

OFFICE OF THE CHIEF ECONOMIST,
LATIN AMERICA AND CARIBBEAN REGION,
THE WORLD BANK

30485

BACKGROUND PAPER FOR REGIONAL STUDY
ON SOCIAL SECURITY REFORM

**The Mexican Defined Contribution Pension System:
Perspective for Low Income Workers**

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1 INTRODUCTION

During recent decades Mexican society has experienced profound transitions in the economic, political, and demographic arenas. Forty years ago, Mexico had high population growth, a unique hegemonic political party system and a closed economy. Today the country has changed completely: demographic growth has declined significantly, there is a democratic political system and the economy is one of the most open in the world.

However, recent decades were also characterized by poor economic performance and poverty levels that have increased considerably, making increases in economic opportunities more difficult to create. Additionally, it is expected that the population will grow from 100 million to 130 million people during the next 30 years.¹ Therefore, in order to generate the necessary opportunities, Mexican society faces several challenges in the economic, educational, medical and social security sectors.. Several structural changes are needed to provide the necessary conditions for better living standards.

An important challenge caused by the demographic transition is the accelerated process of aging of Mexican society during the next decades. Today the majority of the population is relatively young, but given projected life expectancy, the number of people over 60 years of age will increase in absolute and relative terms during a short period of time. This will change the structure of labor markets and the social security system, given the proportional decrease of the workforce and the increase of older workers. Low income workers need to find secure ways to increase their wealth at the end of their working life. Even in the presence of low dependency ratios, pension systems in Mexico face a permanent crisis caused by poor administration of reserves and weak institutions.

This paper analyzes the structure and perspectives of the current pension system, introduced in 1997 as part of Mexico's structural changes. In particular, it focuses on the effects of the system on poverty after retirement and emphasizes the redistributive component of its design. In addition, there is an analysis of alternative forms for financing pensions at the end of the working lives of affiliates. Finally, there are some recommendations to improve the functioning and financing of the system.

¹ National Population Council (CONAPO) Population Projections.

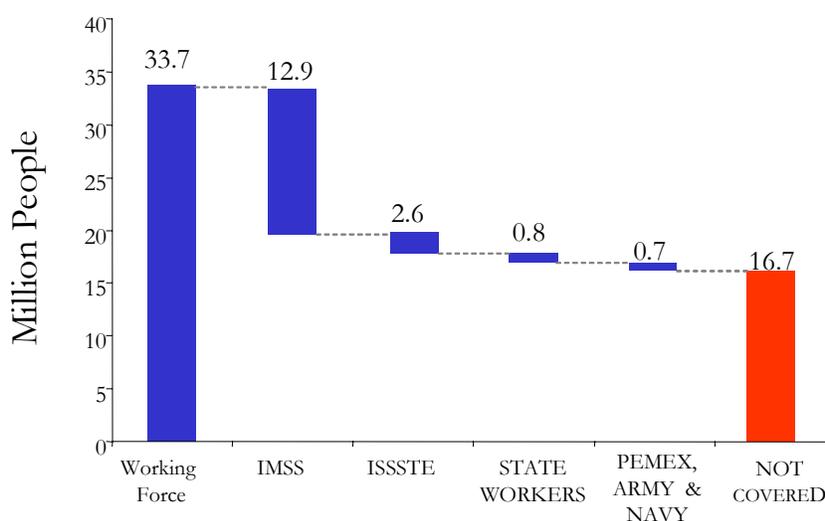
2 PENSION SYSTEMS AND POVERTY IN MEXICO

2.1 THE STRUCTURE OF SOCIAL SECURITY IN MEXICO

Social security is provided by two major groups of institutions in Mexico: one for private sector workers through the Social Security Institute (IMSS) and a housing fund (INFONAVIT). The second covers public sector employees at the Federal and state level through a dedicated Social Security Agency (ISSSTE) and a second housing fund (FOVISSTE). IMSS and ISSSTE essentially provide insurance for health and maternity, old age retirement, severance at old age, disability, , 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. In addition there are several systems at the state and municipal levels and organizations covering workers of the public oil company (PEMEX), the army and the navy. The total number of contributors to any social security system is 16.5 million.

Pension schemes of these systems, generally of the Pay as You Go (PAYGO) variety, have faced financial imbalances caused by economic crises and low growth of formal jobs: contributions have not been enough to provide the benefit levels promised.

Figure 1: Coverage and Structure of Mexican Social Security Systems



**Includes permanent affiliated Workers.*

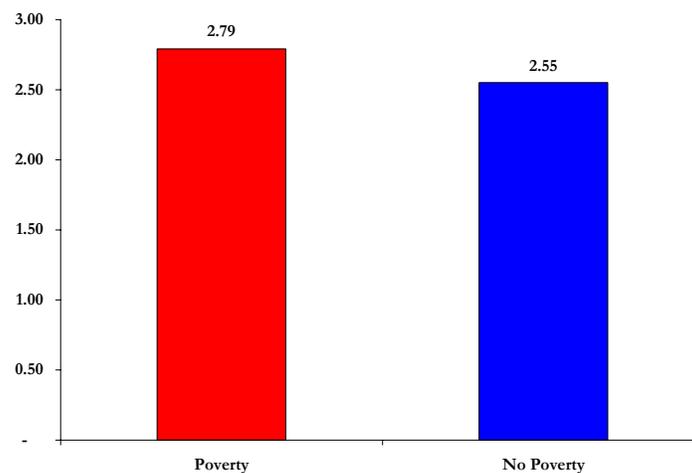
Source: INEGI.

Structural reforms of social security started in 1997 with the reform to the IMSS pension system. Since that time, private sector workers have a Defined Contribution (DC) system with individual accounts administered by specialized companies denominated *Administradoras de Fondos para el Retiro* (AFORES, by its Spanish acronym).

2.2 PENSIONS AND POVERTY CONDITIONS OF THE ELDERLY

According to the new poverty measures, 52 percent of people over 65 years old do not have enough income to satisfy daily requirements necessary to live in adequate conditions. The low coverage of the elderly population by any pension system and the reduction of pension value over time explain this situation.² In addition, there is no universal benefit for the elderly, and public programs have very low coverage. Some exceptions include a program for urban elderly that provides 10 liters of milk to every beneficiary each week. And some local governments, such as that of Mexico City, are implementing electronic cash transfers to people over 70 years old. Nevertheless, there is no fiscal sustainability for this kind of benefit.

Figure 2: Poverty Conditions of Population Over 65 Years (Million People)



Source: Author's estimation based on information of ENIGH 2000.

Demographic transition will increase the number of elderly in absolute and relative terms during the coming decades, putting stress on the current structure and functioning of social security systems.³ During the next 20 years, the population over 65 years old will more than double. Given current wage levels, if economic conditions do not allow workers to contribute to pension systems, a poor and elderly society will likely result.

THE PENSION SYSTEM FOR PRIVATE SECTOR WORKERS

The IMSS pension system was designed as a defined benefit scheme and was originally financed according to a scaled premium system, accumulating the reserves needed to finance the cost of future pension liabilities. Actuarial reserves of pensions were used to build basic infrastructure: funds were used for hospitals and medical technology in order to satisfy the growing demand for services in rural areas. Pensioners paid this cost by reducing the value of their monthly payments each year and by receiving low quality services. The benefit formula was designed to redistribute in favor of low income workers, but given labor market conditions and the failures of the institutional structure, these workers generally did not receive any benefits, even though they contributed during their working life to the pension fund. In other words, the system was sometimes regressive and did not recognize the rights of low income workers whose contributions financed, at least in part, the pensions of higher income workers. Financial imbalance and institutional problems led the system to accumulate a financial deficit that was valued at 141 per cent of GDP.⁴

A first attempt to reform the system was undertaken in 1992, when the government implemented a compulsory system of individual savings accounts that complemented the PAYGO scheme. It was denominated “System for Retirement Savings” (SAR -*Sistema de Ahorro para el Retiro*). Individual accounts were comprised of two subaccounts: one for additional savings (2% of wages) and the other a housing account (with the balance managed by INFONAVIT). Nevertheless, this system had serious failures in its performance: regulatory frameworks were not sufficiently developed and implementation was not properly monitored. In addition, the multiplicity of workers’ identification numbers generated an excessive number of personal accounts. This complicated and aggravated monitoring problems.

Financial imbalance of the system and the structural failures of the IMSS pension and SAR systems obligated authorities and congressmen to design a new reform. In December 1995, the Mexican Congress approved legislation to reform the existing social security law and shift the pension system for workers in the private sector to a privately managed defined-contribution system.

This pension reform is the second major plank of the IMSS reform. By creating a compulsory fully funded capitalization system, the reform has addressed potential problems of financial viability over the long-run; and by making pension rights fully portable for affiliated workers, it has strengthened the links

² New poverty measures are described in Annex 1.

³ The explanation of this transition is described in Annex 2.

between workers' contributions and benefits, thereby increasing the attractiveness of formal activity and full income declaration.

2.3 THE STRUCTURE OF THE IMSS DEFINED CONTRIBUTION SYSTEM

The new system, in place since mid-1997, operates with individual pension accounts and is based on three pillars: private, public and voluntary. The administration of the individual retirement accounts is made through Retirement Fund Administrators (*AFORES*), which are private entities that compete for funds through interest paid on accounts and commissions. Each worker may choose his or her personal *AFORE*. The reform also opened a large market for life annuities. *AFORES* invest retirement savings in the market by using specialized funds denominated *SIEFORES*. The idea is that compulsory savings will increase total private savings, rather than substitute for other uncertain forms of savings. Since the government pays the cost of transition from a pay-as-you-go to a capitalization system,⁵ the principal short-run impact has been a shift from public to private saving.

Initially, an *AFORE* was limited to operate only one *SIEFORE*, which must invest in fixed income securities and inflation-protected instruments. As markets developed and the system became more widely understood, other *SIEFORES* emerged for voluntary savings. Ultimately, investments permitted by the *SIEFORES* include instruments such as financial derivatives.⁶ Nevertheless, there are still rigid investment rules.

According to the new law's transition provisions, employees who made contributions under the former law will be able to choose their retirement benefits – selecting either the former benefits or the accumulated funds in their individual accounts. Since the majority of the retirees in the near future will probably have very small individual accounts, they will likely decide to retire under the former law.

Under the new pension system, the employer, employee and government together will contribute 6.5 percent of a worker's wages to an individual retirement account. Legislators decided to establish an additional government contribution called the “*Cuota Social*,” which represents 5.5 per cent of the minimum wage at the time the new system takes effect, in order to benefit low income workers.

⁴ Grandolini and Cerda, 1998.

⁵Workers no longer pay their contributions to the IMSS but rather to their individual pension saving accounts. But during the transition, the government is paying the gap between what the worker has accumulated in his or her account and what he or she is entitled to receive under the old scheme -- workers already in the old system have the option to choose under which scheme they will receive benefits.

⁶ It is expected that funds will be used for financing projects such as housing, regional development and infrastructure (highways, airports, telecommunications, railways, power generation, ports, and water supply and treatment facilities).

Subsequently, the government's *cuota social* contribution will be indexed to the Mexican consumer price index. Employees are also allowed to make additional voluntary contributions to their accounts.

There is also a housing sub-account in the new system that is still administered by INFONAVIT. This fund is financed by a contribution of 5 percent of wages and upon retirement will be used to purchase the life annuity and survival insurance of the pensioner. Together with the old age and retirement sub-account, this housing sub-account will finance the worker's pension upon retirement. The complete structure of contributions is showed in Table 1 below.

Table 1: Structure of Contributions to the New Pension System

Concept	Worker	Employer	Government	Total	Base	Limit
Retirement		2.000%		2.000%	Base Salary	25 Minimum Wages
Old Age	1.125%	3.150%	0.225%	4.500%	Base Salary	17 Minimum Wages
Cuota Social			5.500%	5.500%	One Minimum Wage	
Housing		5.000%		5.000%	Base Salary	17 Minimum Wages

Source: *Social Security Law, 1997.*

The amount of the pension will depend on the size of an individual's account at retirement age: contributions accumulated during the affiliates' working life, plus investment returns, minus paid commissions. For eligibility to retire with a pension, the worker must be at least 65 years old. In the case of severance at old age, the requirement is reduced to 60 years. After 1,250 weeks of contributions to the individual account, the worker has two options: purchase an annuity from a private insurance company which guarantees a fixed monthly pension, or receive programmed withdrawals from the AFORE.

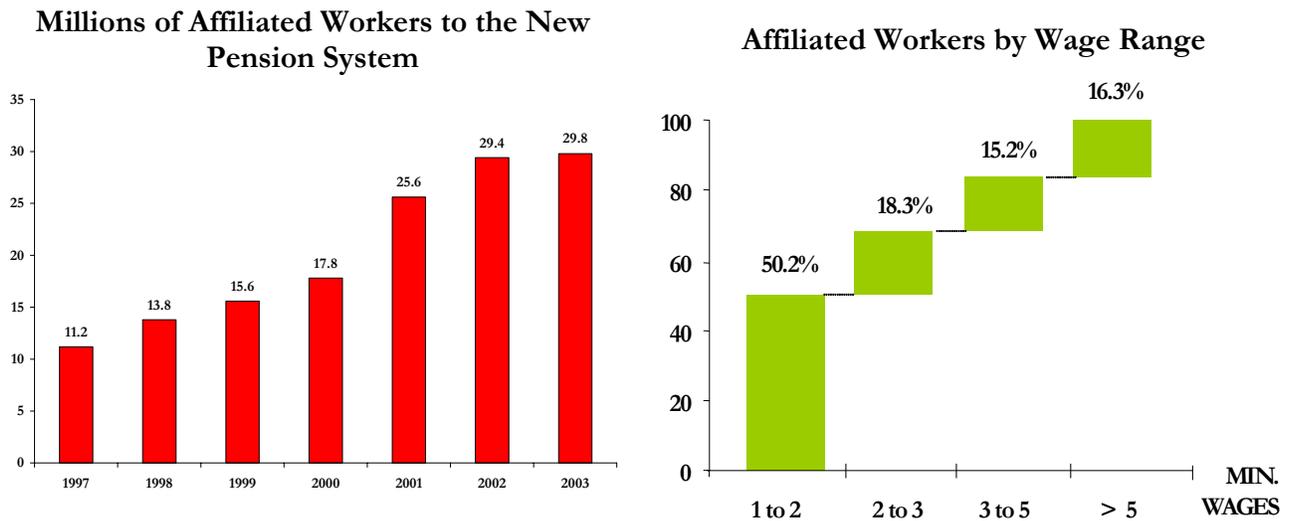
In addition, the new law includes a guaranteed minimum pension in retirement, as well as disability and death benefits. Effective July 1st, 1997, this guaranteed minimum pension equals the minimum wage, which will increase in subsequent years according to the inflation rate. The government will be responsible for financing these pensions. This has a very important effect on the fiscal cost of the reform, given the current level of wages and contributions.⁷

⁷ More than 60 per cent of total affiliates to IMSS earn less than 3 minimum wages. If workers do not accumulate enough resources in their individual account, fiscal costs will increase due to the minimum pension guarantee.

3 THE EVOLUTION OF THE SYSTEM

At the start of the new pension system, 17 AFORES and 17 SIEFORES were formed and authorized for operations. Starting February 3, 1997, they began operation, competing to administer the accounts of as many workers as possible. After 70 months, 7 different AFORES merged with another fund manager and two more were authorized to operate. Last April there were more than 29.8 million workers registered in an AFORE and more than \$4,856 million dollars invested in the SIEFORES.

Figure 3: Affiliates to the DC Pension System



Source: CONSAR

There have been minor changes in the structure of the system since its implementation. The basic differences are the authorization of two SIEFORES for voluntary savings, and lower investment restrictions for SIEFORES. Now it is possible to invest in qualified public enterprises and local and municipal bonds. It is also possible to invest in bonds denominated in US dollars, but only if issued by the Mexican Federal Government. Another change in the system is the portability of the 2% contribution to System for Retirement Savings (SAR) accounts from public workers who are inscribed in the ISSSTE.⁸ This allows bureaucrats to consolidate their multiple accounts and provides the right to invest voluntary savings in the privately-administered system. Nevertheless, there are multiple differences between pensions systems and the rights for workers who switch from IMSS to ISSSTE and vice versa are not recognized in a unified structure. In other words, there is no full portability between the most important pension systems of the country.

⁸ This change was approved by Congress in December of 2000.

4 EVALUATION OF DISTRIBUTIVE ELEMENTS OF THE PRIVATE PENSION SYSTEM

As mentioned in section 3, there are two distinctive elements of the IMSS defined contribution pension system: the minimum pension guarantee and the Cuota Social. In the first case, the effect is similar to a minimum rate of return: if the worker contributes the required 1,250 weeks to his individual account, no matter the balance, he is entitled to a minimum pension equivalent to one minimum salary of 1997. For the second case, the relative impact is greater for low-income than high-income workers. The main outcome is based on the final personal balance at the time of retirement, and also depends on the effect of commissions charged by individual AFORES. In order to analyze these effects, the next sections compare and describe the structure of commissions in different scenarios.

4.1 DESCRIPTION, COMPARISONS AND EFFECTS OF COMMISSIONS

According to the Law governing individual accounts, AFORES can only charge commissions using uniform bases, and they can not discriminate against any worker. Commissions are intended to compensate the pension fund system for the entire range of expenses that AFORES incur in the process of carrying out the key functions of a pension plan: collection of contributions, fund management, record keeping, and management of benefit payments. These commissions should include normal profit and some proportion of start-up costs. Commissions can be based on account assets, on the flow of contributions, or on a mixed scheme, as shown in the following table:

Table 2: Authorized Commissions

AFORE	% Of wage	Annual % of Assets	Annual % of real return
ALIANZ DRESDNER	1.60%	0.50%	
AZTECA	1.30%	0.15%	
BANAMEX	1.70%	0.00%	
BANCOMER	1.68%	0.00%	
BANORTE GENERALI	1.40%	0.70%	
INBURSA	-	0.00%	33%
ING	1.68%	0.00%	
PRINCIPAL	1.60%	0.45%	
PROFUTURO / GNP	1.67%	0.70%	
SANTANDER/MEXICANO	1.60%	1.00%	
XXI	1.40%	0.20%	

Source: CONSAR.

4.1.1 THE MODEL TO COMPARE COMMISSIONS

Commissions reported in Table 2 are difficult to compare. To do this, it is necessary to make some specific assumptions related to wage levels, period of contributions, and real rates of return. The methodology to make these comparisons is developed in this section. It uses a transformation of commissions to express them with the same base: contribution, balance or real interest rate.

The model is based on several assumptions used to calculate the personal balance of the worker during a period of time, the wage level, the structure of commissions (including any discount for permanency) and an equal rate of return for each SIEFORE.⁹

It approximates a balance, not a commission, using this group of assumptions. Consequently, the variable is the “equivalent commission,” not the balance, that is comparable among workers with the same characteristics in different AFORES during a certain period of time. It is important to note that projections are made annually and in real terms in order to simplify the estimations.

The model is organized as follows: the first step is to determine the commission flow.

This methodology would be described algebraically as follows:

a. Commission flow

$$cf_{k,t} = \alpha_{k,t} W_t \quad (1)$$

Where:

k = AFORE

t = year

cf = commission on contribution charged by each AFORE in year t

w = Contribution Level Wage in t , in multiple of the minimum wage

α = commission as % of Contribution Level Wage charged by each AFORE in year t .

⁹ This method is also useful to determine the optimal AFORE for every worker according to his characteristics and the time he is expected to participate in the system.

b. Commission on Real Interest Rate

$$i_{k,t} = \hat{i}_{k,t}(1 - \rho_{k,t}) \quad (2)$$

Where:

$\hat{i}_{k,t}$ = real interest rate obtained by SIEFORE in time t

$\rho_{k,t}$ = commission on real interest rate

$i_{k,t}$ = net real interest rate

c. Commission on Balance

The commission on balance must be calculated on the accumulated contributions and on the net interest rate obtained by every SIEFORE. Accordingly, the method to calculate it is as follows:

$$C_{k,t} = \left(W \cdot (1 + Winc)^{t-1} \cdot 0.065 + cs \right) \cdot dc_t - cf_{k,t} \quad (3)$$

Where:

W = wage level (multiple of the minimum wage)

$Winc$ = annual wage increase

cs = cuota social

dc = contribution density in year t

The annual balance of an individual account is based on the accumulation pattern: previous contributions plus interest rates and new contributions. This can be represented as follows:

For $t = 0$

$$B_{k,0} = SAR \quad (4)$$

For $t > 0$

$$B_{k,t} = (B_{k,t-1} + C_{k,t}) \cdot (1 + i_k) \cdot (1 - \beta) \cdot \left(1 - \frac{cb_{k,t}}{2} \right) \quad (5)$$

Where:

$a_{k,t}$ = Contribution to AFORE k , in year t .

$cb_{k,t}$ = Commission on balance of AFORE k , in year t .

d. Equivalent commission on Contribution

$$cf' = \frac{1 + \left[cs - \frac{(B_t - B_0)}{M_t} \right]}{0.065w} \quad (6)$$

Where:

$$B_0 = SAR \left[(1 - \beta)(1 + \hat{i}) \right]^{t-1} \quad (7)$$

B_0 = Initial balance

cf' = equivalent commission on contribution

$$M_t = \left[\frac{(1 + \hat{i})^t - 1}{\hat{i}} \right] (1 + \hat{i}) \quad (8)$$

e. Equivalent Commission on Wage

$$\alpha' = 0.065cf' \quad (9)$$

Where:

cf' = equivalent commission on contribution

α' = commission of contribution as percentage of wage

f. Equivalent Commission on Balance

β' = % of commission on balance, given:

$$B'_t = (.065 w + cs) \sum_{n=1}^t \left[(1 - \beta')(1 + \hat{i}) \right]^n + B_0 \quad (10)$$

$$B_t(0.95) \leq B'_t \leq B_t(1.05)$$

g. Equivalent Commission on Real Interest Rate

$\rho_{k,t}'$ = % of the commission on real interest rate, given:

$$B_t' = (.065w + cs) \left(\frac{(1+i')^t - 1}{i} \right) + S_0 \quad (11)$$

$$i' = \hat{i}(1 - \rho')$$

$$\text{and } B_t(0.95) \leq B_t' \leq B_t(1.05)$$

4.1.2 EQUIVALENCE OF COMMISSIONS: AN EXAMPLE

Let us assume the characteristics of a representative affiliated worker to the system. The characteristics are:

- Wage: 3 times the minimum wage.
- Real wage growth: 0%
- Real annual investment returns: 3.5% and 5%
- Holding periods: 25 and 40 years.
- Initial Balance: \$10,000.

**Table 3: Equivalent Commissions on Contributions
(% of Contributor's Salary)**

<i>AFORE</i>	<i>25 years</i>		<i>40 years</i>	
	<i>3.00%</i>	<i>5.00%</i>	<i>3.50%</i>	<i>5.00%</i>
ALIANZ DRESNER	1.93%	1.95%	2.11%	2.16%
AZTECA	1.40%	1.41%	1.46%	1.48%
BANAMEX	1.52%	1.54%	1.43%	1.46%
BANCOMER	1.64%	1.64%	1.64%	1.64%
BANORTE GENERALI	1.87%	1.90%	2.12%	2.19%
INBURSA	1.60%	2.30%	2.39%	3.43%
ING	1.68%	1.68%	1.68%	1.68%
PRINCIPAL	1.90%	1.92%	2.06%	2.11%
PROFUTURO / GNP	2.12%	2.16%	2.37%	2.44%
SANTANDER/MEXICANO	2.24%	2.29%	2.59%	2.68%
TEPEYAC	1.70%	1.71%	1.76%	1.77%
XXI	1.54%	1.55%	1.61%	1.64%

As the above table shows, for AFORES with commissions on assets, the equivalent commission on flow increases with the holding period and with the real return of the fund. Also, if the real interest rate increases, the equivalent commission also increases significantly for the AFORE with commissions on real interest rates. For example, in the 25 year period, if the average interest rate is 3%, the AFORE with the lower commission is INBURSA, but if the interest rate is 5%, INBURSA becomes the most expensive.

There are significant differences in prices (commissions) charged by every AFORE: in the first example, the difference between the AFORE with the highest (SANTANDER) and lowest commission (INBURSA) is 1.67 times; in the third column (40 years and 3% of real interest rate), the difference increases to 1.81 times between SANTANDER and BANAMEX.

Commissions of privately-administrated pension systems have a substantial impact on government budgets: higher commissions reduce AFORES investments and eventually, pensions, given the lower balances obtained by workers. This is significant in terms of system efficiency, especially for low income workers: since they do not accumulate sufficient resources in their individual accounts, associated fiscal costs will increase, given the government's obligation to provide a minimum pension.

The privately-managed pension system is designed to be based on competition among fund administrators. This should be reflected in lower prices charged to affiliates and not in economic gains. The basic assumption is of the workers' comprehension of benefits and costs of the system, as reflected in the permanent search for the best administrator according to their preferences.

Nevertheless, the system reports a very low number of switches of individual accounts among AFORES.¹⁰ This is explained by the fact that authorities tried to prevent high levels of commissions derived from continuous switches in the system.¹¹ They allowed the right of one switch of AFORE per year and created a complicated switching process for the worker. As a result, the level of commissions has been maintained, given the low response from workers to the prices charged by their AFORE.

Authorities have eased the rules for switches among AFORES since 2000, but there has been no response from affiliated workers. This is evinced by the low promotion from AFORES to invite workers

¹⁰ According to CONSAR, at the end of April 2003, only 465,708 workers switched to another AFORE since November of 1998. This represents 1.5% of the universe.

¹¹ The Chilean experience is clear: the number of switches and the "gifts" given by AFPs to new affiliates increased administrative costs of the system, and the level of commissions increased.

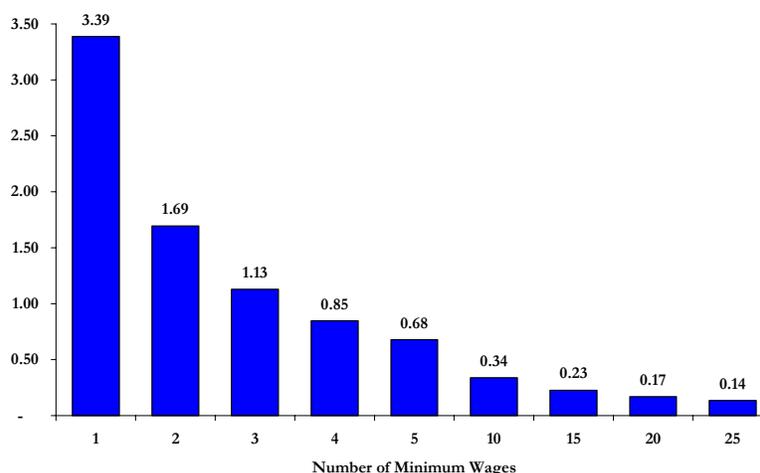
affiliated to other AFORES.¹² It is expected that entry of new AFORES and the inclusion of bureaucrats with SAR accounts to the system will increase competition and reduce price differences charged for account administration.

4.1.3 COMMISSIONS AND CUOTA SOCIAL: DISTRIBUTIVE EFFECTS

Higher administrative costs translate into greater expenditures to finance the guaranteed minimum pension. Public contributions are justified on grounds of efficiency, benefits and distributive effects of the system. In the Mexican case, as described before, the government supplements individual contributions with a flat subsidy of 5.5 per cent of the 1997 minimum wage, which all workers receive regardless of their income level.

The current value of this “cuota social” is 2.51425 pesos per working day. This is 6.05% of a current minimum wage, given adjustments for inflation since June 1997. As shown in Figure 3, more than 68.5 percent of workers earn less than 3 minimum wages, and for these workers, the cuota social represents more than the average commission on contributions. In other words, the cuota more than eliminates the effect of commissions on the contributions of low income workers, given that AFORES can not charge any commission on the cuota social. The following figure and table describes the cuota social in terms of the commission paid by workers to AFORES.

Figure 4: Cuota Social as Multiple of the Commission on Wages



¹² In Industrial Organization terms, there are signs of collusion among AFORES to maintain the number of workers. Nevertheless, this must be probed in a rigorous way.

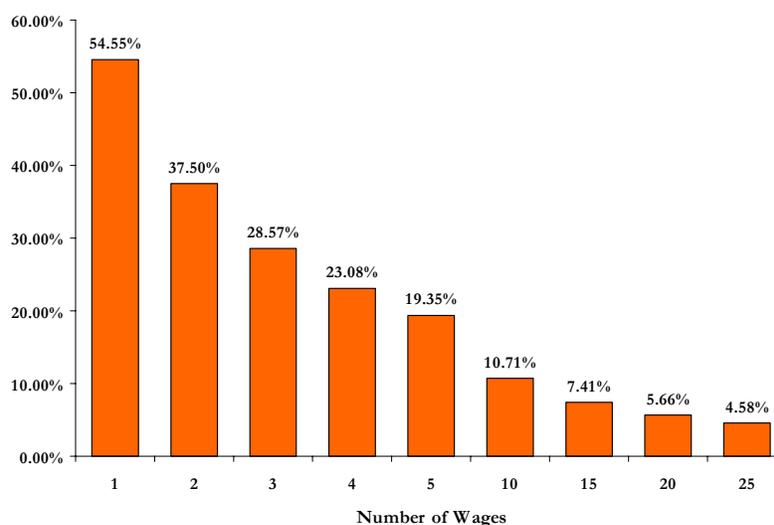
Table 4: The Reverse Effect of Cuota Social on Commissions

Salary (Multiple of Minimum Wage)	Daily Wage (Pesos)	Cuota Social (Pesos)	Cuota Social as % of Wage	Contribution (Pesos)	Commission = 1.7% of Salary (Pesos)	Contribution minus Commission	Net Contribution (Plus Cuota)
1	43.65	2.51425	5.76%	2.84	0.74	2.10	4.61
2	87.30	2.51425	2.88%	5.67	1.48	4.19	6.70
3	130.95	2.51425	1.92%	8.51	2.23	6.29	8.80
4	174.60	2.51425	1.44%	11.35	2.97	8.38	10.90
5	218.25	2.51425	1.15%	14.19	3.71	10.48	12.99
10	436.50	2.51425	0.58%	28.37	7.42	20.95	23.47
15	654.75	2.51425	0.38%	42.56	11.13	31.43	33.94
20	873.00	2.51425	0.29%	56.75	14.84	41.90	44.42
25	1,091.25	2.51425	0.23%	70.93	18.55	52.38	54.89

* 1.7 on Wage

The cuota social allows low income workers to accumulate more than their complete contributions, which increases account balances, and consequently the process of accumulation is higher. This flat subsidy would otherwise function as a minimum price charged by AFORES to workers and generate distortions in the market given that workers or employers do not pay for it. As can be appreciated in the following graph, cuota social represents more than a half of contributions for workers who earn 1 minimum wage.

Figure 5: Cuota Social as % of Retirement Contribution



4.1.4 COMMISSIONS, MINIMUM PENSION GUARANTEE AND RATES OF RETURN

Defined contribution systems represent a great challenge for the future. The effectiveness of this system is not very clear for low-income workers, who make up the majority of the affiliated population. Contribution density (number of weeks contributing to the pension system during working life) is significantly lower for low-income workers given the type of occupations they frequently hold in their working lives (i.e. construction workers). As a consequence, it will be very hard for the majority of the affiliated population to complete the requirements needed to receive a minimum pension.

The current value of the minimum pension is 1,252 pesos per month.¹³ To receive an annuity with similar characteristics, it is necessary to accumulate 626,035 pesos, as of 2003. This amount is obtained by multiplying the value of the minimum pension by 500, the cost of one peso of an annuity.¹⁴ As a consequence, the interest rate required to exceed the minimum pension guarantee must be extraordinarily high, as is shown in the table below. A possible way to receive the amount needed for this guarantee would be an extraordinarily successful fund administration by AFORES, as shown below:

Table 5: Real Return required to Exceed Minimum Pension Guarantee *

Commission On salary	Salary in terms of minimum wage		
	1	2	3
0.000%	10.87%	7.29%	4.37%
0.500%	11.14%	7.67%	4.83%
0.750%	11.29%	7.87%	5.06%
1.000%	11.44%	8.08%	5.30%
1.250%	11.59%	8.29%	5.55%
1.500%	11.74%	8.50%	5.81%
1.750%	11.90%	8.73%	6.07%
2.000%	12.06%	8.96%	6.35%
2.250%	12.22%	9.19%	6.63%
2.500%	12.39%	9.44%	6.92%

**40 years of contributions, and INFONAVTT return=0% real*

Nevertheless, given the historical performance of financial markets, the real returns required to exceed the minimum pension do not appear feasible. This has important fiscal implications, given that the government is obligated to provide a minimum pension once a worker's personal AFORE-administered balance expires.¹⁵

¹³ This is equivalent to 807 pesos (in 1997), indexed by inflation up to February 2003.

¹⁴ IMSS. General Financial Direction.

¹⁵ Article 172 of the Law.

Even for low-income workers who complete the requirements for a minimum pension (1,250 weeks of contributions and 65 years old), the actual level of contributions is not enough to pay for the annuity for the minimum pension. According to the results shown in Table 6, workers with wage levels of 1, 2, or 3 minimum wages will need approximately 500,000 pesos (43,000 USD) to fund an annuity equivalent to the minimum pension. This scenario assumes 25 years of contributions and an interest rate of 3.5 per cent.

Table 6: Balances of a Representative Worker who Contributes 25 years

AFORE	Minimum Wages (3.5%)		
	1	2	3
ALIANZ DRESNER	85,822.08	125,377.69	164,963.38
AZTECA	90,266.31	132,861.05	175,458.10
BANAMEX	90,103.64	131,911.45	173,727.11
BANCOMER	89,412.34	130,522.89	171,653.60
BANORTE GENERALI	85,487.57	125,519.67	165,522.56
INBURSA	82,157.49	124,389.06	166,620.63
ING	89,149.20	130,014.46	170,904.17
PRINCIPAL	86,186.18	125,926.33	165,682.73
PROFUTURO / GNP	83,946.26	122,419.06	160,903.29
SANTANDER/MEXICANO	82,184.06	120,060.26	157,915.45
TEPEYAC	88,466.29	129,277.08	170,075.91
XXI	89,280.66	131,097.62	172,911.09
System	86,871.84	127,448.05	168,028.17
Difference for the Min. Pension	-539,163.95	-498,587.74	-458,007.63

The implications of these results are important: if these conditions continue, all workers who earn less than 3 minimum wages will retire with the minimum pension and fiscal costs will substantially increase. In other words, replacement rates will be 100%, 50% and 33% for workers earning 1, 2 and 3 minimum wages, respectively.

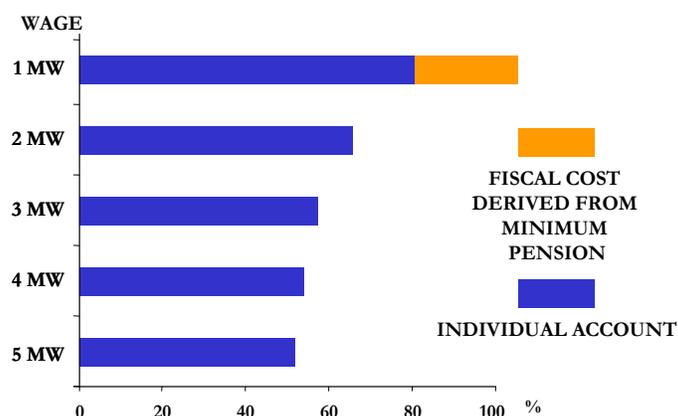
An alternative to this scenario is the use of housing contributions (5%) and their accumulation at the same interest rate. If the interest rate increases to 5% annually, balances increase significantly, as shown in Table 7. Nevertheless, the balance is less than half of the annuity cost.

Table 7: Balances of a Worker who Contributes 25 years, Including Housing Subaccount

AFORE	Minimum Wages (3.5%)		
	1	2	3
ALIANZ DRESDNER	137,930.82	216,328.77	294,738.46
AZTECA	146,185.82	230,949.83	315,693.56
BANAMEX	144,972.95	227,695.51	310,423.87
BANCOMER	143,630.86	224,999.26	306,378.18
BANORTE GENERALI	138,042.72	217,613.40	297,186.08
INBURSA	126,351.44	205,606.21	284,860.98
ING	143,093.30	223,916.55	304,767.04
PRINCIPAL	138,536.31	217,300.12	296,006.44
PROFUTURO / GNP	134,643.06	10,805.38	286,987.35
SANTANDER/MEXICANO	131,996.20	07,081.21	282,172.75
TEPEYAC	142,256.47	223,090.50	303,892.32
XXI	144,241.29	227,329.01	310,423.87
System	139,323.44	219,392.98	299,460.91
Difference for the Min. Pension	-486,712.36	-406,642.81	-326,574.89

Another alternative is the extension of the working life in order to contribute more weeks and accumulate more resources in personal accounts, as shown in Figure 20: contribution years are increased to 40 and the rate of return on assets is assumed to be 5%.

Figure 6: Replacement Rates of Different Income Levels: Individual Account and Fiscal Cost with 40 Years of Contributions



This alternative is not very attractive, as expected labor market conditions during the coming decades will likely make this a difficult option. Additionally, it does not seem very rational to maintain contributions over an 15 additional years if it is possible to earn the same benefits (in the form of the minimum pension) with only 25 years of contributions. In other words, low-income workers would choose to contribute less and receive the minimum pension instead of working longer to receive the same benefits.

4.1.5 MINIMUM PENSION AND CUOTA SOCIAL: ALTERNATIVES FOR FINANCING

The prospects for low income workers in the new system are not very secure and the fiscal costs derived from minimum pensions are quite significant. For this reason, it would be useful to find alternative ways to finance minimum pensions for those workers entitled to this right.

Increasing the cuota social is one such alternative. It could be incorporated as part of the payment structure for minimum pensions: bimonthly federal government contributions allow a higher accumulation, which reduces the gap between the amount needed for a minimum pension and the workers' individual balance. The increase in the balance of a representative worker is approximately 30 percent of the total balance, as shown in Table 8:

Table 8: The Reverse Effect of Cuota Social on Commissions

AFORE	25 Years of Contributions			40 Years of Contributions		
	Balance Without Cuota	Balance With Cuota	Difference	Balance Without Cuota	Balance With Cuota	Difference
ALIANZ DRESNER	137,791.94	181,408.06	31.65%	324,588.43	432,020.84	33.10%
AZTECA	148,783.29	193,596.59	30.12%	358,321.75	470,837.22	31.40%
BANAMEX	145,414.09	190,748.95	31.18%	357,173.72	471,959.80	32.14%
BANCOMER	143,132.64	188,451.94	31.66%	347,025.74	461,842.03	33.09%
BANORTE GENERALI	139,642.51	182,603.64	30.77%	325,704.91	430,329.02	32.12%
INBURSA	137,857.55	173,556.00	25.90%	283,526.63	359,896.59	26.94%
ING	142,222.48	187,536.12	31.86%	344,631.50	459,411.47	33.31%
PRINCIPAL	138,405.65	182,175.61	31.62%	326,998.57	435,085.14	33.05%
PROFUTURO / GNP	133,899.47	176,852.56	32.08%	311,687.74	416,302.15	33.56%
SANTANDER/MEXICANO	131,865.68	173,825.74	31.82%	301,959.99	402,479.38	33.29%
TEPEYAC	142,109.18	186,918.62	31.53%	341,619.46	454,114.82	32.93%
XXI	145,903.36	190,538.81	30.59%	350,185.01	461,963.93	31.92%
System	140,585.65	184,017.72	30.90%	331,118.62	438,020.20	32.24%
Difference to Min. Pension	-485,450.14	-442,018.07		-294,917.17	-188,015.59	

Given the scenario described previously, an alternate way to finance minimum pensions in the long term is through an increase in the cuota social. Fiscal pressures would accumulate at the moment of retirement, but these would be reduced in the future if governments increase their contributions to individual accounts: the professional management of resources would result in a higher return for fiscal resources.

The next table shows this alternative: the cuota social increases to 10% of a minimum wage of 1997, with a real return of 5% for the retirement and housing sub-accounts and 25 years of contributions:

Table 9: Balances of a Worker who Contributes 25 years, Including Housing Subaccount

AFORE	Minimum Wages (3.5%)		
	1	2	3
ALIANZ DRESDNER	185,713.08	271,932.90	358,209.18
AZTECA	197,422.09	292,033.73	386,628.01
BANAMEX	196,405.82	288,541.99	380,674.38
BANCOMER	194,011.86	283,744.09	373,446.26
BANORTE GENERALI	185,680.33	273,749.32	361,854.87
INBURSA	167,352.99	56,867.38	346,381.77
ING	193,255.62	282,198.43	371,159.07
PRINCIPAL	186,600.04	273,222.07	359,900.98
PROFUTURO / GNP	181,032.28	264,436.61	347,887.88
SANTANDER/MEXICANO	177,168.40	259,422.17	341,731.34
TEPEYAC	191,991.41	281,107.41	370,248.74
XXI	194,702.29	287,016.82	379,402.88
System	187,611.35	276,189.41	364,793.78
Difference for the Min. Pension	-438,424.44	-349,846.38	-261,242.01
Difference with previous scenario	100,739.51	148,741.36	196,765.61

The gap between the balance of individual accounts and the cost of a minimum pension is reduced significantly. Increasing the cuota social would reduce the fiscal cost of minimum pensions. In this alternative, a flat subsidy would be paid for all years, although it would be feasible to implement a differentiated scheme according to the number of years of contribution to the system. This would allow low-income workers to increase their chances to have a decent retirement, reducing the likelihood of old-age poverty.

5 CHALLENGES AND CONCLUSIONS

Currently, more than half the Mexican population over 60 years old lives in poverty. There is no universal social public assistance for elderly in the country, and this population depends on personal savings and family transfers to live. Most of the elderly population living above the poverty line worked in the formal sector and are generally covered by the IMSS or ISSSTE social security systems. As a consequence, it is very important to extend the coverage of these systems to the working age population.

Mexican social security systems will face several challenges during the next decades. Demographic transition will accelerate the process of aging of Mexican society in a short period of time. This transition will change the structure of labor markets and the structure of social security systems. If Mexico does not find a way to increase wealth at the end of the working life, it will have to deal with an old and poor society, as a consequence of the increase of old people living in poverty.

In order to prevent this scenario, this paper suggests a mechanism to increase the incentives for workers that will induce their participation in the formal sector of the economy and will lead them to accumulate resources for their future. With this new system, workers covered by the IMSS social security system could save for their future by taking advantage of the personal accounts offered in the current fully funded pension system, which were created by the 1997 reform.

Personal balances in this system depend on the specific characteristics of workers and the administrative performance of AFORES. This paper contains a methodology to simulate the accumulation path of individual accounts and compare commission schemes by imputing individual characteristics and basic variables of macroeconomic scenarios.

According to the results obtained by using this model, those workers who earn less than 3 minimum wages (the average contribution income of IMSS affiliates) and comply with the requirements at the time of retirement (1,250 weeks of contributions and 65 years old) will likely retire with the guaranteed minimum pension, which is equivalent to one minimum wage of 1997 indexed by inflation, no matter the balance of the individual account.

This paper proposes to increase individual balances of low income workers by increasing the cuota social. This will attract more workers to the system and will reduce the fiscal cost of minimum pensions. The cuota social is a component of the defined contribution scheme: a flat benefit for affiliates in the pension system (5.5 per cent of a minimum wage of 1997), that accounts for at least 25 percent of total contributions for workers earning less than 3 minimum wages. In a conservative macroeconomic scenario, an increase of the cuota social to 10 per cent would reduce the cost of minimum pensions by at least 5 percent.

Increasing the amount of the cuota social would also reduce the fiscal cost of transition: personal balances are managed by specialized companies and the average return could be higher compared to those generated by public administration. Consequently, the Mexican government could save future revenues by decreasing the cost of transfers to the new pension system.

In the short run, there will not be substantial fiscal savings derived from the new system for two reasons. The first is the government's pension guarantee to workers who contributed to the old system and decided to retire with it. Consequently, these workers will opt for the highest accessible pension regardless of the accumulated balance of their accounts and the commissions they actually pay to the AFORES. Second, the minimum pension guarantee for new workers with low incomes is not sufficient incentive for their participation in the system nor to switch to the AFORE with the lowest commission scheme.

The paper also recognizes some failures in the Mexican pension system's design that must be tackled. Special mention must be made of the prevalent role of the housing-fund component. A share of minimum pensions is actually financed with unused housing balances, which belong to those workers who did not obtain a credit for their houses and instead accumulated funds in their personal housing subaccounts. However, if this fund is not well administered and financial resource accumulation is not positive in real terms, fiscal costs will increase considerably.

Finally, the current market structure does not generate incentives for greater involvement of workers in the decision of switching to the best AFORE according to prices (commissions), personal characteristics and needs. This does not generate incentives for more competition and commissions reduction, which will also increase the fiscal cost of the reform.

6 ANNEX I. NEW POVERTY LINES IN MEXICO

During recent decades there was no official measure for national poverty that indicated the exact size of the population living in poverty during that period. In 2002, the Mexican Ministry of Social Development established an official measure of poverty. It measures welfare by personal income levels reported in official income-expenditure surveys, and compares it with three reference points (income levels) in the total population. The first reference point, denominated “Food Poverty,” indicates the minimum income required to satisfy daily food requirements. The second point, “Capacities Poverty,” indicates the required income to satisfy food, health, education, shelter, dressing and transportation. Finally, the third point, “Patrimony Poverty,” indicates the income required to satisfy additional needs. The results of this measure are shown in the table below.

Table 10: Poverty Measure in Mexico, 2000

Poverty Type	%of Households and persons	Urban, USD per day	Rural, USD per day
Patrimony	Households: 45.9% Persons: 53.7%	\$4.18	\$2.81
Capacities	Households: 25.3% Persons: 31.9%	\$2.47	\$1.89
Food	Households: 18.6% Persons: 24.2%	\$2.09	\$1.54

Source: Comité Técnico para la Medición de la Pobreza. Currency rate= 10 pesos per dollar.

Today, more than 50 percent of the Mexican population lives on less than 4.18 USD every day. As will be shown in the next section, there is a direct correlation between poverty levels with economic performance and the provision of social security. Formal social institutions do not permanently cover the great majority of persons who do not have enough income to satisfy basic needs, and this population is generally employed in occupations with high levels of informality. Some people who are living under the third poverty threshold commonly work in sectors with a lower level of informality, but with a high level of labor rotation, such as the construction sector; their participation in social security systems is not permanent. In general terms, people living below these poverty lines have not reached retirement age.

As income is more concentrated, especially in the last deciles of distribution, it is highly possible to find high levels of poverty given the levels of personal income. Poverty levels diminish in the presence of economic growth through a direct increase in the average income levels. The combination of demographic growth and low economic performance has increased significantly the absolute number of

people in poverty conditions. During the 1990's, eighty per cent of the additional population was born in poverty conditions.

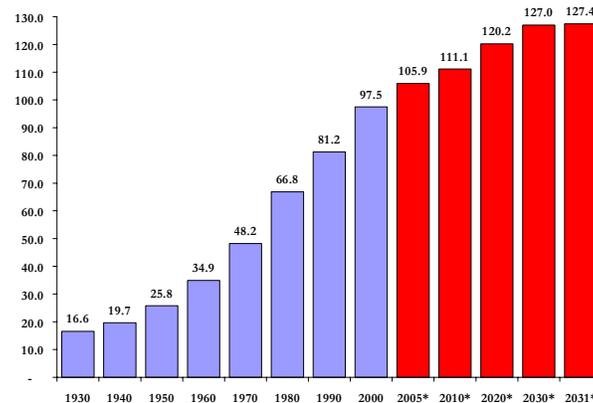
Future poverty levels will depend on the demographic and economic trends of the next decades. Even under optimistic scenarios of economic growth, it is not probable that the Mexican economy will generate enough formal jobs for the young people who will be demanding positions. Consequently, as will be shown, the number of people living in poverty will likely increase considerably, even with a reduction in the relative incidence of poverty, during the next decades. Additionally, this process could be worse in regions where poverty levels are much higher in comparison with others that enjoy more dynamic economic activity.

7 ANNEX II. DEMOGRAPHIC TRANSITION AND THE CHANGE IN AGE PROFILE IN MEXICO

Demographic trends have changed the current age structure of population, and it will continue to change during the coming decades. There has been a relative reduction of people in young age cohorts, while the number of people in working-age cohorts has increased significantly. It is calculated that during the next 15 years, 1.1 million people annually will enter the labor force. In percentage terms, average annual labor force growth will be 2.4 per cent, while population as a whole will increase by 1.8 per cent.

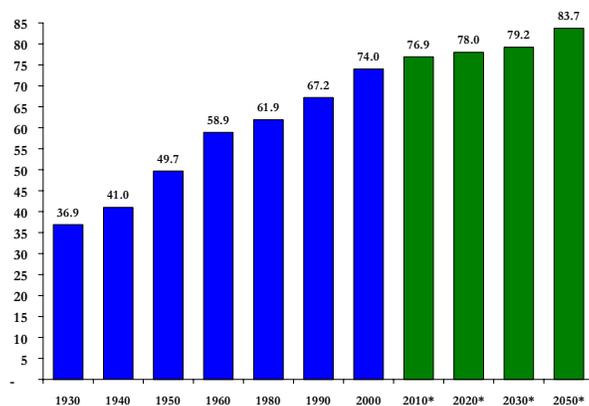
Given present demographic trends, the population aged 12 years or older will increase by 1.9 per cent annually during the next 20 years. But more importantly, the population between 12 and 60 will grow even faster, at 2.5 per cent annually. As a consequence, there will be both an absolute and relative increase in the number of elderly. This will profoundly change the structure and functioning of social security systems and health services.

Figure 7: Mexican Population 1930 - 2030



*Source: INGI. Census data from 1930 to 2000.
and CONAPO. Population Projections 2005-2030.*

Figure 8: Life Expectancy of Mexican Population (1930 – 2050)



Source: CONAPO.

Reduction of mortality and fertility rates and the increase in life expectancy are the main elements of demographic transition. But these phenomena can be explained by the convergence of several causal elements, such as economic growth and industrialization, migration, urbanization process, social development, increase of educational levels, and the connection of regional and international markets. These phenomena have contributed to reduce the number of children per woman, making it more costly to raise children in absolute and relative terms.

The process of demographic transition has not been the same for all regions of Mexico, given the remarkable social and economic differences of regional populations. Mortality and fertility declines speed the pace of group integration in the development process, while marginalized groups are left behind. For example, according to CONAPO, women with twelve or more years of schooling (and a fertility rate of 1.85 children), averaged 1.66 children per woman, while women without schooling averaged 4.7.