Regional Income Disparities, Distributional Convergence, and Spatial Effects

Evidence from Indonesian Regions 2010-2017

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[slides available at: https://project2019e.netlify.app]

Motivation:

- there is limited research about decentralization in Indonesia that has provided a conclusive answer on the regional income disparity dynamics.
- Scarce academic literature on convergence at the district level in Indonesia.

Research Question:

- **To what extent the role of space affects the convergence dynamics across Indonesian regions?**

Methods:

- Classical convergence framework (Barro and Sala-i-Martin 1992) and Distributional convergence framework (Quah 1996; Hyndman et. al 1996)
- Spatial autocorrelation (Moran's I and differential Moran's I)
- Getis Filter (Getis 1995)

Main Results

1. **Significant Spatial Autocorrelation** at the district level.

2. **Distributional Convergence**

    - For provinces, there are 4 convergence clubs.
    - For districts high mobility in the upper tail of the distribution.

3. **Filtered data**

    - High mobility on the filtered distribution.
    - Faster convergence speed for filtered data.

4. **Spatial effects**

    - Spatial effects are reducing the speed convergence of income at the district level.

5. **Policy Implication**

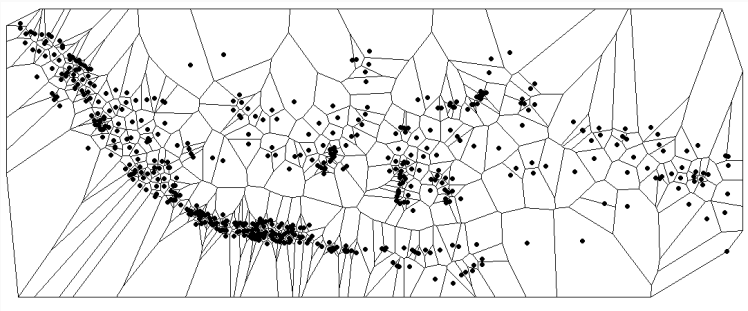
    - Increasing the effectiveness of local government's policies and coordination among regions.

Outline of this presentation

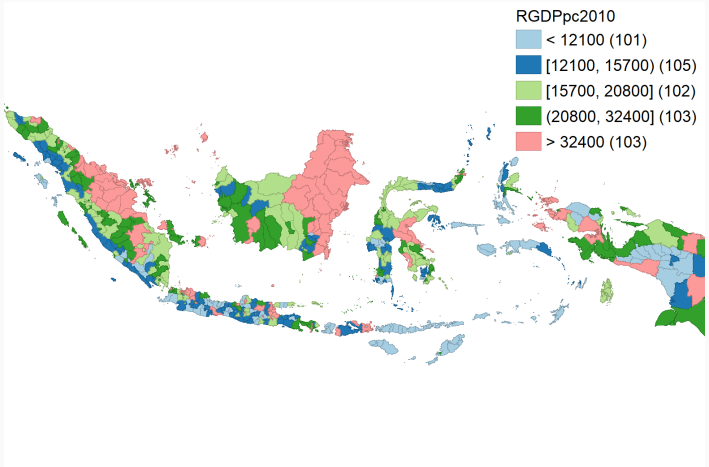
1. **Introduction and Data**
    - Does decentralization promote regional development?
    - A newly constructed data-set
2. **Spatial autocorrelation**
    - Standard Moran's I
    - Differential Moran's I
3. **Spatial Filtering Perspectives**
    - Distributional Dynamic Framework
    - Getis Spatial Filter
4. **Income dynamic transition across districts and provinces**
5. **The filtered data and spatial effects**
6. **Concluding Remarks**

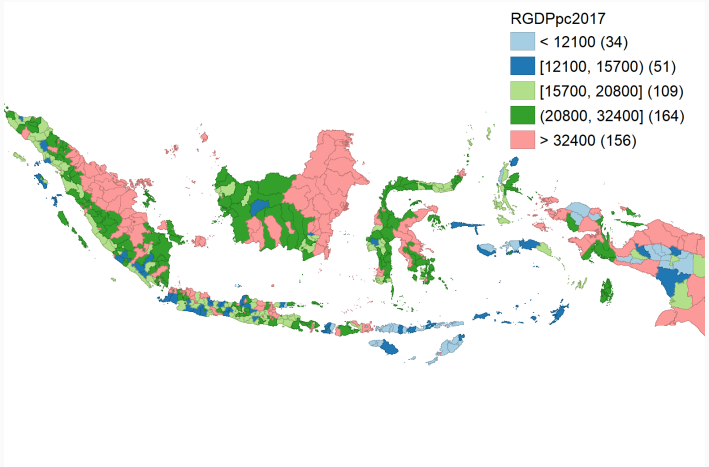
(1) Data

- The centroid coordinates of the capital cities of the districts.



- A balanced dataset (districs interpolation). Income per capita for 34 provinces and 514 districts over the 2010-2017 period.

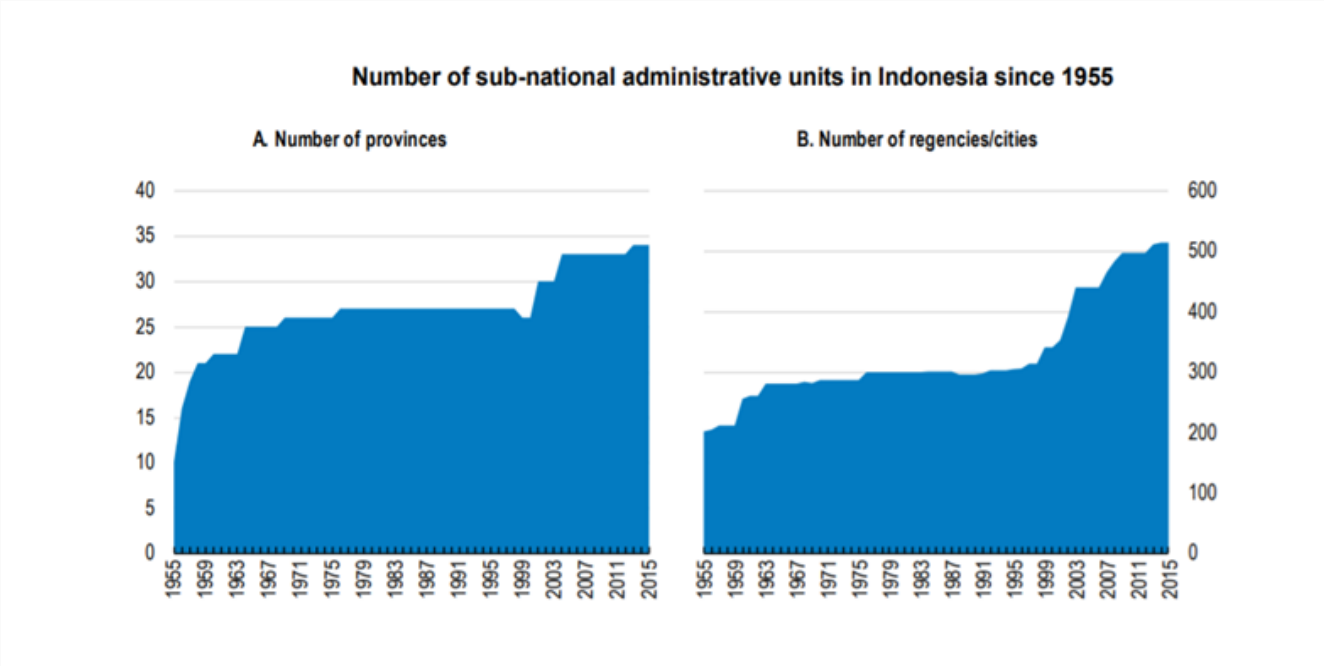




(1) Introduction:

Decentralization to promote regional growth

- After the implementation of decentralization in 2000, the number of provinces and districts (cities and regencies) increased significantly.
- Local governments are granted a greater political autonomy and substantial responsibilities for administration and public services provision.

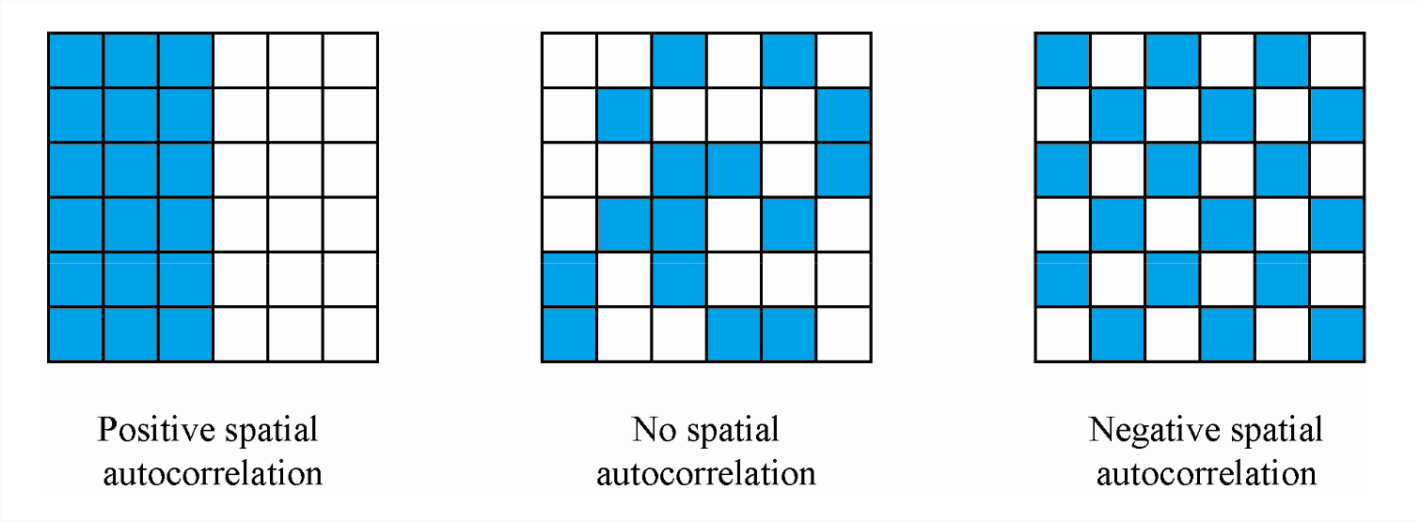


(2) Spatial Autocorrelation :

Moran's I and Differential Moran's I

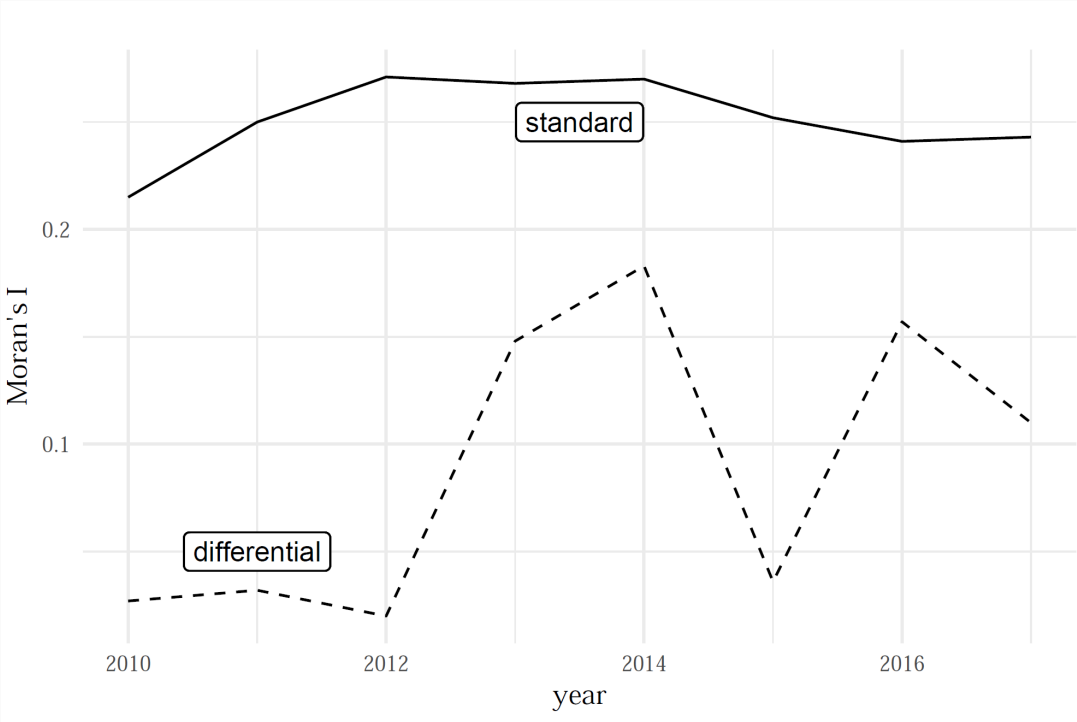
$$I = \frac{\sum_i \sum_j w_{ij} z_i . z_j}{\sum_i z_i^2} = \frac{\sum_i (z_i \times \sum_j w_{ij} z_j)}{\sum_i z_i^2}.$$

- It captures the relationship of a variable in one location with the spatially weighted average of values at neighboring locations.
- The differential Moran's I is conducted to evaluate the robustness.



Spatial Autocorrelation Moran's I

- For provincial data the Moran’s I statistic was **not statistically different from 0** for all years.
- At the district level there are **Strong signs of positive spatial autocorrelation**
- The Moran's I is significant **for all years** from 2010-2017 and the differential Moran's I is significant from 2013

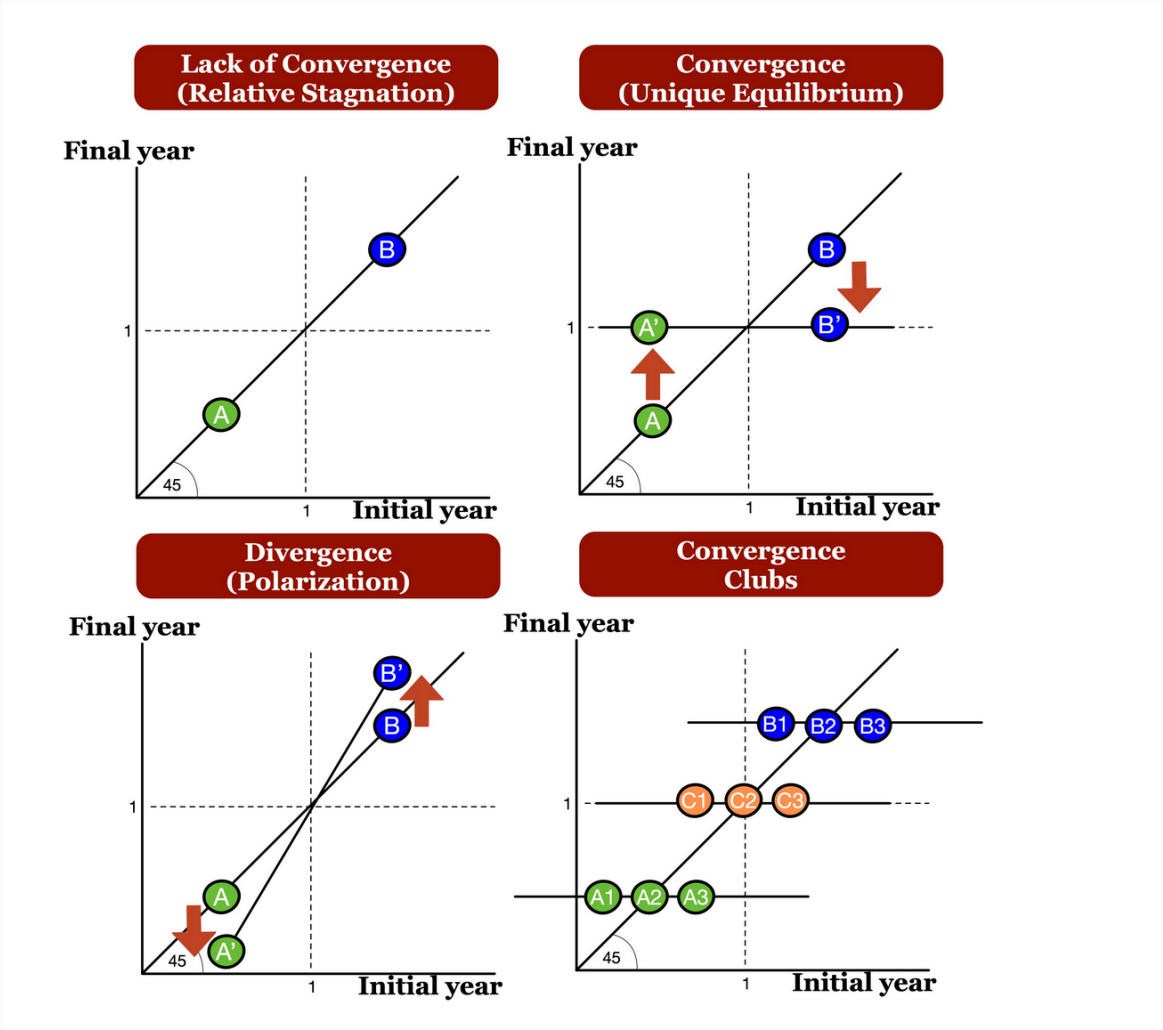


(3) Spatial Filtering Perspective

$$x_i^* = \frac{xi(W_i)}{(n-1)G_i(d_m)}$$

- **A spatial filtering of the data can help us to avoid misguided interpretation**.
- Instead of using spatial regressions we can remove the spatial component of socio-economic variables and used t filtered data in regular regressions.

(3) Distribution Dynamics Framework

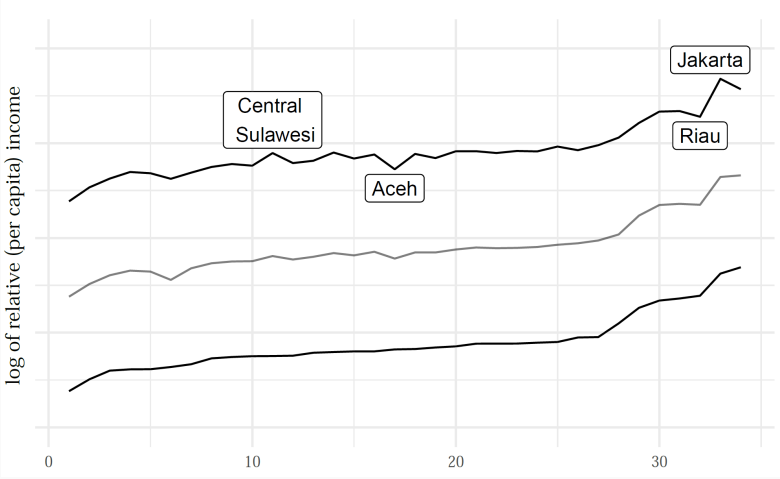


Intra-distribution dynamics

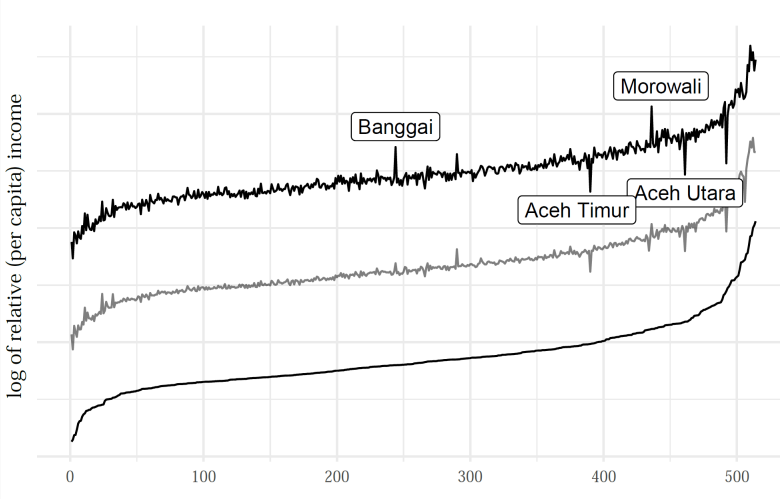
Is the income ranking changing over time?

- Each curve refers to the income levels at a given point in time 2010, 2013 and 2017.
- The lowest curve shows the cross- section of regions in 2010 in increasing order (income ranking from the lowest to the highest)

Provinces

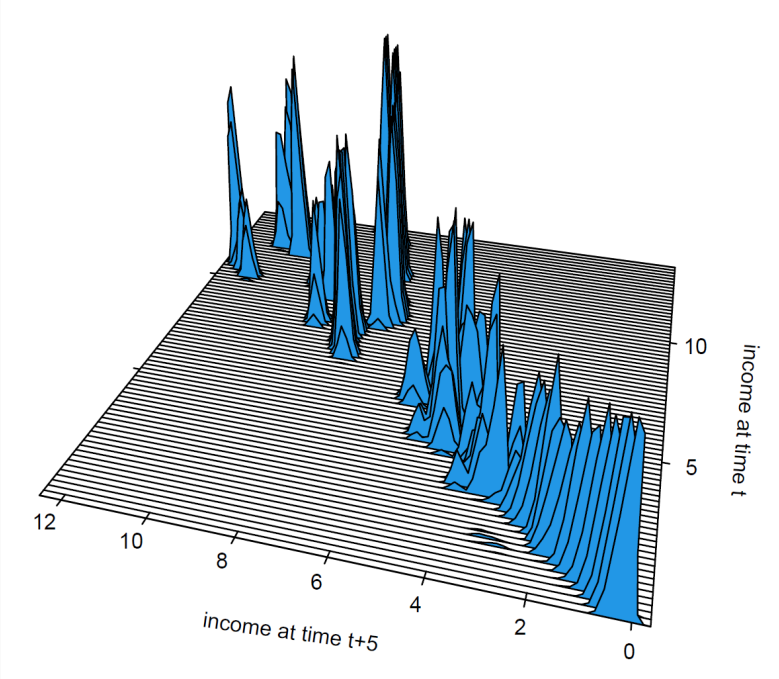


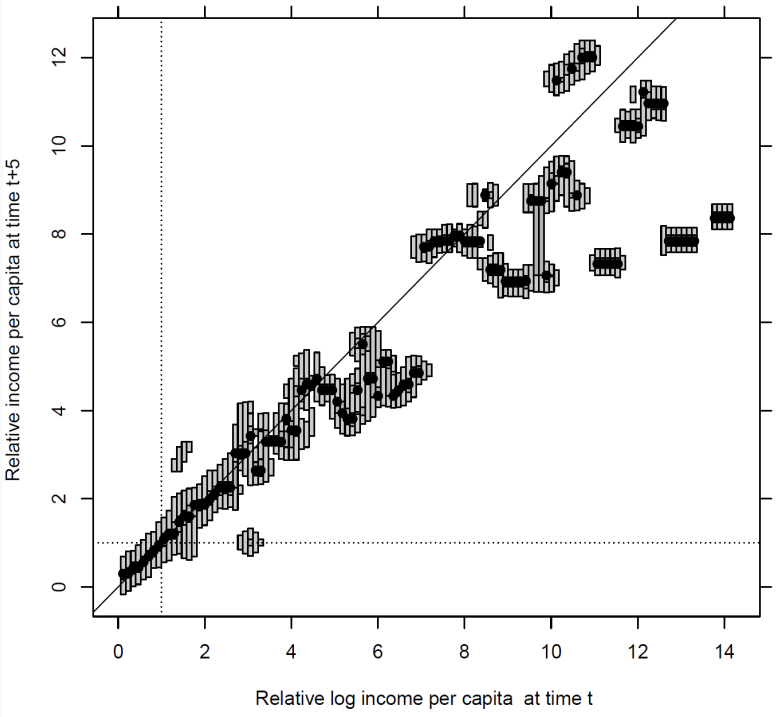
Districts



(4) Income dynamics for districts

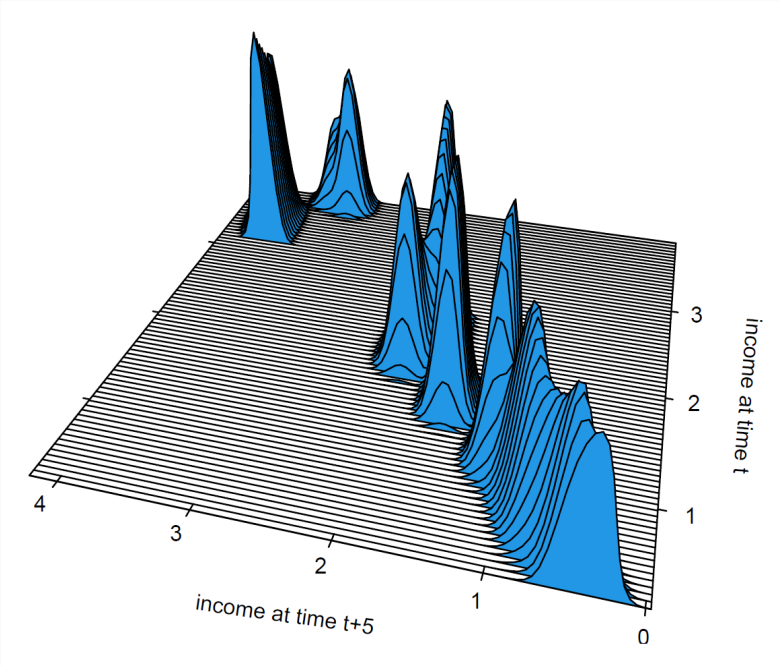
- Low mobility in the bottom of the distribution, the relatively poor remain relatively poor...
- High mobility in the upper tail of the distribution



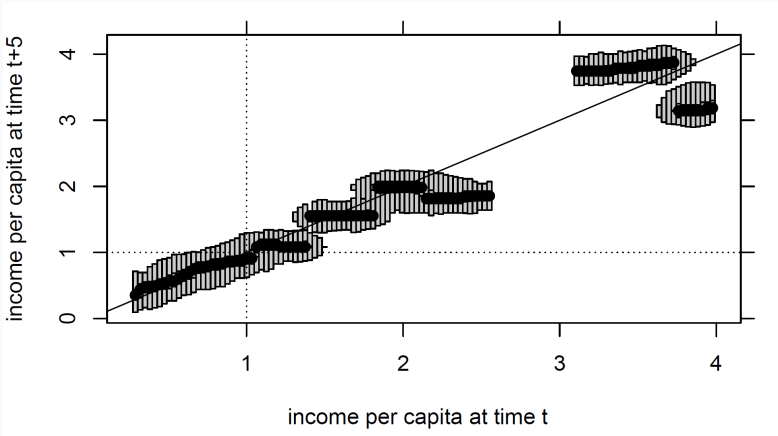


(4) Income dynamics - provinces

Since Spatial autocorrelation is not significant for provinces just distributional and classical convergence analysis are reported.

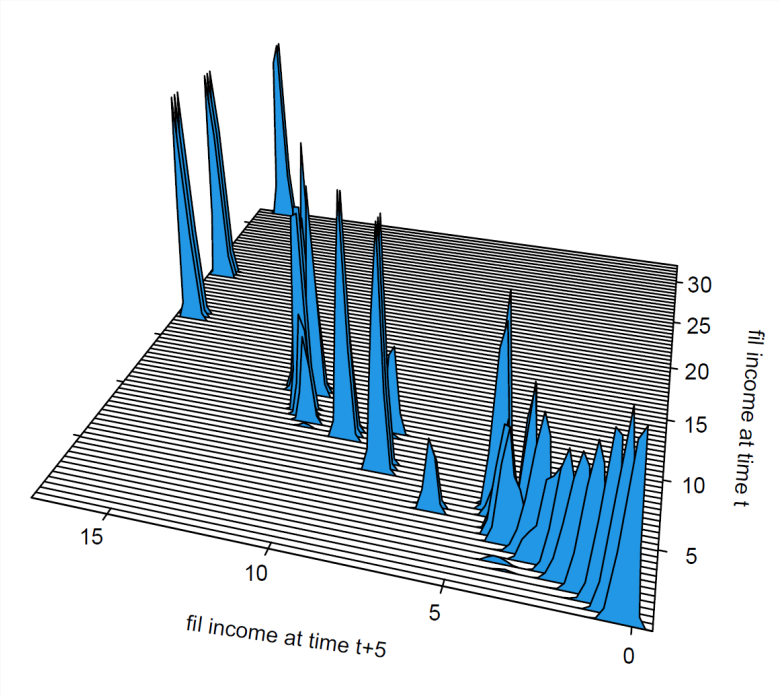


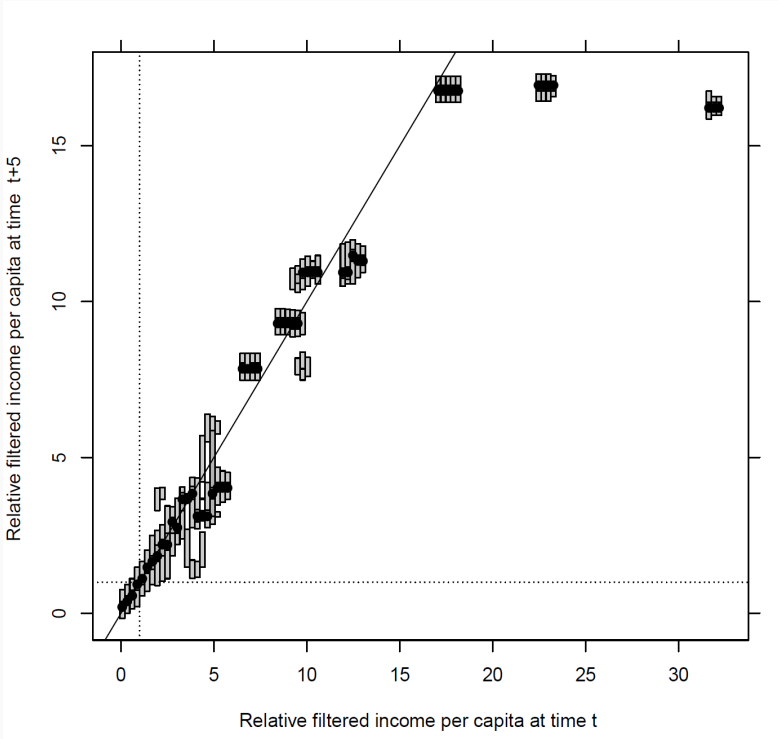
There are at least 2 convergence clubs, two in the upper tail and 2 in the middle of the distribution



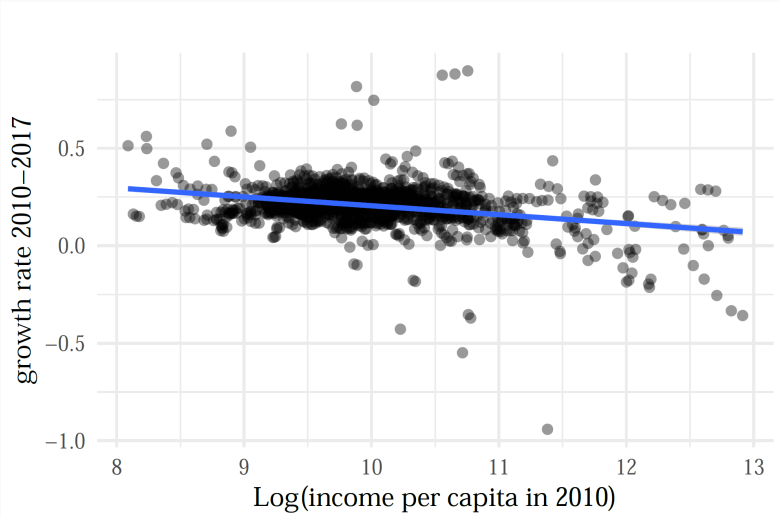
(5) Filtered income dynamics

- Distributional convergence and clusters for the **filtered income variable**
- The regions whit income over 20 times the average income un time t had income of just over 15 in time t+5





(5) Classical convergence results



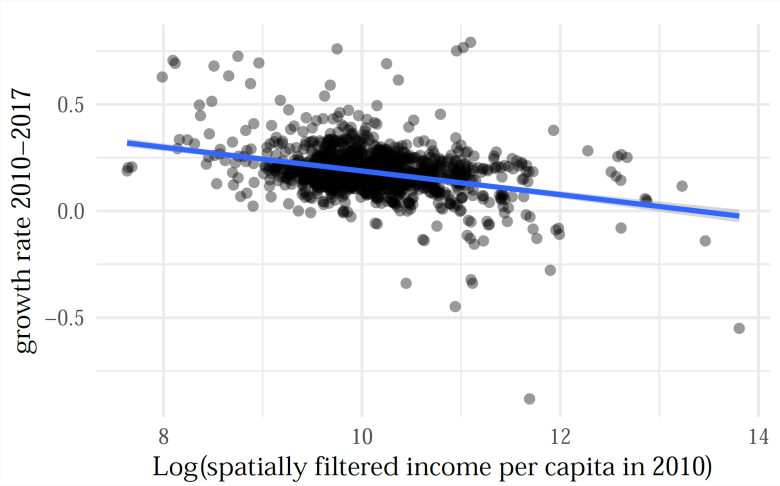


Table 1: Classical convergence framework summary

data (spatial scale)	speed of convergence	half-life(years)	$quotient(\sigma)$
RGDPpc(districts)	0.93***	74.2	1.03
RGDPpc(district-filtered)	1.14***	60.6	1.04*
RGDPpc(provinces)	1.44***	48.6	1.06

Note: unity. The speed of convergence is derived from a linear regression between the growth rate and the initial income value. *, **, *** indicate significance at the 10%, 5%, 1% levels respectively of the regression coefficient. For the quotients, the significance refers the difference from the null hypothesis of a quotient equal to 1.

(6) Concluding Remarks

Inequality still matters :

- Low mobility for the poorest districts and provinces.
- The convergence speed is below the standard in the regional literature for provinces.
- Spatial effects are reducing the pace of convergence at the district level.

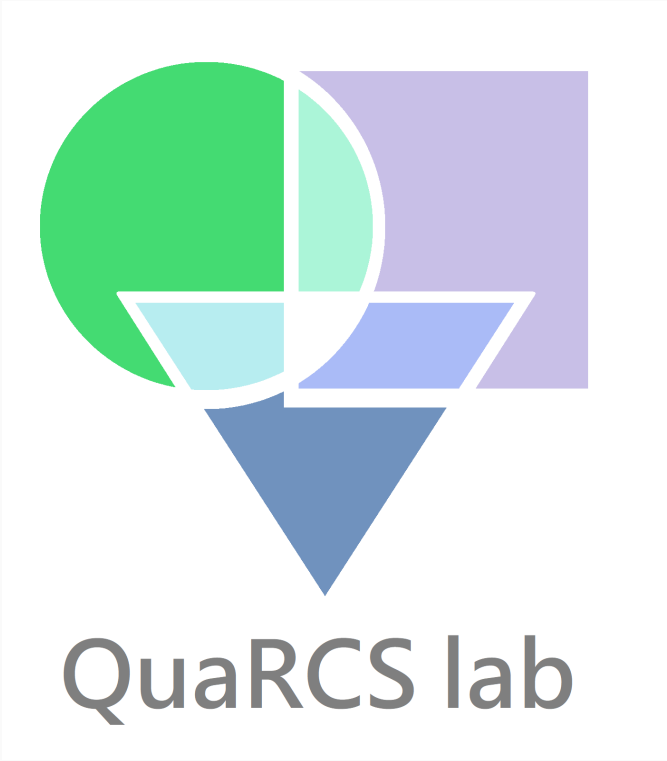
Implications

- To spatially filter regional income is important in order to avoid misleading interpretations.
- Call for better coordination of regional policies at the cluster level.
- Enhance inter-regional connectivity and cooperation.
- Geography matters! breaking spatial barriers and the infrastructure and capabilities required for it must be on top of the policy agenda.

Thanks!

Thank you very much for your attention

QuaRCS lab website https://quarcs-lab.rbind.io/



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