Trans-European Road Investment and Cohesion: An Assessment by CGE Analysis

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Policy context

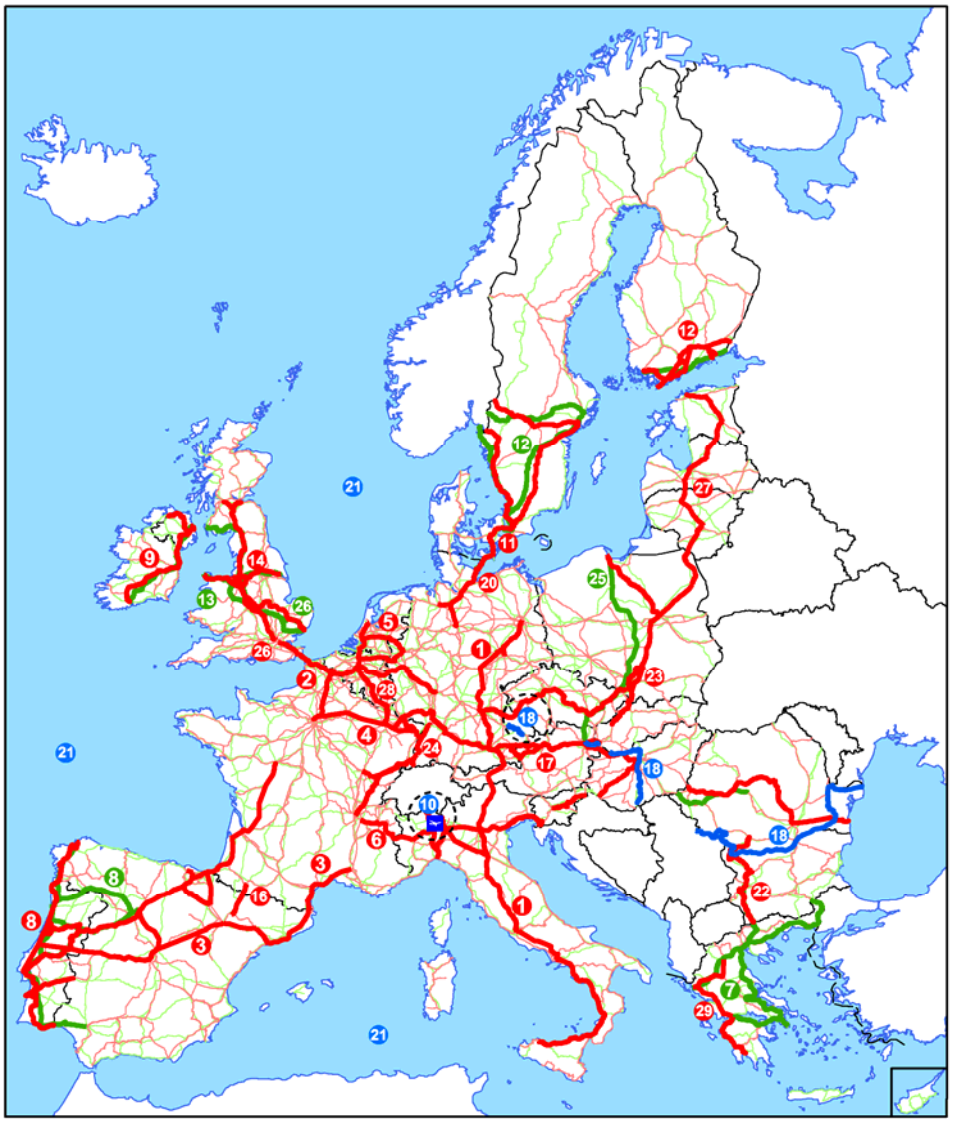
Actual transport policy guidelines laid down in the White Paper „Time to Decide“ (COM(2001) 370 final). Global objectives:

- strengthening European competitiveness and growth
- guaranteeing sustainability, protecting the environment
- fostering cohesion (balanced spatial development)

Fields of activity:

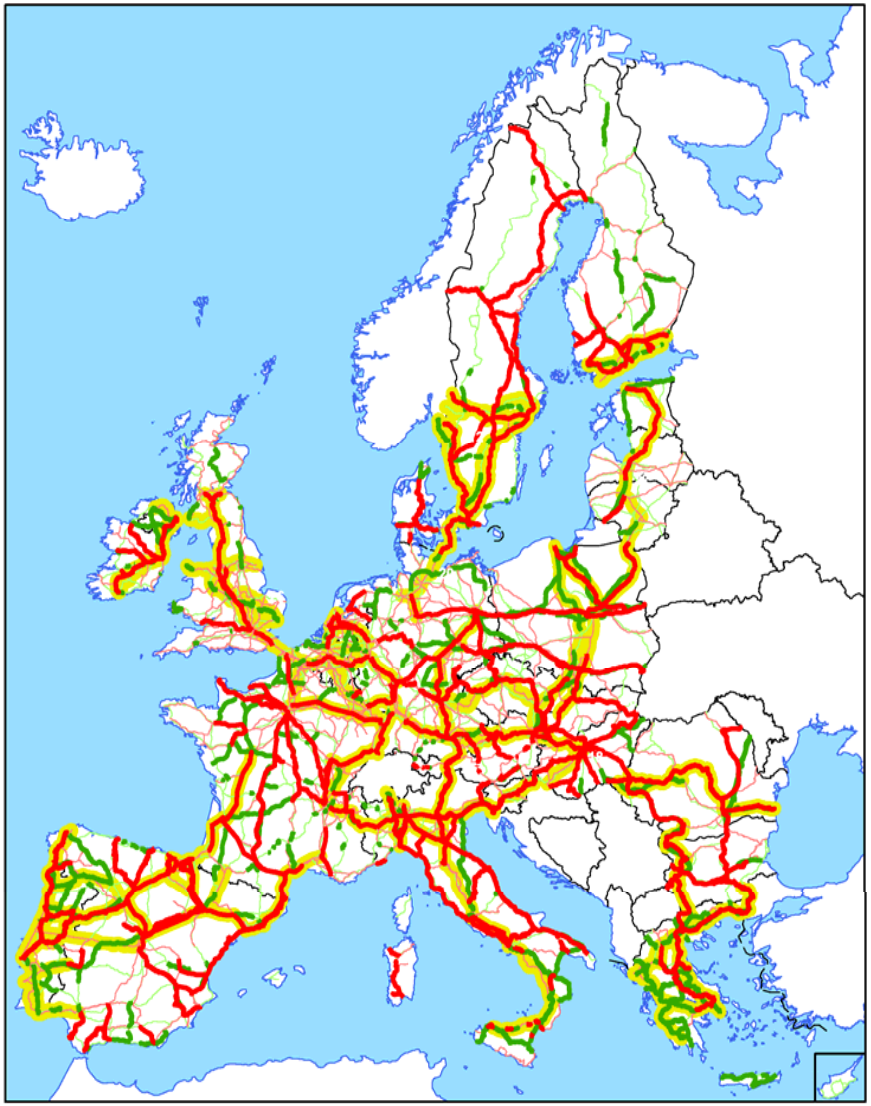
- opening up national markets for competition
- privatisation and liberalisation
- parity of access to infrastructure
- infrastructure investment, “Trans-European Networks” (TEN)
- common guidelines for infrastructure pricing: Social Marginal Cost Pricing (SMCP)

The TEN priority projects



Rail priority project
Road priority project
Waterway priority project
Airport priority project
Other TEN/TINA rail network
Other TEN/TINA road network

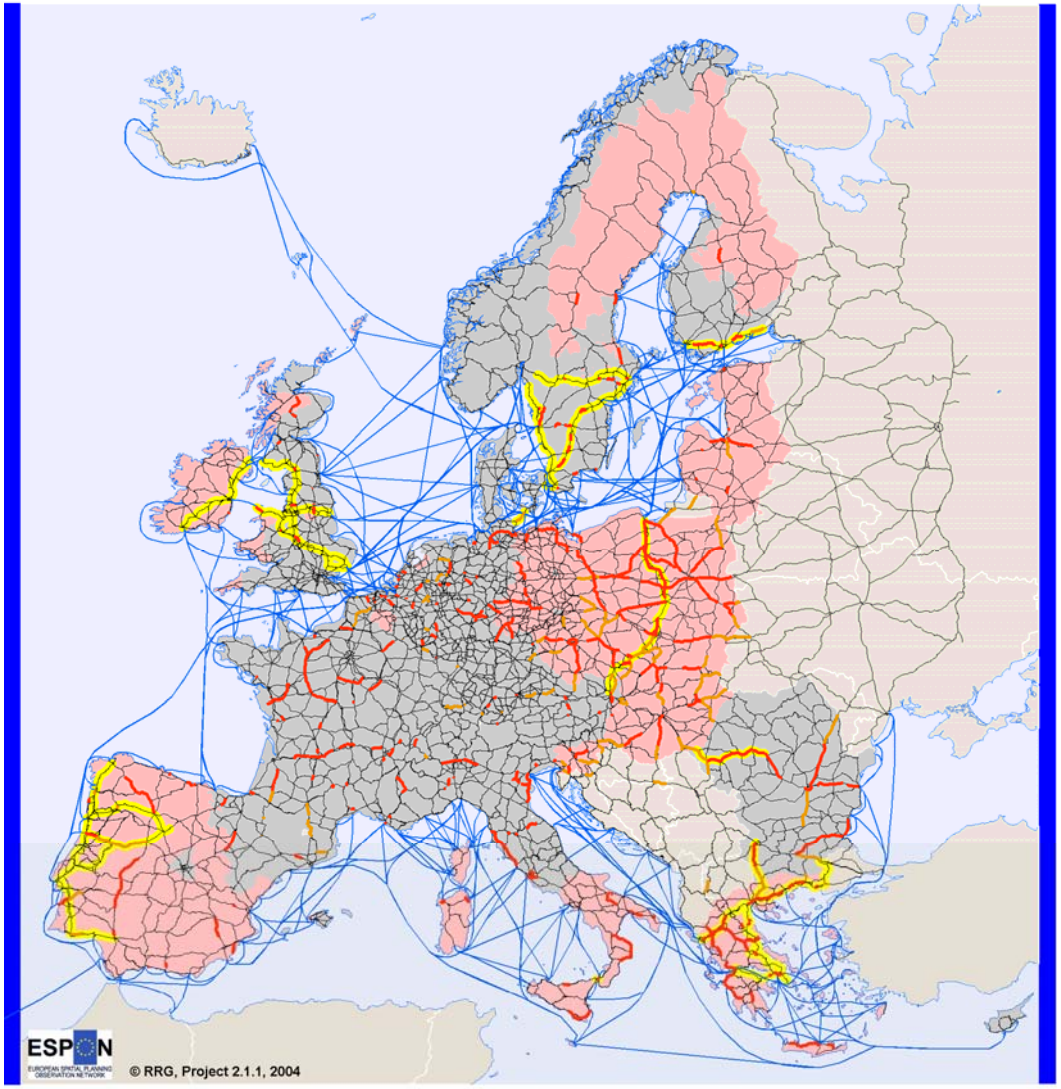
The Trans-European Transport Networks



Rail network: TEN/TINA project
Road network: TEN/TINA project
Other TEN/TINA rail network (without construction work)
Other TEN/TINA road network (without construction work)
Priority projects corridor

The Trans-European Road networks

Road network



Road links
Road priority projects (Scenario B1)
Road projects, non cross-border (Scenarios B2, B3, B5)
Road projects, cross-border (Scenarios B2, B4, B5)
Objective 1 areas (Scenario B5)
Short sea shipping links

Policy context

Funding for transport projects is provided by the EU from

- Designated funds for building the TEN-T priority projects
- Cohesion fund
- Structral funds
- Pre-accession aid (as TINA, TACIS, PHARE)

with the goal of promoting

- economic competitiveness
- balanced and sustainable development and
- re-enforcing economic and social cohesion

Does the EU TEN-T road programme reduce regional disparities in Europe?

The CGEurope model

- Comparative static
- 1373 regions, 1321 in EU25 plus Romania and Bulgaria plus Switzerland and Norway, 51 in rest of Europe including Russia, 1 rest of world
- 2 sectors, tradables and non-tradables, one immobile factor
- Final demand (including investment and public consumption) represented by consumption of a single household per region, receiving regional factor income plus an exogenously fixed net transfer
- Inputs:
  - Local goods
  - Tradable goods (bought from all locations)
  - Primary production factor

The CGEurope model (2)

- No public sector
- Perfect competition on the factor market and market for non-tradables
- Monopolistic Dixit/Stiglitz competition on the market for tradables
- Transfer costs for tradables, depending on infrastructure and pricing
- International trade imposes extra costs on trade due to international and cultural impediments

How do transport policies enter ?

- Freight cost changes affect prices in respective origins and destinations directly and prices in other locations indirectly
- Generalised travel cost changes affect costs of communication between suppliers and customers, which in turn affect returns in the origin and costs in the destination directly and prices in other locations indirectly
- Higher output prices, lower input prices or lower costs of business travel of firms translate into higher factor incomes and, hence, higher households‘ utility
- Lower consumer goods prices reduce the price index and, hence, increase households‘ utility

Data Requirements for the 1- sector CGEurope model

Regional data

- GDP, population (Source: Eurostat)

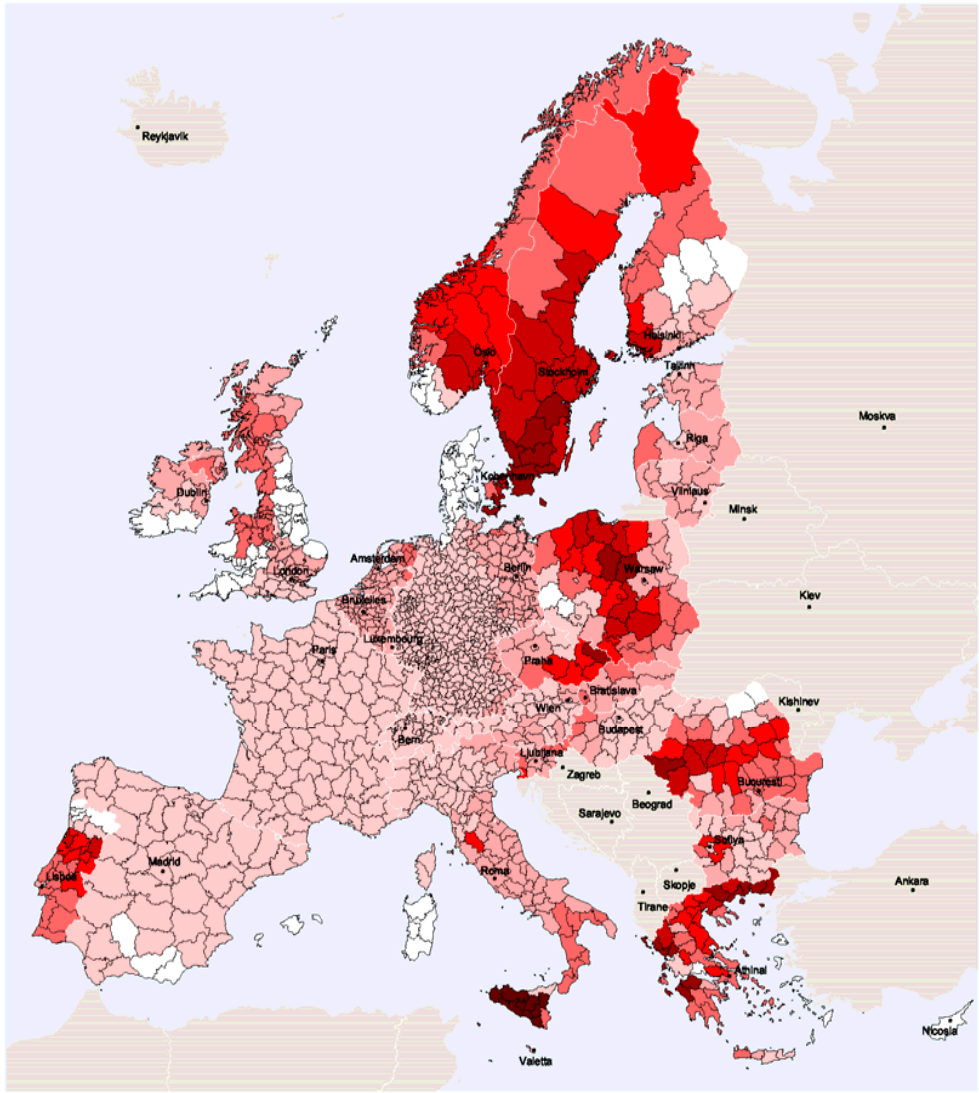
Trade

- International trade in goods and services (Source: Feenstra, GTAP)

Transport costs

- Freight costs by NUTS-3 region pair, purpose (freight, passenger) and mode of transport (road, SSS, rail, air) (Source: Spiekermann&Wegener)

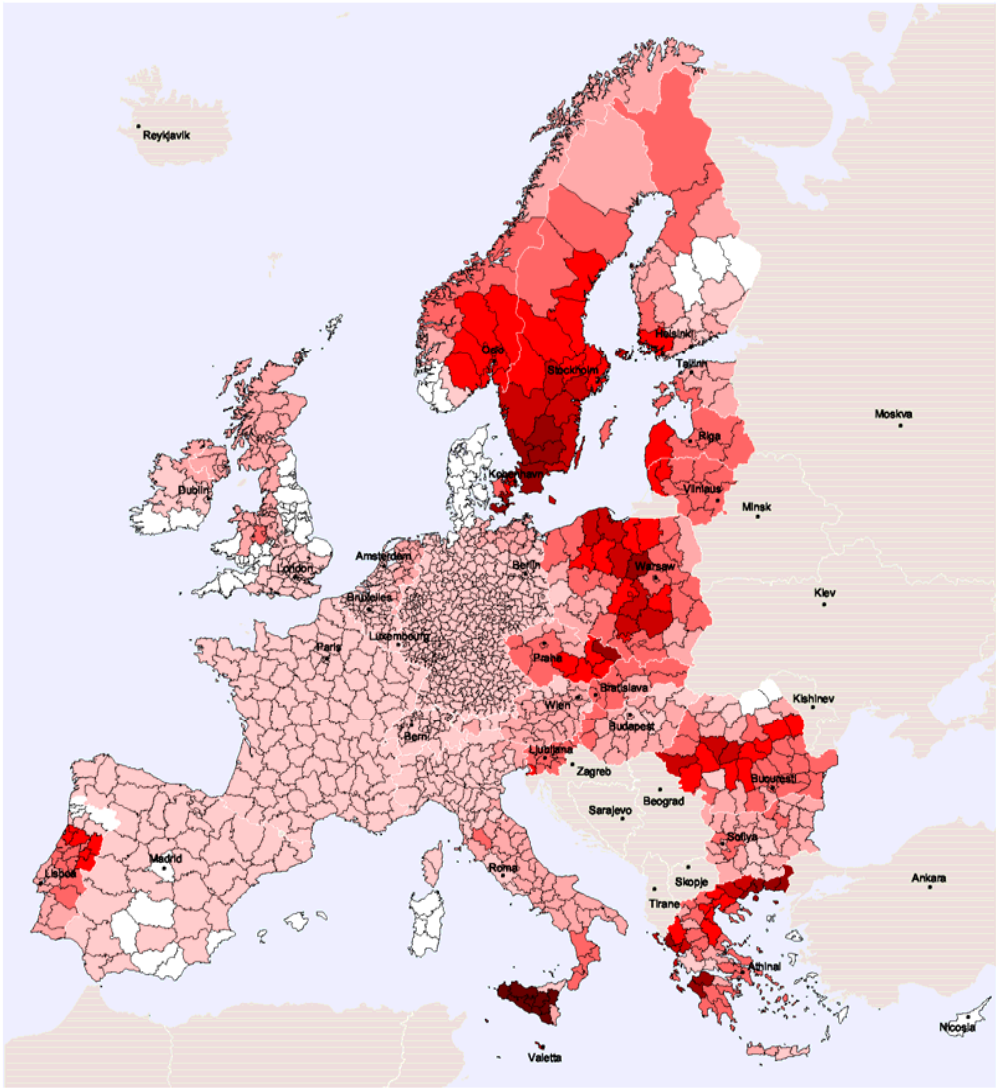
Scenario 1: The impact of the road projects of the TEN priority projects (2000 calibration)



Change of regional welfare in % of GDP

-0.059 - 0
0 - 0.025
0.025 - 0.055
0.055 - 0.11
0.11 - 0.202
0.202 - 0.358
0.358 - 0.684
0.684 - 1.129

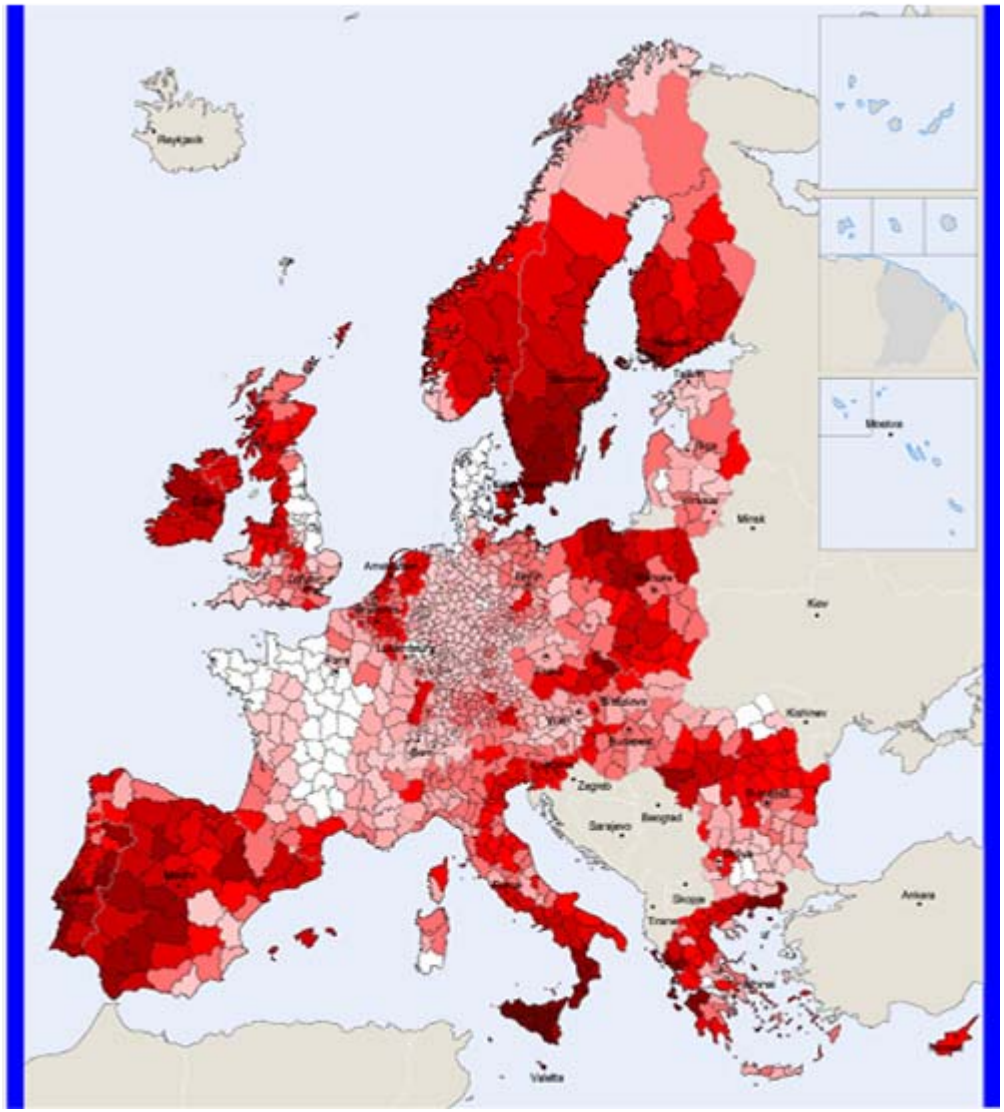
Scenario 1: The impact of the road projects of the TEN priority projects (2020 calibration)



Change of regional welfare in % of GDP

-0.059 - 0
0 - 0.037
0.037 - 0.086
0.086 - 0.167
0.167 - 0.287
0.287 - 0.449
0.449 - 0.663
0.663 - 1.118

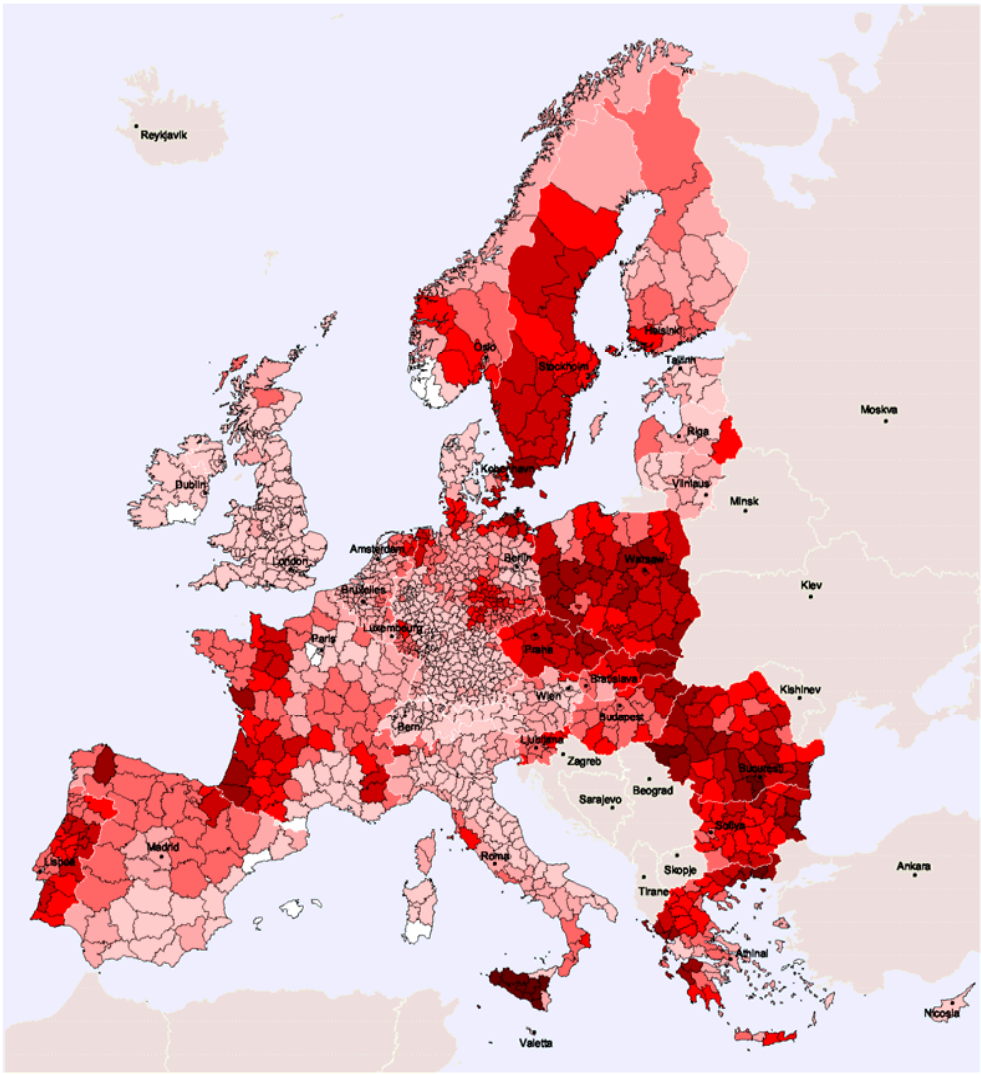
The impact of all road+rail priority projects of the TEN-T (2000 calibration)



Change of regional welfare in % of GDP

- -0.012 - 0.04
- 0.04 - 0.069
- 0.069 - 0.096
- 0.096 - 0.13
- 0.13 - 0.176
- 0.176 - 0.255
- 0.255 - 0.365
- 0.365 - 0.528
- 0.528 - 0.811
- 0.811 - 1.79

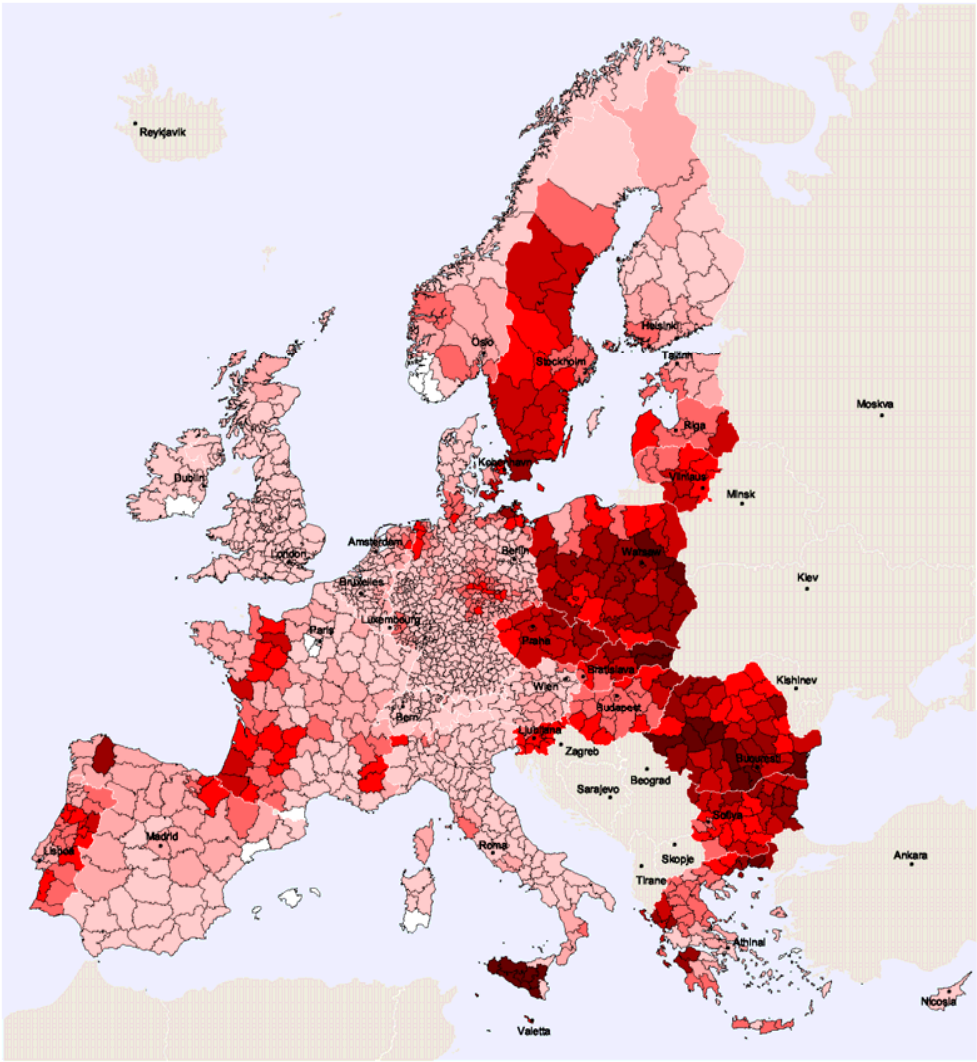
Scenario 2: The impacts of all road projects of the TEN and TINA list (2000 calibration)



Change of regional welfare in % of GDP

-0.098 - 0
0 - 0.094
0.094 - 0.157
0.157 - 0.248
0.248 - 0.371
0.371 - 0.561
0.561 - 0.874
0.874 - 1.246

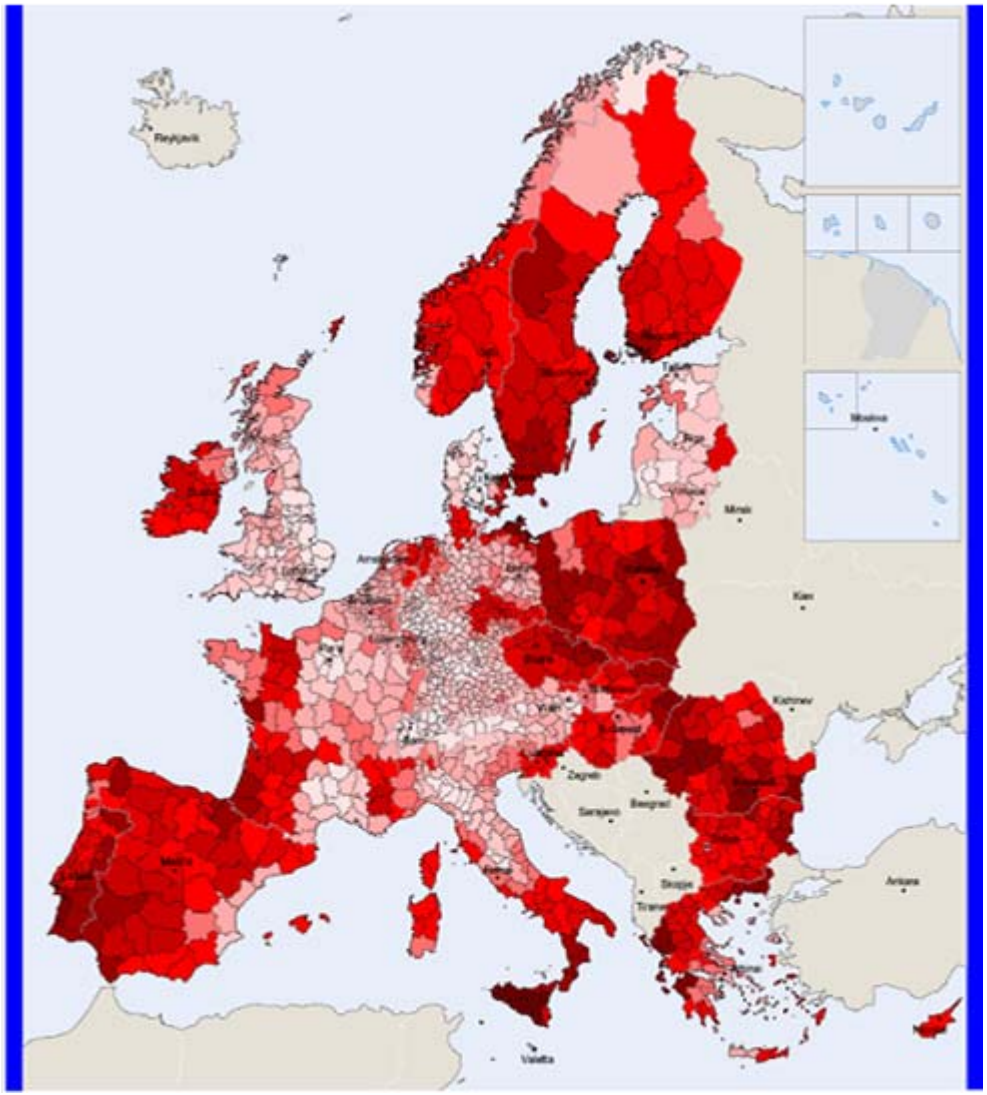
Scenario 2: The impacts of all road projects of the TEN and TINA list (2020 calibration)



Change of regional welfare in % of GDP

-0.108 - 0
0 - 0.144
0.144 - 0.24
0.24 - 0.351
0.351 - 0.493
0.493 - 0.667
0.667 - 0.921
0.921 - 1.234

The impacts of all road+rail projects of the TEN and TINA list (2000 calibration)



Change of regional welfare in % of GDP

- 0.036 - 0.135
- 0.135 - 0.185
- 0.185 - 0.245
- 0.245 - 0.317
- 0.317 - 0.395
- 0.395 - 0.483
- 0.483 - 0.608
- 0.608 - 0.801
- 0.801 - 1.138
- 1.138 - 1.844

Aggregated effects in % of GDP

	Road Priority Projects 2000	Road Priority projects 2020	Road TEN/ TINA 2000	Road TEN/TINA 2020
EU27+2	0.043	0.046	0.133	0.145
EU15	0.040	0.041	0.120	0.128
NMS12	0.091	0.142	0.396	0.572

	Road+Rail Priority Projects 2000	Road+Rail TEN/ TINA projects 2000
EU27+2	0.144	0.262
EU15	0.144	0.251
NMS12	0.165	0.504

Spatial inequality and welfare (1)

Indicators

- Coefficient of variation
- Gini coefficient
- Ratio of geometric to arithmetic mean of GDP (1 if all observations are equal, goes toward 0, if observations are very heterogeneous)
- Coefficient of correlation of the **relative** welfare effects against the benchmark GDP
- Coefficient of correlation of the **absolute** welfare effects against the benchmark GDP

Spatial inequality and welfare (2)

Cohesion impacts in the EU27+2

Scenario	GDP/capita cohesion effects				
	CoV	Gini	G/A	RC	AC
Priority projects in 2000	+	+	+	+	-
Priority projects in 2020	+	+	+	+	-
TEN/TINA projects in 2000	+	+	+	+	-
TEN/TINA projects in 2020	+	+	+	+	-

Cohesion impacts in the EU-15

Scenario	GDP/capita cohesion effects (+/–)				
	CoV	Gini	G/A	RC	AC
Priority projects in 2000	0	0	+	+	0
Priority projects in 2020	0	0	+	+	-
TEN/TINA projects in 2000	+	+	+	+	-
TEN/TINA projects in 2020	+	+	+	+	-

Spatial inequality and welfare (3)

Cohesion impacts in the NMS-12

Scenario	GDP/capita cohesion effects (+/–)				
	CoV	Gini	G/A	RC	AC
Priority projects in 2000	+	+	0	0	-
Priority projects in 2020	0	0	-	-	-
TEN/TINA projects in 2000	0	+	+	0	-
TEN/TINA projects in 2020	0	+	+	+	-

Conclusions

- The road programme decreases spatial inequalities in the EU 27+2, the old EU-15 and in the new member states in relative terms
- This means, in tendency regions with lower GDP/capita gain more in % of their current GDP
- The same can be said if we look at the whole road and rail programme
- However, it leads to a more unequal spatial distribution if you look at cohesion in absolute terms
- Higher relative gains in the poorer regions are translated in relatively smaller absolute gains in Euro/capita
- The last indicator (coefficient of correlation of absolute impact and GDP/capita) shows that both scenarios increases disparities in this sense, because richer regions have higher gains in Euros than the poorer regions