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Territorial Scenarios and Visions for Europe (ET2050)

Territorial Analysis of Scenarios at Mediterranean level

Main & Scientific Report

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Synthesis

Demographic trends are heterogeneous between and within the south European countries depending on economic, social, cultural and spatial factors. Challenges that need to be met are: the spatial concentration of positive or negative demographic development, the population, the ageing population (Italy is the second oldest of the world), migration and growing immigration. The analysis of the GDP per capita performance revealed that the area is far from being cohesive with Greece, Cyprus and Spain facing severe problems of economic instability due to the economic crisis. Urbanisation has been particularly growing along the coastal strip while tourism is the greatest consumer/user of the Mediterranean coast. The area offers a route for exchanges of manufactured products between Europe and Asia, as well as for the supply of Europe with energy products from the Gulf countries. The most pressing challenge is related to possible climate change impacts on the regional energy infrastructure. Finally, in the region, there are a number of political and institutional initiatives of cross border cooperation such as the Mediterranean Action Plan.

According to the baseline scenario (2010-2030) the gaps between regions within Southern countries will grow, creating explosive social and political conflicts at national and European level. These countries are expected to show the same demographic diversity as today with a high net migration and a mild overall increase in old age dependency in comparison to the northern Europe. In terms of GDP per capita, the economic crisis is likely to have continuing impacts in most regions of the Southern European countries, however, with a positive total employment growth rate and diverse results in manufacturing and service employment. Overall passenger and freight accessibility is expected to increase below EU average with a few exceptions around important cities.

Concerning exploratory scenarios for 2030, in **Scenario A**, Southern European population is lower than in the Baseline, despite increased immigration, because of lower fertility. The comparatively high immigration in this scenario results to a strong reduction of the speed of ageing in the promoted regions of southern Europe. GDP growth is higher than in the baseline scenario in all southern countries of Europe with minor exceptions while the gains of employment growth (also in service and manufacturing) in almost all regions are positive due to increased external demand. Road will remain the main mode for passenger transport but Scenario A causes rail share to decrease by one half. The Scenario also shows a 32% average speed increase compared to Baseline 2010. In **Scenario B** population is slightly higher than in the Baseline due to higher immigration. It is the most expansionary scenario in terms of GDP due to the higher and more efficient exploitation of territorial capital elements and local specificities in both large and second rank cities. Employment growth rates seem to be comparable between the southern European countries and the rest of ESPON area and among the southern countries while service employment is more expansionary than manufacturing. Road will remain the main mode for passenger transport but Scenario B provides for moderate rail modal share increases. This scenario also maintains approximately the same speeds as Baseline 2010. **Scenario C** will lead to a more balanced distribution of population between various categories of regions with a reduction of aging in the peripheral and rural areas mostly due to a reduced emigration of working age population. This scenario presents on average a relatively slower rate of GDP growth with respect to the Baseline scenario driven mostly by slower growth in these countries where rural and peripheral areas tend to benefit more. Employment growth in this scenario takes place mostly in the most promoted regions while there is a clear distinction of regions in terms of manufacturing and services employment growth. Road will remain the main mode for passenger transport but rail has the highest growth potential in this scenario, up to 12% in 2030 compared to 6% in 2010. This scenario also maintains

approximately the same speeds as Baseline 2010. Finally, in all scenarios, long distance mobility is expected to grow below average from 2010 to 2030 and because of an increase in energy-saving techniques, the whole of southern European countries presents a noticeable decrease in CO2 emissions (especially in scenario C). Also, global accessibility tends to remain concentrated in the core of Europe, indicating that key global hubs (ports and airports) will mostly remain inside the Pentagon, in the future.

Regarding exploratory scenarios for 2050, in **Baseline scenario** there will exist a significant gap in income between the southern countries with the prosperous old EU member states in western and northern Europe and the new member states in Eastern Europe. According to MULTIPOLES model, total population of the southern regions will follow the trends of the entire European growth, continuing to grow up until 2050. **Scenario A** performs best in terms of competitiveness and economic growth with the already dominant largest metropolitan areas and their immediate surroundings gaining the most while southern European countries are expected to experience a decrease in their overall population between 2030 and 2050. In **scenario B**, countries are expected to experience a decrease in their overall population between 2030 and 2050. In terms of GDP per capita, even though an overall increase is expected for the southern countries until 2050, inside southern countries the results are quite diverse. Finally, **Scenario C** seems to strengthen the still economically lagging regions in southern Europe producing the lowest generative effects because subsidies are directed primarily at peripheral regions with low productivity. The overall southern population is expected to decrease while most regions in the south of Europe are expected to show a positive change in GDP per capita with a few exceptions of regions around important cities.

The Present state

Demographic trends are heterogeneous between and within the south European countries depending on economic, social, cultural and spatial factors. Challenges that need to be met are: the spatial concentration of positive or negative demographic development, the population, the ageing population (Italy is the second oldest of the world), migration and growing immigration. Regarding population growth at national level, central and eastern countries have experienced a modest increase in population in the last years mostly caused by immigration mostly from bordering countries. On the contrary the non-EU countries and Spain have lost a significant part of their population due to emigration. The main handicaps are found in islands where a minimum population threshold, 3,000/4,000 habitants, is not reached. In spite of more restrictive EU migration policies, migratory flows are still high. In 2006, European Mediterranean countries (ES, FR, IT, GR) welcomed over 11 million foreign residents.

The analysis of the GDP per capita performance revealed that the area is far from being cohesive with Greece, Cyprus and Spain facing severe problems of economic instability due to the economic crisis. With reference to the economic activity level and growth performance two patterns are visible in the area since economic strength is obviously influenced by the status of EU integration: old EU member countries are usually performing better economically than new EU member states, which in turn perform better than EU candidate, potential candidate and other countries. The strong Euro-Mediterranean interdependencies at the western Mediterranean constitute southern European countries of the west as essential export markets with an increasing residential economy in coastal areas of Southern Europe. Demographic ageing and the increased spending power of

some older age groups has prompted a growing trend to utilise their role as popular retirement destinations to boost economic growth. Development of a region's residential economy usually focuses on consumer services, health, leisure, culture and education, tourism, financial services and home related services. The jobs created are often relatively poorly paid and low skilled. In the long term, there is a perceived risk that the dominance of these activities could discourage development of higher value-added activities for which more skills are required. This could increase the fragility of local economies.

Urbanisation has been particularly growing along the coastal strip, to accommodate both permanent and temporal population, with the result of a substantial modification of the coastal areas often and adverse effects on the quality of the environment. It should be pointed out that because of both climate and historical/archaeological significance, the Mediterranean continues to be the greatest tourist destination in the entire world. Concurrently, tourism is the greatest consumer/user of the Mediterranean coast (In several coastal regions of Italy, France and Spain the coverage of built-up areas in the first kilometre coastal strip exceeds 45 %). The medium and small-sized cities are experiencing a steady growth, whereas they lack resources and technical capacities. The extent of decentralization in these countries is still quite weak, particularly at the financial level. The expansion of cities is mainly induced by the dynamism of unregulated housing.

South European countries generally have a well-trained and sectorally diversified labour force, with good levels of education. The research and development (R&D) system includes universities, other public and private R&D facilities, science and technology parks, innovation and transfer centres while universities and science centres are concentrated in urban areas or in regional economic centres.

The high photovoltaic (PV) potential of many of the regions in this group is an important asset for the future and could help to ease the strain of high demand for cooling in the summer time. The most pressing problems are related to possible climate change impacts on the regional energy infrastructure. These impacts are likely to be most severe in the Southern regions belonging to Spain, Greece, Portugal and France, both in terms of energy production and demand. In these regions, summers are going to be demanding for energy systems, due to diminishing water reserves, higher average temperatures and heat waves, and eventually, forest fires. The supply problems will coincide in time with higher peaks of electricity demand, derived from a more extended use of air-conditioning. As regards renewable energies, the Mediterranean holds a significant potential, particularly in terms of solar and wind energy. As of now, their contribution to meeting the demand is extremely low.

The Mediterranean offers a route for exchanges of manufactured products between Europe and Asia, as well as for the supply of Europe with energy products from the Gulf countries. Around 24% of the goods tonnage consists of energy products, with non-bulk goods accounting for 36% of the total. Container traffic originating in Asia and bound for European countries is preferentially unloaded in the ports of the northern range. The railway network of the south-eastern countries is not sufficiently developed mostly because of the mountainous morphology of the area. Some countries have efficient systems covering a part of their territory, while other countries have inefficient systems of rail transport. Discontinuities across the borders are very often the season of the limited efficiency of railway at the transnational level. Italy stands out in this respect. A rich and dense transport infrastructure network has been recently updated with fast trains connecting the major cities in the North and in the center of the Country. Slovenia enjoys a favourable position as the key of trade routes between Central Europe and the Balkans. Currently, it represents the

South-East border of the EU28. Its transport infrastructure may still benefit from further investment.

South European countries have undergone major land use changes through the last decades mainly due to the rapid urbanization of the coast, the abandonment of farms and grazing land, deforestation and the expansion and intensification of tourism-related activities and agriculture.

Earthquakes, floods and other fatal disasters regularly unveil a poor implementation of town planning and building rules. With the expected impacts of climate change, the vulnerability of urban areas to extreme hydrometeorological events, to warming and to sea level rise for the very low coastal cities, will be accentuated. With accelerated urbanization, management of household waste has also become a major concern for local authorities. Greater exposure of infrastructure to wave action and coastal storms could be cited as one of the most serious effects. The same problems will be faced by port installations, lagoon areas, and deltas.

Finally, in the region, there are a number of political and institutional initiatives of cross border cooperation. Mediterranean Action Plan, Union for the Mediterranean (UfM), Euro Mediterranean Free Trade Area (EMFTA), Mediterranean Sea Basin Programme as a part of the new European Neighbourhood Policy (ENP), EU-Morocco Action Plan, EU-Tunisia Action Plan, Trans-Mediterranean transport network and Regional Transport Action Plan, ICZM Protocol to the Barcelona Convention, Inter-Mediterranean Commission (IMC), Adriatic-Ionian Initiative (AII).

Impacts of Baseline scenario

According to the ET2050 Interim report, southern countries and regions growth in the last decade was not sustained enough by productivity and global competitiveness. If actual policies remain many of these regions will have in average just marginal growth in the next decade, pushing salaries down in many sectors, and the gap with many Central and Northern regions may grow twice the level as today. The deindustrialisation process will be slowed down because of the salary reductions, and touristic areas and the coastal zones will likely receive increasing senior residents from the rest of Europe. The gaps between regions within Southern countries will grow, creating explosive social and political conflicts at national and European level.

These countries are expected to show the same demographic diversity as today including countries –such as Greece- with more stabilized projections related to an already below replacement fertility as opposed to Cyprus and Albania, which until recently persisted in showing relatively high fertility. However, in some cases, it is unclear, according to the modelling results, why some regions will have a higher population change than others although they show different dynamics –for instance- the difference between Crete and the islands of the north eastern Aegean. The baseline scenario foresees a further process of population concentration in rich and industrialised areas in the Northern and North-Eastern areas of Italy, in the northern region of Greece at the borders of Turkey and Bulgaria, in Cyprus and the south eastern regions of Spain, attracting possible residents form the rest of Europe. On the other hand, regions at the southern part of Italy, at the Northwestern part of Greece, Portugal, the central and southern part of Slovenia and the northern part of Spain are expected to present negative growth rates.

It is likely that factors encouraging migration from Southern countries and the Balkans will remain such as demographic and income differences, economic emergence which encourages the migration of middle classes who risk losing status, political and economic crises. The baseline scenario foresees a mild net migration towards the Slovenian regions, a part of central and Southern Greece and the islands, central Italy and southeastern Spain. Interestingly, for Italy net migration to rich and traditionally industrialised areas in the North-West of the country is also matched by a remarkable process of in-migration towards most southern regions, on the Mediterranean coasts, arguably because of the weather and locational amenities. This result is line also with the case of Greece with a net migration at the western part of Greece matching to the negative population change. In the case of Spain, the negative net migration is related to high emigration and the regions affected must be those which had a lot of immigrants, so those that were developing fast previously. In terms of old-age dependency rate, Slovenia, Cyprus, the southern regions of Italy, the southern and eastern regions of Spain and the Greek regions where large cities are located show a remarkable increase.

For the period of 2010-2030, in terms of GDP per capita, according to MULTIPOLES and MASST forecasts, the economic crisis is likely to have continuing impacts in most regions of the Southern European countries. The GDP projection for Greece and central Spain is extremely negative. However, especially for Greece and for the most regions of the country (including Crete), GDP is not expected to be negative for the future years when including also the latest projections by the taskforce of IMF, EU and the World Bank that foresee a positive growth rate for 2014-2015 and on. The negative growth of the period between 2010 and 2014, however, makes the average 2010-2030 negative in the MASST simulation. Whilst Southern countries present a mild economic performance, with very low, yet positive growth rates, other areas in the macro region present a higher foreseen growth rate, such as Northern Italy, the region around Ljubljana in Slovenia that show positive medium run economic performance, with yearly average GDP growth rate up to more than 2 per cent (in the Slovenian case). These results are in line with the interpretation of the scenario describing Europe with increasing disparities.

In the baseline scenario, most of the regions present a positive average and non-negligible total employment growth rate. Yet, because of a larger expected GDP growth in several industrialised areas in Northern Italy, Cyprus and Slovenia, productivity gains can be expected. However, this does not seem to be the case for Greece and some parts of Spain. Although high numbers of more qualified young people are entering the job market because of the investment in education, due to the economic crisis, maintaining rates of job creation will not be sufficient to substantially reduce unemployment rates.

Certain regions of Greece, Portugal and Slovenia show an expansion of both manufacturing and services jobs especially in areas with long tradition of industrialization and also in coastal and island areas. Northern Italy, Zahodna Slovenija, southern Portugal Cyprus, some areas of central Italy and the area around Athens and the Ionian islands in Greece present a process of further expansion of service jobs while some parts of Spain around the capital and at the southern parts, certain regions of central and southern Italy and the southern central part of Greece are expected to show an expansion in manufacturing employment. Interestingly, because in several of the aforementioned areas GDP is expected to grow more than employment, these results suggest a process of restructuring of the portfolio of economic activities in these areas, towards higher value added products and services. However, internally, disparities among regions also increase.

Overall passenger and freight accessibility is expected to increase below EU average at the most part of the Southern European macro-region. Certain areas constitute an exception. Lombardy, with Milan's airport system, and Lazio, with Rome's, are expected to experience a higher than average growth of passenger accessibility. Surprisingly, Tuscany and Liguria, that are usually less well-connected areas, present remarkable growth of both passenger as well as freight accessibility. Barcelona and Valencia are, driven by relatively high role of manufacturing (exports) and the importance of the inland hinterland (imports), which comprises Madrid. Gibraltar, Marsaxlock (Malta), Gioia Tauro maintain a clear transshipment role in the future, by 2030, while Madrid will continue to act as a getaway to South America, and a like increase in Europe-Africa traffics and Cyprus as the link with the Eastern Mediterranean, Africa and the Middle-east. The results confirm that accessibility, measured in millions of equivalent population, is relatively high in southern western regions -at the level of the rest of Europe- and decreasing towards the central and eastern regions. It seems that infrastructure in Spain, even though excessing in capacity and high maintenance costs, is one of the key assets together with land availability.

Because of an increase in energy-saving techniques, the whole of southern European countries presents a noticeable decrease in CO2 emissions. Reductions follow the same pattern observed at a European scale, higher on more populated and industrialised regions that happen to be along the coastal zones and in capital cities.

In conclusion, regions with high educational attainment will be able to partially offset the effects of demographic change through higher labour productivity such as Northern Spain. However, in regions where the sharp decline in working-age population is coupled with a relatively low educational attainment will be particularly hit by demographic challenges (Italy, Bulgaria).

It is also expected that rural population will continue to decline as a result of the continuing migration from rural to urban areas, especially at the urban coast affecting the use of natural resources, eco-systems and nature conservation. It could also provoke particular implications for urban land use, infrastructure, housing markets and green spaces. Also ageing, immigrants and minority groups could create pressures for social and economic integration policies.

Impacts of exploratory scenarios 2030

Scenario A (Territorial Strategy: Promotion of Metropolitan Global Areas)

This scenario (in line with the FLOWS scenario from the Project Specifications) provides an image of Europe in which the territory is more dynamic, flexible and adaptable to technological, social and economic change. This scenario follows the Europe 2020 strategy of promoting global competitiveness of Europe by promoting the economic development of the largest metropolitan areas of global importance in Europe, i.e. of the 76 Metropolitan European Growth Areas (MEGAs) defined in ESPON 1.1.1 (2005, 118). The policies applied are mainly investments in MEGAs supporting of high-level R&D as well as European transport infrastructure, such as high-speed rail, and enhancing connections and long distance networks, favouring more efficient technologies and management strategies. More integrated trans-national zones emerge by the networking of cities in cross-border areas, and transport and energy corridors link major European centres of production and consumption with neighbouring countries and the rest of the World.

In Scenario A, Southern European population is lower than in the Baseline, despite increased immigration, because of lower fertility. A decrease in the number of births is predicted which, combined with an increasing number of deaths, would result in decreasing natural change especially starting from the 2015-2020 period. In almost all of the regions, population in Scenario A will be lower than in the Baseline scenario. The exception is the metropolitan area of Madrid and Barcelona in Spain due to an increased inflow of migrants. It seems that Scenario A leads to the concentration of population in the largest cities.

The comparatively high immigration in this scenario results to a strong reduction of the speed of ageing in the promoted regions of southern Europe. In exploratory scenario A the assumption on low fertility was also accompanied by the assumption on high net migration gains. Therefore, in Scenario A, characterized by high net migration, the national, cultural and ethnic composition of population will be much more heterogeneous than in the other scenarios, however lower compared to the baseline.

GDP growth is higher than in the baseline scenario in all southern countries of Europe with the exception of Murcia and Trento due to the fact that these regions are just crossed by the major corridors without being nodes. Unexpectedly, Portugal, Spain and especially Greece are not particularly damaged by competitiveness. These countries appear to take advantage of a re-launch of the European economy, increasing their demand for exports, able to overcome the still weak internal market as opposed to certain regions of central and southern Italy. As expected by a scenario of policy concentration, the highest gains in GDP growth rate are experienced in the most important urban poles, including Madrid, Lisbon, Rome, Ljubljana and Athens and some second rank urban areas such as Thessaloniki, Porto and Campania confirming that the Megas scenario not only favors the drivers, but also, due to growth spillovers, input-output linkages and increased demand, development spreads to the rest of the regions.

As with GDP, in terms of employment growth, southern countries are among the major winners, due to increased external demand. At regional level, the gains of employment growth in almost all regions are positive, but the regions with the largest increases are generally regions hosting large urban areas such as Madrid, Barcelona and Lisbon with Greece gaining ground for most of the regions. Scenario A is in favor of a reindustrialization based on a re-launch of new technological paradigms, higher rhythm of innovation, higher productivity linked to an increased share of high-level functions. Manufacturing employment growth is highly concentrated, especially at regional level, at the regions with the most important areas of their respective countries, namely Milan, Turin, Rome, Naples, Athens, Madrid, Barcelona, Lisbon. This is due to the fact that manufacturing is more advanced in this scenario with respect to the past and to the Baseline scenario, it involves a larger use of innovation and hence involves an increased share of high-level functions. Rural and peripheral regions have a lower manufacturing employment growth, as it concentrates elsewhere. This is true for Extremadura and Western Greece. Service employment growth is especially strong in Portugal, Slovenia, Cyprus and most part of Italy, where the increased demand creates an upsurge of tourism, fulfilling its potential in this sector. However, Greece and, although showing a better overall performance in GDP and employment growth, does now seem able to reach its full potential in terms of manufacture and services. Finally, a small number of areas show a good balance between service and manufacturing employment growth rates, with positive gains in both. This happens for example in the case of the areas around Porto, Rome, Ljubljana and central and northern Italy.

Long distance mobility in southern Europe is expected to grow below average from 2010 to 2030. The scenario results in less overall passenger·kilometres than the Baseline in 2030. The fact that the total number of trips in NUTS3 increase much faster than the total passenger·kilometres, indicates that trips tend to be shorter in 2030 than in 2010. Road will remain the main mode for passenger transport but Scenario A causes rail share to decrease by one half. The Scenario also shows a 32% average speed increase compared to Baseline 2010, meaning that the total number of hours spent in travelling in Europe increases with the number of passenger·kilometres travelled. Global accessibility tends to remain concentrated in the core of Europe for the Baseline scenario and the A Scenario, indicating that key global hubs (ports and airports) will mostly remain inside the Pentagon, in the future.

The scenario shows a relative decline of transport emissions and fuel consumption in relation to 2010. This is mostly due to the increase in vehicle efficiency (reduced emission factors in 2030 in relation to 2010), and larger shares of non-conventionally fuelled vehicles in the future. In terms of European accessibility, this scenario provides better accessibility for southern Europe mostly due to new motorways.

Scenario B (Territorial Strategy: Promotion of Cities)

This scenario provides an image of the European territory in which economic and population growth, as well as most private and public investments, take place within existing cities that give structure to the European territory: national capitals and major regional capitals as driving forces. It is a place-based scenario that follows the priority of the European Spatial Development Perspective (1999) and the two Territorial Agenda (2007; 2011) for balanced polycentric urban systems at the macro-regional or national scale for the 261 cities of European or national significance defined in ESPON 1.1.1 (2005, 114). Policies applied are mainly in the fields of Cohesion funds being mostly targeted to cities, including urban renewal and reurbanisation, and R&D investments distributed among cities, and promotion of regional and national transport networks. This scenario is characterised by economically strong and compact cities as centres of excellence. The increasing concentration of added-value activities in cities does not necessarily implies a process of rural decline, but its increasing functional dependency on large cities.

In Scenario B population is slightly higher than in the Baseline due to higher immigration. Similarly to scenario A, here also a decrease in the number of births is predicted which, combined with an increasing number of deaths, would result in decreasing natural change especially starting from the 2015-2020 period. In this scenario also medium sized cities have a population slightly larger than in the Baseline scenario due to increased inflows. The differences in the speed of ageing between this scenario and the Baseline generally follow the migration pattern assumed in the exploratory scenarios. In each scenario the promoted regions gain young migrants faster than the other regions, therefore the ageing in these regions is slower.

Scenario B is the most expansionary scenario in terms of GDP. The higher expansion of growth can be explained by the higher and more efficient exploitation of territorial capital elements and local specificities, present in both large and second rank cities that allow local economies to achieve higher competitiveness. Development based also on second rank cities implies the existence of an integrated and equilibrated urban system, made of efficient second rank cities working with first rank cities in providing quality services and

allowing the latter to avoid strong diseconomies of scale that can be of detriment to growth. The spatial distribution of regional GDP growth rates suggests a rather original model of development, centered around districts, cooperation networks, and Small-Medium Enterprises. In fact, development takes place mostly in medium-large cities, where the presence of SMEs, industrial districts, clusters is relatively larger. Therefore, this scenario suggests a particularly remarkable performance for Southern European countries and especially Spain, Italy and Greece.

The results of the Cities Scenario simulation also present interesting findings in terms of employment growth rates, following GDP growth rates. Employment growth rates seem here to be comparable between the southern European countries and the rest of ESPON area and among the southern countries. In terms of employment growth for services and manufacturing, in Scenario B, service employment is more expansionary than manufacturing for the southern European countries. This scenario is particularly expansive proved by the relatively large number of regions presenting both manufacturing and service employment medium-run (up to 2030) growth rates. Manufacturing employment has a particularly remarkable development in countries such as Spain, Italy and Portugal. Taking into consideration that this scenario tends to be manufacturing-driven, regions faring bad in manufacturing also tend to register mild GDP growth such as Greece that presents a relatively weaker manufacturing employment growth rates with respect to the Baseline. However, Greece benefits from an overall faster growth of European economies, doing particularly well in the service (and in particular, tourism) industry. A major impact of such a manufacturing-driven scenario is a tendency of substituting jobs from relatively high productivity manufacturing activities to service ones with relatively low-function jobs.

Just like in the other scenarios, long distance mobility in southern Europe is expected to grow from 2010 to 2030. The scenario results in less overall passenger·kilometres than the Baseline in 2030. The fact that the total number of trips in NUTS3 increase much faster than the total passenger·kilometres indicates that trips tend to be shorter for all scenarios in 2030 than in 2010. Road will remain the main mode for passenger transport but Scenario B provides for moderate rail modal share increases. This scenario also maintains approximately the same speeds as Baseline 2010, meaning that the total number of hours spent in travelling in Europe increases at the same rate as the number of passenger·kilometres travelled (0.7% speed increase in Scenario B). Scenario B and the Baseline scenario are the most coincident in terms of European accessibility (showing a general increase of core and western accessibility in Europe in relation to 2010).

The Scenario shows a relative decline of transport emissions and fuel consumption in relation to 2010 although less than the one observed in scenario A. Again, this is mostly due to the increase in vehicle efficiency (reduced emission factors in 2030 in relation to 2010), and larger shares of non-conventionally fuelled vehicles in the future.

Scenario C (Territorial Strategy: Promotion of Regions)

Scenario C provides an image of the European territory in which urban and rural territories form a mosaic of different regions and types of territories with identities nourished by local and regional governments able to cooperate in areas of common interest. This scenario responds to the challenges of energy scarcity and climate change expressed in the Territorial Agenda 2020 (2011) by promoting small and medium-sized cities as centres of self-contained and economically resilient regions with more sustainable mobility patterns

yet taking account of the necessary economies of scale of services of general interest and the prospects of an ageing society. Policies applied are mainly from the fields of cohesion funds targeting mostly rural less developed areas, and transport investments focused on local and regional networks. The focus lies on promoting medium-sized cities and reducing the existing imbalances at the medium and lower level of the urban hierarchy and their functions for the surrounding regions. Policies aim at organising the settlement systems in a more polycentric approach, economically resilient, at regional scale. Local production and local markets gain much importance, migration of skilled people from large cities to rural areas accelerates localism, large cities become further decentralized into more productive, slow neighbourhoods. Strengthening the social and economic balance of Europe at the regional level, promoting endogenous development and empowering regional institutions may lead to more efficient provision of public services. Many of the changes in this scenario are much lead by changes of values and behaviour of new generations, policy becoming a support for these.

In Scenario C, despite decreased immigration, the largest increase of population is observed particularly in central Spain and the western regions and north-eastern Aegean islands of Greece which is generally attributed to higher fertility. Also in this scenario, a small decrease in the number of births is observed despite the assumption on pro-family and pro-natalist policies and increasing fertility. The decreasing number of births, combined with an increasing number of deaths would result in decreasing natural change. Again, natural change would be negative (more deaths than births) starting from the 2020-2025 period. Southern rural and peripheral areas will benefit additionally from reduced emigration. At the same time, some large cities, such as Madrid, Athens, Rome, Barcelona and Thessaloniki will have lower population than in the Baseline, because of smaller inflows. Overall, Scenario C will lead to a more balanced distribution of population between various categories of regions. With a negative natural change, the growing extra-European migration will constitute a key balancing factor of population dynamics. In scenario C, the assumption on higher fertility was coupled with the one on low net migration, resulting in a more homogeneous national, cultural and ethnic composition of population. Also in this scenario, the reduction of aging in the peripheral and rural areas is related to a large extent to a reduced emigration of working age population.

This scenario presents on average a relatively slower rate of GDP growth with respect to the Baseline scenario for southern European countries. This is mostly driven by slower growth in these countries (as a consequence of the slowing down of growth in western regions) compared to the emphasis given to the New 12 countries, taking particular advantage of the “Regions” scenario. Within countries, irrespective of the macro area where regions are located, rural and peripheral areas tend to benefit more from this scenario such as Southern Italy, rural Spain and northern and central Greece. This also implies that, within each country, rural areas perform relatively better with respect to the baseline scenario.

Employment growth in this scenario takes place mostly in the most promoted regions with the exception of Italy that presents better results for some peripheral areas (Apulia, Campania and the islands). In scenario C there is a clear distinction of regions in terms of manufacturing and services employment growth. South European countries do not seem able to present better results for both services and manufacturing. On the one hand, the high social welfare requirements call for additional population services in Cyprus, southern Spain, northern Portugal and most of the Italian regions, and, on the other hand, a few regions in Italy, most regions in Greece and central and eastern Spain benefit from additional cohesion funds for the re-launch of industrial activities.

There also seems to be a positive correlation between GDP growth and manufacturing employment growth. Rural and peripheral areas benefit from a buoyant GDP growth, even higher than the increase of manufacturing employment, which testifies for a remarkable productivity increase, at the roots of the continuing process of convergence which can be found in this scenario. This increase in productivity is either obtained by the creation of qualified small businesses and handcrafting activities, or by eliminating inefficient industries, reconverting towards higher value-added sectors. Examples of this kind can be found in Spain, Greece and the Italian Adriatic coast regions. Additionally, some rural areas and metropolitan areas of peripheral countries register an increase in service employment, not enough to compensate for the loss of manufacturing jobs, ending up with a lower total employment growth rate with respect to the Baseline. When this situation is accompanied by a higher decrease in GDP growth rate, this implies a loss in productivity gains, probably due to the increase in low value-added service jobs. This situation can be found in northern Portugal.

The number of trips among NUTS3 increases 61% in Scenario C between 2010 and 2030. Just like in the other scenarios, long distance mobility in southern Europe is expected to grow from 2010 to 2030. The scenario results in less overall passenger·kilometres than the Baseline in 2030. The fact that the total number of trips in NUTS3 increase much faster than the total passenger·kilometres indicates that trips tend to be shorter for all scenarios in 2030 than in 2010. Road will remain the main mode for passenger transport but rail has the highest growth potential in this scenario, up to 12% in 2030 compared to 6% in 2010.

This scenario also maintains approximately the same speeds as Baseline 2010, meaning that the total number of hours spent in travelling in Europe increases just at the same rate as the number of passenger·kilometres travelled (1.8% speed decrease). Scenario C shows a lower share of multimodal trips, implying that trips in Scenario C require less changes between modes than in other scenarios (11% of trips in 2030 in Scenario C require using more than one mode, whereas 18% require so in the 2010).

Scenario C shows the largest gains in environment compared to the other scenarios, with the exception of Lisbon, Madrid, Cyprus and the Ionian islands, and the fact that the scenario is successful in increasing the rail share translates onto a relative factor decline of the CO2 emissions in relation to the total fuel consumption.

In terms of global accessibility, Scenario C tends to distribute activities to a higher extent all over the continent. European accessibility in Scenario C provides a variety of results with different levels of accessibility increases in most of the regions but also with some exceptions in northern Portugal, central Spain, Slovenia, a small part in northern Italy and a surprisingly large part in Greece.

Impacts of exploratory scenarios 2050

Baseline scenario

According to the SASI model, the regions of the south European countries with the highest growth rates are in Italy and Spain. However, after forty years of economic convergence there will exist a significant gap in income between the southern countries with the

prosperous old EU member states in western and northern Europe and the new member states in eastern Europe, even though these regions will on average more than double their GDP per capita in these forty years. In terms of annual growth rate, the countries of Southern Europe seem to present good results with some regions in Italy slightly falling behind. According to MULTIPOLES model, total population of the southern regions will follow the trends of the entire European growth, continuing to grow up until 2050.

Scenario A (Territorial Strategy: Promotion of Metropolitan Global Areas)

Like for the entire ESPON area, in southern countries the already dominant largest metropolitan areas and their immediate surroundings gain most, namely Madrid, Barcelona, Milan, Rome and Athens. Therefore, even though convergence continues in all scenarios, convergence is weakest in Scenario A.

It is apparent that after the decline due to the economic crisis, Scenario A produces the highest generative effects as public investment is concentrated in the largest metropolitan areas with the highest productivity. According to the simulations, Scenario A performs best in terms of competitiveness and economic growth.

According to SASI model results, southern European countries are expected to experience a decrease in their overall population between 2030 and 2050. In terms of GDP per capita, even though an overall increase is expected for the southern countries until 2050, this will only happen for the metropolitan areas while a decrease is foreseen for a large part of southern regions.

Scenario B (Territorial Strategy: Promotion of Cities)

In scenario B the imbalance between the affluent western and northern regions in Europe and the disadvantaged regions in eastern and southern Europe, which are not classified as major cities to be promoted, remains. This imbalance is most visible in the growing disparity between the promoted capital and other large cities. It becomes apparent here that polycentricity at the European level tends to be in contradiction with polycentricity at the national or regional level.

After the decline due to the economic crisis, Scenario A produces the highest generative effects as public investment is concentrated in the largest metropolitan areas with the highest productivity. Therefore Scenario B takes the middle position between Scenario A and C.

According to SASI model results, southern European countries are expected to experience a decrease in their overall population between 2030 and 2050. In terms of GDP per capita, even though an overall increase is expected for the southern countries until 2050, inside southern countries the results are quite diverse with Cyprus showing the best performance, Italy and Spain being divided into regions of the north with good results and the south lagging behind and Greece and Portugal scoring last, with a negative relative change.

Scenario C (Territorial Strategy: Promotion of Regions)

Scenario C seems to strengthen the still economically lagging regions in southern Europe and so clearly pursues the cohesion objective. As also in this scenario the allocation of Structural Funds subsidies follows the inverse exponential function of GDP per capita (as in the Base Scenario), the results are similar to the Baseline Scenario. But nearly all C regions, except the MEGAs and large cities promoted in Scenarios A and B, benefit from the policies applied in the Regions Scenario C, though only little.

After the economic crisis, Scenario C produces the lowest generative effects because subsidies are directed primarily at peripheral regions with low productivity. According to the SASI model, even after the economic crisis, convergence in economic development between regions in southern Europe will continue after the recovery from the economic crisis, though more slowly than before the crisis and with a decrease in overall population. More specifically, most regions in the south of Europe are expected to show a positive change in GDP per capita with a few exceptions of regions around important cities.