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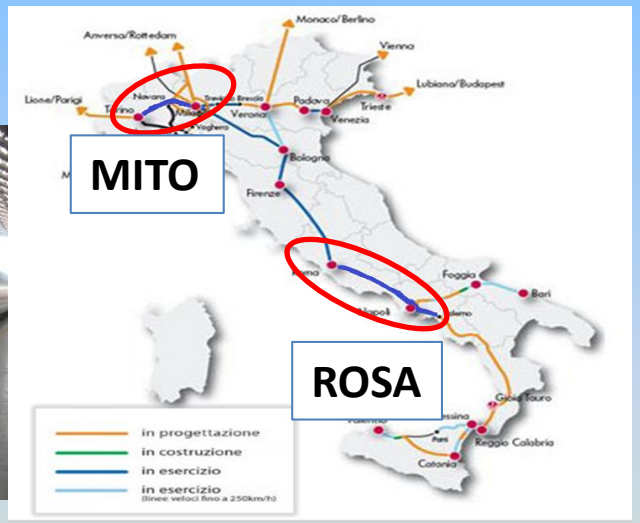
HIGH SPEED RAIL SYSTEMS DEPLOYMENT AND MEGALOPOLIS FORMATION:
THE MITO AND ROSA CASE STUDIES IN ITALY

Francesca Pagliara
Dep. of Civil, Architectural and Environmental Engineering
University of Naples Federico II



The premise

Do high speed rail systems induce megalopolis formation?

- **Definition of a megalopolis**: *large agglomerations, megaregions, mega-cities, megaplexes, megapolitan regions, etc.*

- A **Megalopolis** is: "***an integrated economic urban complex*** *- created by fusion of multiple cities connected by high-speed transportation of 200-300 km/h*" (Sussman, 2011).

- **Megalopolis** is: *"an almost continuous stretch of urban and suburban areas from southern New Hampshire to northern Virginia and from- the Atlantic shore to the Appalachian foothills"* (Gottman, 1961).

- *"A geographical area that shares a common labor market and a common market for household and business services"(*Blum et al., 2009).

- A **megaregion** is: "*a linked network for metropolitan areas that serve as a functional unit for economic activity*" (Contant e Nie, 2009).

HSR impact on Megalopolises formation

POSITIVE IMPACTS:

- Larger labor markets and commercial markets, thus greater productivity.

- *"Better and more effective than cities alone in meeting the economic and social challenges"* (Ross, 2009).

How one would know that a megalopolis emerges as a result of HSR deployment?

No precise parameters, but some observed in case studies are:

- ❑ significant increases in one-day round trips between a pair or group of cities
- ❑ high levels of newly generated induced demand overall
- ❑ induced demand for business trips
- ❑ increase in the number of daily commuters
- ❑ decrease in overnight hotel stays.

HSR impact on Megalopolises formation

- **The approach in the literature:**

  Largely qualitative, supported with syntheses of quantitative analyses of existing empirical evidence before and after HSR deployment.

CONTRIBUTION TO THE INTERNATIONAL LITERATURE: propose a model which can assess the impacts of HSR on the formation of a megalopolis.

MITO and ROSA case studies in Italy

1977-1992
Inaugurazione DIRETTISSIMA “Roma-Firenze”
Oggi in servizio >1,400km

MITO and ROSA case studies in Italy

MITO MEGALOPOLIS

MITO 148,3km (MIlano-TOrino)
(Inauguration Dec 2009)

		TRAVEL TIME	
		BEFORE	AFTER
HSR	MILANO-TORINO	*1h40min*	*49min*

MITO and ROSA case studies in Italy

ROSA MEGALOPOLIS

ROSA 258,6 Km(ROma-SAlerno)

(Inauguration Dec 2009)

RONA (ROma-NApoli) 204,6 Km (Inauguration Dec 2005)

NASA (NApoli-SAlerno) 54 Km con (Inauguration June 2008)

		TRAVEL TIME	
		BEFORE	AFTER
HSR	ROMA -SALERNO	*5h*	*1h54min*
	ROMA-NAPOLI	*3h*	*1h10min*
	NAPOLI-SALERNO	*1h*	*35min*

MITO and ROSA case studies in Italy

❑ **Model proposed:**

Regression models:

$$\Delta POP_t\,(\Delta HousePrice_t) = \beta_0 + \beta_{Growth\text{-}Rate}\,Growth\text{-}Rate_t + \beta_{Res\text{-}Dens}\,Res\text{-}Dens_t + \beta_{Migration\text{-}Rate}\,Migration\text{-}Rate_t + \\ + \beta_{GDP}\,GDP_t + \beta_{UNEMP\text{-}RATE}\,UNEMP\text{-}RATE_t + \beta_{TIME\text{-}HSR}\,TIME\text{-}HSR + \beta_{COST\text{-}HSR}\,COST\text{-}HSR + \beta_{FREQ\text{-}HSR}\,FREQ\text{-}HSR + \\ + \beta_{COMF\text{-}HSR}\,COMF\text{-}HSR$$

	Social indicators			**Economic indicators**		**Transport indicators**			
Independent variables	Growth -Rate	Res- Dens	Migration -Rate	*UNEMP-RATE*	*GDP*	*TIME -HSR*	*COST -HSR*	*FREQ- HSR*	*COMF -HSR*

Dependent variables	ΔPOP
	$\Delta HousePrice$

MITO and ROSA case studies in Italy

MITO

Coefficient

	$\beta_{Growth-Rate}$	$\beta_{Res-Dens}$	$\beta_{Migration-Rate}$	$\beta_{UNEMP-RATE}$	β_{GDP}	$\beta_{FREQ-HSR}$	$\beta_{COMF-HSR}$
Value	0.025	0.0003	-0.025	-0.014	1.26e-06	0.0017	0.112
	(2.92)	(6.77)	(-2.88)	(-3.04)	(3.65)	(4.54)	(5.67)
ρ^2	0.54						
ρ^2_{adj}	0.53						

Corridor MITO – analysis based on *POP*

Coefficiente

	$\beta_{Growth-Rate}$	$\beta_{Res-Dens}$	$\beta_{Migration-Rate}$	β_{GDP}	$\beta_{FREQ-HSR}$	$\beta_{COST-HSR}$	$\beta_{TIME-HSR}$
Valore	1.61	0.003	-1.613	0.04	0.201	-2.899	-13.24
	(5.38)	(3.17)	(-5.37)	(3.03)	(4.45)	(-5.30)	(-5.16)
ρ^2	0.48						
ρ^2_{adj}	0.47						

Corridor MITO – analysis based on *HousePrice*

MITO and ROSA case studies in Italy

RONA

	Coefficient					
	$\beta_{Growth-Rate}$	$\beta_{Res-Dens}$	$\beta_{Migration-Rate}$	$\beta_{FREQ-HSR}$	$\beta_{COST-HSR}$	$\beta_{TIME-HSR}$
Value	0.2	0.45	-0.25	0.75	-1.25	-2.5
	(4.32)	(4.51)	(-4.38)	(7.74)	(-3.69)	(3.70)
ρ^2	0.58					
ρ^2_{adj}	0.57					

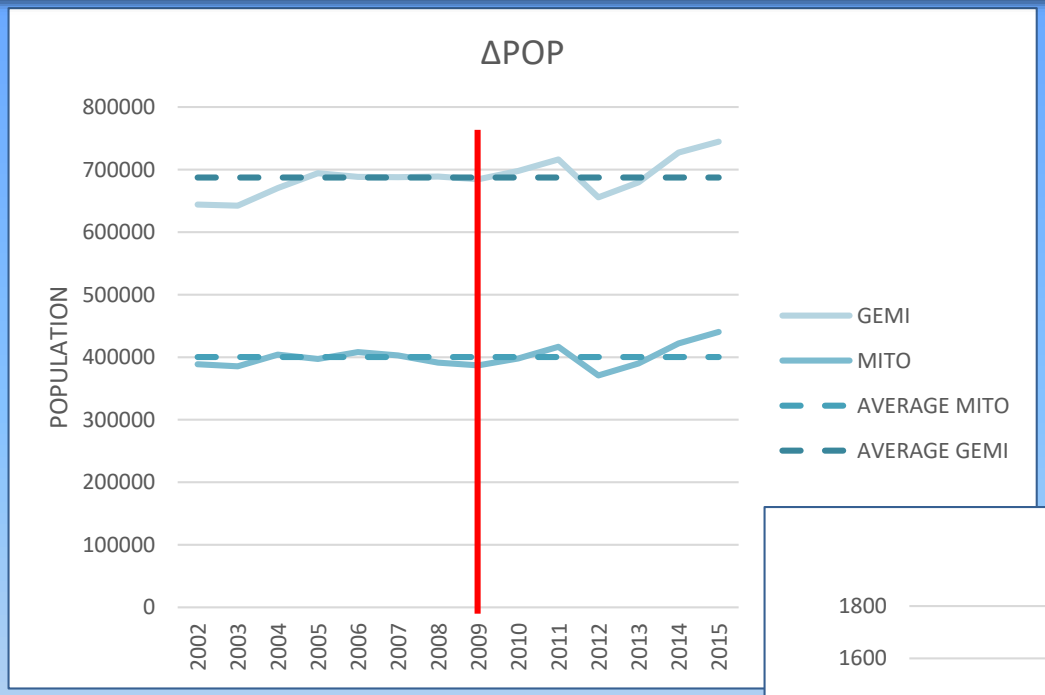
Corridor RONA – analysis based on *POP*

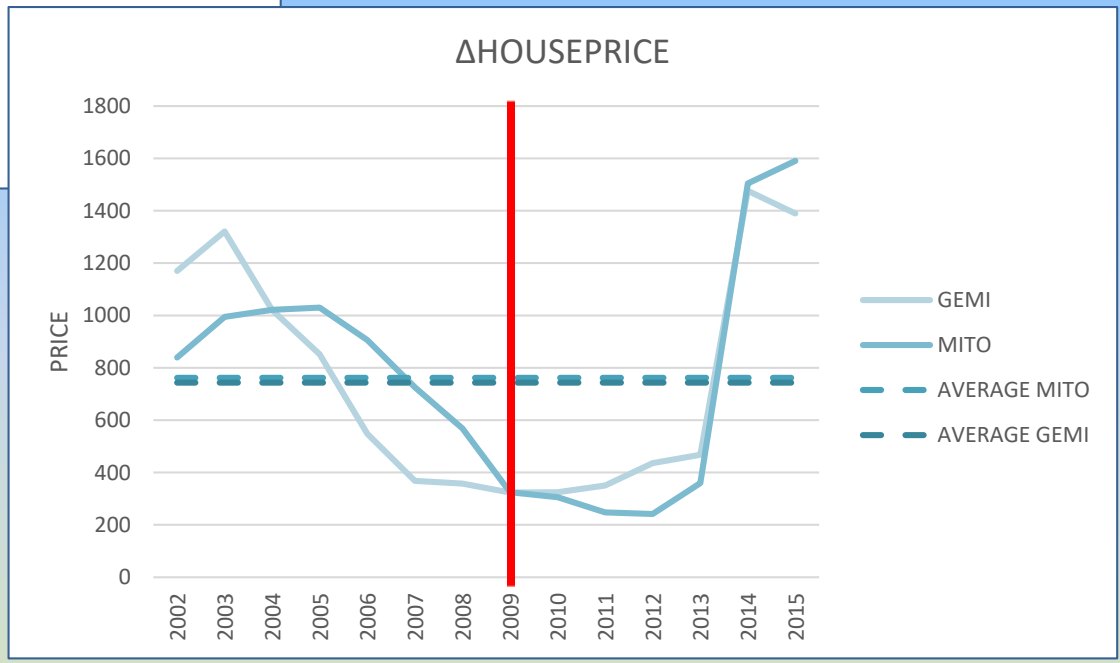
	Coefficient				
	$\beta_{Res-Dens}$	$\beta_{UNEMP-RATE}$	$\beta_{FREQ-HSR}$	$\beta_{COST-HSR}$	$\beta_{TIME-HSR}$
Value	0.09	-2.60	0.42	-0.58	-0.15
	(3.74)	(-4.06)	(3.61)	(-2.15)	(-2.10)
ρ^2	0.55				
ρ^2_{adj}	0.54				

Corridor RONA – analysis based on *HousePrice*

MITO and ROSA case studies in Italy

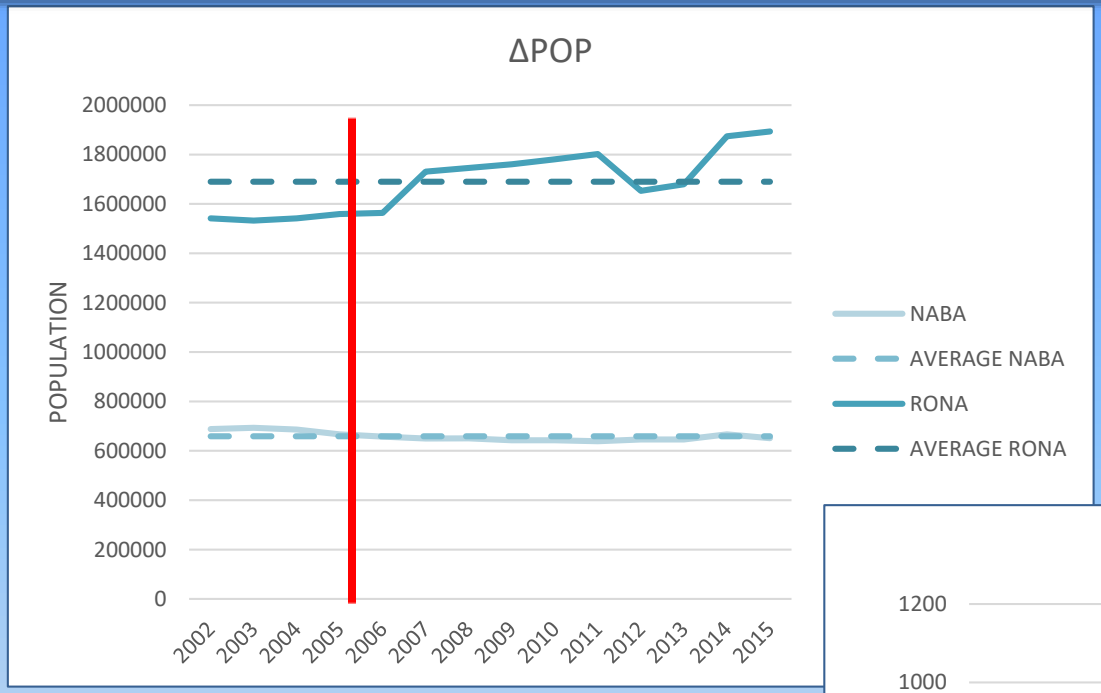
MITO vs GEMI

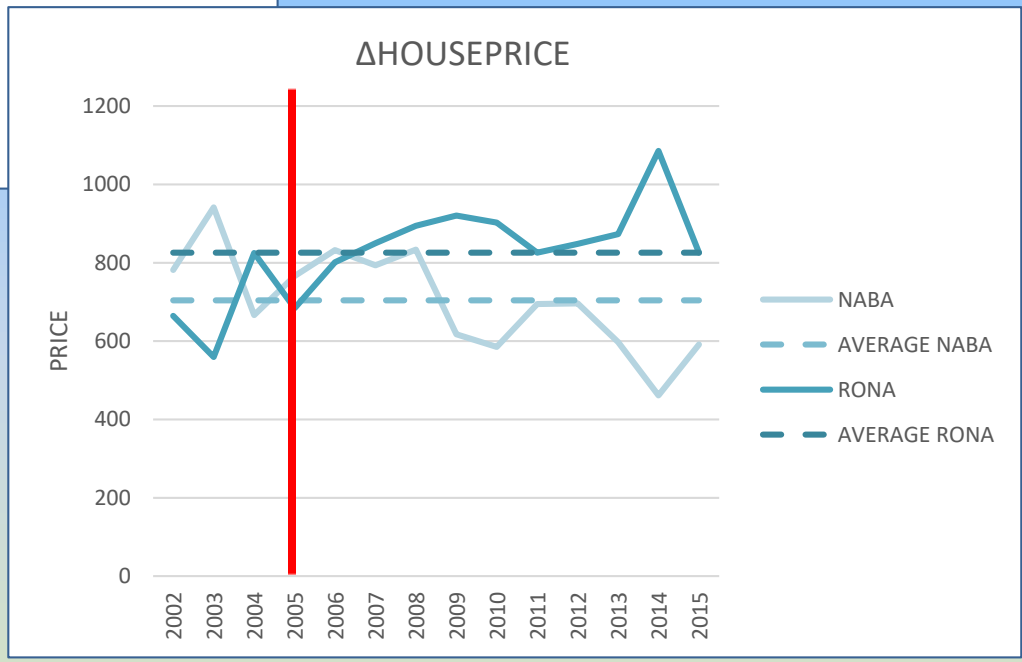




MITO and ROSA case studies in Italy

RONA vs NABA





Conclusions and further perspectives

Further perspectives

From the modelling perspective

-New variables to be considered, such as the salaries change, etc..
-New Model specifications

Other potential corridors to analyse are:

- Paris –Lyon in France
- Frankfurt – Cologne in Germany
- Madrid – Ciudad Real in Spain
- Paris-Lille-Brusseles between France and Belgium
- London-Paris and London –Brusseles between United Kingdom, France and Belgium.
- **Corridors in Japan, such as Tokyo and Osaka**

❑ Megalopolises or megaregions present the need for planning on a new spatial scale with new boundaries and linkages. This implies **institutional change.**