Supporting business R&D for green innovation

Vertical R&D support policies

While horizontal R&D policies have an impact on the overall rate of innovation, vertical R&D policies have the advantage of addressing precisely defined sectoral and technological opportunities by increasing the rate as well as the direction of innovation. If they favour green technologies, they can, in principle, both facilitate knowledge spillovers and address environmental externalities. However, there is the risk that too narrowly specified requirements will screen out potentially more radical innovations. For example, a funding agency will only fund a proposal if it meets the funder's requirements. To be eligible for funding, therefore, a firm is likely to submit a proposal that is more narrowly defined and likely to be incremental in nature.

Besides targeting less radical innovations, vertical R&D policies and long-term support usually imply higher transaction and administrative costs. Although targeted R&D policy is necessary for a system-wide transition, instruments to offset the weaknesses of this policy approach are also needed. For example, it would have been difficult for policy makers and experts alike to foresee the early uptake of wind technologies compared to solar or biofuels.

Prizes as incentives for private R&D

R&D can also be promoted through programmes that specify demand. Some governments have begun using technology prizes to induce R&D and innovation activities in green areas ignored by business. They can thus address a wide range of potentially relevant technologies and the uncertainties involved in both the technologies and their applications. For example, the US government promotes H-Prizes to seek breakthrough technologies in the hydrogen economy. The prizes can be modified in various ways to alter the outcomes and innovation effects. For example, to increase knowledge spillovers, the winning technology can be made available for licensing and diffusion. Prizes can also be made available for non-technological achievements, such as service innovations that enable firms to restructure their value chains or generate new types of producer-consumer relationships and also enhance environmental performance.

Although prizes may serve a useful role, their impact should not be exaggerated. They can also lead to duplication of R&D efforts, and up-front liquidity constraints can lower firm participation (Newell and Wilson, 2005; Scotchmer, 2004).

Instruments such as matching grants, where it is industry matching the government subsidy rather than the contrary, may allow public funders to screen proposals and to ensure that firms invest appropriately. Also, by inducing competition among applicants – through the use of various auction mechanisms – more information can be obtained about the proposals and some unnecessary funding can be avoided (OECD, 2010).

Financing green innovation and technologies

While all of the supply-side policies mentioned have a financial aspect, discussions of finance-related technology policy commonly refer to instruments aimed at improving the supply of risk capital via equity, debt, venture capital or changes in capital markets. Access to finance is particularly severe for actors pursuing green innovation, especially new entrants and start-ups. It is difficult to obtain funding at reasonable cost for an immature market with high capital intensity and relatively high risk. Apart from policy relating to debt and equity finance, governments can provide incentives through risk-sharing arrangements or public-private co-investment partnerships in order to overcome investors' resistance.

Institutional investors can provide much of the capital required for green technology and innovation.

They use different investment vehicles to access green projects via equity (including indices and mutual funds), fixed income (notably green bonds), and alternative investments (such as direct investment via private equity or green infrastructure funds). To tap into these large assets, governments need to provide clear and consistent policies and regulatory frameworks to signal credibility to potential investors. Institutional investors are not venture capitalists, however. They may look for potential investments with steady income streams and are therefore more likely to invest in established and mature technologies (Della Croce et al., 2011).

Policy can take steps to ease access to finance for new and innovative small firms, both with respect to debt (the prevalent source of external funding among all enterprises, including innovative firms) and equity finance. This could involve risk-sharing schemes with the private sector.

Seed capital and start-up financing, often involving business angel funds and networks, play a key role in enabling entrepreneurial individuals to turn new ideas into new products and applications. Having access to these services can provide more than just funding, helping start-ups to develop, and providing advice and on-the-ground manage- ment expertise. Government can foster such networks and associated markets. When public funds are deployed, they should be channelled through existing market-based systems and private funds, and shaped with a clear market approach. Policy should focus on using financial engineering approaches to develop the market for early-stage equity finance, rather than directly providing finance. This requires incentives to develop the necessary skills and experience in venture firms.

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Links
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