Covid-19 and regional economies

A value chain approach

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Work in progress

Sant'Anna Scuola Universitaria Superiore Pisa · SciencesPo ofce · IRPET · IUSS Scuola Universitaria Superiore Pavia

Lockdown, dinamiche regionali e settoriali

Tommaso Ferraresi, Leonardo Ghezzi, Fabio Vanni, Mattia Guerini, Francesco Lamperti, Giorgio Fagiolo, Alessandro Caiani, Mauro Napoletano, Andrea Roventini[1]

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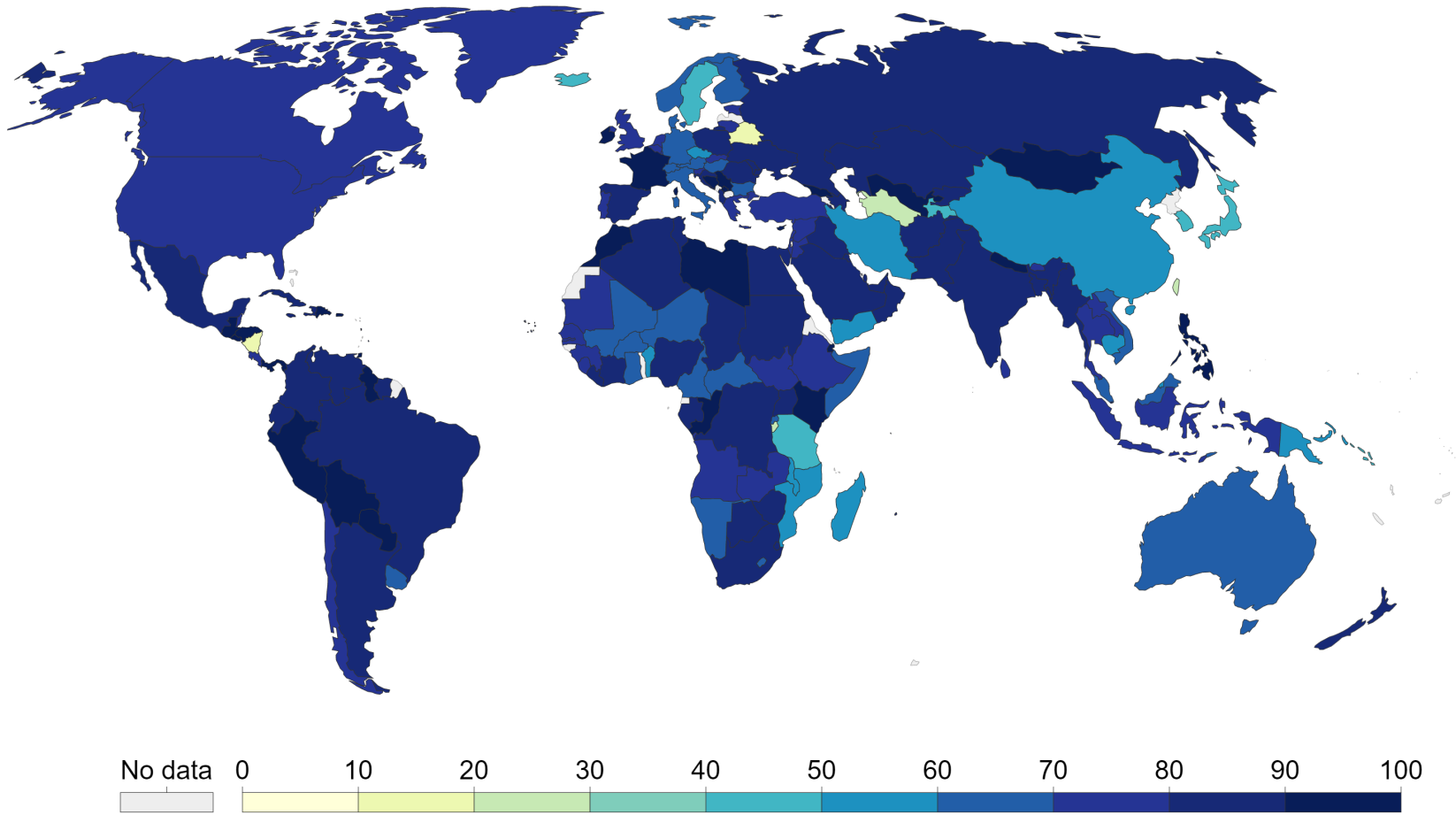
https://github.com/taskforce-covid-19/documenti/blob/master/sgdl_3_Impatto_Economico/sgdl3_lockdown_dinamiche_regionali_e_settoriali.pdf

Zeitgeist economics...

COVID-19: Government Response Stringency Index, May 7, 2020

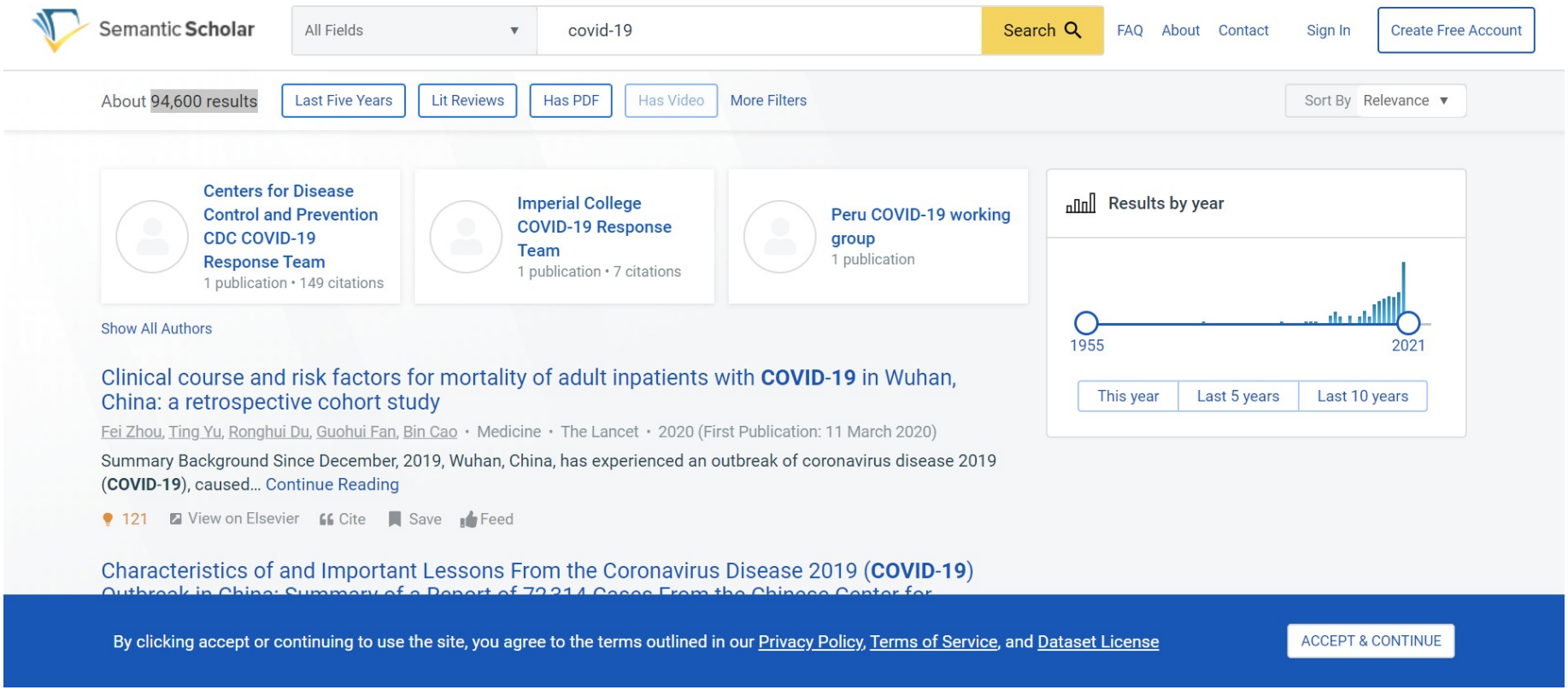
The Government Response Stringency Index is a composite measure based on nine response indicators including school closures, workplace closures, and travel bans, rescaled to a value from 0 to 100 (100 = strictest response).

Our World in Data



Source: Hale, Webster, Petherick, Phillips, and Kira (2020). Oxford COVID-19 Government Response Tracker – Last Updated 5th June.
Note: This index simply records the number and strictness of government policies, and should not be interpreted as 'scoring' the appropriateness or effectiveness of a country's response.
OurWorldInData.org/coronavirus • CC BY

A blossoming literature



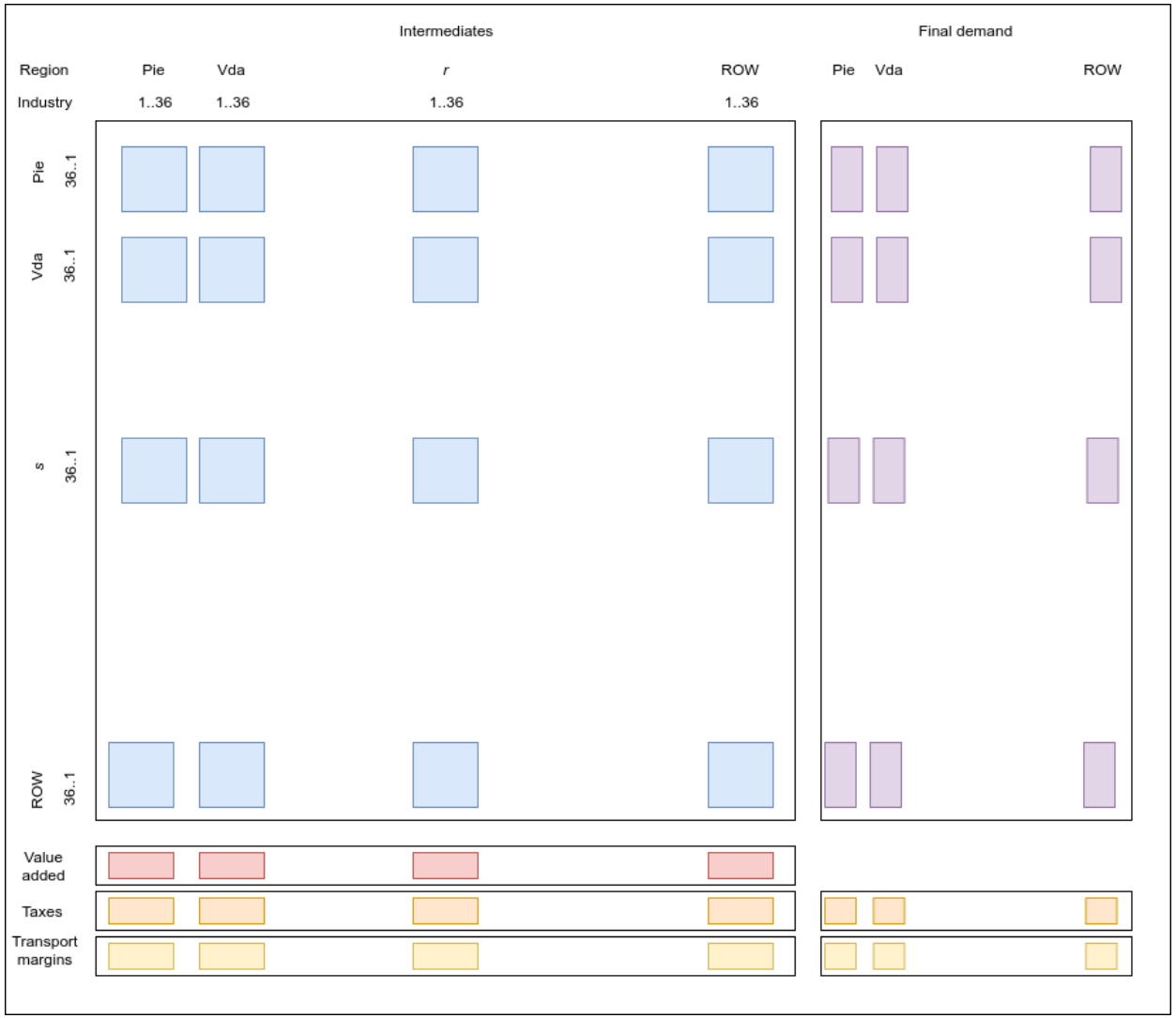
Covid-19 and the economy

1. A crisis with no antecedents:
   - from an epidemiological perspective (Report 20 Imperial College; Goldstein, Lee NBER)
   - from an economic perspective (IMF, EC); V- vs. U- vs. L-shaped recession (Jordà et al CEPR; Galeotti, Surico VoxEU; Fornaro, Wolff VoxEU)
2. and multidimensional:
   - poverty, optimal lockdown, effects of social distancing, teleworking, gender inequality, social capital, human capital, migration, consumption, sector crises, public debt inheritance, financial instability, fiscal and monetary policy, European Union, international trade and value chains, firms heterogeneity, lockdown and supply chains

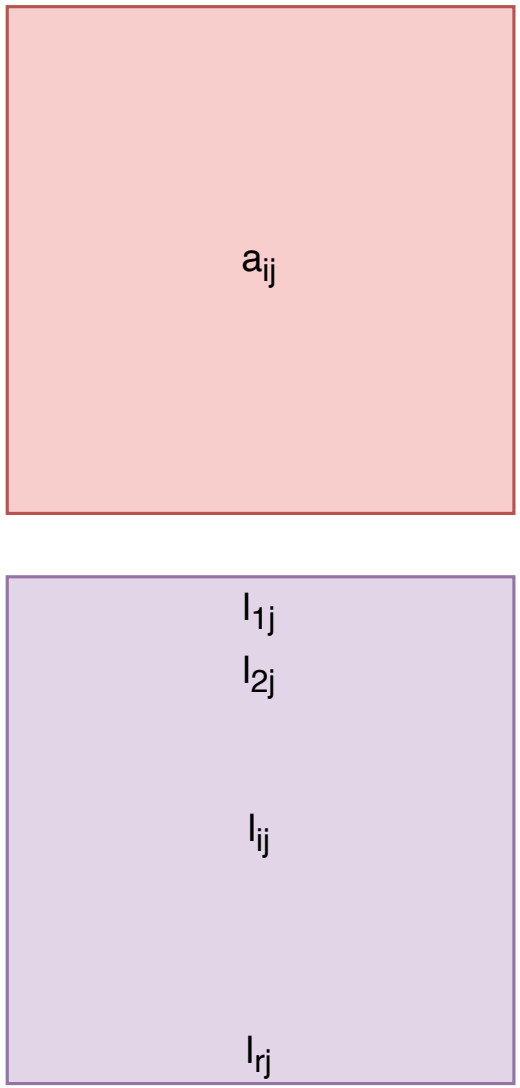
Our work in a nutshell

1. We build up interregional value chains from a final demand perspective and distinguish the places of consumption from those of production
2. For each value chain we estimate – by region and sector – activated production and employment
3. To each occupation we attach a risk of being infected by Covid-19 and a probability for telework
4. (For Tuscany) We distribute value activation in space at the labor market area level

The IRPET-ICIO database, 2015



The value chain through the Leontief inverse



$$df + Adf + A(A^2 df) + ... + A(A^{n-1})df$$

$$(I + A + A^2 + ... + A^n)df$$

The value chain

$\Leftarrow L$

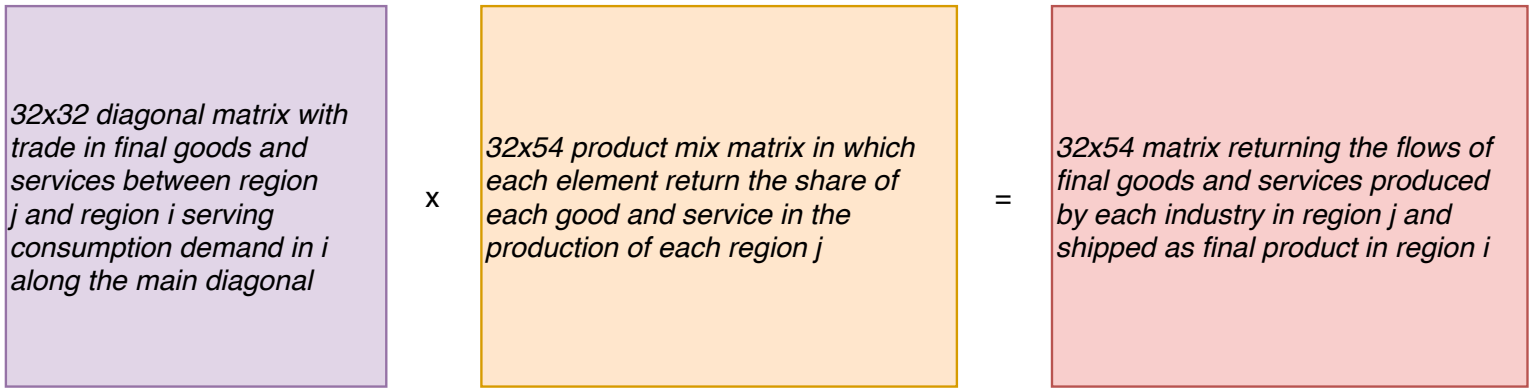
Our value chains...

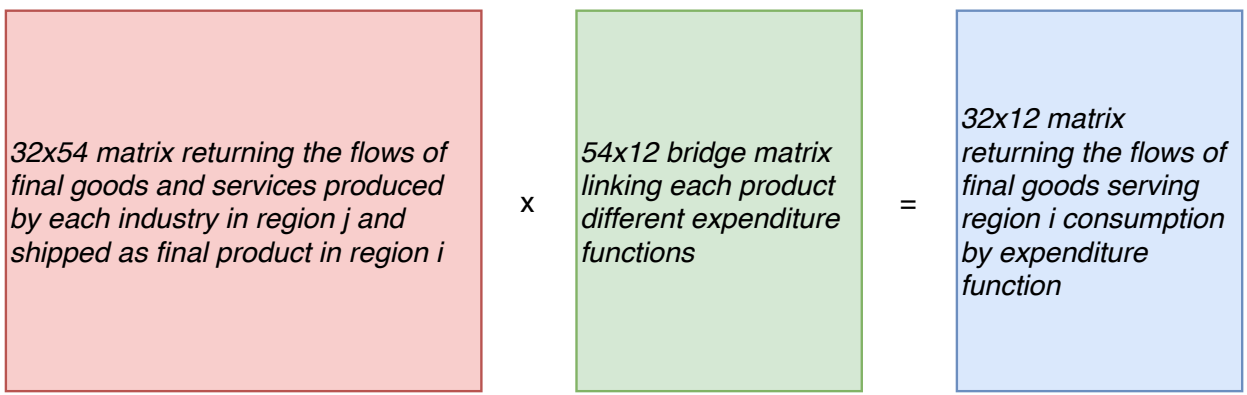
From demand faced by each Italian region:

1. Internal consumption
   - food, beverage, clothing, housing, furniture, housing electrical equipment, health, transports, communication services and equipment, culture and leisure, education, accommodation and restaurants, other goods and services
2. Investment
   - non housing, housing
3. Exports
   - 43 destination markets

Hypotheses: demand will go back to its potential; no further supply shocks as to the inputs which are supplied both from the international and the national economy (e.g., think of firm mortality during the pandemics)

From industries to consumption expenditure functions





Once the flows are estimated a RAS is applied so as to respect rows (flows by industry) and columns (expenditure function shares) constraints

Investment and exports

1. Investment
   - housing: served by construction industry in each region; trade in final goods excluded
   - non housing: served by all other industries; (plus) trade in final goods provided by construction industry
2. Exports
   - 42 destination countries plus the rest of world
   - trade in final goods and in intermediates

Attaching employment, Covid-19 risk and teleworking

1. Once estimated production activated by each demand shock we compute employment by multiplying by regional/sector employment per euro of production.
2. We also distinguish among different categories such as white vs. blue collars.
3. We compute Covid-19 related risk and the teleworkability of each profession by relying upon INAPP (ICP) and ISTAT (Forze di Lavoro) data (years: 2016, 2017, 2018)

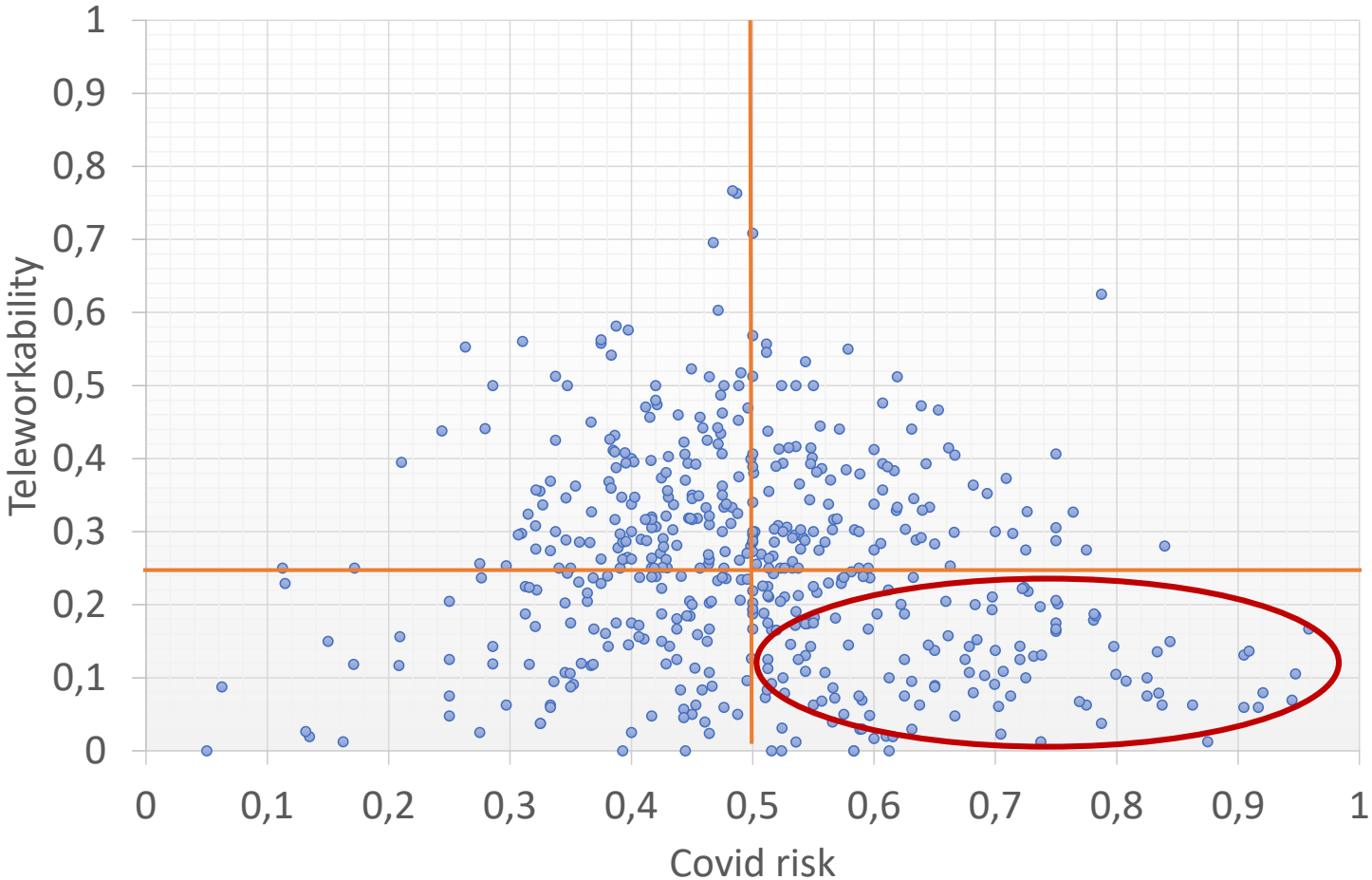
Covid-19 risk

1. INAPP survey: exposure to infections, physical proximity
2. No substitution among dimensions: Covid risk index as a $max(x, y)$; alternative: the two dimensions are kept separated so as to capture two different aspects of Covid related risk
3. Matching with FDL survey in order to get sectors of employment at the regional level

Teleworking

1. INAPP survey which captures different aspects of working life at 5 digits level
2. Teleworkable professions at 4 digits as identified in Duranti et al. (2020): `http://www.irpet.it/wp-content/uploads/2020/06/cr-covid-19-n-1-29-05-2020-1.pdf`; alternative: index built as in Barbieri et al. (2020)... however: they allow for substitution among dimensions...
3. Matching with FDL survey in order to get sectors of employment at the regional level

Risk and teleworkability among professions



From regions to labor market areas (LMAs)

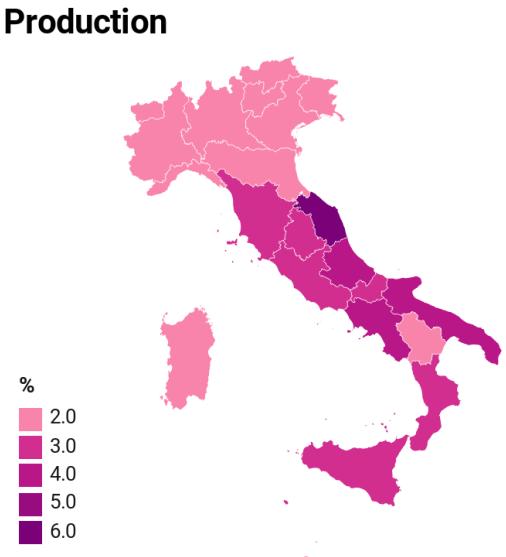
The problem:

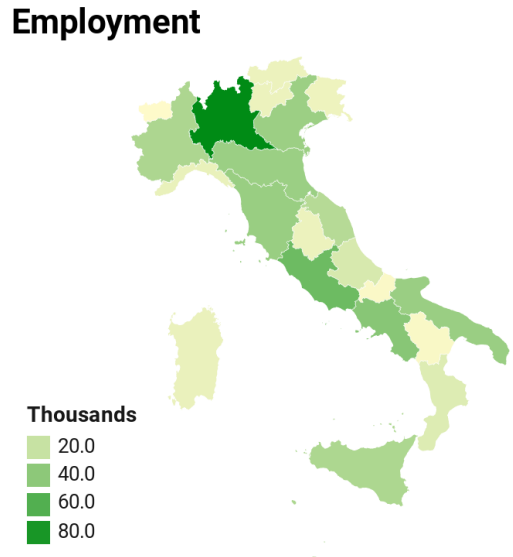
- The contribution of an interregional approach to the value chain literature is highly valuable per se
- however, as to the critical issues raised by the spread of Covid-19, the regional perspective might not be that narrow
- a LMA perspective would help in better linking the economy to the spread of contagion, monitoring the evolution of the virus, designing more tailored policies

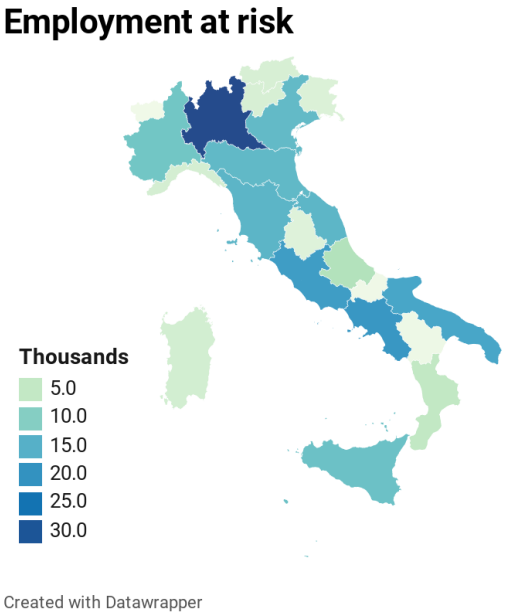
Solution:

- Given the trade flows activated by each shock
- we generate shocks faced by each LMA in Tuscany
- and estimate activated production and employment by sector and LMA

The clothing value chain: Italian demand

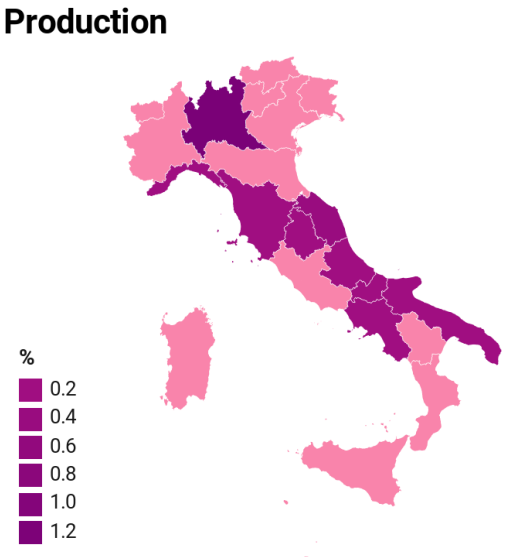


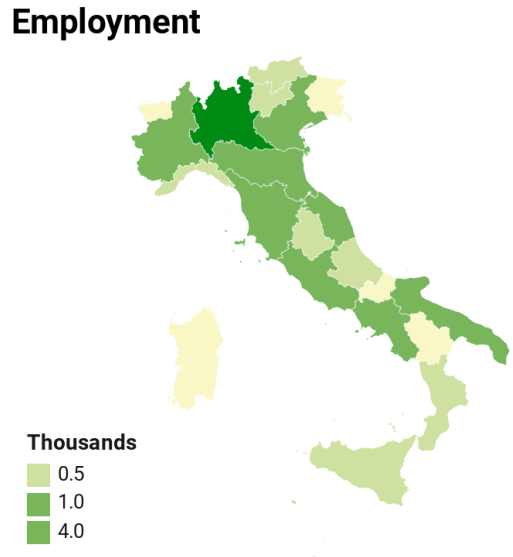


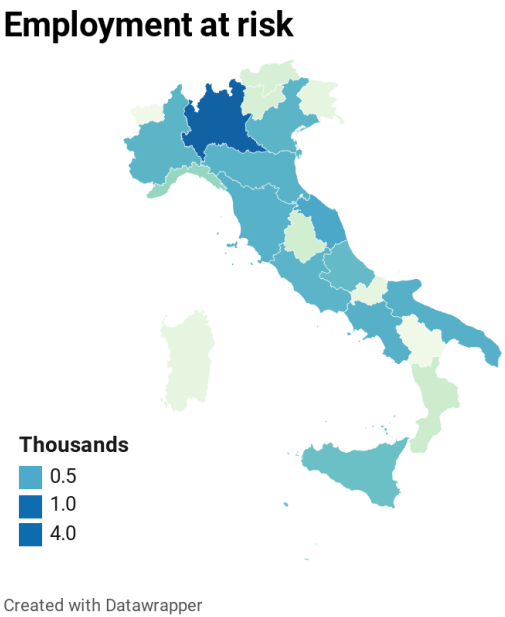


- More than 400 thousands of employees
- Largely employed in manufacturing...
- ... and 41.1% of employees at risk

The clothing value chain: Lombardy demand

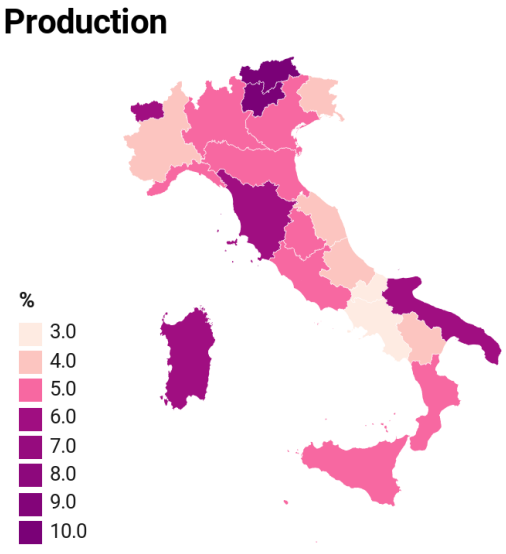


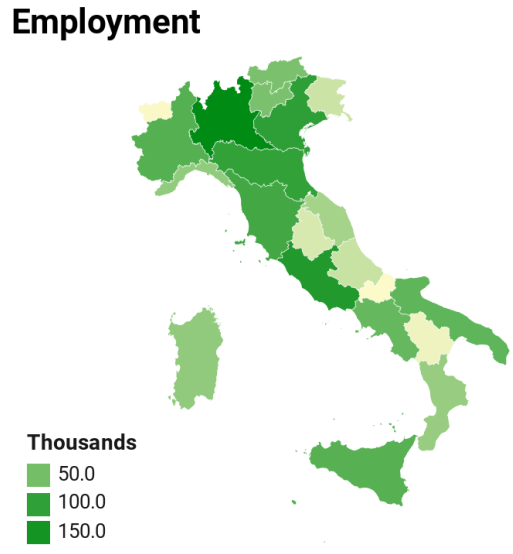


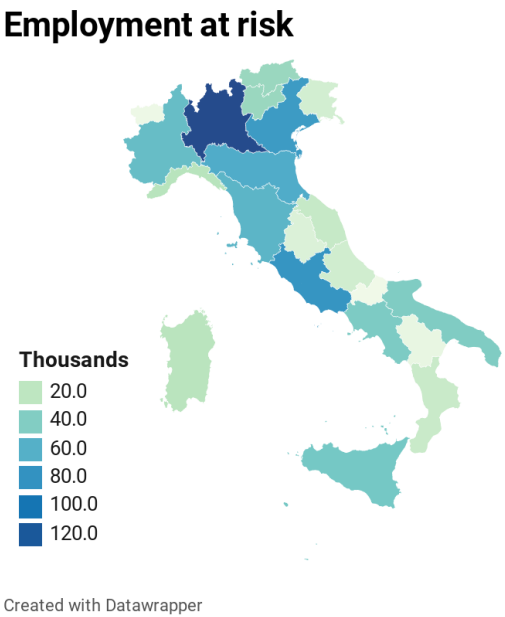


- Opening only one region generates production and employment spillovers...
- ... increasing contagion risk in other regions

The accommodation and restaurant value chain

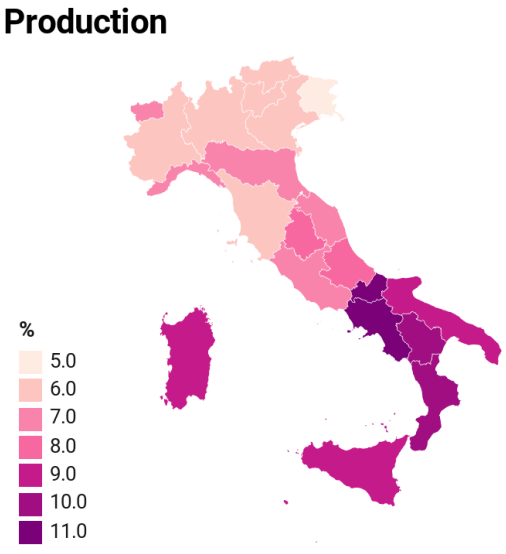


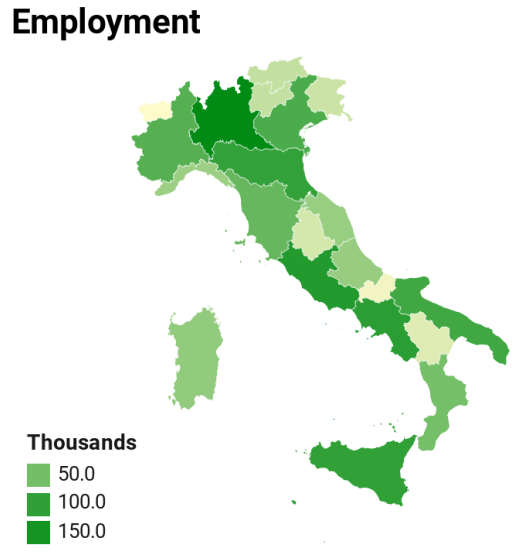


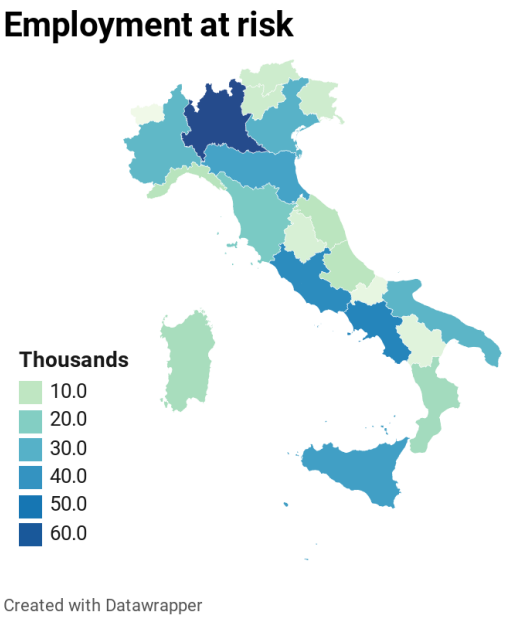


- More than 1 million of employees
- A large share of employment in service sectors...
- ... high Covid risk and low teleworkability (66.9%)

The food value chain

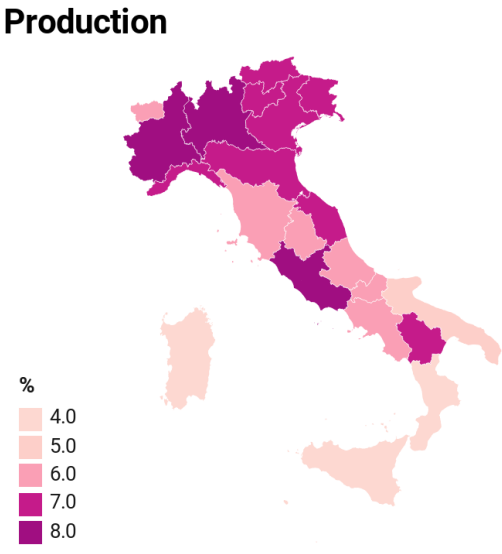


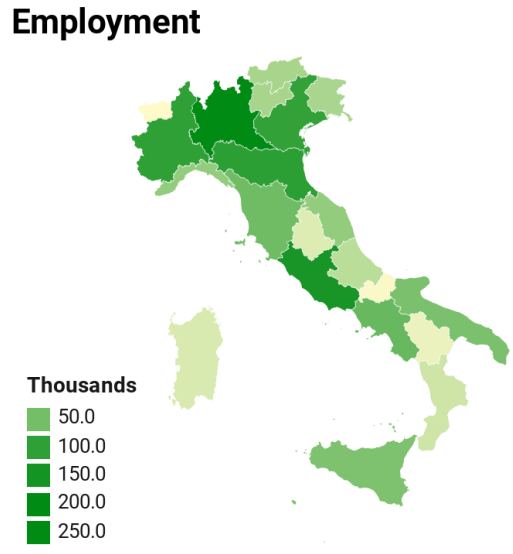


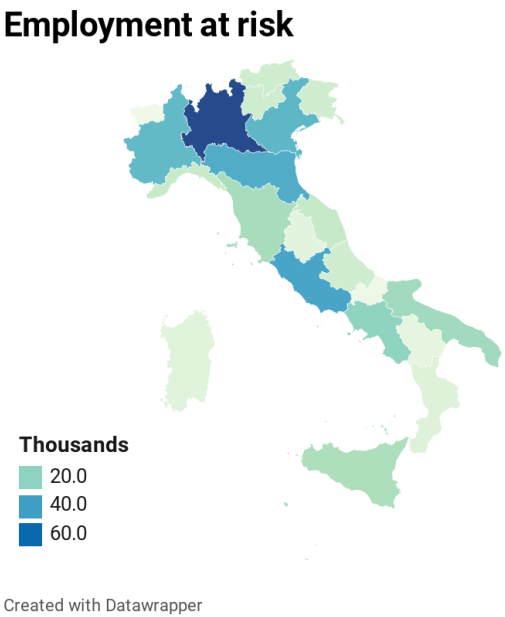


- % of total production and more than 1 million of employees
- A large share of employment in manufacturing...
- ... and 37.0% of jobs at risk

Non-housing investment

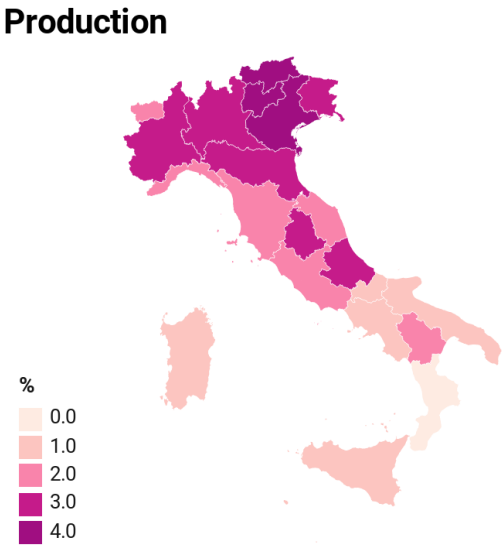


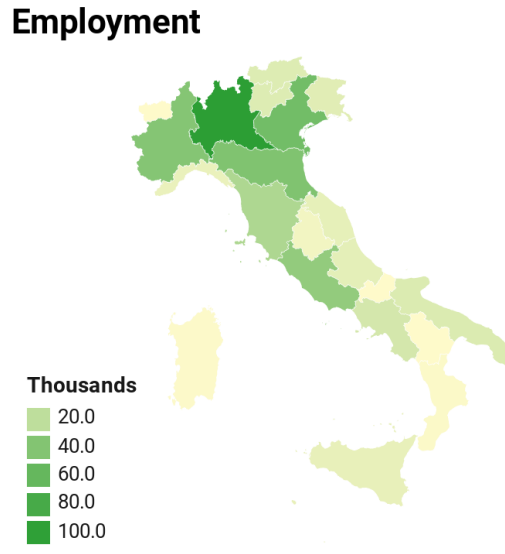


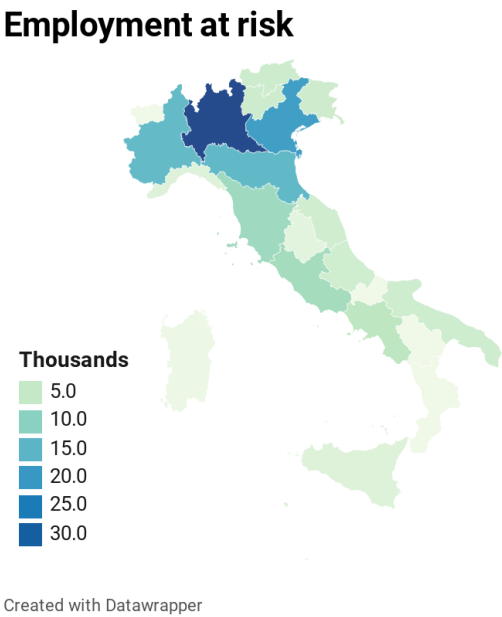


- 1 mil. of employees, mostly in the North
- large share of manufacturing jobs
- less than 1 third of employment at risk

Exports: Germany

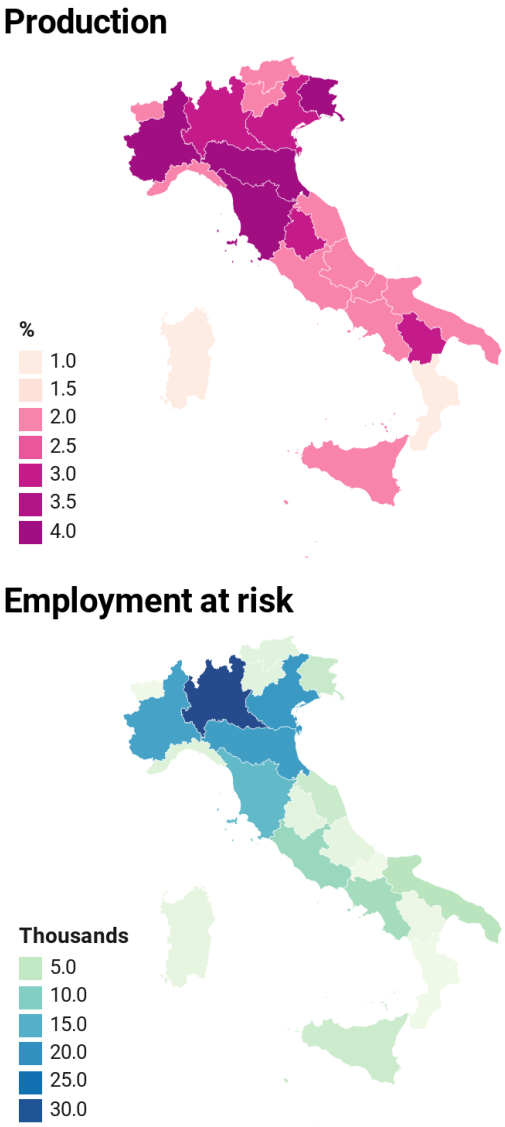






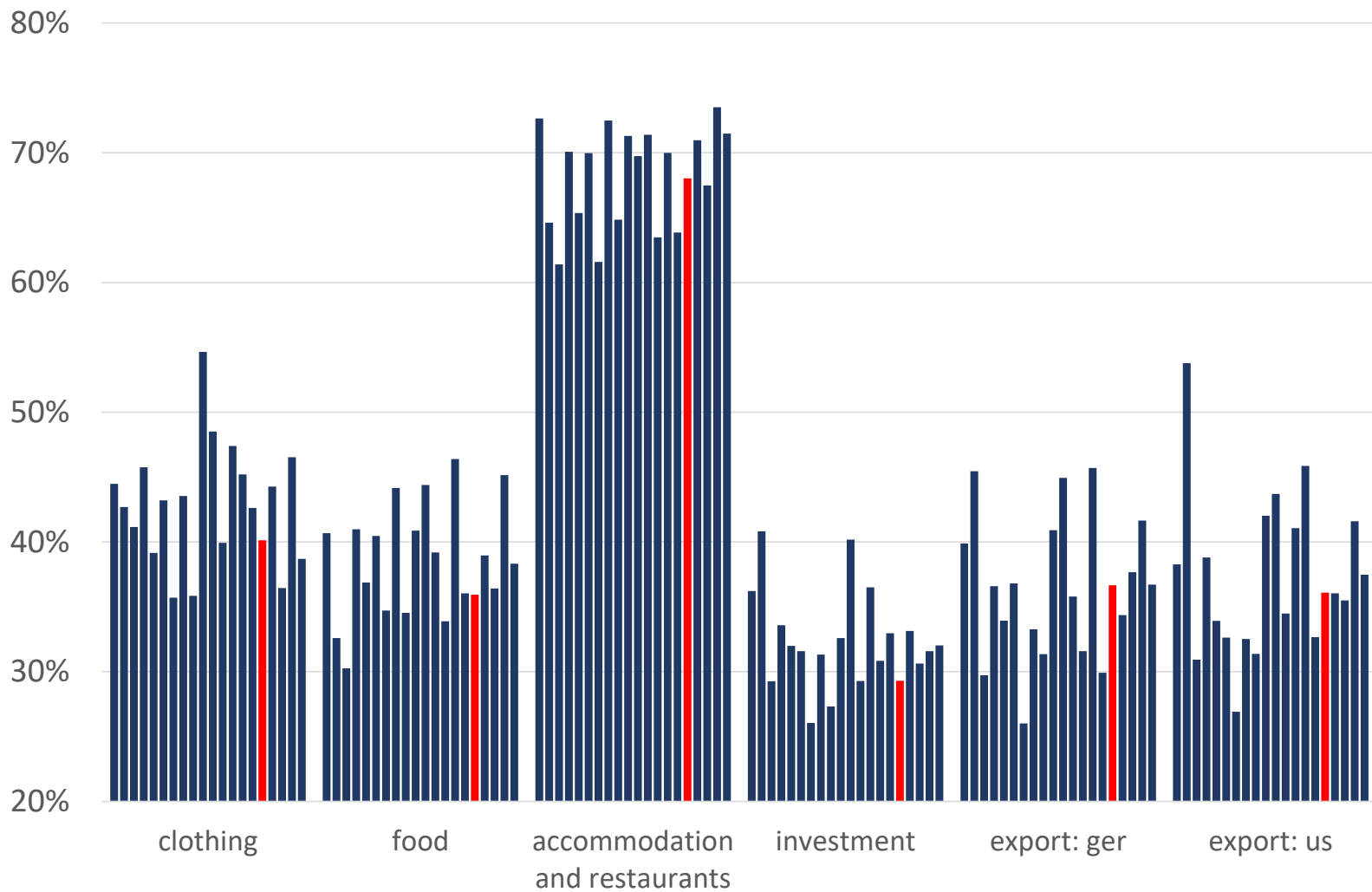
- 400 thousands employees, mostly in the North
- large share of manufacturing jobs..
- 1 third of employment at risk

Exports: US

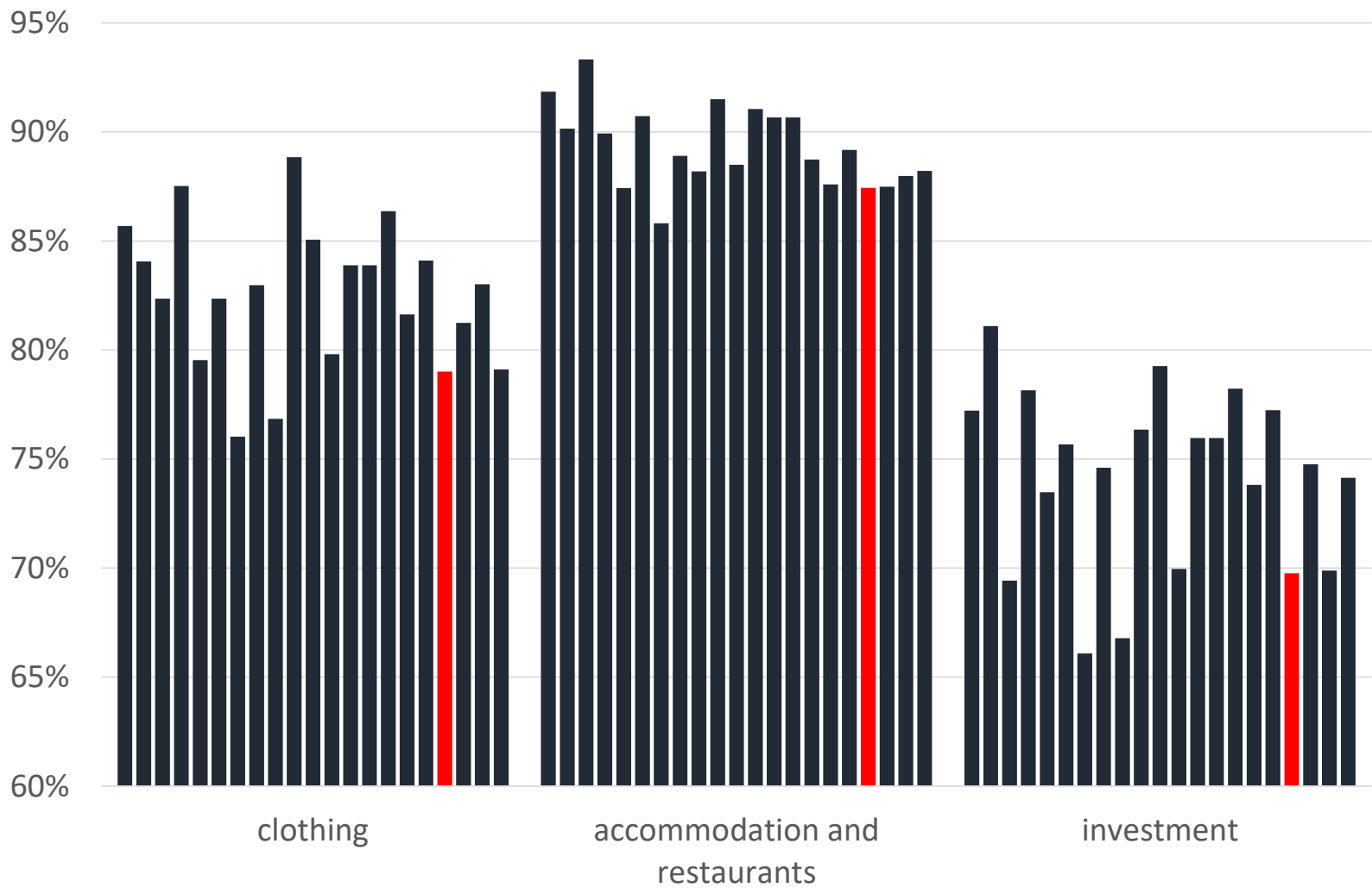


- 400 thousands employees, mostly in the North
- large share of manufacturing jobs..
- 1 third of employment at risk

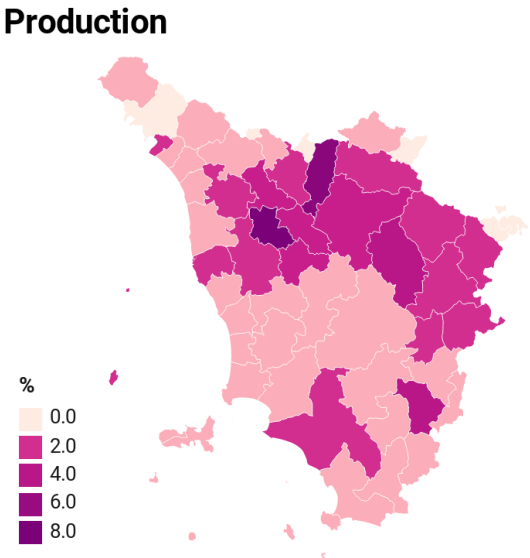
Employment at risk (%)

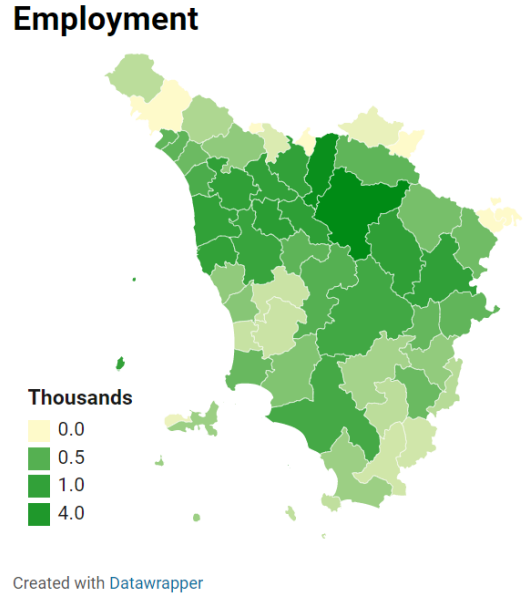


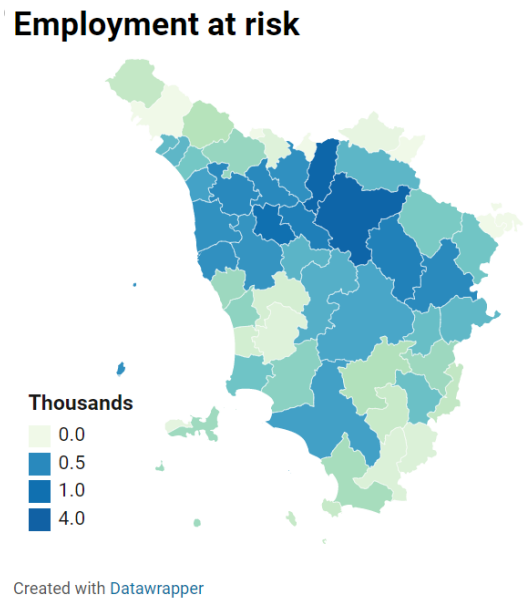
Risk reduction from teleworking



LMA level: clothing

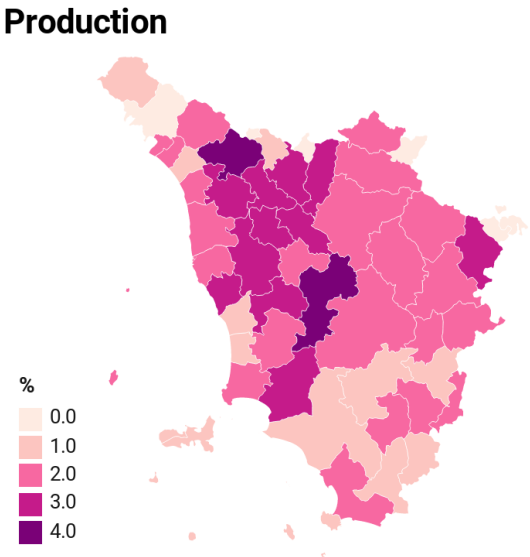


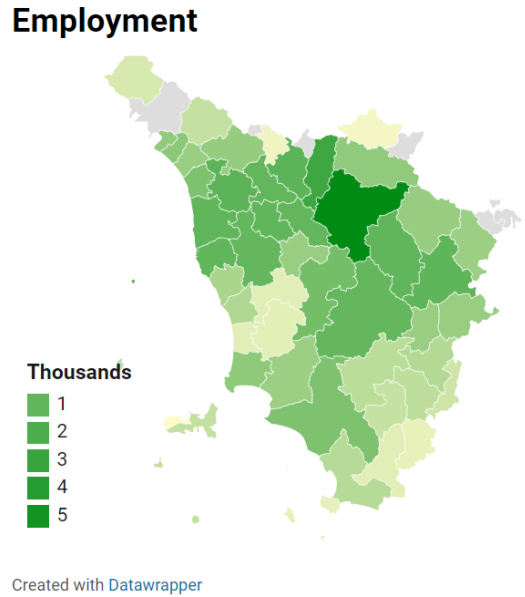


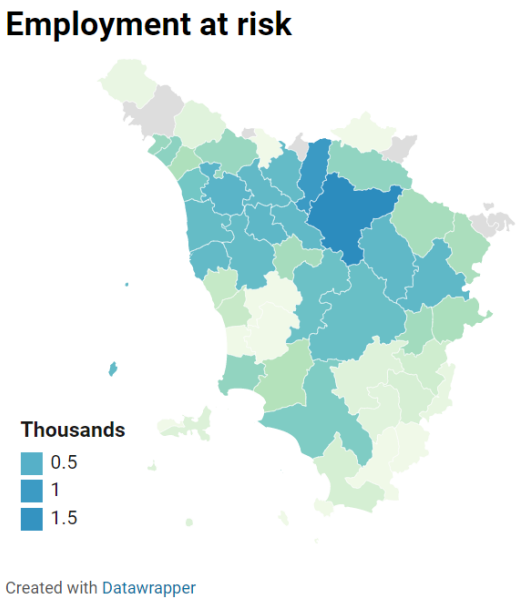


- Fashion industrial districts
- ... where activation and risk concentrate
- ... the pivotal role of Florence

LMA level: German exports

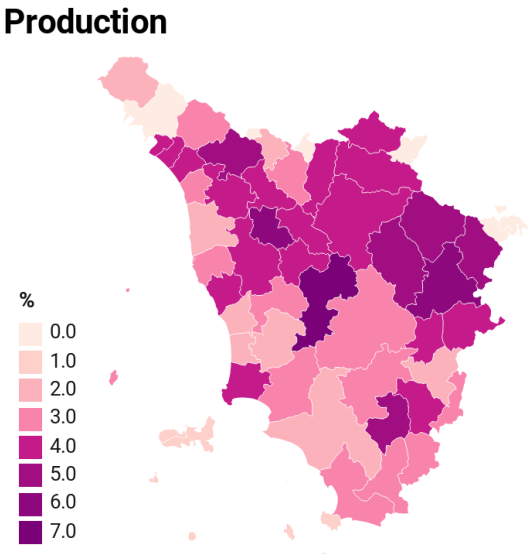


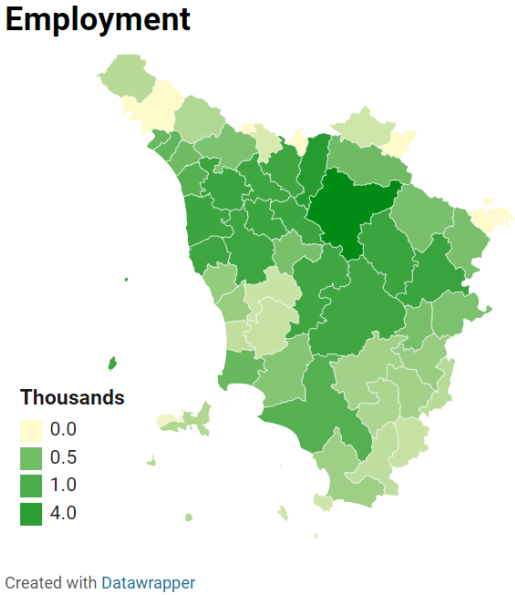


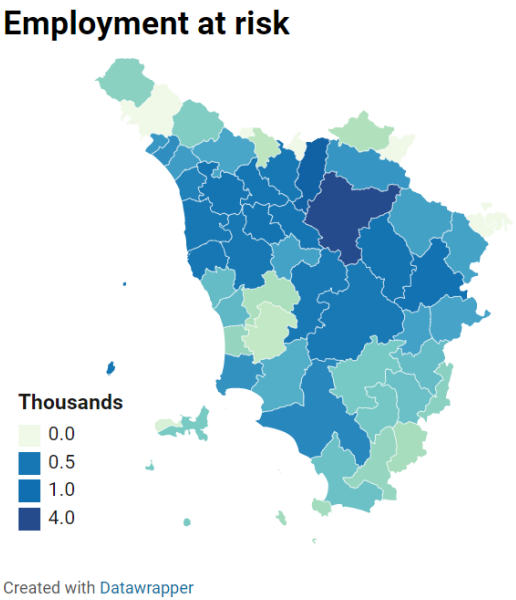


- A relatively diffused activation
- The 'Central Tuscany'
- Florence and Prato in absolute values

LMA level: US exports







- A relatively diffused activation
- Santa Croce sull'Arno, Poggibonsi, Arezzo
- Not teleworkable jobs spread across the region

Preliminary discussion

Our method can be interpreted as a toolkit:

1. for **reopening the economy**. We can monitor the number of workers involved in the activities involved in specific supply chains with respect to information on the spread of the virus
2. for **shutting down the economy**. Given a certain production that we want to be able to maintain, we can minimize the level of people at risk COVID-19 put into circulation to reach that level, appropriately choosing which supply chains to close; and which ones to keep open
3. for **measuring the potential loss**. The work returns the image of a fabric of intense relationships between various territories and this allows to evaluate to what extent the various places are exposed to asymmetric shocks, expressing what could be a potential damage deriving from a change in the final demand, internal and external.

Current and future work

1. The impact of the 2020Q1 at the regional and intra-regional level building scenarios within the value chain framework
2. The inter-LMA model for all Italian regions
3. Simulating the shutdown of Tourism-related consumption
4. Improvement of Covid-related risk and teleworkability indices
5. Covid-19 and inequality: e.g., gender inequality
6. Extension to international value chains, both backward and forward; bottlenecks analysis
7. Geographical labor mobility: pressures on public transports; contagion spread
8. Adding contagion data and epidemiological models