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The Chilean Pension Reform Turns 25: Lessons from the Social Protection Survey

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Keywords

Chile, Retirement system, PAYGO, Defined contribution individual accounts, Social Protection Survey

Disciplines

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Comments

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Abstract

In 1980, Chile dramatically reformed its retirement system, replacing what was an old insolvent PAYGO program with a new structure that relies heavily on funded defined contribution individual accounts. In addition, eligibility and benefit requirements were standardized, and a safety net for old-age poverty was strengthened. Twenty-five years after this reform, the Chilean model is being re-assessed, in terms of coverage, contribution, investment, and retirement benefit outcomes. This paper introduces a recently-developed longitudinal survey of individual respondents in Chile, the Social Protection Survey (or *Encuesta de Previsión Social*, EPS), and illustrates some uses of this survey for microeconomic analysis of key aspects of the Chilean system.

The Chilean Pension Reform Turns 25: Lessons from the Social Protection Survey

Global aging trends pose bankruptcy threats to many conventional pay-as-you-go (PAYGO) social security systems around the world. Accordingly, analysts are looking with keen interest at Chile's funded individual-account defined contribution pension plan, a system that was adopted in 1981 and remains in place after 25 years. Numerous other Latin American countries followed Chile in embracing funded individual-account pensions, and the Chilean model has received substantial attention in the United States and in other countries as well.¹ Commentators have showered the Chilean pension reform with both praise and criticism, and numerous studies have analyzed dimensions of the reform including its impact on the macroeconomy, capital markets, and aggregate savings.² Despite the prominence of the Chilean approach to old-age security and continued debate about the pension system's impacts, however, there has been little attention to microeconomic aspects of the new retirement program. In part, this lack of research is attributable to the lack of longitudinal microeconomic data with which to conduct such analyses.

Our goal in this paper is to introduce a recently-developed longitudinal survey of individual respondents -- the Social Protection Survey (*Encuesta de Previsión Social* or EPS), which provides invaluable new information for microeconomic analyses of key aspects of the Chilean pension system, and to illustrate some of the analyses possible with these data. Initiated

¹ Other Latin American countries who reformed their pension systems along similar lines include Perú (1993), Colombia (1994), Argentina (1994), Uruguay (1996), Bolivia (1997), México (1997), El Salvador (1998), Costa Rica (2001), the Dominican Republic (2003), Nicaragua (2004) and Ecuador (2004). Cogan and Mitchell (2003) discuss prospects for funded individual defined contribution account pensions in the United States.

² Many have written on Chilean pensions system (c.f. Cheyre, 1988; Iglesias and Acuña, 1991; Baeza and Margozzini, 1995 and SAFP, 1998). Implementati and operational aspects have been explored by Diamond (1994), Diamond and Valdés-Prieto (1994), Arenas de Mesa (1997) and Mesa-Lago and Arenas de Mesa (1998). Fiscal aspects of the reform are the focus of other work (c.f. Ortúzar, 1988; Marcel and Arenas de Mesa, 1992; Arenas de Mesa, 1999). Arenas de Mesa and Marcel (1999) have estimated the financing costs associated with the transition (from the old PAYGO to the new funded system) and minimum basic pension guarantees. Yet a common characteristic of these studies (and most studies on the Chilean pension reform) is the use of aggregate and macro-economic information. In fact, the implications of the pension reform on aspects such as private savings are usually deduced from simple aggregate correlations of macro-economic indicators (even though Chile experienced a significant number of concurrent economic reforms) or from simulations carried out on general equilibrium models (the pioneering application in this respect was Arrau, 1991). Even when specific aspects such as the minimum basic pension were analyzed, analysts have simulated representative individuals as they lacked microeconomic data; accordingly they did not consider individual heterogeneities critical for questions of equity (c.f. Wagner, 1991; Zurita, 1994).

in 2002, the EPS fielded a follow-up round in 2004; additional survey waves are scheduled for 2006 and every two years thereafter (funding permitting). In addition, the research team has worked to link respondent records to a wide range of historical administrative files on contribution patterns, benefit payments, and other program features. Accordingly, the EPS represents a substantial advance for analysts interested in important micro questions related to the operation of the new Chilean retirement system. To illustrate some of the richness of the new information available, this paper presents new analyses regarding three key policy questions:

1. Who participates in the Chilean retirement system, and what do lifetime contribution patterns look like?
2. What have people accumulated in the Chilean retirement system, and what benefits may be anticipated?
3. How financially knowledgeable are Chileans about their retirement system?

These three interlinked questions are of interest as they pertain to the central purpose of a retirement system, namely to provide adequate resources for a secure retirement. The subject of pension coverage and who contributes to their pensions over their work lives is important in the Latin American context as well in many other nations where pension system non-participation is currently a topic of active debate.³ Whether and how individual workers and their families participate in the system can only be studied with micro data of the sort we are developing. Anticipated retirement benefits from the system are also of key policy interest, as these will vary with lifetime contribution patterns as well as socioeconomic status, retirement ages, and other factors. In the Chilean context, it is also worth recognizing that the funded individual-account program is backstopped by safety net components, to protect those who accumulate little in their personal accounts. Improved projections of future financing burdens will require detailed data on patterns of contributions and assets accumulated over the lifetime. And finally, learning more about workers' financial literacy regarding their pension system is of interest in the Chilean case, as lack of knowledge may possibly explain participation and other choices related to the system, as well as whether the system favors certain types of people over others (e.g., those with more vs. less schooling).

To preview our results, we show:

³ See for instance Gill et al. (2005).

- Over their worklives, men self-report contributing to the pension system about half the time since age 18, with lower levels for women. Thus men in their 40's report contributing for a total of about 14 years since age 18, and women about 10 years.
- Self-reports of payments into the new Chilean pension system indicate higher contribution levels than do administrative records for the same people over the same time period. For instance, administrative records for men currently in their 40's indicate about 13 years of contribution since age 18, and for women about 6 years.
- Spells of non-contribution appear mainly to be periods when people held no jobs, were unemployed, or were self-employed (self-employed persons are not required to contribute to the system). In other words, contribution patterns during periods of work as employees (particularly wage employment) are very high.
- Account balances reported by respondents who claim to know their AFP accumulations are remarkably similar to those derived from administrative records, averaging around \$3 million Chilean pesos (~US\$5,600). Yet only 40% of the respondents are able to provide an estimated balance, and administrative data for the entire sample suggests that those who offer estimates have larger accounts than respondents who cannot estimate their AFP assets.
- Retirement payments for those currently reaching retirement age also depend on Recognition Bonds from the old PAYGO system. Those Recognition Bonds are worth as much as the AFP system assets for respondents entitled to them. Accordingly, any analysis of retirement assets and eventual benefits must recognize both sources of retirement support.
- Knowledge of the new Chilean pension system is far from perfect. For instance, most workers cannot accurately report contribution requirements under the new system, how much they pay in commissions, what the rules are for minimum pensions, and how they have their funds invested. Lack of knowledge is concentrated among those employees with poorer backgrounds, less education, and women.

- Among retirees, knowledge is more satisfactory. Most people who are retired according to administrative records also self-report they are retired (84%). Some two thirds of the retirees know what kind of pension they are receiving, and about 64% knows the benefit amount (+-20%), though the retired tend to report smaller amounts than are indicated by the administrative data. In general, people who know their pension amounts also are those receiving larger benefits than the median.

Some of these findings appear to be matters of concern to the newly elected Chilean president who confirms that pension reform is high on her policy agenda.

I. The Evolution of Chile's Retirement System⁴

Chile pioneered the development of social security in Latin America, establishing its first national social insurance fund in 1924. The subsequent evolution of Chile's social security system had three stages. The first, between 1924 and the 1970s, was based on the Bismarkian model of occupationally segmented social insurance schemes. The second, from the 1970s to 1980, reflected the Beveridge plan's proposal for universal social security coverage. The hallmark of the third, which began in 1980, was the development of a funded system with privately managed individual accounts, supplemented with a social safety net to be described below.

A. The Chilean Retirement System Before 1980

The Chilean old-age system began in the 1920s, and by the mid-1950s, three main pension funds (or "cajas") provided benefits for most salaried workers and two separate funds covered the police and armed forces. As time went on, other funds were created and the menu of regimes also expanded within the three main pension programs. As of the end of the 1970's, the Chilean retirement system included many individual regimes (150) and substantial institutional fragmentation (35 different funds; see Castañeda, 1990). Consequently coverage was stratified, only moderately progressive, and threatened the nation with a rising fiscal burden. Several different governments tried unsuccessfully to reform the structure over the years, but their attempts were repeatedly blocked by powerful interest groups (Arellano 1985; Mesa-Lago 1994). Benefit eligibility varied across sectors and depended on a minimum number of work years in

⁴ This section draws heavily on Arenas de Mesa (2005).

that sector. Retirement payouts were set according to defined benefit formulas that granted higher payouts for more years of work and higher pay in that sector. Many workers were not covered at all by any retirement plan, and those who were faced very uncertain benefits due to the programs' increasing insolvencies.

Issues regarding Coverage: The core objective of an old-age system is to ensure an adequate income for retirees, with most modern systems also providing social insurance for disabled persons, surviving spouses, and orphans. Effectiveness in fulfilling these objectives therefore relies heavily on the system's ability to collect contributions or taxes when individuals are in the economically active population (EAP). Accordingly, assessing a pension system's success is at least partly measurable by inquiring what percent of active workers pays into the program. Table 1 summarizes the fraction of the labor force and the fraction of the employed population that has paid into the Chilean retirement system over time, and it shows that the highest ratio of contributors was seen mid-1970s with a downward pattern thereafter. When the new system was introduced in 1980, the fraction of workers and the overall labor force that contributed to the INP system fell precipitously, while the contribution rate to the AFP system rose steadily. Other authors report similar patterns over the period, although levels of coverage differ from one study to the next (Cheyre 1988; Arellano 1985).

[Table 1 here]

The downward trend in effective coverage that began in the early 1970s can be accounted for in part by rising unemployment, since jobless workers are not expected to pay into the system. But increasing unemployment was not the only reason since coverage within occupations (among workers with jobs) also declined in the mid-1970s, falling from 86 percent to 71 percent over the period 1975 to 1980 (Cheyre, 1988) or from 71 percent to 53 percent (Arellano, 1985). Some writers contend that much of the coverage decline during the 1970s was attributable to increased evasion (Cheyre, 1988). Other writers emphasize the complex interaction of higher unemployment, greater incentives for evasion, and more precarious labor relations (Marcel and Arenas de Mesa 1992).

Financing the Old PAYGO System: Another measure of a retirement system's effectiveness has to do with its ability to provide benefits to those eligible to receive benefits. In Chile, the number of retirees and others eligible to receive benefits climbed from approximately 500,000

people in the late 1960s to more than 1 million people by the end of the 1970s, for an average annual growth rate during that decade of 5.7 percent (Arenas de Mesa 2000).

Prior to 1980, the system was for all intents and purposes, a PAYGO system (returns on the few invested assets amounted to only 2.5 percent of the system's total annual revenues). As a result, the system's financial equilibrium depended on economic growth, since in a PAYGO program, that determines wage levels and hence revenues from contributions (along with trends in the ratio of contributing members to noncontributing members).

Assuming constant conditions in terms of replacement ratios and contribution rates, the contribution ratio is in turn determined by demographic factors such as the age composition of the population, economic factors such as unemployment, the relative size of the informal sector in the economy, evasion rates, regulatory and policy-related factors such as the established retirement age, and pension eligibility requirements in such cases as early retirement options. In Chile, the ratio of contributing to noncontributing members had trended downward between 1965 and 1980, falling from 3.6 to 2 contributing members for every pensioner. At the time of the reform, government revenues averaging 2 per cent of GDP per annum had already been required to finance the system (see Table 2); further, it seemed clear that maintaining pension promises would have required further infusion of large amounts of government revenues to the old-age system.

[Table 2 here]

B. The 1980 Chilean Pension Reform

Chile's pension system, thus, like those of many other Latin American countries that undertook reforms later, was institutionally fragmented, included a vast number of different regimes, and faced problems regarding finances, coverage, equity, and administrative efficiency (Arenas de Mesa 2000). Both the Frei and Allende administrations attempted to standardize the pension regimes and to do away with privileges enjoyed by limited groups, but both failed to achieve the necessary consensus.

Several years after the military government of General Pinochet took power, it launched national retirement system reform. The first phase sought to stabilize the PAYGO system by raising retirement ages, increasing contribution rates, and eliminating some special schemes. Subsequently in 1980, the government moved to dramatically reform the system by closing the old system to new workers, replacing it with a new system which places at center stage a system

of funded defined contribution individual accounts. In addition, eligibility and benefit requirements were standardized.

While many nonChileans focus primarily on the individual account element of the pension system, it must be recognized that the resulting structure is a “three-pillar public/private” system, in the terminology of the World Bank (1994). The *first pillar* has three key components:

- (1) A noncontributory public system provides welfare-based pensions (*pensiones asistenciales*, or PASIS) for the indigent. The system is means tested and is operated centrally, for both the determination and payment of PASIS benefits.
- (2) A state-guaranteed minimum pension (MPG) for participants in the *Administradoras de Fondos de Pensiones* (AFPs, or pension fund managers) who have 20 years of contributions. The purpose of the MPG is to ensure that all eligible participants will receive a basic level of minimum old-age income, and it is a key element of Chile’s social protection policy. In practice, the federal government makes transfer payments to the AFP accounts of retirees who have insufficient balances to pay the minimum pension.
- (3) A public defined benefit system known as the *Instituto de Normalización Provisional* (INP, or National Pension Fund) which administers the old PAYGO defined benefit program closed to new entrants by the 1980 reform.⁵

The *second pillar* of the Chilean pension system consists of the mandatory contributory defined contribution program known as the AFP system. This is a national savings program aimed at all wage and salary workers, intended to provide participants with old-age benefits (it also provides life insurance and disability benefits as part of the mandatory program). When the new program was announced, existing workers were required to decide whether to remain in the old INP system or to move to the new system. Those who moved to the new system received credit for INP contributions known as a transferable Recognition Bond (RB).⁶ The new AFP system is mandatory for all new wage and salary workers joining the labor force as of 1981, but affiliation remains optional for self-employed workers.

⁵ This institution also manages the retirement systems of the armed forces (the National Defense Pension Fund or Caja de Previsión de la Defensa Nacional -CAPREDENA) and the police force (Chilean Police Force Pension Division or Dirección de Previsión de Carabineros de Chile - DIPRECA).

⁶ This is a lump-sum paid by to workers by the government at retirement, based on the last 12 monthly contributions before June 1979 and adjusted by the proportion of total years under the public system and an annuity factor. RBs are expected to cost around 1% of GDP per year for the period 2000-2020 (Arenas de Mesa and Marcel, 1999).

Wage workers in the AFP system establish individual pension accounts by affiliating with one of the privately managed pension funds. By law, workers must contribute 10% of their monthly earnings, plus an additional contribution (currently between 2% and 3% of monthly wages) to cover administrative costs as well as disability and survivor insurance.⁷ Workers may only participate in one AFP at any given time, but they may periodically switch between AFPs by providing proper notice.⁸ Initially all AFP monies were invested in government bonds, though more recently pension fund managers have been permitted to offer a broader (though regulated) array of investment choices. They also offer a life-cycle investment strategy that automatically moves assets into more conservative investments as workers age. At retirement, retirees may use their accumulated funds (including the RBs) to purchase a lifetime income stream.⁹

Affiliates having contributed at least 20 years but who have accumulated funds insufficient to provide the minimum pension guarantee level are entitled to receive a government subsidy financed from general tax revenues.¹⁰ Workers cannot receive their pensions until the legal retirement age (currently age 60 for women and 65 for men), but early retirement is allowed under some conditions.¹¹ Naturally, as with any defined contribution plan, retiree benefits depend directly on AFP balances at retirement, and hence benefits are a function of workers' lifetime earnings, contribution histories, and AFP investment choices. For this reason, retirees' benefits depend more closely on individuals' risk preferences and behavior, whereas in a defined benefit PAYGO plan, solvency risks are more prominent.

The *third pillar* of the Chilean system, like the second, operates on the basis of individually funded defined-contribution accounts, but in keeping with the World Bank model

⁷ Mandatory system contributions are capped at a ceiling earnings level of approximately US\$1,500/ month; fewer than 5% of AFP contributors earn over that ceiling.

⁸ In response to high levels of churning across AFPs, the Superintendency of the AFP system in 1997 required participants to file paperwork in person at their AFP, a move that greatly diminished the rate of fund switching.

⁹ Additional factors influencing pension amounts are the worker's life expectancy (derived from age and sex-specific official life tables) and the worker's number of survivors at the time of retirement. Retirees have three withdrawal options: (i) Programmed Retirement (*Retiro Programado*), which allows a system of phased withdrawals from the accumulated funds, and where the pension amount is recalculated every year; in this case the pension is paid by the AFP; (ii) a real lifetime annuity from an insurance company (*Renta Vitalicia*); in this case the AFP will transfer funds to the insurer which in turn makes monthly payments; and (iii) some mix of phased withdrawals for a determined period and a deferred lifetime annuity.

¹⁰ The current minimum monthly pension is US\$105 while the minimum wage is about US\$150 a month.

¹¹ Early retirement may be permitted if the worker can demonstrate that his early retirement benefit would be at least 110% of the minimum pension benefit level and 50% of his average monthly contributions over the last 10 years (currently 60% of pension benefits paid by AFPs are for early retirement).

that gained in popularity during the 1990s, it is a voluntary program. Affiliates who wish to pay more than the mandated pension contribution may do so, and such contributions receive some tax benefits.

The new AFP system and the old PAYGO system differ in key ways. Most importantly, workers' AFP accumulations represent funded individually-owned accounts, over which affiliates have some investment and bequest decision-making power. The old system, by contrast, faced bankruptcy due to its PAYGO structure. In moving to the new plan, the hope was that workers would become more aware of the value of participating in the system, the size of their own accumulations, the opportunity to make investment choices, and the options regarding retirement payouts. Further, under the AFPs, workers have a chance to save more than the 10% required contribution, which might be attractive to those who truly value access to funded individual investment-based accounts. Also, AFP savings and pension payouts are inflation-adjusted, addressing a well-known deficiency of the old PAYGO plan.¹² And finally, the fact that AFP affiliates are guaranteed a minimum wage-indexed retirement benefit – worth twice the welfare benefit – if they pay into the new system for 20 years was anticipated to draw more workers into formal sector jobs.

C. Transition Issues

Twenty-five years of experience with the new reform finds the Chilean transition process in full swing. Both the old and the new systems continue in operation, with the old one being gradually wound down over time, and the new one growing at a steady pace. Contributors to the old Chilean system will cease being active workers in about 2025, and retirement pensions will stop being paid in approximately 2050.¹³

It is interesting that the reform was intended to confine the government's role to that of pension system regulator, inspector, supervisor, and guarantor of the AFP system. In particular, via the *Superintendencia de Administradoras de Fondos de Pensiones* (SAFP, or Superintendency of Pension Fund Managers), the government is charged with regulating,

¹² All pension system variables (pension funds, yields, benefits) are measured in "unidades de fomento" (UF), an accounting unit indexed to inflation. Thus, pensions are automatically inflation-adjusted, therefore, solving a long-standing and serious problem of Chilean social insurance. Unlike regular pensions, however, the minimum pension is not indexed against inflation but is instead periodically adjusted by the government..

¹³ The AFP system currently covers nearly half as many pensioners as the INP system, has more beneficiaries than the welfare PASIS pension, and includes three times as many beneficiaries as the public pension system for the armed forces (Arenas de Mesa 2004).

inspecting, and supervising the management of the AFP system (SAFP 2002.) In addition, the government plays a significant role in several key areas:

- (i) Administration and payment of benefits under the old INP system;
- (ii) Administration, calculation, and payment of “recognition bonds”, for those who transferred to the AFPs;
- (iii) Administration and payment of pension benefits under the public plans for the armed forces and the police;
- (iv) Administration and payment of the minimum pension guarantee under the AFP system; and
- (v) Administration of the PASIS welfare benefit system for indigents and those lacking pension coverage.

The first two of these governmental duties is time-limited, but the others are ongoing. Furthermore the government also serves as the guarantor of last resort in the event of the bankruptcy or default of any AFP or insurance provider, and also by ensuring that the yields for plan members remain above an established floor rate. Each of these responsibilities imposes an actual and potential financial burden on government coffers, the amount of which is an area of continuing research (Arenas de Mesa and Gumucio 2000).

Economic Impacts of the Funded Individual Accounts: The accumulating pension funds have played a growing role in the Chilean economy since 1980. The assets have grown to around 60 per cent of GDP (see Table 3; as of 2003). The pension funds have acted as an engine of growth for various sectors of the economy and for the capital and life-insurance markets, among others. The AFPs are now the largest institutional investors in the financial market. They finance five out of nine new mortgages (SAFP 2002).

[Table 3 here]

The asset mix of these funds has changed considerably and has tended to become more diversified (see Table 4). In 1981, the bulk of these investments were in financial paper (71.3 percent), but in 1989 the share of such instruments began to shrink, falling to 26 percent by 2003. Meanwhile, the share of corporate bonds (bonds issued by nonfinancial institutions) and equities expanded, rising to 7.7 percent and 14.5 percent (13.5 percent in business enterprises and 1 percent in financial institutions), respectively, by 2003 (about 13 percent of GDP). Investment in foreign assets began in 1993 (although the law making this an option was passed in 1990). In that year, such investments amounted to 0.6 percent of the funds’ total value; by 2003, their share had grown to 23.8 percent. These changes in AFP portfolios have been made possible by the pension

funds' growth, the development of the capital market and the relaxing of regulations that place limits on investments (SAFP 2002).

[Table 4 here]

II. The Social Protection Survey and Linked Administrative Data

In 2002, the Micro-data Center of the Department of Economics of the Universidad de Chile under the Directorship of David Bravo conducted a new household survey (2002 EPS, *Encuesta de Previsión Social*, or Social Protection Survey). This is an invaluable research tool providing researchers a host of useful new individual-level information for addressing numerous research questions including the main issues of this chapter – information that previously was unavailable.¹⁴ The interview sample was drawn from a sampling frame of approximately 8.1 million current and former affiliates of the Chilean old-age systems compiled from official databases obtained from the Chilean Ministry of Labor and Social Security; the frame included about three-quarters of the population age 15+ in 2001. The survey was fielded between April and December of 2002, collecting data from individuals who were working, unemployed, out of the labor force, receiving pensions, or deceased (in the latter case, information was collected from surviving relatives).

The 2002 EPS survey included socio-demographic information and current labor market data for each member of the household, detailed information about receipt of pensions and types of pension plan participation and retrospective labor market history going back to 1980. Ultimately, the 2002 survey contains data on 17,246 individuals (937 of them were reports by surviving relatives) affiliated with the old or the new retirement system for at least one month at any time during the 1981-2001 time span.¹⁵

Another round of the survey was administered in 2004, which included a second wave for

¹⁴ The 2002 survey was initially called the 2002 History of Labor and Social Security (HLSS, *Historia Laboral y Seguridad Social*) survey. But the follow-up 2004 and 2006 longitudinal surveys are called Social Protection Surveys (SPS, *Encuesta de Previsión Social*). To avoid awkward terminology therefore we refer in this chapter to the 2002 data, as well as the subsequent rounds of data, as Social Protection Surveys. The interested reader is referred to <http://www.proteccionsocial.cl/english/presentacion2002.htm> for access to the public use data, codebooks, and documentation of the survey.

¹⁵ Information on the methodology and extent of the survey can be found in Bravo (2004). Members of the Armed Forces or police covered by separate government pension systems were excluded, as well as a very small percentage of the Chilean population residing in inaccessible or sparsely populated areas (e.g. islands).

previously surveyed respondents, plus new surveys for a subsample of individuals not affiliated with the social security system (individuals never employed in the formal sector) and also a subsample of new entrants into the AFP system between 2002 and 2004. In addition a host of new health and wealth questions were introduced for the first time.¹⁶ Accordingly, the 2004 survey is representative of the entire Chilean population.¹⁷ Furthermore in 2004, the research project received permission to merge responses to the sampled respondents with administrative records on pension contributions and earnings in the PAYGO and AFP systems since 1980, data on the amounts of recognition bonds; and monthly data on account changes in the individual investment accounts, switches between AFPs, AFP commissions charged, and investment returns earned on all accounts in the AFP system. The survey data has also been merged with monthly Social Security records, available since 1981.¹⁸ In what follows, we provide details about the specific variables central for each analysis.

III. Informing the Policy Debate Using the Social Protection Survey

As noted above, the 2002 and 2004 Social Protection Surveys linked to administrative records provide the essential data base for answering the critical micro questions about the current Chilean pension system posed in the introduction of this chapter. Next we turn to the evidence.

A. Contribution Patterns under the Chilean Retirement System

In this section, we characterize retirement system contributions made by EPS respondents. The information used to track contributions is derived from two sources. First, EPS interviewees were asked about their employment and old-age system work histories and contribution patterns from 1980 on. Specifically, Module II of the 2002 EPS survey asks, for each job held since age 15, whether the respondent contributed to the some retirement system, and if so, which system. In addition it asks respondents to report earnings, hours of work, labor force status, occupation and industry for each job. We use this survey information to derive the so-called respondent *self-reported* months of contribution over time. These may be further classified according to the workers' labor market status at the time, which we identify as either

¹⁶ A number of the questions were adapted from the US Health and Retirement Study (HRS) with the intention of providing cross-national comparisons.

¹⁷ Weights are available to reweight to random sampling proportions.

¹⁸ An additional round of the survey is being administered in 2006 and there are plans to undertake further rounds in 2008 and 2010.

working, unemployed, or not in the labor force. To derive the self-report months of contributions to various retirement systems, we first turn to the labor history section of the 2002 EPS. Here we only count months of contributions reported for respondents between the ages of 18 and 60, inasmuch as there is little formal work prior to the younger age, and some groups, particularly women, retire at age 60.

The results of this tabulation may be seen in Table 5. Panel A contains both self-reports and administrative records on months of contributions to the AFP system, for those for whom we have both sets of records.¹⁹ Panel B indicates total months of contributions to all retirement systems, including the old INP as well as the AFP programs. Turning first to the self reports on AFP contributions, we find that men report more months of AFP contributions, on average, than do women. This is not surprising, given that many Chilean women leave the paid labor force for childrearing. Also clear is the rising pattern of contributions by age, such that workers in their late 20s report 64 months of contributions to the AFP system (5.3 years on average) since 1/1981, while workers in their 50's report more than double this level (14.1 years). It is worth recalling that workers older than 39 in 2002 would have been exposed to the old INP system prior to the 1980 reform, and hence they are likely to have had periods of contributions under the old system as well (more on this below).²⁰ Somewhat surprising is the result that months of contributions do not vary much by education, at least for the self-reported tallies.

[Table 5 here]

The second column in Panel A, Table 5, indicates mean months of contributions to the AFP system derived from administrative records over the same calendar period, while the third column displays the ratio of self-reported months to administrative data.²¹ Overall, self-reported contribution months exceed the administrative data counts by 20%, no doubt in part due to recall error.²² Those in the 30-50 age range seem to be most optimistic regarding their self-reported months of contribution, with lesser differences for younger and older individuals. The third

¹⁹ The sample size for which we can currently link self-reports and administrative AFP records for the EPS 2002 is 11,305.

²⁰ The reader should be reminded that as the AFP system has been in place only since the early 1980s and our tabulations run to mid-2002, the maximum possible number of months in the chart can total only about 260.

²¹ Data on AFP contributions are available only from 1/1981. INP contribution patterns may become available in the future but to date these are unavailable for analysis.

²² Another reason that the self-reports of contribution months are higher is that the EPS labor history asks for job beginning and end dates; our calculation assumes that contributions were made without interruption on each job, which may produce an overstatement of contributions if layoffs or other interruptions occurred but are not accounted for in the reported beginning and end dates.

column shows that men are less likely to over-report than women, compared to administrative records; younger workers less than middle aged workers; and educated workers less than the low-educated. Figure 1 plots the months of contribution patterns and differences by more detailed age groups, for the AFP system alone, and for (self reports) of contributions to all retirement systems. Overall the patterns appear similar to those depicted in Table 5.

[Figure 1 here]

For purposes of comparison, Panel B of Table 5 provides self-reported months of contribution data for *all* retirement systems including the old INP, various public sector “cajas”, and the new AFP system. The first two columns focus on respondents with linked records only, while the third column focuses on all EPS 2002 respondents (whether or not they had linked records). Not surprisingly, overall patterns are similar to those previously described by age, sex, and education. One difference is that self-reported months of contributions to *all* systems are higher than those to the AFP system alone, mainly due to the fact that older (age 40+) workers report more contribution months. This is probably accurate, inasmuch as the older workers could have been contributors to the old INP system (and we lack accurate contribution history data from that system).

Table 6 breaks down the pattern of workers months of contributions in the retirement system by labor market categories, specifically working, unemployed, and not in the labor force. The data reveal that the majority of contribution months coincide precisely with those months when respondents were working (particularly in the wage labor force). And contribution patterns during period of work (particularly wage employment) are very high. Put differently, lapses in contributions appear mainly associated with periods of nonemployment, rather than outright nonpayment of retirement contributions during employed periods. This suggests that analysts concerned with low levels of retirement accumulations would do well to focus on non- or unemployment. Furthermore, contribution months are very high for periods of wage work, in the 80-90 percentile range. This implies that the problems of low contribution months are not concentrated among the self-employed; though self-employed persons are not required to contribute to the system this does not seem to be a major source of nonpayment.

[Table 6 here]

B. Retirement Accumulations in the Chilean Retirement System

Previous research has focused on whether workers are contributing ‘enough’ to the Chilean retirement system to obtain adequate benefit levels in retirement. Thus analysts have calculated projected replacement ratios for AFP participants on the assumption that workers would contribute 70-90 percent of their worklives (c.f. Arenas de Mesa and Gana 2003). The replacement rate is defined here as the percentage of the worker’s last pay divided by his monthly pension (assuming the partnered retiree takes a joint and survivor benefit). But in a more recent study, Arenas de Mesa, Llanés, and Miranda (2004) re-computed projected replacement ratios using the self-reports of contribution patterns taken from the 2002 EPS. These new findings are important as they rely on actual patterns of contributions reported over workers’ lifetimes, rather than assumed contribution patterns on average. In addition they provide evidence at the individual worker level so one can project patterns by earnings, sex, and age. These studies project likely AFP balances at retirement, and replacement rates implied by these projections for a male age-65 retiree with female partner 5 years younger, and a lifetime contribution pattern of 80% of the worklife (aka “density of contributions”) of 60%; and a female age-60 retiree with a density of contributions of 80% or 43%.²³ At 65, the man having contributed 80% of his worklife would be expected to accumulate an AFP balance of \$37 million, which those authors expect would finance a (joint and survivor) annuity amounting to about 60% of pre-retirement pay. A single woman who retires earlier after the same contribution pattern would accumulate an AFP balance of \$29 million implying a replacement ratio of 43%. But having lower lifetime contributions reduces projections substantially: for instance, if men contributed only 60% of the time and women 43%, estimated AFP balances would be projected to be lower by 25 to 46%, and the pension annuity drops from to 60% to 44% for men, and from 43% to 23% for women (see Figures 2 and 3).

[Figures 2 and 3 here]

In the present paper, we do not develop new projections of accumulations and replacement rates using the administrative data, though this will be undertaken in future work. But we inform that analysis by reporting on retirement system assets accumulated by participants to date. Panel A of Table 7, for instance, shows that AFP account balances reported by respondents who state that they know their accumulations are quite accurately measured

²³ That analysis assumes that workers’ initial taxable earnings were CP\$200,000 (somewhat below twice the current minimum wage); that real earnings would grow at 2% per year to 50 years of age; that pension investments would earn 4% real per year; and that the worker would pay fixed monthly commissions of \$500.

compared to AFP balances from administrative records, with the median at around \$3 million Chilean pesos (~US\$5,600). On the other hand, only 40% of the EPS respondents could provide an estimated AFP balance, and one might anticipate that these individuals would likely have more assets than those unable to provide an estimate. Indeed, over the entire EPS sample, the median respondent offering a balance estimate appears to have four times the accumulation compared to the median respondent unable to estimate his AFP assets, according to administrative records. Across the entire sample, the median AFP accumulation derived from administrative records totals about \$1.5 million Chilean pesos (or about US\$2,800).

[Table 7 here]

Retirement payments for those currently reaching retirement age also depend on Recognition Bonds from the old PAYGO system. Panel B of Table 7 shows that these Recognition Bonds are worth as much as the AFP system assets for respondents entitled to them, with the median account worth about \$4 million Chilean pesos (~US\$8,000). Accordingly, it is clear that analyses of projected retirement benefits under the Chilean retirement system must recognize both sources of retirement support. Panel C indicates that AFP accruals for those without a Recognition Bond are lower, in part because this group is much younger than those who accumulated substantial benefits under the system that was closed to new entrants in 1980.

C. Financial Literacy Regarding the Chilean Pension System

What workers know about their old-age benefit system can have a major impact on how effectively they prepare for retirement, and how they determine their retirement plans. For example, if people believe their benefits rise with deferred retirement, they may be more likely to respond to incentives to continue work. On the other hand, if they systematically misperceive the costs and benefits of the system, their misinformation can shape the system's popularity as well as the perceived effectiveness of specific reforms (e.g. number of years required for eligibility). Yet very little is known about how people develop the necessary level of financial literacy to understand their pension systems, particularly when workers have personal defined contribution pension accounts. Studies based on the United States' experience suggest that many workers arrive at retirement with little knowledge of their retirement system.²⁴ As a result, they often fail to plan well for their retirement and may be ineffective advocates for retirement system changes. Little is known about whether similar problems arise for workers in a national defined

²⁴ See for instance Mitchell (1988), Gustman and Steinmeier (1999) and Lusardi and Mitchell (2006).

contribution system. As they bear greater responsibility for their own retirement and pension options through personal accounts, workers may be better informed about retirement risks and rewards.

In this section, we investigate to what extent Chilean workers understand and make sense of the pension institutions covering the workforce. We posit that those better informed about their pensions are more likely to make sensible provision for old age, possibly by contributing more, paying more attention to plan investments, and making appropriate payout options. Accordingly, we investigate the factors associated with being informed about the pension system's characteristics, focusing on, for example, the association with age, schooling, occupation, sex, one's birth cohort, and socioeconomic class. Answers to these questions are important for understanding how people perceive their pension system and whether they value the future benefits it will provide. This was an important issue in the recent national elections in Chile, and is a key source of discussion throughout all the Latin American nations which have moved toward systems similar to Chile's (Gill et al. 2004). Our results help identify which workers can most efficiently understand and maneuver under such plans, how the plans might be made more effective, and what are the distributional implications of such plans.

Our results on knowledge of key aspects of the Chilean pension system are summarized in Table 8. Across the top of the chart we indicate the data source, sample, and number of included observations in each cell. Columns (a) and (c) refer, respectively, to the responses for the 2002 survey, first for the entire 2002 sample, and second for just those who were reinterviewed in the panel in 2004. Column (e) refers to all EPS interviewees in 2004, while Columns (g), (i), and (k) breaks the total down into the panel subset, new entrants (affiliates) to the pension system, and non-affiliates.

[Table 8 here]

Row A in Table 8 reports respondents answers to whether they received a statement from the AFP system (the quarterly "cartola" which reports past contributions and projects future benefit amounts). It must be noted that the questions differed slightly across the two years: 2002 respondents were asked whether they had received their AFP quarterly report, whereas 2004 respondents were asked whether they had received an AFP cartola in the past 12 months. In any case, the results are comparable: in the earlier year, 60% of respondents said they received the statement, whereas in 2004 the fraction stood at 69%, with a similar change for the subset of

panel members. Three-quarters of new affiliates, who are likely to be younger than the average respondent, affirm they received it.

Whether the effort to provide pension information translates into useful knowledge about the pension system is quite another matter. Row B.1 of Table 8 shows whether respondents knew the contribution (or payroll tax) rates required for AFP accounts; Row B.2 then indicates whether the responses are correct. In 2002, slightly more than half (53%) of the respondents claimed that they knew what the payroll tax rate is, but just over one-quarter (28%) got the answer correct. In 2004, fewer of the panel members (46%) claimed to know the rate, though more of them (34%) now got the tax rate correct. Not surprisingly, new affiliates are less well-informed, and non affiliates know little to nothing about required contributions.

Another topic of recent policy interest has to do with the commissions charged by the AFPs. If AFP participants pay little attention to investment costs, it is likely that AFPs will not need to compete amongst themselves to drive down prices and enhance service (Berenstein and Ruiz, nd; Valdes Prieto, 2005). The results from our analysis show, in Row C, that fewer than 2% of the respondents (including panel members as well as new affiliates), know either the fixed or variable commissions in either year. Only half of one percent of all respondents claim to know both the fixed and variable commissions. The fact that workers and savers know virtually nothing about the costs of investing their funds suggests that there is much work to be done to educate Chileans about this key aspect of their retirement system.

Financial information regarding amounts accumulated in workers' retirement accounts, and how the funds are invested, is reported in Rows D and E of the same Table. Line D.1 indicates that 45% claim they know their AFP balances in the 2002 survey, with the fraction thus knowledgeable rising to over 50% two years later. Among panel members interviewed both waves, 20% of the respondents had more information in the second period than in the first. It is also of interest that new affiliates also are relatively well informed, with 42% saying they knew their balances. Line D.2 indicates how accurately respondents in 2004 reported AFP their balances, compared to administrative records. Estimated balances are within 20% of administrative amounts for 21% of the sample. Overall, it would appear that AFP plan participants in Chile are about as well (or poorly) informed as compared to their US counterparts in corporate pensions. For instance, Gustman and Steinmeier (1999) find that US workers tend to understate their defined contribution assets by about 30%, at the median, as compared to

administrative records, and by half in the middle and upper tails. Furthermore, the low fraction of those who can offer accumulation estimates suggests that many workers are not well apprised of a key retirement asset.

For the first two decades of life of the Chilean AFP system, affiliates could only decide which AFP they wanted to invest with, but they were not permitted to diversify their holdings across AFPs, nor were they permitted to make asset allocations. In 2000, the government permitted the AFPs to open a more conservative account for retirees or near-retirees (with 10 years of the legal retirement age; and then in 2002, each fund administrator was permitted to expand the number of investment offerings from two to five in order to allow participants to diversify their asset allocations. Under this new “multifund” structure, each AFP must offer a so-called Fund A which invests 80% of the portfolio in equities, Fund E which holds 100% fixed income; and Funds B-D which hold intermediate fractions of equities. Workers may elect to hold up to two funds in a single AFP at a time.

What Chileans indicate that they know about their pension investments is summarized Section E of Table 8. Line 1 finds that respondents in 2002 did not know much about their pension investments (10% claimed to know), but this is not surprising given that they had not yet been granted access to a variety of fund choices. By 2004, almost half of the respondents claim that they know about the multifund setup, though only one-third would admit to knowing how many funds there are, and only around one-fifth can give the correct total number of funds. Further, in 2004, only one-third of the respondents said they knew which funds they held, but only 16% was accurate and 38% was aware of which fund is the riskiest.

Turning finally to retirement system payouts, Section F of Table 8 breaks the results into three topic areas. First, we summarize what people know regarding the AFP system payouts. Second, we review what they know about the minimum pension guarantee payable to those who have made 20 years of contributions. And last, we outline what people know about the minimum welfare (PASIS) benefits.

Several key questions arise regarding the rules pertaining to eligibility and access to benefits under the Chilean retirement system. For instance, the legal minimum retirement age refers to the age at which eligible retirees may claim benefits. When asked what the legal age is for women and men, knowledge here seems quite widespread – around 83-86% report these ages accurately in 2002 (Lines F1.1-1.2). The percentages fall a bit by 2004, mainly due to the

inclusion of non-affiliates in the overall sample, though panel members also show a decline in knowledge. Line 1.3 shows that very few people feel they know how AFP benefits are calculated, with 14% of the panel in 2002 falling to 11% two years later. Almost two-thirds of respondents claim to know the rules for spouse and dependent benefits, but again the percentages fall between years for the same panel sample. It must be acknowledged that many are simply unaware of the social insurance coverage that their spouses and children receive when the worker contributes to the AFP system.

Also of interest is the question of whether respondents know about requirements for the minimum pension guarantee as well as the benefit level. Some pundits have suggested that requiring 20 years of contributions for eligibility might induce workers to drop out of formal sector jobs, and recently some analysts have opined that the minimum benefit might need to be raised (Rother 2006). Our EPS research shows (lines F2) that few respondents in 2002 knew the requirements for the minimum pension benefit, and only a very tiny minority can accurately report the requirements for the minimum pension guarantee (0.2% or fewer). Regarding financial literacy, there was an increase in the panel's awareness of the minimum pension between 2002 and 2004, rising from 22 to 34% , but the accuracy of their knowledge declined.

The final section of Table 8 focuses on what respondents know regarding the welfare (PASIS) benefit, which is a means-tested payment to the indigent. It is interesting that about 20% of the respondents in both years claim they know the eligibility requirements, with no important difference between affiliates and nonaffiliates in 2004 (new affiliates know the least). Further, only 3-4% of the respondents actually know what the correct eligibility requirements are for these payments. Similarly, a relatively large percent (~17%) claims to know the value of the welfare payment, but only about 11% actually knows. While those most likely to need the PASIS benefit, namely the nonaffiliates, are no more likely to be aware of this safety net than others, they are better informed about the welfare benefit level than their affiliated counterparts. This may suggest that those most likely to need this program are somewhat more cognizant of it.

Among retirees, knowledge is generally more accurate than among workers. Most people who are retired according to administrative records also self-report they are retired (84%). Some two-thirds of the retirees know what kind of pension they are receiving, and about 64% know the benefit amount (+/-20%), though the retired tend to report smaller amounts than are indicated by the administrative data. Using the EPS, we can compare respondent questions about payouts

with the administrative records. Comparing those having both self-reports and administrative data linkage, and focusing first on those who say they took the programmed withdrawal payout option, Panel A indicates that beneficiaries understate the value of their payouts by about 7%. That is, at the median, retirees self-reported benefits of only \$69,000 pesos, compared to \$74,000 from the administrative records. For those receiving life annuities, the degree of understatement was even more substantial, with retirees reporting benefits about 10% lower than actually paid. The degree of overstatement was less at the low end. Panel B shows that retirees who said they knew what type of income they received generally had lower actual benefits than the uninformed. Official data in Panel C show that, as of December 2005, the Chilean pension system had some 377,000 old-age retirees, of whom almost 70% were receiving benefits in the form of a life annuity.²⁵

IV. Implications and Conclusions

It is fitting that the Chilean pension reform is receiving much attention as it celebrates its Silver Anniversary. But despite this attention and continued debate about the system's impacts, there has been little attention to microeconomic aspects of the new retirement program. We have introduced a recently-developed longitudinal survey of about 20,000 individual respondents that we have undertaken, the Social Protection Survey (*Encuesta de Previsión Social* or EPS), initiated in 2002 with subsequent biennial survey waves. This data set provides valuable new information for microeconomic analyses of key aspects of the Chilean pension system, that is strengthened further by the links that we have made between respondent records and a wide range of historical administrative files on contribution patterns, benefit payments, and other program features. Accordingly, the EPS represents a substantial advance for analysts interested in important micro questions related to the operation of the new Chilean retirement system.

To illustrate some of the richness of the new information available, this paper presents new analyses regarding three key policy questions:

1. *Who participates in the Chilean retirement system, and what do lifetime contribution patterns look like?* We find that on average, men report almost 40% higher months of AFP contributions than women, which is not surprising given that many women interrupt their labor force careers to rear children. Men report about a fifth and women report about a quarter higher months of

²⁵ This confirms recent findings by James et al. (2006) on payouts under the Chilean pension system.

contributions than indicated in the administrative records, which suggests that self-reports underestimate the extent of shortfall in coverage for sufficient months to satisfy the 20 year minimum contribution requirement for the state-guaranteed minimum pension (MPG) for participants in the AFPs, somewhat more so for women. The probable extent of dependence on the PASIS, thus, is greater than would be indicated by self reports. Also not surprising, there is a positive relation between reported months of AFP contributions and age, with on average an increase in reported months of contribution of a third of a month for every additional month of age over the prime working years between 26-30 and 51-55 years of age. Somewhat surprisingly, self-reports do not differ with schooling attainment; in contrast, the administrative records indicate a positive association with schooling attainment, at least for those who have completed high school or higher levels. Thus self reports are likely to somewhat overstate the relative extent to which those with less schooling are likely to satisfy the 20 year minimum contribution requirement. Spells of reported noncontributions, finally, are strongly associated with nonemployment – which suggests that to increase coverage, efforts might best be directed towards reducing these nonemployment spells.

2. What have people accumulated in the Chilean retirement system, and what benefits may be anticipated? Earlier analysis of the 2002 EPS show that reported contributions must cover fairly high percentages of the work life to have replacement rates of over half (e.g., 80% of 65 year old man's work life in order to have a replacement rate of 60%). With drops in the percentage of the work life in which contributions are made, the replacement rate falls on average by as many or more percentage points. Our findings in this paper show that the EPS respondents who claim to know their AFP accumulations report balances that are close to those in the administrative records. But those who do not claim to know their AFP balances according to the administrative records have much lower balances on average than those who claim to know. Our findings also indicate that for respondents entitled to Recognition Bonds from when they transitioned into the new system, such bonds are worth on average about as much as their AFP assets. Therefore it is important that assessments of their probable financial position upon retirement include the Recognition Bonds in addition to their AFP balances.

3. How financially knowledgeable are Chileans about their retirement system?

While about two thirds of AFP member respondents affirm that they receive periodic reports on past contributions and projected future benefits, much smaller proportions know

critical details such as payroll tax rates and commission rates. That such a small percentage of AFP contributors know the latter suggests that work is needed to increase the effective competition among AFP providers. The majority of AFP plan participants also do not know their AFP balances or details on the multifund system, or the details of the eligibility requirements for minimum pensions. On the other hand, among those who claimed to know their AFP balances, they appear better informed about their accumulations than their US counterparts in corporate pensions, and the fraction of respondents who claimed to know their AFP balances increased between 2002 and 2004. We also know that knowledge about retirement benefits is far from perfect. Most of the retirees according to administrative records also report they are self-retired. Only two-thirds of the pensioners know what kind benefit they receive, and 64% know the amount of the benefit (+/-20%). In other words, it appears that information gaps are considerable, which must limit the effectiveness of the system.

Ultimately, to build a more resilient pension system, it is likely that people will need a better appreciation of exactly what is required for eligibility to each of the pillars. Also, greater financial literacy will be essential in enhancing the contribution and investment patterns. Moreover, much greater knowledge of commissions and related matters is essential for making the AFP system more competitive. Further, in order for the government to make useful budgetary projections better data are needed on who is in the system, who is contributing and who is likely to try to obtain MPG and/or PASIS.

If the system is to survive to its Golden Anniversary or longer, it will also have to be politically resilient. This will be difficult if relatively few Chileans obtain AFP benefits or if replacement ratios prove low. There probably will be pressure to raise MPGs and PASIS pensions, with negative fiscal implications. If people do not accumulate much, there probably will be pressure to allow phased withdrawals instead of annuitizing the payoffs, which also poses risks for the government.

It is essential, of course, in this stock-taking at the Silver Anniversary of the new Chilean pension system to recognize that the system is still very young, and in transition. Most people retiring now were actually not covered by the new system over their entire worklives; rather, today's retirees continue to rely heavily on Recognition Bonds, and relatively less on AFP accumulations. What is unknown is how well future retirees will do who spend their entire lives under the new system. Our initial analysis of the Encuesta de Proteccion Social suggests both

the value of further analysis and some concerns noted above that should be addressed to help the system to become more effective and efficient.

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Table 1: Pension System Contribution Patterns: 1975-80
(percentages)

Year	Contributors/Employment			Contributors/Labor Force		
	AFP	INP	Total	AFP	INP	Total
1975	NA	71.2%	71.2%	NA	61.9%	61.9%
1980	NA	53.3%	53.3%	NA	47.8%	47.8%
1985	44.0%	12.8%	56.9%	38.8%	11.3%	50.1%
1990	50.6%	8.1%	58.7%	46.8%	7.5%	54.4%
1995	57.2%	5.5%	62.7%	53.5%	5.1%	58.6%
2000	59.4%	4.2%	63.6%	54.5%	3.9%	58.4%

Source: Derived from Arenas de Mesa, Berhman, and Bravo (2004)

NA: Not applicable

Table 2: Pre-1980 Old-Age System Revenues and Expenditures: 1974-1980

Year	Revenues	Expenditures	Deficit	Revenues	Expenditures	Deficit
	<i>(millions of 2003 pesos)</i>			<i>(percent of GDP)</i>		
1974	344,523	698,866	-354,342	3	6.2	-3.1
1975	310,985	422,261	-111,276	3.4	4.6	-1.2
1976	360,509	662,877	-302,369	3.4	6.2	-2.8
1977	454,651	831,933	-377,282	3.6	6.7	-3
1978	556,642	1,027,681	-471,039	3.7	6.8	-3.1
1979	937,063	1,241,874	-304,811	5.2	6.9	-1.7
1980	1,017,362	1,336,172	-318,81	5.5	7.2	-1.7

Sources : Marcel and Arenas de Mesa (1992); Central Bank of Chile (BCCH).

Table 3: Cumulative Value and Rates of Return on Chilean Pension Fund Assets: 1981-2003

Year	Pension Fund Assets under Management		Returns on Fund Assets
	Value	% of GDP	Average yearly real return
	(millions of current pesos)		(percent)
1981	11,695	0.9	12.8
1982	44,495	3.7	28.5
1983	99,474	6.5	21.3
1984	159,576	8.4	3.6
1985	281,807	10.3	13.4
1986	433,377	12.7	12.3
1987	644,728	14.1	5.4
1988	885,875	14.7	6.5
1989	1,329,268	17.5	6.9
1990	2,244,481	23.3	15.6
1991	3,769,243	29.7	29.7
1992	4,736,462	29.4	3
1993	6,830,788	35.4	16.2
1994	8,983,563	38.8	18.2
1995	10,230,990	36.1	-2.5
1996	11,555,632	37	3.5
1997	13,405,826	38.6	4.7
1998	14,552,547	39.8	-1.1
1999	18,093,003	48.7	16.3
2000	20,343,371	50.1	4.4
2001	22,955,974	52.8	6.7
2002	25,227,058	54.4	3
2003	29,176,611	58.6	10.5
1981–1991			14.2
1991–2003			8.7
1981–2003			10.4

Source: Arenas (2005)

Table 4: Distribution of Investment Portfolio: 1981–2003
(percentages of total investments)

Year	Govern-ment	Financial Institutions a	Nonfinancial institutions b	Equities c	Mutual funds and others d	Foreign Assets e	Other f
1981	28.1	71.3	0.6	0	0	0	0
1985	42.4	56	1.1	0	0	0	0.5
1990	44.1	33.4	11.1	11.3	0	0	0.1
1995	39.4	22.4	5.2	30.1	2.6	0.2	0.1
2000	35.7	35.1	4	11.6	2.5	10.8	0.2
2003	24.7	26.3	7.7	14.5	2.9	23.8	0.1

Note: Totals should sum to 100 percent except for rounding error.

a. Financial sector less the equities of financial institutions.

b. Business firms less equities and quotas o f investment funds.

c. Stocks of financial institutions plus those of the business sector.

d. Investment funds of the business firms plus others from the external sector.

e. Foreign issuers less others from the external sector.

f. Disposable assets.

Source : Derived from Arenas (2005)

Table 5: Contribution Patterns to the Chilean Retirement System by Sex, Age, and Education: Number of Months Contributed by EPS 2002 Respondents

A. Respondents with Linked Records: Months of AFP Contributions Only

	Mean Self-Report	Mean Admin	Ratio Self/Admin	N
Total	113	90	126%	12108
<i>By Sex</i>				
Men	129	103	125%	6722
Women	94	73	127%	5386
<i>By Age</i>				
18-20	12	13	97%	208
21-25	32	27	117%	1252
26-30	64	51	123%	2013
31-38	107	84	128%	3190
39-45	150	114	131%	2571
45-50	161	129	125%	1257
51-55	170	141	121%	964
56-60	169	141	120%	653
<i>By Education</i>				
< Elem	114	82	139%	2064
< HS	112	83	135%	3267
HS	110	88	126%	3725
>HS	117	103	113%	3052

B. All Respondents: Months of Contributions to All Retirement Systems

	Mean Self-Report*	N	Mean Self-Report**	N
Total	121	12128	120	13397
<i>By Sex</i>				
Men	137	6728	136	7330
Women	101	5400	100	6067
<i>By Age</i>				
18-20	12	213	11	245
21-25	33	1255	33	1319
26-30	66	2016	65	2057
31-38	112	3193	111	3271
39-45	161	2575	156	2781
45-50	176	1259	169	1459
51-55	185	964	174	1251
56-60	184	653	166	1014
<i>By Education</i>				
< Elem	126	2065	122	2629
< HS	120	3276	118	3625
HS	117	3733	117	3938
>HS	122	3054	122	3205

Source: Authors' computations from the EPS 2002 and administrative records linked with EPS respondents.

Notes: EPS respondents in 2002 age 18-60; all results weighted.

*Respondents with a linked administrative record; ** All EPS 02 respondents

Number of months of contributions counted from the date of the first self-reported contribution to AFP system.

**Table 6: Pattern of Contribution Months to All Retirement Systems
by Sex, Age, and Education: Labor Market Status at Time of Contribution**

	Mos While Working	Mos While Unemployed	Mos While NILF	N	% of Months Contributing of Months in that LF Status			
<i>By Sex</i>					<i>Working</i>	<i>Unempl.</i>	<i>NILF</i>	<i>Wage Wkr</i>
Men	135	0.5	0.7	7330	78.72%	5.44%	3.67%	89.30%
Women	97	0.6	2.2	6067	81.86%	4.00%	2.92%	90.56%
<i>By Age</i>								
18-20	10	0.1	0.3	245	80.92%	1.95%	3.86%	81.69%
21-25	32	0.2	0.4	1319	82.26%	2.79%	1.91%	86.31%
26-30	65	0.2	0.6	2057	80.89%	2.48%	1.47%	86.87%
31-38	110	0.4	1.2	3271	77.89%	3.28%	2.40%	87.63%
39-45	154	0.6	1.4	2781	79.32%	4.68%	3.24%	89.93%
45-50	166	1.0	2.1	1459	79.87%	11.04%	5.98%	91.65%
51-55	171	1.2	1.6	1251	82.03%	7.56%	4.55%	93.30%
56-60	161	0.8	4.1	1014	82.73%	4.70%	7.39%	93.54%
<i>By Education</i>								
< Elem	119	1.0	1.8	2629	71.34%	5.49%	2.41%	85.29%
< HS	116	0.6	1.4	3625	76.07%	4.59%	3.59%	88.22%
HS	116	0.4	1.2	3938	84.09%	4.30%	3.31%	91.29%
>HS	121	0.3	1.4	3205	85.96%	4.27%	2.92%	92.26%

Source: Authors' computations from the EPS 2002 and administrative linked data.

Notes: EPS respondents in 2002 age 18-60; all results weighted.

NILF = not in labor force.

Number of months of contributions counted from the date of the first self-reported contribution to AFP system.

**Table 7: Retirement Balances Accumulated Under the AFP and Recognition Bonds:
Self-Report vs Administrative Records**

A. Individual Account Balances, AFP System: Self Report vs Administrative Records

(04 Chilean Pesos)

	<i>For Those with a Self-Reported AFP Balance</i> (N=4,677)				<i>Doesn't Know</i> (N=7,686)	<i>Total</i> (N=12,363)
Percentile	Self-Report Amt	Admin. Amt	Diff	Percentage	Admin. Amt	Admin. Amt
p25	820,000	906,000	-86,000	-10	126,400	324,100
p50	3,000,000	2,929,800	70,200	2	742,600	1,529,000
p75	8,000,000	7,087,800	912,200	11	2,567,400	4,575,100

B. Individual Account Balances Plus Recognition Bonds: Administrative Records Only

(04 Chilean Pesos; N=2,458)

Percentile	AFP Balance	Bond	Total
p25	86,800	748,857	5,800,972
p50	4,263,400	4,491,373	12,700,000
p75	10,700,000	13,000,000	23,800,000

C. Individual Account Balances For Those with No Recognition Bonds: Administrative Records Only

(04 Chilean Pesos; N=9,905)

Percentile	AFP Balance
p25	341,700
p50	1,293,000
p75	3,561,700

Source: Authors' computations from the EPS 2002 and administrative linked data.

Notes: EPS respondents in 2002 age 18-60; all results weighted.

Table 8: Knowledge of Chilean Pension System Attributes

Variable	2002 Survey				2004 Survey					
	All respondents		2002 Affiliates		All respondents		2002 Affiliates		2004 New Affiliates	
	%	n	%	n	%	n	%	n	%	n
A. Receipt of AFP statement										
1.1 Receives AFP statement	60.7	12367	60.6	5942						
1.2 Received AFP statement past 12 mos					69.2	10131	68.8	9324	74.3	807
B. Knowledge Regarding Contributions										
1. Claims knows AFP amt contrib	52.2	13397	51.5	10659	38.0	13711	46.2	10009	39.9	828
2. Gave correct amt AFP contrib	28.0	13397	27.0	10659	30.9	13711	34.3	10009	34.9	828
C. Knowledge Regarding Prices (Commissions)										
1. Claims knows Fixed AFP commiss	1.5	12367	1.5	9805	1.7	10131	1.7	9324	1.5	807
2. Claims knows Var AFP commiss	2.7	12367	2.5	9805	2.1	10131	2.1	9324	1.7	807
3. Claims knows both commissions	0.6	12367	0.5	9805	0.5	10131	0.5	9324	0.5	807
D. Knowledge Regarding Accumulations										
1. Claims knows AFP accum	44.9	12367	45.5	9805	52.7	10131	53.7	9324	42.1	807
2. Gave correct amt AFP accum (+/-20%)					21.6	10124				
E. Knowledge Regarding Investments										
1. Knows how pension funds are invested (c	10.3	12367	9.9	9805						
2.1. Knows about multifunds					47.4	10131	47.5	9324	46.8	807
2.2. Knows how many are the multifunds					32.8	10131	33.1	9324	30.3	807
2.3. Knows correctly number of multifunds					20.2	10131	20.2	9324	20.4	807
2.4. Knows his/her type of fund					32.8	10131	33.1	9324	28.9	807
2.5. Knows correctly his/her type of fund					15.8	10131	16.1	9324	13.0	807
2.6. Knows the riskier fund					38.1	10131	38.8	9324	30.0	807

Table 8 (cont)

Variable	2002 Survey				2004 Survey							
	All respondents		2002 Affiliates		All respondents		2002 Affiliates		2004 New Affiliates		2004 Non-Affiliates	
	%	n	%	n	%	n	%	n	%	n	%	n
<i>F.1. AFP System</i>												
1.1. Knows Female legal retirement age	83.2	13397	82.8	10659	76.5	13711	79.0	10009	73.3	828	68.5	2874
1.2. Knows Male legal retirement age	86.1	13397	85.9	10659	80.0	13711	82.7	10009	77.0	828	71.4	2874
1.3. Knows how AFP calculates pensions	14.2	12367	13.8	9805	9.3	13711	11.1	10009	8.3	828	3.5	2874
1.4a. Claims spouse gets survivor pension benefit	66.4	13397	66.7	10659	65.2	9755	64.1	7319	61.0	384	69.8	2052
1.4b. Claims spouse gets survivor pension benefit */	69.3	9931	69.6	7910	66.1	9037	64.9	6818	62.6	287	71.1	1932
1.5a. Claims kids get survivor pension benefit	61.4	13397	60.9	10659	32.8	11061	40.7	8272	30.5	444	5.3	2344
1.5b. Claims kids get survivor pension benefit */	61.4	13397	60.9	10659	33.3	10599	41.3	7944	33.0	387	5.1	2268
<i>F.2. Guaranteed Benefits</i>												
2.1. Claims knows reqs for min pen	22.2	13397	22.5	10659	31.1	13711	34.3	10009	19.8	828	23.2	2874
2.2. Knows reqs for min pen	0.2	13397	0.2	10659	0.2	13711	0.2	10009	0.1	828	0.2	2874
2.3a Knows there's minimum pension					44.9	13711	49.0	10009	38.1	828	32.9	2874
2.3b Claims knows min pension amt	20.3	13397	21.0	10659	32.8	13711	36.0	10009	25.9	828	23.9	2874
2.4. Gave correct value min pension amt	4.9	13397	5.1	10659	3.4	13711	3.7	10009	2.5	828	2.6	2874
<i>F.3. Welfare Benefits</i>												
3.1. Claims knows reqs for welfare pension	19.3	13397	20.3	10659	19.6	13711	20.5	10009	12.3	828	18.4	2874
3.2. Gave correct reqs for welfare pension	2.7	13397	2.7	10659	3.8	13711	4.0	10009	1.4	828	3.9	2874
3.3. Claims knows welfare pension amt	17.0	13397	18.0	10659	17.5	13667	17.8	9972	10.4	828	18.6	2868
3.4. Gave correct amt welfare pension	11.2	13397	11.9	10659	11.9	13667	11.5	9972	6.9	828	14.6	2868

Notes:

1. Affiliation Status comes from administrative data

2. Sample is restricted to population 18-60 (ages in year 2002)

*/ 2002 and 2004 surveys have different questions making VI.1.4 and VI.1.5 not comparable.

*/ VI.1.4b and VI.1.5b apply to more comparable subsets of people among 2002 and 2004 surveys

n=refers to number of people who were asked the question

Source: Authors' calculations from respondents to SPS 2002 and 2004 surveys.

**Table 9: Pensions Under the AFP System
Self-Report vs Administrative Records**

A. Pensions, AFP System: Self Report vs Administrative Records*

(04 Chilean Pesos)

	<i>For Those with Self-Reports and Administrative records in AFP Phased Withdrawal (Median of the percentile) (N=148)</i>			
Percentile	Self-Report			
	Amt	Admin. Amt	Diff	Percentage
p25	65,000	60,667	4,333	6.7
p50	69,420	74,175	-4,755	-6.8
p75	70,000	74,883	-4,883	-7.0

	<i>For Those with a Self-Reports and Administrative records in AFP Life Annuity (Median of the percentile) (N=604)</i>			
Percentile	Self-Report			
	Amt	Admin. Amt	Diff	Percentage
p25	70,000	73,454	-3,454	-4.9
p50	85,000	93,041	-8,041	-9.5
p75	130,000	142,361	-12,361	-9.5

B. Pensions in the AFP System: Knowledge **

<i>For Those with Self-Reports and Administrative records in AFP</i>		
	%	N
B.1. Know that have a retirement pension	84.4	1,092
Life Annuity	92.8	702
Phased Withdrawal	72.6	440
Temporary Income	95.5	64
Median pension of those that know	78,602	
Median pension of those that don't know	129,430	
B.2. Claim Knows his/her type of pension	82.0	911
Life Annuity	89.4	648
Phased Withdrawal	68.1	308
Temporary Income	92.4	60
Median pension of those claim know	81,126	
Median pension of those claim don't know	92,256	
B.3. Know correctly his/her type of pension	66.0	911
Life Annuity	74.9	648
Phased Withdrawal	52.1	308
Temporary Income	73.2	60
Median pension of those correctly know	91,085	
Median pension of those claim don't know correctly	110,998	
B.4. Know his/her amount of pension (+/-20%)	63.9	676
Life Annuity	68.2	539
Phased Withdrawal	57.0	179
Median pension of those that know his/her amount of pension	91,760	
Median pension of those that don't know his/her amount of pension	121,013	

Source: Authors' computations from the EPS 2002 and administrative linked data.

* Old Age Pension, Phased Withdrawal and Annuities

** Panel 2002-04, Old Age Pension include Phased Withdrawal and Life Annuity

C. Number of benefits in the AFP System : Official Figures

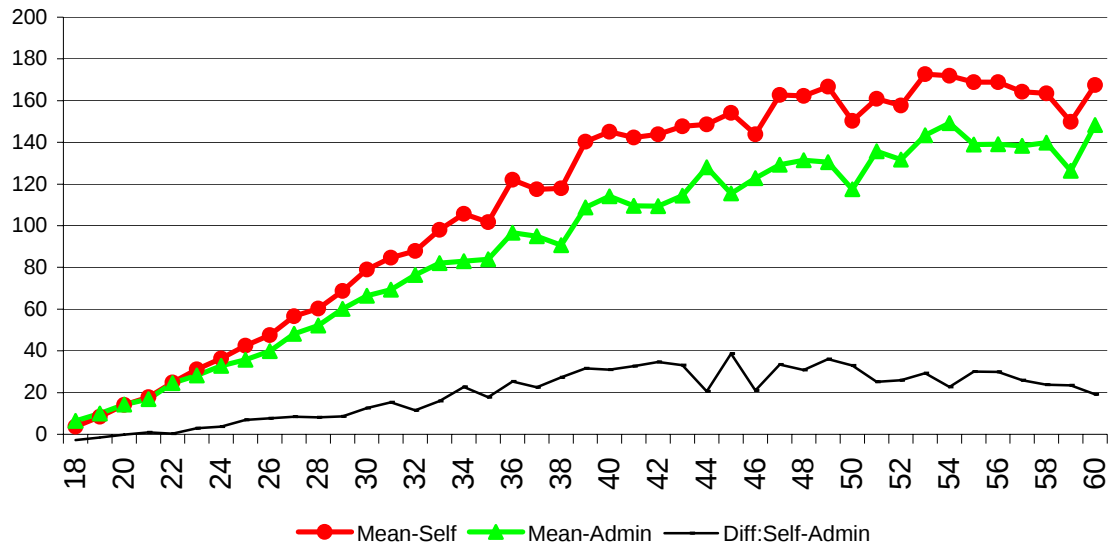
	Old Age			Disability			Survival		
	Phased	Life	Temporary	Phased	Life	Temporary	Phased	Life	Temporary
1990	16,893	12,689	84	4,095	2,645	45	15,176	4,857	19
2000	76,710	142,446	6,217	12,045	7,840	396	55,229	38,402	19
2005	115,236	256,107	5,786	22,496	14,475	1090	71,057	62,507	40

Source: SAFP

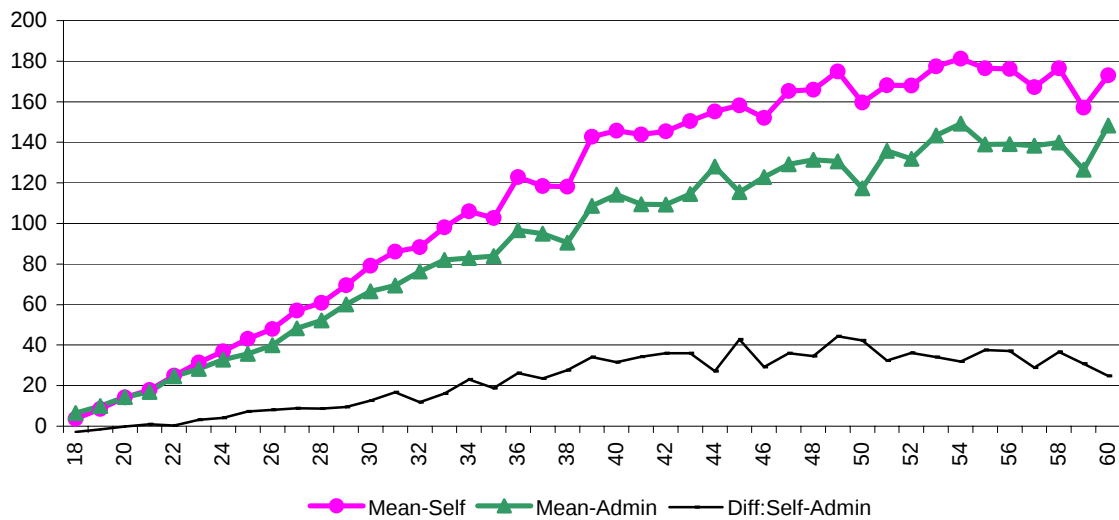
**Figure 1: Contribution Patterns to the Chilean AFP System by Age:
Self-Reported vs Administrative Records**

A. Months of Contributions to the AFP System

I



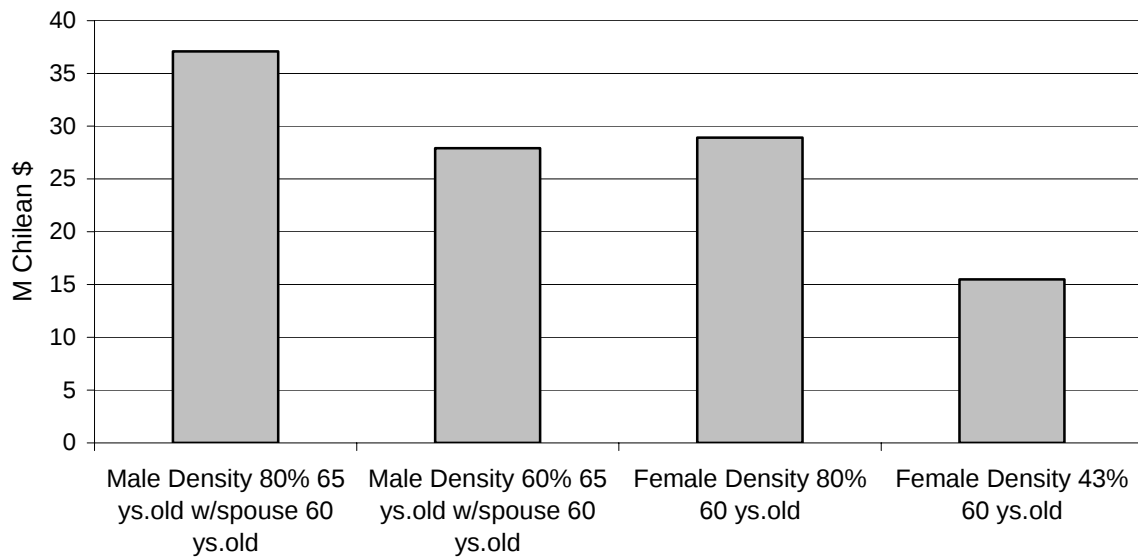
B. Months of Contributions to All Retirement Systems



Source: Authors' computations; EPS '02 respondents age 18-60 with linked administrative record; All results weighted; N=11,305.

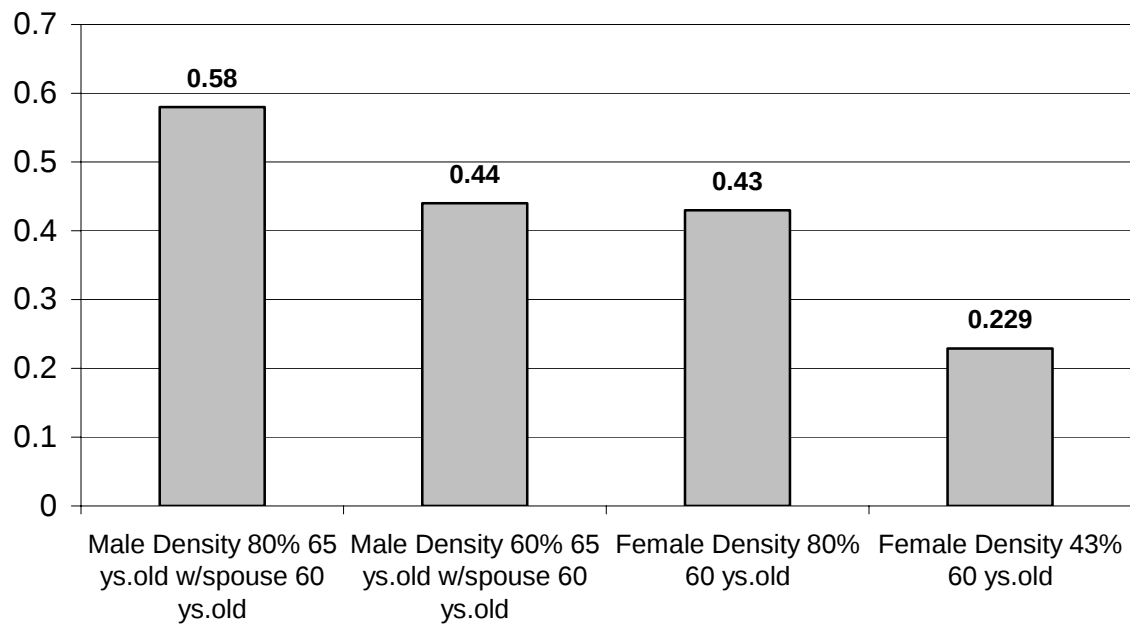
Notes: Number of months of contributions counted from the date of the first contribution to any AFP

**Figure 2: Projected Accumulations in AFP Accounts at Retirement Age
Given Alternative Density of Contribution Assumptions**



Source: Arenas de Mesa, Behrman, Bravo (2004)

**Figure 3: Projected Replacement Rates
Under Alternative Density of Contribution Assumptions**



Source: Arenas de Mesa, Behrman, Bravo (2004)