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# Entrepreneurial Financing: Program Review and Policy Perspective <sup>†</sup>

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## Abstract

*Entrepreneurial financing,<sup>1</sup> such as publicly initiated venture capital or grant schemes, serves as an important policy instrument that aims to bridge the financing gap facing young, innovative businesses, a gap that is mainly due to higher risk and growing uncertainty, and to strategically promote the creation of new ventures through the revitalization of their venture capital industries. This study examines public venture capital initiatives in Australia, Canada, and Sweden, and discovered that all three countries actively foster their venture capital industry through the formation of funds or the provision of tax incentives. It is notable that the majority of financing initiatives heavily depend on supply-side measures rather than demand-driven policies that focus on stimulating private investment in technological innovations and discoveries. This paper discusses in-depth the policy impact of public financing initiatives and their subsequent side-effects raised in the process such as overlapping in funding structure across the country, lack of monitoring and evaluation for feedback, fragmentation across the government ministries and agencies, and competition with the private sector, which may cause inefficiency as a result of public intervention. Financial constraints may arise for many reasons, partly resulting from the lack of investment readiness of young entrepreneurs. This signals a policy shift towards the creation of market-driven demand away from the traditional supply-push approach, and is a grand challenge to policymakers in entrepreneurial financing. Attention is leaning towards the efficiency and effectiveness of these public-financing initiatives in terms of their policy roles. It is worth noting that policy should focus on generating synergy so available resources can be channeled into the early, risky stage of new ventures, working as a facilitator to the achievement of an intended policy goal.*

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## Keywords

entrepreneurial financing, public venture capital, funding gap, investment readiness, crowd out

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<sup>1</sup> Entrepreneurial financing in this context refers to financing particularly for R&D-intensive, technology-based businesses at early, risky stages of a company's growth.

## 1. INTRODUCTION

### 1.1. Background and Research Question

It is a lengthy and complex process translating a scientific discovery into a commercially viable product. The value creation process from scientific research towards the competitive market entails much risk and uncertainty. Financing gaps in the early stages between entrepreneurs and investors is one of the pronounced issues that hamper entrepreneurial activities. Regarding the financing aspect faced by young innovative companies such as start-ups, access to finance is seen as the overarching concern to tackle. Financial conditions have worsened in the aftermath of the 2008 economic crisis, illustrated by certain indicators on business R&D and venture capital investment during the corresponding period. A 2011 survey (EC, 2011<sup>2</sup>) on the access to finance by small and medium-sized enterprises (SMEs) in the European area reveals that SMEs considered access to finance as one of the most pressing problems in the region. Financial constraints have primarily been a chronic issue particularly for fledgling businesses in their early stages of growth.

The main reason for choosing Australia, Canada, and Sweden for policy analysis on entrepreneurial finance focusing on publicly initiated venture capital is significant learning effect generated from their policy experimentations. The three countries are advanced economies, but their economic conditions have stagnated over the years due to the aftermath of the global economic crisis. In an effort to address these issues, the three countries based on an extensive review of their venture capital industries and innovation policies took a variety of stimulus measures that are expected to play a pivotal role in meeting financing needs from young innovative entrepreneurs and boosting the economy as a whole.

The three countries are characterized by their significant distinctions in their venture capital industry such as: 1) Australia has relatively weak venture capital infrastructure, in contrast with compelling strengths in science-based research activities; 2) Canada supports the invigoration of their domestic venture capital industry through public fund formation and tax incentives, although such policy initiatives proved not to be as successful as expected; and 3) Sweden made substantial interventions in the venture capital industry by providing public venture capital funds, which cast some doubt on the efficiency of public venture capital schemes.

Public intervention is regarded as a necessary and appropriate procedure to deal with financing challenges confronted by young innovative start-ups and SMEs (Durufle, 2010) in particular, even

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<sup>2</sup> The survey "Access to Finance for SMEs in the Euro Area" was conducted between 22 August and 7 October 2011 under the request of the European Central Bank and the European Commission. The total sample size for the Euro area was 8,316, of which 7,690 (92%) had fewer than 250 employees. The target period was from April to September 2011.

though it is likely to bring about a picking-the-winner problem in the process<sup>3</sup> and political intervention. This research paper discusses the following policy questions: what is the rationale for market intervention, what policies work and what do not, what are the policy implications and impact, what is the role of government in the implementation process, and what are the future challenges.

## 1.2. Rationale for Public Intervention

Financial markets do not work properly under risky circumstances, mostly due to concern over capital loss. Furthermore, private R&D, a key driver of entrepreneurship, tends theoretically to reach below the socially optimal level of investment (Schuelke-Leech, 2012), largely due to considerable spillover effects<sup>4</sup>(Audretsch, Leyden, & Link, 2012; Griliches, 1992; Jaffe, 1998). Knowledge as a “public good” can be utilized free of charge, irrespective of original investors due to the properties of its non-exclusivity, resulting in underinvestment in innovation.

It is important to note that young innovators tend to lack the track record, managerial expertise, business skills and networks, or even collateral as a guarantee for borrowing. Young technology-based entrepreneurs have no choice but to mobilize personal relationships such as family and friends rather than to use traditional financial institutions. This critical stage is known as the “valley of death,”<sup>5</sup> its name implying its financial risk (House of Commons Science and Technology Committee, 2013). Novel inventions are also an intangible asset class with high-risk and high-reward, making it difficult for financiers to quantify potential value. These reasons make it harder for innovators to obtain access to finance in their early entrepreneurial innovation process.

In short, the rationale for public financing initiatives can be found in: 1) risk aversion, which indicates that investors tend to move away from early stage, risky projects to later stage, less risky projects; 2) positive externality, which implies that social return is higher than private return in the generation of knowledge (Griliches, 1992; Lerner, 2002); 3) asymmetric information, which means skewed information between innovators and investors; and 4) certification effect, or the so-called “stamp of approval,” which suggests certifying new firms to outside investors (Lerner, 2002). Fig-

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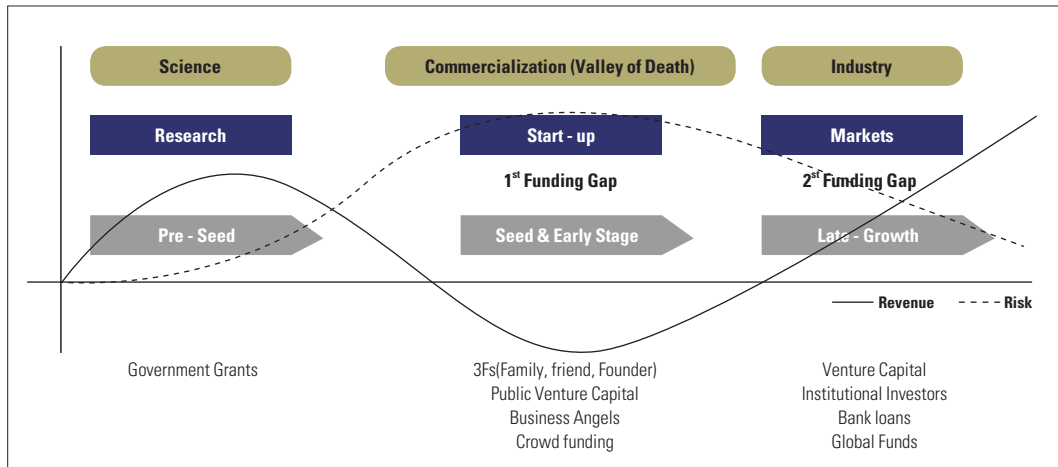
<sup>3</sup> The government’s picking of winners is considered one of the most common government interventions in the modern economy as part of industrial policy. According to the Economist, August 5th 2010, the author under the title of “Picking Winners, Saving Losers” discusses policy examples and developments of government intervention and explains four key drivers to the revival of industrial policy such as: 1) the weak state of the world economy, 2) rebalancing of economies away from finance and property, 3) emergency use of industrial policy tools, and 4) emulation of the apparently successful policies of fast-growing economies. The author provided some lessons from the past such as: i) the more it is in step with a national or local economy’s comparative advantage, the more likely industrial policy is to succeed, ii) policy is least prone to failure when it follows rather than tries to lead the market, and iii) industrial policy works best when a government is dealing with areas where it has natural interest and competence.

<sup>4</sup> Spillover occurs in diverse areas and therefore is confined to the additional benefits generated from the consequence of knowledge creation such as R&D and innovation. A number of studies on the spillover effect show overall R&D spillovers are both prevalent and important in driving innovations (see Zvi Griliches, 1992).

<sup>5</sup> According to Investopedia, the “valley of death” is a commonly used term in venture capital referring to the period of time from when a startup firm receives an initial capital contribution to when it begins generating revenue. During the valley death curve, additional financing is usually scarce, leaving the firm vulnerable to cash flow requirements.

Figure 1 shows financing needs at different stages of the entire innovation process, ranging from scientific research to market production. Entrepreneurial finance can be severely constrained around the valley of death, where risk is likely to hit highest, while return is likely to be lowest.

FIGURE 1. Financing Needs at Different Stages of Company Growth



### 1.3. Research Methodology

The research was done through literature review and diverse debates and discussions with policy-makers, business leaders, and experts in the area of entrepreneurial finance, shedding light on the major role, management and policy impact of public venture capital initiated by Australia, Canada, and Sweden. In addition, a variety of policy issues raised in the implementation process were discussed in-depth, aiming to explore policy insight from those countries' experiences.

At the micro-level, the research focuses on the formation, operation, and performance of publicly initiated venture capital funds in the selected countries. Relevant policy and program examples are introduced, analyzed, and discussed. At the macro-level, the research explores policy impact, which may be positive or negative, managerial aspects, interactions among multiple actors, and then draws implications, lessons to learn, and challenges ahead from a public policy perspective.

## 2. REVIEW OF PUBLIC VENTURE CAPITAL

Venture capital (VC) as professionally managed funds has been in the center of entrepreneurial finance over the last several decades, aiming to finance new and innovative venture firms (UN, 2007, 2009). Young and technology-based firms commonly suffer from lack of funds at early stages largely due to uncertainty. Publicly initiated venture capital (PVC), as a complement to the private venture capital, has played an extremely important role in filling the financing gap especially for new entrepreneurial venture firms (Hood, 2000; IKED, 2007). The role of a government in the ven-

ture capital industry draws growing attention from the entrepreneurial community especially since the global economic crisis of 2008.

Small Business Investment Companies (SBIC, 1958) in the United States, the Scottish Development Finance (SDF, 1982),<sup>6</sup> the Yozma Fund (1992) in Israel, the High-tech Start-up Fund (2005)<sup>7</sup> in Germany, the Early Stage Venture Capital Limited Partnership (ESVCLP, 2007) in Australia, the Labor-sponsored Venture Capital Corporations (LSVCC, 1982) in Canada, and Industrifonden (1997) in Sweden, are some of the typical PVCs initiated by governments.

## 2.1. The Australian Case

Venture capital investment as a share of gross domestic product (GDP) reached 0.06%<sup>8</sup> in 2009, which is above the OECD sample average 0.03%, while gross expenditure on research and development (GERD) as a share of GDP came up to 2.24% in 2008. In an effort to revitalize the venture capital sector, the Australian government in 2005 reviewed the country's venture capital industry and assessed its state and the impact of existing government programs. The key findings by the Review (Australian Venture Capital Association Ltd., 2005)<sup>9</sup> reveal, surprisingly enough, that the Australian venture industry was significantly underdeveloped compared to the breadth and quality of the country's R&D activities, and showed low investment levels, a lack of capital formation and scale, and a very low number of investment managers with a proven track record. In short, the review can be summarized as follows: 1) the Australian venture capital market as a whole is quite modest in size, as a percentage of GDP; 2) the level of venture capital relative to the total private equity investment is considerably less than in many other nations; and 3) the modest level of development of the venture capital sector is in sharp contrast with Australia's high academic scientific output.

Based on the findings from the Review, it is clear that the contribution of professional venture capital to Australian industry is relatively small. This comes as a significant challenge to the government, which leads the implementation of a suite of new policy initiatives recommended by the Review. Major initiatives to stimulate the venture industry include the introduction of the "Early Stage

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<sup>6</sup> The Scottish Development Finance was established in 1982 to provide both equity and secured loans for SMEs, which laid the foundation for bolstering early-stage finance for entrepreneurial businesses in Scotland. Some lessons from the SDF were drawn such as: 1) striking an appropriate balance between commercial achievement and economic development, 2) specific challenges to be addressed, 3) attraction of professional fund managers with expertise, and 4) interactions between SDF and private sector venture capitalists.

<sup>7</sup> The High-Tech Startup Fund in Germany was established to finance innovative high-tech companies in their seed phase through public and private partnership. The funds provide operational support through local coaches and hands-on/strategic support by investment managers.

<sup>8</sup> Data for venture capital investments are drawn from the OECD Entrepreneurship Financing Database (OECD, 2011) and data for GDP are drawn from the OECD MSTI Database. Others are based on national sources.

<sup>9</sup> The primary focus of the Review concerned the existing policy deficiencies in the VCLP reforms that were introduced by the government in 2002.

Venture Capital Limited Partnership (ESVCLP)<sup>10</sup> in 2007 (which would be tax-free to investors), the implementation of the Innovation Investment Funds Round 3 (IIF3) co-investment program in 2008, and the easing of restrictions on the existing Venture Capital Limited Partnership (VCLP)<sup>11</sup> in 2002 (which aims to encourage local and foreign investment in the venture capital and private equity sectors). These measures are aimed at both the short and long-term stimulation of the venture capital industry and the improvement of an important existing program.

The ESVCLP initiative is a significant development on what previous government programs were willing to contemplate in assisting the venture industry. It grants to all the investors in registered venture capital funds a tax-free entitlement to dividends or capital gains generated by those funds. This vehicle has the potential to considerably enhance the ability of early stage venture capitalists to raise funds given the “no tax” status of ESVCLPs for all investors, whether local or foreign, individual or institutional. Under the scheme, the tax benefits accrue to the investors only when the investments yield returns.<sup>12</sup> This may limit the impact of the new policy initiative in a context that no tax deductions are available for capital losses incurred by ESVCLPs. What is worth noting here is that investors are, in general, exposed to risk in a sense that they are not in a position to claim financial compensation from the losses. The impact of “back-end” tax incentives like ESVCLPs is likely to be not so influential as “front-end” tax incentives, which means tax deductions on investments rather than on returns. Under the new ESVCLPs scheme, investors may hesitate to invest, resulting in a weaker policy impact than originally intended.

The IIF3 program, which aims to establish new funds to invest in early-stage companies commercializing Australian research, will co-invest with private funding basically on a 50:50 basis and is expected to build up to A\$200 million over a five-year period with the formation of ten new early-stage venture funds. IIF was formed three times under the original IIF initiative to accelerate commercialization in Australia. IIF Rounds 1 and 2 were formed with five funds (A\$ 130 million in 1998) and four funds (A\$ 91 million in 2001) respectively. IIF Round 3 formed with seven funds (A\$ 140 million until 2011) financed by the Australian Government. Notably, the Cutler Review<sup>13</sup> in 2008 recommended that IIF be maintained and extended with a 4th round after 2012.

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<sup>10</sup> The Early Stage Venture Capital Limited Partnership was established in 2007 as part of the follow-up measures after the extensive review on the venture capital industry in Australia in 2005. The aim was to provide tax concessions for Australian residents and foreign investors who invest in early-stage venture firms.

<sup>11</sup> Venture Capital Limited Partnerships, which was formed in 2002, aims to precipitate equity investment in start-ups and growing Australian companies, and over forty registered VCLPs are under operation as of June 2012. The VCLP scheme was revised in 2007 to provide greater access to foreign investors in high-risk start-ups and expanding companies.

<sup>12</sup> Taxation is an important vehicle that significantly leverages private investment behavior in the process of technological innovation. Therefore, tax policies heavily depend upon the nature or goal of a policy that is achieved, i.e. front-end tax incentive can be helpful to increasing investment, while back-end tax incentive is likely to increase ROI and prevent potential moral hazards in the process as well.

<sup>13</sup> The review of the national innovation system in Australia was carried out by Terry Cutler in 2008 on the request of the Australian Government and produced the “Venturous Australia Report.” The recommendation on Innovation Investment Fund was that it should be maintained with a fourth round after 2012. The primary objectives are: 1) to invest in high growth potential firms, 2) to expand the pool of skilled fund managers, 3) to build downstream investor confidence in follow on investment, and 4) to build institutional fund confidence in supporting early-stage funds.

TABLE 1. The Innovation Investment Fund

Currency	Funding Source	Round 1	Round 2	Round 3	Total
Million A\$ committed	Commonwealth	130	91	140	361
	Private	67	66	150	283
	Total	197	157	290	644
Million A\$ Returns	Commonwealth	105	47	0.6	153
	Private	266	54	0.8	320
	Total	371	101	1.4	473

Source: *Venture Capital in Australia, as of 30 June 2012 (AusIndustry, 2012)*.

Under the new initiative, various restrictions on the operation of VCLPs were removed or relaxed including Australian residency requirements for investees, the minimum fund size of A\$ 10 million, the country of residence of investors, and the appointment of auditors. These changes in turn are important not only for VCLP funds, and they flow through to benefit ESVCLPs that are effectively a subset of the VCLP scheme. The VCLP program has no limit on fund size, and is applicable to later-stage private equity activity. The main attractions of the regime are that foreign investors benefit from tax-free status on investment gains, and general partners are given capital gains tax treatment on carried interest rather than being taxed at ordinary income rates.

According to a 2010 evaluation (Australian Government, 2011), the IIF program was found to contribute both to the commercial development of targeted firms and to the early-stage venture capital market in general. The IIF program has been critical in channeling additional equity capital to genuinely early-stage and high-risk young businesses primarily in new technology sectors. The IIF model is considered an effective way for Government to grow new firms and build a local venture capital market. It draws in private sector investment and provides attractive incentives to fund managers to operate in high-risk areas, leading to higher return on investment (ROI). However, the challenges ahead in the Australian venture capital industry are lack of critical mass in terms of fund size, weakness in exit markets, and lack of commitment from institutional investors such as pension funds (Australian Government, 2011).

It appears that most of the public venture capital funds in Australia focus on seed and the early-stage funding gap. A co-investment approach with private partners as with IIF contributes to creating synergy, diminishing the probability of crowding out and moral hazards. Importantly, public venture capital management by dedicated fund managers is significantly helpful as in the case of IIF and ESVCLP because they provide not only capital but also professional coaching to young innovative start-ups that have little expertise and business skills. As seen so far, it is important that the involvement of a government in the venture capital industry needs to focus on correcting market failure, leaving market forces working properly in the long run.

On balance, the policy measures taken by the Australian government appeared to be bold enough to influence the level of venture capital activity, and their impact would be more or less tangible over time. However, the development of a robust venture capital industry will not occur overnight. A public policy initiative usually takes a long time to prove its merits. The U.S. example is instruc-

tive, where it took twenty years from the introduction of the Small Business Investment Company (SBIC) program<sup>14</sup> in 1958 for the venture capital industry to attain critical mass (Lerner & Watson, 2007).

## 2.2. The Canadian Case

Venture capital investment as a share of GDP reached 0.03% in 2009, which is about the same as the OECD sample average of 0.03%, while GERD as a share of GDP amounted up to 1.74% in 2011. Venture capital in Canada has been diminishing since 2000 in terms of total capital raised and invested. The total venture capital raised and invested in Canada hovers around US\$ 1 billion in 2010, steeply down from a peak of almost US\$ 4 billion in the late 1990s. In order to address the declining venture industry, the Canadian government has launched a variety of policy initiatives that aim to foster the venture capital industry at both federal and provincial levels. At the federal level in Canada are two major interventions. One is the Business Development Bank of Canada<sup>15</sup>(BDC), a government-owned venture capitalist. The other is a labor-sponsored fund program, referred to as Labor-Sponsored Venture Capital Corporations<sup>16</sup>(LSVCCs). In addition, at the provincial level, there are both provincially operated funds and the provincial equivalents of the LSVCC program.

The BDC directly and indirectly provides a great deal of venture capital through the implementation of various programs designed to close financing gaps during business development. The LSVCCs grant tax incentives to encourage venture capital investment and technological innovation as well. Furthermore, many provincial governments in Canada also offer subsidies and tax credits through a diversity of programs of their own, as well exemplified in the provincial governments like Quebec, Ontario, Manitoba, New Brunswick, etc. It is roughly estimated that government-sponsored venture capital funds, which include all LSVCCs, the BDC, all VCCs and venture capital funds operated by provincial governments, reach over 50% of all venture capital invested in Canada (Brander, Egan, & Hellmann, 2008). As a point of comparison, it is in sharp contrast with the U.S. that accounts for approximately 5% of the total invested capital.

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<sup>14</sup> The SBIC Program is a multi-billion dollar, government-sponsored investment fund set up in 1958 to bridge the gap between entrepreneurs' need for capital and traditional sources of financing. It invests long-term capital in privately-owned and managed investment firms licensed as SBICs and for every \$1 an SBIC raises from a private investor, the Small Business Administration (SBA) will typically provide \$2 of debt capital, subject to a cap of \$150 million. Once capitalized, SBICs make debt and equity investments in some of America's most promising small businesses, helping them grow (SBA, 2014).

<sup>15</sup> The Business Development Bank of Canada is Canada's small business bank and a financial institution wholly owned by the federal Government of Canada. It delivers financial and consulting services to Canadian small businesses with a particular focus on technology and exports.

<sup>16</sup> LSVCCs, as a group, are the largest providers of venture capital in Canada. In fact, about 40% of venture capital is derived from LSVCCs. Canadian investors benefit from participating in LSVCCs because not only are they eligible for RRSPs and other retirement plans but they also yield both provincial and federal tax credits equivalent to 15% each. It is a fund managed by investment professionals and invested in small to mid-sized Canadian companies. The Canadian federal government and some provincial governments offer tax credits to LSVCC investors to promote the growth of such companies.



The Venture Capital Industry Review (BDC, 2010)<sup>17</sup> shows how the Canadian venture capital industry faces many gaps in several elements. Some of the gaps found were: shortage of entrepreneurs and skilled management with global networks, overinvestment in the early stages without adequate follow-on capital, a subscale of General Partners (GPs) with strong capability and experience, precipitous decline of venture capital investment, lower level of non-dilutive capital prior to the first venture capital investment, and inefficient allocation of government funds driven by public policy and misaligned incentives, etc. These weaknesses show that Canada must deal with a number of pressing challenges before it can lead the venture capital industry on the right track.

Further understanding on the gaps needs to be considered in the following terms: 1) the skill to commercialize and grow an idea into a commercially viable business is probably the most important aspect, which implies a need for skilled entrepreneurs in both capital and mentoring; 2) a new model for government-sponsored investment through funds-of-funds approach appears promising, as well illustrated in Teralys<sup>18</sup> in Quebec and OVCF (Ontario Venture Capital Fund); 3) skewed investment in early-stage companies, accounting for almost 70%, forces empirically entrepreneurs in Canada to spend too much time on fundraising and furthermore makes them suffer from insufficient capital available for follow-on rounds of investing; and 4) attractive exit options, appropriate allocation of capital, and a vibrant VC infrastructure are critical to creating a healthy venture capital ecosystem.

According to the review, the gaps in the Canadian venture capital industry were as follows: There is a shortage of serial entrepreneurs and skilled managers with global networks, and a subscale of GPs and lack of strong capabilities and experience compared to American GPs. Significant investments made by government and retail funds, with objectives and constraints (e.g., region focus, pacing requirements) may hurt returns. Overinvestment was made at early stages without adequate follow-on capital, leading to dilution. Undercapitalized and sometimes dysfunctional syndicates also make follow-on investment difficult. GPs lack experience and networks to develop companies to potential, and foreign GPs capture a disproportionate share of exit value.

Exits have been mediocre as public markets place a discount on Canadian VC-backed companies, and relatively low listing requirements on the TSX (Toronto Stock Exchange) Venture Exchange can be counter-productive. Total funding to VC eligible companies was proportionately higher in Canada than the U.S. at the turn of the decade but has significantly decreased in recent years. There

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<sup>17</sup> The Review was conducted by McKinsey & Company on the request of the Business Development Bank of Canada's venture group (BDC VC) in 2010. The objective of the review was to understand the state of the venture capital industry in Canada, to assess BDC VC's impact, and to develop a strategy for BDC VC to increase its effectiveness as an industry catalyst.

<sup>18</sup> Teralys Capital initiated in 2004 Quebec Canada is a technology-focused fund of funds financing private venture capital funds that invest in information technology, life sciences, and cleantech companies. The fund has over \$700 million in capital commitments from Caisse de dépôt et placement du Québec, the Solidarity Fund QFL, and Investissement Québec. Teralys Capital is also managing two existing portfolios of venture capital funds with additional assets under management of over \$600 million. It is currently the largest fund of funds in Canada.

currently is a capital supply crunch as institutional LPs and retail funds have significantly reduced investments. Government-sponsored funds made up half of all available LP capital, with allocation sometimes driven by public policy and misaligned incentives. Bottom-quartile funds receive the largest share of capital, which implies the fund's natural selection process is broken.

There are also weaknesses in the venture capital industry such as lower levels of non-dilutive capital from government and other sources prior to first VC investment, lack of a commercialization focus in R&D investment, relatively low effectiveness of technology transfer offices (TTOs) in commercializing technology, lack of connectivity to global markets, and reduced opportunities for syndication, business development, and exits.

As discussed above, Canada has intervened significantly in the venture capital industry through the BDC and LSVCCs in terms of VC amount funded by public actors in an effort to address such overriding issues as funding gaps and undersupply of entrepreneurial finances. These programs, if properly managed, mitigate financial constraints at seed and early stages, but misaligned government intervention, according to many studies, is more likely to adversely affect the VC industry, which results in potential crowding out and lack of high quality projects (Mason & Harrison, 2001). Anderson and Tian (2003), Brander et al. (2008), and Lerner (2009) point out that enterprises supported by private venture capital (PVC) have an overall superior performance in the areas of value creation, competition, and innovation, compared to enterprises invested by government-sponsored venture capital (GVC). Overall, GVC-supported firms exhibit weaker performance in the frequency of successful exits, exit values, and survivorship than PVC-financed firms.

What seems to be controversial here converges on whether government subsidies to venture capital increase the size of the market or whether they merely crowd out<sup>19</sup> private investment (Cumming & MacIntosh, 2006; Leleux & Surlemont, 2003). The study shows that GVCs substitute for or crowd out PVCs, even if there are various data limitations, which suggests GVC programs are not complementing but rather competing with PVCs. In addition, the research reveals that the lower performance of GVCs is largely due to a “treatment effect” rather than “selection effect,”<sup>20</sup> which is closely related to the assumption that PVCs are more likely to choose enterprises with high growth potential to perform well. The important implication is that the treatment effect, which is closely related to learning process through coaching, business skills, and managerial expertise, is not so vibrant in managing GVCs, leading to weaker mentoring or value-added performance, as compared to those of PVCs.

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<sup>19</sup> Many papers discuss the possibility of crowding out as a consequence of governments' involvement such as venture capital funds and grants. There are empirical reports that public venture capital companies underperform those funded by private venture capital companies. See Brander et al. (2008) and Engel & Heger (2005).

<sup>20</sup> Treatment effect here refers to value-added performance as a result of professional advice, mentoring services, and managerial expertise to the entrepreneurial businesses following selection rather than the choice of a promising project. In contrast, selection effect refers to the performance that is generated from the selection of a project with high growth potential from open calls rather than managerial perspective.

As examined, the funding structure overall is very fragmented across the country, with a dual system engaged by federal and provincial governments. Besides, despite the nature of venture capital driven by the inherent market mechanism, too much public venture capital is allocated for invigorating the VC industry, which as a result forces the government to excessively intervene in the venture capital industry. The grand challenge is that total VC investment in Canada continues to decline over the past decade despite the existence of significant public venture capital funds. This implies that it is worth considering some important structural transformation in the public funding mechanism, which aims to not only attract private investment but also improve the framework conditions for the VC industry in the long-term.

### 2.3. The Swedish Case

Venture capital investment as a share of GDP reached 0.08% in 2009 compared to the OECD sample average of 0.03%, ranking third while GERD as a share of GDP amounted to 3.40% in 2010. Public venture capital (PVC) makes a large share of the investments at early stages of company growth in Sweden. Data (SVCA, 2011) strikingly show that 73% of the initial capital and 55% of the follow-up capital came from PVC funds for the first half of 2011. Venture capital is only a small part of the Swedish private equity market, where the buyouts in 2010 comprised 74.2% of the invested capital. Of the venture capital invested, the start-up and later stages makes up the main part and only 4.6% of the venture capital is invested in the seed stages (EVCA, 2012).

Historically, between 1994 and 2000, venture capital investment grew at a staggering annual rate of 188% in Sweden with the help of public and private venture initiatives. This period is known as the Swedish venture boom. Public funds such as “Atle” and “Bure”<sup>21</sup> triggered venture capital market development and promoted entrepreneurial activities. However, those public funds were structured to encourage the investment of large funding blocs and then arguably stimulated investments in capital-intensive later-stage projects. This was not what public venture funds were originally intended for.

The Swedish government played an important role in the development of the domestic venture capital industry, particularly in the early 1970s and 1980s. The government today provides mainly five large state-owned venture capital funds in a nationwide effort to stimulate innovation and entrepreneurship: Industrifonden, Fouriertransform, Innovationsbron, ALMI Invest, and Inlandsinnovation (Uhrbom & Krakowski, 2012). These public funds primarily aim to improve access to finance through the supply of more capital, especially geared towards young innovative entrepreneurs.

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<sup>21</sup>New Swedish venture funds Atle and Bure were established in 1992 to foster new venture firms in their early stages. However, public funds were structured to encourage the investment of large funding blocs and therefore arguably increased investments in capital-intensive later stage projects that could not fulfill their originally intended mission as public funds.

Industrifonden, which was created in 1979 by the Swedish government, is Sweden's largest investor in small growth companies. The fund has important distinctions: 1) its target is SMEs in Sweden with international growth potential; 2) almost all investments are made together with entrepreneurs and co-investors, acting as an active minority investor; 3) its investment stages are mainly both in the late start-up stage that needs funding for product development and in the expansion stage that needs additional funding to grow; and 4) all the returns that come from its investments are reinvested in new projects, holding its original capital intact in real terms.

Fouriertransform, which was founded in 2009 by the state, is intended for investing in commercially oriented R&D projects in the automobile cluster, which stresses strategic motivation to strengthen the competitiveness of the automobile industry. The fund is allowed to invest from early to mature stages, and also emphasizes an important future role in supporting restructuring and spin-offs of companies in growth and mature stages. It is characterized by a long-term investment without any fixed time limits, pursuing an annual return of 10-15%.

Innovationsbron, which was established in 2005, aims to promote the commercialization and utilization of the resources that Sweden invests in R&D and knowledge creation. The fund seeks to offer both competence and capital for development and commercialization of knowledge-intensive ideas, which leads to national competitiveness and sustainable growth. It is worth noting that the fund concentrates only on projects at very early development stages, bridging rather than creating profit for the owners. The investments are usually co-invested and characterized by long-standing and risky projects with high growth potential, which are basically R&D-intensive and technology-based innovations. Notably, a regional investment committee engages in a decision-making of investment, which enables regional partners to work closely together.

ALMI Invest was founded in 2009 together with regional investors as a response to the ERDF (European Regional Development Fund<sup>22</sup>). The fund aims to invest in small companies with long-term growth potential at the expansion stage, even if a substantial amount of the investment is provided to start-up companies. Finally, "Inlandsinnovation" was created in 2010 with the aim of increasing the supply of risk-taking financing in the north of Sweden. The fund varies in size and range from early stages to more mature stages. It invests in the projects with longer horizons and commitments where other investors cannot push ahead.

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<sup>22</sup>The ERDF aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions. It focuses its investments on several key priority areas such as innovation and research, digital agenda, support for SMEs, and low-carbon economy. Its resources allocated to these priorities will depend on the category of a region.

**TABLE 2. Key Facts of the Swedish Public Venture Capital Fund**

	Industrifonden	Fouriertransform	Innovationsbron	ALMI Invest	Inlandsinnovation
Year of inception	1979	2009	2005	2009	2010
Ownership structure	Foundation	Owned by the state	Co-owned: state vs. Industrifonden (83.7% vs.16.3%)	Owned by state via ALMI Företagspartner	Owned by the state
Capital stock (M. SEK)	3,800	3,000	300-400	1,000	2,000
Invest size (M. SEK)	5-100	7-103	2.5 with follow-up max 1M€	2-4 with follow-up 10	-
Investment phases	Later start-up to expansion	Start-up to mature	Seed and start-up	Late start-up to early expansion	Start-up to expansion
Ownership share	15-50%	Max 49%	10-49%	Max 50%	Max 30%
Private co-investment	Preferable	No	No	Yes, at least 1:1	No
Required return	5 year government bond yield	10-15%	No	Yes, 2%, (inflation)	Yes, flexible

Source: Uhrbom & Krakowski (2012)

New or existing innovative ventures in Sweden have suffered from the shortage of capital in the early stages particularly since the dot-com bubble burst in 2000. It has been recognized as a significant challenge to both the VC industry and policy perspective. It may be too costly for private venture capital funds to make a small investment in the early stages, taken into account the efforts by private investors such as time, research cost, and management. This causes private investors to shift towards a preference for large investments in later stages where the risk is deemed to be lower. Some experts argue that a significant decrease of the venture market in Sweden and a long time horizon as with life science brings about the funding gap. In addition, investment in early stages tend to be too small to be profitable for private venture funds, which induces investors to shift towards later stages, expecting to reap higher returns from less risky investments. This partly explains why the early-stage funding gap occurs, leading to a vacuum in capital accumulation in the early stages for enterprises in Sweden. Governments can act as a bridge at this critical juncture by filling this gap, because risk perception and demand for returns that may raise obstacles to the commercialization of business ideas and research inventions are much higher in the private sector than for public funds.

Interestingly, public funds such as Fouriertransform and Inlandsinnovation operate on a commercial basis. This type of fund management could result in spurring private entrepreneurial activities on the one hand, but such a commercial focus may lean towards pursuing lucrative ROI over closing the funding gap in the early stages, as illustrated in Atle and Bure. The provision of such PVCs suggests a strategic motivation from a policy context with a view to fostering specifically targeted industries such as automobiles, or bolstering a regional industrial base. It is very interesting to note that most public funds discussed above tend to invest in all the stages of a company growth rather than focusing on seed and early stages where severe financing gaps chronically occur. Public funds

need to be geared and deepened towards the realization of intended policy goals, leading to better access to finance by entrepreneurial businesses.

Regional engagement, as with the Innovationsbron fund, is a desirable policy direction and is expected to make a positive impact on increased investment opportunity and enhanced regional awareness of entrepreneurship through active interactions. The ALMI Invest fund has a regional focus and seeks to co-invest with the private sector, increasing the sharing of expertise and networks associated with innovation and entrepreneurship, and helping prevent the private investors from potential moral hazard and crowding out. The Fouriertransform fund invests in the automobile industry on a long-term basis without any fixed time limits, which is helpful to mitigating financing bottlenecks in later growth stages.

#### 2.4. A Summary of Three Countries' Cases

These three cases demonstrate a general perception that their current venture industry faces a critical situation, forcing them to conduct an in-depth review or other measures on their VC industry. Their reviews on the venture capital industry follows a series of innovative policy initiatives that aim to boost the venture capital industry through multiple actions such as new fund formation, the granting of tax incentives, and easing restrictions. The observation above commonly shows active intervention in the venture capital industry since the early 1970s, when the venture market was in general at the initial stage. As a consequence, it is true that governments have played a pivotal role in fostering the venture capital industry. The key challenges can be summarized as follows (Table 3): lack of critical mass in fund size in Australia, a subscale of funds and the inefficiency of tax incentives and the decline of VC investment despite the infusion of significant PVCs in Canada, and the dysfunction of too many PVC funds in Sweden as a whole.

TABLE 3. Features of Public Venture Capital by Selected Countries

	Australia	Canada	Sweden
VC investment as a % of GDP (2009)*	0.06	0.03	0.08
Perception on VC industry	Significantly underdeveloped	VC investment continuously declined	Rising funding gap in financing chains
Rationale for public intervention	Gov't Review, 2005	BDC Review, 2010	Strategically motivated
Main distinction	Seed and early stage funding, co-investment	Over-investment in early stages, generous tax benefits	Too many public VC funds
Investment stimulus	Tax incentives for returns or capital gains (back-end)	Tax incentives for investments (front-end)	Co-investment, regional, sectorial focus
Challenges ahead	Lack of critical mass in fund size	Potential crowding out, sub-scale of GPs, role of PVCs	Inefficiency of many public VC funds

Source: compiled, based on national resources.

\*OECD(2012)

### 3. DISCUSSION

This study demonstrates that the three countries have made clear interventions in the market through public initiatives as part of an effort to revitalize their ailing venture capital industries. The socioeconomic impact of such public initiatives is recognized as the most important consideration in their design, implementation, and evaluation. Several critical issues in terms of policy impact can be discussed here despite constraints in relevant data and information.

#### *Crowd In or Crowd Out*

Government intervention is justifiable only when a market, i.e. the venture capital industry, does not work out. In other words, public intervention is rationalized where market failure exists. The countries observed above provide a number of PVC funds as well as tax incentives (except for Sweden) through a variety of financing approaches, which targets to fill the funding gaps particularly at their early stages. The public financing schemes in those countries were mainly shaped by the perceptions based on their reviews that their VC industry is under-developed or under-invested, or insufficient capital in strategic fields. Evidence shows that PVCs may, if poorly managed, crowd out potential private investment rather than complement financial constraints (Cumming & MacIntosh, 2006; Engel & Heger, 2005; Leleux & Surlemont, 2003; Wallsten, 2000). Research on the Canadian case (Brander et al., 2008) contends that PVCs perform poorly, possibly due to a treatment effect rather than a selection effect, compared to their private equivalents. This study exhibits, conspicuously, that PVCs account for over 50% of the total VCs in Canada and that there are too many PVC funds in Sweden, insinuating overall inefficiency in PVC management. The impact of PVCs is still debatable (Brader, Du, & Hellmann, 2010). Importantly, public engagement should be minimized, serving as a catalyzer to get the market going rather than leading the VC industry. In that context, there is significant concern that too many PVCs may substitute for or crowd out private investment in Canada. A fundamental challenge is how to create a synergy effect (Callegati, Grandi, & Napier, 2005) through the implementation of policy intervention while preventing potential crowding out.

#### *Financing Gap or Strategic Intervention*

Public intervention surrounding technological innovations usually targets either closing the financing gap at an early stage or bolstering sector-specific industries from a strategic perspective. An Australian review points out that their VC industry is significantly underdeveloped and well below critical mass, suggesting that policy should focus on the supply of investment capital through the creation and expansion of public funds and the improvement of the VC ecosystem as well as on building a virtuous cycle of the venture industry as a whole. An increase in VC investment from both the public and private sectors could be a possible option as part of a short-term strategy, such as the current IIF extension and the aggressive tax incentives like ESVCLP. In addition, building favorable framework conditions would be encouraging alternatives, such as institution building or supporting entrepreneurial culture and education from a long-term perspective, leading to a viable VC industry.

The VC industry in Canada exhibits overinvestment at early stages and a subscale of GPs, naturally leading to a lack of follow-on capital in later stages. Given the situation, existing VC funds are not

in a position to invest adequately at later growth stages largely due to the small size of funds. This skewed investment trend entails a substantial financing gap at later stages, where new businesses require increasingly more capital towards producing marketable products. It is important for PVCs to fill the funding gap in the early stages while private VCs focus on meeting increased financing needs at later, less risky growth stages. This strategy appears to be a reasonable choice for Canada.

The Swedish case is of a very different nature in that PVCs are very strategic and target-driven. Sweden also provides a number of strategically motivated PVCs across sectors and regions, focusing on mitigating financing gaps for innovative start-ups and further strengthening national competitiveness through fostering the VC industry. There might be overlap between funds that may offset the positive impact of public stimulus packages. The funding structure where the funds are fewer, and hence larger, can be seen as optimal, suggesting a certain level of structuring in the management of existing PVCs towards increasing policy effect. It is notable that the role of PVCs in entrepreneurial financing is considered to be tremendously important, taking into account the large share of PVCs in the Swedish VC industry.

### ***Supply-push or Demand-pull***

The matter of which policy instrument to employ in practice depends on the relevant experts and policymakers' review of market conditions and industrial structure. The three countries examined mostly take on traditional supply-side policy measures in order to address the revitalization of their VC industry, i.e. an increased supply of PVC funds, a provision of tax credit, and co-investment by both public and private partners. Demand-side policy, which attempts to stimulate market needs and in turn reinforce framework conditions on a long-term basis can be conducive to enhancing investment readiness (Mason & Harrison, 2001) by innovators, implying that fledgling entrepreneurs are ready to invest in their projects, enough to meet the investment requirements set by external investors through strict due diligence.

Experts argue that funding gaps in early stages may partly arise from the low quality of project proposals by young entrepreneurs. This refers to the existence of significant mismatch in the quality of business initiatives. The rate of project selection by venture capitalists tends to be very low (Lerner, 2009), suggesting that the quality of business proposals is an overarching concern in the selection process on the investors' side. This is telling evidence on how demand-driven policy can work out in the real business community. A clearer identification on why financing gaps come up in entrepreneurial finance would be a good prescription to addressing the nature of the problem. It is important to note, therefore, that the quality of a project prepared by entrepreneurs relates closely to the funding decision made by private investors. In the end, investment attractiveness and quality of deal flow are considered to be the essential factors that bridge the financing gap between the firms and investors.

### ***Tax Incentives or Grants***

Taxation can be harnessed as an important tool to leverage private investment, which accompanies high risk at early-stage funding. Tax-free status for both locals and foreign investors in Australia is worth attention in a context of availability of global resources. However, the impact of the current



back-end tax scheme could be limited due to no tax exemption for the capital losses incurred, despite the aggressive tax initiative. This type of tax incentive also turns out to take a relatively longer time for reaping visible policy impact compared to front-end tax incentives. It merits considering a policy shift towards front-end tax exemption, which could bring more tangible impact in the short run.

In sharp contrast, Canada introduced a front-end tax scheme, more visible in its policy impact than back-end tax incentives due to tax exemption on an investment irrespective of its returns or capital gains. The choice of granting tax incentives either front-end or back-end depends on the policy goal to be attained. It is observed that Canada operates a generous tax scheme, such as the LSVCC that pays back 30% of the amount invested. Some doubt is cast on the effect of such a tax system, considering how the VC industry still suffers from small fund size and shortage of VC funds in general. The concern is how closely the tax incentive structure contributes to filling the funding gap and further galvanizing the VC industry. Moreover, the Canadian case shows that PVCs appear to be too fragmentary for increasing efficiency across the complex governance structures between local, national, federal, and even global levels. The tax system can comprehensively be examined across a nation in terms of efficiency. It is worth noticing that the recent VC Action Plan<sup>23</sup> considers phasing out the long-standing LSVCC by the year 2017 instead of the government's precipitous deployment of \$400 million in new venture capital over the next seven to ten years.

Sweden notably prefers the formation of PVC funds rather than the provision of tax attractions to tackle the issues faced by the VC industry. Policy impact makes a difference hinging on the policy options between the direct infusion of public funds and indirect investments through taxing mechanisms. It is generally considered that tax policies affect indiscriminately across sectors, largely attributable to the inherent nature of its non-exclusivity. In this respect, impact through direct investments such as grant schemes and subsidies can be more powerful in addressing the targeted policy issues than that of indirect tax incentives. In Sweden's context, tax incentives can, to some degree, be a possible option for rectifying the negative impact of direct investment such as potential crowding out on the one hand and simultaneously attracting business investment into the VC industry on the other.

### ***Direct or Indirect Investment***

The way of financing new venture firms significantly impacts the performance of VC funds management. Commonly, the public sector retains no professional expertise and business skill that enables it to yield lucrative ROI compared to the private sector. It is well recognized that nascent entrepreneurs need not only capital but also appropriate professional coaching in their early stages.

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<sup>23</sup>The Plan released in 2013 is a comprehensive strategy for deploying \$400 million in new capital over the next seven to ten years. It contains the following key actions: 1) allot \$250 million to establish new, large private sector-led national funds of funds, 2) inject up to \$100 million to recapitalize existing large private sector-led funds of funds, 3) use an aggregate investment of up to \$50 million in three to five existing high-performing venture capital funds, and 4) create additional resources to continue developing a robust venture capital system and a strong entrepreneurial culture.

That explains favorably why most PVCs today are managed by fund specialist groups in the form of fund-of-funds rather than through direct investment in a project by public actors. The fund-of-funds approach appears to be a helpful way that manages PVCs effectively, leaving overall fund management to the professional experts. The way of operating PVCs is diverse in three countries. Australia manages PVC funds mainly through co-investment between public and private partners. Canada manages PVC funds through either public equity funds or fund-of-funds, while Sweden operates them diversely through public equity funds, or fund-of-funds or co-investment (OECD, 2013). Empirical evidence demonstrates that the performance of VCs relates closely to the capacity of seasoned fund managers, as clearly illustrated by the Yozma<sup>24</sup> fund in Israel. In addition, it is noteworthy that access to global resources, networks, and favorable incentive structures in proportion to management performance can serve as important determinants in the success of fund management. All in all, it is very important to manage VC funds in a professional way through the participation of global experts in the management of PVCs from the initial stage, in a direction that promotes the mobilization of overseas capital and the interaction of competent fund managers across borders (Lerner, 2009), which will increase the rate of success.

#### 4. POLICY IMPLICATION

The three cases provide valuable insight into the process of design, implementation, evaluation and policy impact of publicly initiated risk finance programs from both micro- and macro perspective. Certain policy implications can be drawn out based on the policy discussions thus far.

From a macro policy point of view, policy focus should be on both short- and long-term approaches based on exhaustive review, which aims to build healthy framework conditions for the growth of the venture capital industry. Creating an attractive environment for entrepreneurial investment is best for dealing with early-stage financing needs faced by innovative businesses. Favorable conditions for revitalizing the venture capital industry can be formed through continued policy support such as new initiatives and institution building. It can also be built through a long-term policy scheme such as education programs or fostering entrepreneurial culture geared towards the creation of an innovative ecosystem (Kelly, 2011; Godin, 2006). It is important to recognize that the three cases must cautiously balance different policy alternatives in order to tackle critical financing challenges. It is clear that a balanced policy mix will substantially help achieve policy goals through increased efficiency. Attention must be paid to the essence of the issues identified, not to disturb the market but to address its core problems, as well illustrated above.

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<sup>24</sup>The Yozma fund was created in 1992 by an Israeli government initiative aiming to promote venture investments in Israel. The Fund engaged by ten groups started with the initial capital of \$100 million owned by the public sector. A decade after the Fund's inception, the ten Yozma groups expanded tremendously to manage Israeli funds totaling \$2.9 billion. The Fund continued to grow, enough to manage approximately \$10 billion through its sixty groups. The Fund was privatized in 1997. The key to its success was mainly due to the attraction of overseas venture capitalists with investment expertise and a global network.

There are a number of specific implications to be drawn from a micro policy perspective. In the case of Australia, government intervention proved to be right and appropriate in terms of the supply of public venture capital funds through the IIF program and tax incentive schemes such as VCLPs and ESVCLPs. Notably, IIF has been successful in attracting private sector investment according to a review in 2008. However, tax schemes designed as “back-end” tax incentives provided tax benefits only when investor yielded returns as a consequence of investment. Taken into account how “significantly underdeveloped” the Australian venture capital industry was at that time, such policy measures in hindsight needed to be more radical and forward-looking rather than introducing “front-end” tax incentives which focus on investment irrespective of ROI. This will likely increase the supply of venture capital funds from the private sector, which in turn bridges the financing gap in the seed and early stages. In addition, co-financing through a matching fund by investors is likely to prevent private partners’ moral hazard (Rigby & Ramlogan, 2012) and precipitate entrepreneurial activities, thus helping reach critical mass in fund size.

In Canada’s case, public engagement in the venture capital industry was done mainly through both fund formation and tax incentive scheme provision. The overall policy mechanism in the venture capital industry appears to be misaligned and fragmentary across the country as seen from the overlapping and subsequent inefficiency of public initiatives. Policy focus should be on structural transformation that induces private investment, thus replacing public venture capital to an appropriate degree. Besides, the complexity of funding schemes and tax incentives makes the programs less effective and skewed in terms of benefits, which ultimately reduces overall policy impact. This inefficiency is illustrated by the fact that public venture capital reaches roughly 50% of total venture capital in Canada. There are research reports that argue over crowding out and the inferior effectiveness of public venture capital compared to private venture capital in terms of value creation, competition and innovation. Too generous tax incentives such as LSVCCs need evaluating in-depth their impact on the venture capital industry over the past three decades toward well-suited alignment. The subscale of general partners (GPs) needs to be addressed in a direction that individual funds can enhance their viability at both national and supranational levels through a structural change of the existing subscale funds.

In Sweden’s case, a number of public venture capital funds have invested in a strategic manner at all stages of technological innovations. Only a relatively small portion of public venture capital, approximately 16%, targets the seed stage of finance (Svensson, 2011). It means that the majority of public equity finance goes to late growth stage, which is probably less risky but highly rewarding. It is worth noting that the later stage is likely to be financed by many other existing financial institutions without resorting to public finance. This may conflict with private interest, thereby crowding out private investment as a result of public finance. In the same context, a focus of public finance on commercial objectives in Sweden could face difficulties in mitigating the financial constraints faced by early-stage innovative firms. Clearly, commercial orientation falls under the influence of private-sector concerns that drive risky investments for a profitable cause. In this regard, a balanced policy consideration in public finance (or the right choice of policy instruments) is an important factor in policy impact, these measures involving direct financing or indirect financing such as tax schemes, financing or non-financing, or supply- or demand-side policy instruments. It is highly probable that

too many public funds in Sweden pose a heavy dependence of entrepreneurial businesses on public finance, leading to side effects such as crowding out and weakened viability of the venture capital industry. In the end, structuring public funds comes as a pressing concern for increased efficiency, letting market forces run smoothly.

## 5. CONCLUSION

Public intervention in either boosting the VC industry or closing the funding gap is regarded as a necessary and important initiative in a modern complex market system largely due to its pump-priming role that sends positive signals to a market. However, publicly initiated measures do not always work out as initially intended, and as a consequence raise certain side effects such as crowding out and market distortion. The pressing challenge faced by the three countries is the lack of efficiency in many ongoing PVCs and the diverse tax incentives. The fundamental question falls on how to let public initiatives work out in the marketplace towards the achievement of an original policy objective. Experts argue that public funds should not be tied to specific areas or industries so that capital is free to finance the best projects, which allows them to increase efficiency and effectiveness. The underpinning message is that public policy initiatives need to be complementary rather than conflicting with the private sector, which creates increased synergy in the market. In the meantime, PVC initiatives should be aligned cautiously through incessant monitoring and evaluation over the full cycle of a project or program in a direction that helps complement potential market failure particularly at early-stage financing, thereby enhancing resilience and response to external environmental challenges and changes. The bottom line is that a balanced policy orientation through either supply-push or demand-pull approaches would be a viable policy option in order to tackle the issues involved.

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