### The rationales for public sector intervention to support finance for innovation

Markets generally provide less finance for innovation than is socially desirable, which provides a justification for government intervention.[[1]](#footnote-1) Specifically, markets underinvest in innovation for several reasons (even if, as discussed below, the severity of market failures can vary, depending on the stage of the innovation process):

1. *Asymmetric information:*Information about the likelihood of success of a particular innovation project is not only limited, but asymmetric. The entrepreneur (or firm) looking for finance has more accurate information than potential investors about how promising an innovation project is, as well as about the entrepreneur’s effort and choices when developing it. This leads to two classical sources of market failure:
   1. *Adverse selection****:*** If banks don’t know the default risk of a particular borrower, they can only price a loan based on the average default risk. As a result, low-risk borrowers face higher interest rates than they would if there were perfect information, and they may choose not to seek loans. This increases the risk of the remaining pool of borrowers, since those who are willing to pay high interest rates are usually also high-risk. Therefore, this pushes up the interest rate the bank needs to charge to break even, which in turn may discourage lower-risk borrowers from applying for funding, increasing again the default risk in the remaining pool. Adverse selection affects equity finance, too. The firm issuing equity has better information on its value than potential investors, so it will seek to raise finance when stock markets overvalue the company and try to avoid it when the stock is undervalued.
   2. *Moral hazard:*Banks cannot perfectly monitor the activities of the inventor after the loan has been approved. As a result, an inventor may be tempted to take on a more risky project than what had been originally agreed upon, since in case of success he or she gets of all the upside, while in case of failure the loss is capped. Moreover, if the firm is close to being in financial distress, the cost for the inventor of taking on additional risk becomes negligible, which can lead to the inventor’s choosing recklessly risky projects. In other words, debt may induce firms to take on more risk than optimal, although it may also have the opposite effect. Specifically, debt can have a disciplining effect in comparison to equity, since monthly payments and the possibility of losing control in case of bankruptcy can help focus an inventor’s mind. Equity fundraising is subject to moral hazard due to the corporate governance issues created by the separation of ownership and control. In short, inventors have the incentive to undertake projects that benefit them even if they don’t maximize profits, and external shareholders may not be able to observe easily whether inventor behavior is deviating from that which maximizes shareholder value.

The outcome of adverse selection and moral hazard is that projects with positive net present value (NPV), which inventors would choose to undertake if they had enough money, may fail to attract sufficient external capital and thus not be developed.

1. *Externalities****:*** Innovation activities generate spillovers, since inventors rarely can fully appropriate the returns their innovation activities generate. Inventors can use intellectual property, secrecy, or first-mover advantage, among other strategies, to capture the returns from their innovation activities. They cannot, however, prevent other firms’ learning from both their successes and failures (which can also provide valuable lessons) and replicating, fully or partially, some of their successes, whether by launching similar products or services or adopting similar processes or business models. As a result of these spillovers, the social return to innovation investment is higher than the private return, and markets invest less in innovation than is socially optimal. This market failure is a common rationale for several innovation policy interventions, such as R&D tax credits, which aim to close the gap between social and private returns to R&D by increasing the latter.
2. *Coordination failures:*Innovation activity happens within a “system,” with different actors and networks as well as underlying infrastructure and institutions. Entrepreneurs come up with ideas, investors back them with their funding, and the new firms try to attract talent, suppliers, partners, and customers. If successful, they expand, go through an IPO, or are acquired in a profitable trade sale. Most (if not all) parts of the system need to be in place for it to function well, and missing parts may not emerge if some others are missing. This creates the typical chicken-and-egg problem and is one reason clusters are so difficult to replicate.
3. *Institutional failures****:*** To work, markets require a set of well-functioning institutions. While not a market failure in a strict sense, an institutional failure can severely damage access to finance for innovative firms. Individuals will not invest in building innovative businesses if property rights are not guaranteed and their firms can be confiscated. Inefficient contract enforcement leads to relationships between different parties being governed by trust rather than contracts, making it more difficult to raise funding beyond family and friends. Inefficient bankruptcy regulation reduces the recovery value in case of financial distress, discouraging the provision of credit in the first place. IP markets and IP-based lending cannot really develop without an efficient intellectual property rights (IPR) system, while banking regulation and accounting standards can also have an important impact.

The market failure rationale is not the only possible justification for government intervention in access to finance. Another approach commonly used by policymakers considers instead the innovation system and its failures. The innovation system consists of the set of actors, rules, and relationships that interact in the innovation process. System failures refer to the components that are not working appropriately and therefore should be fixed, and they include, for instance, the institutional failures discussed above.

Access-to-finance interventions are sometimes justified as part of a mission-driven policy. Rather than “fixing” a market or system failure, the motivation in this case is to address a social challenge or develop a new industry. In other words, a government identifies a goal that is considered socially desirable (for example, reducing climate change) and designs a set of instruments to increase access to finance for innovations aimed at tackling it (for example, clean tech). In this case, finance is typically only one of multiple policy levers used to coordinate action toward addressing that particular challenge or goal.

The severity of some of these sources of failure varies along the stages of the innovation process. For instance, it is typically presumed (but not universally accepted) that externalities are higher in earlier than in later stages of the innovation process, when, in principle, firms are better able to capture the benefits from their innovations. Similarly, asymmetric information may be highest in the earliest stages, when concrete outputs are very few, than later on, when the specifications of an innovative product and its potential market are more visible to the financers. Consequently, the importance of the different market failures in every stage of the innovation cycle is discussed in their respective sections.

1. For a full discussion of the market and government failures associated with access to finance for innovation, see Bravo-Biosca (2014). [↑](#footnote-ref-1)