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Please cite this paper as:

Wilson, K. (2015-06-24), "Policy Lessons from Financing Innovative Firms", *OECD Science, Technology and Industry Policy Papers*, No. 24, OECD Publishing, Paris.
http://dx.doi.org/10.1787/5js03z8zrh9p-en



OECD Science, Technology and Industry Policy Papers No. 24

Policy Lessons from Financing Innovative Firms

Karen E. Wilson



POLICY LESSONS FROM FINANCING YOUNG INNOVATIVE FIRMS

By Karen E. Wilson

FOREWORD

There has been increasing concern from policy makers around the world about the lack of access to finance for young innovative firms. As a result, governments in many OECD countries have sought to address the financing gap and perceived market failures by supporting the seed and early stage market.

This paper seeks to summarise the lessons learned in seed and early stage finance based on OECD work over the past several years focused on policies related to financing high growth firms, including angel investment and venture capital. That research was supplemented with a questionnaire on seed and early stage financing policies in 2012 and a series of policy workshops held between 2012 and 2014. The workshops provided deeper insights into experiences and lessons learned from OECD member countries.

The OECD has been working on seed and early stage finance within the Committee for Industry, Innovation and Entrepreneurship (CIIE) in the Directorate for Science, Technology and Industry as well as across other Directorates. This work has highlighted the growth in seed and early stage finance policies as well as the importance of high-growth firms for job creation and the role that financial development and other policies play in firm dynamics and the growth of such firms.

The OECD Secretariat would like to thank Norway, Switzerland, the Netherlands and Sweden for hosting financing policy workshop over the past several years as well as all of the representatives and experts who provided input throughout the research process. The OECD Secretariat would also like to thank Norway for the voluntary contribution in support of this work.

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The Committee for Industry, Innovation and Entrepreneurship (CIIE) agreed to the declassification of this paper in March 2015.

TABLE OF CONTENTS

Executive Summary 3
1. Background 5
1.1 Angel investment 5
1.2 Policies for seed and early stage financing: 2012 Questionnaire 5
1.3 Financing policy workshops 7
2. Overview of seed and early stage equity investment 8
3. Policy rationales for intervention in seed and early stage finance 11
3.1 Capital Market failures 11
3.2 Spill-over effects and externalities 11
3.3 Policy mix 12
3.4 The balance between public and private sector investment 13
4. Supply side measures 15
4.1 Grants, loans and guarantee schemes 15
4.2 Fiscal/tax incentives 16
4.3 Equity financing instruments 16
5. Framework conditions 18
5.1 Regulatory barriers 18
5.2 Exit markets 19
6. The demand side 22
6.1 Entrepreneurial culture 22
6.2 Entrepreneurial ecosystems 22
6.3 Human and social capital development 23
7. Data and evaluation 27
7.1 Evaluations of financing instruments 28
7.2 Types of evaluations 28
7.3 Design and implementation 28
7.4 Time lags and market cycles 29
7.5 Data challenges 29
8. Conclusions 30
REFERENCES 32

Executive Summary

There has been increasing concern from policy makers around the world about the lack of access to finance for young innovative firms. As a result, governments in many OECD countries have sought to address the financing gap and perceived market failures by supporting the seed and early stage market. This paper seeks to summarise the lessons learned in seed and early stage finance based on OECD work over the past several years focused on policies related to financing high growth firms, including angel investment and venture capital.

Young innovative firms face many difficulties accessing seed and early stage finance and these have increased over the past years. Banks have been less willing to provide loans to start-ups as a result of the financial crisis. Meanwhile venture capital firms have become more risk adverse due to pressures on the industry and have focused on later stage investments. Angel investors have become more visible and active through groups, syndicates and networks but also face challenges.

Capital market "failures" arise mostly due to information asymmetries. These include adverse selection and agency problems. Information asymmetries can be further amplified by the lack of collateral and risky nature of new innovative ventures. Insufficient collateral may particularly limit access to external financing for firms that are heavily reliant on investments in knowledge-based capital (KBC), such as R&D, design or business models.

While it can be argued that a financing gap is not a market failure, a number of governments have chosen to intervene based on broader objectives. Many OECD countries recognize the critical role that young innovative firms play in creating jobs and economic growth and are seeking ways to facilitate the creation and growth of these firms. Also, they recognize that there are positive spill-over effects from the creation and growth of innovative young firms.

While policy measures can be taken on the supply and demand side, the results of the 2012 OECD financing questionnaire showed that the bulk of the measures in OECD countries have been taken on the supply side. Supply side measures may be favoured as they are perceived as being more direct and demonstrate visible action. Framework conditions perhaps play the most important role. However, these levers have implications in other policy areas as well and therefore can be harder to target and implement.

Supply side interventions can range from grants, loans and guarantee schemes to tax incentives and equity instruments. The majority of OECD countries have had grants, loans and/or guarantee schemes in place for many years and support for these programmes increased from 2008 to 2012 as a result of the recent financial crisis. A number of OECD member countries have also put tax incentives in place. These range from young innovative company schemes (YIC), incentives for investments in start-ups, capital gains tax provisions and/or rollover and carry-forward of gains or losses.

There has been an increase in the use of equity instruments in OECD countries but the focus has shifted from government equity funds investing directly to more indirect models such as co-investments funds and fund-of-funds. These later approaches seek to leverage private investment and a number of OECD countries are experimenting with different incentive structures.

While supply side interventions have increased, there is little evidence of the impact of these instruments and whether or not they crowd out private investors. Many of these programmes have not been formally evaluated and empirical analysis of the outcomes of these programmes has also been scarce, in part due to challenges with seed and early stage financing data. There are some recent studies that seem to imply that a mix of public and private venture capital funding can have a positive impact but further analysis is needed to understand the drivers of those results.

The demand side is critical to success of seed and early stage financing, however, it is often overlooked in favour of supply side actions. For firms to launch and grow successfully, human capital development is important. This could be in the form of education, training and/or on the job experience. Many successful entrepreneurs are serial entrepreneurs, starting more than one company. As they start new companies, they share their experience, knowledge and networks with others. There is increasing evidence of the importance of social capital, both local and global, as high growth firms need to grow beyond national borders. International expansion and investment can be critical to the success of these firms.

Demand side programmes can include both human and social capital development. Specific programmes such as incubators, accelerators, business angel networks and matchmaking services have become increasingly popular in OECD countries. Initiatives to create a more entrepreneurial culture are also vital. In many countries the fear and cost of failure is higher than perceived opportunities and/or the perceived skills to pursue those opportunities.

Human capital development can be both for entrepreneurs and investors although the focus is typically on entrepreneurs, helping them better understand how to access capital and present to investors. However, investor training and development is also important for developing the market. Investing in young firms is a very specific skill and requires learning from those with experience.

The framework conditions in a country can perhaps have the most impact on the provision of seed and early stage finance. The development of financial markets and exit opportunities, whether through IPOs on a stock exchange or mergers and acquisitions by other firms, directly influences the development of seed and early stage financing. Bankruptcy regulations, labour market restrictions and other framework conditions also impact firm dynamics as well as the creation, financing growth of innovative firms.

Regulatory barriers and administrative burdens on institutional investors, venture capital funds, angel investors and high growth firms can have a direct result on the provision of seed and early stage finance. In particular, securities legislations and more stringent capital requirements on institutional investors could reduce the supply of investment in venture capital from banks, pension funds and insurance companies, traditionally three of the largest types of private institutional investors.

A number of countries have begun streamlining their growing set of seed and early stage policies, in some cases putting them under one umbrella. However, changes in policies might be driven not only by market conditions but also by the political cycle. Consistent, long-term policies are important to provide the appropriate incentives to invest in seed and early stage firms. In addition, it is not just a matter of which policy to put in place but how to structure and implement it. Also, the size of the public intervention must be appropriate—i.e. large enough that it makes a difference, but not so large that it affects the alignment of incentives and objectives.

Financing for innovative start-ups is complex as different financing instruments are needed for various stages of the firm's development. Policy makers in a number of OECD countries have sought to address the prevailing seed and early stage financing gaps by intervening in multiple areas simultaneously. Therefore policy interventions should not be seen in isolation but as a set of interacting policies. A systems approach is needed which covers both supply and demand side intervention as well as framework conditions. Evaluation and periodic adjustment of the specific policy instruments as well as the full policy mix would be optimal but is challenging in practice.

Policy interest in seed and early stage finance remains high. A number of lessons have been learned from past experiences in OECD member countries, however, there is still much more to monitor and analyse. There are significant differences in firm dynamics, financing and growth of firms across OECD countries and therefore further work in these areas could be useful.

1. Background

Given the growing concern of policy makers about the lack of access to finance for young innovative firms, the OECD has been working on seed and early stage finance. This work has highlighted the growth in seed and early stage finance policies (OECD, 2011; Wilson and Silva, 2013) as well as the importance of high-growth firms for job creation (Bravo-Biosca *et al*, 2013) and the role that financial development and other policies play in business dynamics and the growth of such firms. Ongoing work at the OECD looks at the role that firm dynamics play in an economy characterised by growing investment in knowledge based capital (Andrews and Criscuolo, 2013; Criscuolo *et al*, 2014).

Over the past several years, the CIIE has focused on the financing of high growth firms, including research on angel investment and venture capital. That research was supplemented with a questionnaire on seed and early stage financing policies in 2012 and a series of policy workshops held between 2012 and 2014. The workshops provided deeper insights into experiences and lessons learned from OECD member countries.

1.1 Angel investment

The work in CIIE over the past several years has included work on angel investment, a significant but often overlooked portion of seed and early stage investment in a number of countries. Venture capital is commonly assumed to be the main source of external equity financing but, in reality, the majority of venture capital firms have moved to later stage investments leaving the seed and early stage equity financing market to "informal" investors (OECD, 2011).

Angel investors, who are often experienced entrepreneurs or business people, have become increasingly recognised as an important source of equity capital at the seed and early stage of company formation (Harrison and Mason, 2010). They operate in a segment which falls in between informal founders, friends and family financing, and formal venture capital investors (Freear and Wetzel, 1990; Sohl, 1999). Venture capital involves "formal" or "professional" equity, in the form of a fund run by general partners, typically aimed at investing in early to expansion stages of high growth firms.

Table 1. Equity investors at the seed, early and later stage of firm growth

INFORMAL INVESTORS		FORMAL INVESTORS
Founders, friends and family	**Angel investors** *(typical investment size: USD 25-500K)*	**Venture capital funds** *(typical investment size: USD 3-5M)*
Seed stage investments	*Early stage investments*	*Later stage investments*

Interest in angel investing has grown around the world. Policy makers in some countries have sought to facilitate the development of the market through supply side measures such as tax incentives and co-investment funds as well as demand side measures such as investor training and development. The findings from the research were published in a book (OECD, 2011), which provided the first global overview of the angel investment market.

1.2 Policies for seed and early stage financing: 2012 Questionnaire

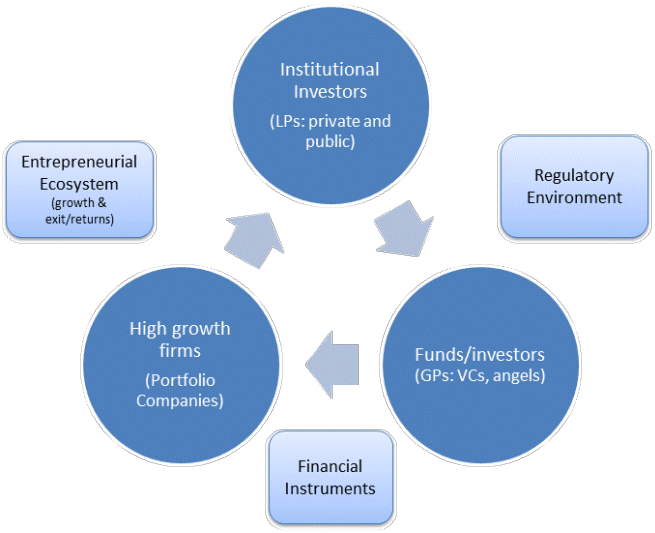
In 2012, the OECD sent a questionnaire on seed and early stage financing to the 34 OECD member countries, which was answered by 32 countries. The questionnaire project was undertaken jointly between the Economics Department and the Directorate for Science, Technology and Industry of the OECD as part of the OECD work on Knowledge Based Capital and under the framework of the New Sources of Growth

initiative. The work aimed to assess the links between seed and early stage policy interventions, the regulatory and administrative environment, and the outcomes in terms of seed and early stage investment. The questionnaire also included several questions related to a mezzanine finance project for the Working Party for Small and Medium Enterprises and Entrepreneurship (WPSMEE).

The questionnaire sought to identify the set of policy interventions which OECD member countries have in place and how these have changed over time. The questionnaire collected details about supply side measures, regulatory barriers and demand side actions. The resulting policy paper (Wilson and Silva, 2013) provides a mapping of existing policies in OECD countries with information collected via the questionnaire. This was supplemented by further research and a more detailed follow-up questionnaire to those people in each country responsible for each of the identified programmes.

The OECD financing questionnaire looked at each of the key players in the entrepreneurial finance ecosystem: the institutional investors (or limited partners – LPs), the intermediary funds (or general partners – GPs) and the high growth firms (portfolio companies – PCs) and the regulatory environment affecting these players. The questionnaire focused on three main areas of public policy impacting the seed and early stage financing cycle between institutional investors, funds/investors and high growth firms: 1) financing instruments; 2) regulatory and administrative barriers and 3) policies to develop the entrepreneurial ecosystem.

Figure 1. Seed and early stage financing cycle



The supply side interventions were classified into three main areas:1) grants, loans and guarantees; 2) tax incentives; and 3) equity instruments. Table 1 summarizes the results from this section of the questionnaire.

Table 2. Summary of results from OECD 2012 financing questionnaire:

Supply side financing instruments
(32 out of 34 member countries responding)

Type of Instrument	Number of OECD Countries	Change in Support (last 5 years)
Grants, Loans and Guarantees	30	Increased in 25 countries
Tax: YIC	9	New in 3 countries
Tax Incentives: Front-end	15	Increased or new in 9 countries
Tax Incentives: Back-end	12	Unchanged in most
Equity Funds: Public	14	Increased in 7 and new in 3 countries
Equity : Fund-of-Funds	21	Increased in 8 and new in 8 countries
Equity Funds: Co-Investment	21	Increased in 11 and new in 6 countries

In terms of regulatory and administrative barriers, the questionnaire focused on specific data on barriers for investors (institutional, venture capital firms and angel investors) in the seed and early stage market. This included restrictions for institutional investors investing in the private equity asset class, barriers to cross border investing and securities legislation.

On the demand side, the questionnaire focused on activities supporting the connection between entrepreneurs and investors. In particular, it included investor readiness and investor training as well as incubators, accelerators, business angel networks and other matchmaking services. The results highlighted the importance of human and social capital as key components of a vibrant entrepreneurial ecosystem.

1.3 Financing policy workshops

In parallel, OECD member countries hosted a series of financing policy workshops to further discuss policy rationale, the link between policy objectives and outcomes and the extent to which the design and incentive structures help countries achieve these goals. The most recent workshop began to more closely link the CIIE work on financing with the ongoing work on firm dynamics.

Norway hosted a workshop in Oslo in September 2012, attended by officials and experts from ten OECD member countries, for an in-depth discussion on public sector equity funds. Switzerland hosted a workshop in April 2013, with representatives from eight OECD member countries, which focused on linking policy objectives with outcomes, evaluation and the financing policy mix. In October of 2013, the Netherlands hosted a workshop, with ten OECD member countries represented, which focused on the impact of regulatory frameworks and new regulations on seed and early stage financing as well as creating incentives for private investors. Sweden hosted a workshop in Stockholm in December 2014 attended by officials and experts from ten OECD member countries focused on the role of early-stage financing in business dynamics and firm growth. These workshops have provided an important platform for the sharing of experiences about what has worked and what has not in OECD member countries. The findings from the workshops are incorporated throughout the paper.

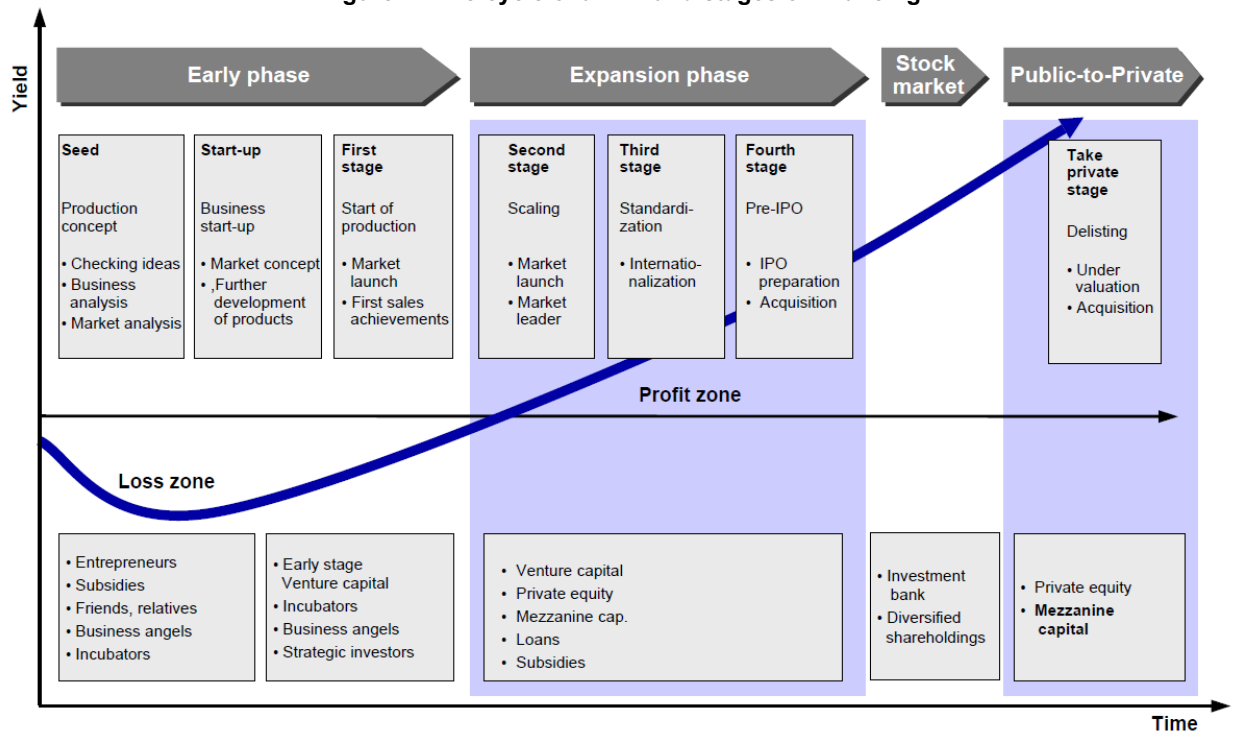
The CIIE work on financing has fed into on-going work across the OECD including in the work on knowledge-based capital and a range of projects in the Directorate for Science, Technology and Industry on financing, innovation, entrepreneurship, high growth firms, productivity and firm dynamics. This work has also fed into the Innovation Policy Platform,[1] the *Science, Technology and Industry Scoreboard* (OECD, 2013d) and *Science, Technology and Industry Outlook* (2014) as well as a number of projects on financing being conducted by the WPSMEE and other parts of the OECD.

2. Overview of seed and early stage equity investment

Often entrepreneurs start their ventures with their own funds and those of friends and family. Depending on the size and scope of the venture, entrepreneurs may need other external sources of seed capital, including debt or equity (angel investment or venture capital). Typically equity investments are focused on innovative high growth firms.

Different types of financing instruments may be more appropriate for different stages of the development of a firm. Figure 2 illustrates a typical life-cycle along with the various stages of financing and types of financing instruments. The figure below highlights the complexity of seed and early stage financing and the need for a mix of instruments to address the various growth phases of a venture.

Figure 2. Life-cycle of a firm and stages of financing



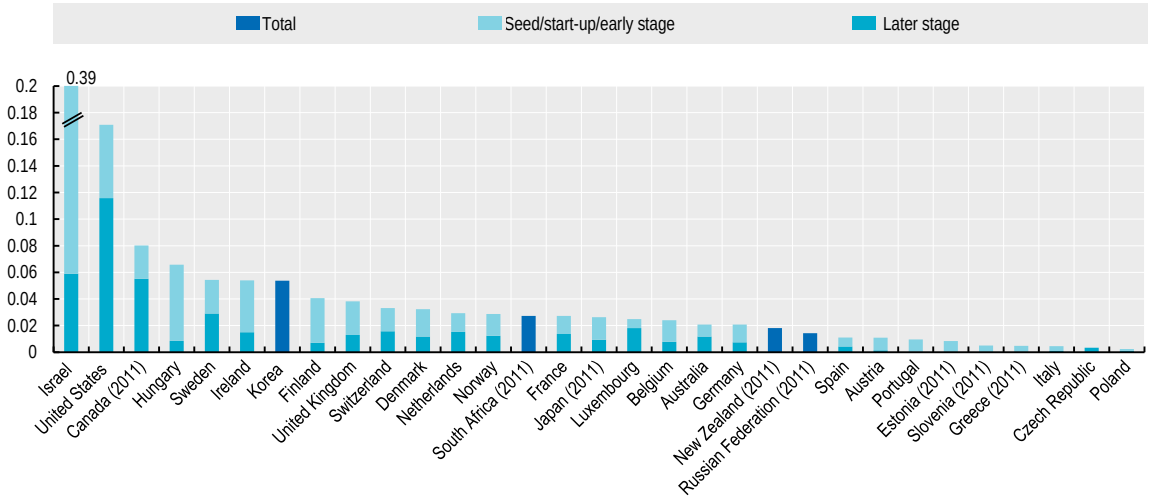
Source: Natusch (2003);OECD (2013d).

Venture capital firms focus on investing in companies in markets characterised by new technologies that are rapidly developing. Venture capital firms invest in a portfolio of companies, knowing that some will succeed, some will fail and the majority will have average or sub-par performance. On average 65% of the portfolio of a VC firm generates 3.8% of the returns, while 4% of the portfolio generates more than 60% of the returns (Nanda, 2010).

Seed and early stage investment can vary greatly across countries, both in terms of volume and approach. In terms of venture capital as a percentage of GDP, Israel and the United States have the highest

ratio (Figure 3). It should also be noted that the definitions of stages (seed, early and later stage) vary across countries although the OECD has a methodology for standardizing them which was used in the chart below. Details on the methodology can be found in the OECD Entrepreneurship at a Glance (OECD, 2013e).

Figure 3. Venture capital investment as a percentage of GDP (USD current prices), 2012

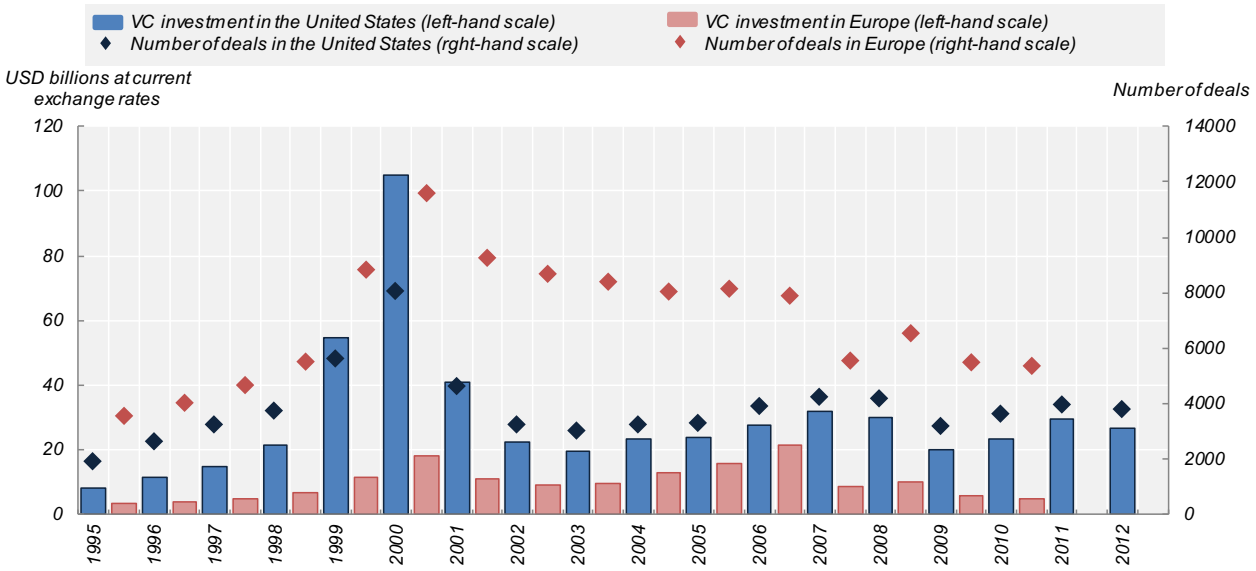


Note: Market statistics, except for Australia, Korea and Japan (industry statistics). Please refer to OECD (2013e) for the statistical definitions of investment stages.

Source: OECD (2013e), Entrepreneurship at a Glance 2013, OECD publishing.

The relative size of venture capital investments is shown in Figure 4 below. Between 1995 and 2010, European venture capital investment has been, on average, approximately one-third the size of investment in United States. However, the number of venture capital deals in Europe is higher than in the United States, showing that VCs are dispersing funds more broadly through smaller deals. In fact, according to the data below, deals in the United States have been on average almost double the size of European deals.

Figure 4. Venture capital investment in the United States (1995-2012) and in Europe (1995-2010)



Note: Data for the United States refer to market statistics, data for Europe refer to industry statistics. Europe includes here Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Former Yugoslav Republic of Macedonia, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Spain, Slovak Republic, Slovenia, Sweden, Switzerland, Ukraine and United Kingdom.

Source: OECD (2013), Science, Technology and Industry Scoreboard 2013, calculations based on PwCMoneyTree, EVCA/Thomson Reuters/PwC and EVCA/PEREP_Analytics.

Research comparing returns on investment demonstrate that the US VC market outperforms the European market on average, although the top funds have more comparable returns (Lerner et al., 2011). This suggests that both experience and size of fund have an impact on VC returns. A VC fund needs sufficient scale to be able to support portfolio companies through multiple financing rounds. However, recent evidence has shown that if funds become too large, returns may also start to decline (Lerner et al., 2012).

In terms of angel investment data, the majority of angel investments are made individually and therefore not captured in national or commercial databases. A growing number of angel investors are investing through groups, networks and syndicates. This data is collected by national angel associations in some countries and by voluntary reporting and therefore provides a window on what is termed the "visible" part of the market (Harrison and Mason, 2010). The United States and Europe, where the angel markets are most developed, are the most active but other markets are developing rapidly. Studies in the U.S. and some European countries estimate that total angel investment is greater than VC investment.

Venture capital firms tend to invest in high technology sectors such as ICT, biotech and clean tech. Angel investors tend to invest in a broader range of sectors than VCs, although the bulk of investment is also typically in ICT, biotech and health related technologies (OECD, 2011). Companies in the ICT sector often have a lower capital intensity and shorter route to exit (Ries, 2011), making them attractive to investors.

Both angel investors and venture capitalist are touted for providing not just funding but "smart money" in the form of experience, expertise and connections (OECD, 2011). This type of support can be particular valuable to firms pursuing high growth strategies and differentiates this type of financing from other forms, including crowdfunding (Wilson and Testoni, 2014).

3. Policy rationales for intervention in seed and early stage finance

A substantial body of literature has suggested that financing plays a significant role in firm creation and growth (Aghion et al., 2007) and notes that entrepreneurs face significant financing barriers (Evans and Jovanovic, 1989; Gartner et al., 2012). In the seed and early stage financing market there is an increasing financing gap due to the fact that banks are less willing to loan to start-ups and venture capital firms have moved to later investment stages (OECD, 2011). While a financing gap is not necessarily evidence of the existence of a "market failure" (not all firms seeking funds necessarily merit them), the funding gap has been persistent and has grown over time, triggering greater attention from policy makers. The main policy rationales are discussed below.

3.1 Capital Market failures

The argument of a "market failure" in firm financing due to imperfect information is not new. Financial market imperfections arise mostly due to information asymmetries. These include adverse selection (Akerlof, 1970; Meyers and Majluf, 1984; Stiglitz and Weiss, 1981) and agency problems (Jensen and Meckling, 1976; Townsend, 1979; Bernanke et al., 1996). Venture capital firms partly reduce the information asymmetry problems, but may lead to additional principal agent problems and significant monitoring costs in the form of GP fees (Kaplan and Stromberg, 2004).

There is a well-documented information asymmetry in the seed and early stage between entrepreneurs and investors (Denis, 2004), which is particularly pronounced for young technology-based firms (Mason, 2009). Financing constraints tend to be more acute for young firms to the extent they have limited internal funds and lack a track record to signal their "ability" to investors. When asymmetric information problems are large, a "missing markets" problem may emerge where many of the innovations associated with young start-up firms may never be commercialised. In addition, seed and early stage financing requires long-term investments, which implies that lenders\investors will require an additional premium, which poses difficulties in devising the appropriate contract (von Thadden, 1995) and increases the transaction costs. This financing gap is partly bridged by venture capitalists or angel investors, who address informational asymmetries by intensively scrutinising firms before providing capital and monitoring them afterwards (Hall and Lerner, 2010; OECD, 2011).

Insufficient collateral may particularly limit access to external financing for firms that are heavily reliant on investments in knowledge-based capital (KBC), such as R&D, design or business models. Traditional debt and equity markets are primarily designed to fund tangible assets that have well defined market prices and can serve as collateral. In contrast, KBC assets are less easy to define and collateralisation is often affected by such assets being non-separable and non-transferable – two impediments to the mobility of any single asset across parties and the realisation of full salvage value in the event of firm bankruptcy.

Devising the appropriate contracts for debt (Albuquerque and Hopenhayn, 2004) or equity instruments (Gilson, 2003; Kaplan and Stomberg, 2004) partly addresses the informational problem and promotes and enforces the alignment of incentives and appropriate monitoring. However, this can be difficult due to the different ways instruments are structured to address different stages, goals and purposes, as well as due to the triple problems of uncertainty, information asymmetry, and opportunism (Gilson, 2003).

3.2 Spill-over effects and externalities

Another potential argument for government intervention relates to the potential spill-over effects of angel and venture capital investment, in terms of their contribution to greater economic growth and job

creation. Studies in the United States and Europe have indicated that companies backed by angel investors and venture capitalists have been important contributors to job growth (EVCA, 2005b, Kerr et al., 2010).

There is strong evidence of the benefits of venture capital for firm growth (Peneder, 2010) and the role it plays in the selection process of high growth and innovative firms (Engel and Keilbach, 2007). Recent evidence using micro-level data for a number of selected European Union countries (VICO) suggests that venture capital firms are an important driver behind post-first venture funding round productivity growth (Croce et al., 2013).

Research suggests that there is a causal link between venture capital investments and employment growth. Few studies, however, have looked at the difference in employment growth based on whether the venture capital is from public or private sources. The Ratio Institute conducted a study in late 2014 using a unique sample of institutional venture capital investments in Sweden during the period 2007-2011. The study focused on the relationship between venture capital investments and several aspects of the firm-growth nexus. The tentative findings indicated that both private- and publicly funded companies seem to experience positive persistence in their consecutive growth rates following an investment, indicating that growth tends to encourage further growth (Halvarsson, *forthcoming 2015*).

A growing body of research has shown that young firms create the bulk of new jobs highlighting the fact that age, not size, is an important determinate of growth (Criscuolo *et al*, 2014; Haltiwanger *et al*, 2011; Stangler and Litan, 2009). Policy makers in a number of countries highlight these potential economic benefits as the main justification for implementing programmes focused on seed and early stage investment. Some countries also note that these programmes form an important part of a broader economic development strategy focused on high growth and technology backed firms.

If there is a well-functioning entrepreneurial and financial ecosystem, the actions of any one group are likely to have positive spill-over effects for their peers (Lerner, 2010). Government intervention can play a catalytic role both in facilitating the functioning of the ecosystem and targeting actions to trigger its further development. However, these actions should provide incentives for the engagement, not the replacement, of the private sector and should be conducted in a manner conducive to the market (EVCA, 2010).

3.3 Policy mix

Policy makers in a number of countries have sought to address the prevailing seed and early stage financing gaps by intervening in multiple areas simultaneously. Therefore financing instruments should not be seen in isolation but as a set of interacting policies. A number of countries have begun streamlining their growing set of seed and early stage policies, in some cases putting them under one umbrella. However, changes in policies might be driven not only by market conditions but also by the political cycle. Consistent, long-term policies are important to provide the appropriate incentives to invest in seed and early stage firms.

Policy makers have focused on supply side measures in seed and early stage finance. However, the full policy mix needs to be taken into account, including the demand side and framework conditions. For example, sometimes a supply-side instrument may have been introduced in a setting of suboptimal framework conditions, which might constitute a second-best policy choice. In fact, some analysts argue that these framework conditions are more important for governments to address than trying to “catalyse” the seed and early stage market through financing instruments.

Demand side policies for seed and early stage finance are often overlooked in favour of more visible supply side measures. However, as public funding has increased, there is a growing concern regarding the

shortage of innovative entrepreneurs, a lack of entrepreneurial skills and capabilities and low quality of investment projects (Murray et al., 2012). Developing the capabilities of investors is also important.

Regardless of the rationale or type of intervention, it is important that the objectives of the programmes are clear and the results are measured accordingly. Given the complexity and interactions between policies for seed and early stage finance, the full policy mix should be taken into consideration including how and why it changes over time.

3.4 The balance between public and private sector investment

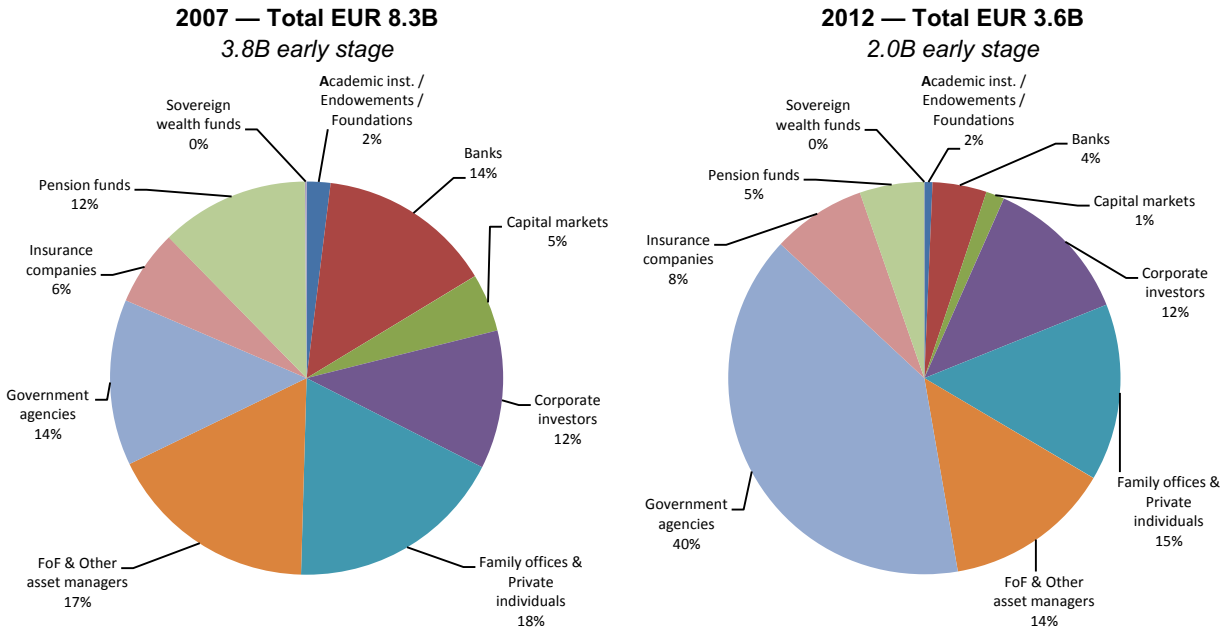
Recent evidence from Buzzacchi *et al*. (2013) suggests that higher public stakes in equity instruments can result in increased private venture capital risk aversion and longer investment periods. In addition, evidence suggests that VC-backed firms perform better if the amount invested by the public sector is smaller, and under control of a private fund manager, than if the amounts are larger (Brander et al., 2010). This reinforces the argument that the size of the public intervention must be appropriate—i.e. large enough that it makes a difference, but not so large that it affects the alignment of incentives and objectives leading to relative underperformance of VC-backed firms (Lerner, 2009). A commonly held view is that the public co-investment should not exceed 50% of the total investment (EVCA, 2005a).

In Europe, there has been a significant change in the mix of institutional investors in venture capital over the past five years with the share of government agencies increasing from 14% in 2007 to 40% in 2012 (Figure 5). Even though, there was a corresponding 57% drop in the total amount of funds raised during that period, including a 47% drop in seed and early stage venture capital, the amount of funding from government agencies increased by 85.4% between 2007 and 2012. While the increase in government agency funding is a response to the financial crisis, it shows a growing reliance on public sector funds in the European venture capital market, particularly the EIF (EVCA, 2012). It is important that public support is leveraged by private investment and does not inadvertently serve to crowd it out (Lerner, 2009).

Figure 5. Venture funds raised in Europe by type of investor

2007 vs 2012

(Incremental amount raised during the year as a percentage of total amount)



Note: Europe includes here Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Former Yugoslav Republic of Macedonia, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Spain, Slovak Republic, Slovenia, Sweden, Switzerland, Ukraine and United Kingdom.

Source: EVCA PEREP_Analytics.

Recent studies in Europe have shown that private venture capital has positive impact in terms of firm growth, while public venture capital is less positive. However, while public and private venture capital may be poor substitutes, they can be good complements as, according to study, companies with both outperform (Bertoni *et al*, 2011; Bertoni and Tykvová, 2015). Unfortunately, many public venture funds are created where there are few private venture capital firms but these are less likely to perform well. Many public venture capital funds tend to be geographically or sector focused with the objective of promoting innovation as tool for economic development but these goals will be hard to reach without appropriate private investment.

Research has shown that public funds should only be utilised where a tangible or imminent market failure in the private sector is evident. These vehicles should be designed in line with the market needs. When public funds are deployed, it is most efficient to channel these through existing market-based systems, namely private funds, and to shape them with a clear market approach to yield the intended results (Lerner, 2010). In particular, the investment decisions should be made by private sector experts, not by government officials. In addition, public contributions should strive to encourage private funding from both individual and institutional investors (EVCA, 2010).

Furthermore, in order to assess their accuracy and efficacy, a periodic review is important to help make adjustments as needed. At the same time, it is important to focus on development of the market, rather than solely on a provision of financing. This requires creating the proper incentives and supporting

the development of the necessary quality, skills and experience in the venture firms and angel investors to match international norms (Lerner, 2009).

4. Supply side measures

The bulk of the seed and early stage finance measures in OECD countries have been taken on the supply side. Supply side measures may be favoured as they are perceived as being more direct and demonstrate visible action. Demand side measures can be less visible as well as harder to target objectives and track outcomes. However, the over focus on supply side measures should be better balanced with demand side approaches. Framework conditions also need to be taken into account and addressed accordingly.

4.1 Grants, loans and guarantee schemes

Debt financing is the most common source of external financing for small, young firms, including innovative ones, although innovative and high-growth firms seek equity financing more than other types of small firms (OECD, 2010). Debt financing involves the acquisition of resources with an obligation of repayment; i.e. the investor does not receive an equity stake. It includes a wide variety of financing schemes: loans from individuals, banks or other financial institutions; selling bonds, notes or other debt instruments; and other forms of credit such as leasing or credit cards (OECD, 2010).

For young firms, and in particular innovative high growth oriented firms, access to credit is particularly difficult due to their lack of tangible assets, and therefore collateral, and their higher risk profiles. Credit constraints for small firms are also due to risks arising from information asymmetries between lenders and borrowers and higher transaction costs. Lenders are not easily able to separate potentially successful businesses from less successful ones and therefore may provide less funding than the company needs and require a higher interest rate. This in turn, can increase the risk of the borrowers and result in a greater share of higher risk firms in the pool of borrowers (Akerlof, 1970).

On the other hand, it is hard for lenders to be sure that once the funds are loaned, entrepreneurs will not take excessive risks or misuse the funds (moral hazard). One way for lenders to overcome the problems associated with information asymmetries is requiring collateral. However, for entrepreneurs and young innovative firms providing collateral might not be possible especially if their main assets are intangible or knowledge-based. Therefore these firms are likely to be credit constrained, independently of their project quality and growth potential.

The recent financial crisis has increased the difficulty for all firms, and particularly small and young innovative firms, to gain access to capital. Government programmes in some countries have tried to help overcome these funding gaps in different ways. One way in which government has intervened is by providing direct funding to credit constrained small, young and innovative firms through loans or grants. Governments sometimes act as guarantors for loans through loan guarantees programmes targeted to firms below a certain age or size.

According to the OECD 2012 financing questionnaire, most OECD countries have at least one grant, loan or guarantee scheme in place. A number of these have been in place for many years although the majority of the countries with these programmes indicated that support increased over the past five years. The majority of countries indicated that they have conducted some form of evaluation of these programmes.

4.2 Fiscal/tax incentives

Increasingly, tax incentives are being used as a way to address asymmetries in the treatment of profit and losses (Poterba, 1989, Gendron 2001, Cullen and Gordon, 2007) which can help in removing barriers and encouraging more investment in start-ups. These include young innovative company schemes, tax credits on investment, reduced capital gains taxes for investors in start-ups and/or provisions for rollover or carry forward of capital gains or losses.

Capital gains tax is an important factor that shapes the seed and early stage equity market (Da Rin et al., 2006) as tax will influence the investment and exit decisions by angel investors and venture capitalists. Recent evidence suggests that, despite a flight to quality selection effect, higher capital gains tax rates reduce both the number of VC-backed and successful companies (Achleitner et al., 2012). Beyond the arguments that increased taxation reduces the incentives to invest in seed and early stage ventures, capital gains taxes have also been argued to work as a barrier to entrepreneurial activity and creation of new firms (Poterba, 1989; Keuschnigg and Nielsen, 2004).

A number of OECD countries have some form of fiscal incentives in place whether for "young innovative companies" and/or for investors in these firms such as "front-end" tax incentives/deductions or "back-end" tax relief on capital gains, including rollover or carry forward of capital gains or losses. Support for these programmes, while still controversial, appears to be growing with some countries putting new programmes in place. Tax incentives can be a "blunt" instrument (i.e. difficult to target effectively) so careful design, monitoring, evaluation and adjustment is necessary to ensure the intended results are achieved (OECD, 2011).

As highlighted during the OECD policy workshop on seed and early stage financing held in Norway in September 2012, the general tax levels in the country – personal income, corporate and capital gains taxes – need to be taken into account when assessing fiscal incentives. In countries with no capital gains tax, such as New Zealand and Switzerland, "back-end" tax incentives are not relevant.

Some countries provide tax incentives at the regional, not the national level. These include the United States where tax incentives are implemented at the state level and Canada, where tax incentives are at the provincial level, as well as some other countries.

4.3 Equity financing instruments

Specific government intervention through equity instruments may be based on various arguments. First, and stemming from the "market failure" and "financing gap" arguments mentioned earlier, intervention in an underdeveloped seed and early stage market may be seen as a way to provide critical mass and signal the merits of seed and early stage investments to private sector investors (Leleux and Surlemont, 2003). According to this "seeding hypothesis", public intervention is seen as a way to facilitate the creation of a private seed and early stage market.

Second, public intervention may be based on considerations beyond pure financial returns (social returns, national strategic interests) which can play an important role in deciding to intervene in the market (Lerner 2009, Murray et al., 2012). Examples of these broader objectives can be efforts to create jobs and economic growth in specific regions or sectors. Nevertheless, caution is necessary in designing such programmes as they can underperform commercially oriented funds (Murray, 1998).

The ability of the public sector to pick winners is typically regarded with some skepticism (Avinimelech and Teubal, 2006). In addition, government must strive to avoid crowding out effects (Cumming and MacIntosh, 2006) and structure instruments effectively to address the specific policy goals (Murray et al., 2012).

According to the 2012 financing questionnaire, most OECD countries have some type of government equity programme. These programmes vary across countries but typically fall into three main categories: direct investment through government funds, fund-of-funds and public/private co-investment funds. Many of these programmes have been focused on venture capital, although programmes targeting angel investment have also grown, particularly co-investment funds.

The total number of government supported equity instruments in OECD countries has grown dramatically over the past five years, especially fund of funds and co-investment funds (Wilson and Silva, 2013). Meanwhile, the number of direct public funds has been reduced. Experience from OECD countries suggests that co-investment funds and fund-of-funds, both of which seek to leverage private sector investment, might be more effective than direct public equity funds. However there is limited evidence to date and not many countries have evaluated these equity programmes to date, perhaps due to the fact that these are relatively new in some countries. It is clear that the design, management and incentive structures of these instruments are critical. In particular, having experienced private sector managers of the funds is important.

4.3.1 Leveraging private investment

A "fund of funds" is an investment strategy consisting of holding a portfolio of other investment funds rather than investing directly in companies. Instead of investing directly in start-up firms, public fund of funds invest in private venture capital firms, often with the requirement that other private institutional investors also invest.

Co-investment funds use public money to match private investment. Typically these programmes work by matching public funds with those of private investors, who are approved under the scheme. Co-investment schemes are often seen not only as a way to leverage private money but also a driver in building, growing and professionalising the seed and early stage investment market by providing a more structured investment process. Co-investments schemes can also be an effective way to attract foreign investors, providing the regulatory environment permits.

Co-investment funds can be structured in many different ways. The majority of co-investment funds are *pari-passu* (on the same terms). However, some funds are structured to provide either upside leverage or downside protection to the private investors. Asymmetric funding schemes allocate a higher proportion of the returns to the private sector investors and a greater part of the losses to the public sector investors. This provides a premium to private sector investors to compensate for the risk and long term nature of seed and early stage investments. Earlier work showed that these programmes provided the appropriate incentives, without creating unintended disincentives, and resulted in a positive impact on returns when the fund is managed by a private sector manager (Murray, 1999). Interest in asymmetric funding schemes has grown recently warranting further evaluation of these types of measures.

Co-investment funds have become increasingly popular in recent years, due in part to the perceived success of existing programmes. New Zealand has had co-investment funds in place for a number of years. Initially, they set up a co-investment fund for venture capital investment (VIF in 2002) and later created one focused on angel investment, New Zealand Seed Co-investment Fund (SCIF), which was modelled on the Scottish Co-investment Fund. The rationale was based on the financing difficulties of start-ups with high growth potential (innovative, technology-based firms) at the seed and early stages.

The overall policy objective of the New Zealand Seed Co-investment Fund (SCIF) is to support the development of the angel equity finance market in the country, by developing a greater professional capacity in the market for intermediating funds between investors and technology-based start-ups, increasing the depth of specialist skills needed to assess and manage early stage investments, increasing the

scale and enhancing networks for early stage investment, catalysing investments that would have not have been made without the programme, minimising fiscal risk and covering costs.

An impact evaluation has been underway and can help shed light on the level of additionality associated with the outcomes of the programme and the unintended consequences, both positive and negative. The sharing of these types of evaluations is important for the further development of seed and early stage financing policies and is discussed further in section 7.

5. Framework conditions

The financial system has a central role in fostering innovation and growth. Policies and reforms of financial institutions and markets can facilitate financing of entrepreneurial firms. Evidence shows that start-up, small and medium sized companies are more constrained by financing and other institutional obstacles than large enterprises (Beck, 2007). Often the regulatory system is complex and/or has hidden disincentives for young innovative firms and/or investors.

To facilitate the creation of new high growth and innovative firms, it is important to simplify the complicated and costly administrative requirements involved in the creation of a business. Legal and regulatory barriers to entry include: administrative burdens to open a business; legal barriers to entry; bankruptcy laws; property rights protection; investors' protection and labour market regulations (OECD, 2008a). The administrative burdens and costs of growing and internationalising firms also need to be addressed. Evidence shows that an appropriate regulatory and legal system can promote the development of the venture capital industry (Armour and Cumming, 2006; Bonini and Alkan, 2012).

Micro-econometric cross-country evidence confirms that tough regulatory and legal environments, in both the labour and the product market, have a negative impact on business entry because they dampen the positive effects of social networks and business skills on entrepreneurship while amplifying the role of attitudes towards risk. Recent OECD work shows that financial markets which are more developed, and therefore enable the reallocation of resources, facilitate innovation in firms (Andrews and Criscuolo, 2013; Criscuolo *et al*, 2014).

A number of other policy areas are also important including tax policy, bankruptcy rules and employment protection legislation. High corporate, individual and/or capital gains taxes may discourage entrepreneurs from establishing a business. Stringent bankruptcy regimes, with high costs or penalties for failed entrepreneurs, can also provide disincentives for entrepreneurs to create high growth (and higher risk) firms (Armour and Cumming, 2006). In addition, restrictive labour market regulations can impact the creation and growth of firms as well as the supply of venture capital (Da Rin et al., 2005).

Other regulatory barriers which might directly impact seed and early stage finance include the ease with which venture capitalists and business angels can organise themselves as limited liability entities. In addition, regulations governing the types of institutions that can invest in seed and early stage venture capital, such as banks, pension funds (venture capital activity in the United States increased significantly following the removal of restrictions on pension fund investments in 1979) and insurance companies impact the amount of capital available for venture capital. Rules affecting stock markets, including secondary exchanges and initial public offerings (IPOs) are also important factors for seed and early stage investment decisions.

5.1 Regulatory barriers

Recent regulatory reforms at the global level (e.g. Basel II and upcoming Basel III for banks) as well as other regulations which are expected to be enforced in a number of OECD countries, most notably in Europe (Solvency II for insurance companies and possible amendments to the IORP directive for pension

funds) may reduce institutional investor interest in venture capital. This is particularly relevant for banks, pension funds and insurance companies, important investors in private equity and the ones which will be impacted most by the upcoming changes in regulations.

Other recent legislative initiatives may have a significant impact upon the seed and early stage market to the extent that they affect investors in alternative assets (including venture capital investors). Examples of these are the Dodd-Frank act in the United States and the Directive on Alternative Investment Fund Managers (AIFMD) in Europe. The motivation for the introduction of these rules stems from the financial crisis and is based on the existence of a perceived "regulatory gap" for certain types of financial instruments. While the consequences of this new wave of legislation are yet to be seen, the industry has already expressed concerns that it can have unintended negative consequences upon venture capital financing (e.g. EVCA, 2011a).

In the aftermath of the financial crisis, significant regulatory changes at the global, regional or national level are being pushed forward with the objective of ensuring greater financial stability. For example, while reforms such as Basel III are likely to make banking safer and more stable, there is a risk that, in the short-term, the more stringent capital requirements could reduce the supply – or significantly increase the cost – of capital for risky business enterprises (Aghion et al., 2013).

Prudential regulation may also affect the ability of insurance companies to invest in riskier assets - Solvency II Directive in the EU (EVCA, 2011b) and alter the risk assessment of asset classes held by pension funds - amendments have been proposed to the European IORP Directive that currently follows a non-risk based approach (EVCA, 2012). As a result, on-going regulatory changes might have a significant impact upon the equity amounts being channelled to seed and early stage firms.

In European Union countries, government interventions have to comply with state aid rules. In the case of measures to promote risk capital investment, the European Union has specific guidelines. This issue was addressed in the financing policy workshop hosted by the Netherlands in October 2013. Even though the European Union does not see evidence of a general risk capital market failure, it recognizes the existence of market gaps for some types of investments at certain stages. State aid is defined as an *advantage in any form whatsoever conferred on a selective basis to undertakings by national public authorities*. However, public intervention in the form of risk capital investments may also be designed in a market-conforming manner which does not entail state aid. In addition, the Commission is working to simplify State aid rules and make them more flexible.

5.2 Exit markets

An effective integrated market for financial services is necessary to provide more capital for investment, including equity sources such as angel investment and venture capital. Efficient legal investment structures and stock markets are necessary to recycle and redeploy financial wealth. Financial returns from venture capital, angel and other private equity investments are predicated on (positive) exits, in the form of trade sales (mergers and acquisitions) or initial public offerings (IPOs) on stock markets. Sometimes the exit involves a sale to another investor. In reality, the majority of exits are negative – failure or bankruptcy of the firm given the risks of investing in early stage companies (see figure 6). Investors therefore take a diversified approach to their portfolio to spread their risk.

IPOs or trade sales (M&A) are critical for high growth entrepreneurship. These types of exits provide an opportunity for investors to realize returns from their investment and therefore potentially frees up funding for further investment in innovative young firms. If investors are not able to capitalise their returns, through an IPO or trade sale (merger or acquisition), then they will not have funds to recycle into new investments (Michelacci and Suarez, 2004; Schwienbacher, 2009). In difficult financial markets, such

as those of the past several years, the lack of exits creates a serious issue for both the angel and the venture capital markets and will impact the future pipeline of investors.

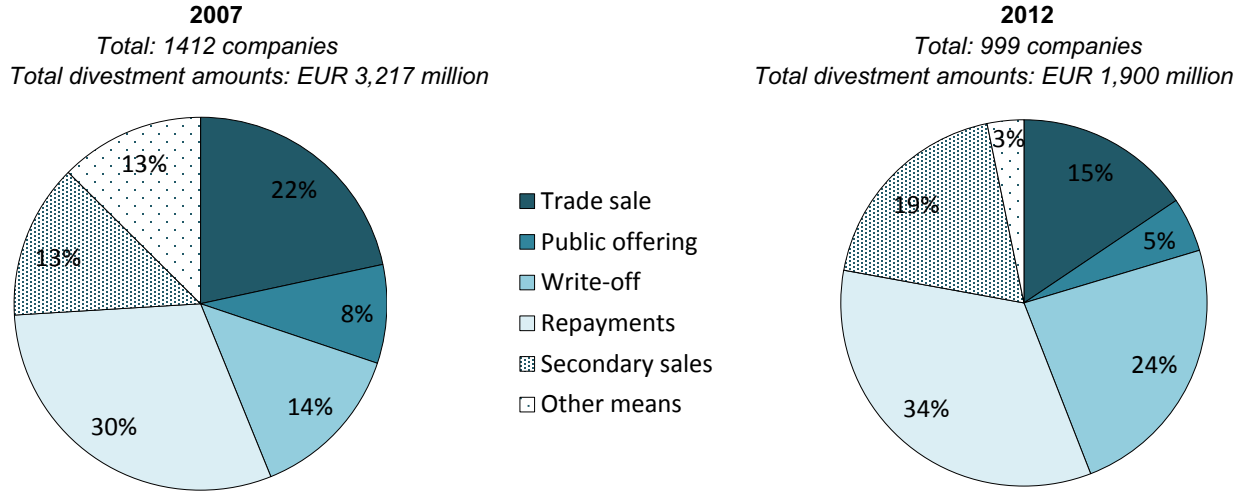
In addition, both trade sales and IPOs often attract positive attention for successful entrepreneurs, which in turn can inspire others. On the other hand, failures or bankruptcies can inhibit entrepreneurship in countries in which there is not a strong entrepreneurial culture or in which there is a stigma of failure, or in fact, a real penalty for bankruptcy in terms of stringent bankruptcy legislation which do not allow entrepreneurs to redeploy assets (Andrews and Criscuolo, 2013).

Financial and exit markets, and particularly IPOs, in many countries including the United States, have been heavily affected by the recent financial crisis and pose a real concern for private equity backed companies (Litan and Schramm, 2012). Recent OECD data shows that the number of new firms listed on stock exchanges in OECD countries in the past decade dropped by half as compared to the previous decade (OECD, 2013c). In addition, the amount of equity that companies raised decreased significantly. In terms of IPOs, the market has not yet recovered from the financial crisis. This impacts the ability of venture capitalists to capitalise their returns and feed them into new investments.

In Europe, according to EVCA data (see Figure 14 below), only 15% of venture capital exits in 2012 (in terms of number of companies) were through trade sales and even fewer, 5%, were IPOs. These numbers are clearly lower than pre-crisis (2007) figures that pointed to 22% of exits through trade sales and 8% through IPOs. Repayments and write-offs were and still are the most prevalent form of exit. Secondary sales also amount to a very significant percentage of total number of exits.

Figure 6. European venture capital exits

2007 vs 2012 Percentage of number of companies



Note: This information does not reflect amounts of capital raised.

Source: OECD based on industry statistics by EVCA/PEREP_Analytics, 2013.

The importance of exits and exit markets is often not fully appreciated by policy makers. Venture funds are structured in a way that requires an exit within the life cycle of the fund, which is typically 10 years, to enable the investors to realize a gain (or loss) and to reinvest the proceeds in other ventures. For both venture capital and angel investors, knowing when to exit, and having the will to do so even in the case that the exit is negative, is as critical as making the initial investment decision (Schwienbacher, 2009). Exit plans should already be taken into consideration when the first investment is made as it takes time and

strategic implementation to move towards positive exits. Without exits, private equity investors have no way of realizing returns on their investments and passing those returns to their institutional investors, enabling further investment.

While vibrant stock markets are critical for successful IPOs and the development of the venture capital market (Black and Gilson, 1998), the potential role of policy in this area is limited. However, there are some actions that can be taken. These include lowering the costs of going public (Ritter, 2013) as well as improving the rule of law and the legal system (Cumming et al, 2006, 2010).

Many high growth entrepreneurial firms are too small to meet the market capitalization requirements for listing on primary stock markets. Secondary markets, such as the NASDAQ which was created in the United States in 1971, have played a very important role for these firms as well as in the development of the venture capital industry (Kortum and Lerner, 2000). In 2013, the London Stock Exchange launched a new platform to attract the growing number of United Kingdom technology firms (Financial Times, 2013). The platform operates in between the main LSE exchange and the Alternative Investment Market (AIM).

During the dot.com boom in the late 1990's, some countries developed secondary markets to allow entrepreneurial firms to list within their country although many high growth firms still prefer the United States stock exchanges for greater liquidity and visibility. In Europe, several countries have, in the past, unsuccessfully tried to create a secondary market for smaller companies. Intense competition over investors amongst exchanges and practices that prevented domestic companies to list abroad, are amongst some of the reasons for failure (Posner, 2009).

Evidence shows that even in recent years, the average long run performance of IPOs in secondary markets is much lower than in main markets, although some of these secondary markets have been relatively successful in attracting IPOs (Vismara et al., 2012). The relatively smaller size of individual economies adds to the difficulties in successfully creating and developing secondary markets and initiatives at a regional level driven by strong supranational political commitment are likely to be more successful (Posner, 2009).

Regulation such as the 2002 Sarbanes-Oxley Act in the United States, on standards for public companies and other compliance costs, have been pointed out as some of causes for the declining trend in small company IPOs in the United States over the last decade. However, this is not undisputed and significant debate still exists. In the United States, a recent legislative initiative (2012 JOBS Act) aims at increasing *public capital markets for emerging growth companies*, by allowing "emerging growth companies" to benefit from reduced regulatory and reporting requirements for up to five years from its IPO. Discussions on regulation in the United Kingdom are also underway (Kay Review). However, there is still significant debate on the implications of these initiatives. In summary, the role of policy in developing stock markets is not clear beyond setting the appropriate framework conditions and some possible actions on the regulatory side.

As noted earlier, the majority of positive exits, especially in today's environment, are through trade sales or merger and acquisitions. Trade sales have long been regarded as the most likely exit route (Cumming and MacIntosh, 2003), even though not necessarily the most profitable from the venture capitalist perspective. While IPOs usually occur within a given "incubation" time in order to maximise potential gains, trade sale exits tend to take more time and be less homogeneous in terms of returns (Giot and Schwienbacher, 2007; Achleitner et al., 2012b). In addition, some policies inadvertently set incentives for companies to remain small and independent when such companies would be better off growing or becoming part of a larger organization (Ritter, 2013).

Often, a larger technology or pharmaceutical or other sector specific company buys the start-up as a way to acquire the technology, expertise and perhaps also the intellectual property (Criscuolo and Menon, 2013). Sometimes two start-ups merge to combine forces. The prevalence of trade sales highlights the importance of networks and relationships between large and small firms. These relationships often don't develop naturally and require a concerted effort. Venture capital firms and other equity investors often help build these bridges as a way to secure an exit for the firms in which they have invested.

6. The demand side

While many policies have focused on the supply side, other public and private activities have focused on demand-side actions which aim to increase the quality and sourcing of deals. The demand side is often overlooked in favour of supply side actions which may be perceived as being more visible and direct. Developing human capabilities, whether on the investor or the entrepreneur side, is important. There is also increasing evidence of the importance of social capital and networks – both local and global (Shukla, 2012), as high growth firms need to grow beyond national borders and networks are often critical in facilitating that growth. However, there is limited evidence on the appropriate role of the public sector versus the private sector in some of these areas.

6.1 Entrepreneurial culture

Entrepreneurial culture and fear of failure are significant barriers to entrepreneurship. In many countries around the world, cultural traditions and the lack of exposure to entrepreneurship as a viable career option can be barriers to innovation and economic growth (World Economic Forum, 2009). By raising awareness and building the necessary skills, at all education levels, a new generation of entrepreneurially-minded people can be encouraged to create new jobs. However, the perceived image of entrepreneurship is, unfortunately, still negative in a number of countries. Culture and image are typically affected by a large number of factors, among them family, friends, the media and the school system. Evidence shows that the opinions and experiences of peers are likely to affect the decisions of individuals to become entrepreneurs (Autio, 2010).

Although many countries have made progress in encouraging a more favourable culture and environment for entrepreneurship, much remains to be done to make this a reality. Changes in cultural attitudes will be a key driver in improving the entrepreneurial environment but this takes time. In that regard, the school systems play a critical role. Entrepreneurship in schools and universities, mentoring and role models can help change mindsets and encourage more young people to consider entrepreneurship as a future career path (World Economic Forum, 2009).

Universities play a key role as connectors in entrepreneurial ecosystems (EFER, 2006). They can be the engines that connect people and ideas as well as attract capital for new ventures. Universities attract talent, develop intellectual capital, conduct research and train generations of young people to work in a variety of fields. However, the gap between what is taught in universities and the needs of the job market is rapidly expanding. Universities need to transform themselves to meet the needs of the 21st century (OECD, 2008b). While a number of universities are becoming more global (Wildavsky, 2010), they also could become more attuned to the needs of the economy (Kauffman Foundation, 2008).

6.2 Entrepreneurial ecosystems

An entrepreneurial economy consists of individuals and institutions in an interconnected system (Schramm, 2006) in which multiple stakeholders play a role in facilitating entrepreneurship and innovation. This includes business (large and small firms as well as entrepreneurs), policy-makers (at the

international, national, regional and local levels), and educational institutions (at all levels but particularly at higher education institutions).

However, even more important are the linkages between these institutions – the functioning of the entrepreneurial ecosystem. Too often these links, whether between universities and businesses or between entrepreneurial and large firms, do not function well and in some cases even become bottlenecks. The key to a vibrant entrepreneurial ecosystem is in facilitating better linkages between these actors. The links in the entrepreneurial ecosystem are primarily through personal networks or "social capital". A growing body of research demonstrates the critical role that social capital plays in high-growth ventures (Stuart and Sorenson, 2007).

Governments should not attempt to create ecosystems but can strengthen them by providing incentives or supporting demand-side oriented programmes. Having the appropriate legal and regulatory framework in place and creating appropriate financial incentives can also contribute to a vibrant ecosystem. In addition, developing a well-educated population and having open borders to people (Guest, 2012), ideas and capital are also important. Initiatives such as "Startup Chile", which provides incentives for successful entrepreneurial teams to move to Chile to build their firms, can help jump start high growth entrepreneurship as well as develop local talent.

6.3 Human and social capital development

A healthy entrepreneurial ecosystem is critical for successful seed and early stage investing. At all investment stages, entrepreneurs may have difficulties in understanding the financing options available as well as the expectations of potential investors. Investor readiness programmes help entrepreneurs anticipate the needs of investors and prepare for presenting to them. The 2012 OECD financing questionnaire showed that many countries have investor readiness programmes for entrepreneurs and, overall, support for these programmes has increased between 2008 to 2012..

6.3.1 Entrepreneur training

Many entrepreneurs are unsuccessful in raising finance because they are either not familiar with the options for external sources of financing or they are not adequately prepared to present to investors (Mason & Harrison, 2004). Access to information about external sources of finance for start-ups can be helpful for enabling entrepreneurs to access the right type of financing for their venture.

Investment readiness programmes for entrepreneurs is an area policy-makers have supported in a number of countries. These programmes typically focus on access to equity financing and focus on helping entrepreneurs understand the specific needs of these investors (European Commission, 2006). Programmes for entrepreneurs are typically focused on "pitching" the company and investor readiness but can also include some of the topics such as an overview about angel and venture capital investing and/or programmes on deal negotiations, term sheets, valuation and exits. In many countries, these programmes are run at universities, incubators/accelerators and/or by specialised agencies.

Many programmes, especially publically funded ones, focus solely on sources of finance and presentation skills, not on the more pertinent business issues which are the determining factors for whether or not investors are willing to provide funding (Mason & Harrison, 2004). Programmes which help entrepreneurs develop their business plans and presentations to a level which answer the most pertinent questions for investors – such as the vision, business model and skills balance within the team as well as business development and access to market plans, could be more helpful (Toschi and Murray, 2009). These programmes can help address the entrepreneur's side of the information asymmetry issue by helping

entrepreneurs better understand the expectations and needs of investors and prepare themselves accordingly, which in turn can result in greater success in securing funding.

The question is who is best placed to support and deliver these programmes and whether entrepreneurs will be motivated to participate in them. In Australia, data from CAUSEE indicates that the majority of both nascent and young firms do not access these sources of information. However, it is unclear whether the low usage of these options is due to a lack of awareness or other reasons (e.g. perceived usefulness). The most effective training programmes are often taught by experienced entrepreneurs or investors (OECD, 2011). Therefore, it may be that privately run programmes are the most effective although public sector support for these initiatives may be helpful.

6.3.2 Investor training

Training of investors is often seen as important for professionalising the industry (Bottazzi et al., 2004), however, according to the OECD 2012 questionnaire results, very few OECD countries have training programmes for investors, whether for institutional investors, venture capitalists or angel investors.

Because angel and venture capital investors are typically experienced business people, it is assumed that they also know how to invest. However, investing in start-ups differs greatly from being a financial investor or building a company in a particular sector. It requires a combination of both skill sets, as well as specific technical skills in terms of conducting due diligence and determining company valuations. Therefore training and mentoring, in which new investors can learn from experienced investors, is an important part of the process (OECD, 2011).

In many countries, venture capital firms are smaller (Murray et al., 2012) and less experienced than those in the United States where the industry has been active for many decades. This often results in smaller deals and can have a negative impact on market performance (Lerner et al., 2011). Programmes which attract foreign investors can play an important role in the training and development of local investors, as evidenced in the Yozma programme (Senor and Singer, 2009).

Training for institutional investors can also be important. Although the amounts that these investors provide to the venture capital industry are large, they are small in terms of the percentage of assets they under management (typically less than 2%). Therefore, it is often hard for institutional investors to devote the necessary time to understand and monitor venture capital investments and in many cases, they invest through intermediaries. More awareness raising and training about the private equity industry in general, and venture capital in particular, may help encourage institutional investors to devote more resources to the asset class. Trade associations such as the European Private Equity and Venture Capital Association (EVCA) provide training courses for institutional investors and fund managers to help develop the industry.

6.3.3 Network development

A number of OECD countries have programmes in place for developing “social networks” (incubators, accelerators, business angel networks and matchmaking services) and policy support for those programmes has grown in the past five years. These programmes help link investors and entrepreneurs and, in many cases, provide additional support and mentoring services.

Network development is not only important at the early stages of firm creation but also for the growth and development of these firms (Kauffman Foundation, 2007). Building links between investors, entrepreneurs and larger companies can lead to more successful “exits” of ventures in the future by creating links with potential later stage investors and corporate partners.

With the current state of the financial markets, IPOs on stock exchanges are rare (Litan and Schramm, 2012). Therefore the only option for high growth entrepreneurs and their investors to realise the gains from the company is to sell or merge their firm with another company at the appropriate time. To that extent, programmes that help develop international networks or connections between start-ups and larger companies can be helpful.

6.3.4 Business angel networks (BANs)

Business angel networks (BANs) play a match-making function between angel investors and entrepreneurs - they do not invest directly themselves (EBAN, 2006). This role is structured to address the information gaps discussed earlier. BANs help to make the investment process more efficient by connecting angels wanting to invest with other players in the local ecosystem (incubators, VCs, development agencies, banks, stock exchanges and others) and, most importantly, with entrepreneurs looking for capital (EC, 2002). One of the most important and basic roles of BANs is to give visibility to the angel activity in a region, and therefore serving as "front door" for entrepreneurs looking for financing, without necessarily giving visibility to each individual angel, who often prefer to keep a low profile.

BANs can be national, regional or local. They can also focus on particular sectors. More recently, a growing number of "affinity" BANs have been created for groups of people with similar backgrounds, experiences, cultures or nationalities (i.e. alumni of universities, diaspora groups, etc.). The mode of operating, including the frequency of meetings and membership criteria can vary tremendously. BANs usually have one or more paid employees and normally operate as a non-profit (EC, 2002). BANs are much more prevalent in Europe (excluding the United Kingdom) than groups which are more common in the Anglo-Saxon countries.

While angel networks can help to address the information asymmetry problem, evidence is still lacking in terms of the track record of individuals BANs. A study in Belgium showed that angel investors would not have known about 82% of the deals in which they invested had it not been for the business angel networks (Collewaert et al., 2010). Sometimes the best investment opportunities are channelled to the better known angel investors who may not need or have an incentive to co-invest through BANs.

With less public money available due to tighter public budgets in countries around the world, angel associations, networks and groups have been seeking new operating models to ensure sustainability. Given their role in market development and data collection, in particular, it is important that these organisations find the necessary resources to continue their work. However, any public support should be linked to measures of intended outcomes.

6.3.5 Incubators

Despite the growing evidence that ecosystems are driven by people, many initiatives in the past decade have focused on infrastructure and, in particular, the creation of incubators (Hansen *et al*, 2000). Many of the early incubator models focused on "infrastructure" (i.e. the provision of office space) supplemented with support services for entrepreneurship, often provided at a discounted rate. The goal of these incubators was to minimize the strategic, bureaucratic and organizational impediments for firms pursuing risky opportunities (Hansen et al., 2000).

Evidence shows that the rigor of the screening process has a direct impact on the performance of incubators (Aerts et al., 2007). Many incubators have not had effective screening processes (i.e. not looking at a balanced set of factors and/or not seeking adequate expert/private sector input) and therefore have not been successful. In addition, many incubator models focus more on "infrastructure" rather than

social networks, the latter of which have been shown to play the more important role (Rothschild and Darr, 2005).

6.3.6 Accelerators

More recently, focus has shifted to new accelerator models (Miller and Bound, 2010). These models are focused on entrepreneurial teams, selected on a highly competitive basis. Unlike incubators, which provide access to space and discounted services, accelerators provide tailored mentoring and support to the selected teams. In the ICT and internet related sectors, investments require smaller amounts of initial capital than more traditional technology and science sectors. These firms have been termed "lean start-ups" as they allow greater capital efficiency and more rapid testing and adjustment of products and/or business models (Ries, 2011).

A new phenomenon of private sector accelerators has been spreading around the world, based on these new "lean start-ups". Many of these are following the successful models of Techstars and Y Combinator in the United States. Accelerators proactively select and focus on working with high potential teams for a defined period of time and differ from the approach of incubators, which are more focused on providing infrastructure and a broad set of services. Accelerators are playing an increasingly important role in boosting high growth start-ups and are becoming an increasingly important player in the entrepreneurial ecosystem for angel and VC investors (Kauffman Foundation, 2007).

Experience from these initiatives is indicating that a more focused approach and facilitating access to highly relevant networks play a key role in the successful growth of start-ups. However, further evaluation of these relatively new programmes is needed to provide concrete evidence.

6.3.7 Online investment tools and crowdfunding

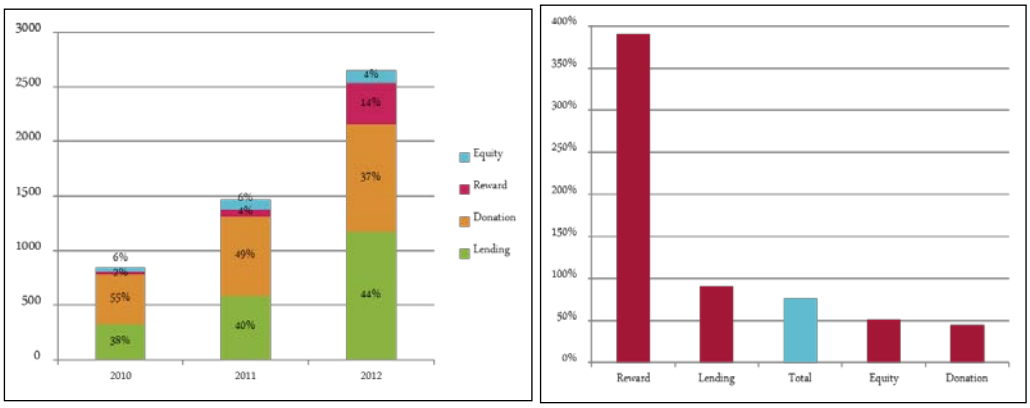
Increasingly, angel investors are using online tools, such as Gust, to assist in the investment process. In addition, online angel networks or matching platforms have started to grow such as AngelList in the United States. AngelList has attracted a number of high quality experienced angel investors and provides extended matching between investors registered in the system and entrepreneurs.

These online services can reduce information search costs for investors. However, online platforms do not replace the necessity for personal contact and face-to-face interactions which are necessary for building confidence and trust between investors and entrepreneurs. Online platforms often end up serving as vehicles for increasing the number of financial investments as opposed to the traditional model of angel investment, which would typically include hands-on support from the angel investor to the entrepreneur (OECD, 2011).

More recently, the concept of "crowdfunding" (using online platforms to enable lots of people to invest small amounts in new ventures) has also started making its way into the seed and early stage markets (Wilson and Testoni, 2014). While there is a growing hype about crowdfunding, there are also many misperceptions. Crowdfunding initially started for philanthropic projects (in the form of donations) and then spread to consumer products (in the form of pre-funding orders, called "reward" based crowdfunding) and lending (De Buysere et al., 2012). However, equity crowdfunding is relatively new and still the smallest part of the crowdfunding market.

Crowdfunding is experiencing exponential growth globally. In the period 2009-13, the compound annual growth rate (CAGR) of the funding volumes was about 76 percent with an estimated total funding volume of $5.1bn in 2013 (Wilson and Testoni, 2014). However, the majority of that funding is in the form of donations, products or lending, not equity.

Figure 7: A) Funding volumes by category ($M) **B) CAGR 2010-2012**



Source: Bruegel elaboration on the basis of crowdfunding industry report 2013 (Massolution).

A lot of attention has been given to the recent legislation in the United States which will allow equity crowdfunding (JOBS Act, approved in 2012 but has not yet come into effect), however, this is currently not legal in many countries. Currently there are active equity crowdfunding platforms in the Belgium, France, Germany, the Netherlands and the United Kingdom but many of these are relatively new (a number of them only launched in 2012) so there is not yet much experience or evidence on how these are working (De Buysere, 2012).

Proponents say that equity crowd funding will allow businesses to raise capital faster and more efficiently (Neiss, 2011). However, this would require changes in securities laws, specifically those related to issuing securities (NESTA, 2012a). Equity crowdfunding will essentially allow unsophisticated investors to invest directly in young risky companies with the expectation of a financial return (NESTA, 2012b). There are many opportunities for all types of crowdfunding but also many challenges, particularly for equity crowdfunding (Isenberg, 2012).

7. Data and evaluation

The experience and sequencing of policies and programmes in seed and early stage financing has varied greatly in countries around the world. Policies that have worked in one country may not necessarily work the same way, or be as successful, in another country. It is important to assess the local environment and existing policy mix to implement the relevant instruments in the appropriate timeframe. In addition, the level, sophistication and dynamics of seed and early stage investment can vary greatly across regions within countries and therefore policy makers must take this into account.

The OECD policy workshop on seed and early stage financing hosted by Switzerland included a focus on evaluation. The workshop highlighted the fact that evaluation of SES market interventions entails significant data and methodological challenges. Having an *ex-ante* and well defined evaluation strategy is important. This includes having a well-defined policy objective and putting thought into the policy questions and evaluation design at the beginning of the process.

Evaluations should take into account the set of considerations related to the supply-side, demand-side and framework conditions. This can be challenging as it involves a mix of direct, indirect and external effects. In addition, quantitative evaluations need to be complemented with qualitative information.

Most evaluations focus on supply-side SES financing policies. While in the past evaluating demand side interventions was difficult, new methodologies drawn from experimental economics could be applied

to evaluate demand side policies. The impact of framework conditions can also be difficult to assess. Challenges remain in identifying complementarities between the different policies and it was suggested at the workshop that further OECD work in this area would be useful. An understanding what other OECD countries are doing in terms of evaluation of financing policies is helpful in working on this subject towards developing better evaluation processes.

The awareness of the importance of evaluating policy interventions is rising. Recently, the United Kingdom HM Treasury published the Magenta book (HMT, 2011) with general guidelines for policy evaluation that, together with the GAO/CBO guidelines in the United States provide state-of-the-art insights on policy evaluation design, implementation and common evaluation challenges (GAO, 2012). The OECD has also provided a review paper (Warwick and Nolan, 2014).

There should be periodic evaluations and an effort to improve the quality of evaluations. Most importantly, the results of evaluations should feed back into the policy process to identifying areas for adjustment in the programme being evaluated. More and better evaluations are needed but trade-offs may exist between conducting good evaluations and delivering clear and timely policy messages.

7.1 Evaluations of financing instruments

Evaluation of policies is critical to ensure they are having the intended outcomes and to enable the necessary modifications to be made along the way. While policies targeting seed and early stage equity investment are being put in place in a growing number of countries, there have been few formal evaluations of these programmes to date.

7.2 Types of evaluations

The types of evaluations can vary between *ex-ante* to *ex-post* evaluations, from qualitative to quantitative approaches, and range in terms of the metrics (e.g. inputs, outputs, outcomes\impact). The type of evaluation might also depend on the purpose of evaluating a given programme and the questions that policymakers pose (HM Treasury, 2011). It might be of interest for policymakers to understand if the programme was carried out according to plans (process evaluation), to identify the main changes in the SES market that resulted from the programme (impact evaluation) and/or to weight the overall costs and benefits of the policy intervention (economic evaluation). Sometimes programmes or policies are simply benchmarked to other programmes, whether within the country or in others.

Most evaluations of risk capital policies in OECD countries to date seem to have been more qualitative than quantitative. The majority of evaluations have been conducted by outside experts and academics. However, many evaluations have been conducted by the implementing agency. Some countries tend to conduct evaluations of these types of instruments more systematically then others but this might also be related to the length of time the programmes have been in place.

There are many challenges in evaluating these programmes, including what is evaluated – whether general policies or specific instruments and which levels are evaluated (implementing agency, programme or instrument level). In addition, there are many elements which can be evaluated including the design (was it structured correctly?), process (was it implemented according to plan?) and governance (was it managed properly?). Many other factors come into play as well, including the impact of the institutional setting, the policy mix and interaction of policies, and the level of intervention (local, regional or national).

7.3 Design and implementation

Evidence has shown that the design and implementation of programmes plays a key role in how well they meet the intended objectives (EC, 2012). The design of the programme needs to fit the local context,

including the existing financial ecosystem. Also, the linkages between these programmes and other support schemes are very important. Often multiple financing programmes are managed by one organization. This could be for various stages (seed, early stage, growth or expansion) using different instruments (debt, equity and/or non-financial).

The agency or organisation responsible for management and implementation sometimes changes over time. This might be due to consolidation (as has recently been the trend) or for other reasons, including political ones. In many cases the names of the programmes also change over time making it difficult for those trying to follow these instruments (entrepreneurs, researchers and others).

The way in which these programmes operate is critical to their success. This includes the outreach or awareness-raising with the targeted company population and the decision-making process. If the process is overly cumbersome or time-consuming, the more eligible companies might choose not to apply. The way in which the public and private collaboration is co-ordinated is also important as well as the relationship and interaction between the programme managers and the supported companies.

7.4 Time lags and market cycles

Getting the timing right for policy intervention is not simple. Policy makers need to know, not only when to start policies, but perhaps more importantly, when and how to end them. Also, market timing is important. Government's role as a catalyst in the market is more important during downturns than during market booms (Brander et al., 2010).

It should be noted that a significant amount of time in planning (and, in many cases, securing the necessary approvals) is often necessary before programmes are launched. It can also take time for the full benefits of policies and programmes to have an effect, especially for SES investing which requires a long-term investment horizon (Lerner, 2009). Policies that are stopped and started within short time frames are often not able to reach the intended results.

In addition, the scarcity of SES data (particularly angel investment) and the lumpiness of venture capital data (one large deal can distort the figures) further complicate the ability for policy makers to identify the right policy at the right time. More and timely data is therefore important. A better quantification of gaps is needed for policy makers to be able to distinguish between true "market failures" versus the lack of a viable market. Policy interventions when, there is no possibility of creating a self-sustaining market, will end up being no more than an inefficient form of subsidy.

7.5 Data challenges

The lack of reliable data on seed and early stage financing can be a barrier to the effective evaluation of programmes in terms of overall impact in the economy. Firms receiving support are not always tracked accurately by the implementing agencies. Commercial databases focus on venture capital and only include some angel financed deals (those in which VCs were also involved). In addition, these databases do not accurately capture all of the relevant elements of equity financing deals, particularly those at the seed and early stage.

It is clear that further work is needed to improve methods and accuracy of data collection for seed and early stage investment in general. Surveys of firms and mappings of individual investments are perhaps the most effective but are time consuming, costly and difficult to implement effectively.

While data is a key factor for a successful evaluation, it is also a major cost component. Therefore, a cost-benefit analysis of whether large scale evaluations are warranted for relatively small programmes is certainly a good practice. The resources employed in the evaluation should be in line with the risks, scale

and profile of the policy (HM Treasury, 2011). In addition, evaluations in SES financing usually require a combination of different statistical methods. Common challenges include the identification of causality and indirect effects. A cost benefit analysis should be done in terms of whether a large scale evaluation is warranted for relatively small programmes.

Another key issue concerns definitions. The technical definition of venture capital, in terms of which investment stages should be included in the data collection, is defined differently in different countries. This can lead to inaccurate comparisons of venture capital, especially the seed and early stage component, across countries. The definitions of angel investors can also vary with the words "business angels", "informal investor" and "informal venture capital" being used interchangeably. Angel investors, who do not have a personal connection to the entrepreneur prior to making an investment, are typically (but not always) differentiated from founders, family and friends. Some studies use total informal investment (founders, family and friends plus angel investment) and others use only angel investment. This complicates data analysis as angel investment measures used in one study might not be comparable to those in another.

In summary, evaluation of seed and early stage financing policies is complex for many of the reasons highlighted above. In addition, the time/cost benefit for evaluation of these relatively small (compared to others) programmes might not warrant an extensive evaluation process. Even when evaluations are conducted, it can at times be unclear what the final metrics actually mean and whether appropriate counter factuals have been taken into account.

8. Conclusions

Support for seed and early stage financing programmes increased in OECD countries between 2008 and 2012 as the financial crisis has dried up traditional sources of financing at the seed and early stages. Despite the growth of these programmes, evidence on the impact of such financing instruments is not conclusive. Analysis should include both qualitative and quantitative measures and, to the extent possible, assess the broader policy mix and not just individual instruments. Further exploring quantitative approaches to the analysis of seed and early stage financing using micro-data, where feasible, could be valuable.

The design and implementation of financing policies vary greatly across OECD member countries. These details often make the difference between success and failure of the programmes. Further sharing between policy makers about how and why policies work could be helpful. The four OECD financing policy workshops, hosted by Norway, Switzerland, the Netherlands, and Sweden have provided a useful platform for the sharing of seed and early stage financing policy experiences. Member countries have expressed an interest in turning this into an on-going dialogue which may also facilitate further international research and collaboration.

While policy makers may talk about addressing the financing challenges for young innovative firms, often their policy objectives are linked to economic growth and job creation or potential broader spill-over effects in terms of innovation. It is important that the specific policy objectives for each intervention are clear in order to determine what type of data and evaluation might be needed to monitor the impact of the policies and adjust them as necessary.

Policies often focus on the supply side when some of the key barriers are on the demand side. Further work on the demand side may be warranted, including a focus on the different models of public and private programmes in these areas. In particular, it would be helpful to better understand barriers to firm growth and how to most effectively facilitate the scaling of young innovative firms.

Framework conditions have been shown to have a significant impact on financing and firm dynamics and could be further examined. In addition, the impact of regulations, including the potential unintended consequences on the financing and growth of firms, might be further analysed.

Additionally, the construction of monitoring indicators that allow cross-country comparisons of not only of the supply-side, but of the full policy mix, including demand and framework conditions could be a venue for future work. Develop a mapping of how the policy mix has evolved in different countries and determining what drove those changes could be an important tool for policy guidance.

Given the increasing reliance on public sector funding in the seed and early stage market, more emphasis should be put on initiatives to attract institutional investors as well as on various equity risk-sharing arrangements between public and private investors. Further research on the dynamics between public and private investment in seed and early stage financing could also be useful.

There is also interest in exploring how firms go through the financing system and which types of support they use. Often the same companies receive support at multiple stages so it could turn out that not as many companies are really supported as policy makers might think. Analysing the implications of firms benefiting from multiple support schemes could be useful.

Policy interest in seed and early stage finance remains high. A number of lessons have been learned from past experiences in OECD member countries, however, there is still much more to be shared, evaluated and analysed. There are significant differences in firm dynamics, financing and growth of firms across OECD countries and therefore further work in these areas could be useful.

NOTES

[1] https://www.innovationpolicyplatform.org/

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