Growth with Equity? Pay Inequality in Chile during the Democratic Era (1990-2006)

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Abstract: This paper explores the evolution of pay inequality in Chile between 1990 and 2006, disaggregated by economic sectors, occupational groups and regions. We use the between-groups component of Theil's T Statistic to obtain decompositions along these lines that are not available in previous studies of economic inequality in Chile. Between-sectors pay inequality increased from 1990 to 1996, after which it decreased, returning to 1990 levels by 2006. This rise and fall is explained primarily by changes in the relative position of the financial sector. Pay inequality between occupational groups did not change significantly during the period of study. Finally, inequality decomposed by region varies mainly with the relative position of Santiago, the richest and largest economic region.

I. Introduction to Pay Inequality in Chile

This paper explores the evolution of pay inequality in Chile between 1990 and 2006, disaggregated by economic sectors, occupational groups and regions. We use the the between-groups component of Theil's T Statistic, applied to the CASEN household survey and concentrate here on wages in the primary occupation. Using this data source, the decomposition properties of Theil's T Statistic permit us to extract details not available in previous studies of economic inequality in Chile. The period under study corresponds to the recovery of democratic rule and is characterized by an impressive reduction in poverty. However, inequality levels have remained high.

Previous studies of income inequality in Chile have generally found that inequality is high and stable. Torche and Solimano (2007) argue that income inequality underwent a small reduction in the period 1987 to 2003, presenting as evidence that the Gini coefficient fell from 0.577 in 1987 to 0.567 in 2003. At the same time, Agostini and Brown (2007) demonstrated that there was a smaller reduction in inequality over the same period, computing a Gini coeffient of 0.547 for 1987 and 0.546 for 2003. However, in 2006 Larrañaga and Valenzuela concluded that the Gini coefficient did not undergo any change during the democratic period; the coefficient was 0.56 in 1990 and 0.56 in 2003. On the other hand, international institutions have reported that income inequality increased in the same period. The World Bank calculated that the Gini coefficient for Chile in 1990 was 0.547 and in 2000 was 0.561. Finally, the United Nation's Human Development Report (2006) calculated that the Gini coefficient for Chile in the 2004 was 0.571, the highest Gini index reported for Chile thus far.

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While previous studies tend to agree that the level of income inequality in Chile is one of the highest in Latin America and around the world it appears that these high levels are linked to very high incomes in the top decile. The Chilean pattern may be described as "concentration at the top" (Torche, F., 2005)[1]. Chile's richest segment of the population receives a very large portion of the national income, while income differences between the middle class and the poor are less pronounced. The wealthiest decile in Chile receives 42.3 percent of total national income (MIDEPLAN, 2001), meaning that Chile is an extreme case of income inequality – in both Latin America and the world. In fact, Chile's inequality levels are twice those of most industrialized countries and 1.5 times larger than that of the United States (Torche F., 2005).

As Szekely and Hilbert (1999) point out in Torche's article (2005):

> The ratio between the wealthiest and the second wealthiest decile is *twice* as large in Chile as in the United States and England, and one of the largest in Latin America, depicting high elite concentration. In contrast, the ratio between the second poorest and the poorest deciles in Chile is *half* that of the United States and England, indicating that inequality at the bottom of the income distribution is much lower in Chile than in these industrialized nations (Cited in Torche 2005, p. 428).

While previous studies have generally focused on income inequality, attention in this paper is focused on *pa*y inequality. Trends in pay inequality can be expected to resemble trends in income inequality, since wages are the main component of income.

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[1]This argument can also be found in (Contreras, D., 1999), (CEPAL, 2004), (Torche, A and Solimano, 2007).

However, a focus on pay places the emphasis on jobs rather than on households, and this allows us to track the relative performance of various economic sectors, occupational groups, and regions, as well as to draw inferences on how these economic structures shape trends in pay inequality (and by extension, to a degree, those of income inequality as well).

This paper is organized into four sections. Section II presents the methods and sources used to measure pay inequality. Section III provides a brief description of the Chilean economic context during the neoliberal period. Section IV presents the evolution of pay inequality in Chile based on our findings. Finally, section V draws some preliminary conclusions based on the study.

II. Methods of Computing Pay Inequality and Sources of Data

In order to analyze the evolution of pay inequality in the Chilean case we used the between-group component of Theil's T Statistic to compute the general trend in pay inequality as well as the contribution to inequality of each economic sector, occupational group, and region.

Theil's T Statistic for the population (T) is made up of two components, a between-group component (T^B) and a within-group component (T^W).

$$T = T^B + T^W$$

The between group element of Theil's T Statistic can be written as follows,

$$T^B = \sum_{i=1}^{m} \left(\frac{Y_i}{Y} \right) \log \frac{\left(\frac{Y_i}{Y} \right)}{\left(\frac{P_i}{P} \right)}$$

The between-group component can be used to generate a lower-bound of overall pay inequality (Theil, 1972). In addition, the measure is constructed in a way that enables the researcher to understand the relative performance of the various groups, and how this translates into rising or falling inequality. For example, consider two economic sectors: one with an income above the mean income $(Y_i > \bar{Y})$ and one with an income below the mean income $(Y_i < \bar{Y})$. The contribution of the former to the Theil's T Statistic is positive, while the contribution of the latter is negative. In addition, one can see that a decline in inequality, measured by Theil's T Statistic, can be caused either by negative contributors improving themselves relative to the mean, or by positive contributors falling back to the mean; in general, both will happen to some degree at the same time.

Data from this study used to construct Table 1 comes from a nationally representative household survey, namely, CASEN *(Caracterizacion Socioeconomica Nacional, National Socio-economic Characterization Survey).* CASEN is the most commonly used data source for studying economic trends in Chile. Data are available every two years from 1990 to 2000 and proceeding then with 2003 and 2006. Data are disaggregated by economic sector, occupational group and region. Our measures of pay inequality were computed using the following two variables:

- *Main Occupation Earnings*: earnings generated from the main occupation. This variable does not include income generated from sources such as rent, a second occupation, pensions, subsidies, etc.

- *Employment*: the number of people who receive monetary income by their labor.

We obtained information for these variables by sector of economic activity, occupational group and geographic region. Table 1 details the categories considered in each case.

Table 1: Data disaggregated by economic sector, occupational group and region

Sector of Economic Activity	Occupational Group	Geographic Region
Agriculture, hunting fishing and forestry	Armed Forces	Tarapaca Region (I)
Mining and quarrying	Legislators, senior officials and managers	Antofagasta Region (II)
Manufacturing	Professionals,	Atacama Region (III)
Electricity, gas and water supply	Technicians and associate professionals	Coquimbo Region (IV)
Construction	Clerks	Valparaíso Region (V)
Wholesale and retail trade, hotels and restaurants	Service workers and shop and market sales workers	O'Higgins Region (VI)
Transport, storage and communications	Skilled agricultural and skilled workers	Maule Region (VII)
Financial intermediation, real estate, renting and business activities	Craft and related trades workers	Bio – Bio Region (VIII)
Community, social and personal service activities	Plant and machine operators and assemblers	Araucania Region (IX)
	Elementary occupations	Los Lagos Region (X)
		Aysen Region (XI)
		Magallanes Region (XII)
		Metropolitan Region (Santiago)

Source: CASEN

## III. Chilean Economic Context during Neo-liberalism

Chile initiated its structural adjustment in the early 1980s. Through a series of neo-liberal economic and social policies, the import substitution industrialization (ISI) economic model was replaced by an open economic model. The new model has at its core exports and the actions of the private sector, and was created with the objective of inserting the country into the increasingly competitive international markets. The change in economic models was mainly due to the collapse of the previous model following the coup in 1973 and the unfavorable international environment at the end of the 1970s and the early 1980s (Fontaine, 1993). Several economic indicators foretold of the eventual collapse. For instance, in 1973, both wages and the GDP were below their 1970 levels; the inflation rate was over 300 percent; the public deficit was more than 20 percent of the GDP; and the black-market exchange rate was ten times higher than the official rate (Salinas, 2006). In 1975, the military government that overthrew Allende initiated neoliberal reforms which included: the introduction of new labor legislation, the transformation of social security, the decentralization of education, the privatization of health care, the adoption of an export-oriented agriculture sector, the transformation of the judiciary, and the decentralization and regionalization of government administration (Silva, 1991).

In the 1990s, democratic governments faced the task of consolidating and extending the export model, which had helped to generate an average GDP growth of 6 percent per year in the second half of the 1980s. Motivated by the success of this export model former Chilean presidents Patricio Aylwin (1990-1994) and Frei Ruiz-Tagle

(1994-2000) decided to deepen and improve the export-driven development strategy. From their point of view, the market for raw materials had less capacity for expansion than the market for industrial products, especially technology. Furthermore, the raw materials market was subject to dramatic variations related to the business cycle. Therefore, they advocated for a sustained effort to achieve higher value-added Chilean exports and thereby, reach a second phase of export development (Weyland, 1999).

To begin, the Aylwin government (1990-1994) further liberalized trade by lowering import tariffs from a uniform 15 percent to 11 percent in June 1991. By decreasing the cost of importing capital goods and other production inputs, the tariff reduction made Chile's exports more competitive (Marfin Lewis, 1998). Continuing with, Frei's government efforts were focused on cutting import duties further, but their insistence on compensating the resulting revenue loss with tax increases created a stumbling block. However, in 1998 a bill was passed lowering tariffs from 11 to 6 percent over five years and raising consumption taxes to cover part of the fiscal loss (Weyland, 1999). Figure 1 presents the trajectory of economic growth in Chile following the military coup, including the crisis of 1982.

Figure 1.- GDP's Growth Rate, 1975 to 2006.
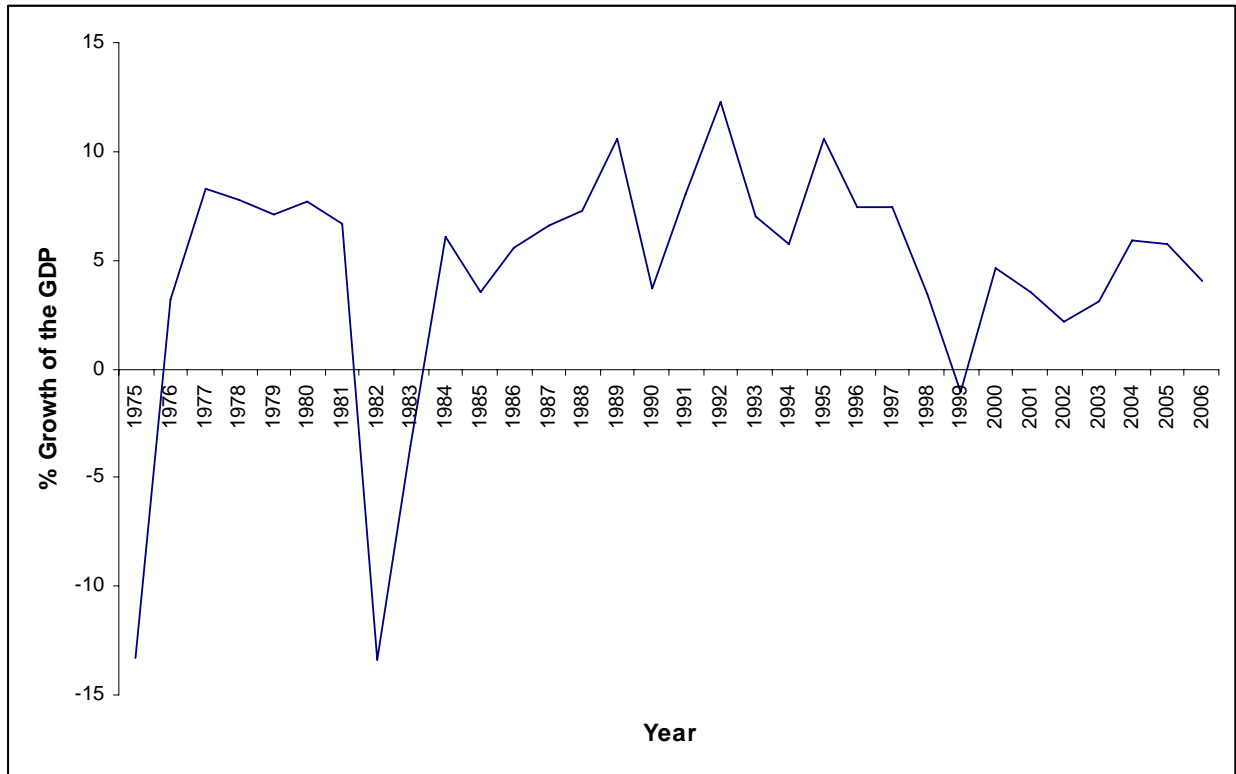
Source: Larrain and Vergara (2001), and Central Bank of Chile.

IV. Pay Inequality in Chile

Our investigation of pay inequality will reveal that, contrary to the general findings of stability in such studies as Larrañaga (2006), Agostini and Brown (2007), Torche, A. and Solimano (2007), the relative positions of sectors, occupations, and regions varied noticeably over the 1990-2006 period, and so did measures of overall inequality taken between these group structures.

The diverse contributions of the economic sectors, occupational groups and regions to pay inequality can be observed through the Theil components. For each category (sector/occupational group/region), we compute contributions to inequality by subgroup using the between-group component of Theil's T Statistic. Results of this

analysis are portrayed in a stacked bar graph, in which those sub-groups with average wages higher than the national average appear above the zero line. Conversely, those with wages below the national average appear below the zero line.

Pay Inequality by Economic Sector

As shown in Figure 2, overall pay inequality among economic sectors in Chile increased from 1990 through 1996, after which pay inequality decreased, returning in 2006 to about the same level as observed in 1990. Why, though, did inequality initially increase and then fall back? Figure 2 shows that, across the period, changes in overall pay inequality from year to year are closely associated with changes in relative wages in the financial sector. Because the financial sector is a high-wage sector (wages are higher than the national average), when relative wages in this sector increase, inequality increases. On average, between 1990 and 1996 we observe increasing relative wages in the financial sector; from 1996 to 2006, relative wages in the financial sector decrease, bringing overall pay inequality back down.

Figure 2. Pay Inequality by Economic Sectors
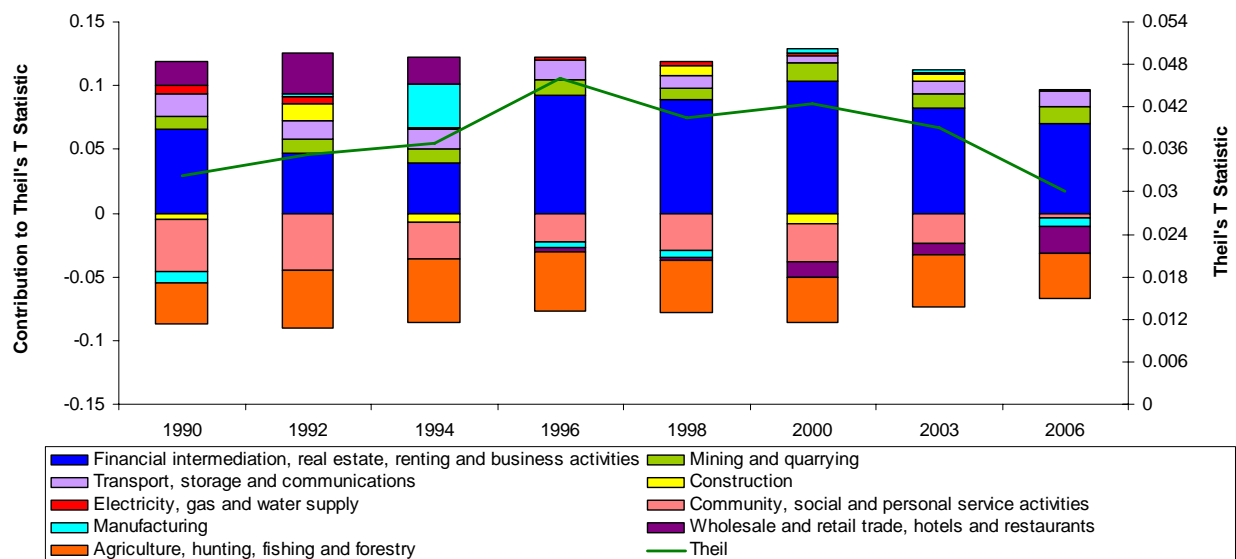
Other high wage groups during the period of study include Mining and Quarrying; Electricity, Gas and Water supply as well as Transportation, Storage and Communication. As can be seen in Figure 2, each of them shows a stable positive contribution to pay inequality since 1990.

On the other hand, the sectors with average wages below the average wage of the economy for the duration of the period were Agriculture, Hunting, Fishing, and Forestry and, Community, Social, and Personal Services.

The Construction sector, Manufacturing sector, and Wholesale and Retail Trade sectors saw their relative wages fluctuate about the mean. These fluctuations may be influenced more by the relative changes in the financial sector than by fundamental changes in the year to year wages earned in those sectors.

**Pay Inequality by Occupational Groups**

Figure 3 shows the evolution of pay inequality among, and the contribution to pay inequality of occupational groups from 1992 to 2006.[2] Here, the overall trend is very stable; it is worth noting that occupational group will tend to be distributed more or less evenly across sectors (though not necessarily across regions). Only from 2003 to 2006 is there a noticeable decrease associated with a decline in the relative wages of Legislators, Senior Officials and Managers. Three groups, all of which represent the more educated sectors of the population and whose members are concentrated in the Metropolitan

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[2] Results for 1990 are omitted because the CASEN survey used a different categorization scheme for defining occupational groups.

Region of Santiago, can be clearly identified as "high wage groups": (1) Professionals, (2) Legislators, Senior Officials and Managers, (3) Technicians and Associate Professionals. All other groups have average wages below the national average.

Figure 3. Pay Inequality by Occupational Groups
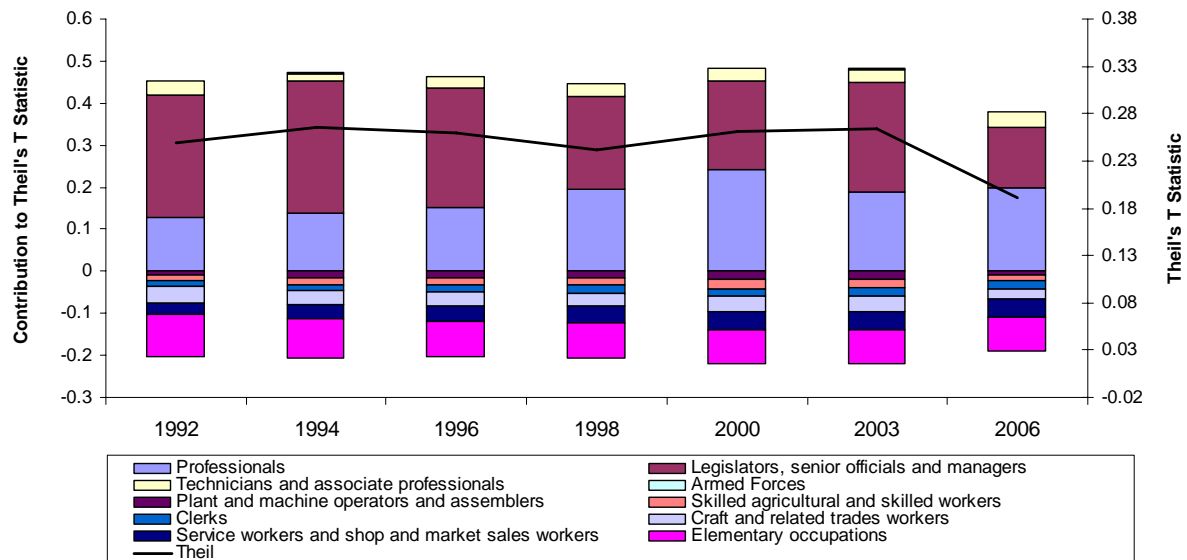
Source: Authors' calculation based on CASEN survey

Pay Inequality by Region

Inequality between regions during the study period is dominated by the difference between the Metropolitan Region (Santiago) and the remaining regions. The Metropolitan Region is comprised of one third of Chile's population, and is the country's economic, financial, and political capitol. The combination of high wages and a significant share of the economy's total employment in Santiago forces most other regions to fall into the low wage category; average wages in almost every region aside from Santiago are below the national average. Figure 4 shows us the evolution of pay inequality among, and the contributions of regions between 1990 and 2006. There is a

sharp rise in the early 1990s, followed by a general decline until 2000; these changes closely reflect the varying position of Santiago.
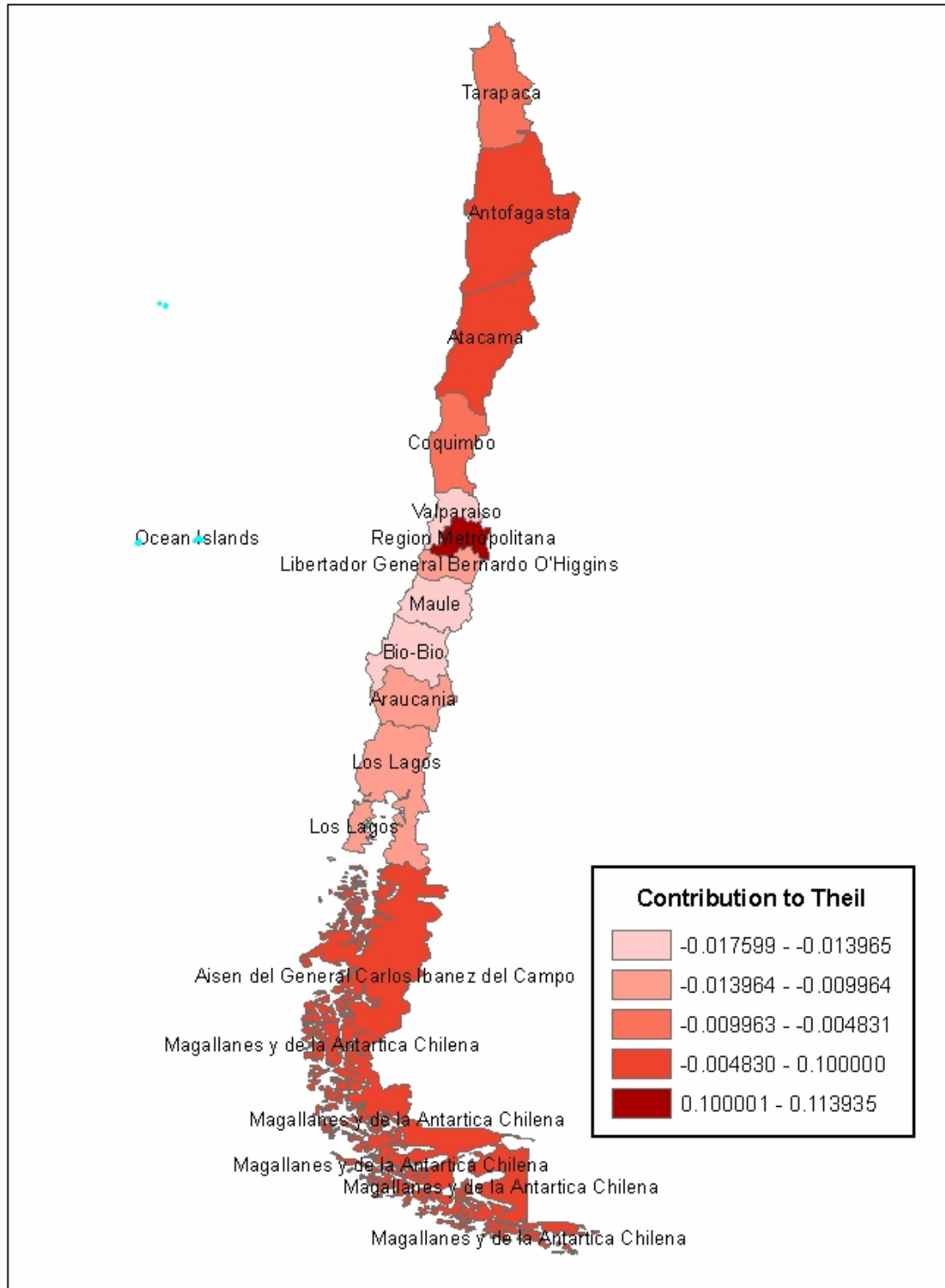
Figure 4. Pay Inequality by Regions
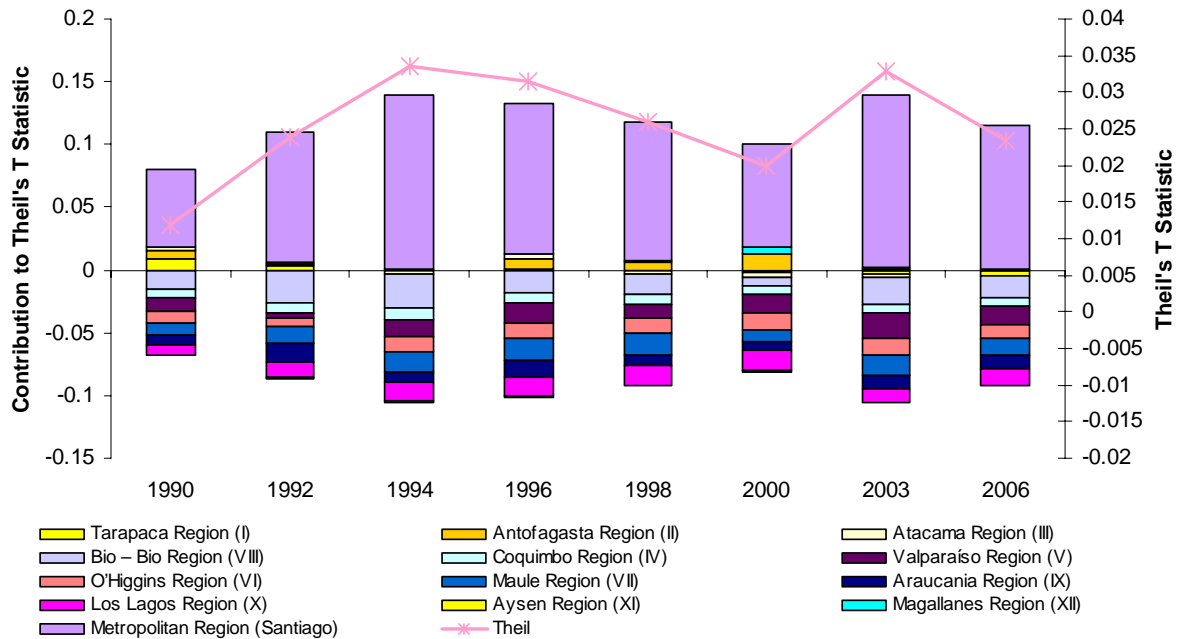
Source: Authors' calculation based on CASEN survey.

Aside from Santiago, the regions whose economies are constructed around the mining or fishing industries enjoyed high wages relative to the remaining regions during the period of study. For instance, the Tarapaca (I), Antofagasta (II), Atacama (III), Aysen (XI) and Magallanes (XII) Regions had higher wages than the national average in some years. As can be seen in the map below, these regions are located in the north and south part of the country.

Theil by Region, 2006

Map legend — Contribution to Theil:

- -0.017599 – -0.013965
- -0.013964 – -0.009964
- -0.009963 – -0.004831
- -0.004830 – 0.100000
- 0.100001 – 0.113935

Region labels: Tarapaca, Antofagasta, Atacama, Coquimbo, Valparaiso, Region Metropolitana, Libertador General Bernardo O'Higgins, Maule, Bio-Bio, Araucania, Los Lagos, Los Lagos, Ocean Islands, Aisen del General Carlos Ibanez del Campo, Magallanes y de la Antartica Chilena, Magallanes y de la Antartica Chilena, Magallanes y de la Antartica Chilena, Magallanes y de la Antartica Chilena, Magallanes y de la Antartica Chilena

The high-wage regions are those regions in which Chile's high-wage economic sectors (Financial Services and Mining) play a significant role in the regional economy. Conversely, the economies of the low-wage regions are predominately concentrated in Agriculture, Commerce, Manufacturing and Construction sector. These sectors have an average income below that of the national average.

V. Conclusion

In general, contrary to the broad findings of studies that amalgamate income by households, we find distinct trends and patterns of variation in pay inequality in Chile over the period from 1990 to 2006. Between economic sectors, pay inequality increases from 1990 to 1996, but returned to 1990 levels by 2006. This fluctuation in pay inequality is explained primarily by changes in the relative position of the financial sector. Pay inequality between occupational groups, however, does appear to have been relatively stable. And at the regional level, significant variations are associated with the changing relative position of the capital region. We conclude that measures of overall household income inequality are not sufficiently detailed and sensitive, to reveal important patterns of changing distribution that clearly reflect significant developments in the evolution of the Chilean economy.

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