

# **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, using the between groups component of Theil's T Statistic, providing us with information that is not available in previous studies of economic inequality in Chile.

In general, the trends in pay inequality observed in this study, whether between sectors, regions, or occupational groups, were high and relatively stable, in keeping with the results observed by other authors.

Between economic sectors pay inequality increases from 1990 to 1996, after which it decreases, 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. Those groups with wages above the national average remained high-wage, while low-wage groups remained low wage. Finally, at the regional level, the regions with the highest wages are Santiago and those regions with significant mining activity.

## **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, using the between groups component of Theil's T Statistic, providing us with information that is not available in previous studies of economic inequality in Chile. This period corresponds to the recovery of democratic rule and is characterized by an impressive reduction in poverty. However, inequality levels have remained high.

Previous studies in Chile have concentrated on income inequality, using the Gini coefficient. Findings indicate inequality is high and stable. Torche A. 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 coefficient 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 calculates 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) points out that the Gini Coefficient for Chile in the 2004 was 0.571, which represents the highest Gini index reported for Chile so far.

While it is unclear whether inequality has increased or decreased since 1990 in Chile, if we analyze the literature on income inequality in Chile, it is possible to

characterize Chilean inequality as follows: the level of income inequality in Chile is one of the highest in Latin America and around the world. (Contreras, D. 1999) (MIDEPLAN 2000) (CEPAL 2004) (The World Bank 2004), (United Nations 2006). However, it is argued that the high levels of income inequality are linked to very high incomes in the top decile (CEPAL 2004), (Torche, F. 2004), (Contreras, D. 1999), (Torche, A and Solimano 2007). The Chilean pattern may be described as “concentration at the top”. Chile is highly unequal because the 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. Thus, Chile’s inequality levels are twice those of most industrialized countries and 1.5 times larger than that of the United States (Torche F. 2004). The wealthiest decile in Chile receive 42.3 percent of total national income (MIDEPLAN, 2001), meaning that Chile is an extreme case – in both Latin America and the world – of high concentration at the top. As Szekely and Hilbert (1999) point out:

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 2004, p. 428).

While previous studies have generally focused on income inequality, the attention in this paper is focused specifically on pay inequality. Trends in pay inequality can be expected to closely resemble trends in income inequality, since wages are the main component of income. In addition, our approach allows us to demonstrate the relative

performance of the various economic sectors, occupational groups and regions, and to draw inferences as to how these relative performances shape the trends in pay inequality.

This paper is organized in four sections. Section II presents the methods and sources used to measure pay inequality. Section III gives 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 of the study.

## II. Methods of Computing Pay Inequality and Sources of Data

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

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 can be written as follows,

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

This between-group component can be used to generate a lower-bound of overall pay inequality because any inequality within groups would generally result in an increase in the measure of overall inequality, and some of that will be observed in increasing differentials between groups. In addition, the measure is constructed in a way that

enables the researcher to understand the relative performance of the various sectors or 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 (because the log function turns values less than 1 into negative numbers). In this way, sectors with above average income are positive contributors to the Theil’s T Statistic, while sectors with below average income are negative contributors to the Theil’s T Statistic. 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 comes from a nationally representative household survey, namely, CASEN (*Caracterización Socioeconómica Nacional, National Socio-economic Characterization Survey*). CASEN is the most commonly used data source for studying economic trends in Chile. Data are available for 1990, 1992, 1994, 1996, 1998, 2000, 2003 and 2006. Data are disaggregated by economic sector, occupational group and region.

Our measures of pay inequality were computed using the following 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 '80s. 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 economic model has its core in exports and the action of the private sector, and was created with the objective of inserting the country into the increasingly competitive international markets.

The change of economic models was due mainly to the collapse of the previous model in the middle of the '70s and the unfavorable international environment at the end of the '70s and the early '80s (Fontaine, 1993). The collapse of the model exemplifies in several indicators. 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 replaced Allende initiated a neoliberal reform, including **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).**

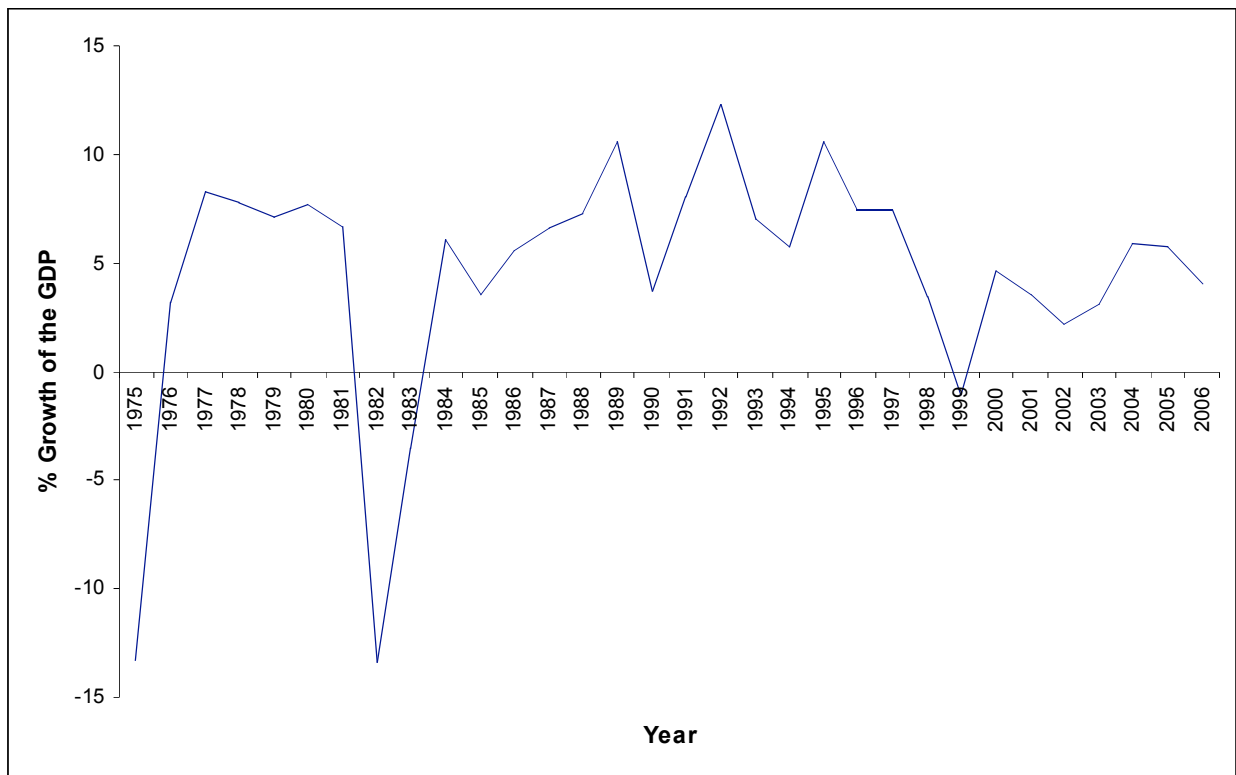
In the 1990s, democratic governments faced the task of consolidating and extending the export model, which had helped to generate an average GDP growth of 6 percent per year in the second half of the 1980s. Thus, the former presidents of Chile Patricio Aylwin (1990-1994) and Frei Ruiz-Tagle (1994-2000) decided to deepen and improve the export-driven development strategy. In their point of view, the market for raw materials had less capacity for expansion than the market for industrial products, especially technology. Furthermore, the market for raw materials was subject to dramatic variations related to the business cycle. Therefore, they advocated a sustained effort to achieve higher value-added in Chilean exports and thereby reach a second phase of export development (Weyland, 1999).

First, the Aylwin government 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). Second, Frei's government tried to cut import duties further, but its insistence on compensating the resulting revenue loss through 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).

In terms of economic growth, the neoliberal reforms implemented in Chile were successful, yielding generally positive macroeconomic indicators since the mid '80s, as shown in Figure 1.

Figure 1.- GDP's Growth Rate, 1975 to 2006.



Source: Larrain and Vergara (2001), and Central Bank of Chile.

The economic growth had a high social cost. The democratic governments implemented different social policies to address this issue, increasing social spending significantly in areas such as education, health care and housing. In fact, from 1990 to



2003, social spending increased 125 percent, an annual rate of increase of 6.45 percent (Ministerio de Hacienda, 2004). This increase in social spending allowed for a wide variety of active developmental policies, such as public health, comprehensive educational reform, training programs for workers, and subsidies to poor households (Weyland, 1999).

#### **IV. Pay inequality in Chile**

Even if we agree with Larrañaga (2006), Agostini and Brown (2007), Torche A and Solimano (2007) that overall income inequality in Chile is relatively stable through the years 1990 – 2006, this overall stability does not reveal how the relative positions of various sub-groups – e.g. economic sectors, occupational groups, or geographic regions – may have varied under Chile’s democratic governments.

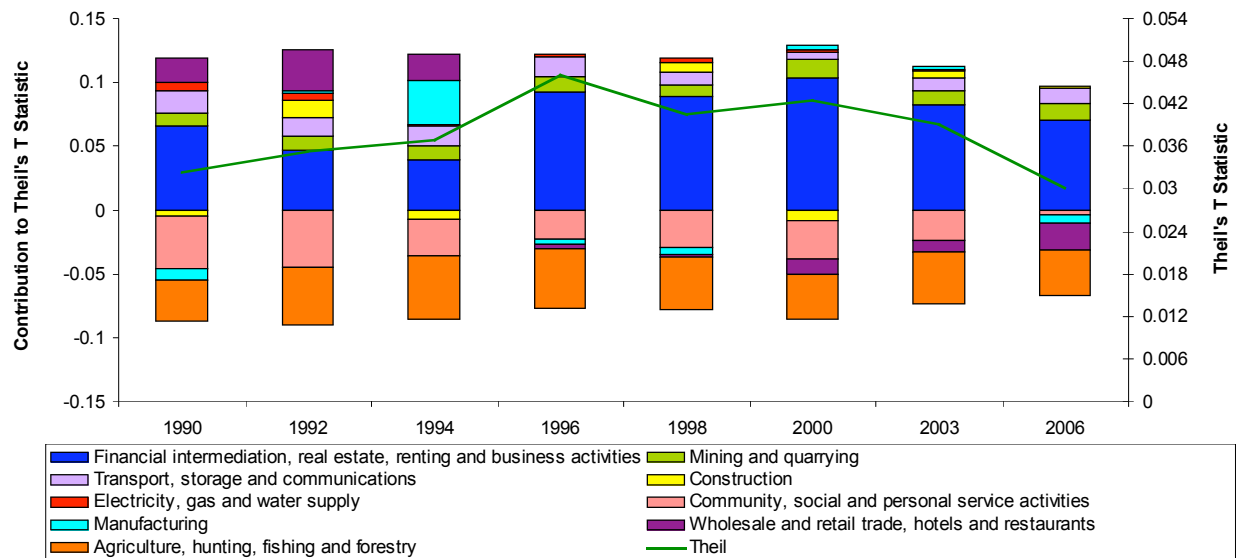
The diverse contributions of the economic sectors, regions and occupational groups to pay inequality can be observed through the Theil components. For each category (sector/region/occupational group), we compute contributions to inequality by subgroup using the between-group component of Theil’s T Statistic. 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: we will refer to these sub-groups as the high-wage sub-groups. Conversely, those with wages below the national average appear below the zero line, and we refer to these sub-groups as the low-wage sub-groups.

##### **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, however, did inequality initially increase and then fall back? We argue that the financial sector plays a defining role in increasing and decreasing inequality during the period of study. 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. 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. 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



Source: Authors' calculation based on CASEN survey

Other high wage groups during the period of study include mining; supply of electricity, gas and water; and, transportation, storage and communication. As can be seen in Figure 2, each of them shows a stable positive contribution to pay inequality since 1990.

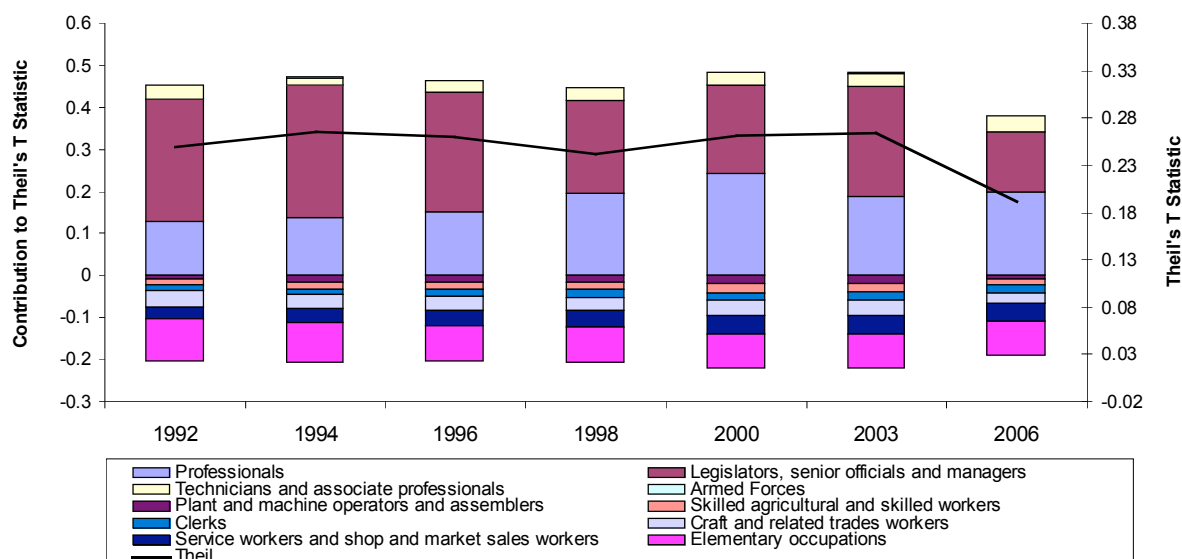
On the other hand, the sectors with average wages below the average wage of the economy for the duration of the period were (1) Agriculture, Hunting, Fishing, and Forestry and (2) Community, Social, and Personal Services.

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 by, occupational groups from 1992 to 2006.<sup>1</sup> The overall trend is very stable; 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 Region of Santiago, can be clearly identified as “high wage”: (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

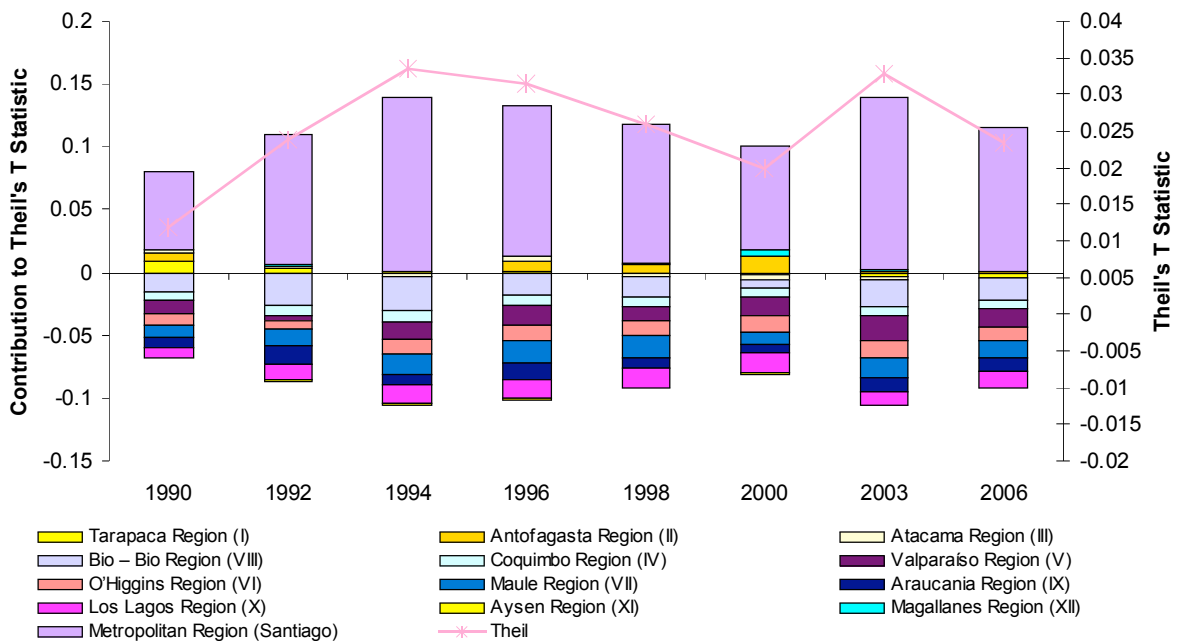


Source: Authors' calculation based on CASEN survey

### 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 concentrates one third of Chile's population, and is the country's economic, financial, and political center. The combination of high wages and a significant share of the economy's total employment in Santiago makes most other regions fall into the low wage category; average wages in almost every region besides Santiago are below the national average. Figure XX shows us the evolution of pay inequality among, and the contributions by, regions between 1990 and 2006. The general trend in pay inequality among regions during the period of study is an increasing one; the changes from year to year are a clear reflection of changes in Santiago's average relative wages.

Figure 4. Pay Inequality by Regions



Source: Authors' calculation based on CASEN survey.

Besides 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. Thus, the Tarapaca (I), Antofagasta (II), Atacama (III), Aysen (XI) and Magallanes (XII) Regions had higher wages than the national average in some years. 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 the national average.

## **V. Conclusion**

In general, the trends in pay inequality observed in this study, whether between sectors, regions, or occupational groups, were high and relatively stable, in keeping with the results observed by other authors.

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. The Mining sector, propelled by the strong demand for copper on the international market, also provided above average wages during the period of study. Other sectors had average wages ranging from slightly above to well below the national average.

Pay inequality between occupational groups did not change significantly during the period of study. Those groups with wages above the national average remained high-wage; low wage groups remained low-wage. The primary distinction between high-wage and low-wage occupations appears to be the levels of formal education.

At the regional level, the regions with the highest wages are Santiago and those regions with significant mining activity. Managers, Professionals and Technicians make up a large portion of their labor force. On the other hand, low-wage regions – particularly those in the southern zone – have economies that depend heavily on agriculture, commerce, manufacturing and the construction sectors, and their labor force consists primarily of the low-wage occupational groups.

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