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The Effect of High-Speed Rail on Tourism: Evidence from Italy

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PREMIUM PARTNER

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Motivation and Literature Review

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Image source: Ferrovie dello Stato Italiane

Motivation of the study

Quantitative studies about the effect of High-Speed Rail on Tourism focus on:

- ✓ **Availability of high-speed railway stations**
- ✓ Service Frequency
- ✓ Number of destinations accessible from HSR

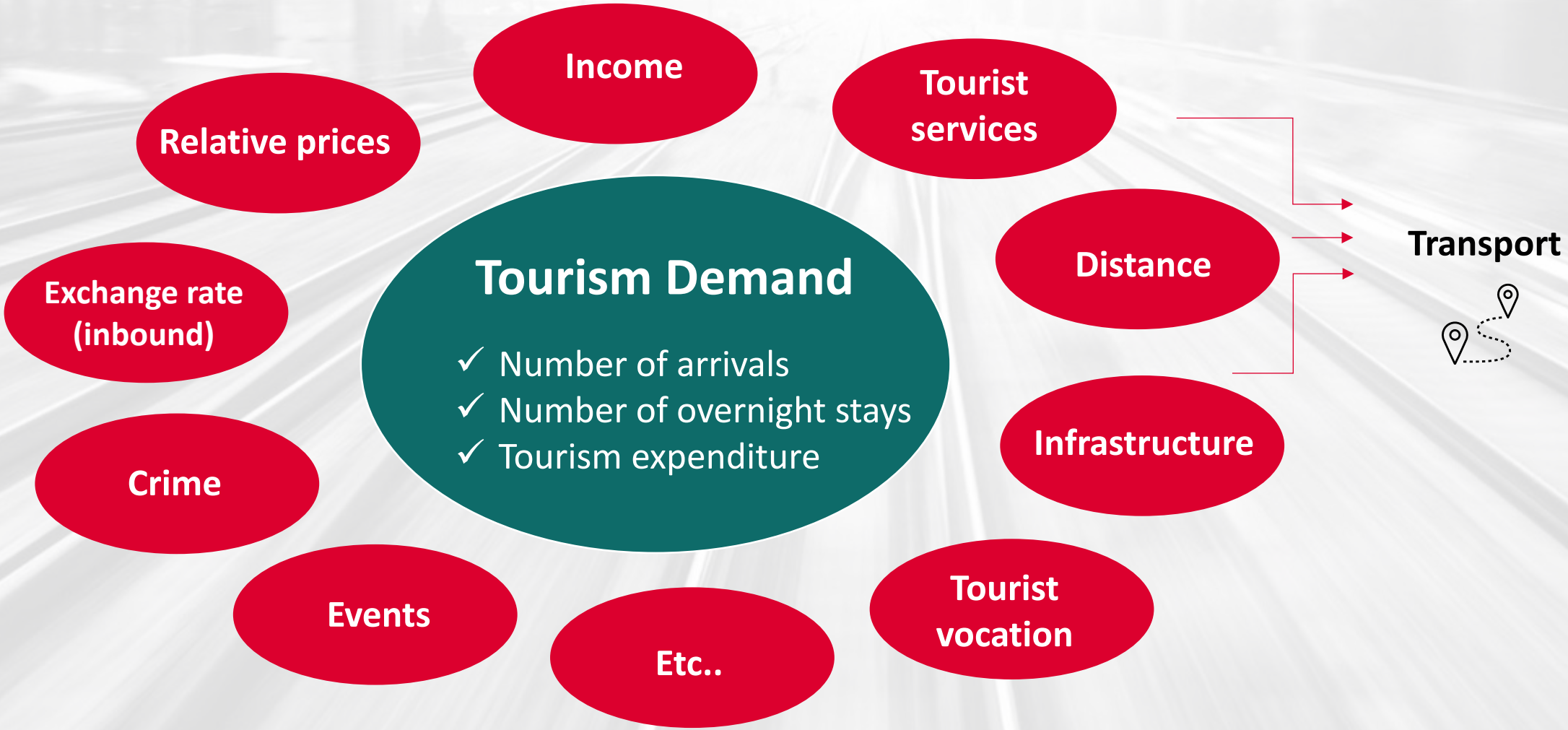
? Travel times and accessibility

Accessibility is the guiding factor for many socio-economic effects of HSR…

What is the role of travel time reduction during the period 2009/2019 in enhancing domestic and inbound tourism in Italy?

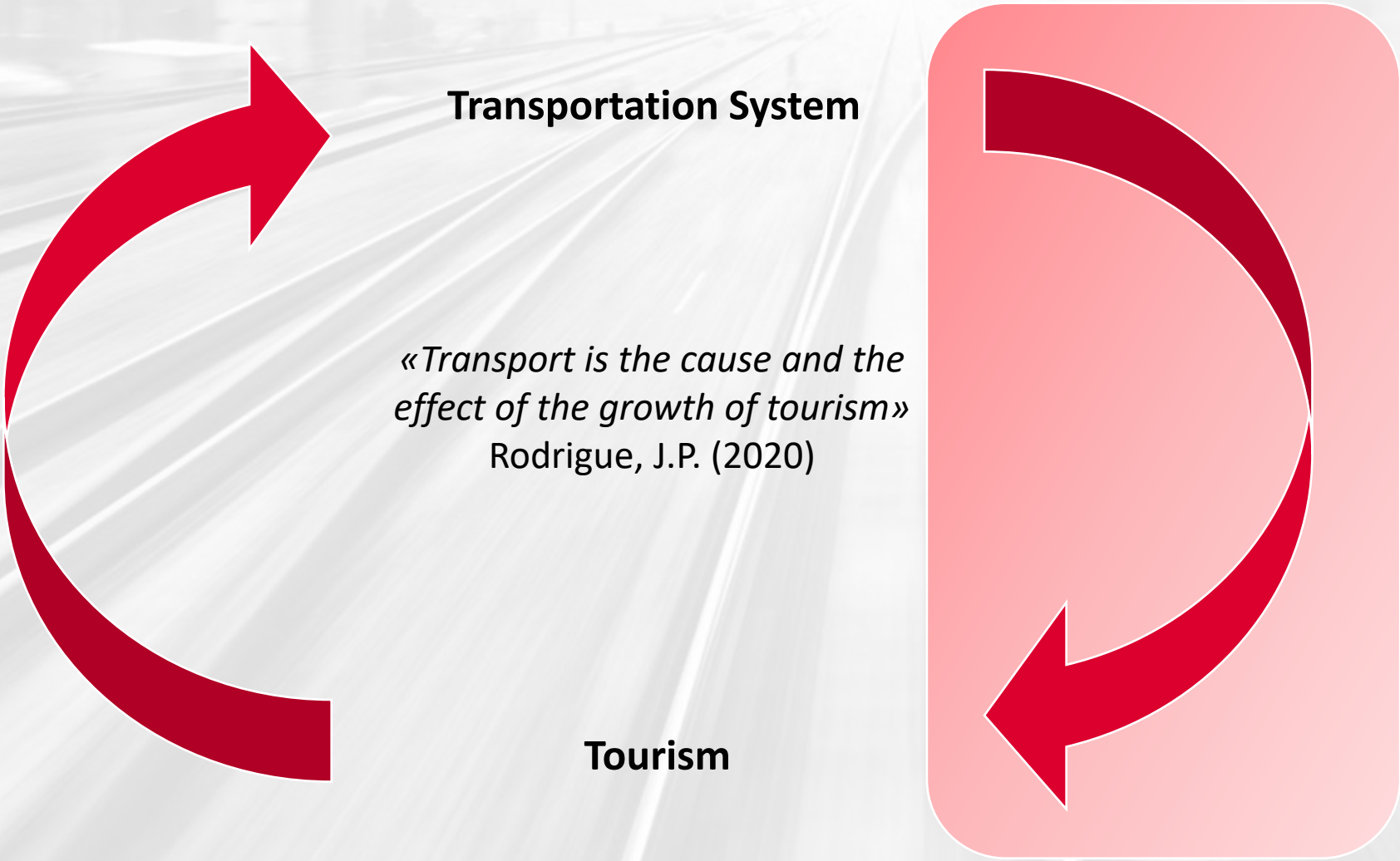
Tourism demand

The Key Factors



Tourism demand and Transportation

The Relationship



«Transport is the cause and the effect of the growth of tourism»
Rodrigue, J.P. (2020)

HSR and Tourism: Literature review

Main findings

Effects

- Decrease in time to reach the destination
- Increase accessibility to destinations
- Increase in the number of tourists
- Decrease in the length of stay
- Increase in urban and business tourism

Conditions

- Pre-existing tourist attractions
- Existence of strong local potentialities and local strategies around HSR

HSR and Tourism: Literature review

Main quantitative studies

Authors - Country	Dep. Variables	Indep. Variables	Approach	Results
• Albalate and Fageda (2016) - Spain; • Pagliara et al. (2017) - Italy; • Pagliara et al. (2021) - China.	• Domestic and/or foreign **tourist arrivals**; • Domestic and/or foreign **Nights**; • Airport passengers.	• Binary variable for **HSR availability**; • Number of HSR destinations accessible from HSR; • Population; • Number of operating bases of low-cost airlines; • GDP; • Number of museums in a city; • Number of Hotels; • Dummy for presence of airports.	**Panel approaches**: • Differences-in-differences method (FE); • Generalized linear model. Non parametric methods: • CART model	• The presence of HSR station **has no direct effect** on tourism flows (Spain); • The presence of HSR station has **a positive impact** on domestic tourism flows (Italy); • The presence of HSR has a **positive impact** on Chinese tourist and this effect is higher for foreign tourists (China).

Datset and Methodology

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High-Speed Railway network in Italy

HS Train brands:

1997 EUROSTAR ITALIA

2009 EUROSTAR ITALIA, FRECCIAROSSA, FRECCIARGENTO

2012 FRECCIAROSSA, FRECCIARGENTO, .italo

time

1992 Firenze - Roma

2005 Dec Roma - Napoli

2006 Feb Torino - Novara

2007 Mar Padova - Mestre

2008 Jun Napoli - Salerno

2008 Dec Milano - Bologna

2009 Dec Bologna - Firenze

2009 Dec Torino - Milano

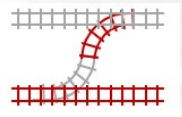
2009 Dec Roma - Napoli completion

2016 Dec Milano - Brescia

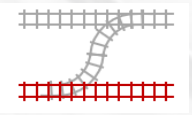
HSR
Main rail network
Railway stations
Regional boundary

Relationship of HSR network with the conventional one:

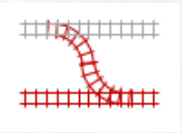
Mixed full



Mixed conventional



Mixed high speed



Italy

Exclusive HS

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Dataset

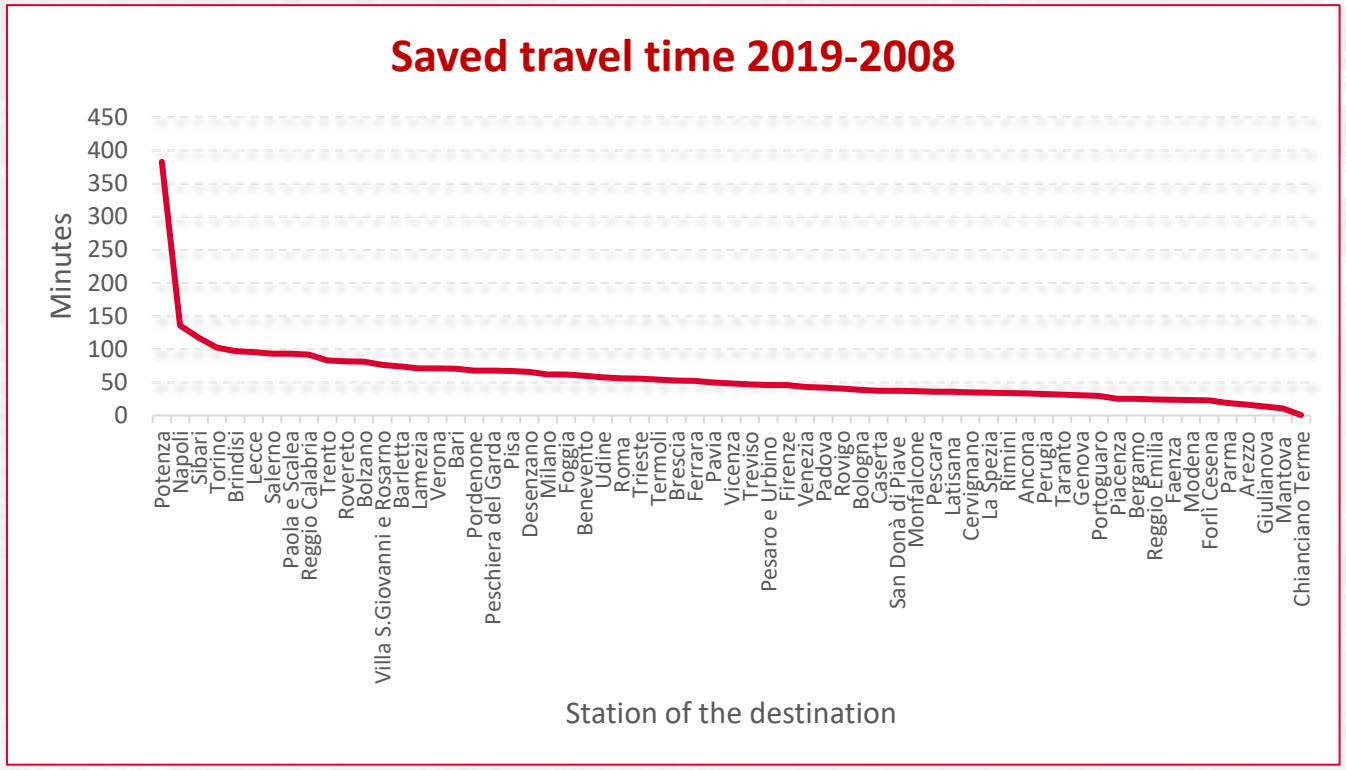
Variables: data source and elaboration

	Tourism Demand	Attractiveness of Destination	HSR variable
Variable	• Arrivals • Overnight stays	• Number of beds	• Accessibility index (Travel times) • Dummy for HS trains
Source	Istat ***Occupancy in collective tourist accommodation***	Istat ***Capacity of collective accommodation***	***Transportation assignment by PTV-VISUM for long distance daily trains from Timetable (2008); GTFS + Timetable (2019)****
Unit of Analysis	Tourists Area / Aggregation of Tourist Areas	Tourists Area / Aggregation of Tourist Areas	Stations serving the Tourists Area

*Tartaglia, M., Vannacci, L., and Farsi, M,. 2022

Dataset 2/2

The Results of the Transportation Assignment Model: Travel Times



- 63 Transport Analysis Zones where at least one

FRECCIAROSSA
FRECCIARGENTO
.italo

stopped in **2019**

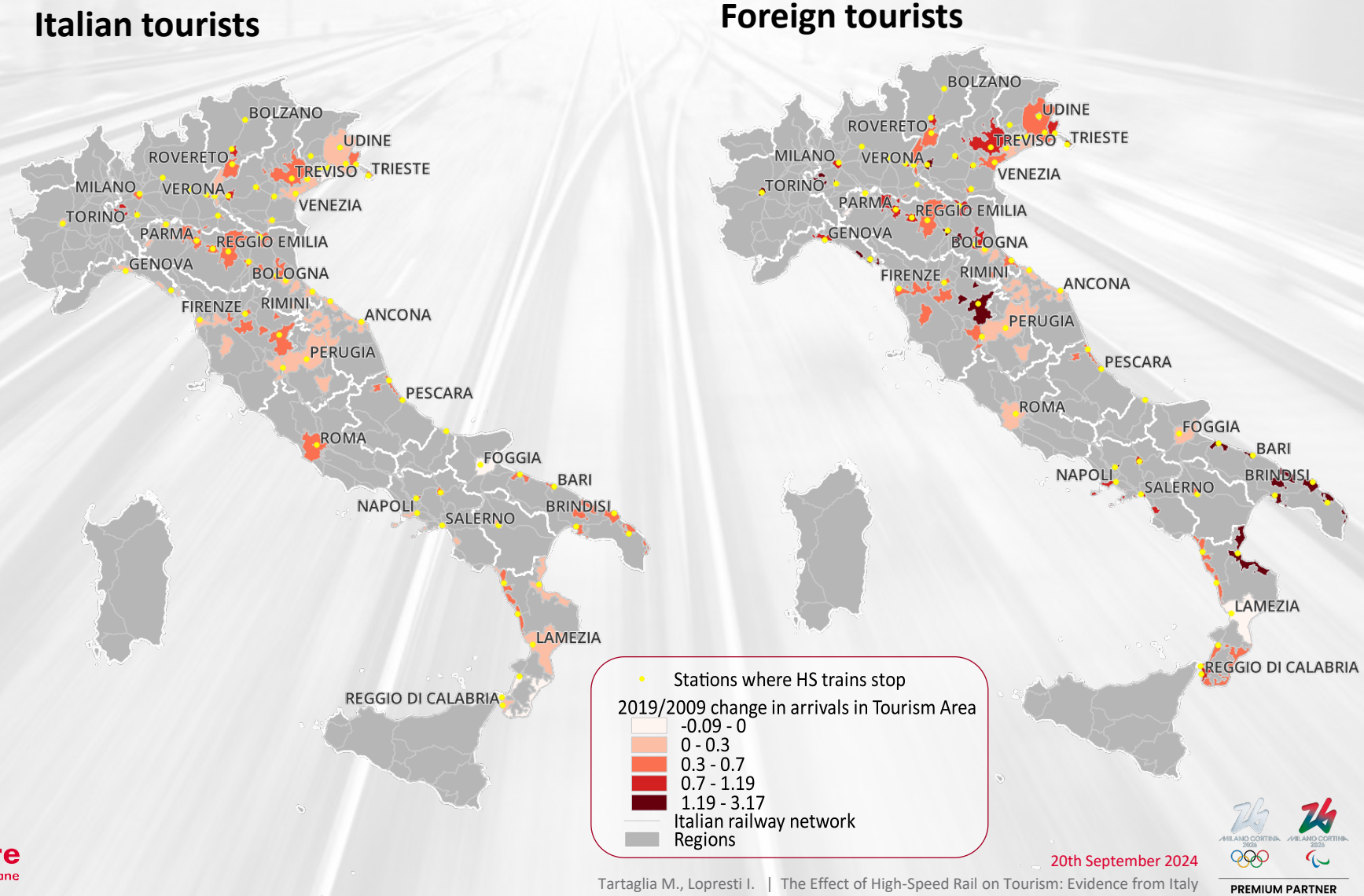
- parameter settings allowed the model to select the long-haul services truly available to the users

Mean time saving is around **57 minutes** (SD = 49.8), the **14% less** than 2008

Methodology and data

The Tourism Areas and HSR stops

- The maps show 2019/2009 **relative variations** in Italian and foreign **arrivals** for each selected tourist area served by **High-Speed train** in 2019 (FR, FA and Italo)
- Higher growth rates are experienced by foreign tourists, which have **more than doubled** in several tourist areas



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Methodology and data

Model

Two period panel dataset
Period: 2009 and 2019
Tourist Areas: 63
Observations: 126

Panel data approach: within fixed effects estimator

$$\tilde{Y}_{it} = \beta_1 \tilde{X}_{it} + \tilde{u}_{it}$$

Number of **Italian** and **foreign arrivals / Overnight stays**

Access_index: $A_j = \sum_{i=1}^{n} \frac{1}{Tt_{ij}}$; where Tt_{ij} is the travel time from station *i* to station of destination *j*

or

Dummy_hsr: 1 in presence of HSR service, 0 otherwise

Beds: number of beds

Results

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Results

Domestic tourism

	Dependent variable:			
	log(arrivals_ita)		log(nights_ita)	
	(1)	(2)	(3)	(4)
log(beds)	0.795***	0.659***	0.638***	0.513***
	(0.073)	(0.086)	(0.096)	(0.073)
Dummy.hsr	0.174***		-0.002	
	(0.063)		(0.066)	
log(access_index)		0.726***		0.532***
		(0.209)		(0.191)
Observations	126	126	126	126
R^2	0.607	0.614	0.422	0.462
R^2 adjusted	0.594	0.601	0.402	0.445
F Statistic (df = 2; 61)	47.112***	48.511***	22.258***	26.241***
Note:				*p<0.1; **p<0.05; ***p<0.01
				HAC Standard Errors in parenthesis

HSR has a statistically significant impact on **Italian arrivals** and **nights**

The positive and significant impact on the **number of arrivals** is counterbalanced by the negative effect on the **length of stay,** lowering the impact on nights

The accessibility index show **higher coefficients** with respect to the presence of HSR station.

Results

Inbound tourism

	Dependent variable:			
	log(arrivals_foreign)		log(nights_foreign)	
	(1)	(2)	(3)	(4)
log(beds)	1.504***	1.032***	1.367***	1.014***
	(0.172)	(0.162)	(0.155)	(0.165)
Dummy.hsr	0.319***		0.231***	
	(0.077)		(0.074)	
log(access_index)		2.279***		1.696***
		(0.412)		(0.456)
Observations	126	126	126	126
R^2	0.593	0.705	0.556	0.631
R^2 adjusted	0.580	0.695	0.541	0.619
F Statistic (df = 2; 61)	44.441***	72.821***	38.154***	52.147***
Note:				*p<0.1; **p<0.05; ***p<0.01
				HAC Standard Errors in parenthesis

For foreign visitors, HSR has a strong positive effect on the **number of arrivals** and **nights**

As it happens for domestic tourism:

- **the length of stay** is affected **negatively**
- The accessibility index show **higher coefficients** with respect to the presence of HSR station

Conclusions

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Concluding remarks and further perspectives

01 As expected, an **increase in accessibility**, in terms of **reduced travel times** in long haul train services, has a **significative and positive effect** on **tourism demand**

02 Through a simple model, we had the opportunity to stress the **role of travel times**, one of the most important factors affecting the relationship between High-Speed rail and tourism

03 The study offers a **comprehensive appraisal of the HSR service**, since it includes all the localities that can be reached by the HS trains, highlighting the connection between them

04 **Further research** should involve more years and/or more disaggregated data for the origin tourism demand to open the analysis to more variables and models. In such scenario, also accessibility indicator could be improved.

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Thanks for your attention!