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PENSION SYSTEM REFORM: THE MEXICAN CASE

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ABSTRACT

The paper analyzes the Mexican pension reform of December 1995. Essentially, the reform substituted a defined-benefit pay-as-you-go system with a fully funded defined contribution system based on individual accounts with a minimum pension guarantee provided by the government. Total contributions to the accounts will amount to 13.5 percent of the salary for the average worker plus 2.5 percent for disability and life insurance that will still be managed by the government's Social Security Institute (IMSS). The new system shares many common elements with other Latin American experiences. However, it shows some advantages and disadvantages with respect to them. Regarding the advantages, the new system completely substitutes the old system; administrative costs are reduced by limiting the number of transfers between pension fund managers to once per year; pension managers are allowed to operate several funds; the law does not establish a minimum guaranteed rate of return for pension funds; and there is a centralized contributions collector agency. Disadvantages include the prohibition of the funds from investing in foreign securities; the IMSS is the sole provider of disability and life insurance; the IMSS will be able to operate a pension fund manager; the housing subaccount offers low returns; there are market share limits; and the new system still faces some portability problems. Finally, we found that the fiscal cost of the transition to the new system is relatively low compared to similar reforms in other Latin American countries.

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I. INTRODUCTION.

This paper analyzes the 1995 reform of Mexico's pension system. The reform substituted the pay-as-you-go (PAYG) system with a fully-funded (FF) system with individual accounts and a minimum pension guarantee. The next section of the paper reviews the basic characteristics of the old social security system in Mexico as well as the reasons to reform it. Section three discusses the main features of the pension reform approved in December 1995. We include an analysis of some specific features related to the design of the new system that are different from recent pension reforms in other Latin American countries. Section four discusses the costs of the reform based on simulation results of an actuarial model. In section five we comment on some of the likely effects of the reform on savings and on the development of the financial system. The last section concludes with some final comments.

Recent changes in life-expectancy, population growth, health costs, as well as an increased level of benefits without the corresponding adjustment in contributions made the Mexican PAYG pension system financially unsustainable. Mexico has joined the group of countries that chose a gradual substitution of the state-run PAYG system with a defined contribution FF scheme with individual accounts. As in most countries, the reform of the pension system in Mexico has important economic, social and political consequences. Therefore, a better understanding of this process in Mexico requires to put it on a broad perspective. The implementation of the pension reform should be viewed as part of a major transformation of the Mexican economy which started in 1988, and that has included profound structural and macroeconomic reforms.[1] It should

be stressed that the restructuring of the financial sector undertaken in the last few years has produced a radical change in the structure of the Mexican financial system. Measures such as financial deregulation, the strengthening of preventive regulations and modernization of the supervisory bodies will be an important complement to the pension reform.

II. BACKGROUND TO THE REFORM.

Social security in Mexico is provided by two major groups of institutions. IMSS and INFONAVIT provide services to workers in the private sector and ISSSTE and FOVISSSTE are directed to the labor force employed by the public sector.[2] In 1992, the SAR, a FF system complementary to the existing PAYG programs was created based on individual retirement accounts for every worker affiliated to IMSS or ISSSTE.[3]

IMSS provides insurance for health and maternity, old age retirement, severance at old age, disability, life, child-care services and workers compensation. INFONAVIT is a housing agency managed by the government and representatives of labor and business organizations. It was created in 1972 with the purpose of providing affordable housing to workers employed in the formal sector and affiliated to IMSS. ISSSTE and FOVISSSTE provide similar services and insurance for workers in the public sector.

Contributions to the social security system have become a heavy burden over private companies and workers, and given its current structure, a major source of distortions in the labor market. Table 1 summarizes current social security contributions for workers in the private sector.

Table 1

Social Security Contributions in Mexico as Percentage of Payroll

		Total	Employer	Employee	Government
IMSS	IVCM*	8.5%	70%	25%	5%
	Health and Maternity	12.5%	70%	25%	5%
	Workers Compensation	2.5%	100%	0	0
	Child care	1.0%	100%	0	0
SAR System	INFONAVIT (housing)	5%	100%	0	0
	Retirement	2%	100%	0	0
Total		31.5%	25.2 %	5.25 %	1.05 %

* IVCM=Invalidez, Vejez, Cesantía y Muerte (Disability, Old Age, Severance at Old Age and Life Insurance). The base salary on which contributions apply has an upper limit equivalent to 10 times the minimum wage, except, for the retirement SAR account and the Health and Maternity Insurance, which are limited to the equivalent of 25 times the minimum wage. The base wage for INFONAVIT contributions is lower than for IMSS contributions.

Health and maternity insurance has accounted for an average of 63 percent of total expenditures of the system during the last 30 years and only for 52 percent of its revenues. During its 51 years of existence it has only had 6 years with a positive balance and has therefore generated significant financial pressure over other programs. Although there is a legal provision which establishes that every branch of insurance at IMSS should be self-financing, it has been a common practice to subsidize deficitiary

programs. In particular, surpluses from the pension system have been used to cover expenses related to health and maternity insurance.[4]

Workers compensation provides insurance against job accidents, including disability and death, and pays medical costs and compensation while workers are out of work. Child care services were introduced in 1973 as women participation in the labor force increased. The IVCM is a defined-benefit PAYG system that provides insurance for old age retirement, severance at old age, and for disability and death.[5] Historically, a significant portion of the IVCM surpluses have been used to maintain the viability of the health branch.

During the last ten years, social security expenditures have increased over 60 percent in real terms, growing from less than 2.5 percent of the GDP to 3.9 in 1994.[6] Pension expenditures have also grown very rapidly in real terms: IMSS pensions alone grew 150 percent during the period, increasing from 0.22 of the GDP to 0.56 while IMSS and ISSSTE total pension expenditures increased 98 percent, reaching 0.8 percent of the GDP in 1994.

2.1 The Old Pension System.

Mexico's old pension system consists of a defined-benefit PAYG public pension scheme. As mentioned above, most of this system is operated by IMSS for private sector employees and ISSSTE for Federal Government employees. The majority of the working population in the formal sector is covered by IMSS. The IMSS system is the one that was reformed in December 1995. Therefore, we will explain the old pension

system by referring to the main features of the IMSS program, known as the disability, old age, severance at old age and life insurance (IVCM).[7]

2.1.1 Evolution of the IVCM-IMSS Pension System.

The IVCM-IMSS program was implemented in 1944 as a collective fund. The original IVCM-IMSS can be characterized as a partially-funded defined benefit scheme. The surpluses of the program were used to pay for investment or current expenditures of other branches of insurance of the IMSS. Its main features are:

Coverage. The program covers registered employees participating in the formal private sector and self-employed workers who voluntarily chose to contribute to the system, as well as their families. In November 1995, the total number of affiliates to the IMSS was 10.9 million. Although this amount represented only 29.6 percent of the Economic Active Population (EAP), it is estimated that it was almost 80 percent of the labor force in the formal sector.[8] The ratio of contributing workers to the number of pensions granted by IMSS has fallen from around 67 workers per pensioner in 1950 to around 8 in 1994.

Contributions. This program is financed by contributions from the employer, the employee and the government based on the following shares, 70-25-5 percent respectively. The total contribution for 1996 amounts to 8.5 percent of the base salary. This base salary, used to compute contributions and benefits, is the worker's contractual wage plus other payments such as bonuses.[9] The total contribution is distributed as follows: disability and life 3.0 percent; old age and severance at old age 3.0 percent; medical services for the retired 1.5 percent; administrative expenses 0.6

percent and social assistance 0.4 percent. In the case of workers earning one minimum wage, the contribution of the worker is paid by the employer.[10]

Eligibility. In order to qualify for a disability pension, disability must be formally proven and certified by IMSS. For eligibility, the worker must have contributed at least 150 weeks. In the case of an old age pension, it is required that the insured be at least 65 years old (60 years for severance at old age) and have contributed a minimum of 500 weeks. In case of death, a survivor's pension is paid to the widow and/or descendants, or to his or his parents. In any case, the insured must have contributed at least 150 weeks.

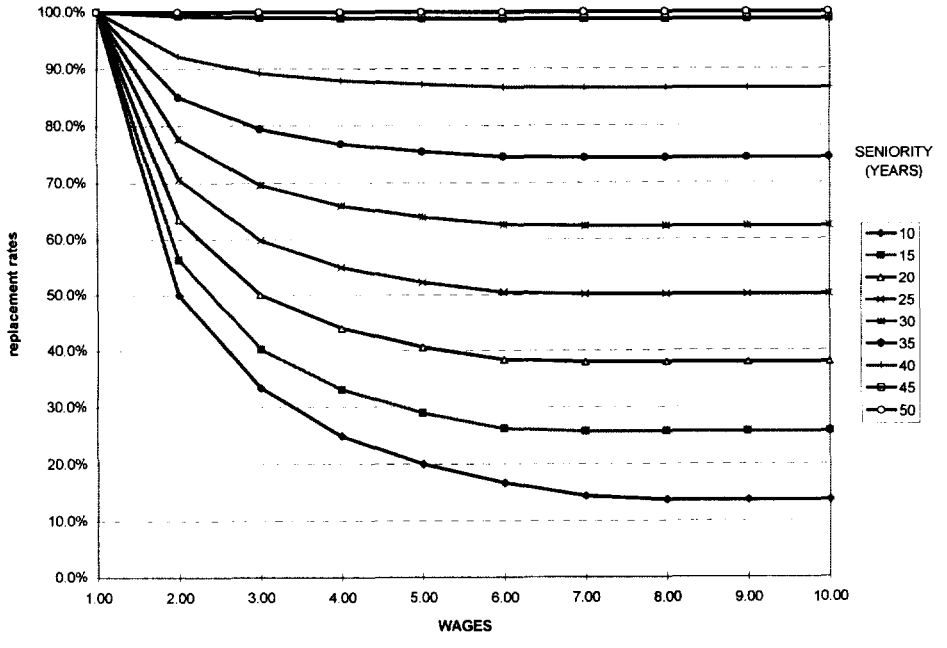
Benefits. Benefits for disability depend on the degree of disability determined by the IMSS. The disability pension for someone classified as totally disable is 70 percent of his last wage, and for partial disabilities adjustments are made according to the labor law. Benefits for old age and severance at old age depend on the number of weeks of contributions exceeding the required 500 weeks of contributions. Benefits are based on the average of the base salary of the last five years divided by the current minimum wage. The IMSS guarantees that the minimum pension would not be smaller than the minimum wage. Additionally, all retired workers have the right to receive medical assistance for themselves and their families. All pensions are indexed to changes in the minimum wage. In 1995, the replacement rate for the worker with the average wage path, after contributing 20 years, would be 50 percent.[11] This percentage could reach 100 percent if the individual contributes for 45 years.[12] The government guarantees that the minimum pension would not be smaller than the minimum wage. Figure 1 shows

the replacement rates under different assumptions about wage levels and contributing periods.

Figure 1

Replacement Rates, IMSS, Old System

(% of Final Wage)



Reserves and Investment. Reserves should be invested in Federal Government bonds or in other assets of highly rated issuers as approved by the National Banking and Securities Commission. Income and spending of each branch of insurance should be registered in separate accounts. These resources should be used to cover only the services corresponding to each branch of insurance. As it is explained below, reserves were not constituted nor invested according to the regulations.

Tax Treatment. Employers can deduct as expenses their contributions to IMSS. Workers pay taxes at the moment of retirement when they receive the benefits, but taxes apply only for the amount exceeding nine minimum wages.

2.1.2 The Retirement Fully Funded Saving System (SAR).

The Retirement Saving System (SAR) was established in 1992 as a mandatory FF savings scheme to complement the public PAYG system. The SAR program is a FF-defined-contribution system based on individual accounts. Some of the main characteristics of the SAR system are the following:[13]

Coverage. All workers that are affiliated to the IMSS or the ISSSTE have to contribute to the SAR system.

Contributions. Each worker has an individual bank account integrated by two sub-accounts: one for retirement and one for housing. Employers pay 2 percent of the base salary to the retirement subaccount and 5 percent to the housing subaccount.[14] The funds in the retirement subaccount are invested in direct loans to the Federal Government while the funds of the housing subaccount are channeled to INFONAVIT. These contributions are in addition to the contributions paid to the IMSS public pension system. The worker can make additional voluntary deposits to the individual accounts.

Benefits. Workers are entitled to receive the total capitalized funds from their individual subaccounts in one payment or to purchase an annuity in the following cases: i) at retirement, ii) when they are entitled to receive a pension because of partial or permanent disability from the IMSS or iii) in the case of death, the funds are given to the beneficiaries chosen by the insured.

Other Benefit Provisions. The insured has the right to withdraw as much as 10% of the total balance of the retirement subaccount in the following cases: i) if partial disability lasts longer than the period established by the social security law or ii) in case of unemployment. The latter can only be claimed by a worker whose balance in the retirement subaccount is no less than 18 times his last contribution and only if there have been no withdrawals during the previous 5 years. With respect to the housing subaccount, if the worker receives a loan for housing from INFONAVIT, the funds accumulated in the subaccount must be used as a down-payment and the employer's contributions plus a worker's contribution equal to 25 percent of his wage are used to pay the loan.

Administration. Contributions are deposited in individual accounts managed by commercial banks. Banks are responsible for record keeping, generating financial statements and making various required filings. They can hold the SAR funds for up to four days and have to send them afterwards to the Central Bank (Banco de Mexico) in the case of the retirement subaccount or to the INFONAVIT in the case of the housing subaccount. Commercial banks charge 0.8 per cent per year of the retirement subaccount balances for operating expenses.[15]

Investment. Funds of the retirement subaccount are channeled to the government as a direct loan. The government pays an interest rate for these funds which must be no less than 2 percent per year, on a monthly basis, over the inflation adjusted balance using the inflation rate of the previous month. Funds of the housing subaccount receive interests according to the remaining operation surplus for the corresponding year.

Actual returns for the retirement subaccount have been more than 5 percent in real terms. However, returns on the housing subaccount have been negative. In 1995, the real return was -9 percent.

Regulation. The regulatory agency is the National Commission for the Retirement Saving System (CONSAR) established in July of 1994.[16] Its main function is to determine the rules and procedures to ensure the correct functioning of the system. This supervisory body has the powers to inspect and surveill all the financial intermediaries that participate in the SAR system, except INFONAVIT.

Tax Treatment. SAR contributions by the employer are deductible. Voluntary contributions by the workers are tax deductible up to a limit. Interest accumulation is tax free. Withdrawals are not taxed up to a limit of 9 minimum wages in case of the annuity option for the retirement subaccount. There is a higher limit for tax exemption in case the employee chooses to withdraw all the funds at once. For the housing subaccount, withdrawals are not taxed at all.

2.2 The Case for Reform.

The most important reason that actually made the reform happen were the increasing financial problems being faced by the old IVCM-IMSS pension program that rendered it financially unsustainable. Another important reason was the need to foster domestic savings. Finally, there are other significant distortions derived from the old pension system, in particular distortions generated in the labor market due to the poor relation between contributions and benefits.

2.2.1 Current Pension System Diagnosis.

Since the end of the 80's, it was evident that the public pension system was facing severe financial problems as a result of its actuarial imbalance. Recent estimates of the actuarial imbalance of the IVCM system show that it represents at least 80 percent of Mexican GDP.[17] Therefore, it became evident that a complete restructuring of the pension system was needed. We stress the main causes of the IVCM financial problems below:

Demographic Trends. The IVCM-IMSS program started to be pressured by demographic trends, in particular regarding the changing population structure and an increase in life expectancy. Mexico's population grew at high rates, 3.7 percent per year on average from 1970 to 1990. Recent estimates yield 1.9 percent for 1990 to 1995. In 1930 total population was 16.5 million, raising to 90 million in 1994. Despite that the population pyramid shows an important share of young people, 35.8 percent between 0 and 14 years old, the fact is that the population in terms of contributors to the social security system is aging very rapidly. Mexico's total population is expected to be over 142 million by 2030 and people over 65 years old will represent around 10 percent of total population. These trends imply that the ratio of retirees to workers would drive up the cost of the current pension system and generate major long-term financing problems. The elderly dependency ratio is expected to increase from 7.0 percent in 1995 to 14.8 percent in 2030.

According to IMSS (1995), the expected average annual rate of growth of retirees for the next 20 years will be 5.7 percent compared with a rate of 2.6 percent for

contributors. Moreover, this problem is being accentuated by an increase in life expectancy at birth, which has risen from 49.6 years in 1950 to 70.8 years in 1995. Finally, there is a reduction in the fertility rate which has gone down from 6.45 children per woman at the end of their fertility period in 1950 to 2.84 in 1995.

The system has also been negatively affected by increased informality in the labor market and lower real wages. In particular, real wages in the manufacturing sector declined 44 percent between 1978 and 1995.

Insufficient Contributions. Current contributions will be insufficient in the medium and long terms to finance increasing generous benefits of the old system that were extended to all the worker's family. Originally, the system covered only the worker and not his dependents. The minimum pension has been increased from 35 percent of the minimum wage before 1989 to 100 percent in 1995, while contributions were gradually raised beginning in 1992 from 6 percent of the base salary to 8.5 percent in 1996, (it is important to remember that from this contribution, 3 percent corresponds to life and disability insurance and 3 percent to retirement, severance at old age and old age insurance). According to IMSS (1996), contributions would have to be increased to 23.3 percent of the base salary in 2020 to avoid a cash-flow deficit in the system in that year.

Weak Relation Between Contributions and Benefits. There is almost no relation between benefits and life-time contributions, which encourages evasion, underreporting of wages and informality in the labor market. For example, on average the IMSS pays for each insured worker a pension for a period of 18 years and the corresponding

widow's pension for 12 years more. Together, this amounts to an equivalent pension of 30 years while in some cases the worker contributed to the system for only 10 years, the required vesting period. In case of contributing for less than 10 years, the worker receives no benefits at all. Finally, the reference base salary to calculate the pension is based on the average of the wages earned during the last five years divided by the current minimum wage and not on the earnings during all years of service.

High Payroll Taxes. The marginal payroll tax rate is very high even for low income workers. For example, for a worker receiving between one and two minimum wages, the marginal tax rate is over 25 percent. For workers earning more than five minimum wages, the marginal tax rate is close to 40 percent. This raises labor costs, favors evasion and induces informality.

Growing Informal Sector and Low Coverage. Other problem that pressures the financial position of the system has been the increasing size of the informal sector of the economy. It is estimated that about 35 percent of the EAP was affiliated to the social security system in November 1995.[18]

Portability Losses.[19] Given the IMSS-IVCM and the ISSSTE pension system defined benefit formulas, there are portability loses between different pension systems in Mexico. Employees with only one employer might receive higher benefits at retirement than employees with more than one employer. Moreover, some workers might lose all benefits if they change from a job covered by the IMSS insurance to one covered by another program.

Inadequate Use of Reserves. Another important problem of the IVCM-IMSS program is related to the inadequate use of reserves which affected its financial position. From its creation, the surplus generated by the pension program has been used to finance infrastructure requirements of IMSS and to partially finance health and maternity insurance, that has been traditionally deficitary. These transfers of resources have strongly decapitalized the reserves of the pension system. A conservative estimate of the reserves that the IMSS should have constituted can be obtained by accumulating the annual net flows (contributions minus payments) of the IVCM. Accumulated flows in each period were assumed to receive a real interest rate equivalent to 3.5 percent per year. Under these estimates, reserves for 1994 should have been around 11 percent of GDP. However, reserves in 1995 were close to 0.4 percent of GDP.[20] It is worth mentioning that the level of reserves presented in the exercise is a conservative estimate of the actual reserves needed to make the system financially viable because in actuarial terms the contributions were not high enough to cover future benefits.

2.3 The Savings Problem.[21]

The Mexican economy still faces a serious shortage of short-term savings and a severe scarcity of long-term savings. During the last seven years, the domestic savings rate declined.[22] According to the Banco de Mexico estimates (1996), gross domestic savings reached an average of 20 percent of GDP during the 80's, dropping to slightly less than 16 percent of GDP by 1994. The main contributing factor was a reduction in private savings, which declined continuously from a level of around 18 percent of GDP in 1988 to around 11 percent during the first part of the 90's, showing a recovery since

1995. On the other hand, public savings have shown major fluctuations since the beginning of the 80's.[23] In any case, Mexico's moderate level of domestic savings has constituted a constraint for investment and has made the country more vulnerable to foreign capital flows. It is now widely accepted that although foreign savings will continue to play an important role in the medium and long terms, it is crucial to increase domestic savings as the main source for financing growth.

The National Development Plan 1995-2000 stated as one of its main economic objectives the urgent need to foster domestic savings. The goal is to increase domestic savings 6 percentage points of GDP by the turn of the century. This requires an increase of both public and private savings. The creation of a FF retirement savings program is one of the elements of this strategy. In this sense, one of the objectives of the recent pension reform has been the creation of a system which could generate domestic savings to support economic development.[24]

III. THE PENSION REFORM.

Since the early 90's, there was a generalized consensus that the social security system, and in particular the IVCM-IMSS pension system, needed to be reformed. There was a long debate about the main elements of the reform and about the depth of the measures to be taken. The President submitted to the Congress a proposal for a new social security law which was approved on mid-December 1995, while the regulations regarding the operation of the financial aspects of the system were approved at the end of April 1996.

3.1 Main Features of the Pension Reform.

The reform substitutes the old PAYG system with a mandatory defined contribution FF system with individual accounts, complemented with a minimum pension guarantee. Basically, this requires the improvement and strengthening of the individual capitalization FF scheme under the SAR system. This includes the development of transparent mechanisms for pension funds management that generate the right incentives for all participants; the development of clear regulations and supervision processes for the management and investment of funds; a clear separation from other social security benefits; a close relationship between contributions and benefits and the design of an adequate transition mechanism.[25] The main features of the new system are summarized below.

3.1.1 Basic Operating Characteristics.

Coverage. The new system is mandatory for all workers in the labor force that are affiliated to IMSS. This includes all workers participating in the formal private sector and self-employed workers who voluntarily chose to contribute to the system, as well as their families.

Contributions. Contributions will continue to be made by employers, employees and the government, as presented in Table 2. The former 8.5 percent of base wage contribution for the IVCM will be divided into two parts: 4.5 percent will be accumulated in the individual accounts and 4 percent will go directly to the IMSS for the provision of life and disability insurance (2.5 percent) and of health services for pensioners (1.5 percent). Additionally, contributions to the individual accounts will include the former 7

percent contributions to SAR (2 percent for retirement and 5 percent for housing). There is a new "social contribution" by the government which is a fixed amount equivalent to 5.5 percent of the minimum wage in January of 1997. This amount will be indexed to the CPI. For a worker earning one minimum wage, total contributions to his individual account will represent 17 percent of his salary. For a worker earning the average wage, total contributions will represent 13.5 percent.[26] Funds in the individual accounts (except the 5 percent that corresponds to housing) will be managed by specialized pension fund management firms (AFOREs).[27] In the case of workers compensation, the employer will pay a premium determined by a formula which includes the base wage and the loss ratio for each firm's activity.[28] The new law considers the possibility of voluntary contributions from workers and employers to the individual accounts.

Table 2

Contributions to the Pension System

	Before the Reform	With the Reform	
Insurance	DOLD (IVCM)	RDO	LDA
IMSS Contributions	8.5%	4.5%	4%
SAR Retirement	2%	2%	
SAR Housing	5%	5%	
Social Contribution	0	2%*	
		13.5%	4%
Total Contributions	15.5%	17.5%	
Total Employer	12.95%	12.95%	
Total Employee	2.125%	2.125%	
Total Government	0.425%	2.425%	

Source: IMSS and CONSAR.

DOSL- Disability, Old Age, Severance at Old Age and Life Insurance.

RDO- Retirement, Severance at Old Age and Old Age.

LDA- Life and Disability.

* The Social Contribution is equivalent to 2 percent of the average wage of workers affiliated to IMSS. It was established at 5.5 percent of the minimum wage.

Benefits for Retirement or Severance at Old Age. For eligibility to a retirement pension it is required that the worker be at least 65 years old. In the case of severance at old age, the age requirement is reduced to 60 years. Benefits depend on the contributions accumulated during the affiliate's working life, plus the returns minus the commissions paid. If the worker has contributed for 1250 weeks he can chose between two options: a) to purchase an annuity from a private insurance company which guarantees a fixed monthly pension for the insured and his survivors, and b) to receive programmed withdrawals from the AFORE, calculated by dividing the balance

(including interests) from the insured's individual account by the number of years that he is still expected to live.[29] In the first case, it is required an annual payment of at least the same amount of the minimum pension guaranteed by the government. Otherwise, the insured should take option b) where the government minimum pension guarantee is applied. If the worker contributed for less than 1250 weeks, he would not be entitled to the minimum pension. However, he would be allowed to withdraw all the balance in his account at once in case he prefers not to buy an annuity or take programmed withdrawals. Early retirement is possible if the worker accumulates in his account the balance necessary to purchase an annuity at least 30 percent higher than the minimum pension.

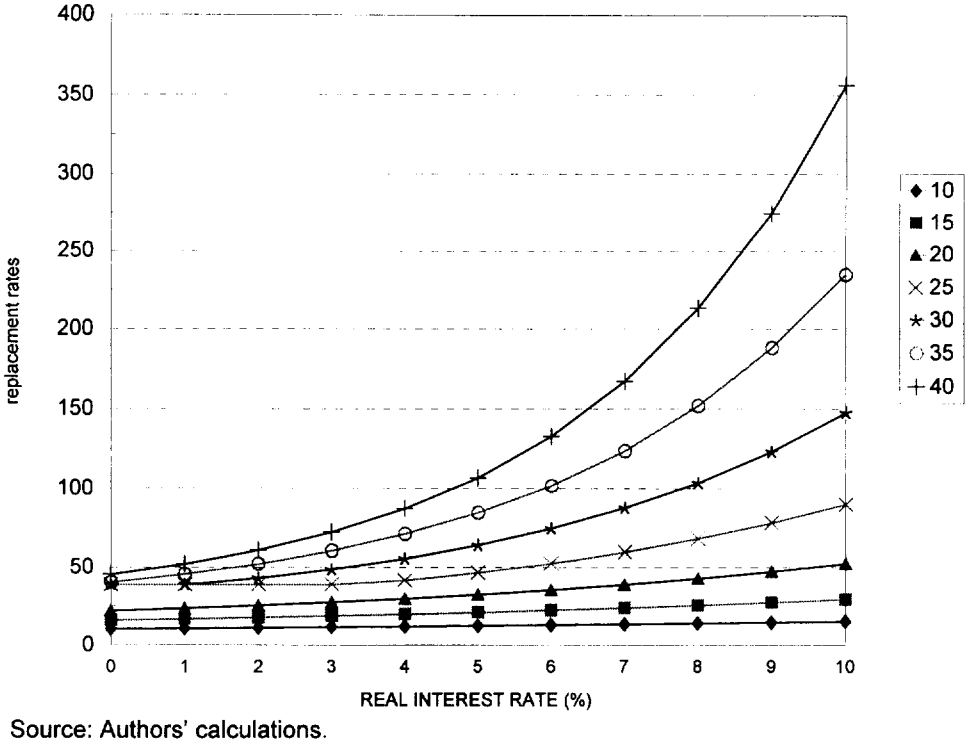
Figure 2 shows the replacement rates under the new FF scheme for workers with the average wage path. These rates assume that the worker did not use the retirement funds for marriage expenses or in case of unemployment, neither the housing funds for mortgage loans. Note that the discontinuity at zero percent real interest rate in the graph is explained because for a contributing period lower than 25 years a worker has no right to receive the guaranteed minimum pension. For a worker that contributed for 20 years, a 7 percent real interest rate would be required to guarantee a pension equal to the one he could have obtained under the old system. It must be said, however, that under the old system contributions would have been insufficient to finance such pension.

The replacement rates are highly sensitive to the contribution period and the interest rate. For example, given a 6 percent real interest rate for the retirement

subaccount and zero for the housing subaccount, an increase in the contributing period from 25 to 30 years, raises the replacement rate from 52.5 percent to 74.5 percent.[30] Regarding the interest rate, a worker with a 25-year contributing period, will have his replacement rate increased from 68 percent to 78 percent when the real interest rate in the retirement subaccount increases from 8 to 9 percent.

Figure 2

Replacement Rates, IMSS*, New System



Source: Authors' calculations.

* It is assumed that the housing subaccount is accumulated with a zero real interest rate.

Benefits due to Disability or Death. The risk of disability and death is covered by two types of insurance: workers' compensation and the life and disability insurance. Both are provided solely by the IMSS. When a covered accident occurs at the workplace,

workers' compensation applies. If the worker becomes disabled under this circumstances, he will receive 100 percent of his current wage for a period of time in which the IMSS will determine whether the disability is permanent or temporal. This period cannot exceed one year. If the disability is determined as permanent, the IMSS will decide whether it is total or partial. When a worker is declared totally disabled he will receive 70 percent of his current wage.[31] For partial disability, the pension is adjusted according to the degree of disability. In case of death, the benefits for the typical family with 3 children will be 70 percent of the last wage received by the deceased.[32]

In case disability or death not related to working conditions, the life and disability insurance applies. Eligibility requires a minimum contributing period of 250 weeks. However, this requirement is reduced to 150 weeks of contributions if the disability is over 75 percent. Total disability in this program occurs when a worker cannot be employed at a wage greater than 50 percent of his previous earnings. The amount of the pension is equal to 35 percent of the average wage, adjusted by the CPI, of the last 500 weeks of contributions. This pension also includes additional payments for relatives such that for an average family with 3 children amounts to a total pension equivalent to 51 percent of the average wage.[33] For pension benefits in case of death, the worker must have at least 150 weeks of contributions. For the typical family described above, the pension would be 53 percent of the average wage used to calculate the disability pension.[34]

In both cases, workers' compensation and disability and life, the IMSS must pay the worker or his beneficiaries a sum insured equal to the difference between the cost of an annuity, based on the benefits mentioned above, and the accumulated balance in the individual account.[35] With the accumulated balances and the sum insured paid by the IMSS, the worker or his beneficiaries must purchase the corresponding annuity from an insurance company chosen by the worker. If the accumulated balance is higher than the cost of the annuity, the worker or his beneficiaries can withdraw the excess funds or increase the benefits of the annuity. In any case, if the benefits are lower than the minimum pension the government will put up the difference so that the worker can purchase an annuity with an income flow equal to the minimum pension. These pensions are adjusted annually according to changes in the CPI.

Guaranteed Minimum Pension. The government will guarantee a minimum pension equal to the general minimum wage at the time of the reform. This pension will be adjusted for inflation according to the consumer price index. Table 3 shows the average yearly returns needed so that the workers would accumulate sufficient resources to finance a minimum pension, for different wage levels in the cases of retirement at old age or severance at old age.

Table 3

Minimum Pension Yearly Implicit Return

	Base Wage	Implicit Real Return
(Minimum Wages)	1	9.81%
	2	6.59%
	3	4.37%
	4	2.65%
	5	1.23%

Assumptions: contributing period=1,250 weeks and real wage annual growth equal to 2.5 percent a year.

Source: Authors' calculations.

Partial Withdrawals from the Individual Accounts. In case of unemployment, the worker is allowed to withdraw, after an unemployment spell of 45 days, at most 10 percent of the accumulated balance in his retirement subaccount if he has at least 250 weeks of contributions and there was no other withdrawal during the previous five years. In case of marriage, the worker with 150 weeks of contributions may withdraw from his retirement subaccount an amount equivalent to a monthly wage. This benefit is granted only once. The benefits and operation of the housing funds remain unchanged.

Tax Treatment. Contributions by the employer will be tax deductible and compulsory contributions will not be taxable income for the worker. Voluntary contributions by the workers will be subject to a favorable tax treatment while interest accumulation will be tax free. Withdrawals will not be taxed up to a limit of 9 minimum wages and there is a

higher limit for tax exemption for the cases in which the employee withdraws all the funds at one time.

3.1.2 Administration.

Management. The management of pension funds will be entrusted to private pension fund administrators called AFOREs, which will be regulated and supervised by CONSAR. These institutions should have as their only activity the management of pension funds. AFOREs will inform the worker about the accumulated balances from the retirement, voluntary and housing subaccounts but will only manage the resources from the retirement and voluntary subaccounts.

Individual Accounts. Participants must affiliate with one AFORE of their choice. Affiliates have the right to transfer, once per year, their accounts to another AFORE. But workers may transfer their accounts whenever there is a change in the commissions charged by the AFORE or in its investment policies.

Housing Subaccount. The 5 percent contributions for this purpose will continue to operate as before. These funds will be channeled to INFONAVIT. There will be a return on these funds according to the operating surplus of the Institute.

AFORE's Role. Each AFORE is allowed to operate several pension funds for its affiliates. Workers are allowed to invest their resources in one or several of the pension funds managed by their AFORE. In addition, AFOREs main functions include record keeping, issuing valuation reports and financial statements, making various required filings and paying benefits if the affiliate chooses the scheduled withdrawals option.

Each pension fund, known as SIEFORE[36], will have a committee that will take the investment decisions.

IMSS Role. IMSS will be responsible for the collection of contributions. It also has auditing and enforcement powers so that employers and workers comply with their obligations. Also, the approved law allows the IMSS to own an AFORE as long as it complies with all the regulatory provisions.

Central Account. Contributions will initially be deposited at an account at Banco de Mexico while the individualization process takes place and the resources are transferred to the AFOREs and the INFONAVIT. All the information about contributions will be centralized by an entity created for that purpose, managed by CONSAR. In case a worker has not chosen an AFORE, the resources from his retirement subaccount will be deposited on this central account for a maximum period of four years starting the first day of January 1997. After this period, CONSAR will assign an AFORE for those workers according to criteria that will be defined in the future.

Commissions. AFOREs will be allowed to charge management fees as a percentage of the contribution flows or of the outstanding individual account balance, or any combination of them. AFOREs will not be allowed to discriminate against any of its affiliates. Individuals will only receive differential treatment in order to encourage permanence in the AFORE and to promote voluntary savings.

3.2. Regulation and Supervision.

3.2.1 CONSAR.

The regulatory and supervisory tasks will be performed by CONSAR. Its main functions are the determination of the criteria and procedures to ensure the correct functioning of the pension system. This supervisory body will authorize and revoke the licenses of AFOREs, and has powers of inspection, monitoring and enforcement regarding the pension funds. CONSAR has also the responsibility of supervising the operations and investment policies of the pension funds.

3.2.2 Investment of Funds.

The authorities have stated that the basic operating principles that will guide investment will be safety and profitability. Therefore, pension funds will be invested only in approved and diversified assets. These assets include Government securities, state-owned companies securities, equity, private debt instruments, shares of other pension funds and other debt instruments issued or endorsed by credit institutions. Investment in foreign instruments is only allowed in the case of Mexican issuers. CONSAR will establish limits on the amount of investment in specific securities as a share of the value of the fund, but it also has discretionality to impose limits expressed as a share of each issuer in the total liabilities of all issuers from the same sector. These limits are maximum limits and the AFORE is free to seek the highest returns under these rules. There are disclosure requirements with respect to the structure of the investment portfolio and the returns obtained. Finally, it is important to emphasize that the AFOREs are allowed to operate several pension funds but at least one of them should

only contain fixed income securities, including indexed bonds. The law does not state a minimum guaranteed return, neither in absolute nor in relative terms.

3.2.3 AFOREs.

Minimum Capital and Fixed Capital. AFOREs should permanently have a fixed capital, at least equal to the minimum capital required, without the right of withdrawal, which will be determined by CONSAR. Foreign investors are allowed to own up to 49 percent of the capital of the AFORE. But in the case of affiliates of countries that have signed an international agreement with Mexico that includes financial services provisions, such as NAFTA, foreign investment can rise to 100 percent.

Investment Reserve. AFOREs are required to maintain an investment reserve known as "special reserve" as a percentage of the total assets under their management. This amount will be determined by CONSAR. The investment reserve must be invested in the same assets as the resources of the pension funds.

Market Share Limits. Starting 1997 and for the next four years, the law states a maximum market share limit of 17 percent for each AFORE. After this period, the limit will raise to 20 percent of the market. However, CONSAR can approve larger limits. The law does not establish how the limits will be determined, however most likely they will be based according to the number of workers affiliated to IMSS registered at each AFORE.

Other. AFOREs must meet rigorous information disclosure requirements. There will be regulations regarding marketing and advertising. In addition, AFOREs are not allowed to issue liabilities, provide guarantees, obtain loans or control companies.

3.3 The Transition.

As mentioned above, the new pension system approved last December will start functioning on January Ist, 1997. There are currently around 1.5 million pensioners of which 780,000 correspond to disability and death, 475,000 are retirement pensions and 265,000 are due to workers' compensation. Since the new system is mandatory, all workers are required to shift to the new individual capitalization scheme and will stop contributing to the old system starting 1997. For the following discussion we will distinguish between the "current pensioners", those who are already receiving a pension at the moment of the reform and "transition pensioners" that include all active workers that have contributed to the IMSS-IVCM program before January 1, 1997 and therefore have acquired rights under the old system.

Payment of benefits to current pensioners will continue to be done by the IMSS but they will be financed by the existing IVCM reserves and by resources obtained directly from general revenues of the Federal Government. In the case of the transition pensioners, instead of using recognition bonds, the reform established the following procedure. A worker already contributing to the old system will shift to contribute to the new system. When he reaches the eligibility age for retirement, he will be able to choose the highest pension between the one granted by the old system (that is, using the benefit formula from the IVCM system[37]) including the SAR funds accumulated as of December 1996 (plus the returns from that date till retirement), and the one obtained with the funds accumulated in his individual account under the new system. If he decides for the latter, the new rules apply. If he decides for the first one, the pension will

be calculated as if the worker had contributed for the old system during the time that he was actually contributing to the new one. In this case, the pension will be financed with the funds in his individual account and will be complemented with government resources. It should be noted that workers choosing the old system will receive their full old IVCM-IMSS benefits but will only get their accumulated SAR balances up to December 1996 plus returns.

3.4 Analysis of the New Pension System Design.

It is clear that a successful pension system reform depends crucially on the adequate design of the regulatory and supervisory framework. Obviously there is no evidence yet to evaluate the Mexican reform, but given the extensive discussion of many design problems of similar recent reform experiences in other countries, it will be useful to comment on some particular issues related to the Mexican case. In this section we will point out some advantages and disadvantages about the new pension system with respect to other Latin American experiences.

We believe that some of the main advantages of the new pension scheme are the following: the new system respects acquired as well as expected rights of current workers and pensioners; the old system is completely substituted by the new system; transfers between AFOREs are limited to one per year reducing administrative costs; AFOREs are allowed to operate several funds; the law does not establish a minimum guaranteed rate of return for the funds managed by AFOREs; there is a centralized contribution's collector agency and a centralized data bank which will favor lower administrative costs.

Compared to other Latin American experiences, it is interesting to point out that in the Mexican case, the reform eliminates the old system in the sense that current workers cannot continue contributing to it. This feature of the Mexican reform can be viewed as an advantage because it allows to move to a more unified pension system. Regarding the collection of contributions, the IMSS will be the central collector which will transfer them to the AFORE chosen by the worker. There is a potential gain derived from the reduction of administrative costs (e.g. with respect to the Chilean case) since there is some evidence that there are economies of scale in the provision of this service.[38] In order for this gain to materialize there is a need for an adequate supervision that limits potential political risks and possible excessive administrative costs of the centralized state agency. An alternative could be a state-run independent agency that performs this service in an exclusive manner and strongly supervised by CONSAR or, as suggested by Diamond (1994), a clearinghouse collectively owned by the AFOREs and restricted not to make a profit to prevent its use as a collusion device to raise industry profits.[39]

The new system has also some features that we believe are still design problems that can be improved in the future. In particular, we emphasize the prohibition to include foreign securities in the pension funds investment portfolio, the operation of the housing subaccount, the minimum pension guarantee, the disability and life insurance monopoly, the market share limits, portability problems and the IMSS AFORE. We elaborate on these issues.

Foreign Securities. The prohibition to include foreign securities in the pension funds investment portfolio is based on the argument that it will not be desirable to channel abroad long term savings that are urgently required for the domestic economy. However, this restricts the possibility of diversifying the investment portfolio and inhibits the diversification of country risk. A better diversified portfolio will work in favor of future pensioners.

Housing Subaccount. The housing subaccount, which receives a contribution of 5 percent of the base salary represents more than 30 percent of total contributions to the new system. These resources are not part of the pension funds managed and invested by the AFOREs and are channeled to the INFONAVIT. The Institute is structured in such a way that most of the risks are born by the savers. Return on their savings depend on the operating surplus of the Institute which is the difference between interest payments actually collected by the Institute minus operating expenses and reserve creation. The interest payments received by INFONAVIT depend on the interest rate charged to the borrower which is between 4 and 8 percent on the outstanding balance of the loan adjusted according to the increases in the minimum wage.[40] Total payments to the INFONAVIT also depend on the employment situation of the worker. When a worker is unemployed, it has been difficult for the Institute to collect payments and most of the time it does not foreclose houses. Also, the Institute is not always able to keep track of workers who change jobs and, in many cases, it does not continue collecting the payments. All these factors, and the labor market conditions and real wage behavior during the last years, have affected the operating surplus of the INFONAVIT

and help explain the negative real returns that the INFONAVIT has given to the individual accounts.

Minimum Pension Guarantee. It has been argued that a PAYG system has an important role as an instrument for redistribution by providing retirement income and income redistribution towards the old-age poor. This implicit redistributive function could be lost when substituting PAYG by FF. As Valdés-Prieto (1994) shows, this substitution can raise long run income and welfare. However, a redistributive instrument might be needed for income distribution purposes and a government guaranteed minimum pension can perform this role. Nevertheless, this guarantee might raise moral hazard issues increasing the fiscal deficit. It can also be argued that another reason for this minimum pension guarantee derives from the inability of the government to credibly commit not to help old-age poor retired people. In this case, it might be recommendable the use, for example, of means tested criteria (or other) to provide this benefit. A positive element of the minimum pension as designed in Mexico is that it is indexed to the Consumer Price Index and not to the evolution of real wages. Since in the medium term real wages should rise, the indexing of the minimum pension to the CPI reduces its rate of increase.

Disability and Life Insurance. In the new system, disability and life insurance will be provided only by IMSS which will charge a fixed premium equal to 2.5 percent of the base salary. There are several problems with this design. The cost is high compared to the ones observed for this type of insurance in other Latin American countries where the pension fund managers compete among themselves and purchase the insurance

for their affiliates from an insurance company. In these countries, workers can choose the pension fund manager that offers the best conditions. For example, in Chile in 1995, the cost of this type of insurance was on average 0.67 percent and in Argentina it is 1.17 percent.[41] In Mexico, the IMSS will not have enough incentives to reduce the loss ratio and its administrative costs beyond what is needed to maintain the financial viability of the system, and therefore it is not likely that there will be a reduction of this premium over time.

Market Share Limits. This provision may entail some negative effects to the functioning of the system. Although the conventional wisdom is that more concentration implies less competition, a well-known result in the industrial organization literature is that this is only unambiguously true for an industry conformed by firms producing homogeneous products and for which the strategic variable of competition is the quantity produced. But in the AFORE's case, competition will be on commissions, returns and services provided. Therefore, it is possible that in the market equilibrium, the market share limits may imply that some workers will not be able to open an account in the AFORE of their choice and a higher social cost for the provision of the services if the cost structure of the firms is not the same.

Portability. The new system still generates portability losses. This is because the reform affects only the IVCM-IMSS program, leaving unaltered other pension programs. In particular, it is important to emphasize that as long as other pension systems, like the ISSSTE, are not reformed, workers changing from a job covered by IMSS to a job covered by other programs might lose pension benefits.

IMSS AFORE. The new pension law allows the IMSS to manage its own AFORE, as long as it complies with the corresponding regulations. However, since the IMSS also conducts the collection of all pension contributions and has audit and enforcement powers, there is a real risk of unfair competition of the IMSS AFORE with the other AFOREs in the system, if the authorities do not enforce the regulations in order to prevent this situation.

An interesting feature of the transition scheme to the new system is that transition workers will be able to choose the higher pension between the old and the new systems when they retire. In other countries, this transition has been managed through the issuance of recognition bonds. The Mexican scheme does not require, as is the case of transition bonds, to calculate the present value of past contributions or of future expected benefits. This design recognizes the workers acquired rights and therefore contributed to make the reform politically viable. However, one important problem of the Mexican scheme is that it creates some moral hazard problems. Workers could pursue riskier investment strategies knowing that they can always fall back to the benefits of the previous system. Also, because of the distortions of the previous system, workers could have less incentive to participate in the formal sector of the economy since they can get a pension from the old system by contributing to it for only ten years.

IV. COSTS OF THE CURRENT AND THE NEW SYSTEMS.

One crucial issue that shapes the long term effects and the success of a pension system reform that entails a shift from a PAYG system to a FF system is the transition. This process has important fiscal and income redistribution effects that may have long-term implications, affecting the achievement of the reform's goals. These effects have been analyzed recently in an extensive way by several authors for various reform experiences.[42]

As a consequence of the substitution of a PAYG by a FF system, the government faces the problem of paying the pensions of current pensioners and of honoring the claims of workers who have contributed to the old public pension system. This situation implies government expenditures that should be financed through higher taxes, a reduction of other government expenditures or issuing new debt, because contributions are now directed toward the new individual accounts. The size of these obligations may have an important fiscal impact on the government's budget while the way this deficit is financed has important effects on income redistribution between current and future generations (intergenerational) and between poor and rich (intra-generational).

Basically we can distinguish two ways to finance this deficit. On one hand the government may issue new debt to swap the old implicit PAYG debt for new explicit debt. Debt financing implies that in the short run national saving, the capital stock and the intergenerational distribution of welfare are only marginally affected, by magnitudes that depend on the net efficiency gains of the reform. On the other hand, the deficit can

be financed by raising taxes or cutting government expenditures. A completely tax financed transition is equivalent to combining a pension reform with a contractionary fiscal policy, and therefore there is a transfer of resources from current to future generations, encouraging higher savings and capital formation and raising future per capita income and wage levels. It is possible to have any combination of both options. The net result will depend on the particular mix of instruments for financing the transition.[43]

The size of the pension debt and the fiscal impact differ among pension reforms depending on the degree of maturity of the old pension system, the size of the formal and informal sectors, the amount of benefits and its relationship with contributions, and the performance of macroeconomic variables like interest rates and output and wage growth.

4.1 The Fiscal Cost of the Reform.

In this section we perform a numerical simulation of an actuarial model that estimates annual pension revenues, expenditures and liabilities of the IVCM-IMSS pension program as affected by the reform under various circumstances. This model is a partial-equilibrium framework that treats relevant macroeconomic variables as given. Nevertheless, for our objective it is a useful instrument that allows us to deal with more disaggregation in a simple way, compared with a general-equilibrium simulation model a la Auerbach and Kotlikoff (1987).

The model is estimated for the two components of the transition fiscal cost: current and transition pensioners. We call the sum of these two components "total transition

deficit". In both cases, we consider pensions paid for old age, severance at old age and for disability and life insurance. The simulations include the case of reform and the case of no reform. The estimates are performed assuming different performances of the main macroeconomic variables. We present a case that we call "full fiscal cost", which includes both the transition and the permanent cost of the reform. As explained below, the permanent cost of the reform is a consequence of the particular features of the new system. The basic macroeconomic variables that shape the results are the real interest rate and the rates of growth of output, wages and the number of affiliates.

4.1.1 Case I. The Cost of the Transition.

We estimate the fiscal deficit derived from honoring the rights of current and transition pensioners, including pensions paid to widows, orphans and other relatives.[44] We perform the simulations for the 1997-2047 period for two scenarios: one of low economic growth and the other assuming better economic conditions (see Table 4). For each case, we also assume three different interest rates. We should remember that in the reformed system transition workers have the option at the time of retirement to choose between the pension granted by the old system or the new one. The decision will be determined by the accumulated individual savings, which depend on the contributing period, the real interest rate and the real growth of wages. Throughout the simulations it is assumed that the labor force covered by the new system will grow accordingly to the IMSS (1995) demographic projections.[45] Our assumptions about these variables satisfy the steady-state condition that the real output growth is equal to the real wage growth plus labor force growth (Harrod -neutral rate of technical

progress).[46] In all simulations it is also assumed that the balance from the housing subaccount is accumulated with a zero real interest rate and that there are no withdrawals from the individual account during the contributing period.

Table 4

Actuarial Model Basic Assumptions

Scenario	Real Output Growth	Real Wages Growth	Real Interest Rate Retirement	Real Interest Rate Housing
High Growth	5%	2.8%	3.5% 6% 8%	0%
Low Growth	3%	0.8%	3.5% 6% 8%	0%

A. High Growth Scenario.

Table 5 reports the estimated total transition deficit, as a percentage of GDP, derived from the pension reform under the high growth scenario. We report only the first year, the last year and the year in which the deficit reaches its maximum in our simulation period. The graphs in the Appendix show the evolution of this variable for the whole period.

Assuming an interest rate of 3.5 percent, the total transition deficit raises from 0.48 percent of GDP in 1997 to a maximum of 2.59 percent of GDP in 2035 falling to 1.87 percent of GDP in 2047. If the interest rate is 6 percent, the maximum transition cost is 2.29 percent of GDP in 2035 and falls to 1.76 percent of GDP in 2047. Finally, if

the interest rate is equivalent to 8 percent, the maximum transition cost is 1.99 percent of GDP in 2031 and falls to 1.47 percent of GDP in 2047.

Current pensioners' deficit represents most of the total deficit in 1997, decreasing continuously after that year. This deficit is not affected by the interest rate but depends on the number of current pensioners, including their widows and other relatives, as well as the increase in the minimum wage. The presence of widows and other relatives explain why the operational deficit lasts for a long period of time. The deficit derived from the transition workers depends on the interest rate, because the higher the interest rate, the higher will be the funds accumulated in the individual accounts and the lower the number of workers choosing the old system. Finally, both components of this total transition deficit are affected by the real wage growth since benefits depend on this variable.

Table 5

Total Transition Deficit

High Growth Scenario (% GDP)

Real Interest Rate	Year	Current Pensioners	Transition Workers	Total
3.5%	1997	0.45%	0.03%	0.48%
	Maximum (2035)	0.03%	2.56%	2.59%
	2047	0.01%	1.86%	1.87%
6.0%	1997	0.45%	0.03%	0.48%
	Maximum (2035)	0.03%	2.26%	2.29%
	2047	0.01%	1.75%	1.76%
8.0%	1997	0.45%	0.03%	0.48%
	Maximum (2031)	0.04%	1.95%	1.99%
	2047	0.01%	1.46%	1.47%

Source: Authors' calculations.

B. Low Growth Scenario

Assuming an interest rate of 3.5 percent, the total transition deficit raises from 0.48 percent of GDP in 1997 to a maximum of 2.30 percent of GDP in 2033 falling to 1.79 percent of GDP in 2047. If the interest rate is 6 percent, the maximum transition cost is 1.96 percent of GDP in 2030 and falls to 1.41 percent of GDP in 2047. Finally, if the interest rate is equivalent to 8 percent, the maximum transition cost is 1.68 percent of GDP in 2027 and falls to 1.04 percent of GDP in 2047. (See Table 6).

Table 6

Total Transition Deficit

Low Growth Scenario (%GDP)

Real Interest Rate	Year	Current Pensioners	Transition Workers	Total
3.5%	1997	0.45%	0.03%	0.48%
	Maximum (2033)	0.03%	2.27%	2.30%
	2047	0.01%	1.78%	1.79%
6.0%	1997	0.45%	0.03%	0.48%
	Maximum (2030)	0.05%	1.91%	1.96%
	2047	0.01%	1.40%	1.41%
8.0%	1997	0.45%	0.03%	0.48%
	Maximum (2027)	0.06%	1.62%	1.68%
	2047	0.01%	1.03%	1.04%

Source: Authors' calculations.

4.1.2 Transition Cost Comparison.

To have an idea about the importance of the accumulated total transition cost in terms of GDP at present value with respect to other Latin American countries that have carried out similar reforms, we estimate the cumulative transition fiscal cost relative to GDP for the complete simulated period. To make our estimate comparable to other studies, we use an interest rate of 5 percent, equal to output growth. The total transition pension cost for the next 50 years is estimated at 82.6 percent of GDP for this scenario. If we compare this amount with the Chilean and Colombian cases, it turns out that the Mexican cumulative transition cost is lower. Using similar assumptions for these two countries, Schmidt-Hebbel (1995) estimates a cumulative cost relative to GDP of 86.5

percent for Colombia and 126 percent for Chile. The difference in these amounts can be explained, in particular with respect to the Chilean case, by the lower maturity of the Mexican pension system, its younger population structure and the lower population coverage of the system.

4.1.3 Case 2. Full Cost.

This simulation includes transition costs plus fiscal costs that are permanent as long as the new scheme is in place. The new pension system implies three additional government expenditures: the minimum pension guarantee, the "social contribution" and the government's share of the global contribution for retirement, disability and life insurance.

As it is shown in Table 7, in the high growth case, the total cost raises from 0.77 percent of GDP in 1997 to 2.53 percent of GDP in 2031 and falls to 2.02 percent of GDP when an 8 percent real interest rate is considered. For medium and low interest rates, the maximum total cost relative to the GDP is equivalent to 2.96 and 3.39 in 2035 and 2036, respectively. The full cost declines to 2.46 and 2.72 percent of GDP in 2047, respectively.

Table 7

Reform Full Cost

High Growth Scenario (% GDP)

Real Interest Rate	Year	Total Transition Deficit	New Pensions**	Other*	Total
3.5%	1997	0.48%	0.00%	0.29%	0.77%
	Maximum (2036)	2.57%	0.67%	0.15%	3.39%
	2047	1.87%	0.75%	0.11%	2.72%
6.0%	1997	0.48%	0.00%	0.29%	0.77%
	Maximum (2035)	2.29%	0.54%	0.13%	2.96%
	2047	1.76%	0.59%	0.11%	2.46%
8.0%	1997	0.48%	0.00%	0.29%	0.77%
	Maximum (2031)	1.99%	0.40%	0.14%	2.53%
	2047	1.47%	0.44%	0.11%	2.02%

Source: Authors' calculations.

*Includes social contribution and government contributions for retirement and disability and life insurance.

** Includes payments of benefits due to disability and life insurance.

In the low growth scenario, as it is shown in Table 8, the total cost raises from 0.77 percent of GDP in 1997 to 2.16 percent of GDP in 2026 and falls to 1.46 percent of GDP with the high interest rate. For medium and low interest rates, the maximum total cost relative to the GDP is equivalent to 2.54 and 3.05 in 2030 and 2035, respectively. The full cost declines to 1.98 and 2.62 percent of GDP in 2047, respectively.

Table 8

Reform Full Cost

Low Growth Scenario (% GDP)

Real Interest Rate	Year	Total Transition Deficit	New Pensions**	Other*	Total
3.5%	1997	0.48%	0.00%	0.29%	0.77%
	Maximum (2035)	2.29%	0.65%	0.11%	3.05%
	2047	1.79%	0.75%	0.08%	2.62%
6.0%	1997	0.48%	0.00%	0.29%	0.77%
	Maximum (2030)	1.96%	0.46%	0.12%	2.54%
	2047	1.41%	0.49%	0.08%	1.98%
8.0%	1997	0.48%	0.00%	0.29%	0.77%
	Maximum (2026)	1.67%	0.35%	0.14%	2.16%
	2047	1.04%	0.34%	0.08%	1.46%

Source: Authors' calculations.

*Includes social contribution and government contributions for retirement and disability and life insurance.

** Includes payments of benefits due to disability and life insurance.

4.1.4 Case 3. No Reform.

This case assumes that there is no reform and that the IVCM-IMSS program will continue indefinitely. Table 9 reports the simulation results for the high and low growth scenarios and the same demographic assumptions as the previous exercises in this section. We do not report the simulations for each interest rate because results are not directly affected by this variable. Given the current low level of the IVCM-IMSS reserves, the effect of the interest rate on the simulation results is negligible.

The fiscal cost without reform, assuming high growth, raises from 1.55 percent of GDP in 1997 to 2.82 percent of GDP in 2022 and to 3.59 percent of GDP in 2047. If we assume low growth, these values are much higher; 3.45 percent and 4.39 percent of GDP respectively. Comparing these results with the values obtained for the full fiscal cost in case of reform, it is clear that the cost of not reforming the current pension system will be much higher in the future.

Table 9

No Reform Fiscal Cost (% GDP)

Year	High Growth	Low Growth
1997	1.55%	1.61%
2022	2.82%	3.45%
2047	3.59%	4.39%

Source: Authors' calculations.

V. MACROECONOMIC IMPLICATIONS OF THE REFORM.

Pension reform in Mexico can have important effects on labor market dynamics, domestic savings rates and capital market development, investment and output growth. These elements will lead to improved overall economic efficiency and raise the likelihood that the Mexican economy can enter into a period of sustainable growth.

5.1 Labor Market Efficiency.

Even though the new pension reform does not involve a reduction in the ratio of pre-tax and after-tax wages, it does imply a substantial gain compared to the current PAYG system. The pension reform makes the system work more as a mandated benefit scheme than as a pure tax, as benefits become more closely related to contributions. Therefore it reduces distortions in the labor market.[47]

On the other hand, the minimum pension guarantee can have negative effects on labor market efficiency. As interest rates and output grow higher, the number of low income individuals will decline, reducing government exposure to the fiscal cost generated by pension guarantees. Nevertheless, at the margin, the minimum pension deters workers from productive activities in the formal sector, since workers entitled to receive such a benefit, will have less incentives to offer additional labor, because future contributions will not imply more income at retirement.

5.2 Savings.

Several studies have analyzed the transition from a PAYG system to a FF scheme and their impact on savings, both for a representative economy and for specific countries based on the Kotlikoff and Auerbach framework (1987).[48] The majority of these papers analyze the transition cost and the alternatives to finance it, which as discussed in section IV, can be simplified to two: tax and debt financed.

Theoretical simulations for tax financed reforms yield increases in stationary savings rates by 3-5 percent of the GDP.[49] For the case of Colombia, it has been estimated that a tax financed reform can increase stationary savings rates by 2.4

percent of the GDP. For debt financed transitions, the representative economy obtains a reduction in long term output of around 1 to 4 percentage points of GDP[50], while steady-state saving is slightly lowered. Partial debt financed transition exercises yield intermediate results.

These authors have also explored the possibility of liquidity constrained consumers in a transition to a FF system.[51] In this case, the new scheme forces individuals to a corner solution where their personal savings are increased to a higher level than originally desired. These exercises yield long term GDP growth estimates as high as 16 percent for a closed representative economy and 4 to 14 percent for the Colombian case.[52] Mexican reform limits individual total indebtedness capacity since workers cannot use their accumulated balances as guarantees in other financial operations.

Mexico's transition is expected to be partially debt financed, but to the moment in which this paper is being written, the government has not announced the way it will be financed. To assess the impact of Mexican pension reform on savings, we undertook a simple and conservative estimation of the possible evolution of accumulated balances in the individual accounts.

The exercise assumes that real GDP grows at 3 percent per year, a real interest rate of 6 percent, real wage increase of 0.8 percent a year, that the total fiscal cost is partially tax financed (50 per cent) and that there is no reduction in voluntary private savings.[53] The increase in contributing workers behave as IMSS projections.[54] It is

assumed that balances in the housing subaccount keep their real value over time, and that there are no withdrawals from any subaccount, prior to retirement.

Table 10 shows the accumulated balance in the individual accounts (including contributions and interest earned minus withdrawals from future pensioners), the fiscal cost per year as estimated in section IV, an implied reduction in public sector savings as the transition is partially tax financed and the estimated net financial savings increase, defined as the difference between annual flows plus into the individual accounts plus interest minus withdrawals and the public sector savings reduction. Finally, it includes an estimation of the accumulated savings increase associated to the pension reform.

Table 10

Effects of the Reform on Savings

(% GDP)

Years	Accumulated Balances (A=Sum B's)	Flows to Individual Accounts (B)	Total Fiscal Cost (C)	Public Sector Savings Reduction (D=1/2 C)	Net Savings Annual Increase (E=B-D)	Accumulated Savings Increase (G=SUM E's)
1	3.98	2.21	0.48	0.24	1.97	3.74
5	13.16	2.44	0.52	0.26	2.18	12.15
10	25.95	2.72	0.72	0.36	2.36	23.66
15	40.07	2.97	1.08	0.54	2.43	35.7
20	55.31	3.16	1.45	0.72	2.44	47.88
30	88.2	3.43	1.91	0.95	2.47	72.35
40	123.75	3.74	1.87	0.94	2.81	98.57

Source: Authors' calculations.

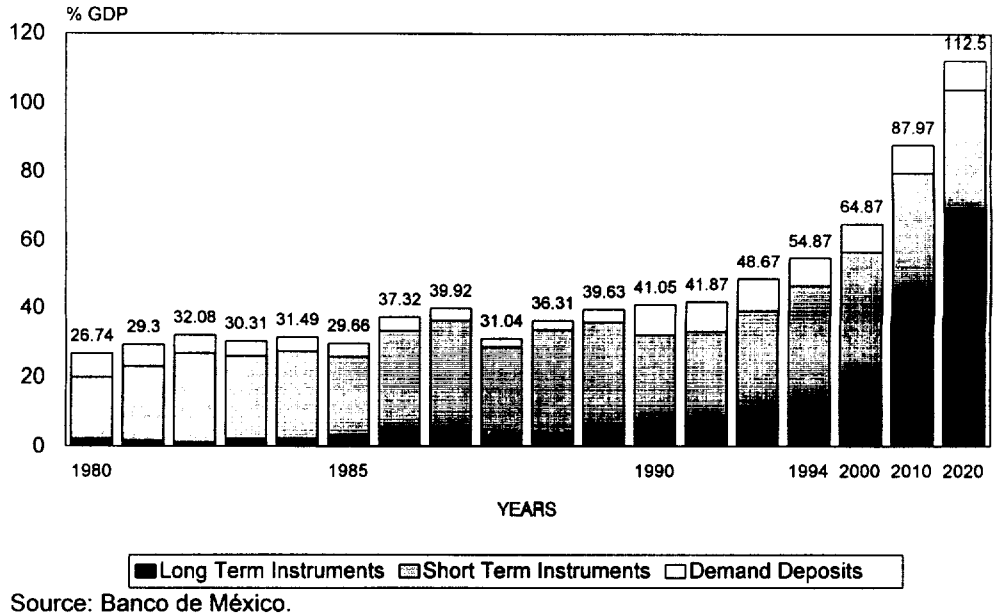
As can be seen, net savings can be increased by around 2.18 percentage points of the GDP in five years and to around 2.81 percentage points after 40 years of the introduction of the pension reform. This is a conservative estimate since it assumes low growth conditions and does not consider a positive real rate of return for the housing account.

5.3 Capital Markets.

Pension reform will produce a significant long term increase in the availability of financial resources to the economy. This will promote further financial specialization and the creation of new instruments, specially those related to long term investments.

Figure 3

Financial Savings (M4-Currency)



Source: Banco de México.

As it can be seen in Figure 3, total financial savings are highly concentrated in short term instruments. Long term instruments account only for 21.7 percent of total

financial savings and 11.9 percent of GDP. With the pension reform, long term instruments could reach 21.9 percent of GDP in 2000 and around to 45 percent of GDP in 2010.

The capitalization value of the Mexican Stock Exchange in 1995 was equivalent to 44 percent of the GDP. If we consider the accumulated balances of the individual retirement accounts estimated in the savings section, and assuming that AFOREs invest their resources as a typical pension fund in the United States (60 percent equity and 40 percent debt) we could expect that total pension fund participation in the Stock Exchange will be around 1.9 percent of the total during the first year, and after 15 years could reach around 15 percent of GDP.

The availability of these resources will promote financial deepening and long term investment. These gains could have a significant effect over investment decisions and growth.

5.4 Investment and Growth.

The National Development Plan 1995-2000 estimates that in order for the Mexican economy to grow at 5 percent annually, Mexico requires an investment rate equivalent to 24 percent of GDP.[55] The plan projects that this investment rate will be financed by domestic savings representing 22 percent of GDP and foreign savings equivalent to 2 percent of GDP. The domestic savings goal requires an increase in this variable of about 6 percentage points of GDP.

From the results of the savings projections, and assuming that all new savings are channeled to finance investment and not to reduce the current account deficit, the

pension reform will directly generate savings that could finance close to 25 percent of the additional required investment by the year 2000. As the system matures, the impact of the reform on savings will be higher and therefore its contribution to investment and growth will be more significant.

VI. CONCLUDING REMARKS.

Pension reform is now a worldwide phenomena forced by changing economic, demographic and social structures. In general, these processes have been part of major economic transformations. Social security reforms involve many different aspects in a complicated manner. There is not a unique way to proceed and each country has applied its own model. However, it is clear that any solution chosen should meet at least two requirements: financial viability and social acceptance.

This paper analyzed the Mexican pension reform and made some preliminary assessments about its future effects on the Mexican economy. We presented and compared the most important characteristics of the old and the new pension systems. There were several factors that caused the reform. First, the old IVCM-IMSS system was financially unsustainable, and second, the Mexican economy needs to increase its domestic saving rate.

The reform basically consists of establishing a fully-funded defined-contribution system based on individual accounts with a minimum pension guarantee provided by the government. Total contributions amount to 13.5 percent of the salary for the

average worker for accumulation in the individual accounts plus 2.5 percent for disability and life insurance that is still managed by IMSS.

The new Mexican system shares many common elements with other Latin American experiences. However, it shows some advantages and disadvantages with respect to them. Regarding the advantages, the new system respects acquired rights of current workers, the old system is completely substituted by the new system, administrative costs are reduced by limiting the number of transfers between pension fund managers to once per year, pension managers are allowed to operate several funds, the law does not establish a minimum guaranteed rate of return for pension funds, there is a centralized contributions collector agency and a centralized data bank.

On the other hand, disadvantages include the prohibition for the funds to invest in foreign securities, the IMSS is the sole provider of disability and life insurance, the minimum pension guarantee, the IMSS' AFORE, the operation of the housing subaccount, portability problems and the market share restrictions. These situations should be modified in the future to further improve the new system.

The fiscal cost of the transition to the new system is relatively low compared to similar reforms in other Latin American countries. The present value of the transition cost represents about 82.6 percent of GDP, lower for example, than the ones in Chile and Colombia. This mainly reflects the fact that the reform was undertaken when Mexico's population was still relatively young.

The reform will have a significant impact on financial savings. Accumulated balances in the individual accounts could reach 24 percent of GDP after 10 years,

around 48 percent after 20 years and 72 percent after 30 years. This will increase the possibility of financing long term investment projects in Mexico and will also promote more efficiency in the financial sector.

NOTES

1 . The reforms have included a major privatization program, trade liberalization, de-regulation of financial markets, legal changes to allow private investment in several infrastructure-related sectors, tax reform and a significant reduction in government expenditures.

2. There are several other public social security systems directed to the armed forces and workers at the public oil company as well as private retirement programs. These programs are small compared to those described in the text.

3. IMSS (*Instituto Mexicano del Seguro Social), INFONAVIT (Instituto del Fondo Nacional de la Vivienda para los Trabajadores*), ISSSTE (*Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado*), FOVISSSTE (*Fondo de la Vivienda del Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado*), SAR (*Sistema de Ahorro para el Retiro*).

4 . IMSS, 1995.

5.This insurance applies only if the worker dies or becomes disable not as a result of an accident or sickness due to his job.

6. This section only includes figures for IMSS and ISSSTE.

7. Severance at old age refers to the case when a worker losses his job and is over 60 years old, independently of whether he resigns or is dismissed by his employer.

8. The number of IVCM pensioners at that time was around 1.2 million, of which 65 percent corresponded to old age pensions and 35 percent were pensions for widows, orphans and other relatives.

9. The base salary on which the contribution applies has a limit of 10 times the minimum wage.

10. In Mexico, the minimum wage is set by law, and employers are required to comply with it. This variable is used as a reference of the wage structure of IMSS affiliates. The monthly minimum wage in July 1996 was equivalent to 90 US dollars. The average wage for workers affiliated to IMSS is 2.8 times the minimum wage.

11. The replacement rate is defined as the ratio of the worker's pension divided by his last salary.

12. In 1995, the wage for the average worker was 2.8 times the minimum wage and the average contributing period was almost 20 years.

13. A more comprehensive discussion of the SAR is presented by Solís Soberón (1995).

14. The base salary to which this contribution applies has an upper limit of 25 times the minimum wage.

15. This fee is divided between 0.5 percent for the bank and 0.3 percent for a clearinghouse that operates a centralized data bank for the SAR system.

16. CONSAR stands for "Comisión Nacional del Sistema de Ahorro para el Retiro".

17. This result is highly sensitive to the real interest rate assumed.

18. Includes IMSS and ISSSTE

19. Portability of benefits among different pension systems requires benefits not to be lost or diminished by shifting jobs in the formal sector.

20. IMSS (1995).

21. A broader discussion of this issue can be found in Solís-Soberón and Villagómez (1996).

22. As it is well known, it is difficult to quantify the precise magnitude of this variable because of several measurement problems. Most of the existing estimates are drawn directly from national income accounts as a residual after deducting the balance of payments deficit on the current account from estimates of gross domestic capital formation. There are other serious problems when breaking down gross domestic savings into its components, private and public savings. These problems derive in different quantitative estimations, although in general these estimations offer similar trends. For a discussion on this issue see Gil-Díaz and Carstens (1996).

23. For a discussion on this issue see Villagómez (1993).

24. In a recent paper, Feldstein (1995) put forward several suggestions of tax reforms in Mexico to stimulate saving. He also discusses the transition to a FF social security system.

25. An interesting discussion about alternative possible reform proposals can be found in Feldstein (1995) and Bosworth, Dornbusch and Poterba (1995).

26. It should be noted that the social contribution in terms of the wage will tend to diminish as real wages increase.

27. AFORE stands for "Administradora de Fondos para el Retiro".

28. The premium paid by each firm is obtained by multiplying the loss ratio of the firm (based on the percentage of permanent, partial and total disabilities, the number of deaths and the average active life of a worker without an accident considered by this insurance) by a premium factor (equal to 2.9) and adding to this amount 0.0025, the estimated minimum risk premium. The estimated premium will be revised on an annual basis.

29. Programmed withdrawals are calculated taking into consideration the age of the worker and his dependents.

30. This result is due to an increase in the numerator because of higher accumulated balances in the worker's individual account, and a decrease in the denominator due to the reduction in wages that the average worker faces after 41 years of age.

31. In the case of disability due to a labor disease the pension will be 70 percent of the average base wage of the last 52 contribution weeks.

32. The widow will receive an amount equivalent to 40% of the insured´s corresponding disability pension and the pension of each child below 16 years old (or 25 if he is still a student) represents 20 percent of this disability pension. In case there is no widow and/or orphans, any other insured´s dependent will enjoy a pension equivalent to 20 percent of the disability pension.

33. These additional payments include a 15 percent of the pension for the wife and a 10 percent of the pension for each child below 16 years old, or 10 percent of the pension for the insured´s parents in case there are no other beneficiaries. If the worker does not have any beneficiary, he will receive an additional 15 percent of his pension or 10 percent if there is only one beneficiary. In all cases, there is an additional payment equivalent to 20 percent of the pension if the insured requires permanent assistance. Finally, it is required that the total pension should not exceed 100 percent of the average wage used to calculate the pension.

34. The widow will receive an amount equivalent to 90 percent of the insured´s corresponding disability pension and the pension for each child below 16 years old (or 25 if he is still a student) will be equivalent to 20 percent of this disability pension. In case there is no widow and/or orphans, any other insured´s dependent will get a pension equivalent to 20 percent of the disability pension.

35. Excluding voluntary contributions.

36. SIEFORE stands for "Sociedad de Inversión Especializada en Fondos para el Retiro".

37. See Section Two.

38. For a discussion on this issue see Diamond (1994). He characterizes the provision of services such as the collection of monthly payments and record keeping as a natural monopoly.

39. Another issue relates to the ability of each worker to chose an AFORE. This is a crucial issue of competition that will allow to reap up the potential benefits of the new

pension system. But, as discussed by Arrau, Valdés-Prieto and Schmidt-Hebbel (1993), this ability might be limited, in particular during the transition period, as a consequence of the amount of information required to take a decision to purchase a new and unknown product. Therefore, at the beginning, the costs implied by the learning process and the time spent will be relatively high. According to the authors, this situation will imply a low elasticity of individual consumer demand favoring a monopolistic competition structure in the provision of these services and reflected in high individual contracting costs and high marketing costs.

40. Changes in the minimum wage are determined yearly by a commission headed by the government which includes representatives of labor and business organizations.

41. For Chile the range goes from 0.4 to 1.73 percent of the base salary. In Argentina, it ranges from 0.32 to 2.18 of the base salary.

42. Arrau (1990), Arrau and Schmidt-Hebbel (1993), Arrau, Valdés-Prieto and Schmidt-Hebbel (1993), Schmidt-Hebbel (1994) and Corsetti and Schmidt-Hebbel (1995), analyze the case of a representative economy and the Chilean and Colombian experiences. These papers are based on a framework developed by Auerbach and Kotlikoff (1987). The main features of the representative economy model used are the following. Household maximize life time utility, lack of intergenerational altruism, no borrowing constraints and voluntary savings are higher than their mandated savings. Household of a given cohort are identical to each

other. There is no uncertainty and the economy is closed. Labor is supplied inelastically and market clearing allows continuous full employment.

43. The intermediate case, as explained by Arrau and Schmidt-Hebbel (1993), was chosen by Chile. The government distinguished among two components of its pension debt: the part due to current PAYG pensioners (operational deficit) and the part due to past contributions made by currently active workers to the old system (honored with recognition bonds). Debt was used to pay for maturing recognition bonds and taxes were used to pay the operational deficit.

44. The simulations presented were made by the authors using publicly available information, and may vary from those made by others, depending on the demographic and macroeconomic assumptions. In particular we do not consider changes on the age distribution; our fiscal cost estimates does not include workers' compensation pensions, commissions paid by the workers nor the SAR's accumulated balances before the reform.

45. IMSS assumes an affiliates growth rate of 2.3% in 1997, 2.9% in 1998 and 2.2% after this year.

46. It should be noted that in the case the rate of technical progress is not neutral, our results will change. In particular, if wL grows at a higher rate than output, the cost will be higher because the pensions under the old system, which are an option for transition workers, are indexed by the minimum wage.

47. See Summers, L. (1989)

48. See footnote 42 where its specific characteristics are explained.

49. Arrau and Schmidt-Hebbel (1993), Cifuentes and Valdés-Prieto (1994).

50. Arrau and Schmidt-Hebbel (1993). This result is driven by the future tax changes assumed by the authors.

51. Villagómez (1993) found significant empirical evidence to support the liquidity constraint consumers hypothesis in the case of Mexico.

52. Cifuentes and Valdés-Prieto (1994). Schmidt-Hebbel (1995).

53. Workers are supposed to have no voluntary savings. This strong assumption is possible in the Mexican case considering current real wages and savings patterns.

54. See footnote 45 for projections.

55. Plan Nacional de Desarrollo 1995-2000.

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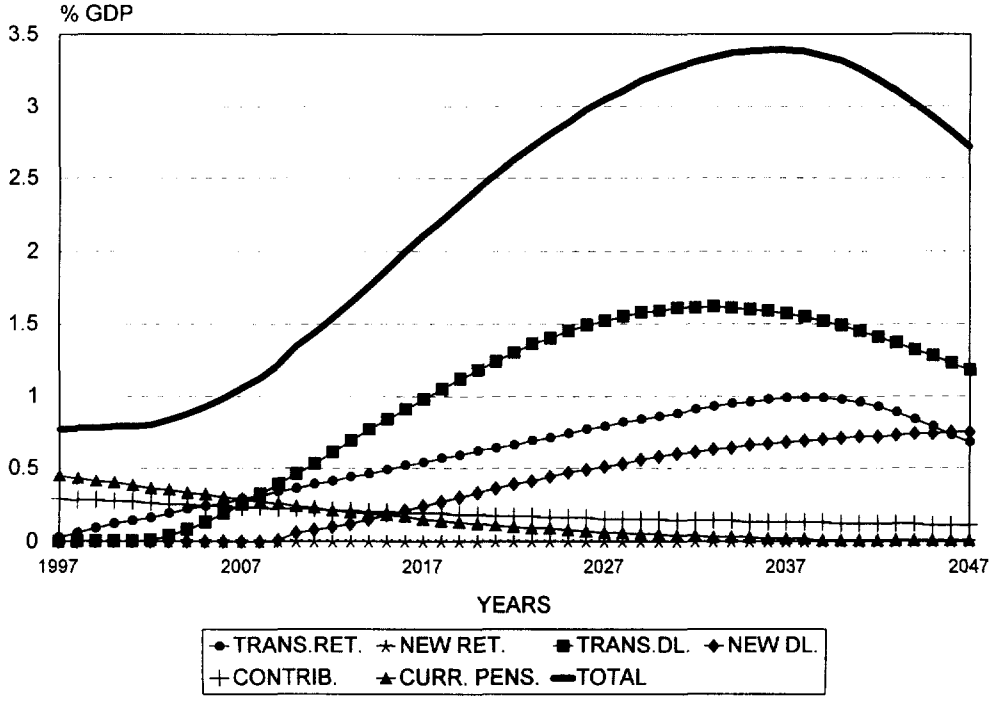
Fernando Solís-Soberón
Alejandro Villagómez-Amézcua

APPENDIX

Figure A-1

Cost of the Reform

High Growth Scenario (Interest Rate 3.5%)



Source: Authors' calculations.

Trans. Ret.= Old Age and Severance at Old Age pensions paid to transition pensioners.

New Ret.= Expenses in Old Age and Severance at Old Age pensions for new pensioners.

Trans. DL= Disability and Life pensions paid to transition pensioners.

New DL.= Expenses in Disability and Life pensions for new pensioners.

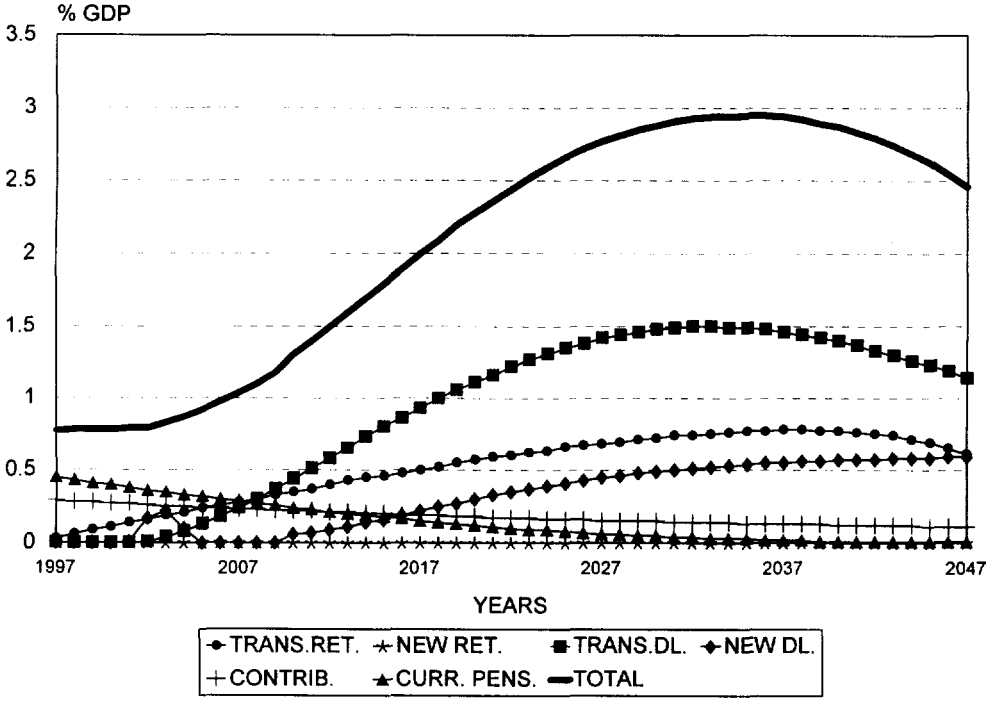
Contrib.= Contributions.

Curr. Pens.= Pensions of current pensioners.

Figure A-2

Cost of the Reform

High Growth Scenario (Interest Rate 6%)



Source: Authors' calculations.

Trans. Ret.= Old Age and Severance at Old Age pensions paid to transition pensioners.

New Ret.= Expenses in Old Age and Severance at Old Age pensions for new pensioners.

Trans. DL= Disability and Life pensions paid to transition pensioners.

New DL.= Expenses in Disability and Life pensions for new pensioners.

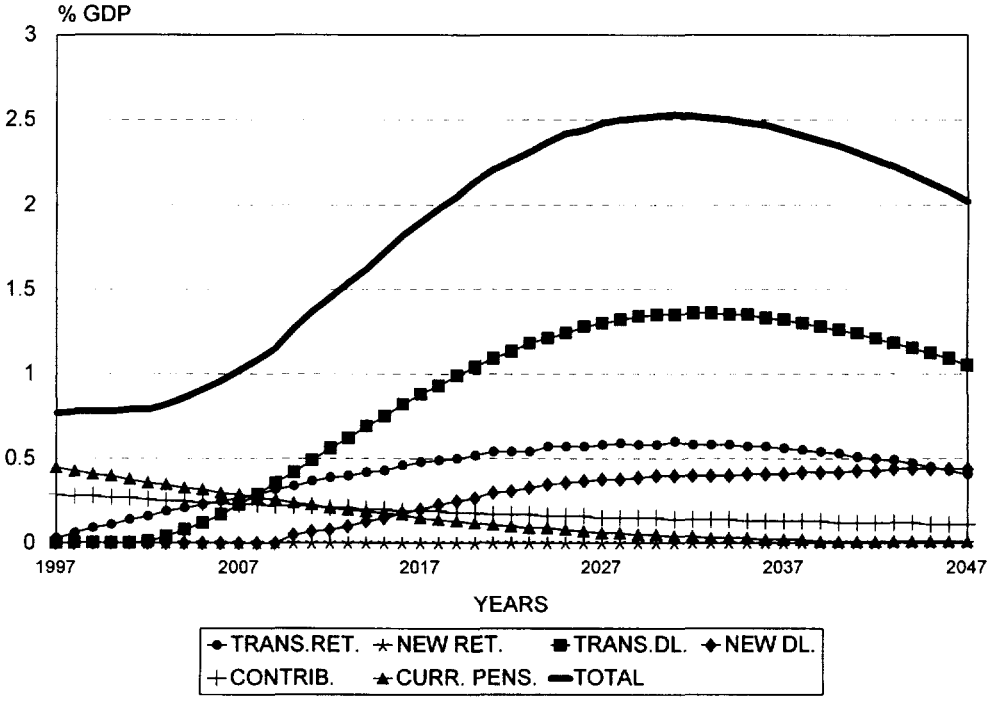
Contrib.= Contributions.

Curr. Pens.= Pensions of current pensioners.

Figure A-3

Cost of the Reform

High Growth Scenario (Interest Rate 8%)



Source: Authors' calculations.

Trans. Ret.= Old Age and Severance at Old Age pensions paid to transition pensioners.

New Ret.= Expenses in Old Age and Severance at Old Age pensions for new pensioners.

Trans. DL= Disability and Life pensions paid to transition pensioners.

New DL.= Expenses in Disability and Life pensions for new pensioners.

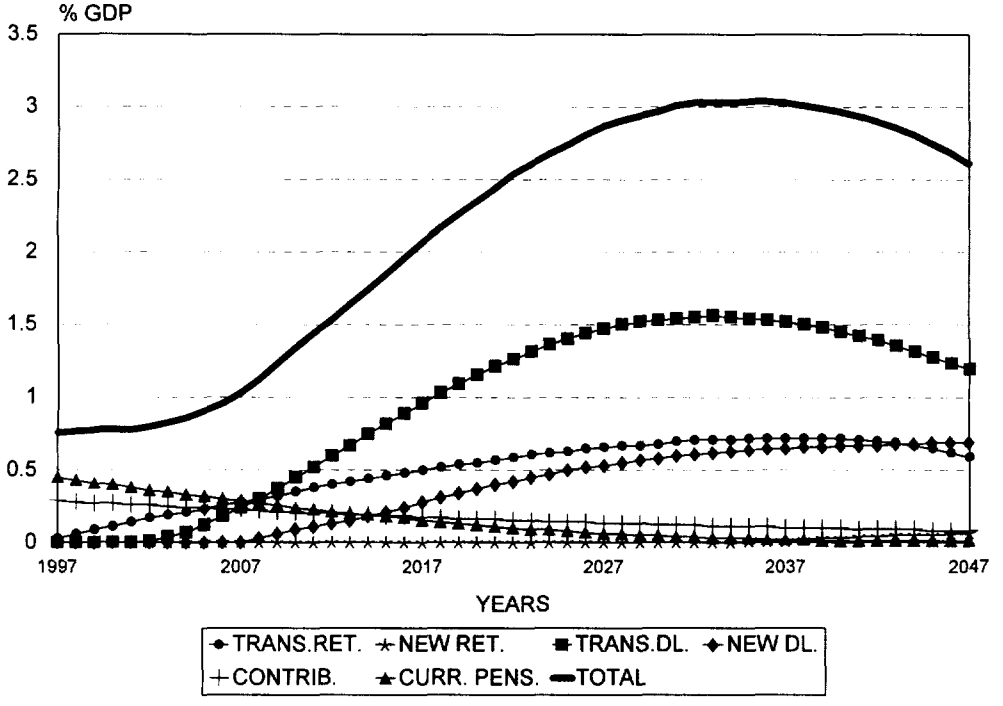
Contrib.= Contributions.

Curr. Pens.= Pensions of current pensioners.

Figure A-4

Cost of the Reform

Low Growth Scenario (Interest Rate 3.5%)



Source: Authors' calculations.

Trans. Ret.= Old Age and Severance at Old Age pensions paid to transition pensioners.

New Ret.= Expenses in Old Age and Severance at Old Age pensions for new pensioners.

Trans. DL= Disability and Life pensions paid to transition pensioners.

New DL.= Expenses in Disability and Life pensions for new pensioners.

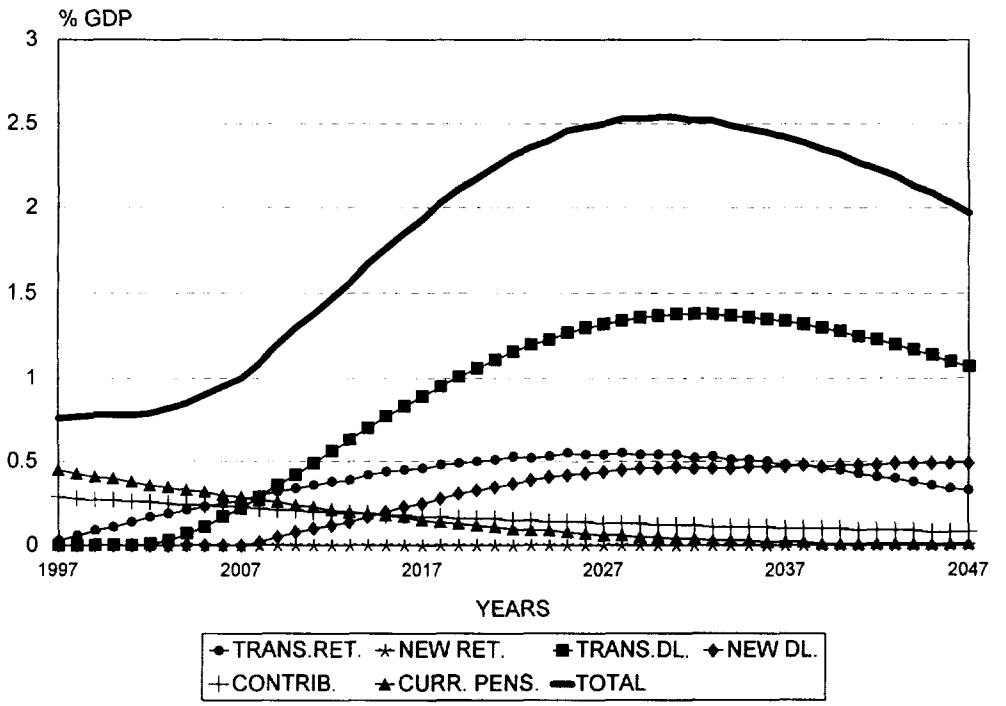
Contrib.= Contributions.

Curr. Pens.= Pensions of current pensioners.

Figure A-5

Cost of the Reform

Low Growth Scenario (Interest Rate 6%)



Source: Authors' calculations.

Trans. Ret.= Old Age and Severance at Old Age pensions paid to transition pensioners.

New Ret.= Expenses in Old Age and Severance at Old Age pensions for new pensioners.

Trans. DL= Disability and Life pensions paid to transition pensioners.

New DL.= Expenses in Disability and Life pensions for new pensioners.

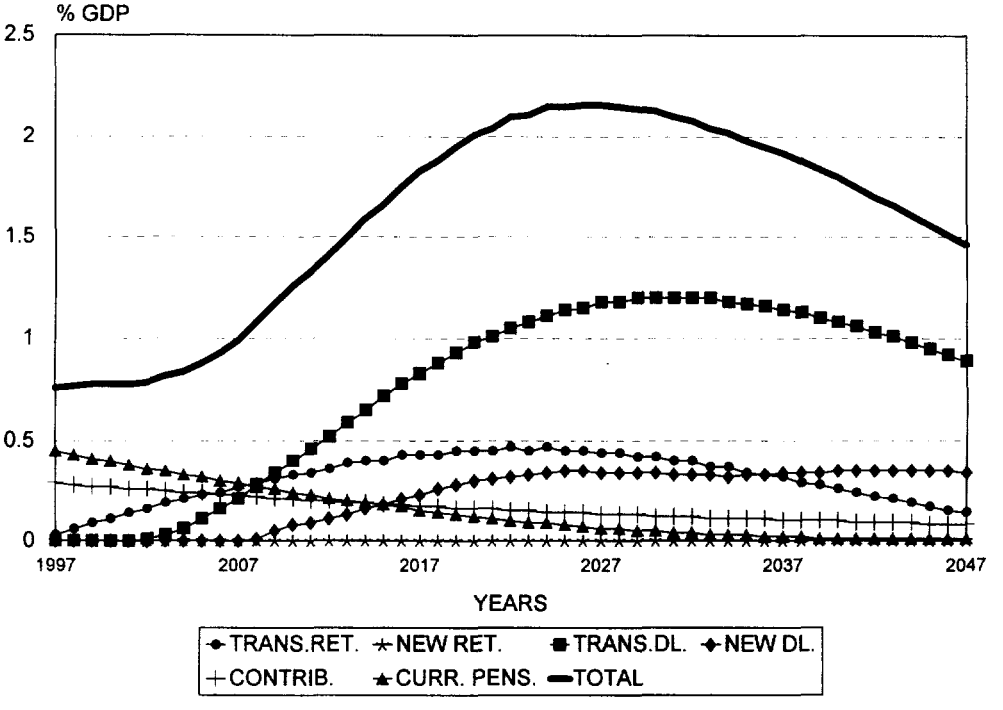
Contrib.= Contributions.

Curr. Pens.= Pensions of current pensioners.

Figure A-6

Cost of the Reform

Low Growth Scenario (Interest Rate 8%)



Source: Authors' calculations.

Trans. Ret.= Old Age and Severance at Old Age pensions paid to transition pensioners.

New Ret.= Expenses in Old Age and Severance at Old Age pensions for new pensioners.

Trans. DL= Disability and Life pensions paid to transition pensioners.

New DL.= Expenses in Disability and Life pensions for new pensioners.

Contrib.= Contributions.

Curr. Pens.= Pensions of current pensioners.