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EXTENDED ABSTRACT

Title: Trickle Down from the Core, or Spillovers from the Periphery? The Equity-Efficiency Trade-Off of the European Cohesion Policy

Authors and e-mail of all: Javier Barbero[1], Francesca Crucitti[1], Nicholas-Joseph Lazarou[1], Philippe Monfort[2], and Simone Salotti[1]

{Javier.BARBERO-JIMENEZ,Francesca.CRUCITTI, Nicholas.LAZAROU,Simone.SALOTTI, Philippe.MONFORT}@ec.europa.eu

Department: 1: European Commission, Joint Research Centre, Seville, Spain
2: European Commission, DG REGIO, Brussels, Belgium

University: N/A.

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Abstract: The aim of the European Union's (EU) Cohesion policy is to reduce disparities between the levels of development of the various regions and the backwardness of the least favoured regions in order to promote its overall harmonious development. While the Cohesion policy investments specifically target the less developed regions with the purpose of reducing disparities, this may come at the expense of investing in other regions in which the returns could be potentially higher and more beneficial for the country as a whole. This opportunity cost is referred to in the literature as the equity-efficiency trade-off (see for example Farole, Rodríguez-Pose and Storper, 2011).

In an exposition of this circumstance, Crucitti et al (2021 and 2022b) while analysing the economic impact of Cohesion policy in Bulgaria and Romania, find that the capital city regions, which are also the richest and most developed regions in these countries, tend to exhibit the highest country-wide returns for Cohesion investment categories in human capital and in transport infrastructures compared to the country-wide returns of other regions. Yet these returns are mostly contained within the region itself, as spillovers to the least developed regions of the respective countries are weak. An equity-efficiency trade-off then emerges as disparities between the capital region and the rest of the country are amplified when attempting to achieve overall higher country growth.

On the other hand, support to private investment in the less developed regions, and non-transport infrastructures investments in Bulgaria only, yield the highest country-wide returns while also generating strong spillovers to other regions of the country. In this case an equity-efficiency trade-off does not exist as intra-country disparities decrease while a high country GDP impact is simultaneously ensured. Such a non-systematic observation of the equity-efficiency trade-off is reflected in the literature. Farole, Rodríguez-Pose and Storper (2011) and Begg (2016) note that its existence is inconclusive regarding EU regional policies, while Castells and Solé-Ollé (2005), find that infrastructure investments in Spain are efficient if managed by regional governments while political factors also play a role in the determination of the trade-off.

In this paper, we employ a tractable model of dynamic spatial general equilibrium characterised by increasing returns in sectoral production, CES preferences in consumption, costly trade, government and households to study the impact of demand or supply side EU Cohesion policy funding shocks. The model comprises 267 EU NUTS 2 regions of which we focus on 105 regions that belong to the nine peripheral Member States of Bulgaria, Czechia, Greece, Hungary, Spain, Italy, Poland, Portugal and Romania, all net beneficiaries of Cohesion policy funding and all having more than four EU NUTS 2 regions. While there are other Member States that are net beneficiaries, they have less than four NUTS 2 regions that do not permit the identification of meaningful intra country spillovers (for example Cyprus and Malta).

The model assumes production technology that is homogeneous within 10 sectors and is a constant elasticity of substitution (CES) combination from employing two factor inputs, labour and capital. Households have preferences for consuming a variety of final goods and services indexed by sector, which are described by a CES utility function. Households are also endowed with labour and capital income adjusted for tax and net transfers of income, and choose to allocate their disposable income between consumption and savings. Their supply of labour hours in the labour market is imperfectly competitive and the real income of labour is determined by their skill level and by the unemployment rate through utilising a static wage curve. Within regions there are governments which consume goods and incur capital expenditures which are financed through taxation. Goods and services can be traded within and across regions and countries and consumers can substitute consumption across locations. Trading across and within regions is costly, with transport costs modelled as an iceberg cost which is increasing in distance. In each time-period the gap between the optimal level of private capital which maximises firm profits and the observed level of private capital after accounting for depreciation, represents the amount of private investment.

The outcome is that in each regional economy, the equilibrium is characterised as an allocation of consumers' consumption and saving, of investors' decisions of investment and production, of firms' factor input and intermediate input bundles for each region and sector. At these allocations, prices of final and intermediate goods and services are characterised, all markets clear and the law of motion of capital is satisfied.

The shocks that we introduce to the model mimic the effects of policies and perturb the initial calibrated steady state affecting endogenous variables such as GDP, employment, imports and exports, consumption and prices across time, regions and sectors. Other

exogenous reasons of economic growth are omitted from the model. The model is solved in a recursively dynamic process, where a sequence of per period static equilibria is linked to each other through the law of motion of state variables. This implies that economic agents are not forward-looking and their decisions are solely based on current and past information.

Specifically, we focus on seven investment categories that represent different spending categories of Cohesion policy and an aggregate category to document the country-wide returns from investing a flat amount of €100 million in each category. We track and compare the impact of the seven in each of the 105 regions as well as the extent to which they impact other regions of their respective countries.

The positive funding shocks affect different economic channels of the model and the performance of the regions also vary depending on their initial economic conditions and endowments. By subjecting the model's regions to these equally sized heterogeneous and exogenous shocks we obtain the GDP impact for each euro expended, defined as the GDP multiplier. A shock may have effects that transcend the borders of a particular region due to trade flows and capital mobility. Hence, we obtain the differential between the regional multiplier generated by a particular shock and the corresponding country-wide multiplier. This difference represents the spillover. We collect the regional and country-wide GDP multipliers and study their interplay with the generated spillovers in order to assess under which circumstances a high level of country-wide growth and strong spillovers can simultaneously occur. In such a situation, equity and efficiency may be achieved as overall growth is maintained and disparities reduce.

We find that there is no systematic equity-efficiency trade-off across investment categories and regions of a country. The trade-off dominates in regions with high concentration of production that generate little spillovers elsewhere in a country. The driving mechanism of the results is the interplay between interregional and international trade. Investments in the richest regions cause an increase in the demand for intermediate goods which come mostly from abroad rather than from within the country, or the demand is covered through better re-allocations of firms' factors of production. Low intra-country imports are not sufficient to generate high enough spillovers for investments taking place in the richest region and consequently country-wide multipliers for these regions represent almost entirely the local multipliers. When these coincide with the highest multipliers recorded in the country the equity efficiency trade-off then dominates.

Such a situation, although beneficial for national GDP, amplifies regional disparities. On the contrary, when there is no trade-off, investments that directly target the less developed regions in a country have the capacity to promote overall country growth, while also reducing intra-country disparities. We find an almost certain existence of a trade-off when all investment shocks occur simultaneously in a region. This is simply a reflection of the behaviour of the local impact of individual shocks in the richest regions which are the capital city regions and production agglomerations. The fact that a simultaneous deployment of different types of investments causes equity-efficiency trade-offs within countries due to the domination of the individual shocks that produce

the trade-offs, offers policy implications regarding the deployment of cohesion policy funds at least in these Member States.

First, the simultaneity of these investments across regions and across types makes identification of the source of the trade-off and the extent of it difficult. Second, given that substantial spillovers emerge when investment is placed outside the richest region, regional needs regarding the types of investment necessary there as well as the extent of intra-country disparities should be incorporated in the decision to invest Cohesion funds. In this way, a more even geographical spread of funds has the capacity to produce substantial country-wide growth while also mitigating the disparities within countries, which can be achieved through delegated management of fund implementation and monitoring by regional governments in line with the suggestions of Castells and Solé-Ollé (2005).

Third, according to Rauhut and Humer (2020), the Cohesion policy, along with other EU policies targeting regional economic growth and development, can foster overall country growth through a cascading manner and should be placed in areas with agglomerations such that they disseminate to other ever-smaller agglomerations of a country. Our results do not lend support for this mechanism as investment categories such as transport infrastructures and labour market interventions across countries are associated with an equity-efficiency trade-off due to the high region-specific GDP impacts in regions with high concentration of production accompanied by little spillovers elsewhere in the respective countries. In this situation the placement of investment in these regions would prevent the Cohesion policy from achieving its mandate, as within-country regional disparities would increase, despite notable country GDP results.

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