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WHY HASN'T INEQUALITY CHANGED IN CHILE SINCE 1990?

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Why hasn't inequality changed in Chile since 1990?

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Abstract

This study measures the impact of changes in the income determinants on inequality in the 1990 to 2003 period, in order to answer the question of why income distribution as a whole has not changed. The methodology utilized is micro-simulations of income distribution, which is the most appropriate technique for analyzing the relationship between changes in determinant factors and changes in income inequality. It is analyzed the role of returns, participation rates, occupational choices, schooling enbdownments, subsidies, pensions and household size. The inertia shown by inequality reflects the interplay of factors that cancel each other out, others that operate slowly over time, and the emergence of new developments that affect distribution. Furthermore, there are no clear indications that this situation will change over the next few years. Progress in this area will require a more active public policy than in the past.

Keywords:

Inequality, participation rates, occupational choices, schooling enbdownments, subsidies, pensions and household size.

Why hasn't inequality changed in Chile since 1990?[1]

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This study measures the impact of changes in the income determinants on inequality in the 1990 to 2003 period, in order to answer the question of why income distribution as a whole has not changed. The methodology utilized is micro-simulations of income distribution, which is the most appropriate technique for analyzing the relationship between changes in determinant factors and changes in income inequality. It is analyzed the role of returns, participation rates, occupational choices, schooling enbdownments, subsidies, pensions and household size. The inertia shown by inequality reflects the interplay of factors that cancel each other out, others that operate slowly over time, and the emergence of new developments that affect distribution. Furthermore, there are no clear indications that this situation will change over the next few years. Progress in this area will require a more active public policy than in the past.

[1] We are grateful for the helpful comments made by the participants in seminars in the Department of Economics of the University of Chile, the Institute of Economics of the Universidad Catolica and the seminar on Income Inequality in Chile organized by the Micro Data Center of the University of Chile and the IDB.

I. Introduction

Since 1990, Chilean governments have been committed to a policy of growth with equity. Its objective is to reduce inequality, as well as poverty and social exclusion, within the framework of an economy that leaves resource allocation and economic growth in the hands of the market and private enterprise. To achieve the objectives of equity, social spending has increased sharply in services such as education, health and housing, as well as numerous social investment programs targeted at supporting vulnerable population groups. Social spending increased in real terms by 125% between 1990 and 2003 with an average annual growth rate of 6.45%.[2]

The results to date have been mixed. The Chilean economy grew at an average rate of 5.5% between 1990 and 2003, producing significant increases in employment and real salaries. That aided the reduction in the percentage of poverty, from an initial level of 38% in 1990 to 18.8% in 2003 (CASEN surveys, respective years). These achievements in economic growth and poverty reduction have made Chile the most successful recent economic development case in Latin America. Meanwhile, the increase in social spending has led to a greater availability of social services in education, housing and health, which lead to increases in non-income dimensions of welfare.

However, income inequality remained practically unchanged in the 1990-2003 period. The Gini coefficient is the same for both years (0.56); the distance between percentiles 90 and 10 fell marginally (11.14 to 10.61); while the ratio between the fifth and first quintiles was 17.9 and 17.6 in the respective years.

The inertia displayed by the income distribution indicators is worrying since the inequality levels are high. In terms of the Gini coefficient, Chile is among the three worst placed countries in Latin America; even though based on the ratio between percentiles 90 and 10 Chile falls into the least unequal 50% of the countries of the region (De Ferrantis et al, 2002). [3] However, either way the inequality situation is certainly bad, considering that Latin America has the highest inequality levels in the world.

[2] Includes spending in education, health, housing and social protection. Budget Office: "Public Finance Statistics 1987-2003".
[3] The statistics refer to household per capita income.

The inertia shown by inequality is surprising given that there have been significant changes in the proximate determinants of income distribution, such as female labor market participation, the educational levels of the labor force, household demography, the structure of the returns to education and income from pensions and monetary subsidies.

This study measures the impact of changes in the income determinants on inequality in the 1990 to 2003 period, in order to answer the question of why income distribution as a whole has not changed. Is it due to a cancelling out among the determinant factors, with some pushing inequality upwards and others downwards? Or, are we facing a structure of inequality that is "resistant" to changes in the income determinants? It is also interesting to identify the factors related to public policies that may play a significant role in reducing inequality in the future.

The methodology utilized is micro-simulations of income distribution, which is the latest technique for analyzing the relationship between changes in determinant factors and changes in income inequality. Juhn, Murphy and Pierce (1994) is a pioneering study that uses this kind of technique to analyze the salary distribution of the United States. Subsequently, the technique is generalized to analyze the changes in the distribution of household income. The recent volume of Bourguignon, Ferreira and Lustig (2005) contains a range of applications of micro-simulations of household income for countries in Latin America and South-East Asia, as well as a theoretical compendium of the methodology and its background information. There is an earlier work for Chile that analyzes the changes in distribution between 1990 and 1998 (Bravo, Contreras and Urzúa, 2002).

Apart from extending the time frame of the last study for Chile, the present study contains a methodological innovation with respect to the above mentioned studies. This consists of simulating pension incomes and monetary subsidies, in addition to employment income that is the backbone of the earlier analyses.

This paper is organized into five sections. The following section presents stylized facts for income distribution and its proximate determinants in the 1990 to 2003 period, including an accounting decomposition of the change in per capita income of the deciles in terms of the different sources of that income. The third section presents the micro-simulations of income distribution methodology. The fourth section presents the data and the estimates on which the results of the study are based. The fifth section presents the results of the income distribution micro-simulations. The final section concludes.

II Structure and changes in income distributions

1990-2003 period

During the 1990 to 2003 period, the main indicators of income inequality show a stationary situation (Table 1). The Gini coefficient is 0.56 in both years; the distance between percentiles 90 and 10 dropped marginally in the period, from 11.14 to 10.61; while the ratio of the fifth and first quintiles is 17.9 and 17.6 for the respective years. The Theil index is the only indicator that shows a deterioration in the distribution, which is due to changes in the upper section of the distribution which that index captures more strongly.

Inequality is characterized based on the per capita monetary income of households. The inequality indicators are calculated based on individuals, so that each household has a weighting equal to the number of people who live there.[4] Live-in domestic help in the employer's household is considered an independent unit.

Table 1: Distribution of per capita household income, 1990 and 2003

	Mean Ch $000, 2003	Gini	Q5/Q1	90/10	90/50	10/50	75/25	Theil
1990	91.0	56.0	17.9	11.14	3.85	0.35	3.32	66.8
2003	142.1	56.0	17.6	10.61	3.64	0.34	3.26	69.7

Source: CASEN surveys, respective years
Note: Corresponds to the distribution of per capita monetary household income at an individual level (Includes incomes equal to zero).

The inertia shown by the inequality indicators contrasts sharply with the great changes in the proximate determinants of income (Table A-1 in the Appendix).[5] In the 1990 to 2003 period, the volume of economic activity measured by Gross Domestic Product practically doubled,

[4] This procedure takes the last unit of welfare as the individual (Deaton, 1997).
[5] Proximate determinants are understood as those that directly influence incomes, such as schooling level. In turn, these factors have a range of determinants (parental income, access to educational establishments, etc). This study analyzes the impact of the first group of factors.

employment grew by 33% and real salaries by 51%. The population grew at an annual rate of 1.43%, expanding in total by 20.3% in the 1990-2003 period. The age structure shows a trend towards ageing: in the year 2003 there was a higher proportion of senior citizens and a lower proportion of children with respect to the base year.

There was a significant increase in the educational level of workers in the period, with a reduction in the proportion of workers with only primary education and an increase in those with completed secondary and higher education. Nevertheless, salaries rose proportionally higher for people with higher schooling levels. Workers with university education show real salary increases of over 50% in the 1990-2003 period, while high school graduates show income rises of around 20% (Table A-2 of the Appendix).

The labor participation rate of women increased by more than 11 percentage points in the period under study (from 35.0% in 1990 to 46.3% in the year 2003). The increase in the participation rate is not homogenous. It is concentrated in groups with the greatest growth potential such as women of low and intermediate schooling levels. Women with higher education already had a participation rate of nearly 80% in the year 1990, and as such had little room to increase.

Household size also decreased during the period. This is partly due to a drop in the birth rate, which began in the 1960s, and which is more significant in the case of women from lower socioeconomic strata (Larrañaga, 2005 b). The reduction in household size is also linked to faster growth in housing, which increased 30% in the period far outpacing population growth (21%). This allows for the formation of new households and a drop in average household size.

However, there has not been a reduction in the participation of households with more than one family nucleus, contrary to expectations given the sharp growth in the number of housing units in the period (Table A-2). This may be a reflection of the increase in secondary nuclei associated to the increase in the percentage of single mothers, who tend to establish secondary nuclei within their parents' households (Larrañaga, 2006 b).

Social policy in Chile

Social policy in Chile is comprised of a range of benefits, transfers and programs that may be grouped into four categories: monetary subsidies, social security, social services and social development programs. The first group includes subsidies allocated to poor households; the second group is transfers based on contributory payments; the third group represents the traditional social sectors like education, health and housing; while the fourth category includes a varied range of more recent programs targeted at vulnerable population groups. In quantitative terms, spending in monetary subsidies represented 3.7% of total social spending in the year 2002; social security payments were 39.8%; social services were 50.4% and social development programs were 6.1%. The strategy of growth with equity has been successful in raising the amount of resources targeted at social programs: between 1990 and 2003 social spending grew by practically 145% in real terms. Nevertheless, social policy has not been very effective in achieving the equity objectives (see Larrañaga, 2006c)

Income structure

The main sources of household income are salaries, self-employed and employers´ income, which in total represented 80.8% of household monetary income in the year 2003 (Table 2). Pensions, monetary subsidies and other incomes represent the remaining 19.2% of household income. It should be noted that the incomes reported in the household surveys do not include payments such as the retained earnings of companies, and capture capital gains and related incomes imperfectly.

The most significant income component is salaries, which represent 47.7% of the total. Salaried workers represented 73% of workers in the year 2003. The average salary was Ch$246,000, for those working 30 hours a week or more. 50% of full-time salaried workers make Ch$150,000 or less per month. Salary inequality is certainly high; the Gini coefficient shows that Chile has one of the highest salary inequality levels in Latin America.[6]

Income from self-employed is the second largest component of household income, although it is only one third that of salaries. Self-employed workers comprise 20% of all workers, and have an average income 45% higher than that of salaried workers, with higher levels of inequality. The Gini coefficient for self-employed workers is 47.4%, while the distance between percentiles 90 and 10 is around 7 times.

[6]Chile lies in fourth place base don the Gini coefficient behind Brazil, Bolivia and Guatemala (De Ferrantis, 2004). However, the levels are not too different to the other countries in the region, which is a region with very high and relatively even inequality levels. Meanwhile, inequality measured by the distance between percentiles 90 and 10 is practically twice the inequality level of the countries of Northern and Central Europe. (OECD, 1996).

Meanwhile, employers' income represents 15.7% of the monetary income of households. It is a significant amount for explaining income inequality, since it represents over one quarter of the income of the richest decile. Around three quarters of employers' income is concentrated in the 5% highest per capita income of households.

Pensions represent just below 7% of household income. These payments include old age, widows, disability, and orphanage pensions, with the first two representing 94% of pension payments. They mainly correspond to payments from the older pays-as-you-go system. These payments are in line with the distribution of wages as pensions were determined in terms of the last salaries.[7] So, the Gini coefficient of the individual receptors of old age and widows pensions paid out by the State is 0.395[8], only a few points below the Gini coefficient of salaries (0.474).

Table 2: Structure of per capita household income (%), 2003

Decile	Employer Income	Self-employed	Salaries	Pensions	Monetary subsidies	Other income	Total
1	0.1	9.6	49.3	8.5	14.2	18.3	100.0
2	0.3	11.3	61.5	8.9	7.3	10.7	100.0
3	0.3	15.5	62.2	8.7	4.6	8.7	100.0
4	0.8	15.0	62.5	9.0	3.1	9.6	100.0
5	1.0	17.5	61.7	9.2	2.3	8.3	100.0
6	2.2	18.3	59.6	10.0	1.7	8.2	100.0
7	2.4	20.6	58.0	9.4	0.9	8.6	100.0
8	3.6	22.0	54.5	8.4	0.5	11.0	100.0
9	8.3	20.1	51.8	8.0	0.2	11.7	100.0
10	26.2	16.7	38.3	4.3	0.0	14.4	100.0
Total	15.0	17.4	47.7	6.7	1.2	12.0	100.0

Source: based on the 2003 CASEN survey

Meanwhile, monetary subsidies are transfers targeted at relieving the poverty situation of people who cannot work. Total spending on monetary subsidies represents a marginal fraction of social

[7] Around 48% of pension payments recorded in the 2003 Casen survey correspond to payments from the old pension system and only 28% correspond to payments from the new system (the other 24% corresponds to the Armed Forces and other types of institutions). Moreover, part of the pensions paid out in the new system are from public funds, through subsidies (minimum pensions) and transfers in the case of persons that made contributions when young to the old system (Recognition Bond).
[8] The Gini coefficients indicated refer to the 2003 Casen survey.

spending and equals only 1.2% of household income, even though its contribution is around 10% of income in the case of the lower deciles. [9]

The contribution of the various income sources to the growth of per capita household income is presented in Table 3 at the decile level. The first column presents the growth rate of per capita income in the 1990-2003 period. The pattern of accumulated growth over these years is quite even among deciles, fluctuating between 51.9% and 60.0%, consistent with stable inequality indicators. The contribution of the various components of per capita income is reported in the respective columns of the Figure. The contribution of each component is the same as the growth rate of the respective income source multiplied by its participation in total income.[10]

The growth of salaries explains nearly half of the increase in per capita household income (47%). The contribution of salaries is surprisingly uniform at the level of the second to the ninth deciles, representing in these cases around 60% of the growth in total income. The contribution of salaries is lower in the extreme deciles, as a result of the greater importance of other income sources in those households.

Around one fourth of the growth in per capita income is explained by rises in employer income. This income is concentrated in deciles nine and ten, representing 45% of the increase in per capita income in the upper decile. The following item in order of importance is household size, whose reduction throughout the period explains 12.3% of the growth in per capita household income. The pattern of growth is relatively even at the level of household deciles, suggesting that there is a cancelling out among underlying factors that operate in opposing directions in terms of inequality: the drop in the birth rate and the formation of new households.

Other income sources contribute only marginally to the growth of per capita household income. Nevertheless, their contribution at an income decile level may be relevant. This is the case with monetary subsidies for the first and second deciles, the income of self-employed workers for the intermediate and upper deciles and pension income in the case of the intermediate deciles.

[9] The subsidies include a non-contributory pension (Pasis), which is paid out for old age or disability to poor people who do not have access to social security; family allowance, which is paid out to the dependents of salaried workers with lower incomes; the single family subsidy (SUF) which is a family allowance for children and pregnant mothers from poor households; the drinking water subsidy which pays a part of the utility bills of poor households and a monetary subsidy associated to the Chile Solidario program.
[10] The weighting is the average participation rate of the years considered (1990 and 2003).

Table 3: Growth of per capita household income by decile (%) : 1990-2003

Decile	Growth 1990-2003	% Participation in per capita income growth 1990-2003							
		Employers	Self-employed	Salaries	Pension	Subsidies	Other income	Household size	Total
1	60.0	0.0	-0.9	48.8	2.4	28.8	11.4	11.7	100.0
2	58.3	0.0	3.9	61.7	4.9	12.4	4.8	10.8	100.0
3	59.1	2.0	10.5	68.6	5.3	7.1	-1.5	9.7	100.0
4	58.5	6.7	7.6	70.7	3.6	4.5	0.4	10.8	100.0
5	58.4	3.6	12.7	66.5	6.4	3.1	-1.3	9.5	100.0
6	57.0	12.0	11.4	56.6	6.1	1.6	-2.1	16.5	100.0
7	55.4	3.7	15.1	68.8	1.6	0.4	-2.3	13.0	100.0
8	55.2	9.7	20.9	61.2	1.8	0.0	-0.5	10.2	100.0
9	51.9	27.2	9.8	61.9	1.5	-0.2	-1.8	12.0	100.0
10	53.9	45.3	6.1	29.5	0.7	-0.1	0.6	18.2	100.0
Total	56.2	26.5	8.8	47.0	2.1	1.3	0.0	12.3	100.0

Source: based on 1990 and 2003 CASEN surveys

III Methodology

Micro-simulations of the household income distribution are carried out to decompose the changes in the distribution in terms of the various determinants of those incomes. This allows us to identify the impact of each of the determinant factors on the income distributions of the households.

For these effects, per capita household income h can be expressed as:

$$y_h = \frac{1}{n_h}\left[\sum_{i=1}^{n}\sum_{j=1}^{J} I_{hi}^{j}\, y_{hi}^{j} + \sum_{i=1}^{n}\sum_{s=1}^{S} I_{hi}^{s}\, y_{hi}^{s} + y_{oh}\right] \qquad (1)$$

The first sum represents income from the labor market, where the super-index j represents the type of labor income and sub-index i represents receptor i of income in household h. Variable I is a function indicator with the value of 1 if the associated income has a positive value and the value of zero otherwise. The second sum includes income from pensions and monetary subsidies, represented by the supra-index s. The third income type y_o represents other income types, which are assumed to be exogenous in the exercise. The number of people in the household is n_h.

Labor income

The decomposition of labor market income closely follows the methodology applied in Bourguignon, Ferreira and Lustig (2005), which includes applications for a range of Latin American and East-Asian countries. The procedure implies decomposing the changes in the distribution of labor income between two periods in terms of three types of effects: (i) price effect, which indicates the change in distribution due to changes in prices or returns; (ii) endowment effect, refers to the changes in distribution arising from the changes in the vector of endowenmts or human capital variables; (iii) participation effect, that captures the changes in income distribution produced by changes in the labor market participation of household members.

The price effect requires estimating the returns to education and other determinants of labor income in the final year, and then to simulate the effect that the change in returns has on the distribution of the base year. Returns are estimated through a traditional income equation for each household member and labor income type:

$$\log y_{hi}^{j} = X_{hi}\,\beta^{j} + u_{hi}^{j} \quad para\ i = 1,......,n_h \qquad (2)$$

The labor market participation is estimated through a multiple choice model, which postulates that the individual chooses the labor alternative that maximizes the utility level. The objective of the model is estimating the parameters that affect the labor market decision (λ), to simulate the effect of final year behavior on the distribution of the base year. The model to be concretely estimated is:

$$I_{hi}^{j} = 1 \quad si\ Z_{hi}\lambda^{j} + \varepsilon_{i}^{j} \quad > Max(0, Z_{hi}\lambda^{j} + \varepsilon_{i}^{j}) \qquad (3)$$

$$I_{hi}^{j} = 0 \quad para\ j = 1,.....,J \quad si\ Z_{hi}\lambda^{j} + \varepsilon_{i}^{j} \leq 0$$

$$j = 1,......., J$$

Where Z is a vector of determinant variables of labor market participation, ε is the error term of the participation equation and j the labor market alternatives (salaried employment, self-employed, does not work). It is possible that the model indicates that an inactive person in the base period would participate in the labor market in the final year. In this case, it is necessary to impute the income that this person would have obtained in the event of being working. This is done based on the specification of the equation (2) corresponding to the type of occupation chosen according to (3), including a specific component of the individual (u_i) derived from a random distribution of the residual. [11]

Finally, the effect of the change in endownments (X, Z) is estimated through a non-parametric procedure. Consider variable X^j for this case. The method requires splitting the individuals into K subgroups, according to the distribution of X^j among exogenous variables. By way of example, in the case of schooling, individuals belonging to the labor force could be divided into subgroups according to gender, age groups and geographical zone of residence. As such, population size N is divided into K subgroups:

$$N=\{N_1, N_2, ...N_K\}$$

For each subgroup k, the distribution function of endownment X^j is constructed, which associates percentile θ of the distribution to each value of the variable, and then inverts that function such that:

$$\begin{aligned} \theta_t^{jk} &= F(X_t^{jk}) \quad k=1,.....K; \quad t=1,2 \qquad (4) \\ X_t^{jk} &= F_t^{-1}(\theta_t^{jk}) \end{aligned}$$

Finally, the endownment of X in the final period is simulated in the initial period utilizing the respective percentiles of the distribution. In other words the values observed of X of t=2 to t=1 are substituted, conditional in the same percentile. The more disaggregation of the population in terms of subgroups k, the more approximate the distribution simulated in t=1 will be to the effective

[11] See Bourguignon and Ferreira (2005)

distribution in t=2. The procedure assumes that there is rank preservation in the ordering of the households in distribution X over time.[12]

$$\hat{X}_1^{jk} = F_1^{-1}(\theta_2^{jk}) \qquad (5)$$

Pension income and subsidies

A similar methodology is applied to simulating the changes in pensions and subsidies. Consider component s of these income types, denominated y^s. The problem to be resolved is simulating the distribution of period 2 in the database of period 1. The distributions of y^s between both periods can change in terms of the distribution of the amounts of transfers received as well as in the distribution of their access. In this case, behavior decisions are not modeled, given that access to pensions and subsidies generally does not respond to decisions that individuals or households make in the present.

To make this simulation, the population is split in terms of subgroups that represent various types of access and/or transfer amounts. The distribution of period 2 in period 1 is simulated for each subgroup, utilizing an analogous procedure to that expressed in the previous (4) and (5), which results in the simulation of the distribution of the transfer amounts.

Meanwhile, to simulate the distribution in the access to transfers this model is estimated:

$$\Pr(y^s > 0) = \Phi(V\delta + v) \qquad (6)$$

$$\log(y^s) = W\gamma + w \qquad (7)$$

Where (6) represents a probit model that estimates the probability of access to transfer y^s, while (7) is an equation that explains the transfer amounts through a range of related factors W. Let ρ_t^k be the

[12] Alternatively, a parametric function may be used to predict the values of X based on a set of related factors observed in both periods.

proportion of the population in subgroup k that obtains the benefit in period t. Incomes are imputed in t = 1 with the following rule:

$$
\begin{aligned}
&if \;\; \rho_1^k \le \rho_2^k \\
&\hat{y}_1^s = F_1^{-1}(\theta_2^s) \quad if \quad y_1^s > 0 \\
&\hat{y}_1^s = \tilde{y}_1^s \quad if \quad y_1^s = 0 \;\; and \;\; G(\,) > \;(1-(\rho_2^k - \rho_1^k))
\end{aligned}
$$

$$
\begin{aligned}
&if \;\; \rho_1^k > \rho_2^k \\
&\hat{y}_1^s = F_1^{-1}(\theta_2^s) \quad if \quad y_1^s > 0 \quad and \;\; G(\,) \le \rho_2^k \\
&\hat{y}_1^s = 0 \quad if \quad y_1^s > 0 \;\; and \;\; G(\,) > \rho_2^k
\end{aligned}
$$

If the proportion of receptors of transfer y^s in subgroup k in period 1 is less or equal than in period 2, each observation with a positive transfer in t=1 is imputed with the amount corresponding to its equivalent percentile in period 2. Individuals that did not receive transfers in t=1 are added to this, to complete the proportion of those with access in period 2, choosing those with a higher probability of access estimated through (6). For these cases, an estimated value of the transfer according to (7) is imputed.

In the event that the proportion of receptors of transfer y^s in subgroup k in period 1 is greater than the proportion in period 2, an amount equal to zero in t=1 is imputed to those individuals who having had access to a transfer in the initial period, have a lower probability of access according to (6). The amount corresponding to their equivalent percentile in period 2 is imputed to the remainder of the observations with a positive transfer in t=1.

IV Data and Estimation of the Model

Data

The estimates and simulations are based on the databases of the 1990 and 2003 CASEN surveys. This is a multi-topic survey of households that includes employment, income, education, health and housing modules. It has been implemented every two or three years since 1987. The survey is representative on a national, regional and urban-rural level. In the year 2003, the sample covered around 60,000 households.

Income equations

The income estimates, as well as those related to labor market participation, were carried out considering people between 15-65 years of age. The returns to human capital are estimated through income equations, distinguishing between dependent employees and self-employed workers[13], as well as between men and women. The equation corresponds to a Mincer type specification, where the logarithm of labor income is regressed on schooling, potential experience and its square, and dichotomous variables for the rural status, the region of residence and part-time workers. Schooling is included through ten categories depending on the educational level completed (no education, incomplete primary, complete primary, incomplete secondary, complete secondary general education, complete secondary technical-professional, incomplete technical higher education, complete technical higher education, incomplete university and complete university).

Table A-3 in the Appendix presents the results obtained for the years 1990 and 2003. The most interesting results are the returns to schooling, since one of the main causes behind the rises in income inequality in various countries since the 1980s has been a wider gap between the salaries of skilled and non-skilled workers. In our case, there is an increase in the wage premium for male salaried workers with higher education and for those with lower levels of schooling, with a drop in the wage premium for those with only secondary education. Male self-employed workers have an analogous behavior, even though the returns to secondary education increase for self-employed workers. It should be kept in mind that the labor force with secondary schooling presents a higher growth rate in the period, which may explain the pattern described in the return structure.

In the case of salaried women, there are increases in the returns of the group with higher levels of schooling, while there is a drop in the wage premium of the groups with primary and secondary education, as well as among those with incomplete higher education. On the other hand, female self-employed workers show rises in the returns to education throughout the various schooling levels.

[13] Employers are not considered in the salary or labor market participation estimates and their incomes are estimated as part of the other incomes component (y_{oh}).

Non-observable factors

Non-observable factors that affect labor incomes are incorporated in the simulations through an adjustment of the error term of the income equations. Assuming that the residuals are normally distributed, its distribution can be summarized by the two first moments. Then, to simulate the effects of the changes of the non-observable factors the residuals of each income estimate of 1990 are re-scaled by the ratio of the standard deviation between years 2003 and 1990 ($\sigma^{2003}/\sigma^{1990}$).

Labor market participation equations

The labor market participation is modeled through multilogit equations for male and female populations. There are three possible choices - inactive, salaried worker or self-employed worker – and three type of household members: head, partner[14] or other member. The specifications utilize a common set of right hand side variables, although some additional controls are added for the case of partners and other household members (Tables A-4 and A-5 in the Appendix).

The common variables are schooling (10 categories), experience and its square, the rural status, as well as dummies for the various regions of the country. It also includes dummies that indicate if the person is married and another to indicate if they have a relationship of co-habitation; and if the person is of school-going age (less than 25 years of age), as well as continuous variables with respect to the average schooling and age of the adults of the household.

The additional controls for the head of household specification are a dummy variable that indicates whether or not only one person lives in the household; household demographics variables: the number of children between 0-8 years of age; the number of children between 9-14 years of age; number of people between 15-65 years of age and the number aged over 65); and the percentage of women in the household. For the labor market participation estimates of partners, the condition of single household is eliminated and a dummy is incorporated that reflects the gender of the person; it also includes a dummy that indicates the employment condition of the head of household and a

[14] For the estimates related to the partners of the head of household, a combined analysis of men and women is considered, since the number of men defined as the partner of the head of household was very low, as such, this estimate included a dummy variable for defining the gender of the partner.

continuous variable for the labor income of the head of household when he (she) works. In the equation for other household members, variables related to the labor market decision and incomes of partners are additionally included (if applicable).

Endownments

i. Education

All people aged 15 or over are distributed into 8 demographic groups, which are defined by gender, urban status and age (15-29; 30-65). The non-parametric method indicated in (5) is used in each subgroup, where the values observed in the 1990 distribution are replaced by the values observed in the 2003 distribution corrected by μ_c^{03}/μ_c^{90}, where *c* indicates the centile of the distribution of the educational level, ordered by the observed values of the variable for each year.

ii) Age composition of the household

The total of households in each period is subdivided into the same 8 demographic groups described previously, considering the three variables at the head of household level. Within each group, the distribution of the four variables associated to the age composition of the household is considered (the number of household members in the age groups: 0-8 years, 9-14, 15-65, and 66 and over). Once again an imputation is made for the distribution observed in 1990 based on the values observed in the 2003 distribution adjusted by the mean ratio for each distribution and in each age group.

The sum of the new estimated values of the age composition of each household for the 1990 period, based on the distribution of the year 2003, allows us to determine the simulated size of each of the households observed in 1990.

Pensions

To simulate the changes in the distribution of pensions, the population is divided into 24 subgroups, according to gender, age groups (below 65, 65-74 and over 74) and schooling (0-3, 4-6, 7-11, 12 and over). The resulting subgroups differ in terms of the percentage of the population that receives pension payments, as well as in the average amounts received (Table A-6 of the Appendix). The payment corresponds to the sum of the pensions paid for old age, widows, orphanage, and disability since there are no disaggregated data for 1990 for these components. Old age and widows pensions represented 94% of the aggregate amount in the year 2003, so the paymemnt corresponds basically to payments made to senior citizens.

In the 1990-2003 period there is a fall in the pension coverage in practically all population subgroups. The drop is significant in magnitude, being over ten percentage points in nearly one third of the cases. This trend probably originates in the pension system reform, considering that the cohorts of senior citizens in the year 2003 have a higher probability of having been exposed to the individual capitalization system, and in that system people can postpone their retirement if the pension they will receive is too low or they may even be excluded if they do not reach a minimum period of contributions.

Meanwhile, the average value of pensions increased 38.3% in real terms between the years 1990-2003. The increase is over 50% in the case of women with low schooling levels. This effect is related to the readjustment of the minimum pension, which implied a real increase of 151% in the 1990 to 2002 period (Arellano, 2004).

The subsequent simulation requires estimates of the previous expressions (6) and (7), in other words, the probability of access to pensions at the level of each of the population subgroups indicated. The procedure is carried out with a probit regression, regressing the dichotomous variable whether or not the person receives pension payments in terms of age, the urban and rural condition, the number of people in the household and regional dummy variables. This same group of variables is used to predict the income of the pension in expression (7). The results of these regressions are not reported due to space considerations, but they are available at the request of interested parties.

Subsidies

In contrast to other income items, the treatment of subsidies considers households as a unit of analysis. This is because the socioeconomic condition of the household is the main criterion in the selection of the beneficiaries of the monetary subsidies. This process is carried out through a targeting instrument called the CAS File which is a proxy means-related test which gives a score depending on the level of economic resources of the household. The underlying logic is that the family (household) has the main responsibility for the welfare of its members; and subsidy policy only has a subsidiary role since it supports individuals when the household does not have enough resources.

We work with the sum of monetary subsidies at the household level, considering that most subsidies pay a low amount of money. As in the case of pensions, the simulation is carried out through a non-parametric procedure for population subgroups that differ in the probability of access to the subsidies and in the amount of the benefit received. This time the subgroups are defined at the centiles of the per capita household primary income distribution, considering that the allocation of subsdies is based on this variable.

For each of the subgroups, the percentage of households that receive subsidies during the years 1990 and 2003 is calculated, as well as the average amount of the benefit received. The estimates show significant variations in the coverage of subsidies throughout the period (Figure A-1 of the Appendix). In 1990, the participation pattern had a moderate slope between centiles of per capita household income, from percentages of around 60% in the poorest groups to rates approaching 40% in the upper centiles. In the year 2003, the slope was significantly steeper, from 80% to 15%, reflecting a clearly targeted pattern of subsidies. This is the result of policies that target subsidies that previously had a flat structure, as in the case of the family allowance for dependents of salaried workers, and the introduction of subsidies that benefit the poorest population groups, such as Chile Solidario and the drinking water subsidy.

The average amount of the benefit per household shows a similar trend (Figure A-2 of the Appendix). Considering only the households that receive subsidies, the average value of the benefit increased 88% in real terms during the 1990-2003 period. The poorest groups show the most significant increases of around 160% in the lower decile, while the households of the upper decile exhibit a percentage increase of around 55%. These results reflected the introduction of new subsidies targeted at poor groups as well as a sharp increase in pre-existing subsidies targeted at the poor (non-contributory pension).

Demographic effect

The demographic effect is analyzed based on a classification of households into 21 subgroups depending on schooling, age and gender of the head of household, as well as on the number of family nuclei (Tables A-7 and A-8 in the Appendix). This association should be interpreted as a reduced form more than as a structural model of the demographic variable. Schooling classifies households into two groups depending on whether the head of household has between 0-12 years or over 13 years of schooling; age classifies households into four categories: 15-29, 30-44, 45-64 and 65 and over. Two categories are added to this depending on the gender of the head of household and the number of family nuclei (1, 2 and over). Some of these categories are added when the size of the subgroup is very small, thus producing the 21 subgroups indicated.

The above classification explains 37% of the variance of household size. In general terms, household size is smaller in households where the head has a higher educational level, is younger or a senior citizen, is female and when there is just one family nucleus per household.

Between 1990 and 2003, changes occurred in the relative participation of the 21 subgroups in the total population. In particular, there is an increase in households where the head of household has a higher educational level, for the various age groups and gender of the head of household, which reduces household size through the composition effect.

V. Income Distribution Simulations

This section presents the results of the micro-simulations of the distribution of per capita household income. The main question to be answered is: what would the change have been in the distribution of the base year given a change in each of the components of household income, disaggregating in terms of the respective price effects, endownment and participation rates?

Labor income

The results are presented for the total of salaried employment and self-employed income. Table 4 shows what the distribution of the per capita income of the year 1990 would have been if the labor incomes of men and women were substituted for those corresponding to the structure of the year 2003. Table 5 presents an analogous exercise considering only the labor income of women, considering that this group underwent largest changes in its labor market participation rate in the period analyzed.

The change in the structure of the returns to education – included in the price effect – is the factor that produces the greatest rise in inequality in the distribution of per capita income (Table 4). Alone, it would have led to an increase of 1.5 points in the Gini and over 4 points in the Theil coefficient; the ratio of quintiles would also have increased two points, from 17.6 to 19.6. These are significant quantitative effects and reflect changes in the demand for skilled labor. However, its impact on income distribution is cancelled out by the reduction of inequality associated to the behavior of the non-observable components in the income equations. Meanwhile, the changes in labor market participation and in the endownments push towards greater inequality, but their impact is not quantitatively significant. Taken as a whole, the mentioned effects cancel each other out and result in a per capita income distribution that is practically the same as that of the base year (last line of Table 4).

Simulating the labor income of women results in small increases in per capita income inequality, explained essentially by changes in the returns structure or price effect. On this occasion there are no compensating changes in the behavior of non-observables. The most interesting result is the effect of labor market participation, which is practically neutral from a distributional perspective. This seems to contradict the stylized facts of the period that show a significant increase in the participation rate of women with secondary and primary education, which would have an equalizing effect on income distribution.

Table 4: Simulation of the change in labor income in household income distribution

	Gini	Q5/Q1	90/10	90/50	10/50	75/25	Theil
1990 actual	56.0	17.9	10.9	3.9	0.35	3.3	66.8
2003 actual	56.0	17.6	10.4	3.6	0.35	3.3	69.7
Price effect	57.5	19.9	11.7	3.9	0.33	3.4	71.1
Non-observables	54.9	16.8	10.5	3.8	0.36	3.3	63.2
Labor market participation	56.0	18.5	11.4	3.9	0.34	3.4	65.8
Schooling endowment	55.9	18.6	11.6	3.9	0.33	3.5	64.9
All	55.2	18.5	11.5	3.7	0.33	3.5	62.5

Table 5: Simulation of the change in labor income of women in household income distribution

	Gini	Q5/Q1	90/10	90/50	10/50	75/25	Theil
1990 actual	56.0	17.9	10.9	3.9	0.35	3.3	66.8
2003 actual	56.0	17.6	10.4	3.6	0.35	3.3	69.7
Price effect	56.4	18.7	11.4	3.9	0.34	3.4	66.9
Non-observable	56.0	18.0	11.0	3.9	0.35	3.3	66.5
Labor market participation	55.8	17.8	10.9	3.8	0.35	3.3	65.9
Schooling endowment	56.1	18.4	11.3	3.9	0.34	3.4	66.1
All	55.7	18.4	11.5	3.9	0.33	3.5	64.2

Figure A-3 in the Appendix shows that the occupation rate of women grows evenly throughout the income distributions, which is consistent with its neutrality on the distributional plane. The interpretation of those results must distinguish between mobility and inequality. The fact that a proportion of women with an intermediate and low schooling level join the labor market is consistent with increased income mobility, but not necessarily with greater income equality. The latter occurs because the trend towards greater equality arising from the increase in household income by those who join the labor market can be cancelled out by the resulting increased distance between that group and those whose occupational situation does not change.

Pensions

The simulation of the distribution of pensions of 1990 based on the parameters of the year 2003 is implemented under three scenarios. First, the 1990 distribution is simulated with the structure of the amounts paid in the year 2003, assuming the participation or access of the population to the benefit to be constant. Second, the 1990 distribution is simulated with the participation structure of the year 2003, keeping the amounts paid in the first year constant. Third, the 1990 distribution is simulated with the payments and access structure of the year 2003. In all cases, the above described methodology is applied, at the level of the 21 specified population subgroups.

The results of the distribution of the *individual* pensions are presented in Table A-9 of the Appendix. The actual distribution underwent significant changes in the period, becoming less unequal. Simulating the change in the amount of the pensions (price effect) closely replicates the change in the actual distribution of pensions; meanwhile, simulating the change in access (participation effect) shows only marginal effects in the change of the pensions. The changes in the distribution of pensions are illustrated in figure A-4, which shows the effective growth as well as that attributable to the price and participation effects.

Table 6 shows the effects of changes in pensions on the distribution of per capita household income. The simulated effect of the price and participation effects produces marginal changes in the distribution of per capita household income. Thus, while the average income grew 56.2% in the period analyzed, the modification undergone by pensions made average income grow only 1.2% (Ch$ 92,100 vs. Ch$ 91,000). Meanwhile, the change in pensions caused an increase in per capita income inequality, even though the magnitude of the effect was only marginal. By way of illustration, the ratio of quintiles would have increased from 17.9 in 1990 to 18.6 in 2003, if the change in pensions had been the only income item that had changed during the period.

The above result arises from the interplay of the participation and price effects. The former reduces average income and increases the inequality indicators; the latter operates in the opposite direction, raising per capita income and reducing inequality. Lower pension coverage in the year 2003 with respect to the base year explains the fall in the per capita income derived from the participation effect. The increase in inequality occurs because smaller pension coverage increases the distance of incomes between households, since it reduces one of the components of total income.

Table 6: Per capita household income ($ 2003), pension effect simulation

	Mean, $	**Gini**	**Q5/Q1**	**90/10**	**90/50**	**10/50**	**75/25**	**Theil**
1990 Actual	91.0	56.0	17.9	11.1	3.9	0.35	3.3	66.8
2003 Actual	142.1	56.0	17.6	10.6	3.6	0.34	3.3	69.7
Simulation								
price 03	93.1	55.7	17.7	10.8	3.8	0.35	3.3	65.7
participation 03	90.0	56.5	18.8	11.6	3.9	0.33	3.4	67.9
Both 03	92.1	56.2	18.6	11.4	3.9	0.34	3.4	66.8

Subsidies

Monetary subsidy policy has different effects on the distribution of per capita household income (Table 7). On the one hand, its impact on the average value of household income is fairly marginal, raising that amount from Ch$ 91,000 in 1990 to Ch$ 93,100 in the year 2003 (2.3%). Virtually all the impact is due to the price effect, while the participation effect is nearly zero. In any case, it represents less than one twentieth of the effective increase in per capita income in the period, and is explained by the low participation of subsidies in household income.

Nevertheless, monetary subsidy policy has a greater impact on inequality indicators. By itself, changes in monetary subsidies would have led to a fall of two percentage points in the Gini coefficient (from 56.0 to 54.0), and an even greater reduction in the ratio of quintiles 5/1, from 17.9 to 14.4. Once again, the weight of the impact corresponds to the price effect, so it is the increases in the amounts of the subsidies targeted at the poor more than increases in the participation of the subsidies that produce the drop in inequality. However, the effective inequality in the year 2003 is similar to that of the base year; therefore the trend towards a reduction in inequality is cancelled out by a trend in the opposite direction of other components of income distribution.

Table 7: Per capita household income, subsidy effect simulation, 1990 and 2003

	Mean, $	**Gini**	**Q5/Q1**	**90/10**	**90/50**	**10/50**	**75/25**	**Theil**
1990 Actual	91.0	56.0	17.9	11.1	3.9	0.35	3.3	66.8
2003 Actual	142.1	56.0	17.6	10.6	3.6	0.34	3.3	69.7
Subsidy Simulation								
price 03	92.7	54.7	15.6	9.7	3.7	0.38	3.1	64.1
participation 03	91.2	55.7	17.2	10.8	3.8	0.35	3.3	66.2
Both 03	93.1	54.0	14.4	9.1	3.7	0.40	3.0	62.8

Demographic effect

The simulation of the demographic changes in the income distribution is presented in Table 8. The demographic effect corresponds to the changes in the relative size of the population subgroups and the changes in household size. The results show that the demographic effect produces a significant increase in average household income; all else held constant, the reduction in household size increases per capita income by 14%.[15] This is a relatively even change throughout the income distributions, which does not produce changes in the inequality indicators of per capita household income. The distribution of the simulated income with the demographic structure of the year 2003 is practically the same as the 1990 distribution, with the aforementioned exception of the change in the average income level.

[15] This figure is somewhat higher than that given by the accounting decomposition (Table 3).

In this case, the factors at work operate in opposing directions and cancel each other out: the fall in the birth rate is more significant in women from low socioeconomic levels; the creation of new households linked to the construction of social housing; and the creation of new secondary nuclei associated to an increase in single mothers in the intermediate and lower strata.

Table 8: Per capita household income, simulation of the demographic effect, 1990 and 2003

	Mean $	**Gini**	**Q5/Q1**	**90/10**	**90/50**	**10/50**	**75/25**	**Theil**
1990 actual	91.0	56.0	17.9	11.1	3.9	0.35	3.3	66.8
2003 actual	142.1	56.0	17.6	10.6	3.6	0.34	3.3	69.7
Simulation								
Household Size	103.7	56.1	18.0	10.8	3.8	0.35	3.3	67.2
Participation	93.4	55.9	17.9	11.5	4.0	0.35	3.4	65.7
Demographic effect	104.8	56.4	17.9	11.3	4.0	0.35	3.5	18.2

Other incomes

In the case of employer income and other incomes, an accounting simulation is carried out, changing the income of the base year with the accumulated growth in the 1990-2003 period at the level of each centile of per capita income. The objective of this procedure is to have a series that can be compared to simulations of the other income items, but no endogenous elements are considered here.

The results of the simulation are presented in Table 9. The changes in employer income had a considerable upward pressure on inequality, with an increase of 4 points in the Gini coefficient, 3.5 points in the ratio of quintiles and nearly 18 points in the Theil coefficient. Meanwhile, the other incomes include a set of heterogeneous elements, including capital gains, donations, personal-consumption and others. The effect of the sum of these incomes is practically neutral in the distribution of household income, due to the probable cancelling out of effects in various directions.

Table 9: Per capita household income, simulation of other incomes, 1990 and 2003

	Mean $	Gini	Q5/Q1	90/10	90/50	10/50	75/25	Theil
1990 actual	91.0	56.0	17.9	11.1	3.9	0.35	3.3	66.8
2003 actual	142.1	56.0	17.6	10.6	3.6	0.34	3.3	69.7
Simulation								
Employer inc	101.9	60.2	21.4	11.8	4.1	0.34	3.4	84.4
Other incomes	94.2	56.1	17.6	10.8	3.7	0.35	3.4	68.0

VI Conclusion

The stability shown by income inequality in the Chilean economy is surprising considering the significant changes undergone by the determinant factors of income. In the 1990-2003 period, employment increased by 33%, real salaries by 51%, the participation of women by 11 points and social spending by 145%. The population increased its schooling and it also aged as a result of the fall in the birth rate, while the average size of households declined 8%.

The micro-simulation of the income distributions allows the factors that underlie the inertia found in the inequality indicators to be identified.

There are factors with an even impact on the incomes of the various households, producing changes that are distributionally neutral. Notable among these are the labor market participation of women and the reduction of household size. In a way, it is a surprising result, since the prior information suggested that they were inequality reducing factors given that their effect was concentrated in households placed in the intermediate and lower parts of the income distribution. The results obtained suggest new hypotheses. The reduction in low income household size as a result of the fall in the birth rate and the expansion of social housing has been cancelled out by an increase in secondary nuclei associated to out-of-wedlock births. The higher labor market participation of women from intermediate and low level sectors reduces the income gap with respect to the more well-to-do sectors, while it produces greater inequality with respect to those who do not participate in the labor market.

Meanwhile, there are other factors that push income inequality up. These include changes in the returns to education and the increase in employer income, which by themselves would have increased all the inequality indicators considered in the analysis. These factors are closely related to the operation of the markets in the context of a high growth economy and therefore provide a note of caution with regard to the role that those determinants have had in income distribution to date. The sharp reduction in inequality undergone by today's developed countries in the first half of the twentieth century was mainly due to the reduction of the income gap between skilled and unskilled workers. That development is still pending in the case of the Chilean economy.

During the period, there was a significant increase in the monetary subsidies targeted at the poorest groups. Even though these transfers represent only a marginal fraction of social spending and household income, targeting spending towards the poorest households was the main force driving income inequality downwards during the period. By itself, it would have reduced the Gini coefficient by 2 points and the ratio of quintiles by 3.5 points.

The role of monetary subsidies stands in contrast to other public policy related factors. Two cases in point are pensions and education, which did not have an impact on inequality during the period even though they are principal determinants of household income.

Pensions continue to be mainly paid out by the State, notwithstanding the privatization of the pensions system in the early 80s. This situation is explained because most retirees belong to the old pay-as-you-go system and because of the public contributions to the new retirees (Recognition Bonds and the minimum pension). However, the previous pension system is based on a contributory system, where the distribution of pensions closely follows the salary distribution, without having significant redistributional elements.

Meanwhile, the increase in schooling has ambiguous effects on income distribution, pushing some inequality indicators upwards and pushing others downwards. The increases in educational coverage should increasingly benefit low income groups given that schooling is truncated by above, but it is a slow process over time given the long cycle of studies and the predominance of older cohorts in the labor market.

In summary, the inertia shown by inequality reflects the interplay of factors that cancel each other out, others that operate slowly over time, and the emergence of new developments that affect distribution. Furthermore, there are no clear indications that this situation will change over the next few years. Progress in this area will require a more active public policy than in the past.

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APPENDIX

Table A-1: Proximate determinants of per capita household income

Indicators	1990	2003
Population		
Total (in millions)	12.93	15.55
% rural	18,5	13,4
Distribution % of population by ages		
0-14	28.5	25.5
15-30	31.2	26.7
31-50	24.0	28.4
51-65	10.5	12.1
66 and over	5.8	7.3
Employment and salary indices		
Employment	100.0	133.0
real salaries	100.0	151.0
Distribution % workers according to schooling		
Primary or none	38.2	24.5
Secondary, incomplete	16.0	15.9
Secondary, complete	24.0	31.9
Non-university higher education	7.0	10.1
University education	14.8	17.7
Labor market participation (%)		
Women	35,0	46,3
Men	77,9	77,5
Unemployment Rate %		
Women	9,7	12,4
Men	7,7	8,4
Type of Employment %		
Dependent	75,6	76,9
Self-employed+Employer	24,4	23,1
Average household size	4,08	3,78

Note: All the statistics come from the 1990 and 2003 CASEN surveys, except the population data (INE).

Table A-2
Demographic Factors

Year	Average household size	Average number of nuclei per household	Average children below 20 per nucleus	Average children < 20, in nuclei with children
1990	4.08	1.19	1.18	1.96
2003	3.78	1.20	0.98	1.77

Source: CASEN surveys, respective years

Table A-3: Estimates of Income Equations

	Women Salaried		Women Self employed		Men Salaried		Men Self employed	
	1990	**2003**	**1990**	**2003**	**1990**	**2003**	**1990**	**2003**
Primary incomplete	.14	.07	.29**	.40**	.19***	.21***	.08	.20***
	(.090)	(.063)	(.141)	(.166)	(.036)	(.040)	(.076)	(.074)
Primary complete	.28***	.20***	.28*	.64***	.31***	.37***	.17*	.47***
	(.094)	(.066)	(.168)	(.176)	(.040)	(.042)	(.086)	(.077)
Secundary incomplete	.42***	.30***	.65***	.67***	.46***	.49***	.37***	.55***
	(.093)	(.066)	(.156)	(.177)	(.038)	(.043)	(.083)	(.079)
Sec complete general	.72***	.60***	.80***	1.04***	.72***	.70***	.65***	.80***
	(.093)	(.066)	(.162)	(.177)	(.041)	(.043)	(.088)	(.080)
Sec complete vocat.	.82***	.69***	.88***	.89***	.81***	.81***	.72***	.84***
	(.096)	(.067)	(.187)	(.188)	(.044)	(.045)	(.103)	(.084)
Terciary tech. incom.	.95***	.71***	1.29***	1.29***	.93***	.90***	1.04***	.90***
	(.112)	(.089)	(.268)	(.302)	(.088)	(.071)	(.146)	(.344)
Tertiary tech complet	1.17***	1.08***	1.30***	1.28***	1.17***	1.22***	.91***	1.24***
	(.098)	(.068)	(.210)	(.201)	(.054)	(.047)	(.121)	(.102)
University incomplete	1.27***	1.24***	1.50***	1.49***	1.26***	1.30***	1.03***	1.21***
	(.096)	(.071)	(.197)	(.208)	(.054)	(.054***)	(.146)	(.102)
University complete	1.56***	1.73***	1.96***	2.29***	1.85***	1.95***	1.72***	2.02***
	(.096)	(.068)	(.211)	(.195)	(.050)	(.048)	(.116)	(.106)
Exp	.030***	.023***	.020	.024***	.040***	.042***	.043***	.038***
	(.002)	(.002)	(.008)	(.006)	(.002)	(.001)	(.004)	(.003)
Exp^2	-.0005***	-.0003***	-.0002	-.0002**	-.0006***	-.0006***	-.0006***	-.0005***
	(.0000)	(.00004)	(.0001)	(.0001)	(.0000)	(.00003)	(.0001)	(.0001)
Rural	-.01	-.09***	-.21***	-.13***	-.19***	-.16***	-.29***	-.24***
	(.025)	(.015)	(.072)	(.044)	(.013)	(.011)	(.032)	(.023)
Constant	10.60***	10.73***	11.05***	10.78***	10.82***	10.80***	11.34***	11.26***
	(.097)	(.088)	(.203)	(.215)	(.050)	(.060)	(.109)	(.102)
Std deviation of residuals	.577	.580	.908	.861	.615	.566	.832	.724
R^2	0.423	0.481	0.254	0.336	0.402	0.485	0.254	0.377

All estimates incluye dummies for regions and part time workers.
***, **, * represent statistical significance at <0.01, <0.05 y <0.1 respectively.

Table A-4: Multilogit estimates, labor market participation 1990 y 2003

	Women Household head				Women Other hh member				Men and women Partner of head			
	Salaried		**Self employed**		**Salaried**		**Self employed**		**Salaried**		**Self employed**	
	1990	**2003**	**1990**	**2003**	**1990**	**2003**	**1990**	**2003**	**1990**	**2003**	**1990**	**2003**
Primary Incomp.	.17***	-.25***	-.31***	.21***	1.63***	1.53***	2.41***	1.14***	.15***	.32***	.08***	.09***
Primary Complete	-.04*	-.42***	-.36***	-.14***	1.97***	1.80***	2.31***	1.38***	-.09***	.38***	-.09***	.27***
Secundary Incomp.	-.47***	-.35***	-.25***	.22***	1.81***	1.71***	2.16***	1.39***	.00	.33***	.35***	.33***
Secon comp general	-.23***	-.35***	-.50***	.08***	3.03***	2.91***	2.94***	2.09***	.49***	.52***	.55***	.48***
Secuon comp vocat	.10***	.18***	-.13***	.61***	3.42***	3.45***	2.99***	2.44***	.82***	1.05***	.42***	.49***
Tertiary tech incomple	.02	-.46***	1.12***	-1.48***	2.91***	3.10***	3.31***	1.78***	1.20***	.71***	1.46***	.08**
Tertiary tech complete	-.06**	-.00	-1.22***	.20***	3.79***	3.56***	3.63***	2.75***	1.69***	1.41***	1.72***	.86***
University incomp.	.04	-.32***	-.51***	.02	3.10***	2.79***	2.45***	2.48***	1.95***	1.56***	1.23***	.76***
Universidty complete	.81***	.91***	.00	.24***	4.66***	3.89***	4.20***	2.87***	3.13***	2.45***	2.10***	1.43***
Exp	.034***	.094***	.057***	.138***	.243***	.206***	.216***	.19***	0.43***	.035***	.107***	.061***
Exp^2	-.002***	-.002***	-.001***	-.002***	-.005***	-.004***	-.004***	-.003***	-.001***	-.001***	-.001***	-.001***
Rural	-.52***	-.70***	-.08***	-.17***	-.42***	-.15***	-.56***	.10***	-.59***	-.54***	-.81***	-.42***
Married	-.90***	-.32***	-.50***	-.16***	-.87***	-.86***	-.79***	-.47***				
Cohabitaion	-.46***	-.19***	.14***	-.20***	-.98***	-.49***	-.13***	-.09***	.42***	.32***	.34***	.34***
Young age	-.67***	-.80***	-1.22***	-.68***	-.03***	-.29***	-.53***	-.42***	-.31***	-.39***	-.68***	-.54***
Number of children	-.23***	-.29***	-.07***	-.11***	-.04***	-.04***	.05***	.16***	-.32***	-.35***	-.10***	-.08***
number of young	-.05***	-.20***	-.05***	-.07***	.03***	-.07***	-.12***	.04***	-.06***	-.14***	-.12***	.02***
Number of adults	-.09***	-.07***	-.11***	-.08***	-.02***	-.03***	-.10***	.01***	.02***	.02***	.03***	-.06***
number of old people	.18***	.03***	.15***	-.06***	-.23***	-.30***	-.19***	.13***	-.12***	-.11**	-.02	.09***
Head working					.06***	.17***	.34***	.21***	.04***	.19***	.25***	.29***
Female									-2.58***	-2.23***	-2.79***	-2.20***
Constant	2.12***	1.16***	-.36***	-1.79***	-4.45***	-3.82***	-6.77***	-6.70***	-2.58***	.60***	-1.38***	-.48***
Pseudo-R^2	0.190	0.132	0.190	0.132	0.184	0.189	0.184	0.189	0.119	0.106	0.119	0.106

All estimates include dummies for regions and for characteristics of other members of the household.
***, **, * represent statistical significance at <0.01, <0.05 y <0.1 respectively.

Table A-5: Multilogit estimates, labor market participation 1990 y 2003

	Men Household head				Men Other member of household			
	Salaried		Self employed		Salaried		Self employed	
	1990	2003	1990	2003	1990	2003	1990	2003
Primary Incomp.	-.62***	-.23***	-.38***	-.09***	1.75***	2.05***	1.86***	1.72***
Primary Complete	-.87***	-.23***	-.71***	-.11***	2.08***	2.47***	2.24***	2.18***
Secundary Incomp.	-1.07***	-.52***	-.88***	-.38***	2.04***	2.27***	1.91***	2.02***
Second general comp.	-.95***	-.74***	-1.02***	-.66***	2.91***	3.37***	2.66***	2.76***
Second vocat compl.	-.96***	-.52***	-1.27***	-.45***	3.15***	3.87***	2.92***	2.86***
Tertiary tech inc.	-1.12***	-1.09***	-1.37***	-1.83***	2.37***	3.11***	1.88***	2.07***
Tertiary tech comp	-1.02***	-.88***	-1.21***	-1.15***	3.38***	3.67***	2.89***	2.91***
University Incomp.	-1.30***	-.62***	-1.66***	-.65***	2.26***	2.95***	2.09***	2.51***
University Complete	-.55***	-.05**	-1.20***	-.72***	3.67***	3.94***	3.18***	3.00***
Exp	.003***	.06***	.03***	.11***	.304***	.28***	.29***	.29***
Exp^2	-.001***	-.002***	-.001***	-.002***	-.006***	-.005***	-.005***	-.004***
Rural	.59***	.24***	.57***	-.47***	.87***	.51***	.86***	.73***
Married	.63***	.47***	.35***	.29***	1.28***	.70***	1.25***	.55***
Cohabitation	.38***	.63***	.34***	.60***	.86***	1.09***	1.36***	1.32***
Young age	-1.16***	-.90***	-1.32***	-1.12***	.28***	.19***	.37***	.22***
Head working					.33***	.50***	.37***	.26***
Constant	3.61***	2.37***	1.45***	.53***	-4.17***	-4.17***	-5.71***	-5.60***
Pseudo-R^2	0.90	0.073	0.90	0.073	0.205	0.220	0.205	0.220

All estimates include dummies for regions and for characteristics of other members of the household.
***, **, * represent statistical significance at <0.01, <0.05 y <0.1 respectively

Table A-6: Pension structure, by population subgroups

Subgroup	% with pension			Average pension ($000 2003)		
	1990	2003	Change	1990	2003	% change
Men						
< 65, 0-3 esc	10.5	8.8	-1.7	77.6	88.6	14.3
65-74, 0-3 esc	76.3	61.5	-14.8	73.1	95.8	31.0
> 74, 0-3 esc	94.1	69.8	-24.3	69.7	94.4	35.5
< 65, 4-6 esc	8.2	8.2	0.0	105.6	130.3	23.3
65-74, 4-6 esc	75.6	70.8	-4.8	98.3	119.9	22.0
> 74, 4-6 esc	93.4	80	-13.4	97.1	129.2	33.0
< 65, 7-11 esc	3.4	3.7	0.3	157.6	164.5	4.4
65-74, 7-11 esc	74.3	72.6	-1.7	149.2	180.2	20.8
> 74, 7-11 esc	88.1	79	-9.1	129.6	166.3	28.3
< 65, >11 esc	3.8	3.1	-0.7	211.2	271.9	28.7
65-74, > 11esc	73.8	73.3	-0.5	246.5	289.5	17.5
> 74, >11 esc	86.9	75.6	-11.3	255.2	253.2	-0.8
Women						
< 65, 0-3 esc	14.9	11.7	-3.2	50.3	79.6	58.2
65-74, 0-3 esc	64	44.7	-19.3	54.7	83.5	52.5
> 74, 0-3 esc	79.3	64.1	-15.2	57.7	88.8	53.9
< 65, 4-6 esc	8.1	8.7	0.6	64.7	84.5	30.6
65-74, 4-6 esc	62.3	47.4	-14.9	67.3	92.0	36.6
> 74, 4-6 esc	77.6	68.6	-9.0	66.5	101.9	53.3
< 65, 7-11 esc	3.4	3.3	-0.1	74.7	105.1	40.6
65-74, 7-11 esc	56.6	50.9	-5.7	86.1	116.5	35.4
> 74, 7-11 esc	72	68.3	-3.7	89.0	132.5	48.8
< 65, >11 esc	3.4	2.9	-0.5	137.2	176.3	28.5
65-74, >11 esc	60.5	59.4	-1.1	155.7	210.4	35.1
> 74, >11 esc	74.1	66.1	-8.0	143.6	183.0	27.5
Total	11.5	10.5	-1.0	103.4	143.5	38.8

Source: based on 1990 and 2003 CASEN surveys

Table A-7: Demographic groups

	% Participation out of total			Average household size		
	1990	2003	Difference	1990	2003	Difference
1	7.67	7.61	-0.06	3.43	3.28	-0.15
2	16.15	14.58	-1.57	4.32	4.01	-0.31
3	25.43	22.68	-2.75	4.16	3.77	-0.39
4	4.88	3.82	-1.06	2.86	2.53	-0.33
5	1.42	2.54	1.12	2.68	2.4	-0.28
6	4.41	6.5	2.09	4.00	3.59	-0.41
7	5.41	6.82	1.41	4.15	4	-0.15
8	0.55	0.68	0.13	2.36	2.18	-0.18
9	0.47	0.55	0.08	2.99	2.79	-0.20
10	1.38	1.52	0.14	3.32	3.35	0.03
11	4.26	3.87	-0.39	2.85	2.7	-0.15
12	1.92	1.63	-0.29	1.97	1.91	-0.06
13	0.34	0.83	0.49	2.68	2.56	-0.12
14	0.63	0.98	0.35	2.62	2.79	0.17
15	0.93	1.07	0.14	5.56	5.78	0.22
16	1.53	1.69	0.16	6.39	5.97	-0.42
17	14.42	13.2	-1.22	6.26	5.92	-0.34
18	6.35	5.62	-0.73	5.42	5.37	-0.05
19	0.24	0.76	0.52	3.93	3.37	-0.56
20	0.29	0.6	0.31	4.62	4.83	0.21
21	1.31	2.43	1.12	5.46	5.36	-0.10
				4.06	3.79	-0.27

Table A-8: Population subgroups by characteristics of head of household and number of nuclei

	Age	Schooling	Gender	Nuclei Number
1	15-29	0-12	men	1
2	30-45	0-12	men	1
3	46-64	0-12	men	1
4	65 and over	0-12	men	1
5	15-29	13 and over	Both	1
6	30-45	13 and over	men	1
7	46-64	13 and over	men	1
8	65 and over	13 and over	both	1
9	15-29	0-12	women	1
10	30-45	0-12	women	1
11	46-64	0-12	women	1
12	65 and over	0-12	women	1
13	30-45	13 and over	women	1
14	46-64	13 and over	women	1
15	15-29	0-12	both	2 and over
16	30-45	0-12	both	2 and over
17	46-64	0-12	both	2 and over
18	65 and over	all	both	2 and over
19	15-29	13 and over	both	2 and over
20	30-45	13 and over	both	2 and over
21	46-64	13 and over	both	2 and over

Table A-9: Individual Pensions ($ 2003) appendix

	Mean $	**Gini**	**90/10**	**90/50**	**10/50**	**75/25**
1990 actual	103.4	43.4	7.7	3.1	0.40	2.2
2003 actual	142.1	39.8	4.6	3.5	0.76	2.0
Simulation 90						
Price 03	132.5	37.8	4.2	3.1	0.74	1.7
Participation 03	107.8	42.9	7.6	3.4	0.45	2.3
Both 03	136.8	37.9	4.3	3.3	0.77	1.8

Figure A-1
Participation in subsidies, household centiles (per capita income) 2003 vs. 1990

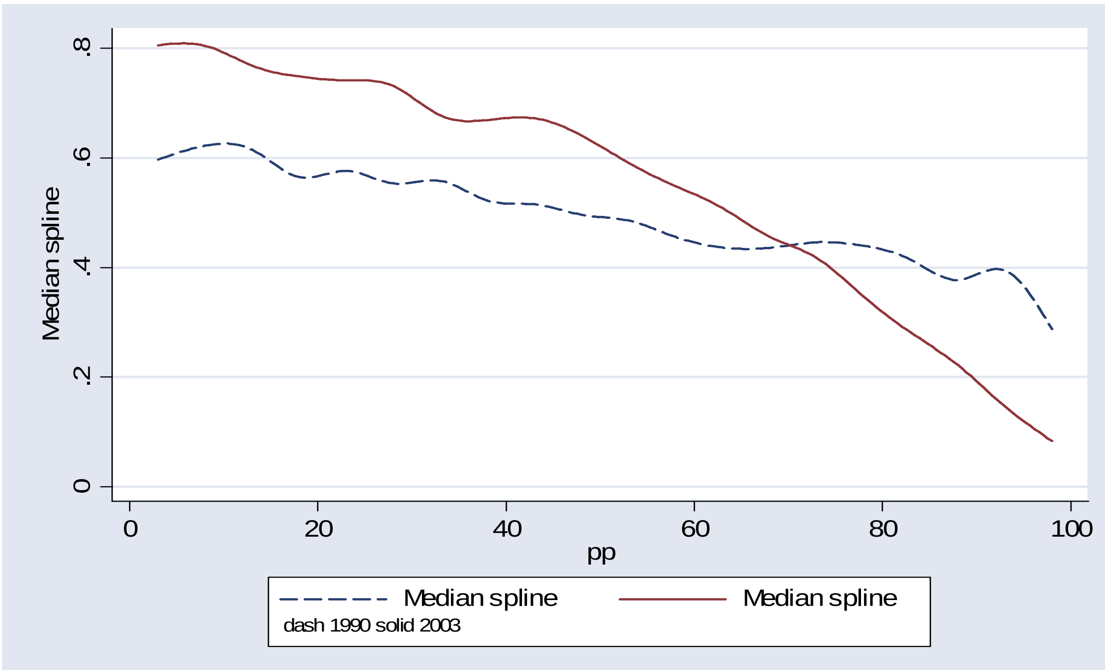

Figure A-2
Average subsidy amount, household centiles by per capita income, 1990 vs. 2003
(Considers only households with subsidies)

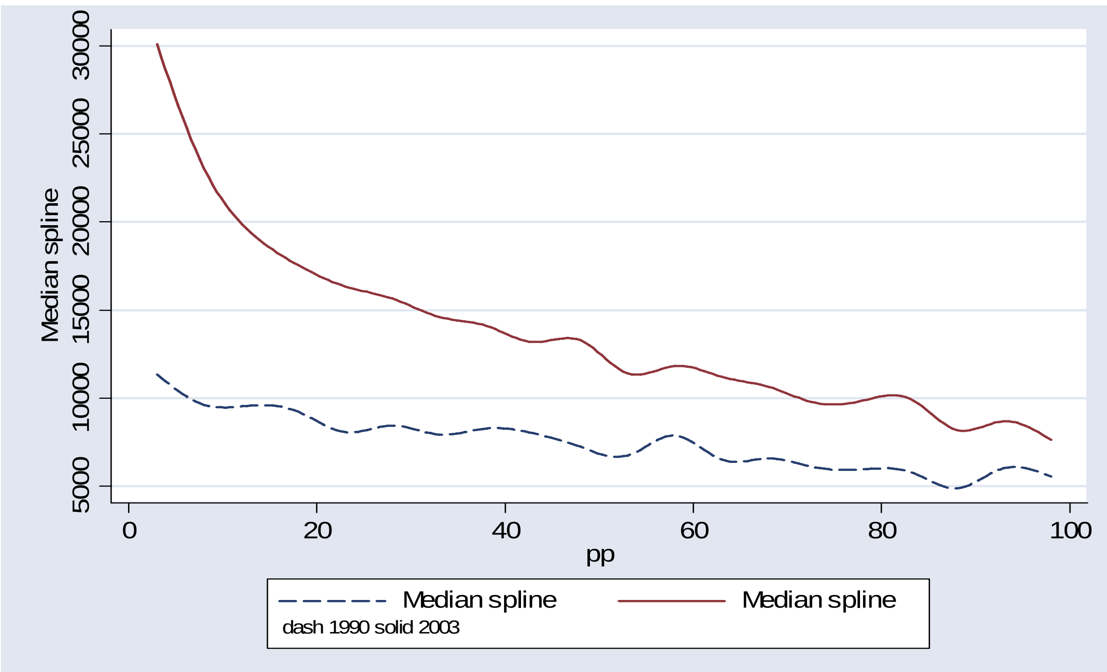

Figure A-3
Occupation rate of women aged 15-65, centiles of per capita income, 1990 and 2003

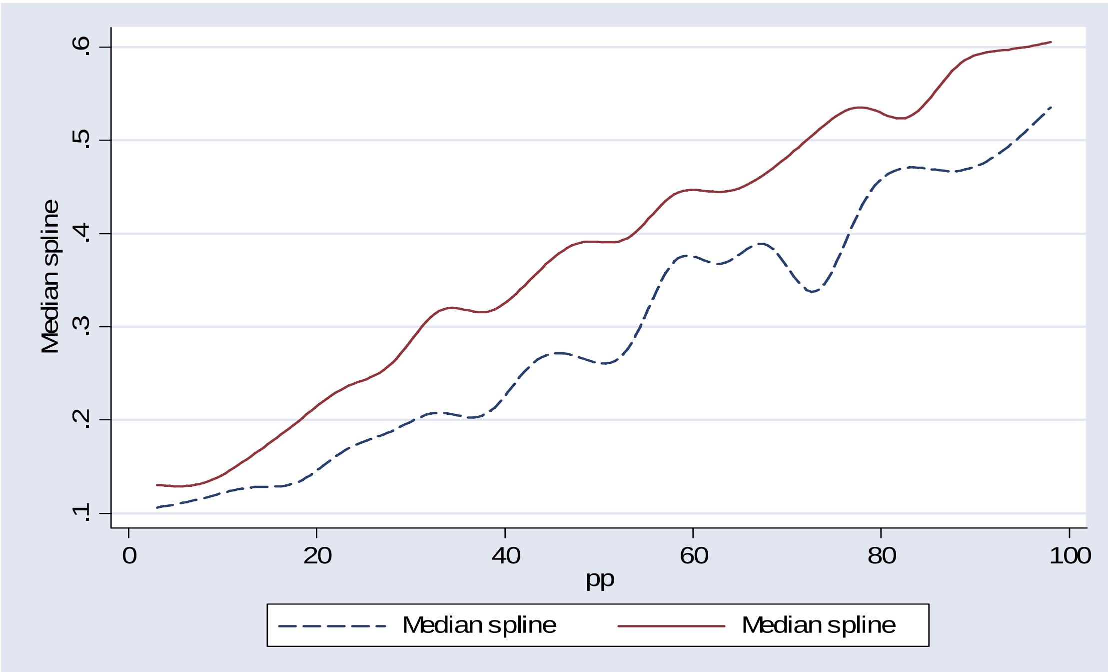

Figure A-4
Pension Simulation