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When did Chile fall asleep? An  
Assessment of national and regional  
income inequality in Chile,  
1973-1990

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**Abstract**

In the two decades after General Augusto Pinochet seized power in September 1973, the Chilean economy transformed; a series of orthodox and liberal reforms aimed at “liberalisation, stabilisation and privatisation” were lauded as a “miracle.” But while hyperinflation was reduced and GDP per capita growth restored, most economists agree that this came at the cost of a spike in income inequality across the 1970s and 1980s. However, our knowledge of this inequality is limited as most studies implicitly assume a household survey which only covers the capital, Gran Santiago, to be representative of the whole country. This dissertation scrutinises this assumption by using novel social tables and wage estimates to construct a Gini coefficient time series for the 1980s which can be disaggregated by region. First, I demonstrate that developments in Gran Santiago were not representative of the whole country in the 1980s, before presenting a new national labour income inequality series for the period, showing a decline in inequality. While this new series is only a partial measure of inequality, it suggests a more complicated picture than previous studies, and as such demonstrates the need for a reassessment of the relationship between Pinochet’s economic policies and income distributions.

Map 1 – Chile’s 13 Regions<sup>1</sup>



**Source:** Cucaluna, “Mapa de Chile por regiones. Para escolares,” [cucaluna.com](http://www.cucaluna.com/mapa-de-chile-por-regiones-para-escolares/), <http://www.cucaluna.com/mapa-de-chile-por-regiones-para-escolares/>

<sup>1</sup> This map shows Chile’s 13 regions as they were organised in 1976. In this dissertation the Metropolitan Region (*Región Metropolitana*) is referred to as “Gran Santiago” for ease of reference and understanding.

## Introduction

On the 25th October 2019, more than 1 million Chileans took to the streets of the capital, Santiago, to protest the administration of current president, Sebastian Piñera.<sup>2</sup> The demonstration, united under the slogan “Chile has woken up”, gave voice to a broad range of complaints from across the country about pensions, health, education, and employment. But while seemingly diverse in nature, these grievances were underscored by one common theme: inequality.<sup>3</sup>

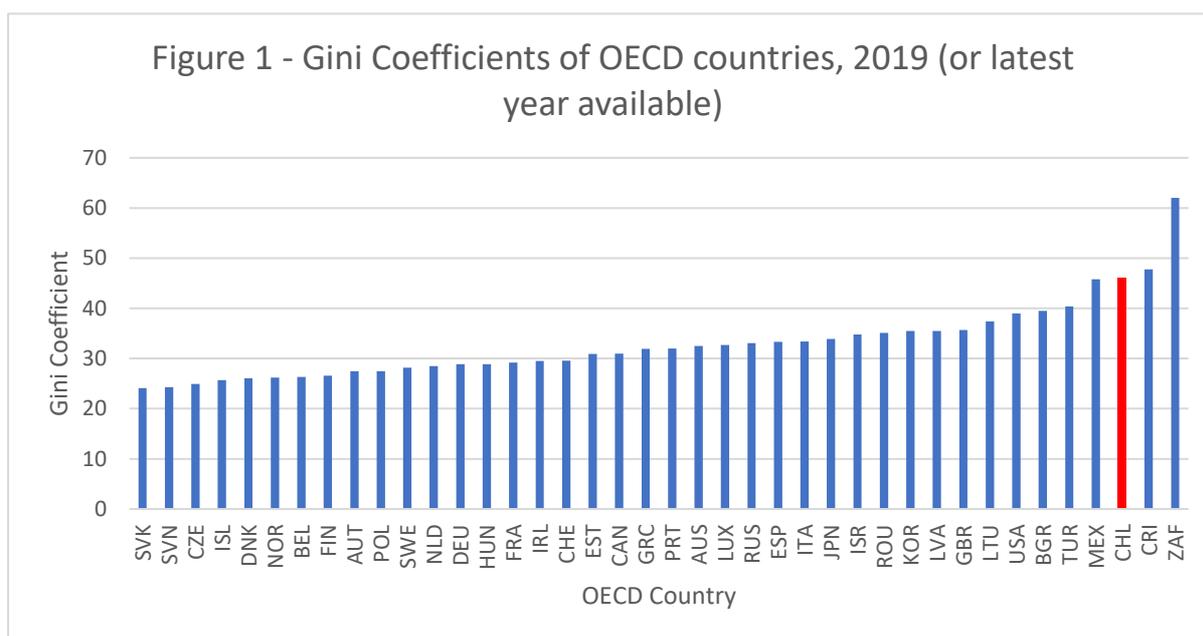
The protestors had good reason to dissent; Chile is one of the most unequal developed countries in the world. Among the Organisation for Economic Cooperation and Development (OECD), a group of 37 high-income nations, Chile’s Gini coefficient ranked third highest, at 46 out of a possible 100 (see figure 1). This income inequality also has a regional aspect, with over 60% of the top 10% of richest households residing in the Metropolitan Region of Gran Santiago, home of Chile’s capital city.<sup>4</sup> When did this high level of inequality arise? Chile may have woken up in 2019, but when did it fall asleep?

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<sup>2</sup> Deutsche Welle, “Santiago protests: 1 million people take part in ‘the biggest march in Chile’,” *DW.com*, 25 October, 2019, <https://p.dw.com/p/3RyQ2>.

<sup>3</sup> Núcleo Milenio en Desarrollo-Social, “octubre 2019,” *Termómetro Social* (October 2019): 6-12.

<sup>4</sup> PNUD, *Desigualdad Regional en Chile: Ingresos, salud y educación en perspectiva territorial*, Programa de las Naciones Unidas para el Desarrollo (2018): 48.



**Source:** OECD, *Income inequality (indicator)*, accessed on 23 March 2020, <https://data.oecd.org/inequality/incomeinequality.htm>.

Journalists and academics alike have converged on one answer to these questions, blaming Chile’s unequal economic development on the liberal and orthodox reforms introduced by Augusto Pinochet, who ruled Chile from 1973-1990. This may seem surprising: Pinochet’s Chile was once held up as a model for developing countries, and had been declared a “miracle” by Milton Friedman in 1982.<sup>5</sup> However, while few challenge the success of Pinochet’s policy of “stabilisation, liberalisation and privatisation” in reducing inflation and increasing GDP growth, many point out that these policies did not lead to proportional increases in real wages, and led to inequalities in access to healthcare and education.<sup>6</sup> Do these

<sup>5</sup> Sebastian Edwards and Daniel Lederman, “The Political Economy of Unilateral Trade Liberalization: The Case of Chile,” *NBER Working Paper Series* 6510 (April 1998): 1; Milton Friedman, “Free Markets and the Generals,” *Newsweek*, 25 January 1982, 59.

<sup>6</sup> See, for example: Jimmy Langman, “From Model to Muddle: Chile’s Sad Slide into Upheaval,” *Foreign Policy*, November 23, 2019, <https://foreignpolicy.com/2019/11/23/chile-upheaval-protests-model-muddle-freemarket/>; Amanda Taub, “Chile Woke Up’: Dictatorship’s Legacy of Inequality Triggers Mass Protests,” *The New York Times*, 3 November, 2019, <https://www.nytimes.com/2019/11/03/world/americas/chile-protests.html>; Richard Davies, “Why is inequality booming in Chile? Blame the Chicago Boys,” *The Guardian*, 13 November 2019, <https://www.theguardian.com/commentisfree/2019/nov/13/why-is-inequality-booming-in-chile-blamethe-chicago-boys>; Kirsten Sehnbruch, “How Pinochet’s economic model led to the current crisis engulfing Chile,” *The Guardian*, 30th October, 2019, <https://www.theguardian.com/world/2019/oct/30/pinocheteconomic-model-current-crisis-chile>.

narratives have firm empirical backing? Does Chilean inequality really have its roots in Pinochet's dictatorship? Many scholars would argue "yes", pointing to the coincidence of Pinochet's ascent to power and a large hike in aggregate income inequality.<sup>7</sup> But the sources used to measure this inequality are unreliable, as they implicitly assume developments in the capital, Gran Santiago, to be representative of changes in inequality across the whole country.

This dissertation tests this implicit assumption by using novel social tables and wage data to estimate a Gini coefficient times series for four Chilean regions from 1982-1991. I argue that Gran Santiago was not representative of wider trends in Chilean inequality, and that income inequality across Chile's regions was largely and persistently heterogenous. Given this finding, I present a new tentative estimate of national income inequality in Chile, showing that while total income inequality may have increased in Gran Santiago during the 1980s, total labour income inequality across the whole country decreased. This new national time series is not comprehensive, and requires a large amount of estimation, but illustrates the need for a reassessment of income inequality under Pinochet due to the limitations of the currently used data.

The rest of this dissertation is structured as follows: section 1 surveys the literature on Chilean inequality under Pinochet, explaining the gap that this dissertation aims to fill. Then, sections 2 and 3 present the sources and methodology employed to create a new time series of income inequality for the 1980s, which can be disaggregated by region and sector of employment. Section 4 directly tests the assumption that income inequality in Chile was representative of all Chile and finds that it was not. Section 5 then presents my new national

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<sup>7</sup> Ricardo Ffrench-Davis, *Entre el neoliberalismo y el crecimiento con equidad: tres décadas de política económica en Chile*, (Santiago: CEPAL, 2003): 310; Javier E. Rodríguez-Weber, "The Political Economy of Income Inequality in Chile Since 1850," in *Has Latin American Inequality Changed Direction?* Eds. L. Bértola and J. Williamson, (New York: Springer, 2017): 49; Javier E. Rodríguez-Weber, "La Economía Política de la Desigualdad de Ingreso en Chile, 1850-2009," *Tesis de Doctorado en Historia Económica*, (Montevideo: Universidad de la República, 2014): 336; David E. Hojman, "Poverty and Inequality in Chile: Are Democratic Politics and Neoliberal Economics Good for You?" *Journal of Interamerican Studies and World Affairs* 38, No. 2/3 (1996): 77.

series of regular labour income inequality and makes brief comments on causality and implications for wider research. The paper is concluded in section 6.

## 1. Historical Context and Literature Review

### 1.1 Pinochet and the Chilean “miracle”: an introduction

Before addressing the various sources and methods used to assess inequality under Pinochet, it is important to outline the Chilean economic context of the 1970s and 80s. The traditional economic literature on the Pinochet era characterises the combination of orthodox and neoliberal reform as a success, as measured by consistent growth in GDP per Capita and decreases in inflation.<sup>8</sup> Indeed, Edwards and Lederman go as far as to characterise Chilean growth in the 1970s and 1980s “a model for reforming economies around the world,”<sup>9</sup> with Milton Friedman famously describing Chilean development as an “economic miracle.”<sup>10</sup>

However, the reality of the “miracle” was more complicated: the timing of the miracle, and the policies which caused it are hotly disputed. Typically, economists characterise the reforms of the 1970s and 1980s as an orthodox blend of “stabilisation, liberalisation and privatisation,” all of which are reforms aimed at restoring economic stability and decreasing inflation. Indeed, trade liberalisation, the privatisation of formerly state-run companies, and increasingly competitive markets have all been credited for Chile’s success.<sup>11</sup> However, from the late 1990s,

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<sup>8</sup> Jose De Gregorio, “Economic Growth in Chile: Evidence, Sources and Prospects,” *Banco Central de Chile* (November 2004): 1-55; Vittorio Corbo and Stanley Fischer, “Lessons from the Chilean Stabilisation and Recovery” in *The Chilean economy: policy lessons and challenges* eds. Barry Bosworth, Rudiger Dornbusch and Raúl Labán (Washington, D.C.: Brookings Institution: 1994). Due to the COVID-19 crisis, it has not been possible to find the appropriate page for this reference.

<sup>9</sup> Edwards and Lederman, “Unilateral Trade Liberalization,” 1.

<sup>10</sup> Friedman, “Free Markets.”

<sup>11</sup> Sebastian Edwards, ‘Stabilization with Liberalization: An Evaluation of Ten Years of Chile’s Experiment with Free-Market Policies, 1973-1983,’ *Economic Development and Cultural Change* 33, No. 2 (January 1985): 223-254; *Ibid.*; Alejandra Cox-Edwards and Sebastian Edwards, “Trade Liberalization and Unemployment: Policy Issues and Evidence from Chile,” *Cuadernos de Economía* 33, No 99 (August 1996): 227-250; Edwards and Lederman, “Unilateral Trade Liberalization”; Pan A. Yotopoulos, “The (rip) tide of privatisation: Lessons from Chile,” *World Development* 17, No. 5 (1989): 683-702; Oscar Muñoz and Hector Schamis, “Las transformaciones del Estado en Chile y la privatización,” in *¿Adónde va América Latina?* Eds. Joaquín Vial and Eliana A. Cardoso, (Santiago: CIEPLAN, 1992). Due to the COVID-19 crisis, it has not been possible to find the appropriate page range for this reference; Vittorio Corbo, “Stabilisation Policies

economists began to describe these reforms as “neoliberal”, shifting the emphasis from the reduction of inflation to the restoration of market forces.<sup>12</sup> But this is simplistic; whether the reforms are best classified as orthodox or neoliberal, to treat the entire Pinochet period as once policy regime would be a mistake. This is best highlighted by Ffrench-Davis, who splits the Pinochet regime into halves, from 1974-1981, and 1982 to 1991. The first half he argues, was characterised by strict stabilisation policies, trade liberalisation and mixed economic growth, while the latter half was characterised by consistent growth marred by recurrent debt problems.<sup>13</sup> This ties in to the dispute about the timing of the Chilean miracle; Edwards argues that trade liberalisation was a success from as early as 1973, while Bosworth, Dornbusch, and Labán dismiss such “premature claims of success,” arguing instead that the miracle started in earnest from 1983.<sup>14</sup> To address this vagueness surrounding what constituted the Chilean miracle, table 1.1 presents a taxonomy of the Chilean economy under Pinochet, identifying four distinct periods defined by political events, and changes in inflation, GDP per capita, and unemployment.

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in Latin America: The Decade of Reckoning,” in *The Transformation of Latin America: Economic Development in the Early 1990s*, eds. Frederico Foders, Manfred Feldsieper, (Cheltenham: Edward Elgar Publishing Limited, 2000): 11.

<sup>12</sup> Markus J. Kurtz, “Free Markets and Democratic Consolidation in Chile: The National Politics of Rural Transformation,” *Politics & Society* 27 No. 2 (June 1999): 275-301.; Ffrench-Davis, *Neoliberalismo*.

<sup>13</sup> Ffrench-Davis. *Entre el neoliberalismo y el crecimiento con equidad: tres décadas de política económica en Chile*, (Santiago: CEPAL, 2003).

<sup>14</sup> Edwards, “Stabilisation with liberalization”; Barry P. Bosworth, Rudiger Dornbusch and Raúl Labán, “Introduction” in *The Chilean Economy: Policy Lessons and Challenges*, eds. Barry P. Bosworth, Rudiger Dornbusch and Raúl Labán (Washington, D.C.: Brookings Institution, 1994), 1-9.

Table 1.1 A taxonomy of macroeconomic developments in Chile, 1973-1990. All numbers to 2 decimal places

Period	Defining events/features	Mean inflation rate of CPI (%)	Average growth rate of real GDP per capita (%)	Average unemployment rate (%)
1973-1975	Transition to dictatorship	410.76	-3.74	Information not available <sup>15</sup>
1976-1980	Orthodox reforms and stabilisation	82.50	+6.63	-0.58
1981-1983	Financial crash and recession <sup>16</sup>	18.96	-5.31	+1.4
1984-1990	Recovery and stability	21.10	+4.65	-1.03

*Sources:* National Accounts, Chile: Social and Economic Indicators

Firstly, the transition to dictatorship from 1973-5/6 was marked by high inflation inherited from the regime of Allende and negative economic growth.<sup>17</sup> Following this, the orthodox shock policies of 1975 led to a concurrent decrease in inflation and consistently strong economic growth, though this was marred by fluctuating unemployment. This period was ended by the financial crash of 1981/2, which saw unemployment soar to 19.6%, GDP collapse, and slightly higher, somewhat stagnating inflation.<sup>18</sup> The end of the period, from roughly 1983/4 to 1990 can be understood as a stable period of declining unemployment, strong economic growth and high, but not hyper, inflation. This context is crucial to understanding the results in this dissertation, especially for the discussion of causality in section 5.2.

## 1.2 The historiography of Chilean inequality

This is not the only study of trends in income inequality in Chile under Pinochet. What sources have been used to measure income inequality in this period? And what trends do these sources reveal? This section summarises existing studies of

<sup>15</sup> *Chile: Social and Economic Indicators* only provides figures on the Chilean unemployment rate starting in 1976.

<sup>16</sup> For a detailed account of the Chilean crisis of 1982, see Carlos Diaz-Alejandro, "Goodbye financial repression, hello financial crash," *Journal of Development Economics* 19 (1985): 1-24.

<sup>17</sup> Edwards, "Stabilization with Liberalization," 223-224.

<sup>18</sup> Carlos Diaz-Alejandro, "Goodbye financial repression."

income inequality in Chile, arguing that the main household survey used to capture inequality is not reliable as it is not nationally representative. Then, I demonstrate that the literature on regional inequality in Chile is not sufficiently developed to compensate for this, as it does not cover the period of 1973-1990 well.

The mainstream literature on income inequality can be divided into two schools. The classical school of inequality historians link inequality and industrialisation, with Kuznets' theory that long-run inequality would follow an "inverted U-shape" curve sparking furious debate.<sup>19</sup> This school uses social tables and household surveys to calculate Gini coefficients or extraction ratios over long periods of time, making arguments about the link between development and inequality.<sup>20</sup> In Latin America, these methods have been used to explore when the region's persistently high levels of inequality arose, and when, if at all, they started to decline.<sup>21</sup> However, in more recent years, a second scholarship has emerged. This scholarship, pioneered by Piketty, rejects measures of income focusing on the whole population distribution, instead arguing that inequality is best captured by calculating the income share of society's richest using administrative tax data.<sup>22</sup>

Both school's sources and methods have been employed to assess aggregate income inequality in Chile in the 1970s and 80s. Studies within the classical school all use a household survey conducted by University of Chile called the *Encuesta de Ocupación y Desocupación* (Survey of Employment and Unemployment, or EOD),

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<sup>19</sup> Simon Kuznets, "Economic Growth and Income Inequality," *The American Economic Review* 45, No.1 (March 1995): 4.

<sup>20</sup> See, for example: Peter H. Lindert and Jeffrey G. Williamson, "Growth, equality and history," *Explorations in Economic History* 22, No.4 (1985): 341-377; François Bourguignon and Christian Morrison, "Inequality among World Citizens: 1820-1992," *American Economic Review* 92, No.4 (September 2002): 727-744; Branko Milanovic, Peter H. Lindert and Jeffrey G. Williamson, "Pre-Industrial Inequality," *The Economic Journal* 121 (March 2010): 255-272.

<sup>21</sup> Jeffrey G. Williamson, "Latin American Inequality: Colonial Origins, Commodity Booms or a Missed Twentieth-Century Leveling?" *Journal of Human Development and Capabilities* 16, No.3 (2015): 324-341; Leandro Prados de la Escosura, "Growth, inequality, and poverty in Latin America: historical evidence, controlled conjectures," *Economic History and Institutions Working Paper* 04-41(04) (June 2005): 1-45; Luis Bértola and Jeffrey Williamson, *Has Latin American Inequality Changed Direction?* (New York City: Springer, 2017).

<sup>22</sup> See, for example: Thomas Piketty, *Capital in the Twenty-First Century* (Cambridge: Harvard University Press, 2013); Palma, "Homogenous Middles"; Thomas Piketty and Emmanuel Saez, "Income Inequality in the United States, 1913-1998," *The Quarterly Journal of Economics* 118, No.1 (February 2003): 1-39.

which records the income of 2,330-3,060 households in the Greater Santiago Region every year from June 1957 to the present day.<sup>23</sup> Calculating Gini coefficients from this source, most agree that income inequality increased dramatically from 1973, before decreasing from 1987.<sup>24</sup> Figure 1.1 reconstructs the EOD Gini coefficient time series (as presented by Rodriguez-Weber), and shows that the Gini coefficient in Gran Santiago rose from 45 in 1973 to over 60 in 1987, before then starting to decline.<sup>25</sup> Following a more Pikettian methodology, Palma uses the EOD data differently, calculating the income share of different percentiles of the Chilean wealth distribution, which shows a 50% increase in the income share of the top decile of earners from 1973 to 1987.<sup>26</sup> Flores et al. apply a similar methodology to novel administrative tax data, which also suggests an increase in income inequality in the 1970s and 80s, as measured by the income shared of the top 1%.<sup>27</sup> Both classical and Pikettian studies of Chilean income inequality in the 1970s and 1980s, then, show a large increase in inequality across the period, as measured by both Gini coefficients and the income shares of society's richest.

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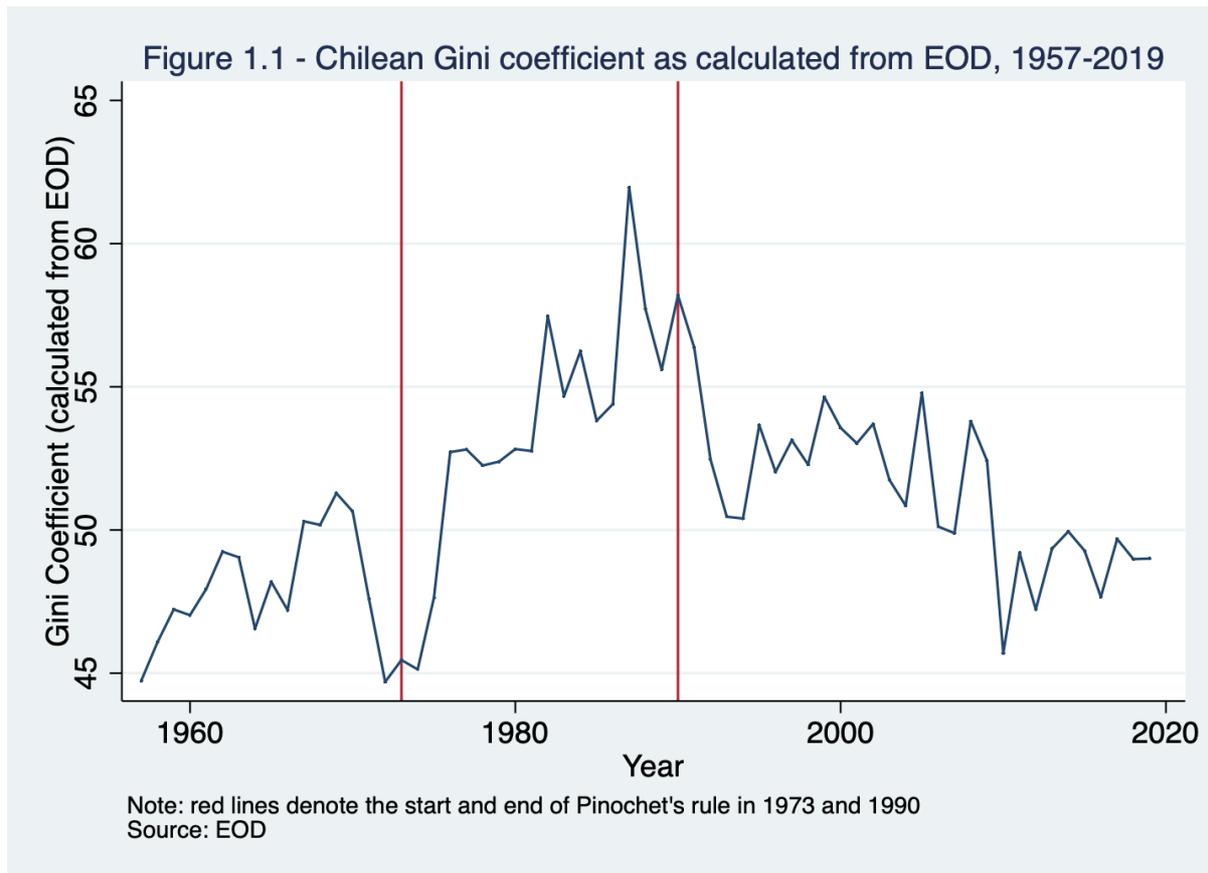
<sup>23</sup> EOD.

<sup>24</sup> This conclusion is reached by: Ffrench-Davis, *Neoliberalismo*, 310; Rodriguez-Weber, "Political Economy," 49; Rodriguez-Weber, "Economía Política," 336; Harald Beyer, "Educación y Desigualdad de Ingresos: Una Nueva Mirada", *Estudios Públicos* 77 (Summer 2000): 114; Dante Contreras, "Distribución del ingreso en Chile. Nueve hechos y algunos mitos," *Perspectivas* 311 (1999): 317; Hojman, "Poverty and Inequality", 75.

<sup>25</sup> Rodriguez-Weber, "Political Economy," 49.

<sup>26</sup> Palma, "Homogenous Middles," 134.

<sup>27</sup> Ignacio Flores, Claudia Sanhueza, Jorge Atria and Ricardo Mayer, "Top incomes in Chile: a historical perspective on income inequality, 1964-2017," *Review of Income and Wealth* (2019): 7.



However, while the inequality literature on the period appears to have reached a consensus, there are many reasons to doubt the sources used to reach these conclusions. The tax data used by Flores et al. is most obviously flawed; the data does not exist for a large part of the 1980s, leaving a gap in our understanding of inequality.<sup>28</sup> But the EOD, used by Palma to calculate income shares, and many others to calculate Gini coefficients, is victim to a more subtle limitation. Although it is rarely explicitly acknowledged, the EOD only includes households in the Metropolitan Region of Gran Santiago, and as is such not nationally representative.<sup>29</sup> French-Davis goes the furthest towards acknowledging this limitation of the EOD, by accepting that the survey only covers “40% of the population of the country.”<sup>30</sup> However, even he argues that the thesis of inequality

<sup>28</sup> Ibid.

<sup>29</sup> EOD.

<sup>30</sup> French-Davis, *Neoliberalismo*, 310.

increasing under Pinochet is “irrefutable.”<sup>31</sup> This is not true. Rodriguez-Weber shows that the EOD suggests different trends in inequality than the nationally representative *Encuesta de Caracterización Socioeconómica Nacional* (National Survey of Socioeconomic Characteristics, or CASEN); the former suggests that inequality increased in the 1990s, while the latter suggests that it decreased.<sup>32</sup> As such, the presumption that Gran Santiago is nationally representative requires further scrutiny before being believed.

How might we test this assumption? Ideally, the secondary literature would give some indication of the existence, or lack thereof, of regional disparities in Chilean development under Pinochet. However, this is sparse, especially in the English language. The only studies of Chilean regional inequality that exist are by international institutions or non-governmental organisations with the aim of understanding modern-day imbalances in levels of GDP per capita across Chile’s 13 regions, *not* the historical origins of inequality.<sup>33</sup> Dealing with a later period, these studies generally show that 1) Chile is a highly unequal country with 2) a high concentration of wealth and income in urban areas, (especially the capital Santiago) that has 3) experienced a gradual decrease in inequality since 1990, particularly after 2000.<sup>34</sup> However, due to a lack of regionalised economic data before 1990, none of these studies mention trends or patterns in Chilean inequality for the Pinochet period of 1973-1990. The only mention of regional imbalances under Pinochet comes from Aroca, who shows that that the

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<sup>31</sup> Ibid., 305.

<sup>32</sup> Rodriguez-Weber, “Economía Política”, 336.

<sup>33</sup> See, for example: PNUD, *Desigualdad Regional*; ; Heinrich von Baer, Ismael Toloza and Felipe Torralbo, *Chile Descentralizado... Desarrollo*, CONAREDE (2013): 1-100; Anthony Bebbington, Javier Escobar, Isidro Soloaga and Andrés Tomaselli, *Poverty, Inequality, and Low Social Mobility: Territorial Traps in Chile, Mexico and Peru*, (Mexico: RIMSIP, 2016); Patricio Aroca, *Desigualdades territoriales en Chile: el Rol del Gobierno y del Mercado*. (Santiago: CEPAL, 2001); Comisión de Desafíos del Futuro Senado de Chile, *Retrato de la Desigualdad en Chile* (Santiago: Chilean Senate, 2018).

<sup>34</sup> Dusan Paredes, Victor Iturra and Marcelo Lufin, “A Spatial Decomposition of Income Inequality in Chile,” *Regional Studies* 50, No.5 (2016): 772; PNUD, *Desigualdad Regional*, 35.; CONAREDE, *Fundamentos y Propuestas para construir una Política de Estado (2014-2030) y un nuevo programa de gobierno (2014-2018) en descentralización y desarrollo territorial* (Santiago: Consejo Nacional para la Regionalización y Descentralización, 2013): 23; Senado de Chile, *Retrato de la Desigualdad*, 33; Dante Contreras, “Distribución del ingreso”, 320; Susana Katherine Chacón Espejo and Dusan Paredes Araya, “Desigualdad Espacial de Ingresos en Chile y su Relación con la concentración de capital humano,” *El Trimestre Económico* LXXXII, No. 326 (April-June 2015): 354.

concentration of the population in Gran Santiago increased across the entire 20th century, including in the period of 1970-1990.<sup>35</sup> Both Foxley and Larraín suggest that these imbalances are a consequence of Chile's highly centralised administrative structure, with political and economic power concentrated in Santiago since at least the start of the 20th century if not before.<sup>36</sup> As such, the Chilean regional inequality literature is not sufficiently developed to refute the idea that Gran Santiago was nationally representative in the 1970s and 80s, a gap which this dissertation attempts to fill.

In brief, this dissertation aims to test one key assumption in the Chilean inequality literature; was inequality in Gran Santiago representative of national developments in the 1970s and 1980s? The answer to this question has implications for our understanding of the relationship between Pinochet's reforms and inequality, as it threatens to cast doubt on the existing consensus that inequality rapidly increased in the 1970s and 80s.

## **2. The Chilean National Accounts**

The existing sources on income inequality are insufficient to test Gran Santiago's representativity; Flores et al.'s tax data is not regionally divisible, and the EOD does not cover all of Chile.<sup>37</sup> As such, this dissertation uses a novel source of data; social tables and average wage data from the National Accounts of the Central Bank of Chile (henceforth National Accounts). These statistical publications are the main source on social economic indicators for Chile and are available in monthly volumes at the British Library of Political and Economic Science for the whole 20<sup>th</sup> century.<sup>38</sup> This section first suggests that these tables are likely derived from a nationally representative household survey. Then, I show that they are

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<sup>35</sup> Aroca, *Desigualdades territoriales*, 2.

<sup>36</sup> Aroca, *Desigualdades territoriales*, 1-4; Alejandro Foxley, *Chile y su futuro. Un país posible*, (Santiago: CIEPLAN, 1987); F. Larraín, *Desarrollo Económico en Democracia*, (Santiago: Ediciones Universidad Católica de Chile, 1987).

<sup>37</sup> The tax data used by Flores et al., "Top Incomes in Chile" is not published. However, Flores confirmed to me that this data is not regionally divisible. Ignacio Flores, email to author, November 4, 2019.

<sup>38</sup> National Accounts.

ideal for testing the representativeness of Gran Santiago but are more limited in their usefulness for constructing series of income inequality.

### 2.1 Where does the data come from?

The provenance of the National Accounts social tables is unclear; the source is simply listed as the “Department of Economics, University of Chile”, giving no more information about how the data was collected.<sup>39</sup> How can we deal with this problem? With little information on how the data was collected, it is near impossible to assess the underlying methodology. However, by calculating some descriptive statistics and comparing them with information from other sources, it becomes clear that the survey is broadly representative of the country, even if we don’t know how this has been achieved.

Table 2.1.1 compares key descriptive statistics derived from two other sources and demonstrates that the social tables produce results in line with other nationally representative statistics with less opaque methodologies. For example, the National Accounts Social Tables imply an unemployment rate of 19.5% in 1982, almost identical to the result of 19.6% calculated from *Chile, Social and Economic Indicators*, a more comprehensive sources of macroeconomic information on Chile. Similarly, the number of people reported as working in agriculture, mining, and manufacturing are similar in the social tables and census data; any small differences are likely due to the seasonality of the data, with censuses collected in June rather March.<sup>40</sup> The consistency of these statistics when calculated from entirely different sources suggests that the social tables used in this dissertation are derived from a broad, nationally representative survey, making them a reliable source of information of the distribution of employment and wages in Chile.

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<sup>39</sup> It is possible that some information on the survey methodology is presented in a volume of the National Accounts. However, it has not been possible to access these volumes digitally during the COVID-19 crisis, so I have chosen to cite: National Accounts, May 1990, 1251.

<sup>40</sup> I discuss the seasonality of employment in Chile in more detail in section 5.1.

Table 2.1.1 – Descriptive statistics of this dissertation’s social tables, compared with CASEN and Census data, 1982.

Source	Unemployment Rate (%)	Number of employees in agriculture	Number of employees in exploitation of mines and quarries	Number of employees in manufacturing industries
<b>National Account Social Tables, March 1982</b>	19.5	611,000	61,300	479,500
<b>Chile, Social and Economic Indicators, 1960-2000</b>	19.6	-	-	-
<b>Chilean Census Data, 1982</b>	19.1	645,483	78,248	488,340

*Sources:* Author’s own calculations from: National Accounts; Chile: Social and Economic Indicators, 1960-2000; Census 1982 and Census 1992.

## 2.2 How useful are the National Accounts?

Now, I demonstrate that the National Accounts are uniquely useful for testing the representativeness of Gran Santiago in the 1980s but are limited in their use for constructing Gini coefficient time series. To make up for the lack of coverage of the EOD, a source must present information on employment and incomes across all of Chile’s regions. The social tables upon which this dissertation draws satisfy this criterium by presenting the number of workers in 10 different sectors of employment across 4 regions from 1982-1991 – the north, centre, south and Gran Santiago.<sup>41</sup> These regions are not administrative divisions in themselves but are groups of the 13 provinces of which Chile was comprised in the 1980s (see map 1). That said, they are not arbitrary, and are united by common economic and geographic characteristics. As shown in table 2.2.1, the 4 large regions are comprised of areas with similar sectoral compositions, levels of GDP per capita, and geographical features. Regions in the north are generally dry, cold deserts

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<sup>41</sup> For an example of one of these social tables, see Appendix 1.

which specialise in primary sector activities such as mining and fishing and have a medium-high level of GDP per capita. Those in the centre are generally warmer, Mediterranean climates with a blend of primary and secondary economic activities, mainly mining and manufacturing. The south is characterised by a mix of warm Mediterranean and cool oceanic climates and is more characterised by its tertiary economic activities in personal services and administration. Gran Santiago is an exception, as a capital region with high levels of GDP per capita, specialising in financial and business services. As such, the divisions in the national accounts social tables are useful for measuring disparities in employment and income across the whole of Chile. While an ideal source might divide Chile into its 13 regions, the presentation of data on 4 different regions is a large improvement on the EOD, which presents data on just one.

However, while the National Accounts social tables are strong in measuring developments across all of Chile, this comes at the expense of both time coverage, and the resolution of the data. The issue of time coverage is most simple; the social tables are published inconsistently, first appearing in 1980, and only appearing regularly from September 1982-March 1991, with a gap in 1988. This means that this dissertation is only able to directly assess trends in regional income inequality in the second half of Pinochet's rule. To overcome this problem, I use both census data and information from CASEN to postulate ex-post and ex-ante trends in Chilean regional development which may indicate how regional income inequality disparities developed before and after the 1980s.<sup>42</sup> I consider these two sources to be reliable, as both are large-scale, nationally representative population surveys which collect microdata on incomes, employment, migration, and education.<sup>43</sup> Furthermore, the limited coverage of the source is only a problem to a limited extent; while it limits the length of the Gini coefficient time series presented in

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<sup>42</sup> Chile Atiende, "Información estadística y metodológica sobre la encuesta CASEN," Last updated 2 January 2020, accessed 12 April 2020, <https://www.chileatiende.gob.cl/fichas/2164-informacion-estadistica-y-metodologica-sobre-la-encuesta-casen>.

<sup>43</sup> The fact that the Chilean censuses are nationally representative is highlighted here: Global Health Data Exchange, "Chile Population and Housing Census 1970," accessed 12 April 2020, <http://ghdx.healthdata.org/record/chile-population-and-housing-census-1970>. The representativeness of CASEN is discussed in detail in Chile Atiende, "Información Estadística."

sections 5 and 6, the period of a decade is long enough to test whether trends in income inequality in Gran Santiago reflected those in Chile as a whole.

**Table 2.2.1 – Characterisation of Chile’s 13 regions**

<b>Larger Region</b>	<b>Administrative Region</b>	<b>Dominant Climate</b>	<b>Dominant Economic Activity, 2014<sup>44</sup></b>	<b>Sector of Dominant Economic Activity</b>	<b>Level of GDP per capita in 1980<sup>45</sup></b>
North	I - Tarapacá	Desert	Mining	Primary	High
	II – Antofagasta	Desert	Mining	Primary	High
	III - Atacama	Desert	Mining	Primary	Medium
	IV - Coquimbo	Desert	Mining	Primary	Low
Centre	V – Valparaíso	Cold semi-arid	Manufacturing	Secondary	Medium
	VI – O’Higgins	Warm summer Mediterranean	Mining	Primary	Medium
	VII - Maule	Warm summer Mediterranean	Manufacturing	Secondary	Low
South	VIII – BíoBío	Warm Summer Mediterranean	Manufacturing	Secondary	Medium
	IX - Araucanía	Warm summer Mediterranean	Personal Services	Tertiary	Low
	X – Los Lagos	Oceanic	Manufacturing	Secondary	Low
	XI – Aisén	Oceanic	Public Administration	Tertiary	Medium
	XII – Magallanes and Chilean Antarctica	Subpolar oceanic	Public Administration	Tertiary	High
Capital	Metropolitan Region of Gran Santiago	Warm summer Mediterranean	Business and Financial Services	Tertiary	High

**Sources:** climate-data.org<sup>46</sup>; National Accounts.

The second issue with the National Accounts is more problematic; they do not give a full picture of Chile’s income distribution. The social tables upon which this dissertation draws present the number of workers in 10 different sectors of employment across 4 regions from 1982-1991). Unlike the EOD, these social tables do not include the number of people unemployed, nor the type of occupation of the

<sup>44</sup> I wanted to use the National Accounts to calculate this for 1980 but have not been able to access the information due to the Covid-19 crisis. Information from Chilean National Accounts 2014.

<sup>45</sup> For illustrative purposes, the GDP per capita of each region in 1982 has been grouped into categories of “high”, “medium”, or “low.” The category boundaries are as follows in 1996 pesos. Low: GDP per Capita < 1,000,000 pesos. Medium = 1,000,000 < GDP per Capita < 1,500,000 pesos. High= GDP Capita > 1,500,000 pesos.

<sup>46</sup> Climate Data, “Chile Climate,” climate-data.org, accessed 23 May, 2020. <https://en.climate-data.org/south-america/chile-75/>.

worker, such as employer or employee. Neither do they include any non-labour income, such as pensions or gifts. The first problem was easily solved – the relevant information on regional unemployment is taken from *Chile: Social and Economic Indicators*.<sup>47</sup> The second problem, however, could not be resolved as no information on the distribution of types of employment within sectors is available in any of the major sources of Chilean statistics.<sup>48</sup> This limits the extent to which the sources can be used to capture income inequality because it is not possible to differentiate the wages of workers within a sector. It is impossible, for example, to distinguish between high-salary business owners and their low-wage employees. This problem concerns the resolution of the data and biases my Gini coefficients downwards; by forcing the use of average wages for all workers within large sectors, variation within professions and within sectors is inevitably lost. However, as this dissertation is focused on *trends* in inequality, this limitation of resolution is not fatal. As such, while imperfect, the sources allow a reasonable estimate of regular labour income inequality between sectors for four large Chilean regions.

In all, the decision to use the National Accounts social tables for this dissertation is well-justified. Firstly, I argue that the data is probably derived from a representative survey similar to the later CASEN survey. Then, I show that this source offers an improvement on the EOD and tax data. While the National Accounts only provide a limited picture of income distributions for a limited portion of Pinochet's rule, these problems are forgivable, and outweighed by the uniqueness of the source in capturing trends in income inequality in Chile's regions, and the country as a whole.

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<sup>47</sup> Chile: Social and Economic Indicators, 392-407 and 434-445.

<sup>48</sup> There are four main sources of economic statistics on Chile: National censuses, the National Accounts, Statistical Compendiums and Chile: Social and Economic Indicators. None of these sources provide this information.

### **3. Gini coefficients and wage estimates**

The methodology employed in this dissertation is broadly determined by the nature of the sources used. While inequality can be measured by income share or distributional measures (see section 1.2) the former is not possible as the National Accounts data only presents information on incomes at a sectoral, rather than individual level. As such, this dissertation uses a distributional measure of income inequality (a Gini coefficient), despite some claiming that Chilean inequality is “all about the share of the rich.”<sup>49</sup> This section outlines the methodology used to test the assumption that inequality in Gran Santiago is indicative of all Chile, as well as how this data is then used to estimate a novel regular labour income Gini coefficient time series.

#### 3.1 Testing for representativeness

Most hypothesis testing in Economic History is performed by regressing a dependent variable on an independent variable, controlling for compounding factors. Rodriguez-Weber shows that this is not appropriate for measuring inequality which “cannot be studied as the single outcome of market forces” due to the idiosyncrasies of institutions and power relations which shape how income is distributed.<sup>50</sup> As such, this dissertation does not attempt to formally test the assumption that income inequality in Gran Santiago is representative of trends across Chile, instead choosing to simply illustrate heterogenous trends in inequality by constructing a distributional measure, the Gini coefficient.

The first step towards creating a Gini coefficient is to assign a wage to each employment sector detailed in the social tables. This process is relatively straightforward; national average wages are presented in a relatively uniform way in the National accounts. Although these are not regionalised, these figures can still be used as it is the relative income of different sectors that matters for calculating a Gini coefficient, not their absolute value. That said, as shown in table 3.1.1, 4 of the 10 employment categories do not fit perfectly. Generally, the

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<sup>49</sup> Palma, “Homogenous Middles”, 87.

<sup>50</sup> Rodriguez-Weber, “Political Economy”, 45.

mismatches are of minor significance; I do not expect the average wage of “personal and household services” workers to be very different from “personal services workers”, for example. Two of these discrepancies are worth explaining, though. Firstly, given the lack of more detailed data, wages for the category “transport, storage, communications, and public utilities” are simply estimated as the equally weighted average of the wages provided for “transport and communications” and “electricity, gas, and water.” Moreover, the national accounts do not list wages for the category “agriculture, hunting, forestry, and fishing.” As such, wages for the category “unskilled workers” are used a proxy for these wages, as these are four sectors characterised by unskilled labour. The need to approximate average wages for these categories casts doubt on the veracity of the estimated Gini coefficients which are eventually constructed. As perfectly accurate wage data does not exist, it is not certain that the Gini coefficients are completely accurate. This is not so strong a limitation as to invalidate my estimates, though. Only 4 of 10 income categories require approximation, and while we do not have *perfect* information on wages, it is reasonable to expect that the proxies used are reasonably close to the unobserved “true” values.

Table 3.1.1 – Categories of employment and wages in the National Accounts

Category in Social Tables	Correspondent Category in Wages	Perfect Match?
Agriculture, hunting, forestry, and fishing	Unskilled workers	No
Exploitation of mines and quarries	Mining	Yes
Manufacturing industries	Manufacturing	Yes
Construction	Construction	Yes
Trade	Retail and wholesale trade, restaurants and hotels	Yes
Government and financial services	Financial services and insurance	No
Personal and household services	Personal service workers	No
Social and community services	Social and community services	Yes
Transport, storage, communications, and public utilities	Numerical average of “transport and communications” and “electricity, gas, and water”	No

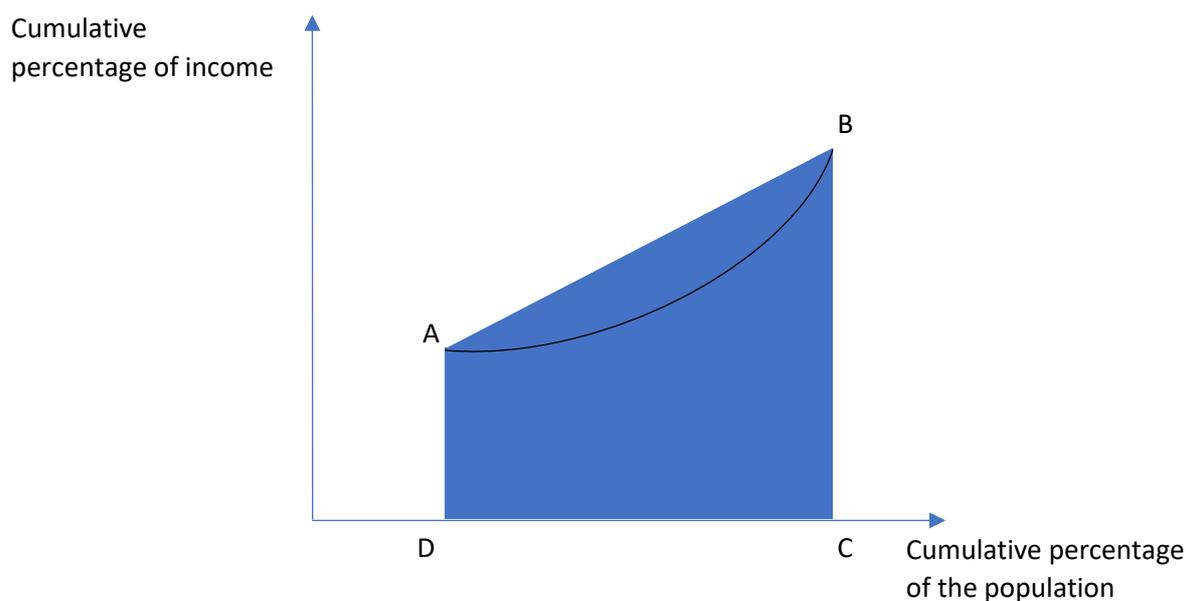
Source: National Accounts

These wage and income categories are then converted into an estimated Gini coefficient. Gini coefficients are a well-established means of measuring inequality in a country by measuring how far the inequality in a population deviates from hypothetical “perfect inequality” in which everyone in the economy has the same income.<sup>51</sup> This coefficient ranges between 0, or perfect equality and 100, or perfect inequality. For the purposes of this dissertation, the Gini coefficient is only “estimated” because data on the wages of each individual is not available. As such, each category of worker is sorted by income from lowest to highest, and the trapezium method is used to linearly interpolate inequality within each category. The method divides the Lorenz curve into trapezia and adds their area together to provide an estimate of the area under the curve. The Gini coefficient is calculated by subtracting this number from 0.5 and multiplying it by 2 to create a measure of how far the Lorenz curve is from perfect equality. The trapezium method likely underestimates the actual inequality within each category, as the richest in each

<sup>51</sup>Jim Chappelow, “Gini Index,” Investopedia, last updated February 3 2020, accessed May 23 2020, <https://www.investopedia.com/terms/g/gini-index.asp>.

sector are likely to make disproportionately more money than the poorest, which is not captured by simple linear interpolation.<sup>52</sup> This point is illustrated in figure 3.1.1: the area of the trapezium ABCD is larger than the area between the Lorenz Curve AB and the x axis, thus overestimating the area under the curve and underestimating the Gini coefficient.

**Figure 3.1.1 – A stylized portion of a Lorenz Curve illustrating the trapezium method**



**Source:** author's own visualisation based on Fellman, "Estimation of Gini coefficients".

However, as data on the distribution of incomes within categories is not available, this trapezium method presents a reasonable estimate of the Gini coefficient without guessing distributions of income within sectors.

These regional Gini coefficients are the most appropriate way to measure inequality given the nature of the National Accounts social tables. While the economic literature tends to prefer income share measures, these would not suit the data, and as such showing differences in Gini coefficients is the only feasible means of testing how representative Gran Santiago is.

<sup>52</sup> For a full explanation of the use and limitations of the trapezium method to estimate Gini coefficients, see Johan Fellman, "Estimation of Gini coefficients using Lorenz curves", *Journal of Statistical and Econometric Methods* 1, No. 2 (2012): 31-38.

### 3.2 Estimating national Gini coefficients

As the test in section 4 shows that Gran Santiago is not representative, this dissertation estimates a new national Gini coefficient to tentatively demonstrate that trends in inequality are different when measured from a national source than one which just covers the capital. The creation of this national Gini coefficient series requires large amounts of estimation, and as such is only considered tentative.

Firstly, the available wage data only provides average national monthly wages for each category, not reflecting variation in the level of wages across different regions. As such, this dissertation constructs two multipliers to proxy regional variation in labour incomes, one based on differences in regional GDP, the other based on regional differences in minimum wages. The regional GDP multiplier assumes that as regions become more productive, GDP per capita will increase, and some of this is likely to be passed through to workers as an increase in wages. As such wages are adjusted by the ratio of GDP per capita in the region in question to national GDP per capita, as calculated from Regional GDP Data.<sup>53</sup> The minimum wage multiplier assumes that regional variation in average wages in each sector is proportionate to regional variation in minimum wages. However, the regional values of minimum wages, available in Chile's "Compendio Estadístico" cannot be accessed from the UK for all years, leaving a gap in the data from March 1984 to August 1987.<sup>54</sup> To fill this gap, I linearly interpolate minimum wage values for the intervening period.

How can this assumption of linearity be justified? After all, minimum wages move in steps, as each increase in minimum wage requires legislation to be passed, which might lead us to expect changes in minimum wages to be anything but linear. However, the justification lies in the way that minimum wages are calculated in Chile: while the *level* of minimum wages may change, the proportional difference in minimum wages between regions stays fixed. For

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<sup>53</sup> For a full specification of these estimations, see appendix 2.

<sup>54</sup> See Bibliography for more details of this source's availability.

example, the minimum wage of Gran Santiago in March 1981 was 98.6% of the unweighted national average minimum wage and remained so in March 1990. The use of linear (rather than exponential) interpolation allows these ratios to be preserved, in turn allowing estimates of regional wages to maintain proportionality.

Table 3.2.1 – Multipliers resultant from different wage estimation techniques, 1990 (all values to 3 decimal places)

<b>Region</b>	<b>Actual Multiplier (from CASEN)</b>	<b>Estimated multiplier from differences in GDP/Capita</b>	<b>Estimated multiplier from differences in minimum wage</b>
North (Regions I-IV)	1.075	1.097	1.046
Midlands (Regions V-VII)	0.884	0.781	0.976
South (Regions VIII-XII)	0.923	0.724	1.006
Santiago	1.057	1.122	1.004

*Sources:* Author's own calculations from National Accounts, CASEN and Statistical Compendiums

While neither of these estimation techniques is completely theoretically robust, they reflect real differences in wages well. Table 3.2.1 compares the multipliers in real wages derived from minimum wage and GDP per capita differences to actual differences in real wages taken from CASEN in 1990. The 2 estimated multipliers are generally above 1 when the CASEN-derived multiplier is also above 1, meaning that the estimated multipliers accurately reflect variations in the level of wages between regions. Furthermore, the magnitudes of these multipliers are similar, with the average difference between the estimated multiplier and the actual multiplier less than 0.1 for both specifications.<sup>55</sup> That said, the GDP per capita multiplier tends to over-exaggerate regional differences, while the minimum wage multiplier tends to under-exaggerate them. As such, these two

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<sup>55</sup> The average difference between the GDP per capita multiplier and the actual multiplier is 0.0969 (3 significant figures). The average difference between the minimum wage multiplier and the actual multiplier is 0.0643 (3 significant figures).

multipliers are a reasonable estimate of regional variations in labour incomes for 1982-1991, with GDP per capita estimates providing an upper-bound of regional differences, and minimum wage estimates a lower-bound.

In all then, the methodology of this dissertation is largely constrained by the sources available. The use of Gini coefficients as a measure of inequality across 4 regions is justified by the resolution of the data prohibiting the use of any alternative measures, and this illustrative method is appropriate for testing the literature's assumptions about Gran Santiago's representativeness. However, when it comes to combining these regional Gini coefficients into a national Gini coefficient time series, the results are much more tentative, relying heavily on estimates of regional differences in wages based on GDP per capita and minimum wage multipliers. As such, the results presented in section 4 are much more reliable than the speculations of section 5.

#### **4. Was Gran Santiago representative?**

As outlined in section 1, the current literature on income inequality under Pinochet implicitly assumes that income inequality in Gran Santiago is representative of developments across the whole country. If this assumption is correct, then there is reason to be confident in the current consensus that income inequality increased in the 1970s and 1980s. However, if this assumption does not hold, then this consensus is cast under serious doubt. If the sources with which inequality is measured are unrepresentative, then more work must be done to establish how inequality really changed across all of Chile. This section first outlines some reasons to suspect that income inequality in Gran Santiago might not be nationally representative. Then, I present a Gini coefficient time series for 4 Chilean regions which confirms this suspicion. Far from being regionally homogenous, I argue, trends and levels in income inequality differed widely across regions, with a particular gulf between developments in Gran Santiago and the north, and the centre and south.

#### 4.1 Internal Migration and Regional GDP: a smoking gun?

Section 1 demonstrated that the literature on regional inequality in Chile is underdeveloped as it does not cover the Pinochet era in any detail, and therefore does not provide sufficient grounds to suggest that Gran Santiago is not representative of all Chile. This section constructs two simple indicators to address this; I argue that long-term trends in internal migration and GDP per capita reveal regional imbalances that justify the speculation that Gran Santiago is not representative of the whole country.

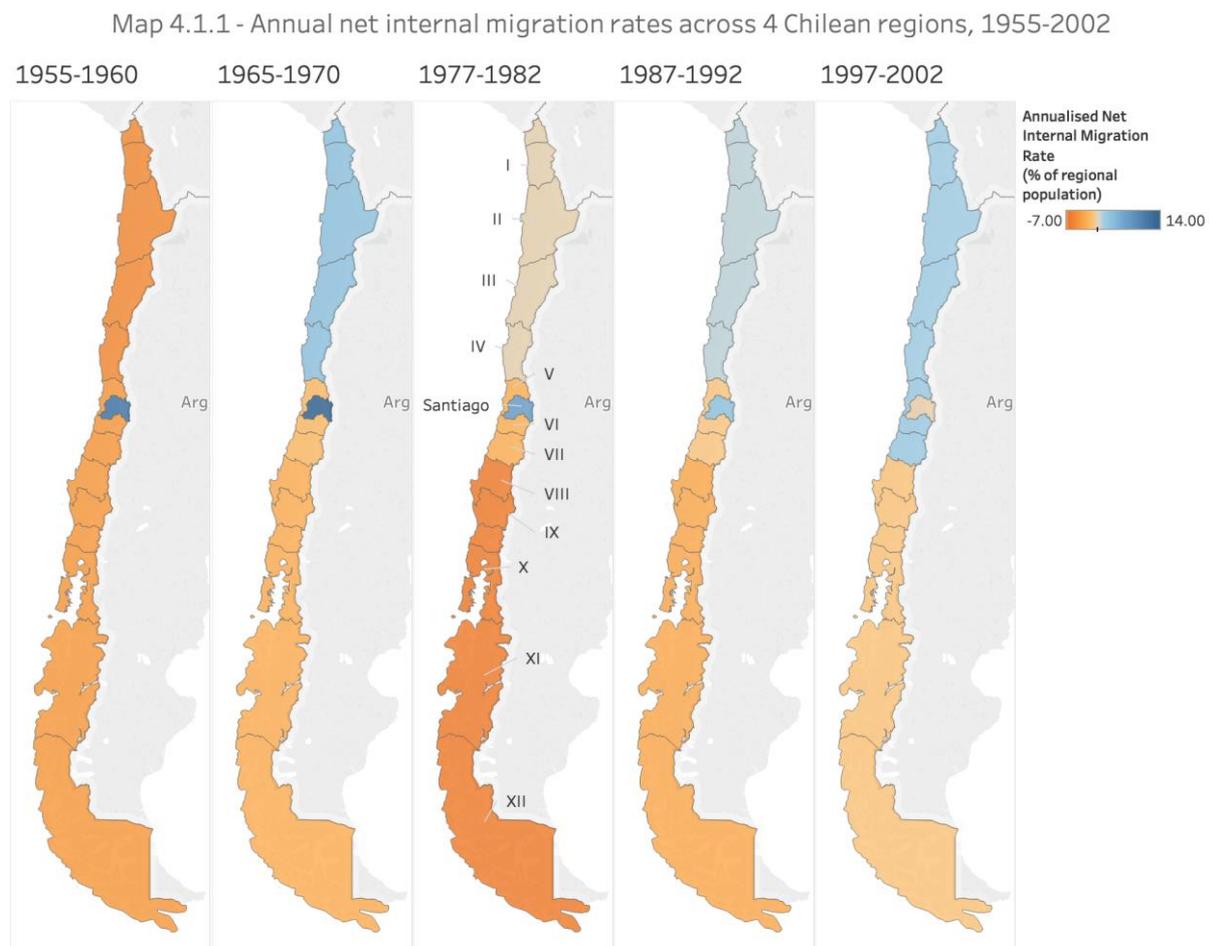
The first indication that Chile's regions are not homogenous comes from its internal migration rates. While internal migration is often considered as a force for reducing regional inequality, it may also be indicator of persistent regional imbalances if it shows that people persistently moved towards or away from a particular area.<sup>56</sup> Spitzer and Zimran demonstrate that internal migration is negatively selective, meaning that migrants are most likely to move from poor regions to richer ones.<sup>57</sup> As such, if a country witnesses persistently high internal migration rates, then this is evidence of regional heterogeneity; a net inflow to region A from region B suggests that region A is a relatively appealing place to live

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<sup>56</sup> See, for example, Francisco Rowe and Patricio Aroca, "Eficiencia de la migración interregional en Chile para ajustar el mercado laboral," *A-MÉRIKA* 1, No. 2 (December 2008): 1-19.

<sup>57</sup> Yannay Spitzer and Ariell Zimran, "Migrant self-selection: Anthropometric evidence from the mass migration of Italians to the United States, 1907-1925," *Journal of Development Economics* 134 (2018): 226-247.

Are such regional imbalances present in Chile in the long run? Map 4.1.1 presents the internal net migration rates (i.e., the number of immigrants minus the number of emigrants as a percentage of the region’s population) for Chile in the 5 census periods of 1960, 1970, 1982, 1992, and 2002, aggregated across our four larger regions. In each year, the censuses provide the number of those dwelling in each region in the year of the census, and where they lived 5 years before. This rate of migration is then annualised (i.e., divided by 5) to give an average net annual



Source: Census Data, 1960-2000

internal migration rate for each large region. Regions which are net recipients of internal migrants are coloured in blue, and net providers of internal migrants are coloured in red. The more intense the shade, the higher the rate of net migration.<sup>58</sup>

<sup>58</sup> Before 1976, Chile was not divided into 13 regions, but 25 provinces, as described here: Statoids. “Regions of Chile.” Accessed 12 April 2020. <http://www.statoids.com/ucl.html>. Figure 1970 recalculates migration rates for this period to make them directly comparable with the periods after. This method was originally explained in Francisco Rowe, “The Chilean Internal Migration (CHIM) database: A Temporally Consistent Spatial Data Framework for the Analysis of Human Mobility,” Region 4, No. 3 (2017): R2.

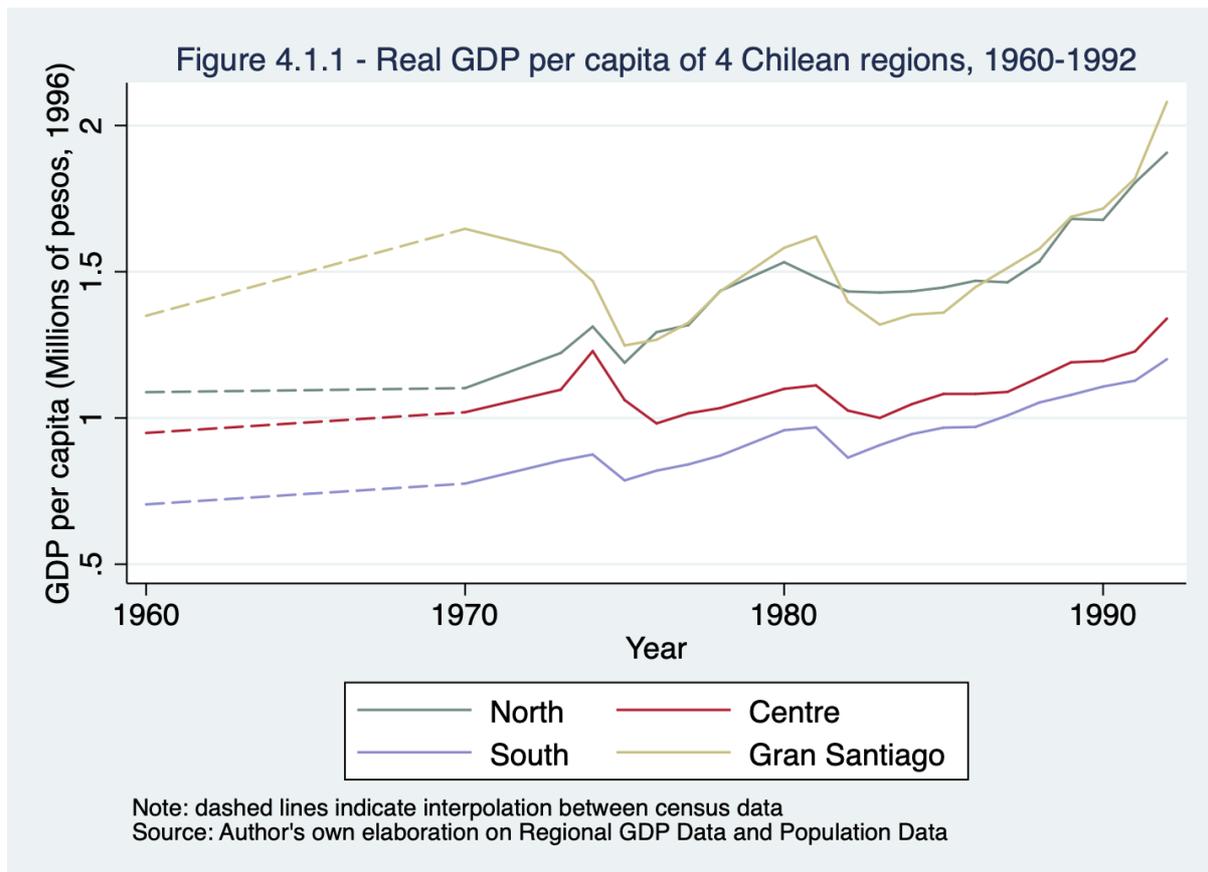
The main takeaway from this map is that Chile was characterised by regional imbalances across the entire second half of the 20<sup>th</sup> century. Gran Santiago was a net recipient of migrants across every 5-year period in the data until 1997-2002, implying that it was a relatively appealing place to live compared to the south, centre, and north from at least 1955. Indeed, the south lost inhabitants to other regions consistently across the period, losing 6.17% of its population to internal migration per year from 1977-1982. The final important feature of the map is that the north became a net recipient of migrants in 1965-1970 and remained so for most of the rest of the period; the slight net emigration of 1977-1982 saw an insignificant 0.4% of the population leave every year. As such, not only were regional imbalances benefitting Gran Santiago a feature of the Chilean economy across the late 20<sup>th</sup> century, but the pattern of these imbalances shifted some time after 1960, with the north beginning to benefit relative to the centre and south. This evidence of regional imbalance is suggestive of the unrepresentative nature of Gran Santiago – it was exceptionally attractive for internal migrants across the 20<sup>th</sup> century, suggesting that it was not a typical Chilean region. Furthermore, internal migration does not just tell a story of “Gran Santiago vs. the rest”; the relative attractiveness of the north, capital, and south also shifted across the period.

Another simple indicator of regional imbalances is regional disparity in real GDP per capita, as this reflects differing levels of productivity across Chile’s different regions. Figure 4.1.1 shows the real GDP per capita of Chile’s four regions from 1960-1992, and demonstrates that, from the start of Pinochet’s rule in 1973, growth in GDP per capita was much stronger in Gran Santiago and the north than in the centre and the south.<sup>59</sup> The divergence of the north from the south and the centre under Pinochet is particularly interesting; while Gran Santiago had been significantly wealthier than the rest of the country since at least 1960, the north and centre had historically experienced similar levels of GDP per capita. However, the gap between the two increased dramatically under Pinochet, with the north’s

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<sup>59</sup> GDP per capita = Real GDP of region (constant 1996 pesos)/Population of Region. Data from Regional GDP Data and Population Data.

real GDP per capita increasing from just 8% higher than the centre's in 1970 to over 40% higher in 1990. This information further colours our expectations of the representativeness of Gran Santiago; at some point under Pinochet's rule, the north and capital diverged from the south and centre, adding to the evidence of Chile's high levels of regional heterogeneity.

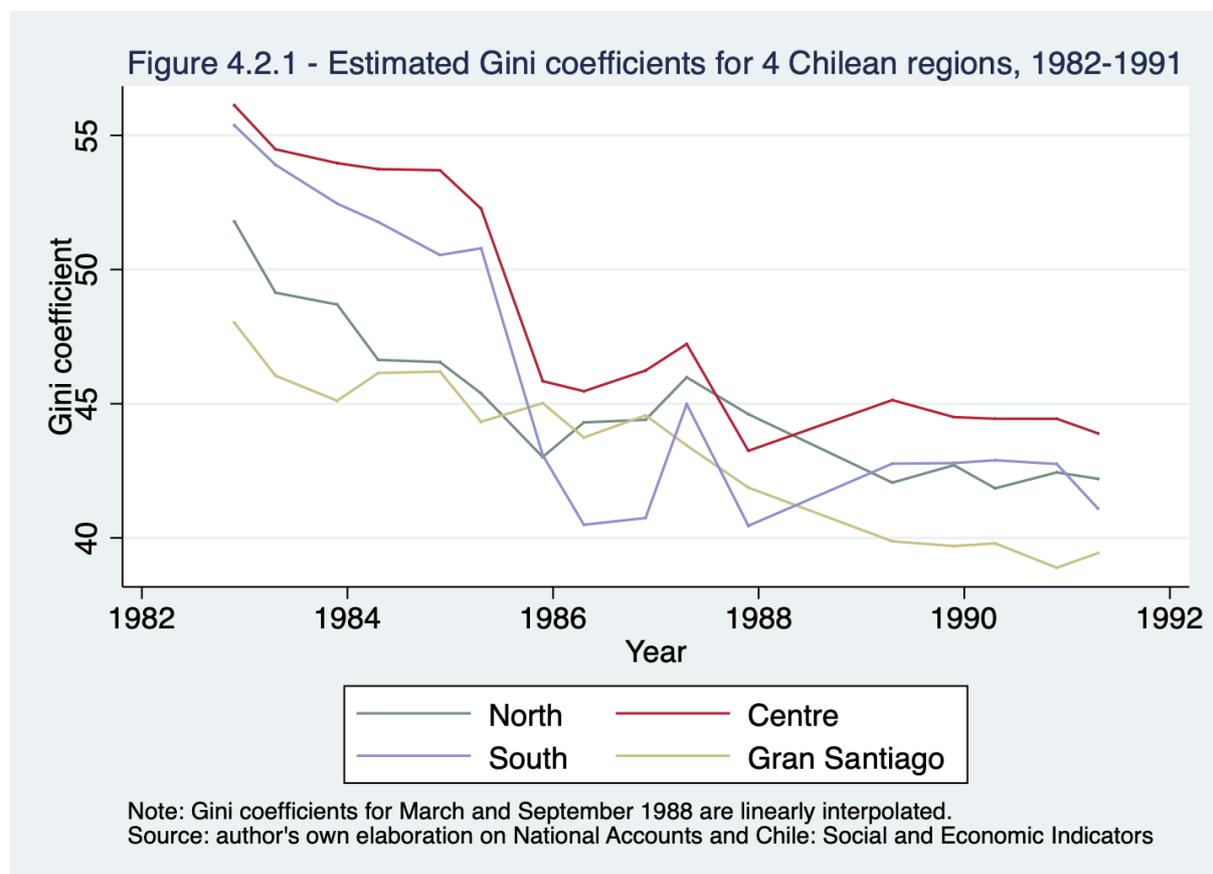


This section, in the absence of a developed secondary literature on Chilean regional inequality under Pinochet, adds weight to the speculation that developments in the capital were probably not representative of all of Chile in the 1970s and 1980s. I find that in terms of internal migration and GDP per capita, Chile was heterogenous across the second half of the 20<sup>th</sup> century, with developments in the north and capital differing widely from those in the centre and south. This fits with the findings of the existing regional literature on the period *after* Pinochet – the United Nations Development Programme (PNUD), for

example, finds that a dichotomy between the north and capital and the south and centre still exists today.<sup>60</sup>

#### 4.2. Regional Gini coefficients

Now that case for Chile’s regional heterogeneity in the 1970s and 80s has been made, I turn to answering the narrow question of this dissertation directly: were trends in inequality in Gran Santiago representative of trends across all of Chile under Pinochet? This section provides a simple answer to this question: “no”. Here, I present my estimated regular labour income Gini coefficient time series for Chile’s four large regions, showing that while 1) all regions experienced a general decline in regular labour income from September 1982-March 1991 and that 2) there were large and persistent differences in levels of inequality and the rate of decline.



<sup>60</sup> PNUD, *Desigualdad Regional*, 31.

Figure 4.2.1 presents my estimates of income inequality within the four Chilean regions of the north, centre, south and Gran Santiago, using the Gini coefficient methodology explained in section 3.1. An initial reading of the graph might suggest that Chile's regions were somewhat homogenous; the Gini coefficient of all four regions declines from the start of the period in September 1982 to the end in March 1991. However, three characteristics of the figure refute this interpretation.

The first important observation from this figure is that levels of income inequality in Chile from 1982-1991 were highly regionally heterogeneous; the estimated Gini coefficients vary widely between regions. For example, in September 1982, the estimated Gini coefficient ranged from 48.02 in Gran Santiago to 56.12 in the centre regions.<sup>61</sup> This range of Gini coefficients persisted across the period, with the difference between the largest and smallest Gini coefficient 4.64 by March 1991. While this is lower than the range of Gini coefficients in 1982, this is unimportant; while the Chilean regions may have been decreasingly heterogeneous across the period, they were never homogenous. The implications of this finding are simple. If labour income Gini coefficients differed across regions in the 1980s, then the literature's current estimates of levels of inequality under Pinochet are rendered unreliable for only including Gran Santiago in their calculations.

The second significant feature of figure 4.2.1 is that regular labour income inequality between sectors was lowest in Gran Santiago across most of the period, being lower than all other regions from 1982-1986 and 1988-1991. This result seems particularly surprising given the results in the literature for the period after 1990; a Chilean Senate report on territorial inequality demonstrates that Gran Santiago had the highest income inequality of any of the 13 regions in 2006, something which the PNUD also reports for 2017.<sup>62</sup> This might suggest that there was a reversal of regional differences in inequality at some point between 1991 and 2006. However, this is inaccurate due to the differences in the categories of

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<sup>61</sup> Author's own elaboration on National Accounts and Chile: Social and Economic Indicators.

<sup>62</sup> Senado de Chile, *Retrato de la Desigualdad*, 36; PNUD, *Desigualdad Regional*, 45.

income capture by these studies and this dissertation. Both the Chilean Senate and PNUD use CASEN, which measures not just regular labour income, but also bonuses, gifts, state transfers, and pensions.<sup>63</sup> As such, these two findings do not directly contradict each other: while Gran Santiago may have been the most unequal region in Chile in terms of total income inequality (as seen in the literature), this was not due to differences in average regular labour incomes between sectors (as measured in this dissertation). This further adds to the case against Gran Santiago's representativeness; it was characterised by relatively low levels of regular labour income inequality under Pinochet, compared to the north, centre, and south.

The final important conclusion from figure 4.2.1 is that the rate of decrease in inequality varied rapidly between sectors. While Gran Santiago and the north experienced inequality decreases at a roughly consistent rate across the period, the decline in the south and centre was less consistent, experiencing a sharp drop from March 1985 to March 1986. What explains this difference? When the underlying social tables are examined, the increase in inequality in the centre and south can be explained by a large change in agricultural wages between March 1985 and March 1986. In this period, the nominal wage of unskilled workers increased from 29,677 pesos per month to 37,007, which reduced inequality by increasing the income share of Chile's poorest workers.<sup>64</sup> As can be seen in table 4.2.1, this change in wages had a large effect in the south and the centre, where more than 25% of workers were in agriculture, compared with just 14.1% and 3.1% in the north and Gran Santiago respectively. This explains the variation in 1985-6 well; those regions with a higher proportion of workers in agriculture experienced a sharper decrease in inequality. In the south, this decrease was exacerbated by a sudden decrease in employment in "government and financial services" of 48.9% in one year. As this was the highest-earning sector in 1985, this change in employed decreased the proportion of the population on the highest

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<sup>63</sup> Ministerio Desarrollo y Social, "Cuestionario 1992", [ministerioiodesarrollosocial.gob.cl](http://observatorio.ministeriodesarrollosocial.gob.cl), accessed May 23 2020, available at [http://observatorio.ministeriodesarrollosocial.gob.cl/layout/doc/casen/cuestionario\\_1992.pdf](http://observatorio.ministeriodesarrollosocial.gob.cl/layout/doc/casen/cuestionario_1992.pdf), 5.

<sup>64</sup> Chile: Social and Economic Indicators, 489-496.

income dramatically, which explains why the south experienced a larger decrease in Gini coefficient than any other sector.

Table 4.2.1 Changes in inequality and proportion of workers in agriculture, hunting, forestry and fishing, 1985-1986

<b>Region</b>	<b>Change in estimated Gini coefficient, March 1985 – March 1986</b>	<b>Percentage of workers in agriculture, hunting, forestry and fishing, March 1985 (%)</b>
<b>North</b>	-1.08	14.10
<b>Centre</b>	-6.79	27.48
<b>South</b>	-10.30	26.53
<b>Gran Santiago</b>	-0.59	4.00

*Source:* Author’s own elaboration on the National Accounts

In all then, the regular labour income Gini coefficient series produced here points to three conclusions: levels of income inequality in Chile’s 4 largest regions were highly heterogenous; Gran Santiago had persistently lower regular labour income inequality than other countries, and the rate of decline in inequality varied due to differences in the sectoral composition of each region. All three of these conclusions offer rebuttals to the assumption outlined in section 1 that the EOD’s data on Gran Santiago is representative of wider trends in inequality across Chile under Pinochet. One key limitation to this finding is that the Gini coefficient time series does not cover the first half of Pinochet’s dictatorship. However, this is offset by the figures in section 4.1 which demonstrate regional imbalances to be a characteristic of the Chilean economy across the entire second half of the 20<sup>th</sup> century. Thus, while this study does not provide specific detail of regional heterogeneity in income distributions from 1973-1981, it is reasonable to speculate that it did exist. As such, Ffrench-Davis’ assertion that existing knowledge of Chilean income inequality is “irrefutable” is inaccurate.<sup>65</sup> Most assessments of inequality assume the regional data presented in the EOD to be nationally representative which, as this section has shown, was not true.

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<sup>65</sup> Ffrench-Davis, *Neoliberalismo*, 305.

## 5. Towards a new understanding of Chilean income inequality

The previous section leaves one large question unanswered. If we cannot trust the EOD as a source on Chilean income inequality at a national level under Pinochet, what can we know about income inequality? This question is far broader than the narrow question asked in section 4 and can only be partially answered. Section 5.1 presents two estimates of regular labour income inequality at a national level, as explained in section 3.2. The results suggest that rather than increasing, labour income inequality actually decreased in Chile across the 1980s. However, due to the amount of estimation required and the limited category of income covered, I argue that this does not conclusively contradict the suggestion in the EOD that total income inequality increased across the period. Section 5.2 then analyses the proximate causes of the measured decrease in income inequality across the period, arguing that a decrease in unemployment, not a convergence of wages, drove the change.

### 5.1. National Gini coefficient time series

Converting the regional Gini coefficient estimates in section 4.2.1 to an estimate national Gini coefficient time series is not simple. As Gini coefficients are not additionally decomposable, it is not possible to produce a national Gini coefficient by simply adding the regional Gini estimates together.<sup>66</sup> Indeed, a large amount of estimation is required to combine these Gini coefficients, with the results in this section based on 2 different estimators of regional disparities in wages, derived from differences in Real GDP per Capita (estimate 1) and minimum wages (estimate 2).<sup>67</sup>

That said, the national Gini coefficients presented here are a “best guess” of Chilean labour income inequality. What trends do they show? Figure 5.1.1 presents my two estimates for Chile’s Gini coefficients from September 1982 to

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<sup>66</sup> This point differentiates Gini coefficients from the more complex Theil index, which would not have been appropriate for use with this data. For a full explanation of how additively decomposable distributional measures of income inequality work, see: A. F. Shorrocks, “The Class of Additively Decomposable Inequality Measures,” *Econometrica* 48, No. 3 (April 1980): 613-625.

<sup>67</sup> These estimates are outlined in section 3, and fully specified in appendix 2.

March 1991. The figure shows a somewhat surprising trend: both estimates show an overall decrease in income inequality from 1982 to 1991. There are two notable exceptions to this. Firstly, the Gini coefficient increases somewhat in the period 1986-7, from 45.98 to 47.61 (estimate 1) and 46.84 to 47.53 (estimate 2). Secondly, while the two estimates produce a similar trend for 1982-1987, the trends differ from 1988-1991, with estimate 1 showing a plateau in inequality, while estimate 2 continues to decrease steadily.

Why might this be? As outlined in section 3, the only difference between estimate 1 and estimate 2 is the indicator used to create a multiplier for regional variation in wages, and as such, the different trend must be a result of differences between regional variation in minimum wages and GDP per capita. The answer can be found in figure 4.1.1, which demonstrates that the GDP per capita of the north and the capital was diverging significantly from the south and the centre. This means that the regional wage multiplier in estimate 1 increased over the period 1988-1991, which puts upwards pressure on the Gini coefficient as it exaggerates regional differences in regular labour income. By contrast, the wage multiplier in estimate 2 remains almost constant, as the ratio of minimum wages between regions remained almost fixed across the period (see section 3). As such, this difference in trend between 1988 and 1991 is a result of the difference in estimation technique of estimate 1 and estimate 2, which present an upper and lower bound of regional income inequality respectively. The real trend in regular labour income inequality in this period was likely a gradual decrease – somewhere between the two lines seen in figure 5.1.1.



How does this trend of decreasing regular labour income inequality compare to our previous understanding of Chilean inequality, based on the EOD? As shown in section 1, most estimates of income inequality based on the nationally unrepresentative EOD suggest that income inequality increased under Pinochet during from 1973 until 1987, at which point it started to decrease.<sup>68</sup> However, when we focus on the 1980s, we see that the increase until 1987 was not so constant: the green line in figure 5.1.2 recreates Rodriguez-Weber’s Gini coefficient estimates, showing that inequality actually zig-zagged downwards from 1982-1986, before spiking upwards suddenly in 1987. Furthermore, the decrease in inequality after 1987 is not constant, with a spike in inequality from 1989-1990. How far does this trend match the trends identified in my estimates?

<sup>68</sup> Palma, “Homogenous Middles,” 130; Rodriguez-Weber, “Political Economy,” 49.

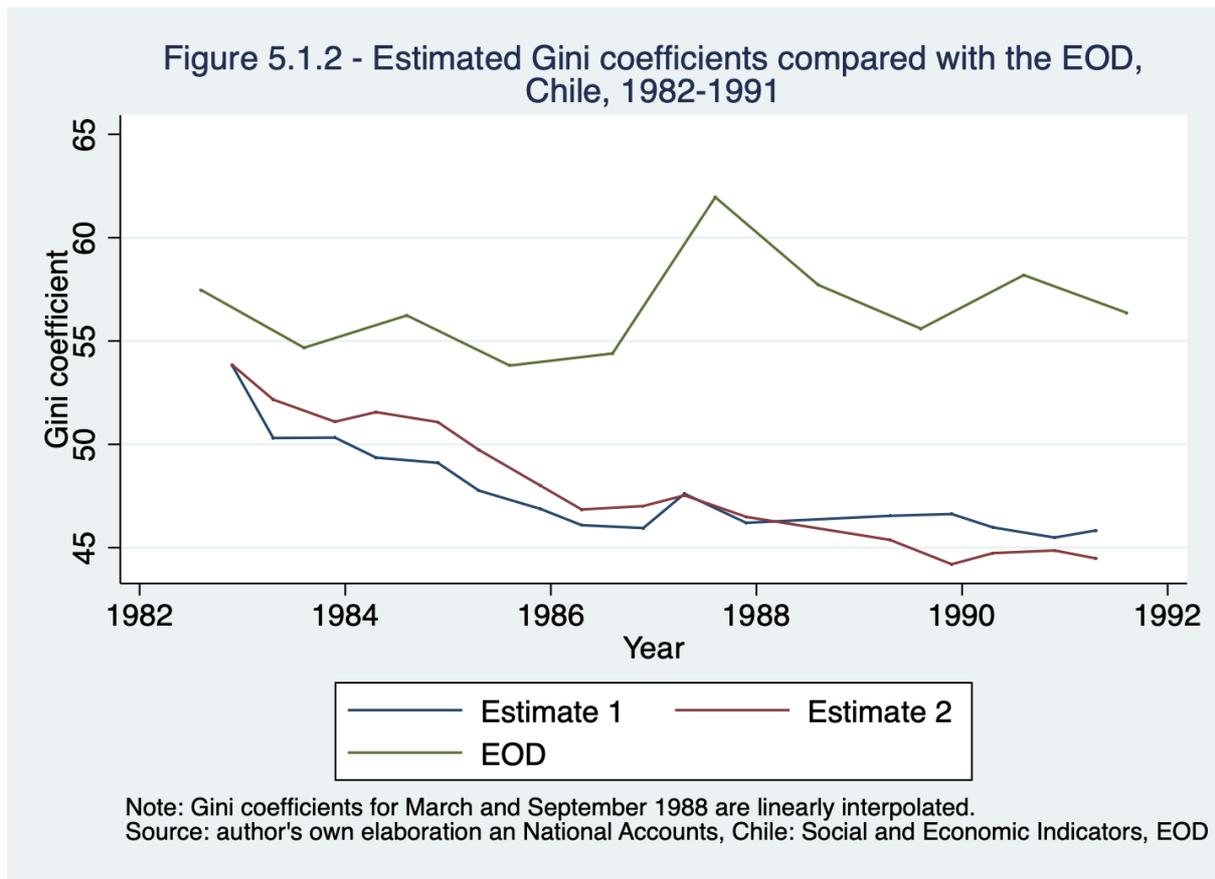


Figure 5.1.2 compares my estimates to those derived from the EOD, which is used by Rodriguez-Weber, Ffrench-Davis and many others.<sup>69</sup> An initial reading of the graph seems to suggest that my estimates largely contradict the EOD estimates; there is a large difference in levels between the two lines, and the trends after 1986 are very different. For example, while the EOD shows a large spike in inequality from 1986-1987 followed by a decrease to 1991, my estimates show a much more modest increase from 1986-1987, and a more gradual decrease thereafter. It is thus tempting to suggest that this figure directly refutes the suggestion that income inequality spiked in 1986-7 across all of Chile. However, even when we ignore that the EOD only covers Gran Santiago, there are 2 reasons that the data in the EOD and my estimates should not be compared.

<sup>69</sup> Ffrench-Davis, *Neoliberalismo*, 310; Rodriguez-Weber, "Political Economy," 49; Rodriguez-Weber, "Economía Política," 336; Beyer, "Educación y Desigualdad", 114; Dante Contreras, "Distribución del ingreso", 317; Hojman, "Poverty and Inequality", 75; Palma, *Homogenous Middles*, 134.

Firstly, the fact that the EOD captures a broader range of income categories might explain the difference in levels of the two lines, and the spike from 1986-1987 in the EOD which is not observed in my estimates. The EOD, as a household survey which collects a large amount of information from individual households, captures many income categories, namely: labour income (wages and salaries); income from gifts or payment in specie; income from independent activity; pension income and “other” income.<sup>70</sup> By contrast, as outlined in section 3, my Gini estimates capture only a subset of this income: the average regular labour income of 10 different sectors. Naturally, my Gini coefficient estimates are consistently lower as they capture a small portion of income. Moreover, the spike of 1986-1987 in the EOD *may* have occurred at a national level but is simply not observed in the limited portion of income which my estimates capture. This is reconcilable with the secondary literature. Palma demonstrates that the income share of the top 10% of Chileans increased rapidly in the period preceding 1987.<sup>71</sup> As the top 10% of earners are not reflected in my estimates, this could provide a strong explanation for why the spike in 1987 is not observed.

Another source of difference between my estimates and those in the EOD is the month in which the data is collected, with the EOD presenting Gini coefficients for June, and my estimates covering March and September. This is significant because the high level of seasonality in the Chilean workforce; especially among women, low income agricultural labour tended to peak in January to March, then decreasing for the rest of the year.<sup>72</sup> This could have implications for the labour share of income as measured in March – the number of women coming out of unemployment and performing seasonal work would cause a decrease in the proportion of workers on zero income in my estimates, thus decreasing estimates of inequality slightly in March compared to June and September. While the extent

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<sup>70</sup> EOD.

<sup>71</sup> Palma, “Homogenous Middles,” 134.

<sup>72</sup> Stephanie Barrientos, “The Hidden Ingredient: Female Labour in Chilean Fruit Exports,” *Bulletin of Latin American Research* 16, No. 1 (1997): 75; Robert N. Gwynne and Cristóbal Kay, “Agrarian Change and the Democratic Transition in Chile: an Introduction,” *Bulletin of Latin American Research* 16, No. 1 (1997): 8; Anna Bee and Isabel Vogel, “Temporeras and household Relations: Seasonal Employment in Chile’s Agro-Export Sector,” *Bulletin of Latin American Research* 16, No.1 (1997): 90.

to which this impacts my estimates is impossible to quantify, it is likely to have a significant effect; Barrientos suggests that seasonal employment during fruit harvests saw almost 300,000 Chileans gain temporary work in January-March 1992, a number which would largely downwards bias estimates of inequality in March compared to June and September.<sup>73</sup>

This section supports two conclusions. Firstly, my estimates of national Gini coefficients decrease across the whole period, save for a small spike in inequality from 1986-7. While this trend is different to that identified in the EOD, these differences might not just arise from differences in geographical coverage; my sources and the EOD also differ in the categories of income and the time of year that they capture. As such, it would be rash to argue that these Gini coefficients dismiss the conventional wisdom that inequality increased in Chile during the 1980s. It would also be inaccurate to use this discrepancy to make claims about the veracity of the EOD for the whole Pinochet period; a nationally representative series of income inequality for all of 1973-1990 would need to be constructed before our existing understanding could be dismissed. However, it is fair to say that my estimated Gini coefficient time series for 1982-1991 casts some initial doubt on this claim, as while total income inequality may have increased across Chile in this period, this was not due to an increase in regular labour income inequality. While more work must be done to fully evaluate claims based on the EOD, this section illustrates that its findings should not be treated as conclusive.

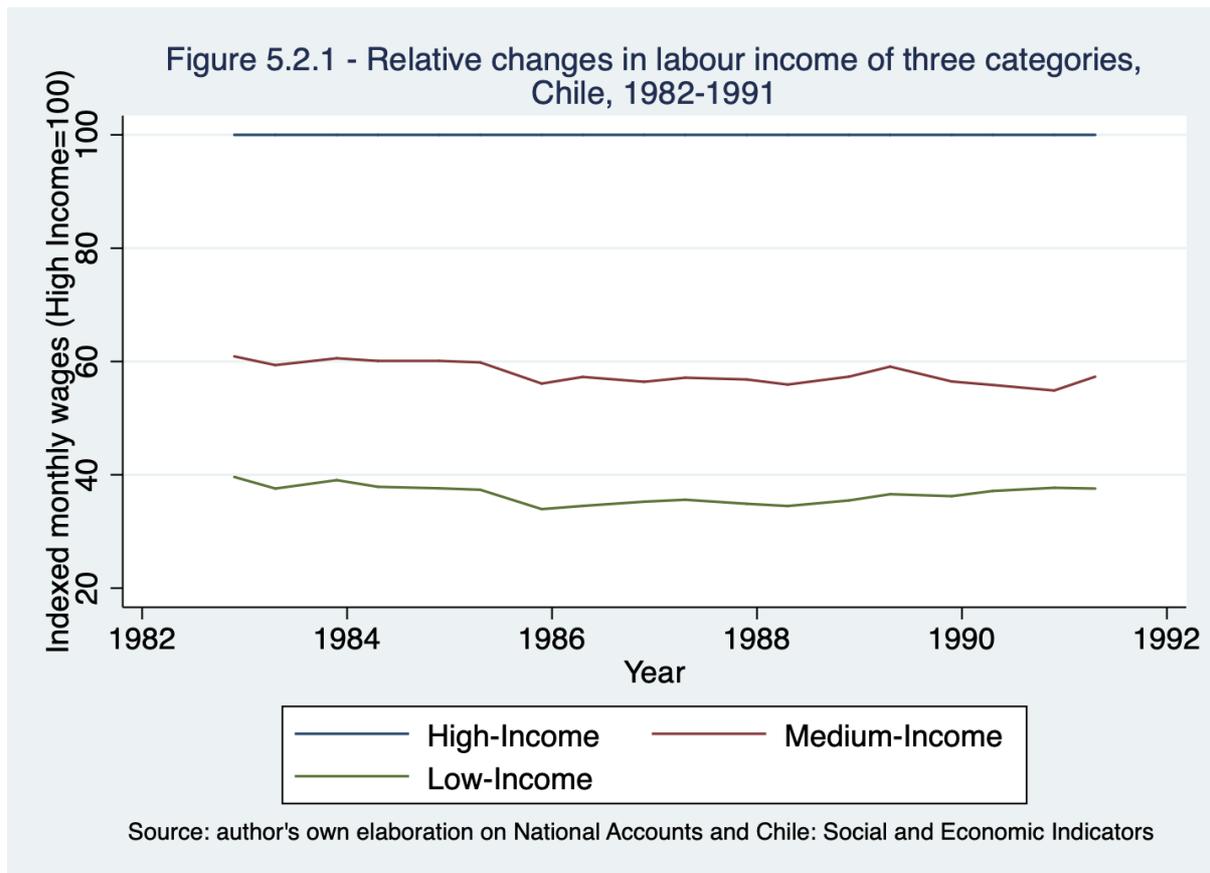
## 5.2. What might explain decreasing regular labour income inequality?

Before concluding, I ask one last question: what drove the decrease in regular labour income inequality seen in my estimates? Here, I analyse the proximate causes of changes in national income inequality presented above, arguing that a decrease in unemployment, rather than wage convergence, explain the decrease in regular labour income inequality.

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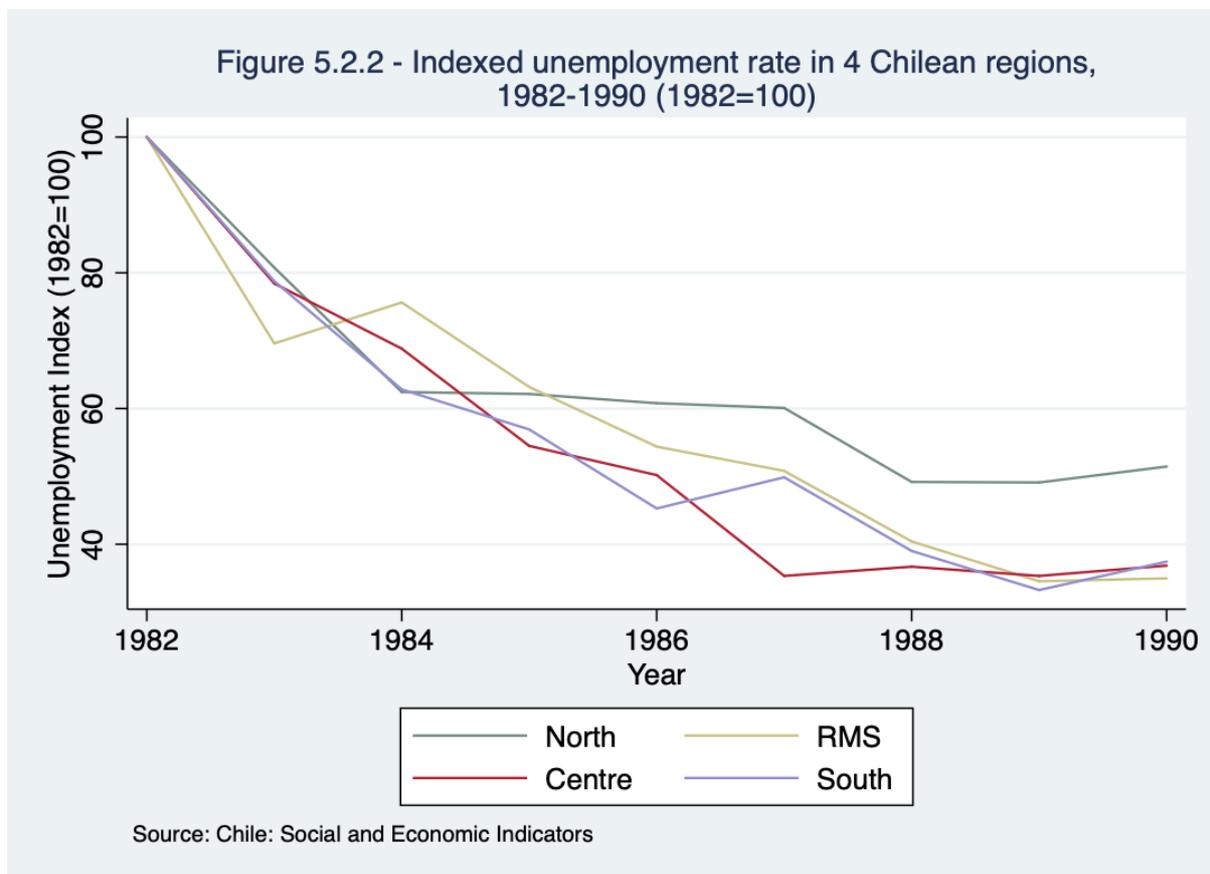
<sup>73</sup> Barrientos, "The Hidden Ingredient," 74.

Any decrease in my estimates of regular labour income inequality must be explained by either the wages received by any group of workers, or the proportion of workers in any sector of the economy. Which of these explains the decrease witnessed across all regions in the 1980s? Figure 5.2.1 demonstrates that the decline inequality was not a result of wage convergence between high-income and low-income sectors. I group the 10 sectors in the social tables into 3 categories of “high-income”, “medium-income”, and “low-income” and index them to wages in the high-income group. The result shows that, relative to high-income wages,



medium-income and low-income wage were stagnant. This means that the decrease in inequality outlined in section 5.1 cannot be a result of wage convergence, as the wages of the poor did not increase relative to the wages of the rich.

Instead, I argue that the largest driving force behind the decrease in labour income inequality in the 1980s was a decrease in the level of unemployment as the country recovered from the 1982 crash. As seen in section 4.1, unemployment was at a high of almost 20% in 1982, decreasing consistently thereafter until 1989.<sup>74</sup> This would have reduced regular labour income inequality as the proportion of the population with zero labour income decreased over time, thus putting downwards pressure on the Gini coefficient. Indeed, this relationship is somewhat confirmed by figure 5.3.2, which shows that the two regions which experienced the largest decreases



in unemployment in the 1980s, i.e. the south and the centre, were also those which experienced the fastest decrease in inequality. This conclusion suggests that, rather than being a consequence of equitable economic policies, the continuous reduction in labour income inequality in the 1980s was driven by “cheap gains” of unemployment reduction which occurred naturally after the crisis of 1982.

<sup>74</sup> Chile: Social and Economic Indicators, 392-445.

This interpretation of the proximate cause of the decline in income inequality in the 1980s has implications for our wider understanding of the relationship between Pinochet's economic policy and income inequality. Many explanations have been offered for how Pinochet's orthodox reforms might have impacted income inequality, including: the weakening of labour unions and social movements; a lack of governmental protection from the negative impacts of privatisation and liberalisation; an increasingly powerful elite; an over-reliance on handouts that neglected the middle of the income distribution, and poor access to higher education.<sup>75</sup> The data presented in this dissertation do not go far enough to address the veracity of these claims in details, due to the complexity of testing the causes of inequality, as noted by Rodriguez-Weber.<sup>76</sup> However, when evaluating candidate causes of changes in inequality under Pinochet, future studies must identify a policy shift which would cause total income inequality to rise in Gran Santiago, even as regular labour income inequality declined across the country.

In summation, section 5 has gone some way towards addressing the questions left unanswered in section 4. If Gran Santiago is not representative of income inequality across all of Chile, then how do my results suggest that the distribution of income might have changed across the whole country from 1982-1991? And what does this tell us about the impact of Pinochet's economic policies on inequality? Neither has been answered fully. However, section 5.1 demonstrates that while total income inequality may have increased across the 1980s, this was not due to changes in regular labour income inequality, which actually declined. While doubt has been cast on the veracity of claims about Chilean inequality based on the EOD, not enough has been done to fully dismiss the existing consensus that total income inequality increased under Pinochet. Then, section 5.2 has shown that the proximate cause of decreasing regular labour income inequality in the 1980s was decreasing unemployment after the 1982 crisis, which has implications

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<sup>75</sup> Rodriguez-Weber, "Political Economy", 60-61; Andrés Solimano, "Three Decades of Neoliberal Economics in Chile," *UNU-WIDER Research Paper 2009/37* (2009): 29-30; French-Davis, *Neoliberalismo*, 330; Palma, "Homogenous Middles", 40-49; Hojman, "Poverty and Inequality", 84; Beyer, "Educación y Desigualdad", 111.

<sup>76</sup> Rodriguez-Weber, "Political Economy", 45.

for future studies of the fundamental determinants of income inequality under Pinochet.

## **6. Conclusions**

The narrow question outlined at the beginning of this dissertation asked: “is it accurate to assume that trends in inequality in Gran Santiago measured by the EOD are nationally representative?” In this dissertation I have argued “no.” By using novel social tables and wage data from the National Accounts, I construct a Gini coefficient time series for 4 Chilean regions, finding Chilean income inequality to have been highly regionally heterogeneous in the period 1982-1991. Using longer term indicators of internal migration and regional GDP per capita, I suggest that this regional heterogeneity probably characterised income inequality across the entirety of Pinochet’s rule, not just the second half.

This finding has major implications for our understanding of inequality under Pinochet. In estimating regular labour income inequality at a national level, I tentatively suggest that national trends in inequality calculated from representative sources may produce very different Gini coefficients for the Pinochet period. While total income inequality may have increased across the 1980s, this was not due to changes in regional labour income inequality, which actually decreased across the period. Although this is not enough to entirely dismiss our current understanding of inequality, which is based on the EOD, I make the case that future research should attempt to construct a more representative source from which to calculate income inequality. Finally, I consider the proximate causes of decreasing labour income inequality in the 1980s, arguing that it was a result of decreasing unemployment in the aftermath of the 1982 crisis. This finding should inform how future studies approach the causal relationship between Pinochet’s policies and inequality: candidate causal factors must be able to explain a simultaneous increase in total income inequality in Gran Santiago and a nationwide decrease in regular labour income inequality.

In hoping to answer the broader question of whether Chile’s contemporary high-income inequality has its roots in the Pinochet period, this dissertation is subject to many limitations. Firstly, the time series that I constructed only covers the latter half of the Pinochet period and does not cover ex-ante or ex-post trends in inequality at all. Furthermore, only partial aspects of income inequality are measurable with the sources used in this dissertation, with the focus simply on regular labour income inequality across 4 large regions. However, this makes two major contributions to the wider debate on whether Chilean income inequality has its roots in Pinochet’s dictatorship. Firstly, I show that the current measures of inequality used, the EOD are not representative, before demonstrating that if income inequality did increase in the second half of Pinochet’s rule, this was not due to changes in relative wages.

Much more work must be done to fully answer the question. The first step would be to construct new, nationally representative social tables for the entire Pinochet period, ideally splitting Chile into its 13 administrative regions, rather than 4 aggregated ones. This would not be a simple task, but the success of Rodriguez-Weber in doing this for the earlier period of 1850-1970 suggests that it might one day be possible. Then, scholars should attempt to find sources which capture more information on non-labour incomes under Pinochet – it is not unreasonable to suggest that the tax data needed to do this could one day be found.<sup>77</sup>

In 2024, 48 years after the creation of Chile’s regional structure, Chilean regional governments will be elected by popular vote for the first time.<sup>78</sup> This may reflect a fitting conclusion to a decades-long process of frustrated attempts to address regional inequality in Chile; political authority is being decentralised, and power lent to regional governments. Chile may indeed have “woken up”. But historians have a long way to go before conclusively deciding when it fell asleep.

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<sup>77</sup> As mentioned above, Flores et al. show that the tax data for 1980-1986 is currently missing. Flores et al., “Top Incomes in Chile”, 7.

<sup>78</sup> Ministerio del Interior y Seguridad Pública, “Ley 21.073”, accessed May 23 2020, available at: <https://www.diariooficial.interior.gob.cl/publicaciones/2018/02/22/41990/01/1356576.pdf>.

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## Appendix 1. Example of a social table from the National Accounts

### Employed population by economic activity in the urban and rural sectors, by region and for the whole country

March 1982

(Thousands of people)

*Source:* Department of Economics, University of Chile

Economic Activity	Whole Country					Urban					Rural				
	Total	Regions I to IV	Regions V to VII	Regions VIII to XII	Gran Santiago	Total	Regions I to IV	Regions V to VII	Regions VIII to XII	Gran Santiago	Total	Regions I to IV	Regions V to VII	Regions VIII to XII	Gran Santiago
<b>Total Employment</b>	<b>3164.7</b>	<b>295.6</b>	<b>681.5</b>	<b>833.7</b>	<b>1353.9</b>	<b>2468.2</b>	<b>241.7</b>	<b>442.6</b>	<b>490.8</b>	<b>1293.1</b>	<b>696.5</b>	<b>53.9</b>	<b>238.9</b>	<b>342.9</b>	<b>60.8</b>
<b>Production of goods</b>	<b>1354.1</b>	<b>124.7</b>	<b>341.4</b>	<b>427.6</b>	<b>460.4</b>	<b>794.9</b>	<b>84.1</b>	<b>150.4</b>	<b>148.0</b>	<b>412.3</b>	<b>559.3</b>	<b>40.6</b>	<b>101.1</b>	<b>279.5</b>	<b>48.1</b>
<i>Agriculture, hunting, forestry, and fishing</i>	633.5	58.9	214.8	274.0	85.7	130.5	25.6	39.4	25.5	40.0	503.0	33.4	175.4	248.5	45.7
<i>Exploitation of mines and quarries</i>	61.3	26.0	11.9	18.6	4.8	52.9	21.0	8.5	18.6	4.8	8.4	5.1	3.3	-	-
<i>Manufacturing industries</i>	479.5	26.9	80.8	92.2	279.6	449.9	25.7	72.9	73.6	277.7	29.6	1.3	7.8	18.6	2.0
<i>Construction</i>	179.8	12.9	34.0	42.7	90.2	161.6	11.9	29.5	30.3	89.9	18.2	1.0	4.5	12.4	0.4
<b>Production of Services</b>	<b>1588.1</b>	<b>142.6</b>	<b>290.4</b>	<b>368.5</b>	<b>786.5</b>	<b>1464.2</b>	<b>130.9</b>	<b>247.5</b>	<b>309.4</b>	<b>776.3</b>	<b>123.9</b>	<b>11.7</b>	<b>42.9</b>	<b>59.1</b>	<b>10.2</b>
<i>Trade</i>	534.6	56.1	93.5	110.8	274.3	503.5	53.6	83.3	96.1	270.5	31.1	2.4	10.2	14.7	3.8
<i>Government and financial services</i>	309.8	32.7	62.0	74.8	140.2	272.8	28.8	51.4	53.6	139.1	36.9	4.0	10.7	21.2	1.1
<i>Personal and household services</i>	402.6	26.9	73.7	92.1	209.9	372.1	24.0	62.1	79.7	206.3	30.5	2.9	11.6	12.4	3.6
<i>Social and community services</i>	341.1	26.9	61.2	90.9	162.1	315.7	24.5	50.7	80.1	160.3	25.4	2.4	10.4	10.8	1.8

<b>Transport, storage, communications, and public utilities</b>	<b>216.4</b>	<b>27.7</b>	<b>49.2</b>	<b>36.6</b>	<b>102.8</b>	<b>203.1</b>	<b>44.2</b>	<b>44.2</b>	<b>32.4</b>	<b>100.3</b>	<b>13.3</b>	<b>1.6</b>	<b>5.0</b>	<b>4.2</b>	<b>2.5</b>
<b>Activities not well- specified</b>	<b>6.1</b>	<b>0.5</b>	<b>0.5</b>	<b>1.0</b>	<b>4.2</b>	<b>6.1</b>	<b>0.5</b>	<b>0.5</b>	<b>1.0</b>	<b>4.2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>

*Source:* National Accounts, May 1983, 1238-1239.

## Appendix 2 – Formalised equations for wage multiplier estimation

This appendix presents the formalised equations used to estimate regional differences in wages across regions, as outlined in section 3.

### Estimate 1 – Real GDP multiplier

The real GDP per capita multiplier is specified as:

$$(1) \text{ Estimated Wage} = \bar{W}_s \times \frac{\text{GDP/Capita}_r}{\text{GDP/Capita}_n}$$

Where W is the average wage for the sector (s) and M is GDP/Capita for the region (r) and the national average (n).

### Estimate 2 – Minimum Wage Multiplier

The minimum wage multiplier is specified as:

$$(2) \text{ Estimated Wage} = \bar{W}_s \times \frac{M_r}{M_n}$$

Where W is the average wage for the sector (s) and M is the minimum wage for the region (r) and the national average (n).

### Linear interpolation of minimum wages, 1984-1987

To interpolate minimum wages from March 1984 to August 1987, I used the equation:

$$\text{Interpolated Minimum Wage} = M_{\text{March 1984}} + \frac{M_{\text{September 1987}} - M_{\text{September 1984}}}{7}$$

Where M is the minimum wage for each month and year. 7 is the number of 6-month periods for which data has to be interpolated, from March 1984 to August 1987.

### Appendix 3 – Estimated wage multipliers, 1982-1992

This appendix the results of my regional wage multiplier estimates, as specified in appendix 2. National average wages are multiplied by these numbers to give an estimate wage for each sector and each region.

Date	Wage Multiplier 1 (GDP per Capita)				Wage Multiplier 2 (Minimum Wage)			
	North	Centre	South	RMS	North	Centre	South	RMS
<b>September 1982</b>	0.8119658	0.8336199	1.136331	1.347892	1.068119	1.015361	0.90987	1.066098
<b>March 1983</b>	0.8005987	0.8672239	1.143746	1.260858	1.068654	1.016237	0.9079143	1.06291
<b>September 1983</b>	0.8005987	0.8672239	1.143746	1.260858	1.068676	1.01626	0.9078341	1.062933
<b>March 1984</b>	0.8245194	0.8722513	1.126997	1.247969	1.067207	1.014519	0.9102196	1.066875
<b>September 1984</b>	0.8237272	0.8722513	1.127262	1.249361	1.067199	1.014524	0.9102178	1.066873
<b>March 1985</b>	0.8292616	0.8817067	1.108062	1.24045	1.067012	1.014373	0.9099033	1.067466
<b>September 1985</b>	0.8281603	0.8817067	1.106903	1.242308	1.067006	1.014376	0.909902	1.067465
<b>March 1986</b>	0.7857821	0.8116013	1.085398	1.211549	1.067189	1.015455	0.9089355	1.06796
<b>September 1986</b>	0.7857821	0.8116013	1.085398	1.211549	1.067184	1.015458	0.9089345	1.067959
<b>March 1987</b>	0.7891651	0.7635939	1.060738	1.204592	1.066823	1.015441	0.9087183	1.068443
<b>September 1987</b>	0.7891651	0.7635939	1.060738	1.207447	1.06682	1.015443	0.9087175	1.068442
<b>March 1989</b>	0.8388046	0.8352559	1.184249	1.504897	1.066422	1.015404	0.9085969	1.066846
<b>September 1989</b>	0.8388042	0.8352559	1.184249	1.504897	1.066428	1.015363	0.9085878	1.06691
<b>March 1990</b>	0.8527021	0.8336015	1.197007	1.291465	1.065402	1.014971	0.9084861	1.069447
<b>September 1990</b>	0.8527021	0.8336015	1.197007	1.291465	1.073756	1.023	0.9091551	1.053386
<b>March 1991</b>	1.073932	1.023216	0.908885	1.054026	0.830381	0.8238915	1.220684	1.328953

*Source:* Author's own elaboration on Regional GDP Data, Population Data and Statistical Compendiums.