The Growth Effect of Functional Specialisation in a Regional System of Cities, Tuscany as a Case Study

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Motivations

- the relationship between the uneven intra-regional spatial distribution of wealth and the regional wealth as a whole, still appears as one of the most puzzling issues in urban and regional economics.
- spatial disparities foster growth?
- the dispersion of economic activities, i.e the polycentricity of the regional spatial economy, can be reconciled with the overall regional efficiency and the full exploiting of agglomeration economies at the urban level, proven that each city has a specific functional role in the urban system.
- urban functions: FIRE (financial intermediation, insurance, real estate), R&D, education, ICT.
- workforce composition and firm fragmentation (HQs vs PPs)
- national/regional systems of cities.

- focusing on Tuscany, this paper investigates the effect exerted by an increasing degree of urban functional specialisation and spatial concentration of wealth on overall regional growth.
- we adopt the Remi-Irpet, a macroeconomic structural model which combines an Input-Output core structure and New Economic Geography linkages.
- we model a highly agglomerative policy mix, i.e., a set of public policies potentially effective in favouring the relocation of high urban functions and highly specialised workforce from the rest of the region and the rest of Italy to the regional capital Florence.
- we evaluate the regional growth effect of these policies as well as their effectiveness in promoting agglomeration and functional specialisation in the regional urban system.

Model's Features

- The Remi-Irpet is a structural dynamic macroeconomic model, based on an Input-Output core structure.
- the model has a 2-region (Tuscany and Rest of Italy) and a 11-region version (the 10 tuscan provinces and Rest of Italy)
- it encompasses 30 sectors, 12 consumption categories and 3 investment categories

▸ Remi

- NEG linkages introduce endogenous agglomeration economies, micro-founded in a Dixit-Stiglitz monopolistic competition flavour.
- demand-linked circular causality (Core-Periphery models)
- modellisation of the cost-linked circular causality á la Fujita-Krugman-Venables, allows for a production-cost effect (Vertical Linkages models)

▸ Remi & NEG

- marginal utility, intermediate inputs and labor productivity are function of accessibility
- accessibility is function of both transportation costs and commuting costs
- for each of the model's areas, the model encompasses internal, inward and outward accessibility
- congestion costs are modelled thanks to the intra-area commuting costs and the area's housing price dynamics

Policies

- *Direct policies*. Tipically, money transfers for workers/consumers belonging to specific occupation types (managers, managerial staffs, other administrative staffs) or for firms/workers belonging to the sectors we identify as representative of the "urban functions", e.g. high technology manufacturing, financial intermediation, business services activities, R&D, ICT.
- *Indirect policies*. Not specific to sectors or occupation types: the infrastructural policies aiming at improving workers/consumers mobility in the area and from/to the area, urban policies broadly directed to "amenity" improvements (public services provision, public green, social services), housing policies aiming at relaxing the agglomeration constraint represented by the housing rent, i.e. the average housing price.

Policies

- *Labor cost*. The non-compensation component of the labor cost for the workers occupied in selected industries is assumed to decline by the 5% as "direct" (functional specialisation) incentives policies are implemented. Such incentives are introduced for the "Financial Intermediation" and "Business activities, R&D and Information Technology" sectors.
- *Amenity*. The *non-pecuniary component of the compensation rate* is assumed to increase by 5% in Florence or, alternatively by 0,5% in every province.
- *Intra-area commuting costs*. A 10% reduction of intra-area commuting costs in case all governmental resources converge on Florence, or a 1% reduction in case they are used to equally abate the commuting costs of each province.
- *Housing*. This policy is intended to reduce the average housing price by 5% in Florence or by 0.5% in every province.

Policies

Also in the case of the region-wide transportation and commuting costs reductions, obtained through regional and inter-regional infrastructural policies, we have adopted two different hypoteses:

a. a 5% reduction of both transport and commuting costs between Florence and the rest of Italy and a 5% reduction between Florence and the rest of the tuscan provinces.
b. a 11x11 transport (and commuting) costs change matrix deriving from the application of a transport model to the recent Regional Plan of Transport Infrastructures (RPTI).

Table: Transportation and commuting cost changes due to the RPTI, % values.

	Transport	Commuting
Intra-regional	-1.2	-1.6
Inflow	-2.4	-2.1
Outflow	-2.3	-2

Scenarios

1. *"Full"*. This scenario includes all the policies, that is direct policies in terms of labor cost incentives and indirect policies in terms of (i) an increase in the local amenity supply, (ii) infrastructural policies fostering a decrease in the local (intra-area) commuting costs and a decrease in the intra-regional and inter-regional transport and commuting costs and (iii) policies aiming at lowering the average local housing price.
2. *"Infrastructural"*. This scenario encompasses infrastructural policies, that is those affecting the transportation and commuting costs as well as those regarding local amenities.
3. *"Price"*. This scenario encompasses policies with direct effects on labor costs for selected industries, as well as on the local average housing price.

Full Scenario

Table: Regional GDP, Full scenario and conterfactual, % change from the Remi-Irpet Baseline values.

Scenario	2013	2020	2030	Counterfactual	2013	2020	2030
Tuscany	0.51	0.99	1.20	Tuscany	0.39	0.85	1.09
Florence	1.66	3.26	4.04	Florence	0.39	0.77	0.97
ROT	0.03	0.05	0.04	ROT	0.39	0.88	1.13

Figure: Regional GDP, Full scenario's net effect, % values.

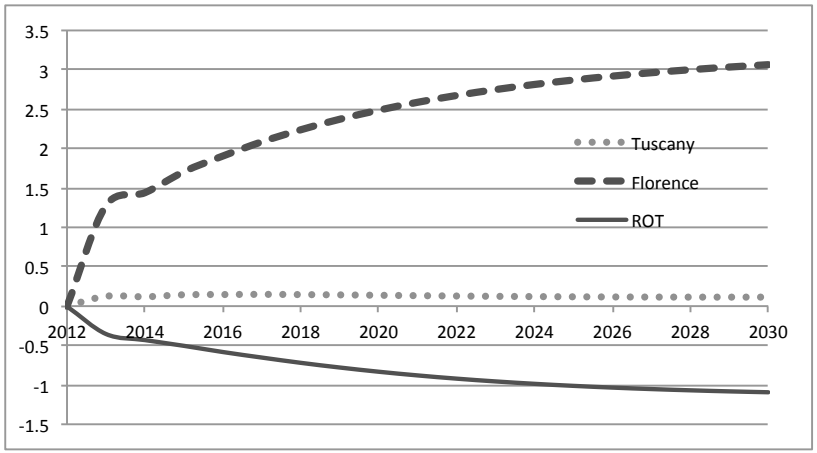


Table: Population, Full scenario's net effect, % values.

	2013	2020	2030
Tuscany	0.01	0.06	0.13
Florence	0.05	0.36	0.86
ROT	-0.01	-0.04	-0.11

Infrastructural Scenario

Table: Regional GDP, Infrastructural scenario and conterfactual, % change from the Remi-Irpet Baseline values.

Scenario	2013	2020	2030	Counterfactual	2013	2020	2030
Tuscany	0.27	0.60	0.79	Tuscany	0.37	0.81	1.04
Florence	0.94	1.97	2.62	Florence	0.37	0.73	0.92
ROT	-0.01	0.03	0.03	ROT	0.19	0.16	0.25

Figure: Regional GDP, Infrastructual scenario's net effect, % values.

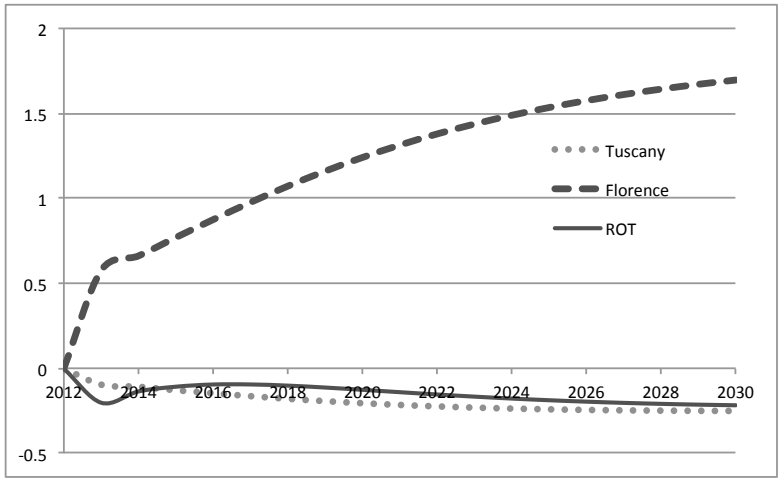


Table: Population, Infrastructural scenario's net effect, % values.

	2013	2020	2030
Tuscany	0.00	0.04	0.08
Florence	0.03	0.28	0.65
ROT	-0.01	-0.04	-0.10

Price Scenario

Table: Regional GDP, Price scenario and conterfactual, % change from the Remi-Irpet Baseline values.

Scenario	2013	2020	2030	Counterfactual	2013	2020	2030
Tuscany	0.24	0.38	0.40	Tuscany	0.02	0.04	0.05
Florence	0.72	1.25	1.36	Florence	0.02	0.04	0.05
ROT	0.04	0.01	0.01	ROT	0.02	0.04	0.06

Figure: Regional GDP, Price scenario's net effect, % values.

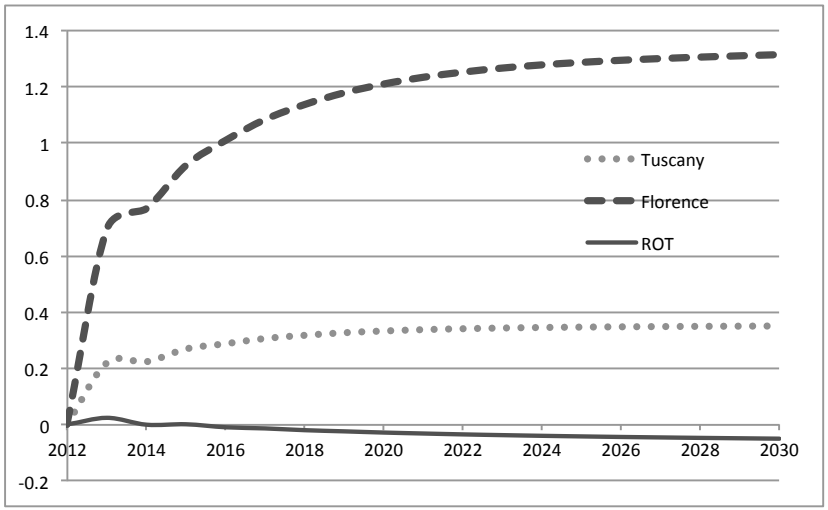


Table: Population, Price scenario's net effect, % values.

	2013	2020	2030
Tuscany	-	0.02	0.05
Florence	-	0.29	0.20
ROT	-	-	-

Functional Specialisation and Sectoral Composition

Table: Output sectoral composition, Baseline and Full scenario, Tuscany, % values.

Baseline	2013	Baseline 2030	Scenario 2030
HT/ICT Man.	**5.4**	**5.3**	**6.5**
Manufacturing	35.8	36.5	32.8
Household	30.5	30.1	29.8
BS	**14**	**14.4**	**20.8**
Non-Market	14.4	13.7	10.1
Total	100	100	100

Table: Output and Employment sectoral composition, Full scenario, Florence and ROT, % values.

	Florence		ROT	
Real Output	2013	2030	2013	2030
HT/ICT Man.	7	7.1	4.7	5.2
Man.	**31.2**	**27.9**	**37.8**	**43**
Household	31.2	29.4	38.1	31.5
BS	**16.1**	**25.7**	**13**	**10.7**
Non-Market	**14.5**	**20**	**14.4**	**10.5**
Total	100	100	100	100

	Florence		ROT	
Employment	2013	2030	2013	2030
HT/ICT Man.	4.9	3.2	2.1	2.2
Man.	**19.8**	**14.1**	23.5	23.8
Household	29.9	31.4	31.2	34.1
BS	**16.9**	**42.2**	13.7	14.5
Non-Market	**29.5**	**9.1**	29.5	25.4
Total	100	100	100	100

Functional Specialisation and Occupation types

Table: Workforce annual growth rate for occupation-type, Full scenario's net effects.

Baseline	Tuscany	Florence	ROT
Top Management	3.6	10.2	-0.4
Managerial Staff	4.3	11.1	-0.1
Other administrative staff	3.5	9.6	-
Blue collars, Other personnel	2.9	8.6	0.2

Table: Workforce annual growth rate for occupation-type, Infrastructural and Price scenarios' net effects.

Infrastructural	Tuscany	Florence	ROT
Top Management	1.4	4.7	-0.2
Managerial Staff	2	5.7	-
Other adm.	1.5	4.7	-
Blue collars	1.5	4.7	0.2

Price	Tuscany	Florence	ROT
Top Management	2.4	6.6	-0.2
Managerial Staff	2.6	6.8	-
Other adm.	2.2	6	-
Blue collars	1.5	4.6	0.1

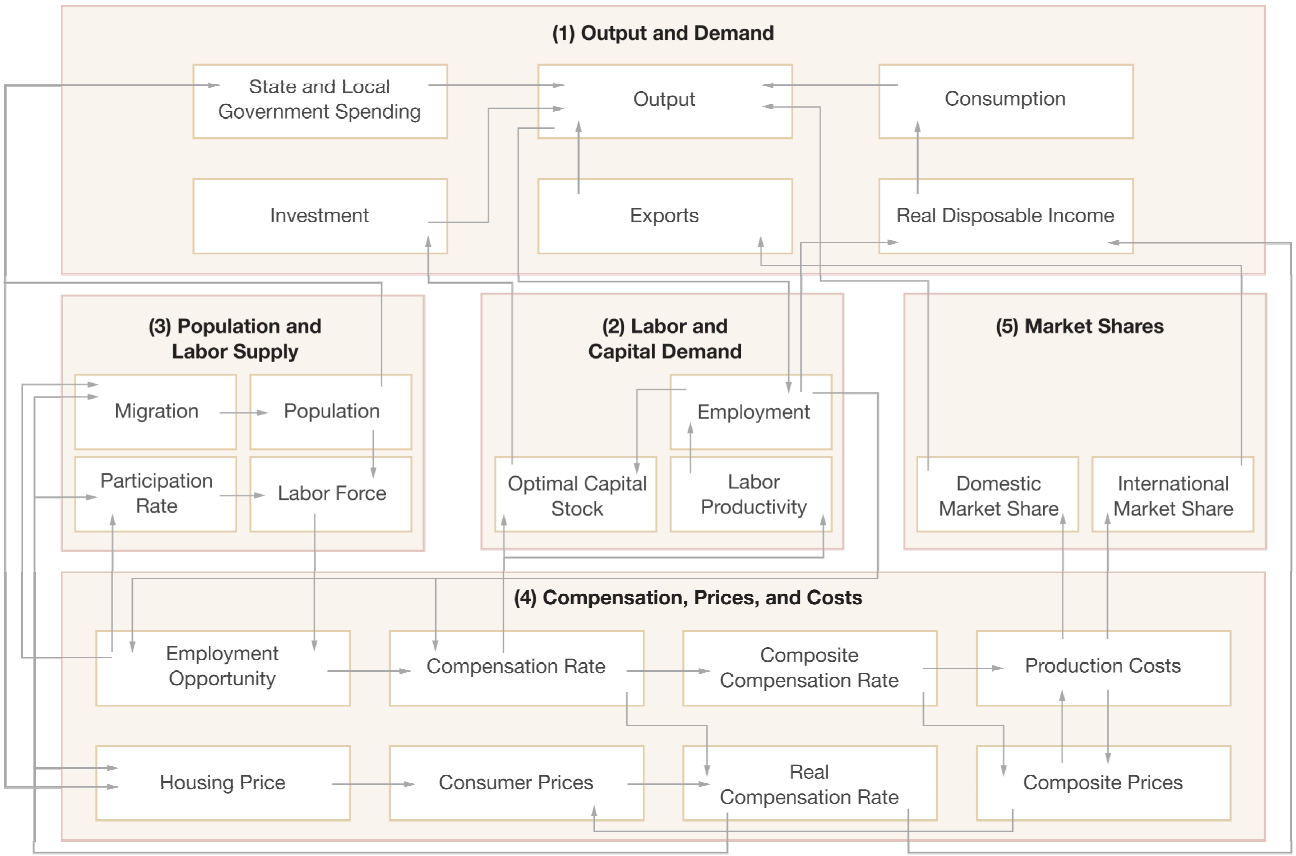
Conclusions

- both flat and agglomerative scenarios ensure a positive effect on the regional GDP growth. However the "full" agglomerative scenario shows an average growth rate surplus of 0.13%.
- this is, as expected, associated to a significant disequalisation of the growth rates of Florence and the rest of Tuscany.
- a more balanced infrastructural policy seems to be more effective in raising regional GDP since, by increasing the accessibility of all areas, including the peripheral ones, it also indirectly favours the regional capital.
- labor market and housing price policies are more effective if spatially concentrated. By benefiting Florence, they increase the regionl competitiveness with respect to the rest of the nation.
- then, a spatially balanced transport infrastructural policy should be associated to pro-agglomeration price/cost incentives in order to maximise potential growth effects.

Conclusions

- the agglomerative policy scenario entails, in the long run, a significant increase of the output share for those sectors that we identify with the urban functions also favouring sectors which do not benefit from direct incentives (H-T manufacturing).
- moreover, it entails a sharp reallocation of workforce from the non-market sectors to the business services sectors.
- the regional capital attracts workers specialised in managerial and administrative tasks from the rest of Italy.

Remi Structure



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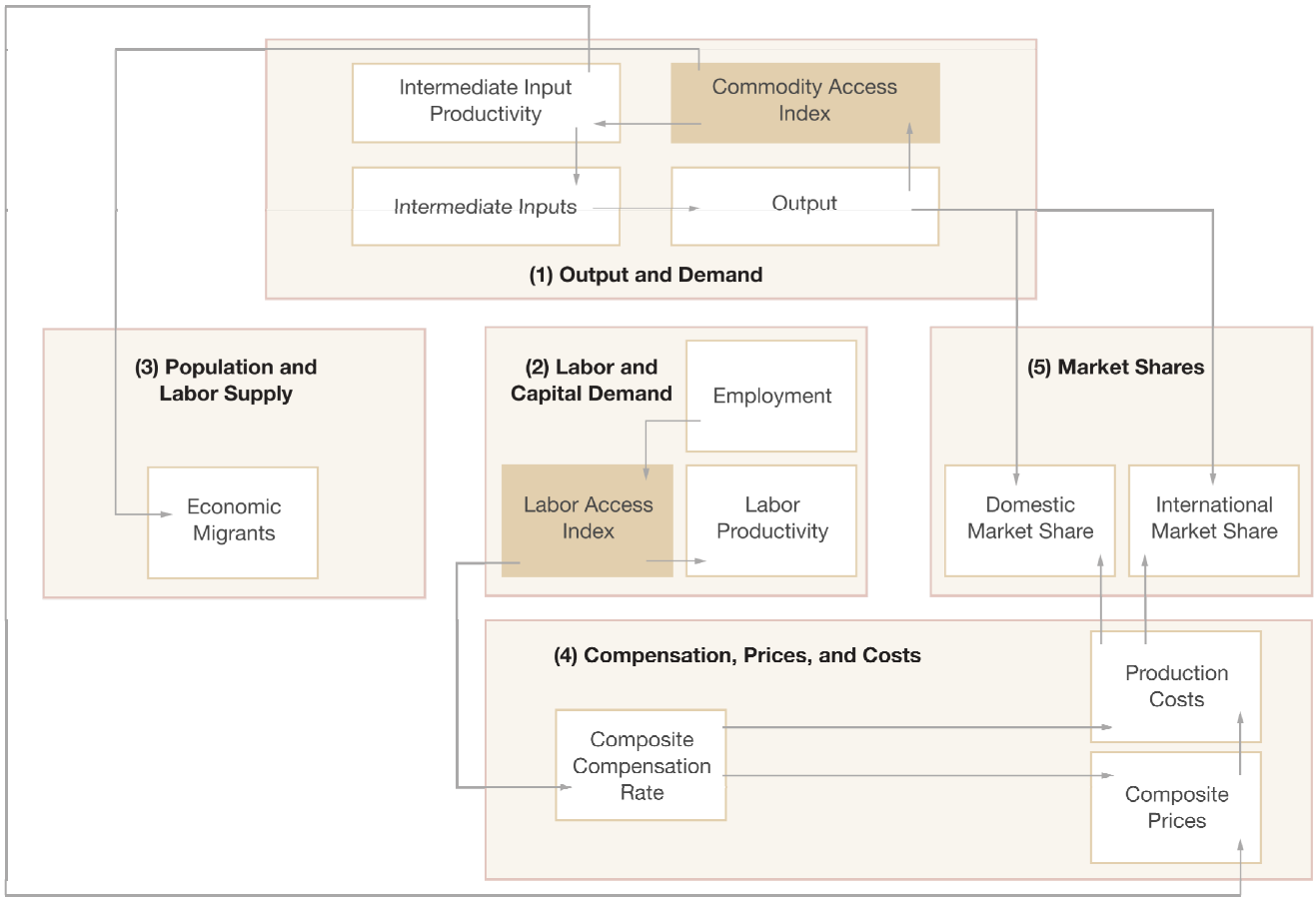
Remi Structure, NEG linkages



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