Personal Retirement Accounts and Saving

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Web Appendix (Not for Publication)

Social Security Reform: Social Security Wealth

The present value of social security benefits is computed under the pay-as-you-go (PAYG) and personal retirement account (PRA) rules. The method and results were compared with the official system used by the private-sector Instituto Mexicano del Seguro Social (IMSS) scheme, and they exactly match. The assumptions are that individuals retire at age 60 with 25 years of contribution. Most workers choose early retirement because they do not have incentives to wait until normal retirement, as described by Emma Aguila (2006).

The annual minimum-wage inflationary loss is 6.4 percent, estimated with historical data from Instituto Nacional de Estadística y Geografía (INEGI). The discount rate assumed is 1 percent. Also, the estimations use IMSS's life-expectancy assumptions. These are 93 years for men and 87 for women. The figure of life expectancy for men accounts for the fact that, after a male pensioner's death, his widow or children under age 16 receive the social security benefits.

The PRA computations assume that annuities provide a money's-worth ratio of 100 percent. Thus, the present value of the social security benefit received after retirement is equal to the retirement funds paid for an annuity. The annuity market in Mexico has low penetration, and it is highly regulated. All companies offer the same price for annuities because they use a unique pricing system (SUC). Mortality tables, inflation indexation, and all other technical parameters to estimate annuities are fixed by the regulatory agencies in Mexico. SUC eliminates unfair practices, and profit margins are small (World Bank and International

Monetary Fund, 2006). Annuities offered by insurance companies using the SUC system are designed to try to match 100 percent money's worth. We assume a real interest rate from 0 to 15 percent. For presentation purposes, we show only two interest-rate scenarios: an optimistic (8.59) and a more conservative (4.00) one. The 8.59 percent real rate of return is a historical average of the PRA real rate of return. The PRA rate of return is after discounting AFORE's fees.[1]

Table A.1 present a summary of the social security wealth estimations for men of the new and transition generations. Those for women are very similar because the rules to obtain social security benefits are the same, and only the life expectancy is different. Women receive benefits for a longer period of time, thus obtaining a higher retirement wealth, but the order of preferences with respect to the type of social security scheme is not altered.

For the new generation, social security wealth is computed assuming that these individuals satisfy the minimum of 25 years of contribution to the PRA or PAYG scheme. New-generation social security wealth is compared in the nonreform and reform scenarios. For the transition generation, the results are presented for different combinations of contributions to the PRA or PAYG system, as indicated in the first column. The present value of the PAYG and PRA social security benefits are computed as multiples of the monthly minimum wage.

Housing contributions are used to compute social security benefits at retirement after 1997. However, they are still managed by Instituto del Fondo Nacional para la Vivienda de los Trabajadores (INFONAVIT), an institute in charge of providing housing credits. We included housing contributions in our estimates. After the 1997 social security reform, individuals from the transition-generation group had to transfer the social security wealth accumulated in the 1992

[1] AFORES or Administradoras de Fondos de Ahorro para el Retiro are private retirement-fund managers.

complementary personal account (Sistema de Ahorro para el Retiro 1992 or SAR 92) to the 1997 PRA. In fact, most SAR 92 savings were not claimed because of the management inefficiencies. Also, for individuals who claimed their SAR 92 savings, the impact on the PRA balance is not significant because the effect is diluted through time, taking into account that the amount transferred corresponded to less than 100 percent of the accumulated amount mainly because of multiplicities of accounts. Thus, the PRA social security wealth computations do not include simulations of the transfers from the SAR 92 system.

In the analysis of the PAYG social security wealth, the one-off payment from the 1992 personal account is considered a random shock that may modify individual behavior until retirement. The general perception was that the amount of social security wealth accumulated in the 1992 personal account was unknown until it was received at retirement. Hence, the SAR 92 balance is not included in the PAYG social security wealth estimations.

Sensitivity Analysis

Table A.2 shows the results using kernel and nearest-neighbor matching. Kernel matching is computed with alternative bandwidths. The estimations follow the same tendency using a higher bandwidth. In terms of the sensitivity analysis, choosing the smoothing parameter implies a trade-off between bias and variance. The higher the bandwidth, the lower the variance, but the greater the bias (Bernard and Silverman, 1986). In this case, matching performance is better with the smallest rule-of-thumb bandwidths.[2] The results are less accurate when estimated with nearest-neighbor matching because this method matches only one control unit. The tendency of the estimators is the same as with kernel matching, but the standard errors are much higher. The latter can be explained by the fact that the control group has a smaller sample size than the treatment group and that some units are matched several times, causing an increase in the variance.

[2] We estimated the average effect of the treatment on the treated (ATT) for all levels of labor income, and the estimator is stable with alternative bandwidths in the sample including lower-income individuals (earning up to five times the minimum wage). Moreover, all the results are statistically significant for any threshold below five times the minimum wage. We find a consistent effect for lower-income workers.

Table A.1: Present Value of Social Security Benefits at Retirement for Men Under the PAYG and PRA Plans for the Transition Generation

Years of Contribution to the Plan		Social Security Wealth	Real Interest-Rate Scenarios											
			Monthly Labor Income (× minimum wage; e.g., 2 = monthly labor income twice the minimum wage)											
			2		4		5		6		10		14	
PRA	PAYG		4.00	8.59	4.00	8.59	4.00	8.59	4.00	8.59	4.00	8.59	4.00	8.59
Panel A. Simulations for the New Generation														
25	25	PRA	347.88	347.88	347.88	347.88	347.88	412.87	347.88	485.40	453.66	775.52	625.08	1,065.64
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.72	628.72	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PRA	PAYG	PRA	PAYG	PRA
Panel B. Simulations for the Transition Generation														
Younger cohorts														
24	1	PRA	347.88	347.88	347.88	347.88	347.88	381.41	347.88	448.55	433.85	717.14	597.96	985.73
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.72	628.72	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PRA	PAYG	PRA	PAYG	PRA
22	3	PRA	347.88	347.88	347.88	347.88	347.88	347.88	347.88	383.37	396.48	613.88	546.81	844.39
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.72	628.72	880.20	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PRA	PAYG	PAYG	PAYG	PAYG
20	5	PRA	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	361.93	526.32	499.52	724.54
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.72	628.72	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PAYG	PAYG	PAYG	PAYG	PAYG
18	7	PRA	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	452.07	455.79	622.90
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.71	628.71	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PAYG	PAYG	PAYG	PAYG	PAYG

Table A.1: Present Value of Social Security Benefits at Retirement for Men Under the PAYG and PRA Plans for the Transition Generation (Continued)

Years of Contribution to the Plan		Social Security Wealth	Real Interest-Rate Scenarios											
PRA	**PAYG**		**4.00**	**8.59**	**4.00**	**8.59**	**4.00**	**8.59**	**4.00**	**8.59**	**4.00**	**8.59**	**4.00**	**8.59**
Older cohorts														
8	17	PRA	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.71	628.71	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PAYG	PAYG	PAYG	PAYG	PAYG
7	18	PRA	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	844.39
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.71	628.71	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PAYG	PAYG	PAYG	PAYG	PAYG
6	19	PRA	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.71	628.71	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PAYG	PAYG	PAYG	PAYG	PAYG
2	23	PRA	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.71	628.71	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PAYG	PAYG	PAYG	PAYG	PAYG
1	24	PRA	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88	347.88
		PAYG	158.54	158.54	275.16	275.16	327.63	327.63	380.16	380.16	628.71	628.71	880.21	880.21
		Select	PRA	PRA	PRA	PRA	PRA	PRA	PAYG	PAYG	PAYG	PAYG	PAYG	PAYG

Notes: *PAYG* refers to the pay-as-you-go system and *PRA* to the personal retirement account plan.

Table A.2: Consumption: Average Effect of the Treatment on the Treated Using Alternative Nonparametric Methods

Labor Income	Kernel Matching Bandwidth			Nearest-Neighbor Matching
	$1.06\sigma n^{-1/5}$	$2.5\sigma n^{-1/5}$	$0.9\min(\sigma, IQ/1.34)n^{-1/5}$	
Lower income	0.1040	0.0942	0.1006	0.0943
Standard error	[0.0550*]	[0.0525*]	[0.0555*]	[0.0694]
Observations	3,887	3,887	3,887	3,887
Higher income	–0.0431	–0.0590	–0.0597	–0.1216
Standard error	[0.0709]	[0.0624]	[0.0736]	[0.0965]
Observations	2,168	2,168	2,168	2,168
All in sample	–0.0325	–0.0364	–0.0386	–0.0871
Standard error	[0.0498]	[0.0476]	[0.0512]	[0.0635]
Observations	6,055	6,055	6,055	6,055

Notes: The kernel function used is the Epanechnikov, and the bandwidths are a rule of thumb suggested by Silverman (1986). σ is the standard error of the propensity score; *n* is the sample size; and *IQ* is the interquartile range. The standard errors of the kernel and nearest-neighbor matching are obtained with the bootstrap methods. The propensity score includes age, gender, education, occupation, number of jobs, total number of household residents, number of children, total number of men in the household, family type, community size, and regional dummies. We refer to those earning less than five times the minimum wage as lower-income workers and those earning more than five times the minimum wage as higher-income workers.
** Significantly different from 0 at the 5-percent level.
* Significantly different from 0 at the 10-percent level.