This PDF is a selection from a published volume from the National Bureau of Economic Research

Volume Title: Tax Policy and the Economy, Volume 22

Volume Author/Editor: James M. Poterba, editor

Volume Publisher: University of Chicago Press

Metadata, citation and similar papers

Research Papers in Economics

Volume URL: http://www.nber.org/books/pote08-1

Conference Date: September 29, 2007

Publication Date: July 2008

Chapter Title: Do HSA Choices Interact with Retirement Savings Decisions?

Chapter Author: Stephen T. Parente, Roger Feldman

Chapter URL: http://www.nber.org/chapters/c2359

Chapter pages in book: (p. 81 - 108)

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Do HSA Choices Interact with Retirement Savings Decisions?

Stephen T. Parente, *University of Minnesota*
Roger Feldman, *University of Minnesota*

Executive Summary

We collected data on health plan choices and retirement savings decisions by employees from a large employer with just under a 16,000-person workforce that offered traditional health plans and a health savings account (HSA) in 2006. We also recorded employees' retirement contributions for the current and prior years along with their health plan choices. We examine (a) whether employees make joint choices for a traditional health plan versus an HSA and participation in an optional retirement plan, and (b) conditional on participation, the amount of the employee's contribution to the optional plan. Using health insurance claims and other human resources data to create control variables of income, job type, age, gender, number of dependents, and health status of the household, we find that those who elected a HSA were more likely to participate in a retirement savings account, and once invested, we find weak evidence that HSA policyholders are more likely to supplement retirement assets. When we account for strong prior preferences for savings behavior we cannot reject the null hypothesis that investing in HSAs does not affect retirement investing. More analysis from other employers with more significant HSA take-up is required to support the conclusions of this analysis.

3.1 Introduction

Congress enacted and the President signed into law the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA). The MMA establishes Health Savings Accounts (HSAs), which are tax-advantaged savings vehicles that can be used to pay for medical expenses incurred by individuals and their dependents. Unused balances

in HSAs can accumulate over a lifetime and at retirement age they can be converted into retirement savings. Early withdrawals for non-healthcare uses have penalties similar to early withdrawals from tax-advantaged retirement accounts.

HSAs are being sold by financial services companies as part of a health and wealth savings package. For example, Fidelity Investments sells a combination of a HSA and personal retirement saving account.[1] The HSA account is coupled with a high deductible health plan (HDHP). Fidelity and other firms also have calculated the amount of a one-time investor-age dependent contribution to cover future medical expenses, as well as provide additional financial assets from long term investments using the HSA asset as the starting investment.

In this chapter we develop a theory of the relationship between health and retirement savings choices, and test the theory using data from a large regional employer to identify whether there is a relationship between HSA election and retirement investment decisions. We posit that these choices will be conditional on prior personal states—including income, previous contributions, previous health history, and demographics such as age and the number of dependents.

We examine two research questions:

- Is HSA choice related to retirement investment decisions?
- If HSA choice is related to retirement investment decisions, do consumers make rational retirement portfolio decisions?

We begin with a description of our earlier work on the factors affecting employees' choices of consumer driven health plans (CDHPs), including HSAs. We then outline the conceptual model to be tested with a new employer database of HSA and retirement investment decisions. Empirical results are discussed in the context of the policy development of tax-advantaged health plans as a vehicle for increased long term financial planning as well as a personal health investment.

3.2 Earlier Findings

The HSAs resulting from the Medicare Modernization Act of 2003 were the product of two separate evolutionary paths. The first was the development of the Medical Savings Account in the early 1990s as advocated by economists, policy makers, and insurance executives who wanted an alternative healthcare reimbursement mechanism to traditional fee-for-

service plans typified by Blue Cross Blue Shield offerings from the 1940s through the 1980s. Their concern was that low thresholds for *first-dollar* coverage invited moral hazard and created an upward pressure on medical care insurance premiums over time. As managed care plans evolved in the 1980s, low co payments at the point of purchase divorced from the consumers' knowledge any representation of the actual price of medical care—leading some to argue that managed care simply compounded the problems presented by first-dollar coverage. An alternative form of insurance called the *medical savings account* (MSA) was developed in the mid-1990s. MSAs were introduced as tax-advantaged health plans in the 1996 Health Insurance Portability and Accountability Act (HIPAA), but were only available to a limited set of the population, most notably senior citizens, individuals, and employers with less than 75 employees.

On a parallel and later development track, new health insurance ventures were inspired by the surge of e-commerce in the late 1990s. Several new plans were developed within months of each other and were funded with venture capital. Definity Health, started in 2000, represented the *defined contribution* approach to health benefits. The name of the firm drew reference to the concept of a 401K retirement model applied to health care. Definity Health and another firm, Lumenos, managed to generate substantial growth in membership by capitalizing on the Employer Retirement and Income Security Act (ERISA) policy vehicle to offer employers a highly customized self-insured health benefit design. The early defined contribution health plans were almost identical to MSAs except that they required no federal guidelines for operation and were largely exempt from state insurance commission oversight and approval. By the eve of MMA in 2003, defined contribution health plans had gained several hundred thousand members in the period of just two years.

The last piece of development was the *consumer driven health plan* (CDHP). In the spring of 2001, the leaders of the insurance ventures held a public conference in Chicago where they all agreed to use the term CDHP to distinguish their products as an innovation designed to engage consumers with information on price and quality to enable better health plan choices. Most of the leaders knew that sufficient data on price and quality of medical care were not yet available, but their intent was to build CDHPs first. If consumers had incentives to use the data currently available, they thought that more higher quality data would be created as the business model evolved.

At the federal level, a new health plan design called *health reimbursement arrangements* (HRAs) was approved by the Internal Revenue Service in 2002. As long as the reimbursement account was funded solely by the employer, employees could use tax-free employer contributions to pay for approved medical expenses. The accounts could be carried over to later years, allowing employees and former employees—including retirees—continued access to unused reimbursements. However, the accounts were not owned by the employee and employers were not obligated to extend coverage to former employees and retirees. Hence, the accounts remained an asset of the employer, not the individual.

HSAs were the product of prior, but limited, development of MSAs and the substantial success of CDHPs in a relatively short span of time. The 2003 legislation made HSAs available to anyone under the age of sixty-five. Unlike an HRA, the HSA account is owned by the employee as an asset with the same early withdrawal penalties as a retirement account, unless the money is used for medical care. Today, there are an estimated five million HSA subscribers and three million HRA holders (AIS 2007). While still a minority of health plan enrollment, CDHP growth has been rapid—particularly for HSAs in the individual and small group markets.

We have found the appeal of HSAs to be national. In one large firm with employees in over forty states, the adoption of HSAs was not isolated to any one geographic location. As seen in figure 3.1, adoption has

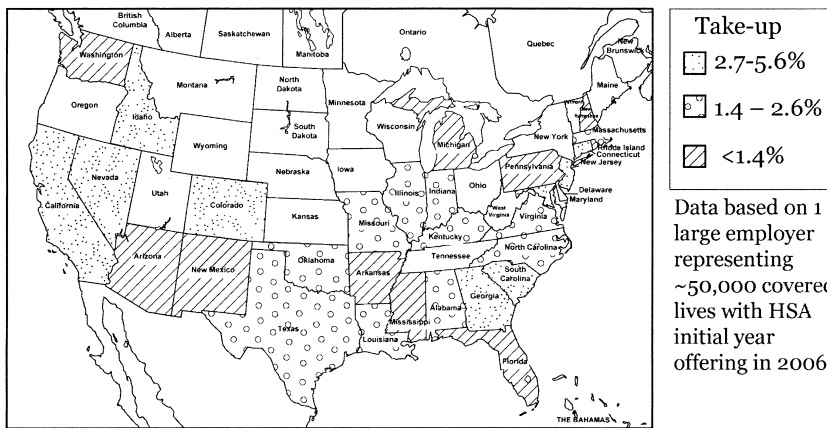

Figure 3.1
One large employer. HSA take-up 2006

been greatest in the West and South Atlantic states. This is somewhat surprising given the dominance of managed care plans in California, but in the case of this employer and others, a previously offered HRA plan was quite popular too—suggesting a preference for CDHP plans.

One of the major attributes of HSAs is consumer ownership of the tax-advantaged spending account. Beyond consumer ownership there are five other key features. First, the unused assets in the HSA roll over at year-end to the next year. This is in contrast to currently tax-advantaged flexible spending accounts (FSAs), which do not roll over. These are often associated as use it or lose it benefits. Second, the HSA must be purchased along with a high deductible health insurance policy. But, the account does not need to be funded at all. In fact, well over half the accounts are unfunded or minimally so—suggesting that the plans are merely a more complicated form of high deductible health insurance with an *option* to invest for later. Third, these plans can be purchased by consumers in state-regulated individual or small group markets. The early CDHPs (HRAs) were usually offered by ERISA-exempt self-insured employers and were outside the jurisdiction of state insurance regulation. Fourth, to limit the tax-deductible exposure of HSA assets, the annual investment is generally limited to the lesser of the insurance deductible or a maximum amount fixed by the U.S. Treasury Department. This has given the Treasury Department a much greater role in the regulation of a health insurance product. Fifth, individuals over age sixty-five may withdraw money from their HSA to pay Medicare Part A, Part B, or HMO premiums. Money withdrawn early for premiums or nonmedical expenses will be considered taxable income and will be subject to a 10 percent penalty, similar to early withdrawals from tax-advantaged retirement accounts.

Our prior research has examined the impact of CDHPs on health plan choice and health care cost and utilization. The first question we addressed was, "Who chooses a CDHP?" We worked with human resources personnel to obtain two years of survey data and health plan claims data from the University of Minnesota, in order to identify a set of demographic factors affecting plan choice. We found that CDHP enrollees had significantly higher incomes than those who chose traditional health insurance plans. There was no statistically significant difference in the health status of employees who chose the CDHP and those who chose other health plan designs. If anything, we found the most favorable selection was in the University's HMO plan (Parente, Feldman, and Christianson 2004).

A concurrent analysis on the affects of a CDHP on medical care expenditures and utilization focused on another large employer in the manufacturing sector. Here, we found that a cohort of enrollees in the CDHP had lower health care costs than those in a preferred provider organization (PPO) in the second year of enrollment, but higher costs than a point of service (POS) plan (Parente, Feldman, and Christianson 2004). A follow-up analysis looking at an additional year of data found that the CDHP had become the most expensive plan by end of the third year (Feldman, Parente, and Christianson 2007). All of these results were based on tracking a cohort of employees for up to four years.

For this employer, we found initial favorable selection into the CDHP, but that quickly changed in subsequent periods as the group became more intense in their service use. One of the explanations for the significant upward trend in CDHP expenditures was the very generous health benefit design offered. For example, the dominant CDHP plan for families provided a two thousand dollar account associated with a three thousand dollar deductible and zero percent coinsurance rate after reaching the deductible—leaving only one thousand dollars of out-of-pocket expenses for a benefit that typically has an insurance premium of nine thousand dollars. Furthermore, the employee could opt to pay the one thousand dollar gap with a flexible spending account (FSA), which would reduce the financial cost by the employee's marginal tax rate, times the spending from the FSA. Subsequent to our analysis, the employer changed the benefit design and offered a less generous CDHP with a larger deductible and 15 percent coinsurance.

Our most recent work on health plan choice focused on a third employer with over one-hundred-fifty thousand covered lives and employees operating in over forty states (Parente, Feldman and Christianson 2007). This employer offered an HRA and an HSA as well as, at least, four other insurance products as concurrent choices. We recently examined data on 2006 choices and found little evidence of adverse selection if we consider both the HRA and HSA as a combined CDHP nest comprising similar plans. However, when we examined all types of plan choice we found substantial unfavorable selection to the HRA and very favorable selection to the HSA. The addition of both types of CDHPs, as sanctioned by the 2003 MMA, split the risk preferences of the employee population. We also found very similar results to our earlier work with respect to higher-income employees choosing CDHPs. This is the first economic analysis of HSA choice in an employer, and it suggests the in-

centives of these plans are sensitive enough to create a significant change in behavior. It should be noted that the HSA and HRA offered by the sample employer used the same account and deductible design. The only difference was whether the account was owned by the employee or was a notional account held by the employer on the employee's behalf.

3.3 Conceptual Model

We develop a conceptual model to examine the relationship between HSA choice and retirement investments. Based on our previous findings that consumers are aware of and act on changes in health benefit design, it is especially interesting to examine their joint health and wealth decisions. The model focuses on the consumers' decisions to take risk. It also assumes the market asset is not tax-sheltered. The model applies best to a person who has maxed-out her tax-sheltered retirement contribution. Unfortunately, we can not fully test the model with our data because we lack information on the types of assets that employees choose for their HSA and retirement investments. The scenario we attempt to test is the HSA and retirement participation choices of employees from a large employer. A full exposition of the model, starting with the concept of Sharpe's risk-averse investor, is presented in Appendix A.

Applying the model to HSA and supplemental retirement decisions, we focus on employees working in firms providing education, health care and the arts, who are eligible to contribute to a 403(b) supplemental retirement savings plan. Furthermore, since 1978 employees also are able to contribute to Section 457 retirement savings plans. Both of these are tax-deferred retirement savings programs. Unused, HSAs are yet another form of tax-deferred retirement savings program.[2]

We assume there is a subset of employees who are maximum savers. They wish to take full or significant advantage of all tax-deferred savings opportunities. Assume an employee of this type has already maxed-out her 403(b)[3] contribution. When an HSA option becomes available, she chooses it, while maintaining her 403(b). Addition of the HSA option allows the person to increase her tax-free savings without reducing her 403(b) contributions. Presumably, this person can also add to her total savings by maxing out both her 403(b) and 457 opportunities.

Imagine another person who has not maxed-out her 403(b). She might still choose an HSA if she were very healthy because of the employer contribution to the account. It has a good return and a low risk because

she does not expect to spend much on out-of-pocket medical care. In this case, we would expect to see some cutback in the 403(b) contribution because the HSA is a better vehicle for tax-free savings.

In both of these scenarios, it is reasonable to expect someone to invest in an HSA as a supplemental retirement opportunity. An interesting question is whether the person who does not typically max out their 403(b) contribution, but chooses an HSA, operates as if she faces a budget constraint for retirement allocations and shifts resources from her previous levels of 403(b) contribution. We attempt to test this empirically.

3.4 Empirical Specification

3.4.1 Data

To complete this analysis, we collected data on health plan choices and retirement savings decisions of employees from a University employer that offered traditional health plans and an HSA in the 2005 open enrollment period for the 2006 benefit year. We also recorded employees' 403(b) and 457 retirement contributions for the current (2006) and prior (2005) years. A 403(b) plan is a retirement plan for University, civil government, and not-for-profit employees. It has the same characteristics and benefits as a 401(k). A 457 plan is a non qualified tax-deferred compensation plan that is similar to a 401(k) and a 403(b) plan. Specifically, we abstract the annual contribution by the employee.

All faculty members at the University participate in a mandatory 401(a) defined contribution retirement program where they must contribute 2.5 percent of their salary, which the University matches with 13 percent of the salary. Civil Service and nonfaculty bargaining unit employees are covered by a defined-benefit retirement program with mandatory employee contributions of 4 percent of total salary, matched by employer contributions of 4 percent of total salary. All employees are eligible to participate in the optional retirement plans. In 2005 and 2006, the maximum 403(b) contributions permitted were eighteen thousand dollars and twenty thousand dollars respectively. Likewise, the maximum 457 contributions in 2005 and 2006 were fourteen thousand dollars and fifteen thousand dollars. Thus, in 2006 an employee could opt for a maximum supplemental retirement contribution of thirty-five thousand dollars.

The employer's available health plans are presented in table 3.1. The

Table 3.1
2006 Health Benefit Plans, Enrollment, and Annual Premiums

		Single		Employee + Spouse		Employee + Child		Family	
2006 Choices	Employees	Employee	Total	Employee	Total	Employee	Total	Employee	Total
EPO	4,627	$481	$4,807	$1,557	$10,377	$1,251	$8,330	$2,041	$13,614
Tiered Network	1,017	$481	$5,060	$1,557	$10,917	$1,251	$8,765	$2,041	$14,329
Point of Service HMO	7,096	$572	$4,898	$1,752	$10,572	$1,409	$8,489	$2,301	$13,874
Regional PPO	1,273	$627	$4,953	$1,872	$10,691	$1,505	$8,585	$2,447	$14,019
National PPO	1,623	$733	$5,060	$2,098	$10,917	$1,685	$8,765	$2,743	$14,316
HRA	170	$783	$5,109	$2,135	$10,954	$1,911	$8,991	$2,470	$14,043
HSA	63	$530	$4,857	$1,594	$10,413	$1,477	$8,557	$2,057	$13,629

Note:
EPO: Exclusive Provider Organzation
PPO: Preferred Provider Organization
HMO: Health Maintenance Organization
HRA: Health Reimbursement Account/High Deductible
HSA: Health Savings Account/High Dedutible

employer pays a fixed contribution by type of coverage: single, two-person, single with child, and family. Variation in premiums to the employee is dependent on the different types of health plans offered and the employee's marginal tax rate. The University offers a preferred provider organization (PPO) health plan with a large provider panel, less cost sharing, and a higher employee cost than the point of service (POS) plan. The University also offers an exclusive provider organization (EPO) with a smaller provider panel then the PPO. The health savings account (HSA) offered in 2006 provided a cash deposit into a bank account designated for medical expenses. For an employee, five hundred dollars is deposited. For a family contract, one thousand dollars is deposited. Unlike a flexible spending account, funds in the HSA do not have to be spent by the end of a calendar year. And in contrast to a health reimbursement account, which is not portable and to which only the employer may contribute, the HSA is fully portable as specified by the IRS. In addition, the employee can contribute up to two thousand dollars (pretax) to the account for single policies and four thousand dollars (pretax) to the account for family coverage. The single-contract HSA deductible is two thousand five hundred dollars and the family-contract HSA deductible is five thousand dollars. For all plans but the HMO, 10 percent coinsurance applies to in-network services. Preventive care is covered at 100 percent in all plans.

The variables available for our analysis are presented in table 3.2. The data are derived principally from human resources data extracts from the employer for years 2005 and 2006. In addition, we used claims data from a previous analysis of consumer directed health plans (CDHPs) to identify the presence of chronic illness in the study population as a dummy variable. The chronic illness variable is based on the identification of the chronic illness groups from the Johns Hopkins Ambulatory Diagnostic Group (ADG) system (Weiner, Starfield, Steinwachs, and Mumford 1991). Previous descriptions of our application of the ADG system are detailed in Parente, Feldman and Christianson (2004).

Using the employer's health plan information and our previous algorithm for measuring pre-tax premiums, we identified a premium measure for HSAs and other health plans. For simplicity, we used a weighted average of other health plan premiums based on contract type and prevalence of take-up in the other plans. From the human resources data, we abstracted employee age, gender, salary, years at the employer, number of dependents, and insurance contract type. We also identified a variable—professional job class—to account for possible social net-

Table 3.2
Variable Names and Descriptive Statistics

	2006 Employee Sample		2005–2006 Employee Panel	
Varia Description	Sample Mean	Standard Deviation	Sample Mean	Standard Deviation
Plan Choices of Employees in 2006	N = 15,964		N = 13,217	
In Health Savings Account in 2006 = 1, else = 0	0.004	0.063	0.004	0.063
Optional Retirement Savings in 2005 and 2006				
2005 opt in to supplemental retirement program (403B or 457) = 1, else = 0			0.319	0.063
2006 opt in to supplemental retirement program (403B or 457) = 1, else = 0	0.301	0.459	0.334	0.466
2005 Amount invested in supplemental retirement program ($)			2,432.89	5678.620
2006 Amount invested in supplemental retirement program ($)	2,496.49	6.106.95	2,768.14	6359.250
Employee investing at 90th percentile of 2005 supplemental program = 1, else = 0			0.035	0.183
Employee investing at 90th percentile of 2006 supplemental program = 1, else = 0	0.033	0.178	0.036	0.187
Employee Chararacteristics				
Employee's tax-adjusted medical insurance annual premium ($)	852.28	517.52	1,255.30	775.319
Employee or immediate family member has chronic condition = 1, else = 0	0.164	0.37	0.187	0.390
Employee elected a single contract = 1, family = 0	0.477	0.50	0.455	0.498
Number of dependents	1.085	1.32	1.132	1.326
Employee's salary minus tax liabilities ($)	49,669.60	36908.11	53,334.03	37291.690
Employee is female = 1, male = 0	0.535	0.50	0.532	0.499
Employee age in 2006	44.48	11.759	45.92	11.276
Years at employer in 2006	11.37	10.076	11.82	9.974
Professional job class = 1, else = 0	0.648	0.478	0.636	0.481

working regarding health benefit decisions. This job class includes administrators, physicians, professors, and research scientists. The employees not classified include clerical workers, maintenance personnel, organized labor fields, and food services. Using pooled data on 403(b) and 457 contributions, we were able to identify the prevalence of supplemental retirement investment contributions and the amount invested annually. In addition, we identified a group—max savers—who

had retirement investment at the 90th and above percentile of the allowed contribution, conditional on investing.

We describe two populations in table 3.2. The first is the population who could select an HSA in 2006. The second is the population who was employed in both 2005 and 2006. The second set of data provides a comparison of the 2005 and 2006 supplemental retirement contributions.

Of special note is the very small take-up of the HSA plan, with only sixty-three employees—or 0.4 percent of the approximately sixteen thousand employee population—selecting this plan. The health reimbursement account had less than two hundred employee take-up. This is surprising given that the 2005 enrollment in CDHPs for this employer was over one thousand three hundred. The combination of a less generous benefit design for both the HRA and HSA between 2005 and 2006 and an increase in premiums relative to other plans likely had an impact. When we designed our natural experiment with this employer, we did not expect such a low take-up. As such, we proceeded with our empirical analysis with caution and we are alert to future employer data opportunities.

3.4.2 Methods

We estimate a bivariate probit model of two concurrent employee decisions: (1) election of an HSA health plan, and (2) the decision to enroll in a supplemental retirement policy. The specification of the bivariate probit permits us to see the different effects of employee characteristics as well as the relatedness of these decisions. This bivariate probit specification estimates the effect of employee characteristics on the joint determination of HSA and optional retirement program participation.[4]

We also used a generalized linear regression model (GLM) to test what factors were associated with the contribution to the supplemental retirement program. For this part of the analysis we use a difference-in-differences approach comparing the impact of pre- and post-HSA introduction on retirement saving. These investment regressions account for repeated observations on individuals, and tests of statistical significance are on based robust standard errors.

We completed this analysis using two different approaches. First we examined the impact of an HSA cohort variable (plus a time interaction) on supplemental retirement investment. Second, we added the max saver variable and fully inter-acted it with time and the HSA cohort to see if there was any evidence of the behavior suggested in figure 3A.3.

3.5 Results

The results of the empirical analyses are presented in tables 3.3, 3.4, and 3.5. First, table 3.3 presents the descriptive statistics for the HSA and non-HSA populations to see differences in personal attributes and retirement savings. Table 3.4 provides the results of a bivariate probit model to test whether there is a relationship between HSA investment and supplemental retirement contributions. Table 3.5 presents the

Table 3.3
Variable Names and Descriptive Statistics—HSA versus non-HSA Cohorts

	2006 HSA Population		2006 Non-HSA Population		
Varia Description	Sample Mean	Standard Deviation	Sample Mean	Standard Deviation	T-test
Optional Retirement Savings in 2005 and 2006	$N = 52$	$N = 13{,}164$			
2005 opt in to supplemental retirement program (403B or 457) = 1, else = 0	0.547	0.500	0.318	0.466	***
2006 opt in to supplemental retirement program (403B or 457) = 1, else = 0	0.509	0.502	0.333	0.471	***
2005 Amount invested in supplemental retirement program ($)	6,413.41	9420.790	2,416.86	5653.190	***
2006 Amount invested in supplemental retirement program ($)	6,753.67	10530.270	2,752.10	6332.170	***
Employee investing at 90th percentile of 2005 supplemental program = 1, else = 0	0.132	0.340	0.034	0.182	***
Employee investing at 90th percentile of 2006 supplemental program = 1, else = 0	0.132	0.340	0.036	0.186	***
Employee Chararacteristics					
Employee's tax-adjusted medical insurance annual premium ($)	682.91	426.708	865.90	516.959	***
Employee or immediate family member has chronic condition = 1, else = 0	0.113	0.318	0.187	0.390	*
Employee elected a single contract = 1, family = 0	0.547	0.500	0.455	0.498	
Number of dependents	0.811	1.139	1.133	1.326	*
Employee's salary minus tax liabilities ($)	75,802.58	53751.620	53,243.57	37184.740	***
Employee is female = 1, male = 0	0.472	0.502	0.533	0.499	
Employee age in 2006	47.04	10.857	45.92	11.277	
Years at Employer in 2006	10.68	9.250	11.82	9.976	
Professional job class = 1, else = 0	0.849	0.360	0.635	0.481	***

Note: Statistical Significance
$^{***}p \leqq .001$, $^{**}p \leqq .01$, $^{*}p \leqq .05$
Population was employed in 2005 and 2006.

Table 3.4
Bivariate Probit of the Decision to Select an HSA and Opt-in to Supplemental Retirement in 2006

Variable	Description	Coefficient	Robust Standard Error	P > |Z|
	Dependent Variable: Chose HSA Plan in 2006 = 1, Chose Other Health Plan = 0			
Employee Chararacteristics				
CONSTANT	Intercept	**–2.758**	0.249	0.000
ADJPREM	Employee's tax-adjusted medical insurance annual premium (in '000s)	**–0.431**	0.167	0.010
CHRONIC	Employee or immediate family member has chronic condition = 1, else = 0	–0.190	0.158	0.232
KIDS	Number of dependents	**0.058**	0.064	0.364
ADJPAY	Employee's salary minus tax liabilities	**0.000**	0.000	0.012
FEMALE	Employee is female = 1, male = 0	–0.101	0.091	0.269
AGEIN2006	Employee age in 2006	0.005	0.005	0.285
JOBYEARS	Years at employer in 2006	–0.008	0.006	0.197
PROFJOB	Professional job class = 1, else = 0	**0.277**	0.112	0.013

	Dependent Variable: Opted in for supplemental retirement (403B or 457) = 1, else = 0			
Employee Chararacteristics				
CONSTANT	Intercept	**–2.038**	0.065	0.000
CHRONIC	Employee or immediate family member has chronic condition = 1, else = 0	**0.067**	0.031	0.030
SINGLE	Employee elected a single contract = 1, family = 0	–0.063	0.036	0.077
KIDS	Number of dependents	0.000	0.013	0.999
ADJPAY	Employee's salary minus tax liabilities	**0.000**	0.000	0.000
FEMALE	Employee is female = 1, male = 0	**0.085**	0.023	0.000
AGEIN2006	Employee age in 2006	**0.018**	0.001	0.000
JOBYEARS	Years at employer in 2006	**0.025**	0.001	0.000
PROFJOB	Professional job class = 1, else = 0	**0.282**	0.026	0.000
/athrho		**0.132**	0.057	0.021
rho		0.131	0.056	

Note: Wald test of rho = 0: chi2(1) = 5.35797 Prob > chi2 = 0.0206
Number of obs = 15964
Wald chi2(16) = 1912.39
Log pseudolikelihood = –9036.3219 Prob > chi2 = 0.0000

Table 3.5
Generalized Linear Model Regression of Supplemental Retirement Contributions Difference in Difference Effects by HSA Take-up Cohort

	Model 1 w/o Max Saver Variable			Model 2 w/Max Saver Variables		
Variable Description	Coefficient	Standard Deviation	T-Stat	Coefficient	Standard Deviation	T-Stat
Intercept	**–7616.126**	504.4787	–15.10	**–2595.607**	342.5622	–7.58
Year is 2006 = 1, Year is 2005 = 0	**981.318**	159.8085	6.14	**959.064**	113.2261	8.47
HSA 2006 Enrollment cohort = 1, else = 0	**3144.154**	1441.7124	2.18	941.192	1123.1388	0.84
HSA Cohort * Year 2006 Interaction	115.918	2036.2178	0.06	–278.754	1587.4520	–0.18
90th percentile contrib. cohort (Max Saver) = 1, else = 0				**18620.108**	254.307	73.22
HSA * 90th percentile interaction				381.276	2213.957	0.17
90th percentile * Year 2006 Interaction				560.133	352.035	1.59
HSA * 90th percentile * Year 2006 interaction				976.957	3130.242	0.31
Employee age in 2006	**226.142**	10.656	21.22	**116.440**	7.232	16.10
Employee is female = 1, ma	**–1108.004**	168.081	–6.59	**–591.371**	112.950	–5.24
Number of dependents	35.632	64.971	0.55	37.613	43.619	0.86
Employee's salary minus tax liabilities (in '000s)	**24.796**	1.992	12.45	**12.595**	1.343	9.38
Employee/family has chronic condition = 1, else = 0	294.903	193.123	1.53	–44.476	129.691	–0.34
Professional job class = 1, else = 0	**4133.395**	186.858	22.12	**2485.810**	126.460	19.66
Years at employer in 2006	**–23.079**	10.297	–2.24	–8.769	6.914	–1.27
Adjusted *R*-square	0.1916			0.6359		
Observations	8824			8824		
Individuals	4412			4412		

results of the difference-in-differences analysis on the factors affecting the level of the supplemental retirement contribution.

In table 3.3, we split the second set of data presented in table 3.2 into the HSA and non-HSA populations based on who chose an HSA in 2006. HSA takers were more likely to opt into supplemental retirement programs and placed greater investment in the programs. HSA takers were also more likely to be max savers than those who chose other health plans. Even with a relatively small HSA take-up, the differences are significant using either pooled or unequal variance T-tests. With respect to employee attributes, there were significant differences in chronic illness (less for HSA population), age (older for HSA), gender (fewer females chose HSAs), income (higher salaried workers chose HSAs), family size (larger families chose HSAs) and professional job class (more chose HSAs).

These results are fairly consistent with our earlier analysis of CDHPs of this employer using 2002 and 2003 data (Parente, Feldman and Christianson 2004; Parente, Christianson, and Feldman 2007). The most striking finding still remains that those with higher incomes prefer the HSA. Interestingly, older employees prefer the HSA. However, those with more chronic illness burden do not select the HSA.

The results of the bivariate probit model for HSA election and supplemental retirement decisions for 2006 are presented in table 3.4. Each dependent variable has its own set of coefficients. The coefficient rho shows that there are common unmeasured factors that influence the HSA and retirement choices. This coefficient is significant indicating the presence of a joint relationship between HSA and retirement investment decisions.

Looking at the coefficients for the plan choice model, the effect of premium is negative as expected—since this can be viewed as a reduced-form version of the health plan demand function. Other significant and positive effects on the decision to select an HSA are income, number of dependents, and whether the employee has a professional job class. Age and chronic illness are significant predictors of choice, but the HSA take-up is too limited to make any strong statements. Gender and chronic illness are negatively associated with HSA choice, while age has positive effect on HSA choice.

The employee characteristics with significant positive effects on the election of a supplemental retirement contribution are chronic illness, income, female gender, age, years on the job, and professional job class. The only negative effect, although insignificant, is whether the em-

ployee elects a single-contract health plan.

In our conceptual model, we predicted that HSA and investment decisions would likely be related. However, the model does not inform us on the direction of variables like chronic illness, gender, and family size. One might assume that chronic illness would have a negative effect if the employee presumed she might not live long enough to fully appreciate her retirement savings. It makes sense for females to invest more than males if the employee recognizes that, on average, she will need more retirement resources since women live longer than men in the United States.

The results of two difference-in-differences models of the factors affecting supplemental retirement contributions are presented in table 3.5. The first model does not include the employee designation of max saver and its interactions, whereas the second model does. From the first model, however, we find that those who chose an HSA in 2006 categorically invest more in retirement savings. In this first model, the year-specific interaction with the HSA cohort is positive but insignificant. However, when we include the max saver variable in the second model, the significance of the HSA cohort variable no longer remains. Also in the second model, the max saver attribute is quite positively related to the retirement contribution. The interaction variables with max savers are all positive but insignificant. The one negative, but insignificant, result is the HSA and year 2006 interaction variable. This result suggests that those who chose an HSA in 2006 reduced their supplemental retirement contribution in 2006 by 278 dollars compared with 2005. These results suggest that HSA plan choice is related to retirement investment decisions but it is not a very strong effect. It is likely that the HSA cohort attribute is highly correlated with the max saver cohort attribute and that the HSA attribute is the weaker of the two with respect to investment decisions.

Other employee attributes have similar effects in the two models. Age, income, and professional class are associated with larger investment decisions. Interestingly, females invest less than males, but from table 3.4 we know they are more likely to invest. Another interesting result is years at work, which is negative in both models and significant in the first model. This result suggests that those with more years invested at the University, with a very generous retirement package, are less inclined to invest more as their tenure increases.

3.6 Discussion

There are three new findings from our empirical analysis. First, we find a positive relationship between those choosing HSAs as a health plan and those choosing to increase their retirement investment assets. We also find evidence that these are joint decisions from our bivariate probit results. Our second finding is that the level of investment savings may have been positively influenced by the introduction of HSAs. Specifically, it appears that HSAs do not crowd out retirement investment but, instead, may serve a complementary role. However, only one of the difference-in-differences models supports this conclusion. A general concern voiced by policy-makers and in editorial pages is that HSAs would be used a tax shelter for the rich. While our results do not provide a convincing affirmation of this suggestion, the findings are more likely to confirm rather than reject this supposition. However, this is early work based on very low take-up of the HSA.

Finally, the very low HSA take-up is also a new finding, but one that we are discovering in several other employers engaged in the research project. One explanation for the low take-up of the HSA plan—from a purely investment standpoint—is that the employer already provided very generous retirement benefits to all its employees with a contribution of 13 percent of annual wage income for faculty and a defined benefit plan for nonfaculty. Secondly, health plan premiums at this employer are heavily subsidized (on average over 85 percent) and the difference between the HSA premium and the very generous PPO premium is relatively small compared with commercially available insurance. The percentage difference at this employer is less than half that of commercial insurance carriers. To be competitive, the HSA premium at the employer should be about 55 percent less than its current amount, given the deductible, coinsurance, and out of pocket maximum.

Our findings contribute to a broader and substantially advanced literature on individual incentives for retirement. They appear to be in line with recent research in this area. For example, we find a large positive effect of salary on the decision to invest and the level of supplemental retirement investment. Dyan, Skinner, and Zeldes (2004) use three sources of data to model whether the rich invest more. They also find a positive relationship between savings and income (though they examined lifetime income) and a weaker positive relationship between the propensity to save and income. If HSAs are seen as another investment vehicle—

a de facto private individual retirement account—it is not surprising that we see the same positive propensity to enroll in HSAs as we do with the election of supplemental retirement associated with wage income. We were unable to observe the effect of lifetime income due to limitations in our data.

Goldman and Maestas (2005) look at a related question: whether increases in risks of higher medical expenses lead to a reduction in exposure to other risks among Medicare beneficiaries choosing between different supplemental insurance policies. While not explicitly examining multi year changes in financial investment decisions compared with health plan decisions, the authors do find evidence that consumers' decisions reflect an active assessment of the trade-offs between different types of risky assets and medical risk.

This chapter has two significant limitations. First, the take-up of HSAs in the employee population is very small. We find several results in our regression analysis that are of the expected sign but are not statistically significant. In particular, we suspect that with a larger share of HSA take-up we might be able to see more robust interaction effects in our difference-in-differences analysis. However, we did find some results with statistical significance suggesting some fairly strong sorting by preferences of HSA takers.

The second limitation is that we do not know the wealth of the individuals or the composition of their assets. In addition, we do not know whether some individuals do not invest because another family member is investing. We tried to address this limitation somewhat by using a difference-in-differences approach where each person's wealth is presumed to be controlled due to the use of two years of data. We also assume that wage income provides some proxy for wealth. However, a more complete measure of assets would be beneficial. In further extensions of this research we hope to obtain asset information for the employees' defined contribution retirement accounts.

A further extension of this research is to test the full conceptual model after obtaining data on individual allocations of assets by different classes of risk. We are working with two employers to provide the data to test the remainder of the model using an approach similar to Goldman and Maestas (2005). There is precedent for this type of work from Barber and Odean (2004) where the authors examined individual investment decisions based on information provided by a financial services firm. We would need a similar level of cooperation from financial

services firms providing 401K/A accounts as well as 403(b) administrators. Fortunately, these same firms are entering the HSA market and may find mutual benefit from sharing data for an independent investigation of this topic.

3.7 Conclusions

Using data from a large employer offering both a HSA benefit and supplemental retirement benefits we find evidence of joint and positive propensities to invest in both assets. We also find that income is large determinant of HSA choice. In addition, we find weak evidence that HSA policy-holders are more likely to supplemental retirement assets. However, when we account for strong prior preferences for savings behavior we find that those investing in HSAs reduce their supplemental retirement investment. However, this difference is not statistically significant. Although these results are preliminary they suggest that consumers are making health and wealth decisions jointly, and that further research in this area is warranted to assess the trade-offs between HSAs and personal investments.

Notes

1. See http://content.members.fidelity.com/Inside_Fidelity/fullStory/1,,6385,00.html for more information on Fidelity's health/wealth retirement product.

2. To the extent that almost everyone will be able to use them to pay their Medicare premiums.

3. Henceforth, we will refer to the sum of all retirement plan contributions as 403(b).

4. A more detailed description of our methods is provided in Appendix B.

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Appendix A

Conceptual Model of Health and Wealth Joint Decisions

According to the theory of finance (Sharpe 1964), risk-averse investors should invest their wealth in a risk-free asset (e.g., Treasury Bills) and a risky market portfolio in proportions that depend on the risk and return for these two assets. One could think of the investor as maximizing:

$$U = U(\mu, R). \tag{A1}$$

Where μ = return and R = risk. Prior to introducing HSAs the only asset is a market asset, so the investor's budget constraint is:

$$\mu = \mu_o + \alpha R_m \tag{A2}$$

R_m = market risk, μ_o = return on risk-free asset and α is a constant return per unit of risk.

The first-order condition for an interior solution to this problem is:

$$\frac{-U_2}{U_1} = \alpha. \tag{A3}$$

The consumer may maximize utility at a corner solution where she holds only Treasury Bills or only the risky market portfolio (M). It would also be possible to borrow at the risk-free rate and invest in assets along the extension of line $\mu_o M$ (see fig. 3A.1).

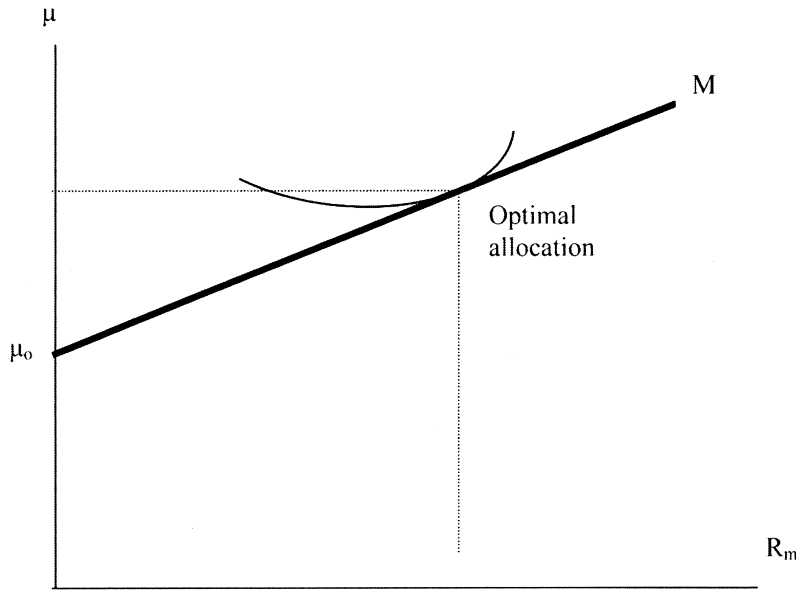

Figure 3A.1
Optimal portfolio allocation under risk

Introducing Health Saving Accounts

HSAs let investors hold their portfolio of choice in tax-free assets, but HSAs also expose them to a new type of risk—person-specific health risk, R_h. If market and health risks are uncorrelated, we can write total risk as the sum of the two risks:

$$R = R_m + R_h \tag{A4}$$

The return on the HSA is:

$$\mu = \frac{\mu_o + \alpha(R - R_h)}{1 - t} \tag{A5}$$

In equation (A5), t is the investor's tax rate. A higher tax rate increases the slope of the HSA return, so equation (A5) is steeper than equation (A2) for any given α. HSAs create a kink in the budget constraint. To the left of the kink, the after-tax market constraint applies; to the right, the pretax HSA constraint applies (see fig. 3A.2).

The decision to take an HSA is bound up with the decision to invest in

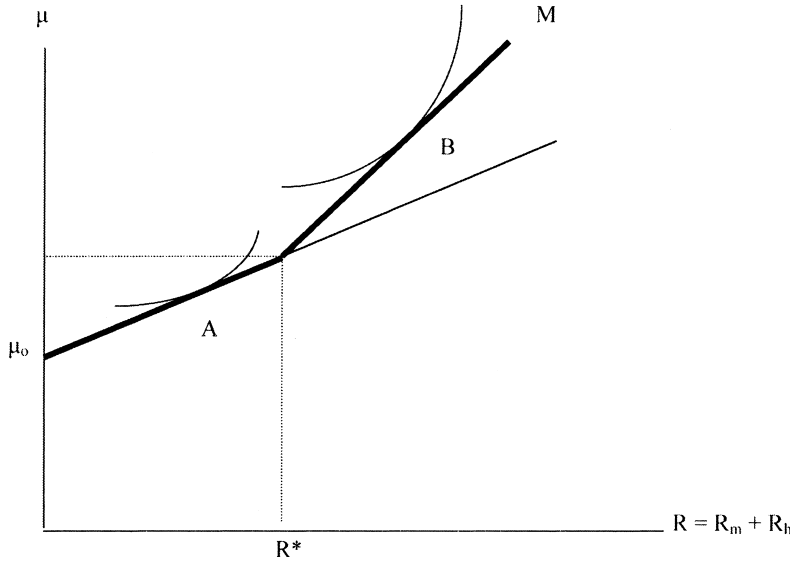

Figure 3A.2
HSAs create a kinked budget constraint

risky assets. Investor B is less risk averse than A, for example. Investor B takes the HSA but A does not.

The location of the kink in the budget can be found by setting equation (A2) equal to equation (B5) and solving for R^*:

$$R^* = \frac{\alpha R_h - t\mu_o}{t\alpha} \tag{A6}$$

It follows from equation (A6) that:

$$\frac{\partial R^*}{\partial \mu_o} < 0, \frac{\partial R^*}{\partial t} < 0, \frac{\partial R^*}{\partial \alpha} > 0, \text{ and } \frac{\partial R^*}{\partial R_h} > 0 \tag{A7}$$

Holding preferences constant, an increase in the return on the risk-free asset or the tax rate will reduce R^*, while an increase in the slope of the market constraint or the investor's health risk will increase it. Because a decrease (increase) in R^* makes an HSA more (less) attractive to the investor, the demand for an HSA can be written as:

$$\text{HSA} = D[\mu_o(+), t(+), \alpha(-), R_h(-)] \tag{A8}$$

The sign following each variable represents the expected sign for the coefficient of that variable on the demand for an HSA.

Next, we want to explain how the investor divides his or her wealth between the risk-free asset and the risky market portfolio. Holding preferences constant, this will depend on factors that determine the slopes of the budget constraints:

(1) An increase in the tax rate is relevant only if the consumer chooses an HSA, but for these investors it increases the slope of the budget constraint—that is, $\partial^2\mu/\partial t\partial R_m = \alpha/(1-t)^2 > 0$—which provides an incentive to invest in risky assets.

(2) An increase in the return on the risk-free asset is a positive income effect for all investors, but it does not affect the slope of the budget constraint. Therefore, it is not clear whether the optimal portfolio shifts toward risky assets when μ_o increases.

(3) An increase in α makes the budget constraint steeper for both types of investors, thereby increasing the attractiveness of risky assets.

(4) An increase in personal health risk is relevant only if the investor chooses an HSA, in which case it has a negative income effect whose sign is not certain.

If we let k represent the proportion of the portfolio invested in risky assets, then from the previous factors we can write:

$$k \mid \text{HSA} = k[t(+), \mu_o(?), \alpha(+), R_h(? \text{ but opposite to sign of } \mu_o)] \quad \text{(A9)}$$

$$k \mid \text{no HSA} = k[t(0), \mu_o(?), \alpha(+), R_h(0)] \quad \text{(A10)}$$

The proportion of wealth held in risky assets should be different for investors who choose HSAs compared with those who do not, and two variables—t and R_h—should matter only if an HSA is chosen.

Application of Theory to Health Savings Accounts and Supplemental Retirement Decisions

Employees working in firms providing education, health care, and the arts are eligible to contribute to a 404(b) supplemental retirement savings plan. Furthermore, since 1978 employees can contribute to Section 457 retirement savings plans. Both of these are tax-deferred retirement savings programs. Unused, HSAs are yet another form of a tax-deferred retirement savings program.

We assume there is a subset of employees who are maximum savers. They wish to take full or significant advantage of all tax-deferred sav-

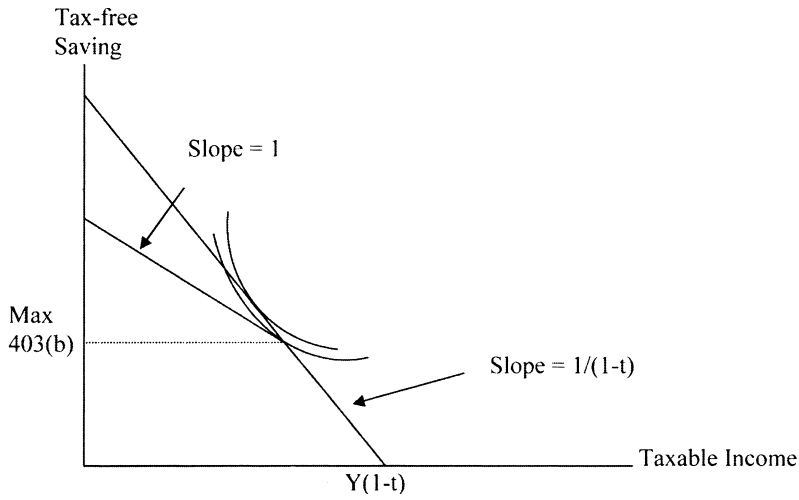

Figure 3A.3
Joint choice of HSA and supplemental retirement contribution

ings opportunities. Assume an employee of this type has already maxed-out her 403(b) contribution. When an HSA option becomes available, she chooses it, while maintaining her 403(b). Addition of the HSA option allows the person to increase her tax-free savings without reducing her 403(b) contributions.

This behavior is illustrated in figure 3A.3. The x-intercept for the budget constraint is after-tax income where Y = income and t = tax rate. The budget constraint has a kink at the max 403(b). The person illustrated has maxed-out her 403(b) contribution. Addition of the HSA option allows the person to move away from the kink, increasing her tax-free saving without reducing her 403(b) contribution. Presumably, this person can also add to her total savings opportunity by maxing out both her 403(b) and 457 opportunities.

Imagine another person who has not maxed out her 403(b). She might still choose an HSA if she were very healthy because of the employer contribution to the account. It has a good return and a low risk because she does not expect to spend much on out-of-pocket medical care. In this case, we would expect to see some cutback in the 403(b) contribution because the HSA is a better vehicle for tax-free savings.

In either scenario, it is reasonable to expect someone to invest in an

HSA as a supplemental retirement opportunity. An interesting question is whether the person who does not typically max out their 403(b) contribution, but chooses an HSA, operates as if she faces a budget constraint for retirement allocations and shifts resources from their previous levels of 403(b) contribution.

Appendix B

Econometric Analysis Approach

We estimate a bivariate probit model of two concurrent consumer decisions: (1) election of an HSA health plan, and (2) the decision to enroll in a supplemental retirement policy. The specification of the bivariate probit permits us to see the different effects of employee characteristics as well as the relatedness of these decisions. The joint probability that the individual chooses an HSA and elects to participate in a supplemental retirement plan is

$$Pr(e = 1, y = 1) = \int_{-Z\alpha}^{\infty} \int_{-X\beta-\gamma}^{\infty} \phi(\varepsilon, \nu, \rho) d\varepsilon d\nu$$

$$= \Phi(X\beta - \gamma, Z\alpha; \rho),$$

where $\phi(\cdot)$ and $\Phi(\cdot)$ are the standardized bivariate normal density and distribution functions (respectively) e is dummy variable determining choices of a HSA, y is a dummy variable for the choice to invest in a 403(b) in 2006, Z is a vector of employee and plan characteristics determining e, X is a vector of employee characteristics determining y, and ε is an error term that is distributed bivariate normally with a variance normalized to one. This bivariate probit specification estimates the effect of employee characteristics on the joint determination of HSA and optional retirement program participation. The conditional probability that the individual enrolls in an HSA, given that she also chose to contribute to a 403(b) plan is

$$Pr(e = 1 \,|\, y = 1) = \frac{Pr(e = 1, y = 1)}{Pr(y = 1)}$$

$$= \frac{\int_{-Z\alpha}^{\infty} \phi(\nu) \int_{-X\beta-\gamma}^{\infty} \phi\left[\frac{(\varepsilon + \rho\nu)}{\sqrt{1-\rho^2}}\right] d\varepsilon d\nu}{\Phi(Z\alpha)}$$

$$= \frac{\int_{-Z\alpha}^{\infty} \phi(\nu)\Phi\left(\frac{X\beta + \gamma - \rho\nu}{\sqrt{1-\rho^2}}\right)d\nu}{\Phi(Z\alpha)}$$

The model is identified (i.e., the estimates it provides will be unique) as long as Z, the vector of explanatory variables in HSA choice equation, contains at least one independent variable not in X, the vector in supplemental retirement decision equation (O'Higgins 1994).

We also used a generalized linear regression model (GLM) to test what factors were associated with the contribution to the supplemental retirement program. For this part of the analysis we use a difference-in-differences approach comparing the impact of pre and post HSA introduction on retirement saving, specified as:

$$(403(b)\ \text{investment} \mid 403(b)\ \text{investment} > 0) = B_x X_i + B_H \text{HSA}_i + B_T T \text{HSA}_i + e_i,$$

where X_i represents a vector of person i variables influencing the optional retirement contribution such as chronic illness, age, gender, family status, and income; HSA_i is an indicator for whether the person chose an HSA in 2006; T is an indicator for 2006; and e_i is a person-specific random error term. The coefficient B_T represents the effect of the HSA on supplemental retirement investment. These investment regressions account for repeated observations on individuals and tests of statistical significance are based robust standard error estimates.

We completed this analysis using two different approaches. First we examined the impact of an HSA cohort variable (plus a time interaction) on supplemental retirement investment. Second, we added the max saver variable and fully inter-acted it with time and the HSA cohort to see if there was any evidence of the behavior suggested in figure 3A.3.