SOCIAL SECURITY REFORM IN COLOMBIA: IMPLICIT TAXES, 'DEATHWEIGHT' LOSSES, AND SUSTAINABILITY

(Abstract)

This essay analyses the issues of implicit taxes, 'deadweight' losses, and pension liability dynamics in the context of the social security reforms of Colombia (1993-2003). We argue that the defined-contribution private system has not yet helped to diminish the 'deadweight' losses usually attributed to the defined-benefit public system (PAYG). Continued fiscal deficits have hindered the use of those private resources to fund higher-returned private projects. On the other hand, the adoption of high payroll taxes has aggravated un/underemployment due to increases in the implicit taxes paid by the firms. In consequence, there is a need for new pension reforms aimed at reducing pension benefits and implicit taxes for the firms.

By: Sergio Clavijo [*/]

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[*/] Member of the Board of Directors of the Central Bank of Colombia (Banco de la República). These views are not necessarily shared by the Board of Directors. The author thanks J.P. Zárate and S. Muñoz, staff-members of the Banco de la Republica, for able assistance with financial and actuarial issues. E-Mail: sclavive@banrep.gov.co

I. Introduction

During the 1990s, pension reforms developed at a rapid pace in Latin America, including Argentina, Bolivia, Colombia, Mexico, and Peru, among others, following the Chilean pioneering reform of the early 1980s. The 1993-pension reform in Colombia was in some regards unique in the sense that it established *competition* between the existing pay-as-you-go system (PAYG), which dates from the early 1960s, and the new Fully Funded System (FFS) that very much resembled the privately run Chilean system, based on the "Administradoras de Fondos de Pensiones", see Ayala (1995).

However, the fiscal cost of the transition implied by the 1993-reform was high, in spite of the success of the reform in increasing the contribution rate from 6.5 % (on earnings) to 14.5 %, and effectively reducing the benefits by postponing the retirement age by two years. In fact, these changes on retirement ages (to 57/62 for females/males) will only be effective from 2014 onwards. It has been estimated that such cost will be increasing (on cash basis) from the current 3% of GDP annually up to 6% of GDP by year 2020 (Echeverry, et.al., 2001).

A second wave of pension adjustments was recently adopted in order to cope with these increases in pension payments. Law 546 of 1999 was approved in order to help build up pension reserves for the territorial entities. Law 797 of 2002 further increased basic contributions by two percentage points (initially to 14,5% and from 2005 onwards to 15,5%) and drastically reduced "replacement rates". However, the new reform failed to increase retirement age (to 60/65 for females/males) and in shortening the transitional period from 2014 to 2008. Nevertheless, it has been estimated that the net present value of the outstanding pension liability, in a 50 year-horizon, was reduced from 220% of GDP to 180% of GDP.

To make the current system viable, economic policy makers face a twofold task in Colombia. First, fiscal provisions should be made to allow for a rapid increase of public savings. It has been estimated that the primary savings of the consolidated government need to be maintained at

3.5% of GDP in order to stabilize the ratio of Public Debt/GDP at the current 62%. Although part of the current public savings gap of about 2% of GDP could be closed by reducing VAT and income tax evasion (currently at levels of 33-35 percent), there is still a need for correcting at the source the fiscal imbalances left after the 1993 and the 2002 pension reforms (see Clavijo, 2002).

Second, a new generation of pension reform needs to be adopted in order to address the fiscal burden that is in prospect as a result of (Alarcon, 2002; Ayala, 2002):

i) Concessions granted to special groups of public servants, including the public security forces, oil workers, and teachers; here the solution is to include these sectors in the general framework adopted under Law 797 of 2003, keeping exemptions to a minimum;

ii) The delay in making effective the new retirement conditions, which should be phased-in immediately, instead of waiting for another 15 years;

iii) The level and conditions under which public guarantees are provided; an effective way to proceed here is to lower the percentage of real wage being guaranteed, say from the current 100 percent to 75 percent;

iv) Retirement age conditions, which should be further increased up to 60/65 (female/male), in line with the observed progress of life expectancy; and

v) The high payroll taxes, which hamper goals in terms of pension coverage and affect indirectly the fiscal burden; hence, earmarked taxes (different from pensions and health) need to be substituted for regular taxes, in the case of child-care (ICBF), and reduced, in the cases of labor training (SENA) and labor assistance (COFAMILIARES), in order to avoid damaging effects on employment and international competitiveness (Clavijo and Lozano, 2001). There exists ample evidence of significant changes in structural unemployment due to changes in payroll taxes, especially in OECD countries (Van Den Noord and Heady, 2002).

A referendum has been scheduled to take place in October 2003, which addresses some of these issues. A complementary option would be to accumulate pension reserves exogenously, for instance, by allocating to the PAYG some of the expected new oil windfall gains. However, the expected amount of unfunded pension liabilities stemming from the public system alone (15% of

GDP) represents about a quarter of the net present value of the known oil exploitation. In fact, the accelerated exhaustion of oil reserves actually poses a threat for maintaining net exports of oil in 2010. Hence, the option of depending on 'windfall oil gains' to close the expected pension gap in the next three decades does not appear to be a prudent and solid fiscal solution to the pension problem.

By addressing these issues at the source, the financial balance of the consolidated government could be kept under relative control. Furthermore, the scope of the FFS could be enhanced with positive effects on growth, savings, and investment for the economy as a whole. The net asset position of the FFS in Colombia by the end-2003 is expected to be 8% of GDP (US$7 billion), after 10 years of having introduced this private system. Although the initial stage of the FFS has been successful, there are great challenges ahead considering that in Chile the reserves of the FFS have reached 40 percent of GDP after 15 years.

In this essay we will analyze the issues of implicit taxes, 'deadweight' losses, and pension liabilities dynamics in the context of the social security reforms of Colombia (1993 – 2003). We argue that the defined-contribution private system has not yet helped to diminish the 'deadweight' losses usually attributed to the defined-benefit public system (PAYG). Continued fiscal deficits have hindered the use of those private resources to fund higher-returned private projects. On the other hand, the adoption of high payroll taxes has aggravated un/underemployment due to increases in the implicit taxes paid by the firms.

We found that in Colombia total firms' contributions into the social security system amounts to 18,9% (11,6% for pensions and 7,3% for health), which is high when compared to the OECD average of 15%. Colombia should take advantage of recent experiences in the developed economies, whereas labor market flexibility and reduction in payroll taxes have contributed to reduce structural un/under-employment. Regarding pension sustainability, the conclusion is that the PAYG system is highly inequitable, where less than 5% of the economically active population will be eligible for pension benefits in the future and yet pension expenditures will

soon represent about 4% of GDP or about one third of all tax revenues. We analyzed key parameters which drive the dynamics of the system and recommend crucial adjustments regarding 'replacement rates' and retiring ages.

Section II focuses on the so-called 'pure tax' component of the social security contributions in Chile and Colombia. We measure their impact on social well-being in Colombia by computing aggregate deadweight losses. Section III addresses the magnitude of the subsidies in the PAYG and relates them to other social expenditures in Colombia. Section IV provides a sensitivity analysis of pension subsidies to key demographic and actuarial parameters. Finally, section V provides conclusions and policy recommendations.

II. 'Pure Taxes' and 'Deadweight Losses'

In this section we will concentrate on the so-called 'pure tax' component of the social security contributions. Such tax corresponds to the contributions levied on behalf of the firm and can be characterized as an indirect disguised tax (Musgrave, 1985 p.25-28).

We will show that the 'pure tax' component levied on behalf of the typical Colombian firm is close to 17% of the payroll, excluding other contributions not related to the pension and health system. This 'pure tax' component is rather high in Colombia, when compared to the 3% recently observed in Chile. Furthermore, such tax would be increased to 19% beginning in 2005 (as approved in Law 797 of 2003), when social security contributions on behalf of the firm would total 28,5%. If included other contributions (such as labor training, child-care, and family protection), total payroll contributions levied on the firm would increased up to 39,5% of the payroll.

How are the Colombian firms to compete within the Free Trade Agreement of the Americas (FTAA) and the WTO negotiations given these extra-costs of 19% produced by payroll

contributions? Apparently, the way Colombian firms are confronting this issue is by recurring to the informal labor market (currently at a level of 30% of total employment), where elusion of payroll taxes is the norm.

Recent studies for OECD countries report that the total average tax wedge on labor is close to 38%, where there is great variance. Of this tax wedge, contributions paid by the firm are on average close to 15%, those paid by the employees amount to 14%, and the remaining 9% correspond to personal income tax withholdings (Van Den Noord and Heady, 2002 p.545). Clearly, the share of social security contributions on behalf of the firm in Colombia (19%) also turns to be high when compared to this OECD average of 15%.

The Contrasting Cases of Chile and Colombia

Table 1 summarizes contributions regarding pensions and health systems in the cases of Chile and Colombia. In the case of Colombia, they exclude the 9% of payroll contributions devoted to labor training, child-care, and family protection; it also excludes the unemployment insurance equivalent to 8,3% of the payroll (both levied on the firm).

Table 1: Social Security Contributions: Colombia and Chile
(As a Percentage of Payrolls)

	CHILE		**COLOMBIA**	
	Pre-Reform 1980	Post-Reform 1990-95	Pre-Reform 1990-92	Post-Reform 2003-2005
Contributions to Health & Pensions (%)	29,3	20,5	16,5	29,5
On behalf of Firms	19,3	0,0-3,0	10,9	19,4
On behalf of Workers	10,0	17,5-20,5	5,6	10,1*
Implicit 'Pure Tax' Component (%)	14,6	2,8	na.	12,7-18,9

* Includes additional contributions of 1% for earnings in the range of 4-20 minimum wages and 2% for those in the range between 20-25 minimum wages.

Source: Our computations based on Castañeda (1992), Schmidt-Hebbel (1995), Clavijo (1998), and Ministerio del Trabajo y Seguridad Social (2002).

Note that while in Chile the 1980 reform worked in the direction of reducing social security contributions from 29,3% to 20,5% of the payroll, the combined effect of the 1993 and the 2002 reforms in Colombia increased them from 16,5% to 29,5%. Furthermore, in Chile contributions levied on the firm were reduced from 19,3% to almost zero (or 3% in the cases of domestic servants), whereas in Colombia firms' contributions have increased from 10,9% to 19,4% (where one percentage point increase was conditioned on the state of the unemployment rate in year 2005).

Looking for a tighter connection between contributions and benefits, the Chilean reform placed all contributions on behalf of the workers in order to avoid firms' evasion (Castañeda, 1992 p.169). Fidelity to the social security has improved, although contributions to the pension system still show fluctuations, especially under economic recessions. There has been, however, a significant reduction in the 'pure tax' component of the social security in Chile, from 14,6% down to 2,8% (Schmidt-Hebbel, 1995 p.22).

Table 2 (second block) shows that in Colombia firms have to assume 75% of the basic pension contribution of 15,5% (a 2 percentage point increase after the reform of 2002). Only 10 percentage points of the total contribution go to the pension fund, while the remaining 5,5 percentage points go to pay for workers insurance, administrative costs and net profits. Firms also assume 66% of the basic health contributions of 11%, which is also partitioned into paying for different insurances, cross-subsidies, and administrative costs and net profits. Hence, total firms contributions into the social security system amounts to 18,9% (11,6% for pensions and 7,3% for health).

Strictly speaking, the direct benefit for the firm of such contributions is nil. It is the worker who is expecting to get, say, a 5% real annual return in the 10 percentage point contribution to the pension fund, of which only he contributed 25%. We will later show that such expected real return could actually be increased to 8-10% if retirement occurs through the PAYG system, which currently offers higher 'replacement rates' than the ones offered by the FFS (under a 5% annual real return). The same could be argued in the case of health benefits. For this reason we, for the moment, allocate a zero gross direct return for the firm out of the 18,9% social security contributions.

Table 2.

Social Security Contributions in Colombia:
The 'Pure Tax' Component for the Firms

	Reform of 1993		Reform of 2002		Cuasi-Neutral Alternative	
	Contributions	'Pure Tax' (% of Payroll)	Contributions	'Pure Tax' (% of Payroll)	Contributions	'Pure Tax' (% of Payroll)
I. Contributions		**0,174**		**0,189**		**0,054**
Pensions	(13.5% Shared at 75%)	0,101	(15.5% Shared at 75%)	0,116	(12.5% Shared at 25%)	0,031
Health	(11% Shared at 66%)	0,073	(11% Shared at 66%)	0,073	(7% Shared at 33%)	0,023
II. Gross Returns		**0,000**		**0,000**		**0,016**
Pensions	(0% Over 10%)	0,000	(0% Over 10%)	0,000	(1% Over 3,125%)	0,008
Health	(0% Over 6%)	0,000	(0% Over 6%)	0,000	(1% Over 2,310%)	0,008
III = II - I Net Returns		**-0,174**		**-0,189**		**-0,039**
Pensions		-0,101		-0,116		-0,023
Health		-0,073		-0,073		-0,015

Source: Our Computations

In consequence, one could argue that the ‘pure tax’ component in the social security is equivalent to the effective share the firm has in paying those contributions (a total of 18,9% in Colombia, where 11,6% is due to pension contributions and 7,3% to health contributions). How could the current legislation be altered in order to reduce such ‘pure tax’ component?

The third block of Table 2 illustrates an example of a cuasi-neutral alternative with respect to the firm. Suppose that the current shares of 75/25% for the firm/employee are reversed and that pension contributions are reduced from 15,5% down to 12,5%. Assume as well that such reversion also occurs in the health contributions of 66/33% for the firm/employee and that they are reduced from 11% to 7% in order to abolish a rather inefficient scheme of cross-subsidies. The result is that firms would total contributions of 5,4% to social security (where 3,1% would go to pensions and 2,3% to health). Obviously, the share for the workers would increase accordingly, in line with the idea of linking contributions to the beneficiaries.

If, additionally, the PAYG system is closed for the new generations and implicit subsidies are abolish by establishing as mandatory the current FFS, firms would see capital markets increase and

the cost of accessing capital would be lower. Let us assume that firms would then get at least a 1% credit cost reduction due to their FFS contributions of 3,125% and a 1% direct benefit due to their 2,31% health contribution, say, for having a better health system for the working class. Hence, the gross direct return would amount to 1,6% in real terms per-annum, implying that the 'pure tax' component for the firm under this new arrangement would be only 3,9%, instead of their current 17,4%.

The pass-through effect of payroll taxes onto the workers wages is an empirical issue. If such pass-through is high, the net impact on labor markets would tend to be rather low. If such payroll burden remains as 'pure taxes' on the firm, their impact on increasing structural un/underemployment would be high. In the United States of America (USA) social security payroll taxes averages 12%, where the firm contributes with 6 percentage points and the worker with other 6 percentage points. Labor market flexibility shows that the impact of such taxes on un/under-employment is rather low in USA and that long-term unemployment has actually decreased from 6,5% to 5,5% in the last two decades (Ball and Mankiw, 2002).

By contrast, in the European Union long-term unemployment has remained high at 10-12%. The average tax wedge on labor income increased by 1% during 1991-95, but declined by -0,6% during 1995-99. This decline in the tax wedge contributed to reduce the structural unemployment in about -0,1%, showing that reductions in labor tax wedges do have an impact in reducing long-term unemployment (Van Den Noord and Heady, 2002). Colombia should then take advantage of recent experiences in the developed economies, whereas labor market flexibility and reduction in payroll taxes have contributed to reduce structural un/under-employment. A fruitful alternative is to pursue social security reforms aimed at having a cuasi-neutral scheme of payroll taxes, as the one just described.

Deadweight Losses

Social security discussions in LDCs are usually limited to finding the implicit subsidy under the

PAYG and to computing the aggregate net present value of those pension liabilities. In developed economies the analysis is carried-out further by way of examining two additional facets of this problem: one has to do with finding the *deadweight cost* generated by payroll taxes and other is related to measuring the impact on long-term economic growth under different ways of funding pension funds.

Regarding the issue of payroll taxes, Feldstein (1996 p.5) has argued that in the USA such taxes, which total 12%, represent a deadweight cost of about 50% with respect to the losses generated by income taxes. This means payroll taxes generate and additional loss of about 1% of GDP per-year.

With respect to the impact on economic growth, the idea has been to establish a counter-factual scenario in which the economy could be operating under a FFS, instead of the PAYG. This methodology has been debated at length, where there is great difficulty in proving that private investment returns are higher than public investment returns, taking into account that in many cases they complement each other.

Nevertheless, there is the alternative of assessing the possible *deadweight loss* by way of comparing the returns obtained under the PAYG with those of the FFS. For instance, Feldstein (1996; 1997) has pointed out that in the case of USA such losses can be as high as 2,8% per-year, due to the fact that private assets (net of taxes) have surpassed public assets' return in that amount.

A first approximation to Colombia's case indicates that the theoretical deadweight loss (3,3%) is not very different from the one found in the USA. In table 3 we illustrate our computations, where we assume that the PAYG is able to maintain their historical net real yield of 4,5% per-year (Comisión de Gasto Público, 1997) and that the same occurs in the case of the FFS, which has been around 12% per-year in real terms (before taxes). Interestingly, this return of the FFS is very similar to the one being used by the multilateral agencies for assessing project's return in Colombia and also coincides with the one found by Harberger (1969) several decades back.

Table 3: Deadweight Losses due to the Pension Funding System (PAYG)
(In percentages)

	United States	**Colombia**
I. Real Return of Assets of the PAYG	2,6	4,5
II. Real Return of Assets of the Private Sector, After Taxes (FFS) = B - C	5,4	7,8
A. Income Tax	42,0*	35,0
B. Gross Real Return (before taxes)	9,3	12,0
C. = A% x B Amount of Taxes	3,9	4,2
III = II - I Social Loss	**2,8**	**3,3**

* Includes Federal and State Taxes on the Firm

Source: Our computations based on Feldstein (1996; 1997) and Harberger (1969).

It is worth noting that this is only a theoretical deadweight loss, because in practice we know that about 50% of the FFS portfolio has been devoted to buying public securities. In this regard, the FFS has not yet taken advantage of higher private returns. As fiscal deficits have been kept high at 3,6% of GDP, FFS portfolios have helped fund such deficits in a significant amount. Statistics show that FFS portfolio represent about 8% of GDP, where 4% of GDP represent public debt (distributed equally between internal an external debt).

Devoting such a high portion of the FFS portfolio to funding public deficits can only be justified on temporary basis, as the transitional period of the pension reform takes place. In the meantime, it is also required to deepen and extend the VAT system and to fight income tax evasion as to increase central government tax revenues above the current 14% of GDP. This is the only way the Colombian economy will be able to take advantage of the FFS and to spur growth as a result of funding private projects with higher real returns.

III. Pension Regimes and Sustainability

The German "Contagion"

It was the German Chancellor Otto Von Bismarck (1815-1898) who suggested in 1881 the idea of creating a public fund for helping those who, for permanent disability of longevity, could require permanent financial support. By 1884, Chancellor Bismarck had turned such idea into the creation of a complex insurance system by which contributions from employees, employer and the State would support a pensional system, based on pre-determined benefits. Sure enough, Germany was the first country in establishing a social security system that by 1889 already included a module of healthcare and severance payments. The unemployment insurance was established in 1927, completing the most ambitious State-benefit system of the Western society, up to that point. The German contagion did not take long and during the Great Contraction of the 1930s in the USA the idea of the Welfare State spread rapidly. President Roosevelt followed the "blue-print" set-up by Bismarck.

In Colombia, the social security system, managed by the ISS, was only launched in 1967, which also adopted the pay-as-you-go (PAYG) scheme. This defined-benefit system has suffered the same "demographic surprises" of the Western world, but experiencing a faster "demographic transition" (see Barr, 2000). Hence, life expectancy at birth has increased more rapidly than in the developed world. For instance, it has been estimated that in Colombia life expectancy at birth has increased from 50 years in the early 1960s to 70 years in the early 2000s. Although pension coverage has remained below world average, reaching only about 40% of the economically active population, the "leverage" (=Contributors/Pensioners) of the PAYG has been declining rapidly from 9 to 5 in the last two decades. At the same time, structural unemployment has increased from 10% to 14% bringing contribution to a historically low point of only 20% of the economically active population.

General Rafael Uribe

It has been said that the figure of the Colombian General Rafael Uribe inspired Garcia-Marquez in the creation of his character General Aureliano Buendia, in *One Hundred Years of Solitude*. It

should be said as well that had he not been defeated during the battle of Nerlandia, in 1902, against the Conservative Party, General Uribe probably would have attempted to increase "social expenditure" faster than Chancellor Bismarck.

However, two differences would have prevailed: on the one hand, General Uribe was a liberal, while Bismarck was a right-wing imperialist; on the other, probably General Uribe would have been smarter in making sure that "social expenditure" reached a more ample spectrum of the needy. Interestingly, historical records show Bismarck as a dictator who ended-up accused of adopting socialist policies, although "social expenditure" was concentrated in those who could access a pension (probably less than 20% of the eligible by age). Similar accusations would hunt later President Roosevelt in the USA.

If the aim were to spread well being, beginning by covering the most basic needs, probably General Uribe would have not concentrated public subsidies in a pension system that today has only the potential of benefiting 20% of the economically active population. Let us imagine that General Uribe wanted to combat poverty on a wide basis. Probably he would have set-up the following list of priorities for the needy:

1. Nutrition, in order to assure a minimum so that children could grow-up healthy;
2. Healthcare, in order to maintain mental and physical conditions during the labor period;
3. Housing, for obvious reasons to have a resting place;
4. Education, to be able to progress local and internationally; and
5. Pension, in order to assure a minimum of resources while aging.

In practical terms, it seems that the dreams and priorities of General Uribe are being systematically betrayed by Congresses of the developing world, as expenditure in pension subsidies will soon be at the top of the budget. For instance, in Colombia public education expenditure now represents 3,5% of GDP and benefits more than 6 million children (in a population of 42 million), while healthcare expenditure represents 4,5% of GDP and benefits almost 12 million. However, pension expenditures now represent 3% of GDP and benefit only one million people, usually from medium

and high strata. Similar figures can be obtained for the rest of Latin America.

Where are the principles of equity and progressivism of the "social expenditure"? Furthermore, a recent study of the World Bank (2002) shows that the needy are really in bad condition: there are 10 million Colombians living in misery (about 23% of the population) and about 27 million live below the poverty line (about 64% of the population). What is then the rationale for allocating 40% of the so-called "social expenditure" in pensions, knowing that most of that money is devoted to the "elite of the public unions"? It would suffice just to reallocate about 20% of the current social expenditure to have a significant and positive impact on the well being of the poor, by means of reducing the mounting pressure of the pension expenditures.

Pension Sustainability

In this section we will concentrate on illustrating the magnitude of the pension subsidies and its sensitivity to changes in key demographic and actuarial parameters. In theory, any PAYG system can be calibrated ex-ante so as to avoid huge subsidies. In practice, Congresses are slow in recognizing imbalances brought about by changes in demographic parameters (e.g. increases in the live expectancy) or macro variables (e.g. slowdown in long-term growth that negatively affects the equilibrium of the PAYG). Furthermore, the Executive branch is even slower in confronting its constituencies to let them know that pension benefits need to be reduced in order to reestablish the viability of fiscal accounts. Time and the political economy of pension reforms clearly work against economic soundness in any PAYG system (see Galasso and Profeta, 2002 p.25).

We have developed an attractive simplification of pension dynamics that can be used to illustrate Congress people about how pension inequalities and financial disorders are generated within a PAGY system. We shall first make key comments on how the main variables should be constructed and then we will proceed to illustrate our basic equation for attaining equilibrium between contributions and payments under a defined-benefits arrangement.

Actuarial Horizon and Life Expectancy

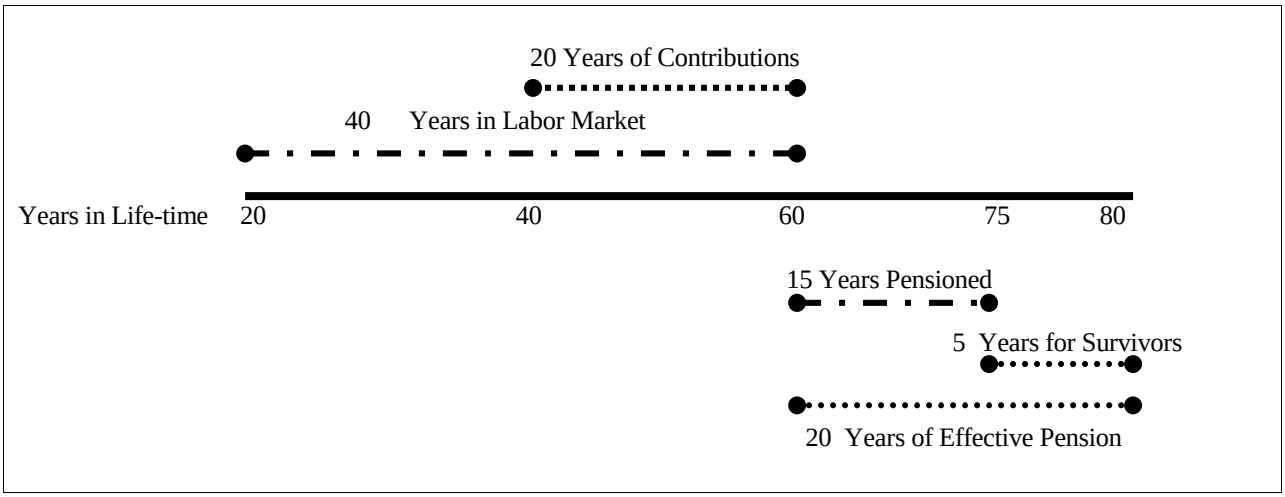
Let us imagine that the typical worker enters the labor market at the age of 20 and remains there for 40 years, until turning 60 years old. Under most legislations, at that age the worker would be eligible for a pension, as long as a minimum of, say, 20 years of contributions have taken place.

In most developing countries, however, the typical worker is not always hired and, most likely, while hired, he/she is not contributing to social security for the very fact that informal markets abound. Several studies show that the typical Colombian worker only contributes to social security about 50% of the time during his/hers labor life (Comisión de Gasto, 1997). It is then evident that under such circumstances PAYG systems will suffer from severe problems of low fidelity to the contribution scheme, making it unsustainable from a financial point of view.

In Colombia until very recently, total pension contributions amounted to 13.5% of wages, where the employer pays 75% and the employee the other 25%. However, only 10% of the wage goes to the pension fund, while the remaining 3.5% are used to cover insurance, operational, and promotional expenses. Diagram 1 summarizes the situation of the typical worker, where we shall assume that contributions occur between the ages of 40 and 60, in order to simplify actuarial computations and to stress test the system. In reality, contributions take place between ages 20 and 60, in a disordered manner. The earlier the contributions, the higher the financial returns and the possibility of turning viable the PAYG system. We shall later allow for a higher number of years of contributions.

The lower part of diagram 1 depicts the benefits side of the equation. It has been estimated that life expectancy at the age of 60 in Colombia is 78 years for a male and 80 years for a female, over the period 2001-2005. This is the relevant information for building the flow of funds of a PAYG and not the life expectancy at birth, which is now close to 69 years for a male and 71 years for a female. This means that a pension is to be paid for about 25 years, 18 to the main beneficiary while alive and 7 to the survivor, who inherits the pension.

Diagram 1: Actuarial Horizon of the Typical Colombian Worker



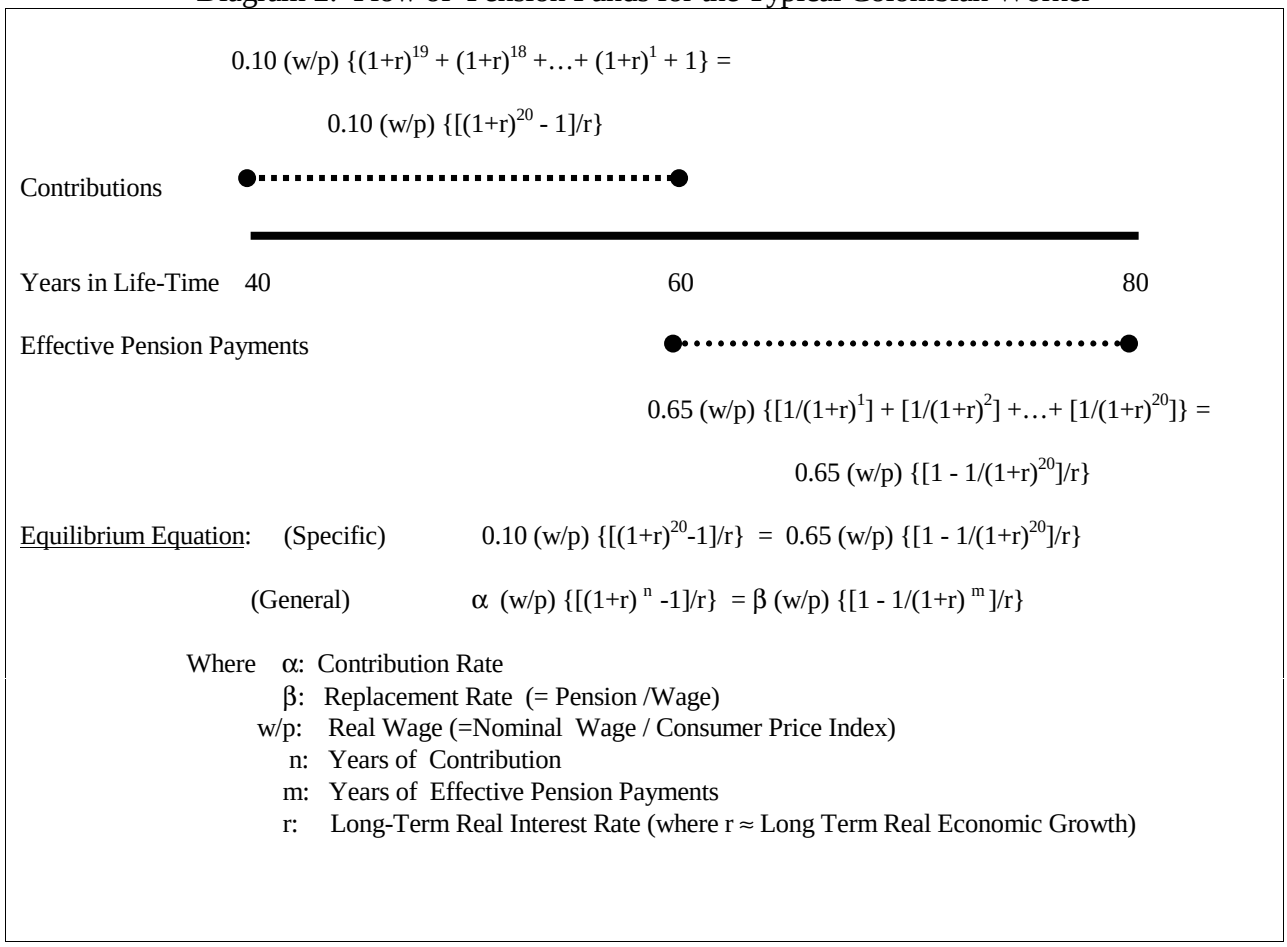
Based on this demographic trend, there are proposals aimed at increasing the retirement age from 60 to 65 years in order to diminish the financial burden that represent the extension of pensions beyond 20 years. We shall assume, for the moment, that pensions are paid for the same number of years (20 years). It is interesting to note that, for example, in the USA life expectancy at the age of 60 has been increasing significantly, from an additional 15 years in 1970 to 20 years in 2000. Early retirement without proper adjustments in replacement rates is also deteriorating the viability of the system. It is for these reasons that different commissions have recommended the increase of the retirement age from 63-65 up to 67-69 and/or the increase in contributions from 12.4% up to 20% in different stages. In fact, the PAYG system of the USA is already experiencing problems of elusion due to the increasing trend in contributions. Even some advocates of the current PAYG system are recommending direct budget funding, instead of higher contributions through payrolls due to its negative effect on employment generation (Palley, 2002).

Flow of Pension Funds

Diagram 2 shows the flow of pension funds for the typical worker in Colombia who contributes for 20 years, during the ages 40 to 60, an amount equivalent to 10% of the real wage; meaning,

0.10*(W/P), where W stands for Nominal Wage and P for the CPI deflator. We shall assume that the real wage is constant. We will leave aside the remaining 3.5% of contributions devoted to pay for insurance and operational costs.

Diagram 2: Flow of Pension Funds for the Typical Colombian Worker



We shall bring all contributions as a worker and all payments to the beneficiaries to the same point, say, at the age of 60, in order to make them comparable. If these flows are computed/discounted at the long-term market interest rate ("r"), we shall conclude that there exists public subsidies in the PAYG system as long as cumulative payments > cumulative contributions. Knowing that public pension assets usually receive the same return as public bonds, we will assume that the long-term

interest rate ("r") relevant for this exercise is determined by the long-term rate of growth of the economy (g). In fact, it can be proven that the viability of the public debt requires that $r \approx g$ (see Meijdam, et.al. 1996; Clavijo, 2002).

Note, first, that when the worker turns 60, his first contribution is worth $0.10*(w/p)*(1+r)^{19}$ and his last is $0.10*(w/p)$. Secondly, observe that pension payments are determined by the replacement rate, which we will assume to be 65% of the real wage; meaning, $0.65*(W/P)$. We shall assume initially that the pension is paid for 20 years, where the original beneficiary lives for 15 years and the survivor for another 5 years. This exercise could be altered to resemble the case of a unique payment in the form of an annuity by simply applying a "hair cut" to the replacement rate equivalent to the returns obtained during the years 61-80. Note also that, at age 60, the first pension payment is worth $0.65*(W/P)* [1/(1+r)^1]$, while the last payment to the survivor is equivalent to $0.65*(W/P) * [1/(1+r)^{20}]$.

By analyzing the particular flow of funds of a beneficiary it becomes clear how subsidies come about. For years, PAYG systems have managed to obscure their accounts by blending flows among generations. However, it is obvious that if there is a pre-defined benefit arrangement that runs into deficits, equilibrium can only be reinstated by means of increasing contributions or reducing benefits, but unfortunately only affecting incoming generations. Only altruism, political power of the old generations, or myopic time horizon analysis would give support to maintain such imbalances (Galasso and Profeta, 2002).

Pension Viability and Fiscal Deficits

The crucial question is: How is it possible to finance payments of 65% of the real wage over 20 years, based on contributions during 20 years of just 10% of the real wage? The equation to be analyzed is as simple as: $0.10*(W/P)*A = 0.65*(W/P)*B$, where the solution requires that $A > B$. In diagram 2 we show that $A = \{[(1+r)^{20}-1]/r\}$, while $B = \{[1 - 1/(1+r)^{20}]/r\}$, so the solution requires finding simultaneously an "r" that sets $A > B$.

In this particular case we found that r = 9.8% would equal cumulative contributions with cumulative payments, avoiding fiscal subsidies. However, the problem is that in Colombia long-term real growth could hardly surpass 4,5%, so the central government is unable to guarantee the required return for maintaining the equilibrium of the system under such parameters of contributions and replacement rates. If these parameters are not altered, the fiscal deficit will increase substantially as subsidies represent an equivalent of 118% (= 0.098/0.045 - 1) for the typical pension granted under such conditions.

In the lower part of diagram 2 we illustrate the general case, where long-term pension equilibrium hinges on four key parameters: on the income side, depends on the rate of contribution (α) and the years of contributions (n); and, on the payment side, depends on the replacement rate (β = Pension/Wage) and the years of payments (m).

IV. Sensibility of the PAYG System to Key Parameters

Table 4 illustrates the sensibility of the pension equilibrium to the replacement rate, under different levels of contributions. The idea is to find the real interest rate that would level-off cumulative contributions with cumulative payments, fixing the time horizon in 20 years for both (that is n = m = 20). Note that for contributions of 10% (α = 0.10) and replacement rates of 65% (β = 0.65), equilibrium requires that r = 9.8%.

Table 5 presents the same results but in terms of subsidies, computed against a long-term interest rate of 4,5%, as explained before. Note that the higher replacement rates are, the higher the subsidies: for β = 0.75, the subsidy equals 136%. At the current level of contribution (α = 0.10), a 10-percentage point reduction will induce a correction in the subsidy of about 20 percentage points.

Table 4

Real Interest Rate Required to Achieve Equilibrium in the PAYG System

(In Percentage)

Contribution Rates %	Assuming: Contributions and Payments during 20 Years with Pensions set at … **Replacement Rates (%) (= Pension / Wages)**			
	45	**55**	**65**	**75**
10	7.8	8.9	**9.8**	10.6
12	6.8	7.9	8.8	9.6
14	6.0	7.1	8.0	8.7
16	5.3	6.4	7.3	8.0
Contribution Rates %	Assuming: Replacement Rate of 65% during 20 years; Contributions during … **Years of Contribution (%)**			
	20	**25**	**30**	**35**
10	**9.8**	7.4	5.8	4.6
12	8.8	6.6	5.1	4.0
14	8.0	5.9	4.5	3.5
16	7.3	5.3	3.9	3.0
Contribution Rates %	Assuming: Contributions during 20 Years with Replacement Rates of 65% during … **Years of Pension Payments (%)**			
	10	**15**	**20**	**25**
10	7.7	9.1	**9.8**	10.2
12	6.5	8.1	8.8	9.2
14	5.5	7.2	8.0	8.4
16	4.7	6.4	7.3	7.7

Source: Our computations based on diagram 2.

Table 5

Implicit Subsidy in the PAYG System

(In Percentage)

Contribution Rates %	Assuming: Contributions and Payments during 20 Years with Pensions set at … **Replacement Rates (%) (= Pension / Wages)**			
	45	**55**	**65**	**75**
10	73.7	97.6	**117.9**	135.9
12	51.7	75.9	95.6	113.2
14	33.6	57.1	77.5	94.3
16	17.8	41.5	61.4	78.6
Contribution Rates %	Assuming: Replacement Rate of 65% during 20 years; Contributions during … **Years of Contribution (%)**			
	20	**25**	**30**	**35**
10	**117.9**	64.0	28.2	2.7
12	95.6	45.6	12.3	-11.3
14	77.5	30.5	-0.7	-22.9
16	61.4	17.1	-12.4	-33.3
Contribution Rates %	Assuming: Contributions during 20 Years with Replacement Rates of 65% during … **Years of Pension Payments (%)**			
	10	**15**	**20**	**25**
10	70.8	103.0	**117.9**	125.6
12	44.6	79.2	95.6	104.3
14	23.0	59.8	77.5	87.0
16	3.6	42.4	61.4	71.8

Source: Our computations based on diagram 2.

Note that maintaining the term of contributions and payments fixed at 20 years makes it hard to find an equilibrium rate: even replacement rates as low as 45% and contributions as high as 16% show a required real yield of 5.3% (see table 4), still representing a subsidy of 17.9% (see table 5). In the second panel of Table 4 we also show the sensitivity of the PAYG system to changes in the years of contributions. Note that just by increasing contributions from 20 to 30 years the equilibrium real interest rate would be reduced from 9.8% to 5.8%. This change would imply reducing the implicit subsidy from 118% to 28% (see second panel in Table 5). With contributions at 10%, but for 35 years, the real interest rate would match the long-term rate of economic growth and the subsidy would be nil. The problem is that current high payroll taxes on the firm, close to 40%, work against promoting higher fidelity to the pension system. Unless such taxes are drastically reduced, it will be hard for the PAYG system to regain equilibrium and, definitely, the solution is not to increase contributions on behalf of the firm and, probably, neither on behalf of the worker, but instead to reduce benefits.

Finally, we show the sensitivity to the number of years during which the pension is paid (see third panels in tables 4 and 5). If demographic factors continue to pressure the number of years of effective payments up to 25, the typical subsidy in a pension would increase from 118% to 125%. There is clearly an urgent need to increase the retirement age from the current 60 years up to 65 years. The best way to proceed here is to replicate the good experience of Spain, where the so-called "Pacto de Toledo" instituted a gradual increase immediately that would put in place the desired target in, say, five years. Unfortunately, the worst practice is the one being pursued today in Colombia, since the proposal is to postpone the adjustment in benefits.

It is worth to highlight the fact that all these exercises underestimate the amount of real life subsidies since replacement rates hardly compute on the real wage earned through active life-time. For instance, the 1993-reform made great efforts on improving pension viability by adopting the real wage average of the last decade, instead of that of the last two years, as the benchmark for computing the replacement rate. The 2002-reform progressed further by increasing the average real wage computation to the last 15-years. However, most exempted regimes (including Congress,

military, oil workers, and teachers) are allowed to use the real wage of the last two years. Under these circumstances the implicit subsidy easily surpasses 200%.

There are funny arrangements as well, aimed at defeating the financial viability of the PAYG system, especially in developing countries. In Colombia, for instance, the so-called "carrousel of pensions" has been established, where the postulated Congressperson includes in second and third places of his electoral-ticket people who are about to retire. The idea is that in the last year of the government the "substitute" takes the place of the elected congressperson. This substitute usually has served, say, 18 years in different public places. Hence, by adding just two years as Congressperson, out of the four that a congress term lasts, they will complete the required 20 years of contributions. Now this substitute will be entitled to all the special pension benefits granted to Congress-people: the replacement rate will not only be higher (75%) but will be referred to the real wage of the last two years, which happens to be three-times the average wage of a life-time civil servant. As a return for a juicy lifetime pension, which easily represents a subsidy of 300-400%, the substitute finances part of the electoral ticket of the Congressperson. This dirty electoral scheme not only promotes mediocre people to congress, but also induces severe "moral hazard problems" in legislation dealing with pension benefits.

Finally, it is also crucial to gain the cooperation of the judicial system to combat elusion to the rules and to battle corruption regarding allocation of pensions. Recent experiences in public sea-port institutions and public financial entities should help to find ways to effectively avoid extra-costs to a PAYG system that is already running big deficits.

V. Conclusions and Policy Recommendations

In this essay we have analyzed the issues of implicit taxes, 'deadweight' losses, and pension liability dynamics in the context of the social security reforms of Colombia (1993-2003). We argued that the private defined-contribution system has not yet helped to diminish the 'deadweight' losses usually attributed to the public defined-benefit system (PAYG). Continued fiscal deficits

have impeded the use of those private resources to fund higher-returned private projects. On the other hand, the adoption of high payroll taxes has aggravated un/underemployment due to increases in the implicit taxes paid by the firms. In consequence, there is a need for a new generation of pension reforms aimed at reducing implicit subsidies.

Our policy lessons regarding pension sustainability can be summarized as follows:

1. It is required to abolish selective periods of contributions as the base for computing the replacement rate, making mandatory that the reference be made to all the real wage history in which contributions were based.
2. Replacement rates need to be reduced immediately to levels that turn viable the PAYG system, probably in the range 45-55%, instead of the current 65-85%. Note however, that this correction would not be sufficient as long as the State guarantees that the minimum pension replacement rate is maintained at 100% of the minimum wage. In Colombia, the minimum wage has been stable around US$100-120 per-month, while in the region the average hovers around US$50-60. In consequence, the State guarantee for a minimum pension should be set at, say, 75% of the minimum wage, as adopted in Chile. However, this would require a Constitutional Reform.
3. Further increases on payroll taxes should be avoided, particularly on behalf of the firm, since they work against increasing the number of years of contribution. Controlling informality in labor arrangements would also work in favor of increasing the number of years of contribution up to 30 years, under which the system would be more viable.
4. Taking into account the increase in life expectancy, which now runs as high as an additional 18 years after the age of 60, the retirement age should be increased gradually to 65 years. The best practice here is to replicate the experience of Spain, where the so-called “Pacto de Toledo” instituted an immediate gradual increase on the retirement age that would put in place the desired target in, say, five years.

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