An Analytical Framework for Assessing the Spatial and Economic Impacts of Transport Network Improvements – the Egnatia Motorway

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Overview

1. Overcoming regional disparities through new transport links?
2. Three analysis steps for assessing the impacts of transport network improvements
3. The case study: The Egnatia Motorway in Northern Greece
4. Conclusions

New transport links for Europe – the trans-European Transport Networks (TETN)

The European Union hopes to contribute to reducing the disparities between regions by the development of the ***trans-European Transport Networks (TETN)***.

The *TETN* are one of the most ambitious initiatives of the European Union since its foundation.

The ***masterplans*** for rail, roads, water-ways, ports and airports require public and private investment between 400 and 500 billion € until the year 2010.

Overcoming regional disparities through new transport links?

Critics doubt that the TETN will reduce disparities between European regions:

- Many of the new connections do not link peripheral regions to the core but central regions with each other.
- The impact of the new connections may be ambiguous: A new motorway or high-speed rail link between a peripheral and a central region may make it easier for producers in the peripheral region to market their products in large cities, but it may also expose their formerly secure regional monopolies to the competition of more advanced producers from the centre.

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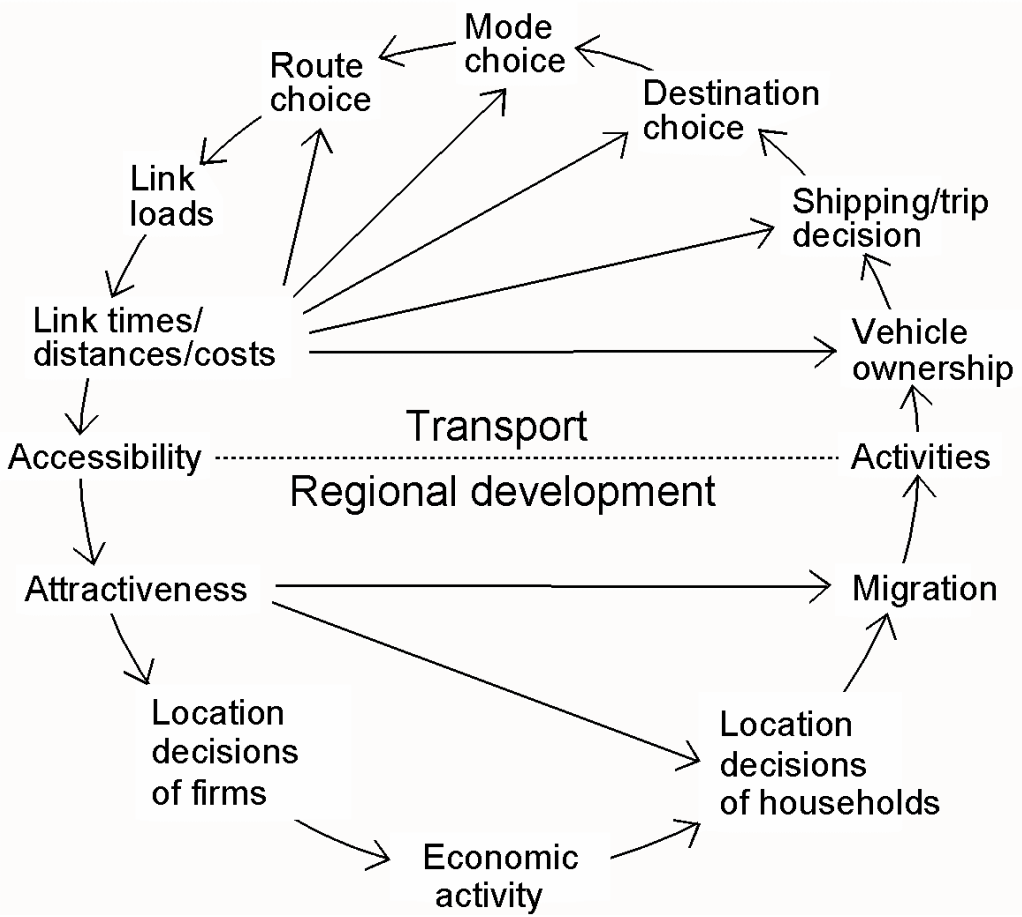
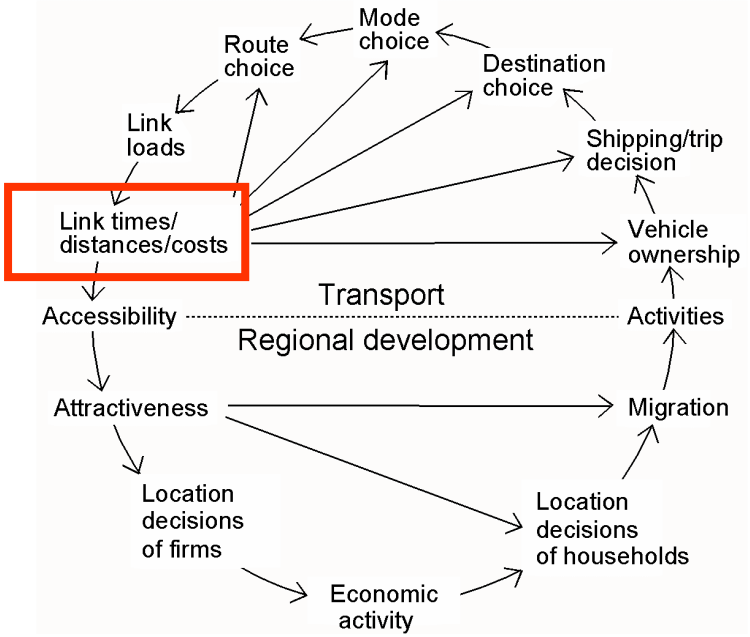
Interactions between transport system and regional development



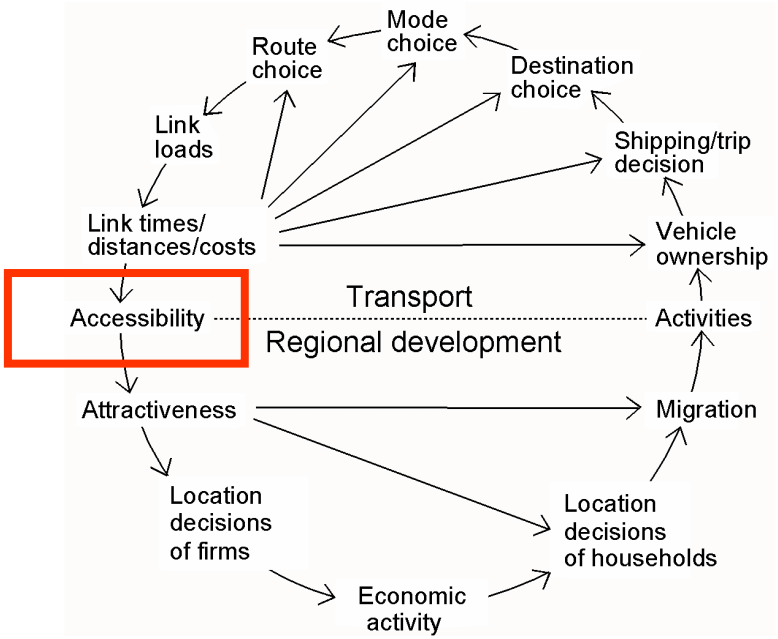
Analysis step I: Travel times



One of the most frequently used indicators for measuring the effects of transport network improvements are travel times. In this study, we display travel times

i) in tables,
ii) as isochrones,
iii) through average travel time savings.

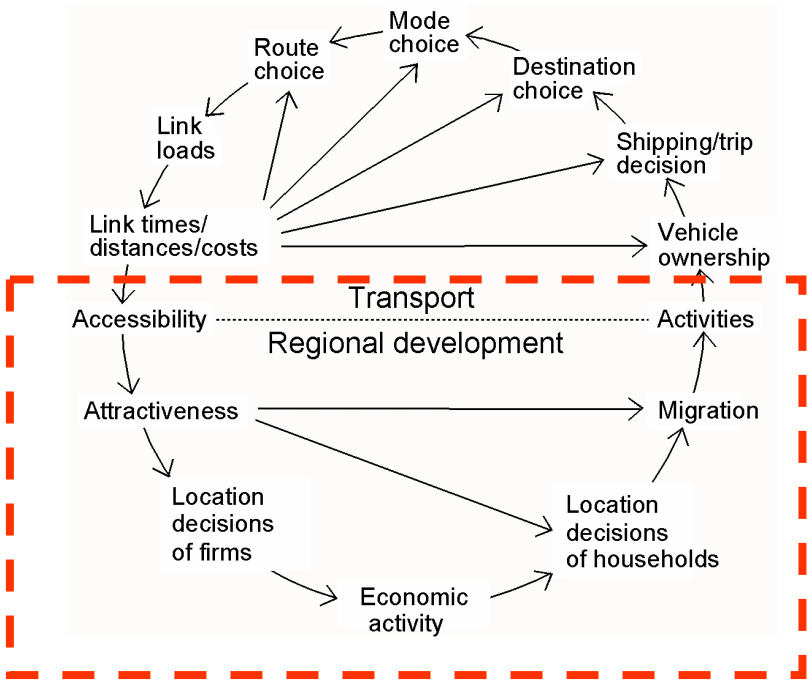
Analysis step II: Accessibility



The potential type accessibility takes into consideration both the distance/ traveltime to destinations ('impedance function') and their size or "mass" ('activity function'). In this study, we employ

- population as mass term,
- car travel time as impedance function.

Analysis step II: Socio-economic impacts



In order to anticipate the effects of new transport links on the regional economic development, it is possible to apply simulation models reproducing economic, demographic and accessibility-related variables and interrelations. In this study we make use of the SASI-model, developed as part of the EUNET project.

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Via Egnatia – 680 km of new motorway

The Egnatia Motorway: Basic Features

Total length	680 km
Completed bevor 1994	94 km
Completed by 2002	394 km
Currently under construction	190 km
Ready to be tendered / in the design phase	96 km
Type of construction	Closed dual carriage way; paved width of 24.5 metres
Bridges	1650 (app. 40 km)
Tunnels	76 (app. 49.5 km)
River crossings	43
Railway crossings	11
Interchanges	50
Total funding (approved so far)	3.2 billion Euro

The Egnatia Motorway – some impressions

section Komotini-Mesti (10/2000)

Kavala Bypass (04/2001)

Section Ladochori-Likopodi (summer 2002)

Source: Egnatia Odos S.A., 2001

Transport Network Scenarios applied for identifying the impacts of new transport links in Greece

Scenario	*Description*
Base year (2001)	Base scenario
Via Egnatia	Base scenario plus full Via Egnatia implementation
Via Egnatia and P.A.T.H.E.	Base scenario plus full Via Egnatia and P.A.T.H.E. Corridor implementation
Greek motorways	Full implementation of all Greek TEN road projects
TEN/TINA	Full implementation of all TEN/TINA road projects

Analysis step I: Travel times

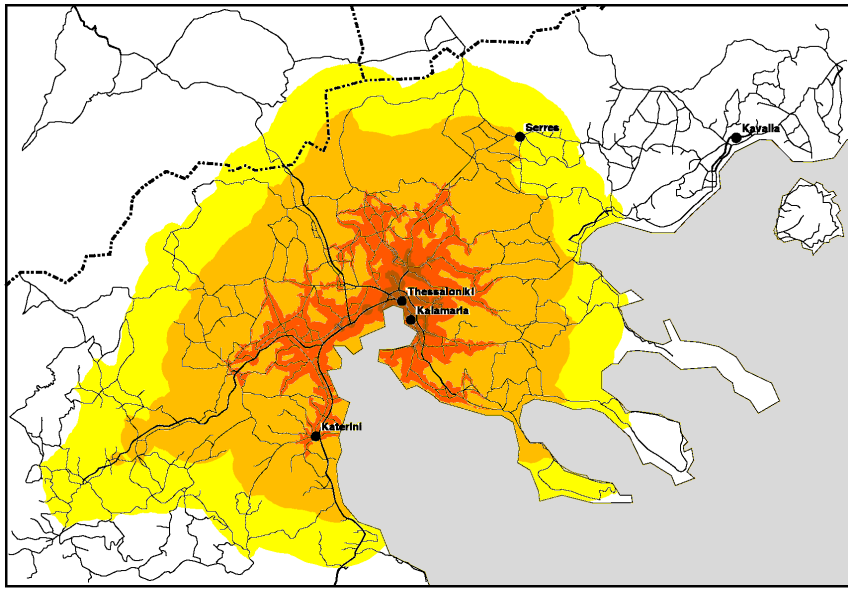
Reduction of travel times (I)
Two examples

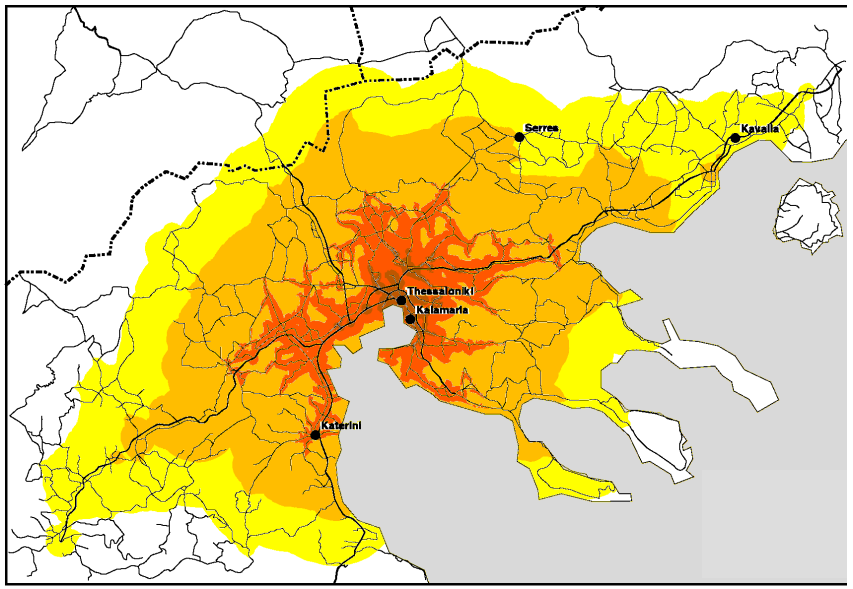
	Base	*Via Egnatia*	*Via Egnatia-P.A.T.H.E.*	*Greek Motorways*	*TEN/ TINA*
Igoumenitsa-Athens					
Travel times (minutes)	437	414	410	345	345
Travel time reduction (vs. Base scenario, minutes)	0	-23	-28	-93	-93
Travel time reduction (vs. Base scenario, percent)	0	-5,3	-6,4	-21,3	-21,3
Alexandroupolis-Athens					
Travel times (minutes)	648	533	490	488	488
Travel time reduction (vs. Base scenario, minutes)	0	-115	-159	-160	-160
Travel time reduction (vs. Base scenario, percent)	0	-17,7	-24,5	-24,7	-24,7

Reduction of travel times (II)

Isochrones:
the example
of Thessaloniki

Base scenario (2001)



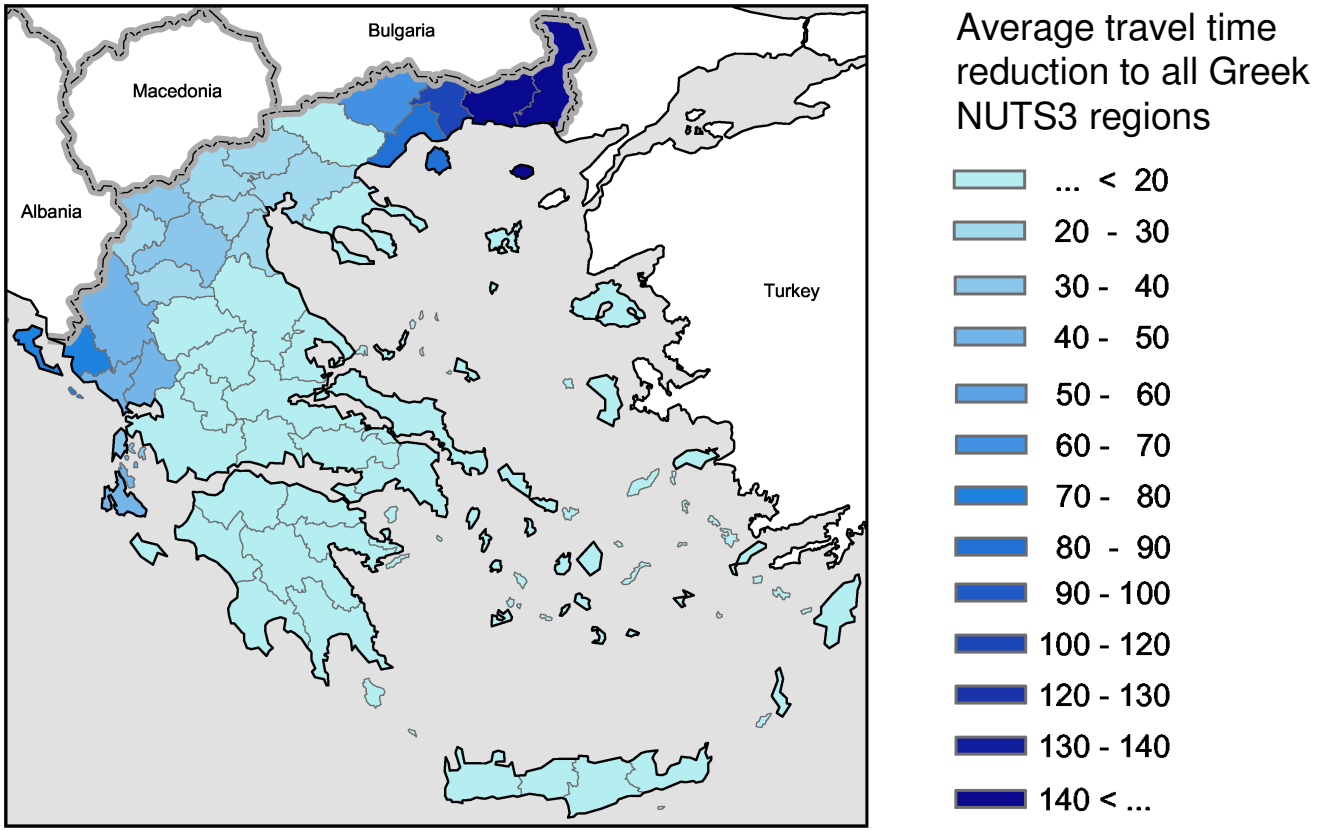


30 min
60 min
90 min
120 min

Via Egnatia scenario

Reduction of travel times (III)

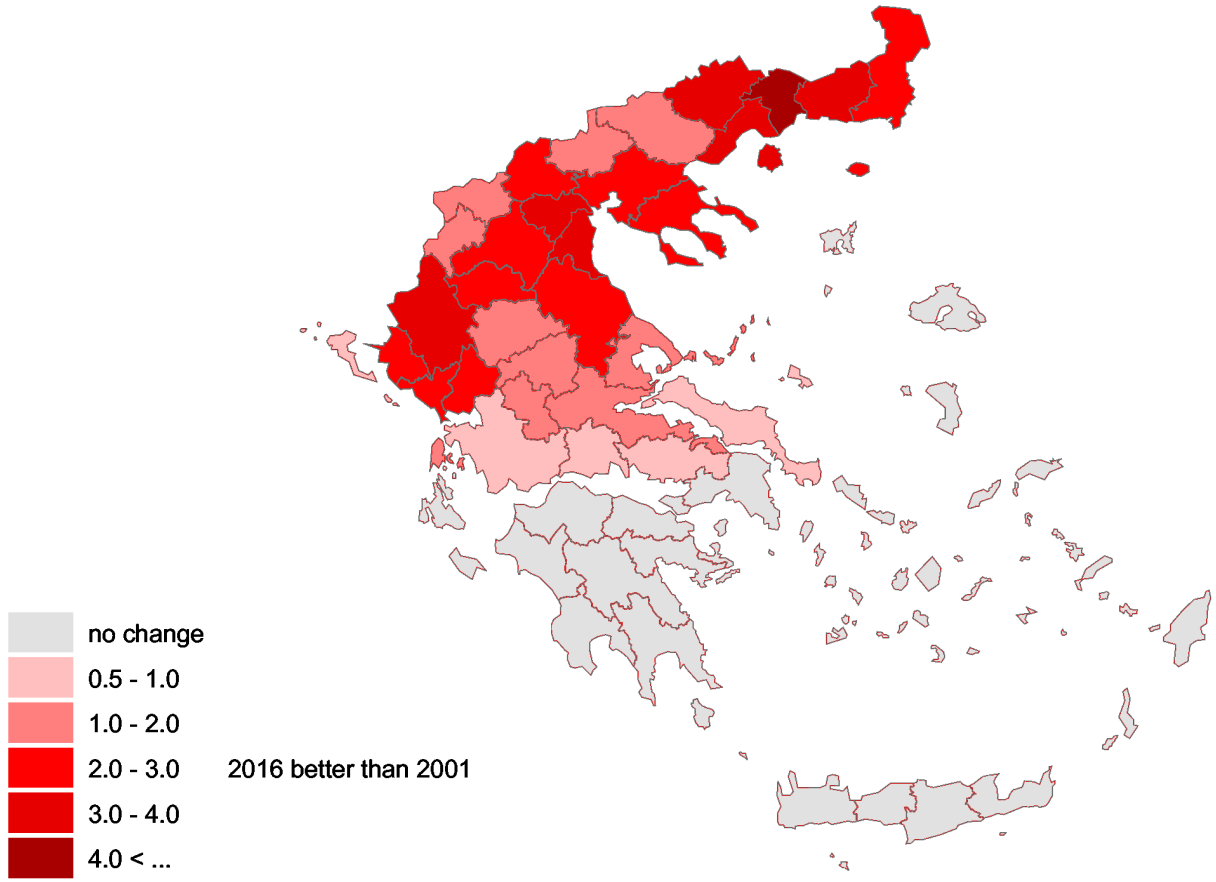
Via Egnatia vs. Base scenario. Travel Time Differences



Analysis step II: Accessibility

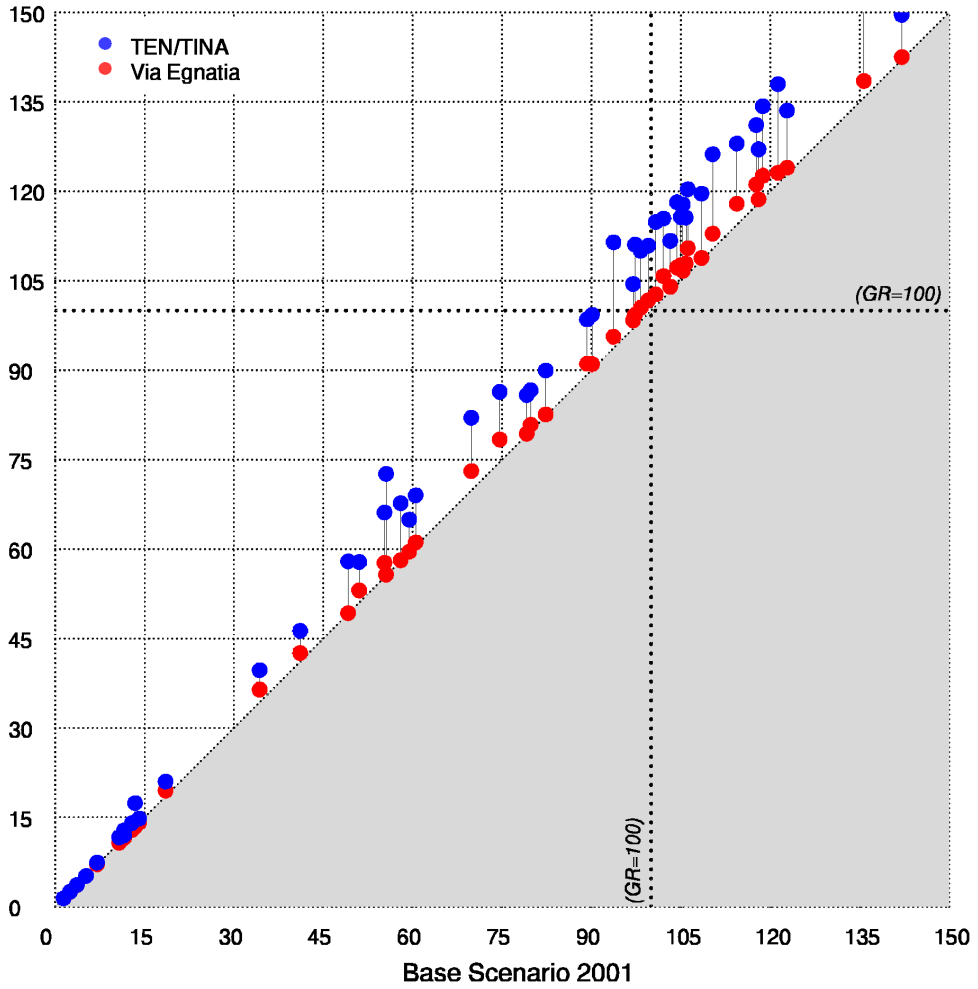
Impact of Via Egnatia on Accessibility (I)

Access to population by car for NUTS 3 regions.
Relative differences in percentage points (GR current situation = 100)
Via Egnatia vs. Base Scenario

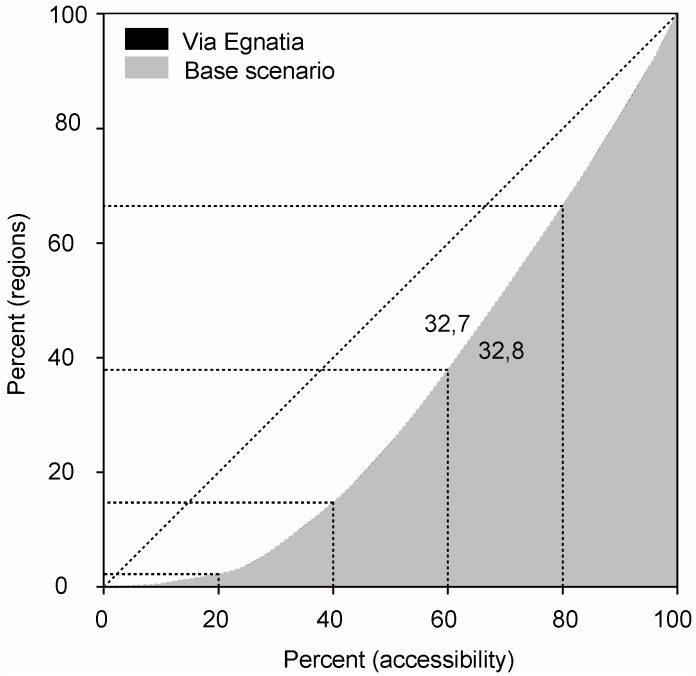


Impact of Via Egnatia on Accessibility (II)

Access to population by car for Greek regions (NUTS 3) (GR current situation =100).
Base Scenario against Via Egnatia Scenario and full TEN/TINA Scenario.



Impact of Via Egnatia on accessibility (III): Gini Coefficients



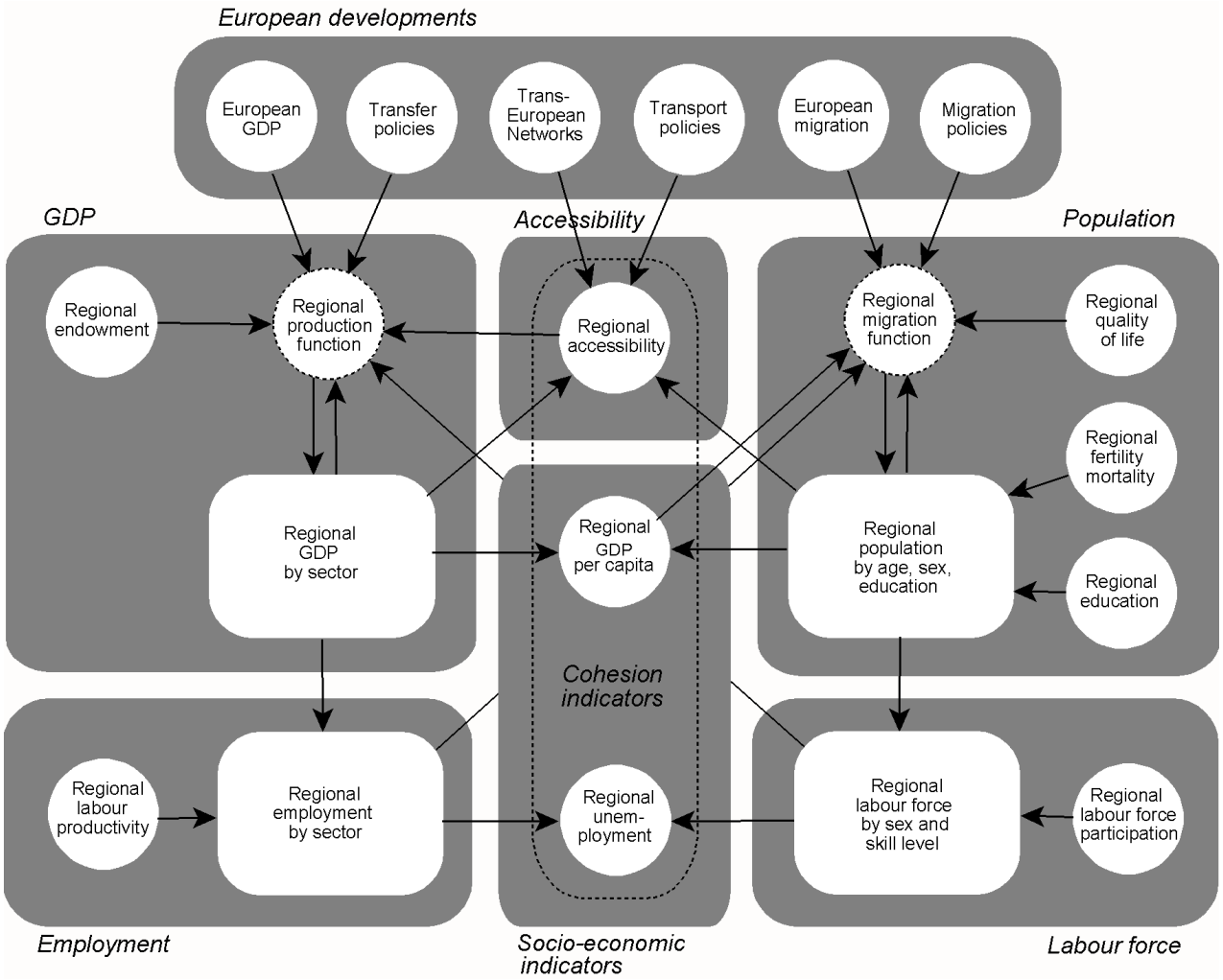
Scenario	*EU regions*	*Greek regions*
Base scenario	0.324	0.328
Via Egnatia	0.323	0.327
Via Egnatia / P.A.T.H.E.	0.323	0.327
Greek motorways	0.323	0.321
TEN/TINA	0.321	0.321

1,083 EU NUTS-3 regions
54 Greek NUTS-3 regions

Analysis step III:
Socio-economic impacts

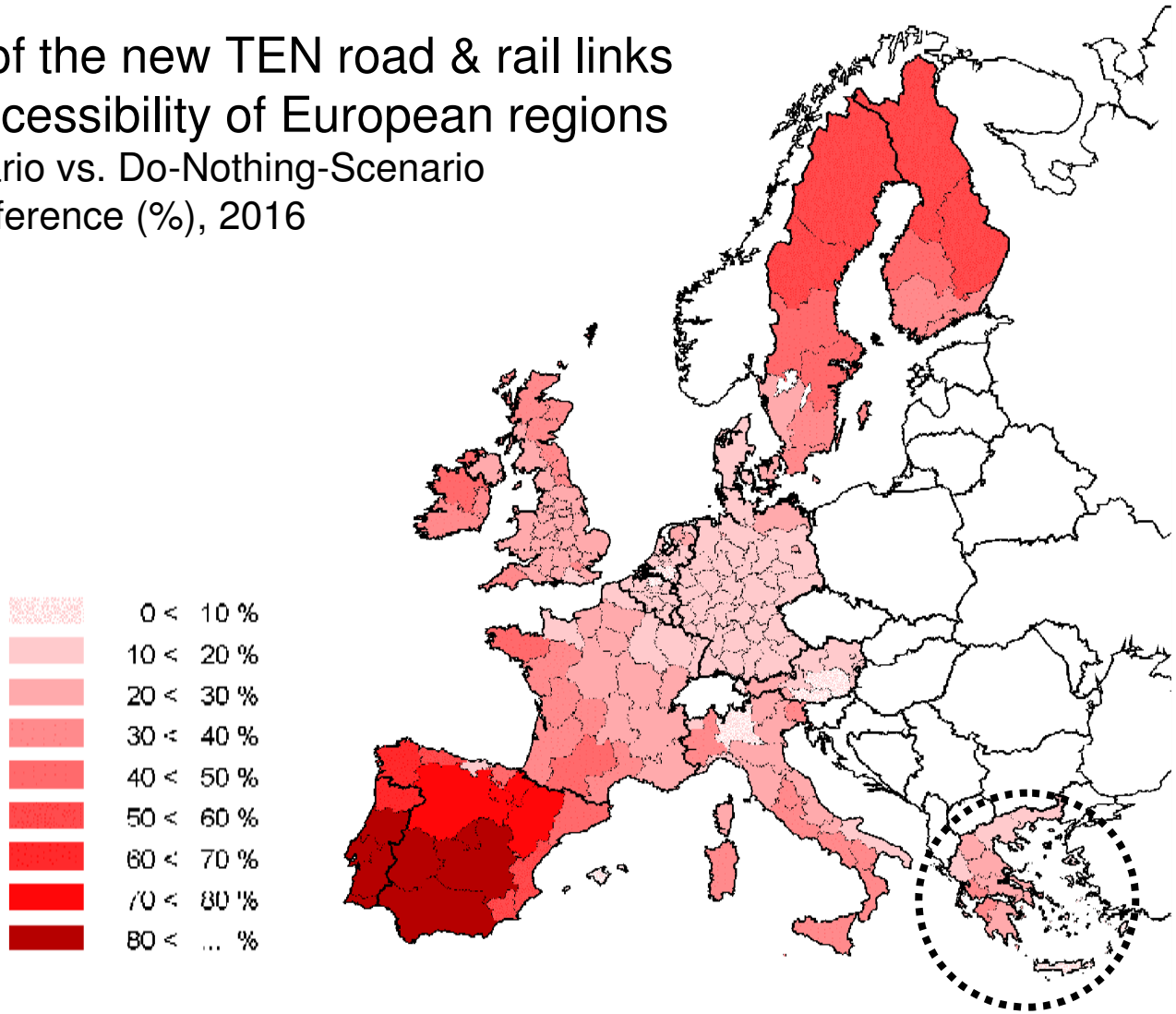
The SASI-Model

Socio-economic and Spatial Impacts of Transport Infrastructure Investments and Transport System Improvements



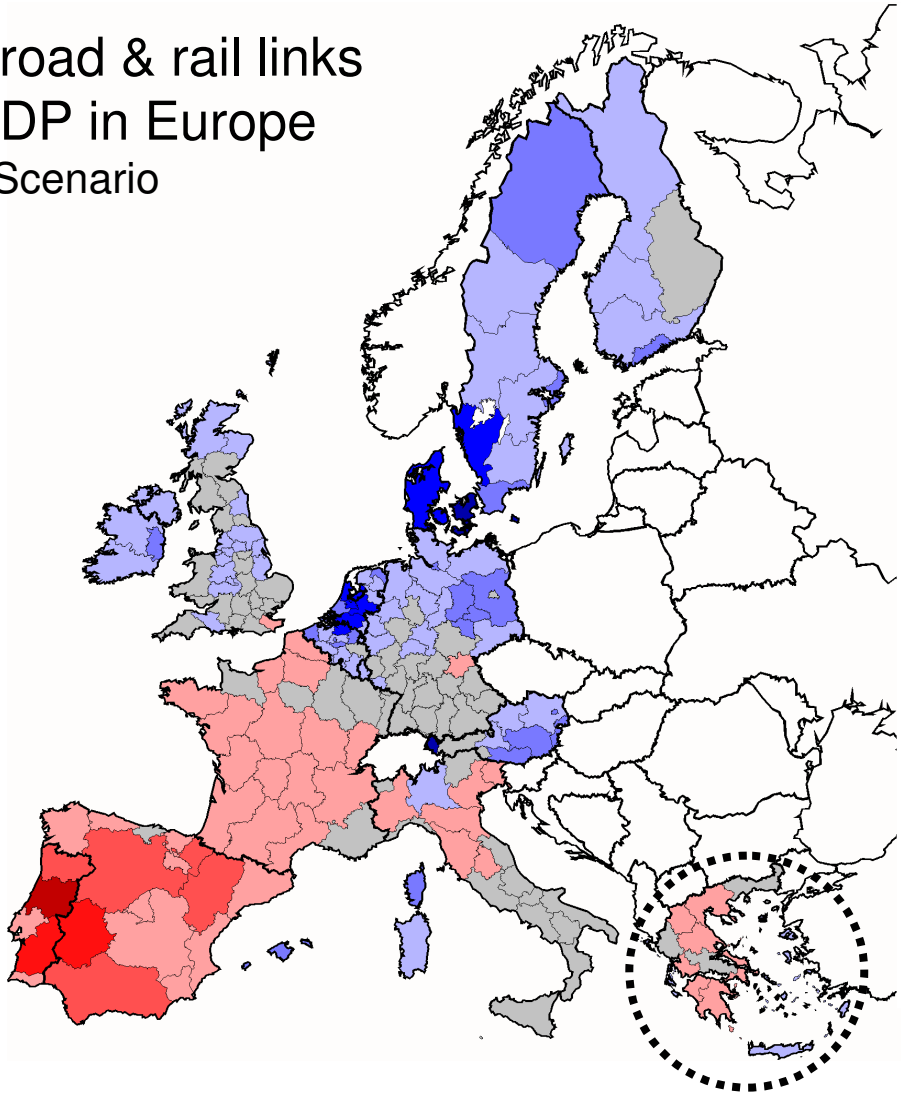
Impacts of the new TEN road & rail links on the accessibility of European regions

TEN-Scenario vs. Do-Nothing-Scenario
Relative difference (%), 2016



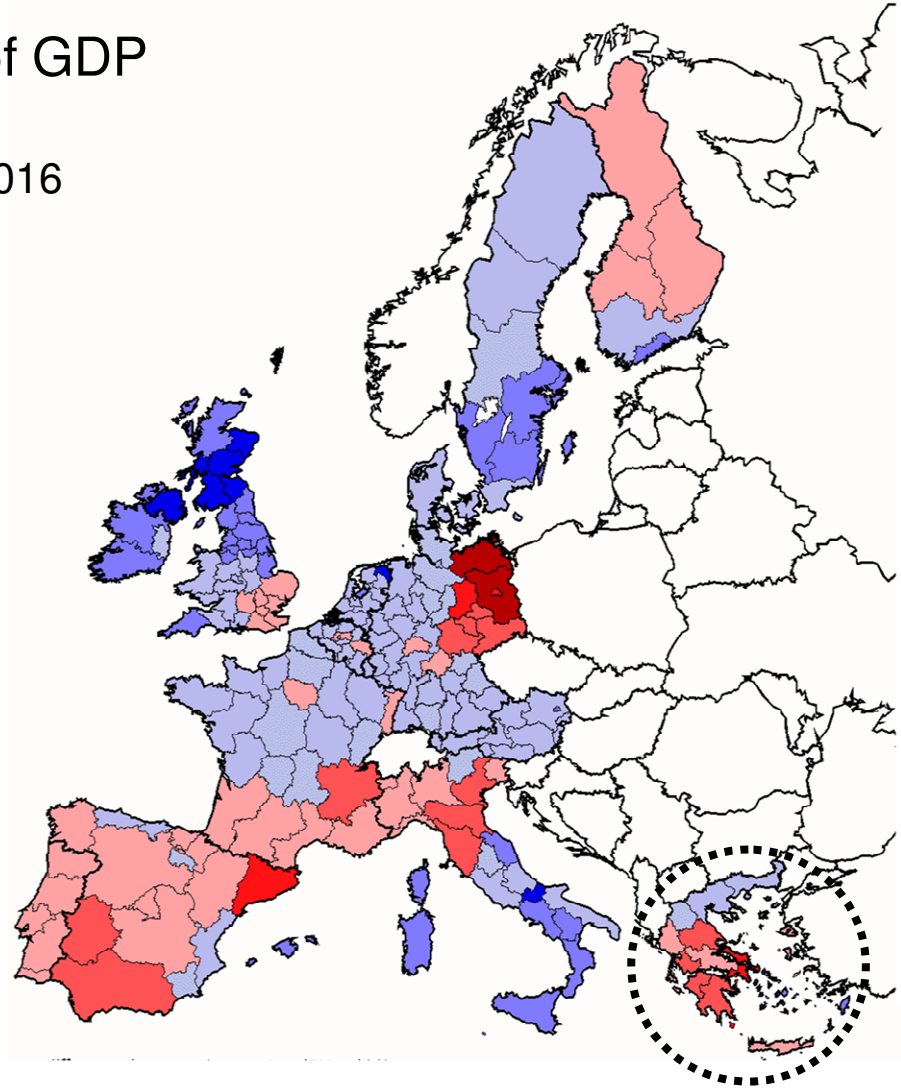
Impacts of the new TEN road & rail links on the development of GDP in Europe

TEN-Scenario vs. Do-Nothing-Scenario
Relative difference (%), 2016



Expected development of GDP in Europe (EU=100)

TEN scenario, Change 1996-2016



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Conclusions I: Overcoming disparities? The Egnatia case study

Analysis step I: Travel Times

Particularly the regions at the end points of the Via Egnatia route will experience travel time savings.

Analysis step II: accessibility

The relative increments in accessibility of the Northern Greek regions will remain rather small unless also further motorway projects, namely the P.A.T.H.E. motorway, are being implemented. However, neither Via Egnatia nor the total of the TEN motorway projects will be able to clearly reduce the accessibility disparities within Greece.

Analysis step III: Socio-economic outcomes

The Greek regions will belong to the European regions with relatively high GDP gains induced by transport network improvements. However, if the changes are standardised (EU=100), Northern Greece is expected to fall further behind the European average.

Conclusions II:
The three-step analytical framework

- The proposed three step analysis of the impacts of transport networks improvements leads to differentiated results: In the Via Egnatia case, traveltimes are clearly reduced, while the related gains in accessibility and GDP-development remain rather modest.
- In public and political discussions, investments into new transport links are often assessed on the basis of traveltime savings only. Hyarchical multi step analyses of spatial and socio-economic impacts as proposed in this paper might be helpful for achieving a more comprehensive assessment of planned transport network improvements.

More information

SASI Homepage:
http://irpud.raumplanung.uni-dortmund.de/
... pro/sasi/sasi.htm
... pro/peri/peri_e.htm

IASON Homepage:
http://www.inro.tno.nl/iason/

IRPUD Homepage:
http://irpud.raumplanung.uni-dortmund.de/irpud/