FETTERED CONSUMERS AND SOPHISTICATED FIRMS:
EVIDENCE FROM MEXICO'S PRIVATIZED SOCIAL SECURITY MARKET

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Fettered Consumers and Sophisticated Firms: Evidence from Mexico's Privatized Social Security Market
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ABSTRACT

This paper brings new evidence on the efficacy of government "nudges" in markets where profit-maximizing firms sell complex products to consumers. We use administrative data from the privatized Mexican Social Security system surrounding a government information intervention, examining both investor behavior and firm response. We show that investors were not sensitive to fees when choosing between fund managers selling regulated and similar funds. Price insensitivity and inertia contributed to sustained high management fees despite many firms participating in the market. To address this market failure, the government constructed an official fee index which combined load and management fees into one index and made this index salient to workers. We show that workers became very sensitive to this index even if doing so caused them to choose a higher-cost fund. In contrast, firms responded optimally to the index and demand shift, exploiting the index formula to lower their index while raising revenues. This erased gains from the policy and redistributed costs from high- to low-income segments of the market. We conclude that effective policies aimed at facilitating complex consumer choice also need to incorporate firm incentives. We discuss applications to current domestic policy debates.

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An online appendix is available at:
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1 Introduction

There is growing empirical evidence that consumers may not choose optimally when faced with difficult or complex choices involving uncertainty, imperfect information, or delayed payoffs over long time horizons (Thaler and Sunstein 2008). In these situations, people may follow the path of least resistance by making decisions based on shortcuts, approximations, or readily available information as a proxy for costly optimization. For example, people may be overly sensitive to default rules or use simple heuristics when allocating resources across investments (Benartzi and Thaler 2001; Madrian and Shea 2001; Cronqvist and Thaler 2004; Benartzi and Thaler 2007; Beshears et al. 2006; Choi, Laibson and Madrian 2010). They respond to advertising, brand name, peer opinion and irrelevant information, or focus on easy-to-understand or salient prices when making decisions (Ausubel 1991; Duflo and Saez 2003; Liebman and Zechauser 2004; McFadden 2006; Cronqvist 2006; Choi, Laibson and Madrian 2007; Kling et al. 2008; Mullainathan, Schwartzstein and Shleifer 2008; Chetty, Looney and Kroft 2009; Abaluck and Gruber 2011).

This has led researchers to suggest that governments can move markets towards efficient outcomes by designing policies that facilitate informed consumer choice (McFadden 2006; Thaler and Sunstein 2008). However, there is little empirical evidence on how strategic firms may react to consumer biases and government policies to shape outcomes (Ellison 2006; Hastings, Madrian and Skimmyhorn 2012). This paper brings new evidence from the privatized social security system in Mexico, offering insight into investor behavior and the efficacy of government "nudges" in the context of fettered consumers and profit maximizing firms.

Mexico privatized its social security system in 1997, moving from a pay-as-you-go system to a defined contribution system with individual private accounts managed by approved private fund managers. Social security and payroll taxes totaling 6.5% of salary are automatically deducted from payroll each month and placed in the personal social security (SAR) account. Workers choose between any of the approved fund managers regardless of place of employment. Between ten and twenty-one well-known firms have competed in the market since the system's inception.

Despite the large number of firms, tight investment regulations and centralized data processing, high fees persisted since the inception of the system (Hastings, Hortaçsu and Syverson 2012). During our sample period, from 2004 through 2006, the average up-front fee on contributions (loads) paid across investors was 24% and the average fee paid on assets under management was 0.268%. These fees were often higher

than fund shares offered to independent investors, suggesting that price inelasticity of demand could be the source of persistently high fees.

Halfway through our sample, the government introduced a new fee index to increase transparency of and sensitivity to management fees. The index combined fund manager load and balance fees according to a particular formula. The government broadly advertised the index to workers as the fee measure they should consider when choosing a fund manager. Because the fee index combined fees using particular assumptions, choosing a lower index firm could actually lead many workers to choose a higher-cost fund for them. We exploit this policy change to test if insensitivity to fees stemmed from a misperception of complex management fees, as opposed to value placed on non-fee attributes or indifference.

We use rich administrative data on individual accounts to establish the following. First, pre-intervention investors from all backgrounds paid little attention to fees when choosing fund managers and displayed substantial inertia, contributing to high equilibrium fees. Post-intervention, investors became sensitive to the index even if doing so caused them to choose a higher-cost fund. Investors of all backgrounds largely ignored actual costs, choosing instead a simple-to-understand cost measure when it was made more salient by government policy. In contrast to investors, firms responded optimally to the changes in demand induced by government policy. We show that the fee index formula over-weighted load fees and under-weighted fees on assets under management, giving firms an incentive to lower load fees and increase management fees. This is in fact what they did. We estimate a model of demand and supply to show that the fee restructuring was a best-response for profit-maximizing firms to the policy intervention and demand shift. We find that firm re-optimization mitigated intended gains from the "nudge" and redistributed management fees from high-income to low-income segments of the market.

Our paper contributes to the literature in Behavioral Industrial Organization (DellaVigna and Malmendier 2004, 2006; Ellison 2006; Gabaix and Laibson 2006) by analyzing how consumer biases and decision making costs impact market outcomes in a privatized social safety-net market, and examining the success of government nudges in a marketplace with sophisticated and strategic firms. The analysis of data from well-identified but isolated controlled experiments in the field or laboratory has documented behavioral shortcomings in complex decisions. (e.g. Duflo and Saez 2003; Beshears et al. 2008; Kling et al. 2008; Choi, Laibson and Madrian 2010). These results bolster the idea the government policy can increase efficiency by incorporating behavioral biases. However, market impacts are difficult to extrapolate. We analyze a natural experiment in which a government implemented a nudge in a large privatized social

security market, and contribute added evidence to this literature.[1] However, our data and policy experiment allow us to go further, providing evidence on how consumer biases impact market outcomes and how firms can impact the success of government nudges aimed at facilitating consumer choice. We conclude that such policies need to provide the right competitive incentives for firms to be effective.

This paper proceeds in five sections. Section two provides background on the privatized social security system in Mexico. Section three describes the government nudge. Section four describes our data and empirical results, and section five concludes.

2 Background

2.1 Overview

Mexico's privatized social security system has been in effect since July 1, 1997. The objective was to make the pension system financially viable, reduce the inequality of the previous pay-as-you-go system, and increase the coverage and amount of pensions through the establishment of individual ownership of retirement accounts. The government approved private fund administrators called Afores (Administradoras de Fondos para el Retiro) to manage the individual accounts and established CONSAR to oversee this new Sistema de Ahorro para el Retiro (System of Savings for Retirement - SAR). Six-and-one-half percent of wages are deposited bimonthly into the SAR account, and the worker can withdraw from this account for retirement (age 65 for men and age 60 for women), disability in old age, and a limited amount of insurance when unemployed.[2] In June 2007, SAR had over 25 million registered accounts, and total funds in the system exceeded 1.27 trillion pesos.[3]

During our sample period, January 2004 - December 2006, there were between twelve and twenty-one Afores in the market. Ten firms were present since the inception of the system and three firms entered in

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[1] Another literature uses observational data from market settings to analyze how behavior falls short of a neo-classical forward-looking ideal, for example Abaluck and Gruber 2011 analysis of Medicare Part D choices. In addition, some studies use changes in policies for savings for retirement or health care plans in particular firms (which precludes consideration of supplier or market response) to identify the importance of behavioral biases or decision-making costs, for example Madrian and Shea 2001 and Handel 2011.

[2] Mandatory contributions to the retirement account come from three places: the worker contributes a mandatory 1.125% of her base salary, the employer contributes an additional 5.15%, and the government contributes 0.225% of the base salary as well as a "social contribution" of 5.5% of the inflation-indexed Mexico City minimum wage ("Ley de Seguro Social," Section V, Article 168. Diario de la Federación 21 December 1995). Workers can withdraw unemployment insurance from the account of 1-3 months of salary depending on the amount available in the account and their contribution history. Workers must have 3 years of contributions to the account to qualify for unemployment insurance withdrawals. This benefit can be used one time in every five year period.

[3] http://www.consar.gob.mx/otra_informacion/pdf/transparencia/informe_semestral_1_2007.pdf; "Registered Accounts" category excludes assigned, uncertified accounts.

the final months of the sample. CONSAR approves each Afore's entry into the market. Afores must submit for approval by CONSAR fee schedules and any subsequent fee changes the Afores wish to implement.[4]

Table 1 lists the entry date and description of each Afore.. The Afores range from prominent Mexican banks like Banamex to international investment firms like HSBC and department store chains like Coppel (similar to Sears); all are well-known institutions in Mexico with sizable physical presence and longevity in finance, insurance or retail sectors.

2.2 Afore Approval, Operation and Investment Restrictions

During our sample, Afores were required to offer two age-based investment funds called Siefores (Specialized Investment Groups for Retirement Funds): a "higher-risk" fund for workers 55 and under called Siefore Básica 2 and a "low-risk" fund for workers over 55 called Siefore Básica 1.[5] Since management fees were set at the Afore level, the same management fee applied to both Siefores within each Afore. In addition, affiliates could not split their funds between Afores or Siefores. At any given time, affiliates could keep their funds with only one fund and one administrator; they could not split their SAR funds between fund managers or between funds within the same fund manager.[6]

The investment possibilities for each Siefore were heavily regulated by CONSAR. Siefore 1 was effectively restricted to investing in Mexican government bonds. Although Siefore 2 could include investments in equities, equity investments were capped at 15% and the investment vehicles were restricted to Principal Protected Notes and Exchange Traded Funds tied to major stock indices. These restrictions implied that Afores differed little on persistent performance. Tests for persistent outperformance using monthly returns show no significant difference between fund manager returns (full regression results available in the Online Appendix, section A1).[7]

2.3 Management Fees

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[4] Article 37, Ley de los Sistemas de Ahorro para el Retiro (Article 37, Retirement Saving System Law).

[5] In March of 2008, the system moved to a 5-fund age-based system introducing 3 'higher-risk' funds with broader investment possibilities for younger workers. See press release 08/07 for details.

[6] For these reasons we will focus our analysis on Afore choice since Siefore choice is completely determined by age of the worker and has no impact on relative costs.

[7] The appendix for this paper is available online at http://www.justinehastings.com/images/downloads/DuarteHastings_2012-11_Appendix.pdf.

Afores were allowed to charge two different types of fees, a load fee and a fee on assets under management. Despite the tight investment regulation Afores charged high and disperse management fees. The load fee was referred to as a "flow fee" because it was quoted as a percent of the worker's salary instead of as a percent of the contribution to the account. Only contributions, not account transfers, were subject to the load.[8] This convention implied that flow fees were reported in a way that made them seem smaller than they were - a flow fee of 1% of salary is actually a 15.4% load fee on the contribution of 6.5% of salary (1/6.5 =0.154). In June 2006, flow fees ranged from 0.5% - 1.65% (i.e., a 7.7% - 25.4% load). The fee on funds under management was referred to as the "balance fee". In addition to the flow fee, firms charged balance fees ranging from 0.12% to 1.5%.

There are two important facts to note. First, high fees were not just an artifact of social security account management costs in Mexico. Afore investments were regulated, and system processes were centralized to minimize system management costs. The management of central processes was put out for bid on multi-year contracts, and Afores paid regulated fees for centralized account processes.[9] In addition, Afores offered shares in Siefores, account management to independent workers, and account management for voluntary savings in retirement accounts. These identical investments often had lower management fees and charged only a balance fee with no load fee (see example in the Online Appendix, section A2).

Second, the mixture of fees between loads and balances implied that the cheapest Afore for a given worker was not necessarily the cheapest for another since total costs depended on the wage to balance ratio of each worker. For example, a family member who was employed in, and planned to leave , the formal labor force to raise children and work within the household could disregard the flow fee and choose the Afore with the lowest balance fee. He or she would expect to have zero contribution flow into his or her pension account while out of the formal labor force. The same would apply to someone exiting the formal sector to take a job in the informal sector for a sizable period of time. In Mexico, there is an active informal labor sector: 30% of SAR account holders with a college education or more (overall 27% of investors) spend time in both the formal and informal employment sectors from 2005 through 2010, and 60% of workers with non-college backgrounds spend time in both sectors over the same time period.[10] Forward-looking agents with full information should take advantage of relative fee changes and

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[8] In other words, there are no monetary costs of transferring an account from one Afore to another.
[9] For example, internal information from CONSAR staff indicated that in 2008, fees for registering a new account were 25.99 Mexican pesos, 0.62 pesos for processing each contribution into the account, and 5.47 pesos for each switching of accounts (fee charged to the Afore accepting the account). One dollar is approximately 12 Mexican pesos.
[10] Based on author's calculations from the 2010-2011 Encuesta de Empleo Retiro y Ahorro, a household survey with field experiments of approximately 7,500 SAR account holders randomly sampled from the administrative data and residing in Distrito Federal.

move to a fund manager with zero balance fees upon leaving the formal sector. This provides variation in the relative management costs of each Afore as well as a simple test for forward-looking behavior.

In addition, further variation in management costs was induced by a change in regulatory policy towards tenure discounts. Most firms offered a small tenure discount off of the flow fee for clients that had passed a certain tenure point with the Afore. This was typically a basis point discount per year of tenure, making other Afores relatively more expensive as tenure increased. In January 2005, CONSAR required that all tenure discounts be recalculated based on years in the system instead of years with an Afore, erasing the built-in switching costs.[11] This regulatory change caused further differential shocks to relative fund manager expenses across individuals during the first half of our sample period.

3 Regulatory Changes, Information and Management Fees

Of course, multiple fees, discounts, and changes in discount rules make it more difficult to calculate the alternative costs of each Afore. To simplify fee information for affiliates, CONSAR created a composite fee index called the "Equivalent Fee on the Balance." Beginning in July of 2005, CONSAR made a specific version of this fee into an official fee index and publicized it as the fee workers should consider when choosing an Afore. We will refer to this fee as the CEF (CONSAR's Equivalent Fee). The index is constructed in the following way: calculate the accrued balance for a person with wage W, balance B, and tenure T at the end of time horizon H at each Afore's current flow and balance fees and a real rate of return (assumed uniform across Afores at 5%), then calculate the balance fee that would lead to the same balance if flow fees were set to zero. This is the Equivalent Fee on the Balance, and it is expressed as an annual percentage rate.

Prior to July 2005, CONSAR calculated this fee using a 25 year horizon which implied that the 25 year CEF (CEF25) was close in magnitude to balance fees. Differences between Afores in the CEF25 were therefore small in absolute value even though these small differences imply large differences in account balance when compounded over 25 years.

From July 2005 onward, CONSAR mandated that the CEF be computed over a 1 year period (CEF1) instead of over a 25 year period. This tripled the size of the CEF, making it closer in size to a flow fee (as a percent of wage) than the balance fee, and increased the absolute fee difference between the Afores. In

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[11] "Decreto por el que se reforma y adiciona la Ley de los Sistemas de Ahorro para el Retiro" Diario de la Federación. 11 Jan 2005. Accessed at www.dof.gob.mx on 12 July 2012.

addition to changing the CEF used from the CEF25 to the CEF1, CONSAR introduced new regulations requiring the prominent display of a comparative CEF1 table on the front page of each worker's account statement.[12] They also required that each affiliate sign a form stating that (he or she) saw and understood the CEF1 table when submitting an application to switch Afores, potentially harnessing Afore sales force to advertise the CEF1 when recruiting customers.

Table II, columns 1 and 2 show the flow fee as quoted (a percent of salary), the implied load as a percent of contributions (flow fee / 6.5), and the balance fee for each Afore in June 2005 (on the eve of the CEF1 introduction and information mandate). The table is sorted in ascending order by CEF25 (column 5). Actinver is at the top with a CEF25 of 0.55, and Profuturo is last with a CEF of 1.14. Columns 3 and 4 show the share of account holders and assets under management in each Afore as of June 2005.

Note that larger share firms are located in the lower half of the table. In addition, firms like Santander and Banamex are dominated on both fee dimensions by other firms, yet have larger market shares.

Columns 5, 6 and 7 show the CEF25, the CEF1 and the rank of the Afore according to the CEF1. Note that the size of the CEF increases 3 to 5 fold when the one year amortization is used. In addition, the relative ranking of the firms based on the CEF changes substantially even though the underlying management fees used for the calculation are unchanged. Changing the CEF formula may have resulted in a large change in perceived management fees even though the actual fees were unchanged.

The change in the CEF formula is a transformation of actual fees and does not reflect actual cost for the individual. Therefore, choices by rational and full-informed consumers should not depend on the CEF or the change in the CEF formula. Choices by rational and fully-informed consumers should not take into account the CEF or the change in its formula as they are a transformation of actual fees, and do not reflect actual costs for the individual. Instead they should make an expected cost forecast given their information on expected formal-sector earnings and account balance and the actual flow and balance fees being charged. However, if consumers follow shortcuts and focus on the CEF post-intervention, demand elasticity with respect to the CEF could change, impacting the elasticity of demand with respect to balance versus flow fees (according to their respective impacts on the CEF).

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[12] June 2005 press release from CONSAR, archived here and accessed on July 12, 2012: http://www.aiosfp.org/noticias/boletines/modificaciones_normativas/BP-10_20JUN05.pdf.

The 1 year CEF is much more sensitive to the flow versus the balance fee. Table III shows the derivative of the CEF25 and the CEF1 with respect to flow and balance fees, evaluated at the fees as of June 2005 (the eve of the reform). Note that the responsiveness of the CEF1 to the flow fee quadruples relative to that of the CEF25, while the responsiveness to the balance fee decreases slightly. An Afore could lower their flow fee by one percentage point, and raise their balance fee by about 2.1 percentage points and their CEF1 would remain the same. Under the CEF25, this same restructuring would have resulted in a substantially higher CEF. Furthermore, under the new CEF1, a firm could have lowered their flow fee by one percentage point and raised their balance fee by 1.75 percentage points and still lowered CEF1. Depending on how much weight investors place on the CEF1 with the new information campaign and the characteristics of their existing and marginal clients, Afores could optimize by rebalancing their fee structure to lower their CEF without lowering effective management costs.

4 Empirical Analysis of Response to Information

4.1 Summary Statistics on Demand and Supply Response

We construct a panel data set for investors and firms from raw administrative data from January 2004 through December 2006. The data records labor force participation, earnings, mandatory contributions to retirement accounts, account balances and movements between Afores for all account holders from the inception of the system through the end of 2006. We combine this with a monthly panel of Afore fees and a constructed history of regulatory changes published in official government registries. The combined data allow us to measure the impact the information intervention had on investment choices, demand for fund managers, and firm pricing strategies.

We begin by looking at raw data on movement of accounts between Afores before and after the policy intervention. Specifically we break our sample into three time periods: January 2004 through June 2005, July 2005 through December 2005, and January 2006 through December 2006, corresponding to the period before the policy change, after the policy change but before firms could have new fee schedules submitted and approved, and after the policy change including firm responses to policy. [13]

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[13] Afores submit fee changes in November of each year for approval by CONSAR, and fees become effective 60 days after the approval process. It is possible for an Afore to submit a claim for fee authorization at another time, however this convention explains why the majority of fee changes occur at the start of 2006 and 2007. The policy was put into law with the 2008 reforms. "Ley De Los Sistemas De Ahorro Para El Retiro," Article 37. Accessed from the Comision Nacional del Sistem de Ahorro Para el Retiro. http://www.consar.gob.mx/normatividad/pdf/normatividad_ley_sar.pdf. (2012).

Tables IV and V summarize movements in accounts between Afores at the time of choice in each of our three time periods of interest. We construct several measures of management costs and examine whether investors were moving from higher- to lower-cost Afores along each of these measures before or after the information intervention. We show the 25th, median, and 75th percentile, among those switching fund managers using individual's actual choices. In brackets beneath each statistic we display what the statistics would have been if switchers had chosen a new fund manager at random according to market share in June 2005 rather than the one they actually selected.[14] This allows us to compare how much "better" investors do relative to a measure of random behavior, as the information policy comes into effect and firm fee schedules change.

Table IV shows that pre-intervention, the median investor was moving to a 2-rank-higher CEF25 fund manager than their current one, even though choosing a new fund manager according to market share would have led them to a 0.94 higher CEF fund manager. Their new fund manager charged a slightly higher flow fee (0.01) and a slightly higher balance fee (0.05) than their old fund manager. By moving to the cheapest flow-fee or balance-fee fund, the median investor could have saved 1.10 flow (17% load) or 0.40 balance fee. Pre-intervention, investors are not choosing to minimize fees along any one of these three dimensions in absolute terms or relative to random choice.

In contrast, beginning in July 2005 when the information intervention starts, the median investor immediately chooses funds with 2-rank-lower CEF1, which results in lower flow fees (-0.13) but higher balance fees (0.05) in line with the higher correlation between the CEF1 and flow fees. Note the entire distribution of behavior shifts towards markedly lower CEF1 fund managers – from the 75th to the 25th percentile, indicating that investors became much more sensitive to the CEF index post-intervention. In addition, investors move towards lower CEF1 funds than our random choice measure would imply. Investors are now doing "better" on this index measure and consequently on flow fees than random choice. However, investors remain worse on balance fees along the CEF1 measure of prices, and consequently better on flow fees but slightly worse on balance fees. The final three columns show that these changes in choice behavior continue through the end of the sample, once firms change fees in response to the policy and its impact on demand.

Figures I, II and III show how the CEF, the flow and the balance fees changed post-information intervention. Figure I plots the CEF over time, using the CEF25 pre-information-intervention and the

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[14] Specifically, for each investor moving to a new Afore, we assign a probability of choosing each Afore equal to their relative market share in June 2005 so that the shares of the Afores the individual could move to add to one. We then use these shares as probabilities of choice to calculate expected changes in fees and costs for each individual from changing fund managers.

CEF1 post-information-intervention. In the pre-period, the CEF is relatively flat, with most changes caused primarily by periodic changes in the underlying assumptions used to calculate the equivalent fee. Post June 2005, but prior to January 2006 (during the waiting period for fee change approval), the level the CEF increases and the relative rankings change substantially with the new CEF1 formula (recall Table II). Starting in January 2006 we see dramatic declines in the fee index, indicating that competition in response to the changed choice behavior in Table IV, columns 3 through 5, is driving the index down.

Figures II and III show the underlying changes in flow and balance fees driving the CEF declines in Figure I. Pre-June 2005, flow fees were nearly unchanged, and if anything balance fees were declining slightly over time. Post-intervention, firms lowered flow fees and raised balance fees substantially in the first months of 2006 and again in the first months of 2007, consistent with the fee change submission and approval cycle. This restructuring of fees, rather than across-the-board fee-lowering, drives the apparent competition on the CEF1 fee index, making the final impact on management costs unclear.

To measure the impact of the information intervention and subsequent fee restructuring on measures of management costs, we construct three cost measures and summarize how these cost measures change as investors move between Afores in Table V. The first measure is a present discounted value of cost until retirement based on each individual's average wage and formal-sector employment rate over our three year period. The second is a predicted cost measure which uses actual baseline formal-sector employment and wages at the time of switching to construct an expected wage and formal-sector employment rate going forward based on individuals with very similar baseline characteristics (age, system tenure, gender, historic employment rate, balance and wage). The third is a myopic cost measure which assumes that the individual's current employment status and wage at the time of switching is what they expect going forward. We show all three measures for comparison; they yield qualitatively similar results. However, in other contexts with similar multi-fee characteristics (health care plan choice or cellular phone plan choice) the literature has focused on predicted cost measures as they are less likely to be endogenous to plan or provider choice.[15] We will use that measure for much of the subsequent analysis.

For each of these cost measures, we convert the present discounted value of management costs from pesos to days of current wages according to administrative wage records to facilitate comparison across individuals. Pre-intervention, the median investor was moving to a fund manager with *higher* expected

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[15] See for example, Miraveti 2003, Heiss McFadden and Winter 2010, Abaluck and Gruber 2011, Handel 2011, Einav et al. 2011, Grub and Osborne 2012, and Jiang 2012. *A priori,* fund manager choice is much less like likely to cause future labor force participation than health care plan choice is likely to cause subsequent use of different health services or cell phone plan is likely to cause calling behavior. However, Hastings Hortaçsu and Syverson (2012) show that demand elasticities calculated using actual costs are smaller in absolute value than those using similarly constructed predicted costs.

costs than the one they were currently in, equivalent to 7.51 to 17.70 days of work at current wages amortized from the switching date to retirement. While this movement was to a higher-fee fund it was slightly better than choosing by our random choice measure. However, the median worker is far from minimizing costs along any of the measures; had they switched to the lowest-cost fund for them, they could have saved between 115.93 and 125.55 days worth of management costs. Post-intervention, these statistics change slightly. The median investor is now moving to a fund manager with a few days lower expected management costs. There is still a substantial fraction of investors moving to much higher-cost-for-them firms. Investors overall are leaving a substantial amount of money on the table by switching to their firm of choice relative to the cheapest fund-manager-for-them along any of the three cost measures. This is partly explained by the fact that the CEF1 does not minimize fees for all investors. Many investors should pay more attention to the balance fee rather than the flow fee because of their relative balance to expected formal sector wage contributions. If the CEF1 had induced firms to lower both fees, seeking a lower-CEF1 fund might have led all investors to a low-cost-for-them fund manager. However, because lower CEF1's came through a combination of lower flow fees but higher balance fees, many investors may have moved to a lower-CEF1 fund that was actually higher-cost-for-them.

To illustrate this point, Figure IV shows the share of account movements pre- and post-intervention that moved to each combination of higher/lower cost/CEF Afores, where cost is measured using our Predicted Cost measure (results are very similar across all three cost measures). Pre-intervention, 40.4% (35.7+4.7) of switchers moved to a lower-CEF25 Afore, but post-intervention, this number jumped to 63.6% (22.9+40.7). However, of that 63.6%, over a third of them (22.9%) moved to an Afore with higher expected costs for them. This is due to the fact that one year costs shift individuals to Afores with low flow fees even if those flow fees are irrelevant to them. On average, though, because most people expect positive account flows, the increased focus on the CEF caused by the information intervention resulted in more people overall moving to lower-cost-for-them Afores (55.9% post versus 41.6% pre-intervention).

Investors responded to the information intervention by seeking lower CEF1 Afores even if that led them to choose higher-expected-cost Afores. This suggests that the response to the CEF1 was caused by investors following shortcuts as substitutes for costly optimization. If price insensitivity apparent in summary statistics on account movements was caused by preferences for non-price attributes then government price indices should have no impact on overall choice behavior. If investors correctly understand the index, they should ignore it if it is inversely correlated with their own expected management costs.

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Further evidence can be seen by examining how choices changed by subgroups according to formal sector employment, age, and experience in the system. Table VI shows median statistics for Afore choice before and after the CEF1 by formal-sector employment. Comparing choice behavior pre-intervention by employment status, we see that those who are never formally employed are not moving towards low-balance fee funds when compared to those who are always formally employed. This is true even though the balance fee is the relevant fee for them and they have equally as much balance fee to save by moving to the cheapest balance-fee Afore. Both fully employed and fully unemployed workers increase focus on the CEF post June 2005. However, doing so decreases predicted costs for the fully employed (from 9.54 to -19.35) but increases predicted costs for the fully unemployed (0.00 to 0.67). Both types of workers switch to lower flow-fee and higher balance-fee firms post-information intervention, despite the fact that they should place very different weights based on their formal sector labor participation.[16]

Table VII repeats Table VI but focuses only on individuals with a last-recorded-formal sector wage in the top quartile of wage earners. We use this as a proxy for education of the worker to examine if those who are likely highly-educated and always unemployed choose Afores to minimize personal management costs. Again, even among this group, we find little difference in behavior between those always and never formally employed during our 3 year sample. If anything, those never employed appear to move towards lower flow-fee Afores pre-intervention, and both types of workers appear to choose lower CEF1 Afores post-intervention which leads to slightly higher average costs (from June to December 2005) for those not employed in the formal sector.

Tables VIII and IX split the sample by age and by length of participation in the system, respectively, where length of time in the system is defined by the time since first formal sector wage contribution under the new 1997 privatized social security system. First, workers of all ages shift from choosing higher-CEF Afores to lower-CEF Afores post-intervention. In addition, they shift towards choosing lower flow-fee but higher balance-fee Afores. Table IX shows similar patterns by years of experience with the system. Since the system is approximately ten years old at the end of our sample, this effectively compares those who had accounts at the beginning of the system with those who joined the system relatively recently. This measure is correlated with age, but not perfectly, as workers from a wide range of ages join the system each year as they start employment in the formal sector for the first time. Interestingly, before the information intervention, experienced workers were slightly better choosers and the only group to move to slightly lower fee funds relative to random choice based on market share. However, relative to

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[16] Note that there are many more workers actively switching who are always formally employed versus never formally employed during this period. This is not because full employment is more common, but instead because workers not actively employed in the formal sector are very unlikely to switch fund managers. See online Appendix Section 3 for further details.

randomly choosing another Afore according to baseline market share, both experienced and inexperienced workers shift their focus towards the CEF1 post-intervention. This leads them to choose lower flow-fee-higher balance-fee options, even though this would lead many experienced workers to a higher-predicted-cost fund manager.

4.2 Linking Fee Restructuring to the Policy Change through Demand and Supply

The government information "nudge" was effective at shifting demand, but towards a measure that was not necessarily positively related to management costs for many workers in the system. Firms were effectively required to advertise this fee index as it was mandated to be displayed on the front page of each statement, and in every switching transaction from one Afore to another. Thus the information intervention may have been successful in part because it harnessed the sales force of Afores to advertise it. Profit-maximizing Afores may not have protested the fee index if it allowed them to rebalance their fee structure to increase profits while attracting customers who were seeking lower fee index funds.

To more formally link the changes in Afore fee structure to the policy change and its impact on demand and firm incentives, we estimate demand for fund managers as a function of the CEF and management costs from January 2004 through December of 2006. We then use data on all account holders to calculate each Afore's best response flow fee and balance fee to the information intervention and the resulting change in demand given characteristics of their current account holders.

Afores set fees to maximize present discounted value of expected profits given assumptions about demand. In any period, Afores generate revenues from two sources: individuals who are their current customers and do not evaluate their accounts in a given period, and individuals who are actively choosing between Afores. The present discounted value of profits for an Afore j on the eve of the policy intervention (June 2005) can be written as:

$$\Pi_j = \sum_t [\delta^t M_{it} * rev_{ijt} * S_{ij0} \prod_{k=0}^{t}(1-\alpha_{ik}) + M_{it} * rev_{ijt} \delta^t \sum_{l=0}^{t-1}\{\alpha_{il} q_{ijl} \prod_{k=l+1}^{t}(1-\alpha_{ik})\}$$

$$+\delta^t M_{it}\alpha_{it} * q_{ijt} * rev_{ijt}] \tag{1}$$

where, α_{it}, is the probability that an individual of type i evaluates her savings and retirement account and her Afore choice in any time period t, S_{ij0} is an indicator if a person of type i is an affiliate of Afore j in

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June 2005 (time 0), M_{it} is the market size (number of investors) of type i in time t, rev_{ijt} is the expected revenue that Afore j will receive from a customer of type i given j's fee structure and i's characteristics and preferences at time t, q_{ijt} is the demand for Afore j from consumer of type i at time t, and δ is a discount rate.[17]

To simplify the analysis we will assume: i) $\alpha_{it} = \alpha_i$ so that the probability that a person of type i evaluates her SAR account and Afore choice is constant over time, ii) preferences governing demand for Afores are also the same over time for an individual of type i, iii) potential revenues are constant over time and iv) the flow of retirement out of and entry into the savings and retirement market is constant over time. With these simplifying assumptions, the present discounted value of profits for each Afore j from individuals of type i can be re-written as:

$$\Pi_{ij} = M_i rev_{ij} S_{ij0} (1-\alpha_i) \sum_{t=0}^{T} (\delta(1-\alpha_i))^t + M_i rev_{ij} \alpha_i q_{ij} \sum_{t=0}^{T} \delta^t \sum_{l=1}^{t} (1-\alpha_i)^l + M_i rev_{ij} \alpha_i q_{ij} \sum_{t=0}^{T} \delta^t \qquad (2)$$

where, α_i, is the probability that an individual of type i evaluates her savings and retirement account and her Afore choice in any period, S_{ij0} is an indicator if person of type i is an affiliate of Afore j in June 2005 (time 0), rev_{ij} is the expected revenue that Afore j will receive from i given j's fee and q_{ij} is the demand for Afore j. Online Appendix Section A4 derives equation (2) from (1).

The first term of equation (2) is the net present discounted value of revenue the Afore receives from its current (June 2005) client base who never evaluate their account. These individuals will choose Afore j no matter what the fee is as they never 'wake up' to evaluate their account. The average worker in fact has never switched Afores from the original Afore they signed up with, and only 10 percent of account holders switch per year. There are segments of the population that switch every few years, and segments that never switch. The Online Appendix, section A3 presents estimates from a discrete time hazard model of Afore switching. It demonstrates that the single largest determinant of Afore switching is employment status: active workers in the formal sector are more likely to periodically switch Afores, while workers who are inactive and no longer making contributions to their account for more than 6 months are very unlikely to switch fund managers (they effectively do not switch). Thus the inframarginal, or 'captive' account holders are unlikely to have flow fee revenues, but likely to have balance fee revenues. Marginal

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[17] See the Appendix, section A4 for the full derivation of this formula.

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customers are likely to have flow and balance fee revenues as they are likely to be actively participating in the formal sector. Thus lowering flow fees but raising balance fees could both increase revenues on inframarginal clients and attract new clients by lowering the CEF1.

The second term is the revenue from individuals who evaluate their account at date t and choose Afore j with probability q_{ij} according to j's characteristics and their preferences over those characteristics given their type i, but then do not ever evaluate their account again until a later future date. They therefore add to j's inframarginal consumer base in future dates. The third term is revenues gained each period from those who evaluate their Afore choice and decide to select Afore j with probability q_{ij}.

Thus an Afore's profit is affected by fees through the impact on revenues for current clients who are not paying attention to their accounts and through the impact on expected revenues and expected demand response for those evaluating their accounts in a given period and switching to Afore j based on their preferences for relative fees and non-fee characteristics.

Workers evaluating their fund manager choice select an Afore, j, to maximize utility function as a function of expected management costs, $cost_{ijt}$, the CEF_{jt}, and Afore-specific values, v_{ijt}.

$$u_{ijt} = \alpha_{ijt} cost_{ijt} + \gamma_{ijt} CEF_{jt} + v_{ijt} \qquad (3)$$

In theory a worker should not care about the CEF in-and-of-itself, as it does not reflect management costs for them. Instead the CEF combines fees in a nonlinear way according to assumptions on tenure, contributions and balances which change with government policy and do not reflect any individual worker particularly well. However, if workers follow shortcuts, defaults and suggestions in lieu of costly optimization, the CEF may drive choices. Actual management costs may not.[18]

To tractably allow for preference heterogeneity, we estimate this model separately pre- and post-information intervention, setting the CEF equal to the CEF25 pre-intervention and the CEF1 post-intervention. Within each regulatory period, we estimate a conditional logit model separately by age

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[18] This equation is effectively a reduced-form version of a more complex model in which agents optimize over what information to pay attention to when faced with costly optimization. See DellaVigna (2009) and Gabaix (2012) for examples of modeling costly decision making.

quartile, wage quartile, and gender, allowing preferences for all Afore characteristics to fully interact with these demographic characteristics.

$$u_{cjt} = \alpha_{cjt} cost_{ijt} + \gamma_{cjt} CEF_{jt} + \delta_{cjt} + \varepsilon_{ijt} \tag{4}$$

Where c indexes the demographic cell that individual i falls into, j indexes the Afore, t indexes the pre-intervention versus post-intervention periods, δ_{cjt} is a cell-time period mean valuation for Afore j which captures mean observable or unobservable characteristics of the Afore such as expected future returns, prevalence of branches, friendliness of service, etc., and ε_{ijt} is an i.i.d. extreme value error term.

4.3 Estimation

Coefficients on management costs versus coefficients on the CEF are identified in several ways. First, as mentioned in the discussion of Figure I, changes in "supuestos" (assumptions placed on the balance, wage, tenure and minimum wage level used in the CEF formulas) cause periodic changes in the CEF's of the Afores independently from changes in underlying fees. Second, regulations in the pre-period changed how discounts for tenure were applied. This exogenously changes the relative flow fees of each Afore based on each individual's system versus Afore tenure and each the Afore's predetermined discount policy. Third, changes in fees change the costs versus the CEF in different ways for different workers based on how different the worker is from the "supuestos" used to make the CEF. Fourth, even conditional on demographics and area of residence, workers will face different costs at each Afore based on their endowment balance when the system privatized (Hastings, Hortaçsu and Syverson 2012), and their relative expected time spent inside or outside of the formal sector. Finally variation in the choice set over time comes from a handful of entries and exits during the pre-period. In each specification, estimated sensitivities to CEF versus cost are robust to the inclusion of one or both of the fee measures in the utility function, implying that the impact of each on demand is separately identified.

Table X shows summary statistics for demand elasticities with respect to cost and the CEF pre- and post-intervention. We evaluate the elasticities at the estimated parameter on the full estimation sample. Pre-intervention (column 2), the average elasticity with respect to the CEF across all individuals was negative but clearly less than one in absolute value. Post-information intervention (column 4), the average is close to if not over one for every Afore, with the exception of Inbursa, the financial arm of the Grupo Carso conglomerate owned by Telmex magnate Carlos Slim, which had not changed its fee structure (.50, .50)

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for a decade and did not change fees in response to the CEF change. Elasticities with respect to expected management costs were near zero before (column 1) and after (column 3) the information intervention.[19]

Table X column 5 uses a control function approach to instrument for post-intervention fee changes. Because our model controls for Afore fixed effects by demographic group pre- and post-intervention, endogeneity of prices would need to occur because the changes in the value of unobservable Afore characteristics within the post period changed in a manner correlated with Afore changes in flow, balance and therefore CEF. We conducted the following robustness check. We estimate the pre-intervention demand parameters and use those parameters along with the Afore revenue function in equation 2 to calculate the best response balance and flow fee of each Afore to the new CEF formula given demand and preferences in June 2005. This best response calculation is driven only by the exogenous change in the CEF formula, the baseline characteristics of the Afore's customer base (the share of customers who are inactive workers and the relative size of their wages and balances) and baseline preferences in the market. We then instrument for the new fees using these simulated best-response fees in our post-period demand estimation using a control function approach (Rivers and Vuong 1988; Petrin and Train 2010). The resulting demand elasticities in the post-period are summarized by Afore in column 5. The elasticities are slightly more negative than in Column 4, but the general change in demand elasticity with respect to the CEF is the same.[20]

These elasticity estimates reflect the raw changes in mean flow of accounts from Tables IV-IX and support the idea that the fall in the CEF1 post-intervention was Afore's competitive response to increased investor sensitivity to this fee index. In addition, because investor elasticity with respect to management costs remained near zero, Afores could artificially lower their CEF1 by raising balance fees and lowering flow fees (as opposed to lowering both fees) without adversely impacting demand even if this resulted in higher management costs.

To link the impact of the CEF formula change and the change in demand on Afore incentives, we calculate profits for each Afore using equation (2) at alternative fee structures holding the other Afore's prices fixed. We examine how the demand and CEF formula changes affect their best response function. We calculate this profit function for each Afore on a 0.10 grid of balance and flow fees. We evaluate the profit function using the CEF25 formula and the pre-intervention demand estimates for the pre-intervention period, and the CEF1 formula and the post-intervention demand estimates for the post-

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[19] The near-zero sensitivity to costs persists even if the CEF is excluded from the model.
[20] In addition to this check, we also estimate post-period preferences using only the period July 2005 through December 2005, before Afore's fee responses to the CEF came into effect. We find similar results using this method as well.

intervention period. We calculate a grid rather than an analytic first order condition as the profit function may not be differentiable on the set of possible fees due to the inelastic base of inframarginal customers (Hastings, Hortaçsu and Syverson 2012).[21] We search over all fee combinations which yield a lower CEF than the current fee structure to reflect regulatory constraints.

Table XI shows the profit maximizing fee-combination for each Afore holding other Afore fees constant. In the pre-intervention period we find that if anything, Afores should lower balance fees and raise flow fees from their current levels if they were charging any balance fee at all.[22] However, the calculations are consistent with the fact that Afores generally had high flow fees and low balance fees in the pre-intervention period given the CEF25 formula, estimated preferences, and investor characteristics. After the information intervention, the profit incentives switch completely. The change in the CEF formula and the change in demand for marginal workers gives Afores the incentive to drop flow fees to zero and increase balance fees several-fold, in line with the fee restructuring that occurred in the market.[23]

As mentioned earlier, higher balance fees and lower flow fees would benefit workers with low balances relative to inflows. Since low-income workers and women are more likely to spend time outside of the formal sector, this new fee structure would raise management costs for these workers while subsidizing wealthier workers as long as they follow the CEF1 formula (or fail to switch Afores once their Afore restructured its fees). Table XII calculates the redistributive and overall impacts of the policy on management costs. To do this we compare expected revenues for each Afore at their June 2005 fees and their December 2007 fees using the same formula we used to calculate the best responses to the policy change (equation 2), under the assumption that fees by December 2007 are at a new equilibrium.

Table XII shows that the policy intervention and firm response resulted in an overall (all affiliates) management cost reduction of 13.5%. However, costs were redistributed from higher- to lower-income affiliates. The *increase* in expected management costs for workers in the lowest quartile of the income distribution among switches (the 50th percentile of workers in the system) ranged from 43.5 to 50.2 percent. Wealthier workers experienced *declines* in expected costs ranging from 13.9 to 21.8 percent. The redistribution is largely due to the fact that low income affiliates are more likely to spend time out of the formal sector, and are less likely to periodically evaluate their accounts and switch Afores to minimize

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[21] See the Online Appendix for further details on the calculation.

[22] We might get this deviation from actual fees as the profit function is approximate and evaluated using universal administrative data that Afores do not have access to. It is an open question as to how firms optimize when demand is not fully known.

[23] In fact the change in the CEF formula alone turns out to be sufficient to generate this response. If we do the same profit calculations in the post-intervention period using the new CEF1 formula but holding preferences constant at their pre-intervention levels, we find the same change in incentives for Afores. Their best responses indicate setting flow fees to zero and substantially increasing balance fees.

management fees. They are an inelastic group for whom management costs from balances outweigh management costs from fees on wage contributions. Had the index increased elasticity for marginal customers (high wage earners) without distorting the relative importance of load versus balance fees and thus firm strategy, this redistribution would have been smaller.

5 Discussion and Conclusion

Policy reforms are increasingly incorporating expanded consumer choice and privatization in an effort to infuse competitive pressure into traditionally publicly-provided markets. Public Education, Medicare Part D and Social Security are all social-safety-net programs moving towards expanded privatization and personal choice. This paper examines potential successes and pitfalls from privatization of social safety-net markets using detailed administrative data and policy nudges in Mexico's privatized social security market.

We establish several important facts. First, high management fees persisted in the market despite the sizable number of reputable firms competing for customer accounts and offering what were essentially homogeneous products given government restrictions on fund investment vehicles. We show that these high fees resulted from investor insensitivity to fees and inertia. To increase sensitivity to fees, the government introduced a new policy half way through our sample period. They adopted a new fee index as an official fee measure and broadly advertised it to workers, requiring its prominent display in account statements and on applications for transferring accounts from one fund manager to another. This fee index combined load and balance fees into one number in an effort to make fees simpler and more transparent, thereby increasing price sensitivity and increasing price competition in the market.

However, the index combined fund manager load and balance fees according to a particular formula, and therefore did not accurately reflect true costs to investors. We show that workers focused on this simple-to-understand and salient fee when choosing a fund manager even though the index actually led many to choose one with higher-costs for them. While we find that the new fee index policy was a successful nudge of worker decisions – making them much more sensitive to fees as measured by this simple-to-understand and prominent index – we show that it led many workers to pay higher actual management costs, particularly after firms responded optimally to the Nudge. We show that sophisticated firms optimized against the fee index formula and the change in demand. Since the index effectively obfuscated fees on assets under management relative to loads (by over-weighting load fees and underweighting fees on assets under management), firms lowered loads but drastically increased fees on assets. Thus they

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attracted investors looking for low-fee-index funds even if they were essentially charging those investors a higher total price. In other words firms did not debias consumer confusion, but instead incorporated it in their re-optimization (Gabaix and Laibson 2006). We use our data and a model of demand and supply to link the nudge and its impact on demand to observed fee changes. We find that the nudge resulted in a redistribution of management fees from high-income to low-income segments of the market.

Our results may have important implications for the design of government plans that increase consumer choice and privatization in an effort to increase efficiency. Rather than harnessing perfect competition, privatized social safety net markets may result in abundant advertising or complicated and obfuscated fee schedules. Passive investors with behavioral biases or large decision making costs may not easily decide in their best long-run interest (Hastings, Madrian and Skimmyhorn 2012). Sophisticated firms in our context optimized against behavioral biases rather than competing to undo them (Ellison 2005; Gabaix and Laibson 2006; Ellison and Ellison 2009; Hastings, Hortaçsu and Syverson 2012). Whether increasing ease of calculating personalized costs in complex markets (Kamineca, Mullainathan and Thaler, 2011), or aggregating decisions and their costs with a single unbiased decision-maker (e.g. employer management of 401k's or "single payer" systems) can most effectively address these issues is a question in need of future research (Campbell et al. 2011). Either way, our results caution that effective policy must incorporate both individual behavior and firm response.

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FIGURE I
CEF CHANGES, JANUARY 2004-JULY 2007

FIGURE II
FLOW FEE CHANGES, JANUARY 2004-JULY 2007
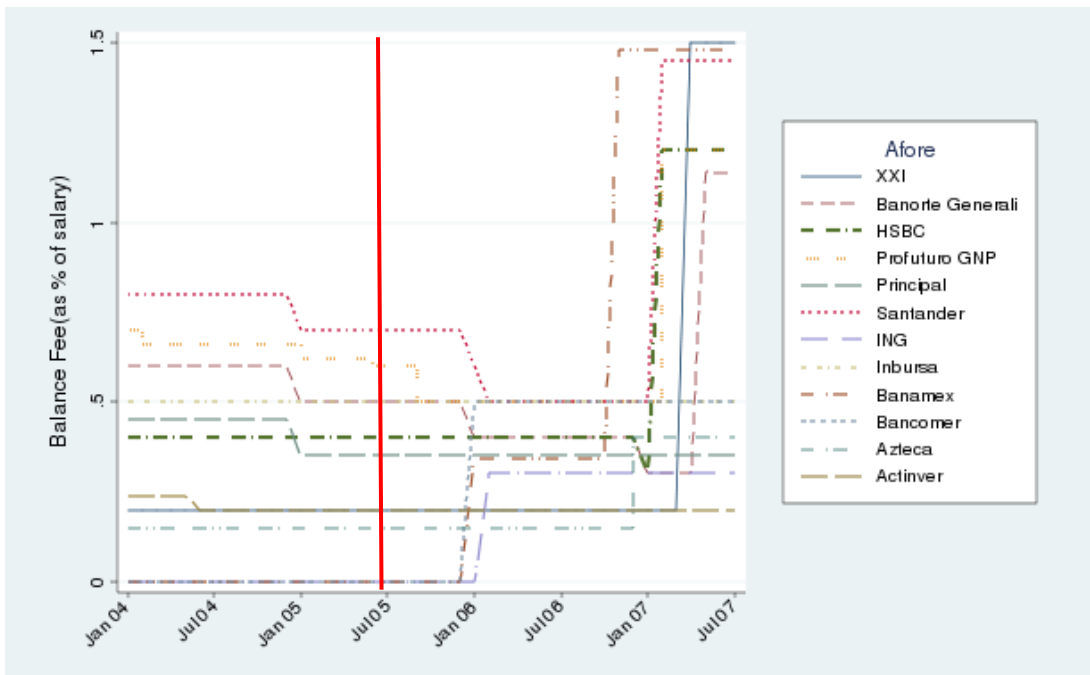
FIGURE III
BALANCE FEE CHANGES, JANUARY 2004-JULY 2007
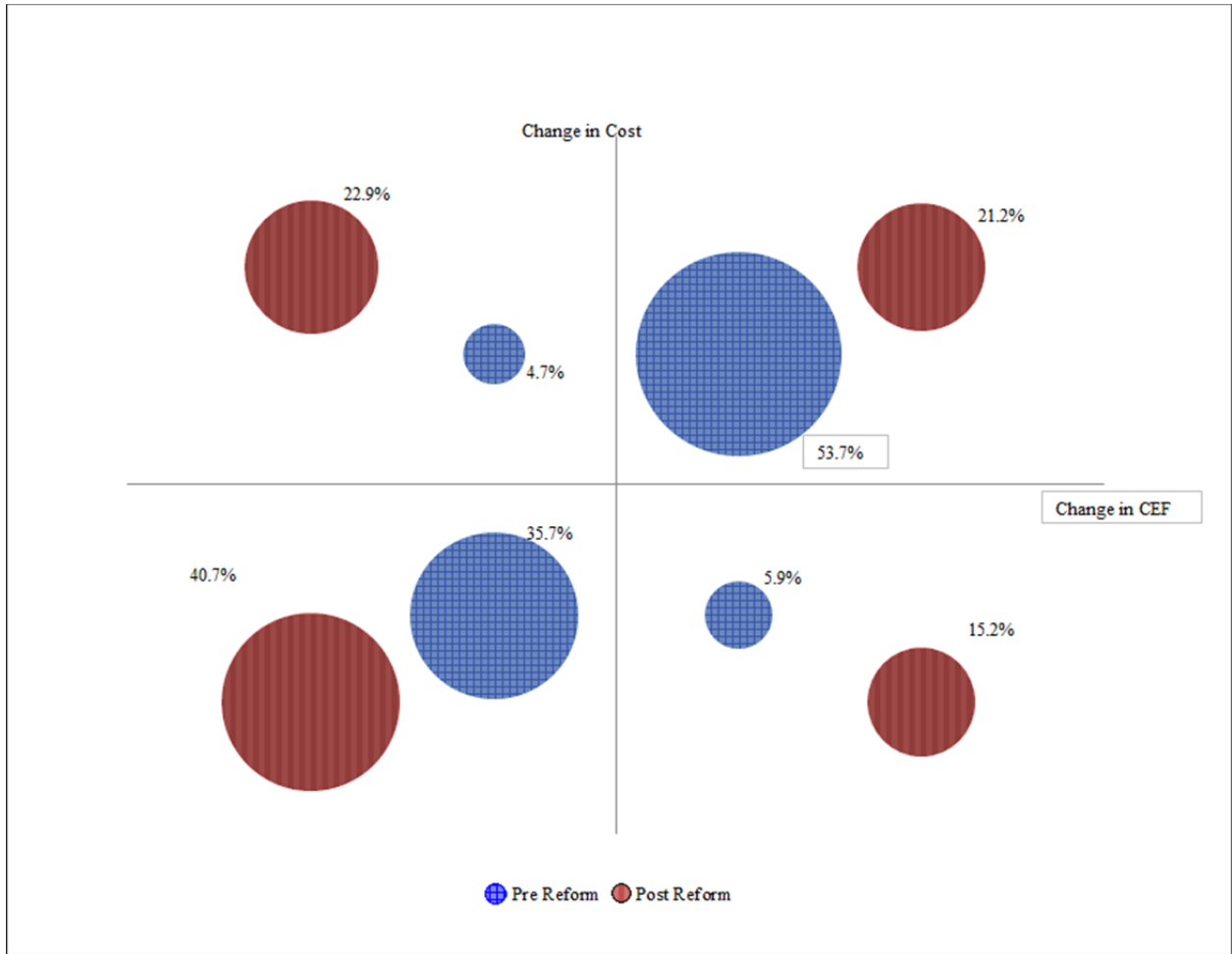
Notes: Statistics based on a 10% random sample of switchers and predicted costs.

FIGURE IV
MOVEMENT OF ACCOUNT SWITCHING BEFORE AND AFTER POLICY CHANGE BY CHANGE
IN COST AND CEF

TABLE I
ENTRY DATES AND DESCRIPTION OF AFORES OPERATING DURING SAMPLE PERIOD,
JANUARY 2004 - DECEMBER 2006

Afore Name	Entry Date	Firm Description and Brand Affiliation
Actinver	Apr-03	Mexican financial sector company; banking, investment funds and insurance
Afirme Bajío	Dec-05	Subsidiary of Financial Group Afirme and of Banco del Bajío
Ahorra Ahora	Aug-06	Subsidiary of Financial Group Monex, leading Mexican foreign exchange firm
Argos	Dec-06	Mexican insurance company affiliated with international insurance company Aegon
Azteca	Mar-03	Grupo Salinas (owns Elektra retailer for lower-income demographic groups and the TV chain Azteca)
Banamex	Jul-97	Large Mexican bank (since 1884), bought by Citigroup (2001)
Bancomer	Jul-97	Large Mexican bank (since 1932), affiliated with Spanish Bank BBVA (in 2000)
Banorte Generali	Jul-97	Mexican bank (since 1899) affiliated with Groupo Generali (International Insurance Co.)
Coppel	Apr-06	Department (1941) store for low- to middle-income; extensive credit programs
De la Gente	Nov-06	Joint venture of small savings institutions and government bank (BANSEFI)
HSBC*	Jul-97	International bank
Inbursa	Jul-97	Financial arm of Grupo Carso, owned by Carlos Slim
ING**	Jul-97	Dutch-based international financial group
Invercap	Feb-05	Mexican mutual funds administrator founded in 1997
IXE	Jun-04	Mexican financial group since 1998
Metlife	Feb-05	Subsidiary of US insurance company MetLife
Principal	Jul-97	Subsidiary of US Principal Financial Group, in Mexico since 1993
Profuturo GNP	Jul-97	Subsidiary of Grupo National Provincial, one of largest Mexican insurance companies
Santander	Jul-97	Spanish bank that bought the Mexican Bank Serfin in 2000, 3rd largest bank in Mexico
Scotia	Nov-06	Bank of Nova Scotia; acquired Grupo Financiero Inverlat in 1996
XXI	Jul-97	Owned by IMSS (former pension system administrator) and Prudential Financial

Notes: *HSBC acquired Afore Alianz Dresdner in 2004 which was Afore Bancrecer Dresdner until 2001. **ING acquired Afore Bital in 2001. Bital is a Mexican bank.

TABLE II
AFORE FEES AND MARKET SHARE BY FEE INDEX PRE- AND POST-INTERVENTION

Afore Name	Flow Fee (Load) (1)	Balance Fee (2)	Share Accounts (3)	Share Assets (4)	25 Year CEF (5)	1 Year CEF (6)	Rank 1 Year CEF (7)
Actinver	1.03 (15.8%)	0.20	0.001	0.002	0.55	2.02	2
Azteca	1.10 (16.9%)	0.15	0.003	0.005	0.57	2.22	4
Invercap	1.03 (15.8%)	0.20	0.000	0.000	0.60	2.17	3
Inbursa	0.50 (7.7%)	0.50	0.027	0.084	0.67	1.53	1
Metlife	1.23 (18.9%)	0.25	0.000	0.001	0.69	2.67	6
IXE	1.10 (16.9%)	0.35	0.000	0.000	0.72	2.42	5
XXI	1.30 (20.0%)	0.20	0.041	0.065	0.79	2.89	7
Banamex	1.70 (26.2%)	0.00	0.244	0.199	0.80	3.49	12
ING	1.68 (25.8%)	0.00	0.085	0.089	0.86	3.44	10
Santander	1.60 (24.6%)	0.70	0.117	0.086	0.87	4.01	15
Bancomer	1.68 (25.8%)	0.00	0.148	0.226	0.88	3.40	9
Principal	1.60 (24.6%)	0.35	0.074	0.039	0.89	3.48	11
HSBC	1.60 (24.6%)	0.40	0.042	0.037	1.00	3.67	14
Banorte Generali	1.40 (21.5%)	0.50	0.096	0.061	1.07	3.40	8
Profuturo GNP	1.67 (25.7%)	0.60	0.122	0.107	1.14	3.64	13

Notes: Statistics are based on a 0.5% random sample of account holders. The share of assets is June 2005 & is estimated using affiliates' account balances in June 2006 and the Afore they were affiliated with in June of 2005. All other statistics are from June 2005.

TABLE III
SENSITIVITY OF CEF1 VERSUS CEF25 TO FLOW AND BALANCE FEES

Afore	Derivative of 25-year CEF w.r.t. balance fee (1)	Derivative of 25-year CEF w.r.t. flow fee (2)	Derivative of 1-year CEF w.r.t. balance fee (3)	Derivative of 1-year CEF w.r.t. flow fee (4)
Actinver	1.014	0.539	0.991	2.073
Azteca	1.016	0.545	0.990	2.073
Banamex	1.035	0.583	0.983	2.075
Bancomer	1.046	0.593	0.983	2.075
Banorte Generali	1.000	0.571	0.985	2.069
HSBC	1.003	0.571	0.984	2.070
Inbursa	1.001	0.527	0.995	2.069
ING	1.044	0.590	0.983	2.075
Invercap	1.014	0.544	0.990	2.073
IXE	1.003	0.544	0.990	2.071
Metlife	1.008	0.549	0.988	2.072
Principal	1.002	0.563	0.984	2.071
Profuturo GNP	1.000	0.570	0.985	2.068
Santander	0.928	0.532	0.983	2.067
XXI	1.025	0.565	0.987	2.073

Notes: Each column shows the analytic derivative of the CEF function as provided by CONSAR evaluated at the Afore's fees as of June 2005.

TABLE IV
AFORE CHOICE BEFORE AND AFTER INTRODUCTION OF 1 YEAR EQUIVALENT FEE INDEX

	January 2004-June 2005			July 2005-December 2005			July 2005-December 2006		
	25th Pctl.	Median	75th Pctl.	25th Pctl.	Median	75th Pctl.	25th Pctl.	Median	75th Pctl.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Changes in Fees (New Afore - Old Afore)									
Change in Afore CEF Rank	-3.00	2.00	5.00	-6.00	-2.00	2.00	-6.00	-2.00	3.00
	[-2.04]	[0.94]	[4.68]	[-3.45]	[-0.67]	[2.72]	[-4.07]	[-0.67]	[2.72]
Change in Flow Fee	-0.12	0.01	0.30	-0.47	-0.13	0.09	-0.34	-0.08	0.09
	[-0.11]	[-0.03]	[0.30]	[-0.17]	[-0.09]	[0.13]	[-0.19]	[-0.05]	[0.07]
Change in Balance Fee	-0.21	0.05	0.40	-0.20	0.05	0.35	-0.15	0.00	0.15
	[-0.25]	[0.07]	[0.33]	[-0.27]	[-0.09]	[0.30]	[-0.11]	[0.01]	[0.11]
Remaining Potential Fee Gain (Cheapest Afore - New Afore)									
Remaining Flow Fee Gain	-1.17	-1.10	-0.90	-1.12	-0.92	-0.52	-0.92	-0.77	-0.50
	[-1.09]	[-1.06]	[-1.02]	[-1.06]	[-1.00]	[-0.97]	[-0.96]	[-0.79]	[-0.73]
Remaining Balance Fee Gain	-0.60	-0.40	0.00	-0.50	-0.40	-0.15	-0.35	-0.25	-0.15
	[-0.33]	[-0.30]	[-0.26]	[-0.30]	[-0.25]	[-0.22]	[-0.28]	[-0.26]	[-0.24]
N	278,348	278,348	278,348	152,629	152,629	152,629	489,993	489,993	489,993

Notes: Statistics are based on a 10% random sample of administrative records on individual account movements between Afores from January 2004 through December 2006. CEF ranking is based on CEF25 from January 2004 through June 2005, and CEF1 from July 2005 through December 2006. For comparison, numbers in brackets show the corresponding change in rank or fees under the assumption that individuals chose Afores with probability equal to their June 2005 market shares instead of the Afore they actually chose.

TABLE V
AFORE CHOICE BEFORE AND AFTER INTRODUCTION OF 1 YEAR EQUIVALENT FEE INDEX

	January 2004-June 2005			July 2005-December 2005			July 2005-December 2006		
	25th Pctl.	Median	75th Pctl.	25th Pctl.	Median	75th Pctl.	25th Pctl.	Median	75th Pctl.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Changes in Costs Measures in Days of Earnings (New Afore - Old Afore)									
Change in Total Cost Measure	-49.29	16.43	127.57	-87.15	-4.31	71.77	-82.1	-7.99	47.77
	[-31.90]	[36.37]	[123.06]	[-85.07]	[1.29]	[71.14]	[-72.79]	[-5.12]	[53.75]
Change in Predicted Cost Measure	-50.01	17.7	128.64	-87.37	-4.8	72.67	-83.8	-8.78	49.53
	[-32.37]	[39.23]	[121.47]	[-84.95]	[1.42]	[71.17]	[-73.74]	[-5.61]	[55.63]
Change in Myopic Cost Measure	-44.28	7.51	121.26	-89.44	-1.6	69.52	-80.17	-3.84	40.7
	[-28.12]	[22.10]	[125.04]	[-83.33]	[0.01]	[70.30]	[-72.43]	[-3.47]	[43.24]
Remaining Potential Cost Savings in Days of Earnings (Cheapest Afore - New Afore)									
Remaining Total Cost Measure	-256.89	-124.8	-51.03	-210.98	-97.45	-32.08	-214.56	-98.83	-32.43
	[-254.71]	[-160.18]	[-82.85]	[-218.55]	[-131.53]	[-57.07]	[-227.38]	[-129.35]	[-51.44]
Remaining Total Predicted Cost Measure	-254.98	-125.55	-52.34	-210.09	-98.51	-33.68	-215.04	-101.75	-35.11
	[-252.35]	[-157.72]	[-85.65]	[-217.05]	[-129.73]	[-60.03]	[-227.27]	[-131.05]	[-56.55]
Remaining Total Myopic Cost Measure	-269.38	-115.93	-34.56	-233.02	-96.26	-24.52	-230.35	-88.27	-23.08
	[-275.89]	[-158.08]	[-59.37]	[-249.01]	[-138.06]	[-39.66]	[-251.08]	[-123.16]	[-32.00]
N	278,348	278,348	278,348	152,629	152,629	152,629	489,993	489,993	489,993

Notes: Statistics are based on a 10% random sample of administrative records on individual account movements between Afores from January 2004 through December 2006. CEF ranking is based on CEF25 from January 2004 through June 2005, and CEF1 from July 2005 through December 2006. For comparison, numbers in brackets show the corresponding change in rank or fees under the assumption that individuals chose Afores with probability equal to their June 2005 market shares instead of the Afore they actually chose.

TABLE VI
AFORE CHOICE BEFORE AND AFTER FEE INDEX INTERVENTION BY EMPLOYMENT SUBGROUPS

	Always Formally Employed			Never Formally Employed		
	Pre June 2005	June 2005 - Dec 2005	Post June 2005	Pre June 2005	June 2005 - Dec 2005	Post June 2005
	(1)	(2)	(3)	(4)	(5)	(6)
Changes in Fees (New Afore - Old Afore)						
Change in Afore CEF Rank	1.00	-3.00	-3.00	-1.00	-2.00	-2.00
	[0.59]	[-0.67]	[-0.67]	[0.59]	[-0.64]	[-0.07]
Change in Flow Fee	-0.01	-0.18	-0.10	-0.07	-0.17	-0.04
	[-0.04]	[-0.11]	[-0.05]	[-0.03]	[-0.03]	[-0.03]
Change in Balance Fee	0.00	0.05	0.00	0.00	0.05	0.00
	[0.08]	[-0.08]	[-0.08]	[-0.05]	[-0.09]	[0.01]
Remaining Potential Fee Gain (Cheapest Afore - New Afore)						
Remaining Flow Fee Gain	-1.09	-0.90	-0.74	-1.02	-0.92	-0.80
	[-1.04]	[-0.99]	[-0.78]	[-1.06]	[-1.00]	[-0.78]
Remaining Balance Fee Gain	-0.40	-0.35	-0.34	-0.40	-0.35	-0.25
	[-0.30]	[-0.25]	[-0.25]	[-0.30]	[-0.26]	[-0.26]
Changes in Costs Measures in Days of Earnings (New Afore - Old Afore)						
Change in Predicted Cost Measure	9.54	-19.35	-19.38	0.00	0.67	-0.04
	[36.60]	[0.11]	[-14.88]	[0.21]	[-0.04]	[0.28]
Remaining Potential Cost Savings in Days of Earnings (Cheapest Afore - New Afore)						
Remaining Total Predicted Cost Measure	-137.91	-105.03	-109.86	-11.20	-15.53	-13.84
	[-184.75]	[-151.43]	[-149.02]	[-16.16]	[-14.88]	[-17.38]
N	117,165	66,205	191,528	5,923	3,690	14,497

Notes: Median value in sample reported in all columns. Statistics are based on a 10% random sample of administrative records on individual account movements between Afores from January 2004 through December 2006. Always employed indicates those who made contributions through formal sector employment in all periods in our sample. Those never formally employed have SAR accounts but do not record any formal sector employment contributions to those accounts during our sample period. CEF ranking is based on CEF25 from January 2004 through June 2005, and CEF1 from July 2005 through December 2006. For comparison, numbers in brackets show the corresponding change in rank or fees under the assumption that individuals chose Afores with probability equal to their June 2005 market shares instead of the Afore they actually chose.

TABLE VII

AFORE CHOICE BEFORE AND AFTER FEE INDEX INTERVENTION BY EMPLOYMENT AND WAGE SUBGROUPS

	Always Formally Employed & High Earner			Never Formally Employed & High Earner		
	Pre June 2005	June 2005 - Dec 2005	Post June 2005	Pre June 2005	June 2005 - Dec 2005	Post June 2005
	(1)	(2)	(3)	(4)	(5)	(6)
Changes in Fees (New Afore - Old Afore)						
Change in Afore CEF Rank	1.00	-3.00	-3.00	-1.00	-4.00	-3.00
	[0.41]	[-0.67]	[-0.67]	[0.12]	[0.46]	[0.22]
Change in Flow Fee	-0.02	-0.19	-0.10	-0.10	-0.21	-0.08
	[-0.08]	[-0.12]	[-0.06]	[-0.03]	[-0.03]	[-0.02]
Change in Balance Fee	0.00	0.00	0.00	0.00	0.00	0.00
	[0.11]	[0.06]	[-0.10]	[-0.09]	[-0.09]	[0.01]
Remaining Potential Fee Gain (Cheapest Afore - New Afore)						
Remaining Flow Fee Gain	-1.08	-0.90	-0.73	-0.95	-0.90	-0.75
	[-1.04]	[-0.99]	[-0.77]	[-1.04]	[-0.99]	[-0.77]
Remaining Balance Fee Gain	-0.40	-0.35	-0.34	-0.40	-0.40	-0.25
	[-0.30]	[-0.25]	[-0.25]	[-0.30]	[-0.26]	[-0.26]
Changes in Costs Measures in Days of Earnings (New Afore - Old Afore)						
Change in Predicted Cost Measure	2.49	-25.33	-22.44	0.31	0.53	0.00
	[30.44]	[-1.44]	[-19.92]	[0.08]	[0.09]	[0.12]
Remaining Potential Cost Savings in Days of Earnings (Cheapest Afore - New Afore)						
Remaining Total Predicted Cost Measure	-126.87	-94.71	-96.32	-9.50	-11.95	-11.23
	[-170.14]	[-136.72]	[-130.98]	[-11.82]	[-12.57]	[-13.61]
N	80,132	45,818	130,396	1,897	1,160	4,078

Notes: Median value sample reported in all columns. Statistics are based on a 10% random sample of administrative records on individual account movements between Afores from January 2004 through December 2006. Always employed indicates those who made contributions through formal sector employment in all periods in our sample. Those never formally employed have SAR accounts but do not record any formal sector employment contributions to those accounts during our sample period. CEF ranking is based on CEF25 from January 2004 through June 2005, and CEF1 from July 2005 through December 2006. For comparison, numbers in brackets show the corresponding change in rank or fees under the assumption that individuals chose Afores with probability equal to their June 2005 market shares instead of the Afore they actually chose. High wage earners are those in the upper quartile of wage earners in our sample.

TABLE VIII
AFORE CHOICE BEFORE AND AFTER FEE INDEX INTERVENTION BY AGE

	Under 30 yrs old			Between 30-40 yrs old			Over 40 yrs old		
	Pre-June 2005	June 2005- Dec 2005	Post-June 2005	Pre-June 2005	June 2005- Dec 2005	Post-June 2005	Pre-June 2005	June 2005- Dec 2005	Post-June 2005
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Changes in Fees (New Afore - Old Afore)									
Change in CEF Rank	2.00	-2.00	-2.00	1.00	-3.00	-3.00	1.00	-3.00	-3.00
	[1.18]	[-0.58]	[-0.07]	[0.59]	[-0.67]	[-0.85]	[0.61]	[-0.67]	[-1.10]
Change in Flow Fee	0.02	-0.10	-0.06	-0.01	-0.18	-0.10	-0.01	-0.20	-0.11
	[-0.02]	[-0.09]	[-0.04]	[-0.03]	[-0.11]	[-0.06]	[-0.03]	[-0.11]	[-0.06]
Change in Balance Fee	0.05	0.05	0.00	0.05	0.05	0.00	0.08	0.00	0.00
	[0.07]	[-0.09]	[0.01]	[0.07]	[-0.10]	[-0.02]	[0.07]	[-0.10]	[-0.09]
Remaining Potential Fee Gain (Cheapest Afore - New Afore)									
Remaining Flow Fee Gain	-1.10	-0.92	-0.78	-1.07	-0.90	-0.74	-1.07	-0.90	-0.70
	[-1.07]	[-1.02]	[-0.83]	[-1.04]	[-0.99]	[-0.76]	[-1.05]	[-0.99]	[-0.76]
Remaining Balance Fee Gain	-0.40	-0.40	-0.25	-0.40	-0.35	-0.30	-0.40	-0.35	-0.30
	[-0.30]	[-0.26]	[-0.26]	[-0.30]	[-0.25]	[-0.26]	[-0.30]	[-0.25]	[-0.25]
Changes in Costs Measures in Days of Earnings (New Afore - Old Afore)									
Change in Predicted Cost Measure	40.54	3.75	-11.87	11.20	-14.39	-13.24	1.98	-4.62	-3.39
	[75.77]	[26.00]	[-5.50]	[29.02]	[-2.83]	[-11.80]	[5.21]	[-1.94]	[-2.66]
Remaining Potential Cost Savings in Days of Earnings (Cheapest Afore - New Afore)									
Remaining Predicted Cost Measure	-180.51	-150.46	-156.87	-85.56	-73.08	-77.36	-31.03	-24.47	-26.27
	[-214.26]	[-186.83]	[-193.27]	[-104.11]	[-92.02]	[-94.35]	[-39.16]	[-31.38]	[-31.02]
N	181,175	93,246	291,616	61,745	37,088	123,729	35,428	22,295	74,648

Notes: Median value in sample reported in all columns. Statistics are based on a 10% random sample of administrative records on individual account movements between Afores from January 2004 through December 2006. CEF ranking is based on CEF25 from January 2004 through June 2005, and CEF1 from July 2005 through December 2006. For comparison, numbers in brackets show the corresponding change in rank or fees under the assumption that individuals chose Afores with probability equal to their June 2005 market shares instead of the Afore they actually chose.

TABLE IX
AFORE CHOICE BEFORE AND AFTER INDEX INTERVENTION BY EXPERIENCE

	Over 7 years in system			Under 3 years in system		
	Pre-June 2005	June 2005-Dec 2005	Post-June 2005	Pre-June 2005	June 2005-Dec 2005	Post-June 2005
	(1)	(2)	(3)	(4)	(5)	(6)
Changes in Fees (New Afore - Old Afore)						
Change in Afore CEF Rank	-1.00	-3.00	-3.00	3.00	2.00	-1.00
	[0.09]	[-0.67]	[-0.85]	[2.80]	[3.75]	[2.49]
Change in Flow Fee	-0.09	-0.20	-0.08	0.30	0.02	-0.02
	[-0.11]	[-0.13]	[-0.05]	[0.30]	[0.19]	[0.04]
Change in Balance Fee	0.00	0.00	0.00	0.10	0.06	0.00
	[0.11]	[-0.10]	[-0.02]	[0.06]	[-0.07]	[0.05]
Remaining Potential Fee Gain (Cheapest Afore - New Afore)						
Remaining Flow Fee Gain	-1.02	-0.90	-0.73	-1.17	-1.07	-0.90
	[-1.01]	[-0.98]	[-0.75]	[-1.09]	[-1.08]	[-0.87]
Remaining Balance Fee Gain	-0.40	-0.40	-0.25	-0.40	-0.40	-0.25
	[-0.30]	[-0.25]	[-0.26]	[-0.30]	[-0.26]	[-0.26]
Changes in Costs Measures in Days of Earnings (New Afore - Old Afore)						
Change in Predicted Cost Measure	-2.37	-15.81	-14.32	55.36	34.30	14.48
	[16.85]	[-4.93]	[-11.72]	[70.01]	[43.80]	[20.55]
Remaining Potential Cost Savings in Days of Earnings (Cheapest Afore - New Afore)						
Remaining Total Predicted Cost Measure	-96.41	-77.50	-82.39	-151.20	-134.78	-140.29
	[-131.56]	[-107.06]	[-108.86]	[-173.50]	[-167.25]	[-177.63]
N	82,032	71,214	247,168	123,922	33,993	96,496

Notes: Median value in sample reported in all columns. Statistics are based on a 10% random sample of administrative records on individual account movements between Afores from January 2004 through December 2006. CEF ranking is based on CEF25 from January 2004 through June 2005, and CEF1 from July 2005 through December 2006. For comparison, numbers in brackets show the corresponding change in rank or fees under the assumption that individuals chose Afores with probability equal to their June 2005 market shares instead of the Afore they actually chose.

TABLE X

MEAN ESTIMATED ELASTICITIES FOR AFORES PRE- AND POST-INTERVENTION

| | Elasticity Pre-Intervention w.r.t. | | Elasticity Post-Intervention w.r.t. | | |
| | Management Cost | CEF | Management Cost | CEF | CEF IV |
Afore	(1)	(2)	(3)	(4)	(5)
Actinver	0.003	-0.211	0.051	-0.906	-1.037
Azteca	-0.001	-0.211	0.046	-0.950	-1.044
Banamex	-0.026	-0.245	0.070	-1.293	-1.615
Bancomer	-0.003	-0.249	0.085	-1.209	-1.275
Banorte Generali	0.000	-0.357	0.088	-1.237	-1.275
HSBC	-0.013	-0.336	0.079	-1.336	-1.350
Inbursa	0.019	-0.217	0.066	-0.616	-0.869
ING	0.003	-0.243	0.085	-1.370	-1.419
Invercap	-0.036	-0.257	0.052	-0.959	-1.060
IXE	-0.001	-0.266	0.075	-1.096	-1.180
Metlife	-0.039	-0.282	0.067	-1.194	-1.277
Principal	0.006	-0.286	0.090	-1.484	-1.442
Profuturo GNP	0.006	-0.349	0.100	-1.289	-1.382
Santander	0.026	-0.276	0.110	-1.448	-1.445
XXI	-0.002	-0.261	0.067	-1.290	-1.299
N	2,732,799	2,732,799	5,824,526	5,824,526	5,824,526

Notes: Cells report average demand elasticities for each Afore across all individuals who switch between Afores during the pre- and post-intervention periods. Demand elasticities are calculated at estimated demand parameters and the data using the actual Afore characteristics at the time of each individual's choice.

TABLE XI

BEST RESPONSE TO INFORMATION MANDATE AND PREFERENCE CHANGES

Afore	June 2005 market, Old Preferences, CEF25		June 2005 market, New Preferences, CEF1	
	Best Response Flow Fee	Best Response Balance Fee	Best Response Flow Fee	Best Response Balance Fee
	(1)	(2)	(3)	(4)
Actinver	1.3	0	0	2.0
Azteca	1.2	0	0	2.2
Banamex	1.6	0	0	3.4
Bancomer	1.6	0	0	3.1
Banorte Generali	1.6	0	0	3.0
HSBC	1.9	0	0	3.0
Inbursa	1.3	0	0	1.5
ING	1.4	0	0	2.6
IXE	1.4	0	0	2.7
Invercap	1.3	0	0	2.6
Metlife	1.5	0	0	2.8
Principal	1.7	0	0	2.7
Profuturo GNP	1.9	0	0	3.1
Santander	1.5	0	0	3.4
XXI	1.5	0	0	2.8

Notes: Statistics are based on a 10 percent random sample of account holders. Cost measure used is predicted cost. Fees are profit-maximizing fees over all fees that would result in a lower CEF than current fees, assuming competitor fees are held fixed.

TABLE XII
IMPACT OF FEE RESTRUCTURING ON EXPECTED MANAGEMENT COSTS
BY DEMOGRAPHICS

Wage Quartiles (among account movers)	% Change in Expected Costs	
	Female (1)	Male (2)
1	43.50%	50.20%
2	-16.10%	-13.90%
3	-18.40%	-19.60%
4	-21.80%	-21.70%
Overall (male and female)		-13.50%

Notes: Percentage change in expected costs = (Cost at Dec. '07 fees-Cost at June '05 fees)/(Cost at June '05 fees). Statistics are based on a 10% random sample of account holders. Cost measure used is predicted cost.