

A Primer and Assessment of Social Security Reform in Mexico

**MARCO A. ESPINOSA-VEGA
AND TAPEN SINHA**

Espinosa-Vega is a senior economist in the Atlanta Fed's research department. Sinha is Seguros Comercial America Chair Professor of Risk Management and Insurance at the Instituto Tecnológico Autónomo de México. They thank Asok Chaudhuri, Frank King, Dipendra Sinha, Selahattin Imrohoroglu, Steve Russell, and Steve Smith for insightful comments.

WHILE A NUMBER OF THEORETICAL ECONOMISTS HAVE ACCEPTED THE NOTION THAT MOVING FROM A PAY-AS-YOU-GO TO A FULLY FUNDED SOCIAL SECURITY SYSTEM WOULD IMPROVE A COUNTRY'S WELL-BEING, THERE IS FAR FROM UNIVERSAL AGREEMENT ON THIS POLICY PRESCRIPTION.¹ FOR EXAMPLE, WHILE KOTLIKOFF (1996) CALLS FOR A

move to a fully funded pension system in the United States, Diamond (1998) presents a number of caveats for such a move.² Moreover, the major thrust of the World Bank (1994) that advocates moves away from a pay-as-you-go system has been severely criticized by Orszag and Stiglitz (1999) from within the World Bank itself. Perhaps these discrepancies explain why, to date, only a few economies have switched from a pay-as-you-go to a fully funded system.³ Recently, however, the economic projections of a number of countries with pay-as-you-go systems have shown significant future actuarial imbalances. As a consequence, several of these countries are either contemplating or are engaged in a significant redesign of their pay-as-you-go systems.

While in the United States the debate about switching to a fully funded system continues, eight

countries in Latin America claim to have either abandoned or are in the process of abandoning their pay-as-you-go systems in favor of fully funded systems.⁴ Mexico is one of these eight countries, and it is of particular interest to U.S. analysts because of both its geographical proximity and close relationships with the United States and the similarities of its reform program to what many policymakers and economists advocate for the U.S. system.

The Mexican government claims that it has started a move to a fully funded system. As proof, proponents of the new system point out that since 1997 Mexico has adopted a privately managed defined-contribution system. It is important to emphasize, however, (as is done in Espinosa-Vega and Russell 1999) that a pension system can be privately administered without being fully funded. The new system is seen in some circles as a great accomplishment. Proponents

of the pension reform (for example, Rodríguez 1999 and Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuá 1998) predict that it will lead to a number of positive future developments: (1) The system will be actuarially balanced. (2) It will increase private (and national) saving. (3) Workers will migrate from the informal to the formal labor market. (4) More workers will be covered by the social security system. (5) The new system will create long-term investment instruments. But before uncorking the bottle of champagne, it is important to ask a few questions. Has Mexico started a migration toward a fully funded system? What are the likely net gains from the Mexican pension reform? Are predictions

1 through 5 likely to materialize?

There is voluminous literature on social security systems, both country-specific and general. A survey on this literature is beyond the scope of this article. The objective here instead is to provide a primer on the Mexican pension system and to evaluate it critically. The ultimate intended goal in

analyzing the Mexican experience is to illustrate the difficulties in assessing the economic significance of a pension reform. In general the hope is that in the current environment where every other country seeking reform claims to be jumping on the fully funded wagon, this discussion may help to temper expectations.

The article traces some of the official rationales for the reform in Mexico and provides a summary of the new developments leading to it. It reports its operational rules and the critical elements of the new pension system. The article also applies the insight of a companion piece by Espinosa-Vega and Russell (1999) to assess the significance of the changes introduced by the reform. It makes clear that while the reform is likely to bring some benefits, it also has costs (something that has not been emphasized in the existing literature). Finally, it calls for further research to appraise the predictions spelled out above and the net benefits of the reform for the Mexican society. In the end, the Mexican case provides a good case study for those countries that are either considering or have engaged in a pension reform of their own.

Key Features of Mexico's Old Social Security System

The next sections introduce the most significant features of the old Mexican public pension system as a point of reference for discussing the reform. There have in fact been several pension plans in Mexico. Each of these plans is in turn part of a larger benefits plan. Federal employees' accounts are managed by the Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE). There is a special fund for the state-owned petroleum-related monopoly, PEMEX. Private-sector workers' accounts have been managed by the government-run Instituto Mexicano del Seguro Social (Mexican Social Security Institute: IMSS). Furthermore, within each of these institutions, health insurance, housing programs, and social security programs are bundled together. Because the first two systems have been left intact, this discussion focuses solely on IMSS and more particularly on the old-age security aspect of IMSS, which is the core of the current Mexican pension reform.

The IMSS started its operation in 1943–44. Its social security chapter was designed to cover four areas: disability, old age, severance, and disability and life insurance (Invalidéz, Vejez, Cesantía en Edad Avanzada, y Muerte, or IVCN). As stated in Grandolini and Cerda, “The original IMSS-IVCN can be characterized as a partially funded defined benefit scheme. However, since the very beginning, it operated as a pay-as-you-go scheme as the fund’s actuarial reserves were used to finance other social insurance activities, particularly health” (1998, 4).

Restricted to IMSS, the reform affects only the portion of the economically active population working in the formal private sector. The fact that this sector is proportionally smaller than its counterpart in developed economies may be relevant in assessing the macroeconomic impact of the reform. More than 40 percent of Mexico’s 33.5 million labor force is outside the formal sector (Judisman 1997), working in what the International Labor Organization (van Ginneken 1998) calls the informal sector: independent workers (excluding professional, administrative, and technical personnel), domestic workers, and workers in small enterprises (with five workers or fewer).⁵ Of the total economically active population, social security covers less than one-third. To put it differently, it covers slightly more than half the workers in the formal sector. Therefore, talk about reform is talk about directly affecting only half the formal labor force.

Mexico is in dire need of further research to guide it through its decision on whether and how to switch to a fully funded pension system.

The discussion that follows reviews other relevant features unique to the Mexican pension system. It starts by looking at the eligibility criteria for workers to qualify for benefits (called the admission fee) and the fraction of individuals' working income received upon retirement (the so-called replacement rate).

Benefit-Eligibility Requirements and the Replacement Rate under the Old System

For retirees the most important aspect of their benefits is the proportion of wages received during their active years that is replaced by their retirement income. This proportion is called the replacement rate. For example, a replacement rate of 100 percent would mean that an individual's annual income would be the same before and after retirement. The concept of replacement rate is significant because eligibility requirements are often quoted in terms of it. It is also important to review the replacement rate and eligibility criteria here to be able to contrast the old system with the new.

For most individuals, wages tend to rise with age. Therefore, it is incorrect to talk about a single replacement rate. Instead, it is customary to discuss the replacement rate with respect to either lifetime-average wage or final salary (and in some cases with respect to an average of a worker's five or ten highest-income years).

In the old regime, the system of old age (and disability) benefits was designed so that a worker became fully eligible to receive benefits after just 500 weeks of contribution. However, benefits did not increase much with additional contribution, as Table 1 illustrates. Moreover, if for some reason a

TABLE 1
Replacement Rates under Mexico's IMSS System (Percent)

Salary at Retirement	Years in the System	
	10	30
1 minimum salary	100	100
6.5 x minimum salary	23	25
10 x minimum salary	14	16

Source: Serrano (1999a)

worker stopped contributing for 500 consecutive weeks, he or she would lose all retirement benefits.

The numbers presented in Table 1 are instructive. The first row states that for a person earning one minimum salary, the replacement rate would be 100 percent regardless of the number of years the individual contributed to the pension fund. Things are not very different for other participants. A person earning ten times the minimum salary, for example, would get 14 percent of his or her wage replaced after ten years and 16 percent of his annual salary replaced after thirty years. In this case, although the incentive to contribute to the pension fund for more than ten years was not zero, it was minimal. Recent estimates show that 86 percent of current retirees get exactly one minimum salary as the retirement benefit (Sinha 1999a).

Thus there was a fairly low minimum admission fee. The fact that workers qualified for pension after only 500 weeks of work created an incentive to contribute just long enough to become eligible

1. For a detailed description of the key differences between pay-as-you-go and fully funded systems, see a companion article by Espinosa-Vega and Russell (1999).

2. Feldstein's (1974) theoretical analysis suggests that privatization of social security would reduce the distortions that payroll taxes impose on household saving and labor supply decisions. Even in the absence of redistributive considerations or the presence of market imperfections, Feldstein's work, as well as that of his successors, is subject to a qualification shown in Diamond's (1965) theoretical analysis: a mandated pay-as-you-go defined-contribution social security system would improve a country's well-being provided the economy was dynamically inefficient. (Roughly put, a competitive economy is said to be dynamically inefficient if it saves "too much" relative to the social optimum.)

Imrohoroglu, Imrohoroglu, and Joines (1995) extend Diamond's general equilibrium work by adding potentially more realistic lifetime structure and market imperfections. They are able to show how the replacement rate (the ratio of retirement benefits to preretirement wages) varies according to the market structure and specific parameter assumptions. Because their analysis focuses on economies that are dynamically inefficient, Diamond's result prevails. Abel and others (1989) provide empirical support for the dynamic efficiency of the U.S. economy. Building on their work and expanding Feldstein's analysis to a general equilibrium framework, Kotlikoff (1996) has provided extensive simulation analysis for the U.S. economy that supports Feldstein's conclusion. In a framework that allows for intra- and intergenerational redistribution, these authors show that in a competitive economy privatization of the social security system would—after intragenerational lump-sum transfers if necessary—improve the well-being of the country. A recent example of a serious critique of a fully funded scheme is found in Sinn (2000).

3. See Schwarz and Demircuc-Kunt (1999) for a complete list of countries engaged in pension reform.

4. The countries are Argentina, Bolivia, Chile, Colombia, El Salvador, Mexico, Peru, and Uruguay.

5. In Latin America, more than half of the economically active population work in the informal sector.

and then either drop out to the informal sector or “unregister” with the IMSS and continue working without being officially on the payroll. This awkward eligibility requirement was another factor contributing to the actuarial imbalance of the IMSS-IVCM under the old system, which was funded essentially by a payroll tax. At the same time, because employers were responsible for paying part of this tax, many of them understated the wage rate of workers just to avoid paying the payroll tax.

In addition, the government had relaxed eligibility by, for example, relaxing the age of retirement, by using broader definitions of disability or poor health, and so forth. One manifestation of this problem, which was severe in the Mexican system, is that an increasing number of people were getting a disability pension. Since the middle of the 1980s, the proportion of people drawing a disability pension has stayed at more than 40 percent (see Table 2), a very high figure compared with Organisation for Economic Cooperation and Development (OECD) countries, whose population is generally much older.

As is described below, one can identify two opposing factors affecting the balance of the pension portion of the IMSS fund. Even though the replacement rate appears generous at first glance, it is quoted in terms of the minimum salary. The minimum salary in Mexico at the time of the reform was roughly \$24 a day. The World Bank (2000) considers that in developing nations an “adequate” standard of living can be maintained with \$40 a day. This low level of disbursement (in combination with the large proportion of young to old people described below) worked to boost the coffers of the IMSS. On the other hand, the low admission fee made it unattractive to stay in the system for more than ten years and thus constituted a strain on the coffers of the system.

At the same time, there were other strains on the retirement account of the IMSS. The Mexican benefit system has historically been tied to the minimum wage (that is, it has always been calculated as a multiple of the minimum wage), which is adjusted only by legislation. Indexing of retirement benefits was first introduced in the Mexican system in 1989, when Congress passed a law stating that for calculation of IMSS benefits the minimum wage would be indexed to the consumer price index. The government thereby increased the benefits of the retired population by indexing benefits to inflation but added to strains on the IMSS because it did not at the same time index revenue to inflation.

In spite of these idiosyncrasies, from its inception the private pension system in Mexico operated with surpluses because of favorable demographic factors. For example, behind these surpluses lay a

TABLE 2
IMSS-IVCM Disbursements by Old-Age Retirement and Disability Categories (Percent)

Year	Old Age	Disability
1981	64.95	35.05
1985	58.86	41.14
1990	56.47	43.53
1994	57.01	42.99

Source: IMSS (1997)

large base of contributors relative to benefit recipients. However, for most of those years, instead of building reserves these surpluses were used to subsidize IMSS’s other programs such as its health insurance component. According to the IMSS, this status quo was sustainable without any changes until the year 2007. However, as the next section illustrates, in recent years Mexico has experienced dramatic changes in mortality rates and demographic trends, changes that would have reduced and even eliminated the surpluses on the IMSS pension accounts.

The Demographic Angle

In recent years Mexico has experienced a significant drop in its fertility and mortality rates, which has led to a relatively rapid aging of its population. For example, the proportion of population above age sixty in France was 5 percent in 1750. Mexico reached the same milestone in 1985. However, by 1985 the proportion of French population older than sixty rose to 15 percent. It took France 235 years to get to that point. Mexico will reach this number by 2025, in only 35 years. France had the opportunity to change its social institutions slowly to cope with the problems associated with population aging. Mexico, on the other hand, has had to expedite its social security reform.

Table 3 presents a clearer picture of how rapidly population changes are occurring in Mexico. The table shows actual population proportions for 1970 and 1990. In addition, it includes projected population proportions in 2010, 2030, and 2050. As the numbers clearly show, over a period of eighty years (between 1970 and 2050), the proportion of population older than sixty rises from 6.13 percent to 24.35 percent.

One reason for such a dramatic change in population structure is a rapid decline in fertility rates. In 1970 the mean fertility rate of women was 6.5 children per lifetime. This figure is projected to fall

TABLE 3 Actual and Projected Changes in Age Distribution, 1970–2050

Age	1970	1990	2010	2030	2050
0–4	18.59	13.20	9.38	7.38	6.43
5–9	15.14	12.65	9.47	7.31	6.42
10–14	12.77	12.70	9.59	7.37	6.45
15–19	10.38	12.18	9.39	7.33	6.43
20–24	8.22	9.86	8.80	7.19	6.30
25–29	6.78	7.97	8.32	7.21	6.18
30–34	5.53	6.72	8.28	7.26	6.20
35–39	4.69	5.49	7.99	7.16	6.22
40–44	3.90	4.40	6.60	6.86	6.24
45–49	3.33	3.62	5.38	6.54	6.31
50–54	2.44	2.92	4.51	6.48	6.33
55–59	2.13	2.41	3.60	6.14	6.14
60–64	1.87	1.91	2.76	4.89	5.71
65–69	1.53	1.50	2.14	3.79	5.21
70–74	1.20	0.97	1.56	2.92	4.80
75–79	0.85	0.71	1.11	2.06	4.08
80+	0.68	0.77	1.11	2.11	4.55
Total	100	100	100	100	100

Source: Data from United Nations (1998, table 3)

to 2.1 by 2050. At the same time, the infant mortality rate fell from sixty-nine per thousand live births to eleven per thousand live births. These two trends have opposite effects with the decline in fertility leading to fewer people entering the workforce and the improved infant mortality rate somewhat alleviating this problem. At the same time, the mortality rate of people in higher age groups has also fallen, contributing further to the aging of the population structure.

All these changes can be summarized in what is called the dependency ratio of the population. The dependency ratio is usually defined as the number of people in 0–14 and 65+ age groups (the dependent group) divided by the number of people in the 15–64 age group (because the labor force usually consists of the latter age group).

Over the eighty-year period from 1970 to 2050, the dependency ratio changes dramatically (from 1.03 to 0.52) in the first forty years. As Table 4 shows, it drops from 1.03 to 0.52. Thus, the number of people dependent on the working-age population by 2010 will have fallen by 50 percent. Then it is projected to rise somewhat. This rise is somewhat

TABLE 4 Actual and Projected Dependency Ratios, 1970–2050

Indicator	1970	2010	2050
Dependency Ratio	1.03	0.52	0.61
Old-Young Ratio	0.09	0.21	0.97

Note: The dependency ratio is the number of people in age groups 0–14 and 65+ divided by the number of people in the 15–64 age group. The old-young ratio is the number of people in the 65+ age group divided by the number of people aged 0–14.

Source: Atlanta Fed calculation using data from United Nations (1998)

deceptive, however, hiding the composition of the dependent population. The change in composition of the dependent population is evident in the ratio of old to young in the population, which moves from 9 percent to 97 percent over the total period. This scale of change in age composition has been witnessed by very few countries over such a short time.

In view of these demographic changes, policy-makers have had to face a pressing question: How

onerous would maintaining the status quo be? The discussion now turns to this question.

Estimating the Actuarial Imbalance

So far, the discussion has identified and described the strains to the Mexican private pension system without actually reporting what it would have cost the government to maintain the status quo under IMSS-IVCM. Without trying to evaluate their accuracy, this section reports three such estimates.

Table 5 contains a projection attributed to IMSS by Grandolini and Cerda (1998). The table reports that the present value of IMSS commitments through 2058 as of December 31, 1994, (the year Congress started to consider a second reform) was 142 percent of the 1994 gross domestic product (GDP) present-value deficit.

To get a sense of how the time path of actuarial deficit would play out had there been no changes in the system, IMSS itself calculated the projected deficit. The IMSS figures are reproduced here as Table 6. The table shows that the IMSS would have run a surplus until 2005 (a positive number in the table indicates a surplus) had the old system not been changed. Therefore, the situation in Mexico was not like that of Argentina or Uruguay (where the governments were already filling up the deficits of their pay-as-you-go pension systems with current government budgetary resources). On the other hand, after 2020 the deficit would have mounted rapidly.

Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca (1998) present an alternative estimate of the cost of maintaining the IMSS-IVCM status quo. The least costly of their scenarios has the cost going from 1.55 percent of GDP in 1997 to 3.59 percent in 2022 and 6.69 percent in 2047.

Why do these estimates of the deficits differ? For example, according to the IMSS figures, for 1997 there was a surplus in the pension fund. On the other hand, Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca (1998) report a deficit for 1997. Given the information provided by the different authors, it is impossible to identify explicitly the reason for most of these differences, and it is therefore impossible to adequately compare the different estimates.

An additional challenge is that not all estimates consider the same concepts. The concept of implicit pension debt measures the stock of debt today. If all the taxes to finance the pay-as-you-go system are set to zero, the implicit pension debt shows how much the government owes (implicitly) to the current generation as of today. There is no liability for future generations in this calculation.

The calculation is the exact analog of government debt with one difference: explicit government debt does not depend on the mortality experience of the current generation. On the other hand, implicit pension debt does because most governments promise pensions for widows (and sometimes to other dependents).

This concept should be contrasted with that of the present value of cash flow deficits. As the name suggests, cash flow deficits are calculated as the difference between expected contributions at every future date, which in most cases represents a deficit. Then, the present value of the stream of numbers is calculated. If contribution rates and benefits rates do not change but the underlying demographics do, the deficit will be altered. Specifically, aging of the population will make deficits worse. The period over which the deficit is calculated also matters. The larger the period, of course, the bigger the deficit.

The issue is further complicated because authors may not explicitly identify the concepts with which they are working. For example, the Grandolini and Cerda (1998) and Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca (1998) studies do not always clarify whether they are talking about implicit pension debts or cash flow deficits.

Additional problems arise from the fact that there is no universal standard for the discount rate chosen to calculate the present value. For example, Grandolini and Cerda (1998) chose to use a 3 percent discount rate. The advantage of Table 6 is that it allows avoiding taking an arbitrary discount rate. Instead of all the numbers being lumped by being added up, they remain a vector of values. The significance of such confusions is that they can lead to vastly different conclusions (see Sinha forthcoming, chap. 3, especially table 3.33.) Nonetheless, without attempting to homogenize the different estimates of the cost of maintaining the status quo under IMSS-IVCM, it is clear that, according to these studies, maintaining the status quo would have been very costly for the country.

The New Mexican Social Security System

In December 1995, the Mexican Congress passed the new Social Security Law (*Ley de Seguro Social*), paving the way for the current system. A second set of laws (*Ley de los Sistemas de Ahorro para el Retiro*) was passed in April 1996. These laws allowed privatized management of the country's pension system. They approved operation of investment management companies (*Administradores de Fondos de Ahorro*, or AFORES) to manage individual retirement funds (*Sociedades de Inversion*

TABLE 5
Present Value of Future Pension Deficits (in Billions of Pesos) as of December 31, 1994

Assets		Liabilities	
Reserves	3.25	PV of old pension	96.93
PV of future contributions	683.67	PV of future liability	2,390.61
(Affiliates now)	179.74	(This generation)	1,017.40
(Future generations)	503.93	(Future generations)	1,373.21
Total	683.92	Total	2,487.54

Source: Grandolini and Cerda (1998)

TABLE 6 Actuarial Deficit Projection of IMSS If the Old System Had Continued

Year	Millions of 1994 Pesos	Percent of 1996 GDP
2000	9,916	0.39
2005	667	0.03
2010	-23,407	-0.93
2015	-63,950	-2.55
2020	-122,827	-4.89
2025	-200,741	-8.00
2030	-264,501	-10.54

Note: Some of the estimates that went into computing Tables 5 and 6 include (1) Demographics: sizes of workers and retirees of every generation in the future. These numbers will in turn depend on fertility and mortality projections (ignoring migration). (2) Estimates of growth rates of real wages in the future. (3) Retirement pattern of the elderly in the future. (4) Participation rate of women and other part-time workers in the labor force. (5) Proportion of economically active population participating in the formal sector. (6) Inflation rate projection. Under the old regime, the benefits are calculated on the basis of the average nominal salary of the last five working years. It also required a choice of a discount rate to convert these figures to a single number. Although the authors reveal that these are partial equilibrium computations the exact methodology is not spelled out in the document.

Source: IMSS (1997, table 18)

Especializadas en Fondos para el Retiro, or SIEFORES). In addition, the Mexican government set up a separate division to oversee all activities of the AFORES: Comisión Nacional del Sistema de Ahorro para el Retiro (CONSAR). To clarify the roles of the AFORES, CONSAR has set out general rules of operation for the companies (see Banco de Mexico 1996).

The stated objectives of AFORES include the following: (1) To open, administer, and manage the individual retirement accounts in agreement with

provisions in social security laws. Regarding housing-promotion subaccounts, the AFORES will register each worker's contributions and the interest paid thereon, using information provided by social security institutions.⁶ (2) To receive from social security institutions the contributions made, in accordance with the law, by the government, employers, and workers, as well as voluntary contributions by workers and employers. (3) To itemize the amounts received periodically from social security institutions and deposit them into each worker's individual

6. The housing subaccount requires a contribution of 5 percent of wages. This amount is substantial (the retirement contribution is 6.5 percent of wages). In the past, this housing subaccount has earned a negative real rate of return. All future estimates assume that it will earn a zero real rate of return. One interesting question is, Why is the government so keen on getting the house in order for the retirement account but not touch the housing subaccount?

retirement account as with the returns obtained on the investment of these funds. (4) To provide administrative services to mutual investment funds (the SIEFOREs). These are direct subsidiaries of the AFORES. In fact, at present, each AFORE is allowed to have one SIEFORE.

Contribution Structure. The contribution structure of the new system is as follows: Each individual pays a compulsory 6.5 percent of wages into an individual retirement account. The government contributes a “social quota” (called *cuota social*) of 5.5 percent of minimum wage (regardless of the wage rate of the worker). This social quota is funded from the government’s general revenue every year; thus the funding mechanism is taxes on the current generation of workers. In addition, workers must contribute 5 percent to a housing subaccount (INFONAVIT) that will be consolidated with the AFORE account upon retirement. Also, 4 percent of wages go to IMSS for disability and survivors insurance. Workers can also make additional voluntary contributions. The AFORES started to collect compulsory and voluntary contributions in February 1997. Contribution to the new system became compulsory for all private-sector workers in September 1997.

AFORES are allowed to charge management fees either as a percentage of contribution, a percentage of value accumulated, or any combination thereof. Most AFORES charge fees as a percentage of contribution. All are required to inform affiliates about their accounts at least once a year with statements that include information about accumulated value, contributions during the year, and any charges the account has incurred.

Contribution Requirements: A Comparison.

In order to gain some perspective on the differences between the required contributions and on eligibility requirements under the old and the new social security systems, the following information is provided. The box on page 19 is a compilation of information provided by CONSAR, IMSS, and SHCP (Secretaría de Hacienda y Crédito Público) and reported in Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca (1998, 146) and Grandolini and Cerda (1998, 13).

The box allows identifying at a glance some of the idiosyncratic features of the old system mentioned above that have been eliminated. For one thing, the minimum ten-year contribution necessary to qualify for retirement benefits has been replaced by a minimum twenty-five-year contribution. Also, because there is only a minimum defined benefit under the new regime, the asymmetric inflation-indexing problem described above should

be eliminated. And because the notion of a social security surplus has been eliminated, the funds can no longer be a source of subsidy for other IMSS activities. At the same time, because the IVCM has been separated from the health care and maternity benefits provided by IMSS, deficits in these areas will be directly reflected in government deficits.

Issues Involving the Fund Managers. Workers can choose any AFORE for contribution. Once an AFORE is chosen, no change can be made for one year, though it is possible to choose a different AFORE every year without any financial penalty. In Mexico, fund-hopping has been very low. In 1999, less than 0.01 percent of workers changed funds. This stability stands in sharp contrast with Chile, where fund-hopping has exceeded 25 percent per year.

By the end of 1997 CONSAR had licensed seventeen AFORES (listed in Table 7). Some of the AFORES are fully owned by Mexican companies, and others are partly owned by foreign companies. For example, AFORE Bancomer is 51 percent owned by the second-largest banking group in Mexico, and the remaining 49 percent is owned by Aetna, one of the largest insurance companies in the United States. Garante has a particularly interesting ownership structure with majority shareholding by a Mexican group, part ownership by Citibank, and part by a pension fund from Chile, AFP Habitat. Ownership structure of Siglo XXI is also notable: half of it is owned by the IMSS, the government organization that continues to run health care and disability and death insurance for the entire system.

Three of the AFORES established in 1997 have merged with others. Confia bought Atlantico, Santander bought Genesis, and Profuturo bought Previnter. Consequently, as of August 1999, fourteen AFORES are left in the market. All of these mergers had to be approved by CONSAR.

Market Share. There were two very distinct waves of membership in the new social security scheme. The first was the initial rapid expansion until the number of affiliates hit around 10,000,000 within a span of ten months (see Chart 1). Then came a second, slower stage of expansion over the next fourteen months. At the end of August 1999, about 14,900,000 workers had signed up for one AFORE or another.

It should be noted that of the approximately fifteen million workers who belonged to some AFORE in August 1999, about 87 percent are active contributors. The fact that an individual signs up and becomes an affiliate does not necessarily mean that

TABLE 7 AFOREs Authorized by CONSAR, 1997

AFORE	Main Shareholders with Percentage Holding
Atlántico Promex	Banca Promex, 50; Banco del Atlántico, 50
Banamex	Grupo Financiero Banamex-Accival, 100
Bancomer	Grupo Financiero Bancomer, 51; Aetna Internacional, Inc., 49
Bancrecer-Dresdner	Grupo Financiero Bancrecer, 51; Dresdner Pension Fund Holdings, 44; Allianz México, S.A., 5
Bital	Grupo Financiero Bital, 51; ING America Insurance Holding Inc., 49
Capitaliza	General Electric Capital Assurance Co., 100
Confía-Principal	Abaco Grupo Financiero, 51; Principal International, 49
Garante	Grupo Financiero Serfín, 51; Grupo Financiero Citibank, 40; Hábitat Desarrollo Internacional, 9
Génesis	Seguros Génesis, S.A., 100
Inbursa	Grupo Financiero Inbursa, 100
Previnter	Boston AIG Company, 90; Bank of Nova Scotia, 10
Profuturo GNP	Grupo Nacional Provincial, 51; Banco Bilbao Vizcaya-México, S.A., 25; Provida Internacional, S.A., 24
Santander Mexicano	Grupo Financiero Invermexico, 75; Santander Investment, S.A., 25
Siglo XXI	Instituto Mexicano del Seguro Social, 50; IXE Grupo Financiero, 50
Sólida Banorte	Grupo Financiero Banorte, 99
Tepeyac	Seguros Tepeyac, 99
Zurich	Zurich Vida, Compañía de Seguros, 77; Gabriel Monterrubio Guasque, 10

Note: No mention is made of shareholders with equity participation under 5 percent of the total capital of the respective AFORE.

Source: Banco de Mexico (1997)

he or she will contribute to the system regularly. In addition, each may have more than one account, inflating the number of affiliates. SAR (Sistema de Ahorro para el Retiro) accounts provide one classic example: by the end of 1995, there were 65 million accounts in SAR but less than twelve million workers in the formal sector.

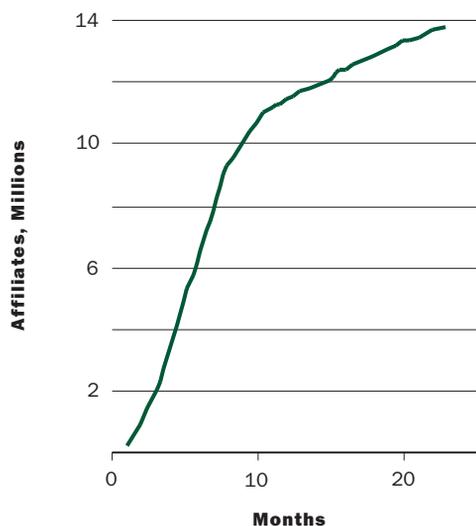
The amount of contributions in the system has also increased steadily. Between July 1997 and July 1998, investment in the system equaled US\$3 billion (at an exchange rate of 10 pesos per U.S. dollar as of January 1999). Over the next seven months (July 1998 to January 1999), investment grew another

US\$3 billion. If this trend continues, in twenty-five years AFOREs will hold an amount equal to 40 percent of GDP (assuming a real GDP growth rate of 2 percent a year and real rate of return of funds at 6 percent a year).

Table 8 presents a summary of compulsory and voluntary contributions to the existing AFOREs as of the end of 1998. As is evident, the market is highly concentrated, a feature common to other Latin American countries such as Chile and Argentina (see Queisser 1998).

CONSAR has explicitly prohibited any AFORE from holding more than 17 percent of market share

CHART 1
Systemwide Take-Up Rates of AFORES
through January 1999



Source: CONSAR (1999)

in terms of the number of affiliates. However, it does not restrict market share in terms of total value of assets in portfolios. For example, an AFORE may have 20 percent market share in terms of its portfolio's value but less than 17 percent in terms of the number of affiliates. The value of investments in both Banamex and Bancomer has exceeded 17 percent during most of the past two years, for instance. As Table 8 shows, the level of concentration in terms of total investment portfolio is far higher than in terms of the number of affiliates: six companies have around 77 percent of the market share in terms of investments. Contrary to what the regulation intended, with more market consolidation, this proportion is likely to rise in the future.

The Portfolios of the Fund Managers. An integral component of any pension system is the composition of the portfolio held on behalf of its contributors. As Table 9 shows, AFORES' portfolios are heavily concentrated in government bonds.

This portfolio composition results from CONSAR's stipulation that a minimum of 51 percent of an AFORE portfolio be held in the form of inflation-indexed bonds and at least 65 percent in assets with a maturity of no more than 183 days. CONSAR's reasons for this portfolio requirement are to build trust in the system and avoid volatility in the portfolio (see CONSAR 1999). On January 31, 1999, more than 66 percent of AFORES' portfolios were in inflation-indexed bonds (called BONDE91 and UDIBONOS). Another 22 percent were in CETES (Mexican

Treasury bills). The average maturity of investment portfolios is 111 days, well below CONSAR's cap.

CONSAR specifies that an AFORE can hold up to 35 percent of its portfolio (disposicion quinta, 5) as private debts (CONSAR 1997). Given this range, why do private debt holdings amount to only 2.83 percent of all portfolio assets? CONSAR's qualifications on the type of debt that can be included probably account for the low figure. Regulations specify that only private short-term debt meeting Standard and Poor's mxA-3 grade or equivalent and long-term private debt meeting Standard and Poor's mxAA+/mxAA grade would make the cut (CONSAR 1997, chap. 3 and app. A), and only a very small fraction of Mexican private debt meets these eligibility requirements.

Recent Proposals for Portfolio Changes.

Recently there has been criticism about the need for Mexico to move forward with privatizing its pension system (for example, Rodriguez 1999). Specifically, criticism has focused on the fact that the AFORES' portfolios consist mostly of government debt. Even though, as explained in Espinosa-Vega and Russell (1999), there would be no guarantee that the new system would be fully funded if the government relaxed its high government-debt requirement for AFORES' portfolios, questions remain about the economic impact of allowing AFORES more flexibility in the composition of their portfolios.⁷ Recently, the Mexican federal government has been considering a proposal to allow AFORES greater flexibility on how retirement savings are invested. CONSAR has proposed to increase investment options for the fund administrators, including the right to buy debt sold by Mexican corporations in overseas markets. It is not hard to foresee a trend in the direction of allowing AFORES to have larger holdings of stocks. As explained in the next paragraph, this move, together with the issuance of inflation-indexed long-term government bonds, may represent net gains for the generation of active workers when they retire.

In the shift from defined benefits under the old system to defined contributions under the new system, risk is shifted from workers' active years to their years of retirement. The reason for this shift involves risk created by the possibility of increases in the inflation rate. Under Mexico's old defined-benefits social security system, the nominal (peso) value of the benefits was indexed to the inflation rate. Thus, workers did not have to fear that the purchasing power of their social security benefits would be reduced by higher inflation. However, during periods when the government had budget prob-

TABLE 8 Money Invested and Number of Affiliates in AFOREs

Fund	Amount in Pesos ^a	Percent	Affiliates ^b
Banamex	10,209,603,059	18.16	1,742,930
Bancomer	13,183,450,811	23.45	2,364,074
Bancrecer	1,981,244,448	3.52	619,789
Banorte	2,628,350,064	4.68	1,260,762
Bital	4,772,054,894	8.49	1,499,758
Confía	1,027,806,121	1.83	332,999
Garante	4,824,234,812	8.58	1,633,528
Génesis	302,320,757	0.54	140,957
Inbursa	5,072,806,294	9.02	378,376
Profuturo	5,155,845,595	9.17	1,998,211
Santander	3,534,727,403	6.29	2,026,656
Siglo XXI	3,041,053,960	5.41	462,473
Tepeyac	285,687,001	0.51	228,621
Zurich	199,941,483	0.36	185,576
Total	56,219,126,705	100	14,874,710

^aAs of the end of 1998

^bAs of the end of August 1999

Source: CONSAR (1999)

TABLE 9 Asset Allocation of AFOREs at the End of 1998

Type	Amount in Pesos	Percent
Nominal government	13,699,239,431	22.54
Real government	40,139,931,258	66.04
Repurchase agreements	1,810,442,216	2.98
Private papers	1,722,866,789	2.83
Deposit in Banco de Mexico	3,404,749,272	5.60
Total	60,777,228,966	100

Note: Nominal government means government bonds denominated in nominal terms. Real government means government bonds denominated in real (inflation-adjusted) terms.

Source: CONSAR (1999)

lems—for example, if weak performance of the economy reduced tax revenues or high interest rates increased the burden of debt service—the government had to increase taxes or borrow to maintain the level of benefits.

Under the new system, an increase in the inflation rate will reduce the purchasing power of the govern-

ment or private bonds with fixed nominal values held by the social security system. This inflation will also reduce the purchasing power of benefits paid to retirees. The government may be tempted to take advantage of this fact and increase the inflation rate during periods when it has budget problems, rather than increasing taxes or borrowing. Thus, the new

7. For a fuller explanation of the related issues, see Espinosa-Vega and Russell (1999).

system may increase the risk facing retirees, but it will reduce the risk facing active workers.

On the other hand, there are reasons to expect that the amount of inflation risk facing retirees under the new system may not be very large. First, some of the assets held by the Mexican social security system will consist of stock, and the rate of return on stock tends to increase when the inflation rate increases so that some of the reduction in purchasing power from retiree benefits from government or private bonds will be offset. Second, most of the bonds held by the system are likely to be short-term bonds. The long-term bond market in Mexico currently has a low volume of issues and little trading, and it will probably stay that way unless or until the government convinces the public that it is unlikely to indulge in high inflation. As the inflation rate increases, maturing short-term bonds can be replaced with new short-term bonds yielding higher interest rates, so the losses from inflation will be limited. Finally, the interest rates on many of the longer-term bonds purchased by the system may be indexed to the inflation rate. The Mexican government has recently begun to issue indexed bonds in substantial quantities.

Transactions Costs and Commissions. A key source of dissatisfaction and confusion with most newly privatized pension systems is the fees charged by the fund managers (also called commissions or costs of transactions). The main concerns are that the management fees are high, that the fees are lumped with insurance premiums for the life insurance component of the pension plans (see Sinha forthcoming, chap. 3), that the management fees are obfuscated because in most cases they are presented as a fraction of a worker's salary, and that sometimes it is not clear whether the commissions are expressed as a proportion of flow into the fund on a yearly basis or as a proportion of balance in the fund at a given point in time. As pointed out by Diamond (1998), some of these concerns are widespread. For that reason, this section takes a close look at the commission structure for the Mexican pension system.

Table 10 gives the details of the commissions charged by the 17 AFOREs that started out in 1997. The three of them that have since merged with others have assumed the names of the companies under which they are operating.

Most of the commissions charged apply to the flow of contributions. However, some companies charge on the balance in the fund as well as on flows. One company (Inbursa) charges commissions exclusively on the real (inflation-adjusted) rate of return of the fund. (Inbursa charges no fee if the real rate of return is not positive.) In addition to the different fee

structures, the way charges are expressed is somewhat misleading because they are expressed as a percentage of wages and not as a percentage of contribution every year.⁸ For example, 1.7 percent charges on a person contributing to the system a mandatory 6.5 percent of her \$100.00 wage will be effectively paying a \$26.15 (26.15 percent) commission charge.

Given that it is somewhat difficult to compare charges across different AFOREs using the figures in Table 10, CONSAR has worked out commission "equivalents." The idea is that all charges are converted to a charge only on flow of funds. CONSAR publishes these estimates, shown here in Table 11. The results assume that the real rate of return is 5 percent (with no inflation), the charges are applied to a person with three times the minimum wage, and that person has the same income throughout life.

Even after the conversion into equivalent charges on flow, comparisons of different AFOREs are difficult. Among other things, the commission charged is effectively a function of years in the system. It is also a function of factors such as the expected rate of return and the level of wages (some of these results can be seen in Sinha, Martinez, and Barrios-Muñoz 1999). In addition, as Table 11 shows, in some cases (Siglo XXI, Tepeyac, Profuturo, Santander) charges actually go up monotonically without falling over time for the same AFORE. The reason is simple. These companies charge fees on contributions as well as on the account balance. As time passes, more money is accumulated in the accounts, and the bite of charges on the account balance gets bigger.

Assessing the Reform

The focus of the analysis thus far has been the pension system of the formal private sector in Mexico. The discussion has examined the factors that have accounted for surpluses on this pension system and the strains that, if unchanged, would transform these surpluses into deficits in the near term. It also describes key aspects of the new pension system such as the new managers of the system (AFOREs), their portfolios, and recent proposals to modify their portfolios and looks at the new eligibility criteria, the "admission fee," and the replacement rate under the new system. The next sections establish what it would take to assess the significance of the reform and identify a research agenda.

Most economists agree that the old Mexican pension system was a pay-as-you-go system. Many of the predictions about the state of the economy under the new pension system (for example, a sharp increase in national saving) have the economy resembling one

TABLE 10 Fee Structure of AFOREs

AFOREs	Charges on Flow Each Year (Percent of Wages)	Charge on Account Balance (Percent)	Charge on Real Rate of Return (Percent)
Atlántico Promex	1.40		20.00
Banamex			
1997	0.20		
January 1998	0.85		
March 1998 onward	1.70		
Bancomer	1.70		
Bancrecer-Dresdner	1.60		
Banorte	1.00	1.50	
Bital	1.68		
Capitaliza	1.60		
Confía Principal	0.90	1.00	
Garante	1.68		
Génesis	1.65		
Inbursa			33.00
Previnter	1.55		
Profuturo GNP	1.70	0.50	
Santander	1.70	1.00	
Siglo XXI	1.50	0.20	
Tepeyac	1.17	1.00	
Zurich	0.95	Variable	

Note: In addition, Bancomer, Banamex, Bital, Garante, and Génesis have discounts for people who stay with their funds for long periods of time. These are not shown in the table above.

Source: CONSAR (1999)

under a fully funded system. Thus, the old and new social security systems seem to be two radically different systems. An important question to ask, however, is whether the new system is truly a fully funded system or simply represents a change in the form of the pay-as-you-go system.

Fully Funded: Is It There Yet?⁹ There are a number of ways to engage in genuine reform, that is, to go from a given modality of a pay-as-you-go

system to a fully funded system. However, choosing the way to reform is not trivial. Each alternative social security scheme implies different costs for different generations of workers, and their implementation thus can be subject to the forces of political discourse. The simplest way to carry out a genuine reform would be to have the current workers pay (on top of their regular pension contributions) for the benefits of the current generation of retirees.

8. The following illustrates the difference: Expressing the commission in terms of a fraction (z) of a person's wage (w) would mean that her total commission payments $t = z \times w$. The total commission payments by an individual who is required to contribute a fraction (ss) of her wage, subject to a commission (cc) on her contribution would be $t = ss \times w \times cc$. This means that one can extract the effective commission fee (cc) by noticing that $cc = z \times w / (ss \times w)$.

9. This section relies heavily on Espinosa-Vega and Russell (1999). Readers should consult that companion article for a fuller understanding of the issues.

TABLE 1.1 Equivalence of Commissions (Percentage of Wages)

Fund	One Year	Two Years	Five Years	Ten Years	Twenty Years
Banamex	1.70	1.70	1.69	1.65	1.58
Bancomer	1.68	1.68	1.66	1.65	1.64
Bancrecer	1.60	1.60	1.60	1.57	1.51
Banorte	1.16	1.18	1.23	1.29	1.44
Bital	1.68	1.68	1.68	1.64	1.61
Garante	1.68	1.68	1.68	1.68	1.68
Génesis	1.65	1.65	1.65	1.65	1.65
Inbursa	0.36	0.43	0.64	1.00	1.73
Principal	1.43	1.43	1.44	1.44	1.41
Profuturo	1.75	1.76	1.79	1.84	1.95
Santander	1.81	1.82	1.86	1.98	2.19
Siglo XXI	1.52	1.53	1.54	1.56	1.60
Tepeyac	1.28	1.30	1.34	1.47	1.69
Zurich	1.09	1.09	1.14	1.19	1.14

Source: CON SAR (1999)

Clearly, though, this approach would place an unbearable burden on current workers. An alternative would be to issue debt to pay off the current retirees at the time of the reform and then retire the debt, through time, by taxing the current and future workers for a number of years. Under either scenario, the government's actions at the beginning of the transition process would be the same. Bonds must be issued to obtain funds needed for social security payments to current and near-future retirees.

The actions that will distinguish a transition to a fully funded system from a transition to a pay-as-you-go system of the bond/tax-or-transfer type will occur in the future. If the government switches to a fully funded system, then over the next few generations it must collect enough revenue, via new taxes, to retire the aforementioned bonds. If it is switching to a pay-as-you-go, bond/tax-or-transfer system, however, then it may not have to change its total social security tax collections because it will roll the bonds over indefinitely without retiring any of them.¹⁰

How can it be known today whether the Mexican government will retire the bonds in the future? That is to say, how can the government's intentions to switch to a fully funded social security system be known at this point? Although the government has announced that it does plan to switch to a fully funded system, it has not announced any plans to

increase future taxes and it has not announced any schedule for retiring the bonds. Even if the government did make such announcements, how credible would they be? Future Mexican governments might feel free to ignore them, either by explicitly reversing the decision to retire the debt or by postponing the beginning of the debt-retirement process. Future governments would have plenty of incentive to not follow through. Beginning the bond-retirement process would require increasing taxes, a move likely to be opposed by the voting public.

Viewed in this light, there are good reasons to question the likelihood of Mexico's ultimate success in switching to a fully funded social security system as well as the motivations for the reform. On the one hand, the government may wish to get the credit for initiating a switch to a fully funded system—a system, which, in the view of most economists, would be better for Mexico in the long run. On the other hand, the government may be slow to take any concrete steps to begin the transition to such a system because, as mentioned above, they would be politically costly in the short run.¹¹ It seems more likely, then, that the switch will turn out to be one from a tax-transfer pay-as-you-go system to a bond-based pay-as-you-go system.

Why Change Systems? A switch of this sort may have some significant economic effects, but perhaps,

more importantly, it creates the appearance of reform. It does so in several different ways. First, since switching to a bond-based system could (but does not necessarily) represent the very first step in a transition to a fully funded system, this switch allows the government to claim that it has begun the transition process. Second, the switch to a bond-based system allows the government to privatize a number of aspects of the administration of the social security system—a step that might have some benefits in its own right and that many people are likely to misinterpret as representing more effectual reform. Third, all the idiosyncratic features of the old system discussed above represent economic distortions for the decisions of firms and workers in the system. And, as mentioned earlier, other than demographics, it is these idiosyncratic features that would have contributed to the actuarial imbalance of the Mexican pay-as-you-go system. The adoption of a pay-as-you-go system does not require indexing benefits against inflation while leaving contributions unchanged, awkward qualification criteria (lax eligibility requirements), or allowing the government to use the system as an outright source of government revenue. Elimination of these features could go a long way in improving the operation of the old pay-as-you-go system and solving its actuarial imbalance problems.

Asymmetric Indexation and the Admission Fee. Indexing benefits against inflation while leaving contributions unchanged insulates social security recipients, but it represents higher taxes in other sectors or a higher government deficit. This asymmetric indexation became a serious problem when inflation rose to triple digits in 1994–95. This problem will be avoided by the move to defined contributions.

As discussed above, the low admission fee under the old system created the incentive to stop pension contributions altogether after the initial 500 weeks required for becoming eligible for retirement benefits. There is also clear evidence that many employers understated the wage rate of workers just to avoid paying the payroll tax. Under this admission scheme, contributing workers in the formal sector subsidized those in the informal sector that had stopped contributing once they had paid their low admission fee. Under the new system, a minimum twenty-five year contribution is required to qualify for any benefits, and at retirement a worker gets the market return to his contributions. This tightening of the eligibility requirements will eliminate the

strain that the old requirements had on the IMSS pension accounts.

Management Fees. The new system introduces a feature only implicit in the old system: transaction costs (or commissions) imposed by AFOREs on their contributors. It is not straightforward to compare the transaction fees charged by the different AFOREs. However, careful review (see Sinha 1999a) reveals that most charges (by private pension companies in other Latin American countries) are in the order of 20–25 percent of contributions—ten times higher than charges in defined-contribution plans of Singapore or Malaysia. The usual defense offered by proponents of Mexico's system has been that (1) Chile has a similar cost structure and (2) mutual funds in the United States have similar cost structures. In fact, CONSAR has recently used the data in Table 12 to argue that the commission in Mexico is on the average lower than in other Latin American countries, a claim originally made by Solís-Soberón (1997).

There are potential problems with reaching such a conclusion, however, as comparing Chile and Mexico's commission structures illustrates. Table 12 states commission as a percentage of covered pay, not as a percentage of contribution. In Chile each worker contributes 10 percent of the salary into the system whereas in Mexico the contribution is only 6.5 percent of salary. Thus, as a percentage of contribution, average charges in Mexico would be more than 29 percent ($1.919/6.5$) while in Chile it is under 23 percent ($2.291/10$). Another factor is that the government contribution to the system has been ignored. It is difficult to evaluate the government contribution because it varies with the wage rate of the worker. For an average worker earning three times the minimum salary, it amounts to 1.83 percent of the salary. If that factor is added to 6.5 percent, the total is 8.33 percent. Computed this way, the commission charges amount to 23 percent ($1.919/8.33$), exactly the same as charges imposed in Chile. This complexity illustrates the need for a careful review of the claim that Mexico has managed to reduce the charges that Chile could not.

In contrasting transaction costs of pensions in Mexico with those charged by mutual funds in the United States, the following has to be considered. First, charges for the majority of mutual funds in the United States are on the order of 10 percent (of contribution) and not 25 percent (see Mitchell

10. The government will have to pay the interest on the bonds, but it can do so without increasing its social security tax collections.

11. Cooley and Soares (1999) discuss how a pay-as-you-go system may in fact represent the rational politico-economic outcome in a democratic regime.

TABLE 12
Commission Structure Comparison

Country	Percent of Covered Pay
Argentina	2.410
Chile	2.291
Mexico	1.919
Peru	2.294
Uruguay	2.070

Source: Solís-Soberón (1997)

1996). In fact, there are mutual funds that charge 1 percent or less. Second, unlike in the case of mutual funds, in Mexico (as in Chile) membership in an AFORE is compulsory. Thus, even if the transaction costs were the same, comparing the two would be like comparing apples and oranges.

The most pertinent question for this discussion concerns how the transaction costs under the new system compare with costs under the old pay-as-you-go system. Under the old system, administrative costs (the analog of transaction costs) as a percentage of total social security expenditures hovered around 17 percent in the 1980s for Mexico (International Labor Organization 1991). As mentioned above, on average the current transaction cost is around 24 percent, implying a cost increase of roughly 7 percent.

It appears that, at least for the time being, AFORES are acting as bookkeeping entities with few true portfolio manager functions. As mentioned above, only a very small fraction of Mexican private debt meets CONSAR's eligibility requirements. As is clear in Table 11, the 35 percent ceiling that an AFORE is allowed to hold in the form of private debt is far from binding. In this context, it might make sense for the government to solicit bids and choose the single bookkeeper charging the lowest management fee. While a monopoly in the private management of widely diversified pension portfolios is not desirable, a monopoly in bookkeeping may very well be, as Bolivia's experience demonstrates. Bolivia awarded a monopoly right to an international consortium to manage its pension system.¹² The commission charges are 0.5 percent of average salary (10.5 percent of salary for retirement and 2 percent for life insurance).¹³ In contrast, under the Mexican system, the average charges are 1.6 percent of salary with only 6.5 percent going into the retirement fund. In addition, in Bolivia the disability and death insurance payment is equal to 4 percent of salary.

A potential justification for leaving bookkeeping and portfolio management together in the AFORES could be that the AFORES will be active when CONSAR relaxes its portfolio restrictions. The problem with this justification is that separating bookkeepers and fund managers may be more efficient even under these conditions. The best bookkeepers may not be the best managers of a wider-spectrum portfolio.

The Replacement Rate. It is also important to recognize that because of differences in how the replacement rate is determined—under the new system it will be market-determined—contrasting alternative replacement rate projections under the new system against the replacement rate under the old system will be challenging. The ultimate concern, of course, is whether the new replacement rate will represent an improvement for future retirees. A complete answer requires a sophisticated analysis. The replacement rate under the new regime is the endogenous result of changes in factors such as wage levels (because the value of the social quota depends on the level of wages; that is, a low-wage earner gets a relatively high social quota), real interest rates, mortality rates (because mortality rates are going to change over the next sixty years), the discount rate at which the whole life annuity is calculated, and commissions (for example, some commissions depend on the inflation rate, as for one company that does not charge if there are no gains in real terms).

Table 13 illustrates the sensitivity of the replacement rate to alternative economic scenarios. It reports the resulting replacement rates, other things being equal, under alternative real rates of return of AFORES' portfolios. These simulations are subject to criticism on a number of grounds. Among other things, they take a flat lifetime wage profile, assume a flat interest rate profile with zero inflation rates, take mortality projections from United Nations (1998), and assume that commissions stay put. However, the simulations suffice to focus attention on the sensitivity of the replacement rate to the relevant economic variables.

Table 13 also has calculations of replacement rates under different scenarios when three elements are altered: (1) The replacement rate is calculated with different real rates of return. However, the effects of inflation are not taken into account, and since earnings of managed funds depend on the nominal interest rate, inflation would have an impact. (2) For each panel of the table, the wage rate varies. Wage rates are expressed as multiples of the minimum wage. So calculations are made with one, two, three, four, five, six, and ten multiples of minimum wages. (3) The number of years in the labor force also varies (from

TABLE 13 Replacement-Rate Calculations for Whole Life Annuity Starting at Age 65^a

Time (Years)	Salary in Times Minimum Wage						
	1	2	3	4	5	6	10
Real Rate of Return, 3 Percent; Real Wage Growth Rate, 0 Percent							
5	3.53	2.63	2.32	2.17	2.08	2.02	1.90
10	7.41	5.51	4.87	4.56	4.37	4.24	3.99
15	11.83	8.79	7.78	7.28	6.97	6.77	6.37
20	16.85	12.53	11.09	10.37	9.94	9.65	9.07
25	22.54	16.76	14.84	13.87	13.30	12.91	12.14
30	29.01	21.57	19.09	17.85	17.11	16.61	15.62
35	36.35	27.03	23.92	22.37	21.44	20.82	19.57
40	44.69	33.23	29.41	27.50	26.36	25.59	24.06
45	54.17	40.28	35.65	33.33	31.94	31.02	29.16
Real Rate of Return, 10 Percent; Real Wage Growth Rate, 0 Percent							
5	4.20	3.12	2.76	2.58	2.47	2.40	2.26
10	10.55	7.84	6.94	6.49	6.22	6.04	5.67
15	20.51	15.24	13.48	12.61	12.08	11.73	11.03
20	36.09	26.82	23.73	22.18	21.25	20.64	19.40
25	60.49	44.94	39.75	37.16	35.61	34.57	32.50
30	98.74	73.33	64.87	60.63	58.09	56.40	53.01
35	158.78	117.89	104.27	97.45	93.36	90.64	85.19
40	253.13	187.90	166.16	155.28	148.76	144.41	135.72
45	401.56	298.00	263.48	246.22	235.86	228.96	215.15

^a Calculated with a flat lifetime wage profile and no consideration of inflation.

Source: Sinha (1999b)

five to forty-five years). Note that the wage profile does not vary; the wage rate for every year in the labor force is assumed to be the same.

Consider, for example, the first entry of the top panel of the table—3.53 percent. A person earning the minimum wage for five years and retiring at the age of 65 will get 3.53 percent of his or her wage replaced if he or she earns one minimum wage. Each entry has two other elements built into it. One is the assumption about the real interest rate that an annuity would earn. The other is the (conditional) mortality rate of the population (after retiring at 65). The 3.53 percent results from calculating the replacement rate that would be the average of the rates obtained under each of the seventeen AFORES. Therefore, each calculation explicitly takes into account management or commission fees.

For understanding the significance of the different replacement rates, it is helpful to compare these replacement rates to the U.S. average. For instance, in the United States in 1998 the average wage was around \$28,000. The retirement benefit after forty-three years of service was \$11,256. This amounts, roughly, to a 40 percent (11,256/28,000) replacement rate. In Mexico, the average salary is slightly more than three times minimum salary. In U.S. dollars, this amount is around \$10 a day. Thus, under the scenario with 3 percent real rate of return, to get a replacement rate of 40 percent the average worker has to work for more than forty-five years. Under the assumption of a 10 percent real rate of return, the 40 percent replacement rate can be achieved in twenty-five years.

12. The consortium consists of Banco Bilbao Vizcaya S.A. and Invesco-Argentaria.

13. See von Gersdorff (1997) for a summary of the Bolivian system.

How does the new system compare with the old in terms of replacement rates? For a person earning one minimum salary, under the old system a 100 percent replacement could be had in ten years (Table 2). Under the new system, if the real rate of return is 3 percent, a person with one minimum salary after forty-five years of service would be able to achieve only a 54.17 percent replacement rate. With a real rate of return of 10 percent, the same person after thirty years of service will get 98.74 percent of the salary replaced. Only if a worker stayed in the labor force for at least thirty-five years and the rate of return was high (10 percent or more) would the retirement benefits under the new system be higher (for almost all wage levels) than those under the old system. One other important observation is that for low-income workers the replacement rate is always higher than for high-income workers. The reason is that as a percentage of income the social quota is financially more important for low-income workers.

What Are the Net Gains from Switching across Pay-As-You-Go Pension Systems in Mexico?

The last section identified some of the potential gains and costs of the reform. However, what needs to be established are the net gains or overall effects on well-being for current and transitional retirees as well as for future generations of Mexican citizens. Economic outcomes are the result of complex simultaneous interactions among different economic variables in both the short and long runs. To say, for example, that the government contributes a “cuota social” to the retirement fund of a worker (as is currently the case under the reform) is to say that the government commits to borrowing or taxing in the future (from either the same or future generation of workers) to meet the obligation of an accounting entry. Thus, contrasting the well-being of Mexican citizens under the alternative pay-as-you-go systems would require a sophisticated analysis. At a minimum, the analysis should recognize the intertemporal nature of individuals’ decision making, that individuals’ expectations are based on all available information, including government policies, and that economic variables interact with one another. Thus, to determine the consequences of a reform, one must consider saving decisions, taxing, and government debt policies simultaneously—a general equilibrium framework.

The following example illustrates how such an approach could make a difference. De Nardi, Imrohoroglu, and Sargent (1999) look at the effects of projected U.S. demographics on its current pay-as-you-go system. They use projected increases in the dependency ratio and analyze the economic

consequences of several alternative fiscal adjustment packages. One of their experiments consists of leaving the social security system unfunded (perhaps an analog of the Mexican case). They conclude that back-of-the-envelope accounting calculations made outside a general equilibrium framework differ significantly from those obtained in a general equilibrium context. One may therefore wonder about the accuracy of the projected actuarial imbalances—discussed earlier—arising from sticking to the old Mexican pension system.

Another finding in De Nardi, Imrohoroglu, and Sargent is that even when a country sticks to a pay-as-you-go system, “reducing retirement benefits through taxation of benefits and consumption or through postponing the retirement eligibility age results in a significant reduction of the fiscal adjustment necessary to cope with the aging of the population” (1999, 578). As discussed above, under the new Mexican system, there is a new minimum twenty-five year contribution required to qualify for any benefits. This regulation amounts to a reduction of retirement benefits. Also, as discussed above, the Mexican reform may not represent a departure from its pay-as-you-go system. Thus, just as in the comparisons performed in De Nardi, Imrohoroglu, and Sargent, the relevant comparison in Mexico may be across two pay-as-you-go regimes rather than between a pay-as-you-go and a fully funded system. Because that is the case, the relevant analysis would, for example, have to contrast the net benefits of maintaining a pay-as-you-go system while changing the minimum contribution requirement from ten to twenty-five years and introducing the cuota social and other features of the new system reviewed above. It would not be surprising if, just as in De Nardi, Imrohoroglu, and Sargent, a reduction of retirement benefits resulted in a significant reduction of the adjustments necessary to cope with the aging of the population in Mexico. However, De Nardi, Imrohoroglu, and Sargent’s findings are specific to the structure and parameters of the U.S. economy, and it seems essential to perform the same experiment for the specific parameters of the Mexican economy. To date, there has not been a general equilibrium analysis of the net benefits of modifying the pay-as-you-go system in Mexico. Thus the answer to the question of what the net gains of a modified pay-as-you-go system might be is that nobody knows.

What Are the Net Gains from Switching to a Fully Funded Pension System?

As discussed above as well as more thoroughly in Espinosa-Vega and Russell (1999), the theoretical literature suggests that, with

Comparison of Mexico's Pay-As-You-Go and Reformed Old-Age Security Systems

Area	Pay-As-You-Go	Reformed
Institutional responsibilities:		
Old age and severance (RCV)	IMSS	New entrant picks AFORES or IMSS retirement (transition generation only)
Disability and life insurance (IV)	IMSS	IMSS
Contributions (percent of wage) ^a :		
Contribution by employer and employee	10.075	10.075
Government contribution	0.425	2.425
Eligibility requirements:		
Old age	500 weeks' (10 years') contribution; 65 years old	25 years' contribution; 65 years old
Severance	500 weeks' contribution; 60 years old	25 years' contribution; 60 years old
Old age: Withdrawals ^b		Gradual withdrawals from individual account in AFORE, ^c or annuity bought from an insurance company
Minimum pension guarantee (MPG)	Equivalent to one Mexico City minimum-wage level indexed to actual minimum wage	Equivalent to one Mexico City minimum wage on 7/1/97 indexed to the CPI ^d

^a Under IVCM, contributions could not exceed ten times the minimum wage, and under the new system the limit is twenty-five times. The column listing the after-reform structure includes Life and Disability Assurance.

^b Lump withdrawal at retirement permitted only for balances in excess of 130 percent of the cost of an annuity equal to the minimum pension guarantee (MPG).

^c Only gradual withdrawals are allowed in order to reduce the risk that recipients will outlive their accumulated balances.

^d Currently average wage for IMSS affiliates is 2.6 minimum wages; thus MPG is approximately 38 percent of average wage.

Sources: Grandolini and Cerda (1998) and Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca (1998)

some qualifications, moving to a fully funded system or abolishing a pension system altogether should improve the well-being of society at large. The qualifications include a country having a dynamically efficient economy and the absence of any significant imperfections in capital and labor markets. A number of students of pension systems agree with Abel and others (1989) that the U.S. economy is dynamically efficient but acknowledge that the United States may experience some potentially significant market failures. Huang, Imrohroglu, and Sargent (1997) start by explicitly incorporating what is generally considered a standard market failure. In their model, there are uninsurable uncertainties about lifetimes and labor income. This type of market failure has indeed been used to justify pay-as-you-go social security systems.

Huang, Imrohroglu, and Sargent perform two experiments similar to the actions some analysts claim Mexico has started to take. In the first, the government eliminates its pay-as-you-go system, issuing a large quantity of bonds to buy out the transitional generation of retirees. At the same time, the government raises labor income taxes for the next forty years in order to pay back this debt (this tax represents the transition cost). The second experiment is motivated by some recent proposals in the United States that call for investing the current social security surpluses in the stock market. In their second experiment, the government raises labor income taxes. And the proceeds are used to acquire equity. Future retirement benefits are then paid out of the returns to this equity. The advantage of adopting this government-sanctioned fully funded scheme is that it allows the government to redistribute benefits to those citizens who because of, for example, extended layoff periods were unable to accumulate enough savings for their retirement or those citizens who outlived their retirement benefits. They show that in the long run, the second experiment provides the larger net gain. While the study was performed for the U.S. economy parameters (and, as the authors note, there are a number of directions in which it could be improved), its importance for Mexico consists of recognizing that the size of the net gains is itself a function of key features of the economy, including the specific type of market failures in place (such as the large size of the informal sector in Mexico). For example, a common theme throughout most analyses of Mexico's reform is the expected migration from the informal to the formal sector of the economy. In order to understand the impact of the reform on the informal-sector workers' decisions to migrate, one has to endogenize informality. Stated differently, there is no clear idea of the

sensitivity of workers' decisions about where to work and the role of changes in payroll taxes associated with alternative pension schemes in those decisions. Neither is it clear how workers' decisions about migrating in turn affect the ultimate impact of government policies in the economy.

At the same time, it may be of significant relevance where the revenues needed to pay for the transition come from. The macroeconomic implications of either taxing wage income or issuing government debt to finance the transition from a pay-as-you-go to a fully funded system may be quite different from each other. Also, it is important to specify the timing and the type of tax to be used to finance the deficit that arises from financing the reform; otherwise, the analysis will be at best incomplete.

Serrano (1999b) attempts to estimate the net benefits of switching to a funded system in Mexico in the context of a general equilibrium analysis.¹⁴ He finds that the gains from doing so significantly outweigh the present value of the transition costs, which in his worst-case scenario represent 59.3 percent of 1997 GDP. Should CON SAR view Serrano's work as their endorsement to press ahead with a reform to a fully funded pension in Mexico? In an effort to answer this question, it is important to outline Serrano's study. As in Huang, Imrohroglu, and Sargent (1997), Serrano incorporates a market failure in his analysis. The market failure consists of a minimum-denomination restriction in the formal financial intermediation sector under the pay-as-you-go system. That is, he assumes that when such a pension system is in operation, poor savers are unable to participate in the formal banking sector. In his analysis, once a fully funded system is adopted, these poor savers will have access to the formal financial system. In his words, "Our thesis is that many poor workers will obtain access to the formal financial system through the privatized social security system. . . . The introduction of an obligatory FF [fully funded] system may give these people access to the financial system (1999b, 3)." In other words, adopting a fully funded system would have the same benefits, in his analysis, as eliminating the minimum-denomination restriction in the formal banking sector. The question, of course, would be why the poor savers did not have access to the formal financial system in the first place. The answer may be that the low level of savings by the poor was insufficient to justify the necessary maintenance or transaction costs incurred by financial intermediaries when opening a new account. If this is the case, what leads Serrano to believe that things would be different under a fully funded system? The government could, of course, subsidize these transaction

costs, but it could do that regardless of the pension system in place. In addition, the overall impact of such subsidies would have to be carefully analyzed.

It is also true that a large number of poor savers are part of the informal labor market. A government-sanctioned fully funded system is relevant to them only if they migrate to the formal labor market. Serrano would have to explain why such a pension system would lead to migration to the formal sector. Following the steps of Serrano's analysis, one cannot disentangle where the gains come from. Do they come from eliminating the market failure, or do they come from switching from a pay-as-you-go to a fully funded system? In short, it seems best to think of Serrano's work as a work in progress.

Another important point to note is that Serrano's estimate of the transition cost (59.3 percent of 1997 GDP) serves as a reminder that even when there are net gains from switching to a funded system the transition imposes a hefty cost on any society. Agreeing to when and how to pay for it would be the subject of difficult political discourse. It is no coincidence that while there are other estimates of the transition costs, there is no mention (other than Serrano's) about when and how such costs would be taken care of.

In addition to Serrano (1999b), other articles estimate the transition cost. By the authors' own admission, these estimates are far from perfect; for example, Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca acknowledge that their model "is a partial equilibrium framework that treats relevant macroeconomic variables as given" (1998, 158). Partial equilibrium estimates may drastically err in either direction, as discussed above and shown by De Nardi, Imrohoroglu, and Sargent (1999). For completeness, this discussion includes transition costs estimates by Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca (1998) and Grandolini and Cerda (1998) with a reminder that these costs are only part of the information needed for estimating the net gains of the reform.

Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca (1998) and Grandolini and Cerda (1998) acknowledge that moving away from the old pay-as-you-go system will impose on the Mexican economy two types of costs with certainty and another two potential costs. First, the government has to pay the so-called social quota to every participant, and that payout affects the government deficit. As can be seen in the box, this amount on average equals an additional 2 percent of wages. Second, since all contributions of private-sector

workers went to AFOREs starting September 1, 1997, one has to consider the resources necessary to provide payments to pensioners existing prior to that date.

The first group of retirees under the new system will emerge in about twenty-five years. What exactly will they get? There are two possible scenarios. In the first, if the funds in the individual's account at retirement do not exceed an annual income stream equivalent to one minimum wage for the actuarial remainder of his life, then the government will guarantee benefits equivalent to one minimum wage for the duration. This approach may affect the government deficit. In the second scenario, if the individual's account exceeds an annual income stream equivalent to one minimum wage for the actuarial remainder of the worker's life, he or she can choose between withdrawing funds on a monthly basis or purchasing a lifetime private contingent annuity. Under this scenario there is no impact on the deficit. Transition workers have a pension-guaranteed switch option. At retirement, they will be able to choose between their benefits under the old or the new system. Their choices may have an impact on the government deficit.

Grandolini and Cerda (1998, table 11, 24) report the fiscal cost of the transition as calculated by the Ministry of Finance (Secretaría de Hacienda y Crédito Público, or SHCP). The present value of the total cost of the transition from 1997 to 2024, as a fraction of 1994 GDP, is 17.76 percent. Sales-Sarrapy, Solís-Soberón, and Villagómez-Amezcuca (1998) compute the fiscal deficit arising from the compensation to current pensioners and transition workers from 1997 to 2047 under the new social security scheme. For this period, they estimate that the total cost of the transition would be 82.6 percent of GDP.

After 2047 (the year most transitional workers cease to exist) the only social security cost for the government would be the social quota. If, as estimated in Grandolini and Cerda (1998), this cost were less than 0.1 percent of GDP after 2025, the total social quota cost from 2047 to 2058 would be about 1.1 percent of GDP. Based on the computations presented earlier, the highest estimated cost of the transition from 1997 to 2047 would be 82.6 percent of GDP. Thus, in the worst-case scenario the cost of the transition from 1997 to 2058 would be roughly 84 percent of GDP (1.1 percent plus 82.6 percent).

The message from these computations seems to be that given the fiscal cost savings—even for the worst-case scenario, the reform represents a

14. As of this writing, Serrano's is apparently the only study of its kind.

44 percent savings over the estimated 141 percent of GDP cost of holding on to the status quo—the country should press ahead with the transition to a funded system.

But is this interpretation of these estimates correct? First, as mentioned earlier, detailed attention needs to be given to the different assumptions regarding the type and time of taxes necessary to pay for the transition cost as well as other assumptions about the relevant market imperfections and redistributive considerations. Second, as the discussion above implies, it may be that at best the studies represent estimates of the cost of changing between types of pay-as-you-go systems and not of transitioning to a fully funded system. Since both the estimates of the cost of maintaining the status quo and transitioning to a funded system are partial equilibrium estimates, it is hard to place confidence in them. Finally, in order to evaluate the desirability of either changing the form of the pay-as-you-go system or moving to a fully funded system, it is important to emphasize that what matters is the net benefit of the change in pension system. General equilibrium analyses modeling Mexican unique features are essential if comparative policy analysis is going to be meaningful. Informality in the labor market of the economy and emerging financial markets are two examples of such features that must be accounted for. In closing, on the basis of the information reviewed here, it seems safe to say that nobody really knows what the net gains from switching to a fully funded system might be.

Conclusion

This article describes some of the factors that if left unchanged very likely would have led to an actuarial imbalance of the Mexican pension system in the near term. This article contends that after reviewing the key aspects of the new pension system, one cannot tell whether the government intends to switch to a fully funded social security system. An interesting question is whether the Mexican public believes the government will carry out such a switch. If the public believes a gen-

uine transition will begin in the future, then they will expect interest rates to be lower in the future: stated differently, the public will begin to view current interest rates as above their long-run levels. This situation should cause them to increase their saving to take advantage of the temporarily high level of interest rates. As they do, the level of private saving should begin to rise and the level of market interest rates should begin to fall.

Unfortunately, the more gradual the public expects the transition to a fully funded system to be, the smaller the expectational effect on saving and interest rates is likely to be. Since Mexico's current financial and political situation would seem to favor a very gradual transition, the effect might not be large enough to be identified easily. It might take many years, or even a generation or more, for the effect on saving and interest rates to be noticeable.

If the conjecture in this article and in Espinosa-Vega and Russell (1999) is correct, the current pension reform is another pay-as-you-go system. It would be interesting, then, to try to estimate the net gains from the switch from the old pay-as-you-go system to a new version of it. Unfortunately, to date there are no solid studies with such estimates. More research is needed to better assess how the impending demographic changes and the changes in the eligibility criteria, the replacement rate, and other aspects of the new system will affect the country's overall economic welfare.

The commitment to switch to a fully funded system is not trivial. It requires decisions about how and when to pay for hefty transition costs. Unfortunately, while there are a number of studies about the effects of switching to a fully funded pension system for the United States, there is little solid information for Mexico. Mexico is in dire need of further research to guide it through its decision on whether and how to switch to a fully funded pension system.

It must be said that Mexico is not alone in this respect. Mexico's experience should be viewed as an illustration of the difficulties in assessing the net benefits of a pension reform.

REFERENCES

- ABEL, ANDREW B., N. GREGORY MANKIW, LAWRENCE H. SUMMERS, AND RICHARD J. ZECKHAUSER. 1989. "Assessing Dynamic Efficiency: Theory and Evidence." *Review of Economic Studies* 56:1-20.
- BANCO DE MEXICO. 1996, 1997. "The Mexican Economy." <<http://www.banxico.org.mx/gPublicaciones/FSPublicaciones.html>>.

- CONSAR. 1997. "Circular CONSAR 15-1." *Diario Oficial de la Federacion*, June 30.
- . 1999. <<http://www.consar.gob.mx>>.
- COOLEY, THOMAS F., AND JORGE SOARES. 1999. "Social Security Based on Reputation." *Journal of Political Economy* 107 (February): 135-60.

- DE NARDI, MARIACRISTINA, SELAHATTIN IMROHORGLU, AND THOMAS J. SARGENT. 1999. "Projected U.S. Demographics and Social Security." *Review of Economic Dynamics* 2 (July 1999): 575–615.
- DIAMOND, PETER A. 1965. "Government Debt in a Neoclassical Growth Model." *American Economic Review* 55:1126–50.
- . 1998. "The Economics of Social Security Reform." National Bureau of Economic Research Working Paper no. 6719, September.
- ESPINOSA-VEGA, MARCO A., AND STEVEN RUSSELL. 1999. "Fully Funded Social Security: Now You See It, Now You Don't?" Federal Reserve Bank of Atlanta *Economic Review* 84 (Fourth Quarter): 16–25.
- FELDSTEIN, MARTIN S. 1974. "Social Security, Induced Retirement, and Aggregate Capital Accumulation." *Journal of Political Economy* 82 (September/October): 905–26.
- GRANDOLINI, GLORIA, AND LUIS CERDA. 1998. "The 1997 Pension Reform in Mexico." World Bank Policy Research Working Paper no. 1933, June.
- HUANG, HE, SELAHATTIN IMROHORGLU, AND THOMAS J. SARGENT. 1997. "Two Computations to Fund Social Security." *Macroeconomic Dynamics* 1, no. 1:7–44.
- IMROHORGLU, AYSE, SELAHATTIN IMROHORGLU, AND DOUGLAS JOINES. 1995. "A Life Cycle Analysis of Social Security." *Economic Theory* 6, 83–114.
- IMSS (Instituto Mexicano del Seguro Social). 1997. *La Seguridad Social ante el Futuro*. Mexico.
- INTERNATIONAL LABOR ORGANIZATION. 1991. "The Cost of Social Security." Geneva, March.
- JUDISMAN, CLARA. 1997. "La Informalidad en Mexico: Características y Tendencias." Secretaria del Trabajo. Unpublished document.
- KOTLIKOFF, LAURENCE J. 1996. "Privatization of Social Security: How It Works and Why It Matters." National Bureau of Economic Research Working Paper no. 5330, October.
- MITCHELL, OLIVIA S. 1996. "Administrative Costs in Public and Private Retirement Systems." National Bureau of Economic Research Working Paper no. 5734, August.
- ORSZAG, PETER R., AND JOSEPH E. STIGLITZ. 1999. "Rethinking Pension Reform: Ten Myths about Social Security Systems." World Bank Conference on New Ideas about Old-Age Security. September 14–15, 1999. Washington, D.C.: World Bank.
- QUEISSER, MONIKA. 1998. "The Second Generation Pension Reforms in Latin America." Development Centre Studies, Organisation for Economic Cooperation and Development, Paris.
- RODRIGUEZ, L. JACOBO. 1999. "In Praise and Criticism of Mexico's Pension Reform." *Cato Institute Policy Analysis*, no. 340, April 14.
- SALES-SARRAPY, CARLOS, FERNANDO SOLÍS-SOBERÓN, AND ALEJANDRO VILLAGÓMEZ-AMEZCUA. 1998. "Pension System Reform: The Mexican Case." In *Privatizing Social Security*, edited by Martin Feldstein. Chicago: University of Chicago Press.
- SCHWARZ, ANITA M., AND ASLI DEMIRGUC-KUNT. 1999. "Taking Stock of Pension Reforms around the World." World Bank. Unpublished paper. May.
- SERRANO, CARLOS. 1999a. "Social Security Reform—How Much Will It Cost and Who Will Pay for It: The Mexican Case." World Bank. Unpublished paper.
- . 1999b. "Social Security Reform, Income Distribution, Fiscal Policy, and Capital Accumulation." World Bank. Unpublished paper.
- SINHA, TAPEN. 1999a. "Lessons from Privatization of Pension Plans." Paper presented at the Canadian Institute of Actuaries special conference on retirement.
- . 1999b. "We Are Not in Kansas Anymore: Risks of Privatizing Pension." Instituto Tecnológico Autónomo de México. Unpublished paper.
- . Forthcoming. *Privatization of Social Security in Latin America*. Norwell, Mass.: Kluwer Academic Publishers.
- SINHA, TAPEN, FELIPE MARTINEZ, AND CONSTANZA BARRIOS-MUÑOZ. 1999. "Publicly Mandated Privately Managed Pension in Mexico: Simulations with Transactions Cost." Society of Actuaries, *Actuarial Research Clearing House*, no. 1:323–54.
- SINN, HANS-WERNER. 2000. "Why a Funded Pension System Is Useful and Why It Is Not Useful." National Bureau of Economic Research Working Paper no. W-7592, March.
- SOLÍS SOBERÓN, FERNANDO. 1997. "Análisis comparativo de las comisiones que cobrarán las AFORES." CONSAR. Unpublished paper.
- UNITED NATIONS. 1998. *Demographic Bulletin*. Santiago, Chile, July.
- VAN GINNEKEN, WOUTER. 1998. "Social Security for the Informal Sector: Investigating the Feasibility of Pilot Projects in Benin, India, El Salvador, and Tanzania." Issues in Social Protection Discussion Paper No. 5. Social Security Department, International Labor Office, Geneva, Switzerland.
- VON GERSDORFF, HERMANN. 1997. "Pension Reform in Bolivia: Innovative Solutions to Common Problems." World Bank Policy Research Working Paper no. 1832, September.
- WORLD BANK. 1994. *Averting Old Age Crisis*. New York: Oxford University Press.
- . 2000. "Understanding and Responding to Poverty." <<http://www.worldbank.org/poverty/mission/up1.htm>> (April 4).