

A Spatial Decomposition of Income Inequality in Chile

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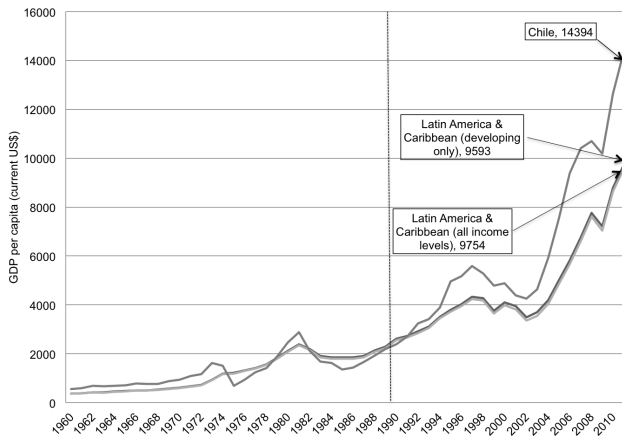
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- Between 1985 and 1997, the per capita GDP of Chile grew at 7.1% per year (De Gregorio, 2005).
- The per capita GDP grew at 4.1% between 1991 and 2005. (Schmidt-Hebbel, 2006).
- May 2010 Chile became the first South American country to join the OECD.
- From 2006, Chile has been the country with the highest nominal GDP per capita in Latin America.

GDP per capita

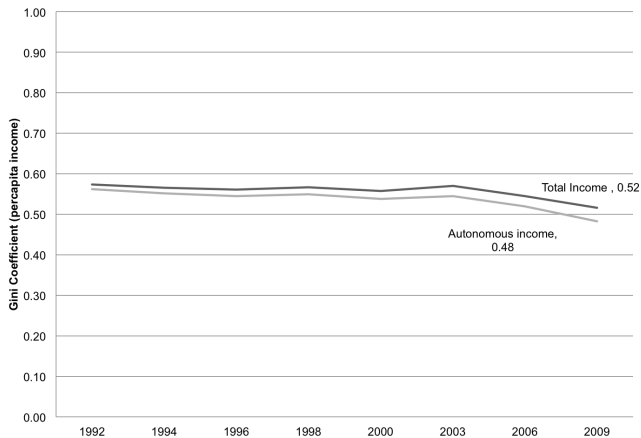


Source: World Bank Indicators.

Income Inequality

- The recent OECD report estimates a Gini coefficient of 0.5 for Chile, the highest level among the countries included and much higher than the OECD average (0.31).
- This coefficient was persistently high between 1987 (0.58) and 2006 (0.55) (Solimano and Torche, 2008).
- The richest 20% of the population is 17:1 the average income of the poorest 20%, compared with 9:1 in the United States and 10:1 in Peru (PNUD, 1995).

Gini Coefficient



Sources: Author's calculation based on Chilean Social-Economic Characterization CASEN.

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Previous literature identifies the high and persistent income inequality of Chile, but it still ignores other dimensions associated with the inequality. In particular, the current literature does not connect the income inequality among individuals with the income inequality among spatial units. Accordingly, the income inequality among individuals is, thus far, assumed to be an isolated process disconnected from the spatial location.

Objective

This research line pursues to estimate the spatial income inequality in Chile at different spatial scales. If this magnitude is considered statistically significant, then some potential causes must be tested to identify the potential causal mechanism behind these disparities.

Research Questions

- Q1: How important is the spatial income inequality in Chile?
- Q2: What are the main causes?
- Q3: What is the role of the market working?
- Q4: What is the role of the public policy?

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Measuring spatial income inequality

- Standard inequality index, namely Theil Index, Gini Coefficient, 90-10 ratios.
- Three Stage Theil Decomposition
- Multilevel decomposition

Standard inequality index

- Single parameter entropy family (Shorrocks 1980, 1984, 1988)

$$E_c(y) = \frac{1}{c(c-1)n} \sum_{i \in N} \left\{ \left(\frac{y_i}{\mu} \right)^c - 1 \right\}, c \neq 0, 1, \quad (1)$$

- Theil coefficient (corresponding to $c = 1$)
- Mean logarithmic deviation (corresponding to $c = 0$)
- Half of the square of the coefficient of variation (corresponding to $c = 2$)

Three Stage Theil Decomposition

- Gustafsson and Shi (2002) and Akita (2003) propose to decompose the Theil Index by groups, where the groups are spatial units, estimating the inequality within counties counties (T_{WG}) and between counties (T_{BC}).
- Two-Stage decomposition does not permit the use of multiple spatial scales such as in the case of Chile (region, provinces and counties).
- The literature also ignores the statistical significance of the spatial decomposition.

Table 5 Classification of countries according to their structure of inequality

Estimates of within-region inequality ($W' = T' - B$)			
	Low $W' < 0.150$	Medium $W' (0.150, 0.300)$	High $W' > 0.300$
Low regional inequality $B < 0.015$	<i>Sweden, Netherlands, Norway, Austria, Denmark</i>	USA, Australia, Japan, Canada, UK, Switzerland, France	Senegal
Medium regional inequality $B (0.015, 0.059)$	<i>Finland, Germany, Spain, Poland, Czech Republic, Belgium</i>	Ireland, Italy, China	Paraguay, Madagascar, Bolivia, Uzbekistan, Russia, Nepal, Egypt, Mexico, Argentina
High regional inequality $B > 0.060$	<i>Hungary, India, Estonia, Kyrgyzstan</i>	Vietnam, Indonesia, Thailand, South Africa	Peru, Chile , Niger, Sri Lanka , Philippines, Brazil , Kazakhstan

Countries within particular categories are sorted in ascending order according to B . Countries in bold are distinguished by very high overall income inequality estimates ($T' > 0.500$), while those in italics by very low overall inequality ($T' < 0.150$)

Three Stage Theil Decomposition

- We develop a Three-Stage Spatial Decomposition (between-counties, between-provinces and between-regions).

$$T = T_{WC} + T_{BC} + T_{BP} + T_{BR} \quad (2)$$

- The method also evaluates the statistical significance of the spatial inequality. For p spatial permutations, the sample moments for the spatial scale k are:

$$\bar{T}_{BK} = \frac{1}{P} \sum_p^P T_{WK}^p \quad (3)$$

$$S_{T_{BK}} = \left[\frac{1}{P} \sum_p^P (T_{WK}^p - \bar{T}_{BK})^2 \right]^{\frac{1}{2}} \quad (4)$$

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- The decomposition is estimated using autonomous income and total income.
- The data source is the National Survey of Social Economic Characterization CASEN.
- The estimations are carried out between 1992 and 2009.
- The spatial test uses 10000 permutations.

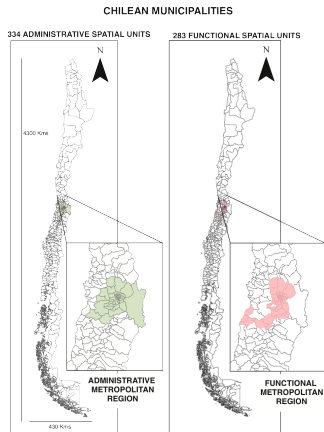
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Table 1: Administrative division

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Spatial Units



Source: Abalos & Paredes (2013, WP).

Figura 6: RUF - Flujos absolutos

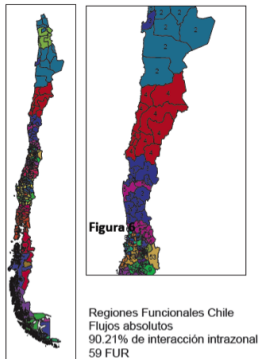
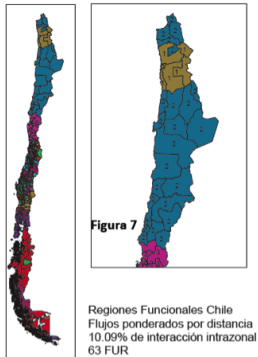
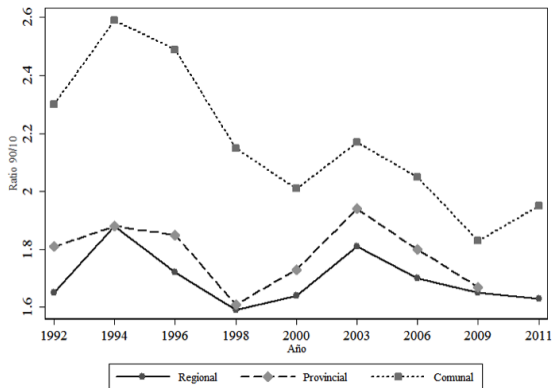


Figura 7: RUF - Flujos ponderados por distancia



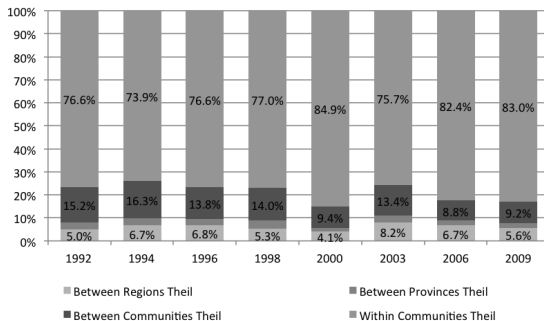
Source: Abalos & Paredes (2013, WP).

Standard inequality index



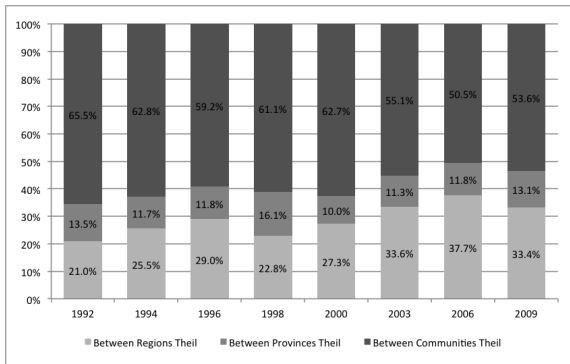
Source: Chacon & Paredes (WP).

Three-Stage Spatial Decomposition



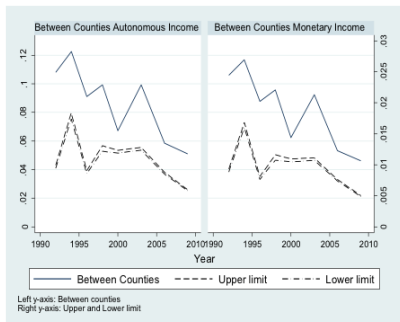
Source: Paredes, Iturra & Lufin, 2012 (WP).

Three-Stage Spatial Decomposition

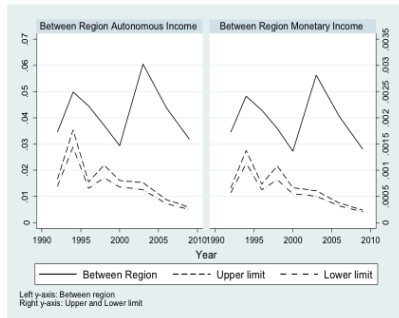


Source: Paredes, Iturra & Lufin, 2012 (WP).

Three-Stage Spatial Decomposition



Source: Paredes, Iturra & Lufin (2012, WP).



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Conclusions and Policy Implications

- Previous literature identifies the high and persistent income inequality of Chile, but the geographic heterogeneity of this inequality is still unexplored.
- This lack of discussion motivates the existence of spatially blind policies that ignore the interaction between individual and spatial inequality.
- Our decomposition indicates that between 1992 and 2009, 21% of the total inequality is attributable to geographical scale. The results show that spatial inequality is a relevant magnitude to be considered by policy makers.

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