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POLICY BRIEF
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Open Source Software-policy can influence the global economy

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Open Source Software-policy can influence the global economy

Open Source Software has become an important knowledge asset in modern economies and has gained increasing traction in the last two decades. Considering its positive impact on the global economy, it is important to strengthen the skill base and the incentive to invest in Open Source Software.

The creation and provision of Open Source Software (OSS) is not a new phenomenon but it has gained increasing traction in the last two decades – more than 65% of firms are now using or contributing to OSS, according to the Black Duck Software Survey 2016. While this suggests that OSS is becoming a decisive production factor, its macroeconomic impacts are largely unknown. OSS has spurred both hopes of new potentials for economic growth but also fears of losing competitive advantages by causing spillovers to competing firms or economies.

A recent study shows that both effects are real. However, one should not overemphasize the risks since the macroeconomic net effect is, on average, positive – without contributions to OSS development, world GDP would be 2.2% lower. Moreover, investment in R&D as well as complementary patenting can reduce the risks of unintended spillovers further.

THE ROAD FORWARD FOR POLICY

Results from the study suggest different fields for effective policy action.

Strengthen the incentives to contribute

The companies' investments in OSS are often limited by fear of spillovers. However, the study shows that to reap the benefits of available OSS the companies' capacity to identify how they can benefit from this global knowledge pool needs to be strengthened through their own contributions to it.

Supranational coordination – for example at the level of the European Union – should be considered to increase OSS development. The already existing framework programs to support research and innovation, Horizon 2020 and Horizon Europe, could be further oriented towards OSS projects.

- Following the creation of OSS supported with public money, further measures could support its broad diffusion to exploit its positive public characteristics.
- Since we face different Open Source licenses, OSS created with public funding should be explicitly in the public domain so anyone can modify and use the software without any restrictions.
- It is also possible to introduce tax breaks for individual and professional contributors.

Increase the skill base

Contribution to OSS is resource-intensive and the development of **software skills** is an important factor both to absorb and contribute to OSS, which is necessary to exploit the synergies with R&D and patenting.

- Promote programs at Higher Education Institutions to include Open Source – development, business models, and licensing.

Start-ups are important players in the use and development of OSS. Despite the massive involvement of individuals and micro companies in OSS by the Member States of the EU, there is a lack of successful entrepreneurship in the EU.

- Provide relevant education, and establish a culture to foster Open Source based start-ups.

A STUDY OF HOW OPEN SOURCE SOFTWARE IMPACTS THE ECONOMY

The empirical study sheds first light on the economic contribution of OSS to GDP as well as the mechanisms by which such effects emerge. It is based on a cross-country panel from 2000 to 2018, including 25 of the largest EU countries plus the USA, Japan, Korea, Canada, China, Norway, and Switzerland.

Matching data from GitHub, the largest online repository for OSS, to OECD country level data, we find that OSS is

indeed a valuable production factor. However, it also has features of a public good leading to sizeable knowledge externalities. As a result, countries experience an increase in GDP when the world stock of OSS grows. However, they experience a decline in GDP resulting from their own contributions. The net effect is on average positive. If no country contributed to OSS development, GDP would be 2.2% lower in the long-run. For the EU, this corresponds to an annual GDP contribution to about US\$ 400 billion per year and for Sweden alone: approximately US\$ 15 billion.

An interesting finding is that smaller economies suffer more from spillovers compared to other countries because of the limited capacity to internalize external effects. That may be a risk for small open economies like Sweden. However, higher R&D and patenting intensities can help to reduce the GDP-losses associated with own OSS contributions.

KEY POINTS FOR POLICY

- National GDP increases when the world stock of OSS grows. However, increasing own contributions to OSS reduce the countries' GDP because of unintended spillovers. The net effect is nonetheless on average positive.
- Stronger national involvement in R&D and patenting activities can further reduce the risks of spillovers.
- To internalize the positive knowledge externalities and reduce free-rider situations, supra-national policy coordination, for example at the level of the European Union (EU), needs to be developed.
- Higher Education Institutions should promote OSS with respect to its development, the creation of OSS-based business models, and its licensing.

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The here reported figures are taken from the corresponding article Blind, K., & Schubert, T. (2023). “Estimating the GDP effect of Open Source Software and its complementarities with R&D and patents: evidence and policy implications.” *The Journal of Technology Transfer*, 1-26.

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