



IRPET Istituto Regionale
Programmazione
Economica
della Toscana

A multi-LMA I-O model: The case of Tuscany

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Why a multi-LMA and what we would like to explain

1. **Heterogeneity, how and to what extent** different territories make up the regional growth due to different specialization (*bottom up*)
2. **Covariance , how and to what extent** they are affected by external shocks and policies, that is: how they covariates in terms of flows of products and income
3. **Distribution, how and to what extent** VA is redistributing amongst subregional areas in terms of Disposable Income

A quick note

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by

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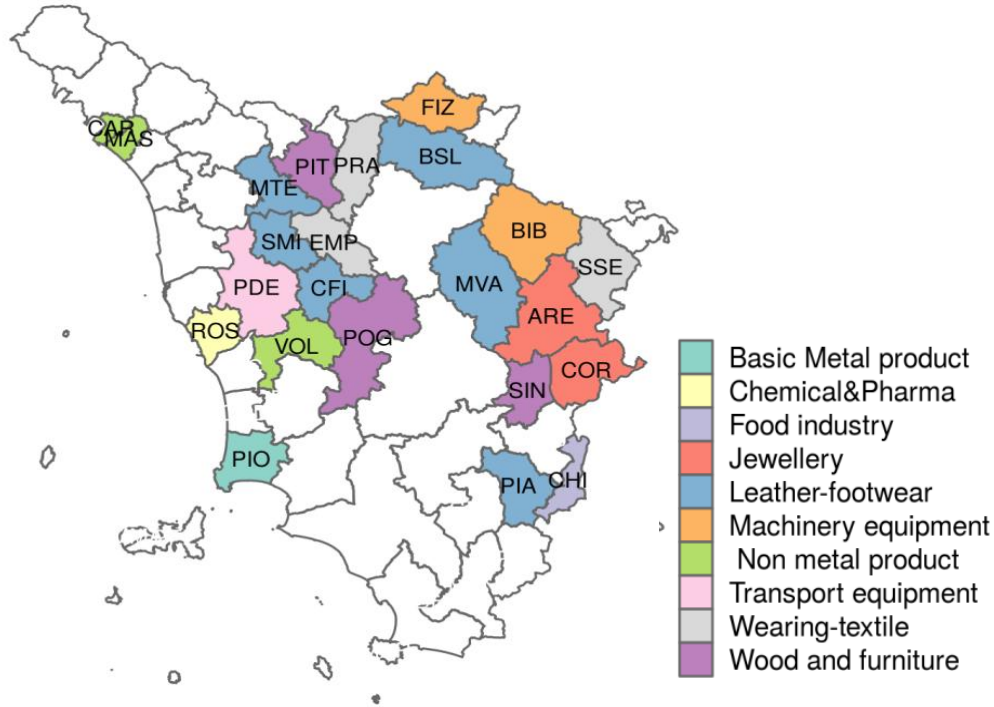
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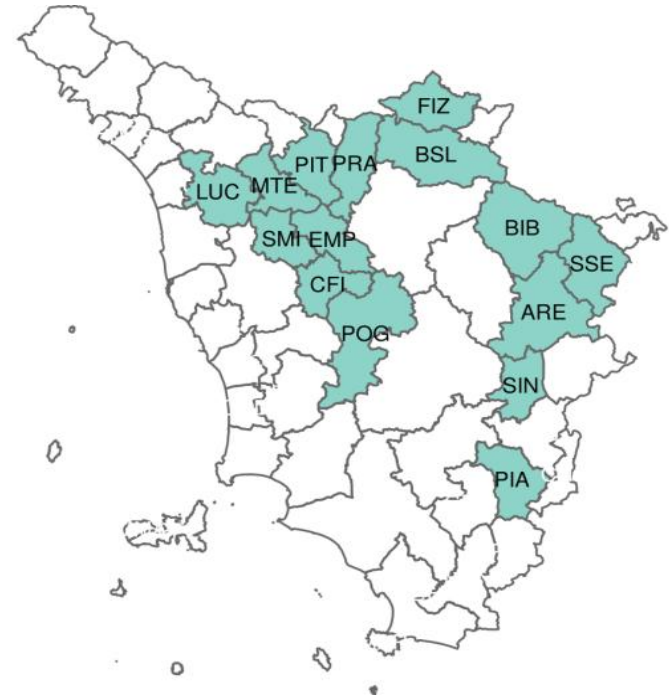
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LMAs of Tuscany: at a glance

Manufacturing specialization

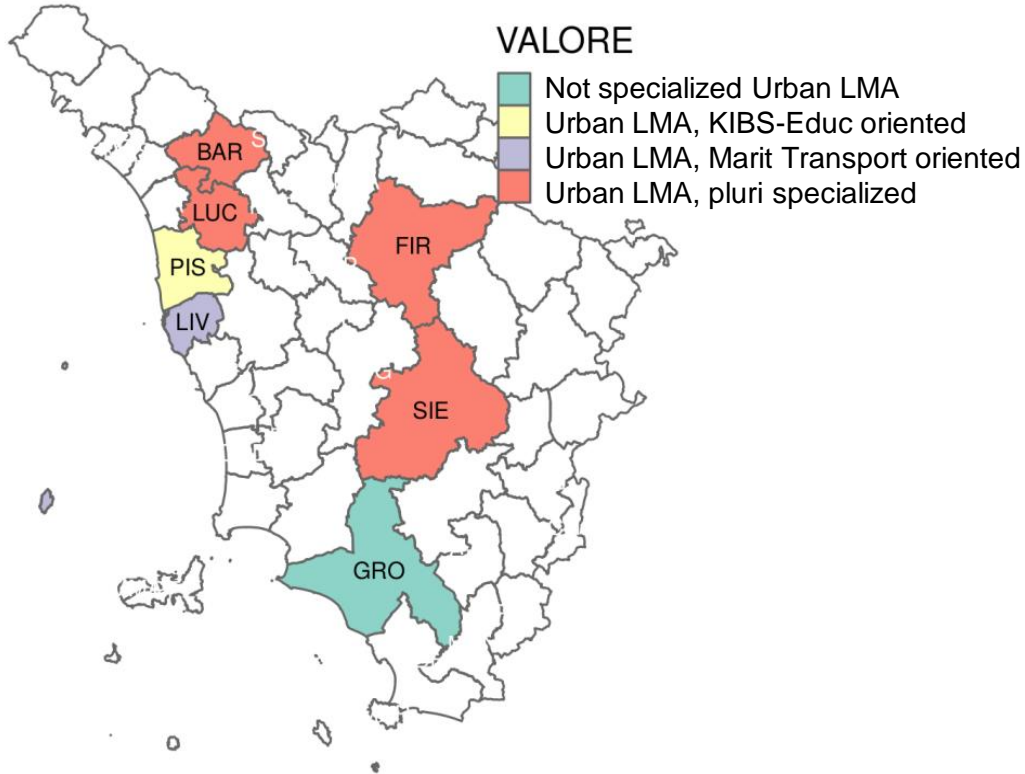


SME economic districts

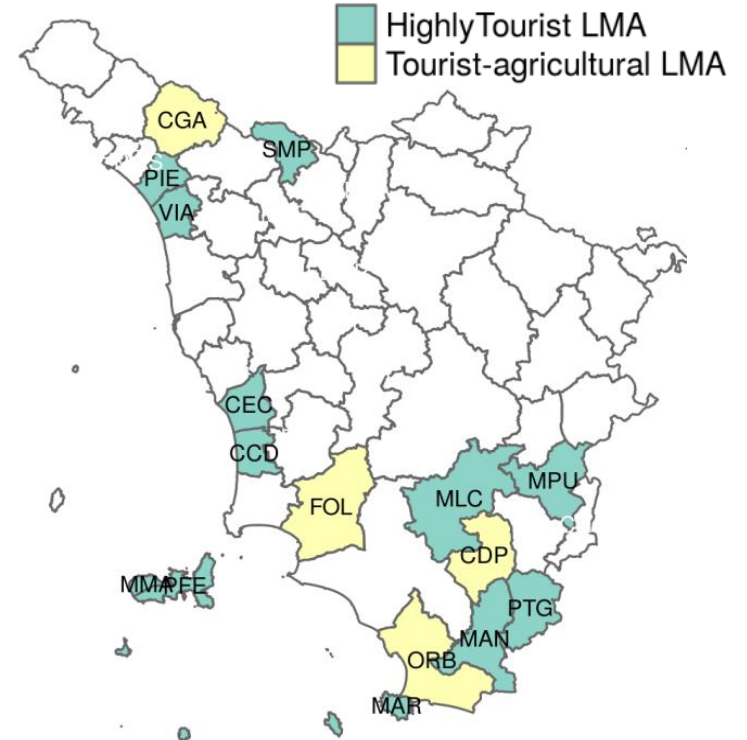


LMAs of Tuscany: at a glance(II)

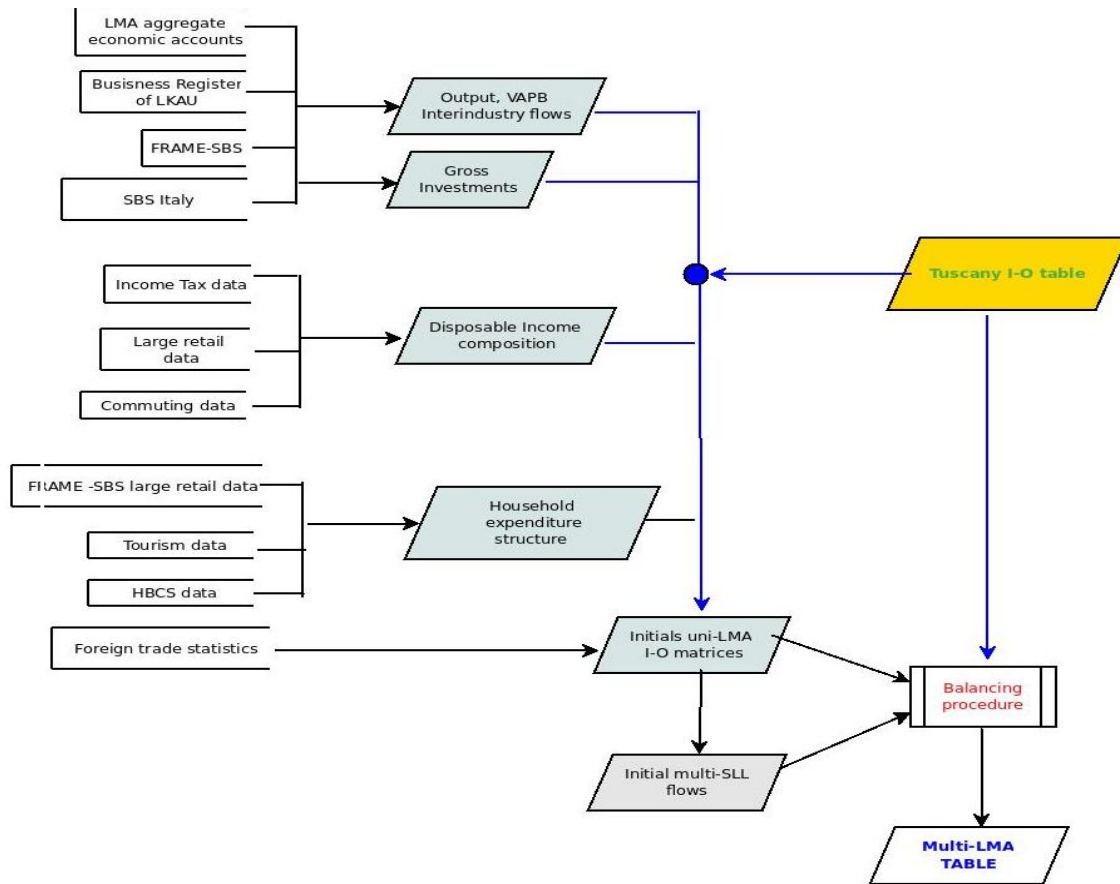
Business services specialization



Tourism/agriculture specialization



The multiLMA table assembly line



MultiLMA model: structural form

$$\mathbf{x} + \mathbf{mr} + \mathbf{mw} + \mathbf{ml} = \mathbf{A} \cdot \mathbf{x} + \mathbf{f} + \mathbf{c} + \mathbf{er} + \mathbf{el} + \mathbf{ew}$$

$$\mathbf{v} = \widehat{\mathbf{V}} \cdot \mathbf{x}$$

$$\mathbf{w} = \mathbf{W} \cdot \mathbf{v}$$

$$\mathbf{yd} = \Phi \cdot \mathbf{w}$$

$$\mathbf{c} = \mathbf{H} \cdot \boldsymbol{\theta} \cdot \{[\mathbf{yd} \cdot (1 - \tau) \cdot \boldsymbol{\beta}] + \mathbf{ck} + \mathbf{tur}\}$$

$$\mathbf{mw} = \mathbf{M}_w \cdot (\mathbf{A} \cdot \mathbf{x} + \mathbf{f} + \mathbf{c})$$

$$\mathbf{mr} = \mathbf{M}_r \cdot (\mathbf{A} \cdot \mathbf{x} + \mathbf{f} + \mathbf{c})$$

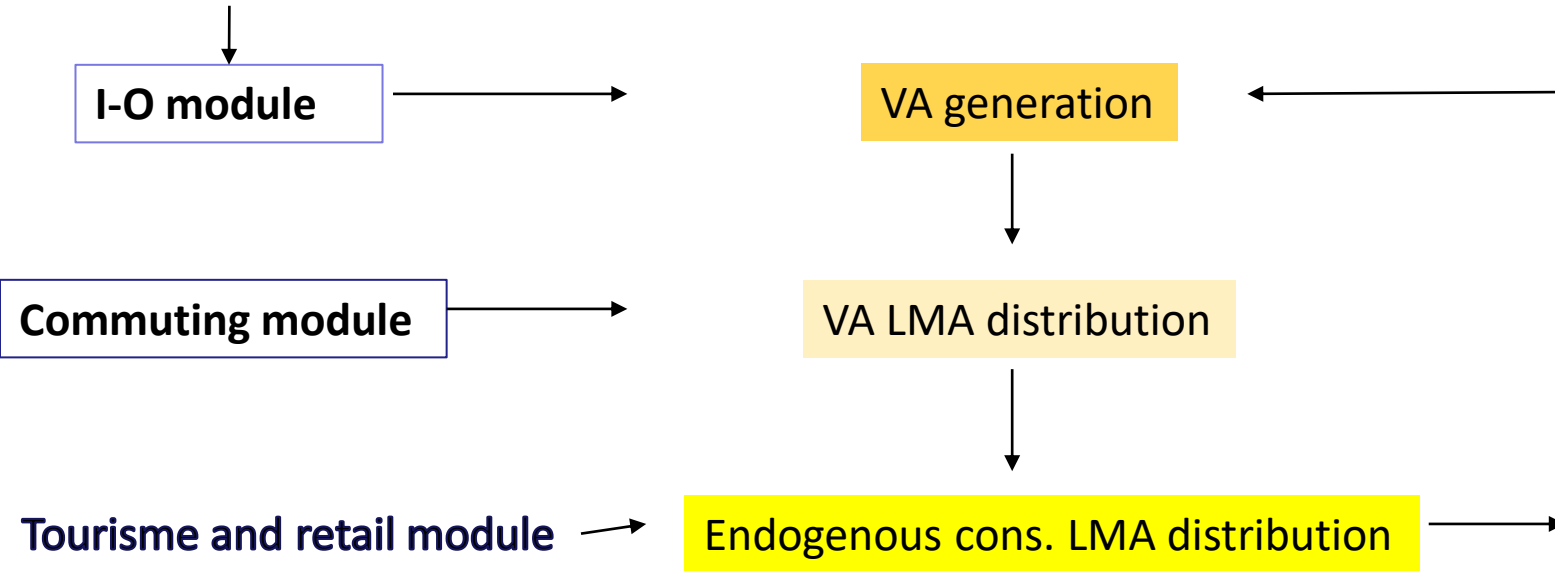
$$\mathbf{ml} = (\mathbf{I} - \widehat{\mathbf{Q}}) \cdot (\mathbf{I} - \mathbf{M}_w - \mathbf{M}_r) \cdot (\mathbf{A} \cdot \mathbf{x} + \mathbf{f} + \mathbf{c})$$

$$\mathbf{el} = \check{\mathbf{Q}} \cdot (\mathbf{I} - \mathbf{M}_w - \mathbf{M}_r) \cdot (\mathbf{A} \cdot \mathbf{x} + \mathbf{f} + \mathbf{c})$$

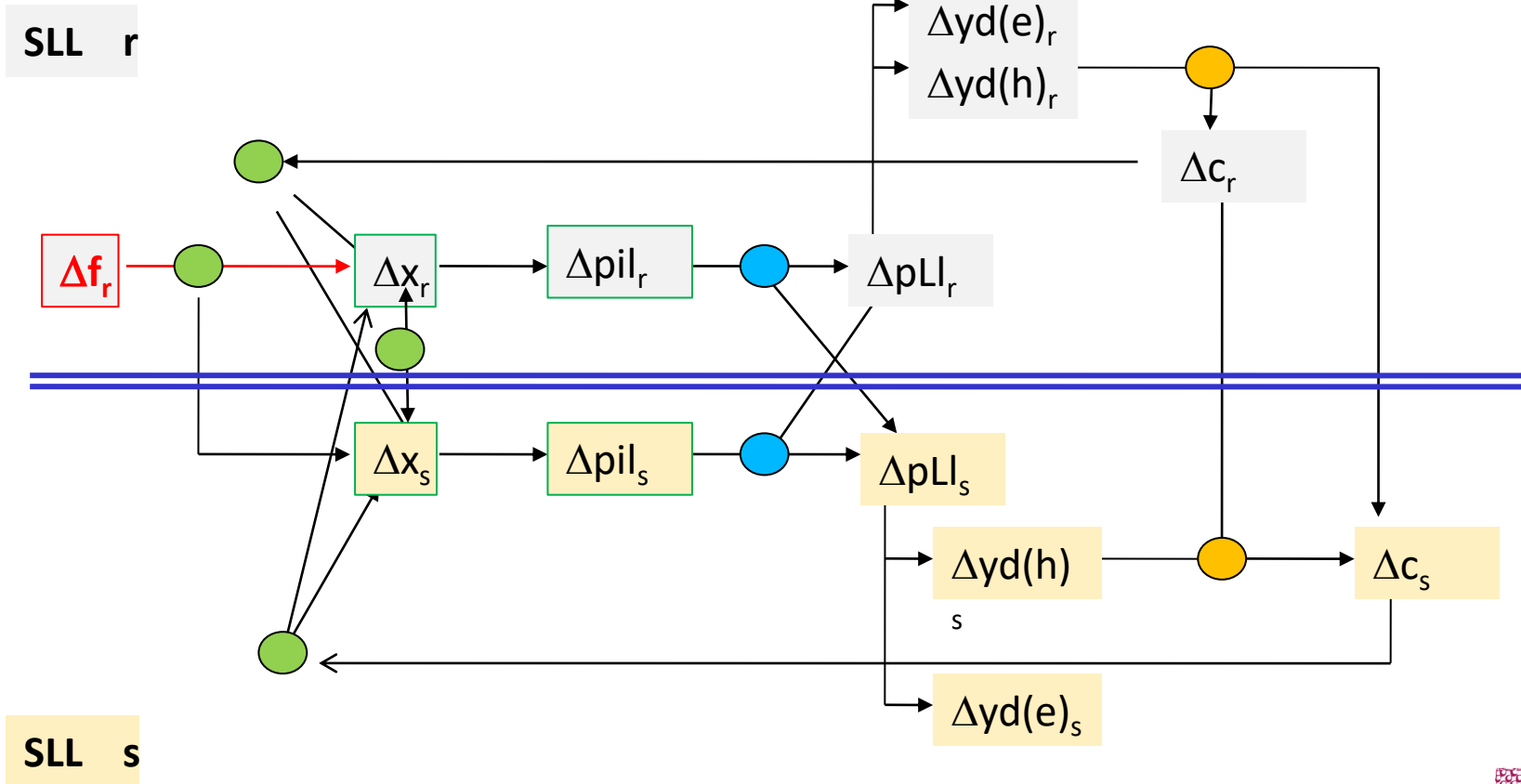
x	= Output	
f	= Exog. Final Demand (G,GFI,NPISH,Cinv)	←
ew	= Foreign export	←
er	= Regional export	←
el	= LMA export	
mr	= Regional import	
mw	= Foreign import	
ml	= LMA import	
v	= Value Added bp	
w	= W&Salaries	
yd	= Disposable Income (HH)	
c	= Total domestic consumption	
ck	= Exog. Domestic consumption (exc tur.)	←
tur	= Tur. expenditure	←
A	= Intermediate input coeffs	
Mr	= Regional Import coeffs	
Mw	= Foreign Import Import coeffs	
V	= VA coeffs.	
W	= W coeffs	
Φ	= Commuting O-D incomes coeffs	
τ	= Implicit income tax rates	
β	= Average Cons. Props	
H	= Consumption bridge matrix	
Q	= Mmulti LMA trade coeffs	
θ	= Retail O-D coeffs	

Multi SLL main causal relations

Final demand change

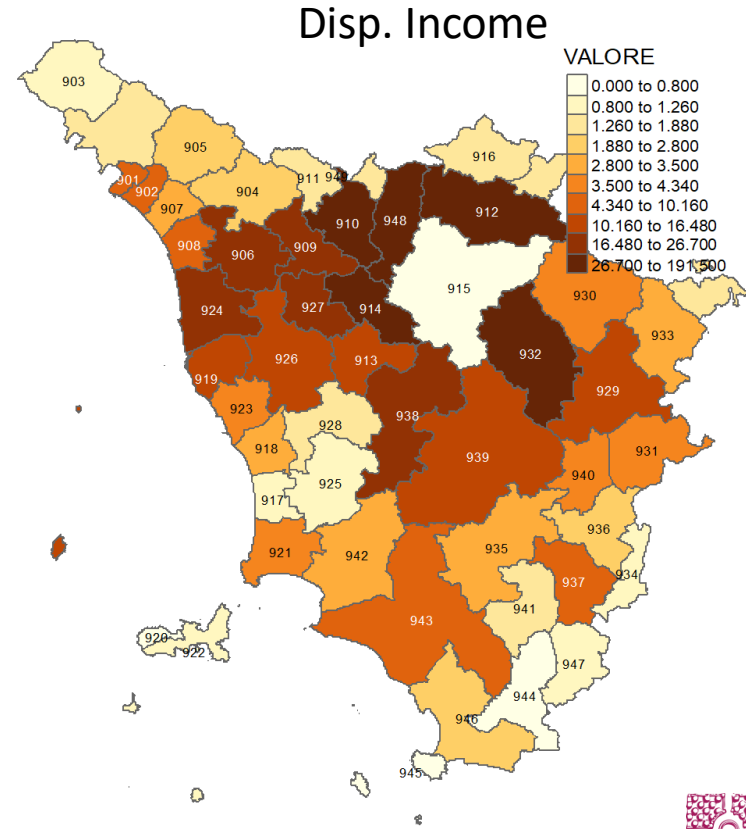
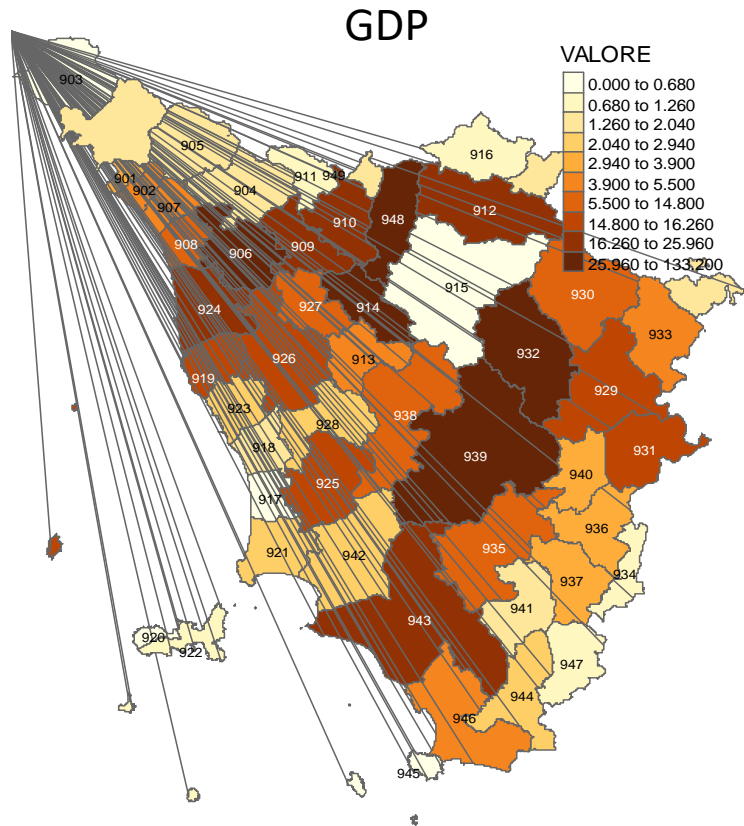


A causal chain: final domestic demand



Some results: shocks transmission to other LMAs

Florence LMA foreign export



The LMAs backbone of tuscan economy: a feedback loop exercise

