

CHILE'S PENSION REVOLUTION COMING OF AGE*

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Abstract

At age 18, Chile's pension revolution – exported throughout Latin America and beyond – is entering adulthood. Tested by vastly different macroeconomic, financial, and political environments during 1981-1999, the radical overhaul of Chile's pension system is paying off. Capital and labor markets operate more efficiently and national saving, TFP growth, and aggregate growth have increased. But the largely privately-managed and strictly regulated fully-funded pension system also shows some flaws regarding its microeconomic incentives and performance. This paper takes stock of the Chilean pension system's accomplishments and shortcomings. It provides a quantitative assessment of the pension reform's macroeconomic and growth benefits and a qualitative review of its microeconomic problems, pointing out areas of necessary reform.

KEYWORDS: Pension System, Social Security, Growth.

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1. A BRIEF HISTORY: FROM PUBLIC PAY-AS-YOU-GO TO PRIVATE FULLY-FUNDED PENSIONS

Chile started in 1924 a mandatory pension system organized around private and state-managed social-security institutions (SSIs) for particular groups of workers.¹ Originally designed as fully-funded pension schemes, pension reserves were depleted over the years as a result of restrictive investment policies and low returns, unsustainable contribution-to-benefit ratios, and use of reserves to finance other benefits including health services, family allowances, and subsidized mortgage loans provided to some contributors. Heterogeneity of pension regimes, contributions and benefits, inter and intra-generational redistribution, and efficiency among SSIs was large, reflecting differences among participating groups in their political weight in securing special benefits provided by ad-hoc laws or administrative/budgetary decisions granted by the executive.

In 1952 a significant pension reform took place, replacing the nominal FF system by an explicit adoption of PAYG and defined-benefit pension schemes administered by existing SSIs. Other changes involved separation of health and pension programs, major increases in contribution rates, and explicit adoption of defined-benefit formulas based on high replacement of pre-retirement wages and differential mandatory retirement ages for men and women. In the absence of hard budget constraints imposed on the SSIs, the political system was vulnerable to major lobbying efforts by organized labor to raise pension benefits beyond contributions. Indeed this occurred during the next decades, when SSI deficits were covered by government transfers.

The reform of 1952 was also unsuccessful in reducing the disparity in pension contributions and benefits across SSIs, across cohorts within any given SSI, or across individuals within any given cohort. Chile's PAYG system was bad at reaching the old-age poor but very effective in benefiting massively the first cohorts of pensioners and those that benefited from subsidized credit programs financed by early pension surpluses -- mostly middle-class contributors. High and variable inflation exacerbated the effects that frequent changes in pension contributions and benefits had on worker uncertainty about their future pension benefits. Blatant inefficiency in SSI management -- reflected in high administrative costs and bad customer service -- were added to the structural problems of Chile's old PAYG system.

This dismal view of Chile's PAYG system -- beset by large inequities, inefficiencies, and rising fiscal and macroeconomic costs -- led to various reform proposals made in the 1960s and 1970s, i.e., during democratic governments. However, Chile's actual pension reform took place only in 1979-1980, designed and implemented by a group of economists headed by Labor Minister José Piñera under the military government of Pinochet. The reform's underlying diagnose was broadly in line with the previous reform proposals. However the reform departed from the preceding proposals by implementing a system comprising full funding of the main pension pillar, full privatization of pension services,

¹ Excellent accounts of the history of Chile's pension system and the 1980 pension reform can be found in Wallich (1983) and Diamond and Valdés-Prieto (1994).

full separation between the redistributive and old-age saving functions, and devolution of all relevant pension decisions to individual participants. In fact, Chile's new pension system implies a revolutionary departure not only from the country's history but also from all mandatory pension schemes existing in the world in 1980. Moreover Chile's pension reform has been the most radical of all pension reforms adopted worldwide since the 1980s.

The reform took place in two stages. In the first stage (in 1979) the existing PAYG system was overhauled by adopting uniform indexation mechanisms for all pensions and, most important, by substituting minimum retirement ages (60 for women and 65 for men) for lower retirement ages and generous retirement rules based on years of work. The latter change reduced dramatically the government's implicit PAYG debt, without changing the fundamentals of the existing system but reducing dramatically the cost of any subsequent systemic reform.

Stage 2 came in 1980 with the adoption of a radically different pension system, to be started in May 1981. The new pension law (DL 3500) implemented a gradual transition from the preceding "one-pillar" to a new "three-pillar" pension system² (Table 1). Clear separation of the redistributive and old-age saving functions of the pension system was accomplished by completely delinking the first and second pension pillars.

2. THE PILLARS

2.1 Main features of the pension pillars and their interactions

First pillar

The first pillar is comprised by two means-tested government transfer programs targeted at the old-age poor, designed as complements to the second pillar. First, the elderly poor that have not participated in any pension system are entitled to a means-tested assistance pension, at approximately US\$ 56 per month or 12% of the average taxable monthly income in 1998. Second, participants in the second-pillar pension system are benefited by an option or minimum-pension guarantee, that is a government-financed supplement to their pension savings at retirement in order to achieve a minimum pension level, at approximately US\$ 126 per month or 26% of the average taxable monthly income in 1998. Second-pillar participants are not entitled to receive only the minimum pension, not on top of the assistance pension.

Complete separation on the financing side of the first pension pillar from the second pillar is ensured as both government assistance programs are financed by general government revenue -- not by worker contributions. However the minimum pension guarantee implies a potentially important disincentive effect (a 100% implicit tax on voluntary saving returns in excess of mandatory pension saving), at least for those income groups that are close to the eligible minimum pension level. 65-year old men and 60-year old women are entitled to the minimum pension supplement if they have contributed

² Here we use the World Bank terminology introduced by the now classical Old-Age Crisis report (World Bank 1994), whose proposed three-pillar structure was very much modeled on the Chilean reform of 1981.

continuously to any pension system for at least 20 years and if they have not any other income in excess of the minimum pension level. In Chile, however, government identification of non-pension wealth of contributors claiming a minimum pension at retirement is probably not very effective. Hence the disincentive effect is lessened, at the cost of raising substantially the fiscal cost of the minimum pension guarantee, as discussed in section 3.

Table 1: Chile's Old and New Pension Systems

Old System (1924 - 1981; gradual extinction after 1981)

One Pillar

- PAYG defined-benefit system managed by state SSIs with heterogeneous costs and benefits

New System (Gradual transition since 1981)

Three Pillars

First Pillar (Old-Age Re-distribution and Insurance)

- Assistance pension for non-participating old-age poor, means tested
- Minimum pension guarantee for participating old-age poor, means tested

Second Pillar (Old-Age Saving and Insurance)

- Defined contributions
- Individual pension accounts
- Private industry of pension fund managers and insurance companies
- Strong government regulation and supervision
- Government guarantees on pension fund assets and rates of return

Third Pillar (Voluntary Old-Age Saving)

- Tax incentives on complementary voluntary saving for old age
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Second pillar

The new and dominant second pillar embodies a radical departure from the previous one-pillar system. The new defined-contribution scheme is based on participant contributions to pension funds invested in financial assets. Second-pillar participants hold individual pension accounts that register their contributions and pension fund returns net of management fees paid to pension fund management companies, termed AFPs (the acronym for "Administradora de Fondos de Pensiones" or pension fund management company). AFPs are private providers of pension services during the active life of pension system participants. They are specialized financial companies that are separate legal entities from the pension funds they manage. AFP participants belong to three groups: contributing workers, non-contributing workers, and pensioners under the phased-withdrawal pension option. AFPs provide the following services to participants: collection of contributions, pension fund investment, record keeping, and information provision. Participants are entitled – and forced – to choose one among all AFPs at an individual level – neither their unions nor their employers are allowed to negotiate on their behalf. Participants are currently entitled to switch AFP every 5 months.

Retirement age is generally 65 for men and 60 for women but each participant is entitled to bring forward retirement (if she has accumulated sufficient pension savings to finance a benchmark pension level) or postpone retirement (if she decides to continue working). At retirement the worker has access to her full cumulative pension savings and faces two choices. Her first option is a phased pension capital withdrawal for a pre-determined number of years (at a rate of return formula defined by law), choosing among AFPs that provide this post-retirement service on a fee basis. The second option involves buying a pension annuity from an insurance company. Survival risk associated to the first option is capped by retaining the option of accessing to the government minimum pension once the retirement pension capital is exhausted.

Third pillar

The system's third pillar is comprised by tax incentives provided to two types of voluntary savings beyond mandatory retirement savings. The first category is voluntary additional contributions deposited jointly with the mandatory contribution. This additional retirement saving benefits from the same tax treatment of mandatory contributions, that is, income tax exemption on both principal and returns but pension benefits are treated as any other form of taxable income. The second category is voluntary additional contributions to a separate, second individual account at the AFP of the first choice; here the principal is not tax exempt but returns are. Funds can be withdrawn at any time from the second account; therefore this is a general saving incentive, not specific to retirement savings albeit managed by an AFP. There are additional tax incentives on specific savings instruments in Chile but they are totally unrelated to retirement savings.

Regulation, government guarantees, and supervision

Pension funds, the AFP industry, and pension annuities paid by insurance companies are heavily regulated and tightly supervised by specialized government agencies. Pension fund investment by AFPs is strongly regulated by portfolio ceilings imposed on specific asset classes, specific issuers, companies related by ownership to the corresponding AFP, and investment by an individual AFP in a specific company. Investment of reserves for pension annuities by life insurance companies are subject to similar portfolio regulations.

AFPs and life insurance companies are subject to regulations on minimum capital (debt-equity ratios) and pension fund reserves. AFPs are required to hold a guarantee fund on 1% of pension fund assets to finance any difference between their managed pension fund's annual real rate of return and the larger of 2% and 0.5 times the industry average pension fund return. If replenishment of the guarantee fund in case of required withdrawal by the AFP is not achieved within 15 days, the AFP license is revoked and the pension fund is sold to other AFPs or a new market entrant. If the AFP guarantee fund is depleted an ultimate government minimum-return guarantee is triggered, covering any return shortfall by government revenue. The AFP guarantee fund has been used only twice by AFPs due to shortfalls in their pension fund returns and the ultimate government guarantee has never been used since 1981.

A second government guarantee is on pension annuities managed by life insurance companies. The government guarantees 100% percent of the annuity up to the level of the minimum pension and 75% above that level. This guarantee has been exercised once, when a life insurance company went bankrupt in 1984.

Strong supervision of the AFP and life insurance industries is exercised by the Superintendency of AFPs and the Superintendency of Securities and Insurances. Both institutions monitor closely financial performance and compliance of regulations of all firms and are also actively involved in administrative and legal changes of the existing regulatory and supervisory framework. In fact, regulation of the privately managed pension industry has evolved significantly since the initial law of 1980 – at any point in time at least one pension industry reform proposal is considered by Congress.

Systemic transition

Instead of mandating a discrete shift by all active contributors from the existing state-run PAYG scheme to the new privately-managed FF system, the reform allowed for a long, gradual, and partly endogenous transition. A half-century long transition has two advantages: it is easier to implement administratively and it allows to spread out over 50 or more years the fiscal costs of the reform.

PAYG pensioners in 1980 remained in the old system. Active contributors to PAYG were allowed to choose among staying in the old system or switching to the new scheme. Their affiliation to the new system was strongly encouraged by a significant decline in pension contributions (from an average close to 20% of taxable income under PAYG to a flat 10% under FF, subject to a monthly wage ceiling currently at ca. US\$ 1,900. The 10% reduction in pension contribution rates was added to take-home pay, hence providing a massive incentive for most contributors. Shifting to the new system was also encouraged by government information and AFP marketing campaigns (that emphasized, in addition to the gains in take-home wages, the expected increase in pension fund returns in comparison to PAYG returns).

New labor market entrants are forced to participate in the new FF system -- a feature that implies that the old PAYG system is extinguished after the last active participant in the PAYG system passes away at some point after the year 2025.

Unsurprisingly most young and middle-aged PAYG contributors switched to the new system. At December 1982 – only 19 months after the reform start – 36% of the Chile's employed had shifted to the FF system, and only half that figure, 19% of total employment, remained in the PAYG system (Figure 1). At the end of 1997, 61% of the employed were active contributors to the FF system and only 5% were remaining in the old PAYG (mostly workers close to retirement). Therefore coverage of total employment (as measured by active contributors) has increased significantly after the pension reform, from 51% in 1980 to 66% in 1997.

Pension system coverage, contributions, and benefits

Pension system coverage by the PAYG system of old-age population aged 55 and above stood at 68% in 1980, before the reform start. This figure increased to a peak of 75% in 1985, falling gradually afterwards to attain 69% in 1997. Pension system coverage by the new FF system increases gradually over time, attaining 21% in 1997. While the figures of old-age coverage by the old and new system are not directly comparable³, they suggest a significant increase of total pension coverage of the elderly since the start of the new system.

Total contributions to the new system (old system) attained 3.3% (0.5%) of GDP in 1997, implying an aggregate 3.8% pension contributions in Chile. Due to the gradual transition, most pensions are still paid out by the old system (by an amount equivalent to 2.6% of GDP) while the new system is paying benefits to a much smaller number of people (equivalent to 0.9% of GDP). Individual pensions averaged 39% of current average taxable income under the old pension system and 45% of current taxable income under the new system in 1997.^{4 5} Note that the pension benefit paid by the new system is a weighted average of the benefits that accrue in lieu of contributions to the old and new pension systems.

2.2 Interaction of pension system with other social programs

As mentioned above early retirement is freely decided by contributors as long as they have achieved a minimum retirement capital. This is different from earlier access to individual pension savings due to worker disability or survival by a spouse or close relative of a deceased pension system participant.

In fact, the new pension system is closely linked to two other social programs: disability insurance and survivors insurance. Contributions to all three programs are mandatory for pension system participants and are made on a monthly basis to their selected AFP. Contribution rates on disability and survivors insurance are market determined for benefits determined by law and stand at 0.5% of taxable income in 1997 (Table 2). As in the case of standard pensions, the government guarantees a minimum pension level to beneficiaries of disability and survival pensions. The two latter insurance programs are kept separate from the pension system other than their joint management by AFPs. AFPs reinsure both disability and survivor insurances with insurance companies.

Health insurance is kept separate from the pension system in all its dimensions -- mandatory contributions, management, and provision of health benefits. A (mostly richer) 30.4% of the labor force contributes 7% of taxable income to a privately-managed system of private health provision while 56.5% of the labor force contributes 7% of taxable income

³ This figure is over-estimated by referring to PAYG pensions, not pensioners. Some people receive more than one PAYG pension and some PAYG pensioners are below age 55.

⁴ All pension figures are aggregates or averages for old-age, disability, and survivor pensions due to lack of disaggregated data.

⁵ The pension to taxable income ratios reflect pension benefits paid to current pensioners relative to incomes of current workers and hence are not replacement ratios.

to a government-managed system of public health provision. The remaining 13.1% of the labor force are either not covered at all (and hence may qualify to minimum social health services provided by the public system) or contribute voluntarily to private health programs.⁶

Unemployment benefits are also kept separate from pension benefits. The current program of unemployment benefits is a means-tested targeted program that provides small and temporary contingent benefits to a small share of the labor force. In addition employment legislation requires employers to pay a severance payment of 1 month per working year up to 11 years. Congress is currently discussing a government-proposed unemployment insurance program that would require workers and employers to share contributions toward unemployment savings deposited in individual accounts at AFPs, that could be used during unemployment spells or otherwise be added to pension savings at retirement.

2.3 Microeconomic features of the second pillar

This sub-section focuses on microeconomic features of the private pension system, including the structure and costs of the AFP industry, the composition of the average pension fund portfolio and its rate of return, the structure of commissions charged by AFPs to their customers, and the AFP cost structure.

AFP operational scale and market concentration

The pension fund industry started with 12 AFPs in 1981, a number that increased to a peak of 21 companies in 1993-1994, then falling again – through mergers, acquisitions, and closures – back to 12 AFPs in 1998. The average scale of operation trebled from 88,000 active contributors per AFP in 1982 to 274,000 in 1998 (Fig. 2). Some years ago economies of scale had been estimated to be reaped up to 60,000 active contributors (Diamond and Valdés Prieto 1994) but market participants estimate them today at a much larger number. Average pension fund assets managed by each AFP have increased from US\$ 51 million in 1982 to US\$ 2.4 billion in 1998.

However, average figures are misleading because AFP industry concentration is large and rising. The share of the three largest AFPs is 70.3% by affiliates and 60.7% by managed pension fund assets in 1998. Rates of return on AFPs' own capital -- not to be confused with the rates of return on pension funds managed by AFPs or on pension assets held in individual accounts, analyzed below -- became positive and very high after being negative during the first three years of startup of the system, when the scale of operation was low and marketing costs were high. Very high returns of 39-48% in real terms on AFPs' own capital reaped during 1989-1991 prompted a massive entry into the industry and a substantial reduction in subsequent returns -- together with industry consolidation -- down to 11.1% in real terms in 1997.

⁶ Data for 1997.

Pension fund assets and portfolio investment

Total pension fund assets managed by AFPs rose rapidly in the early 1980s with the large increase in new contributors and high initial rates of return on pension funds. Total assets attained a peak of US\$ 30.5 b. in 1997 and, as a share of GDP, a peak of 43.8% in 1997 (Fig. 3). While the number of contributors is still rising, their outstanding average pension wealth has been stagnating during the last 3-4 years as a result of low pension fund returns.

Portfolio investment by AFPs has been heavily regulated by investment instruments although regulations have been gradually liberalized over the last 18 years. Until the mid-1980s investment was mostly restricted to government bonds, bank deposits, and mortgage debt. Investment in stocks has been allowed since 1986 and investment abroad is only allowed since 1993 (Fig. 4). All investment categories are limited by portfolio share ceilings that are gradually revised upward over time. For instance, in early 1999 the ceiling on investment abroad was raised from 12 to 16%, of which the share invested in variable-income assets was increased from 6% to 8%. As of end-1998 the average pension fund portfolio is still largely concentrated in government paper (i.e., central bank debt, at 41.4%), bank deposits (14.1%), and mortgage debt (16.3%). Assets invested abroad add up to only 3.9% of aggregate pension assets but this share is growing rapidly since late 1997 as a result of the decline in domestic-market as compared to international-market rates of return.

Returns on pension funds and individual accounts

Pension fund returns in real terms were high but volatile from 1981 through 1994 -- a reflection of Chile's high but volatile investment opportunities (Fig. 5). From 1995 through 1998, however, pension fund returns have been barely positive on average, with two years recording negative real returns. Stagnating yields since the mid-1990s reflect both a stagnating domestic stock market and, in 1998, high short-term interest rates and a steep growth reduction in the aftermath of the international financial crisis. The start of the new pension system is likely to have contributed to the high asset yields observed during 1981-1995. This is one important reason why it is unlikely that the high average annual real rate of return of pension funds, at 13.8% during 1981-1994 (or 11.0% during 1981-1998) could be sustained into the future.

Real rates of return on individuals' pension accounts stand significantly below pension fund returns as a result of relatively high commissions paid by contributors to AFPs. Over the 1991-97 period for which data is available, individual accounts yielded on average 8.3%, a figure that is 1.9% lower – due to commissions – than the return on pension funds.

Structure of commissions paid by contributors

AFPs are currently entitled to charge a fixed and a variable commission (Table 2). The fixed commission has declined by some 80% since 1981. The variable gross commission – levied as a percentage of wages – comprises payment of insurance premia on disability and survivor insurance, as well as the variable net commission paid to AFPs to cover their costs and profits. Insurance premia have declined from 1.9% to 0.5% of taxable

income during the last decade. However the residual net commission – the sum of AFP costs and profits – has risen from 1.7% to 2.4% of taxable income during the last decade.⁷ The total net commission paid to the AFP – the sum of fixed and variable net commissions – has risen slightly, from 2.2% of taxable income in 1988 to 2.5% in 1997.

Table 2
Commissions paid by Contributors to AFPs, 1981-1997 (percentages of taxable income)

	Fixed commission (1)	Variable gross commission (2)	Insurance premia (3)	Variable net commission (4) (4)=(2)-(3)	Commission on balance (5)	Total net commission (6) (6)=(1)+(4)+(5)
1982	0.79%	2.66%	N/A.	N/A.	0.17%	N/A.
1983	1.01%	3.60%	N/A.	N/A.	0.43%	N/A.
1984	0.92%	3.58%	N/A.	N/A.	0.60%	N/A.
1985	0.72%	3.57%	N/A.	N/A.	0.59%	N/A.
1986	0.53%	3.40%	N/A.	N/A.	0.63%	N/A.
1987	0.48%	3.39%	N/A.	N/A.	0.52%	N/A.
1988	0.49%	3.56%	1.89%	1.67%	0.0%	2.16%
1989	0.31%	3.25%	1.76%	1.49%	0.0%	1.80%
1990	0.22%	2.99%	1.47%	1.52%	0.0%	1.74%
1991	0.16%	2.97%	1.05%	1.92%	0.0%	2.08%
1992	0.13%	2.93%	0.70%	2.23%	0.0%	2.36%
1993	0.09%	2.95%	0.71%	2.24%	0.0%	2.33%
1994	0.08%	2.92%	0.64%	2.28%	0.0%	2.36%
1995	0.07%	3.04%	0.52%	2.52%	0.0%	2.58%
1996	0.09%	2.90%	0.51%	2.39%	0.0%	2.48%
1997	0.08%	2.90%	0.53%	2.37%	0.0%	2.45%

Notes: The commission on pension savings balance was eliminated in 1988. All figures are ratios to the average taxable income of the pension system. Insurance premia are calculated considering the total cost of insurance and the total income of AFP contributors.

Source: PRIMAMERICA (1999) and author's calculations.

AFP cost structure

A quick review of the AFP industry cost structure reveals the large share of marketing costs in AFP total revenue, growing from 10% in 1988 to 34% in 1997 (Fig. 6). AFPs devote a large effort to raise their market share by hiring salespeople that often lure contributors away from competing AFPs by offering side payments or even changing individuals' affiliation without their prior knowledge. A 1997 administrative ruling by the AFP Superintendency has made more difficult these practices, implying a significant drop in salespeople and marketing costs of AFPs during 1998, which have been partly passed on to consumers in the form of lower variable commissions.

2.4 Fiscal and macroeconomic effects of pension reform

⁷ A third commission was charged on the outstanding pension savings account until 1987, when it was abolished.

Significant fiscal and macroeconomic effects could be expected from Chile's pension reform. This sub-section starts by evaluating the reform's fiscal consequences and putting the pension reform in the overall context of macroeconomic stabilization and structural reform. The latter comparison enables next to approach the more difficult task of isolating the quantitative contribution of pension reform to Chile's improvements in factor market efficiency, overall factor productivity growth, saving, investment, and aggregate growth.^{8 9}

Pension Reform and Public Deficit

When active contributors switch from PAYG to FF the government incurs suffers a loss in PAYG contributions, having to finance two types of pension benefits: ongoing pension payments to PAYG pensioners and payments of future PAYG pension benefits in lieu of past contributions to PAYG made by switching contributors. Any reforming government faces the theoretical option of making immediately explicit its total implicit PAYG debt by paying it off, simply by issuing checks to both PAYG pensioners and switching workers for their total pension wealth at the time of the reform. For budgetary reasons -- finance ministers dislike explicit government deficits even if they arise from amortization of implicit debt -- the Chilean reformers (as well as all subsequent reformers in other countries) did not follow this option. Instead they decided to spread out the fiscal cost of the transition (that is, the making explicit of the implicit cost), roughly in tandem with the systemic transition of changes in affiliation from PAYG to FF.

Therefore the fiscal cost of pension reform is reflected in two pension deficit components. One is the so-called "operational deficit", arising from paying out pensions to current and future PAYG pensioners. The second is the so-called "recognition-bond deficit", due to the payment of past (pre-switching) PAYG pension benefits that accrue to FF pensioners at retirement. Every previous PAYG contributor is issued a government promise at switching to FF, called recognition bond, that matures at her retirement. At that date the government hands out a check to the pensioner that approximately reflects the present value of her historical PAYG contributions.^{10 11}

The operational pension deficit rose rapidly after the reform start -- reflecting the stampede of PAYG contributors to FF -- toward a peak of 3.8% of GDP in 1984 (Fig. 2). Its

⁸ Simulations of transitional (steady-state) growth effects of pension reform in representative economies are reported for the exogenous (endogenous) growth case in Arrau and Schmidt-Hebbel (1991) (Corsetti and Schmidt-Hebbel 1997).

⁹ The measurement of the contribution of pension reform to Chile's takeoff is based on regression results for private saving, private investment, and productivity growth in Chile, reported in Schmidt-Hebbel (1998 a,b).

¹⁰ Although the PAYG regime was a defined-benefit system, calculation of the recognition bond was based on an estimate -- often done roughly due to the lack of systematic records on past PAYG contributions -- of the present value of PAYG contributions, at the date of switching. From that date through retirement the outstanding recognition bond earns a real rate of return (after adjustment of principal to inflation) of 4% per annum.

¹¹ Note that instead of handing out a check at retirement, the government could have chosen an even more gradual reform transition deficit by making pension payments to future pensioners. This alternative would have extended the length of the transition deficit -- possibly by some 20 years -- in a way exactly consistent with the demographics of the reform transition generations.

slow subsequent decline is a function of the average life span and age distribution of PAYG pensioners, standing at 1.6% of GDP in 1997 and estimated to converge to zero around the year 2020. In the absence of FF pensioners at the start of the new system, the recognition-bond deficit starts at zero in May 1981 and increases gradually over time, attaining 0.8% of GDP in 1997. Its convergence toward zero is estimated to take place after 2030. Therefore the total pension reform deficit relative to GDP attains a maximum of 4.1% in 1984 – but its constant domestic-currency value is still rising. In 1997 the total pension reform deficit attained was US\$ 1.9 b. or 2.5% of that year's GDP.

In 1979, before the 1981 pension reform, the government started a massive improvement in fiscal policy by attaining a significant and systematic general-government surplus. Excepting the recession period 1982-1986, the total government surplus has averaged 1.8 % of GDP between 1979 and 1997. The non-pension surplus -- the sum of the overall surplus plus the pension reform deficit -- attains a high average 5.4% of GDP from 1987 to 1997. The latter figure is the economically more relevant one because the pension deficit is simply equivalent to the fiscal effort in paying off the implicit PAYG debt.

How large is the total implicit PAYG debt that is made explicit by pension reform? Arrau (1991) estimates that the first-stage PAYG reform of 1979, that raised substantially retirement ages of the old PAYG system, cut the government's implicit PAYG debt by half. Estimates for the remaining PAYG debt in 1980, shortly before the second-stage reform, point toward an implicit debt of 85% of GDP. A conceptually different estimate is for the present value of reform transition deficits, estimated at 126% of GDP (Arrau 1991). These figures are higher than those of many other developing or transition countries that have either implemented or considered reforming their PAYG pension systems but is significantly lower of similar estimates made for OECD countries.¹²

A critical issue for assessing the macroeconomic effects of pension reform transitions is to identify how the pension deficit is financed.¹³

Some authors argue credibly that the Chilean government started in the late 1970s to prepare actively for the pension reform transition deficit by showing large surpluses -- for the first time in recent economic history (Diamond and Valdés 1994). However, unless one refers to a counter-factual lab experiment that holds constant other factors affecting government balances, it is impossible to learn from ex-post government accounts in which

¹² Comparisons of implicit PAYG debt estimates for various countries can be found in Arrau and Schmidt-Hebbel (1994) and Schmidt-Hebbel (1998a).

¹³ If the reform deficit is offset by raising the non-pension surplus, reform transition generations bear the cost of paying off the implicit PAYG, benefiting post-transition generations by freeing them from servicing the old PAYG debt. The corresponding intergenerational transfer to future cohorts raises long-term income, saving, and capital levels -- as in the case of any other contractionary fiscal policy that improves the net asset position of the government (Diamond 1965, Auerbach and Kotlikoff 1987). Alternatively, if the reform deficit is financed by issuing government debt or reducing government assets (by selling international reserves or public enterprises) the implicit PAYG debt is simply swapped for issuing another public net liability. Without a first-order change in the public sector's net asset position, there are only second-order intergenerational transfer and long-term macro effects due to differences in PAYG and FF rates of return.

way a particular government program or reform has been financed in any real-world economy. Fungibility of financial resources does not allow to infer any causal relation from the changes in pension transition deficits and the non-pension transition fiscal position.

Such an attempt is particularly futile in Chile's experience of the early 1980s as public finances had to absorb the most intense shocks -- completely unrelated to pension reform -- that hit Chile during the last decades. Among them were a major terms-of-trade loss, complete cut-off from voluntary foreign lending, a deep recession, and a huge banking crisis. For instance, asserting that pension reform was financed by non-pension surpluses before and after 1981 is equivalent to saying that changes in all other non-pension revenue and expenditure categories -- including the costs of the 1982-85 banking crisis estimated at a cumulative 41.1% of GDP (Marshall and Schmidt-Hebbel 1994) -- were accommodated residually by the available mix of tax resources, debt issuance, and inflation taxation. This illustrates that it does not make much sense to single out a particular financing source of Chile's reform transition deficit. While Chile's pension reform was supported by an improvement in the fiscal position some years before the reform start it is not possible to identify the precise financing mix of this reform or any other structural change or shock affecting Chile's public finances thereafter.

Macro stabilization and structural reform

More than two decades of systematic stabilization and structural reform efforts are reflected by country's improved fiscal and monetary stance (Table 3). Non-financial public-sector surpluses were attained early on (in the late 1970s), reversed in sign during the early 1980s due to the financial crisis and deep recession, and were again corrected in the mid-1980s. Since 1975 Chile has pursued a very gradualist anti-inflation program, bringing inflation down from some 1000% in 1973 to 4.7% in 1998.

Chile has adopted a broad and deep program of structural reform since the mid-1970s. An international index of structural reform progress (Lora 1997, Schmidt-Hebbel 1998b) shows for Chile an improvement in policy reforms from an index value of 8.4 for the 1960s-early 1970s to 62.0 in the 1990s. How much did pension reform contribute to the 54-point improvement? If pension reform acts by improving financial and labor market policies -- as argued below -- one should focus on the improvement observed in the two latter sub-indexes that are part of the overall reform index. Research by Schmidt-Hebbel (1998a) suggests that the relative contribution of pension reform to the progress in the overall index of Chilean policies has been in the range from 5% to 20%.

Capital markets

Banking and capital markets have developed rapidly and diversified broadly in Chile since the start of domestic financial liberalization and capital-market reforms in 1974-75. Capital-market deepening is reflected by the substantial increase in broad financial liabilities measured by M3 (from 16% of GDP in 1961-74 to 37% in the 1990s) and in stock market capitalization (from 28% in 1980-81 to 92% in the 1990s). Capital-market liberalization helped developing new financial instruments and industries, including insurance services, bond markets, mutual funds, and risk-rating agencies. Banking and

capital-market development takes place under conditions of sound regulation and effective supervision by specialized agencies.

Private pension fund assets have increased to 35% of GDP in the 1990s and pension funds hold significant shares of Chile's equity, bank deposits, and public debt. There is little doubt that the AFP industry has helped in developing and deepening Chilean capital markets. But going beyond this general assessment is very hard. However estimating the precise contribution of the privatized and FF Chilean pension industry to the current structure and quality of financial and capital markets is tricky – it would require agreeing on an appropriate model and counterfactual which is still not available.

Table 3
Chile: Various Indicators, 1961-97 (percentages unless noted otherwise)

	1961-74	1975-81	1982-89	1990-97
Pension Systems and Public Finance				
Pension system contribution rate	n.a.	26.0	10.0	10.0
Pension system contributors / labor force	n.a.	n.a.	57.6	62.5
Pension transition deficit / GDP	0	0	3.0	2.5
Non-pension public deficit / GDP	6.3	-2.8	-3.3	-5.1
Macroeconomic Stabilization and Structural Reform Indicators				
Total non-financial public deficit / GDP	6.3	-2.8	0.9	-1.9
Normalized inflation ($\pi/(1+\pi)$)	29.3	43.0	16.3	11.6
Index of structural policy progress (1995=62.8)	8.4	40.5	54.5	62.0
Capital markets				
M3 / GDP	15.9	18.4	28.4	36.8
Stock market capitalization / GDP	n.a.	27.7 (2)	24.8	91.7
Private Pension Fund (AFP) Assets / GDP	0	0	9.9	34.9
Labor Markets				
Unemployment rate	6.3	13.1	13.2	7.2
Real wage growth	2.1	10.5	-0.7	4.1
Labor market informality	n.a.	43.3 (1)	43.8 (3)	40.3 (4)
Male labor force participation rate	n.a.	70.2	72.2	75.9
Saving, Investment, and Growth				
National Saving / GDP	12.5	11.4	12.1	24.8
Foreign Saving / GDP	2.6	5.6	6.2	2.4
Gross Domestic Investment / GDP	19.2	17.8	19.2	29.2
Gr. FK Investment / GDP (const. prices)	19.2	16.0	17.9	25.5
Average Productivity of Capital	33.7	34.7	35.7	41.8
TFP growth	1.2	2.0	-0.1	2.7
GDP growth	3.3	4.4	2.6	6.7

Notes: n.a.: not available. (1) 1981. (2) 1980-81. (3) 1985. (4) 1990-94. The data for 1990-97 includes projected figures for 1997.

Source: Central Bank of Chile, Lora (1997), Schmidt-Hebbel (1998 a,b), and authors' calculations.

Labor markets

Pension reform can contribute to improved labor markets by reducing the pure tax component of pension contributions. Lower labor taxes on formal-sector employment contribute to lower structural unemployment, less employment (and production) informality, higher informal-sector wages, and a higher overall labor supply. What does the evidence show for Chile?

After almost two decades of high unemployment, Chile has reached levels close to full employment since the early 1990s, allowing for high annual real wage growth (Table 3). Edwards (1997) simulates the contribution of pension reform to labor-market improvements in Chile. The author considers the extreme case when the full PAYG contribution is a pure tax on labor. In that case pension reform could have reduced structural unemployment by a range of 2.0 to 3.2% and could have raised real wages in the informal sector by a range of 4.6 to 7.7%.¹⁴

In regard to total employment informality, ILO data shows that since the start of pension reform, the share of informal employment has declined from 43% in the early 1980s to 40% in the early 1990s (Table 3). This three-percentage point decline may seem small. However it is remarkable when comparing it to the evolution of labor informality in every one of 12 other Latin American countries (all with PAYG pension systems), where on average labor informality increased from 31% to 42% during the same decade (ILO 1996, Uthoff 1994). In a separate study Loayza (1996) shows that Chile has the smallest level of production informality in Latin America in the early 1990s, at 18% of GDP, with the next country (Argentina) recording a 22% and the last one (Bolivia) with 66% of output produced in the informal economy.

Finally consider the evolution of total labor supply after pension reform in Chile. Total male labor force participation has in fact increased substantially, from 70.2% in the late 1970s to 75.9% in the 1990s.¹⁵

Saving

After decades of economic under-achievement, a major shift of performance took place in the late 1980s. Chile's decade-long takeoff is reflected by significant trend breaks of saving, investment, and growth rates from historical levels (cf. Table 1). National saving attains 25% of GDP in the 1990s, twice its average level observed during the preceding three decades. Current-price gross domestic investment reaches 29% of GDP during 1990-97, exceeding substantially its historical level. Gross fixed-capital investment (GFKI) rises by less, to 26% of GDP during 1990-97, as inventory accumulation jumps to 3% in the 1990s. TFP growth attains 2.7% per annum in the 1990s, a figure that exceeds substantially

¹⁴ Edwards' simulations should be taken as upper-bound values of pension-reform benefits. When considering a pure-tax component of PAYG contributions less than 100%, or allowing for capital reallocation among sectors that differ in capital-intensities and for static and dynamic general-equilibrium feedback effects (as in Schmidt-Hebbel 1997a), the values are likely to be much lower than those obtained by Edwards.

¹⁵ Male labor force participation is a better indicator of labor supply than total male plus female labor force participation because of the long-run trend increase that is observed in female participation.

the meager 1.2% recorded in 1961-74 or the 0.9% observed in 1975-89. As a result of higher investment and TFP growth, GDP growth doubles, increasing from a modest historical level of 3.3% to a level of 6.7% in the 1990s.

A major shift in the structure of national saving has taken place in Chile (Figure 8). The large swings of the central government saving ratio to GDP reflects policy shifts and business-cycle effects that have characterized the last three decades, but it stabilizes in the 1990s at an average 4.5% of GDP. Public enterprise rationalization adopted since 1974 raised public enterprise saving to positive levels but subsequent privatization led to a trend decline of public enterprise saving levels. Chile's radical pension reform of 1981 led to a gradual increase in mandatory private pension saving that stands today at 3.8% of GDP. However the most radical change in any individual saving component is observed in the case of voluntary private saving. After a dozen years of sub-standard saving from 1985 through 1986, the private sector has been able to raise quickly its voluntary saving rate, from 4.5% in 1986 to an average 14.4% throughout 1990-97. There is preliminary evidence that most of this increase has taken place in the corporate sector while households are saving little more than before 1987.

Using regression results for voluntary private saving in Chile (Schmidt-Hebbel 1998a), the large increase in saving can be decomposed according to its explanatory determinants. Fig. 9 summarizes the decomposition of the structural rise in saving that took place between the 1961-1974 pre-reform period and the 1990-97 post-reform period, when a significant part of the reforms -- including pension reform -- had already taken place and saving had taken off. The results show that the doubling in the national saving rate is due to a rise in non-financial public sector saving (from 4.9% to 6.6% of GDP), the emergence of mandatory private pension saving at an average 3.7% of GDP, and a large increase in voluntary private saving (from 7.7% to 14.4% of GDP).

Fiscal adjustment as reflected by the aforementioned increase in total public saving was only partially offset by lower private saving and by a low amount (0.5% of GDP). The combined effect of overall tax reforms and saving incentives is reflected in a 3.5%-of-GDP rise in voluntary private saving. The small increase in foreign saving contributes to a tiny 0.1%-of-GDP in private saving. More important is the effect of Chile's demographic transition, explaining 2.1% of the private sector's saving increase. Finally, the increase in trend GDP growth from the 1960s to the 1990s explains another 2.1% of Chile's private saving rise. The latter variable confirms the existence of a virtuous saving-growth cycle, widely documented in other takeoff experiences.

Now let's look at the overall contribution of pension reform to saving. This is not an easy task. First, as discussed above, there is no way to pin down how pension transitions were financed and therefore how public saving was affected by the reform. Second, it is difficult to establish the direct contribution of pension reform through overall tax reforms net of crowding out of MSAV. Table 4 summarizes three alternative estimates of the effects of pension reform on the rise of national saving from 1961-74 to 1990-97.

The two main features determining that determine the effects of pension reform on national saving are how transition deficits are financed and how the private sector reacts to mandatory pension saving. For the first dimension we assume fiscal-contraction financing of pension reform at 100%, 75%, and 50% in columns 1, 2, and 3, respectively. For the second we assume moderate net crowding in at 50% and 25%, and moderate net crowding out at -27% ($= (2.7 - 3.7)/3.7$) of mandatory pension saving, in columns 1-3, respectively.

The results of this simple calculation suggest that national saving has increased in response to pension reform by a range of 1.2% to 5.5% of GDP. The mid-point contribution of 3.8% is equivalent to 31% of Chile's national saving rise. The remaining 69% is due to other measures of fiscal adjustment, tax reform, and various structural changes.

Table 4
Contribution of Pension Reform to the 1961-74 to 1990-97 Rise in the National Saving Ratio to GDP (percentage)

	<i>Large effects</i> (1)	<i>Moder. effects</i> (1)	<i>Small effects (2)</i>
<i>Rise in total public deficit due to pension deficit, at hypothetical proportions of 0, 25%, and 50% of pension deficit</i>	0	-0.25*4.4= -1.1	-0.5*4.4 = -2.2
<i>Rise in mandatory private pension saving</i>	+3.7	+3.7	+3.7
<i>Increase in voluntary private saving due to:</i>	+1.8	+1.2	-0.3
(i) Crowding in by lower total public deficit at regression coefficients	0	0.26*1.1 =0.3	0.34*2.2 = 0.7
(ii) Crowding in by overall 1980s tax reforms at regression coefficients and hypothetical participation of pension reform in overall 1980s tax reforms	0.5*3.5 = 1.8	0.25*3.5 = 0.9	0.5*5.3= 2.7
(iii) 100% crowding out by mandatory pension saving	0	0	-1.0 * 3.7= -3.7
<i>Rise in national saving explained by pension reform</i>	+5.5	+3.8	+1.2
<i>Total rise in national saving rate</i>	+12.2	+12.2	+12.2

Note: (1) Based on equation (1a), Appendix, Schmidt-Hebbel (1998a). (2) Based on equation (1b), Appendix, Schmidt-Hebbel (1998a).

Investment and productivity

A major shift in the structure of gross domestic investment at constant prices has taken place in Chile. The ratio of gross fixed capital investment (GFKI) by the central government to GDP fell significantly after 1974, with little further variations or structural breaks. Public enterprise GFKI shows a trend decline reflecting the decreasing share of public enterprises in GDP, as a result of large-scale privatization. Inventory accumulation is highly erratic and close to zero up to 1983 and stabilizes at a couple of percentage points

of GDP afterwards. As in the case of saving, private GFKI shows a massive structural break.

Using regression results for private GFKI in Chile (Schmidt-Hebbel 1998), the large increase in the latter is decomposed according to its explanatory determinants. Applying a procedure similar to the one used in explaining the contribution of pension reform to saving allows to estimate a range for its contribution to higher private GFKI (Table 5). Overall improvements in structural policies explain 7.2% of the 13.0% rise in the latter, of which we estimate a contribution of pension reform in the range from 0.4% to 1.5%. For the mid-point case of 0.9% of GDP, this is equivalent to a small contribution (9%) of pension reform to the overall rise in the private GFKI rate.

Table 5
Contribution of Pension Reform to 1961-74 to 1990-97 Increase in Private GFK Investment Rate, Average Productivity of Capital (APK), and TFP Growth Rates

<i>Variable</i>	<i>Total Rise</i>	<i>Rise attributed to Pension Reform</i>		
		Large effects	Mod. Effects	Small effects
<i>Private Investment Rate</i>	13.0			
due to rise in strucpol	7.2			
due to pension reform		1.5	0.9	0.4
<i>APK</i>	8.1			
due to rise in strucpol	5.7			
due to pension reform		1.2	0.7	0.3
<i>TFP Growth Rate</i>	1.5			
due to rise in strucpol	1.8			
due to pension reform		0.4	0.2	0.1

Source: Author's calculations.

Finally use is made of regressions for average productivity of capital (APK) and growth in total factor productivity (TFP) in order to identify the contribution of overall structural policy improvements and pension reform to the observed increase in both measures of productivity (Table 5).¹⁶ For the mid-point estimates of the contribution of pension reform, the latter explains 0.7 point of the total 5.7-point increase in APK and 0.2% of the 1.5% rise in the TFP growth rate.

Overall contribution of pension reform to growth takeoff

Now let's put together the preceding estimates in order to infer about the possible contribution of pension reform to Chile's 3.4% increase in GDP growth observed between the 1960s and the 1990s. Using a simple growth model, it is straightforward to decompose the growth increase by the contribution of the higher investment (or saving) rate, the higher average product of capital, and the increase in TFP growth.

¹⁶ TFP is measured residually by a standard Solow growth equation, also reported in Schmidt-Hebbel (1998a).

The contribution of pension reform to growth through the three mentioned variables is estimated to range from 0.4 to 1.4 percentage points (Table 6). The increase in growth attributed to pension reform in Table 6 implies that pension reform may have contributed from 12% to 41% to Chile's 3.4 percentage point increase in GDP growth, with a mid-point estimate of 26% or 0.9 percentage points of growth increase. Contributing by a quarter to a country's growth takeoff implies a large payoff to Chile's radical pension reform.¹⁷

Table 6
Contribution of Pension Reform to 1961-74 to 1990-97 Increase in GDP Growth

<i>Variable</i>	<i>Total Rise</i>	<i>Rise attributed to Pension Reform</i>		
		<i>Large effects</i>	<i>Mod. Effects</i>	<i>Small effects</i>
<i>National Saving Rate</i> due to pension reform	13.0	5.5	3.7	1.2
<i>Average Product of Capital</i> due to pension reform	8.1	1.2	0.7	0.3
<i>TFP Growth Rate</i> due to pension reform	1.5	0.4	0.2	0.1
GDP growth due to pension reform (share of total GDP growth gain)	3.4	1.4 (41%)	0.9 (26%)	0.4 (12%)
through higher saving		0.8	0.5	0.2
through higher APK		0.1	0.1	0
through higher TFP growth		0.4	0.2	0.1
growth-saving feedback		0.1	0.1	0.1
due to other reforms and structural changes (share of total GDP growth gain)		2.0 (59%)	2.5 (74%)	3.0 (88%)

Note: calculations are based on a standard Solow Cobb-Douglas growth model with a 40% capital share. Source: Author's calculations.

3. CURRENT SHORTCOMINGS OF CHILE'S PENSION SYSTEM AND REFORM OPTIONS

Chile's three-pillar pension system does not face fundamental fiscal, financial, and macroeconomic problems. With a mostly fully funded and privately managed pension system, Chile's ongoing demographic transition toward a much older population structure during the next decades will be smoothly absorbed by the pension system. In fact, by

¹⁷ Holzmann (1997) estimates an even larger range of estimated values for the contribution of pension reform to higher growth, at a range of 1.0 to 2.9 percentage points.

reforming early on, Chile has defused any “ticking pension time bomb” – there is no old-age crisis in Chile’s future (World Bank 1994). The reason is that an ageing population – and Chile’s population will undoubtedly age as demographic maturity is attained in the next 3 to 5 decades – will not put increasing pressures on its pension system because people’s pension benefits will reflect the country’s return on its net savings and not past promises made by a PAYG transfer system that can not be honored. Another advantage of the reformed system is that its decentralized design – combining private management and individual pension accounts – makes it more robust to pressures or outright assault from the political system.

Having solved the major traditional problems of state-managed PAYG systems does not warrant avoiding secondary shortcomings and problems of its own. In fact, Chile’s private pension pillar faces a number of problems in the microeconomic realm of its regulatory incentives industrial organization. Some shortcomings have been solved by various administrative and legal changes undertaken after 1980. However a significant number of issues remains to be addressed. These issues are very much in the public domain and are currently discussed by industry participants, regulatory authorities, academic specialists, the Superintendency of AFPs, and the media.¹⁸ The Chilean Congress is currently considering various reform proposals. In the following some of these issues are briefly described and some solutions are mentioned.

Excessive investment restrictions. Continuing liberalization of excessive investment restrictions (tight ceilings on asset classes) is required to insure getting closer to the risk-return frontier. However a balance has to be struck between avoiding excessive risk-taking by AFP management of pension funds and achieving better risk-adjusted returns. One obvious measure that requires prompt implementation is a substantial liberalization of the low current ceiling on foreign assets (and its sub-ceiling on foreign variable-income assets), currently at 16% (8%). While this ceiling is still not binding for any individual pension fund, it will become so in the near future as AFPs continue their ongoing strategy of portfolio shifts toward foreign equity holdings.

Excessive restrictions on portfolio diversification and consumer choice. Contributors are currently forced to concentrate their pension savings in one account managed by the particular AFP of their choice – but AFPs tend to replicate each other’s portfolio (see below). Therefore no significant portfolio differentiation is available to contributors. This lack of choice is particularly acute for those contributors that are close to retirement and therefore are more averse to bear return risk.¹⁹ Addressing this problem faced by older workers, a reform project is considered by Congress that would offer contributors up to 10 years below retirement age and pensioners an option to open a second pension account (with the same AFP of their first account) specialized on fixed-income assets. However this would not be enough for addressing different risk-return preferences within cohorts of

¹⁸ Recent studies on pension system problems and solutions include Gemines 1999, Iglesias 1999, and Superintendency of Pension Fund Administrators (1999).

¹⁹ For instance, the number of people that retired under the AFP system declined by 6% in 1998 as compared to 1997, postponing retirement because of negative returns on their pension accounts.

younger workers. To address the latter need, more choice of different portfolios should be offered to all contributors, possibly a choice among 2 or 3 different pension funds offered by different AFPs. This also would allow AFPs to specialize in different types of portfolios.

Excessive switching of AFPs. Enticed by side payments from AFP sales agents instead of differences in risk-adjusted returns or services, contributors switch affiliation at an excessive rate. A number of 120,000 monthly changes in affiliation were recorded in 1997 – a figure that is disproportionately high in comparison to the average stock of ca. 3 million contributors in 1997. After the administrative changes adopted by the AFP Superintendency in November 1997 that were mentioned above, switching fell substantially to ca. 50,000 per month, a figure that is still high. The consequence of excessive switching is high marketing costs and excessively high commissions, as discussed in section 3.

One way to reduce excessive switching (and hence excessive marketing costs) further – other than imposing more severe administrative barriers that could reduce the industry's level of competition – is to introduce a new commission structure, discussed below.

Inefficient commission structure. The structure of commissions appears to be inefficient in two dimensions: the individual commission structure and non-differentiation of commissions among contributors.

The individual commission structure is biased toward the variable commission and against the fixed commission, in comparison to the cost structure of AFPs (Diamond and Valdés 1994). This has two implications: redistribution from higher to lower-income contributors and excessive marketing efforts by AFPs in capturing high-income contributors. It also does not seem efficient to rule out commission charges on outstanding balances (as done worldwide by private pension funds and mutual funds) because investment management costs are at least partly proportional to the size of the funds. However there are two problems in substituting variable commissions on outstanding pension savings balances for commissions on wages: pension savings balances of young contributors are low and a constant rate of variable commission charged on outstanding pension savings balances implies increasing contributions over active life. This tradeoff has inhibited a revision of the commission structure to date.

The current pension law forbids both charging different commissions to different contributors and collective negotiations of AFP commissions by groups of workers or their representatives (employers or unions). This legal restriction is costly. First it avoids reaping economies of scale in marketing and contracting costs. Second it leads to a rigid commission structure that cannot reflect cost differences among contributors. Third it leads to excessive contributor switching of AFPs as the latter are not able to induce consumer loyalty through permanence discounts. Finally it leads to higher commissions. Hence a reform that allows for a flexible commission structure is urgently required and is currently considered by Congress.

Rate-of-return guarantee. The floor guarantee on pension fund returns is perceived as a major cause of the excessive herding of AFPs regarding their investment strategies, leading to almost identical pension fund portfolios. Reduction or outright elimination of this guarantee (as in Peru's privately-managed FF pension pillar) would provide an incentive to AFPs to specialize better in investment strategies, therefore enhancing consumer choice.

AFP sharing in pension fund returns. The AFP's current participation in the investment risk of their portfolio choice is asymmetric and non-linear, occurring on the negative side when their rate-of-return guarantee is called upon. When returns on their managed pension funds are high relative to a benchmark level, they have to be accumulated as excess reserves to complement their rate-of-return guarantee. This provides little direct incentive to improve AFP investment policies. A better way would be to allow for more extensive sharing of AFPs in the investment risk.

Ballooning costs of the government's minimum-pension guarantee. The government's minimum pension guarantee has both incentive and fiscal costs. Indeed, one problem of this guarantee is that it provides a potentially strong disincentive to voluntary saving, as discussed in section 1. On the fiscal side, according to a recent study (Gemines 1999), the cost of the minimum pension guarantee will balloon in the future. Solutions to address this dual incentive and fiscal problem comprise better targeting and means testing of the guarantee and/or gradually reducing the value of the government guaranteed minimum pension relative to the economy's average wage level.

Insufficient coverage. As discussed above, two thirds of Chilean employed were covered by the pension system in 1997, most of them by the new FF system. While this fraction is substantially higher than before the pension reform, this still leaves out one third of total employment, mostly comprised by dependent workers in the informal economy and independent workers and entrepreneurs. Many of them are poor and have little resources and face weak incentives for contributing to the formal pension system. The rigid commission structure does not allow to reflect possibly larger administrative costs of these groups. In addition many of the poorer non-contributors will be eligible to assistance pensions. Therefore for both equity and efficiency reasons a government incentive to AFP affiliation by independent and informal workers should be evaluated.

5. CONCLUSIONS

This paper has taken stock of the accomplishments and shortcomings of the Chilean pension revolution started in 1981. Its general conclusion is that radical substitution of a new pension system anchored on a dominant fully-funded and privately-managed second pillar – complemented by a limited distributive first pillar – is paying off. Capital and labor markets operate more efficiently. National saving, TFP growth, and aggregate growth have increased substantially and significantly. But the largely privately-managed and strictly regulated fully-funded pension system also shows some flaws regarding its microeconomic incentives and performance that were analyzed here. Addressing these shortcomings in the

future would allow further improvements in the way the Chilean pension system provides old-age security to its population.

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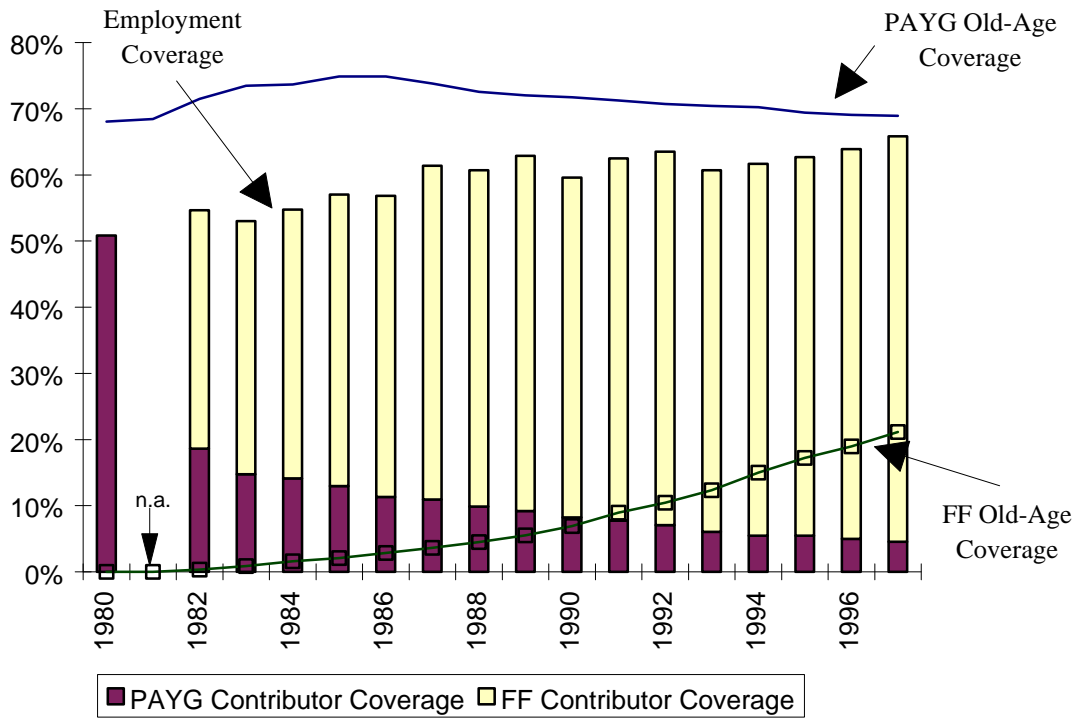
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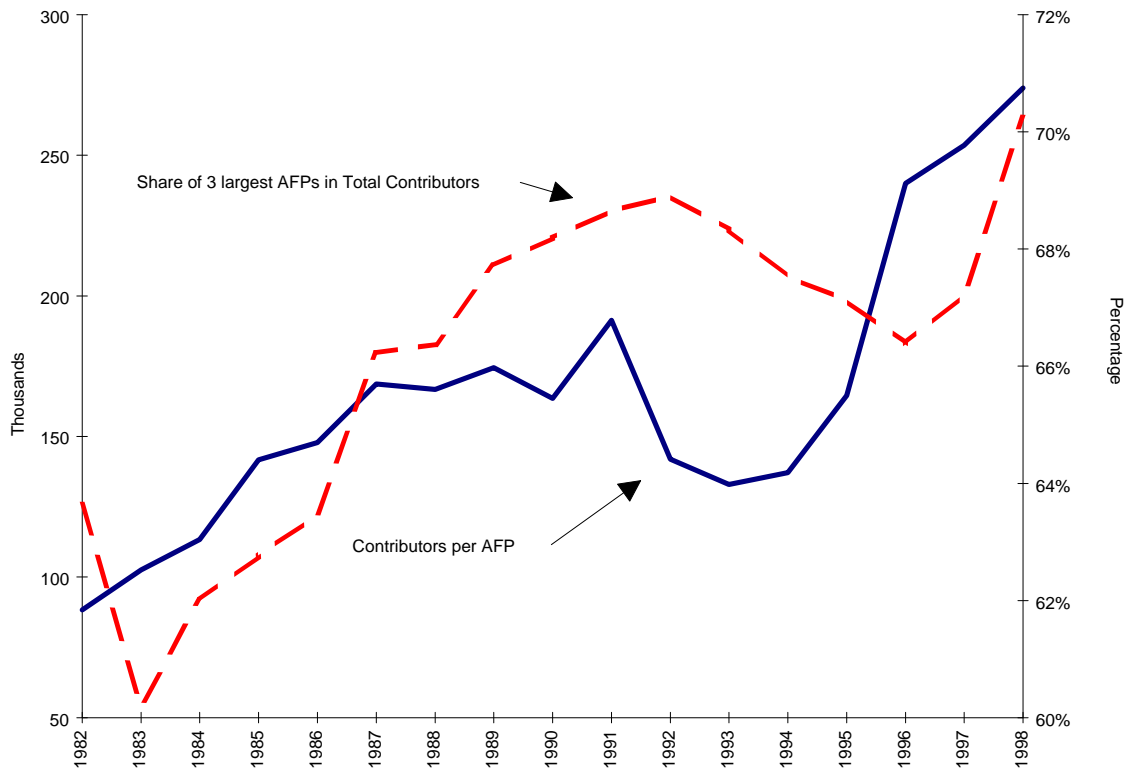
Figure 1
Pension System Coverage of Active and Passive Population, 1980-1997
 (percentage)



Notes: Employment coverage is defined as the ratio of active contributors to PAYG (or to FF) to total employment. Old-age coverage is defined as the ratio of PAYG (or FF) pensioners to the population of age 55 and above.

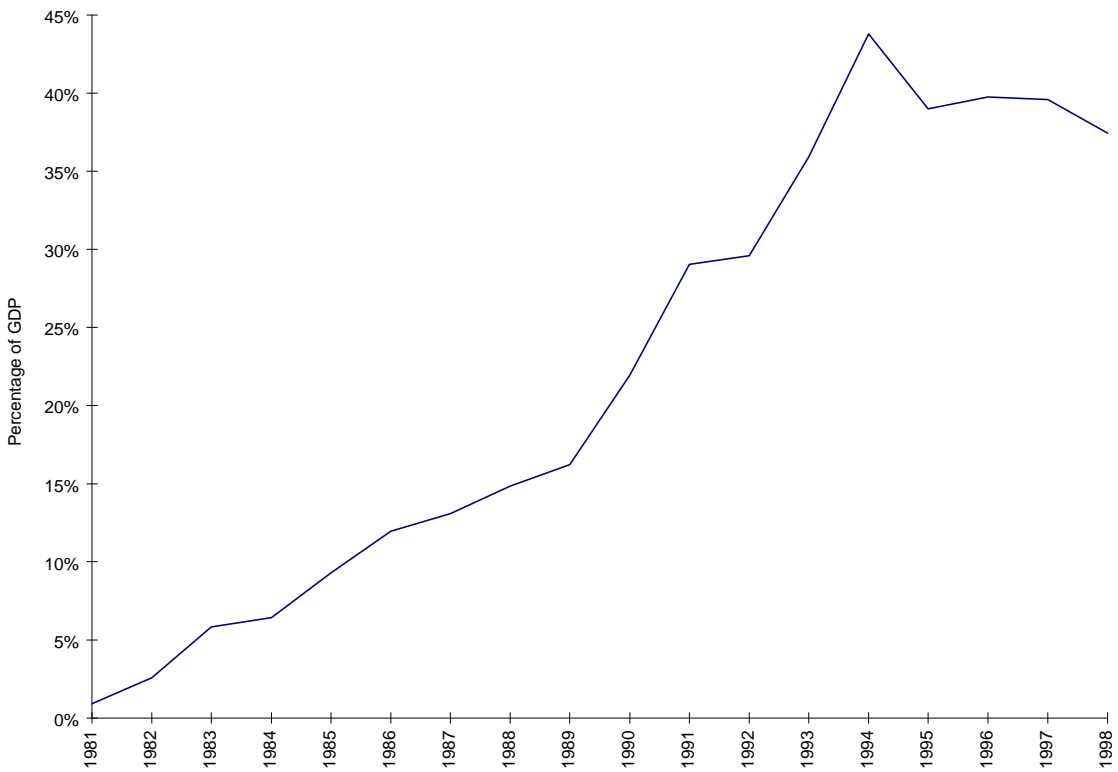
Source: PrimAmérica (1999), INP (various issues), INE (various issues), and Central Bank of Chile.

Figure 2
Scale of Concentration of AFP Industry



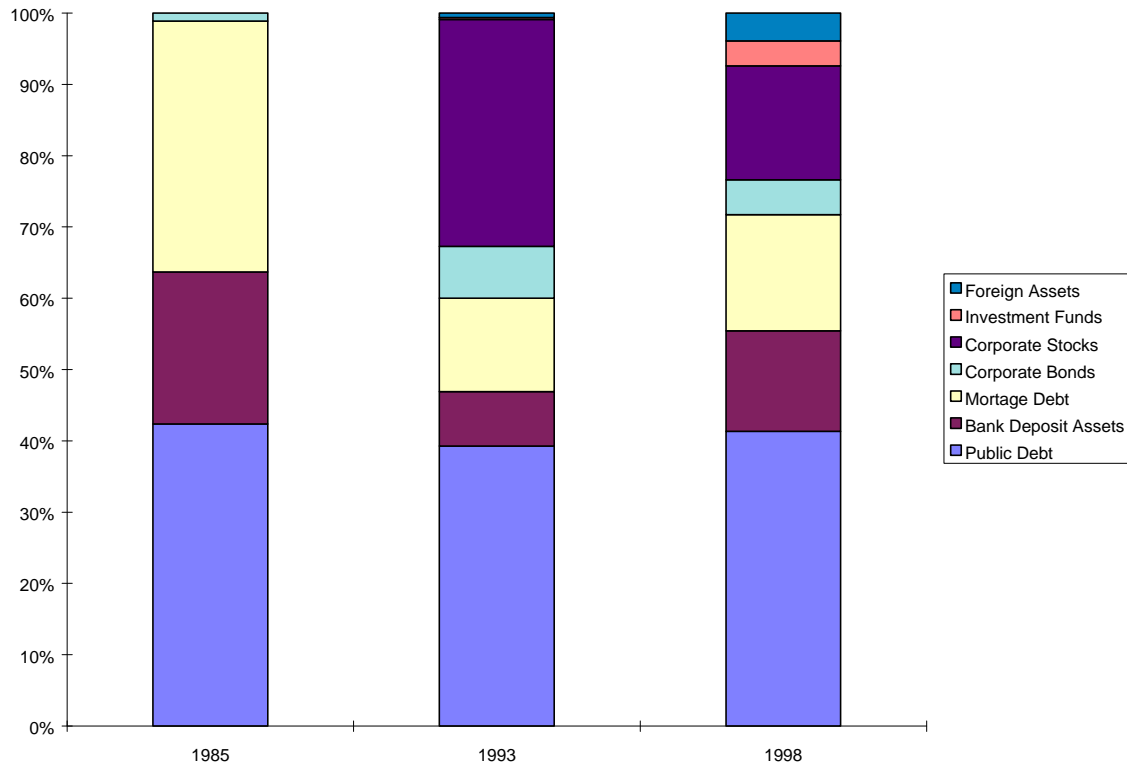
Source: PRIMAMERICA (1999).

Figure 3
Pension Funds Assets/ GDP, 1981-1998
(percentage)



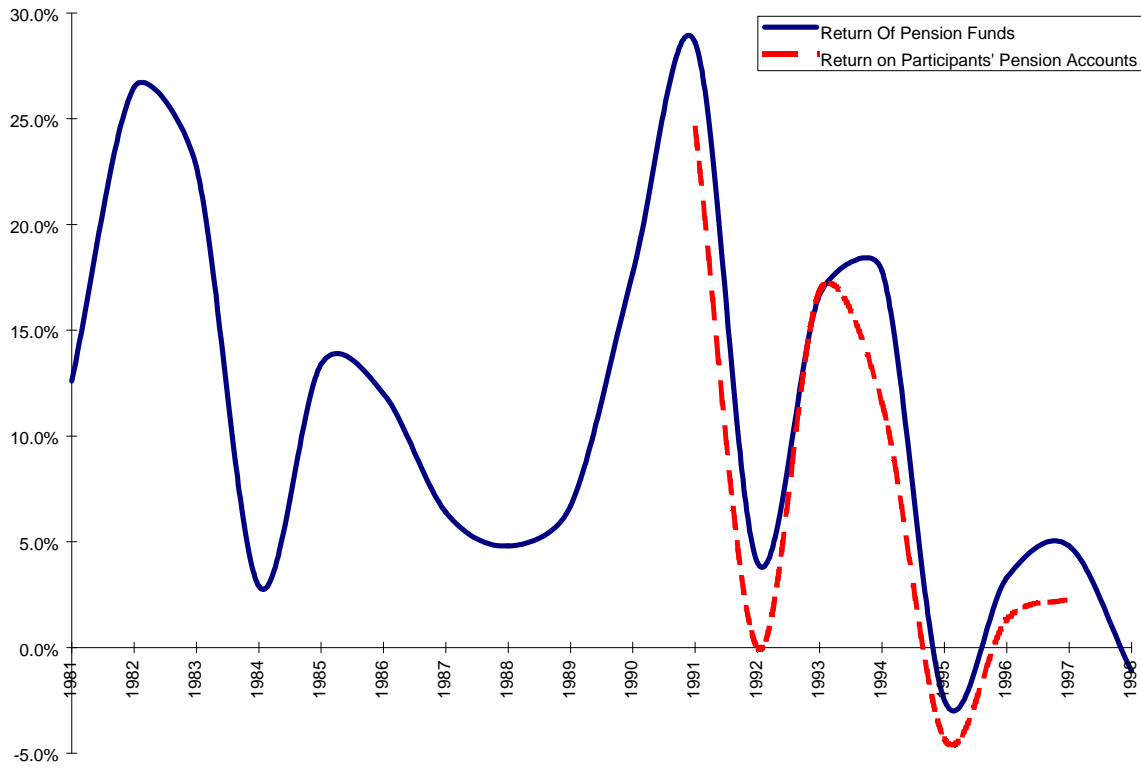
Source: Central Bank of Chile and SAFF (various issues).

Figure 4
Pension Funds Portfolio Composition
(percentage of total assets)



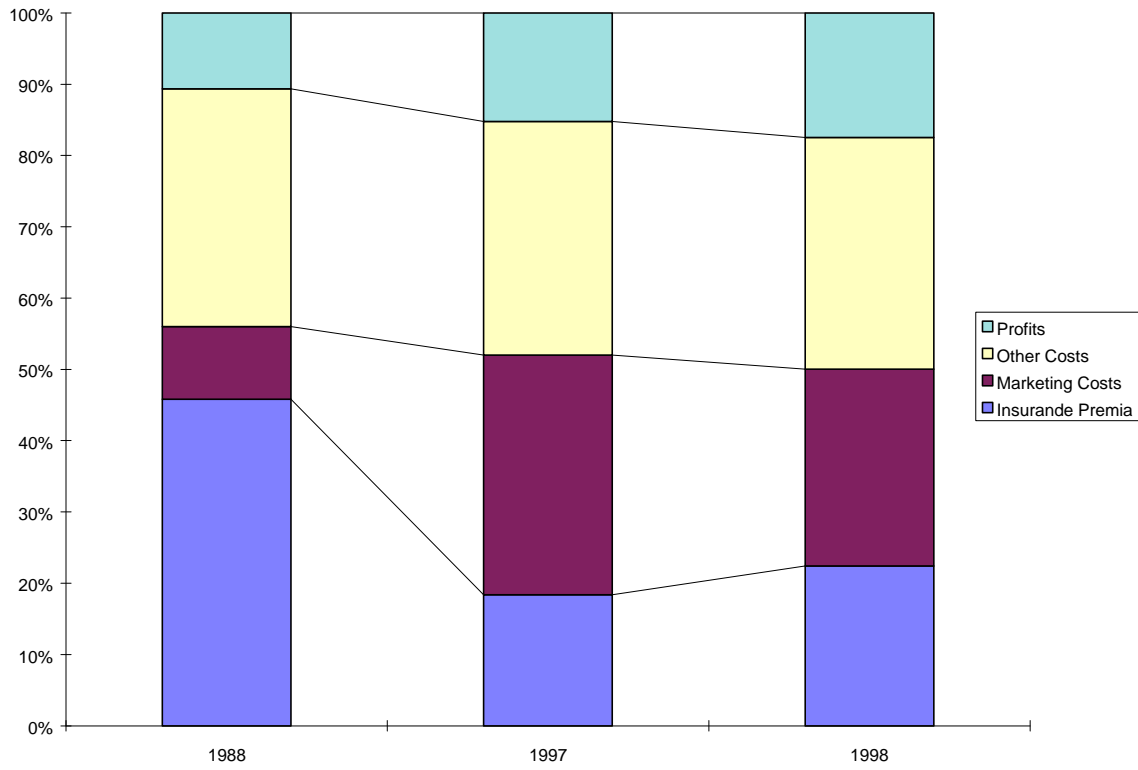
Source: Central Bank of Chile and SAFP (various issues).

Figure 5
Rates of Return of Pension Funds and Individual Pensional Accounts
(percentage)



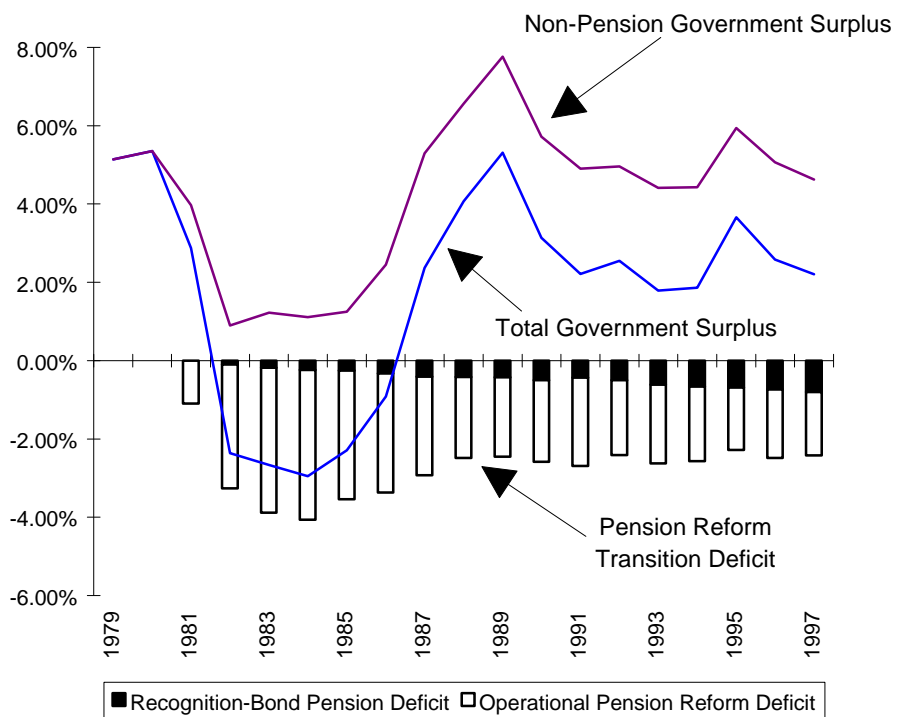
Source: PRIMAMERICA (1999) and Central Bank of Chile.

Figure 6
Cost Structure of AFPs
(percentage of total costs)



Source: PRIMAMERICA (1999) and *Superintendencia of AFPs*

Figure 7
Government Non-Pension and Government Pension Reform Transition Deficit,
1979-1997
(percentage of GDP)



Source: DIPRES (1997), INP (various issues) and Central Bank of Chile

Figure 8
Sector Saving Rates, 1960-97
(percentage of GDP)



Figure 9
Explaining Chile's Higher National Saving
(percentage of GDP)

