Benchmark the Trends of Spatial Inequality in Megaregions and Explore the Role of High-Speed Rail

1. BACKGROUND
Spatial Inequality denotes the unequal distribution of resources and opportunities (jobs, education, and health services, etc.) over an area of natural and built environment. Among many strategies taken to reduce SI, investing in major transportation infrastructure has been a common one (Kanbur and Venables, 2005).

Parallel to the growing interest in reducing SI, there are worldwide attention to the phenomenon of megaregions. This paper benchmarks the SI at megaregion level based on the existing data and literatures.

2. RESEARCH QUESTIONS
1) The study aims to benchmark the SI condition and trend of megaregions in multiple continents (38 megaregion comparison)
   a) SI measurement based on economic activities
   b) Inter-megaregion and intra-continent comparison
2) The study explores the effects (revealed or potential) of major transportation investments in reshaping SI of megaregions (3 case study)
   a) How High-Speed Rail (built or proposed) affects inequality of accessibility

3. LITERATURE REVIEW
1) Theoretical concepts
   Inverted-U shaped pattern (Kuznets, 1955; Williamson, 1965)
   Economic convergence (Rey and Montouri, 1998; 2010; Laslinsi, 2019)
2) Discussions (Kim, 2008; Wei, 2017)
   Positive and negative effects of SI (Kim, 2008; Wei, 2017)
   Spatial autocorrelation of inequality
3) Empirical studies
   US income inequality since 1950s (Wei, 1999)
   China income inequality since 1950s (Fan and Casetti, 1994)

ACHIEVEMENTS
1. Summary of Spatial Inequality Trends in 38 Megaregions
   **Spatial Comparison:** Chinese megaregions show the highest SI among the three continents. Notable, in 2016, the average Gini coefficient of the 19 megaregions’ coefficients was reportedly 0.246. In the United States, the 11 megaregion average reported a Gini index value of 0.106. the average Gini for EU’s fell in between at value of 0.108.
   
   **Temporal Comparison:** In China, 14 of 19 city-clusters experienced a decline in income inequality from 2006 to 2016. The three-year data from 2013 to 2016 showed all but one mega-city regions in Europe showed improvement in income SI. In the United States, the picture shows a trend opposite to those in China and Europe: eight of the 11 megaregions saw rising income inequality from 2010 to 2016.

2. Summary of Accessibility Inequality Affected by HSR
   **What matters in the change of accessibility inequality?**
   **Existing mobility conditions:**
   - In European countries with long history of rail-based mobility services, the rail upgrade offers an incremental improvement commensurate to magnitude of accessibility inequality
   - In the US where personal mobility is high based on car ownership, HSR offers mobility improvement to particular market segments
   - In China where personal mobility has been relatively low, HSR led to a major mobility elevation while shrunken the inequality gap
   **Scale of rail network extension:**
   - Polarization and corridor concentration dominate when HSR services occur in a few number of cities and regional corridors.
   - As multiple corridors form a network, HSR’s role to reduce spatial inequality will expand.

3. Conclusions
   Megaregions offer a new spatial approach to address inequality issues. Megaregions across jurisdictional, or multi-national boundaries in the European case. A megaregional approach to SI helps uncover the disparity between fast growing, affluent core cities, and the by passed, underperforming communities in the region.

   HSR elevates mobility by reducing travel times. Yet its role in reducing spatial inequality is contingent on the geographic coverage of HSR network, the pre-existing level of mobility of the served region, and the integration with other transportation systems to reach non-HSR locations.

RESEARCH AGENDA

1. List of references
   2. Empirical study
   3. Access to accessibility
   4. How to access
   5. Texas
   6. Central of Dian
   7. MCRs

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