Published in final edited form as:

Lat Am Policy. 2014 December ; 5(2): 331–350. doi:10.1111/lamp.12051.

How Do Management Fees Affect Retirement Wealth under Mexico's Personal Retirement Accounts System?

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Abstract

In 1997, Mexico transformed its pay-as-you-go social security system to a fully funded system with personal retirement accounts, including management fees. This article examines changes in retirement wealth resulting from this new system. It shows that management fees have drained a significant proportion of individuals' retirement wealth and have increased the number of persons claiming a government-subsidized minimum pension, particularly from the time the system was introduced in 1997 until adjustment to management fees in 2008. Since 2008, retirement wealth accumulation has been similar to that of the previous system.

En 1997, México transformó su sistema de pensiones basado en cotizaciones individuales a uno de ahorro para el retiro que incluyen cuotas por la administración de las cuentas. El presente estudio examina los cambios en el monto de las pensiones como resultado de la introducción del nuevo sistema. Los resultados muestran que las cuotas de administración han drenado una proporción significativa del ahorro para el retiro de los individuos por lo que ha aumentado el número de personas que solicita la pensión mínima garantizada subsidiada por el gobierno desde que se introdujo el sistema en 1997 hasta que se hicieron ajustes en las cuotas de administración de los fondos de pensiones en 2008. A partir de 2008, la acumulación del ahorro para el retiro ha sido similar que la del sistema anterior.

Keywords

retirement wealth accumulation; retirement fund management fees; social security reform; Mexico

Introduction

To expand coverage of pension systems to more persons and contain the costs of doing so, many countries are contemplating or have already enacted pension reforms. In 1997, Mexico reformed its pay-as-you-go (PAYG) social security system to a fully funded, personal retirement accounts (PRAs) system. Such systems are increasingly replacing PAYG systems throughout the world because they are considered more financially sustainable. This is particularly important in Mexico where, according to the National Council for the Evaluation of Social Development Policy (CONEVAL), in 2012 approximately 45.8% of the people at least 65 years old were in poverty and 26.5% lacked access to social security (CONEVAL, 2013).¹

This article compares how Mexican workers fare on accumulated pension wealth in the old PAYG and the new PRA systems. It pays particular attention to how PRA system fees have affected retirement wealth accumulation. It uses administrative data from the Mexican National Commission for the Pension System (CONSAR), the regulatory agency of the PRA system, to simulate retirement wealth under the rules of the PRA system and the previous PAYG system, from before and after the 2008 reform to the fees structure. Examining experiences with PRA schemes in other countries can help policymakers determine whether this option is appropriate for their country and, if so, help them avoid some pitfalls of previous implementations.

The PRA design in Mexico rests on three pillars: (1) a minimum pension guarantee by the government, (2) PRAs managed by private retirement fund managers, and (3) voluntary retirement saving accounts with tax advantages such as those available in the United States through 401(k) plans and individual retirement accounts. Whereas the previous PAYG system made the government bear all risk, Mexico's PRA system distributes risk more broadly. The government bears the risk for the first pillar, the minimum pension guarantee, but employees bear risks for the second and third pillars, the PRAs and the voluntary retirement saving accounts.

The PRAs have management fees. Previous studies have found that retirement fund management fees in Mexico are the highest among the Latin-American and Organisation for Economic Co-operation and Development countries, eroding from 18% to 23% of the total accumulated retirement benefits (see Dobronogov & Murthi, 2005; James, Smalhout, & Vittas, 2001; Kritzer, 2000; Kritzer, Kay, & Sinha, 2011).

Previous research also analyzes behavioral responses to incentives to contribute to voluntary retirement accounts such as 401(k)s in the United States (see Benartzi & Thaler, 2001; Beshears, Choi, Laibson, & Madrian, 2013; Choi, Laibson, Madrian, & Metrick, 2003; Madrian & Shea, 2001). This article analyzes a mandatory social security system with retirement accounts managed by pension fund managers. The government highly regulates the investment portfolio and management system fees. Retirement funds with high management fees may deplete savings to the extent that individuals receive a minimum pension guarantee—increasing government fiscal cost for retirement programs.

Average retirement fund manager fees could drain retirement wealth by almost 6% of what would have been accumulated with the lowest fee manager on the market. This would lead to the Mexican government spending 0.19% of annual gross domestic product (GDP) to subsidize pensions for low-income earners, compared with the 0.09% it spent for the PAYG system.

Changes in PRA system management fees in 2008 have helped it perform almost as well as the PAYG system would have, but to increase accumulation of retirement wealth, the PRA scheme would require lower fees, among other changes. Had the PRA system used the fee

¹More than half of the labor force in Mexico is in the informal sector and does not contribute to the social security system. Some individuals in the informal sector receive a noncontributory pension government subsidy, which is a flat rate lower than the minimum pension guaranteed by the social security system (Aguila, Diaz, Manqing Fu, Kapteyn, & Pierson, 2011).

structure of the lowest fee manager since 2008, it would have resulted in wealth accumulation 8.4% greater than that of the PAYG system. In this scenario, the annual government subsidy for the minimum pension guarantee would have been 0.15% of GDP in 2012.

Retirement fund managers must be able to pay their costs and make a profit, but management fees reduce retirement wealth accumulation. Should they reduce retirement wealth to the extent that individuals qualify for a minimum pension guarantee, they might lead individuals to comply only with the minimum requirements for the PRA system and to spend a larger proportion of their working life in the informal sector.

The article is organized as follows. In the next section, it discusses in more detail the management of the PRA system and the data on it. In the third section, it describes how retirement wealth under the PRA and PAYG systems in Mexico is estimated. In the fourth section, the effect of fees on retirement wealth accumulation in a PRA system is analyzed. In the fifth section, the present value of retirement wealth under the PRA and the previous PAYG systems is estimated. The sixth section concludes with some policy implications.

The Mexican PRA System and Its Management

The performance of the PRA system depends on that of private retirement fund administrators called *Administradoras de Fondos para el Retiro* (AFORES). The AFORES manage the PRAs of the PRA system. The rules that govern the AFORE investment portfolios restrict the proportion of funds that can be invested in the financial market apart from government bonds.

When the PRA system was introduced, there was only one authorized investment portfolio, and most of its funds had to be invested in government bonds (Grandolini & Cerda, 1998). Since 2001, the maximum proportion of funds that can be invested in the domestic market has increased. Investment in international financial instruments was not allowed until April 2005. In September 2012, 57% of AFORE portfolios were still invested in government bonds (CONSAR, 2012), making the government the principal recipient of retirement funds (Daza & de La Luz Juárez, 2008). This hinders competition between retirement fund managers because it makes it more difficult for them to differentiate themselves by providing more attractive real returns (Mesa-Lago, 2002; Sinha, 2002).

Several previous studies have suggested that the highly regulated nature of portfolio investment may explain the lack of a link between the rates of return and management fees (Arenas de Mesa & Mesa-Lago, 2006; Daza & de La Luz Juárez, 2008; Gutierrez, Serra, & Fischer, 2003; Kritzer, 2000; Mesa-Lago, 2002; Sinha, 2002). This study focuses on understanding how management fees affect the accumulation of social security wealth. Because prior studies have documented that rates of return and management fees are unrelated, we conduct our analyses assuming a fixed interest rate (Dobronogov & Murthi, 2005; Sinha, 2002). For robustness, retirement wealth with different interest rate scenarios is simulated.

From July 1997 until February 2008, AFOREs charged three types of management fees: a load factor, fees on the balance of the account, and fees on the accrued interest. Since March 2008, the PRA system has allowed AFOREs to charge a fee only on the account balance. The CONSAR data include information for all 32 AFOREs that have operated at any time since the PRA system was established, 13 of which were still operating in November 2012. While fees vary by AFORE, each AFORE charges the same fees to each of its investment portfolios.

Accrued Interest Fee

A few AFOREs had accrued interest fees between 1998 and 2003. In May 1998, only 2 AFOREs of 19 then operating had accrued interest fees: Atlantico Promex, with a 20% fee, and Inbursa, with a 33% fee. In November 1998, Atlantico Promex merged with another AFORE, leaving Inbursa as the only one with a fee on accrued interest until March 2003. Inbursa dropped this fee, and no other AFORE charged it before it was banned in 2008.

Load Factor Fee

PRA load factor fees are calculated as the percentage of the total wage on which the worker paid a retirement contribution rather than as the percentage of the contribution, as is customary in the United States. This makes them appear small, when in fact they translate into high fees. Consider a worker who earns U.S.\$1,000. Total contributions amount to 6.5% of the wage, or U.S.\$65. A load factor fee of 1% is applied to the contributed amount divided by 6.5% (that is, to the income): $(\text{U.S.}\$65/0.065) \times 1\% = \text{U.S.}\10 . In the United States, this would be considered a load factor fee of 15.4% (e.g., U.S.\$10 is 15.4% of U.S.\$65). Similarly, a load factor of 1.5% in the Mexican PRA system is equivalent to a load factor of 23% in the United States.

In December 1999, load factor fees for AFOREs (see Figure 1a) were between 0 and 1.7%. By the end of 2002, mean load factor fees started to decrease, and AFORE Banamex offered the highest fee on the market. More frequent and transparent information may have led to this reduction. In late 2002, AFOREs began sending PRA statements at least twice rather than once yearly. In 2002, AFOREs also had to provide information about their fees and employee contributions on the statements. At the same time, the mechanism to switch between AFOREs became more flexible. As a result, employees increasingly switched AFOREs, and competition among AFOREs to retain or attract clients may have led them to reduce their fees. Employees increasingly favored AFOREs that had the highest market share, were most advertised, or were most available in an individual's hometown (Calderón-Colín, Dominguez, & Schwartz, 2008; Prieto, 2005).

In November 2005, the regulatory framework changed to include penalties for AFOREs in response to a large volume of complaints about incorrect fee application and insufficient information about individual accounts (de Servicios Parlamentarios, Retirement Saving System Law; CONSAR, 1996, article 100). This may have reduced customer trust in AFORE operations. AFOREs may have reduced their fees in response; by December 2007, load factor fees were between 0.5% and 1.6%, with the average and median both below 1.0%.²

Balance Fee

In May 1998, balance fees were between 0% and 1.5% (Figure 1b), and most AFOREs did not charge this fee. Balance fees began to decrease in December 1999, converging to an average of 0.39% in December 2006. Many more AFOREs introduced balance fees in March 2003; by February 2006, most AFOREs had a balance fee. In late 2006, the Banamex AFORE increased its balance fee from 0.34% to 1.48%, and most other AFOREs increased their balance fees as well. These fees increased even more after the regulatory framework abolished all other fees in February 2008, with the range then reaching 1.1% to 3.3%. Balance fees began to decrease in January 2009, falling to a minimum of 0.99% and a maximum of 1.59% by November 2012. This may indicate that regulatory simplification does not necessarily increase competition between pension fund managers.

Estimating Retirement Wealth in the Mexican PAYG and PRA Systems

To qualify for social security benefits under the PRA system, a worker must contribute for at least 1,250 weeks, or approximately 25 years. The PAYG required only 500 weeks, or approximately 10 years, of contributions. The normal retirement age is 65 in both plans. In the PRA system, early retirement is possible at age 60 if a worker has a sufficient balance to obtain retirement benefits at least matching the minimum pension guarantee. Retirement prior to age 60 is available if a worker has a sufficient PRA balance to obtain retirement benefits at least 130% of the minimum pension guarantee. In the PAYG system, for each year before age 65 but after age 60 that one retires, retirement benefits are reduced by 5%; for example, those retiring at age 60 receive 75% of normal retirement benefits (Aguila, 2012).

Contributions to the social security system are defined as a percentage of the worker's wage. The employer, the employee, and the government contribute to the social security system. The employee and employer contributions did not change after the social security system reform of 1997, remaining combined at 6.275% of a worker's wage (Aguila, 2011). PAYG social security benefits are computed as

$$P^{PAYG} = [\delta(\bar{w}) * \bar{w} + \alpha * (cy - 10) * \lambda(\bar{w}) * \bar{w}]$$

where $\delta(\bar{w})$ is the replacement rate for the first 10 years of contribution to the PAYG system, $\lambda(\bar{w})$ is the replacement rate for every year of contribution after the first 10 years, $\bar{w}$ is the average wage of the 5 years prior to retirement, cy is the years of contribution to the social security system, and α indicates if the individual has contributed more than 10 years to the social security system.

²Some pension fund managers also provided discounts on their load factor fees according to tenure in the fund. The first AFOREs to implement such discount schemes were Banamex and Bancomer. These discounts consisted mainly of decreasing load factor fees by 0.01%, 0.02%, or 0.05% per year after being with the same fund for two to five years. By 2006, most AFOREs had adopted discount schemes to increase customer loyalty by making switching more costly. Some AFOREs completely eliminated the load factor fee after 25 years of tenure. After February 2008, when only the balance fee was allowed, the discount scheme was eliminated.

Like the PAYG system, the PRA system in Mexico has some redistributive components. First, the government deposits a monthly social quota in each individual account, equivalent to 5.5% of the minimum wage in Mexico City. Second, the government offers a minimum pension guarantee, equivalent to the minimum wage in Mexico City. The federal government also contributes 0.425% of a worker's wage to his or her account (Aguila, 2011). Thus, employees and the government share the financial risk in Mexico's PRA system.

PRA social security benefits are computed from the balance in the individual account, which depends on the contribution rate $c = c_e + c_{em} + c_g$, the employee contribution rate c_e , the employer contribution rate c_{em} , and the government contribution rate c_g , all expressed as a percentage of the worker's monthly wage w_t in month t . The government contribution also includes a fixed redistributive component (Social Quota). These contributions are calculated monthly but are deducted from the worker's wage and deposited in the AFOREs on a bimonthly basis. The balance of a PRA also depends on the fees charged by retirement fund managers, as described above. The PRA system has had three types of management fees: load factor (fee_l), discontinued in 2008, accrued interest (fee_r), discontinued in 2003, and balance fee (fee_b). PRA account performance also depends on the monthly rate of return r and the monthly periods of contribution to the system K .

Because the contributions are deposited bimonthly, but the balance and the interest fees are charged monthly, the account balance of the PRA retirement benefits is computed without management fees at time K for a worker that has worked a total of K months and makes bimonthly contributions as

$$P_K^c = [(w_1 + w_2) * c + 2 * Social\ Quota](1+r)^{K-2} + [(w_3 + w_4) * c + 2 * Social\ Quota](1+r)^{K-4} + \dots + [(w_{K-1} + w_K) * c + 2 * Social\ Quota]$$

The accumulated monthly fees at month K are computed as

$$P_K^f = \sum_{t=1}^K fee_t (1+r)^{K-t}$$

and the value of the fund at month as K $P_K^{PRA} = P_K^c - P_K^f$. The interest rate fee is calculated at time t as $fee_r(P_t)$ here fee_r is the fee rate charged on interest earnings and r is the interest rate earned on the balance P_t . The load factor fee at time t is $(w_{t-1} + w_t) * c * fee_l$, and the balance fee at time t is $fee_b(P_t)$.

Present Value of PAYG and PRA Retirement Wealth

The present value of PAYG or PRA retirement benefits (PVP^j) are computed at the time of retirement, where $j = PAYG, PRA$, as follows:

$$PVP^j = \sum_{l=R}^L \frac{P^j}{(1+\eta)^{l-R}}$$

Here, L is the total life span in years, P is the annual retirement benefits, η is the discount rate, and R is the date of retirement.³ We assume individuals retire at age 65, make 25 years of contributions, and live 8.4 years on average after retirement.⁴

Fees and Accumulation of Social Security Wealth in the Mexican PRA System

Retirement fund management fees have changed greatly over time. By some estimates, AFORE administrative fees have eroded 18% to 23% of total accumulated retirement wealth (Arenas de Mesa & Mesa-Lago, 2006; Calderón-Colín et al., 2008; Christensen, 2007; Corbo, 2004; Dobronogov & Murthi, 2005; Gutierrez et al., 2003; Hastings & Tejeda-Ashton, 2008; James et al., 2001; Kritzer, 2000; Kritzer et al., 2011; Levy, 2008; Martínez & Murcia, 2008; Mesa-Lago, 2002; Mitchell, 1999; Prieto, 2005; Tapia & Yermo, 2008). Levy (2008) shows that from 1998 to 2006, the sum of management fees obtained by the AFORES was 1.08 times the total contribution (“social quota”) of the federal government to the workers. In other words, management fees may be siphoning off the entire government subsidy.

The importance of different fees for the accumulation of retirement funds for a median worker is assessed. According to CONSAR's definition, a median worker is one with earnings three times the minimum wage; in November 2012, this was equivalent to U.S. \$433 a month.⁵

A real annual rate of return on retirement funds before applying management fees of 5.0% is assumed. CONSAR (2012) also uses this rate to illustrate differences between AFORES. The monthly contribution to the PRA is 6.5% of a worker's wage, with the additional social quota equal to U.S.\$7.90 per month in November 2012. All contributions are deposited bimonthly. As an example, the median worker started contributing to the PRA system in May 1998 and retires in 2023, after 25 years of contributions. Load factor fees are applied bimonthly as a fraction of the worker's wage and balance fees monthly.

The amount accumulated in the PRA system for a median worker facing the highest, lowest, mean, and median fees of the 32 retirement fund managers that operated at any point between May 1998 and November 2012 is estimated. The highest, lowest, mean, and median

³A real annual discount rate of 1% was used in the simulation. The net present value of retirement wealth is not computed because contribution requirements for both systems are the same.

⁴According to the Mexican National Population Council (CONAPO), the life expectancy at birth of the average Mexican male in 2012 was 73.4 years. The life expectancy at birth is used instead of the life expectancy at the retirement age because the latter is not available for Mexico. It was assumed that in all cases, workers start to contribute when they are 40 years old and remain in the system 25 years until they retire at age 65. That is, the system faces the same time horizon.

⁵CONSAR (2003) uses this definition to estimate and project insurance payouts. The exchange rate used here and throughout the article, unless otherwise specified, was 13.1 pesos per dollar, which was the monthly average in November 2012, as reported by the Mexican Central Bank (BANXICO, 2012).

fees reported each period by the entire pool of fund managers are applied, taking into account all the different types of fees. A baseline scenario assumes no management fees. The loss due to management fees is computed in each case as a percent of the balance that would have accumulated without fees. For every period, the difference between the accumulation in a particular case of fees and the case without fees is divided by the scenario without fees. For this exercise, it is assumed that the individual could use different AFOREs each period and hence consistently face the highest, lowest, mean, and median fees. Changes in the slope of the loss in retirement funds in the simulations reflect changes in management fees.

Figure 2a presents the loss in accumulated retirement benefits as a result of accrued interest fees, and Figure 2b presents the loss resulting from load factor fees. By the time the accrued interest fee was eliminated in 2003, individuals with the highest fees had lost approximately 2% of their accumulated wealth. Such losses have decreased since then, but remain for some.

Load factor fees create much greater losses, more than 20% in some circumstances. The median loss was 19.3% in 1998 and 16.7% in 2008; the mean loss in January 2008 was 16.3%. The loss began to decrease after the load factor fee was eliminated in 2008. The minimum load factor fee loss was zero between 1998 and 2002, when Inbursa did not apply such a fee, but increased to 0.62% in 2003 and to 2.3% in 2008. The highest load factor fee losses stem from charges by Banamex and Bancomer—the two AFOREs that have consistently had the highest market shares—as well as from charges by Profuturo GNP and Santander Mexicano.

Figure 2c shows that the losses in social security wealth accumulations due to fees on the account balance are small initially but increase over time. There is substantial heterogeneity across retirement funds in such losses. Several AFOREs, such as Banamex, Bancomer, HSBC, and Inbursa, only started applying a balance fee after 2003. From 1998 to 2011, median loss increased from 0 to 3.4%, and highest loss increased from 0.3 to 5.8%; losses appeared to have accelerated in more recent years and may be a result of the elimination of other fees. Pension fund managers tried to offset the elimination of other fees by increasing the balance fee.

In Figure 3, the loss in retirement wealth from all fees (load factor, balance, and accrued interest fees) for a median worker is shown. The lowest loss increased from 0 to 7.0% in 2012, the median loss increased from 19.2 to 19.9%, and the highest loss increased from 21.2 to 24.3%. While the levels of loss from the lowest fee AFOREs have increased in recent years, those for the mean, median, and highest have stabilized or even decreased. The considerable losses in social security wealth are mainly due to the high load factor fee before February 2008 and high balance fees since then.

Retirement Wealth in the Mexican PAYG and PRA Systems

Table 1 shows the present value of retirement benefits for the PAYG and PRA systems. For the PRA system, two estimates for various fee scenarios are shown: the present value of retirement benefits obtained through employee, employer, and government contributions and

the present value of retirement benefits that the government has to subsidize to guarantee the minimum pension for low-income workers.⁶ Scenarios for fee structures before and since 2008 are also shown, reflecting the different fees permitted in those times, to assess the effects of the 2008 reform on retirement wealth.

The “representative” PRA in Table 1 is that with the highest number of persons registered between 1998 and 2008, and between 2008 and 2012. Specifically, the representative AFORE was the one with the maximum $Share^h$,⁷ where

$$Share^h = \frac{\sum_{t=1}^T \left(\frac{A_t^h}{\sum_{h=1}^H A_t^h} \right)}{T}$$

and T is the total months in the period (May 1998 to February 2008, or March 2008 to November 2012), and A_t^h is the number of persons registered to the AFORE h in the month t . In the original scheme of PRA fees, valid between 1998 and 2008, ING was the fund manager with the largest number of persons registered, averaging 19.9% of all registrants.⁸ From 2008 to 2012, Banamex had the highest market share, with an average of 16.0% of all registrants.

For a worker earning minimum wage, the present value of accumulated retirement wealth in the PAYG system is U.S.\$13,204, plus U.S.\$1,780 received as a subsidy from the government to reach the minimum pension guarantee. Under the PRA system, the minimum-wage worker accumulates U.S.\$11,445 if contributing to the representative AFORE and receives an additional U.S.\$3,539 from the government subsidy. Under the 2008 reforms, the minimum-wage worker contributing to the representative AFORE will accumulate U.S.\$11,149 and receive an additional subsidy of U.S.\$3,835.

For all levels of labor income, individuals would have been better off in the PAYG system than they would have been in the pre-2008 PRA system, but not in the system since then.⁹ The amount accumulated in the PRA system also depends on the performance of the real interest rate. The PAYG system provides higher retirement wealth than the PRA scheme in most cases, when the real rate of return is below 5.1% before 2008 and below 4.8% since then. The observed average real rate of return, estimated as the difference between the monthly average rate of return of the government bonds at 28 days and monthly inflation,

⁶The subsidy is calculated as the difference between the minimum pension necessary to cover the life expectancy of the median worker after retirement (eight years) and the retirement wealth accumulated by the worker.

⁷All AFORES that continued providing services until November 2012 are included in the analysis. Registrants of an AFORE acquired by another are included with the acquiring AFORE.

⁸From 1997 to 2001, no AFORE was permitted to have more than 17% of total registrants. Since then, no AFORE has been permitted to have more than 20% of registrants. See the 17th article of the Consumer Protection Law (Cámara de Diputados, 1992) as modified by the 26th article of the Retirement Saving System Law.

⁹In the PAYG system, the minimum pension guarantee was indexed to adjustments in the minimum wage from 1997 to 2002 and to changes in inflation since then. The PRA minimum pension guarantee is subject to changes in inflation. For ease of interpretation, Table 1 presents only the estimates of the present value of retirement benefits of the PAYG system for the minimum pension guarantee adjusted for inflation.

was 9.6% for the period 1997–2012, 11.8% between 1997 and 2007, and 4.9% between 2008 and 2012. The observed real interest rate of return suggests that the scenarios in which contributors are better off in the post-2008 PRA system is achievable.

Within the PRA system fee scenarios, the worse option for workers earning more than three times the minimum wage was the original scheme with load factor, balance, and accrued interest fees. Even though the load factor fee was eliminated in 2008, the balance fee increased substantially. As a result, retirement wealth accumulation increased only slightly. Eliminating load factor fees got rid of an important drain on retirement wealth and helped retirement wealth increase to that of the PAYG system, despite the increase in the balance fee. The average loss of total retirement wealth in the 25 years of contribution under the representative fees of the PRA system before 2008 was 0.8% higher than in the PAYG system, and since then the PRA system has yielded on average 2.5% more than the PAYG system.

The average loss of retirement wealth between the representative fee system and the retirement wealth that would have been accumulated in the PRA system with no fees was 14.5% for the fee structure after 2008, in comparison with 17.2% in the scenario with the pre-2008 fee structure. Therefore, the 2008 reform achieved only a minor reduction in the fees and a minor increase in retirement wealth accumulation.

The gap of the social security wealth accumulation of the AFOREs with the lowest and highest fees in each system was also compared. In the pre-2008 regime, the lowest fees would have increased social security wealth accumulation 5.6% more than the representative AFORE. The highest fees would have drained 5.1% more than the representative AFORE would (case of highest fees not shown in Table 1).¹⁰ In the post-2008 regime, the lowest fee schemes would have accumulated 8.4% more than the PAYG scheme and 5.9% more than the representative AFORE. The highest fee schemes would have diminished wealth

¹⁰To obtain the AFOREs with the mean, least, and most expensive fees, the average of each of their fees by period (before and after 2008) was estimated, and the formula was then applied to obtain the PRA present value of retirement benefits. For AFOREs that received registrants from AFOREs they acquired, average management fees ($Avfee_y^{h,K}$) were estimated by weighting fees by the total number of registrants in the AFORE with the equation

$$Avfee_y^{h,K} = \frac{\sum_{t=1}^T \left(\frac{\sum_{k=1}^K (fee_{y,t}^k * A_t^k)}{\sum_{k=1}^K A_t^k} \right)}{T}$$

where $fee_{y,t}^k$ is the management fee of type y (load factor, accrued interest, or balance fee) in month t of the fund manager k that merged to AFORE h , and A_t^k are the persons registered to AFORE k in month t . It was found that Inbursa yielded the lowest loss pension in the original PRA-fee scheme, and Profuturo GNP produced the highest loss. From 1998 to 2008, Inbursa applied a load factor fee of 0.25%, an accrued interest fee of 17.1%, and a balance fee of 0.24%, and Profuturo GNP applied a load factor fee of 1.65%, no interest fee, and a 0.69% balance fee. The mean loss of present value of retirement wealth between Inbursa and Profuturo GNP was 8.4%. Since 2008, ISSSTE (State Workers Security and Social Services Institute) has had the least expensive fee scheme, with a balance fee of 1%, and Coppel the most expensive, with an average balance fee of 2.24%. The gap in terms of loss of retirement wealth between the least and most expensive AFOREs was approximately 9.4%.

accumulation by 5.0% compared with the representative AFORE, and by 2.5% compared with the PAYG regime.

In other words, the present value of retirement wealth of the PRA with the representative AFORE is less than that of the least-expensive fee scheme, but more than that of the most expensive. The AFORE with the highest market share does not apply the lowest (or highest) management fees. Calderón-Colín et al. (2008) suggest that the Mexican worker is unable to effectively evaluate the performance of his AFORE, leading to inelasticity in demand with respect to price. They note that 53% of workers who switched AFOREs in 2006 lost retirement wealth in doing so.

The most expensive AFORE can drain almost 25% of retirement wealth in both the pre-2008 and the post-2008 fee schemes (results not shown). High management fees also affect low-income workers and the government. Gaps between accumulated retirement wealth and the minimum pension guarantee activate the redistributive component of the PRA system, with the government paying the difference (Gill, Packard, Pugatch, & Yermo, 2005). High management fees could impose high costs on the government when it must ensure the minimum pension guarantee to a larger number of workers whose PRA savings fall short (Mitchell, 1999).

To ensure that retiring workers have a pension worth at least the minimum guarantee, the government must subsidize 11.9% of the social security wealth in the PAYG system, 23.6% in the pre-2008 PRA system, and 25.6% in the post-2008 PRA system. This annual subsidy would be equivalent to 0.09% of the GDP in 2012 for the PAYG system, 0.18% in the pre-2008 PRA system, and 0.19% in the post-2008 PRA system.^{11, 12} The annual government subsidy is higher for the post-2008 PRA system because high balance fees have a different effect than high load factor fees on retirement wealth accumulation for lower income workers. The lowest fee pre-2008 PRA would require a subsidy equivalent to 0.17% of GDP to guarantee the minimum pension to all, and the lowest fee post-2008 PRA would require a 0.15% subsidy. Schemes with lower fees provide higher accumulations of social security wealth.¹³

¹¹The percentage of the tax burden of the new system with respect to the case with no fees was obtained using the formula

$$\left(\frac{(TB_f^{DC} - TB_{nf}^{DC}) * C_{1mw} * 100}{GDP} \right) / LE_{xp}$$

where TB_f^{DC} is the tax burden of the PRA system with fees, TB_{nf}^{DC} is the tax burden of the PRA system with no fees, C_{1mw} is the number of contributors earning minimum wage in the third quarter of 2012, GDP is the gross domestic product of Mexico in 2012, and LE_{xp} is the average life expectancy in years for a retiree (or here, nine years).

¹²These figures were obtained by computing the rate of increase between the amounts of retirement wealth provided by the government in the PAYG scenario and in the PRA systems with fees and without fees.

¹³These estimates accord with Franco (2004). She uses the pre-2008 fee scheme, conducts Monte Carlo simulations on the wages of the contributors registered in the system in 2002, and uses Markov chains for the probability of contributing to the system in each period of time. She finds that a present value of the annual fiscal cost of the government subsidy for the minimum pension guarantee of all contributors equaled 0.26% of GDP in 2002.

In sum, low-income workers who would receive the minimum pension guarantee in the PAYG are not affected by AFORE management fees because the government effectively bears the cost of these fees for such workers. These fees affect workers who could have obtained retirement benefits above the minimum pension guarantee under the no-fee scheme.

To decrease the government burden in the scheme with fees, Tuesta (2011) proposes increasing the social quota from the current 5.5% of the minimum wage to 11% for all workers with an income below four times the minimum wage and eliminating the social quota for workers earning at least four times the minimum wage. In that scenario, the effect of the fees scheme would be much higher for workers earning more than four times the minimum wage. This could provide incentives to under report higher wages and thereby obtain the social quota.

The large loss of retirement funds under the different fee schemes in the PRA system suggests it may be necessary to have more competition in management fees in the AFOREs market (Calderón-Colín et al., 2008; Kritzer et al., 2011; Tapia & Yermo, 2008). In Table 1, the retirement wealth accumulation with the fees scheme imposed by the least expensive AFORE is included, that is, those charging the lowest fees in the pre- and post-2008 regimes. Representative contributors affiliated with the least-expensive AFOREs would significantly improve their retirement benefits, by 4.8% in comparison with the PAYG system before 2008 and by 8.4% since then. In the first case, the total government subsidy would be 0.17% of GDP, 0.08% of GDP more than the PAYG scheme, or 0.01% of GDP lower than the representative AFORE. In the post-2008 scheme, the subsidy would be 0.15% of GDP, 0.07% of GDP higher than the PAYG scheme, or 0.04% lower than the representative AFORE.

Table 2 presents the composition of the retirement wealth over time for all regimes. In the PAYG system, employers make the highest proportion of worker's wage contributions for workers earning more than four times the minimum wage. Employer contributions constitute similar proportions of retirement wealth for similar workers in the PRA schemes, albeit slightly higher in the pre-2008 PRA regime than in the post-2008 regime. The highest proportion of contributions to retirement funds of employees earning more than twice the minimum wage is in the PAYG system. The social quota, a fixed-amount contribution, represents a larger proportion of social security wealth in the PRA system after 2008 than before. In both PRA systems, interest is the largest component of accumulated retirement funds. Assuming a 5% real interest rate, interest accounts for 65.5% of retirement wealth in the pre-2008 system and 62.6% in the post-2008 system. Finally, Table 2 shows the drain of AFORE fees in total retirement benefits. On average, AFOREs drained 31.9% of total retirement benefits in the pre-2008 PRA system and 26.0% of such wealth in the post-2008 system.

As of November 2012, the Mexican PRA system had 48.2 million participants. The redistributive component of the Mexican social security system—the minimum pension guarantee—in 2012 cost the government at least U.S.\$205.5 million, and the entire social security system cost the government at least U.S.\$9.5 billion in the same year (Ministry of

Finance, 2012). This included the cost of benefits for individuals retired under the PAYG system and the social quota. Such costs for the government are expected to exponentially increase in coming years.¹⁴

Final Remarks

This article calculated and compared social security wealth accumulation under the Mexican PAYG and PRA systems. It also documented the effect of AFORE management fund fees—load factor, balance, and accrued interest—on individual retirement funds. The greatest losses in the PRA scheme before 2008 were due to the load factor fee. To simplify the system, all fees were eliminated except for one that all AFOREs would apply. That one remaining fee—the balance fee—increased substantially. As a result, there was only a slight decrease in the loss of retirement wealth accumulation relative to the pre-2008 scheme.

It was found that individuals were better off in the previous PAYG system than in the pre-2008 PRA scheme, but they obtained similar social security benefits in both of these systems, depending on the performance of the real rate of return. With a real rate of return above 4.8%, the post-2008 PRA system performs better than the PAYG scheme, as does the pre-2008 system with a rate above 5.1%.

For the retirement wealth of low-income workers in the PRA system to approximate that of the PAYG system, the defined contribution system must have a low management fee structure. By depleting pension wealth, management fees increase the number of persons qualifying for a subsidized minimum pension guarantee. This guarantee cost the government approximately 0.19% of the GDP in 2012, compared with 0.09% for the PAYG system and 0.18% for the pre-2008 PRA system. Although 2008 reforms eliminated all fees but the balance fee, they did not have a substantive positive effect on retirement wealth. Each type of fee has different effects on retirement wealth accumulation by level of labor income.

Previous studies suggest that mature PRA systems should produce lower fees. The PRA system has been in place in Mexico since 1997, almost 17 years. Tapia and Yermo (2008) and Dobronogov and Murthi (2005) suggest that large sunk costs of implementation may require AFOREs to apply high management fees when beginning operations. As years pass and the system matures, retirement fund managers should become profitable because of economies of scale. Consequently, management fees should diminish. Moreover, in the long run, fees should be close to real costs (James et al., 2001). Shah (1997) suggests that in Mexico, the low responsiveness of management fees is due to the poor competition among AFOREs—presenting a case similar to Chile, where fees have been expensive over time.

For Latin-American countries, the structure of fees is generally not based on costs (Crabbe, 2005; Devesa, Rodríguez, & Vidal, 2003), and competition has apparently not yielded a rational system of fees. Fees include administration, competition, sales personnel, differentiation, and advertisement costs (Crabbe, 2005). Advertisement costs have increased

¹⁴The daily minimum wage in Mexico City was 62.3 pesos in November 2012, as reported by the National Commission of Minimum Wages (CONASAMI, 2012).

rather than reduced overall costs, offsetting economies of scale created by a large provider (Gill, Ozer, & Tatucu, 2008).

Beyond the erosion of wealth accumulation of retirement funds in the mandatory account, the costs of saving in this system do not provide incentives to increase voluntary contributions. Moreover, the self-employed have no incentive to join the PRA because they can obtain higher returns from investing their contributions in other assets (Gill et al., 2005; Levy, 2008). AFOREs may be increasing incentives for workers to leave the formal sector and avoid mandatory contributions to the PRA system.

Some solutions have been suggested to reduce the AFORE costs. Moving to a structure where fees are applied as a percentage of accrued interest may reduce costs (Christensen, 2007; Martínez & Murcia, 2008). If more transparent and simpler information is provided to registrants, price competition among AFOREs could increase (Gutierrez et al., 2003; Hastings & Tejeda-Ashton, 2008). Shah (1997), Gutierrez et al. (2003), and Corbo (2004) suggest opening the AFORE market to other financial institutions such as banks and insurance companies. Gill et al. (2005) propose moving from a mandatory saving scheme to a flexible one in which an individual decides how much to contribute, possibly yielding a competitive voluntary savings market. Prieto (2005) recommended implementing a system in which the management fee is a unique percentage of the salaries of all workers registered to all AFOREs to make managers compete for workers' accounts on performance of returns and amount of retirement wealth. Prieto (2005) also asserts a deep asymmetry of information because the government has not advised workers on how to choose a fund manager but legally requires them to contribute to one of them.

The hazard of a lack of competition between fund managers is important to consider when implementing a PRA system (Mesa-Lago, 2002). It is crucial to pay attention to the fee structure when designing PRA systems and when studying how such a reform might affect economic preparation for retirement. Most Mexican workers are not enrolled in the AFORE with the lowest fees. This may suggest that workers are myopic when assessing the effects of fees on retirement wealth accumulation.

These results suggest that informing participants of the effect of management fees on their retirement wealth, promoting financial literacy programs, and supporting mechanisms to help individuals optimize saving for retirement would increase the demand elasticity of the fees. Supplements to bank statements indicating how participants' retirement wealth in their current AFORE compares with that of those with the highest and lowest management fees could also increase demand elasticity of the fees. This would help individuals understand the role of management fees in their retirement wealth. New schemes that provide transparency and promote competition among AFOREs could improve the performance of the PRA system in Mexico.

Acknowledgments

This study was supported by a grant from the U.S. Social Security Administration (SSA) funded as part of the Retirement Research Consortium (RRC) and the National Institute of Aging (NIA) funded program project "International Comparisons of Well-Being, Health and Retirement" 2P01AG022481-06. We thank Nelly Mejia and Alfonso Rivera for their excellent research assistance.

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Figure 1a. Evolution of Management Fees, 1998 to 2012: Load Factor Fee

Source. Authors' calculations with data from CONSAR, 2012.

Note. Load factor fees are computed as a percentage of a worker's wage.

Figure 1b. Evolution of Management Fees, 1998 to 2012: Balance Fee

Source. Authors' calculations with data from CONSAR, 2012.

Note. Balance fees are an annual percentage.

Figure 2a. Cumulative Loss of Pension Funds for a Median Worker by Type of Fee: Accrued Interest Fee

Source. Authors' calculations with data from CONSAR, 2012.

Figure 2b. Cumulative Loss of Pension Funds for a Median Worker by Type of Fee: Load Factor Fee

Source. Authors' calculations with data from CONSAR, 2012.

Figure 2c. Cumulative Loss of Pension Funds for a Median Worker by Type of Fee: Balance Fee
Source. Authors' calculations with data from CONSAR, 2012.

Figure 3. Cumulative Loss of Pension Funds Due to Load Factor, Balance, and Interest Fees for a Median Worker

Source. Authors' calculations with data from CONSAR, 2012.

Table 1
Present Value of Retirement Benefits in the PAYG and PRA plans (U.S. Dollars)

Labor income (number of times the minimum wage)	PRA before 2008				PRA after 2008			
	PAYG		Representative fees		Lowest fees		Representative fees	
	Retirement wealth	Retirement wealth from taxes (pension guarantee)	Retirement wealth contributions	Retirement wealth from taxes (pension guarantee)	Retirement wealth contributions	Retirement wealth from taxes (pension guarantee)	Retirement wealth contributions	Retirement wealth from taxes (pension guarantee)
1	13,204	1,780	11,445	3,539	11,587	3,397	11,149	3,835
2	18,263	0	18,222	0	18,846	0	18,261	0
3	25,691	0	25,000	0	26,104	0	25,373	0
4	31,697	0	31,778	0	33,362	0	32,485	0
18	130,369	0	126,665	0	134,978	0	132,053	0
19	137,612	0	133,443	0	142,236	0	139,165	0
20	144,855	0	140,221	0	149,495	0	146,276	0
Average proportion of pension compared with the PAYG case *	0.0		-0.8		4.8		2.5	8.4

Source: Authors' calculations with data from CONSAR, 2012 and CONAPO, 2012.

Note.

* is calculated as the sum of the proportional difference between the retirement wealth in the PRA system and the retirement wealth in the PAYG system for each labor income level, including the tax burden.

PAYG, pay as you go; PRA, personal retirement account.

Table 2
Composition of Retirement Wealth by Level of Income and Regime (Percentage of Total Account)

Labor income (number of times the minimum wage)	PAYG			PRA before 2008					PRA after 2008					Interest		
	Government	Employer	Employee	Interest (paid by government)	Social quota	Government	Employer	Employee	AFOREs	Interest	Social quota	Government	Employer		Employee	AFOREs
1	1.4	25.5	7.1	66.1	28.1	1.1	26.3	5.7	-21.9	60.5	29	1.2	27.2	5.9	-26	62.6
2	2	36.8	10.3	51	18.9	1.5	35.4	7.7	-26.3	62.8	18.8	1.5	35.3	7.7	-26	62.6
3	2.1	39.3	10.9	47.7	14.2	1.7	40	8.7	-28.6	63.9	13.9	1.7	39.2	8.6	-26	62.6
4	2.3	42.4	11.8	43.5	11.4	1.9	42.8	9.3	-29.9	64.6	11.1	1.8	41.4	9.1	-26	62.6
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18	2.5	46.4	12.9	38.2	3	2.2	51	11.1	-34	66.6	2.8	2.1	48	10.5	-26	62.6
19	2.5	46.4	12.9	38.2	2.9	2.2	51.2	11.2	-34.1	66.6	2.7	2.1	48.1	10.5	-26	62.6
20	2.5	46.4	12.9	38.2	2.7	2.2	51.3	11.2	-34.1	66.6	2.6	2.1	48.2	10.5	-26	62.6
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Aver age	2.4	44.3	12.4	40.9	7.3	2	46.8	10.2	-31.9	65.5	7.1	1.9	44.6	9.7	-26	62.6

Source: Authors' calculation with data from CONSAR, 2012.

Note. Average is a simple algebraic average of the proportions of each item for all the levels of income.

AFORE, Administradoras de Fondos para el Retiro; PAYG, pay as you go; PRA, personal retirement account.