REPORT ON WORK IN PROGRESS

ET2050

Territorial scenarios and visions for Europe

- ESPON P1 project -

Synthesis of the Second Interim Report

May 2013

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Foreword

The Second Interim Report of the ET2050 project gives a complete overview of the work done by April 2013. This report has been delivered to the ESPON CU on 30 April 2013 and given to the ESPON MC for reading and commenting on 7 May 2013.

The current background document synthesises the Second Interim Report and serves as input for meetings with European Institutions. The complete Second Interim Report can be downloaded from the project webpage at the ESPON website:

http://www.espon.eu/main/Menu_Projects/Menu_AppliedResearch/ET2050.html

The aim of these meetings is to raise awareness regarding the ET2050 project, to receive input and build co-ownership regarding a European Territorial Vision for 2050. This will be done by first presenting and discussing the baseline scenario showing what will happen in Europe in the absence of new policies and unexpected events. Then some exploratory scenarios will be presented and discussed investigating several Territorial Cohesion issues and their influence on the social and economic evolution of Europe. The meeting will be concluded with looking into additional dissemination possibilities.

Aim of the Project

ET2050 aim is supporting policy makers in formulating a long-term integrated and coherent vision for the development of the EU territory. This aim is twofold: content-wise, a product, namely a vision for the European Territory, has to be developed; and process-wise, those who will elaborate this product, namely policy makers, have to be supported by sound scientific knowledge. As is often the case in territorial development policy, the process is essential to achieve a successful result. Through the participatory process, the main steps towards the European Territorial visions will be:

- *Baseline Scenarios 2030-2050*: What will be the future state of the European territorial structure based on the hypothesis that development trends and policies remain stable?
- *Exploratory Scenarios 2030-2050:* What can be feasible future states of the European territorial structure in three territorially different scenarios?
- *European Territorial Vision 2050:* What is the room for manoeuvre to politically steer the future state of the European territorial structure and what is the range in which a realistic territorial vision can be formulated?

Therefore, behind the study lies the analysis of the social, economic and territorial Cohesion evolution of Europe during the next decades, and the possible evolution in Cohesion policies. Updated information on the project evolution can be found in www.et2050.eu

Next, the basic assumptions on the scenarios are introduced, and results produced by modelling are presented. A detailed reference to qualitative assumptions and narratives can be found at the *First Interim* Report of the project (FIR October 2012, annex 1). Quantitative assumptions and results for the modelling exercise, and the detail of the forecast models used: MULTIPOLES/demography, MASST3/socioeconomic, MOSAIC/transport, METRONAMICA/ land use and SASI/integrated towards 2050, are reported in the *Second Interim Report* (SIR) submitted in April 2013.

World reference framework scenario

The following table contains key figures for the reference world scenario common to all the European scenarios being studied.

	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
World Population (millions of people)	2.531	3.039	3.708	4.473	5.308	6.125	6.910	7.670	8.323	8.889	9.214
World Urban Population (% over total population)	29%	33%	36%	39%	43%	46%	50%	55%	59%	64%	69%
World illiteracy rate (% of population 15+)	44%	41%	37%	30%	24%	18%	17%	14%	11%	9%	7%
World Gini Coeficient (Income Disparities)	0,63	0,64	0,65	0,66	0,66	0,66	0,64	0,63	0,63	0,62	0,60
World GDP (1000 milions of 2010 €)	4.501	7.422	13.535	19.367	26.411	34.214	43.338	60.565	84.638	106.888	134.986
World total trade (goods % services in 1000 million €)	125	178	479	2.250	5.625	13.027	19.947	36.060	65.189	100.272	154.236
Global seaborne traffic (billion tonne·km)	4.862	7.197	10.654	16.777	16.440	22.927	32.746	48.472	69.707	100.246	144.163
Global air traffic (billion RPKs)	226	368	600	1.100	2.100	3.381	4.621	7.491	12.145	19.688	31.918
World Tourism (million overnight visitors per year)	25	64	109	170	319	560	940	1.281	1.746	2.379	3.241
World energy consumption (MTOE)	2.900	3.754	4.884	6.469	7.192	8.441	10.182	13.442	17.747	20.758	24.280
World CO2 emissions (million tones)	10.000	11.802	14.908	18.990	21.977	24.224	29.905	38.875	50.537	56.757	63.741
Real crude oil price (€2010 per barrel)	13	12	9	82	33	30	67	108	121	130	138

The world reference scenario assumes a continuation of the main trends of the latest decades. The share of European countries in terms of the world population, economic production, trade, or tourism gradually diminishes down to the levels of early 1800s.

The extra-European exchanges, in terms of investments, trade, passenger air flows or tourism will likely grow faster than intra-European exchanges. Large metropolis in Europe are increasingly globally connected, as well as regional and national economies.

Baseline Scenario 2030

Description

The Baseline scenario is a projection of current trends in absence of neither new policies nor unexpected events. It may be likely in the near future, but it is very unlikely further away. It involves a rather pessimistic view in relation to the capacity of governments to reform public policies, the willingness of companies and citizens to change their behaviour, as well in terms of technologic progress.

The Baseline Scenario is inspired in the short and medium Regions 2020 Report (2008, 2011), and assumes as starting point similar hypothesis of the "Sluggish recovery" scenario, a pathway based on a permanent loss in wealth compared to pre-crisis pathway, (but the wealth is still permanently growing nevertheless) and lower growth path.

Main Assumptions

Issue	Baseline Assumption
Fertility	Total Fertility Rate increasing to 1,66 in 2030
Mortality	Between 2010 and 2015, mortality rates are assumed as those proposed by the LSE scenario in the ESPON DEMIFER for the 2015-2020 period. After 2015, life expectancy linearly increasing until 85 years for men and 90 for women in 2050.
ExtraEU Migration	Total immigration increases at a rate of 2% every 5 years, with the increase being delayed by 5 years in the most crises-hit countries (CY, GR, IT, ES, PT, IE)
IntraEU Migration between countries	Emigrating rates are kept constant as in pre-crisis times for leading economies in Europe (based on MIMOSA and IMEM studies), and are significantly increased for least performing economies
Monetary policies	In Western European countries, stability of interest rates, ULC, exchange rates, inflation; Progressive convergence of Eastern EU towards Western European Countries valuesDecrease of interest on bonds: end of speculation periods
Fiscal policies	Increase of tax rates in the Western and Eastern Countries. Debt/GDP remains constant
Macro-economic framework	The crisis ends in 2015
Transport Policies	From 1.04% of EU GDP in transport investment to 0.73%. New transport provision from 70% to 53% of total transport investment. Network maintenance from 30% to 45%. Investments in long-distance infrastructure, from 28% (€ 610 billion 1995-2012) to 17% (€ 330 billion 2013-2030).

General assumptions in relation to European policies:

Policy	General Assumption
European policy framework	Budget maintained or slightly reduced in real terms. Shallow reforms to partially renationalise policies (e.g. Cohesion, Agriculture, Transport).
Economic and Financial	Stabilisation. Euro-zone maintained. More strict budgetary controls. Maastricht criteria in deficits and debts reinforced. Increasing fiscal and labour market harmonisation.
Cohesion	Budged slightly reduced. Limited and gradual reforms favouring urban areas and direct support to productive activities
Agriculture	Limited reform of the Agricultural policy favouring rural development and ecological criteria. Budget reduced.
Energy	No effective policies at European level. Each country follows its best interest.
Transport	Transport infrastructure investments in Transeuropean networks reduced, particularly in rail. Some success of opening market policies.
Environment	Environmental regulations relaxed for less developed regions
Enlargment	Only Croatia, and Balkan Countries, becomes EU members before 2030. Trade agreements with USA and Neighbouring Countries.

Main results from models:

The main results from the models illustrate not 'relative decline', but growing disparities (see p 47 SIR)

Ten additional results from the models are the following:

1. More stable population at European level. Depopulation of Eastern European rural regions.
2. Ageing is universal across Europe
3. Continuous East-West labour-related migrations.
4. Average economic growth at a moderate, not marginal, level
5. Divergent economies, with higher productivity gaps between the core and peripheral regions (growing disparities
6. More jobs being created everywhere, with lower salaries in less developed regions. Marginal economic growth is not related to productivity gains in Southern and Eastern regions, while higher growth related to productivity in central regions.
7. Reindustrialisation of the economy, with balanced employment growth in manufacture and services. Technological innovation concentrated only in some sectors and regions. Increasing dependency of more expensive energy
8. Growth in long-distance and intercontinental traffic, but more limited territorial integration, with few passenger and freight cross-border flows. Increasing road share in inland transport. Polarised development in transportation nodes well connected globally, usually large metropolis.
9. Expansive land consumption, producing more hybrid urban-rural geographies
10. Reduction on Green-House Emissions in more advanced industrial economies

Next table develops these trends further on, presenting key figures still at an aggregated European level[1].

Baseline Trend	Key Trend	Possible Territorial Implications
More Stable **Population**. Depopulation in many Eastern rural regions	From 514 million inhabitants in 2010 to 530 in 2030 and 539 in 2050. Fertility rate increases up to 1.66 in 2030.	Many Eastern rural regions suffer population decline while large and capital cities grow because of internal migration, taking advantage of agglomeration economies.
Aging in most regions	Old Dependency Ratio (ODR) grows from 25% on average in 2010, to 40% in 2030 (219 millions of elderly) and 54% in 2050.	Ageing European population is general in Europe, excepts in large cosmopolitan cities and regions attracting young skilled people. Retiring age likely increases (e.g. up to 70 years old)
Increasing **Migrations**. Labour migrations East-Western (and probably South-North).	Total cumulated migration between NUTS2 up to 40 Million between 2010 and 2030	More mobility because of temporary labour migration and personal visits. More diversified migration purposes, from labour to leisure and tourism, health care and education. Increasing attraction of large cities in front of rural regions.
Average **economic growth** at a moderate, not marginal, level	1,89% annual growth up to 2030 (MASST3). Economic growth at different speeds. 45 regions grow at less than 1% annual growth.	Increasingly different paths to economic recovery across regions. Marginal economic growth is not related to productivity gains in Southern and Eastern regions, while higher growth related to productivity in central regions.
Divergent **economies**, with higher productivity gaps between the core and peripheral regions	From GINI coefficient 26.1 in 2008 to 28.5 in 2030	Increasing disparities between core regions of Europe and several peripheries (Southern, Eastern).
More **jobs** being created everywhere, with lower salaries in less developed regions.	Employment annual growth of 1,59%. It grows at a sustained rate in Europe, meaning that large parts of the recovery for the crisis comes from job creation and lower salaries, instead of productivity gains.	Labour markets are reformed in Southern European countries and more jobs are generated even with low economic growth. Increase in social disparities also because the likely reduction of social public expenditures, that may hit specific zones and neighbourhoods.
Reindustrialisation of the economy, with balanced employment growth in manufacture and services.	Jobs in manufacture grow at similar rates than service (1,69% services, and 1,49% industry).	Technological innovation concentrated only in some sectors and regions. Increasing dependency of more expensive energy
Growth in long-distance and intercontinental **traffic**.	Polarisation of global accessibility in regions having intercontinental transport services in airports and ports.	Continuous growth of long-distance and inter-continental traffics, and increasing share of road in inland transport. Polarised development attached to global transport nodes (e.g. intercontinental airports and ports).
Accessibility changes influenced by other factors than new infrastructure.	Population and economic changes, as well as increasing transport costs heavily influence accessibility within Europe. Road and air becoming the dominant modes. Rail modal share below 5% in 2030 (6,6% in 1995, 6,2% in 2009) for passengers, and below 7% for freight (12,6% in 1995, 10% in 2009).	Limited territorial integration, with few passenger and freight cross-border flows. Polarised development in transportation nodes well connected globally, in general located near larger metropolis

[1] These features were first generated as hypothesis by the ET2050 foresight models, and then adjusted by the actual ET2050 forecast models (Multipoles, MASST, MOSIC, METRONAMICA, SASI).

Baseline Trend	Key Trend	Possible Territorial Implications
Expansive **land consumption**, producing more hybrid urban-rural geographies	More specialised and segregated uses in large metropolitan areas, especially in Southern and Eastern regions with weakest planning traditions.	Increasing low-dense urbanisation, with different development patterns across territories. Relaxed planning regulations in Southern European countries in coastal and touristic zones.
Reduction on **Green-House Emissions** in more advanced industrial economies	Transport emissions related emissions reduced 16% because of a combination of lower economic growth and the use of more environmentally friendly vehicles and energy sources.	Decreasing CO2 emissions but targets are not met. Environmental regulations are relaxed in less developed regions.

Key features of the Baseline at a European level

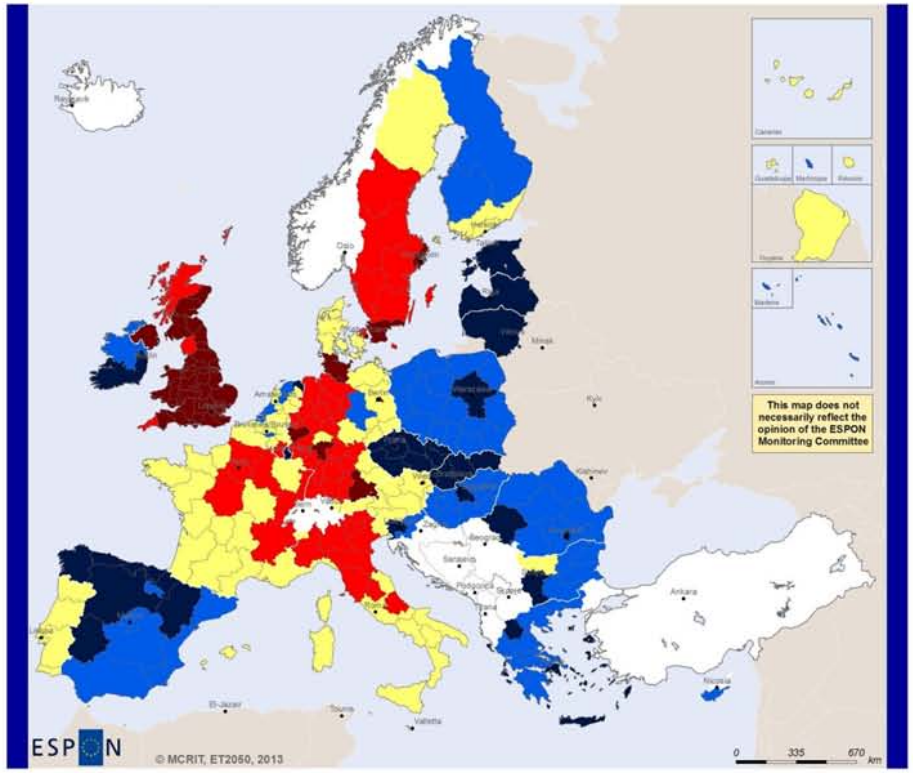
General Conclusions for macro-regions (p 78 SIR):

Even though some variables remain stable or with just a marginal change, at aggregated level, there are increasing changes at regional and macro-regional level. The following overall trends have been observed by large macro-regions:

- Western/Central and Northern countries and regions may emerge stronger from the crisis, being able to keep their public finances healthy, and growing at a reasonably high speed (above 2% every year in average for twenty years). This result is not surprising since these regions have, in average, very well educated and high living standard societies, with resilient regional economies and many sectors and corporations are able to compete successfully in Europe, as well as globally. All of these regions have many differences, and particularities, but most of them have efficient public administrations and sound planning systems.
- Central/East and Eastern European countries will hardly be able to sustain the strategy of growth of the previous decade, when many industries were attracted, many from the Southern European regions. While large cities and capitals may have agglomeration economies, rural areas will tend to be depopulated. Migrations from East to West will continue. Social Welfare may grow slowly, and the gap with Northern and Western/Central regions may also grow.
- 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 Western/ Central and Northern regions may grow twice the level is today. The deindustrialisation process will be slowed down because of the salary reductions, and touristic areas and the coastal zones will likely received increasing senior residents from the rest of Europe. The gaps between regions inside Southern countries will grow, creating explosive social and political conflicts at national and European level.

Relative change in GDP per capita from 2000 to 2008

Measured in percentage (%) to the EU27 average GDP growth



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Regional level: NUTS2
Source: Mcrit, 2013
Origin of data: ESPON DATABASE
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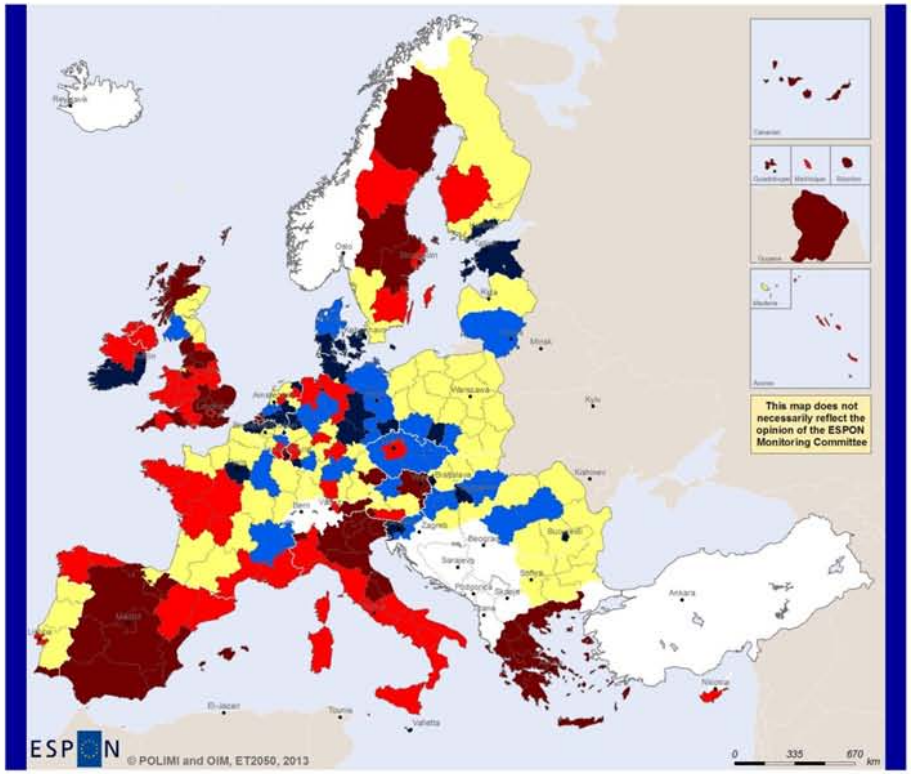
Relative change in GDP per capita growth in relation to EU27 average

- < -15%
- -15% - -5%
- -5% - 5%
- 5% - 15%
- > 15%

Relative change in GDP per capita from 2008 to 2030 (Baseline)

Measured in percentage (%) to the EU27 average GDP growth



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Regional level: NUTS2
Source: Mcrit, 2013
Origin of data: ESPON DATABASE
© EuroGeographics Association for administrative boundaries

Relative change in GDP per capita growth in relation to EU27 average

Results obteined by MASST (Economy) and MULTIPOLES (Demography) forecast models

- < -15%
- -15% - -5%
- -5% - 5%
- 5% - 15%
- > 15%

Exploratory Scenarios 2010-2030

Conceptual framework: Polycentrism at different scales

Polycentricity is the overarching concept behind the Territorial Cohesion goal, from the ESDP to the Teritorial Agenda 2020, that its first priority says that promoting polycentric development is the precondition of territorial cohesion and a strong factor of territorial competitiveness. Polycentricism, as a concept, is understood at three different geographic scales by the 3 Exploratory scenarios.

- **Scenario A**, based on Promoting Metropolitan Global Areas, in a pro-globalisation framework conditions favouring openness and economic growth. The scenario favours a reindustrialization process, especially in the western countries, based on a re-launch of new technological paradigms, higher rhythm of innovation, higher productivity linked to an increased share of high-level functions

At global scale, to ensure European successful economic competitiveness, the size and agglomeration advantages of European larger metropolis, linked to knowledge sharing and technologic innovation, is promoted by National and European policies. Therefore, public policies at European and National level to promote higher agglomeration economies in largest metropolis and transport nodes and corridors (Mega-cities and Mega-corridors, so to speak) or at less removing constrains to their spontaneous growth are foreseen (this Scenario, called A, focused on the promotion of large metropolitan global areas, would be in line with the Europe of Flows presented in the Project Specifications).

- **Scenario B**, based on Promoting Cities, with less strict fiscal policies and increased public investments balancing social inclusiveness and economic growth. It is a more spatially diffused scenario, both population and business services grow all over Europe

Congestion costs in large and more dense European metropolis will grow more rapidly than in other continents, and the promotion of **urban regions and second rank cities** well connected to global metropolis, as well as to smaller cities and more rural areas, with relatively diversified economic activities, and social inclusiveness, is a preferable political option in Europe, not necessarily producing less economic growth (this Scenario, called B, focused on the promotion of large and medium size cities, would be in line with the *Europe of Cities* presented in the Project Specifications) (remark: *an emphasis on 'green cities' could be decided, benefitting from economy of scales and densification)*

- **Scenario C**, based on Promoting Regions, as well as other public policies more strongly emphasising endogenous and potentially ecological sensitive development. Less developed regions, often rural and sparsely populated, are targeted by public policies, and local endogenous activities are promoted.

Local and regional scales favouring geographic proximity have to be strongly promoted by public policies to support endogenous development and increase economic resilience in a world with increasing economic vulnerability and scarce and more expansive transport and energy, even if this leads to zero growth in the short-term. European Cohesion policies should be targeted to small and medium-size towns and **rural regions**, especially in less developed countries, favouring changes in people and corporative behaviour. This territorial policy will support emerging alternative economic practices such as consumer cooperatives, agro-ecological production networks, social currency networks, seed banks, etc, therefore balancing the strong deterritorialisation trends of contemporary global medium size cities, especially in less developed regions, would be more in line with the *Europe of Regions* presented in the Project Specifications)

General Scenario Orientations

Each of the ET2050 scenarios was assigned a specific spatial development pattern in the first Interim Report.

	A Scenario (Promoting MEGAS)	B Scenario (Promoting CITIES)	C Scenario (Promoting REGIONS)	BASELINE
Spatial distribution of population and economic growth, (and territorial governance)	Relative accessibility and connectivity to international transport networks and agglomeration economies attract growth, following spontaneous market tendencies. Global cities, mostly MEGAS grow bigger.	Large cities attract both more people and activities because effective public policies promoting them at National scale. Internal migrations from sparsely populated areas to urban centres.	Medium-size cities and towns attract people based on their cultural and environmental quality, and strong public policies and incentives. Change in consumer behaviour favouring proximity and self-sufficiency. Intense decentralisation at local and regional level. Limited external migrations.	No relevant modification on actual spatial patterns

Spatial distribution of activities among ET2050 Scenarios

These general criteria were made explicit generating three sets of regions in Europe which would be promoted when establishing exogenous assumptions for each of the Scenarios.

- Type 1 regions, to be promoted in the A Scenario, are regions with a share of LUZ[2] population over regional population > 1,500,000 inhabitants;
- Type 2 regions, to be promoted in the B Scenario, with a share of LUZ population over regional population between 1,500,000 and 300,000 inhabitants;
- Type 3 regions, to be promoted in the C Scenario, with a share of LUZ population over regional population < 300,000 inhabitants.

Main Assumptions on Policies and Exogenous Variables

Next table contains the main assumptions considered, both policies and exogenous variables:

	A Scenario (Promoting MEGAS)	B Scenario (Promoting Cities)	C Scenario (Promoting Regions)	BASELINE
Demographic Policies	Openness to migrants from outside Europe	Relative openness.	More strict immigration policies. Public support to natality and families.	Continuation of actual trends
Fertility	1,5 in 2030	1,66 in 2030	1,8 in 2030	1,66 in 2030
Mortality	For the initial 5-year period, between 2010 and 2015, mortality rates are assumed as the ones proposed by the "Limited Social Europe" (LSE) scenario for the 2015-2020 period (in the ESPON DEMIFER study). After 2015, life expectancy is linearly increased until the values of 85 years for men and 90 years for women in 2050.			
Extra-EU Migration	Total immigration increases at a rate of 3-7% every 5 years, substantially faster than in the Baseline	Total immigration increases at a rate of 2-4.3% every 5 years, still faster than in the Baseline.	Total immigration decreases at a rate of 2% every 5 years	Total immigration increases at a rate of 2% every 5 years, increase being delayed by 5 years in the most crises-hit countries (CY, GR, IT, ES, PT, IE)

[2] Large Urban Zones as defined by Eurostat in the frame of Urban Audit

	A Scenario (Promoting MEGAS)	B Scenario (Promoting Cities)	C Scenario (Promoting Regions)	BASELINE
Intra-EU Migration between countries	Flows tend to move from all over in Europe towards largest metropolises integrated in the global economy (regions type A)	Flows tend to move from rural and sparsely populated areas towards other areas in Europe (regions type B)	Flow from rural and sparsely populated areas towards other areas significantly decreases (regions type C)	Migrating rates are kept constant as in pre-crisis times for leading economies in Europe (based on MIMOSA and IMEM studies), and are significantly increased for least performing economies
Monetary policies	In Western European countries, stability of interest rates, ULC, exchange rates, inflation; Progressive convergence of Eastern EU towards Western European Countries values Decrease of interest on bonds: end of speculation periods			
Fiscal policies	Slow tendency towards stability pact: 60% of Debt/GDP. Decrease of public expenditure growth rate especially in vicious countries.	Debt/GDP remains constant	Slow divergence from stability pact. Slight increase of public expenditure growth rate	Increase of tax rates in the Western and Eastern Countries. Debt/GDP remains constant
Macro-economic framework	The crisis ends in 2015			
Transport Infrastructure Policies	€ 1.630 billion (2013-2030) in transport investment, 0.60% of EU GDP. 50% of transport budget in new infrastructure provision. Modal allocation of investment in TENs, substantially increased for air and ports, substantially decreased for rail Investments in long-distance infrastructure (mostly in regions type A) are 20% of total transport budget (€ 330 billion 2013-2030). *30% for short distance.*	€ 2.290 billion (2013-2030) in transport investment, 0.85% of EU GDP. 60% of transport budget in new infrastructure provision. Modal allocation of investment in TENs, increasingly rail based. Investments in long-distance infrastructure (mostly on regions type B) are 18% of total transport budget (€ 470 billion 2013-2030). *42% for short-distance.*	€ 1.790 billion (2013-2030) in transport investment, 0.67% of EU GDP. 45% of transport budget in new infrastructure provision, 25% allocated in TENs (€ 160 billion). Investments in short-distance infrastructure (mostly in regions type C) are 34% of total transport budget (€ 160 billion 2013-2030). *11% for long-distance.*	From 1.04% of EU GDP in transport investment to 0.73%. New transport provision from 70% to 53% of total transport investment. Network maintenance from 30% to 45%. Investments in long-distance infrastructure, from 28% (€ 610 billion 1995-2012) to 17% (€ 330 billion 2013-2030).
Transport Market Regulation Policies	0,07% of EU GDP yearly in smart ITS infrastructure equipment -10% vehicle emission factors respect to Baseline, due to environmental regulation Pricing in those motorways were there are no tolls today Increased efficiency of fossil fuels, some RES, emergence of CCS. Targets partially met.	0,02% of EU GDP yearly in smart ITS infrastructure equipment More 10% average rail speed due to enhanced management -10% vehicle emission factors respect to Baseline, due to environmental regulation High development of centralised RES and nuclear. Targets partially met.	0,04% of EU GDP yearly in smart ITS infrastructure equipment +5% average rail speed due to enhanced management - 5% average road speeds due to regulation -20% vehicle emission factors respect to Baseline, due to environmental regulation + 5% road and air transport costs due to taxation Decentralised RES. Lower energy consumption. Targets met.	0,02% of EU GDP yearly in smart ITS infrastructure equipment Car emission factors in 2030 a 30% lower than in 2010, with development of new technologies and driven by Euro Standard regulations Fossil fuels remain important. Emissions reduced but targets are not met.

	A Scenario (Promoting MEGAS)	B Scenario (Promoting Cities)	C Scenario (Promoting Regions)	BASELINE
Environment	Increased efficiency of fossil fuels, some RES, emergence of CCS. Targets partially met.			
Cohesion policies	Half of the present budget. Allocation among regions in 2007-2013 as 2000-2007	Budget kept constant. Allocation among regions in 2007-2013 as 2000-2007	Budget doubled. Regions type C get 2/3 of the budget, Type B 1/3	Budget kept constant. Allocation among regions in 2007-2013 as 2000-2007

Synthesis of Scenario Assumptions on Exogenous Conditions and Policies

Modeling Results: synthesis

(MULTIPOLES, MASST3, MOSAIC and METRONOMICA models, pp 85-121 SIR)

	A Scenario (Promoting MEGAS)	B Scenario (Promoting Cities)	C Scenario (Promoting Regions)	BASELINE
Total EU31 Population in 2030 (in millions; *514 million in 2010*)	527.7	530.8	531.6	530.2
Total Migrations 2010-2030 (cumulated number of migrants in millions)	39.6	38.8	37.2	37.9
Economic Growth (average yearly increase 2010-2030)	+2.22%	+2.31%	+1.82%	+1.89%
Regional Divergence (GINI coefficient in 2030; *26.1 in 2008*)	28.0	28.2	28.3	28.5
Total Employment (average yearly increase 2010-2030)	+1,92%	+1,96%	+1,55%	+1.59%
Manufacturing Employment (average yearly increase 2010-2030)	+2,12%	+1,66%	+1,08%	+1.38%
Service Employment (average yearly increase 2010-2030)	+1,86%	+2,04%	+1,67%	+1.63%
Total transport demand for passengers (total pax·km increase 2010-2030 in %)	+34.3%	+34.8%	+31.6%	+39.0%
Total travel cost (total euros increase 2010-2030 in %)	+29.7%	+34.9%	+29.0%	+39.3%
Total time spent travelling (total hours increase 2010-2030 in %)	+23.3%	+34.5%	+32.1%	+41.0%
Total CO2 due to transport (total tones increase 2010-2030 in %)	-40.3%	-58.4%	-35.4%	-25.2%
Total CO2 (total tones increase 2010-2030 in %)	N/A	N/A	N/A	-28.9%

Main Features of ET2050 Scenarios in 2030

	A Scenario (Promoting MEGAS)	B Scenario (Promoting Cities)	C Scenario (Promoting Regions)	BASELINE
Population (total population)				
Society (Social inequities)				
Economy (economic performance)				
Technology (innovation)				
Energy (total consumption)				
Transport (total traffics)				
Land-Uses (artificial land occupation)				
Environment (climate change progression)				
Governance (participative governance)				

Baseline and Exploratory Scenarios towards 2050

Description

The baseline scenario and the three exploratory scenarios A, B and C were considered towards the horizon 2050, keeping the same framework conditions than the 2030 baseline scenario, and promoting Metropolitan Global Areas (A), Promoting Cities (B), Promoting Regions (C). The scenarios were modelled by SASI model, a spatial-developed integrated model.

Main Assumptions on Policies and Exogeneous Variables for Baseline scenario 2050

Year	Population EU27 (million)	Population EU31 (million)	GDP EU27 (billion € of 2010)	GDP EU31 (billion € of 2010)	Annual net migration EU27 (1,000)	Annual Structural Funds (billion € of 2010)	Oil price per barrel (€ of 2010)
1981	459.8	470.5	7,067	7,472	77	5.0	39
1986	464.3	475.2	8,073	8,524	285	8.2	19
1991	471.4	482.7	9,534	10,037	1078	17.8	18
1996	478.1	489.7	10,334	10,875	748	34.7	20
2001	482.1	494.1	111,710	12,251	654	37.6	25
2006	491.2	503.6	12,751	13,329	1578	48.2	55
2011	500.6	513.6	12,596	13,158	857	50.3	63
2016	514.1	527.7	13,370	14,009	1239	55.4	90
2021	526.0	540.0	14,548	15,207	1327	60.2	96
2026	534.8	549.3	15,774	16,487	1300	65.4	102
2031	540.7	555.6	16,903	17,668	1290	70.5	109
2036	542.4	557.7	18,105	18,952	1265	75.6	115
2041	540.0	555.5	19,393	20,273	1217	80.9	121
2046	534.4	550.1	20,772	21,718	1163	86.7	127
2051	526.0	541.7	22,251	23,268	1094	92.6	133

Policy Assumptions for the 2050 Exploratory Scenarios

In three exploratory scenarios modelled by SASI so far, the framework conditions are kept the same as in the Baseline Scenario, and only policies, i.e. **the allocation of Structural Funds subsidies and the transport policies are changed**. In this respect, these scenarios (named A0, B0, C0) are policy-variants of the Baseline, and do not continue exactly the same A, B and C path scenarios developed until 2030 by MULTIPOLES; MASST3 and MOSAIC.

Concerning Structural Funds subsidies consist of EU regional policy expenditures from the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund (CF). In relation to the total volume of the EU Cohesion policy fund, the following hypotheses were taken:

- No separate assumptions are made about the volumes of the three funds of the EU Cohesion policy (ERDF, ESF and CF).
- Total Cohesion Policy expenditures (ERDF, SFF and CF) are linked to total EU27 GDP in real terms, i.e. are estimated as a percentage of total EU real GDP.

- **Baseline Scenario**: the share of cohesion policy expenditures respect to EU27 GDP remains constant along time (0.4% of EU27 GDP)
- **A Scenario**: expenditures remain constant in nominal terms, i.e. are almost halved compared to the Baseline Scenario in terms of % to GDP (€ 49.2 billion)
- **B Scenario**: the same as in the Baseline Scenario.
- **C Scenario**: expenditures grow annually by 5%, i.e. grow almost three times as fast as in the Baseline Scenario.

As regional allocation rule the inverse exponential function of GDP per capita empirically derived from the allocation in the funding period 2007-2013 was used

Transport policies are included in the model in terms of accessibility changes due to improvements in the transport system that benefit either most global metropolis, cities or less populated regions.

Results

Next table presents main results in terms of GDP and GDP per capita annual increases.

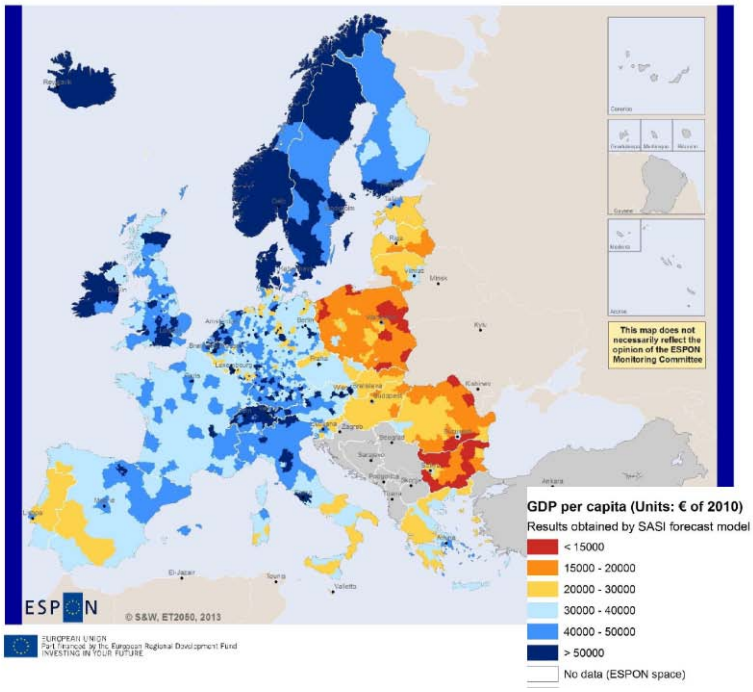
Period	GDP				GDP per capita			
	Base	A	B	C	Base	A	B	C
1981-2008	+2.22	+2.22	+2.22	+2.22	+1.94	+1.94	+1.94	+1.94
2008-2013	–0.39	–0.39	–0.39	–0.39	–0.84	–0.84	–0.84	–0.84
2013-2031	+1.60	+1.72	+1.66	+1.62	+1.22	+1.33	+1.28	+1.24
2031-2051	+1.39	+1.41	+1.40	+1.39	+1.51	+1.54	+1.53	+1.52

The simulations of 2050 scenarios by SASI support the hypothesis that the forces moving towards continuing economic convergence may remain in effect after the economic crisis. However, they will be less powerful that in the previous decade not strong enough to close the gap between economic performance of the economically lagging new member states in eastern Europe.

The difference between scenarios in terms of GDP and GDP/capital is relatively small in the long-term, indicating that the impact of the Structural and Cohesion funds as well as the transport policies applied have a marginal impact in terms of overall growth. The impact they have in the regional distribution of growth is however clear.

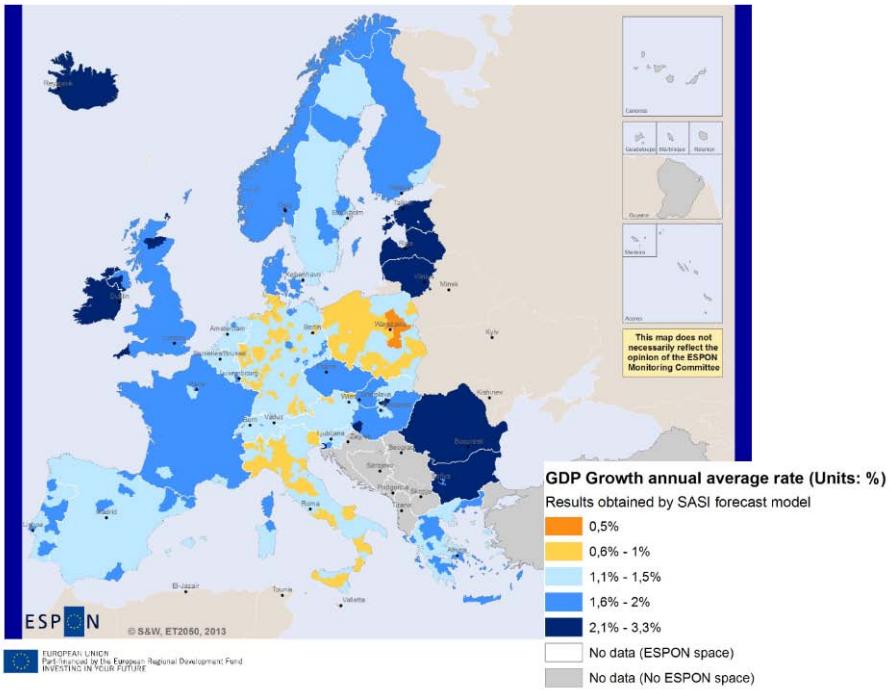
Baseline 2050: GDP per capital results

GDP per capita 2051 (Baseline)
Measured as € of 2010



Baseline 2050: Growth 2010-2050

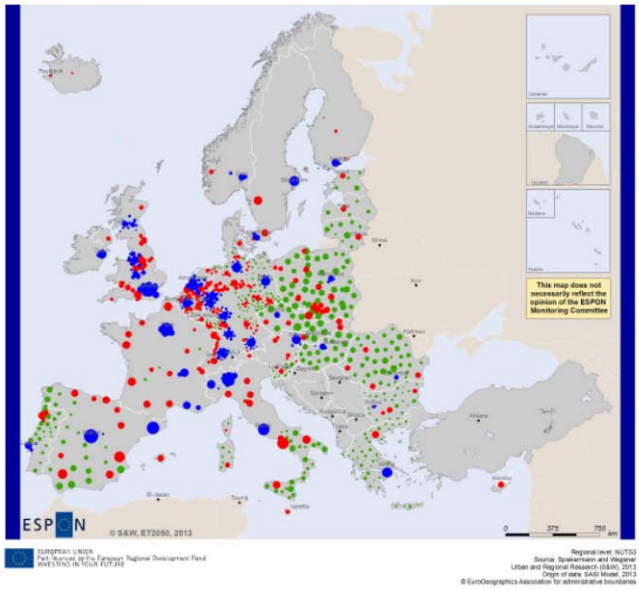
GDP Growth 2010 - 2051 (Baseline)
Measured as annual average GDP growth rate along the period



Scenarios 2050: Structural Fund Subsidies

Structural Fund Subsidies (Scenarios A, B and C)

Measured as per cent of the total volume of Structural Fund Subsidies



Subsidies allocated to each region expressed in % of the total Structural Funds

Results obtained by SASI Exploratory Scenarios

- Scenario A
- Scenario B
- Scenario C

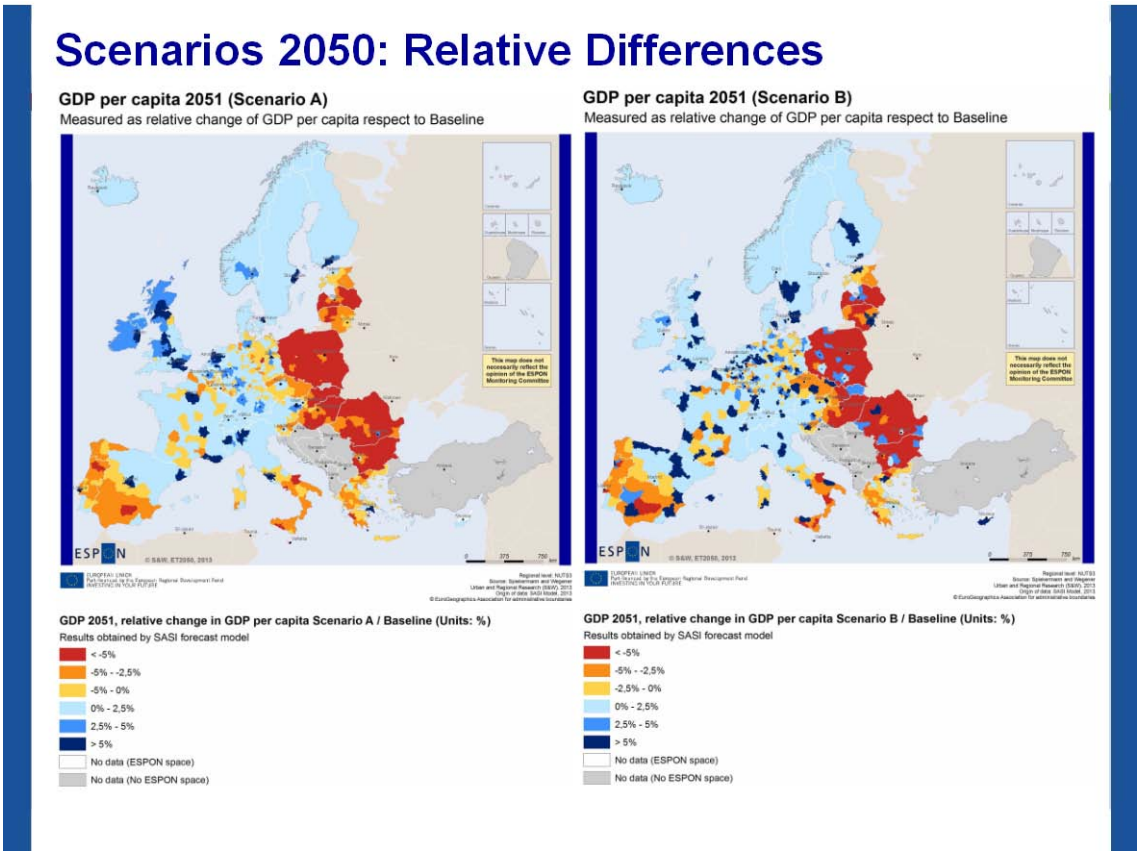
- 1.0 % of EU27 Structural Funds
- 0.5% of EU27 Structural Funds
- 0.25% of EU27 Structural Funds

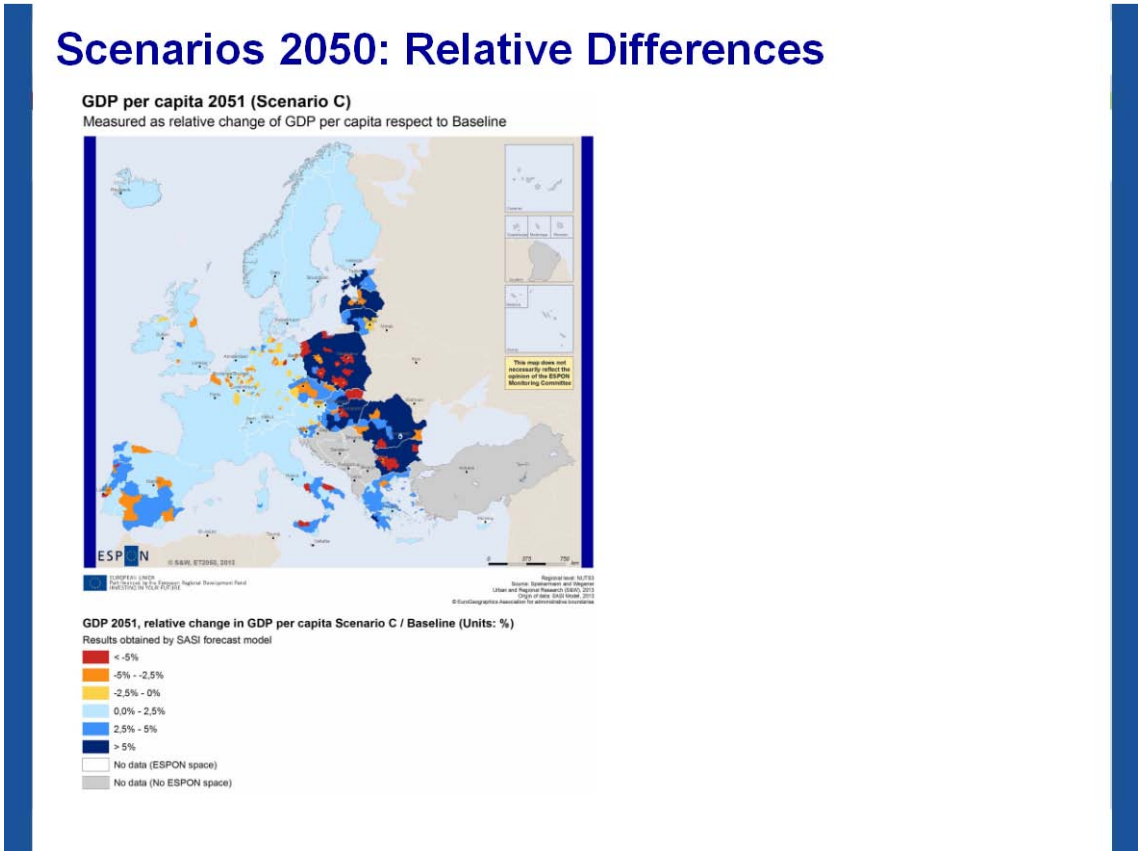
The next three maps show how GDP per capita in the three exploratory scenarios deviates from the Baseline Scenario in the year 2051. The three maps express the conceptual intention behind the three scenarios:

- The **MEGAs Scenario A** reinforces the already dominant position of the major metropolitan areas in the 'Pentagon' through GDP-oriented Structural Funds subsidies, high-speed oriented transport network improvements and better links between long-distance and local transport, such as better access to high-speed rail terminals. The new member states in eastern and southern Europe lose most compared with the Baseline Scenario, in the most severe cases up to 10%. The already dominant largest metropolitan areas and their immediate surroundings gain most, up to ten per cent compared with the Baseline Scenario. Whether this policy of making the strongest players even stronger will result in increased overall European growth, as the Lisbon strategy claims, will be discussed below. (see illustration in map p 20)
- The **Cities Scenario B** emphasises the polycentric urban system of Europe already proposed as a desirable vision by the European Spatial Development Perspective of 1998/1999 and further articulated in the Territorial Agenda of 2007. It strengthens the position of large European cities by education-oriented Structural Funds subsidies, medium-speed oriented transport network improvements and better links between regional and local transport networks. This polycentricity orientation is clearly reflected in the results shown in the map: The major cities selected and their immediate hinterlands in both eastern and western Europe grow significantly faster than the remaining regions. However, 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

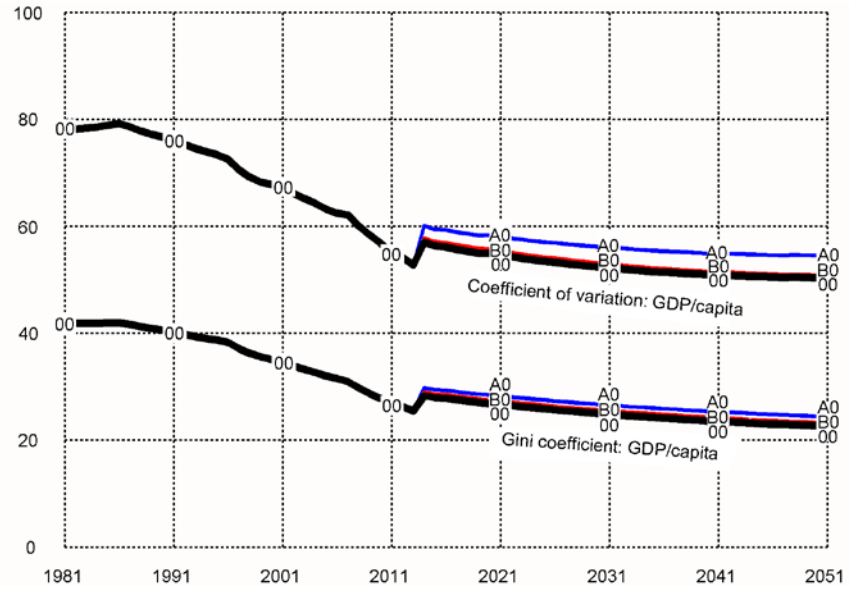
in the growing disparity between the promoted capital and other large cities in the new member states in Eastern Europe. It becomes apparent here that polycentricity at the European level tends to be in contradiction with polycentricity at the national or regional level. It will be asked below how the polycentric Cities Scenario B scores in terms of both competitiveness and territorial cohesion compared to the MEGAs Scenario A and the Regions Scenario C.(see illustration in map p 21)

- The **Regions Scenario C** strengthens the still economically lagging regions in eastern and 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 except that the promotion of rural and peripheral regions in the new member states in eastern Europe is stronger, as the number of eligible regions is smaller, 355 compared to the total of 1,290 EU regions in 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. Whether the scenario really scores better in terms of cohesion will be discussed below. (see illustration p 22)





What the three difference maps do not show is whether spatial development in Europe in the next decades will lead to further convergence of economic conditions or, after the recent economic crisis, to political fragmentation and economic divergence. This is analysed by the two most common indicators of spatial cohesion, the coefficient of variation of GDP per capita and the Gini index. Both indices measure the degree of disparities between objects of observation, in this case 1,347 NUTS-3 regions: the higher the indicator values, the greater are the disparities.



Cohesion indicators: coefficient of variation of GDP per capita and the Gini index

This last figure shows that, according to the SASI model, even after the economic crisis convergence in economic development between regions in Europe will continue after the recovery from the economic crisis, though more slowly than before the crisis. The reason is that in most new member states in Eastern Europe technology, i.e. labour productivity, may continue to catch up with that in the more advanced member states in western and northern Europe, although not as fast as in the years 1991-2011 after the fall of the Iron Curtain. Convergence continues in all scenarios (the line of the Regions Scenario C0 is hidden behind the black line of the Baseline Scenario). As to be expected, convergence is weakest in the MEGAs Scenario A.

According to the simulations the MEGAs Scenario A performs best in terms of competitiveness and economic growth, whereas the Cities and Regions Scenarios A and B perform better in terms of territorial cohesion. However, the scenarios presented so far **differ only in two types of policies, EU regional policy subsidies and transport** policies, with the framework conditions kept the same as in the Baseline Scenario.

There are other possible futures that may have a significant impact on the performance of the European spatial system. It will be the task of the forthcoming work to find out whether the impacts of the framework conditions and policies examined so far will be the same under significantly changed framework conditions and policies. This analysis will be carried out together with MULTIPOLES land-use forecast, further emphasising the territorial cohesion dimension of 2050 scenarios.

Preliminary General Conclusions

Based on the result received so far, preliminary general conclusions can be drawn. These conclusions will be further refined when additional results of the Metronamica (land use) and SASI (integrated towards 2050) models are available.

- European population will remain stable overall, no shrinking expected, but demographic evolutions will be very different across regions. Total population of 31 European countries will grow from 514 million in 2010 to 530 million in 2030 (less than predicted by EUROPOP 2010) and 539 million in 2050 (in line with EUROPOP). While decline is expected in many Eastern European countries, especially in rural inner areas, in Northern European countries, and some Western/central European countries with social policies protecting young families, population may grow at moderate rate because of increasing fertility. Southern European regions may grow depending on the balance of their migration flows.

- The intra-European international migrations which started immediately after EU accession in very selective patterns are still expected to last from East to West. Increased internal mobility leading to concentration of population in urbanised areas with increasing labour shortage and depopulation on the peripheral rural regions.

- Ageing will be universal all over Europe, in contrast to Neighbouring Mediterranean countries. But large cosmopolitan metropolis attracting young skilled population and specialised tourist areas may host much younger population that many remote rural areas.

- The improvement in life expectancy because of better health care will likely continue in the future (above 90 year in 2050). The burden of social expenditures will require to delay for a number of years the age of retirement and promote part-time, teleworking and more flexible working styles. The impact of a predominantly older population in terms of values may result on either more resistance to innovation or accelerating changes in favour of a more sustainable and serene living conditions for all. Increasing migrations of seniors down to the Sunbelt Mediterranean regions can be expected, or to medium-size towns in regions with high quality of life.

- Economic growth will be very different across European regions. While Northern European regions, with efficient institutions, strong local economies globally connected, and healthy well educated societies, may likely grow at a reasonable rate, Eastern and Southern European regions may have very low, eventually negative in some rural areas, economic growth up to 2030. Intra-national regional disparities increase in all countries.

- Despite the low economic growth, the actual level of unemployment (around 27% in Greece and Spain, on average) will be progressively improved in the coming years because of a net reduction of salaries (that implies a drastic reform on present Labour market regulations). Total employment growth rate increases across Europe, which partly recovers from present huge unemployment growth rates. The growth will likely be caused not by productivity gains but because of more people working.

- Industries will likely remain in these countries longer, delaying delocalisation decisions. A reindustrialisation process may begin. Jobs in services and industries will grow.

- Accessibility at global level will make the few large cities and regions having intercontinental airports and ports more competitive than others.

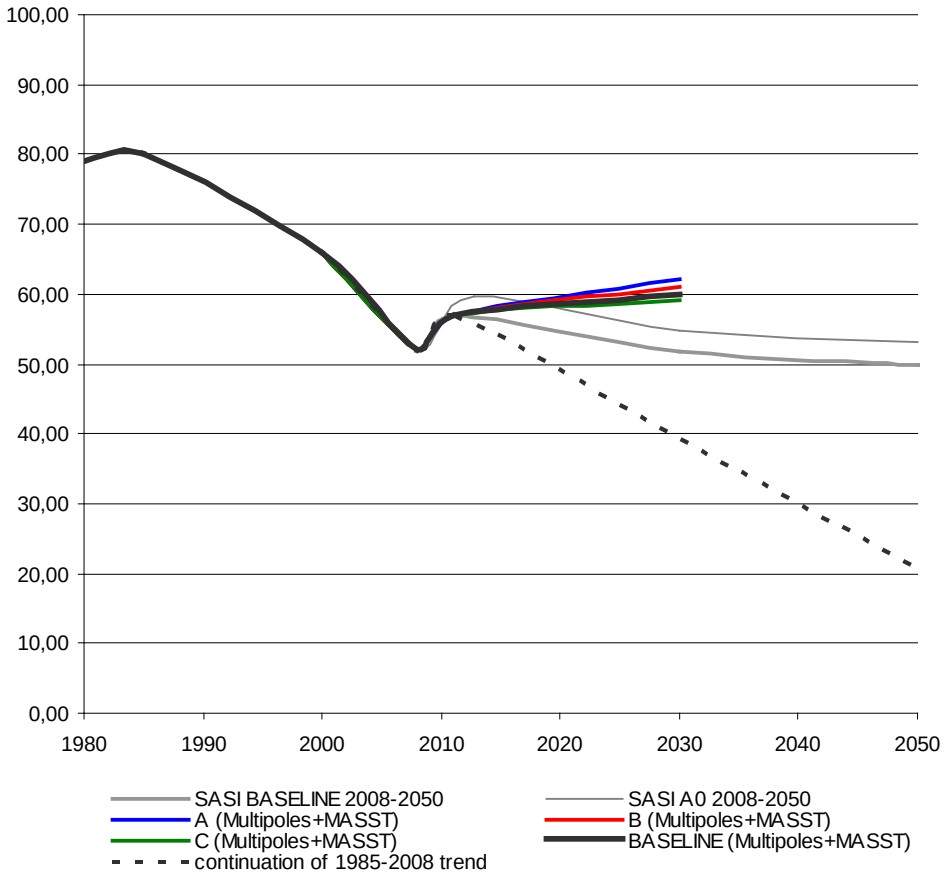
- Differences in accessibility at intra-European level may become less relevant, in economic development terms, because of the relative endowment across all regions. Addressing missing links and bottlenecks in high capacity road networks in Eastern Europe may still provide sensitive accessibility increases.

- Accessibility will not be related mostly to infrastructure but to the actual management. Costs may increase in relative terms for certain relations (e.g. busiest roads heavily tolled, peripheral relations if subsidies removed) and accessibility may even diminish.

- Emissions will be reduced because of savings and efficiency gains, in the transport sector.

Concerning Cohesion policies:

- This is a major change in relation to past trends, towards increasing economic convergence among European countries and regions. In the most optimistic scenario studied, convergence continuously increases, very slowly in relation to previous decades. In most scenarios, convergence is likely to decrease at least until 2030. This change should be considered when rethinking Cohesion policies, as well as other European policies, for coming programming periods.



Cohesion indicators: Coefficient of Variation of GDP per capita. Source: MULTIPOLES, MASST, SASI Model and ESPON DB 2013

- The impact of territorial policies favouring the growth of large metropolises, networks of cities or less developed regions is relatively marginal in terms of average GDP/capita for Europe, even if the redistribution effects may be important across regions. Alternative scenarios for 2030 result in differences of (at most) 10% mostly due to alternative macro-economic policies applied.

- The impact of the crisis will likely last still for a number of years in many regions in the south and the east, and the aftermath of the crisis will not likely be for Europe a coming back to the previous situation. The crisis itself is triggering important policy reforms, at European and national level, and induces changes in people behaviour, from investments and consumption patterns to the role of all public institutions and the effectiveness of public policies in a global economic and financial integrated system.

Territorial Vision 2050

Next Steps in the exploratory scenarios

Ongoing modelling works will be mostly focused on exploring Territorial Cohesion issues in the 2050 scenarios:

- Economic, technologic and environmental more extreme scenario variants, or wild cards, being studied by applying the integrated SASI model also up to 2050 period, as a support to the development of the Territorial Vision for 2050.
- All modelling results are being integrated to update the meta-modelling tools (TV+) to be used to analyse the feasibility of the Territorial Vision for 2050, and the necessary political pathways.
- Integration of indicators into the Territorial Impact Assessment tool, and definition of the missing ones by TV+ Meta-model and/or qualitative expert judgment.

Therefore, the possibility to adjust the results included in this report can not be excluded, even if major changes are very unlikely.

Next Steps towards the Territorial Vision 2050

For the Territorial Vision 2050, the aim is to create a territorial vision for the future and not to territorialise a more socio-economic or societal vision.

This means that the Vision will integrate, from the beginning, territorial aspects such as territorial structures, balanced and sustainable development, territorial capital and potential as well as challenges and vulnerability. The vision will focus on types of regions, metropolitan regions, cities and towns rural territories, accessibility and connectivity, ecological structures, functional regions, cooperation across borders, etc.

On this backdrop, while drafting the vision, the mind of thinking will be the Union's long term economic, social and territorial cohesion and the corresponding policy and thematic priorities.

The Territorial Vision will be elaborated using the results of the exploratory scenarios exercise and already existing territorial visions for Europe and its territories.

However, the most important input will come from various stakeholders at all levels expressing their vision or dream for a future ideal European territory. This means that the process creating the Territorial Vision 2050 becomes a qualitative exercise inviting for a strong drive from policy makers in a participatory process.

Annex

- Slides including maps and graphs