UNIVERSITÀ CATTOLICA del Sacro Cuore

CRANEC

Centro di ricerche in Analisi economica
e sviluppo economico internazionale

Working Paper 04/21

European Institute of Innovation and Technology grants as a 'mission-oriented' policy: a preliminary quantitative analysis for the euro area and Italy

Giovanni Barbieri, Santiago José Gahn

VP VITA E PENSIERO

UNIVERSITÀ CATTOLICA del Sacro Cuore

CRANEC

Centro di ricerche in Analisi economica
e sviluppo economico internazionale

Working Paper 04/21

European Institute of Innovation and Technology grants as a 'mission-oriented' policy: a preliminary quantitative analysis for the euro area and Italy

Giovanni Barbieri, Santiago José Gahn

VP VITA E PENSIERO

Giovanni Barbieri, CRANEC Research Fellow, giovanni.barbieri@unicatt.it

Santiago José Gahn, CRANEC, Università Cattolica S. Cuore di Milano and University of Bari, santiago.gahn@uniba.it

✉ segreteria.cranec@unicatt.it

www.vitaepensiero.it

ISBN 978-88-343-5180-2

PREMESSA

Questo Working Paper si colloca nell'ambito di una ricerca, in svolgimento, del Centro di Ricerca in Analisi Economica e Sviluppo Economico Internazionale (Cranec), dal titolo *Piattaforme tecno-scientifiche (PTS) e Comunità di Riferimento. Il caso Mind HumanTechnopole (M-HT) in Milano", e* finanziata da Fondazione Cariplo.

***

Il progetto si pone in continuità naturale e innovativa con la preesistente attività di ricerca avviata dal Cranec in collaborazione con la Fondazione Edison, il cui prodotto è stato il volume *"Euro-piattaforme: Scienza, Tecnologia ed Economia. Una connessione cruciale per l'Italia"* edito per i tipi del Mulino nel 2020, in cui si scattava una fotografia dello stato dell'arte delle piattaforme tecnologiche europee, della politica della scienza europea e delle connessioni strategiche tra ricerca e impresa.
Il carattere innovativo della ricerca attuale rispetto a quella appena citata è che si pone l'obiettivo di andare oltre l'analisi sistematica di ciò che esiste attualmente, per provare a prefigurare, a partire dallo scenario attuale e anche dai suoi aspetti disfunzionali, scenari futuri e possibili modelli sistemici in cui l'esperienza vissuta delle piattaforme tecnologiche europee e le attuali innovazioni a livello di politica della scienza possano contribuire a definire in maniera ottimale e paradigmatica il panorama italiano ed europeo della tecnoscienza sia per le infrastrutture esistenti, sia per quelle da realizzare.
In questo WP, ad esempio, dopo avere effettuato una ricognizione del processo di policy e del percorso "accidentato" che ha portato alla nascita dell'Istituto Europeo di Innovazione e Tecnologia (EIT) e delle sue Knowledge Innovation Communities (KIC), si procede ad una analisi di impatto sul PIL di 17 paesi europei dei *grants* erogati dallo stesso istituto dal 2014 al 2019. I risultati qui presentati, seppur in forma preliminare, dimostrano che la spesa (*grants*) in ricerca e sviluppo realizzata dall'EIT ha un impatto positivo in termini di

crescita sia a livello europeo sia italiano, pur rimanendo aperte importanti domande circa le asimmetrie e le esternalità che questo tipo di spesa localizzata geograficamente può generare.
L'EIT è uno dei punti focali del progetto di ricerca in svolgimento, dal momento che dalla sua pur breve esistenza si possono cogliere spunti e indicazioni fondamentali circa la strada da percorrere e che l'Italia ha avviato con, ad esempio, la creazione di MIND – Human Technopole, di cui tuttavia resta da verificare la capacità effettiva di mettere a regime un sistema tecnoscientifico pienamente integrato.
Proprio il carattere innovativo di questa linea di ricerca impone, inoltre, di concentrare gli sforzi di ricerca in connessione alla realizzazione del PNRR che, nella Componente 2 della Missione 4 (dalla ricerca all'impresa) appare cruciale per la definizione dei futuri assetti tecno-scientifici del nostro Paese e per la creazione di una rete ricerca-impresa efficiente in grado di dare al Paese la capacità di affrontare le sfide tecnologiche del futuro.
I risultati finali di questa ricerca saranno infine presentati nell'ambito di un convegno di interesse nazionale su questi temi, che si svolgerà a settembre p.v. presso l'Accademia Nazionale dei Lincei nel quadro della collaborazione Fondazione Edison – Lincei, attiva dal 2003 e che ha già visto l'organizzazione di convegni su questi temi.
Il progetto di ricerca si avvale del coordinamento del Prof. Alberto Quadrio Curzio, della Prof.ssa Floriana Cerniglia e del dott. Alberto Silvani. Il gruppo di ricerca è formato dal dott. Giovanni Barbieri, dal dott. Santiago José Gahn e dalla dott.ssa Piera Magnatti.

Alberto Quadrio Curzio
Presidente Cranec

Floriana Cerniglia
Direttore scientifico Cranec

ABSTRACT[1]

This paper focuses on the development of the *European Institute of Innovation & Technology* and its political economy after following the Lisbon European Council. We analyse the aggregate impact of *EIT grants* on the euro area's GDP (17 countries) using a SVAR technique and we perform a similar time-series exercise for Italy, as a robustness check, for the period 2014Q1-2019Q4.
Results indicate that 'EIT expenditures' have a positive impact on GDP, both in the case of the euro area and Italy. Such 'mission-oriented' spending at the continental level could be a way forward for the eurozone.

JEL classification: F55, O38, O52
Keywords: European Institute of Innovation & Technology, Public Expenditures, technology platforms, Europe, Italy

[1] This research was carried out as part of a research project funded by Fondazione Cariplo.

INDEX

1. Introduction

In March 2000, the Lisbon European Council marked a decisive moment in defining the beginning of a strategy that reshaped, at least in its expectations, the European R&D effort, setting the challenge of becoming the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with new jobs and greater social cohesion, within ten years. However, the Lisbon strategy which designed the European Research Area didn't work at its full potential, partly because it lacked a clear political consensus. The strategy itself was well pointed, aiming at reducing the per-capita income gap with the US which, however, kept lagging undiminished. The aim was to be achieved through the implementation of the knowledge economy, which would have fostered cooperation and partnership networks among European Universities and Research Institutions. The point at stake was the governance of the process that many stakeholders considered weak and generating the possibility of bandwagoning episodes and predatory behaviours. Nobody was willing to share the process of setting the scientific research agenda, given prevalent concern of linking national strategies with general and applied scientific research activities in certain sensitive fields. This was the point that some scholars highlighted at that time (Tabellini and Wyplosz, 2006) explaining why the Lisbon process should have undergone a deep restructuring.

The issue of national disregard towards the construction of a European Research Area was tackled in Lisbon with the open method of coordination. This was the tool through which the Commission intended to place its regulatory activity in the middle ground defining the European Union's scientific research priorities. Prior to Lisbon, the working framework used for scientific research was to designate what was a European and what was a national competence. The new approach requested member countries to set autonomously their research priorities,

but to frame them within a European common interest scenario. Member States were expected to present a yearly report on their progresses to the European Council. The report was to be evaluated by the Commission and a process of peer pressure would adjust the distortions in each country's policy agenda. This working method, understandingly, resulted in a stalemate in which almost all countries faced the pressure of powerful national lobbies. The Lisbon strategy was in essence blocked.

The *European Institute of (innovation and) Technology* (EIT) was the response of Jos´e Barroso, President of the European Commission, to the stalemate. Instead of relying exclusively on the concept of the knowledge economy, it factored in industry and institutions, and used the triple helix model of innovation formulated 16 years before by Henry Etzkowitz and Loet Leydesdorff (1995). After a sticky start, the cooperation among member countries for the development of the *EIT* gained momentum. Since the beginning of its operativity, the *EIT* was perceived as the appropriate body to boost both the European innovation processes and industrial competitiveness feeding domestical effectual demand, output growth and human capital formation.

The recovery of domestic effectual demand should be, after the recent COVID19 crisis, one of the short-term priority objectives of Europe. EU expenditure implemented through the *European Institute of Innovation and Technology* can easily be considered as research and development expenditure and especially as 'mission oriented'. Thus, *EIT* and its *Knowledge and Innovation Communities* (*KICs*) are a way to focus efforts on reducing production costs and favouring companies and start-ups at the forefront of technology. While the literature on 'mission oriented policies' has exploded in recent years (Kattel and Mazzucato, 2018; Mazzucato, 2014, 2018a, 2018b), analyses of the quantitative effects of this type of expenditure are scarce (Deleidi and Mazzucato, 2021), particularly for Europe.

Quantitative analyses on *EIT* and *KICs* are hardly to be found; this paper in part attempts to present a first approach to analyzing these techno-structures.
We begin by assessing in Section 2 how the different types of 'autonomous' expenditures (government expenditures, exports and real estate) have performed since 1995 in Europe and in Italy. After reviewing the experience of the *EIT* in Europe in Section 3, we analyse the aggregate impact of the *EIT* on European GDP in and using the same SVAR technique, we repeat the exercise for Italy in Section 4. Although the time series is too short to obtain conclusive results, the impact of this type of expenditure on output is, in principle, positive.
Some conclusions are provided in Section 5.

2. Autonomous components performance: euro area and Italy

Europe has been characterised by mediocre growth since the 2009 crisis. This does not help European integration, on the one hand, where the malaise of the population may have consequences for disharmonization and, on the other hand, it does not help to position Europe as a leading economy vis-`a-vis the United States and China. The problem of effective demand requires some focus. For some authors (Serrano, 1995), it is autonomous, non-capacitycreating expenditures that drive economic growth. There is a growing literature on how to measure these components in empirical terms.[2] We can see from Figure 1, that GDP in the euro area has closely tracked the path of autonomous expenditures (Z). In this case, Z includes exports (X), public expenditures (G) and real estate (D/RES) - home-building and home improvements.

[2] See Haluska et al. (2020) section 3 for a review.

Fig.1. Autonomous expenditures and its components (euro area - 1995-2020)

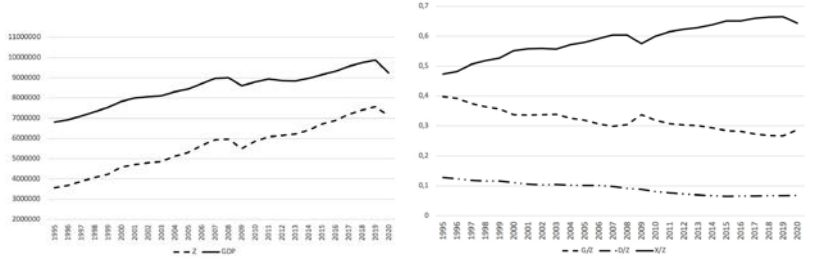

Figure 1. Autonomous components of aggregate demand (*Z*) and GDP (LHS) and government expenditures (*G*), dwellings (*D*/*RES*) and exports (*X*) as a percentage of autonomous components of aggregate demand (*Z*) (RHS) in euro area (1995-2020). Source: OECD.

As we can see in Figure 1, exports (*X*), as a percentage of *Z*, grew over time, while *G* and *D*/*RES* declined as a counterpart. The euro area became more and more dependent on external markets than on building a strong domestic market. This is nothing new and is widely acknowledged in the literature (Cesaratto, 2013; Cesaratto and Stirati, 2014; Paternesi Meloni, 2021). But is this a problem? As always, it depends. There is nothing wrong with being an export-led economy. It, however, could have some undesirable impacts. First, a reduction of the national 'policy space' (Carabelli and Cedrini, 2019): The level of exports is mainly determined by the level of external demand, so it does not depend on the euro area's decisions. Secondly, public spending in certain sectors can have strategic impact on the whole economy: from the development of infrastructure to the improvement of logistics and the reduction of costs - to the development of new technologies that could imply negative returns for many years, where the private sector is reluctant to invest.

Fig.2. Autonomous expenditures and its components (Italy - 1970-2020)

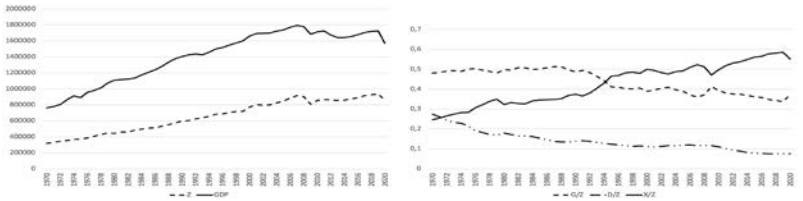

Figure 2. Autonomous components of aggregate demand (*Z*) and GDP (LHS) and government expenditures (*G*), dwellings (*D*/*RES*) and exports (*X*) as a percentage of autonomous components of aggregate demand (*Z*) (RHS) in Italy (1970-2020). Source: OECD.

For the Italian case, these stylised facts are not very different. As we observe in Figure 2, GDP clearly follows the autonomous components of aggregate demand (*Z*).[3] And, as in the euro area's case, increased exports are the main driver of output, while public spending and the real estate sector fall as a percentage of *Z*. This export led strategy obviously leads to deflationary policies (Secareccia, 2004; Cavallo & Cottani, 2010), where countries seek to gain spurious competitiveness by lowering real wages. Given the constraints imposed by convergence towards the single currency, coupled with the Maastricht Treaty, it is clear that public expenditures have suffered the most from the structural adjustment implemented over time. The dramatic cutbacks witnessed in these types of expenditure since 1990/1992 have had serious implications for Italian GDP. It is relevant to ask whether this strategy is sustainable over time.[4]

[3] See a demonstration in G´oes, Moraes & Gallo (2018) for the italian case.

[4] According to Wynne Godley (1992), 'If a country or region has no power to devalue, and if it is not the beneficiary of a system of fiscal equalisation, then there is nothing to stop it suffering a process of

In this context of constant decline of public expenditures in Europe and Italy, several proposals have been made at the European level to reverse this situation. One option is to strengthen innovation schemes within Europe in order to *create* markets through 'missionoriented policies'. Mission-oriented innovation has required public agencies to not only 'derisk' the private sector, but also to lead in the direct creation of new technological opportunities and market landscapes (Mazzucato, 2016). It is widely recognised that this type of expenditure has a strong impact on output, especially in the long run (Deleidi and Mazzucato, 2021; Dosi et. al, 2021). It is also widely acknowledged that the countries that are currently leading the technological frontier have invested heavily in this type of development from the public sector, especially from public agencies of the state (Mazzucato, 2011). One recent example is the *European Institute of Innovation and Technology* and it is the one we will analyse in the next section.

3. The European Institute of Innovation and Technology

The *European Institute of Innovation and Technology* was created by the European Union in 2008 to strengthen Europe's innovation capacity. Bringing together more than 2000 partners, the *EIT* is Europe's largest innovation network. Its vision is to become the leading European initiative enabling innovators and entrepreneurs to develop world-class solutions to societal challenges and create growth and skilled jobs. According to the European Parliament and the Council of the European Union, the main objective of the *EIT* should be to contribute to the development of the EU's and the Member States' innovation

cumulative and terminal decline leading, in the end, to emigration as the only alternative to poverty or starvation.'

capacity and involve higher education, research and innovation activities at the highest level. It should create links between research and innovation activities and businesses and their commercial application, as well as support the creation of start-ups, spin-offs and small and medium-sized enterprises (SMEs). It operates primarily through autonomous and partnerships between higher education institutions, research organisations, businesses and other stakeholders in the form of sustainable and long-term strategic networks that are self-sustaining in the innovation process. This vision has been further supported with the adoption of the new Strategic Research Agenda for 2021-2027, with a 3 billion budget to finance EIT's activities which is a totaling an extra 600 million with respect to the 2014-2020 period.

The EIT can be considered a small miracle of European scientific cooperation, since it was developed in a relatively short period of time and in an equally short amount of time managed to gain the trust of all the actors involved and produce significant results. It is an intuition born from the European Commission, who noted that the Lisbon Strategy (2000) did not sufficiently address the many aspects of scientific cooperation needed for a fully integrated European Research Area. In particular, the major problem that the Commission tackled was national resistance to cooperation in technological innovation, given the strategic aspects related to this type of research activity. Both the private and public sectors, in fact, did not favor the development of the Lisbon Agenda, for reasons linked to its undoubted shortcomings. The initiative to promote the *EIT*, launched in 2005, also struggled to make its mark, due to the well-known national resistance and the aforementioned nature of the governance schemes adopted in Lisbon. The crucial point was that the presence of a supranational actor such as the EIT to coordinate R&D activities discouraged the participation of the public and private sectors but, in fact, the Lisbon Strategy itself

had already paved the way for the emergence of a new supranational norm of top-down coordination in higher education and research (Kaunert, 2010). The step that perhaps helped the EIT project gain momentum the most was the realization that in order to create a favorable coalition of public and private actors willing to cooperate in the spirit of the Lisbon Agenda, the element on which to build the entire governance of the EIT was that of the knowledge triangle (Huisman & de Jong, 2014). In accordance with this model, the whole consultation process initiated in 2005 deeply restructured the role of the stakeholders and the commitment to define the actual role of the *EIT* and its *KICs* by integrating them with the real problems related to R&D activity at the European level. In concrete terms, what emerged in 2006 (European Commission 2006) was the proposal for a two-speed or 'integrated' EIT. A centralized EIT, governed by a Governing Board quite independent from the European Commission and endowed with a fair degree of autonomy, whose role would be to coordinate common efforts in certain priority areas and define a shared strategic research agenda. Secondly, a dislocated EIT, consisting of independent KICs, open from time to time to public and private funding for specific research lines. At the end of the whole process, and after some residual national resistance, the integrated model was the one that took hold thanks to the inclusion of innovation and entrepreneurship in its mission, elements that brought it in line with the Lisbon Strategy.

We could say that the *EIT* can be represented in abstractly way through the Triple Helix Type III model (THT III, Etzkowitz & Leydesdorff, 2000). In the THT III innovation model, three actors (university, industry and government) work together to achieve the national or regional innovation goal by forming a mutually beneficial relationship (Tomassone, 2012). In this way, universities, private sector and public administration operate in unison, within a joint model capable of creating

hybrid organisations that develop innovation through the interaction of the different needs of these actors. Innovation is associated with the process of pooling resources and activities on a regional level (Bruijn, 2004; Tomassone, 2012). The form used by the *EIT* is that of partnerships because, partially, the *EIT* was created in response to the dissatisfaction of the private sector in participating in the European platforms.

These partnerships are selected by the *EIT* Governing Board based on a transparent process and designated as Knowledge and Innovation Communities (*KICs*). The Governing Board steers the activities of the *EIT* and evaluate the activities of the *KICs*. The *EIT* has a legal identity and, in order to ensure its functional autonomy and independence, it administers its own budget whose revenues include a contribution from the EU, it raises funds from the private sector and from the income generated from its own activities. Therefore, the industry, finance and service sectors are expected to contribute significantly to the *EIT* budget and, in particular, to the budget of the *KICs*. For long-term self-sufficiency, these projects have funding programmes in which the share of public funding is reduced year by year to make room for the private sector. Each *KIC* has an innovation incubator and also a body to help bring small projects to scale.

EIT-KICs relations are managed through formal and informal channels. At a formal level, the contours of *EIT-KIC* cooperation are defined in individual (long and short-term) framework agreements. More informally, the *EIT* engages with its *KICs* through task forces, coordination working groups and panels. Each *KIC*, which operates autonomously, has till now been organised around five to ten co-location centres (CLCs), which are intended to act as geographical hubs that provide a physical space for local interaction within the innovation ecosystem and for the practical integration of the knowledge triangle. CLCs are organised and structured according to their

relevant national and regional innovation context and are based in a pan-European network of existing laboratories, offices or campuses of a *KIC* partner. *KICs* are required to develop and implement income generating strategies in order to maintain their innovation ecosystem and knowledge triangle activities beyond the period covered by the grant agreements. There are currently ten *KICs*; they are:

- EIT Climate-KIC: Innovation for Climate Action
- EIT Digital-KIC
- EIT Manufacturing
- EIT Urban mobility
- EIT Food
- EIT Health
- EIT InnoEnergy
- EIT Raw Materials
- EIT Cultural and Creative Sectors and Industries (CCSI)
- EIT Water, Marine and Maritime Sectors and Ecosystems (WMM)

While there have been several qualitative analyses of the *EIT* over time (Rohrbeck & Pirelli, 2010; Huisman & de Jong, 2014; Quadrio Curzio & Silvani, 2020), we have found only one quantitative analysis, published by the Economics and Econometrics Research Institute (EERI), Brussels (Dimitrov & Kancs, 2019; Ivanova, Kancs & Thissen, 2019).

The authors obtained two types of results. First, they measured the impact of *EIT* investments on regional *GDP*, and second, they performed the same type of measurement in a comparative fashion between territories that directly benefit from *EIT* investments and those that are indirectly affected. The work illustrates some interesting results. The most important finding is that *EIT* investments contribute to strengthening EU innovation capacity at the aggregate level. However, although the overall result is positive at the aggregate level, a simulation shows that at the regional level outcomes can be quite unequal,

illustrating how the distribution of gains from innovation processes tend to be more than proportionally concentrated in regions where EIT investment is highest. They show, therefore, that the effects produced by policy measures can be positive or negative, and trigger different investment dynamics between regions that leads to strongly diverse rates of development, depending on the investment policies at the *EIT* level.
Given the importance of the *EIT* for European's future, we think that more research needs to be done on this platform. In the next section, we will try to carry out a preliminary analysis with the aim of assessing the impact of the *EIT* on GDP in Europe and in Italy.

4. Data, methodology and results

4.1. Data and methodology

EIT grants are linked to expenses related to start-ups, which have not yet scaled up, or are in the process of scaling up their small projects. These are, in short, expenditures that could be considered autonomous and 'mission-oriented', which have a high degree of discretion. Hence, we will try to analyse the impact of these expenditures on GDP. To analyse the impact of *EIT* expenditures in Europe, we built a database containing all *EIT* grant funds for the period 2014-2019. The data are annual, so to increase the power of the observations we decided to transform the time series into quarterly series using the denton methodology (in averages). In addition, we incorporated the variables of government expenditures, exports and real estate as control variables (see data details in Appendix A). They are, in short, the variables that we previously considered as Z when analysing the euro area and the Italian case in Section 2. This database contains information on 17 countries for the period 2014Q1-2019Q4 which allows us to obtain 408 observations.

Fig. 3. EIT grants and Gross Domestic Product by country (2014Q1-2019Q4)

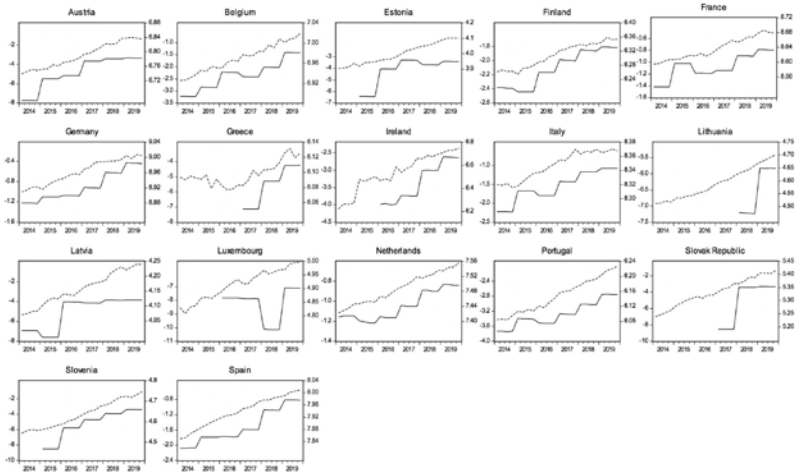

Figure 3. EIT Grants (solid line) and GDP (dashed line) by country (2014Q1-2019Q4). Source: EIT Country Factsheets and OECD.

Figure 3 shows the absolute real values of *EIT* grants and GDP. Although it is not linear, there seems to be a relationship between the level of *EIT* grants and the level of output. Following the previous analysis, if autonomous expenditures at the national level have an impact on GDP, we could expect European expenditures to also have a similar impact. Although in this case, it is only *EIT* funding, we could calculate a kind of multiplier effect of 'EIT expenditures'. To see if there is a real impact of *EIT* grants on GDP, we decided to use the Structural VAR methodology (panel and time series). The methodology is in line with the traditional time series Structural VAR literature, such as Bernanke (1986), Blanchard and Quah (1989), Blanchard and Watson (2007), Clarida and Gali (1994) and Sims (1986), among others. The advantage of VAR models is that once exogeneity is assumed, they allow us to calculate the impact of one variable on another and also their dynamics over

time. In short, we use 2 models. First, a dataset with a 'stack' of countries and, second, we analyse the case of Italy in time series. We apply pooled SVAR methodology; that is, as if the sample were a 'stack' of countries. Restricted by the unbalanced panel and the quantity of observations, in our first model, we do not have fixed effects by country. A Structural VAR technique with short-run restrictions is performed in which we assume that *EIT* grants have an impact on output in the first quarter, but not the other way around. Our model has 5 variables. The order of the variables is determined as follows. *EIT* grants as the most exogenous variable since, at least for us, they do not depend on the level of exports (*X*), public expenditures (*G*) or real estate (*D*/*RES*). Secondly, we assume that exports are more exogenous than the amount of public expenditure and real estate and finally, we take public expenditures to be more exogenous than real estate. Therefore, the order of the variables is as follows,

$$EIT \rightarrow -X \rightarrow -G \rightarrow -D \rightarrow -GDP$$

In our second model, we analyse the case of Italy. Taking the information from the EIT Country Factsheets 2019/2020, we can observe that there has been an increase in *EIT Grants* for Italy, both in nominal and real terms (see Figure 4). Given the reduced quantity of observations, our model has 3 variables: *EIT grants*, *Z* and GDP. This allows us to calculate the potential impact of a shock to *EIT* grants and to *Z* on Italy's GDP.

Fig. 4. EIT grants in Italy (2014-2019)

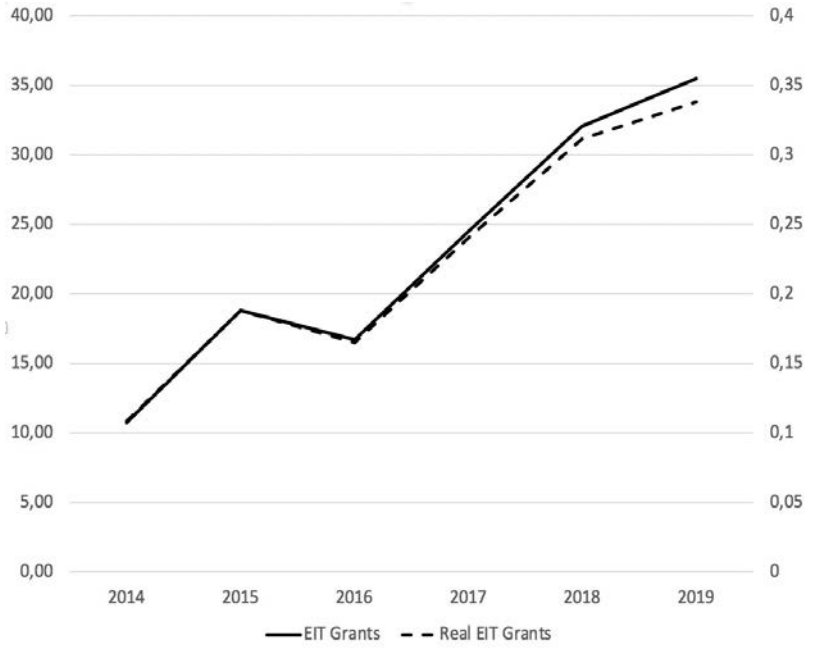

Figure 4. EIT Grants (solid line) and GDP (dashed line) in Italy (2014-2019). Source: EIT Country Factsheets and OECD.

4.2. Results

4.2.1. Time-series SVAR for the whole set of countries

With this model in mind, as described in the previous section, we selected the number of lags under the SC criterion (see Appendix B Table 1). For the European case, we find that *EIT grants*, exports and public expenditures have a positive and significant impact on GDP. Both exports and *EIT grants* have a long-term impact that is significant even after 20 periods, i.e. 5 years. On the other hand, the effect of real estate/residential

investment (*D*/*RES*) is non significant. These results are shown in Figure 5.

Fig. 5. EIT grants and Gross Domestic Product for the whole set of countries (2014-2019)

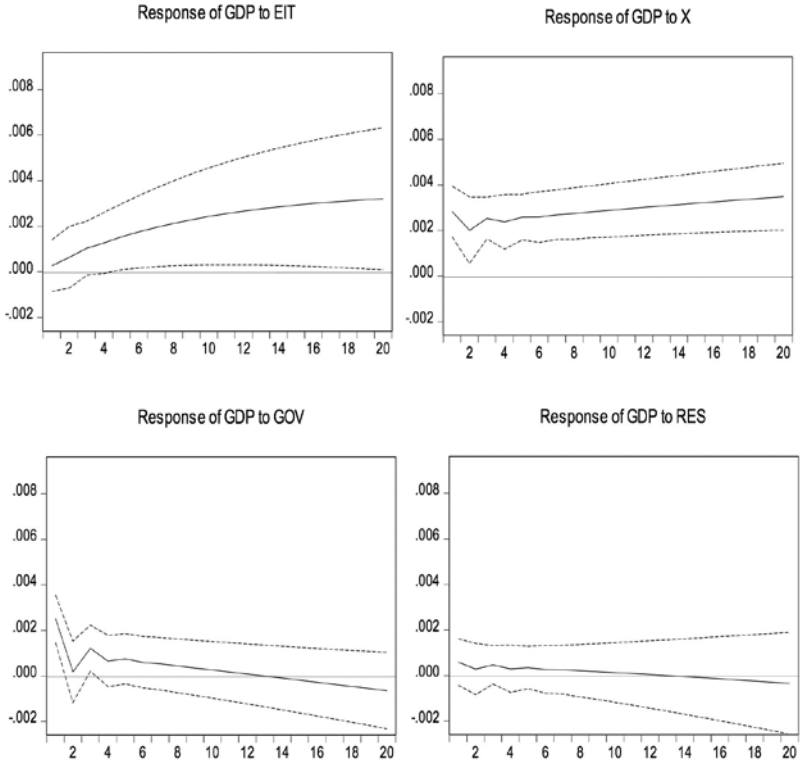

Figure 5. Impulse response functions of GDP to different shocks. Bands with +/- two standard error. Source: own elaboration based on EIT Country Factsheets and OECD.

4.2.2. Time-series SVAR for Italy

For a robustness check, we decided to analyze the case of Italy. In this case, the analysis is performed with 2 lags following the Schwartz criterion (see Appendix B Table 2) and we impose, again, a short-run recursive impulse-response.

Fig. 6.Autonomous expenditures and its components (Italy - 1970-2020)

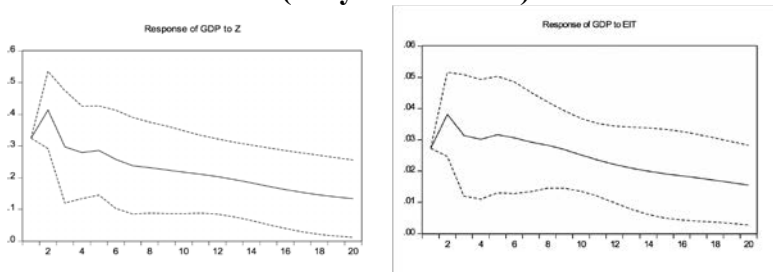

Figure 6. Response function of *GDP* to *Z* (LHS) and *EIT grants* (RHS) Italy (2014Q1-2019Q4). Bands with +/- one standard error.
Source: own elaboration based on EIT Country Factsheets and OECD.

As we can see in Figure 6, a shock to *Z* has a positive and persistent effect on GDP, even after 20 quarters, thus we can affirm that the effect is persistent. On the other hand, on the right side of the graph we can observe the response of Italy's GDP to an increase in *EIT* grants. This result is also persistent and positive until the 20th quarter, indicating that an increase in *EIT* grants can have positive and persistent effects on Italy's GDP, in line with our previous statements.

Given the short time frame of the data, these results should be taken with extreme caution. Clearly, as time passes and better data become available, these results can be recalculated. However, we believe that they can be considered as preliminary results. Beyond the numerical results, the important point is that *EIT-funded expenditures* can have strong and persistent impacts on output. Our first results related to Europe and Italy are a kind of robustness check. If this is the case, then a planned innovation policy at the federal (European) level could constitute the main basis for meeting the technological leadership objectives that Europe would seek to achieve.

5. Conclusions

Expenditure at the European level, implemented through the *European Institute of Innovation and Technology* (EIT) can easily be considered research and development expenditure, especially as 'mission oriented' expenditure. While the literature on 'mission oriented policies' has exploded in recent years, quantitative analyses of this type of expenditure are scarce, particularly for Europe. This paper attempted to present a first approach to the quantitative analysis of *EIT*.

After analysing how different types of expenditures (government expenditures, exports and residential investment) have performed in Europe - since 1995 - and Italy - since 1970 -, we reviewed the *EIT*'s experience in Europe and its political economy since the Lisbon European Council. We also analysed the aggregate impact of *EIT grants* on GDP of 17 European countries using the SVAR technique and we repeated a similar exercise for the Italian case to check for robustness. While the period under analysis is too short to draw long-term conclusions, it is worthwhile to make a preliminary analysis of these types of expenditure.

Even taking this caveat into account, the results indicate that the impact of EIT grants on both European and Italian output is positive.

Among the various extensions that could be explored further for this work, one could consider regional asymmetry. Given the correlation that the preliminary data suggest between *EIT* grants and GDP in Europe, it is possible to infer that *EIT* grants, while showing a positive correlation with output at the aggregate level, might determine differences at the regional level. If this is true, the geographical location of *EIT* grants could have the potential to set in motion asymmetric dynamics across euro area regions. Among this, it is reasonable to investigate whether the geographical location of *EIT* grants has the potential to set in motion dynamics of financial and human capital diversion,

draining resources from one point to another within the Union. This needs to be further analysed in order to contribute effectively to the policy-making process.

6. References

Bernanke, B. S. (1986). Alternative explanations of the money-income correlation. NBER Working Paper w1842.

Blanchard, O. J., and Quah, D. (1989). The dynamic effects of aggregate demand and supply disturbances. *American Economic Review, 79* (4), 655-673.

Blanchard, O. J., and Watson, M. W. (2007). Are Business Cycles All Alike?. University of Chicago Press.

Bruijn, P. D. (2004). Mapping Innovation: Regional Dimensions Of Innovation And Networking In The Netherlands1. Tijdschrift voor Economische en Sociale Geografie, 95(4),
433-440.

Carabelli, A. M., & Cedrini, M. A. (2019). Keynes, the Eurozone Problem, and the Issue of Policy Space. The Review of Keynesian Studies, 1, 42-60.

Cavallo, D., & Cottani, J. (2010). For Greece, a 'fiscal devaluation' is a better solution than a 'temporary holiday' from the Eurozone. VoxEU.org, 22.

Cesaratto, S., & Stirati, A. (2010). Germany and the European and global crises. International Journal of Political Economy, 39(4), 56-86.

Cesaratto, S. (2013). 13 Notes on Europe, German mercantilism and the current crisis. The
Global Economic Crisis: New Perspectives on the Critique of Economic Theory and Policy, 144, 246.

Clarida, R., and Gali, J. (1994) Sources of real exchange-rate fluctuations: How important are nominal shocks?. Carnegie-Rochester conference series on public policy. Vol. 41. NorthHolland.

Deleidi, M., & Mazzucato, M. (2021). Directed innovation policies and the supermultiplier:
An empirical assessment of mission-oriented policies in the US economy. Research Policy, 50(2), 104151.
Dosi, G., Lamperti, F., Mazzucato, M., Napoletano, M., & Roventini, A. (2021). Mission-
Oriented Policies and the 'Entrepreneurial State' at Work: An Agent-Based Exploration (No. 2021-25). Groupe de REcherche en Droit, Economie, Gestion (GREDEG CNRS), Universit´e Cote d'Azur, France.
Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and 'Mode 2' to a Triple Helix of university–industry–government relations. *Research policy, 29*(2), 109-123.
European Commission. 2006. Proposal for a regulation of the European parliament and the council establishing the European Institute of Technology. Brussels: Commission of the European Communities.
Godley, W. (1992). Maastricht and All That. London Review of Books,14(19), 3-4. Retrieved from http://www.lrb.co.uk/v14/n19/wynne-godley/maastricht-and-all-that
Go´es, M. C. B., Moraes, V. D., & Gallo, E. (2018, May). The supermultiplier model and the role of autonomous demand: An empirical test for European countries. In Presented on the 1st International workshop on demand-led growth, conflict inflation and macroeconomic policy.
Haluska, G., Braga, J., & Summa, R. (2021). Growth, investment share and the stability of the Sraffian Supermultiplier model in the US economy (1985–2017). Metroeconomica, 72(2), 345-364.
Huisman, J., & de Jong, D. (2014). The construction of the European Institute of Innovation and Technology: The

realisation of an ambiguous policy idea. *Journal of European Integration, 36*(4), 357-374.
Dimitrov, G., & Kancs, D. (2019). Economic Impacts of the European Institute of Innovation and Technology Investment Strategies: A Model-based Analysis. JRC Working Papers No. JRC115573, European Commission, Luxembourg.
Ivanova, O., Kancs, D. A., Thissen, M. (2019). EU economic modelling system: Assessment of the European Institute of innovation and technology (EIT) investments in innovation and human capital (No. 10/2019). EERI Research Paper Series.
Kattel, R., & Mazzucato, M. (2018). Mission-oriented innovation policy and dynamic capabilities in the public sector.
Kaunert, C. 2010. The area of freedom, security and justice in the Lisbon Treaty: commission policy entrepreneurship? European Security 19, no. 2: 169–89.
Mazzucato, M. (2011). The entrepreneurial state. Soundings, 49(49), 131-142.
Mazzucato, M. (2014). A mission-oriented approach to building the entrepreneurial state. Innovate UK.
Mazzucato, M. (2016). From market fixing to market-creating: a new framework for innovation policy. *Industry and Innovation, 23*(2), 140-156.
Mazzucato, M. (2018a). Mission-oriented innovation policies: challenges and opportunities. *Industrial and Corporate Change, 27*(5), 803-815.
Mazzucato, M. (2018b). Mission-oriented research innovation in the European Union. European Commission.
Paternesi Meloni, W. (2021). The price vs. non-price competitiveness conundrum: a postKeynesian comparative political economy analysis (No. PKWP2109).

Rohrbeck, R., & Pirelli, L. (2010, April). The European Institute of innovation and Technology: How to steer a multi-stakeholder innovation ecosystem. In DIME Conference-
Organizing for Networked Innovation.
Seccareccia, M. (2004), 'The European Economic and Monetary Union in the Global Economy: Is There a Deflationary Bias? - Editor's Introduction', International Journal of Political Economy, Vol. 34, no. 2 (Summer), pp. 3-4.
Serrano, F. (1995). Long period effective demand and the Sraffian supermultiplier. *Contributions to Political Economy, 14*(1), 67-90.
Sims, C. A. (1986) Are Forecasting Models Usable for Policy Analysis?. Quarterly Review of the Federal Reserve Bank of Minneapolis. 2-16.
Tabellini, G., & Wyplosz, C. (2006). Supply-side reforms in Europe: Can the Lisbon strategy be repaired?. *Swedish Economic Policy Review, 13*(1), 101-56.
Tommasone, M. (2012) Modelli di Trasferimento tecnologico in contesti avanzati e in via di sviluppo. Tesi di Dottorato.
Quadrio Curzio, A. e Silvani, A. (2020). Introduzione. Euro-infraestrutture techno-scientifiche: casi, politiche e strategie.

Appendix A. Data Sources and Web References

EIT EIT grants - funding to the country. Millions of euro. 2014-2019. Deflated with GDP deflator from OECD. Source: Country Factsheets https://eit.europa.eu/ library/eit-country-factsheets-20192020 and OECD. Variable in logarithms.

X Real exports - expenditure approach. Quarterly data (2014Q1 - 2019Q4). Source: OECD. Variable in logarithms.

GDP Real Gross domestic product - expenditure approach. Quarterly data (2014Q1 - 2019Q4). Source: OECD. Variable in logarithms.

G Real General government final consumption expenditure - expenditure approach. Quarterly data (2014Q1 - 2019Q4). Source: OECD. Variable in logarithms.

D/*RES* Real dwellings - expenditure approach. Quarterly data (2014Q1 - 2019Q4). Source: OECD. Variable in logarithms.

Appendix B. Lag selection

Table 1: Lag selection for euro area

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-925.8123	NA	0.001608	7.756769	7.829283	7.785987
1	2289.818	6270.480	4.56e-15	-18.83182	-18.39674	-18.65651
2	2372.289	157.3812	2.83e-15	-19.31074	-18.51309*	-18.98935
3	2429.457	106.7142	2.16e-15	-19.57881	-18.41860	-19.11133*
4	2455.417	47.37711	2.15e-15	-19.58681	-18.06403	-18.97324
5	2486.181	54.86285*	2.05e-15*	-19.63484*	-17.74950	-18.87519

Note: *=optimal lag.
Source: own computations based on available data.

Table 2: Lag selection for Italy

Lag	LogL	LR	FPE	AIC	SC	HQ
0	70.05650	NA	3.28e-06	-6.953316	-6.754486	-6.919666
1	121.4920	81.21403	2.25e-08	-11.94653	-11.54887	-11.87923
2	148.7332	37.27739*	2.01e-09	-14.39297	-13.79648*	-14.29202
3	150.4702	2.011261	2.73e-09	-14.15476	-13.35944	-14.02016
4	157.1569	6.334715	2.33e-09	-14.43756	-13.44342	-14.26931
5	165.9743	6.497034	1.74e-09*	-14.94466*	-13.75168	-14.74276*

Note: *=optimal lag.
Source: own computations based on available data.

Printed by
Gi&Gi srl - Triuggio (MB)
December 2021


9788834351802