

# A longitudinal overview of the European national innovation systems through the lenses of the Community Innovation Survey

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## Abstract

For [Schumpeter \(1982\)](#), economic growth was related to the innovation of products and the continual development of the existing ones. The extent to which an economy is able to grow depends on both the favorable terms of trade and the degree of specialization in knowledge intensive products with higher value added (for [Economic Co-operation et al., 1997](#)). These characteristics, in turn, are determined by the ability of the policy makers to develop coherent economic policies which stimulate spending on R&D activities and increase the efficiency of the innovation process.

Prior to the development of policies, the policy makers are required to investigate the current and past structural features of the innovation activities, thereby unfolding the innovation system in the economy. A standard approach for performing this step is utilizing cross-sectional microdata capturing the innovation activities of the firms in the country. These data is then used to estimate the famous [Crépon et al. \(1998\)](#) (CDM) structural econometric framework to analyze the relationships among R&D, innovation and productivity.

The Community Innovation Survey (CIS) based innovation statistics, released by Eurostat, has been extensively applied for this purpose. Among others, [Hashi and Stojčić \(2013\)](#) have used the CIS4 version of the survey to show that larger firms are more likely to embark on innovation activities and invest more in innovation but innovation output decreases with firm size. [Ballot et al. \(2015\)](#) used this dataset to discover conditional complementarities between product and process innovations and between organizational and product innovations, and [Disoska et al. \(2020\)](#) implemented the dataset to highlight the differences in the innovation processes between different countries.

The major advantage of the CIS is that it is designed to provide statistical information on the innovativeness of sectors by type of enterprises, on the different types of innovation and

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on various aspects of the development of an innovation, such as the objectives, the sources of information, the public funding, the innovation expenditures etc. These statistics are broken down by countries, type of innovators, economic activities and size classes.

However, despite an abundance of studies that use various versions of the survey, investigations combining multiple CIS versions have been largely neglected. The only recent contribution is (Mairesse and Robin, 2017), where the authors use CIS data on french firms capturing three different waves of the survey (CIS3, CIS4 and CIS 2008) to assess the measurement errors in the CDM research–innovation–productivity relationships. The potential of longitudinal studies which evaluate the differences between the innovation activities and characteristics between and within countries, to the best of our knowledge, is yet to be exploited.

To bridge this gap, here we perform a detailed longitudinal analysis on the innovation performance in 15 European countries by using data for three waves of the survey: CIS 2010, CIS 2012 and CIS 2014. The temporal dimension of our dataset includes periods during the Financial crisis as well as the period after the crisis. As such, it allows us to fully evaluate the changes in the innovation processes within the countries during and after the crisis. Moreover, by dividing the countries into two groups depending on their level of economic development we are able to investigate the differences in the innovation activities between the countries.

We find that there is one driver of the innovation process whose validity is independent on the group to which a country belongs and the time period used for research – the probability for a typical firm to engage in innovation increases with its size. The other factors influencing the decision process differ. A firm’s productivity increases significantly with the innovation output, but only with firms operating in developed countries. We find that the recent financial crisis had an initial negative impact on the companies’ intensity to innovate in less developed countries. Subsequently, this suggests that, as the level of development of an economy decreases, the national innovation system becomes vulnerable, and in periods of crises higher level of innovation output results in lower labor productivity. We argue that these issues can be resolved only through a complete reconstruction of the national innovation systems in developing countries since the current one is unsustainable and fragile in times of economic crises.

**Keywords:** CIS, innovation systems, longitudinal studies.

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