

## Venture capital

This section explores the role of venture capital in financing innovation and helping build innovative businesses. It provides a description of what venture capital is and how it works and its advantages and disadvantages. It then outlines the different types of policy instruments used (government funds, co-investment funds, fund-of-funds models) and provides examples of successful, and relatively less successful, interventions.

*What it is.* Venture capital firms are fund managers that invest in companies with high growth potential. These tend to be newer firms that need capital to grow but do not have a significant asset base, strong cash flows, or a long credit history that would allow them to raise debt finance. The distinguishing feature of investee businesses is their potential to grow exponentially in size and value if successful (Barry et al. 1990).

Venture capital funds are raised from institutional investors (for example, pension funds and insurance companies) and wealthy individual investors and are usually managed via partnerships. The VC managers of the fund are described as general partners (GPs) because they manage the fund and are liable for its legal debts and obligations. The investors are described as limited partners (LPs) because their liability for debts and obligations is limited to the amount of their investment in the fund. LPs are passive investors because they are precluded from getting actively involved in the management of portfolio companies.

*Characteristics.* Several factors set venture capitalists apart from other types of funds and financial intermediaries and make them particularly suitable to invest in young innovative firms with high risk but also high potential.

Before investing in a business, a VC firm conducts a thorough analysis to gain a detailed insight into the business's strengths and weaknesses, its growth potential, and the prerequisites for achieving this growth. This includes assessing the originality of the potential intellectual property, evaluating the risks of imitation, and examining the market conditions (Florida and Kenney 1988). Because of this strict filtering process, even if venture capitalists usually receive a large number of proposals, they only invest in a small minority.

If its assessment is positive and the VC fund decides to invest in the firm, its shareholdings are typically in the form of preferred stock or convertible notes, giving additional control rights. The VC fund will generally join the investee board and participate in the decision-making process of the company, and, under certain circumstances, they may also be able to impose the replacement of the management of the firm (Kaplan and Stromberg 2003). Investment is usually provided in tranches and only when particular milestones have been met.

To have diversified portfolios and ameliorate the high-risk nature of their investments, VC funds make a number of investments. Most expect a few very successful investments to balance out the negative returns from the rest of the portfolio. They can invest in firms at several stages of the innovation cycle, although most of their recent activity has focused on later-stage investments. VC funds often co-invest with other VC funds, and, unlike in private equity investment, they usually have minority shareholdings in their investees, with founders, management, business angels, and other VC funds as the other co-investors.

VC funds have a relatively long-term focus, since they are based on a model of ten-plus-two years, which means they run for at least ten years with the possibility of extending for another two if they have not divested all their investments. The closed-end nature of most VC funds, whereby investors must commit their investments for the length of the fund and cannot redeem them early, makes this a long-term bet for investors, but it also allows investee businesses the time to develop without the threat of key investors withdrawing their liquidity at any point.

The usual investment cycle is for funds to invest over the first five to six years of the fund. New investments are not made as the focus moves to growth and exit, although follow-on investments will occur in some investees in the later years. Many viable investments require more than one round

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of capital raising, so funds need to divide their resources to cover both initial and follow-on investments.

Most investments are held on average between five and seven years and, given their nature, are quite illiquid (another reason the sector is riskier than others). Some are held for much shorter periods, either because it quickly becomes apparent that growth prospects are low or because an exit becomes available. Others are held for longer, either because some technology areas take a considerable time to reach the market (for example, pharmaceuticals) or because economic conditions make it difficult to realize value. The recent financial crisis lengthened the holding time of many investments because capital became very scarce, general economic conditions made it hard for new businesses to grow quickly, and the market conditions for exits were poor.

In popular culture, venture capital investees are matured to the point where they are launched via an IPO or stock market launch. In reality, IPOs are extremely rare. Many investments do not succeed and are closed down (albeit quietly and in an orderly fashion). For the minority that continue to grow, the exit strategy can be via an acquisition by a larger firm, a merger with a competitor, or a buyout by managers in the business.

*Advantages and disadvantages.* Venture capital funds can play a crucial role in helping firms innovate (Florida and Kenney 1988). Kortum and Lerner (2000) examined the effect of venture capital on patented inventions in the United States across twenty industries from 1965 to 1992. Controlling for R&D spending, they found venture capital funding increases patenting rates: “A dollar of VC is three times more effective in stimulating patenting than a dollar of corporate R&D.” Venture capital represented only 3 percent of corporate R&D from the late 1970s to the mid-1990s, but the funds accounted for 10–12 percent of privately funded innovation in the United States.

In addition, VC-backed firms’ patents more often lead to breakthrough innovations, as they are more frequently cited by other patents, and venture capitalists, at least in Silicon Valley, are more likely to fund innovators rather than imitators (Hellman and Puri 2000). The location of VC activity also matters when considering its benefits, however. For instance, the evidence shows the European VC industry was not as important as the U.S. industry in fostering innovation (Popov and Roosenboom 2012).

Venture capital is often described as “smart capital,” as venture capitalists can benefit their investee companies in several ways beyond the provision of capital. These benefits include assisting with business planning and strategy, mentoring the managers, providing strategic, technical, commercial, and legal advice, improving corporate governance, helping to recruit key staff, and making connections (Gans et al. 2002; Gorman and Sahlman 1989). In some cases, they will step into their investees and work for periods of time, and they usually sit on the board. They also create networks of collaboration among investors, universities, R&D centers, large and technologically oriented firms, small entrepreneurs, and skilled workers (Florida and Kenney 1988). This provides venture-backed companies an advantage over other firms, increasing their chances of success.

It is less clear that venture capital is always perfectly aligned with related policy goals of governments. Even though they are long-term investors, venture capitalists ultimately want to exit their investments on financial terms that are most advantageous to themselves and their investors. In some cases this will involve a sale and/or move of the business overseas, which may not be the option preferred by governments. Policymakers usually want to see businesses, particularly if they have received taxpayer support, growing domestically or, at least, retaining a significant amount of value-adding activity locally. Also, some argue that venture capital receives too much policy attention, given the small number of firms it funds, and that some (though not all) of this attention should be redirected toward other sources of funding, as well as toward improving the wider innovation ecosystem.

Finally, VC returns have been very low since the dotcom bubble burst (Lerner et al. 2011). Aside from some star funds, most VC funds struggle to make positive returns and, thus, raise additional funding from private investors. Consequently, the proportion of government capital as a proportion of all capital raised by VC funds is rising in most countries around the world. As an example, in 2007 government agencies accounted for less than 10 percent of investment in European venture capital,

while by the first half of 2011, this had grown to over 55 percent. There is a debate on whether this underperformance relative to other asset classes is a structural issue that calls for revising the whole model or is the result of cyclical factors and thus will improve over the next couple of years as exits are made.

*Policy interventions.* Venture capital plays an important role in supporting risky ventures that provide a path to market for nascent technologies, until the point where they have been effectively “de-risked” and become suitable for mainstream actors. Therefore, they contribute to reaping the benefits of R&D investments that might have been supported by the state, with the potential growth benefits this entails for an economy.

Two market failures can serve as justification for government intervention to increase VC activity in an economy. The first is coordination failure. A VC industry will fail to develop in a region unless it has a good pipeline of promising startups, business angels to back them in their earlier stages, and lawyers able to negotiate VC deals and IP agreements, as well as sufficient experienced investment professionals, developed exit markets, and a supportive regulatory and fiscal environment (among other conditions). Yet many of these will not emerge without a developed venture capital industry in the first place. Given that place and history matter, building a functional market may require temporary support from government, until the “system” is fully developed and hence self-sustaining. This highlights another lesson: trying to promote a VC capital industry by providing financial support to VC funds is unlikely to be successful if measures are not also put into place to develop the whole ecosystem.

A second potential rationale for public intervention in VC is the positive externalities from the innovation activities generated by the investee companies. While this could be a justification for a permanent intervention to support VC activity, some argue the benefits from doing so may not outweigh the costs, given the existence of government failures. Another rationale often used to justify public intervention is the so-called “equity gap.” For small VC deals, the cost of the due diligence required to select which companies to invest in may be too high relative to the potential reward, so VC funds have progressively refocused toward larger and later-stage deals, creating an “equity gap” that leads to suboptimal investment in early-stage companies (see Box 8). As discussed earlier, however, this market failure arising from asymmetric information is not a sufficient rational on its own for public intervention<sup>1</sup>.

**Box 8. UK Regional Venture Capital Funds—The Mixed Record of Policy Intervention**

The Regional Venture Capital Fund (RVCF) program was launched in 2002. It established regionally based venture capital funds for which most investment was provided by the private sector. It was meant to demonstrate to potential investors that commercial returns could be made by funds investing in the equity gap, so that future funds could have less government subordination, and risk capital to growing small businesses could increase without displacing other activity in this part of the market. Nine funds were established, with the British government supplying approximately £75 million of the total £226 million of capital. Each fund was subject to strict investment limitations, which affected the spatial diversification and capital provision of the portfolios.

The investment returns of the Regional Venture Capital Funds have been poor, with much of the blame being placed on their design. Furthermore, 36 per cent of the amount invested went to management fees. The design affected the funds’ ability to get access to good-quality deals; the timing of investments; their geographical coverage; their sizes; and their ability to make follow-on investments and to exit individual investments on a timely basis.

The pool of viable business propositions targeted by the funds was restricted in some cases by investment criteria—for example, by their regional focus and the total allowable investment limit for a business of £500,000, which restricted the size of initial and follow-on investments.

Source: 2009 National Audit Office, Venture Capital Support to Small Business.

Governments can use a range of different mechanisms to support the provision of venture capital

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and build local capability within the sector:

1. *Capacity building*: Governments can try to build the capacity of the VC market with several types of measures, such as by attracting foreign experienced funds to operate in the region, building more connected networks, or supporting entrepreneurs to become investment ready.
2. *Tax incentives*: As with business angels, many governments have created specific tax incentives to reward individuals (or corporates) that invest in VC funds to increase the supply of investment into innovative businesses. The incentives can take a number of forms, which have been discussed in more detail in an earlier section<sup>2</sup>.
3. *Government-run VC funds*: Governments have directly established, financed, and managed VC funds, which in theory operate in similar fashion to private VC funds. In Europe these have often been underpinned by structural adjustment funds, and they often have a regional focus. They were often the first attempt to create a venture capital industry in many countries, but the regional focus has limited the scope and quality of deal flow, and the personnel may not have been first class. Consequently, their performance has often been poor.
4. *Fund of funds*: A model used in various areas of the finance industry, fund of funds involves a government establishing an overarching investment instrument with a significant allocation of capital, which then co-invests in existing or new private sector VC funds. This allows government to spread investment activity among several different funds that potentially have different business models and different investment/sectoral/geographical focus. This promotes diversity in the market and should enlarge the pool of experienced fund managers.
5. *Co-investment funds*: Similar to those used to encourage business angel activity, co-investment funds typically work by matching public funds with those of private VCs, investing alongside them. This approach leverages private money with public funding while keeping investments commercially focused by following the lead of private investors.

The OECD recently surveyed its members about their use of these types of equity investment measures and found the following (Wilson and Silva 2013):

- These programs have been increasing in the past five years, especially funds of funds and co-investment funds. Thirteen out of thirty-two OECD countries indicated they have direct public equity funds, twenty-one out of thirty-two have fund-of-funds programs, and twenty-one out of thirty-two also have co-investment funds in place.
- Around 45 percent of the programs have sector requirements (some targeting specific sectors—usually information and communications technology, biotech, and clean tech), while most have geographical restrictions, requiring the investee firm to be headquartered in the home country (58 percent) or, often, in a particular region within the country (37 percent).
- Half of the instruments focus on a specific stage, which is often seed (83 percent) and/or early stage (79 percent), even if they allow follow-on funding rounds (93 percent). Only a few have investee age requirements (27 percent), but investee size requirements are common (66 percent).

Several precautions should be taken when intervening in the venture capital market. First, interventions should neither be too small, since their impact is minimal, nor too large, since they may have counterproductive effects, not only crowding out current investment but also damaging the future development of the VC industry. Without additional investable propositions, more public money may only reduce the opportunities available for private venture capitalists (assuming any exist), reducing their returns and thus forcing them out of the market or making it more difficult for them to raise follow-on funds in the future.

Second, delegating to professional investors the decisions on what companies to invest in and leveraging private funding is considered a more effective approach. In other words, rather than setting up publicly owned venture capital funds, using a fund of funds (assuming the market is large

enough to justify one) or a co-investment model is considered preferable, even if the design, management, and incentive structures of these instruments also play a determining role.

Governments generally need to build capability to manage any equity investment activity, and most establish specialized financial institutions to do so. The performance of any equity investment vehicle is almost completely dependent on the effectiveness of the fund managers, so the process of selecting the fund manager is the key stage of the process. But making this selection is extremely hard—early-stage equity investing is new, and most potential managers will either have poor records or no records at all. The instinct is often to fund financiers/bankers as fund managers; experience indicates, however, they can struggle to adjust to early-stage investing and often try to take their funds “back” into later-stage funding, where they are more comfortable.

The design of equity instruments is subject to policy tensions. The desire to see commercial returns (or at least some returns) from taxpayers’ investments and to build a local equity finance sector does not always align with the desire to see innovation commercialized and innovative local SMEs grow. Venture capitalists are looking for exits, and if this means selling a promising SME that is commercializing public sector research to an overseas company and seeing it move offshore, they will do so.

The ability to attract private co-investors is also highly sensitive to the incentive structure offered by fund managers in relationship to both capital returns and profit (particularly whether capital protection or preferred treatment on capital returns is offered). So policymakers are frequently called upon to allow co-investment funds to offer highly preferential treatment to private investors. This presents a policy challenge, however: how much should governments underwrite private investors’ risk? The Yozma fund (discussed in Box 9) delivered excellent returns to its investors in the 1990s, and its general model has been widely copied. As is explained in the box, though, Yozma occurred at a specific time in a specific ecosystem. Very few other co-investment schemes in the world have ever delivered the level of returns Yozma achieved.

#### **Box 9. The Yozma Fund—The Mixed Record on Policy Intervention**

The Yozma story relates one of the most successful interventions ever to foster the venture capital industry and promote innovation by high-tech firms. Various factors contributed to its being the right scheme at the right time, however. First, Israel had started to provide significant support to business sector R&D in the late 1960s, which started to build the potential investment pipeline. The massive immigration of professionals from the Soviet Union in the early 1990s and the laying off by the Israeli military industry of hundreds of aerospace engineers provided a large pool of technology workers and potential entrepreneurs. Interested in promoting the expansion of high-tech industry and taking advantage of this human capital, the government was convinced that the development of a competitive VC industry was an essential precondition to increasing innovation and growth. Domestic private capital did not give enough support to innovation, and foreign investors were not willing to allocate funds without guarantees of returns. This created a challenge for the expansion of Israel’s high-tech industry, which the government was keen to address.

In 1993, the Yozma program was launched, with the goal of creating a critical mass of venture capital investment, attracting foreign financial investors and promoting knowledge creation to perpetuate the industry without government support. The program was based on a US\$100 million government-owned VC fund with two objectives: to invest in private VC funds and to invest in high-tech Israeli companies. The government decided to direct US\$80 million to the first objective and the remaining US\$20 million to the second. The target level for private capital was US\$200 million to US\$250 million.

Source: Avnimelech and Teubal (2002a, 2002b, 2004).

Regardless of which particular design is chosen, policymakers must to try to ensure their domestic equity investment industry has well-developed international links, is benchmarked against international norms, and attracts international investors. This is important not only because the path to market for many innovative investees will be international, but also to ensure the local managers



are operating at global standards of practice. Governments can also use multiple approaches within the same instrument to assist different elements of the ecosystem and diffuse risk. The description in Box 10 of the Tech-based SMEs Venture Capital Introductory Fund from China provides one example.

As with other forms of financial intermediation, public funding is only one contribution governments can make to the success of the industry. Venture capital is a global industry with global norms, and investors are far more comfortable operating in countries whose laws reflect these norms and whose institutions can effectively enforce them in an efficient but not burdensome manner.

### Design and implementation observations—equity investment instruments

Instrument	Observations
Government-run VC funds	<ul style="list-style-type: none"> <li>- Introducing this instrument may be necessary if there is no history of or infrastructure for early-stage equity funding and private sector investment is unlikely.</li> <li>- Policymakers need to be realistic about expected returns, given that early-stage equity investing is a learned skill and the record of investment returns of these types of funds has been poor.</li> <li>- The record of regionally focused funds in particular has been bad, and new schemes should learn from these lessons. If a fund is to be regionally focused, they need to be realistic about whether deal flow is sufficient.</li> <li>- It is important to establish funds on commercial lines, with commercial incentives and commercial independent management.</li> <li>- Governments need to develop or buy specialized capability to manage these types of schemes rather than rely on career bureaucrats.</li> </ul>
Co-investment fund	<ul style="list-style-type: none"> <li>- A co-investment fund enables fund managers to leverage government funds to raise private capital, with fund managers making all the investment decisions on commercial terms.</li> <li>- Robust mechanisms are needed to select potential funds. Selecting fund managers is extremely hard—early-stage equity investing is new, and potential managers will either have poor records or no records. The selection process should, then, involve extensive due diligence and expertise.</li> <li>- This assessment capability is highly specialized, so governments need to develop or buy specialized capability to manage these types of schemes rather than rely on career bureaucrats.</li> <li>- The instinct is often to fund financiers/bankers as fund managers; however, experience</li> </ul>

	<p>indicates they struggle to adjust to early-stage investing, as it involves a different skill set than is usual for them.</p> <ul style="list-style-type: none"> <li>- It is important to try to ensure funds have international links and are benchmarked against global performance standards.</li> <li>- The ability to attract private co-investors is highly sensitive to the incentive structure offered to them around both capital returns and profit (particularly whether capital protection or preferred treatment on capital returns is offered). This presents a policy challenge: how much are governments prepared to underwrite private investors' risk?</li> <li>- A healthy funding ecosystem has a mixture of funds with different business models. Funding is also needed at the different stages (seed/startup/growth) so innovative businesses can continue to grow.</li> <li>- The traditional model of the ten-plus-two-year, closed-end fund making equity investments, with fund managers taking a 2 percent annual management fee, is being challenged by other, more flexible models. If they have some experience, policymakers should not be overly prescriptive regarding what model funds should use but should focus instead on the investment outcomes.</li> <li>- Policymakers and government stakeholders need to accept that many investments will not be successful, and most will take many years to exit.</li> </ul>	
VC fund of funds	<ul style="list-style-type: none"> <li>- See above</li> <li>- A fund of funds can be a mechanism to spread the investment activity among several different groups who can have different business models and investment/sectoral/geographical focuses.</li> <li>- This promotes diversity in the market and builds a larger pool of experienced fund managers.</li> <li>- The goals of generating commercial returns, building a venture capital industry, building the local ecosystem, and building innovative local SMEs do not always align, which can generate policy tension. Objectives and expectations need to be clear.</li> <li>- The performance of any equity investment fund is almost completely reliant on the effectiveness of the fund manager, so the</li> </ul>	

	<p>process of selecting the fund manager is the key role of a fund of funds.</p> <ul style="list-style-type: none"> <li>- A government needs to build or buy specialized capability to manage a fund of funds rather than rely on career bureaucrats.</li> <li>- Countries need to have sufficient deal flow to justify multiple funds.</li> <li>- Design features can include recycling returns to the government into new funds, enabling a degree of self-sustainability.</li> <li>- The fund of funds is sometimes integrated into a broader finance organization (for example, a business development bank), which offers a range of financial support through a variety of instruments.</li> </ul>	
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### Notes

- <sup>1</sup>See Bravo-Biosca (2014) for further discussion.
- <sup>2</sup>See the discussion on policy interventions in the business angels section.

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 Government support for private finance for innovation  
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