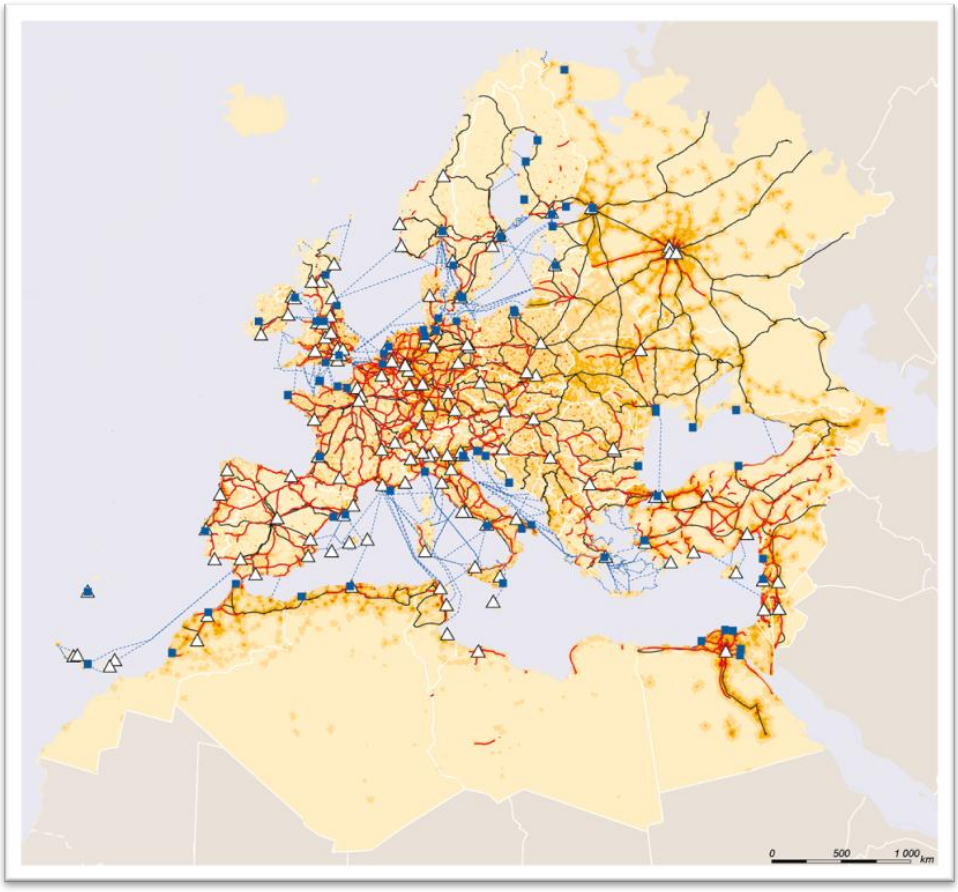
Regione Siciliana

An estimation of insularity cost in Sicily



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The cover map was published by ESPON in 2013.

NVVIP SICILIA
Nucleo Valutazione e Verifica Investimenti Pubblici Regione Siciliana

Regione Siciliana
Presidenza della Regione
Dipartimento della Programmazione

Regione Siciliana
Assessorato Regionale dell'economia
Servizio Statistica ed Analisi Economica

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"Understanding Sicily, therefore, means for a Sicilian understanding himself, absolve himself or condemn himself.

But it means, at the same time, understanding the crucial conflict tormenting us, an oscillation between claustrophobia and claustrophilia, hate or love for seclusion, yielding to a temptation to leave or a comfort to stay in a den intimacy, seduced by a way of living life as a solitary vice.

Insularity, I mean, is not just a geographic segregation: it leads also to a segregation within our provinces, our families, our rooms and hearts, building up our pride, distrust, shyness and our sense of being different ".

*(*G. Bufalino, *The plural island,* 1985*)*

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Foreword

by Gaetano Armao, Vice-President and Economy Councillor of Region Sicily

"Nothing is so unfair as sharing equal parts
among non-equal partners"
Don Lorenzo Milani
"Lettera a una professoressa", Firenze 1976

A study on insularity cost in the largest European and Mediterranean island may seem an ambitious work, considering the wide dimension of regional population, wealth, goods, transport and economic target, as well as present serious economic crisis due to COVID-19 pandemic and most urgent emergency measures which are now the highest priority.

However, to reach a successful result from the on-going two-year intense negotiation between the Sicilian regional council and the national government for a redefinition of their financial relations – as it has already happened for other autonomous northern regions and Sardinia as well - it becomes crucial to point out and financially quantify the key factor for an effective definition of this financial agreement.

In this view, the regional council has adopted Resolution no. 59 of 13 February 2020, aimed at carrying out the present study to estimate the insularity cost in Sicily. To quantify this estimation, this study analyses the insularity cost impact on Sicilian economy and finally points out which basic element is needed to define an effective agreement as a conclusion of this negotiation between the regional and national authorities.

1. The condition of insularity, pursuant to article 174 and foll. TFEU and art. 119 (revised) of the Italian Constitution, must be addressed by implementing specific rebalancing measures (territorial continuity, tax benefits, economic development measures, infrastructural improvement, aid schemes, etc.)[1]. Their goal is not only to fulfil the known principles of European and national law, but above all to implement concrete legislative measures to balance an economic gap and related "insularity cost", ensuring to Sicilian citizens equal treatment and social rights[2].

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1 On the condition of insularity see, within the broad bibliography, P. Fois, *Il regime delle isole nell'ordinamento comunitario*, in Riv. giur. sarda, 1999, 903 ss.; T.E. Frosini (a cura di), *Isole nel diritto pubblico comparato ed europeo*, Torino, 2007; I. Meloni, B. Sanjust di Teulada, *La condizione di insularità nell'Unione Europea: accessibilità e incidenza del trasporto marittimo*, Cagliari, 2015; M. Cardia, *Coesione territoriale e principio di insularità nell'ordinamento dell'Unione europea,* in *www.studisullintegrazioneeuropea.eu*, 3-2015, 599 e foll.; P. Fois, *La continuità territoriale e l'insularità nell'Unione Europea*, in M. Comenale Pinto (a cura di), *La continuità territoriale della Sardegna. Passeggeri, merci low cost e turismo,* Roma, 2015, 37 e ss.; T.E. Frosini, *«Insularità» e Costituzione*, in *Riv. giur. Mezz.,* 2020-1, 247 e ss.; among Gaetano Armao contributions on the subject: *Redimibile Sicilia. L'autonomia dissipata e le opportunità dell'insularità*, Sovaria Mannelli, 2017, and *Insularità, autogoverno e fiscalità di sviluppo nella prospettiva della macroregione del Mediterraneo occidentale*, in *Le Istituzioni del federalismo*, 2017-3, 765 et seq..

2 It should be remembered that Italy, after Brexit, has become the European country with the largest island population, over 6.6 million inhabitants (12% of them live in Sardinia and Sicily and the latter is now the largest

Article 174 TFEU is the main pillar of European social, economic and territorial policy of cohesion. As generally known, the first and second paragraphs state that the EU aims at reducing the economic development gap among regions by strengthening cohesion policies, while the third paragraph states that a particular attention must be paid to those regions suffering from serious and permanent geographical disadvantages, including islands.

Unfortunately, despite several specific statements on this subject by the European Parliament (the latest was "*Special situation of islands*", *European Parliament resolution*, 4 February 2016), the European Committee of Regions ("*Entrepreneurship on Islands: contributing towards territorial cohesion*", *Opinion of the European Committee of Regions* 2017 / C 306/10, May 2017) and other less important bodies, the "condition of insularity" is still considered as a marginal aspect within cohesion policies and ESI funds' implementation[3].

Islands, as widely known, show peculiar features, and have to face special geographical, economic, demographic and social challenges in the context of European policies' implementation: a small size (surface, population, economy), a limited local market, serious difficulties to achieve scale economies, high transport costs, poor local enterprise connections and entrepreneurial skills, underdeveloped infrastructures and business services (compared to continental situation), limited social and education services for citizens and, more recently, a wide and serious migratory phenomenon.

In the European Document on 2021-2027 Planning, approved by the Conference of Italian Regions on 21 February 2020, it was highlighted, among other things, that post-2020 cohesion policy should consider carefully islands' situation, recognize their strategic role and create the conditions for their equal and coherent development compared to other European areas. More specifically, the European Institutions were formally requested to adopt regulations and planning schemes to balance territorial discontinuity, defining a specific "insularity index" depending on territorial extension, population, geographical and travel distance from the continent and most developed national areas. The final goal is to promote a islands' social, economic and environmental development in urban areas as well as inland isolated areas, with fewer population and services, according to the provisions of TFEU art.174.

Following to the aforementioned 2016 European Parliament resolution and 2017 European Committee of Regions' opinion, on the occasion of budget law approval in Italy a debate has started about planning ad-hoc financial, infrastructural and tax-reducing measures addressed to islands, recognizing their economic and structural disadvantages in terms of higher costs for goods' export and raw material import, mobility, road and railway infrastructures and support to economic businesses on a national and European level.

Only by implementing these rebalancing measures, European islands, especially Sicily and Sardinia, will be able to relaunch their growth prospects and share their

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European island) out of the total 17 million European islanders, consequently it has to focus on the condition of insularity as of its main public policy priorities.

3 A total of 17.7 million people live in 362 islands with over 50 inhabitants in 15 European countries (3.7 million in outermost regions and over 6.6 million in Sicily and Sardinia); in these regions GDP per capita is under 80% of EU average and a significant part of them still belong to under-developed region category, so they face specific structural and permanent difficulties which entail for their companies additional costs and penalise their development prospects. Most of these islands (classified as NUTS 2 and 3) have not completed their process of economic convergence, and in the last 20 years their situation has even deteriorated, in particular due to financial crisis, austerity policies adopted by Member States, poor innovation and a worsened connection and transport situation.

strategies to reach territorial continuity and enjoy tax benefits[4].

2. With reference to national law, it must be outlined that the Italian Constitutional Court in its ruling no. 6 of 2019 considered illegitimate a part of article 1, paragraph 851 of Law no. 205 of 2017, due to the reason that "it has not allocated in favour of the Autonomous Region of Sardinia within the period 2018-2020 the necessary resources to agree with national authorities the most appropriate conditions within public finance agreement, according to its constitutional rights[5]».

This is a crucial legal step, which confirms a principle already stated by the Constitutional Court itself, stating that national budgetary policies should be arranged in close agreement with regional authorities. National law is then not oriented to consider, within financial relations between national and local authorities, "tax duty" as a "tyrannic rule[6]".

In order to give effect to its ruling, the Court, on the basis of constitutional, enabling and jurisprudential legislation, determined which criteria should be used to quantify 2018-2020 financial support to the autonomous region of Sardinia, with a view to a final State-Region agreement. These criteria are: 1) regional finance amount compared to national finance; 2) regional institutional duties and related financial resources; 3) permanent structural disadvantages, insularity cost and per capita income; 4) average amount of public finance contributions charged to public bodies in the same period of time; 5) allocation amount to finance essential services connected to civil and social rights[7].

With particular regard to insularity status, despite the previous fund cancellation provided for by Article 119, third paragraph, of the Constitution, later eliminated in 2001 reform text, public law recognises this disadvantage and by Law no. 42 of 2009, Article 27, guarantees the adoption of rebalancing measures like tax benefits, infrastructure enhancement and implementation of equal conditions. According to this

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4 In this sense, it appears significant that both the Commissioner for Cohesion Ferreira and the Commission President Von der Leyen have communicated to Sicilian Regional Government their commitment to support the condition of insularity as an essential element to plan 2021-27 programming period.

5 On this ruling, see among others: G. Demuro, *The Island, the constitutional judge and the uninformed state*, in "The Regions", 2019-1, 319 ff .; F. Guella, *Unconstitutionality due to insufficiency: the Court criticizes the not previously agreed state quantification of the greater areas of regional expenditure, with an additive ruling of principle which nevertheless needs future agreement,* ibid., 331 et seq .; R. Montaldo, *From the Court a new "directive" sentence on the subject of provisions, between regional financial autonomy and inertia of the legislator*, in Giur. cost., 2019-1, 56 ff .; E. Talarico, *When constitutional judgments limit the discretion of the legislator's budgetary policies*. Notes to the sentence of the Constitutional Court n.6 / 2019, in www.dirittoeconti.it, 2019-1, 82 et seq .; A. Riviezzo, B*udget balance, loyal collaboration and the Pyrrhic syndrome* (short entry to the Constitutional Court 11 January 2019, n.6), in Regional Law, 2019-2; C. Forte, M. Pieroni, *The sentences n. 101/2018 and n. 6/2019 of the Constitutional Court: the relationship between law and budget and the effects of the rulings on public finance balances*, in www.forumcostituzionale.it, 2020-2 and Gaetano Armao contribution *Conditions of insularity and public air service obligations*, in Magazine dir. economy, transport and the environment, 2020, 36 et seq.

6 The sentence censures, among other things, the State delay in the application of the Court previous rulings, stating that the application cannot be indeterminately delayed, but it must occur promptly after the sentence publication and in any case before the adoption of following national budget law. It is "precisely the mechanism of "financial intervention priority" consequent to the rulings [of the] Court – as stated in the sentence - that characterizes a dynamic equilibrium principle, which fairly balances in financial matters the provisions of article 81 of the Constitution, the safeguarding of legislative discretion and an effective application of Constitutional Court ruling ». It follows that, in the adoption of budgetary policy, the legislator discretion is "limited" by Constitutional Court judgements, which must be implement promptly after their publication and in any case before the following budget law approval. In accordance to the mentioned principles, and after several warnings to the legislator to include rationally and proportionally the territorial autonomous authorities in the achievement of public finance objectives and duties, it was declared the constitutional illegitimacy of budget law provisions regarding the Autonomous Region of Sardinia for the period 2018-2020.

7 Finally, the ruling contains a warning to all involved parties, as well as all financial Courts, on the need to ensure a transparency of public accounts, and a compliance with the "*numerical budget rules*", as defined by the European Union.

provision, "following the failure to redefine financial relations between the State and the Autonomous Region of Sardinia in accordance with Article 27 of Law no. 42 of 2009, it should be noted that, almost ten years after the enactment of this law, the insularity issue and its disadvantages has never been taken into consideration in the definition of revenue and expenditure budgets for autonomous regions".

Therefore, this rule carries out, for the first time, a more careful interpretation of Article 27 of Law no. 42–2009, which becomes relevant for its constitutional recognition of insularity status, even without a specific quotation within the text of the Constitution itself. It will have crucial effects on financial relations between the State and islands' authorities, as it clearly recognizes "insularity cost" as a key factor to arrange these relations in a complete and appropriate manner[8].

As far as the Sicilian Region is concerned, it is worth remembering that, besides the recognition of the aforementioned principles, in the agreement between the President of Sicily and the Minister of Economy and Finance of 19 December 2018 it was stated (point 7) that: "In order to promote the establishment of European and non-European companies and people in Sicily, national and regional authorities will plan any possibility to provide for development taxation benefits, depending on the availability of financial coverage, in accordance with the procedures agreed within negotiating committees on regional financial autonomy, local taxation and insularity status[9]".

As a matter of fact, the Sicilian council has long under-considered to ask the national government for the recognition of this status (at least since 2012), but this issue was focused again in 2018 and included in a preliminary agreement with national government.

With reference to this, by Resolution n. 265 of 18 July 2018 including Regional law n.8, art.70 of 8 May 2018, on "Regional interventions aimed at promoting a European recognition of insularity status", the regional council asked the national government to quantify exactly insularity cost and promote the needs of Sicily and other islands within European institutions. The main goal is the definition of island-addressed policies and rules, such as an "insularity statute", in line with overall cohesion policy, not a derogation from the European legislation obligations.

A similar request was submitted to Italian and French governments by an inter-institutional assembly representing Sardinia and Corsica councils ("*Consulta corso-sarda*"), by a resolution of 4 July 2017 "On the recognition of insularity status in the implementation of Article 174 TFEU[10]".

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8 In line with the above-mentioned concepts, but not included in this research, it is useful to observe that the condition of insularity may be considered as a necessary and sufficient prerequisite to adopt development tax measures consistent with EU Treaties, but not considered as a State aid pursuant to art. 107 and 108 of the TFEU and of Regulation no. 2015/1589 of the EU Council of 13 July 2015.

9 To ensure the respect of Sicilian citizens' rights to territorial continuity, it was requested to approve a regime of air and sea transport reduction (as it is already the case for Sardinia), providing the necessary financial resources within state aid schemes. Specific measures are envisaged to fulfil a proper application of the treaties' provisions regarding island aids and in the same way of Article 349 TFEU provisions with regard to outermost islands, on the assumption that insularity must be considered as a permanent structural disadvantage penalising competitiveness. Moreover, it should be provided an integration of the requirements stated by TFEU art. 107, par. 3 lett. a), to consider these aids compatible with internal market, considering also the Court of Justice guidelines, stating that this derogation concerns the regions where the economic situation is extremely disadvantaged compared to the Union as a whole, and so provide the implementation of a development taxation regime.

10 The European Parliament, by its aforementioned resolution of 4 February 2016 on the condition of insularity: - encouraged the Commission to provide a clear definition of permanent geographical, natural and demographic disadvantages that island regions may can present with reference to Article 174 TFEU; - invited the Commission to explain how it intends to implement the provisions of Article 174 TFEU with regard to the permanent

Some ad-hoc committees have been established after the agreement of 19 December 2018 between Sicilian authorities and the Ministry of Economy and Finance to analyse more carefully the issues concerning Sicilian autonomous status. Within the works of a special insularity committee to discuss tax benefits and special regimes, the members of a regional delegation asked the national government to submit to the European Commission the requests mentioned in regional council resolution n. 265 of 18 July 2018. In particular, in order to recognise the insularity status within new structural funds' negotiations, it was requested to know whether the European Commission had implemented the requests indicated in European Parliament resolution of February 4th 2016[11].

During the works of this committee, they also asked national authorities to urge the Commission to achieve, or start, the aforementioned study/analysis on additional costs deriving from insularity condition by referring to ESPON (European Spatial Planning Observatory Network) parameters and regional competitiveness index (RCI).

In this regard, the Ministry of Economy representatives pointed out that insularity issue peculiarities may properly be submitted to the European Commission within the definition of regional aid rules referred to regional state aid orientations, of ad-hoc regional aid charts for each member state and of regulations regarding state aid exemption.

The Sicilian delegation has then proposed to start a constructive discussion to agree the application of European provisions in the field of aids to insular regions, mentioned in European Parliament Resolution of 4 February 2016, as well as in article 349 TFEU with regard to outermost islands.

3. On the subject of insularity status, some proposals to (re)insert it among constitutional provisions should be mentioned, referring to a specific State obligation to support disadvantaged regions and act to remove their economic gaps. It is not just a question of principle or constraint to apply the measures adopted by the Italian State, but an important legality pillar within the provisions defining the principles of cohesion, solidarity and equality, clearly stated in art. 119 of the Constitution, in full compliance with other general constitutional, legal and administrative provisions.

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handicaps of island regions, which hinder their development and prevent them from achieving economic, social and territorial cohesion; - invited the Commission to set up an 'Island desk" within the Commission's Directorate-General for Regional and Urban Policy (DG REGIO), composed of officials responsible for analysing and coordinating islands' issues; - invited the Commission to present a specific communication containing an '*Agenda for EU islands*' and, subsequently, a '*White Paper*' monitoring the development of insular regions based on best practices, with the participation of local, regional and national authorities and other relevant actors, like economic and social partners and civil society representatives; - requested the Commission to start an in-depth study/analysis on transport additional insularity costs for passengers, freight, energy supplies as well as SME access to markets; - believes that there should be an ad-hoc definition/categorization for islands, which takes into account not only their differences and peculiarities, but also their specific situation; - asks the Commission to establish a homogeneous category for all islands, based on Article 174 TFEU, which recognizes the condition of insularity; - asks also the Commission to take into account other statistical indicators, in addition to GDP, reflecting the economic and social vulnerability resulting from permanent geographical handicaps.

11 Furthermore, it was pointed out that the opinion of the European Committee of the Regions of 12 May 2017 on "*Entrepreneurship in islands: a contribution to territorial cohesion*", at par. 30: - stresses that many factors that specifically hinder islands' development may not be quantified using GDP per capita as an indicator; - proposes therefore to broaden the range of complementary indicators used in the context of cohesion policy, in order to improve the analysis of islands' socio-economic situation; - suggests two further indicators: regional competitiveness index (RCI) and accessibility index; - recommends to continue the researches to point out which further indicators may fully describe insularity additional costs; - recommends the Commission to carry out studies aimed at comparing the performance of island and continental businesses, even when continental counterparts are other Member State islands.

In particular, the Sicilian Regional Assembly in its session of 19 February 2020 approved a *legge-voto* (legislative decree no. 199) containing the "Inclusion in Sicily's special statute of article 38-bis on the recognition of disadvantages deriving from the insularity condition", submitted and planned in the agenda of the Commissions for constitutional affairs of the Chamber (pdlc. n. 2445) and the Senate (ddl n. 1792). This proposal of a constitutional law regards art. 38-bis, stating that: "the State recognizes the disadvantages deriving from the insularity condition and will provide any necessary measure or intervention to ensure equal rights to Sicilian citizens", so that the adoption of insularity rebalancing measures may become a constitutional parameter to plan national public policies.

This proposal is connected, moreover, to a popular legislative proposal, which postulates the inclusion of insularity condition in art. 119 of the Constitution (legislative decree no. 865 containing a "Modification of art. 119 of the Constitution, concerning the recognition of serious and permanent geographical disadvantages deriving from insularity"). It was submitted to the Commission for Constitutional Affairs of the Senate, which unanimously approved a final text providing the inclusion in article 119 of the Constitution, after the fifth paragraph[12], of these lines: "The Italian Republic recognizes island peculiarities and will carry out any necessary measure to remove the disadvantages deriving from insularity".

Text approved unanimously by the Commission on the day this report was presented.

Palermo, 30 October 2020

12 Before 2001 constitutional reform, notably, it provided that: "to fulfil specific purposes and particularly to support Southern Italy *(Mezzogiorno*) and islands, the State by law provides ad-hoc regional contributions", consequently eliminating a (non-exclusive) state priority addressed to Mezzogiorno and Islands' support interventions.

An estimation of insularity cost in Sicily

1. Insularity as a condition of disadvantage

Insular regions, either nearest or furthest from the continent, have some basic features that make them different from continental regions. This derives from the incontrovertible fact that insularity, considered as territorial discontinuity, causes several economic, environmental, social, demographic and transport disadvantages to islands compared to continental areas. Insularity has become an important issue within the political, economic and social debate also in the European Union, which includes a great number of small and large islands[13].

Insularity is primarily a disadvantage to growth opportunities, to the extent that "*...it produces social and economic delays and makes the rights of island citizens more limited and weaker compared to continental ones. A significant example may be the ancient question of transport costs, considerably higher for island services. An island is naturally in a disadvantaged condition and its inhabitants cannot have the same opportunities as continental ones*"[14].

In a European context this issue is largely debated with regards to its relevance to policy planning[15]. The European Commission itself carefully considers the adoption of ad-hoc policies to balance islands' gaps in line with the objectives of Cohesion Policy[16]. As an example, some correcting factors aimed at compensating the negative effects of insularity have been included among the criteria to define financial allocations under Cohesion Policy and FAS funds within 2007-2013 and 2014-2020 programming cycles, in order to increase the resources allocated to the islands of Sicily and Sardinia. The Regional Intergroup for Insularity within the European Committee of Regions has carried out an advanced analysis to define which policy objectives[17] should be achieved to ensure substantial equal treatment and social rights

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13 The European Union includes a large number of islands and residents; 28 percent of insular population lives in Sicily (see paragraph 2), which therefore represents a relevant example of a European region "with geographical specificities" including also the smaller islands' district under its jurisdiction (Article 174 TFEU and resolution 3014 of 2015). Article 174 of Lisbon Treaty states that "In order to promote its harmonious overall development, the Union should develop and pursue any initiative to strengthen economic, social and territorial cohesion. In particular, the Union should implement any intervention to promote a harmonious economic development as well as territorial cohesion. In particular, it should aim at reducing disparities among the unbalanced levels of economic development in different regions and notably support underdeveloped and disadvantaged regions . A particular attention must be given to rural areas, areas subject to industrial transition and regions suffering from a severe and permanent natural or geographical handicap, such as outermost scarcely populated regions in northern Europea, islands, mountain regions and transnational areas. "

14 Tommaso Edoardo Frosini, Insularità e Costituzione, Rivista giuridica del Mezzogiorno, anno XXXIV, 2020, n. 1.

15 Insularity as a cause of geographical disadvantage has been also pointed out by the European Commission, which recognised that specific policy actions addressed to islands should be carried out to fill in this gap. To support this view, see the European study "The Development of islands - European Islands and Cohesion Policy" (EUROISLANDS 2011), which provides information on the environmental and economic parameters that can negatively and/or positively affect islands' attractiveness. Some of these factors can be accessibility, geographical discontinuity and a consequent more difficult access to transport infrastructures.

16 Cohesion Policy, among other things, has the mission of contributing to rebalance economic and social competitiveness in specific territories.

17 See *Manifesto for European islands*, approved by the Regional Insularity Intergroup of European Committee of the Regions, December 2019: - to take into account territorial dimension and guarantee equal development opportunities to the islands, - to focus on the issues of insularity and territorial discontinuity as key factors within European transport policy, - to carry out a European investment policy that provides for specific measures and instruments to support insular governments, - to modify the current legislation on regional state aids, in order to harmonize its application all over European insular territories, - to carry out specific measures, which must take into consideration the vulnerability of islands to face climate changes, - to encourage the transition of islands' economy to

to island inhabitants[18].

In a national context, however, the island disadvantage has been under-considered and very few specific provisions or actions have been taken to compensate the insularity gap and guarantee equal rights to these citizens. On the basis of such objective evidence, Sicilian regional council has strongly supported the issue of balancing the insularity disadvantages[19] within the latest year negotiation with national authorities to implement in Sicily an independent financial taxation system. Another relevant related issue discussed during this negotiation is the implementation of economic development taxation to attract investments, businesses, people and improve infrastructural network.

These issues are strongly underlined in regional planning documents (EAER, NaDEFR, etc.), in order to define a proper agreement with national authorities and EU introducing some measures to balance territorial discontinuity and support Sicilian enterprises and citizens[20]. With regard to policies, several analysis and proposals have been put forward[21] and more generally, the typical features[22] of island disadvantages have been identified as follows:

1. Isolation and geographical distance;
2. Limited market size;
3. Limited road transport;
4. Economic impact of mono-specialization;
5. Economic weakness;
6. Lack of attractiveness for workers and businesses;
7. Limited access to information and communication technologies.

Finally, oppositely to the mentioned disadvantages, it should be considered that such condition of insularity and geographical isolation increase the protection of environment, ecosystems and cultural heritage, promoting some key economic sectors like tourism .

Considering the wide and complex features of the above-mentioned aspects, this study represents a first general analysis introducing to more in-depth studies in specific sectors, which may improve the policy-maker knowledge and support his decisions.

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a circular model, - to improve enterprise competitiveness in islands, - to strengthen the European tools of territorial analysis and create a ad-hoc statistical category for islands, - to create specific bodies competent on island issues within European institutions.

18 See the relevant sentence no. 6 of 2019 of the Italian Constitutional Court, which recognizes "the costs of insularity" and "the permanent structural disadvantages" of islands.

19 See Common Document of Sardinia and Sicily approved by the Conference of Regions and Autonomous Provinces of 11/14/2019 "For the recognition of compensation measures for insularity in 2020 budget law" and in taxation system.

20 See what was specified by the Constitutional Court in its sentence no. 6 of 2019 as well as in recent Constitutional law n. 865, aimed at amending article 119 of the Constitution by introducing after the fifth paragraph: "*The State recognizes the serious and permanent natural disadvantages deriving from insularity and will carry out the necessary measures to guarantee in insular regions an equal and effective enjoyment of individual and inalienable rights* ".

21 Previous studies propose numerous theoretical models that analyse the effects of islands' distinctive features on economic development. Among these we may mention the "Trade Gravity Model", which considers the negative consequences of market distance, the "New Economic Geography", which explains how a joint effect of distance and small size can influence the choice of a company location, or the "New Trade Theory", which evaluates the scale economy key role and its effects on trade network.

22 See the analysis carried out by Corsica Chamber of Commerce, which indicates, on the base of previous studies' data, some categories listing thee negative consequences of insularity (Chambre de Commerce et d'Industrie de Corse, Impact de insularité en Corse sur la performance économique des entreprises , Juin 2019, p. 17 ff.).

2. The main Sicilian gaps in a European and national context

The European Union is characterized by a large number of islands with over 50 inhabitants (362), which have a total population of 17.7 million inhabitants, 3.7 million of which in the ultra peripherical regions. Sicily has approximately 5 million residents (28 percent of overall island population) and is one of the largest and economically most relevant islands in Europe, with a peculiar geographical insular area including also a smaller island close district. Average GDP per capita of this population is quite modest, that is 79.2% of EU GDP average, so that a significant part of these islands is included among the least developed European regions[23].

In such context, there is a strong wealth and GDP difference among European islands, as you can see in Figure 1, which shows the amounts of GDP per capita in some Nuts2 and Nuts3 European islands[24]. The figure shows that GDP per capita in a few selected Northern European islands is higher than EU average and higher also than GDP in all 362 European islands. Oppositely, GDP per capita in Southern European islands is much lower than EU GDP average and GDP of all 362 islands.

Fig. 1 - GDP per capita in some European islands in 2018

Source: Elaboration based on Eurostat data

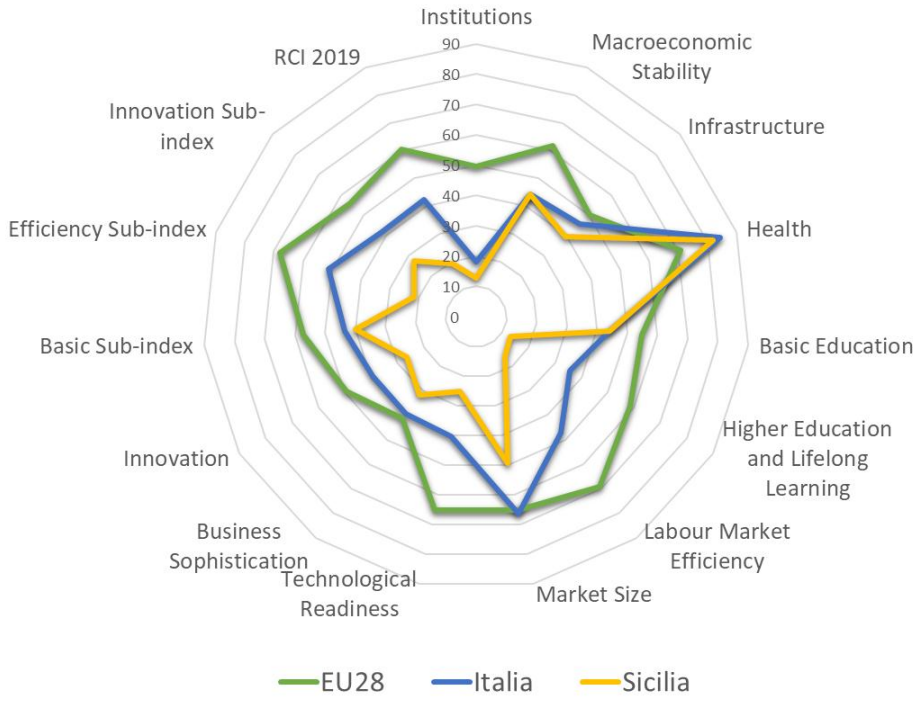
In a general European context, most of the social and economic indicators, adopted by European Commission to carry out spatial and temporal comparisons among Nuts2 regions, in Sicily are below the Italian and European average. The competitiveness framework may be summarised by using a complex indicator called

23 Referring to 2010 data, published in the Opinion of the European Committee of Regions on: "Entrepreneurship in the islands: a contribution to territorial cohesion" (2017 / C 306/10) presented by Marie-Antoinette Maupertuis (FR / AE), Corsica regional councillor.

24 Italo Meloni, Benedetta Sanjust di Teulada, The condition of insularity as an economic disadvantage. The case of Sardinia, XXXVIII Italian Conference of Regional Sciences, Cagliari, 20-22 September 2017.

Regional Competitiveness Index (RCI)[25], which is calculated every year. Sicily shows within this framework negative values in some relevant sectors like: infrastructure, human resources, innovation and administrative institutional efficiency (figure 2). Both in Italy and in Sicily, the only sector showing a better situation compared to Europe is health, with regards to mortality rate for various causes (suicides, road accidents, early death age, circulatory and cancer diseases).

Fig. 2 - Competitiveness Index in 2019

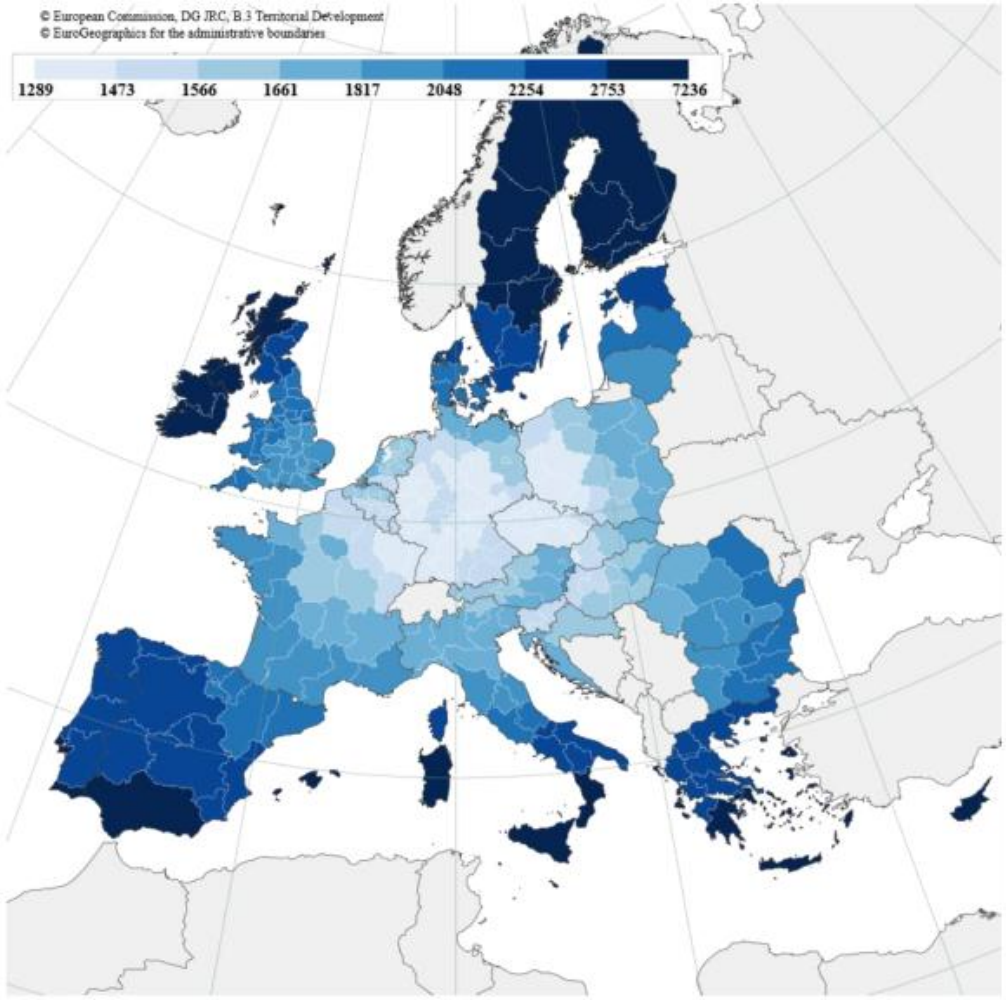


Source: European Commission

The highlighted gaps may also be related to the peripherality of these regions and their relevance could be further investigated by using proxy variables quantifying their relevance, such as average transport cost rate, which penalises the whole socioeconomic territorial system. Figure 3 shows average transport cost in Nuts 2 European regions, compared to other European regions. The sensibly higher amount of transport cost in Sicily is particularly evident, it is the region with the most expensive average transport cost in Italy.

25 https://ec.europa.eu/regional_policy/en/information/maps/regional_competitiveness, Regional Competitiveness Index (RCI) which measures the main competitiveness factors in the last ten years for all NUTS-2 regions in 'European Union. The Index includes over 70 comparable indicators, measuring the capacity of a region to offer an attractive and sustainable environment for businesses and residents' life and work.

Fig. 3: Average transport cost in European regions



Source: Persyn , D., Díaz-Lanchas , J., and Barbero , J., quot., Fig. 3, p. 10.

Moreover, even in a national context, Sicily has historically been characterized by a significant gap with respect to other Italian regions, as shown by the main socio-economic indicators.

During the latest 30 years, this gap compared other Northern Italian regions has become even wider, especially for infrastructure system, which inevitably penalises its competitiveness performance within national productive system and domestic and international trade.

The main macroeconomic data show these differences: in 2018, Sicily GDP per capita was 17,721 Euro, at the penultimate position among Italian regions (followed by Calabria), with a gap of 1.266 Euro compared to the average in Southern Italian regions (figure 4). In the same year, the unemployment rate in Sicily for over 15 population was 21.5 %, about 3 % below Southern Italy average rate (18.4%) and twice national average rate (10.6%).

A cross-section analysis comparing GDP per capita and unemployment rate in Italian regions, based on the latest available official data regarding 2018, is an evidence of an inverse relation between GDP per capita and unemployment rate with different rates in more developed regions, transition regions and least developed regions. A historical analysis of 2008-2018 GDP per capita in Sicily, Southern regions and all Italian regions

shows that the gap dividing it from Italian and Southern regions has not become smaller in any way, with a slight data progressive difference since 2014 (figure 5).

Fig. 4 - GDP per capita and unemployment rate by regions - 2018 (absolute values and % values)

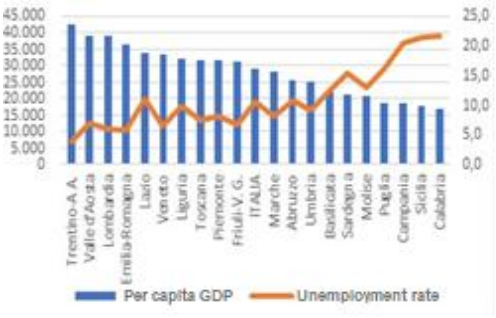
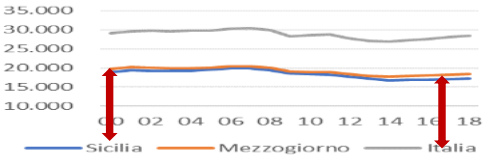


Fig. 5 - GDP per capita in Sicily, Southern Italy and Italy - period 2000-2018 (chain linked values for 2015)



Source : Elaboration based on Istat data

With regard to gross fixed investments, which is the variable that can increase productive skill rate and balance the existing infrastructural gap, in figure 6 it is possible to observe that the values in Sicily are nearly always lower than in all Italy and Southern Italy, and tend to decrease more markedly because of its low attitude to investment, especially during 2008 financial crisis, showing its tangible effects until 2015 especially in particularly fragile economic systems, like Sicily. With regard to trade rate with foreign countries (import and export), which is an important indicator to assess the trading attitude in an economic system, in figure 7 we can observe, in particular, that Sicily shows wider positive/negative fluctuating values compared to Italian and Southern Italian regions (*Mezzogiorno* area), resulting in a more serious vulnerability compared to reference markets[26].

Fig. 6 - Gross fixed investments - Period 2008-2017 (incidence % on GDP , chain-linked values for 2015)

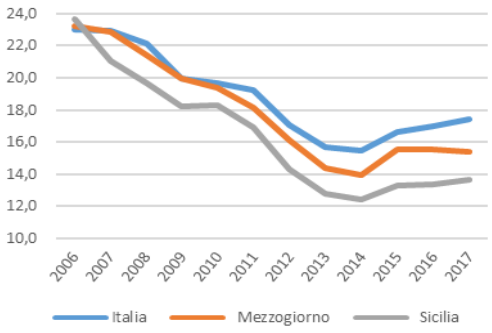
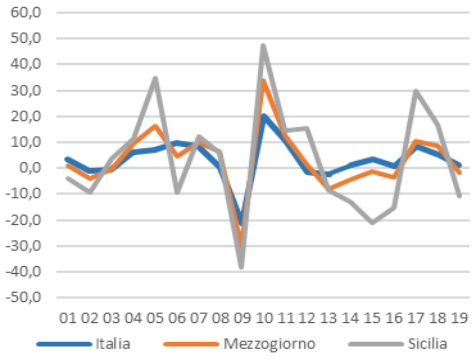


Fig. 7 - Import and export - Period 2001-2019 (% rates

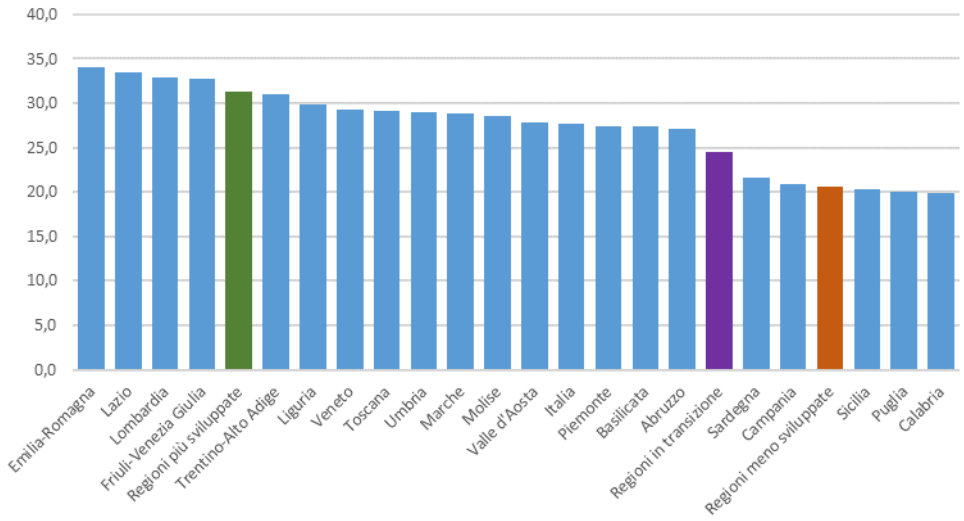


Source : Elaboration based on Istat data

26 It is relevant on this subject to underline Sicily's specialization in the processing of petroleum derivatives, whose production traditionally covers over 60% of regional exports and is strongly influenced by variations in prices and in raw material demand. However, it should also be remembered that this is a regional economic sector with a significant incidence of high value-added imports.

To complete the picture about Sicilian disadvantages, another element must be mentioned, which is both the cause and the consequence of a low economic dynamism, namely the investment in human resources. In figure 8 we can observe how the share of highly educated people (calculated as the ratio between the population aged 30/40 who has achieved a 5/6 education level according to "Isced" scale and the total population of the same age[27]) is smaller than the average in Italy and in Southern Italian regions.
What comes out is the low level of tertiary education in Sicily (20.3%), standing below the less developed regions' rate (20.6%), followed by Puglia and Calabria.

Fig. 8 – 30-34 yrs. tertiary education rate by regions - 2019 (% rates)



Source: Istat.

Finally, it should be noted that historical Sicilian condition as a disadvantaged and underdeveloped region, which has never been overcome, has presently worsened due to Covid 19 pandemic: the region is undergoing its post-war most serious decline, with a more serious and pervasive impact on different economic sectors and areas than the one caused by the Italian speculative bubble in 2008.

In other words, we are witnessing not only a health emergency, but a severe economic and social crisis with short-term consequences as well as structural negative effects, deepening the gap between Sicily and other European regions.

3. Experimental estimations of insularity cost.

Scientific studies offer numerous examples of evaluation procedures aimed at estimating the insularity socio-economic impact on a given territory. However, an

27 ISCED (International Standard Classification of Education) is an international standard created by UNESCO to classify educational ranges and qualifications from 1 to 7: 5 and 6 ranges are equal to secondary school and University (three-year level) qualifications.

overall assessment of insularity costs requires a significant effort, because of the different factors involved and an unclear reference policy and non-uniform methodology to define insularity. In this respect, the European Parliament adopted a resolution on 4 February 2016[28], stating that "*there should be an appropriate island definition/categorisation, that takes into account not only their differences and peculiarities, but also their specific situation*", requesting the Commission to create a homogeneous category suitable to all insular territories, on the basis of Article 174 TFEU. The resolution also calls on the Commission to "*take into account other statistical indicators, in addition to GDP, which can reflect the economic and social vulnerability resulting from permanent geographical* disadvantages[29]".

To start an analytical evaluation procedure, whose results may support policy decisions, the first objective was to carry out a macroeconomic estimation of insularity effects/costs in Sicily, and subsequently to create a more complex model and give a value to any "cost item".

It was necessary to carry out a preliminary evaluation of insularity economic impact, which may be a reference to the institutional activity; consequently, after considering the existing studies on the subject, it was decided to follow two non-alternative methodological approaches and give a quantitative value to the basic hypothesis.

In this study we intend:

1. To measure, on the basis of **an econometric model** referring to a series of explanatory variables, the impact on GDP per capita of appropriate indicators linked to territorial wealth resources. What is obtained is an overall macroeconomic assessment, which, however, may not define the cost of any single component affected by insularity, and is also influenced by the model chosen, the variables available and the set of data used;
2. To evaluate the insularity effects on transport costs and then evaluate, using **MMS - Regione Siciliana multi-sector model** the overall effects of higher transport costs on Sicilian economy, with reference to goods' international export and other demand variables depending on price variations (household consumption, etc.). Then this approach, partly similar to the one used to assess the economic effects of SEZs[30] (Economic Special Zones) in Sicily, will provides an estimation of this very relevant insularity effect.

The **first approach,** based on the research work carried out in 2020 by IBL Institute[31] (Istituto Bruno Leoni) follows an econometric model, referred to economic development existing studies, to measure the average annual impact of insularity on GDP per capita and overall GDP; as noticed above, however, it may not give a value to any cost item due to insularity. This model firstly defines an island features from the economic point of view, by pointing out three factors, that must occur jointly: i) small size tendency; ii) remoteness; iii) vulnerability. Specifically, a tendency to create small size entities may cause in turn a tendency to establish a self-referent economy, a less efficient use of productive factors and a condition of

28 Procedure 2015/3014 (RSP), https://www.europarl.europa.eu/doceo/document/TA-8-2016-0049_IT.html

29 G. Armao, *Insularity and self-government,* in Saija, M., Anchustegui, E., Armao, G. (2016). Self-government and autonomy. Comparing Basques and Sicilians, Padova, 33 et seq .; See point 5 of the Resolution.

30 See: Regione Siciliana, "Strategic Development Plan for Special Economic Zones in Eastern Sicily", see in particular paragraph 5. "The expected social and economic impact ", p. 173; http://www.euroinfosicilia.it/zes-sicilia-orientale-e-occidentale

31 Carlo Amenta, Carlo Stagnaro and Luca Vitale, The cost of insularity. The case of Sardinia, IBL Briefing Paper 189, 24 August 2020. For theoretical references, see, in particular, p. 10-11.

structural delay; a remote distance causes a general increase in transport costs, a non-integration in neighbouring markets and related specializing opportunities, an increase in the unitary cost of locally produced and imported goods; finally, vulnerability increases the risk of suffering from the negative consequences of exogenous economic or environmental shocks. These three factors are strictly linked, so that "*the limitations of small-size islands become more serious if they are vulnerable and far from the markets, the limitations of remoteness are wider for vulnerable and small islands and vulnerability has worst effects in small and remote islands. If any of these factors tends to decrease, most of the disadvantages linked to insularity are reduced*"[32].

The **second approach** intends to measure the transport cost gap due to insularity and its rebound effects on economic actors and reference activities. This approach is based on two different steps: i) an estimation of insularity extra-cost obtained from the comparison between transport cost in Sicily and in a benchmark area; ii) an evaluation of higher transport cost impact on Sicilian economy measured by MMS. In particular, REGTCS database was used to simulate the effects of transport cost variations, as already applied by "JRC Policy"[33], which assessed the infrastructure investment economic effects on motorway network and the consequent transport cost saving amount[34]. A partially similar strategy has been adopted in MMS model, which contains a representation of a complete price-list in 29 regional economic branches. Prices are included in the equations that measure the final demand factors (household consumption, goods' international exports, etc.), as well as public employment income.

3.1. Econometric estimation based on per capita GDP

As already described, this procedure is based on an econometric model used by Bruno Leoni Institute, using a territorial data panel from 2000 to 2018, on which a regressive procedure with fixed effects has been built[35].

In the present research, it was chosen to present the results deriving from the original application of IBL model as well as of a **variant** model. In the original block of equations some changes have been introduced, in order to plan a model more suitable to the represented territory peculiarities, by adding an infrastructure explanatory variable (inclusion of regional ports), as well as modifying the part representing human skills (inclusion of the rate of graduates).

IBL model is as follows:

$$GDPpc_{it} = \beta_0 + \beta_1 Distance\_continent + \beta_2 Interest\_active\_rate_{it} + \beta_3 Savings\_GDP_{it} + \beta_4 Highway\_sup_{it} + \beta_5 Railways\_sup_{it} + \beta_6 Publicspending\_GDP_{it} + \beta_7 Illiterate_{it} + \beta_8 Airports_{it} + \beta_9 Interchange\_comm_{it} + \beta_{10} Surface_{it} + \varepsilon_{it}$$

Variant model is as follows:

32 Ibidem, pag. 8

33 "Joint Research Center" is the research center of the European Commission which produces scientific advice to support policy; https://ec.europa.eu/knowledge4policy/organisation/jrc-joint-research-centre_en

34 See Persyn, D., Díaz-Lanchas, J., and Barbero, cit., pp. 14-19.

35 For econometric model analysis, GRETL software (Gnu Regression, Econometrics and Time-series Library) was used, a multi-platform package for statistical and econometric analysis written in C programming language, open source and free. A panel is a sample that contains observations on N items for T years, ie. the observations on each element are repeated over a period of time (time series data on each element). In the present case Italian regions are the elements. The fixed effects' model measures the specific effect in a deterministic way, that is, the set of specific characteristics of each element , which however remain unchanged over time.

$$GDPpc_{it} = \beta_0 + \beta_1 Distance\_continent + \beta_2 Interest\_active\_rate_{it} + \beta_3 Savings\_GDP_{it} + \beta_4 Highway\_sup_{it} + \beta_5 Railways\_sup_{it} + \beta_6 Publicspending\_GDP_{it} + \beta_7 Illiterate_{it} + \beta_8 Airports_{it} + \beta_9 Interchange\_comm_{it} + \beta_{10} Surface_{it} + \boldsymbol{\beta_{11} Ports_{it}} + \boldsymbol{\beta_{12} Tertiary\ education\ rate} + \varepsilon_{it}$$

In both models we have:

1. *GDPpc* is the annual gross domestic product per capita in Sicily, according to Istat regional data;
2. *Distance_continent*: a variable that measures the distance from the continent. Obviously, this variable assumes a positive value only for Sicily and Sardinia – Continent_averagereggio measures the average distance between the routes Cagliari-Rome and Sassari-Rome to Sardinia (495 km) and Palermo-Reggio Calabria and Catania-Reggio Calabria to Sicily (183);
3. *Interest_active_rate* is the average active interest rate of regional banks, data source is the Bank of Italy;
4. *Savings_GDP* is a proxy of regional savings' amount, based on the ratio between the amount of bank deposits and regional GDP, according to Bank of Italy data;
5. *Highway_sup* measures the ratio between highway network kilometres and regional extent. Data source is Istat;
6. *Railways_sup* measures the ratio between railway network kilometres and regional extent. Data source is Eurostat;
7. *Publicspending_GDP* is the amount of regional public expenditure. Data source is Istat;
8. *Illiterates* means the illitterate population rate in different regions; in particular, this variable is calculated as a ratio between the number of illiterates and the resident population according to 2011 census. This variable represents a human capital proxy. Data source is Istat;
9. *Airports* means the number of airports recognized by Enac (military or inactive airports are excluded). Data source is ENAC;
10. *Interchange_comm* is the variable that represents the ratio between Import and Export total amount and Gross Domestic Product in different regions. Data source is Istat;
11. *Surface* means regional territorial extent;

In the **Variant** model we have the following integrations in regressor composition:

12. *Ports* means the number of ports in a region. Data source is Istat;
13. *Tertiary education rate* indicates the ratio between 30-34 aged population with a 5/6 education level (Isced7) and the total amount of same aged population. Data source is Istat.

The interest coefficient in this model is obviously β1Distance_continent. This coefficient represents an economic disadvantage influencing per capita income and is connected to continent distance unitary increase, therefore to insularity condition. It might be defined as an implicit tax charged on island residents. This disadvantage, multiplied by continent distance, provides an approximate measurement of regional GDP loss per capita, which, multiplied by regional resident population, may give a first general estimation of insularity cost charged on overall GDP.

The choice of IBL model to measure kilometre distance is linked to goods and people logistical movement. With regards to distance from Sicily, it was chosen the nearest geographical province (Reggio Calabria). This choice, which is still under investigation, represents a first generally reasonable proxy to define a concept of distance from

reference markets, identifying the geographically closest continental point. As shown in tables 1 and 3, the coefficient of continent distance is negative and highly significant in both models.

Tab. 1 - Regression results - IBL estimates (Bruno Leoni Institute)

Variables	**GDP_pc**
β1Continent_averagereggio	**-11,57 *****
β_2*Interest_active_rate*$_{it}$	-4,326 ***
β_3*Savings_GDP*$_{it}$	-6,366 ***
β_4*Highway_sup*$_{it}$	54,483 ***
β_5*Ferrovie_sup*$_{it}$	-24,628* *
β_6*Publicspending_GDP*$_{it}$	5,556 ***
β_7*Illiterate*$_{it}$	-2,705 ***
β_8*Airports*$_{it}$	-177,6
β_9*Interchange_comm*$_{it}$	-7,420 ***
β_{10}*Surface*$_{it}$	0,0816
Constant	58,075 ***
Observations	*378*
R-squared	*0,839*

Source: IBL model - *** *significance level at 99%*

IBL model shows that it is possible to quantify Sardinia annual GDP loss per capita, that is 5,700 Euro.[36] The value of this variable is obtained by multiplying estimated value of GDP per capita loss per each kilometre of distance (ie. about 11.6 according to an estimated value of β1Continente_mediiareggio) by the average distance between Cagliari-Rome and Sassari-Rome (equal to 495 kilometres). Taking into account a 95% confidence interval, the insularity cost for Sardinia is between 3,800 and 7,600 Euro per capita.

The same value of GDP per capita loss per each kilometre of distance (about 11.6) can be applied to Sicily, so multiplying GDP per capita loss by average distance between Palermo-Reggio Calabria and Catania-Reggio Calabria (equal to 183 kilometres), we obtain a GDP per capita loss of 2,123 Euro. Therefore, the amount calculated on overall GDP is 10.6 billion Euro, equal to 11.9% of GDP (Table 2).

With regard to other model variables, it is possible to note a negative effect of rates regarding illiterate population in the last census (used as a proxy for human capital), railway network kilometres, bank active interest rate and trade rate, which may cause inefficiencies and higher trade costs, and so accentuate insularity negative effects. Public expenditure is obviously a positive and significant aspect within GDP framework. The other variables considered do not yield statistically significant results (table 1).

Tab. 2 – Estimated costs based on GDP and resident population (IBL)

Regions	Loss of GDP per capita	GDP at current prices (2018)	GDP per capita (2018)	Resident population (2018)	Insularity Cost	Share on GDP
Sicily	**2.123**	88.843.600.000	17.721	4.999.891	**10.614.768.593**	**11,9%**
Sardinia	5.700	34.578.300.000	21.034	1.639.591	9.345.668.700	27,0%

Source: IBL model

36 Extra transport cost that contributes to this result is quantified in Meloni and Teulada study (op. Cit. Page 19) and is equal to 660.3 million euros for 2013, that is 2.1% of 2013 regional GDP.

In the **Variant model**, as mentioned above, it was decided to include two new explicative variables, namely "**Ports**" and "**Tertiary education rate**", to complete the list of territorial features including accessibility and human resources' skills. The introduction of these two variables led to a clearer explanation of overall variability, being R^2 equal to 0.840, and at the same time to a decrease of distance coefficient β1Continent_medium, which was -11.57 in IBL model and -7.15 in the variant model. This variation results in a less negative insularity impact on GDP per capita, as the availability of ports increases accessibility rate in the two islands compared to national average (Table 3).

Table 3 - Regression results – Variant estimation on IBL basis

Variables	**GDP_pc**	
β1Continent_averagereggio	**-7,15**	** *
β_2*Interest_active_rate*$_{it}$	-3,92	***
β_3*Savings_GDP*$_{it}$	0,55	
β_4*Highway_sup*$_{it}$	9,22	***
β_5*Ferrovie_sup*$_{it}$	-9,07	***
β_6*Publicspending_GDP*$_{it}$	5,26	***
β_7*Illiterate*$_{it}$	-15,98	***
β_8*Airports*$_{it}$	0,68	
β_9*Interchange_comm*$_{it}$	-6,44	***
β_{10}*Surface*$_{it}$	3,55	***
β_{11}*Ports*$_{it}$	-11,44	***
β_{12}*Tertiary education rate*	5,11	***
Costant	16,42	***
Observations	*380*	
R-squared	*0,840*	

Source: NVVIP elaborations on IBL model and Istat/Eurostat data
*** *significance level at 99%*

The **Variant model** quantifies GDP per capita loss per year for Sardinia as 3,539 Euro, (obtained multiplying the estimated value of GDP per capita loss per each kilometre of distance, i.e. 7.15, by average distance between Cagliari-Rome and Sassari-Rome, equal to 495 kilometres).

For Sicily the Variant model yields to a GDP per capita loss of 1,308 Euro, (again calculated multiplying the estimated value of GDP per capita loss per each kilometre of distance, i.e. 7.15, by the average distance between Palermo-Reggio Calabria and Catania-Reggio Calabria ,equal to 183 kilometres).

Taking into account a 95% confidence interval, insularity cost in Sicily is between 600 and 1,990 Euro per capita. Consequently, considering overall GDP, it is possible to estimate an annual insularity cost in Sicily equal to nearly 6.5 billion Euro, that is 7.4% of GDP (Table 4).

Table 4 – Estimate of costs based on GDP and resident population (Variant model)

Regions	Loss of GDP per capita	GDP at current prices (2018)	GDP per capita (2018)	Resident population (2018)	Insularity Cost	Share on GDP
Sicily	**1.308**	88.843.600.000	17.721	4.999.891	**6.542.107.378**	**7,4%**
Sardinia	3.539	34.578.300.000	21.034	1.639.591	5.802.512.549	16,8%

Source: NVVIP data elaboration

3.2 Estimation of transport cost impact

An estimation of insularity cost using MMS[37] model includes two "steps": the first one is based on a comparison between transport costs in Sicily and in a benchmark area, while the second one aims at measuring its rebound effects on regional economic actors and reference activities by using MMS model resulting in an estimation of insularity gap. In previous studies, this kind of evaluation had been carried out for Sardinia, in order to measure the island accessibility by maritime transportation[38] on the basis of some reference parameters like remoteness (real distance), isolation and geographical discontinuity (transport frequency and waiting times). The resulting indicator was then used to compare accessibility to Sardinia and to another continental region, proposing a methodology to monetise the disadvantage due to insularity. Considering both goods and passenger maritime transport, total extra cost including travel and waiting time was estimated in 2013 as 660.3 million Euro, equal to 2.1% of Sardinia GDP[39].

First step

With reference to a methodology adopted in the EU considering a wider database, a preliminary assessment of the insularity impact on transport costs may be obtained using REGTCS[40] database, published by JRC, which measures the distance, travel time and transport costs across European regions including 267 Nuts 2, i.e. all the geo-administrative units equivalent to Italian regions[41].

More precisely, two indicators provided by REGTCS database were used to carry out this preliminary estimation:

- **total transport cost**, referred a 40t articulated lorry average travel cost between the centroids of each pair of regions[42]. This parameter includes cost items such as wages, fuel, motorway tolls, etc. For island-bound travel, it was included the cost of ferries for wheel vehicles;
- **GDP of European regions** situated at the start or destination of commercial flows, which can be used to create transport cost weighted averages, reflecting the distance between regions and their potential market size.

For each Nuts2 European region, a transport cost average was calculated compared to other European regions, both simple and weighted with GDP of destination region. The results for Italian regions are presented in Table 5.

37 As this is a preliminary assessment, this study mentions the potential controls and improvements that can be applied to the procedure, considering an eventual further analysis of this approach.

38 Italo Meloni, Benedetta Sanjust di Teulada, cit., p. 1.

39 Ibidem, Table 9 p.19.

40 Persyn, D., Díaz-Lanchas, J., Barbero, J, Conte, A., and Salotti, S (2019). *A new dataset of distance and time related transport costs for EU regions*. Territorial Development Insights Series, JRC119412, European Commission; Persyn, D., Díaz-Lanchas, J., and Barbero, J. (2019). *Estimating road transport costs between EU regions*. JRC Working Papers on Territorial Modelling and Analysis No. 04/2019, European Commission, Seville, JRC114409.

41 For territorial unit classification (NUTS) see: Eurostat, Statistical regions in the European *Union and partner countries* - NUTS and statistical regions 2021, 2020.

42 On the use of centroids for estimating the distances between regions see Persyn, D., Díaz-Lanchas, J., Barbero, J, Conte, A., and Salotti, S, cit, pp. 6-8.

Table 5 – Average transport costs in Italian regions

Regions	Average	Weighted average with GDP	Average	Weighted average with GDP	weighted average/average
	Absolute values		*Italy index number*		
Piemonte	2.069	1.848	84,0%	78,2%	-10,7%
Valle d'Aosta	1.985	1.740	80,6%	73,6%	-12,4%
Liguria	2.158	1.951	87,6%	82,5%	-9,6%
Lombardia	1.985	1.795	80,6%	75,9%	-9,6%
Provincia Autonoma di Bolzano	1.848	1.701	75,0%	71,9%	-8,0%
Provincia Autonoma di Trento	1.917	1.761	77,8%	74,5%	-8,1%
Veneto	2.002	1.876	81,3%	79,4%	-6,3%
Friuli-Venezia Giulia	1.977	1.902	80,3%	80,5%	-3,8%
Emilia-Romagna	2.113	1.981	85,8%	83,8%	-6,3%
Toscana	2.212	2.077	89,8%	87,8%	-6,1%
Umbria	2.327	2.229	94,5%	94,3%	-4,2%
Marche	2.365	2.277	96,0%	96,3%	-3,7%
Lazio	2.525	2.439	102,5%	103,2%	-3,4%
Abruzzo	2.548	2.479	103,5%	104,9%	-2,7%
Molise	2.704	2.669	109,8%	112,9%	-1,3%
Campania	2.799	2.769	113,7%	117,1%	-1,1%
Puglia	2.910	2.934	118,2%	124,1%	0,8%
Basilicata	2.944	2.952	119,5%	124,9%	0,3%
Calabria	3.243	3.271	131,7%	138,3%	0,9%
Sicilia	3.711	3.753	150,7%	158,8%	1,1%
Sardegna	3.371	3.243	136,9%	137,2%	-3,8%
Nord Ovest	*2.049*	*1.833*	*83,2%*	*77,6%*	*-10,5%*
Nord Est	*1.971*	*1.844*	*80,1%*	*78,0%*	*-6,4%*
Centro	2.357	2.255	95,7%	95,4%	-4,3%
Sud	*2.858*	*2.845*	*116,1%*	*120,4%*	*-0,4%*
Isole	*3.541*	*3.498*	*143,8%*	*148,0%*	*-1,2%*
Italia	***2.463***	***2.364***	***100,0%***	***100,0%***	***-4,0%***

Source: Prometeia elaboration on REGTCS database

We can observe that transport cost gap in Sicily has the highest index among all Italian regions. Consequently, based on a simple average, transport cost index in Sicily is 50.7% higher than Italian average and 29.8% higher than in Southern continental regions. Furthermore, taking into account the economic size of destination regions, transport cost indexes in Italian regions change significantly, decreasing in north-western regions (-10.5 per cent), north-eastern regions (-6.4 per cent) and central regions (-4.3 per cent) .

Southern regions show a modest average transport cost decrease, balancing actually a slight index increase in Puglia, Basilicata, Calabria and Sicily, the regions with the most difficult access to Italian and European markets. Using an average value weighted on GDP, Sicily's transport cost gap reaches 58.8% compared to national average and 31.9% compared to Southern Italy average (table 5).

On the basis of these preliminary calculations, this last result can represent an estimated value[43] of Sicily's insularity gap[44].

43 Alternative estimates of transport cost gaps may be obtained using PBL_EUREGIO database, originally elaborated by "PBL Netherlands Environmental Assessment Agency" and then included in JRC RHOMOLO model,

Second step

In this second processing procedure, REGTCS database was taken as a reference to simulate the effects of transport cost variations, as already applied by "JRC Policy", which assessed the economic impact of infrastructural investments on motorway routes and consequent transport cost saving[45]. A partially similar strategy was adopted in MMS model, which contains a complete price representation in 29 regional economic branches. Prices are included in the equations that measure final demand factors (household consumption, goods' international export, etc.), as well as public employment income.

Theoretically, total logistic costs may not coincide with transport and storage cost in the same branch. According to previous studies, total trade logistic costs are attributable to four elements: transport costs, warehouse costs, stocks' costs and administrative costs[46]. Consequently, the estimation of the cost of goods logistics starting from the information of national accounts and input-output tables is a complex operation that requires several steps[47]. Though it may represent a quite difficult work, such analysis based on regional data would identify very precisely logistics' data in Sicily[48].

For a preliminary estimation, it was considered sufficient to simulate the economic effects of decreasing transport costs in Sicily to the values in a benchmark area (southern regions). In operational terms, following MMS model, *Transport and storage* costs would decrease enough to fill-in the above mentioned 31.9% gap and consequently, with the help of this model equations, it would be possible to quantify the rebound effect on prices in other sectors (considering also production costs), on final demand and on salaries.

Following this approach, it is not possible to differentiate the cost of freight logistics

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which provides an estimation of goods and services' trade flows throughout European regions in different sectors. By referring to both REGTCS and PBL_EUREGIO databanks, it would be possible to calculate the incidence of each aforementioned cost in each sector and for each European regional trade flow. To achieve this result, however, it is necessary to overcome some difficulties, that is:

- harmonizing geo-administrative nomenclature of both databases, which refer to two different editions of Eurostat NUTS.

- updating PBL_EUREGIO figures for regional aggregates (sectoral added value, etc.), which at a first check seem different from those included in Istat/Eurostat regional economic accounts. An update of PBL_EUREGIO to include latest official data may therefore be necessary.

Taking into account these still unsolved problems, PBL_EUREGIO database was not used in a preliminary estimation.

See Thissen, M., Diodato, D., and Van Oort, F. (2013). *Integrated regional Europe: European regional trade flows in 2000.* BPL Netherlands Environmental Assessment Agency, The Hague; Thissen, M., Diodato, D., and Van Oort, F. (2013). *European regional trade flows: An update for 2000–2010.* PBL Netherlands Environmental Assessment Agency, The Hague; Thissen, M., Di Comité, F. Kancs, D., and Potters, L. (2014). *Modeling inter-regional trade flows: Data and methodological issues,* in RHOMOLO. Working Paper 02/2014, ISBN: 978-92-79-44509-5, doi: 10.2776 / 871154, European Commission, Directorate General for Regional and Urban Policy, Brussels .

44 The gap value (31.9%) is obtained from the ratio between a weighted average in Sicily (158.8%) and in continental South (120.4%).

45 See Persyn, D., Díaz-Lanchas, J., and Barbero, cit., pp. 14-19.

46 Antonio Dallara (2014) *The total cost of goods logistics at national level: an estimation method,* Journal of Economics and Transport Policy, n. 3.

47 Antonio Dallara, cit., Box 1, pp. 17-18.

48 For example, an important element in Dallara's estimation methodology is represented by internalized transport services (in-house). In 2008, goods' road transport for one's own account represented 31% of national road transport (Antonio Dallara, cit., P. 28). Due to an increased outsourcing of transport services, this rate decreased over the years from to 31.1% in 2008 to 21.3% in 2015 and 16.8% in 2018 (ISTAT, Road freight transport). In Sicily, the transport rate on one's own account is higher: it was 58.3% in 2008 and then dropped to 30.3% in 2018. To avoid yearly fluctuations, reference value may be an average for 2013-2018 period, which is 31.1% in Sicily (20.5% of national average).

and passenger logistics, but to calculate price decrease in other connected activities (land, maritime and air transport services, warehousing and transport logistics, mail and courier services). REGTCS transport cost indicator is supposed to measure the cost gap for freight road transport and also for storage and other transport services.

Table 6 shows the results of this simulation and a comparison of different rates in a general framework of 2010-2016 Sicilian economy. This counterfactual analysis by MMS model shows what would happen if transport and warehousing prices had an exogenous 23% reduction compared to early 2010 values. Prices in different productive sectors are closely interdependent, so the deflator impact on added value of transport and storage cost is -31.4 per cent (i.e. a value very close to previously estimated gap compared to southern regions) in the first simulation year, reaching progressively -47.0 per cent after 7 years, as soon as economy stabilized again.

Table 6 - The effects of transport and storage price reduction. A counterfactual analysis 2010-2016. Variation rates compared to a general background

Cod.	Variables	2010	2011	2012	2013	2014	2015	2016
	Prices							
CA_DVAI17	Exogenous shock prices transport. and storage	-23,0%	-	-	-	-	-	-
DVAI7	Prices transport and storage	-31,5%	-36,4%	-39,1%	-40,8%	-42,9%	-43,6%	-47,0%
DVAT	Total economy prices	-3,1%	-4,4%	-5,4%	-6,4%	-7,2%	-8,0%	-9,5%
	Impact on the regional economy:% values							
PIL	Gross domestic product	2,4%	3,3%	4,0%	4,7%	5,0%	5,6%	6,8%
MX	Net imports	2,1%	3,1%	3,6%	4,2%	5,0%	5,5%	6,9%
XT	Internati. Exp. of goods	0,7%	1,4%	2,1%	3,1%	4,5%	6,6%	8,1%
CF	Household final consump. Expend.	0,5%	0,8%	1,2%	1,5%	1,8%	2,1%	2,4%
CC	Final consump. Expend. of GPAs	0,2%	0,3%	0,5%	0,6%	0,8%	0,9%	1,1%
IFL	Gross fixed investments	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
KREDD	Disposable household income	3,0%	4,1%	5,0%	5,9%	6,6%	7,3%	8,9%
KRED1	Income from employment	3,0%	4,1%	4,9%	5,9%	6,6%	7,4%	9,2%
N	Employees	0,1%	0,3%	0,7%	1,1%	1,6%	2,1%	2,8%

Source: Prometeia MMS model for Sicily.

Considering aggregated data, the application of a one-off transport price reduction would affect progressively in the selected period the whole regional economic system, reaching -9.5 per cent in the last year. Price reduction would affect crucially goods' export rate, which would increase at end of the period by 8.1 per cent within the general scenario. In real terms, an increase would occur also for other connected values, such as household consumption (+2.4 per cent) and AAPP final consumption expenditure (+1.1 per cent), consequent to price reduction and household income increase (+8.9 per cent in real terms).

Within the general scenario, GDP increases by 6.8 percent and employed rate by 2.8 percent after 7 years (table 6).

Some final considerations are necessary to complete this counterfactual analysis. Within MMS present scheme (version 4.0), gross fixed investments are predetermined (exogenous) and therefore do not react to a transport cost reduction or other regional economic variables, as reported in Table 6 results. Within MMS, regional trade towards other Italian regions is not linked to prices[49] and consequently to transport costs.

As a matter of fact, within this counterfactual scenario net imports (in real terms)

49 In Italy there is no available information on prices on a regional basis (except for agriculture) and therefore it is not possible to compare interregional trade according to prices. The value added deflators that can be obtained from Istat regional economic accounts result from re-weighting national deflators on a regional basis and consequently are completely equalled to national average data.

follow GDP trend, leading to the unrealistic conclusion that Sicily trade balance referred to the rest of Italy would not be affected by a transport cost reduction. It is a limitation which occurs in a representation of the channels used to apply transport cost variables to other regional economic variables, which may be later modified carrying out ad hoc interventions, for example about interregional trade[50].

Finally, it should be noted that the impact on regional economy of transport extra-cost due to insularity is equal to 6.8% of Sicily GDP, higher than the estimated rate for Sardinia (2.1 % of 2013 GDP, according to Meloni and Teulada study; see note 2.4.). The differences between these two estimated values may arise from several factors[51]:

1. in Sardinia it was considered only insularity extra-cost on maritime transport, while in Sicily all transport modes and related activities (warehousing, etc.) were included;
2. if we consider transport costs calculated by REGTCS database indicators (including flows all over European regions), Sardinia presents a smaller gap between its parameters and average national ones. Consequently, for Sardinia transport costs are 36.9% (simple average) and 37.2% (average weighted with GDP) higher than national average, while for Sicily the same parameters are respectively 50.7% and 58.8% higher (see above, Table 1).
3. calculation methods are very different and this may affect the results. In Sardinia it is considered only the monetary cost of longer travel times, while in Sicily the estimation takes into account a wider range of factors.

Conclusions

Geographical disadvantages like remoteness, insularity or poor accessibility are common to many EU regions and should be faced by corrective political actions, which must take into account not only these disadvantages, but also any consequent advantage deriving from their adoption. In particular insularity, considered as territorial discontinuity, determines many other local economic, environmental, social, demographic and transport disadvantages, compared to continental regions, as pointed out in several previous researches.

In the present study we have tried to provide a preliminary estimation of insularity cost in Sicily, by applying two different methodological approaches:

- the **first approach** is based on an analysis of the main factors affecting insular regions' development, that is "dimension", "distance" and "vulnerability". These factors have been quantified using some historical proxy variables applied for the latest twenty-year period to all Italian regions. A regressive model was applied to obtain an econometric estimation of insularity cost in Sicily, equal to **6,54 billion Euro,** that is **7,4 percent of regional GDP** (referring to 2018 values) .
- the **second approach** is based on MMS, "*Regione Siciliana multi-sector model*", and carries out a counterfactual analysis to estimate extra-transport costs penalising Sicily and its economic activities and actors, as well as the economic impact of a

50 In future updates of this model, it will be also possible to update the estimated values of different variables with respect to international export prices.

51 With regard to this comparison, and other controversial aspects highlighted above, further in-depth analysis may be carried out, depending on the needs of Sicilian regional authorities and the availability of European and national statistical data.

cost reduction for transport and warehouse services. According to this procedure, this reduction will have a highly positive effect, making transport cost average in Sicily equal to southern continental regions, resulting in an **regional GDP increase of 6.8 per cent (2018),** ie. approximately **6.04 billion Euro.**

Further deeper studies may (and must) be carried out using more detailed estimation models reflecting regional peculiarities. Nevertheless, the above proposed models, despite their methodological differences, give both effective results to estimate the impact of insularity extra-cost on Sicilian economy.