Privatization of Pension in Mexico and Its Costs

7.1 Introduction

The reform sequence in a country is one of the most difficult processes. We tackle this issue in the Mexican context. Next, we develop a model of calculating the cost of managing funds in Mexico. This process allows us to rank the pension funds in Mexico, including all the bells and whistles of the system.

7.2 Sequencing of Reform

Pension reform does not take place in a vacuum. Other types of reform also take place in a reforming country. One of the nagging questions is: at what point of the reform process should we consider pension reform? This question was put more baldly by Mitchell (1997):

> Those working with the practical issues of old-age system reforms in developing countries frequently confront the question of what should come first–pension reform or other reforms? Neither practitioners nor researchers have a single, unique response to this question; in fact, Vittas (1995) has suggested that the best approach is probably to take advantage of reform opportunities when feasible, then working incrementally as conditions permit. Having said this, it remains the case that many countries implementing a retirement system reform are typically compelled to do so by old-age system insolvency. Hence the option of letting a public pension system default and cease payments is not often politically viable, inasmuch as the elderly population relying on government benefits can often organize substantial political support. Indeed countries from Russia to Argentina have faced politically destabilizing retiree demonstrations when government-provided benefits have been delayed or reduced in the past.

For Mexico, we first provide a catalog of reform over the past three decades. This helps us understand the pension reform (both in 1992 and in 1997) in its proper context.

It is somewhat complicated to create a quantitative index of reform. Fortunately, a number of researchers have developed methods for assessing reform in different sectors of the economy by creating and calculating indexes.

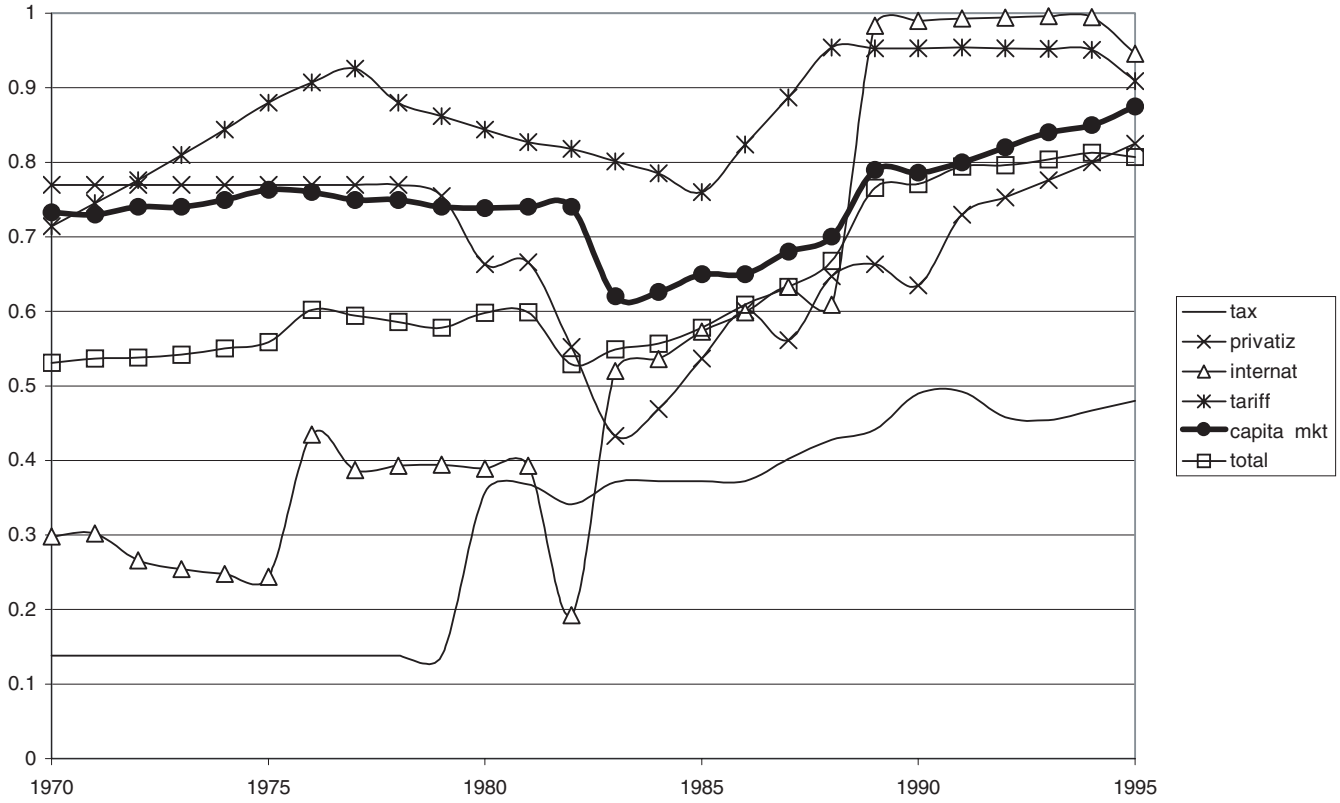
The exact method of calculating the reform indexes has been described in Morley et al. (1999). What I report below are five different measures of reform: trade reforms, domestic financial reforms, international financial reforms, tax reform and general privatization (along with an average index).

Tariff reform: This index is the average of two sub-components: the average level and the dispersion of tariffs. The raw observations of tariffs are drawn from a number of studies.

From figure 7.1 we note that there are four phases of changes in tariff reform in Mexico. During the first phase (1970–1976), there is a steady march of tariff reduction. Things went the wrong way over the next nine years (1976–1985). Tariff reduction followed after that (1985–1988). From then on, not much movement in tariff reduction has taken place. Of course, this does not take into account what followed after 1995. The biggest story there is the implementation of the North American Free Trade Agreement (NAFTA). One of the main clauses of NAFTA that has affected the pension market is to allow Canadian and American companies to participate in the privatized pension market.

Capital market reform: This index is the average of three sub-indexes: control of borrowing and lending rates at banks and the reserves-to-deposits ratio.

FIGURE 7.1
REFORM IN MEXICO



Not much movement took place during 1970 to 1981 (see figure 7.1). With the nationalization of banks and capital control, things took a turn for the worse (1982–1984). For the rest of the decade, controls were slowly lifted. In 1991, with the reprivatization of banks, the situation has steadily improved.

International financial liberalization: This index is the average of four components—the sectoral control of foreign investment, limits on profit and interest repatriation, controls on external credits by national borrowers and capital outflows. The index for each component was derived from the descriptions contained in the IMF's Balance of Payments Arrangements in addition to independent information from various World Bank country memoranda.

This index reflects somewhat halting steps to market opening in 1975 and a sharp increase in control in 1982–1983 (see figure 7.1). The year of 1988 is a watershed year for changes in foreign investment. Tremendous reduction in restriction of foreign investment took place that year. Since then, there has been very little restriction on foreign capital movement in and out of Mexico.

Tax reform: This index is the average of four subcomponents: the highest marginal tax rate on corporate incomes and personal incomes, the value-added tax rate and the efficiency of the value-added tax (VAT). The latter is defined as the ratio of the VAT rate to the receipts from this tax expressed as a ratio of GDP. The latter indicator expresses the coverage or the neutrality of the VAT tax as well as the efficiency of the government in collecting the tax.

Tax reform in Mexico is notable for the lack of reform. It lags behind all other indices. The year of 1978 saw a big jump in tax reform (see figure 7.1). Since then, it has been a very slow gradual process. It should be noted that such reform in tax systems is endemic all over Latin America (see Sinha, 2000, Chapter 1).

Privatization: This index is one minus the ratio of flow of cost of state-owned enterprises to nonagricultural GDP.

This index shows three distinct phases: relatively more privatized activities during the 1970s; a sharp *increase* in the sphere of government activities during the 1980s followed by an increase in privatization (higher level than in the 1970s) during the 1990s (see figure 7.1).

Total: This is an *unweighted* average measure of all the five reform indexes above. Since this index is the average of the above five, it follows a middle path among the other indexes. Overall, there has been a decline in reform with the 1982 change in government followed by a sharp increase in reform with the subsequent change in government in 1988.

From all the measures (with the probable exception of tax reform) it is clear that pension reform in Mexico followed other major reforms. Doubtlessly, other types of developments will take place in the capital markets following pension reform (such as the development of indexed bonds, contingent annuities, etc.).

7.3 Labor Market Reform

One of the questions we have not addressed above is the labor market reform. Reforming the labor market is not strictly necessary for pension reform. If the labor market is not segmented (informal part of the economy is small), and the pension is mandatory, there is no direct impact. There are indirect impacts. (1) Market rigidities create unemployment. (2) It also creates a different set of incentives for the timing of retirement. Therefore, it might force people to retire early. Unemployment induced by labor market rigidities also forces retirees to accumulate less (due to unemployment spells). It could put pressure on the government pension safety net. In Mexico (and other Latin American countries), there is an additional problem: informal markets. People working in the informal markets are not covered by social security (see Clavijo and Valdivieso, 2000).

7.4 Calculating the Future Value of AFOREs in Presence of Transactions Costs

7.4.1 Developing the Model

Essentially, individual retirement benefits are calculated by using a future value formula. However, the simple future value formulas we find in Kellison (1991) or other similar treatments do not deal with some of the complexities we find in the Mexican system. (1) Government contribution to the individual account does not apply every month, and the indexing is also not applicable monthly. (2) Commissions come in three basic flavors: (a) commission over the flow of funds, (b) commission over the account balance and (c) commission over the *real* rate of return. In addition, some companies charge commissions by combining (a), (b) and (c). (3) In addition, the commissions mentioned in (2) do not stay constant over time. They vary with the number of years one stays in the fund. (4) The income of each individual does not stay constant during his/her working life. Such changes have to be taken into account. For these reasons, the following discussion will be based on a recursive development of the formula for calculating retirement benefits.

7.4.2 What is the Right Measure of Cost?

Because charges apply to different parts of the AFORE, it is not easy to compare charges across AFOREs. If we look at the system as a whole, there is a problem of charges when the system starts up. Charges appear too high! In Chile, for example, in 1984, charges amounted to 9% of wages or 90% of contributions to the retirement system (Edwards, 1996, p. 17). However, the costs have come down to about 15% of contributions in 1990 (see World Bank, 1994, p. 224).

7.4.3 Simple Formula

For individual AFOREs, it makes it difficult to compare across funds. For example, suppose we want to compare the charges for Inbursa and Banamex. Since Banamex charges 26.15% of total contribution up-front but Inbursa charges nothing up front, it may seem like charges for the AFORE run by Banamex are very high. However, charges for Inbursa are complicated because their charges apply to the *real rate of return*; over the long run, it adds up. Thus, it makes little sense to calculate charges as a percentage of total assets in a system that just starts up.

There are several ways to look at the charges: (1) operating costs as a percentage of total annual contribution; (2) operating costs as a percentage of average total assets; (3) operating costs as a percentage of covered annual wages; and (4) operating costs as a percentage of affiliates times per capita income.

There are two components of the new system: contribution by the worker and contribution by the government. The contribution by the worker is 6.5% of his or her base wage. The contribution by the government is 5.5% of the minimum salary *indexed to the rate of inflation.* There are two additional complications: (1) interest rate is calculated for every account every *two* months, and (2) indexation of the government contribution takes place every *three* months. Let S_k denote the accumulated sum in the k^{th} month.

Therefore, we can write the accumulated value in the AFORE as follows in a recursive formula in the simplest case:

$$S_k = \begin{cases} (6.5\% * BW * 2 + G_k) * (1 + i_1^{(12)}) \\ \quad k = 1 \\ S_{k-1} * (1 + i_k^{(12)}) \\ \quad k = 2i \; i = 1,2, \ldots, \dfrac{CP}{2} \\ (S_{k-1} + (6.5\% * BW * 2 + G_k)) * (1 + i_k^{(12)}) \\ \quad k = 2i + 1 \; i = 1,2, \ldots, \dfrac{CP - 2}{2} \end{cases}$$

where, the government contribution (G, also called Social Contribution)
We write $G_k = CS_k + CS_{k+1}$
Where CS_k is defined as follows:

$$CS_k = \begin{cases} 5.5\% * MW - where...k = 1 \\ CS_{k-1}(1 + \pi^{(4)}) - where...k = 3i, i = 1,2,... \\ CS_{k-1} - in\_all\_other\_cases \end{cases}$$

There are several peculiar features of the formula above: calculation of the benefit account uses a *simple interest* rate for the adjustment for one month's rate of return to a bimonthly rate. Therefore, we get the factor BW.2 in the above equation. Every even month, the accumulated value is simply the value of the fund with compounded interest. Every odd month, *two* monthly contributions of BW are added. Along with it, the government contribution (G) is thrown in at every odd month. The G was set at 5.5% of the minimum salary in Mexico City for the year 1997 (about US$1 per day under the exchange rate at the end of 1997). Every three months the government contribution is adjusted according to the consumer price index. Thus, we have a factor $\pi(4)$ that indicates this adjustment.

It should be noted that most other simulations done on the Mexican system do not take into account the social contribution. For example, for her simulation results, Mitchell (1999, p. 14) states that the social contribution has not been included. This is an important omission. For example, for workers with one minimum salary, the social contribution virtually doubles (5.5% of wage social contribution and 6.5% of wages—their own contribution) the total amount of money. In a recent study by the Centro de Estudios Económicos del Sector Privado showed that 48.70% of all workers in Mexico earn less than two times the minimum salary (reported in the CNI en Línea, 28 January, 2001). Hence, for a very large portion of the affiliates, the calculation with a low salary base is extremely important.

7.4.4 Making the Formula More Realistic: Charges

In the formula above, we did not take into account charges that funds impose on the account holders (affiliates). Some AFOREs have charges on contribution as a percentage of wages (for example, for Banamex). Others have charges on the balance in the AFORE account (such as Bancrecer). Still others have charges on the real interest rate (such as Inbursa). Let CW be the charge on wage (rate). Let CB be the charge on balance. We need to modify the above formula as follows:

$$S_k = \begin{cases} \left(6.5\% * BW * 2 * \left(1 - \dfrac{CW}{6.5\%}\right) + G_k\right) \\ * (1 + i_1^{(12)}) * \left(1 - \dfrac{CB}{12}\right) \quad k = 1 \\ S_{k-1} * (1 + i^{(12)}) \quad k = 2i \quad i = 1,2, \ldots, \dfrac{CP}{2} \\ \left(S_{k-1} + \left(6.5\% * BW * 2 * \left(1 - \dfrac{CW}{6.5\%}\right) + G_k\right)\right) \\ * (1 + i_k^{(12)}) * \left(1 - \dfrac{CB}{12}\right) \\ \quad k = 2i + 1 \quad i = 1,2, \ldots, \dfrac{CP - 2}{2} \end{cases}$$

There is a third element of charges. For two funds (Inbursa and Atlantico) charges apply to the real rate of return. Thus, we need to modify the formula to incorporate that element.

Therefore, if we include charges on the *real* interest rate, the formula becomes:

$$S_k = \begin{cases} \left(6.5\% * BW * 2 * \left(1 - \frac{CW}{6.5\%}\right) + G_k\right) \\ * \left((1 + i_1^{(12)}) * \left(1 - \frac{CB}{12}\right) - \left(\frac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right) * CY\right) \\ \quad k = 1 \\ S_{k-1} * \left((1 + i_1^{(12)}) * \left(1 - \frac{CB}{12}\right)\right. \\ \left. - \left(\frac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right) * CY\right) \\ \quad k = 2i \quad i = 1,2, \ldots, \frac{CP}{2} \\ \left(S_{k-1} + \left(6.5\% * BW * 2 * \left(1 - \frac{CW}{6.5\%}\right) + G_k\right)\right) \\ * \left((1 + i_1^{(12)}) * \left(1 - \frac{CB}{12}\right)\right. \\ \left. - \left(\frac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right) * CY\right) \\ \quad k = 2i + 1 \quad i = 1,2, \ldots, \frac{CP - 2}{2} \end{cases}$$

where $\pi^{(12)}$ is the monthly inflation rate, and CY is the charge on the real interest rate and $i_R^{(12)}$ is the real interest rate

$$i_R^{(12)} = \frac{(i^{(12)} - \pi^{(12)})}{1 + \pi^{(12)}}$$

One assumption made here is that the charges remain fixed for the total life of the system. Charges for each company depends on the number of years a person has been in the AFORE. For example, AFORE Banamex charges 1.70% of wages up to year 4. However, the person who stays with it for the fifth year gets a reduction in charges. Thus, the year 5 charge becomes 1.68% of wages, the year 6 charge becomes 1.66% of wages, and so on. This process continues until year 39 with the AFORE with a reduction of 0.02% of wages for every additional year. Hence, our formula needs to take such a reduction into account.

$$S_k = \begin{cases} \left(6.5\% * BW * 2 * \left(1 - \frac{CW * (1 - f_k)}{6.5\%}\right) + G_k\right) \\ * \left((1 + i_1^{(12)}) * \left(1 - \frac{CB*(1 - f_k)}{12}\right)\right. \\ \left. - \left(\frac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right) * CY * (1 - f_k)\right. \quad k = 1 \\ S_{k-1} * \left((1 + i_1^{(12)}) * \left(1 - \frac{CB * (1 - f_k)}{12}\right)\right. \\ \left. - \left(\frac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right) * CY * (1 - f_k)\right) \\ \quad k = 2i \quad i = 1,2, \ldots, \frac{CP}{2} \\ \left(S_{k-1} + \left(6.5\% * BW * 2\right.\right. \\ \left.\left. * \left(1 - \frac{CW * (1 - f_k)}{6.5\%}\right) + G_k\right)\right) \\ * \left((1 + i_1^{(12)}) * \left(1 - \frac{CB*(1 - f_k)}{12}\right)\right. \\ \left. - \left(\frac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right) * CY * (1 - f_k)\right) \\ \quad k = 2i + 1 \quad i = 1,2, \ldots, \frac{CP - 2}{2} \end{cases}$$

Note that f_k is not the same for all funds. For example, AFORE Bancomer offers a rising discount rate starting with 0.01% of wages up to 0.05% of wages.

7.4.5 More Refinements

There is still one realistic element missing in our formula: growth in wages. In Chile, the average wage rate has grown at a rate of 6% per year over the last twenty years. But the rise in average wage rate is not important here as it represents the average across many individuals at a given point of time. For individuals, the more meaningful number is the growth of wage rate longitudinally. Therefore, we need to modify our formula thus:

$$
S_k = \begin{cases}
\left(6.5\% * BW * 2 * \left(1 - \dfrac{CW * (1 - f_k)}{6.5\%}\right) + G_k\right) \\
* \left((1 + i_1^{(12)}) * \left(1 - \dfrac{CB*(1 - f_k)}{12}\right)\right. \\
\left. - \left(\dfrac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right) * CY * (1 - f_k)\right) & k = 1 \\
S_{k-1} * \left((1 + i_1^{(12)}) * \left(1 - \dfrac{CB * (1 - f_k)}{12}\right)\right. \\
\left. - \left(\dfrac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right)\right. \\
\left. * CY * (1 - f_k)\right) & k = 2i \quad i = 1,2, \ldots, \dfrac{CP}{2} \\
\left(S_{k-1} + \left(6.5\% * BW * (1 + \Delta s^{(6)}) * 2\right.\right. \\
\left.\left. * \left(1 - \dfrac{CW * (1 - f_k)}{6.5\%}\right) + G_k\right)\right) \\
* \left((1 + i_1^{(12)}) * \left(1 - \dfrac{CB * (1 - f_k)}{12}\right)\right. \\
\left. - \left(\dfrac{i^{(12)} - \pi^{(12)}}{1 + \pi^{(12)}}\right) * CY * (1 - f_k)\right) \\
k = 2i + 1 \quad i = 1,2, \ldots, \dfrac{CP - 2}{2}
\end{cases}
$$

where $\Delta s^{(6)}$ is the bimonthly growth rate of wage rate of an individual worker over his or her lifetime. Here, we are assuming that the growth rate is constant. However, because of the recursive nature of the formula, it is easy to incorporate a non-linear growth rate in wages. In some countries (Chile, South Korea), the average wage rates have risen by more than 6% in real terms per year. In others (Mexico), the average real wage rate has fallen over the past two decades. However, here we should be looking at the wage rate for each individual *longitudinally* and not the average wage for the population.

Finally, the formula may seem somewhat strange for charges applying to real rates of return. For example, what happens when the real rate of return turns out to be negative? We took that into account by simply adding a restriction that took a zero value (for CY) when the real rate of return was negative.

7.4.6 Some Observations on Commissions

Most often in Mexico, commissions are expressed as a percentage of wages and not as a percentage of contribution. Thus, if a person earns 1,000 pesos a month, the actual contribution will be 6.5% of 1,000 pesos or 65 pesos. Hence the charges in some cases will be a straight percentage of that 65 pesos. Out of the 17 AFOREs, 15 charge on the flow of wages. In fact, eight of them charge only on the wages and nothing else. These companies, therefore, do not have schemes based on performance of the funds. Regardless of the performance of the fund, charges apply. Clearly, it is easy to make a comparison across those funds: all we have to do is to choose the fund with the lowest charges. In this case, the winner is Previnter with 23.85% of contribution. Note that even by international standards, this is very high.

7.5 Issues for Simulation

Several issues need to be addressed before we could go ahead with the simulation exercise. (1) What should be the appropriate rates of return for an AFORE? In this context, we have to make guesses about the rate of inflation and the real rate of return separately, because two of the seventeen AFOREs have charges on *the real* rate of return (Inbursa and Atlantico). (2) We have to specify the time path for the growth of wage rate for an individual. (3) We have to guess some evolutionary time paths of charges.

TABLE 7.1
COMMISSIONS AS PERCENTAGES OF CONTRIBUTION

AFORE	*Commissions as a % of wage*	*Charges as a % of contributions*
Banamex	1.70%	26.15%
Bancomer	1.70%	26.15%
Profuturo	1.70% plus others	26.15% plus others
Santander	1.70% plus others	26.15% plus others
Bital	1.68%	25.85%
Garante	1.68%	25.85%
Genesis	1.65%	25.38%
Previnter	1.55%	23.85%
XXI	1.50% plus others	23.08% plus others
Capitaliza	1.50%	23.08%
Atlantico	1.40%	21.54%
Tepeyac	1.17% plus others	18.00% plus others
Banorte	1.00% plus others	15.38% plus others
Zurich	0.95%	14.62%
Confia	0.90% plus others	13.85% plus others
Bancrecer	Charges on balance	Charges on balance
Inbursa	Charges on real return	Charges on real return

7.5.1 Guessing the Evolution of Rates of Return in Mexico

It is a daunting task to predict inflation and interest rates for a country that has seen triple digit inflation rates and negative real interest rates over number of years in the last 20 years (see figure 7.2).

Very few forecasters are brave enough to predict these rates past three years (Even the Central Bank of Mexico is reluctant to venture into such an exercise!). However, pension schemes are meant for long-run benefits. Most workers who are contributing into the system now will not see the benefits until several decades later. Thus, it is essential to work out some possible future paths of rates of return on investment. CONSAR has stipulated that all investment must be made in CETES (short-term government bonds) for now. Even though it is never stated explicitly, most people expect that the rules for investment will be relaxed in the future.

7.5.2 Scenarios

We decided to run the simulations under three sets of scenarios: a fixed interest rate, stochastic but time independent interest rates, and stochastic and time dependent interest rates. The fixed interest rate scenario gives us a benchmark. However, it is unrealistic to expect that the (nominal) interest rate and the inflation rate are not going to change over future decades in Mexico. A more realistic approach is to assume a stochastic interest rate. To do this, we need to make some assumptions about the distribution of the rate of inflation and/or the rate of nominal interest rate. In our simulations, we posit two sets of assumptions: a truncated normal distribution and a uniform distribution. We felt that it was unrealistic to assume a normal distribution without any modification because the nominal interest rates would not take very large positive or negative values. A study of month-to-month changes in the (nominal) interest rate shows that they are not independent. There is clear evidence of first order au-

FIGURE 7.2
ADMINISTRATIVE COST AS A PROPORTION OF TOTAL EXPENDITURE

tocorrelation. Therefore, we build a model with first order autocorrelation (we use a model of the following form: $x_t = 0.7x_{t-1} + 0.015 + \varepsilon$ where ε is subject to a choice of variance: ε is normally distributed with mean zero and some chosen variance. Under this assumption, the long-term interest rate converges to 5%). It is also possible to restrict the maximum and minimum of the distribution in a similar vein as discussed earlier.

7.6 Lessons from Simulations

Simulations were carried out under various scenarios with fixed interest rates, stochastic but independent interest rates and stochastic dependent independent interest rates. What follows is a general discussion of the results. In the tables that follow, we only restrict our results for the *deterministic case.* With stochastic rates, the results depend on the exact paths of realization of interest rates. However, the modal frequencies of these realizations were very similar to the ones discussed with deterministic rates.

7.6.1 Discussion of the Results

Broadly, the results show that for most income levels, Inbursa performs the best at the *beginning.* Intuitively, since Inbursa charges only on balance, it performs well with a small balance. As the balance grows, the charges get higher and higher. Others that charge on contribution only have exactly the opposite result. Their charges appear high when the balance is low (compared with the contributed amount). This gets relatively smaller as the balance grows. However, this kind of result is sensitive to several factors that determine how the balance grows. They are the following: (1) the real interest rate, (2) the level of income, and (3) the inflation rate.

Impact of the real interest rate: if the real interest rate is high and stays high (for example, more than 6%), the charges of Inbursa begin to bite within five to ten years. If the real interest rate is low (say, 3%), the performance of Inbursa stays at the top for twenty years.

Impact of income level: if the income level rises, the benefit from staying with Inbursa rises. For example, for people earning minimum wage, the benefits from Inbursa erode after ten years. But for people earning ten times the minimum wage, the benefits from staying with Inbursa remain for twenty years.

Impact of inflation rate: Except for Inbursa, all other funds charge regardless of how well the funds are performing (Atlantico charges on the real rate and the contribution). Therefore, if the inflation rate is equal to the nominal rate of return on the funds, Inbursa will not charge anything. This is not the case for any other fund. Therefore, a variable inflation rate puts a floor value on the charges of Inbursa, but not for the others.

The simulation results show another interesting aspect of the situation: After 10 to 20 years (depending on the level of income), it is optimal to switch to a different fund. Which fund to shift to? The answer again depends mainly on the level of income and the level of the real interest rate.

In our results, we do not show the accumulated values under each scenario for each fund. Instead, we report the ranking of the funds. One issue is that it does not tell us how far apart the funds are in their final balance. Another issue is that it does not tell us how it compares with a fund with zero fees. The precise results depend on the scenarios considered. In most cases, the fund balance is reduced by 15 to 30 percent due to the presence of management fees. The gap between funds in two consecutive positions also depends on the exact nature of the scenario. For 25 years or more, in most cases, the differences are in the order of magnitude of one to three percent.

A quick look at the table above tells us the story about the best performing AFOREs when the real interest rate is 3%. For example, the first box in the top left hand corner says that Inbursa is the best performing fund (when the nominal interest rate is 3% and inflation is 0% and a person with income equivalent to one minimum salary leaves his or her money in the AFORE for 5 years). In fact, for investment for 5, 10 and 15 years, Inbursa turns out to be the best. However, the scenario changes dramatically after 25 years—the best AFORE with 0% inflation turns out to be Zurich, but Banamex leads in other scenarios. This scenario was chosen because with the National Development Plan, the Mexican government is projecting a long-term real rate of 3% in Mexico.

What happens if we choose a different scenario? Does the ranking change? The answer is yes. Once again, Inbursa does well for short time periods such as five or ten years. However, Banamex rules for all the long horizon scenarios. We have also included other funds in the top three positions. For example for a nominal 6% interest rate and 0% inflation rate, if you keep your money in your AFOREs for ten years, Confia comes out at the top, followed by Zurich and Banamex.

If the real interest rate stays high (say 9%) for a number of years, the advantage of Inbursa erodes quickly as the next set of results shows.

TABLE 7.2
Different Scenarios with the Real Interest Rate: 3%

	Real Rate		3%					
	Initial Wage		10 Min Salaries					
	Min Salary		768.5					
Rates		***Time (In years)***						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
		Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Zurich
3%	**0%**	Bancrecer	Bancrecer	Bancrecer	Bancrecer	Bancrecer	Zurich	Inbursa
		Confia	Confia	Confia	Zurich	Zurich	Bancrecer	Banamex
		Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Zurich
9%	**6%**	Bancrecer	Bancrecer	Bancrecer	Zurich	Zurich	Zurich	Banamex
		Confia	Confia	Confia	Bancrecer	Bancrecer	Banamex	Inbursa
		Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Zurich	Zurich
15%	**12%**	Bancrecer	Bancrecer	Bancrecer	Zurich	Zurich	Inbursa	Banamex
		Confia	Confia	Zurich	Bancrecer	Banamex	Banamex	Previnter
		Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Zurich	Zurich
21%	**18%**	Bancrecer	Confia	Zurich	Zurich	Zurich	Inbursa	Banamex
		Confia	Bancrecer	Confía	Banamex	Banamex	Banamex	Previnter
	Real Rate		3%					
	Initial Wage		1 Min Salaries					
	Min Salary		768.5					
Rates		***Time (In years)***						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
		Inbursa	Inbursa	Inbursa	Inbursa	Zurich	Zurich	Zurich
3%	**0%**	Confia	Confia	Zurich	Zurich	Banamex	Banamex	Banamex
		Bancrecer	Zurich	Confía	Banamex	Inbursa	Previnter	Previnter
		Inbursa	Inbursa	Inbursa	Banamex	Banamex	Banamex	Banamex
9%	**6%**	Confia	Confia	Banamex	Previnter	Previnter	Previnter	Previnter
		Bancrecer	Banamex	Previnter	Inbursa	Zurich	Capitaliza	Capitaliza
		Inbursa	Inbursa	Inbursa	Banamex	Banamex	Banamex	Banamex
15%	**12%**	Confia	Banamex	Banamex	Previnter	Previnter	Previnter	Previnter
		Zurich	Confia	Previnter	Capitaliza	Capitaliza	Capitaliza	Capitaliza
		Inbursa	Inbursa	Inbursa	Banamex	Banamex	Banamex	Banamex
21%	**18%**	Confia	Banamex	Banamex	Previnter	Previnter	Previnter	Previnter
		Zurich	Previnter	Previnter	Capitaliza	Capitaliza	Capitaliza	Capitaliza
Bases:								
	Real Rate		3%					
	Initial Wage		100 Min Salaries					
	Min Salary		768.5					
Rates		***Time (In years)***						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
		Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Inbursa
3%	**0%**	Bancrecer	Bancrecer	Bancrecer	Bancrecer	Bancrecer	Zurich	Zurich
		Confia	Confia	Confia	Zurich	Zurich	Bancrecer	Bancrecer
		Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Zurich
9%	**6%**	Bancrecer	Bancrecer	Bancrecer	Bancrecer	Zurich	Zurich	Inbursa
		Confia	Confia	Confia	Zurich	Bancrecer	Banamex	Banamex
		Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Zurich
15%	**12%**	Bancrecer	Bancrecer	Bancrecer	Zurich	Zurich	Zurich	Inbursa
		Confia	Confia	Confia	Bancrecer	Banamex	Banamex	Banamex
		Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Inbursa	Zurich
21%	**18%**	Bancrecer	Bancrecer	Bancrecer	Zurich	Zurich	Zurich	Inbursa
		Confia	Confia	Zurich	Bancrecer	Banamex	Banamex	Banamex

TABLE 7.3
Different Scenarios with the Real Interest Rate: 6%

	Real Rate		6%					
	Initial Wage		10 Min Salaries					
	Min Salary		768.5					
Rates		***Time (In years)***						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
6%	**0%**	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Bancrecer Inbursa Confia	Bancrecer Zurich Confia	Zurich Bancrecer Confia	Zurich Bancrecer Banamex	Zurich Banamex Previnter
12%	**6%**	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Zurich Bancrecer Confia	Zurich Banamex Previnter	Zurich Banamex Previnter	Zurich Banamex Previnter
18%	**12%**	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Inbursa Zurich Bancrecer	Zurich Banamex Previnter	Zurich Banamex Previnter	Zurich Banamex Previnter	Zurich Banamex Previnter
24%	**18%**	Inbursa Bancrecer Confia	Inbursa Confia Bancrecer	Inbursa Zurich Confia	Zurich Banamex Previnter	Zurich Banamex Previnter	Zurich Banamex Previnter	Banamex Zurich Previnter
	Real Rate		6%					
	Initial Wage		1 Min Salaries					
	Min Salary		768.5					
Rates		***Time (In years)***						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
6%	**0%**	Inbursa Confia Bancrecer	Inbursa Confia Zurich	Zurich Previnter Banamex	Zurich Banamex Previnter	Zurich Banamex Previnter	Zurich Banamex Previnter	Banamex Zurich Previnter
12%	**6%**	Inbursa Confia Bancrecer	Inbursa Confia Banamex	Banamex Previnter Capitaliza	Banamex Previnter Capitaliza	Banamex Previnter Capitaliza	Banamex Previnter Capitaliza	Banamex Previnter Capitaliza
18%	**12%**	Inbursa Confia Zurich	Inbursa Banamex Previnter	Banamex Previnter Capitaliza	Banamex Previnter Capitaliza	Banamex Previnter Capitaliza	Banamex Previnter Capitaliza	Banamex Previnter Capitaliza
24%	**18%**	Inbursa Confia	Banamex Previnter	Banamex Previnter	Banamex Previnter	Banamex Previnter	Banamex Previnter	Banamex Previnter
Bases:								
	Real Rate		6%					
	Initial Wage		100 Min Salaries					
	Min Salary		768.5					
Rates		***Time (In years)***						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
6%	**0%**	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Bancrecer Inbursa Confia	Bancrecer Zurich Confia	Zurich Bancrecer Confia	Zurich Bancrecer Banamex	Zurich Banamex Previnter
12%	**6%**	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Bancrecer Zurich Confia	Zurich Bancrecer Banamex	Zurich Banamex Previnter	Zurich Banamex Previnter
18%	**12%**	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Zurich Bancrecer Inbursa	Zurich Banamex Previnter	Zurich Banamex Previnter	Zurich Banamex Previnter
24%	**18%**	Inbursa Bancrecer Confia	Inbursa Bancrecer Confia	Inbursa Bancrecer Zurich	Zurich Inbursa Banamex	Zurich Banamex Previnter	Zurich Banamex Previnter	Zurich Banamex Previnter

TABLE 7.4
DIFFERENT SCENARIOS WITH THE REAL INTEREST RATE: 9%

Bases:

Real Rate	9%
Initial Wage	10 Min Salaries
Min Salary	768.5

Rates		*Time (In years)*						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
		Inbursa	Bancrecer	Bancrecer	Bancrecer	Zurich	Zurich	Zurich
9%	**0%**	Bancrecer	Inbursa	Confia	Zurich	Bancrecer	Banamex	Banamex
		Confia	Confia	Zurich	Confia	Banamex	Previnter	Previnter
		Inbursa	Inbursa	Bancrecer	Zurich	Zurich	Zurich	Zurich
18%	**9%**	Bancrecer	Bancrecer	Zurich	Banamex	Banamex	Banamex	Banamex
		Confia	Confia	Confia	Previnter	Previnter	Previnter	Previnter
		Inbursa	Inbursa	Zurich	Zurich	Zurich	Banamex	Banamex
27%	**18%**	Bancrecer	Confia	Confia	Banamex	Banamex	Zurich	Zurich
		Confia	Bancrecer	Banamex	Previnter	Previnter	Previnter	Previnter

Bases:

Real Rate	9%
Initial Wage	1 Min Salaries
Min Salary	768.5

Rates		*Time (In years)*						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
		Inbursa	Confia	Zurich	Zurich	Zurich	Banamex	Banamex
9%	**0%**	Confia	Zurich	Banamex	Banamex	Banamex	Zurich	Previnter
		Bancrecer	Banamex	Previnter	Previnter	Previnter	Previnter	Zurich
		Inbursa	Banamex	Banamex	Banamex	Banamex	Banamex	Banamex
18%	**9%**	Confia	Confia	Previnter	Previnter	Previnter	Previnter	Previnter
		Zurich	Previnter	Capitaliza	Capitaliza	Capitaliza	Capitaliza	Capitaliza
		Inbursa	Banamex	Banamex	Banamex	Banamex	Banamex	Banamex
27%	**18%**	Confia	Previnter	Previnter	Previnter	Previnter	Previnter	Previnter
		Zurich	Capitaliza	Capitaliza	Capitaliza	Capitaliza	Capitaliza	Capitaliza

Bases:

Real Rate	9%
Initial Wage	100 Min Salaries
Min Salary	768.5

Rates		*Time (In years)*						
Nominal	***Inflation***	**5**	**10**	**15**	**20**	**25**	**30**	**35**
		Inbursa	Bancrecer	Bancrecer	Bancrecer	Zurich	Zurich	Zurich
9%	**0%**	Bancrecer	Inbursa	Confia	Zurich	Bancrecer	Banamex	Banamex
		Confia	Confia	Zurich	Confia	Confia	Bancrecer	Previnter
		Inbursa	Inbursa	Bancrecer	Zurich	Zurich	Zurich	Zurich
18%	**9%**	Bancrecer	Bancrecer	Confia	Bancrecer	Banamex	Banamex	Banamex
		Confia	Confia	Zurich	Confia	Previnter	Previnter	Previnter
		Inbursa	Inbursa	Zurich	Zurich	Zurich	Zurich	Zurich
27%	**18%**	Bancrecer	Bancrecer	Bancrecer	Banamex	Banamex	Banamex	Banamex
		Confia	Confia	Confia	Previnter	Previnter	Previnter	Previnter

7.6.2 What Do We Learn from the Simulations?

From the simulations, one fact emerges very clearly: There is no single ''winning'' AFORE under all possible alternatives. However, we can see that under most cases, there are two or three AFOREs that top the list. Does that mean that an optimal strategy would be to stay with one fund for a number of years and then switch? In fact, this intuition is borne out by

the results. In some cases it requires two or three switches depending on the scenario and the number of years one stays in the system of AFOREs.

Since our exercise here is highly disaggregated by fund and by the level of income, we are able to detect the ''optimal fund switching'' behavior. In contrast, Mitchell (1999) conducts a set of simulations with a person earning average income and without the discount given to persons with a long tenure in one fund. She comes to the wrong conclusion that ''Plan ranking by commissions prove rather stable across simulated holding periods and interest rates.'' (p. 16)

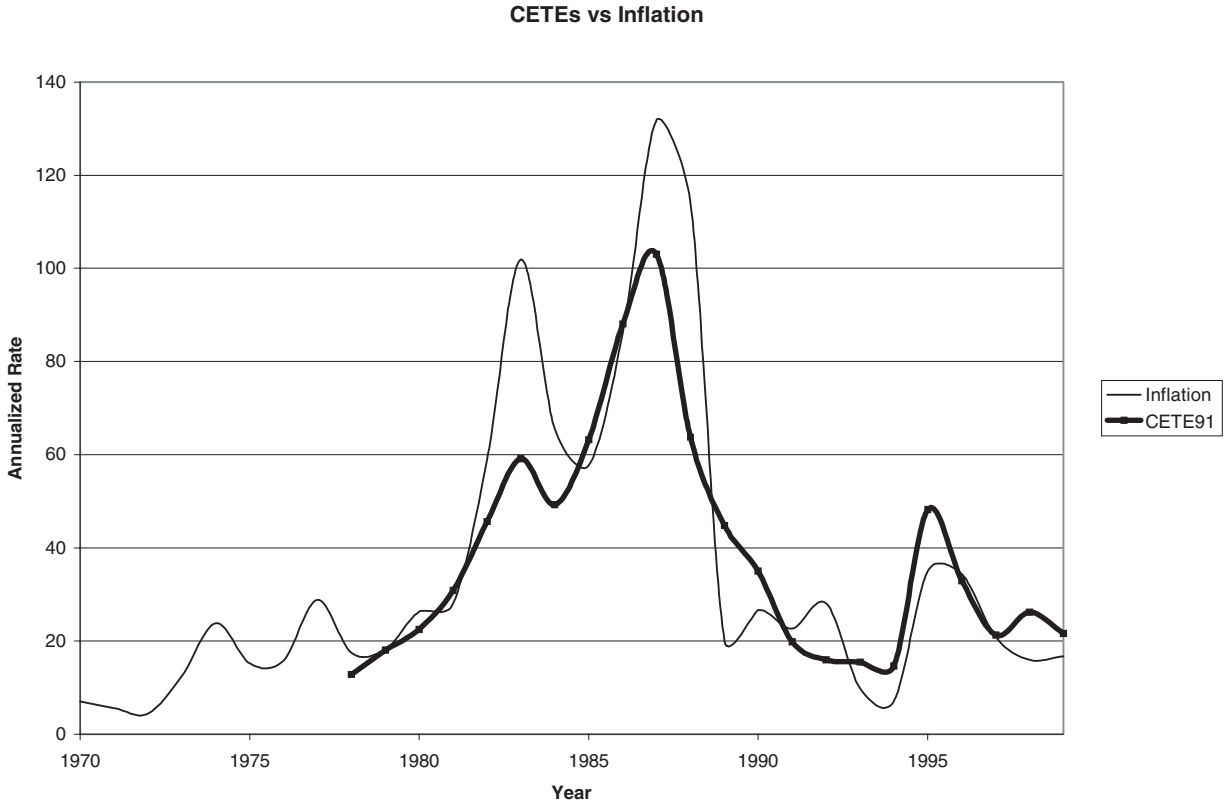
7.7 Cost of the Old Versus Cost of the New

Figure 7.3 presents the cost of running the old system between 1944 and 1994.

According to the data from IMSS, the cost rose during the first five years of operation, then it declined steadily during the 1960s. The cost started rising in the late 1970s. After a series of reforms, the cost of running the system fell, starting in 1984, only to rise again later. During all the ups and downs of cost, it has not risen over 20% since the late 1950s.

There are two ways of measuring the cost of the new system. One is to see how much the companies are spending in various categories (such as advertisement, running the agency, payment for the agents and the like). The other is how much the companies are charging the affiliates. The first method is fraught with difficulties because the methods of accounting used by the companies vary enormously. Costs vary simply because the accounting processes vary. Therefore, what we get is not a true picture about a company. The second method is tells us how much its costs the affiliates. It still does not address the true cost of running the system (as the profits are not separated out). Total charges amount to 20–25% of contribution under the new regime. Therefore, the cost gets higher under the new regime. In this cost estimate of the new regime we have not taken into account what happens when the money is converted into an annuity at retirement. In the United Kingdom, a study by Murthi et al. (1999) shows that during the conversion of a

FIGURE 7.3
Inflation Rate and CETEs Interest Rate in Mexico



lump sum into an annuity, in a private market, the affiliates lose between 10% and 20% of total value. If this were to happen in Mexico, the amount of money lost in the process of getting a contingent annuity out of an individually managed defined contribution plan could range from 30% to 45%. Even under the most optimistic scenarios, the benefits of a publicly mandated and privately administered pension plan look dubious.

7.8 Conclusions

In this chapter, we have shown that a publicly mandated and privately administered pension plan came very late in the privatization process in Mexico. Nevertheless, the cost of running the new system is high and it will remain high in the foreseeable future. In fact, this high cost renders the rationale for privatization highly questionable.