



INNOVATION POLICY FOR CROATIA

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Innovative capacity in Croatia

Modern growth theory identifies knowledge creation as a primary determinant of long-term growth (e.g. Aghion and Howitt 1998). Knowledge creation is meant to be both the acquisition of individual competences (human capital) and the invention and market introduction of hitherto unknown products and production processes (innovation).

As measured by the EU's Innovation Union Scoreboard, which quantifies innovation performance along 25 dimensions, Croatia is a 'moderate' innovator and falls into the third out of four categories, together with the Czech Republic, Hungary, Poland and Slovakia. With a low growth rate in innovative capacity, Croatia even runs the risk of falling into the lowest category, of modest innovators, in future evaluations (European Commission 2014). In fact, Figure 1 reveals that the absolute number of patents with the European Patent Office (EPO) as well as the PCT,¹ which can be seen as a measure of significant innovations, peaked in 2002 and 2003, respectively, and that the trend had been negative subsequently. In terms of fields of technology, patent applications filed with major international patent offices (EPO, PCT) over the past few years have been predominantly in the fields of pharmaceuticals and ICT.

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¹ PCT = Patent Cooperation Treaty. This system of 148 cooperating states allows applicants who seek patent protection in several countries to file one single international application. A PCT application is equivalent to a regular filing in each of the PCT contracting states (Intellectual Property Office 2015).

Božić (2011) investigates the reasons for the low innovation performance of Croatian firms, focusing on the decision to abandon or delay innovations. Based on data from the Croatian Community Innovation Survey in 2006, she examines the innovative activity of over 1,000 firms. The results suggest a number of constraining factors that play an important role in abandoning innovation projects in Croatia, including firms' lack of external and internal sources of financing, insufficient information on existing technologies, and the presence in many markets of a dominant incumbent that discourages innovation. Among the main reasons for delaying innovation projects are a lack of external finances and information, a lack of qualified personnel, and the unsuccessful search for cooperation partners in R&D.

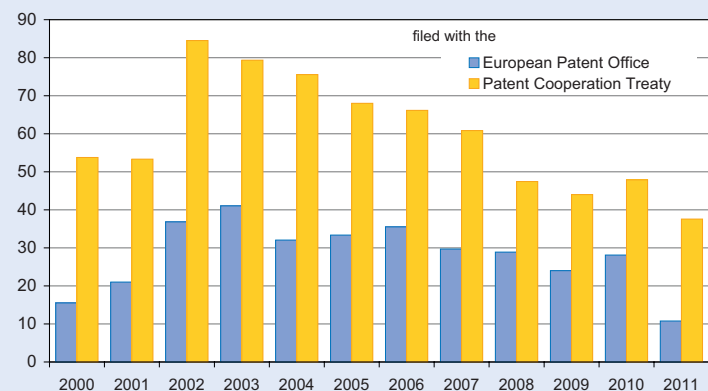
Leverage points for innovative capacity

Increase FDI

On average, multinational companies are generally more productive and innovative than domestic firms (e.g. Criscuolo 2005). Foreign direct investments can thus be a substantial source of technology transfer for transition countries, and they could help Croatia to move closer to the technology frontier. Figure 2 shows the relative, and increasing, role that foreign

Figure 1

Total patent applications from Croatian inventors^{a)} filed 2000–2011

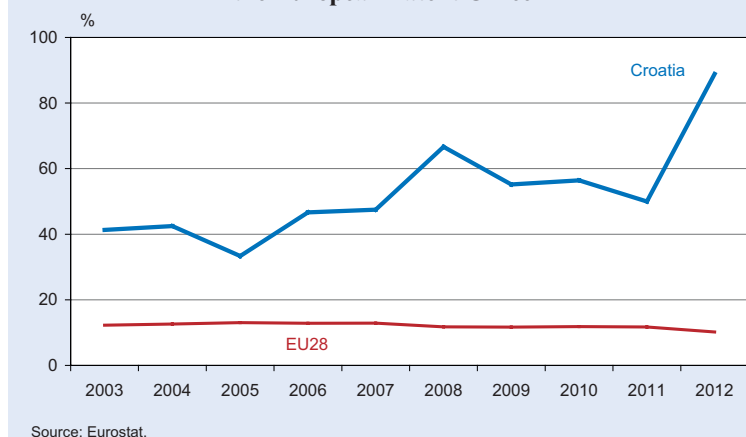


^{a)} Inventor's country of residence.

Source: OECD.

Figure 2

Foreign ownership of domestic inventions in patent applications to the European Patent Office



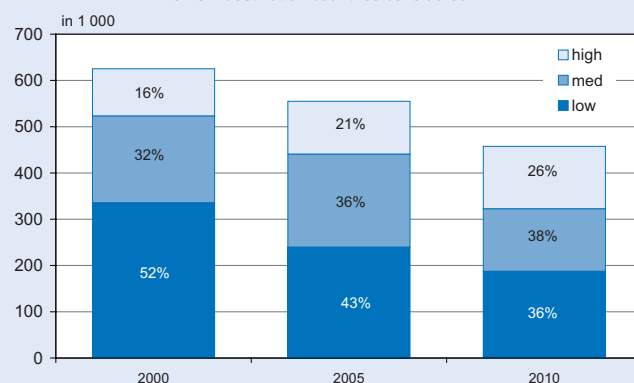
owners play in patent applications, especially compared to the EU average. Thus, the best innovation policy for Croatia is probably to undertake structural reforms aimed at improving the conditions for FDI.

Undertaking such reforms is probably also the best policy to prevent the flight of human capital. Croatia is suffering from brain drain, i.e. the phenomenon that highly skilled people leave the country, which may have severe consequences for the economy's future innovative capacity. In fact, while in the 2000s the overall, and still sizeable, number of Croats living in OECD countries has decreased, the share of highly-skilled among them has increased from 16 to 26 percent (see Figure 3). Policymakers should thus aim at creating favorable framework conditions in order to keep, and attract, human capital.

Figure 3

Brain drain from Croatia

Total number of Croatia nationals aged 25 years and older, living in each of the 20 OECD destination countries considered



Mobilize R&D expenditure in the private sector

Research and development expenditure is low in Croatia. In 2013, only about 0.8 percent of GDP was spent on R&D, compared to an average of 2 percent in the European Union (Eurostat, 2015). Between 2011 and 2013, Croatian expenditure in R&D was highest in the technology fields of engineering (39.5 percent), life sciences (21.4 percent), biomedicine and health (16.8 percent), and biotechnical sciences

(8.7 percent). Industry sectors with the highest R&D expenditure are pharmaceuticals, telecommunications, motor vehicles, manufacture of food and beverages, and computer programming. However, R&D funding is dominated by the public sector with comparably low R&D expenditure in the private sector. This development calls for policies that stimulate private sector innovation activities.

The What Works Center for Local Economic Growth at the London School of Economics performed an evidence report for R&D grants, loans and subsidies as well as R&D tax credits (What Works Center for Local Economic Growth 2015). The goal of this report was to collect rigorous evidence on the effectiveness of these measures in OECD countries. After reviewing around 1,700 studies, the authors found that only 63 studies met minimum standards of state-of-the-art policy evaluations, and that R&D grants, loans and subsidies can positively impact private R&D expenditure, although the effects

are not always positive since public support might crowd out private investment. R&D grants, loans and subsidies are more likely to improve outcomes for small to medium-size companies than for larger ones. Programs that emphasize collaboration perform better than those that just support single private firms, while those that target particular production sectors tend to do worse in terms of increasing private R&D expenditure and innovation, compared to those that are

sector-neutral. Also, R&D tax credits can positively impact private R&D expenditure whereby, in particular among small firms, given that they are likelier to face greater financial constraints, making them more responsive to changes in tax credits.

According to the international evidence, one means of stimulating private R&D expenditure in Croatia is R&D grants. Smaller grants targeted at Croatian SMEs across all sectors may be the right measure to kick-start R&D projects in SMEs. A focus could be on collaborative R&D projects. Furthermore, innovation vouchers that encourage cooperation between the applicant and a research institution may help SMEs to cross the bridge towards science and to facilitate knowledge transfer. R&D grants and innovation vouchers are relatively cheap measures compared to general R&D tax credits, in particular when the R&D tax credit is in proportion to the level of the expenses instead of to the increment of R&D. Therefore, in a strained-budget situation such as that prevailing in Croatia, R&D tax credits might not be the right choice for the country.

Another means of simulating private R&D expenditure in Croatia is an increased public procurement activity, as shown in an evidence report prepared by Falck and Koenen (2016). These so-called demand-side innovation policies, such as public procurement of innovation, can act as a pull-factor for private R&D expenditure. However, evidence also suggests that there is a high risk of public money crowding out private money, an effect that can be reduced by introducing competition for public funds. According to the World Economic Forum's Global Competitiveness Index 2014-2015, Croatia ranks 129 (out of 144) in the public procurement for technological products to increase demand for innovations. The drawback of such procurement policies is that they do not alleviate the pressure on the public budget. In addition, just as it is the case with R&D funding, discretionary decisions on which technology fields to promote must be based on sound evaluation of the internationally competitive potential of Croatian industries. In this context, public procurement of innovative eGovernment solutions could generate a double dividend for Croatia by increasing the efficiency of the public administration and increasing private R&D in a technological field with high potential for spillovers.

Summary

Croatia risks sliding down to the category of 'modest innovator' in the European Union. In order to increase Croatia's innovation capacity, a combination of both the right framework conditions and an active innovation policy that mobilizes R&D expenditure in the private sector seems appropriate. The structural reforms needed to attract FDI are one prong of a successful innovation strategy, since FDI generates knowledge transfer and creates opportunities for high-skilled Croats so that they are less inclined to leave their home country. The other prong includes measures of active innovation policy that do not overly strain the public budget. Sector-neutral R&D grants to SMEs, innovations vouchers and a well-designed public-procurement strategy of innovation are measures that have proven to be effective in increasing private R&D expenditure.

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