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Are Social Security Reforms Gender Neutral? Current Estimates of Standards of Living and Future Prospects for Chilean Elderly Men and Women*

by

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1. Introduction

In 1981 Chile replaced a mature government-run social security system that operated on a pay-as-you-go (PAYG) basis and generated a large fiscal deficit, with a privately managed system based on individual retirement accounts. There has been a significant amount of work analyzing the management, operation, and financial effects of the reformed system (see for example, Vittas and Iglesias, 1992; Baeza and Margozini, 1995). This paper is concerned with some of the microeconomic effects of the reform, mainly, its impact on retirement incomes of the elderly, and in particular, its effect on the living standards of elderly men and women.

The Chilean population is expected to age rapidly in the course of this generation, as the fraction of individuals above 65 years of age increases from 6.1% in 1990, to 12.7% in 2025, and to 17.3 in 2050 (see Table 1). How is the current generation of elderly fairing? How is the current generation of young adults preparing for old age? What are the prospects of current generation when reaching old age? To answer these questions, the paper examines the levels of income per capita and living arrangements of the current elderly, estimates their poverty rates, and compares these with the poverty rates for the younger population. Drawing from the current behavior of the working-age population, current data on demographic trends, and the particular characteristics of the social security system, it simulates the expected evolution of the financial positions of younger men and women as they reach old age.

2. Social Security Reform and Incentives

This section offers a brief description of the old and new systems and points out at key elements that affect workers incentives to participate in each case. The old system was composed of several retirement funds managed by distinct institutions, with affiliates channeled along the while and blue-collar divide. The most important of the funds --the Social Security Fund, SSS -- represented blue-collar workers, or the equivalent of 62.6

percent of all contributors in 1980. The second and third most important funds were the Public Employees Fund and the Private Employees Fund.

The system was financed by a payroll tax with a very weak link between contributions and benefits. In 1973, for example, total contributions to the retirement plan -- by employers and employees -- averaged 26 percent of wages. Once contributions to the national health system were included, total payroll contributions exceeded, for some workers, 50 percent of wages. During the late 1970s, payroll taxes rates were lowered, and in 1980, social security contributions varied between 32.5 and 41.04 percent of taxable wages.

Eligibility towards retirement benefits was defined by age (65 for men and 55 for women) in the SSS; and by age (65 for all) or seniority (30 years) in the two main employee funds. Retirement benefits were based on a formula that included a base salary (average of the last five years of wages in the case of SSS and Private Employee Funds, or the last three in the case of the Public Employees Fund) and years of service. The benefit had an upper bound of .70 basic salaries in the SSS; and one basic salary in the Public and Private Employees Funds. Only the SSS and the Private Employees Funds contemplated an indexing clause in their benefits formula, with the correction applying to the last three years of salaries only. While benefits also included survivors pensions, widows that had pension benefits on their own account, were required to choose between their own retirement pension and the corresponding widows pension.

The reform reduced the overall contribution towards social security to approximately 20 percent of taxable wages; established a set of common rules for all contributors; compartmentalized the various parts of the social security package in different products; and introduced competitive forces in the market for these products. The new system requires affiliates to make a 10 percent contribution towards pensions and a 7 percent towards a health program. It also requires AFPs to insure their affiliates against the risk of income loss associated to invalidity and death. All civilian contributors are treated equally, except for the fact that income base for social security contributions is capped at

maximum of 60 UF (Unidad de Fomento -- an indexed unit) per month and is subject to a minimum equal to the minimum wage[1]. Any affiliate can also make voluntary contributions over and above the required 10 percent, which as in the case of required contributions, are exempted from income taxes.

The first element of competition is the choice of AFP--or retirement fund administrator. This choice is highly influenced by each AFP administrative fee. This fee covers a package of services that include the administration of individual accounts, the management of investments, information and consultation services, and the insurance premium towards workers compensation. The market-determined fee generally varies between 2.55 and 3.4 percent of taxable wages, except in the case of hazardous occupations, in which case workers are required to make an additional contribution of 2%. Upon retirement, the obligation to provide workers compensation coverage ceases and in practice AFPs stop charging the administrative fee. [2]

The requirement to contribute towards a health program introduces a second choice. Affiliates can stay in the public health system (Fonasa), or may opt out. If they do so, they would apply the 7 percent of their taxable wage and some additional amount, to buy a health insurance package from a private health care insurer or Isapre--Instituto de Salud Previsional. Isapres, in turn, offer various health care packages with variable costs, generally more expensive than the basic public (Fonasa) program.[3]

Employees cannot be contributors to the pensions program without making contributions towards the health care program. It is the responsibility of employers to make the appropriate transfers of funds. Employers deposit contributions towards pension benefits

[1] The data analysis will focus on November 1994. The minimum wage was 39,000.56 pesos per month, and the UF (unidad de fomento) was 11,463.72. Given the value of the dollar at that time (413.45 pesos/dollar), the minimum contribution was equivalent to US$ 94.3 and the maximum to US$ 1,663.6. While the minimum wage is set on a monthly basis, in practice, the minimum contribution can be less than 10% of the minimum wage, if the affiliate declares a small amount of hours.

[2] For a discussion on the economics of this fee, and in particular, the implicit cross-subsidies on the financing of the workers' compensation insurance, see Valdes and Navarro (1992).

at the respective AFPs, and contributions towards health insurance at Fonasa or the respective Isapres. Retirees and beneficiaries for disability are also required to buy a health insurance plan, which can be public or private. In these cases, retiree's contributions towards a health care program (also equivalent to 7% of the monthly pension) are subtracted directly from their pension benefit. The self-employed, who are not required to contribute, must make arrangements directly with AFPs and ISAPREs.

In the reformed system, retirement benefits are a function of the accumulation of funds, with a tight matching between contributions and benefits, except for a guaranteed minimum pension financed by the central government budget. Men can retire at 65 and women can retire at 60. Both have also the option to retire earlier. This option requires an accumulation of funds large enough to generate an annuity equivalent to 50 percent of average annual income of the last 10 years of contributions (indexed according to the consumer price index). In addition, the annuity obtained must be at least equal to 110 percent of the minimum pension. Men and women that choose to continue working after their respective minimum retirement age, do not have the obligation to make the 10 percent contribution towards pensions --although they can still make voluntary contributions – but, they must continue to make the contributions towards health.

At retirement, beneficiaries have another choice. Their accumulated funds can be withdrawn in three alternative modes. They can opt for a program of annual withdrawals; an immediate transformation of their accumulated fund into a stream of steady annual payments or annuity (through a contract with a private insurance company); or a combination of a deferred annuity and a program of annual withdrawals. Unlike annuities, annual withdrawals vary year after year as a function of the remaining fund (which varies with returns and initial withdrawals), and life expectancy (which varies with age).[4] The remaining funds are invested as part of the AFP's portfolio, and have market returns.

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[3] The choice of health care provider is highly influenced by income and health status (see Sapelli and Torche, 1998).

[4] By 1997 there were already 250,000 retirees receiving pensions under the new system. Of these, approximately one half had opted for annuities, and one half for programmed withdrawal.

Old age pensions are calculated on the basis of the accumulated fund in the individual account, the life expectancy of the affiliate, and that of his/her family members who are or can be beneficiaries of the "survivors pension." By law, any affiliate generates a benefit towards his/hers legal dependents of a survivors pension. The benefit becomes available to a survivor at the time of death of the active affiliate or at the time of death of the retired affiliate. In case of death of an active affiliate, his/her survivor will receive the accumulated fund plus any benefits that would apply in case of work-related accident covered by insurance. Naturally, the legal obligation to provide funding towards a "survivors pension," establishes a constraint to be considered in the calculation of the affiliate's own pension in any of its three modalities.

In Chile, married men are required to make provisions to provide a pension for their widows[5], married women are required to make provisions for their husbands --only when the husband is disable, and parents are required to make provisions for dependent children. Any unused portion of the accumulated fund, in case of death of an active worker without survivors, or in case of death of a retiree that opted for a program of annual withdrawals, becomes part of the beneficiaries' inheritance.

Unlike the old public system, where widows had to choose between retirement benefits and husbands pensions, in the new system, own retirement benefits and family-related pensions can complement each other. This feature has particular impact on women, who are likely to become widows and who typically have pension benefits from their husband's accounts.

The reformed system established a minimum pension guaranteed, which has typically been equivalent to 80 percent of the minimum wage. This guarantee is available to individuals that have been active contributors for at least 20 years. Given the system design, where

[5] The surviving wife must have been married to the contributor for at least six months before his death, and for at least three years if the wedding took place with a retired man.

pensions are determined by individual accumulation of funds, any difference between an actuarially fair benefit and the minimum guaranteed pension is financed by the central government budget.

In a separate means-tested program, the elderly poor may qualify for the PASIS subsidy. This is a poverty-targeted transfer program, financed by the central government budget, and administered at the regional (intendencias) level. In short, neither the minimum pension nor the poverty-targeted programs are funded through a narrow tax on social security contributors, instead, they are funded through a broader tax on national income.

It is important for readers to bear in mind that the 1981 reform eliminated the possibility to join the old system. The reform allowed the already established affiliates to choose between staying in the old system or join the new system. Those that moved to the new system transferred an estimate of the acquired benefits (Bono de Reconocimiento) to his/her individual retirement account. In addition, those that chose to join the new system were able to pocket the payroll tax savings associated to the change, which represented an average 11 percent increase in net wages (Iglesias, 1990). Yet, an important fraction of the current elderly, are beneficiaries of the old system, which was consolidated into the Institute of Pension Settlements (Instituto de Normalizacion Previsional - INP). The younger generation and more precisely, those that entered the labor force after the reform (after 1981) did not have the option to enter the old system. The armed forces stayed out of the reform altogether, and continue to organize their health and old-age benefits programs around CAPREDENA -- Caja de Prevision de la Defensa Nacional (Social Security Fund of the Armed Forces) (see Table 14 in section 5).

3. Standards of Living of the Elderly: Data and Methodology

The key data source for the statistical analysis is the micro data set of the Caracterización Socioeconómica Nacional (CASEN) for 1994. This is a nationally and regionally representative household survey carried by the National Planning Office (MIDEPLAN),

through the Department of Economics of Universidad de Chile.[6] The sample contains 178,057 observations (111,643 representing urban and 66,414 representing rural areas). Urban areas are defined as groupings of dwellings with population of 2,000 or more. The survey collects information on demographics; characteristics of the dwelling; educational attainment; health care; occupation and employment; and incomes. Income questions distinguish income from work, income from capital, rental, imputed rent, and transfers such as pensions.

The data used is the one adjusted by Cepal (see Cepal, 1995) with three additional corrections that were already justified in a recent study by The World Bank (see World Bank, 1997). (1) Live-in domestic service workers are treated as a separate household. (2) Incomes are deflated by a regional price index. (3) The three richest households in the sample are excluded from the income analysis because the incomes reported can be regarded as genuine outliers (see World Bank, 1997, Vol. II, pg 6).

Income Data

The survey goes into a significant amount of detail to record the various income sources for each member of the household. Workers report their income from work. In addition, workers and non-workers report on three possible sources of income. (1) "Other incomes" include: rental of property; interest on financial or monetary assets; an estimate on owner-occupied housing[7]; donations; alimony; value of home production; other. (2) "Government transfers" include; PASIS pensions[8]; unemployment benefits; SUF family subsidy; water subsidy; other. (3) "Retirement" benefits include; Workers' pensions; invalidity pensions; and widows or other dependent pensions.

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[6] I am thankful to the Economics Department at Universidad de Chile, and in particular to Dante Contreras, for assistance with Casen data.

[7] The survey assigned imputed rent from owner-occupied housing to the head of households. Nevertheless, in a number of cases, the owner of the dwelling was not the reported head. We reassigned those values to the reported owner.

[8] These are targeted to the poor, and will be explained in detain in section 3.

A first summary of this information is presented in Table 2 where the population 16 and older has been categorized by age group and as worker or non-worker. The sub groups are defined as follows:

- Worker, includes individuals that work and report monetary income
- Non - workers are conformed by pensioners, renters and others:
  - Pensioners, includes individuals who report retirement income as the only source of income (includes PASIS program)
  - Owner includes individuals with imputed income from house ownership, if this is the only source of income.
  - Other, includes non-workers with various sources of income
  - None, includes individuals with no personal income.

There are significant gender differences in the likelihood of generating income from work. These differences, in turn, reflect the known gender differences in labor force participation patterns, which are analyzed in more detailed in section 6. Close to 70 percent of men of all ages generate income from work and only 32 percent of urban women and 16 percent of rural women of all ages do so.

About 60 percent of elderly women and 70 percent of elderly men receive some sort of retirement income

The relative importance of the various sources of income changes according to age and gender. For example, 67 percent of urban men of all ages obtain income from work and 70 percent of non-working older men have retirement income, suggesting a correspondence between work income and retirement income for men. The patterns for women are different. Only 32 percent of urban women of all ages obtain income from work, while 60 percent of non-working older women have some sort of retirement income. The picture is not too different in rural areas, except for a smaller percentage – only 16 percent-- of working women report income from work.

The lack of correspondence between work income and retirement income is not driven by weak links between contributions and benefits within the social security system. It is explained by two factors. In urban areas, most elderly women are widows, and a large fraction of them have retirement benefits either from their own work or from their husbands. The fraction of widows in rural areas is smaller, but the fraction of elderly women that are individual beneficiaries is 60 percent --about the same as in urban areas. In rural areas, where poverty rates are higher, close to 40 percent of female beneficiaries of retirement income are PASIS beneficiaries.

PASIS

The social assistance pension (Pension Asistencial - PASIS) was established by Decree Law 869 (1975). It is given to indigents that are over 18 and incapacitated, or above 65, that have resided in the country for a minimum of three years. In December of 1998, old-age PASIS beneficiaries represented 12.5 percent of all old-age beneficiaries (public and private). Coverage is significant in the rural areas where poverty levels are higher. Indigence is defined as an individual with:

(a) no resources of her/his own, or resources equivalent to less than 50% of the minimum pension per month; and

(b) average family income below 50% of the minimum pension, where average family income is defined as family income divided by the number of family members.

The targeting of PASIS is evident, as the poverty levels are much larger among PASIS recipients. In fact, based on the 1994 data we use here, we calculate that about 75 percent of poor women receive the PASIS subsidy. While these pensions are financed by a special fund distributed to the thirteen regional authorities (Intendencias), the amount of the PASIS benefit is determined by law. With these two variables set, the number of beneficiaries in each region is pre-determined. Thus, Intendencias use a special poverty measure indicator to establish priorities and target the limited funds. Currently, most of the Intendencias have waiting lists of qualified individuals without access to benefits.

Given the relative scarcity of resources, assigning priorities, and removing non-qualifiers from the list of beneficiaries is a significant amount of work. The Institute of Pension Settlements (Instituto de Normalizacion Previsional - INP) assists the Intendencias with some of the background checks.

The PASIS benefit has two components: (a) free medical assistance in the Public System and, (b) a monthly benefit which has changed by law several times. The benefit is indexed to the CPI (adjusted every December). Currently, the benefit is $32,772.84 per month. This is equivalent to 50% of the minimum pension, or about 11% of the average wage. Given that the data analysis in this paper is based on 1994 information, it is relevant to note that the typical amount for 1994 was $15,967.[9]

The household unit

To describe the living arrangements of older men and women, we start out with three conventional household types: unipersonal, nuclear, and extended. Each household is formed by a minimum of one family, conformed by a "head of household," who may have a spouse or partner, a child, a parent, a sister, etc. Everybody is defined in relation to the "head of household." If the family is limited to a head, spouse or partner and child(ren), it is considered a "nuclear" family. If the family includes other members aside from the "nuclear" family, it is considered "extended." Non-family members, except for live-in domestic workers, are classified in the same family category of the main family. Live-in domestic workers are considered unipersonal households.

A non-trivial fraction of older men and women live with married children in an extended family situation. There are also a non-trivial number of older men and women that live with unmarried grown up children. This situation does not fit with the extended family definition, although it is closer to the extended family than to a nuclear family, simply because grown children are likely to be taking care of their parents. To attend to this

[9] For a comparison to per capita income and other relevant indicators, see Table 22.

distinction, nuclear families were subdivided into two types: those with at least one child 30 years of age or older, and those with no children 30 or above.

We first look at a series of indicators of living conditions of old age women and men in relationship to younger men and women. The key variables are summarized in Table 3, which presents the population along the rural-urban divide. The urban-rural distribution of population in Chile is 10 to 2 approximately. It is useful to note that male ratios are above one for all age groups in rural areas, and below one for all age groups in urban areas. A relatively large fraction of women migrate to urban areas to study or work at a relatively young age. It also appears, as if life expectancy for women is significantly higher in urban areas. The tables show very similar levels of utilities access and declining differences in schooling across generations, between urban and rural areas.

In urban and rural areas, older women are more likely to be widows, more likely to live in extended households, and less likely to live in a nuclear household than men of the same age group. Older women are more likely to live in unipersonal households in urban areas than in rural areas. The overall number of elderly women is much higher than the overall number of elderly men --this is explained by gender differences in longevity. A challenge for the analysis therefore, is to establish the living standards or well being of older individuals inserted in extended households and compare it with that of older individuals living alone, or with their spouse.

4. The Welfare of Older Men and Women

In the previous section we established that about 60 percent of elderly women and 70 percent of elderly men receive some form of retirement income. In this section we are interested in establishing the actual income levels of elderly men and women. We use CASEN data for 1994 to examine their housing arrangements, their levels and sources of income, and the incidence of poverty. Given that retirement income is not the only source of income, and that old men and women most often do not live alone, we compare the

levels of household income per capita for men and women 60 and over, controlling for the type of household structure they live in.

Table 4 organizes households according to the number of elderly individuals that live in them in urban and rural areas. In urban areas, more than 67 percent of the households are non-elderly households, that is, all individuals living in them are younger than 60. The fraction of non-elderly households in rural areas is smaller, below 63 percent. The presence of elderly (males or females) is characteristic of The presence of elderly males is more common in rural households. While 27 percent of rural households contain at least one elderly male, only 20 percent of urban households contain an elderly male. At the same time, 24 percent of households, in rural and urban areas, house at least one elderly woman. In the tables that follow we report per capita incomes for elderly and non-elderly households, controlling for the number of elderly that live in them.

In order to measure income per capita, we must take into account the fact that there are economies of scale within households and that the cost of living varies according to age. We start with a sensitivity analysis, using five alternative scales: a simple members count (N); the Chile scale (Neq); the Deaton scale (NeqD); the OECD scale (NeqO); and the Cutler scale (NeqC).[10] The Chile scale is a household-equivalency scale calculated by Contreras (1995), using the Rothbarth adult goods method.[11] We use these five different

[10] The Deaton scale weights all adults 18 or over as 1; children below 6 as .2; children between 7 and 13 as .3; and children 14-17 as .5. The OECD scale weights the first adult as 1; additional adults as .5; and children less than 14 as .3. The Cutler scale weights adults 20 to 65 as 1; adults above 65 as 1.27; and children less than 20 as .72. (see…..)

[11] Contreras' scale was estimated excluding all households with a single adult from the sample, and taking two adults as a reference type. He found that adult good expenditures were restored to the childless couple level when incomes for families with one child in the age categories below was raised by estimated percentages. Contreras' original scale was modified to include single individual households, and to take into account economies of scale within the household. The scale used, which is also applied to unipersonal households, is the following:

$Y_i = X_i/M_i$, where

$M_i = 1.2 + 0.8(N_{aa} + N_{11\text{-}15}) + 0.4\, N_{5\text{-}10} + 0.3\, N_{0\text{-}4}$

With Naa = number of additional adults in thre household

$N_{11\text{-}15}$ = number of children aged 11-15 in the household

$N_{5\text{-}10}$ = number of children aged 5-10 in the household

$N_{0\text{-}4}$ = number of children aged 0-4 in the household

sets of weights to count household members and calculate income per capita. The results are shown in Tables 5 to 11.

Table 5 shows that *urban households with one or two elderly are generally better of in per-capita income than households without elderly*. But, pc income among households with more than two elderly are significantly below the average. If households are categorized by the number of elderly that live in them, average incomes are the highest among households with two elderly, except when using the Cutler scale. Households with two elderly, which are mostly representative of nuclear households of elderly couples, have a better than average standard of living, except when we use the Cutler scale. This scale gives extra weights to the elderly cost of living, weighting individuals above 65 as 1.27 individuals in the 20-65 age-range. The other formulas, except for Deaton's, allow for economies of scale for the second adult. The picture in rural areas is not so clear. Incomes per capita among households with elderly are just slightly above the average using any of the scales.

Using a poverty line of 30,100 pesos per equivalent adult[12], we estimate poverty counts and the fraction in poverty, using the same estimates of household income per capita shown in the income tables. The results for poverty calculations by household according to the number of elderly are presented in Table 6 and contain two key results. Poverty rates are higher in rural areas compared to urban areas across comparable households with or without elderly. The data also shows that poverty among households with elderly is lower than poverty among households at large, both in urban and rural areas. This conclusion is robust to the choice of equivalency scale, except when using Cutler's. Therefore, the conclusion regarding the relative well being of the elderly can be turned around if we assume, as Cutler does, that the elderly are subject to a substantially higher cost of living.

[12] A regional price level indexed incomes in the different regions. The poverty line is the same used by a recent World Bank study on Chilean Poverty and Income Distribution (World Bank, 1997).

Table 7 focuses on individuals, and allows a closer look at gender differentials. Once again, income per capita is measured at the household level adjusting household size by equivalency scales. The estimated per capita incomes are applied to each individual, and the table presents poverty counts by age and gender category. Table 7 leads us to conclude the following. *Poverty rates are generally lower among elderly males and females, compared to younger males and females --in the 16 to 59 age-range. Poverty rates are higher among 16-59 year old females relative to 15-59 year old males, and also higher among elderly females relative to elderly males.*

Table 8 takes a closer look at the elderly population to establish any differences in poverty rates among the very old (above 70) relative to the old (60 to 70). The evidence suggests that there are no clear patterns of differences among these two groups, except for the fact that rural women between 60 and 70 appear to be less poor than rural men in that same age group.

Table 9 summarizes the data on living arrangements by age and gender, using the four household types defined earlier. It is clear that *elderly women are more likely to live in extended families than elderly men*. About 50 percent of elderly men live in nuclear households with or without adult children. This pattern is observed in urban and rural areas, and suggests that *men are more likely to age with their household while women, perhaps because they live longer, are more likely to age with an extended family.*

Table 10 presents calculations of poverty counts for the elderly according to the housing arrangement that describes them. The income per capita figures (not shown) used to arrive to these calculations, indicate that across the different scales, income per capita levels are the highest among unipersonal and nuclear households. Nuclear households with adult children (30 or over) are characterized by capita incomes below nuclear, and above extended. This would suggest that the unipersonal or nuclear-household arrangement is an alternative that lower income households cannot afford. Yet, the

distribution o income among unipersonal households of elderly individuals is very unequal, causing a usually high poverty incidence among unipersonal households.

These cross tabulations do not allow us to draw any conclusions on causality. Extended households may originate on the move of an elderly widow to her son's household. They may also originate on the move of a man, wife and children to his parent's house. When we turn to poverty counts, we see that *the highest incidence of poverty among the elderly is found among extended households.* Again, there are many possible explanations. But, as we learn later (Table 13), the incidence of poverty is larger among extended households where the elderly have a positive income on pc income.

Sources of Income among the elderly

We turn to the various sources of income among the elderly and to the significance of these sources to the overall household income. About 74 percent of urban and rural elderly women generate some form of income. Close to 100 percent of elderly males in urban areas generate some form of income and about 93 percent of elderly males in rural areas do so. Women are less likely than men to contribute in any of the categories of income generation (work, imputed rent, and own pension), although the differences are less pronounced in retirement income.

The fraction of elderly men that receive an old-age pension is twice as large as that of men –62 vs. 31 percent Yet, an additional 19 percent of elderly women receive survivor's pensions, closing the retirement income gender gap. Women with sources of income earn less relative to men, in each category. Differences are smaller in the PASIS program and the imputed rent category. The fact that elderly women are poorer than elderly men is also evident in the importance of the PASIS program as a source of income for elderly women, particularly in rural areas.

Table 12 uses the same categories used in Table 11 to show the significance of income contributions of the elderly to total household income. *The likelihood that elderly women make contributions to household incomes is lower than that of elderly men.*

Furthermore, the relative contribution of elderly women's incomes towards total household incomes --among those that make contributions-- is also lower than income producing elderly men. The exception on the last regularity is the case of imputed income from owner occupied housing. This last finding suggests the importance of researching the role of investments in housing, as an alternative to social security savings, in the case of women.

The finding that a significant fraction of elderly women live in extended households raises another set of questions question. Do these women improve the standard of living of the household they join? Are the households they join close to the poverty line? Unfortunately, we do not have any direct measure of the non-monetary contribution of elderly individuals (with babysitting, household chores and the like). Table 13 reports the results of comparing extended-households income per capita with and without the elderly person in question.

In rural as well as urban areas, close to 85 percent of elderly men have a positive impact on the extended-household income, while less than 45 percent of elderly women do. The average impact (positive or negative) is relative small in rural areas, and more significant in urban areas. Perhaps surprisingly, the incidence of poverty is higher among households that get an income per capita boost from the elderly.

5. Differential Coverage of Active Men and Women

Section 4 established that about 60 % of elderly women and 70% of elderly men receive retirement benefits. Yet, the retirement incomes of elderly women are lower on average. Part of this difference is explained by the fact that many elderly women have no income source at all, and they qualify for a means tested basic transfer --the PASIS program. We are interested in estimating the extent to which the social security system influences gender differences in incomes. To do this we use data on current workers, and we estimate the

type of pensions that would be generated if they made the required contributions along their working life.

The data used for this analysis is also CASEN 94, which provides information on current affiliation and contributory status, and current benefits. The information about years of contributions is not available from CASEN, nor is it publicly available from the AFPs. We estimate years of contributions based on our understanding of contributory status for men and women. That analysis leads us to conclude that there is a very high probability of contributing among employees. Yet, the choice of employment status cannot be easily differentiated from the decision to contribute. Therefore, we use the information on employment by age to estimate "experience accumulation," and assume that the accumulation of pension funds takes place in parallel to the accumulation of experience.

The first pre-requisiste to become a contributor to the social security system is to participate in the labor force. Table 13 presents two very streamlined equations that estimate the impact of several variables on the probability of labor force participation of 16-65 year old urban women and men. The participation variable (0,1) is driven by marital status (dmarr) ; years since finishing school or potential experience (ex) and its quadratic; a dummy for post-secondary schooling (posts) ; and an interactive for married with post secondary (dmsc). The average man and woman in the sample have 22 years of potential experience (ex). The likelihood of participation is significantly lower for women --at 39% on average than for men-- at 82% on average. Marriage will further reduce the probability of participation for women and will increase it for men. Post secondary schooling increases the likelihood of participation and diminishes the negative effect of marriage for women, but lowers the probability of participation for men.

Table 14 presents summary data for 1994 on contributory behavior among workers. The data is organized along the urban-rural divide and by age categories and gender. The categories correspond to: INP -- the Instituto de Normalizacion Previsional, which manages affiliates and pensioners from the old system; AFP --contributions to the new

system; Capredena represents contributions to the Armed Forces pension system; Other represents alternative means --usually foreigners; and NO represents no contributions at all.

As recently as 1994 Chile's system fell considerably short of universal coverage. Urban males have the highest rate of total coverage – defined as contributing to any retirement scheme --, at 70 percent. The fraction of urban working women that contribute to social security is 65 percent. The lowest coverage corresponds to rural males, with 47 percent. It may also be seen that, with the exception of rural males, those in the 16 to 39 year-old had the highest degree of coverage.

Although there are no comparable survey data for the pre reform period, existing estimates indicates that Chile's old pay-as-you-go system covered up to 86 percent of those employed in 1975 and 71 percent of the employed in 1980 (Cheyre, 1991). It has been argued that the drop in coverage was motivated by the high contribution rates. Yet, after the privatization reform there has only been a small increase in the coverage of the formal retirement system, suggesting that there is a fraction of the population that does not value the social security system. Yet, the fact that younger workers exhibit a higher coverage ratio may indicate, however, a secular trend towards greater participation in the system.

Under the new rules of the social security system, benefits are a function of the accumulation of funds. Women that make contributions early in their careers, or have a flat earnings-age profile, are not penalized, as they would have been before. Contributions add to the accumulated fund independently of the timing of labor force participation and independently of the periodicity of income-generating activities. As we will see in the next section, current data suggests that, with the exception of women with less than secondary schooling, a "typical" working woman accumulate more than 20 years of experience. If women make contributions for 20 years, they access the guaranteed minimum pension, which is a significant benefit for workers at the low end of the earnings distribution.

A closer look at the sample of currently working men and women, reveals that much of the gender differences in contributory status, particularly among those required to contribute, are associated to occupational classifications. The reader must recall that the law requires dependent employees on employment contracts to make contributions to their personal retirement accounts. The self-employed and those without contracts may, if they so wish, make voluntary contributions to the pension system. In urban areas, for example, the employees category accounts for about 72 percent of working men and just about 60 percent of working women. Within the employee's category, 82 percent of males and 85 percent of females have contracts, and among those that have contracts, 95 percent of men and women make contributions. Nevertheless, the data indicates that after controlling for variables such as age, schooling, sector of employment and establishment size, women are still less likely to make contributions than men.

Yet, the decision to become and employee and to have a contract is not independent from the decision of contributing to social security. It is of interest, therefore, to examine the contributory behavior of those not required to contribute. Tables 15 and 16 summarize this data with a probit equation that measures the impact of several variables on the probability of contributing. Up to 25 percent of individuals not required to contribute (the self-employed and the employees without contracts) do make contributions. This fraction increases with age and schooling, and does not vary much with the level of salaries or the sector of employment. Establishment size and gender are important factors. In particular, workers in larger establishments are more likely to contribute. It is apparent that, with or without controlling for industry and establishment size, women are 6 to 7 percent less likely to contribute. This finding is concerning as it indicates that women, in similar circumstances to men, are less likely to assign a value to their social security contributions that men do. The fact that married women obtain health care coverage through a contributing husband's family plan, may be part of the explanation. This reduces the value of the 20 percent contribution to just about 13 percent. Further work should

examine the impact of the tied-in character of the pension and health care programs on couple's incentive to save towards retirement.

6. Estimating Funds Accumulation and Future Pensions

The aim of this section is to estimate the accumulation of funds at age 60 for women and age 65 for men, and calculate expected replacement rates for the two. We only have data on current contributors and current wages. We use the available data as a synthetic cohort, and estimate the typical work behavior of men and women and the typical wages throughout the life cycle for men and women. It is reasonable to distinguish a few schooling categories for men and women, because schooling is a key explanatory variable of wage levels, age of marriage, and labor force participation. For the case of Chile, it makes sense to distinguish five groups: incomplete primary, complete primary, incomplete secondary, up to four years of post-secondary, and five or more years of post-secondary.

There are two key challenges for the estimation. First, there is no longitudinal data on contributory behavior, or labor force participation. The Chilean survey we use does not collect data on actual experience either. Therefore, we are forced to use information on current employment and past employment to construct patterns of experience accumulation by age and schooling. Second, we must produce an estimate of wage variations as individuals age, based on observed patterns of wage differences by age from a cross section. We use data on salaries by age and schooling to obtain age-wage profiles for the same schooling categories.

Earnings Profiles

We start from the heroic assumption that current patterns of earnings (as a function of schooling and experience) have been there for some time, and will remain stable in the future. The key challenge is to capture that earnings pattern from the data. The human capital earnings function, in which earnings are expressed as a quadratic in potential

experience, is probably the most widely accepted empirical specification in economics. Nevertheless, for the question in front of us, this procedure is not the most appropriate. First, we simply do not have a good proxy for female experience. Second, our aim is to get the best estimate of wages for workers of a given age (since contributions and benefits eligibility are bound by age).

The literature has suggested that it is appropriate to use other specifications to measure wage profiles as long as one pays attention to the following:

1. Ideally, one would focus on wages as a function of experience. Mincer was right about focussing on experience rather than age to line up the profiles for different schooling categories. The empirical evidence tells us that the labor market values accumulated experience and not just age. Yet, these two variables are co linear for a given schooling level, if workers stay continuously in the labor force after earning their school diploma.
2. The quadratic specification in experience has a poor fit, especially when we want to describe the life-time-earnings profile of an individual of given schooling.
3. There has been a move away from a unique coefficient on schooling to a set of regressions by schooling level (ex: incomplete primary, primary, incomplete secondary, secondary, and post secondary).

The aim is to get wage estimates to calculate contributions towards social security. These contributions are made on a monthly basis and accumulate through time. We are aware that wages vary by experience, and that experience increases with age. But, a closer look at the Chilean data reveals that there are noticeable differences in labor force participation behavior by schooling categories. In fact, as suggested from Table 13 estimates, men are more likely to participate than women, and more educated women are more likely to participate than less educated women. From these regularities one can expect that labor market experience would accumulate faster for men or at higher levels of schooling.

The data on wages from the 1994 Casen survey was organized along sex/age/schooling categories, and an average wage was calculated for each cell. This method does not impose a particular functional form, and it also has the advantage of implicitly weighting the sample according to its composition (by other characteristics) within each cell. Given the limitation imposed by sample sizes, it is not possible to estimate average wages for single age categories. A compromise had to be found between gaining sample size and keeping the age categories short, since estimated salaries for a range of years are likely to overestimate starting-period contributions and underestimate end-period contributions. Thus a period estimate is acceptable to the extent that the average estimate is reasonable, and that the periods are short enough. We finally settled for a five-year interval. The estimates are shown in Tables 17 and 18.

Experience

In the labor literature it is usual practice to assume that experience is equal to potential experience, which in turn is equal to "age-years of schooling –6." This assumption works well for working men who are likely to participate with little interruptions, but not for women who are not steady participants in the labor market. Women with career interruptions accumulate less experience than men would at the same age.

To estimate the accumulation of funds, it is necessary to have an estimate of wages -- which was obtained in the previous sub section--, and also an estimate of contributory behavior. We start from an estimate of male and female current employment probabilities by age within each category of schooling, and also distinguishing by marriage status. The precise procedure is as follows:

1. The entire sample is separated in 20 main categories (2*2*5): Men and women, married and single, and five schooling categories. Within each of these 20 samples, we calculated the proportion of individuals that worked, as a fraction of those that ever worked.[13]

[13] The sample of men that ever worked is almost always the same as the sample of men, but the sample of women that ever worked varies with age. For example, at age 34, the fraction of women that ever worked goes from 67 percent among those without complete secondary schooling, to 75, 93 and 97

2. Since marriage is an important determinant of participation, and marriage age varies significantly by schooling category, our "typical" man and woman is assumed to get married at the age at which 50 percent of that category is married. We assume that the "typical" man and women within each schooling category accumulates experience as a single person first, gets married, and continues to accumulate experience as a married person afterwards. This step reduces our categories to 10: five schooling categories, two sexes. We then estimate that accumulated experience, by single age.

3. The results of the estimation are summarized in Tables 19 and 20, where accumulated experience is shown by cells of age and schooling-categories. As suggested by the participation equations presented in Table 13, women accumulate experience at a lower pace than men, but the differences are less significant among more educated women.

4. The estimated contributions assume that our "typical" worker in each schooling category makes contributions, and the number of years of contributions varies according to the age category as indicated in Tables 18 and 19. Obviously these are simplified estimates, and sensitivity calculations are in order.

We learn a number of important things from this exercise. First, a large fraction of women work at least at some point in their lives. The proportion of women that ever works rises with schooling. Furthermore, the fraction of currently working women --as a proportion of ever working women-- also rises with schooling, showing a higher degree of labor force attachment.

The picture that emerges is captured in Figure 1 where two male and female schooling types are represented. The lines describe the relationship between accumulated experience (estimated) and age. A relatively higher line indicates steady accumulation of experience, as it is the case of male with secondary schooling. A relatively high and steeper line

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percent among those with secondary, up to 4 years of post secondary, and 5 or more years of post secondary schooling.

indicates fast accumulation after a later start, as it is the case of males and females with 5 or more years of post secondary schooling.

Figure 1

7. Gender-differentiated social-security benefits

This section explores gender-differentiated accumulation of funds, pension benefits, and replacement rates, based on simulations for representative workers. The impact of social security reform (from a PAYG to a multi-pillar system) and of particular pay out policies of a DC system will be calculated.

The rules of the old public system, which covers the majority of the currently retired population, forced women to choose between retirement income and pension. That is, if

they had benefits from their own working years, and were eligible for a pension as a widow at the same time, they could not access the two sets of benefits, and had to choose the better of the two (see article 7- Law 10.383). The key change brought about by the reform is that the accumulated fund that an individual owns and is administered by an AFP cannot be confiscated. Independently of other income sources, these funds would become a source of retirement income, or in case of death, would become part of the individual bequest.

Estimated Pension Benefits

Based on the earnings profiles reported in Table 17, we assumed that workers of a particular schooling and gender accumulate experience as indicated in Table 19, and make the required contributions (10% of wages) continuously.

Table 21, 21a and 21b offer a first set of estimates. First, we calculate the accumulated funds for each of the typical men and woman contributors assuming two rates of return –3 and 5%. Second, we report the reference salary or the average tax base for the last 10 years of contributions, in per-month units. Third, using the accumulated fund, we estimate the monthly benefit that would result from transforming the fund into an annuity.[14] Fourth, we estimate the replacement ratios that result using the pensionable salary as a reference salary (average of last ten years of contributory wages). Table 21 uses the wage estimates from the cross-section without any further adjustment. Yet, it is more realistic to assume that wages will have a secular trend of the order of 1 or 2 percent. This assumption is incorporated in equivalent calculations shown in Tables 21a and 21b. We assume that the typical elderly man is married with a woman that is three years younger. This typical man retires at age 65, with a life expectancy of 15 years. His wife will live beyond his expected life, and he would have to provide for 6 years of his "survivor's pension," at 60% of his own. Chilean law requires retiring married men to put aside funds in order to cover a pension for his widow and surviving children in case of

[14] In these set of calculations we make no corrections for the effect of the guaranteed minimum pension.

death.[15] The law does not require retiring married women to provide for their surviving husbands, unless the husband is handicapped. In our calculations, we assume there are no surviving minors, that men reserve part of their fund to provide for surviving wives, and that women convert their entire fund to their annuity.

The resulting replacement ratios divide the estimated annuity by the reference salary. These ratios are highly sensitive to the system's rate of return, which drive the annuity, and to the estimated reference salary, which is a function of the experience earnings profile and the degree of attachment to the labor force during the last ten years of work. If earnings get flat or fall during the late stage of a worker's career, the reference salary tends to be low and the replacement ratio tends to be relatively high. Thus, as we compare the replacement ratios that result from assuming no secular wage growth (Table 21), one percent (Table 21a) and two-percent growth (Table 21b), we see replacement ratios systematically fall.

In spite of the fact that women accumulate funds through a shorter period, women's replacement ratios are very close to those of men. There are three reasons for this:

(1) Replacement ratios are calculated as the ratio of the monthly annuity over the reference salary, which is the average tax base of the last ten calendar years of work divided by 12. The reference period corresponds to 120 calendar months. To the extent that the typical man or women would work less than 120 calendar months during the reference period, the estimated reference salary is lower than the estimated average wage for the same reference period. The reader may compare the average salaries reported in Table 17 with the estimated reference salary reported in Table 21. For example, the reference salary for men with secondary schooling is 122 thousand, while the corresponding salaries for ages 56 to 65 in table 17 are 198 and 161. The same comparison for the case of women with secondary schooling shows 63 thousand for the reference salary and 157 and 169 for average wages.

[15] The exact amount required to comply with this regulation is a matter of a private contract between the retiree and an insurance company.

(2) Women's experience earnings profiles are flatter, causing the denominator in the replacement ratio to be relatively low.
(3) Women's annuities are calculated on the basis of their entire fund, since they are not required to provide for their surviving spouse. It is assumed that the number of surviving children is zero.

These estimates can be compared with those provided by Baeza and Burger (1995). Their estimates are based on actual retirement cases. They use a sample of 4,064 individuals that have retired under the new system, and estimate that the average replacement rate has amounted to 78%. The highest (relative) pensions have been obtained by those individuals that have opted for early retirement, with a replacement rate of 82% under programmed retirement. Baeza and Burger (1995) attribute this result to the fact that only those that have had rapid accumulation of funds -- mostly by making voluntary contributions -- can in reality opt for early retirement. To December of 1997 average old age pensions under the capitalization system were 39% higher than average pensions under the old pay-as-you-go regime. In the case of disability, pensions under the new system were 61% higher than under the previous regime. Overall, replacement rates have been quite high – indeed higher than under most industrialized countries' systems.[16] Naturally, since the Chilean system is a defined-contribution system, there are no assurances that the replacement rates observed until now will be maintained in the future.

Estimated Incomes of Elderly Men and Women

In Table 23 we provide estimates of social security related incomes for elderly men and women in each of the schooling categories using the results of Table 21a. That is, we assume that the economy experiences a secular 1% real growth in wages.

We assume that elderly women are married from age 60 to 76, and are widows from age 77 to 83. There are two types of elderly women. The first type represents women that

[16] On industrial countries replacement rates see, for example, Davis (1998) and the papers in Grueber and Wise (1999).

never enter the labor force and whose elderly income will be determined by their widow's pension. This group of women will have no retirement income from age 60 to age 76, and will have a widow's pension from age 77 to 83. The second type represents women that work according to the typical work profiles estimated in Table 19, whose elderly income will be equal to her estimated annuity from age 60 to age 76. Starting at age 77, her pension income will be the sum of her annuity and her widow's pension. To calculate the widow's pension, we assume that couples belong to the same schooling category.

These estimates are compared with the corresponding incomes that would be obtained under the old system rules[17]. Retirement benefits were based on the following formula:
Monthly Retirement Benefit = Max(A,B)
Where,

$$A = .50^* BS + .01^*BS^*(W - 500)/50$$

$$B = .70^* BS$$

With BS= basic salary = sum of total taxable wages of the prior five years, divided by sixty, indexing the last three years, and
W = Total number of weeks of accumulated experience.

Men could retire at 65 and women at 55. Benefits included survivor's pensions equivalent to 50% of the pension of the originator for the widow, and 20% of the mean salary per child. But, widows that had pension benefits on their own account were required to choose between their own retirement pension and the corresponding widow's pension. Therefore, under the old system rules, our second group of women will have access to retirement benefits at age 55. Assuming she is married to a man 3 years her elder, at age 77 she will choose between her own retirement benefits and the widow's pension.

[17] Since rules varied according to the specific fund, we used the SSS which represented more than 60 percent of contributors in 1980.

A number of interesting results appear from the calculations.

1. The new system generates higher pensions for working men and women under the assumption that the system has a rate of return of 5%.
2. If the rate of return is 3%, the new system still generates higher pensions for men, but it results in lower pensions for working women than the old system.
3. Widows are expected to obtain higher pensions under the new system independently of rates of return. The reason is that survivor's pensions, which are driven by the size of accumulated funds, turn out to be a larger fraction of reference salaries than in the old system.
4. Working women, married to a contributor, are expected to obtain much higher incomes in old age than under the old system. For example, a working woman with up to 4 years of post-secondary schooling, and under pessimistic expectations on system's returns, would draw an annuity of about 50 thousand pesos at age 60. This annuity will be topped with a widow's pension of 85 thousand at age 77, to generate a combined income of 135 thousand.

Who will benefit from the guaranteed pensions and how much is it going to cost?

The state guarantees minimum old age, invalidity, and survival pension benefits to poor affiliates and their beneficiaries, as long as they fulfill the following conditions:

First, "no one can obtain the state subsidy if the sum of all individual incomes from pensions, rents and taxable wages, is equal or higher than the minimum pension." (art 80, DL 3,500). Therefore, unlike earned benefits through contributions, access to the guaranteed minimum pensions can be taken away if income-generating conditions change.

Second, in order to qualify for the minimum guarantees, individuals must demonstrate a minimum degree of association to the system.

The minimum old-age pension is guaranteed to:

a) all men above 65 and women above 60, that
b) have registered at least 20 years of contributions, and

c) have incomes (the sum of pensions, rents and taxable wages) below the minimum pension. If the qualifying affiliate were also a recipient of the PASIS benefit, he/she would have to give up that pension as soon as the guaranteed minimum benefit is activated.

The minimum invalidity pension those affiliates that are declared legally incapacitated and:

a) Do not qualify for the minimum pension and belong to one of the three following groups,
b) Have registered a minimum of two years of contributions during the 5 years preceding incapacitation, or
c) Are affiliates at the time of the accident that causes incapacitation and are contributors at the time of the declaration of incapacitation, or
d) Have accumulated 10 years of contributions.

The minimum survivors pension will be available to legal survivors of affiliates in the following cases:

a) The affiliate was retired at the time of his/her death.
b) The affiliate was an active contributor with a minimum of two years of contributions during the last five years preceding death.
c) The affiliate was a contributor and died on the job.
d) The affiliate had accumulated 10 years of contributions.

The minimum survivors pension is a fraction of the minimum pension.

Accidents on the jobs are covered by insurance, which in turn pay out in proportion to reference salaries. Therefore, the relevant cases for the state guarantee are of three types, (1) individuals who earn very low salaries, or (2) work few hours or contribute sporadically, or (3) become incapacitated or die early in their career, leaving a large number of legal survivors.

An accurate estimate of the number of affiliates who would qualify for minimum pension at retirement, or for invalidity or survivor's benefits while active, requires longitudinal data

on individual contributions. Our analysis has relied on a cross section. In the absence of the appropriate data, we focus on the following facts:

1. The minimum pension is very close to the minimum wage (see Table 22).
2. Those that earn close to the minimum wage throughout their active life are sure candidates for the minimum pension.
3. The amount that the state would have to contribute will be inversely related to the rate of return of the system and the accumulated experience (as contributors) of those earning wages around the minimum wage.

Based on 1994 data, we estimate that 13 percent of working males and 24 percent of working females earn the minimum wage or less.[18] The majority of minimum wage earners are individuals with less than secondary schooling, and just about one third of them make contributions toward social security. This information suggests that a significant fraction of low wage earners may not qualify for the minimum pension, since it requires a minimum of 20 years of contributions.

We assume that 15,000 men and 5,000 women retire each year. Currently, about 67 percent of them are in the less than secondary schooling category. The incidence of low wage earners in this category is about 30 percent for women and 10 percent for men. Assuming that all low wage earners qualify for the minimum pension, the total number of subsidies is approximately 2010 =1005 male cases + 1005 female cases (.67*15,000*.10 + .67*5,000*.30). We assume that the state has to subsidize one half of each minimum pension. Thus, the cost of the subsidy is the present value of an annuity equivalent to ½ of the minimum pension for a period of 23 years in the case of women, and a period of 15 years in the case of men.

Compounding the annual subsidy at 3%, the present value of the cost of the annuity subsidy per each qualifying woman is $3,847,804. The cost of the annuity subsidy per

[18] The estimated percentages correspond to full time wage earners (more than 85% of the sample) with monthly wages below 40,000 pesos.

each qualifying man is $ 2,793,477. Assuming a total of 1005 male cases and 1005 female cases per year, the total cost of the subsidy amounts to $ 6,674.5 million per year in 1994 pesos. This figure corresponds to 0.3% of total government expenditure in 1994.

The issue of retirement age

Current information indicates that a significant fraction of men and women that have reached retirement age, choose not to retire. Thus, the retirement age operates as an option that individual take when it is more convenient for them. If women stay in the labor force beyond age 60, they will add to their fund accumulation and they will be more likely to qualify for the minimum pension on grounds of years of contributions. The impact on annuities is positive on two grounds: the accumulated fund is larger, and the number of years to be covered by the annuity is smaller. Furthermore, replacement ratios typically double (see Table 24).

Part of the explanation for the much larger replacement ratio is that reference salaries fall for older women, mainly because the "typical" experience accumulation between age 60 and 65 is significantly lower than in the previous age range. Postponing retirement would increase the annuity. But, will an additional year of work past age 60 add to a woman's welfare? The answer depends on individual preferences, and the option to retire early or late is a superior alternative to the requirement to reach age 65.

8. Conclusions

Women are less likely than men are to be income contributors to their household. This is true in any of the categories of income generation, although the differences are relatively smaller in the case of retirement income. In urban areas, the fraction of elderly men that receive an old-age pension is twice as large as that of men –62 vs. 31 percent. But, an additional 19 percent of elderly women receive survivor's pensions, closing the retirement income gender gap. In rural areas, where old-age pensions are less typical, more than 23

percent of elderly women are beneficiaries of a PASIS, a government program targeted to the elderly poor.

In urban and rural areas, older women are more likely to be widows, and more likely to live in extended households than men of the same age group. Poverty rates –measured at the household level using equivalency scales, are generally lower among elderly males and females, compared to younger males and females. But, controlling for age category, poverty rates are higher among females.

Women are less likely to contribute to social security because of their lower labor force participation. But, women workers are also less likely to contribute than male workers are. A closer look at the sample of currently working men and women, reveals that much of the gender differences in contributory status, are associated to occupational classifications. Recall that the law only requires dependent employees on employment contracts to make contributions to their personal retirement accounts. In urban areas, for example, the employees category accounts for about 72 percent of working men and just about 60 percent of working women. Within the employee's category, 82 percent of males and 85 percent of females have contracts, and among those that have contracts, 95 percent of men and women make contributions. Nevertheless, the data indicates that after controlling for variables such as age, schooling, sector of employment and establishment size, women are still less likely to make contributions than men.

The decision to become and employee and to have a contract is not independent from the decision of contributing to social security. We found that up to 25 percent of individuals not required to contribute (the self-employed and the employees without contracts) do make contributions. This fraction increases with age and schooling, and does not vary much with the level of salaries or the sector of employment. It is apparent that, with or without controlling for industry and establishment size, women are 6 to 7 percent less likely to contribute. This finding is concerning as it indicates that women, in similar circumstances to men, are less likely to assign a value to their social security contributions

that men do. The fact that married women obtain health care coverage through a contributing husband's family plan, may be part of the explanation. This reduces the value of the 20 percent contribution to just about 13 percent. Further work should examine the impact of the tied-in character of the pension and health care programs on couple's incentive to save towards retirement.

Once is established who is and who is not likely to contribute, we estimate the retirement income associated to specific patterns of work and contributory behavior. Lacking longitudinal data to the analysis, and lacking information on labor market experience, we had to device a strategy to simulate the typical work behavior and wages earned of men and women throughout the life cycle. Since labor market participation, age of marriage, and schooling, are highly related, we divided the samples along sex and schooling categories and defined a typical age of marriage for each of those groups. Subsequently, we estimated patterns of employment and wages for each category and used then to build up the accumulation of social security funds for a typical worker in each category.

The rules of the old public system, which covers the majority of the currently retired population, forced women to choose between retirement income and pension. That is, if they had benefits from their own working years, and were eligible for a pension as a widow at the same time, they could not access the two sets of benefits, and had to choose the better of the two. The key change brought about by the reform is that the accumulated fund that an individual owns and is administered by an AFP cannot be confiscated. Independently of other income sources, these funds would become a source of retirement income, or in case of death, would become part of the individual bequest.

A number of interesting results appear from the calculations. (1) The new system generates higher pensions for working men and women under the assumption that the system has a rate of return of 5%. (2) If the rate of return is 3%, the new system still generates higher pensions for men, but it results in lower pensions for working women than the old system. (3) Widows are expected to obtain higher pensions under the new

system independently of rates of return. The reason is that survivor's pensions, which are driven by the size of accumulated funds, turn out to be a larger fraction of reference salaries than in the old system. (4) Working women, married to a contributor, are expected to obtain much higher incomes in old age than under the old system. For example, a working woman with up to 4 years of post-secondary schooling, and under pessimistic expectations on system's returns, would draw an annuity of about 50 thousand pesos at age 60. This annuity will be topped with a widow's pension of 85 thousand at age 77, to generate a combined income of 135 thousand.

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Table 1: Chile – Population Aging

	Year, or five-year period starting in year			
Demographic Indicator	1990	2005	2025	2050
% population 65+	6.1	7.7	12.7	17.9
Median age	25.6	29.6	34.3	38.5
Life expectancy at birth (males)	71.5	73.7	75.9	77.5
Life expectancy at birth (females)	77.4	79.8	82.2	84.0
Life expectancy at 60 (males)	18.3	19.5	20.6	n.a.
Life expectancy at 60 (females)	21.8	23.4	23.5	n.a.
Life expectancy at 65 (males)	14.8	15.9	16.9	
Life expectancy at 65 (females)	17.9	19.3	19.6	n.a.

Source: CELADE. Boletin Demografico 61 & 62 (1998)

Table 2: Income Sources, by age and gender
Urban and Rural areas

	Workers	Non Workers				Total
	Income from various sources	Retirement only	Various income sources	Inputed rent only	No income	
URBAN males						
16 to 39	69.29	1.21	2.58	0.29	26.63	100
40 to 59	82.52	9.95	2.35	2.09	3.09	100
60 plus	23.85	70.05	1.98	2.06	2.07	100
Total	67.01	12.89	2.43	1.04	16.62	100
URBAN females						
16 to 39	36.65	1.31	4.09	1.42	56.54	100
40 to 59	38.46	8.88	4.28	6.12	42.26	100
60 plus	6.67	59.66	3.24	3.96	26.47	100
Total	32.3	12.93	4	3.17	47.59	100
RURAL males						
16 to 39	78.13	1.72	2.98	0.35	16.81	100
40 to 59	84.14	7.3	4.83	1.09	2.63	100
60 plus	26.77	64.94	4.19	1.72	2.38	100
Total	70.85	14.23	3.69	0.79	10.44	100
RURAL females						
16 to 39	19.75	1.6	6.27	1.22	71.16	100
40 to 59	16.21	9.56	9.75	3.7	60.78	100
60 plus	3.78	60.2	6.29	3.96	25.77	100
Total	16.03	13.87	7.23	2.38	60.49	100

Source: Casen 94

Table 3: Basic Indicators of Living Conditions

URBAN	MALE			FEMALE		
	16 to 39	40 to 59	60 plus	16 to 39	40 to 59	60 plus
Population Totals	2,226,430	1,097,127	511,849	2,391,319	1,235,381	702,101
Marital Status						
married	39.02%	80.57%	73.07%	44.13%	67.15%	40.36%
widow	0.16%	1.60%	13.57%	0.50%	6.77%	41.34%
single	52.94%	6.49%	5.23%	44.70%	10.88%	9.87%
Employment						
currently employed	70.86%	87.31%	37.77%	37.98%	42.50%	11.19%
ever employed	83.90%	99.20%	96.87%	68.51%	74.15%	64.29%
Household structure						
unipersonal	1.91%	2.39%	7.15%	2.62%	3.87%	13.05%
nuclear	60.05%	64.65%	37.25%	59.12%	55.72%	21.62%
nuclear with adult offspr.	4.77%	4.12%	12.80%	3.21%	4.99%	12.83%
extended	33.28%	28.84%	42.80%	35.05%	35.42%	52.50%
Domestic Workers	0.03%	0.07%	0.00%	1.96%	1.49%	0.67%
Disability in population	1.29%	2.19%	6.12%	0.94%	2.50%	9.11%
Schooling						
none	1.12%	2.21%	7.37%	1.03%	3.37%	10.30%
Incomplete Primary	10.56%	35.55%	54.06%	11.11%	39.31%	58.22%
Complete Primary	8.08%	9.56%	5.26%	8.38%	10.27%	4.79%
Incomplete Secondary	29.64%	8.32%	6.46%	27.26%	9.51%	4.93%
Complete Secondary	24.78%	21.21%	13.59%	25.99%	20.48%	14.05%
Post Secondary	24.16%	20.86%	11.40%	24.70%	15.28%	5.92%
Utilities						
electricity	99.62%	99.68%	99.53%	99.68%	99.74%	99.48%
water	99.07%	99.29%	99.25%	99.11%	99.36%	99.36%

Source: Casen 94

Table 3: cont

RURAL	MALE			FEMALE		
	16 to 39	40 to 59	60 plus	16 to 39	40 to 59	60 plus
Population Totals	439,080	216,259	137,872	422,377	210,759	131,506
Marital Status						
Married	39.28%	75.10%	67.22%	50.37%	72.31%	48.54%
Widow	0.25%	1.82%	14.21%	0.37%	6.68%	32.72%
Single	53.16%	13.26%	11.22%	40.25%	10.44%	12.63%
Employment						
Currently employed	81.15%	88.03%	41.39%	20.96%	18.15%	6.13%
Ever employed	90.48%	98.87%	95.95%	53.81%	51.08%	45.47%
Household structure						
Unipersonal	2.12%	5.25%	9.60%	1.28%	2.53%	9.79%
Nuclear	59.44%	59.00%	36.56%	63.14%	54.75%	26.45%
Nuclear with adult offspr.	6.85%	4.98%	12.10%	3.05%	6.08%	13.90%
Extended	31.59%	30.77%	41.74%	32.53%	36.63%	49.85%
Domestic Workers	0.04%	0.04%	0.00%	0.91%	0.62%	0.19%
Disability in population	1.97%	3.31%	11.45%	1.49%	2.37%	10.30%
Schooling						
None	2.99%	12.24%	27.72%	3.02%	15.60%	31.45%
Incomplete Primary	38.60%	66.29%	62.42%	36.67%	66.06%	59.42%
Complete Primary	20.30%	6.50%	2.29%	18.18%	5.69%	1.89%
Incomplete Secondary	21.18%	4.01%	1.60%	21.05%	3.18%	1.63%
Complete Secondary	10.45%	3.79%	3.24%	13.23%	4.59%	2.86%
Post Secondary	5.74%	5.89%	2.20%	6.85%	3.71%	2.01%
Utilities						
Electricity	99.62%	99.68%	99.53%	99.68%	99.74%	99.48%
Water	99.07%	99.29%	99.25%	99.11%	99.36%	99.36%

Source: Casen 94

TABLE 4: Distribution of households according to the presence of elderly dividuals (>=60)

URBAN AREAS

# of elderly in household	Male or Female elderly	Female elderly	Male elderly
No elderly	67.47	76.14	80.22
1 elderly	20.37	22.39	19.41
2 elderly	11.29	1.37	0.34
3 elderly	0.79	0.06	0.02
4 elderly	0.07	0.04	0.00
5 elderly	0.02	0.00	0.00
All households	100.00	100.00	100.00

RURAL AREAS

# of elderly in household	Male or female elderly	Female elderly	Male elderly
No elderly	62.56	76.33	72.83
1 elderly	22.97	22.68	26.26
2 elderly	13.60	0.95	0.84
3 elderly	0.76	0.04	0.07
4 elderly	0.11	0.00	0.00
5 elderly	0.00	0.00	0.00
All households	100.00	100.00	100.00

TABLE 5: Adult equivalence income per capita levels
by gender of elderly household memebers

URBAN AREAS

# of elderly in household	Deaton equivalency scale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
None	118,028	149,963	101,759	109,141	93,176
1	119,300	154,938	88,594	114,292	110,114
2	123,369	174,160	85,316	126,139	119,148
3	87,929	134,328	55,008	94,571	84,319
4	45,439	77,167	29,536	52,128	45,314
5	79,844	118,329	40,739	80,540	70,125
Total	118,606	153,174	97,253	111,707	99,007

RURAL AREAS

# of elderly in household	Deaton equivalency scale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
None	61,726	76,175	52,343	55,873	47,773
1	70,339	91,856	54,204	67,803	65,215
2	67,436	95,252	46,601	68,903	64,239
3	80,604	121,386	43,738	84,549	76,384
4	48,940	80,565	33,567	55,012	47,016
5					
Total	64,330	81,938	52,029	60,088	53,567

TABLE 6: HOUSEHOLD POVERTY RATES
(using adult equivalence scales)
by gender of elderly household memebers

URBAN AREAS

# of elderly in household	Deaton equivalency scale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
None	16.0	10.1	23.8	19.8	28.9
1	10.7	6.1	25.3	12.3	17.2
2	9.7	3.5	29.8	9.2	13.5
3	5.1	2.4	30.3	4.0	6.8
4	2.0	0.0	42.6	2.0	2.0
5	0.0	0.0	69.7	0.0	0.0
Total	14.3	8.6	24.7	17.2	25.0

RURAL AREAS

# of elderly in household	Deaton equivalency scale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
None	36.3	23.6	49.8	42.2	56.6
1	29.2	17.1	52.3	31.6	38.1
2	24.6	9.8	57.4	22.8	31.4
3	20.2	4.6	55.0	18.9	23.6
4	15.1	12.2	35.8	15.1	15.1
5					
Total	33.3	20.5	51.2	37.5	49.5

TABLE 7: Proportion of INDIVIDUALS below the poverty line by age and gender (using adult equivalence scales to calculate per capita income)

URBAN AREAS

age group	Deaton equivalencyscale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
Males 0 -17	20.4	13.5	35.1	26.3	40.2
Fem 0 -17	20.0	13.2	34.2	26.0	40.0
Males 18-59	14.3	7.5	21.7	16.1	24.6
Fem 18-59	15.3	8.5	23.4	17.5	26.6
Males 60+	9.5	3.8	25.9	9.6	14.4
Fem 60+	10.5	5.5	29.0	11.3	15.6

RURAL AREAS

# of elderly in household	Deaton equivalencyscale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
Males 0 -17	42.7	29.2	63.2	50.9	69.5
Fem 0 -17	43.4	30.4	64.1	52.1	70.6
Males 18-59	34.1	18.6	47.8	36.6	50.9
Fem 18-59	38.0	21.4	52.6	41.4	55.8
Males 60+	26.6	13.1	52.9	26.4	34.1
Fem 60+	44.1	33.6	49.5	44.4	47.4

TABLE 8: Proportion of ELDERLY INDIVIDUALS below the poverty line by age and gender
(using adult equivalence scales to calculate per capita income)

URBAN AREAS

age group	Deaton equivalency scale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
Males 60-70	9.8	4.1	20.3	10.1	15.1
Fem 60-70	10.2	5.2	24.1	11.1	15.1
Males 71+	9.0	3.2	36.1	8.8	13.1
Fem 71+	10.9	6.1	37.1	11.5	15.4

RURAL AREAS

# of elderly in household	Deaton equivalency scale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
Males 60-70	28.6	15.3	46.2	28.1	36.3
Fem 60-70	26.6	13.5	49.2	26.6	33.6
Males 71+	23.7	9.7	62.7	23.9	30.9
Fem 71+	26.3	12.3	68.0	27.7	35.0

TABLE 9:

In what types of families do elderly men and women live?

URBAN

	Unipersonal	Nuclear	Nuclear/adult	Extended
Male 0 –17	0.07	66.69	0.34	32.90
Fem 0 – 17	0.16	65.98	0.43	33.43
Male 18 – 39	2.06	59.46	5.14	33.35
Fem 18 – 39	2.72	58.46	3.36	35.45
Male 40 – 59	2.39	64.64	4.12	28.85
Fem 40 – 59	3.87	55.71	4.99	35.43
Male elderly	7.16	37.23	12.81	42.81
Female elderly	13.05	21.62	12.83	52.50

RURAL

	Unipersonal	Nuclear	Nuclear/adult	Extended
Male 0 –17	0.05	68.34	0.73	30.87
Fem 0 – 17	0.12	67.75	0.73	31.40
Male 18 – 39	2.32	58.84	7.31	31.52
Fem 18 – 39	1.31	63.00	3.16	32.52
Male 40 – 59	5.25	59.00	4.98	30.77
Fem 40 – 59	2.53	54.75	6.08	36.63
Male elderly	9.60	36.56	12.10	41.74
Female elderly	9.79	26.45	13.90	49.85

TABLE 10 : Proportion of elderly population below the poverty line by living arrangement

URBAN

	Deaton equivalency scale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
Living arrangements					
Male elderly					
Uniperson	6.6	6.6	28.5	9.1	6.6
Nuclear	7.5	2.3	22.9	7.6	8.7
Nuclear/adult	8.0	3.4	17.2	7.0	8.7
Extended	12.3	4.8	30.8	12.3	22.2
Female elderly					
Uniperson	7.7	7.7	30.2	9.8	7.7
Nuclear	6.8	1.9	25.6	6.7	7.3
Nuclear/adult	9.4	3.7	21.9	8.3	0.1
Extended	12.9	7.0	31.9	14.2	22.4
*Non- elderly**					
Uniperson	7.7	7.8	7.7	9.1	7.8
Nuclear	15.1	8.8	22.0	18.4	26.6
Nuclear/adult	8.7	3.1	14.4	7.3	9.8
Extended	16.3	7.7	26.8	17.1	28.5

* above 16 years of age

Table 10: cont

RURAL

	Deaton equivalency scale	OECD equivalency scale	Cutler equivalency	Chile equivalency scale	Income per capita
Living arrangements					
Male elderly					
Uniperson	22.0	22.0	48.6	24.1	22.0
Nuclear	21.9	11.5	46.6	21.3	24.7
Nuclear/adult	25.8	7.1	45.9	22.3	25.6
Extended	32.0	14.1	61.4	32.6	47.4
Female elderly					
Uniperson	19.8	19.8	62.9	26.7	19.8
Nuclear	19.7	9.4	48.9	18.5	20.9
Nuclear/adult	29.7	9.6	53.6	26.8	30.0
Extended	30.5	14.5	61.0	31.7	45.3
*Non- elderly**					
Uniperson	12.5	12.5	12.5	14.7	12.5
Nuclear	36.3	23.2	49.4	41.9	55.7
Nuclear/adult	26.6	9.1	38.7	25.1	28.8
Extended	39.5	17.7	57.6	39.8	57.6

* above 16 years of age

Table 11: Individual Income Sources of the elderly

URBAN

	Elderly women		*Elderly men*	
	% with income source	Average amount (of those with income source)	% with income source	Average amount (of those with income source)
Salaried work	11.2	93,962	37.8	153,204
Inputed rent from owner-occupied housing	37.7	31,007	72.2	36,107
Own pensions	59.7	71,859	70.1	124,703
Old age *	30.9	78,413	62.0	133,160
Dissability *	4.5	48,363	5.6	64,233
Survivor's *	19.4	77,206	1.2	125,943
(PASIS) *	6.2	15,139	3.2	15,835
Total Income	73.5	108,161	97.9	226,814

* included in the own pensions calculation

RURAL

	Elderly women		*Elderly men*	
	% with income source	Average amount (of those with income source)	% with income source	Average amount (of those with income source)
Salaried work	6.1	70,003	41.4	92,102
Inputed rent from owner-occupied housing	32.2	13,775	64.6	18,795
Own pensions	60.2	36,515	64.9	59,085
Old age *	18.8	55,193	46.2	70,028
Dissability *	6.9	32,304	7.5	46,418
Survivor's *	14.5	40,754	0.8	50,751
(PASIS) *	23.3	14,912	14.2	15,001
Total Income	74.2	56,045	97.6	134,606

* included in the own pensions calculation

Table 12: Contribution of income sources to total household income

URBAN

	Elderly women		*Elderly men*	
	% with income source	Share of total household income (of those with income source)	% with income source	Average amount (of those with income source)
Salaried work	11.2	26.6	37.8	35.3
Inputed rent from owner-occupied housing	37.7	17.6	72.2	12.9
Own pensions	59.7	35.7	70.1	43.7
Old age *	30.9	36.2	62.0	44.7
Dissability *	4.5	32.0	5.6	39.8
Survivor's *	19.4	36.8	1.2	48.5
(PASIS) *	6.2	18.6	3.2	19.1
Total Income	73.5	47.2	97.9	62.1

* included in the own pensions calculation

RURAL

	Elderly women		*Elderly men*	
	% with income source	Share of total household income (of those with income source)	% with income source	Share of total household income (of those with income source)
Salaried work	6.1	27.0	41.4	31.0
Inputed rent from owner-occupied housing	32.2	13.0	64.6	10.8
Own pensions	60.2	31.3	64.9	40.4
Old age *	18.8	37.3	46.2	43.6
Dissability *	6.9	31.5	7.5	35.4
Survivor's *	14.5	37.4	0.8	36.7
(PASIS) *	23.3	18.2	14.2	22.3
Total Income	74.2	43.0	97.6	64.2

* included in the own pensions calculation

Table 13: Elderly males raise the extended household pc income, elderly females tend to lower it.

Urban areas

	Elderly males			Elderly Females		
Effect on per the extended household per capita income (YN-YNa)	100	Houshls. in Poverty	Average change in income per capita	100	Houshls. in Poverty	Average change in income per capita
Increase	85.0	12.9	32,376	44.3	19.4	18,917
Reduce	15.0	9.1	-14,054	55.7	9.9	-24,814

Rural areas

	Elderly males			Elderly Females		
Effect on per the extended household per capita income (YN-YNa)	100	Houshls. in Poverty	Average change in income per capita	100	Houshls. in Poverty	Average change in income per capita
Increase	84.3	33.2	20,214	41.9	43.1	12,156
Reduce	15.7	29.4	-11,198	58.1	22.9	-13,060

YN= Household Income/Household Members

YNa = (Household Income – Income of elderly individual)/ (Household Members-1)

Table 14: Labor Force Participation in Urban Areas, 1994

Women ages 16 to 65

```
Probit Estimates                                  Number of obs =  36318
chi2(5)       =5282.99                                              Prob >
chi2   = 0.0000
Log Likelihood =  -21625.39                       Pseudo R2     = 0.1089

------------------------------------------------------------------------------
      lf |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
   dmarr*|  -.2989674   .0059621   -47.92   0.000   .527342  -.310653 -.287282
      ex |   .0424897   .0008599    49.20   0.000   22.1012   .040804  .044175
     ex2 |  -.0008204   .0000167   -48.92   0.000   671.896  -.000853 -.000788
   posts*|   .1501181   .0101847    14.92   0.000    .16931   .130156   .17008
    dmsc*|   .2027046   .0143729    14.09   0.000   .080649   .174534  .230875
---------+--------------------------------------------------------------------
  obs. P |   .3887329
 pred. P |   .3753771  (at x-bar)
------------------------------------------------------------------------------
(*) dF/dx is for discrete change of dummy variable from 0 to 1
    z and P>|z| are the test of the underlying coefficient being 0
```

Men ages 16 to 65

```
Probit Estimates                                  Number of obs =  33104
chi2(4)       =9412.63                                              Prob >
chi2   = 0.0000
Log Likelihood = -11069.162                       Pseudo R2     = 0.2983

------------------------------------------------------------------------------
      lf |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
   dmarr*|   .1122782   .0049625    22.62   0.000   .543983   .102552  .122004
      ex |   .0388999   .0006178    70.44   0.000   21.4947   .037689  .040111
     ex2 |  -.0007603   .0000114   -73.45   0.000   642.041  -.000783 -.000738
   posts*|  -.0569415   .0055919   -11.15   0.000   .181489  -.067901 -.045982
---------+--------------------------------------------------------------------
  obs. P |   .8165781
 pred. P |   .8879128  (at x-bar)
------------------------------------------------------------------------------
(*) dF/dx is for discrete change of dummy variable from 0 to 1
    z and P>|z| are the test of the underlying coefficient being 0
```

Table 15: Workers by Contributing Status and Institution: Urban and rural, by age and gender

	16 to 39	40 to 59	60 plus	Total
URBAN Males				
INP	1.38	6.18	16.52	4.14
AFP	68.87	60.01	35.02	63.36
Capredena	1.38	2.55	0.95	1.76
Other	0.33	1.11	1.48	0.68
No	28	30.15	46.04	30.03
no answer	0.04	0	0	0.02
Total	100	100	100	100
URBAN Females				
INP	1.94	7.88	16.22	4.75
AFP	66.56	52.89	24.57	59.63
Capredena	0.4	0.81	0.14	0.53
Other	0.12	0.58	0.36	0.29
No	30.98	37.6	58.71	34.72
no answer	0	0.24	0	0.08
Total	100	100	100	100
RURAL Males				
INP	2.09	10.62	13.21	5.83
AFP	44.85	39.12	21.02	40.79
Capredena	0.28	0.35	0.07	0.28
Other	0.28	0.36	0.19	0.3
No	52.49	49.56	65.51	52.8
no answer	0.01	0	0	0.01
Total	100	100	100	100
RURAL Females				
INP	1.37	6.02	12.91	3.38
AFP	48.79	41.69	17.83	44.93
Capredena	0.13	0	0	0.09
Other	0.09	0.23	0.72	0.17
No	49.62	52.06	68.54	51.44
Total	100	100	100	100

Source: Casen 94

Table 16: Contributors among Civilian Workers Not Required to Contribute (self employed and employees without contracts)

EQ1

Probit Estimates — Number of obs = 11019
chi2(20) = 600.04 — Prob > chi2 = 0.0000
Log Likelihood = -5991.4309 — Pseudo R2 = 0.0477

contr	dF/dx	Std. Err.	z	P>|z|	x-bar	[95% C.I.]	
salarioh	.0000209	4.38e-06	4.78	0.000	543.83	.000012	.00003
yschool	.0140523	.0012457	11.25	0.000	8.86959	.011611	.016494
age	.0107557	.0018747	5.73	0.000	38.2814	.007081	.01443
age2	-.000092	.0000223	-4.12	0.000	1629.07	-.000136	-.000048
AGRI*	-.0208325	.0158046	-1.29	0.195	.124512	-.051809	.010144
MINI*	-.0274786	.0354607	-0.75	0.453	.014339	-.09698	.042023
INDU*	-.0370054	.0146957	-2.43	0.015	.127507	-.065808	-.008202
UTIL*	-.0577195	.0641543	-0.83	0.406	.003267	-.18346	.068021
CONS*	.0151046	.0155179	0.98	0.325	.143389	-.01531	.045519
COMM*	.0050619	.0129518	0.39	0.695	.27988	-.020323	.030447
TRAN*	.0026499	.0165642	0.16	0.873	.101552	-.029815	.035115
FINA*	.1381073	.0308374	4.84	0.000	.026953	.077667	.198548
REG1*	.0257467	.0160953	1.60	0.110	.498412	-.005799	.057293
REG2*	.0845879	.0188047	4.67	0.000	.221073	.047731	.121444
REG3*	.0268874	.0184528	1.48	0.139	.19666	-.009279	.063054
t6_9*	.0616362	.0222535	2.90	0.004	.045739	.01802	.105252
t10_49*	.1726473	.0170998	10.87	0.000	.091478	.139132	.206162
t50_199*	.1617451	.0261941	6.69	0.000	.035393	.110406	.213085
t_200*	.3308905	.0332646	10.36	0.000	.021508	.265693	.396088
woman*	-.0622602	.0097629	-6.16	0.000	.278065	-.081395	-.043125
obs. P	.2580089						
pred. P	.2488856	(at x-bar)					

(*) dF/dx is for discrete change of dummy variable from 0 to 1
z and P>|z| are the test of the underlying coefficient being 0

Table 17: Contributors among Civilian Workers Not Required to Contribute (self employed and employees without contracts)

EQ2 No controls for sectors or region

```
Probit Estimates                                  Number of obs =  11223
chi2(5)       = 288.15                                                Prob >
chi2   = 0.0000
Log Likelihood = -6247.2808                       Pseudo R2     = 0.0225

------------------------------------------------------------------------------
   contr |      dF/dx   Std. Err.      z    P>|z|     x-bar  [    95% C.I.   ]
---------+--------------------------------------------------------------------
salarioh |    .000021   4.31e-06     4.89   0.000   533.945   .000013  .000029
 yschool |   .0149383   .0011765    12.67   0.000   8.88096   .012632  .017244
    edad |   .0078518    .001826     4.30   0.000   38.1842   .004273  .011431
      e2 |  -.0000693   .0000219    -3.17   0.002   1622.17  -.000112 -.000026
  dwoman*|  -.0667793    .008799    -7.31   0.000    .28005  -.084025 -.049533
---------+--------------------------------------------------------------------
  obs. P |   .2566159
 pred. P |   .2520265  (at x-bar)
------------------------------------------------------------------------------
```

Table 18: Average Wage by Cell. 1994 pesos. Urban Areas

Estimated Monthly Male Wages (based on full time earners)

age category		schooling category			
	incom prim	incomple sec	compl secondary	up to 4 post sec	5+ year post sec
16 – 20	$49,145	$61,958	$72,894	$76,149	
21 – 25	$61,366	$72,884	$89,050	$119,020	$313,293
26 – 30	$67,259	$84,219	$108,092	$155,493	$358,164
31 – 35	$70,030	$94,988	$133,436	$195,497	$482,094
36 – 40	$76,019	$103,699	$151,606	$223,750	$524,083
41 – 45	$88,323	$115,844	$174,791	$248,305	$540,316
46 – 50	$93,893	$143,450	$221,171	$269,793	$643,224
51 – 55	$90,986	$128,078	$201,733	$247,731	$595,663
56 – 60	$92,653	$135,883	$197,906	$281,721	$542,736
61 – 65	$81,430	$122,726	$161,457	$240,541	$513,568

Estimated Monthly Female Wages (based on full time earners)

age category	schooling category				
	incom prim	incomple sec	compl secondary	up to 4 post sec	5+ year post sec
16 – 20	$48,479	$48,124	$62,718	$66,393	
21 – 25	$49,496	$60,800	$75,702	$95,447	$179,198
26 – 30	$53,374	$59,136	$82,812	$167,499	$232,048
31 – 35	$53,044	$66,317	$91,003	$130,258	$260,202
36 – 40	$52,251	$70,051	$107,584	$138,252	$304,915
41 – 45	$58,110	$79,232	$137,248	$179,873	$312,696
46 – 50	$60,745	$83,353	$134,975	$209,027	$212,333
51 – 55	$62,959	$75,782	$156,673	$154,783	$222,027
56 – 60	$63,795	$93,730	$168,694	$149,990	$283,680

Table 19: Average Wage by Cell. 1994 pesos. Rural Areas

Estimated Monthly Male Wages (based on full time earners)

age category		schooling category			
	incom prim	incomple sec	compl secondary	up to 4 post sec	5+ year post sec
16 – 20	$37,668	$42,506	$56,157	$88,857	
21 – 25	$43,432	$55,902	$68,433	$112,153	$243,750
26 – 30	$49,868	$60,723	$81,972	$135,896	$317,579
31 – 35	$52,327	$69,470	$95,238	$176,645	$400,465
36 – 40	$54,395	$71,925	$118,671	$200,252	$399,359
41 – 45	$57,420	$75,418	$107,963	$230,895	$362,290
46 – 50	$57,239	$112,694	$155,878	$220,039	$322,625
51 – 55	$58,567	$141,572	$225,033	$264,672	$410,312
56 – 60	$60,898	$218,035	$336,533	$229,700	$498,000
61 – 65	$58,215	$175,077	$361,482	$194,727	$247,500

Estimated Monthly Female Wages (based on full time earners)

age category		schooling category			
	incom prim	incomple sec	compl secondary	up to 4 post sec	5+ year post sec
16 – 20	$33,848	$40,529	$47,879	$68,700	
21 – 25	$37,207	$47,194	$57,497	$86,258	$240,000
26 – 30	$37,621	$56,637	$65,448	$157,300	$198,700
31 – 35	$42,131	$47,856	$105,055	$129,123	$149,929
36 – 40	$39,737	$51,981	$79,612	$135,354	$136,625
41 – 45	$44,138	$53,716	$90,667	$148,765	$190,588
46 – 50	$46,996	$87,577	$103,913	$269,870	$215,556
51 – 55	$47,782	$73,143	$79,091	$175,333	$207,833
56 – 60	$40,202	$56,091	$165,167	$207,500	$196,250

Table 20a: Estimated Experince by Age Category in Urban Areas

Ever Working Males

age category		schooling category			
	incom prim	incomple sec	compl secondary	up to 4 post sec	5+ year post sec
16 – 20	2.61	1.32	2.92	0.44	1.00
21 – 25	6.62	5.38	6.98	2.95	3.07
26 – 30	11.14	10.05	11.61	7.54	7.00
31 – 35	15.67	14.81	16.37	12.40	11.89
36 – 40	20.36	19.53	21.25	17.25	16.84
41 – 45	24.86	24.12	25.94	21.88	21.76
46 – 50	29.25	28.61	30.47	26.51	26.59
51 – 55	33.24	33.01	34.37	30.92	31.51
56 – 60	36.78	36.51	38.10	34.94	36.18
61 – 65	39.58	39.00	41.08	38.54	39.59

Ever Working Females

age category		schooling category			
	incom prim	incomple sec	compl secondary	up to 4 post sec	5+ year post sec
16 – 20	2.37	1.68	2.36	1.00	0.00
21 – 25	4.50	3.87	5.43	3.80	2.88
26 – 30	6.07	5.45	7.26	6.56	5.71
31 – 35	7.73	7.26	9.43	9.54	9.57
36 – 40	9.62	9.44	11.85	13.01	13.49
41 – 45	11.85	11.77	14.48	16.86	17.97
46 – 50	13.89	13.94	17.26	19.74	22.20
51 – 55	15.68	16.03	19.51	23.77	26.39
56 – 60	17.10	17.61	21.15	27.19	29.84

Table 20b: Estimated Experince by Age Category in Rural Areas

Ever Working Males

age category		schooling category			
	incom prim	incomple sec	compl secondary	up to 4 post sec	5+ year post sec
16 – 20	3.49	2.17	2.34	1.01	0.00
21 – 25	7.66	6.38	6.36	3.98	1.75
26 – 30	11.76	11.05	10.82	8.79	5.75
31 – 35	16.48	15.83	15.59	13.79	10.75
36 – 40	21.18	20.48	20.23	18.74	15.75
41 – 45	25.78	25.06	24.71	23.53	20.75
46 – 50	30.34	29.83	29.35	28.53	25.75
51 – 55	34.51	34.41	33.18	32.62	30.27
56 – 60	38.54	37.89	37.00	34.62	35.27
61 – 65	41.74	40.79	41.22	38.92	37.52

Ever Working Females

age category		schooling category			
	incom prim	incomple sec	compl secondary	up to 4 post sec	5+ year post sec
16 – 20	2.30	2.07	1.82	2.18	0.00
21 – 25	3.54	4.04	4.86	5.28	0.00
26 – 30	4.86	5.37	6.20	7.80	4.25
31 – 35	6.27	6.76	8.48	10.74	8.51
36 – 40	7.78	8.43	11.24	14.27	11.46
41 – 45	9.10	10.24	14.11	17.84	16.26
46 – 50	10.55	13.35	16.20	21.81	19.76
51 – 55	11.64	15.21	18.53	25.31	22.76
56 – 60	12.88	16.95	20.28	27.89	26.26

Table 21: Estimated Retirement Benefits. Urban contributors.
(assumes no secular wage growth) 1994 pesos

MALES RETIRING AT 65					
Fund average rate of return	Incomplete Primary	Incomplete Secondary	Secondary	up to 4years of post-secondary	more than 4 years of post secondary
	Accumulated Fund				
3%	$7,095,216	$9,708,645	$13,967,023	$18,911,801	$42,772,857
5%	$12,395,665	$16,229,771	$23,052,160	$30,467,621	$68,748,038
	Reference Salary (Average contributory base for the last 10 years) / month				
	$55,661	$78,147	$121,917	$199,758	$428,647
	Estimated Annuity (expressed in monthly payments)				
3%	$41,390	$56,635	$81,476	$110,321	$249,514
5%	$85,765	$112,293	$159,497	$210,805	$475,666
	Replacement ratio				
3%	0.74	0.72	0.67	0.55	0.58
5%	1.54	1.44	1.31	1.06	1.11

FEMALES RETIRING AT 60					
Fund average rate of return	Incomplete Primary	Incomplete Secondary	Secondary	up to 4years of post-secondary	more than 4 years of post secondary
	Accumulated Fund				
3%	$2,101,020	$2,808,759	$5,158,874	$9,235,856	$17,537,601
5%	$3,694,415	$4,868,360	$8,484,528	$15,264,258	$24,806,698
	Reference Salary (Average contributory base for the last 10 years) / month				
	$20,295	$30,665	$63,001	$113,630	$190,753
	Estimated Annuity (expressed in monthly payments)				
3%	$9,890	$13,221	$24,284	$43,475	$82,553
5%	$21,110	$27,818	$48,481	$87,220	$141,746
	Replacement ratio				
3%	0.49	0.43	0.39	0.38	0.43
5%	1.04	0.91	0.77	0.77	0.74

Fund calculations are based on estimated wages from cross section (Table 17), except for the estimated wage for males age 46-55. These values were capped at 60 UF ($550,259).
The wage base of each year is equal to the estimated wage times the average annual work time for the period estimated from Table 15.
The annuity is calculated using a 6% commission for the insurance company, and a 3% or 5% interest rate respectively. Males are assumed to survive for 15 years and make provisions for

survivors' pension for 6 years at 60% of their own. Females are assumed to survive for 23 years and make no additional provisions.

Table 21a: Estimated Retirement Benefits. Urban contributors.
(assumes a 1% secular wage growth) 1994 pesos

MALES RETIRING AT 65					
Fund average rate of return	Incomplete Primary	Incomplete Secondary	Secondary	up to 4years of post-secondary	more than 4 years of post secondary
	Accumulated Fund				
3%	$8,848,937	$12,206,990	$17,674,860	$24,210,478	$54,779,309
5%	$14,648,450	$19,885,417	$28,432,155	$38,063,461	$86,012,529
	Reference Salary (Average contributory base for the last 10 years) / month				
	82,949	116,341	181,542	298,041	638,712
	Estimated Annuity (expressed in monthly payments)				
3%	$51,620	$71,209	$103,106	$141,231	$319,553
5%	$101,352	$137,587	$196,721	$263,360	$595,119
	Replacement ratio				
3%	0.62	0.61	0.57	0.47	0.50
5%	1.22	1.18	1.08	0.88	0.93

FEMALES RETIRING AT 60					
Fund average rate of return	Incomplete Primary	Incomplete Secondary	Secondary	up to 4years of post-secondary	more than 4 years of post secondary
	Accumulated Fund				
3%	$2,301,037	$3,121,732	$5,784,032	$10,401,287	$19,689,105
5%	$3,613,779	$4,787,286	$8,727,753	$15,556,146	$29,598,891
	Reference Salary (Average contributory base for the last 10 years) / month				
	$28,826	$43,635	$89,457	$161,446	$271,856
	Estimated Annuity (expressed in monthly payments)				
3%	$10,831	$14,695	$27,227	$48,961	$92,680
5%	$20,649	$27,355	$49,870	$88,888	$169,128
	Replacement ratio				
3%	0.38	0.34	0.30	0.30	0.34
5%	0.72	0.63	0.56	0.55	0.62

Fund calculations are based on estimated wages from cross section (Table 17), except for the estimated wage for males age 46-55. These values were capped at 60 UF ($550,259).
The wage base of each year is equal to the estimated wage adjusted by a 1% annual growth, times the average annual work time for the period estimated from Table 19.
The annuity is calculated using a 6% commission for the insurance company, and a 3% or 5% interest rate respectively. Males are assumed to survive for 15 years and make provisions for survivors' pension for 6 years at 60% of their own. Females are assumed to survive for 23 years and make no additional provisions.

Table 21b: Estimated Retirement Benefits. Urban contributors.
(assumes a 2% secular wage growth) 1994 pesos

MALES RETIRING AT 65					
Fund average rate of return	Incomplete Primary	Incomplete Secondary	Secondary	up to 4years of post-secondary	more than 4 years of post secondary
3%	$10,870,746	$15,108,781	$22,011,280	$30,479,946	$68,954,848
5%	$17,512,754	$23,974,814	$34,503,528	$46,750,680	$105,740,182
	Reference Salary (Monthly)				
	$123,227	$172,662	$269,481	$443,285	$948,740
	Estimated Annuity (expressed in monthly payments)				
3%	$63,813	$88,691	$129,209	$178,921	$404,774
5%	$121,671	$166,567	$239,716	$324,805	$734,640
	Replacement ratio				
3%	0.52	0.51	0.48	0.40	0.43
5%	0.99	0.96	0.89	0.73	0.77

FEMALES RETIRING AT 60					
Fund average rate of return	Incomplete Primary	Incomplete Secondary	Secondary	up to 4years of post-secondary	more than 4 years of post secondary
3%	$2,760,492	$3,789,168	$7,080,300	$12,766,495	$24,066,051
5%	$4,226,973	$5,668,970	$10,419,936	$18,668,938	$35,446,728
	Reference Salary (Monthly)				
	$40,835	$61,925	$126,684	$228,773	$386,400
	Estimated Annuity (expressed in monthly payments)				
3%	$12,994	$17,836	$33,328	$60,094	$113,283
5%	$24,153	$32,393	$59,540	$106,674	$202,543
	Replacement ratio				
3%	0.32	0.29	0.26	0.26	0.29
5%	0.59	0.52	0.47	0.47	0.52

Fund calculations are based on estimated wages from cross section (Table 17), except for the estimated wage for males age 46-55. These values were capped at 60 UF ($550,259).
The wage base of each year is equal to the estimated wage adjusted by a 2% annual growth, times the average annual work time for the period estimated from Table 15.
The annuity is calculated using a 6% commission for the insurance company, and a 3% or 5% interest rate respectively. Males are assumed to survive for 15 years and make provisions for survivors' pension for 6 years at 60% of their own. Females are assumed to survive for 23 years and make no additional provisions.

Table 22: Useful Benchmarks Chilean Economy (1994 data)

Indicator	1994 pesos
Average monthly income per capita *	78,057.60
Average monthly wage *	133,348.00
Minimum Wage (monthly)	39,000.56
Minimum Taxable Income	39,000.56
Social Security Benefits (1994 average) *	93,673.00
Workers' pensions *	107,521.00
Invalidity pensions *	54,954.00
Widows' or survivors' pensions *	72,132.00
Minimum Pension	37,738.39
PASIS benefit (monthly)	17,906.60
Poverty Line (monthly per equivalent adult)	30,100.00

* Estimates based on CASEN data.

Table 23: Estimated Retirement Incomes under the new and old systems. Urban contributors.
(assumes a 1% secular wage growth) 1994 pesos

MALES RETIRING AT 65*					
	Incomplete Primary	Incomplete Secondary	Secondary	up to 4years of post-secondary	more than 4 years of post secondary
Estimated Annuity (expressed in monthly payments) from Table 21a					
3% return	$51,620	$71,209	$103,106	$141,231	$319,553
5% return	$101,352	$137,587	$196,721	$263,360	$595,119
Estimated benefit under the old SSS system					
Formula based Benefit	$35,075	$46,839	$73,841	$133,114	$268,445

* The estimated annuity for the typical male in all schooling categories, as shown in Table 21a, is above the minimum pension. Therefore, we use the same values reported in Table 21a as estimates of monthly incomes.

FEMALES					
	Incomplete Primary	Incomplete Secondary	Secondary	up to 4 years of post-secondary	more than 4 years of post secondary
Estimated monthly income from age 60 to 76 working females **retiring at 60***					
3% return	$10,831	$14,695	$37,738	$48,961	$92,680
5% return	$20,649	$27,355	$49,870	$88,888	$169,128
Estimated monthly income under the old SSS system **starting at age 55**					
Formula based Benefit	$15,641	$22,071	$49,105	$86,593	$129,033
Estimated widow's pension from age 77 to 83 (new system)					
3% return	$30,972	$42,725	$61,863	$84,738	$191,732
5% return	$60,811	$82,552	$118,033	$158,016	$357,071
Estimated widow's pension under the old SSS system **Non-working women from age 77 to 83**					
Formula based Benefit	$17,538	$23,420	$36,921	$66,557	$134,223
Estimated **total income from pension sources** under the old SSS system **Working women from age 77 to 83**					
Formula based Benefit	$17,538	$23,420	$49,105	$86,593	$134,223

* The estimated annuity for the typical female in the two lower schooling categories falls below the minimum pension. Because the typical woman in these two categories does not have enough years of contributions to qualify for the minimum pension, the estimated incomes remain equal to the annuities reported in Table 21a. On the other hand, females with complete secondary schooling have sufficient contribution time to qualify for the minimum guaranteed by

the state. In this Table the estimated monthly income reported for this group, under the assumption of 3% return, is replaced by the minimum pension (as reported in Table 22).

Table 24: Postponing Retirement: Estimated Impact on Women' Pensions

24. a. System offers a 3% rate of return

	Incompl Primary	Incompl Second	Secondary	Up to 4years Post Sec	more than 4 years Psec
no secular trend in wage growth			ANNUITY		
at 60	$9,890	$13,221	$24,284	$43,475	$82,553
at 65	$11,793	$15,584	$28,899	$52,096	$98,666
			Replacement ratio		
at 60	0.49	0.43	0.39	0.38	0.43
at 65	0.78	0.83	0.72	0.65	0.67
Wages rising at 1% per year			ANNUITY		
at 60	$10,831	$14,695	$27,227	$48,961	$92,680
at 65	$15,043	$19,956	$37,504	$68,100	$128,398
			Replacement ratio		
at 60	0.38	0.34	0.30	0.30	0.34
at 65	0.67	0.72	0.63	0.58	0.59
Wages rising at 2% per year			ANNUITY		
at 60	$12,994	$17,836	$33,328	$60,094	$113,283
at 65	$18,255	$24,352	$46,300	$84,480	$158,506
			Replacement ratio		
at 60	0.32	0.29	0.26	0.26	0.29
at 65	0.55	0.60	0.53	0.48	0.49

24. b. System offers a 5% rate of return

	Incompl Primary	Incompl Second	Secondary	Up to 4years Post Sec	more than 4 years Psec
no secular trend in wage growth			ANNUITY		
at 60	$21,110	$27,818	$48,481	$87,220	$141,746
at 65	$23,913	$31,253	$54,815	$99,016	$161,090
			Replacement ratio		
at 60	1.04	0.91	0.77	0.77	0.74
at 65	1.59	1.67	1.37	1.24	1.10
Wages rising at 1% per year			ANNUITY		
at 60	$20,649	$27,355	$49,870	$88,888	$169,128
at 65	$30,152	$39,415	$72,520	$130,092	$246,863
			Replacement ratio		
at 60	0.72	0.63	0.56	0.55	0.62
at 65	1.34	1.43	1.23	1.10	1.14
wages rising at 2% per year			ANNUITY		
at 60	$24,153	$32,393	$59,540	$106,674	$202,543
at 65	$35,548	$46,847	$87,108	$157,318	$297,707
			Replacement ratio		
at 60	0.59	0.52	0.47	0.47	0.52
at 65	1.07	1.16	1.00	0.90	0.93