

## R&I AND LOW-CARBON INVESTMENT IN APULIA, ITALY: THE RHOMOLO ASSESSMENT

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- The European Cohesion Policy supports eleven thematic objectives. Four of these are key priorities for the European Regional Development Fund: Research and Innovation (R&I), Information and Communication Technologies (ICT), SME competitiveness, and Low-carbon economy.
- The European Commission's Joint Research Centre (JRC) is supporting Apulia, Italy, with the design and implementation of Regional Innovation Strategies for Smart Specialisation (RIS3).
- Quantitative tools such as the RHOMOLO model could help evaluate the impact of funding programmes in different policy areas across European regions.
- R&I and Low-Carbon ERDF Investments aim at generating sustainable growth and supporting the capacity of regional economies to innovate in line with the Energy Union strategy and the EU's transition to a low-carbon economy.
- Policy simulations using the RHOMOLO dynamic CGE model show positive macro-economic effects of the ERDF investments related to the R&I and Low-carbon thematic objectives in Apulia both within the region and in its neighbouring regions.

### 1. Policy context

The aim of the European Cohesion Policy (ECP) is to achieve economic and social cohesion, that is to reduce the disparities between EU regions by promoting more balanced and sustainable territorial development.

In the Multi-Annual Financial Framework (MFF) 2014-2020, coordination and coherence between the ECP and other regional development policies of the EU have been strengthened via the common provisions for the five funds of the European and Structural and Investment funds (ESIF), that is the European Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund, the European Agricultural Fund for Rural Development (EAFRD) and the European Maritime and Fisheries Fund (EMFF). One third of the EU budget, slightly more than €370 billion (2011 prices), goes to the objective of economic, social and territorial cohesion, with more than half of that targeting less developed regions whose GDP is less than 75% of the EU average.

For the period 2014-2020, EU member states and regions are expected to actively support innovation within the context of Smart Specialisation. The ex-ante conditionality linked to the implementation of the R&I thematic objective (TO) of the ESIF, for example, requires that national or regional R&I strategies for smart specialisation (RIS3) include a monitoring mechanism in place and adopt a

framework outlining the available budgetary resources (European Parliament and Council, 2013). The role of innovation, however, is not simply confined to the R&I objective (TO 1), as innovation also contributes to other ERDF investment priorities such as ICT, SME competitiveness and the transition to a low-carbon economy (TO 2, 3, and 4, respectively).

Apulia is one Italian region whose GDP is about 4.4% of the Italian GDP and 0.5% of the EU GDP. Despite its relatively low industrialization rate, Apulia is active in terms of policy experimentation and participation to EU-sponsored interventions (IPRES, 2015). The RIS3 of Apulia established the framework for facing the actual and forthcoming innovation challenges by means of available territorial investments. Based on the objectives of supporting competitiveness by strengthening the regional innovative system, Apulia identified three key strategic areas: (1) sustainable manufacturing, (2) human health and environment, and (3) digital, creative, and inclusive communities.

The ex-ante macroeconomic impact assessment of the ERDF investment programme on R&I and Low-carbon in Apulia has been carried out by means of the RHOMOLO model. This spatial Computable General Equilibrium (CGE) model is parametrized on 267 EU NUTS2 regions and it has been developed for the purpose of territorial impact assessment (Lecca et al. 2018).

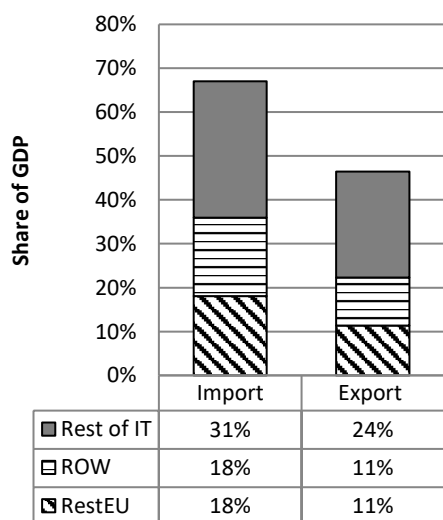
This Policy Insight refers to the ex-ante evaluation of the macroeconomic impact of the ECP 2007-2015 fully explained in Di Comite et al. (2018). This Insight reports only its main features and results.

## 2. The RHOMOLO simulations

Modern macroeconomic models such as RHOMOLO provide coherent and internally consistent frameworks to analyse the channels through which macroeconomic policies affect national and regional economies. In particular, RHOMOLO provides sector-, region- and time-specific results to support EU policy making and investment programs. The version of RHOMOLO model used for this analysis covers all EU NUTS2 regions, each regional economy being disaggregated into six economic sectors.

Public investments such as those funded by the ERDF affect the economic performance of regions by influencing demand, capital accumulation, productive capacity, and by generating spillover effects. The latter are due to linkages of one region with the rest of the EU regions via both trade and factor mobility. Apulia is a particularly open region in terms of trade, with exports and imports being equivalent respectively to 46% and 67% of its regional GDP (see Figure 1).

Figure 1: imports and exports as a share of regional GDP in Apulia, Italy



Such trade openness provides a first intuition of the potential impact of external shocks hitting the regional economy. Large inter-regional spillover effects from investments in this region can be expected.

Of all the ERDF investments planned in Apulia over the programming period 2014-2020, €338 million

are related to the R&I thematic objective, and €198 million are to be used to support the shift towards a low-carbon economy. The objective of the policy simulations with RHOMOLO is to understand how the economy would react to a given policy shock, in this case the EU-supported investments targeting the two aforementioned thematic objectives.

### The policy impact of this research

*An analysis similar to the one reported here, but broader in scope and without such a specific focus on Apulia, is featured in the Impact Assessment of the ERDF and of the Cohesion Fund published on the 29<sup>th</sup> of May 2018 (European Commission, 2018). Apulia is one of the eight regions receiving JRC support for the implementation of RIS3 and the development of a cross-cutting approach to grow and governance.*

## 3. Main results

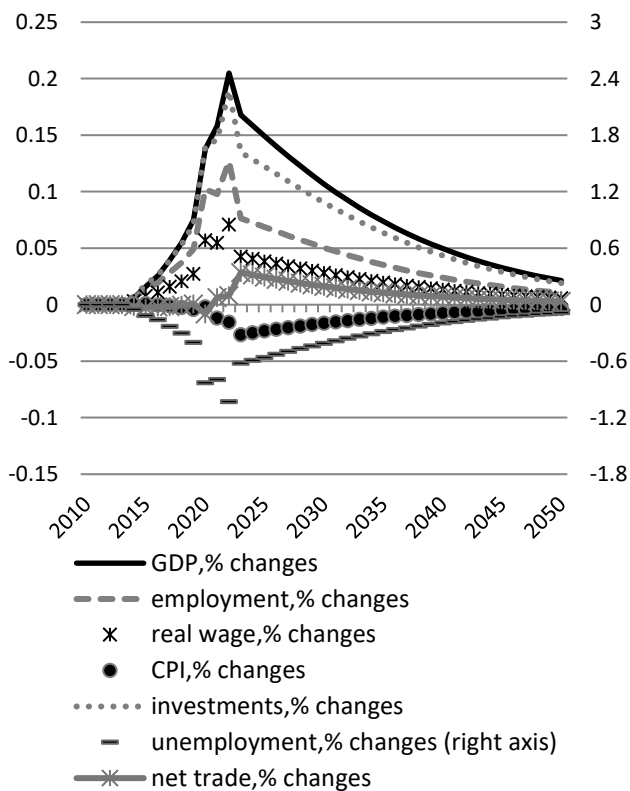
The results of the RHOMOLO simulations are reported below focusing on key macroeconomic variables such as regional GDP, employment, real wage, trade, and consumer prices (CPI).

Simulations show that the short-run economic effects of the policy intervention are mainly driven by the demand effects generated by ERDF investments during the period 2014-2022 over which the funds will be spent. When the period is over, inter-regional investment transfers to Apulia cease, the demand effects dissipate, and the structural effects of investments on productivity gain momentum and become the main drivers of the results after 2022.

Figure 2 shows how the main variables of interest move over the simulation period. The peak of the economic effects is reached in 2022 due to the assumptions that the distribution of funds will follow the time profile of the funds for the previous programming period, thus reaching its peak two years after the official end of the period. However, all key variables continue to record a positive impact of ERDF thanks to the capital stock built until 2022, and also due to the long-run structural effects on productivity.

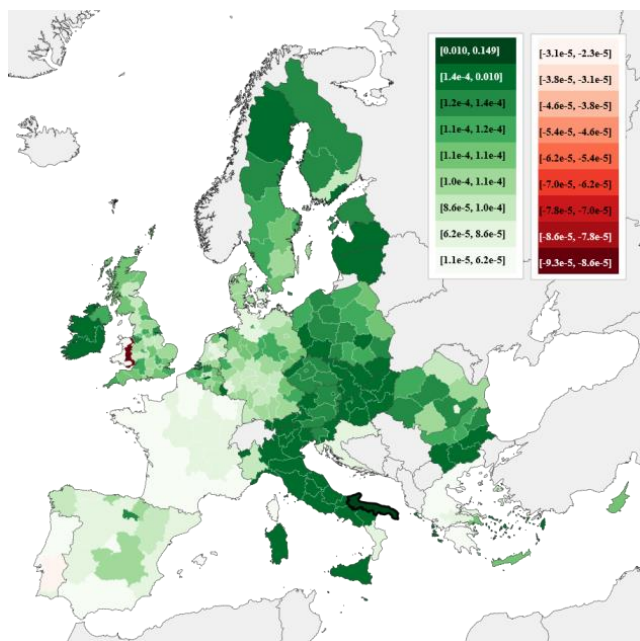
In particular, GDP, investment, and employment increase while unemployment decreases, and the prices' reduction at the end of the programming period has positive effects on net trade.

Figure 2: Impact of ERDF investments in Apulia (% changes from baseline)



For the reasons anticipated above, it is reasonable to expect spillover effects on the rest of the EU regions, and especially the neighbours of Apulia. Figure 3 shows the GDP impact of the Apulia ERDF investments in 2025.

Figure 3: GDP changes in EU regions due to the ERDF in Apulia (% changes from baseline)



The key message conveyed by Figure 3 is that the policy impact is not only localized in the beneficiary region of Apulia, but spills over to other regions which are linked with it through the complex system of trade flows. The majority of the Italian regions are those benefitting the most from the Apulia investments on R&I and Low-carbon, but some positive effects are recorded in other EU regions as well.

## 4. Conclusions

The RHOMOLO analysis summed up in this Policy Insight concludes that the ERDF investments 2014-2020 for R&I and Low-carbon in Apulia will contribute positively to the development of the region, with positive spillover effects in other regions of the EU. The full analysis explores more aspects related to the ECP and its implementation and it is reported in Di Comite et al. (2018).

To conclude, it should be noted that CGE models such as RHOMOLO should not be used for forecasting economic developments, rather they can be used for a "what if" type of analysis and provide insights on the sign and magnitude of economy-wide impacts of policies. Also, the results of the analysis reported here rest on the assumption that the ERDF investments on R&I and Low-carbon are implemented timely and with no inefficiencies.

### How to cite:

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## Read more

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