Master Course in
“Applied Labour Economics for Development”
(MALED)
2010/2011
Turin, Italy

DISSERTATION

Collective Bargaining Structure and the incidence on Income Distribution
Some insights to the Chilean case

Student: Gonzalo DURAN

Supervisor: Daniel KOSTZER
United Nations Development Programme
“Collective Bargaining Structure and the incidence on Income Distribution: some insights to the Chilean case”

Abstract

The high inequality in income distribution represents the *Dark Side* of the Chilean development model. Indeed, as the country achieves higher levels of GDP per capita each year, inequality figures increase or at best remain. This paper explores the hypothesis of distribution induced by collective bargaining. In this space, we declare that the Chilean model has failed to achieve a distribution induced by its own unions because of, among other factors, an incorrect degree of centralization in the collective bargaining system. In particular, how does the structure of collective bargaining affects the distribution of income? By using a simplified version of Kalecki’s distributive models and Atkinson’s empirical specifications, we conclude that the distribution induced by collective bargaining has a statistically significant role as well as the structure of it. By making a micro-simulation exercise we can see that a change in Chilean structure of Collective Bargaining could improve the Gini coefficient by 7%.

Keywords: Collective Bargaining, Income Distribution, Inequalities
JEL Codes: J51, D33, O15

This version: October 15th, 2011

---

1 I appreciate the comments of Daniel Kostzer any errors or omissions are my responsibility.
Email: giduran@puc.cl
INDEX

1. Introduction ........................................................................................................................................... 4

2. Literature Review ................................................................................................................................. 5
   2.1 Literature Review based in the estimation of the macroeconomic impact of collective bargaining ................................................................. 5
   2.2 Literature Review on income distribution ......................................................................................... 8
   2.3 The chilean system .......................................................................................................................... 11

3. Theoretical Framework .......................................................................................................................... 14
   3.1 The Kaleckian Theorical Framework ................................................................................................. 15
   3.2 Incorporating the collective bargaining effect .................................................................................. 16
   3.3 The scissors of Inequality and the “Wages - Productivity Gap” ...................................................... 17
   3.4 The transmission mechanism to an improvement in income distribution ........................................ 19

4. Empirical Model .................................................................................................................................... 23
   4.1 Econometric Model Specification .................................................................................................... 23
   4.2 Rationale and theoretical implications of the variables included in the models............................... 25
   4.3 Data Set: variable description and source of data ............................................................................ 26
      4.3.1 GINI .......................................................................................................................................... 26
      4.3.2 RATIO D10/D1 ......................................................................................................................... 27
      4.3.3 LEVEL .................................................................................................................................. 27
      4.3.4 COVERAGE (COV) ............................................................................................................... 27
      4.3.5 UNION DENSITY (UD) ......................................................................................................... 27
   4.4 Estimating Model .............................................................................................................................. 31
      4.4.1 Model N°1 estimation results .................................................................................................... 32
      4.4.2 Discussion of the results of model No.1 .................................................................................... 32
      4.4.3 Model N°2 estimation results .................................................................................................... 33
      4.4.4 Discussion of the results of model No.2 .................................................................................... 34
      4.4.5 Model No.3 estimation results ................................................................................................ 35

5. Policy Recommendations ....................................................................................................................... 37

6. Final Remarks ......................................................................................................................................... 39

References .................................................................................................................................................. 41

ANNEX: ADJUSTED AND OBSERVED VALUES ...................................................................................... 46
1. Introduction

1973 implied a structural change in Chile. In the field of collective bargaining, this is decentralized to the maximum level, not allowing multi-employer, sectoral bargaining nor national type agreements. Coordination is not visible either.

For years, the Gini coefficient for Chile has remained stagnant at levels above 0.5, thus denoting a lack of progress in terms of improving the distribution of income. In this scenario, collective bargaining plays a non-transferable role that, given the background, seems to have failed to reaching the expected results.

If the goal is to improve income distribution through trade union actions, Is the model structure of collective bargaining relevant?, How does it affect the centralization and coordination levels?

The two main hypotheses are: (1) increased coverage of collective bargaining improves the distribution of income; and (2) centralized collective bargaining improves the distribution of income.

Both the question and the hypotheses are empirically addressed by using simple a regression model and applying micro-simulations techniques, both in transversal and in time series. The data used comes from the ICTWSS V.3.0 database of the Amsterdam Institute for Advanced Labour Studies (AIAS) and from administrative bases of the Ministry of Labor and the Central Bank, for the Chilean case.

The main contribution of this master’s degree thesis falls within the context of industrial relations and its effects on income distribution, both public policy concern issues.

This paper is structured as follows: Section 2 presents a review of related literature; Section 3 presents the theoretical framework; Section 4 is the empirical part; Section 5 present the Policy Recommendations, and section 6 concludes.
2. Literature Review

The impact of collective bargaining on the distribution of income has a vast development and treatment on both economic and legal articles. Nevertheless, there are only a few who, taking collective bargaining as a fact, are willing to debate about the best system when it comes to improving wage dispersion. As shown below, starting from the contribution of Calmfors and Drifill (1988), their studies focus on rivalizing models of collective bargaining as for the different macroeconomic effects that each model might have, diminishing them exclusively to employment and wages.

2.1 Literature Review based in the estimation of the macroeconomic impact of collective bargaining

There is a vast literature focused on estimating the economic impact of collective bargaining. Particularly, the studies aim to estimate the employment elasticity of collective bargaining and the wage elasticity of collective bargaining.

Calmfors and Drifill's (1988) study is a must-see reference. The authors theorize and prove that there is a non-monotonic relationship between the degree of centralization of collective bargaining and economic performance. The study in question is the origin of the so called “hump-shaped curve of wage bargaining”. According to this hypothesis, highly centralized systems (national level) or highly decentralized ones (company level and/or plants) are associated with higher rates of employment and moderate wage increases. Between these two poles, the intermediate-level collective bargaining (sectoral) would have greater impact on wages and unemployment (Calmfors and Drifill 1988, Calmfors 1993).

Calmfors’ further studies would show mixed evidence: in some cases, there is a monotonic relationship and in others, there is none (being the classic hump shape). Drifill (2006), on

2 In this section we discuss three strands of research that, once interwoven, form the basis substrate of this article. The lines are: collective bargaining and macroeconomic impacts, impacts on income distribution, and finally the Chilean system of collective bargaining.
the other hand, after reviewing the evidence for recent years concludes that the original prediction of the hypothesis would be robust.

Aidt and Tzannatos (2008) arrived to Calmfors and Drifill (1988) same result. They show, using a graphical modeling, the different responses to a productivity shock that an economy might have. In this space, the “negotiated real wages” curve would have a steeper slope for both centralized and fully decentralized systems. Therefore, the impact on employment is more severe in the intermediate model, in industrial bargaining.

**Figure 1:**
**Collective Bargaining systems and their impacts on economic equilibriums**

For Freeman and Gibbons (1995) the degree of centralization of collective bargaining can be illustrated in a cost-benefit scheme. According to them, the costs fall as the degree of centralization rises. This suggests a gain in efficiency by taking control of oligopolistic firms’ “rent-sharing”. However, there is a point at which the costs outweigh the benefits. Indeed, to Freeman and Gibbons, over certain level of centralization (pure), the costs are very high due to the loss in flexibility.

Beyond the degree of centralization of collective bargaining, there is a current of research that has focused on the level of **coordination**.
To Ruesga et al (2007) it is coordination and not the degree of centralization what drives to a better macroeconomic performance. In the words of the authors: “... due to a higher coordination, (unions and employers) succeed in adjusting wages to economic developments. Besides, when entrepreneurs are highly coordinated, they can match wage increases in all businesses, so the conditions of competition are not substantially altered” [pp. 55, Ruesga et al (2007)]. Borghijs et al (2003) have a similar view that refers to coordination as the degree of consensus sought by the actors, but from informality.

Dussaillant (2008), quoting Flanagan (2003) defines coordination as “the level at which decisions taken by unions and employers have been taken with a broad view of all the parties involved” [pp.139, Dussaillant (2008)].

Boeri and van Ours (2008) show that even decentralized collective bargaining (at firm level) can be coordinated through trade unions, at both sectoral or national levels.

Nevertheless, coordination is more likely in presence of centralized schemes, but also occurs in decentralized models. The classic example here is Japan. At this point, Flanagan (2003) enriches Calmfors and Driffill’s hypothesis, pointing out that there would actually be a monotonic relationship between economic performance and degree of coordination. Hence, Japan’s low rates of unemployment. Other authors, such as Park (2004), point out that coordination and centralization through “open shops models” do better in terms of economic growth.

As from a trends analysis, the monitoring of OECD countries, show a movement towards decentralization of collective bargaining. For Booth et al (2000), this corporatization of collective bargaining has been lead by the employer side, in a constant battle to ease collective bargaining and labor markets.

Studies that have measured coordination recognize the methodological difficulty that this means (Dussaillant 2008, Flanagan 1999). Ruesga et al (2007) are based on the distinction proposed by Traxler and Kittel (2002), distinguishing between vertical and horizontal coordination. Still, Flanagan himself (1999) notes that given the actual ambiguities in measuring the degree of centralization of collective bargaining, it is preferable to use coordination to estimate macroeconomic effects.
At this point, Traxler (1996) refers to the disruption of industrial change thesis, where the decline of the industrial sector is contrasted with the booming of the services sector. For the author, disruption implies the decline of collective bargaining in favor of individual bargaining.

Borghijs et al (2003), show that the tendency towards decentralization has been accompanied by an increase in the degree of coordination. Therefore, to reach a non ambiguous conclusion about the effects on the labor market is not a possible conclusion.

2.2 Literature Review on income distribution


In this sense, one of the classical approaches is the one followed by Card (1992) and also by Hirsch and Schumacher (1998). According to them, the wage distribution is compressed because the effect of collective bargaining is especially more powerful (in terms of the reward) in less qualified workers. Kahn’s (2000) research yielded the same results on a sample of 15 OECD countries: “... greater coverage of collective bargaining increases relative wages for less skilled men and women” [pp. 577, Kahn (2000)]

However, taking collective bargaining as a fact, very few researches actually rival models or systems of collective bargaining, leading to a better distribution of income. Blau and Kahn (1996) declare that institutional factors such as the extension of the coverage of collective bargaining can partially explain the differentials in wage inequality. The authors

\(^4\) Gosling and Machin (1993) estimate that the de-unionization of workers might have increased wage dispersion in Britain between 15% and 20%
base their point in the wage gap between unionized workers with non-unionized ones. In this regard, decentralized models such as United States’, show greater wage dispersion, hence an increased wage inequality than those systems where bargaining is more centralized. They conclude that centralization of collective bargaining reduces wage differentials between the median and the first decile of income.

Lucifora (1999) comes to similar recommendations indicating that labor market regulations may have important effects on the distribution of wages. Claudio Lucifora focuses on the minimum wage by force of law, anti-discrimination agreements and mandatory extension of collective bargaining.

Dell’Aringa and Pagani (2005) provide valuable evidence from the Eurostat European Structure of Earnings Survey. They confirm that: “... the decentralization of bargaining produces more wage inequality when it is radical and widespread, and when accompanied by a process of de-unionization” [pp. 21, Dell'Aringa and Pagani (2005)]

For Visser and Checchi (2009), the tendency indicates that those countries that are characterized by a low coverage of collective bargaining experience a higher degree of inequality. In contrast, those with higher coverage are more egalitarian. For the authors, a reduction of union density is transferred to a lower coverage of collective bargaining which increases inequality. From a tendencies analysis, they confirm that out of 25 countries, 19 of them reduced union presence and experienced increases in inequality.

At this level, one of the most recent researches belongs to Dahl, Maire and Munch (2009), who, taking the case of Denmark, found out that decentralization of collective bargaining increases wage dispersion. Quoting Fitzenberger, Kohn and Lembcke (2008) they show that the paradigmatic German case (which has shown an evident tendency towards decentralization of collective bargaining) shows that wage dispersion is higher in the bargaining at enterprise level, as opposed to the bargaining at the level of economic activity branch. This type of evidence might bring important insights in terms of equity.
The U.S. Economic Policy Institute, using the information contained in Venn’s study (2009) shows that greater coverage in collective bargaining means leads to lower levels of inequality 90/10.

The evidence shown in NCTU (2009) points in Venn’s (2009) direction and reveals another effect: greater coverage of collective bargaining might have effects on productivity improvements (through the effect of coordination). The positive correlation between productivity and collective bargaining may have been proven previously by the studies of Belman (1992) and Freeman (2007).

In a recent publication, Traxler and Brandl (2009), argue that "high coverage” collective bargaining gives more democracy to industrial relations. The authors prove that such structure does not come into conflict with the macroeconomic efficiency. Indeed, taking a 10-year period, they found evidence in favor of an improvement in income distribution and in youth unemployment rates.

Finally, Hayter and Weinberg (2011) confirm to this date, the clear pattern between greater coverage of collective bargaining and lower inequality in income distribution. At this level, centralized systems are more likely to have higher coverage in collective bargaining (AFL-CIO 2007).
2.3 *The chilean system*

Since 1973, the Chilean system operates through collective bargaining at corporate level, giving no chance whatsoever to negotiate at higher levels (neither by a group of companies, nor by branch of economic activity, or nationally). Barrera (1995) defines it as an excessive decentralization.

The Chilean system of collective bargaining is the only one of a set of 53 countries (OCDE group plus annexed countries, see Visser 2009) where the transition from a high level of centralization to a lower one, takes place in a context of repression, in this case, under the dictatorial regime of Augusto Pinochet (1973-1990).

As a matter of fact, when reviewing the ICTWSS V.3.0 database statistics of the Amsterdam Institute for Advanced Labour Studies (AIAS), we can see that for the period between 1960 and 2010 only 5 countries have a standard deviation greater than 0.9 in regards to the degree of centralization in collective bargaining⁵ (Chile, along with New Zealand, Ireland, Israel and Sweden). This is the group of countries that have experienced greater changes in the structure of collective bargaining. Among them, Sweden and Israel have changed more gradually, without jumps of over "a degree" at a time. Ireland, on the other hand, is the most recent case that due to the economic crisis in which it was involved, was forced to change from grade 4 to 1. New Zealand is another case of a radical change, going from grade 4 to 1 when in the late 80's' implemented the Employment Relations Act⁶, anyhow, under a democratic regime. Chile, on the other hand, went from a grade 3 in 1972 to a grade 0 between September 1973⁷ and July 1979 and then to a grade 1 along with the coming into force of the "Plan Laboral". It is, therefore, the most significant change in all the countries contained in the AIAS database.

---

⁵ According to the AIAS classification, the degree of centralization or level refers to the dominant. This is classified as follows: 5 = central or national level; 4 = central or national level, with additional sectoral/local or company bargaining; 3 = sectoral or industry level; 2 = sectoral or industry level, with additional local or company bargaining; 1 = local or company bargaining

⁶ See Morrison (1996)

⁷ On September 18, 1973 is issued a decree which suspended the filing and processing of lists of demands, as well as work permits to attend union issues (Barrera, 1981).
The collective labor relations model and its institutions, such as collective bargaining, strikes and trade unions have all had a clear structural change throughout the history of Chile. In 1979, under one of the most violent and revolutionary military dictatorships in Latin America\(^8\) (Gazmuri 2001, Rojas 1988), a new labor regulatory framework is presented, after a 6-year long ban in terms of collective bargaining.

According to Barrera et al (1985), the new regulation encourages the division of workers\(^9\), forbids the participation of workers in corporate management issues (by limiting the content of the subjects to be negotiated), limits collective bargaining for smaller companies to the maximum, and limits the effectiveness of strikes by allowing both dissidence and legal replacement of striking workers. The scope of application of collective agreements is restricted only to the list of people signing it (closed shop).

This framework is the **basis** of the current collective labor relations system in Chile.

The new labor institutions beginning in July 1979, with the so-called "Plan Laboral"\(^10\) (DL No. 2200, DL No. 2755, DL No. 2756 and DL No. 2758) causes a “jump down” of 42% in the membership association statistics\(^11\).

Consecutively, for the past 32 years, the unionized population and, by default, those who have the possibility of bargain collectively, has grown at a rate considerably lower than the records of employment figures. In fact, trade union members have increased by 48% in the period between 1979 and 2010. However, for the same period, the employed figures have grown by 123%. Therefore, we can see a decrease in the probability of being unionized in

---

\(^8\) The military dictatorship in Chile lasted from September 11, 1973 to March 11, 1990.
\(^9\) Negotiation cannot be made separately, employees not necessarily negotiate all together (multi-unionism and bargaining groups arise), public employees and other workers are excluded from collective bargaining.
\(^10\) To review the features of the "Plan Laboral", we suggest Muñoz (1985).
\(^11\) This statistical gap has two components: the remaining of inactive unions due to recess, or to the expiration of their legal status (not fixed since the promulgation of the Labor Code); and the effect of both economic and repressive policies on the levels of affiliation (Frias, 1993).
recent years. This is reflected in a decrease of the “absolute\textsuperscript{12}” union density which goes from 19.4% in 1979 to 13.9% in 2010.

Dussaillant (2008), points out that the decrease of national union density is explained mainly by the impact of the industry sector. This fall would respond to the increasing globalization process and the trade opening experienced during the 90's.

For O'Connell (1999) the changes in labor institutions would be what have had the highest incidence (as happened in the New Zealand case). For the author, the Chilean case, along with the Peruvian, show a government-assisted decentralization. Here, Chile's legislation allows the existence of more than one union per company and more than one union organization as a collective bargaining representative.

From a legal approach, Rojas Miño (2001) warns that the incapacity to set up supra-company collective bargaining is a violation of the Trade Union Freedom Principle.

Another feature of the present status of collective bargaining in Chile is its almost exclusive presence in the productive strata of high productivity (or modern sector\textsuperscript{13}), as opposed to the extremely low presence in the rest of the production units (Durán, 2011).

The above mentioned intersects with the "Multi-Rut" phenomenon, or the multiplicity of legal forms typical of the modern sector of the economy (Durán 2011, Durán 2009, Durán and Kremerman 2007) that may lead to the maximum level of decentralization in collective bargaining. There are no longer negotiations by company, but by "RUT". Durán and Kremerman (2007) prove the awful consequences of this in trade union terms.

The high union atomization in Chile, hinders all efforts to coordinate collective bargaining, making the Chilean experience, something very different to what happens in Japan.


\textsuperscript{13} According to ECLAC’s classification. The labor market is set up in a heterogeneous way, with different development stages. The modern sector is highly productive and is related to large enterprises.
Regarding the link between distribution of income and collective bargaining, Durán (2009) provides an analysis of the economic performance of collective bargaining in Chile. Processing administrative data of real initial adjustments by collective bargaining, the author concludes that functional income distribution has worsened in Chile. On one hand, the surplus of capital has increased participation. On the other hand, the wage mass has fallen, and the economic performance of collective bargaining have not exceeded the real 1% average in the last year. In other words, the difference between being unionized and not is extremely low.

Despite Duran’s (2009) conclusions, a study made by the SOL Foundation (2010) emphasizes on the methodology used by the Chilean Department of Labor in order to capture the economic performance of collective bargaining. The award, still low in both amount and coverage terms, would be somewhat higher when considering the effect of the end of bargaining bond (among others). This element must be considered for further simulations.

3. Theoretical Framework

The theory underlying the research question of this article is in the field of income distribution.

The theoretical model takes elements from the pioneering model developed by Michal Kalecki in the mid 30's and documented at great length in Kalecki (1971). It includes Ingrid Rima’s considerations mentioned by Kostzer (2007), using a Right-to-Manage (according Boeri and van Ours explanations) scheme, and the inclusion of the analytical framework of Lorenz-Gini. It also introduces the newest considerations present in the “Oxford Handbook of Economic Inequality” (Salverda, Nolan and Smeeding (2009))14. The theoretical framework is summarized in a transitional four-quadrant graph.

14 The theory of distribution has been also developed by Thomas Piketty in a specification that introduces transfers from richer percentiles to poorer ones. Piketty (1994) is a re-distribution model induced by tax policies. The model used in this document focuses on the distribution induced by unions.
3.1 The Kaleckian Theoretical Framework

Kalecki (1971), develops a model of income distribution in which firms face imperfect competition\(^{15}\) (presence of oligopolies), and where gross profits are defined as the value added after serving the payroll.

\[ \Pi_K + W_K = \delta (W_L + M) \]  

(1)

Where:

\[ \Pi_K = \text{Firm Earnings}; \quad W_K = \text{Capitalist Overhead} \]
\[ \delta = \text{Mark-up}; \quad W_L = \text{Payroll}; \quad M = \text{Nonwages Costs of production} \]

Kalecki's model assumes the existence of two classes: capitalists, business owners, and wage-earning employees, who sell their labor to businesses. From (1), it is possible to represent the share of wages in value added of a given firm (industry or country):

\[ \theta = \frac{W_L}{W_L + \delta (W_L + M)} \]  

(2) \[ \Rightarrow \quad \theta = \frac{1}{1 + \delta (j + 1)} \]  

(3)

Equation (3) indicates the inverse relationship between the mark-up and payroll participation. Consequently, and considering that the share of profits and revenues for the capitalist (salaries in the Kaleckian nomenclature) are complemented by participation in the product, we have:

\[ 1 - \theta = \frac{\Pi_K + W_K}{Y} \]  

(4)

Equations (3) and (4) show that a higher payroll means greater participation of the working class in value added and lower participation of the capitalists (in the a la Kalecki model).

3.2 Incorporating the collective bargaining effect

Collective bargaining, thus compressor of wage distribution (see the review of literature), allows to increase the share of wages in value added, improving the contribution of labor in functional income distribution.

Vogel (2008), using a “Right-to-Manage\textsuperscript{16}” model for wage setting, argues that unions are consistent (in the empirical sense), compressing the wage distribution. This is achieved mainly through the effect of collective bargaining on less skilled workers.

Graphically, the \textit{Kaleckian} theory is reproduced by Vega (2007), based on a neo-Keynesian specification that integrates supply and aggregate demand with payroll and gross profit.

\textbf{Figure 2: Employment, Unemployment and Functional Income Distribution}

Following Kalecki (1971) and assuming a Right-to-Manage model, in which, the higher the bargaining power of the union, the higher the wage increase, the first effect of collective bargaining, is on the WL curve. Collective bargaining causes an increase of the $\alpha$ angle (depending on the rate of wage increase) throughout the entire section\(^{17}\).

The first order effect is the upward shift of WL (ceteris paribus). Then what happens to gross profits will depend. If both aggregate supply and aggregate demand remain in the same starting and ending points, profit will decrease and the distribution effect would be net. In the event that the aggregate demand increases by the greater purchasing power of wage-earning consumption – assuming that the average propensity to consume is higher among workers than among capitalists – then the sales of the firms (by way of volumes) will also increase, and ceteris paribus will increase the profit rate. In the latter case, the distribution of income will only improve if the decrease in gross profit due to higher wages is higher than the increased profits by greater purchasing power of workers. Finally, if wage increases are incorporated into the aggregate demand in the presence of unused installed capacity, production increases, idle decreases, and therefore wages may increase, as long as the profit rate for capitalists is maintained or increased.

In the latter case, the key to improving the distribution of income to the workers side would be given by the surplus capacity of firms and the fact that the decline in earnings due to collective bargaining is greater than the increasing effect of aggregate demand.

### 3.3 The scissors of Inequality and the “Wages - Productivity Gap”

A key point of the theoretical model of income distribution, which includes the effect of collective bargaining, is related to the criticism Kostzer (2007) performed about the neoclassical labor market, where theory and reality fail to underestimate the degree of monopsony inherent in certain industries. On this basis, workers sell their labor to companies that impose their own conditions. In this scheme, workers do not have the option to negotiate their actual productivity.

---

\(^{17}\) WL is not linear but exponential.
In this line, Glyn (2009), based on models of Michal Kalecki, reformulates the theoretical perspective of the effect it would have on the labor share, the observed empirical dissociation between growth in labor productivity and growth in compensations. A slower growth of wages regarding productivity leads to a decline in the share of work on the product$^{18}$.

**Figure 3: Scissors of Inequality and the Wages – Productivity Gap**

Collective bargaining as a labor institution (Boeri’s approach, 2008), partly corrects the inequality of origin, **the one that arises within the labour relationship**. The left side of Figure 3, shows the initial situation of Glyn (2009), it is possible to observe the dissociation between growth in productivity and wages. **The visual effect created by the two curves is what I will call “scissors of inequality$^{19}$”.** The impact of collective bargaining in the “closing” process of this scissors is more likely to be seen in countries that use centralized systems or with a higher degree of coordination (empirical evidence of the latter is provided by the **WoW 2008**).

---

$^{18}$ The “wage - productivity” gap has been widely studied in the United States by the Economic Policy Institute (see Mishel and Shierholz (2011)), and also by ILO’s International Institute for Labour Studies (The World of Work Report- WoW 2008); in Chile, contributions of Vega (2007) and Frigolett (2010) stand out.

$^{19}$ The gap must also be analyzed according to the framework of the labor market heterogeneity that identifies 3 productive sectors: modern stratum, intermediate stratum and traditional stratum. The opening intensity of the scissors of inequality is greater in the modern stratum and smaller in the traditional one (Durán, 2011)
Therefore, following Kalecki (1971), collective bargaining, leads to a reduction of the gap and to an improvement in labor's share in the product (increases the \( \alpha \) angle in Figure 2, \( WL \rightarrow \) decreases the mark-up “\( \delta \)”). In graphic terms, unpaid productive surplus decreases - UPS (right side of Figure 3).

### 3.4 The transmission mechanism to an improvement in income distribution

Finally, this theoretical modeling closes with the analysis of the transmission mechanism to a measure of income distribution. The Gini Index\(^{20}\) is used for these purposes.

In order to measure inequality, there are graphic and synthetic indicators. Among the first ones, we can find the Lorenz curve and the curve of Pen\(^{21}\), while in the case of the indices, we find those from the Lorenz family (or derived from the Lorenz curve), along with those from the family of the entropy theory (Theil, Atkinson), and the percentile ratio indexes.

The Gini coefficient comes from the family of Lorenz and has theoretical foundations based on economics and sociology, that is, is more than just a statistical indicator. In fact, the Gini coefficient is based on Rawls' “Social Justice Theory” and on Runciman’s\(^{22}\) Theory of Relative Deprivation. Meanwhile, the Theil and Atkinson indicators are based on the Theory of Entropy (see Jenkins et al (2009)).

Furthermore, for Amartya Sen, the Gini coefficient has properties that make it superior to other measures units that seek to measure inequality\(^{23}\). In addition to the above, the Gini is preferred over other indicators, due to the ease of both its calculation and interpretation (Medina 2001).

---

\(^{20}\) The Gini Index corresponds to the Gini area expressed in percentage terms - is the distance from full equality and effective distribution, therefore is the area not covered by the Lorenz curve; it takes values between 0 and 1. The closer it is to 1, the more unequal the distribution.

\(^{21}\) A good document that reviews the various measures of inequality: Jenkins et al (2009).


\(^{23}\) One of the most important properties is the "scale independence", an absent issue statistical dispersion indicators, such as Variance.
Following Kostzer (2011), a simple way to calculate the Gini index is given by a bi-equation system of geometric deduction:

\[ L = \frac{1}{2} \sum (S_j + S_{j-1}) r_j \quad (5) \Rightarrow G = \frac{5,000 - L}{5,000} \quad (6) \]

Equation 5 represents the relative distribution of income. It forms a cloud of points that shows what cumulative percentage \((S_j + S_{j-1})\) of income a particular group of the population takes. For example, the wealthiest 10% \((r_j=10)\) accumulates a 47.5% of income. Equation (6), on the other hand, is one of the many ways one can calculate the Gini Index. In this case, considering that the goal is to calculate the area of concentration or “Gini area” and that the triangle formed under the diagonal, has an area equal to 5,000, the result comes from the difference.

If \(L=0 \rightarrow G=1\) (perfect inequality), while if \(L=5,000 \rightarrow G=0\) (perfect equality). Consequently, the negative relationship indicates that the higher \(L\), the lower \(G\).

The arithmetic impact of collective bargaining suggests a distribution between the groups \((S_j)\) that form the cloud of points on the Lorenz curve. In particular, increases the relative weight in the cumulative function of the lower quantiles \((r_j)\) and decreases the higher ones. This causes an increase in \(L\) and a decrease in \(G\). The impact on the Gini is similar to that caused by a system of tax-induced redistribution (as pointed out by Piketty (1994)). As a result, in collective bargaining, the higher the level of coverage (more cumulative impact on \(r_j\)), the bigger the chance of causing improvements in income distribution in a measure such as the Gini index (this is the distribution induced by unions shown in Figure 4).

\[ G(t) = 2 \int_0^t (t - L(t)) dt \]

---

24 The formulas are due to estimate the geometric areas formed under the 45° diagonal, where the ordinate axis represents the cumulative percentage of income; and the abscissa axis the cumulative percentage of families. Therefore, the 45° diagonal reflects the equal distribution of wealth.

25 Chilean case, according to 2009 CASEN, using labor income per household.

26 Base times height divided by 2 \(\Rightarrow 100 \times 100 / 2\)

27 Another way to express the Gini, also following Simpson’s rule, but in continuous terms, is the following.
In this model, the distinction between centralized or decentralized collective bargaining affects the $\alpha$ angle, and the gap $\Delta$ in Figure 5. It also produces effects in the fourth quadrant (gini), whereas increases the percentage of the population receiving higher percentage of income.
Based on the hypothesis of Calmfors and Drifill (1988), the model developed here (“Right-to-Manage” Union Induced Income Distribution) will have better performance (greater elasticity collective bargaining / gini) under schemes where the likelihood to have wage dispersion is lower → models of intermediate-high centralization, coordinated and intended to avoid fragmentation.
4. Empirical Model

4.1 Econometric Model Specification

The empirical counterpart of the theoretical model consists of three models: the first, a simple linear regression, takes a set of countries where collective bargaining is applied and analyzes the impact of coverage on both wage dispersion and income distribution indicators. The second model takes the cases of Chile and New Zealand and considers the same exercise of the first model, but in an inter-temporal perspective; finally, the third model involves the use of micro-simulation techniques, it takes the Chilean case for 2009, and simulates the effect of a change in the structure of collective bargaining on the Gini coefficient.

The three models are based on Atkinson and Brandolini (2009), who, using the gini coefficient as a dependent variable, analyzed the impact of a set of variables, including the degree of coordination in wage setting.

The following specifications seem to be more close with the initial question of this research: How do levels of centralization and coordination of collective bargaining affect the distribution of income?

Model No.1: Cross Sectional Country Sample

\[ \ln GINI_i = f(COV_i, LEVEL_i, UD_i, ... ) \]  \hspace{1cm} (7)

Model No.1 explores the relationship between the coverage of collective bargaining (COV) and the levels of inequality in income distribution (LnGINI). Besides, degree of centralization (LEVEL) along with union density (UD) are also used as explanatory variables of the natural logarithm of the Gini coefficient.
The specific hypothesis in this model are: (a) a greater degree of coverage in collective bargaining, improves the Gini coefficient (reduces it); (b) a greater degree of union density improves the Gini coefficient, (c) a greater degree of centralization in collective wage determination, improves Gini; and (d) by transitivity, a greater degree of centralization in collective bargaining, improves coverage.

Model No.2: Time Series Regression Model

\[ \ln GINI_T = f(UD_T, LEVEL_T, COV_T, ...) \] (8)

Model No.2 explores the relationship between the degree of centralization of collective bargaining and inequality in income distribution from a time-based perspective. To do this, two cases have been selected: Chile (1961-2008, annual data) and New Zealand (1984-2010, biannual data).

In this case the hypothesis are: (a) greater union density has positive effects on income distribution (reduces the Gini coefficient); (b) greater coverage in collective bargaining also has a positive impact on income distribution and finally, (c) a greater degree of centralization of collective bargaining is favorable for the distribution of income.

Model 3: Cross Sectional Regression Model

\[ GINI_i = f(LEVEL_i, COV_i, ...) \] (9)

Finally, the third model examines the response of the Gini coefficient to a micro-simulated change on the structure of collective bargaining in the Chilean case. For this we work with Casen Survey for 2009.
4.2 Rationale and theoretical implications of the variables included in the models.

Models (No. 1, No. 2 and No. 3) are characterized by being simple linear regressions (SLR). SLR models have been chosen since they are considered necessary to set the appropriate ground level to future work with interactions and multiple variables.

The inclusion of variables primarily responds to a criterion of information availability. In fact, model No.2 was impossible to reproduce, including a thorough series for the collective bargaining coverage variable, due to the limited data for the period before the start of Pinochet’s "Plan Laboral" (1979)\(^{28}\).

Another variable that is often used in related studies is the union wage premium (Lewis 1965, Pencavel 1977, Freeman 1993, Atkinson 1997, Saba 2002, among many authors), that is the impact on wages due to the integration to a union association. In Chile, this information is not captured through household surveys (traditional method) which limits its inclusion in an econometric study\(^{29}\).

Model No.1 has the characteristic of being applicable for a series of countries. The implication of this is that it takes different models of collective bargaining and does not follow the evolution in time of a particular one (as the model No.2 does).

In both models, the specification includes three choices of explanatory variables, all aiming to the same theoretical goal: to explain the effect of unionism on the distribution of income. The inclusion of variables in a "simple" way (as a simple regression model), seeks to "purify" or "distill" the gross effects of the mere inclusion of the Union Density Rate. By including COV, the goal is to investigate the specific explanatory power of collective bargaining agreements on the distribution of income. This is particularly interesting

\(^{28}\) The period of Prohibition of Collective Bargaining in Chile (1973-1979) is a disruptive time for the series of data (structural break). At the same time, for the period prior to the Military Regime (pre-1973), there are no official statistics records on collective bargaining whatsoever, due in part to the autonomy of the parties to carry out the negotiations. Indeed, in both Armstrong and Aguila (2005) as in DERTO (1977), only statistical series of unionism and conflict are displayed, but not of collective bargaining.

\(^{29}\) This aspect also limits the use of econometric regression models such as Quantile Regression (Dell’Aringa and Pagani 2005, Buchinsky 1994).
because in some systems of collective bargaining, union membership itself does not guarantee to be involved in collective bargaining, therefore it is expected that the explanatory power of the variable COV to be greater than the UD variable.

On the other hand, the use of the LEVEL variable, seeks to confirm the coverage hypothesis (COV). A priori, a low degree of centralization in collective bargaining is associated with low coverage of collective bargaining. Nevertheless, LEVEL also investigates the possibility of a form of collective bargaining in two stages or hierarchical (as discussed below), being this factor, which would have more incidence on an improvement in inequality of income distribution, thus, having a more significant impact on unpaid productive surplus (theoretical framework).

The expected sign for both COV, LEVEL, and UD variable is negative, to mean that a higher coverage of collective bargaining or a higher rate of unionization can be translated into a lower Gini coefficient (see theoretical framework, see figure 5).

4.3 Data Set: variable description and source of data.

4.3.1 GINI

Gini coefficient. The data set for Chile (1961-2008) was taken from the Employment and Unemployment Survey of the University of Chile. We also used the series (1990 - 2009) taken from the Survey of Socioeconomic Characterization (CASEN)\textsuperscript{30}. For other countries\textsuperscript{31}, the source of data is UNU-WIDER\textsuperscript{32} as the latest observation available (the mode is year 2006).

\textsuperscript{30} In this case we use independent income. Same situation for the case of the survey of the University of Chile.
\textsuperscript{31} In New Zealand case the sources of data are the Ministry of Social Development
\textsuperscript{32} United Nations University. World Income Inequality Database (WIID)
4.3.2 **RATIO D10/D1**

Autonomous income ratio from wealthiest 10% and the poorest 10%. The sources of information are: the Employment and Unemployment Survey of the University of Chile and CASEN Survey.

The selection of the variables Gini and D10/D1 ratio, both based on Household Surveys data, seeks to avoid falling into the trap of "labor aristocracy", that is an improvement in income distribution due to the fact that high-skilled workers improve their income considerably. This phenomenon, when it happens, affects the factorial distribution of income (National Account System), giving more weight to earnings, while hiding the inequality inside of the labor factor. In addition to the above, the advantage of the use of household surveys data is that avoids the censorship of observations, such as non-registered workers.

4.3.3 **LEVEL**

Level of centralization of collective bargaining. The source of information is AIAS\(^{33}\).

4.3.4 **COVERAGE (COV)**

“Adjusted” coverage of collective bargaining. In this case, we work with the wage-earning employees covered by collective bargaining as a proportion of the total of the country’s wage-earning employees having the right to bargain collectively, expressed as a percentage. For Chile, the data was taken from the Statistics Yearbooks of the Department of Labor. For the remaining countries, data comes from the AIAS and ETUI\(^ {34}\).

4.3.5 **UNION DENSITY (UD)**

Union Density. Is the rate of unionization. For Chile, the data was taken from the Statistics Yearbooks of the Department of Labor. For the remaining countries, data comes from the AIAS.

---

\(^{33}\) Amsterdam Institute for Advanced Labour Studies. Data Base on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts, 1960-2010 (ICTWSS)  
\(^{34}\) European Trade Union Institute. Worker Participation Data Base (WP).
Figure 6: Stylized Facts, Chilean Trends and Other Key Labor Market Indicators

Graph 1: Wage Productivity Gap in Chile
Years, 1993 - 2009; Baseline 100 = 1990

- Average Wage Index
- Median Wage Index
- Productivity Index

Source: Fundación SOL, in base to Central Bank database and INE database, Chile

Graph 2: Wage adjustment resulting from Collective Agreements in Chile
Years, 1989-2007; Administrative Data, in percentage (%)

Source: Own made, in base to Statistics Yearbooks of the Department of Labor

Graph 3: Union Density and Collective Bargaining Coverage in Chile
Years, 1980-2009; Administrative Data

- Union Density
- Collective Bargaining Coverage

The union density has fallen relative to the early 90 situation

Source: Own made, in base to Statistics Yearbooks of the Department of Labor

Graph 4: Real increase in Statutory National Minimum Wage
Percentage (%)

- PAA
- EFR
- RLE
- MBJ

Source: Own made, on base to Administrative Data
Figure 6 (cont): Stylized Facts, Chilean Trends and Other Key Labor Market Indicators

Graph 5: Inequality Trend by Government: Period 1961-2010
P90/P50 Earning Distribution Ratio

Graph 6: Gini Coefficient
Years, 1960 - 2009; University of Chile Labor Force Survey (June)
During Salvador Allende’s Government Chile reach the lower Gini Index
The Union Density also was record

Graph 7: Gini and Collective Bargaining Coverage
Jelle Visser Sample of 49 countries (OECD + Medium Income)

Graph 8: Gini Coefficient and Collective Bargaining degree of Centralization
Jelle Visser Sample of 49 countries (OECD + Medium Income)

Source: Own made, on base University of Chile Employment and Unemployment Survey

Source: Own made, in base to University of Chile LFS

Source: Own made on base to ICTWSS V.3.0 database AIAS (2011) & WIDER
Note: Level 1: less centralization i.e: firm, plant level
Figure 6 depicts the synthesis of the problem under analysis in 8 graphs. Graphic 1 shows the unpaid productive surplus seen in the theoretical section; in the figure is possible to verify a deterioration of the alpha angle (same situation found in the U.S. by Mishel and Shierholz 2011). Graphic 2 show that the economic performance of collective bargaining in Chile is not significant and has deteriorated over time. In part, the situation is due, as it will be shown, to the excessive degree of decentralization of collective bargaining.

Graph 3 depicts that both collective bargaining coverage and union density have remained at a standstill for the Chilean case, being unable to reach the pre-coup levels (1973). Graph 4 shows the progress in the national minimum wage which mechanism is the parliamentary discussion. The real adjustments show warm progress and an exception for the presidential term of Eduardo Frei Ruiz Tagle (1994-1999) when a criterion of equity was added to the formula.

Graphs 5 and 6 depict the situation of inequality in Chile over the past 50 years. In general we observe that the D9/D5 ratio has worsened. It is the same for the Gini.

The so-called "labor aristocracy" is also present in Chile once verified that high-skilled occupational groups (high skill white collar workers) revenues, have increased by 59.1% between 1992 and 2009, while the blue collar workers have done so, by 55.1%.  

Finally, Graphs 7 and 8 show two important relationships. The first one shows that, indeed, countries with higher coverage are associated with a lower Gini index. While countries like Chile, with low collective bargaining coverage is associated with higher Gini coefficients. The second graph is a complement of the first one and addresses the degree of centralization of collective bargaining. It is verified that the greater the higher the degree, the better the performance in terms of inequality measures.

---

35 Both in Graph 4, as in Graph 5, presidential terms are shown as abbreviations, each one standing for: **JAR**: Jorge Alessandri Rodriguez; **EFM**: Eduardo Frei Montalva; **SAG**: Salvador Allende Grossi; **JMG2**: Junta Militar de Gobierno (Pinochet), second period; **PAA**: Patricio Aylwin Azocar; **EFR**: Eduardo Frei Ruiz Tagle; **RLE**: Ricardo Lagos Escobar; **MBJ**: Michelle Bachelet Jeria.

36 Own processing of CASEN survey data, constant prices, November 2010. The median wage of independent income was used.
Graphic 7 along with the figures presented in Annex prove the spatial relationship between the main variables under study. In the case of Graphic 7, there is no significant presence of unusual observations. Graphic 12 (see appendix) shows no clear break points, nevertheless, the original series of union density for the 1973-1979 period (First National Military Government in Chile) had to be adjusted, after they found a significant amount of unions in recess.

4.4 Estimating Model

For Model No.1, we use a set of 49 countries with effective collective bargaining. We have selected OECD’s 34 countries plus 15 countries included in Jelle Visser’s database in the AIAS. We use the simple regression technique with linear specifications and Log-lin.

For Model No.2, Chilean case, we use a time series that covers the period between 1961 and 2008 for the data taken from the Survey of the University of Chile, and the period between 1990 and 2010 for the data taken from CASEN Survey. In the case of New Zealand, the data cover the period 1984-2010.

In the case of Chile, Gini coefficients had to be processed directly from micro-data, from both University of Chile and the CASEN Surveys. To do this we used STATA’s ADO File called "INEQUAL737”.

For Model No.3, we use the CASEN Survey for 2009 and autonomous incomes (YAUTAJ). For this case, the simulation is made taking the median wage for wage-earning employees, increase that amount by X % and then determine the threshold under which a wage readjustment will be applied. The assumption here is that the coverage of bargaining increases and protects all those less-skilled workers whose autonomous income is below the simulated threshold.

37 INEQUAL “7” was chosen since it allows working with factors of expansion containing non-integer numbers.
This exercise seeks to objectify (with the appropriate assumptions), the impact that a change in structure (from a completely decentralized model to a centralized) has on both the Gini coefficient and the Lorenz curve.

**4.4.1 Model N°1 estimation results**

Table No.2

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln_GINI:</td>
<td>Hyp1</td>
<td>ln_GINI:</td>
<td>ln_GINI:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hyp2</td>
<td>Hyp3</td>
</tr>
<tr>
<td>COVN</td>
<td>-0.4890***</td>
<td>(-5.05)</td>
<td></td>
</tr>
<tr>
<td>UDN</td>
<td>-0.4325**</td>
<td>(-2.28)</td>
<td></td>
</tr>
<tr>
<td>LEVEL</td>
<td></td>
<td>-0.0713**</td>
<td>(-2.30)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.7618***</td>
<td>3.6467***</td>
<td>3.6669***</td>
</tr>
<tr>
<td></td>
<td>(67.58)</td>
<td>(55.90)</td>
<td>(50.96)</td>
</tr>
<tr>
<td>Observations</td>
<td>49</td>
<td>43</td>
<td>49</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.3514</td>
<td>0.1124</td>
<td>0.1014</td>
</tr>
</tbody>
</table>

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

**4.4.2 Discussion of the results of model No.1**

The estimated parameters for the three specifications (in this case, the three hypothesis of model No.1) have the expected sign and are significant. In particular, increasing the coverage of collective bargaining by 10 percentage points leads to an improvement in the Gini coefficient by 4.8%\(^{38}\) (ceteris paribus), this result is significant at 1%.

---

\(^{38}\) It is 4.8% since coverage data are expressed in percentage terms rather than integers. (For example a 70% coverage is expressed as 0.7)
For the second specification, an increase of 10 percentage points in union density leads to an improvement in the Gini coefficient by 4.3%, in this case the result is significant at 5%.

Regarding the third specification, it is confirmed that an increase in the degree of centralization of collective bargaining improves the distribution of income by 7.1%. This result is significant at 5%.

Finally, when checking how the degree of centralization affects on the coverage of collective bargaining, the result is as expected: for every single degree of increase in the level of centralization for collective wage setting, collective bargaining coverage increases by 52.7%. This result is significant at 1%.

4.4.3 Model N°2 estimation results

Table No.3

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ln_GINIchile</th>
<th>ln_INEQ</th>
<th>lnGINInz</th>
<th>lnGINInz</th>
</tr>
</thead>
<tbody>
<tr>
<td>UD</td>
<td>-0.4149***</td>
<td></td>
<td></td>
<td>-0.7416***</td>
</tr>
<tr>
<td></td>
<td>(-3.94)</td>
<td></td>
<td></td>
<td>(-11.03)</td>
</tr>
<tr>
<td>COV</td>
<td></td>
<td>-2.5486***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(-5.39)</td>
</tr>
<tr>
<td>LEVEL</td>
<td></td>
<td></td>
<td>-0.0848***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(-9.68)</td>
</tr>
<tr>
<td>Constant</td>
<td>4.0108***</td>
<td>4.3410***</td>
<td>3.6750***</td>
<td>3.7801***</td>
</tr>
<tr>
<td></td>
<td>(225.98)</td>
<td>(65.61)</td>
<td>(182.37)</td>
<td>(145.06)</td>
</tr>
<tr>
<td>Observations</td>
<td>48</td>
<td>17</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.2519</td>
<td>0.6592</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t-statistics in parentheses</td>
<td>*** p&lt;0.01, ** p&lt;0.05, * p&lt;0.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

39 According to the scale of Visser (2009)
40 This means: for example if country "A" has a collective bargaining of 5% of coverage, increasing by one point in the level of centralization of collective bargaining leads the collective bargaining coverage to 7.5%.
4.4.4 Discussion of the results of model No.2

When discussing the econometric results of model N°2, in general, one can say that the estimated parameters have the expected sign and are significant (all at the highest level).

In particular, for the Chilean results, one can confirm that, when the Gini coefficient of the Survey of the University of Chile (1961-2008) is used as the dependent variable, union density has a significant impact on income distribution. Indeed, an increase of 10% in unionization, leads to an "improvement" of 4.1\% in the Gini coefficient.

Still in the Chilean case, when using the ratio D10/D1 derived from the Survey CASEN as a dependent variable, one may inquire about the impact of collective bargaining coverage. The results show that a decline in the coverage (ceteris paribus) has played a (statistically significant) role in the deterioration of income distribution (this being measured as the D10/D1 ratio).

The second case studied is New Zealand. This country is of particular interest, as one of the few who has experienced a sudden change in the structure of collective bargaining, going from a mechanism focused in the collective wage setting, to a completely decentralized one (at firm level). The situation occurred during a reform of labor laws that took place in the late 80’s.

The result can be seen in Table 3. Indeed, when looking at the impact of decentralization (degree by degree), we can confirm that for New Zealand, this involves a deterioration in the Gini coefficient of at least 8.4%.

Finally, when exploring the effect of union density, the results are consistent with the theory outlined at the beginning and with was found for Chile: the de-unionization led to a

\[\text{It is } 4.1\% \text{ since unionization data are expressed in percentage terms rather than integers. (For example a union density of 70\% is expressed as 0.7)}\]
worsening of income distribution in New Zealand (ceteris paribus, this specification gets the higher R2, reaching 91%)

4.4.5 Model No.3 estimation results

According to data taken from the 2009 CASEN Survey, the median autonomous income for wage-earning workers is $ 249,730\textsuperscript{42}. It was decided to set threshold at $ 300,000. Subsequently, the distribution of autonomous income (YAUTAJ) is subjected to a wage increase of 30% for those who earn less than $ 300,000, this incentive captures the impact of the change in structure for collective bargaining.

![Graph 9: Generalized Lorenz Curves for YAUTAJ by stimulus*, 2009](image)

\textsuperscript{42} Sintaxis en STATA:

\begin{verbatim}
sum yautaj [w=expr], d
replace yautajz =yautaj*1.1 if inrange(o23,3,7) & yautaj<=300000
replace yautajz =yautaj if inrange(o23,1,2) | inrange(o23, 8,9)
replace yautajz =yautaj if inrange(o23,3,7) & yautaj>300000
\end{verbatim}
Table No. 4
Inequality Measures (INEQUAL7)

<table>
<thead>
<tr>
<th>Inequality measures</th>
<th>L=1</th>
<th>L=2</th>
<th>L=3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative mean deviation</td>
<td>0.40648</td>
<td>0.40012</td>
<td>0.37500</td>
</tr>
<tr>
<td>Coefficient of variation</td>
<td>1.87331</td>
<td>1.84820</td>
<td>1.76602</td>
</tr>
<tr>
<td>Standard deviation of logs</td>
<td>108.810</td>
<td>105.956</td>
<td>104.037</td>
</tr>
<tr>
<td>Gini coefficient</td>
<td>0.55148</td>
<td>0.54390</td>
<td>0.51764</td>
</tr>
<tr>
<td>Mehran measure</td>
<td>0.67289</td>
<td>0.66413</td>
<td>0.63781</td>
</tr>
<tr>
<td>Piesch measure</td>
<td>0.49077</td>
<td>0.48378</td>
<td>0.45755</td>
</tr>
<tr>
<td>Kakwani measure</td>
<td>0.25341</td>
<td>0.24728</td>
<td>0.22736</td>
</tr>
<tr>
<td>Theil index (GE(a), a = 1)</td>
<td>0.66067</td>
<td>0.64466</td>
<td>0.59423</td>
</tr>
<tr>
<td>Mean Log Deviation (GE(a), a = 0)</td>
<td>0.58301</td>
<td>0.56135</td>
<td>0.52038</td>
</tr>
<tr>
<td>Entropy index (GE(a), a = -1)</td>
<td>2.85852</td>
<td>2.66173</td>
<td>2.67106</td>
</tr>
<tr>
<td>Half (Coeff.Var. squared) (GE(a), a = 2)</td>
<td>1.75464</td>
<td>1.70791</td>
<td>1.55941</td>
</tr>
</tbody>
</table>

Source: CASEN LFS, 2009

5. Policy Recommendations

A set of policy recommendations can be gathered from this investigation, which undoubtedly will require greater development and questioning in a further investigation particularly focused on the operation of institutional outlines.

The first recommendation that emerges is to revitalize the centralized collective bargaining, in order to optimize the coverage of collective bargaining, increasing wages, decreasing unpaid productive surplus and inequality. The above analysis indicates that, going the decentralized way, causes an underutilization of this labor institute.

Thinking about the design of a labor institution of collective bargaining to be inclusive, we recommend a collective bargaining structure with the capacity to run on more than a single level (such as the sectorial).

Although centralized bargaining gives workers from different sectors of the economy the possibility to associate and bargain their salaries collectively –forbidden issue for small and medium companies’ employees, when it comes to decentralized outlines - is reasonable to consider for such negotiation to set wage grids aligned with the reality of the production units involved. The problem is that there are different economic capacities within the same industry or branch of economic activity.

In this sense, there are at least two operational solutions leading to a more centralized collective bargaining and that are not confined to a single employer: Articulated Collective Bargaining and Two Steps Collective Bargaining or Cascading Style.

The first solution organizes the negotiating issues in order to avoid overlap or double negotiation of subjects. Thus, the agreements reached in upper structures leave specific windows to be opened in company-level agreements or territory (Ozaki 2003, Villavicencio

43 In this regard, Felgueroso et al (2005) state that: "... a negative relationship has been found between the degree of centralization of collective bargaining and wage inequality. So that the more decentralized the bargaining system in a country, the higher the wage gap"
2011, among others). For Perez de los Cobos (2003) articulated negotiation: "... seeks a material specialization of different levels of negotiation in order to achieve a structure that assigns to its various units the treatment of what will best suit to their negotiator field". [Perez de los Cobos 2003, pp.9]. Articulated Collective Bargaining is practiced in Spain (Palenzuela et al 1996).

The second solution does not contain the restriction depicted in the articulated one, thus allowing two issues to be traded separately on more than one level. According to this model, centralized bargaining sets a first level of minimum conditions on national and sectoral contracts. The second stage consists of improving the ground levels through less centralized structures (ETUI, Worker Participation44). The "cascade style" emerges as a real alternative to reduce scissors of inequality, while dealing with the problem of heterogeneity in production (ECLAC).

This type of negotiation is practiced in Nordic countries and is also known as hierarchical negotiation. For Ozaki (2003) this kind of negotiation creates a new climate of "active negotiations" revitalizing the pressure of conflict and of strike on contents that may already be agreed. However, in certain systems and as noted by Holden (1988), it has been chosen to preserve this point by means of the impossibility of having strikes at this stage of the negotiation. Some authors have pointed out that this stage of the negotiation operates within the framework of a "peace clause" (Hunnes et al 2009).

Bargaining in two stages (two-stage wage setting), is particularly relevant in countries with a high component of productive heterogeneity. ECLAC’s approach says in fact that given the fact that the modern sector of the economy is the most productive and the most innovative in terms of corporate structures, requires an institutionalism that fits such architecture (Durán, 2011).

44 http://www.worker-participation.eu/National-Industrial-Relations/Across-Europe/Collective-Bargaining2
Taking into account the results of this research, it is recommended to move towards hierarchical collective bargaining in two stages, also called Cascade type\(^{45}\). It also raises the recommendation that in contexts with high inequality (as in Chile\(^{46}\)), this cascade has to operate without restrictions, to say, with the ability to allow the strike option. The above rests on the fact that the cascade, along with being a tool that transmits emphasis and depth in the framework of a negotiation, is also in charge of being a power transmission belt in this case, for trade union actors.

Cascade type collective bargaining, is part of the trade union auto-reform program for the Americas promoted by the ILO program for workers (ACTRAV)\(^{47}\).

6. Final Remarks

This article’s aim is to investigate the role the degree of centralization of the collective determination of wages would have, within a country’s income distribution. Consequently, the research question is *how does the structure of collective bargaining affect the distribution of income?*

The main outcome of the investigation is related to the revitalization and presentation of an economic theory that supports the thesis that income distribution may be induced by means of association and that collective bargaining would be the instrument to reverse the alienation that currently finds respect of surplus production (the dissociation between the curves of growth of productivity and wages: i.e. the Scissors of Inequality).

In this sense, the structure of collective bargaining, has an empirical impact that is statistically significant on measurements on the distribution of income. The fact that a

\(^{45}\) Hunnes et al (2009) show that this type of negotiation, increases the likelihood that the blue collar workers get higher wages, which according to the theoretical framework presented in this investigation, may cause a decrease in unpaid productive surplus (UPS).

\(^{46}\) Once companies have achieved wage compression along with low levels of inequality (as those seen in Scandinavian countries), the use of the articulated bargaining is much easier to understand.

\(^{47}\) See project FSAL. Check UNI-Val, 2005
country has more coverage of collective bargaining that other, explains in part, a better
distribution.

The methodology used to test the hypotheses was mixed. In some regressions were run
using a simplified method of Atkinson's specifications, in terms of inquiring about the
union explainers of the Gini coefficient. On the other hand, we used a micro-simulation
technique consisting on applying a stimulus on a group of wage workers, assuming two
scenarios: low (Graph 9) and high (Graph 10) bargaining coverage.

The econometric results are statistically significant and with the expected signs. The
hypotheses made for each alternative were also confirmed. In particular, the impact of
collective bargaining coverage on the distribution of income is greater than one shown be
the rate of unionization; this is explained by the points made above: the fact of being
unionized it does not guarantee one’s participation in collective bargaining processes.

The results obtained with the degree of centralization (LEVEL) show that collective
bargaining in more than one level and aimed to higher coverage structures (sector and / or
national) can achieve better results in terms of the Gini coefficient.

Regarding the simulation, we concluded that a 30% increase in the wages of less skilled
workers has implications for improved GINI (for Chile) in about 3.4 points under a system
of this high coverage, high degree of centralization.

The policy recommendation that this article points out is to consider centralized collective
bargaining within a strategy that seeks to combat the growing inequality in income
distribution. In order to reduce the unpaid productive surplus, it is recommended to move
towards hierarchical collective bargaining also called Cascade type.

---

48 Even more, in some systems there are clauses to extend the benefits of collective bargaining achieved by
trade unions. This has an impact on the coverage figures (COVs). In these cases, the literature refers to the
problem of the Free Rider (Boeri and van Ours, 2008).
References


KOSTZER, D. (2007). “Labor markets, economic development, and job quality Ingrid Rima’s contributions to labor economics” in Mathew Forstater, Gary Mongiovi and Steven Pressman (coord.) “Post Keynesian Macroeconomics Essays in honour of Ingrid Rima”.


ANNEX: ADJUSTED AND OBSERVED VALUES

Graph 11:
Model No.1: \( \ln(gini) = a + b \times \text{COV} \)
Adjusted and Observed Values

Source: Own made based on Model No.1 econometrics exercise

Graph 12:
Model No.2: \( \ln(I\text{gini}) = a + b \times \text{UD} \)
Adjusted and Observed Values

Source: Own made based on Model No.2 econometrics exercise