

# Income and Wealth Inequality in Chile

*Master's Thesis*

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## Motivation

In Chile, inequality is a dominant social issue that causes a lot of resentment and is putting a huge pressure on politicians, as in many countries of Latin America. Until recently, the country has been dominated by a handful of families, owning most of the wealth and having a very large political influence. Inherited from the Pinochet dictatorship and the neoliberalism economic doctrine enforced at the time, this system has not been strongly attacked under the Coalition government until 2009, and it is only recently that President Bachelet has pledged to address these issues in her current mandate in presidential office. This oligarchic system is causing a large gap between the wealthiest and the rest of the population, which has very limited access to public services. While the public health and education systems are offering poor and overcrowded services, private universities and hospitals are able to achieve very high quality in their offers, but at a very high cost. This gap in the education system has been the cause of large student protests in 2013, ended in violence and dissatisfaction.

While the political awareness of inequality rises, and the Chilean civil society is paying more attention to these subjects, it is more and more urgent to be able to provide precise estimates of inequality in the country, in order to support the political process of these social reforms. It is extremely important for Chile to address these issues, so that the country does not become divided between billionaires and beggars.

I would like to thank my supervisor, Facundo Alvaredo, for his very helpful comments and guidance on my work; as well as Thomas Piketty, who has directed me to him and has allowed me to precise my interests in this area of study. I would also like to express my gratefulness to Thomas Blanchet and Jonathan Goupille-Lebret, who have both been very helpful and have answered my many questions on household surveys and income distributions. Finally, I would like to thank Andrés Yany, from the Chilean Central Bank, for his help in accessing the dataset I am using in this work, as well as the team working on the Encuesta Financiera de Hogares.

## Literature review

The study of top incomes in Chile has already been partially covered, but recently new data has been made available, which provides more information on the matter.

On income inequality, Ferreira and Litchfield (1999) have offered a first analysis of the income distribution in Chile using the Employment and Unemployment Survey (a household survey conducted by the University of Chile), but the time period was narrow as it covered the years from 1987 to 1994, and the survey only covered the Greater Santiago area. This has been a first approach to inequality in the country, and it was focusing on poverty reduction, in particular during the end of the Pinochet regime. In the same line of work, Ruiz-Tagle (1998) studies the income distribution from 1957 to 1997, using the Encuesta de Caracterización Socioeconómica Nacional (CASEN), a household survey conducted by the Ministry of Social Development every two or three years across the country. This study offers various measures of income inequality (Gini index for example), but does not look specifically at top shares.

On top income shares, Mayer and Sanhueza (2011) have offered an historic perspective on the evolution of top incomes from 1957 to 2007 using the Employment and Unemployment Survey. However, this study has not been extended to the present day and was geographically limited, by the nature of its dataset, and therefore may not have been representative of inequalities at the country level. It is also subject to probable underestimation of the top to the distribution, which is a usual issue in the use of household surveys. Fairfield and Joratt (2015) then extended the study of top income shares by using individual tax-return micro data on the 2005-2009 period, looking specifically on business income. Overall, no analysis of top income shares has been conducted for years more recent than 2009, so my dataset allows for an extension of the period of study.

Regarding the wealth distribution, very little has been done about Chile. Torche and Spilerman (2006a) offer a study of the distribution of asset ownership per income group, based on a household survey (the Survey of Intergenerational Financial Linkages) in 2003, but they do not address the distribution of asset value. Another paper by Torche and Spiderman (2006b) also offers estimates of the distribution of housing wealth by income decile, from household survey data, and they estimate a top 10% share of housing wealth of 24,2% in Chile in 2000. I will try to provide more recent and accurate estimates.

On the international level, the World Wealth and Income Database (WID) aggregates results from studies conducted in a variety of countries, aiming to quantify wealth and income inequality worldwide. The WID offers data on about seventy countries, but only three of them are located in South America: Colombia, Uruguay and Argentina; only Colombia has data for the period of time that I cover. I will therefore use it as a comparison for my results in Chile. I will also be using top incomes and wealth shares and ratios from studies done on household surveys in other countries, mainly the United States and Spain, in order to have a point of comparison with methodological differences as little as possible.

## Data

The dataset we are using comes from the Encuesta Financiera de Hogares (EFH). It is a household survey conducted almost yearly since 2007, by the Central Bank of Chile. This dataset remains mainly unexploited, as the OECD and the World Bank both base their work on income distribution on the CASEN survey, which has been carried out since 1985 by the Ministry of Social Development. The CASEN survey has indeed a much larger sample size. However, CASEN and the EFH offer very similar income information, as the EFH income distribution is adjusted to match the CASEN figures.

Our sample covers a varying number of households, depending on the year (see table 1). Some households remain in the sample from one year to another, in order to provide panel data. The survey is supposed to be representative of the urban population of Chile, at the national level. However, the survey waves 2008, 2009 and 2010 have been conducted only in the Metropolitano area, which is the region around the capital city of Santiago, and also the richest region in Chile. Therefore I will consider that these waves only cover the urban population of the Metropolitano Region.

*Table 1 - Population coverage*

	2007	2008	2009	2010	2011	2014
Sample size (household)	3 828	1 154	1 190	2 037	4 059	4 502
Expanded household population	3 847 952	1 755 155	1 834 346	1 852 373	4 233 502	4 701 109
Survey working population	5 040 123	2 732 219	2 830 100	2 670 332	2301305	7 063 413
Survey individual population	12 875 088	6 420 843	6 622 249	6 242 745	13 815 221	15 429 819
Target population of the survey	14 628 035	6 514 770	6 647 048	6 678 867	15 358 006	15 812 252
What % of the target population is represented in the survey ?	88,02 %	98,56 %	99,63 %	93,47 %	89,95 %	97,58 %

The survey provides mainly information at the household level : income, debt, assets (financial and non-financial), pensions, ratios of indebtedness and payment means (we will not use these last two sources of information, as it is irrelevant to our subject). Personal and social information on the household head is also provided, but its content varies with the survey year.

Regarding income, the survey provides information about different types of income, and this is changing across the different survey waves. There is always a variable describing labor income, which sums up all incomes coming from employment, both in formal and informal sectors, as well as earnings coming from bonuses and exceptional incomes. The survey also provides information on income from pensions and government subsidies, which I will not take into account in the net income. Most surveys also provide information about income from imputed or real rents, as well as income from financial assets.

The information on wealth is also of a changing quality. All survey waves offer information about real estate wealth, as well as the value of vehicles owned by the household (cars for most households, but also boats, planes...). All survey waves, except the 2010 one, offer information about the value of financial assets; some of them offer a decomposition of these assets between those with a fixed rent and those with a variable rent.

However, there is no information about the detailed composition of the household; we know nothing about the age and gender of the household members, neither about their individual income, their employment status, their level of education... This has been a major drawback from using this survey, and this is the reason why it has not really been possible to construct an individual distribution of income and wealth. Our study of the income distribution will therefore be mainly conducted at the household level.

# Top incomes and the income distribution

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## 1. Methodology

### a. Income definition

Income can be defined in many different ways.

Initially I chose to focus on **disposable income**, as it is a measure widely used by statistics institute (OECD, or the INSEE in France) and would therefore provide some points of comparison. The OECD defines disposable income as « the sum of wages and salaries, mixed income, net property income, net current transfers and social benefits other than social transfers in kind, less taxes on income and wealth and social security contributions paid by employees, the self-employed and the unemployed. » However, this choice bears significant drawbacks for the study of top incomes and income inequality, as it tends to distort inequalities, since the purpose of income taxation and government benefits is to be reducing inequalities. Comparing the distributions of net income and disposable income could be a way to assess how efficient the government's transfers policy is at reducing inequality, but this is not my area of interest here.

The income variable I will thus be focusing on in this work is **net income**, as it has been defined in Atkinson et. al. : income excluding all government transfers and fringe benefits, including capital gains. This is net of income tax and of social security contributions paid by employees.

### b. From the household level to the individual level

Although analyzing the household income distribution provides already a lot of information, many studies on income and wealth distributions and top shares are conducted at the individual level. Building a database of individual income and wealth would therefore have allowed me to compare my results with the literature, and mainly with other countries included in the World Wealth and Income Database. However, having very little information on the composition of the household or on household members made the transfer to the individual level rather uncertain. For example, considering that the World Wealth and Income Database only takes into account individuals aged 20 or more, I would have to make assumptions about household members' ages.

I have used the available information to build two types of individual distributions, in order to compare them with the household distribution of income.

The raw way to consider individual income is to divide the household income by the number of inhabitants in the household; in other words, to consider the household income per capita. This is imperfect, as it takes into account all individuals, instead of considering only those over 19 years old. It might therefore be far from reality: for example, in a household of five persons, including two parents and three children, it is inaccurate to assume that the children earn as much money as their parents. However, it is a way to account for household size. I therefore created as many

individual observations as household inhabitants, and attributed to each observation an equal share of the total income of the household they are part of.

Another way to create a database of individual income is to only take into account the household members that are working. Indeed, the only information on household composition that the data provides is the number of people among the household that are working. I could therefore assume that this matches the number of people aged 20 or more, or the number of people who earn money, and divide the total household income among them. Once again, this method is widely inaccurate; it is indeed very likely that many households are multi-generational, and that there is for example two parents working, and two teenagers that are doing part-time jobs in addition to their studies, or short-term contracts requiring no qualifications or work experience; in this case, the two teenagers are earning a much lower amount than the parents, and dividing household income equally among them is therefore underestimating the parents' income and overestimating the teenagers' income. It is also not taking into account the possible income inequality between the parents, which may be large as Chile is a country in which women tend to have significantly lower wages than men because of gender inequality. This induced individual income distribution is therefore likely to underestimate income inequality. However, it is a way to estimate individual income, maybe more accurately than by using per capita household income.

### c. Generalities about the income distribution

Before getting into the analysis of top income shares, one needs to make sure that the income data is consistent with previous analysis from household surveys in Chile. As most statistics from the OECD, the World Bank or other institutions working on the income distribution come from the CASEN survey, it is not an adequate comparison to check my data, since the EFH income data is already adjusted to match CASEN figures. I therefore chose to compare my early results with those obtained by Mayer and Sanhueza using the Employment and Unemployment Survey. Initial results on the distribution of household income are reasonably close (see table 2), so this is a good step ahead to assume that this work could extend the series of top income shares presented by Mayer and Sanhueza.

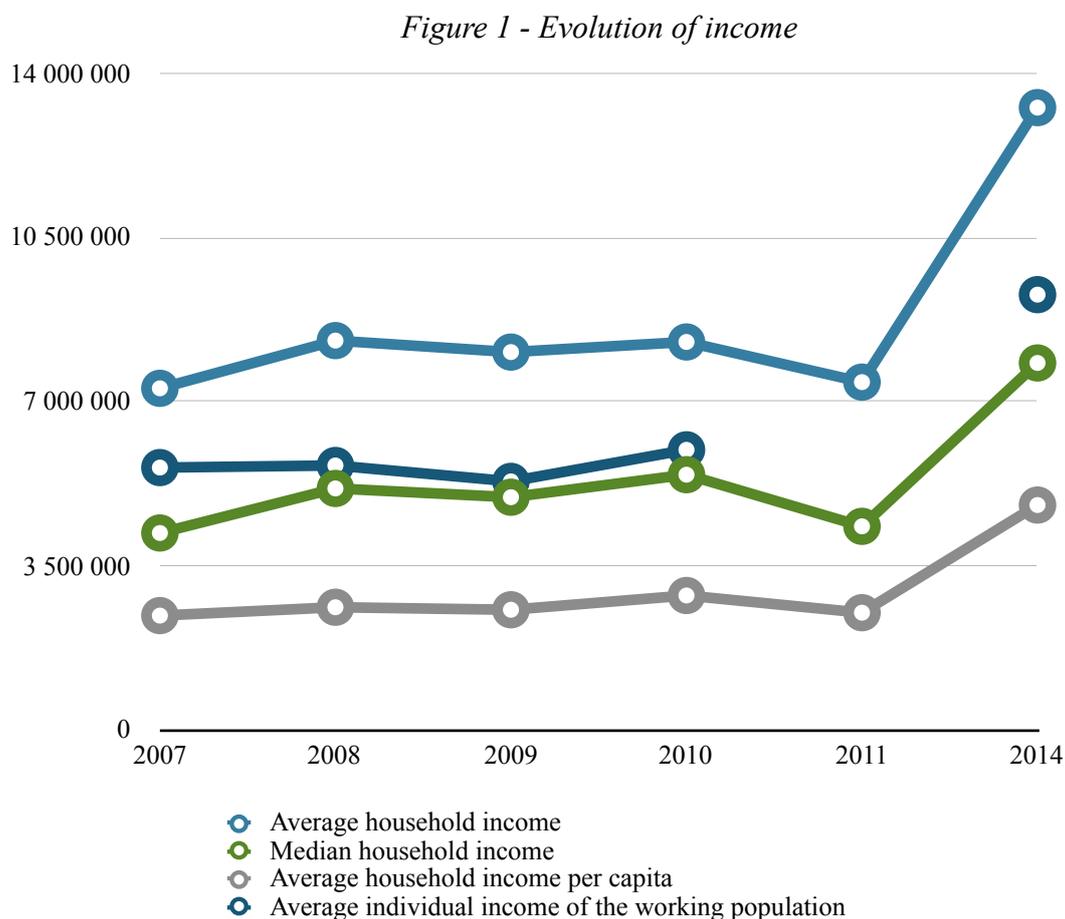
*Table 2 - Average and median income*

<b>Annual income, pesos</b>	<b>Results from the EFH, 2007</b>	<b>Results from Mayer and Sanhueza (Employment and Unemployment Survey)</b>
Average household income	7 288 206	6 143 148
Median household income	4 200 000	4 067 628

Results on the levels of household income and wealth are available in Table A of the Appendix. Surprisingly, these amounts are not substantially higher for the survey waves 2008, 2009 and 2010, despite the change in geographical coverage, so this is a good sign for the comparability of the different waves. Amounts of the household disposable income per capita from the survey are,

however, lower than OECD figures, which reinforces the plausibility of income underestimation in the survey sample. The GDP per capita is, however, much higher than all measures of income per capita, which suggests an unequal distribution of income, as described in Cademartori (2011).

Figure 1 presents the evolution of various income measures, in real terms. Comparing these evolutions is also a way to assess the relevance of each indicator, and to see how they differ.



All income indicators follow more or less the same evolution pattern, with a strong increase in 2014. This suggests that the different indicators are comparable within each series. As expected, the average income of the working person is well above the average household income per capita. It remains under the average household income.

To see how these indicators differ (other than in absolute levels), I need to compare each income distribution, and mainly how the choice of one of these measures of income affects the top income shares.

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## 2. Description of top incomes

The study of top income shares is meant to provide descriptive evidence of income inequalities at the national level, by showing how concentrated the income is. It is also representative of how much power the upper classes have in the country. In situations where, for example, 50 % of the country's income is earned by only 1% of the people, it is very unlikely that the remaining 99% have any power over the country's economy, in terms of purchasing power for example. This is of course an extreme example of income inequality.

To run this analysis, I have chosen to focus on the top 1%, 5% and 10% income shares. Even though the size of my sample might be too small to get a consistent result for the top 1% income share, I have decided to keep this variable as it carries along a very strong symbolism and represents the dominant social class. Top 5% and top 10% income shares are usual variables, so using them will allow me to compare my results with other top incomes studies, on Chile and on other countries.

### a. Top income shares : 1%, 5%, 10%

#### Income thresholds for top income shares

Once again, I did a quick comparison of my results with those from Mayer and Sanhueza by comparing the income thresholds I found for top income shares. They do not look at the top 5% income share, but income thresholds for the top 10% are rather similar. However, I find a much higher income threshold for the top 1% income share. I did not have major concerns about this since they also have a limited sample size (about 3000 households), so it is expected that results concerning the top 1% are to be variable.

*Table 3 - Income thresholds*

<b>yearly household income, pesos</b>	<b>Top 1%</b>	<b>Top 5%</b>	<b>Top 10%</b>
2007	56 550 000	21 609 240	13 800 000
Mayer and Sanhueza, 2007	39 671 916	unavailable	12 725 148

As mentioned before, I will compare the top income shares for three income distributions, in order to compare various levels of analysis and to see how it impacts the top of the distribution.

#### Top income shares - The household distribution

Table 4 presents the top income shares for the top 1%, 5% and 10%, calculated using the total household income. The top 1% income share therefore refers to the share of total income

Figure 2 - Comparison of top income shares

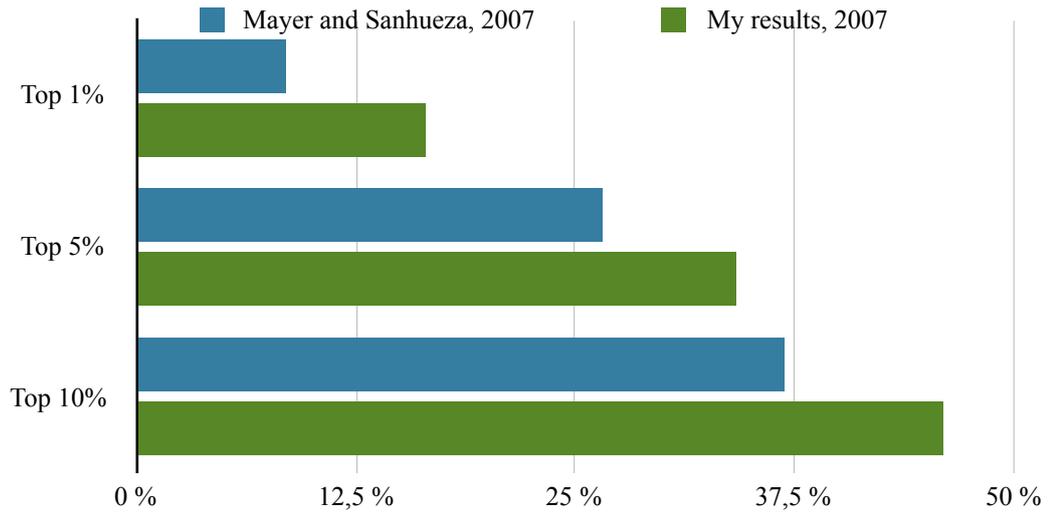
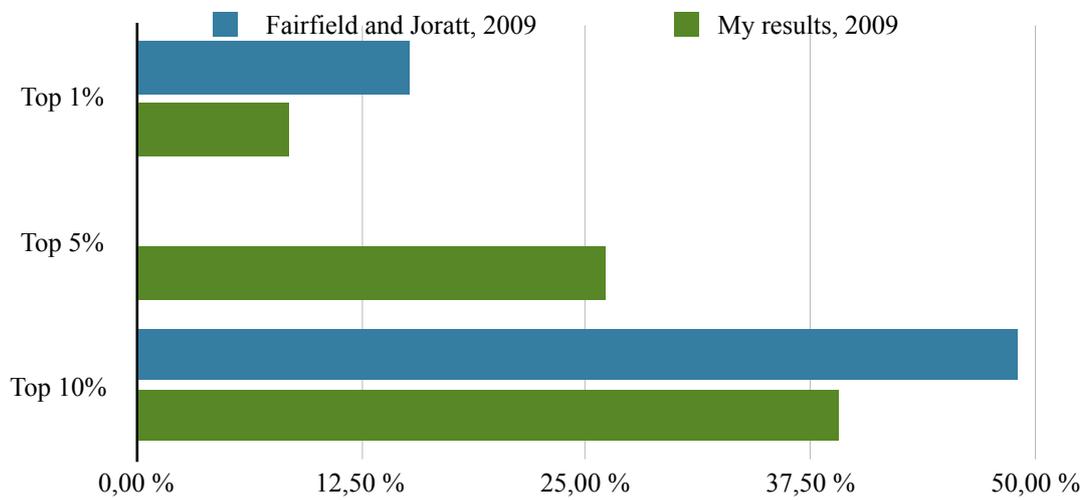


Figure 3 - Comparison of top income shares

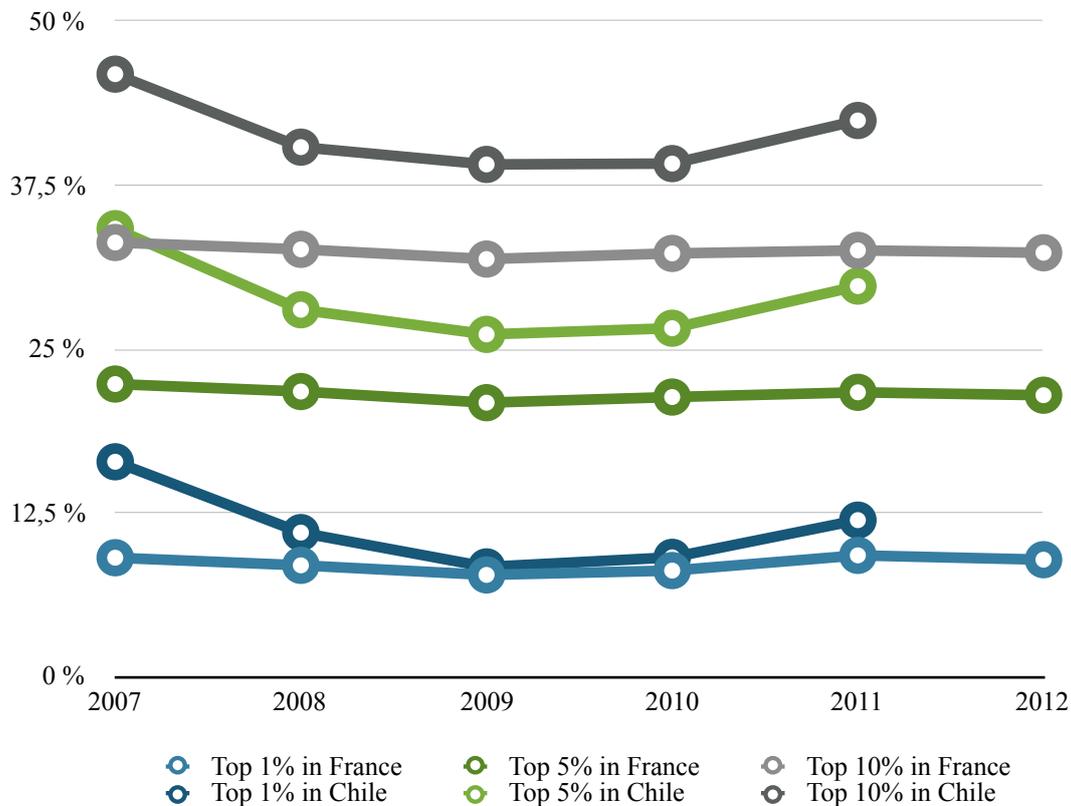


owned by the 1% richest households, so it may differ from the share of total income owned by the 1% richest people, which I will try to determine using approximates of the individual income distribution later.

Table 4 - Top income shares - total household income

	Income share of top 1%	Income share of top 5%	Income share of top 10%
2007	16,41 %	34,18 %	45,96 %
2008	11,01 %	28,00 %	40,39 %
2009	8,39 %	26,12 %	39,07 %
2010	9,12 %	26,59 %	39,14 %
2011	11,96 %	29,80 %	42,42 %
2014	10,73 %	28,53 %	41,43 %

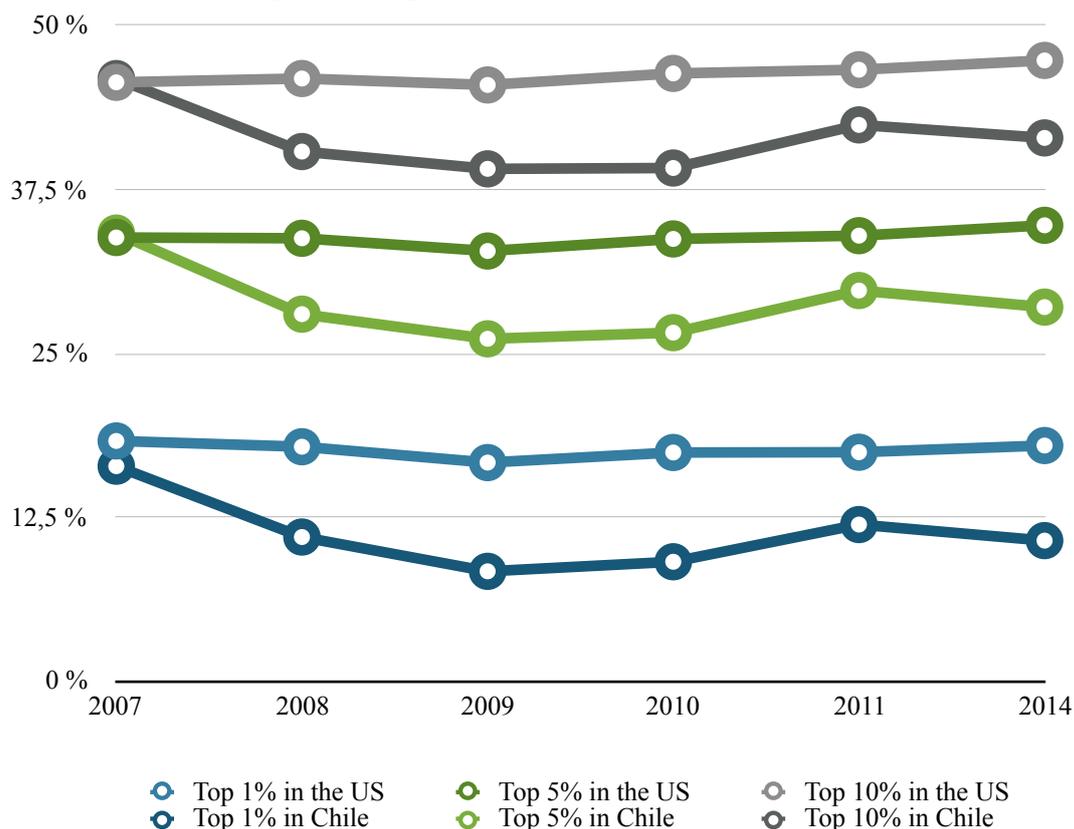
Figure 4 - Top income shares in France and in Chile



My results show that top income shares have been decreasing from 2007 to 2009, which is consistent with an overall decrease witnessed since 2000 (Mayer and Sanhueza), and then increasing until 2014, with a peak in 2011-2012. Changes in top shares are rather small over the period of study.

In order to assess the relevance of these results, I compared them with other studies on Chile (see figures 2 and 3). My results for 2007 are rather high when compared with Mayer and Sanhueza. This is maybe due to the fact that richest households are oversampled in the EFH to correct for the plausible underestimation of top incomes in a household survey, while this oversampling is not done in the Employment and Unemployment Survey. However, I obtain lower top income shares than Fairfield and Joratt for 2009. This is not surprising, as Fairfield and Joratt use income tax data: this source of data is much more accurate than a household survey, which is subject to under-reporting and underestimation of the very richest part of the population. The gap between the top income shares from the EFH and those from Fairfield and Joratt offers an estimation of the methodological error induced by the use of an household survey in top income shares calculations. Although this error is likely to vary with time, I can roughly estimate that my top income shares are underestimated by 8%. This will be useful when I compare my results with studies on other countries.

Figure 5 - Top income shares in the US and in Chile



To get a better view of where Chile stands in terms of top income shares, it is useful to compare these results with top income shares in other countries. To have a perfect point of comparison, I would need top income shares calculated from household surveys, at a similar period of time. However, household surveys are rarely used to compute top income shares, as they are considered as imperfect in this specific subject. As a consequence, most of the recent literature on top income shares uses income tax data. I will thus compare my results with top income shares from other countries with this major difference in mind. Unless specified otherwise, my main source for top income shares is the Wealth and Income Database (WID).

When comparing Chile with France, it seems that it is France has more equality. Top income shares are overall lower in France, so the methodological differences in these results do not matter for this assessment. However, it would probably be false to assume that top 1% income shares are as close as they seem to be, considering the probable margin of error of 8% as explained above. It is interesting, though, to notice that top income shares in Chile and in France have followed the same pattern of evolution : a decrease until 2010, followed by a renewed increase in 2011-2012, although this increase seems more moderate in France than in Chile.

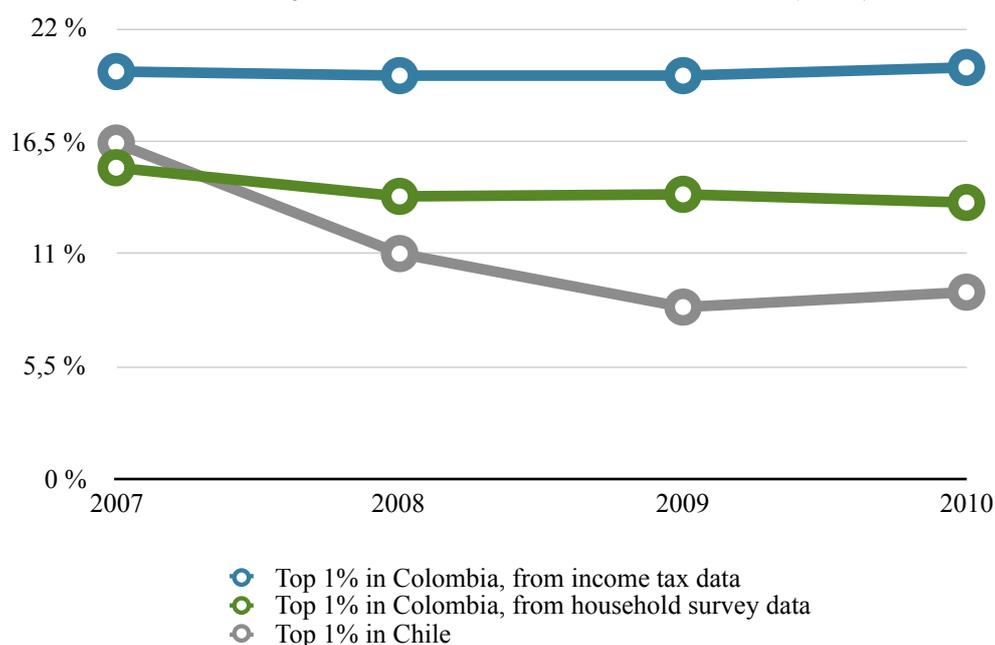
As the United States is often cited as a reference in top income shares studies, I chose to use it as a comparison point too. Moreover, it is often considered that Chile has an economic policy

and an economic culture very close to the American ones. The main guideline for economic policy in the nineties has indeed been neoliberalism and the Milton Friedman doctrine of free market. In Chile, the American society is often seen as an ideal of freedom and entrepreneurship, which is important for the acceptance of inequality. In this philosophy, poor people are poor because they accept it and do not work enough, so there is less justification for a strong social system to support them. This is of course a caricature, and it is evolving rapidly.

According to my results, top income shares in Chile are lower than in the United States. However, when taking into account the methodological differences, the situation does not appear so different, and it is hard to assess which country has the most concentrated income distribution. Once again, the top income shares in both countries follow a similar pattern, with a decrease until 2009 and a peak in 2012.

As Chile is often cited as one of the most unequal countries in Latin America, it is useful to compare my results with the top income shares of another Latin American countries which have this information in the WID for recent years: Colombia.

*Figure 6 - Top 1% income share in Colombia and in Chile - source for Colombia: Alvaredo and Londoño (2012)*



Even taking into account the methodological difference, Colombia seems much more unequal than Chile; the top 1% income share suggests an extremely high concentration of income among the upper classes. The information from survey data confirms this. As the 1% top income share in Colombia has been calculated both from survey data and income tax data, for the same period of time, the gap between those two figures allows me to have an idea of the order of magnitude of the underestimation of top income shares by survey data. Comparing my results on Chile to those from Fairfield and Joratt for 2009 implied that the underestimation could be about 8% ; here, it is closer to 6% and varies over the year. This is of course not a perfect estimate : to

compute top income shares, it is obviously not acceptable to calculate them using household survey data, and then to add 6 to 8 percent to all of them. However, when comparing two countries whose top income shares have been calculated using different data sources, it gives me an idea of how much of the gap between these two countries is due to the difference in data sources, and how much is due to an actual difference in income concentration.

This higher concentration of income in Colombia is confirmed by its Gini index, which was as high as 59,4 en 2007 and went down to 53,5 en 2012 (so it remains significantly higher than Chile's). It is interesting to compare Chile with Colombia as both countries base an important share of their economies on commodities, have gone through a phase of total market liberalization in the nineties, and have experienced a very high growth rate since 2000 with a crash in 2009.

#### Top income shares - individual income distributions

In the comparison of top income shares from various countries I have drawn above, I did not take into account the fact that top income shares from income tax data are calculated at the individual level. To make sure that this is acceptable, I need to see if there is a change between top income shares from the household distribution and top income shares from the individual distributions that I am able to use, as described above.

Using the distribution of household income per capita, instead of total household income, leads to very similar results. For most top income shares, the relative deviation is below 5%; for all results, it remains below 10% (see details in Table B of the Appendix). Moreover, top income shares for total household income and per capita household income follow a similar evolution, so I can infer that the evolution of the distribution of income is not mainly driven by changes in household size or in household composition; at least not in this short period of time. For wider studies on the income distribution using household surveys, on cross-country comparisons, Bover (2008) has indeed proved that taking into account the changes in household structure is necessary; but considering the extend of my study, it seems rather similar to consider total household income and per capita household income to study top income shares.

*Table 5 - Top income shares - Per capita household income*

	share of top 1%	share of top 5%	share of top 10%
2007	15,72 %	33,71 %	45,71 %
2008	11,73 %	29,62 %	41,89 %

	<b>share of top 1%</b>	<b>share of top 5%</b>	<b>share of top 10%</b>
2009	9,32 %	27,38 %	39,86 %
2010	9,72 %	27,94 %	40,33 %
2011	11,74 %	29,66 %	42,26 %
2014	11,59 %	29,80 %	42,89 %

Table 10 presents the top income shares obtained by considering only the working members in the household, and splitting the total household income among them. The resulting income distribution is less concentrated than the original household distribution, because the households in which nobody is working are eliminated, and these households are more likely to be at the bottom of the income distribution. The top 1% income share is not as affected by this change in the income distribution as the other top shares, which means that most of the households in the top 1% are containing members of the top 1% income share of the working population. It would therefore possible to use this individual income distribution, but this will result in an underestimation of income inequality as it does not take into account the people who do not work.

*Table 6 - Top income shares - Working population*

	<b>share of top 1%</b>	<b>share of top 5%</b>	<b>share of top 10%</b>
2007	14,94 %	30,21 %	41,10 %
2008	10,96 %	26,32 %	37,38 %
2009	7,82 %	23,53 %	35,24 %
2010	8,79 %	24,37 %	36,22 %
2011	10,69 %	27,46 %	39,74 %
2014	10,84 %	26,58 %	38,50 %

From these results, it seems that the household is an appropriate level of study for the income and wealth distribution in this context, and considering the lack of information on household composition in the survey.

#### *Household income distribution - bottom income shares*

This section presents the repartition of income over the total household population. It appears that income is very concentrated among the top of the distribution, leaving the bottom 20% with very little or no income. This tendency does not seem to be changing rapidly, but there have been some improvement since 2011, with a share of household income of the bottom 20% going from 2,22% in 2011 to 3,09% in 2014.

*Table 7 - Household income distribution*

	2007	2008	2009	2010	2011	2014
Less than 10%	0,58 %	0,89 %	0,98 %	0,73 %	0,47 %	0,89 %
10 to 20%	1,97 %	2,37 %	2,40 %	2,19 %	1,75 %	2,20 %
20 to 40%	7,08 %	7,93 %	7,79 %	7,87 %	6,79 %	7,44 %
40 to 60%	11,54 %	12,60 %	12,47 %	12,94 %	11,91 %	11,89 %
60 to 80%	18,38 %	19,82 %	20,46 %	20,77 %	20,18 %	19,72 %
80 to 90%	14,50 %	16,02 %	16,82 %	16,37 %	16,47 %	16,43 %
90 to 94%	11,78 %	12,40 %	12,96 %	12,55 %	12,63 %	11,63 %
95 to 99%	17,77 %	16,99 %	17,73 %	17,47 %	17,84 %	19,07 %
99 to 100%	16,41 %	11,01 %	8,39 %	9,12 %	11,96 %	10,73 %

### Income ratios

I have decided to use income ratios because the information it offers is slightly different from top income shares. It can be considered that income ratios show how wide the gap is between the top income shares and the rest of the population, while top income shares is rather about the repartition of the income across the country. Ratios are a measure of income dispersion, while top income shares show concentration.

These ratios have very concrete and immediate consequences, and are describing a reality in people's lives. It means something to observe that the 1% richest people in the country are earning twenty times as much as the average person, as this income gap can lead to major political and social gaps.

*Table 8 - Income ratios*

	Average income of percentile 100 to average income of the total population	Average income of decile 10 to average income of the total population
2007	16,5	4,6
2008	11,0	4,0
2009	8,4	3,9
2010	9,1	3,9
2011	11,99	4,24
2014	10,74	4,14

This table is a clear evidence of the evolution of the top 1% income share in the income distribution. The first ratio presents the gap between the top 1% population and the rest of the population : in average, a household from the top 1% income share earns 10 to 11 times what a average household earns in 2014. This gap has been decreasing from 2007 to 2009, and has even been reduced by half during this time period. However this evolution seems to have reversed itself

since, although the situation is not as extreme as in 2007. Regarding the second column of the table, it presents the ratio between the average household income of the top 10% population and the general average household income. This ratio has followed a similar evolution pattern as the previous one, but its variations are not as large, which allows me to conclude that a large part of the evolution of inequality in the income distribution is due to the evolution in the top 1% income share population.

To put these ratios in perspective, I compare them with similar income ratios computed from studies of the income distribution based on household survey data, in Spain and in the United States. Even if the periods of time are not the same, it is interesting to compare these results because unlike what I used for top income shares, these ratios have been calculated using the same methodology as my results.

*Table 9 - Income ratios in Spain - source : Bover (2008) and own calculations*

<b>Average income of decile 10 to average income of the total population</b>	
2002	3,11
2005	3,53

Income distribution in Spain in the early 2000s is less dispersed than in Chile in our period of study. This situation may, however, has evolved since the financial crisis, as it has strongly hit Spain economically and socially.

*Table 10 - Income ratios in the US - source : Federal Reserve Bulletin and own calculations*

<b>Average income of decile 10 to average income of the total population</b>	
1998	4,13
2001	4,45
2004	4,27
2007	4,72

Income ratios in the United States show a higher and increasing dispersion of the income distribution than in Chile, which indicates that the top 10% households in the United States might be even further away from the « average » household, in terms of income but, as a result, also in terms of living conditions and social position.

## **b. Capital income, labour income**

Making the distinction between capital income and labour income is useful, because it allows us to understand what the major source of income is, and therefore what causes changes and evolutions in the income distribution. Moreover, it is an important component of income mobility and social change. When a large share of the total income comes from capital and not from labour,

it is harder to rise to the upper class by one's own work effort; the upper classes are thus mainly made from people who come from a wealthy family and own a large amount of wealth, probably from their inheritance.

Among the total population

*Table 11 - Capital and labour income*

	<b>Share of labour income in total income</b>	<b>Share of capital income in total income</b>	<b>Other sources of income</b>
2007	80,7 %	18,7 %	0,57 %
2008	81,1 %	18,4 %	0,47 %
2009	82,8 %	16,8 %	0,44 %
2010	80,3 %	17,6 %	2,04 %
2011	76,7 %	20,8 %	2,42 %
2014	76,4 %	13,6 %	10,03 %

In the total population, labour income is largely predominant and accounts for about 80% of total household income. This proportion is slightly diminishing from 2009, but this decrease has to be put in perspective with the fact that the share of income whose sources are unspecified (in the 'other' category) is also increasing from 2010, and is really high in 2014. Moreover, in all survey waves, the quality of data on capital income can vary a lot, mainly because of missing data and unspecific variables. This table highlights indeed the poor quality of details on income in the data from the 2014 survey wave.

Among the top 1%, 5%, 10% income shares population

One could expect households from top income shares to have more capital income, either because they own more wealth, or because their wealth is more profitable (or both). For this reason, I look at how the shares of labour income and capital income evolve across the distribution. I chose to not consider the results from 2014 because they were affected by the poor data quality.

*Table 12 - Labour income among top income shares*

	<b>Share of labour income in total income among the top 1%</b>	<b>Share of labour income in total income among the top 5%</b>	<b>Share of labour income in total income among the top 10%</b>	<b>Share of labour income in total income</b>
2007	87,2 %	83,9 %	83,6 %	80,7 %
2008	83,6 %	81,6 %	82,5 %	81,1 %
2009	81,9 %	85,3 %	85,2 %	82,8 %

	<b>Share of labour income in total income among the top 1%</b>	<b>Share of labour income in total income among the top 5%</b>	<b>Share of labour income in total income among the top 10%</b>	<b>Share of labour income in total income</b>
2010	73,3 %	80,5 %	81,8 %	80,3 %
2011	73,2 %	77,4 %	78,1 %	76,7 %

*Table 13 - Capital income among top income shares*

	<b>Share of capital income in total income among the top 1%</b>	<b>Share of capital income in total income among the top 5%</b>	<b>Share of capital income in total income among the top 10%</b>	<b>Share of capital income in total income</b>
2007	12,5 %	15,5 %	15,8 %	18,7 %
2008	15,3 %	17,8 %	16,9 %	18,4 %
2009	14,8 %	13,4 %	13,9 %	16,8 %
2010	16,5 %	14,0 %	14,2 %	17,6 %
2011	19,4 %	17,8 %	17,6 %	20,8 %

Surprisingly, labour income represents a larger share of total household income among the top 5% and 10% shares than among the general population, while the share of capital income shrinks. The share of labor income in the top 1% income share is, however, smaller than in the total population, but this may be related to the fact that in this part of the household population, a very large part of income has no specified origin. Overall, labor income tends to constitute a larger share of total household income for the top 5% and 10% income shares, while capital income is less important among all top shares than among the total population. However, these differences are not very large, and the income repartition between labor and capital is similar across the distribution.

This suggests that according to my results, rich households are rich mainly because they have a really high income, not because they live off their wealth. This predominance of income over wealth suggests that Chile is far from being a country dominated by annuitants. The income structure of the country may be closer to the United States' income structure around 2000, with extremely high wages at the top of the distribution. However, these conclusions need to be considered with caution, because it comes from household survey data. Under-reporting of capital income is thus very likely, and it is even more among the richest households, both for sampling reasons and because it is easy to dissimulate this type of income.

Finally, the evolution of the share of capital income among the top 1% suggests that it may be taking more importance in the following years, as it has increased from 12,5% of total income in 2007 to 19,4% in 2011, despite the impact of the 2009 recession. Maybe in Chile, as in the United States, « capital is back ».

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### 3. Wealth distribution and top wealth shares

#### a. Description of household wealth

Considering my previous results and the comparison I did between various types of income distributions, I decided to focus on households to perform the analysis of the wealth distribution, so my results in this section will be about household wealth. I have kept the same variables as before, in order to be able to compare the wealth distribution with the income distribution.

#### **Mean, median wealth in USD**

##### Top wealth shares : 1%, 5%, 10%

This table presents top 1%, 5% and 10% shares of household wealth, which provides a good overview of the top of the distribution. This sets forward two main facts.

*Table 14 - Top shares of household wealth*

	Share of top 1%	Share of top 5%	Share of top 10%
2007	19,04 %	41,40 %	55,00 %
2008	23,67 %	46,18 %	58,50 %
2009	20,72 %	42,22 %	56,00 %
2010	15,05 %	36,62 %	51,80 %
2011	19,59 %	43,15 %	57,29 %
2014	17,45 %	42,59 %	57,65 %

First, household wealth in Chile is very concentrated. 10% of the population own more than half of the total household wealth.

Second, the evolution of top wealth shares is not exactly similar to the evolution of top income shares. It starts indeed with an increase of all top wealth shares between 2007 and 2008, while top income shares were decreasing until 2010. Top wealth shares then decrease until 2010 and increase strongly in 2011. For most recent years, the top 1% wealth share has decreased from 19,59% in 2011 to 17,45% in 2014, but this evolution is not enough to expect a lasting decreasing trend from 2014 to nowadays, and in the future. Top 5% and top 10% wealth shares show very little change between 2011 and 2014, with a 0,56% decrease for the top 5% and a 0,36% increase for the top 10%. Hence, my results do not really point to a clear conclusion as to the evolution of wealth inequality and wealth concentration in the period of study, nor in the near future.

Once again, it is important to take into account the fact that my dataset is a household survey, so it is probably underestimating wealth at the top shares of the distribution, for several reasons: sampling (the wealthiest people are probably not in the survey sample, and even if they are,

they are likely to refuse to comply with the time-consuming survey process) and under-reporting (the rich have no interest in reporting their accurate wealth, especially for people involved in fiscal fraud; and as the wealthiest have often different types of assets, it is easier to dissimulate them). However, I have no point of comparison for Chile on this matter, so it is hard to have an order of magnitude of this underestimation

To put these numbers in perspective, I compare my results to top wealth shares obtained from studies in other countries. My first point of comparison is with Spain. Here, top wealth shares are calculated using household surveys, so there should be no methodological difference.

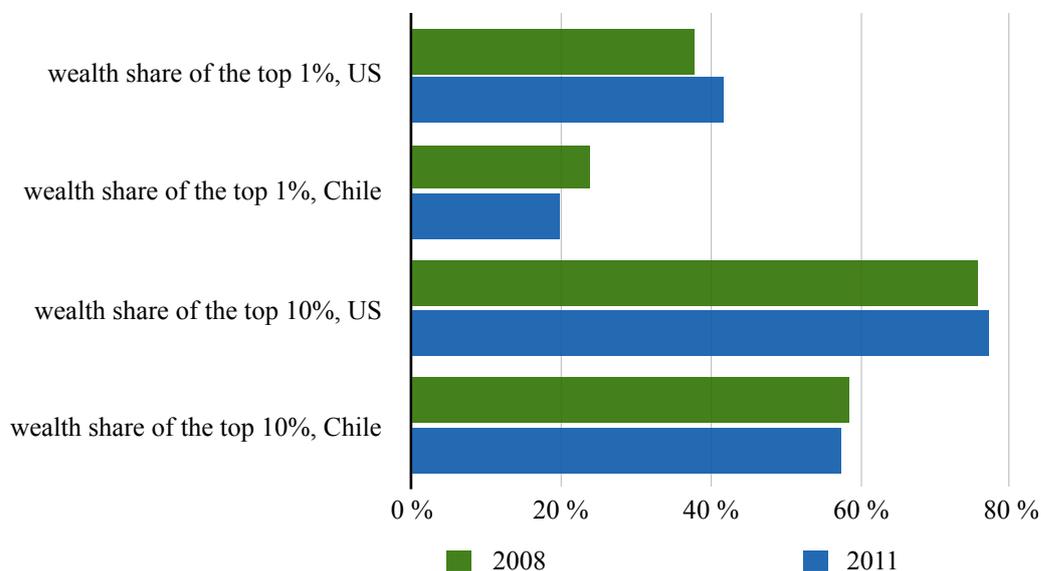
*Table 15 - top wealth shares in Spain - source : Bover (2008)*

	wealth share of the top 1%	wealth share of the top 10%
2002	15,7 %	43,2 %
2005	12,1 %	40,0 %

Top wealth shares in Spain are significantly lower than in Chile, so it indicates that the wealth distribution is more concentrated in Chile in recent years than it used to be in Spain from 2002 to 2005.

For the United States, top wealth shares have been computed using income tax data (Saez, 2013). As it is possible to assume that the income distributions and income ratios of the two countries are relatively similar, it is interesting to notice this large gap in top wealth shares. Although it is difficult to assess the extent of the impact of the methodological difference, it seems to indicate that wealth in the United States is more concentrated than in Chile.

*Figure 7 - Top wealth shares in the US and in Chile - source : Saez (2013)*



## Complete household wealth distribution - bottom wealth shares

Table 16 - Household wealth distribution

	2007	2008	2009	2010	2011	2014
Less than 20%	-0,72 %	-1,56 %	-1,96 %	-2,11 %	-1,36 %	-1,81 %
20 to 40%	3,70 %	2,44 %	1,87 %	2,08 %	2,17 %	1,87 %
40 to 60%	8,89 %	9,55 %	10,56 %	11,50 %	9,14 %	8,45 %
60 to 80%	17,07 %	16,48 %	17,84 %	19,10 %	17,17 %	17,11 %
80 to 90%	16,07 %	14,55 %	15,69 %	17,65 %	15,60 %	16,71 %
90 to 94%	13,60 %	12,32 %	13,77 %	15,18 %	14,14 %	15,07 %
95 to 99%	22,36 %	22,51 %	21,51 %	21,57 %	23,55 %	25,14 %
99 to 100%	19,04 %	23,67 %	20,72 %	15,05 %	19,59 %	17,45 %
total	99,99 %	99,96 %	100,00 %	100,02 %	100,00 %	99,98 %

A large share of households at the bottom of the distribution have negative wealth, because they are very heavily indebted. This indebtedness is a large burden on households' budget: in 2014, households in the bottom half of the distribution spend on average 23% of their monthly income on debt reimbursement.

The wealth of the bottom of the distribution has been deteriorating over the study period, despite a short improvement in 2011. This is worrying, for many reasons; one of them being that it means that an increasing proportion of the population is living with more debt that it can eventually repay, so there is a high risk of default on the household debt from this part of the distribution. Overall, the 2014 distribution is very similar to the 2007 distribution, except for extreme wealth shares. At the bottom of the distribution, the population of the bottom 20% wealth share in 2014 is much more indebted as in 2007, while the 20 to 40% income share has been more or less divided by two. The wealth of the bottom of the distribution has thus been strongly reduced : poor people became poorer. On the other end of the distribution, there has been an increase of the top 1% wealth share, from 55% in 2007 to 57,65% in 2014, so rich people became richer. The middle of the distribution, however, did not experience any major change. Over the study period, wealth in Chile has therefore become more concentrated.

### Wealth ratios

I study wealth ratios for similar reasons as income ratios: to get a measure a dispersion of wealth across the distribution. When it comes to wealth, ratios are even more convertible into tangible realities than income.

*Table 17 - Wealth ratios*

	<b>Average wealth of percentile 100 to average wealth of the total population</b>	<b>Average wealth of decile 10 to average wealth of the total population</b>
2007	19,08	5,51
2008	23,71	5,87
2009	20,69	5,58
2010	15,07	5,20
2011	19,63	5,75
2014	17,44	5,76

For example, in Chile, the average household owns a house (or an apartment) and at least one car or another motorized vehicle. The table above shows that households in the top 1% of the wealth distribution own, in average, in 2014, about seventeen times more wealth. A way to look at this ratio is to consider that the average household from the top 1% wealth share owns about seventeen houses and seventeen cars; it underlines the gap between the living conditions of the average household and of the top 1%.

The first wealth ratio, representing the quotient between the average wealth of the top 1% and the average wealth of the distribution, follows a similar evolution as the top 1% wealth share. The second wealth ratio, representing the quotient between the average wealth of the top 10% and the average wealth of the total population, shows small variations between 2007 and 2014, reaching a slightly higher level in 2014 than in 2007. As for the top wealth shares, it is hard to predict the evolution of these variables from this only table.

Once again, I compare my ratios to wealth ratios computed from household surveys, in Spain and in the United States.

*Table 18 - wealth ratios in Spain - source : Bover (2008) and own calculations*

	<b>Average wealth of decile 10 to average wealth of the total population</b>
2002	2,96
2005	2,51

The Spanish wealth distribution shows much less dispersion than in Chile. The gap between the average wealth of the top 10% and the mean wealth is more than twice bigger in Chile today than in Spain in 2005. This translates into a much lower Gini index for Spain (33,4 in 2004 for Spain, while Chile's Gini index in 2013 is about 50,5).

Table 19 - wealth ratios in the US - source : Federal Reserve Bulletin and own calculations

Average wealth of decile 10 to average wealth of the total population

1998	5,48
2001	5,70
2004	5,65
2007	5,94

In the United States, the wealth distribution seems to be about as wide as in Chile, even slightly more dispersed when ratios for 2007 are compared. However, this only presents the ratio of the top 10% average wealth; I expect the average wealth of the top 1% wealth group in the United States to be further away from the mean wealth than in Chile, as the United States are more likely to have extreme values of wealth in the population. Indeed, in the United States, about 7,5% of the adult population is part of the top 1% wealth share at the world level, while only about 0,5% of the adult population of Chile is part of this top wealth share (source : Credit Suisse Global Wealth Databook for 2014).

## b. Capital implicit interest rate

The following tables present the implicit capital interest rate. This interest rate is calculated using the value of assets owned by the household, and the income the household earns from it. For example, for real estate, the implicit capital interest rate will be the total of imputed or real rents, over the year, divided by the value of the corresponding real estate.

Over the general population, the implicit capital interest rate fluctuates around 6%, with a decrease from 7,03% in 2010 to 5,21% in 2014. It is difficult to interpret this evolution, as the quality of data on this matter changes a lot from one year to another, and not all variables are present in all survey waves; so results are not perfectly comparable.

It is surprising to see that the interest rates are higher among the total population than among top wealth shares. Usually, richer people tend to have more possibilities to exploit their wealth and to diversify their investments, or to have an employee who takes care of it, which means that they usually get much better interest rates than the average, so usually above 6%, which is rather standard for a low-risk capital investment. Here, top wealth shares show much lower capital interest rates than 6%, and also much lower than the average capital interest rate. This may be due to the fact that the design of the survey might not cover all types of assets in great detail, so a share of capital income, coming from assets not included in the survey, is omitted by the population of top wealth shares. It can also be due to voluntary under-reporting, and fiscal fraud.

Table 20 - Implicit capital interest rate

	implicit capital interest rate among the total population	implicit capital interest rate for the top 1%	implicit capital interest rate for the top 5%	implicit capital interest rate for the top 10%
2007	4,51 %	3,68 %	2,90 %	3,22 %
2008	6,29 %	2,43 %	3,80 %	4,34 %
2009	6,32 %	2,25 %	3,66 %	4,01 %
2010	7,03 %	3,99 %	4,01 %	4,45 %
2011	6,42 %	3,65 %	3,96 %	4,34 %
2014	5,21 %	1,07 %	2,05 %	2,41 %

To understand the composition of wealth and capital income in greater detail, I decompose the capital interest rate between two main types of assets : real estate, and financial assets. These two types of assets are representing a large majority of the total wealth. They are also the two only types for which a detailed income information is presented (I chose to perform this decomposition on the 2009 dataset since it is the survey wave that offers the most detailed capital income information).

Table 21 - Decomposition of capital interest rates

2009	total population	top 1%	top 5%	top 10%
real estate implicit interest rate	5,64 %	2,46 %	3,64 %	3,42 %
financial assets implicit interest rate	5,67 %	5,67 %	3,74 %	3,84 %

Several points can be made using this table. First, the implicit interest rate for financial assets is always above the interest rate for real estate, which is usual. For the top 1% wealth share, the difference is rather large. Second, once again, for both asset categories, the implicit interest rate among top wealth shares is lower than among the total population, which is cause for concern. Clearly the range of the EFH does not include a lot of extremely wealthy people who own profitable financial assets; or maybe the under-reporting problem is a larger concern than what I expected.

### c. Joint distribution of income and wealth

In this section, I will compare the wealth and income distributions and see how symmetric they are. The question here is: are the wealthiest people also those who earn the most income ? This has other implications. If the very wealthy people are also the people who earn the highest incomes, it may mean that top-paying jobs are mainly occupied by members of this wealthy elite. Or it may rather imply that it is possible to gain wealth and to elevate oneself in society by one's work.

Considering my previous findings, this last supposition could be more accurate, since I have established that most of income among the top shares comes from labour income rather than wealth.

Table 22 presents the proportion of households from various top wealth groups in each top income group. Table 23 presents the symmetric results, i.e. the proportion of households from various top income groups in each top wealth group. These numbers are calculated for 2014.

*Table 22 - Percent of top wealth households in various income groups*

2014	Top 10% income	Top 5% income	Top 1% income
% of top 10% wealth	40,80 %	23,78 %	5,18 %
% of top 5% wealth	50,09 %	33,35 %	9,27 %
% of top 1% wealth	66,11 %	51,52 %	20,43 %

*Table 23 - Percent of top income households in various wealth groups*

2014	Top 10% wealth	Top 5% wealth	Top 1% wealth
% of top 10% income	40,80 %	25,09 %	6,70 %
% of top 5% income	47,55 %	33,36 %	10,49 %
% of top 1% income	51,12 %	45,76 %	21,06 %

Overall, the two distributions are rather symmetric. The degree of association is moderate, as only 20,43 % of households from the top 1% wealth share are in the top 1% income group (and 21,06% of households from the top 1% income group are in the top 1% wealth group). There is a however a significative difference in the top 10% share: 66% from the top 1% wealth group are in the top 10% income group, while only 51% of the top 1% income group are in the top 10% wealth group. This means that being in the top 1% share for wealth gives you a better chance to be more highly ranked in the income distribution, that you would be ranked in the wealth distribution if you were in the top 1% share for income. To be at the top of both the wealth and the income distribution, it is therefore slightly more efficient to own a lot of capital, rather than to get a highly paid job.

#### d. Private wealth, national income and balance sheets

##### How important is private wealth ? Wealth/GNI ratios

The ratio of privately-owned wealth to Gross National Income gives me information about the weight of private wealth in the country, in terms of wealth accumulation. It is a way to look at the amount of wealth accumulation and its dynamics, as well as drawing comparaisons on wealth accumulation with other countries on an equivalent basis.

For sampling reasons, it is very likely that the extreme top of the wealth distribution is not represented in the survey: for example, none of the Chilean billionaires is part of the sample. When I calculate the wealth-to-GNI ratio, it is easy to correct this omission by simply adding the wealth of billionaires to the total wealth in the survey. To do so, I use Forbes' billionaires ranking for Chile from 2007 to 2014. Adjusting the top of my distribution by creating observations for billionaires from Forbes' estimates is of course a very rough way to compensate for the flaws of the survey, but it is a first attempt at trying to improve the precision of the survey. In addition, in order to take into account the changing population coverage, I expanded the amount of wealth provided by the survey proportionally to the population for 2008, 2009 and 2010.

Despite this attempt, the level of private wealth compared to national income is unexpectedly low. I get an estimate of private wealth of about 130% of national income, which is still far behind Mexico (private wealth was 237% of national income in 2009), the United States (470% in 2013) or even more so, Spain (660% in 2013). Considering the large variance of my results, I am not prone to conclude that Chile is a country in which private wealth is not very important, and that Chilean households have not accumulated much, although it seems to be what this ratio indicates.

*Table 24 - Wealth-to-income ratios*

	2007	2008	2009	2010	2011	2014
private wealth in the survey / GNI	109,52 %	119,54 %	102,54 %	102,97 %	112,62 %	115,48 %
(private wealth in the survey + wealth from billionaires) / GNI	118,41 %	130,92 %	110,17 %	117,28 %	132,63 %	131,06 %

Moreover, my results are not in line with what could be expected in the long-term. Indeed, using the Harrod-Domar-Solow formula, I calculate the long-run wealth-income ratio using macroeconomic variables. At first look, it seems that the situation in Chile is still far from what the formula predicts in the long-term. It is not very surprising, as the country has just experienced a period of very high growth, which is now expected to be moderated; it was not in a stable position corresponding to its long-run macroeconomic situation. However, if the growth remains around its 2014 levels and the saving rate does not decline, the level of capital accumulation in the long-run should be as high as 700%. My results therefore point to two possible conclusions : 1- Chile has not reached its long-term level in terms of capital accumulation, 2- the EFH dataset strongly underestimates private wealth in the country.

Table 25 - Wealth-to-income ratio, from the Harrod-Domar-Solow formula

Source : World Bank	2007	2008	2010	2011	2014	Average over the 2007-2014 period
GDP growth	5,22	3,27	5,75	5,79	1,82	4,37
Saving rate, % of GDP	33,1	27,9	28,7	26,9	23,1	27,94
Population growth	1,1	1,1	1,1	1,1	1,1	1,1
long-run wealth/income ratio	524 %	638 %	419 %	390 %	791 %	511 %

### Financial wealth and national balance sheets

In order to put the aggregate wealth from the survey in context, it is interesting to compare it from wealth in national balance sheets. However, Chile does not disclose complete national balance sheets; but the public data available from the Central Bank provides information on the total value of financial assets in the country. I compare it to the aggregate value of financial wealth in the survey, taking into account the changing population coverage, to assess its representativity on this subject.

Table 26 - Financial wealth's representativity

Share of financial wealth represented in the survey	
2007	1,10 %
2008	0,47 %
2009	0,53 %
2010	no information on financial wealth
2011	1,49 %
2014	2,21 %

The share of national financial wealth represented in the survey is very low, so I can conclude that the survey is not representative of financial wealth in the country. This means that all my results on wealth are rather concerning non-financial wealth than total household wealth.

It is also interesting to compare the average per capita financial wealth from the survey and from national balance sheets.

*Table 27 - Financial wealth per capita*

	<b>Per capita financial wealth from the survey, USD</b>	<b>Per capita financial wealth from national balance sheets, USD</b>
2007	713	56 042
2008	456	58 695
2009	512	58 862
2011	1 374	81 216
2014	1 833	74 092

This table points to a similar result: there is a huge gap between the financial wealth accounted for in the survey, and what is described in national balance sheets. My results on wealth are thus inaccurate concerning financial wealth, and therefore probably underestimating top wealth shares (as financial wealth is usually owned by the wealthiest).

## Conclusion

This work sets forward several facts. First, it offers a quantification of income and wealth inequality at the household level until 2014, using the most recent dataset available. I find that the top 1% households earn as much as 10% of total income, while the top 10% earn about 40% of total income. These income shares have been decreasing over our period of study, although they have experienced a slight increase around 2011, but the trend seems to have returned to a decrease since. Top wealth shares have followed a similar pattern of evolution, with a top 1% wealth share of about 17% in 2014, and a top 10% wealth share as high as 57% of total household wealth. This points out Chile as, indeed, a country with very high levels of inequality, comparable to the current situation in the United States.

As expected, it is very likely that the EFH underestimates both top wealth and top income shares, and specifically financial wealth which is largely underrepresented in the survey. In the absence of recent income tax data, it is useful to take profit of data from household surveys to get a first estimate of inequalities in the country at the moment. However, it would be a significant improvement if researchers were granted access to income tax data, and were able to use it for further research. The issue of tax evasion would still have to be addressed, but this would still allow for much more precise estimates of top income and wealth shares.

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# Appendix

*Table A - Top, mean and median household income and wealth*

	2007	2008	2009	2010	2011	2014
Top household income in USD, current	1 198 178	951 269	213 957	335 130	795 997	1 152 694
Top household income in USD, ppp	1 919 339	1 449 030	339 786	478 370	1 106 268	2 008 353
Median household income in USD, current	8 039	10 719	9 628	11 759	10 193	14 691
Median household income in USD, ppp	12 877	16 327	15 290	16 785	14 166	25 597
Mean household income in USD, current	13 950	17 286	15 637	17 878	17 419	24 919
Mean household income in USD, ppp	22 346	26 331	24 834	25 519	24 209	43 417
Mean household disposable income per capita, survey, current USD	5 448	6 194	5 725	7 174	7 051	9 935
Mean household disposable income per capita, survey, USD, PPP	8 727	9 435	9 092	10 241	9 800	17 310

	2007	2008	2009	2010	2011	2014
Mean household disposable income per capita, USD, PPP, OECD estimates	unavailable	10 597	11 126	11 883	13 762	unavailable
GDP per capita, current USD	16 704	16 322	16 132	18 166	20 189	22 037
Top household wealth, USD, current	3 885 465	3 636 642	4 100 845	1 285 644	4 197 077	3 317 434
Top household wealth, USD, PPP	6 224 054	5 539 552	6 512 574	1 835 150	5 833 048	5 780 008
Median household wealth, USD, current	8 266 741	8 266 741	8 266 741	8 266 741	8 266 741	8 266 741
Median household wealth, USD, PPP	8 266 741	8 266 741	8 266 741	8 266 741	8 266 741	8 266 741
Mean household wealth, USD, current	58 378	50 530	41 543	44 880	56 443	64 973
Mean household wealth, USD, PPP	93 514	76 971	65 975	64 062	78 444	113 203

Table B - Relative deviations between the household income and the household income per capita top income shares

**Top 1% income share    Top 5% income share    Top 10% income share**

2007	4,19 %	1,38 %	0,54 %
2008	-6,61 %	-5,80 %	-3,71 %
2009	-11,04 %	-4,85 %	-2,02 %
2010	-6,61 %	-5,09 %	-3,05 %
2011	1,78 %	0,47 %	0,40 %
2014	-8,03 %	-0,00 %	-3,53 %