of concept, can be effective at this stage. The possibility of raising funds from research grants may be important catalysts. Grants that have been vetted by governments or universities sometimes give a “badge of credibility” to an entrepreneur seeking capital. In the past few years early stage investments have been facilitated by “seed funds”, which make small amounts of money and support available for pre start-up preparation of business concepts and business plans.

Business angels play key roles in the early stages of the life of the firm. They provide informal equity finance on relatively flexible conditions. The classic business angel is a successful former entrepreneur who has realised profit from initial ventures and contributes both capital and coaching skills. He/she normally plays an active role in supporting the development of products and the management of the company in its early phases.

Box 1. Networking Angels

Business angels serve as a bridge between the earliest forms of informal investment, where it is nearly impossible to separate the act of providing capital from other aspects of developing a product and starting and managing a company, and the later phases of the life of a company where the separation of functions becomes sharper. They are active in all categories of newer companies, both those which will peak as medium-sized enterprises with modest growth potential as well as those that will qualify for formal venture capital.

Compared to the investment criteria of venture capitalists, business angels will tend to invest more on an intuitive feeling rather than based on the precise valuation of the term sheet of the company. Their decision will be based on highly intangible assets of the company, such as the experience of the entrepreneur or of the management team. This can be explained by the fact that angels invest in the very early stages of a company, when the entrepreneur may not have a well articulated business plan.

Business angels' methods of operation also tend to be somewhat different from those of conventional venture capitalists. They tend to own common stock rather than preferred convertible stock, the preferred instrument of venture capitalists. Because they invest their own money, angels invest preferably in companies with which they can maintain close contacts; thus, they often operate in very narrow geographic areas. In the United States, it is sometimes said that business angels operate within a radius of 80km of their homes. They will also frequently ask for a seat on the board so as to closely oversee the work done by

the team.

An important advance has been the emergence of well-developed channels to share information and to provide a means of introduction and contact between innovative firms and potential investors. Business angels networks (BANs) have the potential to mobilize substantial pools of informal venture capital that were for formerly fragmented and invisible, to stimulate demand for equity finance that would otherwise have been latent, and to facilitate investments by creating communication channels. Contacts are maintained with other sources of deal flow such as universities, government investment promotion agencies, incubators, financial institutions, lawyers and consultants.

BANs operate mostly on the regional level, but sometimes have a national coverage. In some European countries they are represented by a national federation which mainly works towards raising awareness on the topic of angel investing and the potential economic role that angels can play in filling the equity gap. In addition to nationally and regionally organised BANs, there are increasingly sectoral BANs for biotech, Internet, media, etc., or for women investors. Some of these networks are sponsored by local governments. BANs may also be sponsored by financial institutions, stock exchanges or venture capital associations.

Tax incentives that enable individuals to defer income taxes or to offset losses in early stage investment against other income may have a stronger effect on angel finance than on venture capital.

Venture capital is a more structured technique providing a link between the innovative firms and institutional sources of capital. Although venture capitalists may participate at any stage of the life cycle of an innovative SME, they often enter the firm at the middle to later stages. Normally, in each round, the expected rate of return diminishes, but through all phases the investor always expects a return higher than on publicly traded investments.

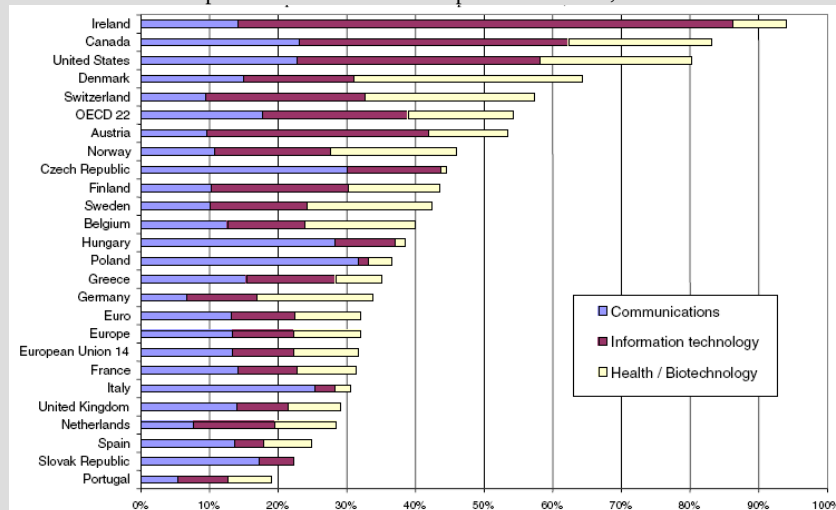
Box 2. Providing Finance to High-Technology Sectors

In order to compensate for high risk and for the prolonged period of illiquidity, the proposed project must have potential to attain very high revenue growth. Frequently such opportunities are found in the advanced technology sectors, although firms such as Federal Express or Starbucks Coffee Company did not operate in high-technology sectors, but on innovative business models with potential for high rates of growth and thus were credible venture capital candidates.

An indication for the innovative potential generated by venture capital is the share of high-technology sectors in total venture capital. Half of the OECD venture

capital flows into high-technology firms, but there are large disparities among countries.

Share of high-technology sectors in total venture capital
As a percent of total venture capital investment, 2000-03



Note: Total venture capital investment consists of early and later stage venture capital as well as, except for the United States, buyouts. European Union 14 comprises data from Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Euro, Denmark, Sweden, and the United Kingdom. OECD 22 comprises data from European Union 14 countries as well as from Norway, Switzerland, the Czech Republic, Hungary, Poland, the Slovak Republic, Canada and the United States.

Source: OECD, 2003.

By providing opportunities for certain investors to deploy their capital to innovative and high growth sectors of the economy, venture capital can offer diversification to offset the risks in other asset classes. Venture capital also holds the promise of higher absolute returns over time in order to compensate for the lesser liquidity and transparency of venture capital investments.

The venture capital firm, which is typically organised as a limited partnership, brings together venture capitalists (the general partners), who are active specialists in the various stages of the venture capital cycle, with the investors (the limited partners.) The partnership has a definite life after which it terminates, and will normally have a number of investments at

various points of the investment cycle and revenues from exits will normally be reinvested in new ventures.

At the end of the process the venture capitalist aims to realise a return on the investment through “exit”. The exit may take the form of a trade sale to a company that wishes to make a strategic acquisition, a sale to a group seeking to achieve managerial control over the company (including a management buyout) or through an initial public offering (IPO). While trade sales are much larger than IPOs in volume terms in almost all times and places, IPOs are important in establishing valuation, both for listed and unlisted companies. IPOs are also important in setting standards to which newer companies can aspire, since many highly successful companies are publicly listed. Without such “exit vehicles”, venture capital cannot function. A certain number of high-growth companies eventually achieve listing on specialised exchanges or specialised parts of exchanges that are reserved for high-growth companies. The archetypical system for listing such companies is NASDAQ in the United States, but several exchanges (or sections of exchanges) dedicated to emerging companies are found in other countries.

Investment at any stage of the life cycle is frequently contingent on there being some potential to advance to the next stage. Thus, providers of funding in the seed stage and start-up phases are more likely to respond positively to business plans when they believe the proposal has the capability of attracting support of business angels. Business angels in turn will be encouraged if they believe that the project is a good candidate for venture capital financing. This process is most explicit in the venture capital process in which it is accepted that equity will be injected into the firm in successive rounds, with the objective of realising an exit through a trade sale or an IPO. Overall, if gaps appear at any point in the funding continuum, the capability of the system to support the emergence of high potential firms is lessened by a disproportional amount. A funding gap will act as an impediment to the development of innovative SMEs. The absence of the necessary instruments, institutions or techniques at any point of the cycle will pose a serious obstacle to the entire process of formation and growth of innovative SMEs.

4. Two Drivers of Success: Location and Talented Labour

The availability of technical expertise and support in critical amounts and across a full range of products highlights the importance of developing technology hotbeds or regions conducive to knowledge-based industry.

Geographic proximity is an ingredient in building an environment conducive to innovative SME development. Investors must remain in

ongoing communication with technical innovation, innovative entrepreneurs and the marketing plans of competitors. Therefore, these investors, as well as the entrepreneurs they support, tend to be located near technology clusters, concentrated in areas near universities and other research facilities. In the United States, the classic examples are Silicon Valley in California and similar locations in the Boston area. This tendency is often reinforced by policies to build science parks, often close to universities and research facilities. Similar clusters are found at various locations in the United Kingdom and in continental Europe. In recent years, clusters have been developed in Bangalore, India and Shanghai and other places in China. The geographic concentration of innovative SMEs and the close connection between the financial aspects and non-financial aspects of innovative SME investment suggest that the most important precondition for a successful system of innovative SME finance is the broader social, technological and business environment in which the innovative SME operates.

However, it is not completely agreed what makes some regions successful centres of technological innovation and finance.

The World Knowledge Competitiveness Index (WKCI) (produced by the international consulting firm Robert Huggins Associates) compares 125 regions in North America, Europe and Asia Pacific in terms of their competitive position as centres for knowledge-based economic activity. The index uses 19 variables such as employment in the knowledge economy, patent registrations, R&D investment by public and private sectors, information and communication technology and access to finance. In 2005, Silicon Valley scored the highest globally, with US regions achieving the seven highest scores. In Europe, Stockholm scored highest with Nordic countries generally scoring well. Many of these locations are not in the traditional financial centres of their own countries, suggesting that geographic proximity to entrepreneurs and researchers is more crucial than proximity to traditional providers of finance. To the degree that it is within its power, one of the best contributions that government can make to the process of innovative SME finance is to create an environment that favours the emergence of technology hotbeds. Of course, to the degree that certain regions emerge as successful technology hotbeds, other regions will be at a disadvantage when attracting innovative SMEs.

The policy implications are not always straightforward. Sweden, which is reputed to have a tax system and other policies designed to produce social egalitarianism that would not appear to be favourable to entrepreneurship and risk taking, scores high on the WKCI index and also has a comparatively well developed venture capital sector. China and India are making rapid strides in attracting venture capital investment despite

significant problems in the market infrastructure in areas such as bureaucratic rigidity, uncertain legal environments, and spotty records concerning the equitable treatment of foreign investors and the protection of intellectual property. In fact, several Asian regions that are now significant technology centres, such as Bangalore and Shanghai, achieved low scores on the WKCI. Despite these apparent paradoxes, it is plain that location is a critical element in the development of innovative SMEs and, hence, efforts to identify and quantify the elements that make for a successful location are useful.

The cases of Silicon Valley and cities such as Toronto or Dublin demonstrate the important contribution that the attraction of talented overseas labour can make to the stimulation of entrepreneurship, often in knowledge-intensive sectors. Tolerance, social capital and a positive image appear to be key factors contributing to success in attracting skilled and entrepreneurial people. The quality of university systems is also clearly a critical asset for attracting overseas students and researchers. It must be recognised that many people move overseas temporarily as a career step. Their contribution to economic development can nevertheless be highly positive and, given suitable follow-on opportunities, people will often wish to stay. At the same time, it should be recognised that attraction programmes must fit with established immigration policies that seek to balance the interests of attracting skilled workers for economic development and protecting the jobs of domestic workers in occupations where there are labour surpluses. Indeed, the attraction of skilled and talented workers from overseas should go hand in hand with policies to upskill the domestic workforce.

5. Government Support of Risk Capital Markets

In a competitive market, suppliers of finance have powerful incentives to overcome barriers to SME finance. In most OECD countries, banks perceive SME finance as an attractive line of business and thus have developed effective monitoring techniques. Whether a country experiences a financing gap will ultimately depend upon whether the business environment is sufficiently robust to enable borrowers and lenders to interact with confidence on an arm's length basis.

In the belief that there are instances of market failure in the innovative SME financing process, many OECD countries have programmes to provide equity investments to innovative SMEs.

The early stage in the life of a company, where the entrepreneur first seeks outside financing is where many analysts and policy makers perceive

a market failure or financing gap for new and risky enterprises and recommend official intervention to aid investment. Surveys of potential entrepreneurs often indicate that the lack of financing is perceived as a barrier to enterprise formation. However, many potential investors report a scarcity of investment ready proposals. To some degree, the difference in perceptions reflects the difference between entrepreneurs' and financiers' viewpoints. In many cases, entrepreneurs, especially those in technology-related fields, may have strong technical backgrounds and novel ideas but may lack the business acumen to turn ideas into marketable products. Entrepreneurs may have unrealistic expectations about the possibilities to retain control and/or the terms for sharing risk and rewards with outside investors.

Channels of communication for entrepreneurs and investors constitute a critical part of the infrastructure. Studies have shown that the lack of awareness of small firms concerning alternative financing is a factor depressing demand for venture capital. The information gap that has to be bridged: on the one hand, potential investors have to gain access to information about potential new projects; on the other hand, entrepreneurs need to gain access to information about the availability of potential financing and about the requirements in terms of transparency and acceptable contracts that are required to induce investors to participate in undertakings. National and local authorities can play a useful indirect role in encouraging private initiatives at the local level, by contributing for example to the development of incubators, which help provide infrastructure, on-site advice and information on venture capital suppliers. Similarly, they can lock in some of the benefits of existing geographical clusters that have spawned naturally. A key feature of such clusters is the informational networks that bring together business angels, venture capitalists, professional firms including lawyers and accountants, entrepreneurs and university business schools.

Also, government participation can come either directly in the form of an equity participation in private sector venture capital firms or government participation in joint venture capital funds with a private party, the so-called hybrid fund. National and sub-national governments have provided financial support in the form of loans or guarantees. Government loans are given to small firms, for which financing from other sources is more difficult to obtain or more expensive. Guarantee schemes facilitate venture investments by lowering some of the risks involved. Guarantees may be attached to the provision of loans (usually from banks) or equity (usually venture capital). In addition to governments, international organisations are major suppliers of funding for venture capital. The European Union and the European Investment Bank have several programmes to invest in venture

capital. These schemes are often targeted to firms in an early stage of development when the firms have difficulties in attracting private capital. As private sector involvement grows, the government typically aims to phase out its programmes. Programmes usually seek to maximise private sector participation. To achieve this, government funds are often offered on a matching basis. Public officials are usually not directly involved in the investment process. Rather, this responsibility is delegated to specialists from the private sector. In some of these schemes, the share of the government is lower than that of the private investors and most of the upside of the investment is transferred to the private investors. Private investors often have the option of acquiring the government's investment at a favourable rate.

Since many governments have assigned a high priority to the development of risk capital and have made considerable sums available to support this sector, it is worth keeping in mind the need to avoid skewing incentives. Government intervention should not seek to alter the basic nature of risk capital which is that entrepreneurs must persuade investors to accept high risk in the hope of obtaining high return. As in all government programmes to support private lending, the principle of risk sharing must be observed in which the entrepreneur is expected to place funds at risk alongside those of the public agency. Project selection must be made by the private partners and the reward structure should allow the official side to obtain a reasonable return on the investment, but leaving a substantial benefit potential to the private partners. Governments should also be wary about providing funds at concessionary rates. Policies that reduce rates of return below those which private investors will accept can stifle the emergence of an equity market for innovative SMEs.

Some countries have provided tax relief for various forms of investment in unlisted companies or in companies listed on second tier or growth exchanges. In the United States, corporate and individual investors in shares of small companies may exclude all or part of capital gains on such shares from income taxes if the investment is held longer than five years. In addition, taxes on capital gains are deferred if the proceeds are reinvested in other innovative SMEs. In many European countries, investors in funds specialising in SMEs or innovative SMEs receive a tax deduction at the time of investment as well as exclusion or reduction of capital gains taxes if specified conditions are met. Japan also provides investors with tax deductions at the time of investment as well as exclusion of taxes on capital gains. Since venture capitalists depend upon capital gains for their income, the industry tends to press strongly for low rates of capital gains taxation. Many of the investors in venture capital, such as pension funds, are tax exempt. However, the empirical support for a strong correlation between

capital gains taxes and venture capital investment is ambiguous. The United States and the United Kingdom, where the private equity sector is advanced, have fairly high capital gains taxes (and had even higher rates of capital gains taxation during periods when the industry grew exceedingly rapidly), while many countries with low or no capital gains taxes do not have thriving private equity sectors.

Stock options are commonly used as an incentive for managers and employees in new technology-oriented companies. OECD studies on entrepreneurship and the new economy recommended that members simplify the legal and tax treatment of stock options, encourage broad-based plans for employees, and ensure that their tax system is neutral vis-à-vis this form of compensation.

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CHAPTER 10

Conclusion

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Baumal (2002), in his analysis of the growth miracle of capitalism, pointed out three critical features of innovation¹ that can magnify the contribution of technical change to economy. The first feature is a cumulative effect. Many innovations do not merely replace older technology; rather, they add to what was previously available, thus constituting a net increase in the economy's store of technical knowledge. Such innovations can entail creative knowledge accumulation. Second, innovation carries a spill-over effect in the economy. Improved technology, once created, not only contributes to the output of the firm which made the breakthrough, but also, at relatively little additional cost, can add outputs to other enterprises. Thus, it constitutes economies of scope and scale. Third, innovation brings an acceleration and dissemination effect. Studies have found that the average time between the commercial introduction of new products and the entry of competitors supplying the same or similar products fell from 33 years at the beginning of the 20th century to three years at the end. Over the last ten years this process has accelerated further.

Innovation is a key concept in a knowledge-based economy. It includes new ideas, technologies, processes and methods with which enterprises can better meet demand at low costs. Under the new techno-economic paradigm which is important in this economy, development and diffusion of new products and processes require not only science and technology but also, probably more importantly, non-research, soft and entrepreneurial skills. Indeed, innovative activities may arise from any part of the

* This Chapter refers to the speech made by Sergio Arzeni and round table discussions at the conference on April 26, 2007.

¹ Schumpeter (1934) defined innovation as new combinations of existing resources. This combinatory activity was labeled as "the entrepreneur function" fulfilled by entrepreneurs. Schumpeter saw innovation as a specific activity carried out within an economic sphere and with a commercial purpose. In this sense, a technology-based firm, which is often used as a synonym for an innovation-oriented firm, should be differentiated from each other. However, many aspects of the two types of firms share similar implications for policy purposes. They are used interchangeably here unless a thorough distinction is required.

production process: not only R&D labs but also soft or intangible skills such as entrepreneurial ability, communication skills and adaptability contribute strongly to innovation, especially in services and organizational innovation. In his 'Management Challenges of the 21st Century', Peter Drucker (2001) noted likewise that the test of an innovation is whether it creates value. Therefore, innovation means the creation of new values and satisfaction for customers on the basis of imagination, creativity, new idea and technology.

As Romer (2007) insisted, economic growth tends to spring from better *recipes*, not just from more *cooking*: the latter alone would eventually run out of raw materials with causing unacceptable levels of pollution and nuisance, while the former filled with new ideas could generate more economic values per unit of raw material with fewer unpleasant side effects. The importance of new *recipes* becomes imperative, especially in a knowledge-based economy compared with the industrialized one where *cooking* itself is determinate.

Who will be the leaders that generate a variety of innovations in the knowledge-based economy? The most promising candidates are SMEs filled with a sense of adventure. Today, a distinctive feature of the new economic environments - and their consequence - is that the average age of new entrepreneurs has fallen drastically. Most flagship entrepreneurs in the information, communication and technology firms (ICTs) over the last 30 years started their businesses when they were between 16 and 20 years of age, giving birth to a wave of new firms which grew very quickly in new fields and grasping new opportunities: the so-called *gazelles*.

Is innovation a sole possession of SMEs? As to the question, Schumpeter himself had two different views in his life: Schumpeter Mark I and Schumpeter Mark II, respectively. In his earlier thoughts (Schumpeter Mark I) Schumpeter (1934) focused mostly on individual entrepreneurs, for which had comparative advantages of attempting radical innovation realizing the motives² of entrepreneurship. In his later works such as Schumpeter (1943), he observed that innovation may be effectively carried out through collective entrepreneurship in the area of routinized innovation (Schumpeter Mark II). Baumol (2002) also took the same view as Schumpeter that entrepreneur-led innovation should be distinguished from routinized ones. Following them, SMEs are particularly active in innovation in new and promising areas at an early stage of technology. However, after a dominant standard emerges, the competitive advantage may shift towards LEs. Then a whole line of innovation creating chain between SMEs and LEs and an evolutionary process of SMEs to grow up along with innovations should be taken into account. This is, at least, applicable to Korea where

² Schumpeter (1934) pointed out the three motives of entrepreneurship; the will to conquer: the impulse to fight, or to prove oneself superior to others; and joy of creating.

SMEs' innovative motive is abundant but they do not create a series of economic value-added due to competitive pressures with LEs. Furthermore, Korean LEs are not aggressive to take on risk by pursuing in-house innovations and R&D, and they lack acquisition of necessary innovations and technologies from outside due to regulations. Thus, the entrepreneurial activities are constrained in both sectors.

Under these circumstances, what would be necessary policies to promote entrepreneurship in the area of financing arrangement? Basically, according to Schumpeter, the entrepreneurial function has to be distinguished analytically from the roles of other actors in the firm, such as the capitalist/financier (Fagerberg, 2003). As such, the entrepreneurship and financing could be decomposed but the former is highly dependent on the latter. The relevance is particularly paramount to SMEs facing additional disadvantages to LEs, *ceteris paribus*. On top of the common difficulties of SMEs' financing such as information asymmetry and high transaction costs (as in Chapter 2 by Thorsten Beck), innovative businesses often confront larger uncertainties. The uncertainties faced by innovative SMEs are twofold: high default probability and unexpected returns when making success. New and small firms are more likely to jump into things when it is hard to imagine what possible outcomes will be. Since LEs tend to engage in more routine type of innovations, the payoff is much more predictable. In contrast, SMEs which take part in radical innovation are exposed to low likelihood of success with unknown return.

To the extent that innovative businesses require a number of trials and errors,³ venture capital supporting these businesses needs to be patient. In view of the necessity of patience, the royal avenue to finance entrepreneurship is always internal cash flow. When it comes to external financing, we should pay more attention to business angels as Chapter 6 (by William Bygrave and Andrew Zacharakis) explained. Due to their dominant investment amounts vis-à-vis venture capital investments at the entrepreneurial stage, the infrastructure for business angels to be active will be of particular importance in promoting innovative businesses vigorously. One of the prerequisites is the monitoring of angel investors on the invested businesses. As Chapter 9 (by Sergio Arzeni) emphasized, two key drivers for successful environments for fostering innovative SMEs, or geographical proximity and talented labor, are related to monitoring through close contact and communication by being closely located.⁴ One more policy recommendation in this context is that Korea should allow and guarantee

³ The US magazine *Inc.* publishes annually the 500 fastest-growing small businesses and what we discovered – surprisingly – was that 84% of them reported that the business they started was distinctly different from the firm they run today.

⁴ This view is shared in Chapter 7 (by John Thompson).

better monitoring instruments for angels investors, not alone rich business angel networking. It goes without saying that active investments on innovative businesses cannot be expected without transparent corporate governance, or confident recovering mechanism of investors mentioned by Shleifer and Vishny (1997), in the SME sector, as well.

Venture capital investment to which enormous attention and expectation have been paid to date is also an important area of interest in relation to fostering innovative SMEs. As Chapter 4 (by Dongsoo Kang) showed, among various public financial assistances, venture capital policy outperformed credit guarantee and direct lending to SMEs in Korea. Contrary to the title of venture capital, however, Korean venture investments, especially government participated ones, have not been involved in a necessary amount of risks as discovered in Chapter 5 (by Suil Lee). In comparison with the best practices of advanced countries, the degree and depth of government roles in venture capital markets are too predominant that private sectors' incentives are distorted and their passions have subsided.⁵ It is strongly recommended, as argued during the conference by John Holloway at the European Investment Fund (EIF), that the government should limit its role as an indirect supporter, rather than main investors. In the method of investment, it is to set up principles and areas of public investment but the specific SMEs under investment need to be chosen by private financial institutions like in EIF. In this context, the new approach of *fund of funds* announced by the Small and Medium Business Administration (SMBA) of Korea is evaluated at the right direction.

Public credit guarantee, basically, asks for the same principle of management as venture capital in Korea. As shown in the empirical observations (in Chapter 4), credit guarantee has not achieved satisfactory results for sustainable development of SMEs and the support of innovative businesses. Upon evaluations, the Korean government initiated the reforms on credit guarantee scheme in both quantity of investment and quality of management. Overall, the direction of the reforms is rightly posited, but their degree is so gradual that it raises doubts about their effectiveness. The order of degree, above all, needs to be taken into account and then the realistic price of credit guarantee should be imposed on the guaranteed. As for the current financial commodity of loan guarantee to innovative SMEs, it needs to be under scrutiny whether the nature of risks of business and the loan guarantee are consistent and further what type of guarantees would be fit for the adventurous businesses from the financial perspective. In this

⁵ There is the exceptional case of Israel where the public sector has invested successfully in innovative firms. This is an outstanding lesson on how government can give opportunities and hope to the young and small. To do so, parliament needs to accept that taxpayers' money can be invested in new ideas and may be lost. The result of Israeli experience is that eventually the government earned money *per se* and contributed to building a very vibrant high-tech economy.

sense mutual credit guarantee as used in European countries and equity guarantee scheme deserve attention. In light of sponsoring innovative businesses, there exist increasing interests and expectations, at least among Korean policymakers, in employing financial innovations such as securitization techniques on intellectual properties like patents and technology. However, we should not expect innovative financial techniques too much as argued in Chapter 8 (by Jay Eisbruck). The financial techniques are mostly applicable to established firms with proven records, rather than nascent ones with just potentials. The current financial markets are not well developed to take on such high risks embedded in innovative SMEs.

McClelland (1961) highlighted a sense of achievement as key success factors of entrepreneurship. Entrepreneurship will be more successful when people depend more on themselves than on governments. The financing practices of SMEs in Korea, however, have been inconsistent with fostering entrepreneurship with innovations. Obviously, Korea has not had enough room to take a stance for supporting innovation-oriented businesses, albeit their necessities. The expeditious economic growth up until the financial crisis in 1997 did not require SMEs to be equipped with international competitiveness. Most SMEs in the era played a role as subcontractors to large enterprises which were exposed to direct global competition. Price, rather than quality, competitiveness had guaranteed their survival and proliferation. After the outbreak of the crisis, many SMEs faced the limitations of pre-existing strategies, but could not afford to restructure themselves due to financial and operational hardships. The Korean government which had to focus on both financial and corporate reforms, on a large scale, could not help bailing out the SME sector: extending all dimensional financial supports to SMEs such as benign credit guarantees without thorough credit examinations, public participation in the venture capital funds as a major investors and increasing amount of policy lending.

Contrary to the existence of these generous public financial supports to SMEs, there exists, both home and abroad, an emerging cause for streamlining, simplifying and focusing the government financial assistances in favor of technology-based, innovation-oriented and growth-led SMEs. Clearly, it is not with ease to narrow the gap between the current status and future direction. The new public SME financial support schemes bring about drastic resource and wealth redistributions among various stakeholders, including not only both existing and forthcoming SMEs but also politicians and the government itself. Nevertheless, the government should, with a firmly set principle, exercise a leadership to get through resistance based mainly on interests. Due to the suppliers' dominant role of public financing, it is the government that should and could initiate a series of reforms.

Finally, it is worthwhile to note that public financial assistances should not shrink nor distort private sector's incentives, and the very fundamental nature of adventurous investment, to take on risk. No attempt to discourage or indulge voluntary investors over the extent to which market failures due to underdevelopment of financial system are resolved, and to which positive externalities are contained should be under reconsideration. Hence, the government needs to be of patience.

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