

- ROMAN, R. (1993). "La Reforma Previsional en Argentina: Qué Podemos Esperar?" Centro de Estudios de Población. Working Paper. Buenos Aires, December.
- ROMAN, R. and H. BERTIN. (1996). "Lessons from Pension Reform: The Argentine Case". Paper presented at the EDI Conference on Pension Systems: From Crisis to Reform. *The World Bank*, Washington, D.C., November.
- SALES, C. and F. SOLIS. (1996). "Pension System Reform: The Mexican Case". Paper presented at the NBER Conference on Privatizing Social Security, Cambridge, MA, August.
- SCHMIDT-HEBBEL, K. (1993). "Pension Reform Transitions from State Pay-As-You-Go to Fully-Funded Systems". Working Paper. *World Bank*, June.
- SCHMIDT-HEBBEL, K. (1995). "Colombia's Pension Reform: Fiscal and Macroeconomics Effects". Working Paper. *The World Bank*, Washington, DC.
- VALDES PRIETO, S. (1995). "Vendedores de AFP: Producto del Mercado o de Regulaciones Ineficientes?". Pontificia Universidad Católica de Chile. Instituto de Economía Documento de Trabajo, N° 178.
- WORLD BANK. (1994). *Averting the Old Age Crisis*. Oxford University Press, Washington D.C.
- WORLD BANK. (1995). "Argentina's New Integrated Pension System: First Year Assessment". World Bank Working Paper, no author, November.
- WORLD BANK. (1996). "Mexico: Contractual Savings Development Program". *The World Bank Memorandum*, Regional Operations Committee Meeting, March.

FISCAL AND MACROECONOMIC EFFECTS OF COLOMBIA'S PENSION REFORM^{1,2}

KLAUS SCHMIDT-HEBBEL

Central Bank of Chile

Abstract

In 1994 Colombia started replacing its state-run and pay-as-you-go (PAYG) pension system by a privately-run and fully-funded scheme. Numerical simulations for the government's reform transition reveal implicit PAYG debt levels and corresponding reform transition deficits that are high relative to other countries, considering that Colombia's old pension system was characterized by low coverage, low system maturity, and a young population. Simulation results show that output could increase by 10% due to higher future saving caused by financing the pension deficit by a fiscal contraction—but this would occur only in the very long term. Sooner and possibly larger gains could be reaped from higher employment and production in formal sectors, and the development of capital markets spurred by the reform. In addition, Colombia's new pension system—that includes a redistributive pillar targeted at the poor—is potentially more equitable than the old scheme. To reap these efficiency and equity benefits, however, the Colombian government would have to adopt complementary reforms. They include giving the private fully-funded pension pillar a commanding role, supporting the development of capital markets, and bolstering formal-sector employment by the reduction of deadweight tax burden of non-pension programs that are currently financed by payroll taxes on labor.

I. Introduction³

Colombia's congress enacted a deep reform of the pension system in December 1993. Contributions to new private pension funds started in April 1994. The

reform comprises a gradual and partial substitution of Colombia's current state-run pay-as-you-go (PAYG) system by a privately-run fully-funded (FF) one that could be the dominating pension pillar in the near future. The required institutional, fiscal and financial changes are large, and so are the potential efficiency and equity gains if the reform succeeds.

This study analyzes the prospective fiscal and macroeconomic effects of the pension reform.⁴ Section II focuses on the features of Colombia's old and new pension system. The next section reports numerical simulation results for the government's reform transition deficits and their capitalized value. Section IV discusses Colombia's options for financing the pension reform deficit, reporting simulation results for the long-run output and welfare effects of a reform financed by fiscal contraction, and making a qualitative assessment of the overall consequences of pension reform. A concluding section summarizes the main findings and identifies some challenges faced by the Colombian government to ensure that the potential efficiency and equity gains of pension reform are realized.

II. Main Features of Colombia's Pension Reform

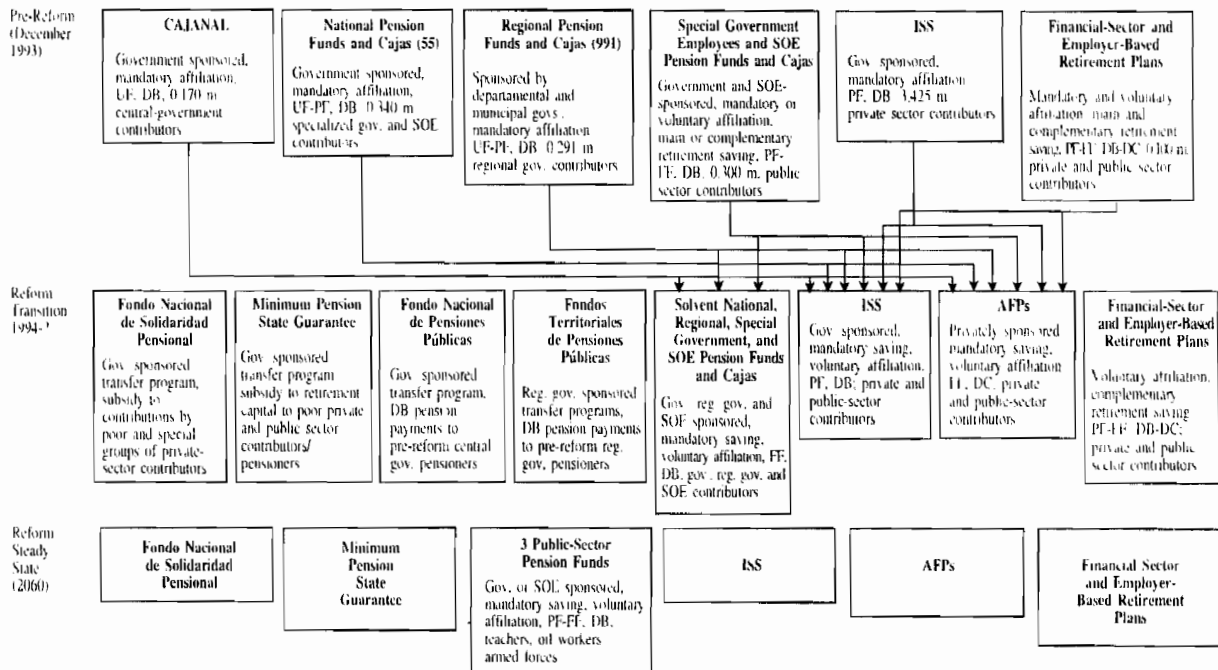
Colombia social insurance system has been beset by all the ills of state-managed pay-as-you-go (PAYG) schemes in other developing and OECD countries. For the last 50 years, Colombia's pension system has been characterized by uneven contributions and benefits across different pension sub-systems, large transfers to the first generations of pensioners, weak relations between contributions and expected pension benefits, low coverage of Colombia's labor force, inefficient public management, very poor funding of pension liabilities, and rising fiscal transfers to cover cash deficits. However, as a result of its early stage of demographic and systemic maturation, as well as low coverage, most of these deficiencies have been quantitatively smaller in Colombia than in other countries. This makes Colombia's 1994 pension reform—the fifth after those in Chile, Argentina, Mexico, and Peru—even more remarkable. It shows the farsightedness of the government in anticipating the long-term unsustainability of the old pension scheme due to its serious fiscal, labor-market, and macroeconomic consequences that would have been suffered in the future.

2.1 The Old Pension System

At the time of the reform in late 1993 Colombia's fragmented pension system is comprised by six broad categories of pension plans and institutions (see Table I). The first three categories are pension institutions for government workers (Caja Nacional de Previsión (Cajanal), 55 other national pension funds and cajas, and 991 regional pension funds and cajas);⁵ a fourth category comprised by decentralized special-government and state owned-enterprise (SOE) pension funds;⁶ Instituto de Seguros Sociales (ISS), the mandatory pension system for private-sector workers; and a final group of pension plans that are sponsored by financial-sector

TABLE I

COLOMBIA PENSION SYSTEM INSTITUTIONS BEFORE AND AFTER THE REFORM



Notes: Arrows indicate possible reaffiliations by contributors.

UF-PF-FF: unfunded - partially funded - fully funded; DB-DC: defined benefits - defined contributors; SOE: state-owned enterprises.

firms (insurance companies) for voluntary old-age saving by private and public-sector workers and by private firms for their own employees (occupational or employer-based schemes).

Colombia's large diversity of pension institutions stands in marked contrast to the low coverage of its labor force. The three government-sector systems (called Sistema Público Pensional or SPP⁷) comprise 800,000 contributors and 532,000 pensioners, and the dominating ISS comprises 3,425 million contributors and 265,000 pensioners (Tables 1 and 2). The total number of contributors in 1993 (4,225 m.) reached barely 29.6% of Colombia's labor force or 31.8% of total employment.⁸ Low coverage reflects large evasion—not only of pension contributions but of payroll taxes at large as well as profit, income, and indirect taxes.

Colombia's 29.6% pension-system coverage of labor force is indeed low by international standards. In Latin America and the Caribbean coverage is 38.3% while in middle-income countries it averages 34.8%.⁹ Inferring from cross-country regressions relating pension system coverage to per-capita income, Colombia's labor force coverage is significantly lower than the 43% figure which would correspond to the country's income level.

As opposed to most other pension schemes in the world, contributions paid by government employees to SPP were generally zero under the old pension system. Private-sector workers, however, were required to contribute a (low) 6.5% of their wages to ISS (Table 3).

Benefits provided by the old pension system also varied widely between different regimes (and were also more favorable to public-sector workers) but were on average generous. As in many other countries, the first generations after pension systems are started benefit the most. However, their gains are large not only relative to their low costs but also in comparison to other countries. Standard retirement ages under Colombia's old pension scheme were 50-55 (for women) for public-sector and 55-60 for private-sector workers (Table 3). Standard replacement rates were defined as pension payments relative to average nominal wages 2 years before retirement and varied between 75% for public-sector and 45-90% for private-sector workers, subject to low numbers of minimum years of contributions. However, wide-spread special pension regimes provided even better conditions than those of the standard benefits package, such as frequently granted early retirement and replacement rates well in excess of 100%. In Cajanal alone 17 different pension regimes coexisted in 1993, while many national, regional and SOE-sponsored cajas for public-sector workers offered their own old-age insurance packages.

All six components of Colombia's old pension system—excluding a few retirement plans offered by private-sector retirement plans for voluntary savers—were defined-benefit programs, with plan sponsors bearing in theory the risk of changes in investment values (in those funds with at least partial funding) or in contributions (in the more typical cases of unfunded or PAYG plans). However, real pension benefits were not effectively protected under the old pension scheme. Frequent legislative and administrative changes in pension plans and variable inflation rates—that affect the real value of both the pension base at retirement

TABLE 2
COLOMBIA: POPULATION, EMPLOYMENT AND PENSION SYSTEM
COVERAGE, 1990-1993
(thousands unless indicated otherwise)

	1990	1991	1992	1993
1. POPULATION (1)	32,300	32,841	33,391	33,951
1.1 Young (0-19)			14,871	15,006
1.2 Active (20-59)			16,412	16,783
1.3 Old (60+)			2,109	2,162
2. LABOR FORCE (2)	13,692	13,949	13,917	14,275
3. EMPLOYMENT (2)	12,598	12,834	12,945	13,300
4. MANDATORY PENSION SYSTEM (*)				
Contributors				4,225.0
Pensioners/Contributors				532.0
Contributors/Labor Force				12.6%
Contributors/Employment				29.6%
Pensioners/Old Population				31.8%
				24.6%
4.1 SPP (3)				
Contributors				800.0
Pensioners				266.7
4.1.1 Cajanal				
Contributors				
Pensioners (4)				91.9
4.1.2 National Pension Fund and Cajas				
(55 in 1993)				
Contributors				
Pensioners (4)				105.9
4.1.3 Regional Pension Funds and Cajas (5)				
(491 in 1990)				
Contributors				
Pensioners	48.7			291.1
				68.9
4.2 ISS (6)				
Contributors	2,724.3	2,876.9	3,167.1	3,425.0
Pensioners	207.7	221.9	244.3	265.3

Note: (*) Excludes the three public pension funds exempted from the pension reform.

Sources:

(1) DANE.

(2) Instituto de Seguros Sociales.

(3) Ministry of Finance estimates.

(4) Ministerio de Trabajo y Seguridad Social (1994), Sub-dirección de Desarrollo Social. Cuadro-Resumen de Censos de las Pensiones en 1993.

(5) For 1990-1989-90 National Pension Census, summarized in Ministerio de Trabajo y Seguridad Social (1993a). For 1993, calculated residually.

(6) ISS (1994).

(6) ISS (1994).

TABLE 3
COLOMBIA: CONTRIBUTION RATES AND BENEFITS OF OLD PENSION SYSTEM

	ISS Pension System for Private Sector Workers	SPP Pension System for Public Sector Workers
1. CONTRIBUTION RATES (2/3 paid by employer, 1/3 paid by employee)	6.5%	Generally zero
2. RETIREMENT BENEFITS		
2.1 Retirement Ages	55 for women, 60 for men (minimum 10 years of contributions)	Generally, 50 for women, 55 for men (minimum 20 years of contributions); many special regimes
2.2 Defined Benefit Formula	Minimum [45%+3% (1-10), 90%] of the average nominal wage during the two years preceding retirement	Generally, 75% of average nominal wage before retirement; many retirement special regimes
2.3 Minimum Pension	100% of minimum wage	
2.4 Average ISS Pension	125% of minimum wage	
2.5 Pension Dispersion	100%-6,000% of minimum wage	

Sources: Ayala (1994) and Ministerio de Trabajo y Seguridad Social (1993a).

and pension benefit payments during retirement—changed significantly constant-price pension benefits and hence weakened further the links between individual contributions and expected benefits.¹⁰

Colombia's old mandatory pension system sponsored by the public sector was operated as a financially unbalanced PAYG system requiring net government transfers to cover its revenue shortfalls. Pension payments by SPP reached 1.42% of GDP in 1993, almost entirely financed by budgetary public-sector transfers to Cajanal, the other national, and the regional pension funds and cajas (Table 4). Pension benefits paid by ISS reached 0.84% of GDP in 1993, slightly below 1993 contributions of 0.97% of GDP, implying a small surplus.

Colombia's mandatory public pension spending at 2.3% of GDP (or 11.1% of government expenditure) is well below the average 4.5% of GDP (or 16.2% of government expenditure) in middle-income countries (World Bank, 1994b). Low coverage is only one of the three reasons for Colombia being an outlier. The other two are that Colombia is still at relatively early stages of population maturation and pension system maturation. Hence its old-age dependency ratio—the relation between the number of pensioners and contributors—attains only 12.6%, also much below the average 21.0% observed in Latin America and the Carib-

TABLE 4

COLOMBIA. PENSION SYSTEM CONTRIBUTIONS, BENEFITS, SURPLUSES, AND RESERVES, 1992-1994
(Col. \$ billion, unless defined otherwise)

	1992				1993				1994 (4)			
	Contribs	Benefits	Surplus	Reserves	Contribs	Benefits	Surplus	Reserves	Contribs	Benefits	Surplus	Reserves
A. Sistema Pensional Publico % of GDP					n.a.	592.2 1.42	n.a.	n.a.	0	1.33	-1.33	n.a.
Cajanal (1)					n.a.	175.7	n.a.	0				
59 National Pension Funds and Cajas (1)					n.a.	284.8	n.a.	30.0				
991 Regional Pension (2) Funds and Cajas					n.a.	131.7	n.a.	n.a.				
B. ISS (3) % of GDP	248.6 0.75	255.0 0.77	-6.4 0	516.4 1.6	406.5 0.97	349.6 0.84	56.9 0.1	650.2 1.6	1.06	0.97	0.09	n.a.

Sources:

(1) For 1993: Ministerio de Trabajo y Seguridad Social (1994): "Cuadro-Resumen de Costos de las Pensiones en 1993".

(2) Estimated proportional to Cajanal pension benefits as the product of average Cajanal pension and the number of Cajanal pensioners

(3) 1992-1993: Instituto de Seguros Sociales (1993). 1994: the author's counter-factual simulations for no-reform case.

(4) For 1994: the author's counter-factual simulations for no-reform case

Note: Current-price GDP levels are \$33,064 for 1992 and \$41,724 for 1993.

n.a. not available.

bean (Table 2 and World Bank 1994b). Coverage of old people—the ratio between pensioners and persons over 60—is only 24.6% in Colombia, contrasting to the average 30.8% in Latin America and the Caribbean.

Colombia's ongoing demographic transition and the maturation of its pension system imply that the low 1993 pension transition deficit is not at all representative of future pension payments shortfalls that would have accrued under the old pension scheme. The simulations in section III will show that under the old structure of contributions and benefits a massive rise in the pension deficit would have occurred in the next decades, forcing either increasing government transfers or lower net pension benefits to future generations, or a combination of both.

Run as a de-facto PAYG scheme, SPP current pension reserves are close to zero (Cajanal's reserves are actually zero) and ISS pension reserves reach only 1.6% of GDP (Table 4), far below its implicit pension liabilities estimated below. In the absence of pension reform, the gap between implicit PAYG debts and explicit reserves would only increase in the next decades until maturity of the population age structure and the pension system were attained.

However, a deteriorating fiscal position is only the most visible cost of Colombia's old pension system. Its design flaws—common to most other pension regimes in the world—impose rising efficiency and equity costs. The large transfers to the first generations of pensioners reduces long-term saving and growth. The weak links between payroll contributions and PAYG benefits embedded in a PAYG system with implicit redistribution and large benefit uncertainty contribute to employment and production informality, tax evasion and moral-hazard behavior by contributors, and again, lower growth (see Ayala, 1995). Both the lack of funding and public-sector management precludes the positive contribution to capital-market development and growth made by privately-managed FF schemes that invest pension savings in long-term financial instruments. State-managed pension funds, with non-transparent cost and benefit structures and strongly subject to political and special-interest pressures, show high administrative costs relative to their low-quality services reflected in low steady-state benefits to pensioners. Income redistribution in such systems is often perverse and regressive, seldom reaching the old-age poor.

2.2 The new pension system

Realization of these costs and inequities of the old system led to the Colombian pension reform. After three years of government preparation and congressional discussion, the Colombian Congress passed Law 100 in December 1993. The law provides the general frame for both pension and health system reforms with considerable administrative latitude given explicitly by the Congress to the government to issue decrees on essential features of both reforms until July 1994. The government issued a large number of decrees that regulate fundamental aspects of pension reform legislation and implementation.

The pension reform introduces fundamental changes to the old mandatory pension scheme.¹¹ Its main elements are:

- * Significant increase in pension contribution rates paid by all active workers and significant reduction of pension benefits accrued to all younger workers and to those older workers that change affiliation to private pension funds.
 - * Substitution of a mixed PAYG - fully-funded (FF) scheme for the existing PAYG system.
 - * Introduction of two alternative mandatory pension sub-systems, chosen on an either/or base by contributors: a state-managed defined-benefit partially-funded PAYG scheme run by ISS and a privately-managed defined-contribution FF system comprised by private providers of contribution collection and investment services (pension-fund management firms called Administradoras de Fondos Pensionales or AFPs) and by private providers of pension services and annuity payments (insurance companies).
 - * Transparent income redistribution by starting explicit programs in support of pension benefits for the poor.
 - * Government recognition of complete pension rights accrued to current (1994) pensioners and older contributors and of partial pension rights accrued to younger contributors, implying public-sector repayment of the corresponding implicit PAYG debt through means other than future payroll contributions.
 - * Regulation and supervision of investment funds managed by ISS and AFPs.
 - * Regulation of reform transition and reform exemptions.
- The institutional set-up for the reform transition lasting through, say, 2060 is complex (Table 1). All public-sector workers changing jobs and new labor market entrants are forced to affiliate either with ISS or AFPs. Insolvent national, regional, special government, and SOE-sponsored funds will be closed and their workers can choose between ISS and AFPs. Currently insolvent funds—the very large majority of all public funds—are allowed to constitute reserves to reach solvency and hence remain in business. Solvent funds retain their affiliates until the last survivors pass away. Three public-sector pension funds were exempted from this general rule and hence will survive in the long term as unfunded (or partially-funded) PAYG and defined-benefit (DB) plans: those for teachers, oil workers, and the armed forces. Transitional transfer programs financed by the central government (Fondo Nacional de Pensiones Públicas) and regional governments (Fondos Territoriales de Pensiones Públicas) are started to pay pensions to pre-reform pensioners during the reform transition. All private-sector workers can choose between the new ISS and AFPs.
- Redistribution through the pension system is made transparent and explicit by two new central government transfer programs (Table 1). The Fondo Nacional de Solidaridad Pensional (FNSP) subsidizes contributions by lower-income contributors—a distributive subsidy intended to extend labor-force coverage—and will be financed by a payroll tax of 1% charged to higher-income contributors. The Minimum Pension State Guarantee provides a capital subsidy to poor people that have contributed for at least 10 years but have not been able to accumulate a retirement capital required for financing an annuity equivalent to a minimum pension.
- Contribution rates have been raised for all pension sub-systems to 11.5% in

1994, 12.5% in 1995, and 13.5% in 1996 and thereafter (Table 5). The 13.5% paid to AFPs is the sum of 10% for pension contributions and 3.5% for invalidity and survival insurance premia and fund administration costs. All contributors with a wage base exceeding 4 minimum wages pay an additional 1% contribution to finance ENSP.

TABLE 5

COLOMBIA: CONTRIBUTION RATES AND BENEFITS OF NEW PENSION SYSTEM

	ISS Government-Managed Defined-Benefit Pension System	AFPS Privately-Managed Defined- Contribution Pension System
1. CONTRIBUTION RATES (75% employer, 25% employee)	13.5% (11.5% in 1994, 12.5% in 1995) plus 1% of (wage base exceeding 4 minimum wages)	13.5%* (11.5% in 1994, 12.5% in 1995) plus 1% surtax of (wage base exceeding 4 minimum wages)
2. RETIREMENT BENEFITS		
2.1 Retirement Ages	55 and 60 for women and men older than 35 and 40 years, respectively, or for whom contribution periods exceed 15 years in 1994	Minimum age of [60 years for women and 62 years for men, age at which pension savings finance a pension annuity larger than 110% of minimum wage]
2.2 Pension Benefits	Old-system DB formula for women and men older than 35 and 40 years. DB formula for younger: (min [65% + 2% for each 50 weeks of contribution between 1,000 and 1,200 weeks + 3% for each 50 weeks of contribution between 1,200 and 1,400 weeks, 90%] of average nominal wage last 2 years (last 1 yr.) before retirement of private (public) sector workers)	Based on returns on contributions

* Sum of 10% contribution for retirement savings and 3.5% for fund administration expenses and invalidity and survivor insurance premia.
Source: Ministerio de Trabajo y Seguridad Social (1993b).

Colombia's new pension payroll tax rates are slightly higher than those in three other Latin American countries that have reformed their pension systems (Argentina, Chile, and Peru), exceed average contribution rates in Latin America and the Caribbean (10.5%), and are well below those in Eastern Europe and the Former Soviet Union (25.5%) and the OECD (16.3%). However, what really matters for forward-looking contributors is not the absolute size of payroll taxes but how closely they are related to expected benefits. Colombia's pension reform establishes a close link between pension contributions and benefits, at least for those workers that choose the fully-funded AFP system, and abstracting from the 1% payroll surtax on higher-income earnings.

As opposed to most other reforms in Latin America, however, the generous current old-pension benefit package for those women (men) of age 35 (40) or older in 1994 who choose to affiliate with ISS has not been modified (Table 5). Also the defined-benefit formula for people choosing ISS is unchanged if they are of age 35 (40) or more. This continuation of low retirement ages and generous DB formulae for middle-aged and older cohorts introduces a strong (albeit temporary) bias in favor of ISS affiliation by these age groups, particularly women. Retirement ages for younger contributors at ISS are increased by 2 years and their DB formula differs slightly from the standard DB formula of the old pension scheme (cf. Tables 5 and 3). For all workers—young and old—affiliating with AFPs, retirement ages are 60 (62) or any earlier age at which retirement savings finance a pension annuity of at least 110% of the minimum wage.

Colombia's benefit structure comprised by its new (steady-state) retirement ages and minimum years of required contributions is very similar to that prevalent in the reformed Latin American economies, but is substantially less generous than that offered in most other, typically unreformed, developing countries. Finally, Colombia's steady-state retirement ages are only slightly lower while its required years of contributions are higher than in the OECD countries, where life expectancy is well above Colombia's.

2.3 The Reform Transition

A useful distinction for understanding the pension reform transition and how the implicit PAYG debt is made explicit is between pension rights of current (pre-reform) pensioners and those accrued to current workers in lieu of their affiliation to the old system. Payments of pensions to current pensioners will be done through the newly established national and regional pension funds and those few surviving funds and cajas deemed to be solvent. This will imply explicit transfers from the central and regional governments as long as the last current pensioner survives—for at least three decades from now on.

The second and larger part of the implicit PAYG debt are past pension rights accrued to current (1994) workers. Following the Chilean precedent, pension recognition bonds (bonos de reconocimiento pensionales) will be issued to those currently active workers that choose to shift affiliation from any pre-1994 pension institution to AFPs or from any pre-1994 pension institution other than ISS to the

ISS. Recognition bonds will be issued by the pension institutions were workers were affiliated before shifting to AFPs or ISS.¹²

With regard to institutions, Cajanal is expected to be phased out by 1995 while all other insolvent national pension funds and *cajas* could be closed in 3-4 years. The insolvent regional pension funds should be phased out in a similar time frame. Although their pension liabilities are the responsibility of the corresponding regional governments, it is anticipated that the central government will play a significant role in bailing them out.

In accordance to its new role, ISS has been converted from a government agency to an autonomous and corporatized SOE (*empresa industrial y comercial del estado*). ISS will continue as a PAYG pension fund in the sense that current pensions will be paid by current capital income and current contributions; hence there is no one-to-one link between contributions and future pension benefits at the individual level. However, the degree of ISS funding—the ratio of reserves to pension liabilities—should increase substantially in the future as a result of new affiliations by active workers bringing with them pension recognition bonds.

Colombia also started recently a system of privately managed unemployment insurance funds (*fondos de cesantía*) that invest mandatory payroll contributions and pay out their capitalized value at labor severance or quit. These funds have been a lab test for the privately-managed pension funds or AFPs that started operation in April 1994. AFPs are receiving contributions from new affiliates since June 1994. Affiliation to AFPs is growing from 0.319 m. in late June to 0.553 m. in late September 1994, the latter figure equivalent to 13% of total pension contributors in late 1993.

At retirement AFP contributors withdraw their capitalized pension savings to buy a pension annuity, a deferred pension or programmed pension withdrawals from insurance companies. Hence while active-life pension plans with AFPs are based on defined contributions, retirement-life pension benefits are actuarially-fair defined-benefit plans.

The recently established Intendency for Pension Funds in the Superintendence for Banks is mandated with regulation and supervision of both ISS and AFPs in all facets related to pension contribution collection, establishment and management of pension funds, and investment of pension fund assets. As has happened in Chile since 1980, one could anticipate a positive externality of FF and privately-managed AFPs on the development of capital market instruments and its regulation. In fact, recent reforms of Colombia's financial system in 1990 and 1992 were motivated in part by the subsequent pension reform.

The coexistence of two different pension systems potentially enriches the set of consumer choices allowing contributors to decide between defined-contribution (DC) and DB systems. However, because the DB feature is embedded in a state-run PAYG (or partially-funded) pension system, the costs of such a scheme are perpetuated. In fact, considerable financial and economic uncertainties arise from the right conferred to contributors (subject to certain restrictions) to shift every three years their affiliation—back and forth—between ISS and AFPs. While currently older cohorts have a clear incentive to remain affiliated with their current

pension funds or re-affiliate with ISS, the choices of younger and future generations will be strongly influenced by the expected risk-benefit profile of ISS relative to that of the AFPs. The degree of ISS funding and its political and financial autonomy from the government will be paramount in contributor decisions.

III. Fiscal Implications

Colombia's reform—like other pension reforms in Latin America—combines two very different changes: a reduction in net benefits paid to future pensioners by the existing PAYG system, and a gradual substitution and partial privatization of the existing PAYG scheme by a dual PAYG-FF system. The first reform component reduces pension system deficits and the implicit PAYG debt of the government incurred *vis-a-vis* future pensioners and improves the financial position of public pension institutions. The second reform component entails a regime change that makes explicit the currently implicit PAYG debt as current PAYG pensioners are paid off and past PAYG pension liabilities accrued to workers are paid to those shifting to a FF scheme. During this extended horizon the making explicit of PAYG debt is reflected by reform transition deficits incurred by the government.

This section reports numerical simulation results of the fiscal effects of Colombia's pension system changes.¹³ They are based on an actuarial model that computes annual pension revenues, expenditures, surpluses, and outstanding net liabilities for the three components of Colombia's current mandatory pension system: (i) the government pension system (SPP) comprised by Cajanal, the national, and the regional pension funds and *cajas* as well as their successor transfer programs (FNPP and FTTP), (ii) the public Instituto de Seguros Sociales (ISS), and (iii) the new privately-managed pension funds or AFPs.¹⁴

There are two major differences between the model used here and its predecessors. First, this model embodies the features of the actual pension reform reflected in Law 100-1993 (Ministerio de Seguridad Social y del Trabajo, 1993b) as opposed to those of preliminary reform projects and proposals embedded in the other studies.¹⁵ Second, this study allows for a series of step-wise simulations that identify the separate contribution of demographic, systemic-reform, and economic factors to transition deficit and debt levels. However, both the model used here and its predecessors are partial-equilibrium accounting frameworks, devoid of behavioral economic content, that treat relevant macroeconomic variables—such as growth and interest rates—as pre-determined. However, the simplicity of these frameworks make them useful devices to provide actuarial projections of fiscal deficits and debt levels for a given macroeconomic environment.¹⁶

Four simulations are performed below. Table 6 summarizes their main features. The simulations follow a sequence starting with a no-reform scenario to follow with a step-wise introduction of relevant features and necessary assumptions related to Colombia's pension reform.

Figure 1 shows projected contributors to each pension system component for three different scenarios:

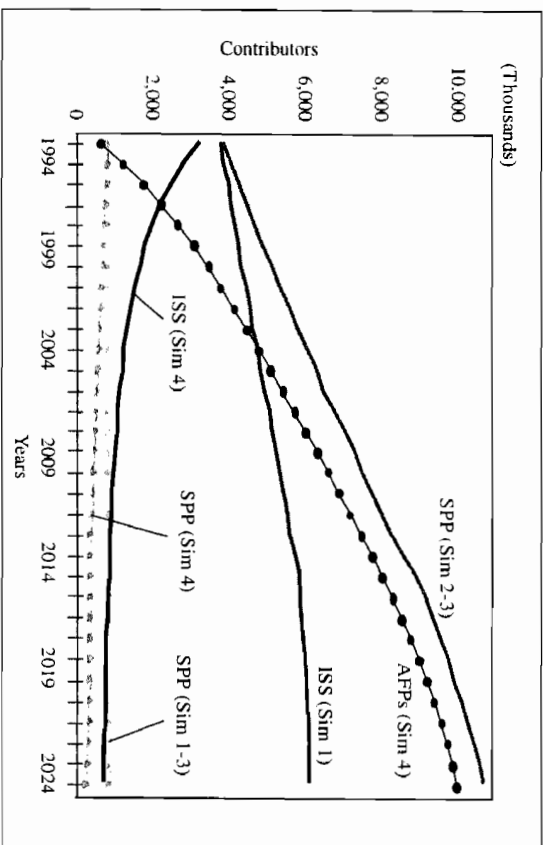
- (i) constant labor-force coverage and no reform (simulation 1),
 (ii) gradual and large rise in labor-force coverage of the pension system from 29.6% in 1994 to 46.6% in 2025, for simulations with no reform (simulation 2) and with partial reform (simulation 3), and
 (iii) actual (full) reform case, with a gradual and large rise in labor force coverage of the pension system from 29.6% in 1994 to 46.6% in 2025 (simulation 4).
 Under simulations 1-3, SPP contributors grow slightly from 800,000 contributors in 1994 to 850,000 in 2025.¹⁷ With constant labor-force coverage in simulation 1, ISS grows from 3.8 m. in 1994 to 6.1 m. in 2025. However, when coverage is raised all additionally covered workers affiliate with ISS so that ISS grows massively to 10.7 m. contributors in 2025 under simulations 2 and 3.¹⁸ Finally, under the reform-case simulation 4, the shift of affiliation from ISS and SPP to AFPs implies that AFP contributors increase from 600,000 at the end of 1994 to 10.1 m. in 2025, at the expense of declining contributors at ISS (with only 600,000 in 2025) and at SPP (with 200,000 in 2025). The projected shift of affiliation to AFPs is massive but gradual, reflecting the assumption that the risk-return frontier offered by the AFPs dominates that of ISS during the length of the

TABLE 6

FISCAL EFFECTS OF COLOMBIA'S PENSION REFORM: MAIN FEATURES OF FOUR ACTUARIAL SIMULATIONS

Simulation 1: Constant Coverage, No Reform
* Constant pension system coverage (affiliation to mandatory pension system at 1994 level of economically-active population)
* No pension reform
* Base-case economic variables (annual real interest rate $r = 5\%$, annual real GDP growth rate $g = 5\%$, annual real wage growth rate $w = 3\%$)
Simulation 2: Increasing Coverage, No Reform
* Increasing pension system coverage (affiliation to mandatory pension system grows from 29.6% of economically-active population in 1994 to 46.6% in 2025)
* No pension reform
* Base-case economic variables
Simulation 3: Increasing Coverage, Partial Reform
* Increasing pension system coverage
* Partial pension reform (increase in contribution rates and in retirement ages, but no AFPs)
* Base-case economic variables
Simulation 4: Actual Reform Base Case
* Increasing pension system coverage
* Actual pension reform (increase in contribution rates and in retirement ages, plus start of AFPs)
* Base-case economic variables
* Base-case speed of shift of affiliation from ISS-SPP to AFPs

FIGURE 1
 COLOMBIA: CONTRIBUTORS TO THE MANDATORY PUBLIC AND PRIVATE PENSION SYSTEM, ALTERNATIVE SIMULATIONS, 1994-2025



transition horizon. Strong AFP growth in the reform case is consistent with the experience observed during the initial reform months and the forecasts by market participants.¹⁹

Let's now turn to the fiscal effects of the pension reform. Table 7 reports first and last-year deficits of ISS and SPP during the simulation horizon 1994-2025 and Figure 2 shows the complete time profile of the mandatory public pension system (ISS and SPP combined) for simulations 1-4. Under the constant-coverage no-reform simulation 1, the total public pension system deficit rises from 1.1% of GDP in 1994 to 3.5% of GDP in 2025. This reflects what would have happened to Colombia's public PAYG scheme in the absence of any reform—an explosive deficit path as a result of pension system maturation and a graying population.²⁰

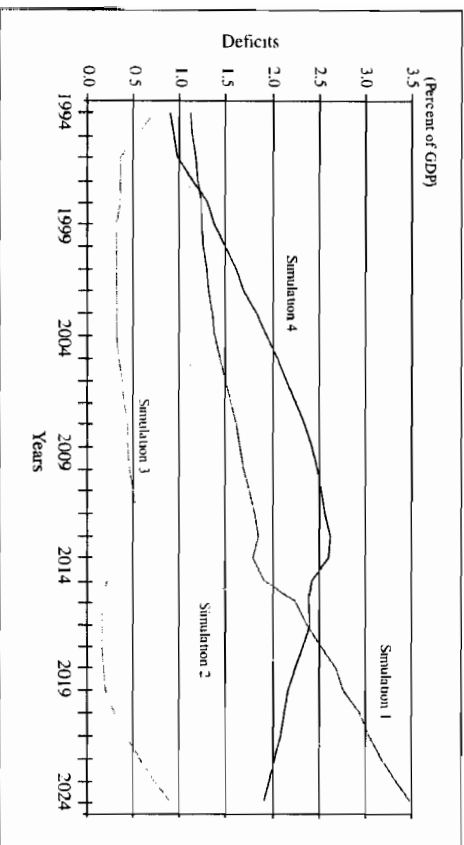
The counter-factual scenario of no-reform but increasing pension system coverage implies postponing to the future the deficits embedded in the old PAYG system. When affiliation to ISS grows strongly during 1994-2025, a larger base of contributors sustains over a longer period the exponentially growing number of ISS pensioners. Therefore the time profile of ISS deficits (and of total deficits in figure 2) is shifted down, but toward the end of the projection horizon deficits start to grow strongly, reaching 2.99% of GDP in 2025.

TABLE 7
COLOMBIA: PUBLIC PENSION SYSTEM (ISS AND SPP) DEFICITS IN 1994 AND 2025.
VARIOUS SIMULATIONS
(Percentage of GDP)

Simulations	ISS		SPP		TOTAL	
	1994	2025	1994	2025	1994	2025
1. Constant Coverage, No Reform	-0.24	1.86	1.33	1.61	1.09	3.47
2. Increasing Coverage, No Reform	-0.25	1.38	1.33	1.61	1.08	2.99
3. Increasing Coverage, Partial Reform	-0.25	0.13	0.96	0.75	0.71	0.88
4. Actual Reform Case	-0.08	1.06	0.96	0.86	0.88	1.92

Source: Author's calculations.

FIGURE 2
COLOMBIA: MANDATORY PUBLIC PENSION SYSTEM (ISS PLUS SPP) DEFICITS,
ALTERNATIVE SIMULATION, 1994-2025



The (still counter-factual) scenario 3 combines an increase in coverage with a partial pension reform. The differences in levels and time profile of deficits with simulation 2 are staggering. Raising both contribution rates and retirement ages has a massive and permanent effect on the financial position of both ISS and SPP. Total pension deficits decline immediately—in 1994—to 0.71% of GDP and continue falling subsequently to reach a bottom level of 0.15% of GDP in 2017 and 2018, to start rising again, attaining 0.88% of GDP in 2025. This confirms the conclusion—observed in other pension reform cases such as Chile—that raising contribution rates and retirement ages has a large impact in reducing pension system deficits and hence the size of the implicit PAYG debt. However, as opposed to Chile where retirement ages were raised for younger and older cohorts of contributors, the increase in retirement ages affects only the younger generations. If they had also been raised for the older, transition deficits would have been lower.

Now consider the actual reform case embedded in simulation 4. Introducing the option of affiliation with AFPs implies that ISS and SPP lose gradually their contributor bases while continuing pension payments to their own current and future pensioners and to those who have moved to AFPs. The time profile of total ISS and SPP deficits starts at 0.88% of GDP in 1994, reaches a peak of 2.61% in 2013, and then declines to 1.92% of GDP in 2025 (and even further subsequently).²¹

In the reform case simulation 4—as well as in simulations 1-3—real GDP growth (g) is equal to the real interest rate (r). This allows to add up annual deficit ratios to GDP in order to obtain the capitalized deficit ratio or cumulative pension debt ratio to GDP. This value is the present value pension debt ratio to GDP at any year, today or in 2025. Adding up 1994-2025 annual deficit ratios yields the cumulative pension debt ratio to GDP for that period. Total ISS and SPP recognition bond debt incurred during 1994-2025 is 9.0% of GDP, only one sixth of total operational deficit debt at 54.2% of GDP. Hence total explicit pension debt incurred during 1994-2025 under the reform case simulation is estimated at 63.2% of GDP (Table 8).

It is expected that pension transition deficits of both ISS and SPP will continue beyond 2025, converging toward zero around 2060. SPP (including the transfer programs FNPP and the FTTPs) will be extinguished by then. However, one may anticipate continuation of ISS with a core number of affiliates for the very long term, implying a corresponding implicit PAYG debt associated to this group. For the total pension transition period 1994-2060, explicit debt levels attain 14.4% of GDP for the recognition-bond deficit component and 69.2% of GDP for the operational deficit part. This implies reaching a grand total of 83.6% of GDP of explicit pension debt, that requires an identical amount of explicit government financing.

How much of this explicit debt is due to pension system deficits that would have been observed under a partial pension reform and how much is due to making explicit the implicit PAYG debt as people shift to the fully-funded AFPs? The answer lies in comparing the cumulative explicit pension debts for the partial-reform simulation 3 and the full-reform case simulation 4 (Table 9). The cumu-

TABLE 8
COLOMBIA: CUMULATIVE PUBLIC PENSION SYSTEM (ISS AND SPP) EXPLICIT DEBT,
REFORM CASE SIMULATION
(Percentage of GDP)

	ISS			SPP			TOTAL		
	Recognition Debt	Operational Debt	Total Debt	Recognition Bond Debt	Operational Debt	Total Debt	Recognition Bond Debt	Operational Debt	Total Debt
1994-2025	8.8	19.0	27.8	0.2	35.2	35.4	9.0	54.2	63.2
2026-2060	5.0	5.0	10.0	0.4	10.0	10.4	5.4	15.0	20.4
1994-2060	13.8	24.0	37.8	0.6	45.2	45.8	14.4	69.2	83.6

Note: The cumulative debt levels for 2026-2060 are based on deficit projections consistent with the time trends of 1994-2025 simulations and restricted to attaining zero deficit levels in 2060.
Source: Author's calculations.

TABLE 9

COLOMBIA: CUMULATIVE PUBLIC PENSION SYSTEM (ISS AND SPP) EXPLICIT AND
IMPLICIT PAYG DEBT, REFORM CASE SIMULATION
(Percentage of GDP)

	Increasing-Coverage Partial Reform Simulation 3			Increasing-Coverage Actual Reform Case, Simulation 4		
	1994-2025	2026-2060	1994-2060	1994-2025	2026-2060	1994-2060
Cumulative Explicit Debt due to Pension System Deficits:						
1994-2025	12.4	12.0	24.4	63.2	20.4	83.6
2026-2060	5.0	5.0	10.0	5.4	15.0	20.4
1994-2060	17.4	17.0	34.4	68.6	35.4	104.0
Total Explicit Debt Requiring Financing due to partial-reform deficits due to making explicit the implicit PAYG Debt				83.6	24.4	108.0
Remaining steady-state Implicit PAYG Debt of ISS at 2060					4.5	4.5
Total Implicit PAYG Debt					63.7	63.7
Total Explicit and Remaining Implicit PAYG Debt				88.1	88.1	88.1

Note: The steady-state implicit PAYG debt of ISS at 2060 is estimated as the product of annual steady-state pension payments after 2060 (0.45% of GDP for 400,000 pensioners) and the expected average number of years of pension payments for each pensioner (10).
Source: Author's calculations.

relative 1994-2060 explicit debt under simulation 3 is 24.4% of GDP, falling 59.2% of GDP short of the cumulative explicit debt of the reform case simulation. Hence the implicit PAYG debt of Colombia's pension system (evaluated at contribution and benefit levels of the new system) that is made explicit by the actual reform is 59.2% of GDP. Adding to this figure the remaining steady-state implicit PAYG debt due to the survival of ISS with a core number of affiliates in 2060 and beyond—estimated at 4.5% of GDP²²—implies a total implicit PAYG debt of 63.7% of GDP. Finally, the total sum of Colombia's explicit pension reform and remaining implicit PAYG debt at 88.1% of GDP reflects what would have been the total explicit debt if the PAYG system (ISS) had been phased out entirely by the pension reform, as happened in Chile.

Let's now return to the other results by comparing the debt levels incurred by SPP and ISS under the four simulations and the asset levels accrued to AFP affiliates under simulation 4 (Table 10). This comparison is limited to the first 32 years of the transition period (1994-2025). Under constant coverage and no reform (simulation 1), the total (ISS and SPP) explicit pension debt is 60.6% of GDP. Increasing ISS coverage (simulation 2) raises ISS contributions for an extended (but temporary) period, leaving ISS with net assets of 1.0% of GDP in 2025 and postponing for subsequent decades the accumulation of net ISS debt. The financial effectiveness of the partial pension reform—comprising higher contribution rates for all and higher retirement ages for younger cohorts—is reflected by an increase in ISS assets and an increase in SPP debt ratios, each by 18 percentage points of GDP (simulation 3). Hence total public pension debt shrinks from 48% of GDP (simulation 2) to 12.4% of GDP (simulation 3).

TABLE 10

COLOMBIA: CUMULATIVE PUBLIC PENSION SYSTEM (ISS AND SPP) DEBT AND
PRIVATE PENSION SYSTEM (AFPS) ASSETS AT YEAR 2025, VARIOUS SIMULATIONS
(Percent of GDP)

Simulations	Public Pension System Debt			Private Pension System (AFP) Assets
	ISS	SPP	Total	
1. Constant Coverage, No Reform	11.6	49.0	60.6	-
2. Increasing Coverage, No Reform	1.0	49.0	48.0	-
3. Increasing Coverage, Partial Reform	-19.3	31.7	12.4	-
4. Actual Reform Case	27.8	35.4	63.2	52.3

Source: Author's calculations.

As discussed above, the actual reform case (simulation 4) implies an explicit public pension debt level of 63.2% of GDP. Private pension (AFP) system assets accumulated during 1994-2025 attain 52.3% of GDP. It is important to note that this figure is very close to 50.8% of GDP. The latter is the difference between simulation-3 and simulation-4 explicit debt levels, i.e., the implicit PAYG debt made explicit by the shift of pension system contributors to AFPs during the first 37 years of the reform.²³

We conclude that Colombia's pension reform will imply substantial transition deficits. Their values are sensitive to three highly uncertain conditions: the success of Colombia's new mandatory pension system in extending worker coverage, the speed of re-affiliation from ISS-SPP to AFPs (as well as their possible return to the ISS), and macroeconomic performance. On the latter this section has assumed that growth, interest, and wage rates are unaffected by the pension reform itself—a simplifying assumption of actuarial projections that will be lifted in the next section.

IV. Fiscal and Macroeconomic Implications of Colombia's Pension Reform

Colombia's GDP growth reached an average annual 3.5% during the 1980s, exceeding by much the depressed 1.4% average GDP growth rate in the rest of Latin America and the Caribbean.²⁴ This better-than-average result was largely due to Colombia's more consistent and careful macroeconomic policy stance. But such a performance is still insufficient to lead to significant improvements in per-capita living standards and to overcome poverty. This realization led the Colombian government to initiate deep structural reforms since 1990, including trade reform, liberalization of the domestic financial sector and international capital flows, public sector reform, and limited privatization of SOEs. At the same time, public sector activity and spending were reoriented toward social sectors and poverty elimination. Part of the latter reorientation is reflected by the 1993 pension and health reforms.

While Colombia has faced strong fluctuations in its external terms of trade during this period of reforms, it is benefiting from major recent oil discoveries in Cusiana and Cupiagua. The present value of 1993-2005 net income flows of the oil discoveries is estimated at US\$ 15.2 b. (or 26.1% of 1994 GDP), of which the government is entitled to 81% or an estimated US\$ 12.4 b. (equivalent to 21.2% of 1994 GDP). Therefore a major macroeconomic challenge facing Colombia in the near future is to manage its oil bonanza in a way that is consistent with pursuing a sustainable fiscal policy and a structural reform program that includes a significant pension reform.

4.1 Financing options

Colombia is facing a long period of pension reform deficits that start at 0.9% of GDP in 1994 and peak at 2.6% in 2013, falling gradually thereafter to disappear by, say, the year 2060. The capitalized value of pension deficits incurred

until 2060 could reach a total of 83.6% of GDP, according to the reform case simulations summarized above (Table 8). Pension deficits will last for a very long time horizons, during which many other shocks will surely impinge on public finances. Therefore it is sensible to identify now possible sources for financing significant and protracted pension reform deficits. Obviously this decision has to be taken as part of the government's overall financial programming that requires deciding on the size and financing of its overall officially recorded deficit.

A look at Colombia's fiscal stance reveals a picture of a growing public sector (as measured by expenditure and revenue shares in GDP) that, however, has been able to maintain a roughly balanced budget and low levels of indebtedness. These fiscal conditions are much more favorable than those in most other OECD and developing countries, including those prevailing in Chile during the first 5 years after the start of its pension reform.

Colombia's government faces two fundamental choices in deciding how to finance its pension reform deficit:

- (a) Paying off the implicit PAYG debt by a combination of issuing domestic debt, using future net income from oil discoveries, using revenue from SOE privatization, and cutting government capital expenditure; or
- (b) reducing its non-pension fiscal deficit by raising taxes or reducing current expenditure.

The first option is the "purest" form of pension reform. It leaves the government's net total wealth or asset position (including explicit and implicit liabilities) unchanged even though the official government deficit records an increase by the amount of the pension deficit. The second option, however, avoids an increase in the official government deficit although it implies an increase of net total (explicit and implicit) government wealth. This alternative also implies an income transfer from current and future transition generations (those hurt by higher taxes or lower government expenditure) toward long-term future generations free from PAYG transfers (which would have been paid if the old PAYG system were maintained) or higher taxes/lower public expenditure (which would have been required to finance the shortfall of returns as a result of lower non-pension net assets under the first option).

In deciding among these choices—or any combination of them—the following criteria should be considered.

- (i) Resources Available from New Oil Discoveries and Privatization. While not all resources from oil discoveries and privatization could be used for paying for pension deficits (due to budgetary and political pre-commitments and restrictions), it is useful to compare the upper bounds of potentially available resources with the pension resource needs. Adding the total estimated present value of net income accruing to the government from the oil discoveries (21.2% of GDP) to a rough estimate of the present value of privatization revenue (10.0% of GDP)²⁵ yields a figure of 31.2% of GDP, that falls short of total long-term pension financing requirements (83.6% of GDP). Still, the figure of 31.2% of GDP is equivalent to the capitalized value of total pension deficits during the first 18 years of reform (1994-2011).

(ii) Financial Effects of Issuing Explicit Domestic Debt. If all government revenue from oil discoveries and privatization were used for paying off part of the pension debt, there would still be a sizable amount—52.4% of GDP—requiring other sources of financing. What effect would be felt in domestic financial markets—particularly on interest rates—if that amount were entirely financed by issuing domestic debt, hence raising the outstanding domestic debt from 6.0% in 1993 to 58.4% of GDP by, say, 2060?

In answering this question it is important to keep in mind that issuing explicit domestic debt for paying off implicit government debt does not have first-round macroeconomic and financial effects. If financial-market participants see through this debt swap, i.e., do not suffer from fiscal illusion. If financial market participants, including the new AFPs, realize that the government's net wealth position is unaffected by a debt-financed pension reform that simply increases both the supply of government debt and the demand for government paper (through the investment of AFP resources), interest rates on government debt (and hence domestic interest rates at large) should be unaffected. This seems to have happened in the aftermath of the Chilean reform throughout the 1980s when explicit government debt grew rapidly while PAYG pension debt was repaid, but real interest rates did not change much. However, some degree of fiscal illusion should not be ruled out a priori, justifying a careful initial use of debt financing.²⁶

(iii) Intergenerational redistribution, saving and growth effects of financing the pension deficit by reducing the non-pension deficit. As discussed above, a pension reform combined with a contractionary fiscal policy is what the second option is about. It involves a resource transfer from transition toward future generations, contributing in this way to higher long-term saving and income. Therefore wider considerations of fiscal sustainability and intergenerational equity should determine how much pension deficit financing should rely on fiscal contraction. This decision will also be influenced by its effects on long-term saving and output, estimated in the next section.

(iv) If fiscal contraction is used and the non-pension deficit is cut, which taxes should be raised and which expenditure programs should be cut? Answering to this question is beyond the scope of this paper—it is part of the government's ongoing evaluation of fiscal policy and the relative efficiency of its individual financing instruments and spending programs.

4.2 Long-run output and welfare effects of Colombia's pension reform if financed by fiscal contraction

How large is the long-run increase in output and welfare when the transition deficit is financed by raising taxes or cutting expenditure? An answer to this question is provided here by applying an overlapping-generations exogenous-growth model parameterized for the Colombian economy.²⁷ The model simulations are performed for the pre-reform steady-state equilibrium under a PAYG system and the post-reform steady-state equilibrium with a FF pension scheme—the latter relevant only for the very long run, that is 70 or more years into the future.

Two comparative simulations are performed for Colombia, each of them comparing macroeconomic performance and consumer welfare levels of the initial PAYG and the final FF system. Simulation 1 is for homogeneous consumers which share a common subjective discount rate and pay a low mandatory pension contribution rate of 3.6%. The latter figure is close to the average contribution rate paid by Colombia's total labor force (comprising those paying and those evading payroll taxes) during 1994-2025. Simulation 2 distinguishes between consumers with low and high subjective discount rates—the latter are strongly affected by credit constraints—but both pay a low contribution rate. Credit constraints are reflected by a non-negativity constraint imposed on consumer assets. Model results are summarized in Table 11 and life-cycle profiles for income, consumption, and non-pension assets are depicted in Figure 3. The results quantify the qualitative predictions of pension reform theory for a tax-financed transition reform deficit, i.e., when the implicit PAYG debt is paid off by transition tax-paying generations.

Simulation 1 for homogeneous consumers reflects that the initial PAYG debt is 62.9% of GDP when the pension contribution rate is 3.6%. The PAYG debt figure is close to the estimate for Colombia's implicit PAYG debt accumulated through 2025 (63.2% of GDP). Eliminating that debt by adopting a FF scheme changes the life profile of individual consumption and income as depicted in Figure 3.

Shifting resources from tax-paying to future cohorts raises long-term saving, capital, and consumption levels. Capital deepening (the capital/output ratio increases by 13 percentage points) leads to a fall in capital productivity and hence in the real interest rate, and to a higher wage rate. The lower interest rate is reflected by a less steep intertemporal life-cycle consumption schedule (Figure 3). The higher rate of return of the FF schemes—that is, the difference between FF real interest rate and the PAYG 5% steady-state GDP growth rate—explains why the replacement ratio (pension/average wage during the last 10 working years) increases by so much under the FF scheme. Output increases by a very modest 2.4% and future consumers enjoy a small welfare gain of 4.2%—at the expense, obviously, of income and welfare losses suffered by the transition generations that have paid off the implicit PAYG debt.

Simulation 2 differentiates between consumers with low and high discount rates. Consumers in the second category are credit-constrained for a significant fraction of their lives, forced by the mandatory pension schemes to save more than what they would voluntarily do. Because of these consumers, there is less capital in this economy, real interest rates are higher, and wages are lower. However, the shift of PAYG to FF—which benefits long-term consumers because of the resource transfer—has a stronger relative effect on all variables than under simulation 1 because credit-constrained consumers are forced to save a large fraction of their resource transfer. Welfare of unconstrained consumers increases by more than welfare of constrained people because the latter save more than what they would do in a voluntary saving scheme. The output levels is now 3.9% higher in the very long run.²⁸

These simulation results point toward a number of important conclusions:

COLOMBIA: LONG-RUN MACROECONOMIC AND WELFARE EFFECTS OF A FISCAL CONTRACTION-FINANCED PENSION REFORM. TWO SIMULATION RESULTS

TABLE 11

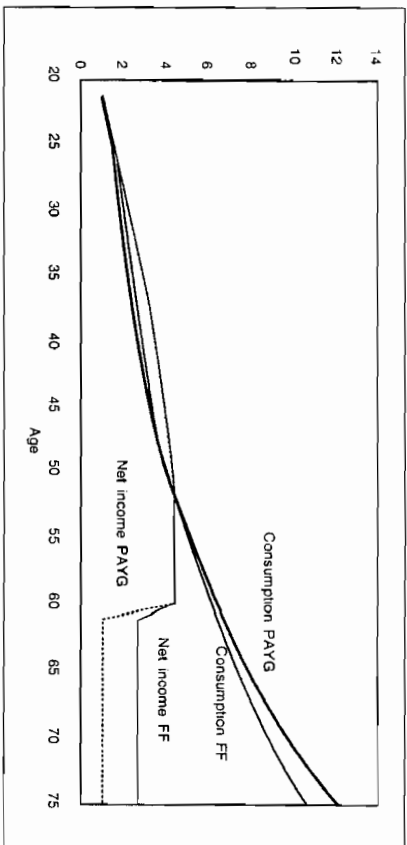
Simulation 1: Homogeneous Consumers without Credit Constraints, Low Contribution Rate		
	Pre-Reform Stationary Equilibrium under PAYG	Post-Reform Stationary Equilibrium under FF
Implicit PAYG Debt/GDP	62.9%	0
Real Wage Rate	1.15	1.18
Replacement Rate	28.9%	66.4%
Pension Fund Assets/Capital	0	31.7%
Consumption/GDP Ratio	64.4%	63.3%
Investment/GDP Ratio	24.9%	26.0%
Real Interest Rate	8.6%	8.0%
Capital/Output Ratio	2.90	3.03
Increase in Output		+2.4%
Increase in Welfare (Equivalent Wealth)		+4.2%

Simulation 2: Heterogeneous Consumers Paying Low Contribution Rate		
	Pre-Reform Stationary Equilibrium under PAYG	Post-Reform Stationary Equilibrium under FF
Implicit PAYG Debt	62.9%	0
Real Wage Rate	1.07	1.10
Replacement Rate	28.9%	102.7%
Pension Fund Assets/Capital	0	46.5%
Consumption/GDP Ratio	67.9%	66.3%
Investment/GDP Ratio	21.4%	23.0%
Real Interest Rate	10.5%	9.5%
Capital/Output Ratio	2.50	2.68
Increase in Output		+3.9%
Increase in Welfare (Equivalent Wealth): of unconstrained consumers of constrained consumers		+6.5% +5.5%

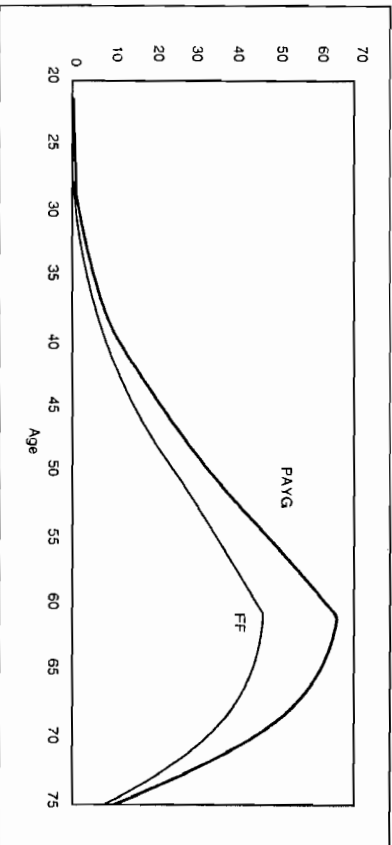
Source: Author's calculations.

FIGURE 3

LIFE-CYCLE INCOME AND CONSUMPTION PROFILES UNDER PAYG AND FF SYSTEMS IN COLOMBIA. SIMULATION 1



LIFE-CYCLE NON-PENSION ASSET PROFILES UNDER PAYG AND FF SYSTEMS IN COLOMBIA. SIMULATION 1



Financing of Colombia's pension reform by raising taxes or cutting government current expenditure leads only to modest output and welfare gains that are all in the single-digit percentage range. However, if labor force coverage by the new pension system is significantly extended as a result of introducing FF—say from the current 29.6% to 70% or more—the output and welfare gains of tax financing could exceed 10%. The larger is the share of credit-constrained consumers, the more significant are the macroeconomic and welfare changes of tax financing.

Finally, the larger is the pure FF component of pension contributions—that is, the lower is the pure tax component—the larger will be the incentive and macroeconomic effects of the pension reform.

4.3 Long-run effects of Colombia's pension reform on growth and equity

Saving and growth

The quantitative simulations of the preceding section show that financing the pension reform through fiscal contraction raises long-term saving and output. Beyond this effect it is also possible that overall saving is increased as a result of lower myopia if workers are made more aware of old-age savings by holding individual pension savings accounts. Further effects on output growth—as opposed to effects limited to the level of output—could only be reaped if higher saving translated into higher investment does not ultimately drive down the return on capital to the level of the discount rate. That would depend on the nature of Colombia's capital accumulation and growth process, i.e., on the endogeneity of long-term growth.

Formal employment and growth

Colombia's new pension system offers the potential benefit of reducing the incentives for payroll tax evasion and hence contributing to larger shares of more productive formal-sector employment and production. However, two features of Colombia's reform make it unlikely that such gains could be reaped as a result of pension reform alone.

First, pension contribution rates have been increased substantially, from 0-6.5% prevalent before the reform to 13.5-14.5% in 1996 and thereafter. This is troublesome for myopic contributors, those that because of their high subjective discount rates do not value much the pension benefits they will receive in a distant future even though these benefits are closely linked—through market returns—to their current contributions. For this group of contributors, the pension reform induces a further disincentive to work in formal sectors, encouraging a larger shift to informality. Hence it is only for less myopic people that the reduction in the pure-tax component of payroll taxes offers a positive incentive to go formal.

Second, pension contributions are a relatively minor component of overall payroll contributions for seven social programs that, after the pension and health reforms, range between 39.83% and 46.33% (Ministry of Labor and Social Security, Colombia). These are very high levels, not only in absolute terms but, most important, because of their high pure-tax components. Under certain assumptions,²⁹ the pure tax component of payroll contributions could be as high as 13 to 16% for non-myopic contributors—a powerful incentive for informal employment.

This points to the inference that in order to raise the share of formal-sector employment and production, payroll contributions other than pension should also be closely linked to expected benefits at the individual level. Therefore the dis-

tributive components of all programs should be financed by general taxation. Only then would the potential contribution of pension reform to formal-sector employment and hence higher average labor productivity growth be realized.

Capital market development and growth

Colombia's reform combines a partial privatization of pension services with an explicit focus of the government on its redistributive and regulatory functions. Colombia's administrative costs ranged between 5% and 15% of contributions under its old pension system (Ayala, 1994). The limited international experience suggests that some administrative costs could fall with privatization while others—fundamentally marketing expenses—increase when pension services are provided by a competitive industry of private providers among which contributors can choose.³⁰ Net rates of return of pension savings, portfolio diversification, and the overall quality of pension services should increase significantly with privatization. The government's specialization on redistribution and regulation/supervision of the pension service industry should also contribute to efficiency gains reflected in better pension services at lower cost.

Beyond the provision of pension services, Colombia's FF private pension system endowed with broad portfolio choices by AFPs should spur the development of capital markets in general and the market for long-term securities in particular. If Chile's experience offers any indication, it is that capital-market development takes off with a privatized FF pension system. This involves both a large growth of domestic equity and bond markets and portfolio diversification by investing part of pension savings abroad. As a positive externality of this growth in capital markets, Colombia's legal and regulatory framework for capital markets will require further improvements and the country's integration into world financial markets will increase. Colombia's financial intermediation will improve and its capital cost could fall—both factors contributing to additional efficiency and growth gains.

Equity and poverty

Colombia's old pension system—as most state-run PAYG schemes³¹—was inequitable and ineffective in providing support to the old-age poor. Intra-generational distribution of income (from lifetime rich to lifetime poor) through the pension system was regressive in Colombia for two reasons. First, most of Colombia's poor engage in informal activities that pay lower wages than those prevalent in formal sectors (World Bank, 1994a), in part because of the existence of a formal-sector PAYG system. Second, income redistribution within the pension system was highly regressive, allowing for large differences in contributions and benefits among different pension plans that benefitted those groups that were more successful in pushing for higher net benefits—typically not the poorest.

By eliminating the pure tax component of pension contributions (at least for non-myopic contributors), the pension reform offers the possibility of attracting low-income groups. A more important instrument, however, is the direct redistribu-

bution toward low-income contributors (through partial subsidies of their contributions by the Fondo Nacional de Solidaridad Pensional) and low-capital workers at retirement (through the Minimum Pension State Guarantee). These explicit redistributive programs targeted to the poor, complemented by the elimination of perverse redistribution pervasive under the old system, makes the new system much more equitable and effective in addressing old-age poverty.

What can be said about intergenerational distribution? During the reform transition the massive transfer to current pensioners is maintained. Older contributors keep their generous benefits but pay larger contributions, and younger contributors see their benefits cut and are required to contribute more. Further intergenerational redistribution will mostly depend on how the transition deficit is financed. As discussed above, deficit financing through fiscal contraction implies income redistribution from transition generations toward future cohorts. Other forms of financing—by issuing debt, using privatization and oil revenue, or cutting public investment—leave intergenerational distribution largely unaffected.

V. Conclusions and Future Policy Challenges

Colombia's 1993 pension reform precluded an explosion of fiscal imbalances, efficiency costs, and systemic inequities that the country would have suffered in coming years as a result of demographic and systemic maturity. The pension reform, initiated in June 1994, corrects many of the flaws of the preceding system by combining a reduction in net benefits paid to future pensioners and a gradual substitution and partial privatization of the existing PAYG scheme by a dual PAYG-FF system.

The direct impact of the reform components entails a reduction of pension system deficits as well as of the implicit PAYG debt of the government. Making this debt explicit is reflected by reform deficits incurred by the government. The government during the transition period will have to choose among different options to finance such deficits, considering their dissimilar impact on long-term savings, output, and welfare paths.

Efficiency gains in labor and capital markets are unlikely to be reaped as a result of pension reform alone. The government of Colombia faces five policy changes in order to ensure that the growth and poverty-alleviation benefits of the pension reform come to fruition.

First, the complex institutional changes required by the pension reform should be executed effectively and promptly. This includes determining the solvency of national and regional pension cajas and funds, phasing out insolvent institutions, starting new institutions (the national and regional pension payment programs and the distributive transfer programs), performing calculation and payments of recognition bonds, supporting smooth changes in contributor affiliation from old public funds to the AFPs (and ISS), and ensuring effective regulation and supervision of both ISS and AFPs by the Intendency for Pension Funds.

Second, the role played by ISS as an important provider of pension services

in Colombia should be clarified and, in the long-term, revised. First, there is a risk that the efficiency and equity costs of a state-managed PAYG system will be preserved in proportion to the size of ISS. Second, considerable financial and economic uncertainties arise from the right of contributors to shift affiliation back and forth between ISS and AFPs. Addressing these problems could be done in two stages. The first step involves maximizing funding of ISS liabilities by ensuring that new affiliates bring their actuarially-fair recognition bonds with them, improving the quality of portfolio investments of ISS reserves, and maximizing financial and political autonomy of ISS from the central government. For the longer term a reform of ISS ensuring full funding of its pension liabilities and partial or complete privatization should be given serious consideration.

Third, diversification of investment portfolios of pension funds towards private and international instruments should be gradually but continuously permitted to ensure reaching higher risk-return frontiers for all contributors. Larger international portfolio diversification would allow Colombia's workers to hedge against country-specific shocks and risks.

Fourth, the government should decide on how it will finance its pension reform deficit. While this decision could be revised over the years as part of overall fiscal policy decisions, it would be beneficial to identify certain forms of financing from the outset. The use of revenue from oil discoveries and SOE privatization and issuance of explicit government debt would be the first choice if the government wants to de-link its pension reform from a contractionary fiscal policy. Issuing debt could be an effective choice as long as financial markets understand that this involves a simple swap of explicit government debt for implicit PAYG debt and hence do not react by requiring higher risk premia for holding government paper.

Finally, and most important, pension reform has to be complemented by other reforms of social security and labor market programs that are currently financed by payroll contributions. In order to reduce evasion of payroll taxes and raise the share of formal-sector employment and production, the high pure-tax components of today's very large payroll contributions should be eliminated. This requires identifying alternative sources of general taxation to finance these programs. Once these changes are implemented, Colombia will start reaping the full efficiency and growth gains derived from larger formal-sector employment and production.

Notes

- 1 This paper was written while the author was Principal Economist at the World Bank's Research Department.
- 2 I thank Upiamo Ayala and Hermann von Gersdorff for the initial motivation to write this paper, subsequent discussions, and valuable comments to a first draft. I am also very indebted to Loređana Helmsdorff and Rodrigo Cifuentes, who kindly performed the simulations for sections 3 and 4, respectively. I benefited from useful discussions with Alberto Carrasquilla, Eduardo Lora, Beatriz Marañanda, Dolly Ovalle, Mauricio Peretti, Fanny Santamaría, Beatriz Helena Torres, José Darío Uribe, and Mónica Uribe in Bogotá, and valuable comments received subsequently from Suman

- Berry, Jorge Humberto Botero, Carlos Caballero, Juan Luis Londoño, Guillermo Perry, Miguel Urutia, and Leonardo Villar at World Bank and Bolsa de Bogotá - ASOFONDOS seminars. I thank Ariel Fiszbein for kindly providing data.
- 1 A broader and more detailed version of this paper is found in Schmidt-Hebbel, 1995.
 - 2 For the most complete and recent evaluation of pension systems across the world see World Bank (1994b). For a survey of issues for the design and reform of pension systems see Arrau and Schmidt-Hebbel (1994). Comparative studies of Latin American pension systems and reforms include Mesa-Lago (1978, 1993), Mc Greevey (1990), and Fundación Friedrich Ebert de Colombia (1992). The initial reform proposal by the government of Colombia that includes actuarial financial projections is in Ministerio de Trabajo y Seguridad Social de Colombia (1993a). Among other studies on Colombia's pension reform in anticipation of the December 1993 law are C. López (1992), H. López (1992), Contraloría General de la República (1992), Ocampo (1992), Ramírez (1992), Zuleta (1992), and Lora, Zuleta and Helmsdorff (1993). A comprehensive account of the Colombian pension reform process, its objectives and outcomes is found in Ayala (1995), Lora and Helmsdorff (1995) and an evaluation of the financial prospects of ISS and the private pension funds based on the December 1993 law.
 - 3 The precise number of national and regional pension funds changes frequently. The 55 national pension funds in 1993 are individually identified in Sub-Dirección de Desarrollo Social (1994) and the 991 regional pension funds are those identified by the 1989-90 Social Security Census summarized in Ministerio de Trabajo y Seguridad Social (1993c).
 - 4 SOE funds, established by public-sector firms for their own workers, operate according to a self-determined structure of contributions and benefits.
 - 5 Throughout this paper SPP is defined as excluding the three special public-sector pension funds for oil workers, teachers, and armed-forces personnel exempted from the pension reform.
 - 6 This figure of 4,225 million contributors in 1993 excludes the roughly 300,000 contributors to the three special public-sector funds exempted from the pension reform and an estimated 100,000 contributors to private voluntary and/or private occupational plans.
 - 7 The source for the international data reported here and below is World Bank (1994b), Table A.4.
 - 8 Full indexation of pension benefits to inflation was adopted in 1988 for public-sector pensioners.
 - 9 Voluntary complementary pension plans offered by the financial sector or private employers are not affected by the reform.
 - 10 For further description of recognition bonds see Schmidt-Hebbel (1995).
 - 11 The simulations performed for this study were requested through the Ministry of Finance of Colombia and are reported in detail by Helmsdorff (1994). The simulation model and its applications follow similar exercises reported in Ministerio de Seguridad Social y Trabajo (1992, 1993a) and Lora, Zuleta, and Helmsdorff (1992).
 - 12 It should be noted that the projections of contributors and pensioners (and hence of deficits and outstanding debts) for SPP include all public-sector workers that will re-affiliate with ISS now or in the future, while the corresponding projections for ISS exclude the latter group of workers. Hence this unrealistic but useful simplifying assumption affects the projected composition but not the overall levels of worker affiliation, deficits, and debts of the total public pension system (controlled by SPP plus ISS).
 - 13 Ministerio de Trabajo y Seguridad Social (1992) reports one actuarial partial-equilibrium simulation of net surpluses and assets for ISS, SPP and private pension funds (AFPs) for the pension reform. Ministerio de Trabajo y Seguridad Social (1993a) provides actuarial partial-equilibrium simulations of net surpluses and assets for ISS with and without pension reform and for AFPs under the pension reform, for the projection period 1992-2020 and under alternative sets of economic and demographic assumptions. Lora, Zuleta and Helmsdorff (1993) report alternative simulations for ISS and AFP net assets under different reform scenarios.
 - 14 The assumptions on coefficient values and simulations features are summarized in Schmidt-Hebbel (1995), Annex 1.
 - 15 These figures exclude the roughly 300,000 contributors to the three public pension funds exempted from the reform: teachers, oil workers, and armed forces personnel.
 - 16 A significant increase in labor force coverage as a result of Colombia's pension reform is highly likely as a result of both the reduction in the pure tax component of pension contributions and a partial subsidy to pension contributions by low-income groups.

- 19 Differences in speed of affiliation result from the uncertainty about long-term projections of the share of the population covered by a mandatory pension system. For simulations considering varying affiliation speeds see Schmidt-Hebbel (1995).
- 20 The aggregate deficit of ISS and SPP hides a quite different financial picture in each institution. While SPP shows deficits in all years and simulations, ISS shows (declining) surpluses until 2007 in simulation 1, 2015 in simulation 2, 2024 in simulation 3, and 1995 in scenario 4, and deficits thereafter.
- 21 For a more disaggregated projection of annual deficits by institutions and types of deficits see Schmidt-Hebbel (1995).
- 22 For the purpose of pension debt simulations—and their overall public-sector impact—it is immaterial how much of this implicit PAYG debt will be explicitly recognized—and paid—by the public pension institutions (or their sponsors) that will loose affiliates, being forced to honor recognition bonds and hence to partially fund ISS. The resulting improvement in ISS reserves simply offsets a net asset deterioration in another public-sector institution.
- 23 The reason for the difference is that the rate of return on private pension assets (5%) is higher than the rate of interest paid on recognition bonds (4%).
- 24 For recent reviews of Colombia's macroeconomic, growth, and equity performance and perspectives see García (1995), Montenegro (1995), Posada and Gaviria (1995), and Uribe (1995).
- 25 This figure comprises preliminary estimates of possible privatization revenue from selling SOEs in the following sectors: power plants (US\$ 1.8 b.), financial sector and banking (US\$ 0.6 b.), and others including mining, infrastructure, utilities, and transport (\$3.2 b.).
- 26 Issuing external government debt has similar effects to issuing domestic government debt if the domestic financial market participants (including the new AFPs) undo the increase in the country's net external debt by buying external assets for the same amount. This, however, is unlikely. Hence the risk premium paid on Colombia's external debt and the likelihood of a cut in the supply of external financing funds will increase with the level of net external indebtedness.
- 27 The model is a one-sector, two factor (exogenous labor and endogenous capital) optimal-consumption life-cycle specification for the stationary equilibrium of 55 overlapping cohorts for a closed economy. The specific parameter values are reported in Schmidt-Hebbel (1995), Annex 3.
- 28 Maximum macro and welfare changes are obtained when a very high average contribution rate is assumed. This is possible when the pension system reaches a labor force coverage of 100%.²⁹
- 29 If 13.5% of pension contributions, 6.0 to 8.0% of health contributions, 5.33% of unemployment insurance contributions, 1.0 to 2.5% of accident insurance, and 1.0% of training contributions are closely related to expected benefits but the remaining contributions are unrelated to benefits, the pure tax component of total payroll contributions is 13 to 16%.
- 30 Cost comparisons between different pension systems is difficult because of differences in quality across pension regimes. (For a discussion and cross-country cost comparisons see Valdés-Prieto, 1994 and World Bank, 1994b). Privatized competitive pension systems like the Chilean scheme show significant marketing costs that obviously are absent under a monopolistic state-run scheme. However, the quality of collection, investment, insurance, and benefit payment services is higher when provided by a competitive industry of private firms.
- 31 The empirical evidence available for OECD countries shows little if any redistribution from the lifetime rich to the lifetime poor. Indirect evidence for developing countries suggests that intragenerational distribution in conventional public pension schemes is strongly regressive. (For examples see World Bank, 1994b, pp. 131-138).

References

- APARICIO, M. and W. EASTERLY (1995), *Crecimiento Económico: Teoría, Instituciones y Experiencia Internacional*. Banco Mundial - Banco de la República, Colombia.
- ARRAU, P. (1990), "Social Security Reform: The Capital Accumulation and Intergenerational Distribution Effect", *PRE Working Paper # 512*, The World Bank, Washington, D.C., December.
- ARRAU, P. (1991), "La Reforma Previsional Chilena y su Financiamiento Durante la Transición", *Colección Estudios CIEPLAN 32* (June): 5-44.

- ARRAU, P. and K. SCHMIDT-HEBBEL (1993). "Macroeconomic and Intergenerational Welfare Effects of a Transition from Pay-As-You-Go to Fully-Funded Pension Systems", *manuscript*, The World Bank, Washington, D.C., June.
- ARRAU, P. and K. SCHMIDT-HEBBEL (1994). "Pension Systems and Reforms: Country Experiences and Research Issues", *Revista de Analisis Economico* 9 (1): 3-20.
- AYALA ORAMAS, U. (1994). "La Reforma Pensional Colombiana", presented at the *Seminar on Privatization, Regulation and Social Security Reform: Colombian and International Experience*, Sanafé de Bogotá, Colombia, May 12.
- CONTRALORIA GENERAL DE LA REPUBLICA DE COLOMBIA (1992). "La Reforma de la Seguridad Social en Colombia: Una Aventura Económica", *Serie Estudios Ocasionales* No. 3, Sanafé de Bogotá.
- FUNDACION FRIEDRICH EBERT DE COLOMBIA (FESCOL) (1992). *Regímenes Pensionales*. Sanafé de Bogotá, Colombia.
- GARCIA, J. (1995). "El Crecimiento Económico Colombiano", in M. Aparicio and W. Easterly (eds.): *op.cit.*
- HELMSDORFF, L. (1994). "Simulaciones de Efectos Financieros de la Reforma de Pensiones en Colombia", *manuscript*, Ministerio de Hacienda de Colombia - Banco Mundial, May, Bogotá.
- INSTITUTO DE SEGUROS SOCIALES (1994). *Estadísticas 1993: Resumen Ejecutivo*. Sanafé de Bogotá, February.
- LOPEZ, C. (1992). "Elementos para un Debate sobre la Reforma a la Seguridad Social en Colombia", in Fundación Friedrich Ebert de Colombia (FESCOL): *op.cit.*
- LOPEZ, H. (1992). "Ciclo de Vida, Seguridad Social y Atención a la Tercera Edad en Colombia", in Fundación Friedrich Ebert de Colombia (FESCOL): *op.cit.*
- LORA, E. H. ZULETA and L. HELMSDORFF (1993). "Viabilidad Económica y Financiera de un Sistema Privado de Pensiones", *Covuntura Económica* 22 (1), Fedesarrollo.
- MC GREEVEY, W. (1990). "Social Security in Latin America: Issues and Options for the World Bank", *World Bank Discussion Paper* 110, Washington, D.C.
- MESA-LAGO, C. (1978). *Social Security in Latin America: Pressure Groups, Stratification and Inequality*. Pittsburgh University Press.
- MESA-LAGO, C. (1993). "Pension Reform in Latin America: Importance and Evaluation of Privatization Approaches", paper presented at the *Seminar on the Economic and Social Impact of Privatization in Latin America*, Institute of the Americas, La Jolla, California, January.
- MINISTERIO DE TRABAJO Y SEGURIDAD SOCIAL (1992). *Exposición de Motivos del Proyecto de Ley por el cual se crea el Sistema de Ahorro Pensional y se dictan otras disposiciones sobre seguridad social*, Sanafé de Bogotá, D.C., September.
- MINISTERIO DE TRABAJO Y SEGURIDAD SOCIAL (1993a). *Sistema General de Pensiones: Nuevo Estadístico y de Proyecciones*. Sanafé de Bogotá, D.C., July.
- MINISTERIO DE TRABAJO Y SEGURIDAD SOCIAL (1993b). *Ley de Seguridad Social (Ley 100 de 1993)*, Sanafé de Bogotá, D.C., December.
- MINISTERIO DE TRABAJO Y SEGURIDAD SOCIAL (1993c). *La Previsión Social para los Empleados del Sector Público*. Sanafé de Bogotá, D.C., December.
- MINISTERIO DE TRABAJO Y SEGURIDAD SOCIAL (1994). "Cuadro Resumen de Costos de las Pensiones en 1993", Subdirección de Desarrollo Social, *manuscript*, Bogotá.
- MONTENEGRO, A. (1995). "El Crecimiento Económico Colombiano", in M. Aparicio and W. Easterly (eds.): *op.cit.*
- OCAMPO, J.A. (1992). "La Propuesta Gubernamental de Reforma al Régimen Pensional: Análisis y Alternativas", *Debate de Coyuntura Económica* 26: 28-48.
- POSADA, C.E. and A. GAVIRIA (1995). "El Crecimiento Económico y la Distribución del Ingreso: El Caso Colombiano Posterior al 1950", in M. Aparicio and W. Easterly (eds.): *op.cit.*
- RAMIREZ, H. (1992). "La Reforma Pensional Propuesta por el Gobierno", *Debate de Coyuntura Económica* No. 26: 7-12.
- SCHMIDT-HEBBEL, K. (1994). "Pension Reform Transitions from State Pay-As-You-Go to Privately-Managed Fully-Funded Systems", presented at the *International Seminar on Privatization in Colombia*, Sanafé de Bogotá, May 11-12.
- SCHMIDT-HEBBEL, K. (1995). "Colombia's Pension Reform: Fiscal and Macroeconomic Effects", *World Bank Discussion Papers* 314, The World Bank, Washington, D.C., November.

- URIBE, J.D. (1995). "Inflación y Crecimiento Económico en Colombia: 1951-1992", in M. Aparicio and W. Easterly (eds.): *op.cit.*
- VALDES-PRIETO, S. (1994). "Administrative Changes in Pensions: Chile, the U.S., Malaysia, and Zambia", *Policy Research Working Paper Series*, The World Bank.
- WORLD BANK (1987). *Colombia, Social Security Review*. *manuscript*, Washington, D.C.
- WORLD BANK (1994a). *Colombia: Colombia Poverty Assessment Report*. *manuscript*, Washington, D.C.
- WORLD BANK (1994b). *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth*. Oxford University Press.
- ZULETA, H. (1992). "El Régimen Pensional de Colombia: La Necesidad de un Cambio Radical", in Fundación Friedrich Ebert de Colombia (FESCOL): *op.cit.*