經濟與管理論叢(Journal of Economics and Management), 2011, Vol. 7, No. 1, 1-22

Medical Savings Accounts and Preventative Health Care Utilization

Justin R. Cress
Department of Economics, University of Kentucky, U.S.A.

David M. Zimmer*
Department of Economics, Western Kentucky University, U.S.A.

Introduced during the late 1990's, medical savings accounts (MSAs) increase cost sharing between employers and employees. Despite assurances from proponents claiming cost sharing will stem the tide of rising health care prices and expenditures, skeptics argue that MSA enrollment could reduce utilization of preventative care. This paper estimates preventative care demand models based on data from the National Longitudinal Survey of Youth. These models measure the association between MSA enrollment and the utilization of physicals among adults and doctor visits among children. The models control for endogeneity using a variety of techniques. The results indicate that medical savings account enrollment does not significantly impact the utilization of preventative care.

Keywords: health savings account, medical saving accounts, consumer-driven health plans, preventative care
JEL classification: I11, I18, C23

1 Introduction

In the United States, federal and state governments finance approximately half of health care spending, with the other half financed with private dollars (Gruber, 2010). For this reason, health policy debates in the U.S. typically revolve not around

Received May 25, 2009, revised March 29, 2010, accepted April 23, 2010.
*Correspondence to: Department of Economics, Western Kentucky University, Bowling Green, KY USA. E-mail: david.zimmer@wku.edu. The authors would like to thank editors Cathy Chen and S. W. Hu, and an anonymous reviewer for providing helpful comments.

the delivery of care, but rather around financing mechanisms. At one end of the political spectrum, politicians associated with the Democratic Party generally support increased government involvement in healthcare financing. Although not the official stance of the Democratic Party, many Democratic politicians favor a Canadian style “single payer” system in which all health care expenditures are channeled through the federal government. At the other end of the political spectrum, politicians associated with the Republican party generally favor less government involvement in healthcare financing. Republicans generally believe efficient outcomes result from individual citizens directing their own healthcare financing decisions. To this end, Republicans have shown particular fondness for tax-preferred medical savings accounts, part of the broader movement toward consumer driven health plans (CDHP). These accounts allow individuals to set aside income, protected from federal taxes, to be spent on future medical services.[1]

Opponents of private financing mechanisms in general, and medical savings accounts in particular, counter that private health care financing encourages individuals to skimp on important preventative services. This paper investigates this particular source of controversy surrounding medical saving accounts. Specifically, the paper addresses the following question: Do individuals with medical savings accounts consume fewer preventative services than individuals without such accounts? Estimates rely on data from a nationally-representative sample of full-time employees, some of whom have employer-sponsored insurance coupled with medical savings accounts, and others who have employer insurance without medical saving accounts.

Uncovering the relationship between medical saving accounts and preventive health care consumption is complicated, however, because individuals who expect to consume many (or few) preventative services might be attracted to such accounts in the first place. This paper employs several empirical approaches that seek to uncover the causal relationship of medical savings accounts. The different approaches rely on slightly different identification strategies, which lend some evidence of robustness to the main findings.

[1]President Obama’s healthcare reform bill, for which details are still emerging at the time of this writing, represents a complex blend of public and private financing mechanisms.

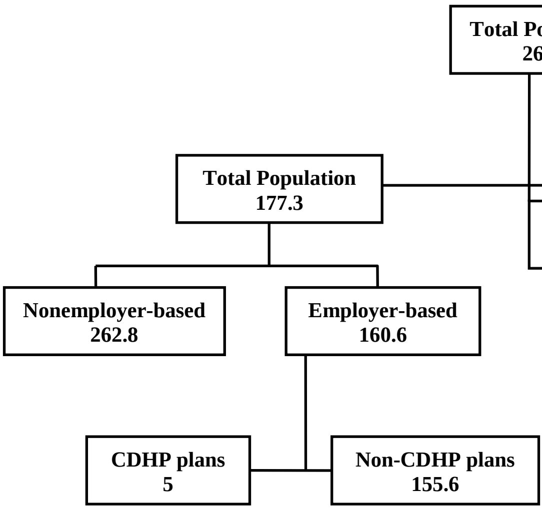
We present estimates from several nationally representative preventive health care demand models. The findings take a first step toward determining the influence that CDHPs, specifically medical savings accounts, have on the utilization of physicals among adults and doctor visits among children. The results indicate that medical savings accounts do not significantly influence preventative care utilization.

2 Flexible Spending Accounts

Figure 1 outlines health insurance options for non-elderly Americans as of 2009.[2] Approximately 67 percent of the non-elderly population receives coverage through a private source, with more than 90 percent of private policies offered as fringe benefit compensation through employers. This employer-based system is derived, primarily, from historical accident. To combat inflation during World War II, the U.S. government imposed economy-wide caps on wage compensation. Unable to increase wages to compete for labor, employers began offering health insurance. In addition to providing a convenient pooling mechanism, employer-provided insurance offered an additional advantage for employees: Wage compensation is subject to federal income and payroll taxes, whereas compensation in the form of fringe benefits, such as health insurance, is not. The tax-preferred status of private health insurance has remained an important, and costly, detail of the U.S. healthcare system. The federal government lost approximately $260 billion in 2009 due to the non-taxation of health insurance benefits (Gruber, 2010).

An important drawback of this system is that favorable tax treatment of employer-provided health insurance encourages individuals to increase consumption of healthcare services to (possibly) inefficient levels. This arrangement finances medical services with pre-tax dollars, including predictable, non-catastrophic services and routine doctor visits. The reduction in the marginal cost of care faced by consumers under such a system increases consumption, creating an upward pressure on prices and expenditures (Feldstein, 1973; Pauly, 1986).

[2]All U.S. citizens enroll in the federally-operated Medicare program at age 65.



Sources: Gruber (2010) and the Kaiser Family Foundation

Figure 1: Non-elderly Americans' sources of health insurance coverage

By increasing out-of-pocket costs, cost sharing should give consumers a more accurate assessment of the marginal cost of treatment, reigning in price and expenditure increases. This ideology of individual responsibility for health care financing materialized in consumer driven health plans (CDHP). CDHPs couple tax-preferred medical savings vehicles with high-deductible catastrophic loss insurance. CDHPs increase the marginal cost of routine health care faced by consumers, ostensibly restoring market discipline by encouraging competition on price and quality. However, opponents of individual financing argue that by increasing the marginal cost of service, CDHPs discourage the utilization of preventative care (Davis *et al*., 2005), especially among children (The Children's Partnership, 2006). As Figure 1 indicates, CDHP plans represent a small portion of employer-based policies, but this segment has experienced rapid growth in recent years. Although the American versions of CDHP plans have received intense scrutiny in the western world, other nations, including China, Taiwan, Singapore, and South Africa, also have experience with CDHP-type setups.

The initial introduction of tax-preferred medical savings accounts appeared in the Kassebaum-Kennedy bill (Health Insurance Portability and Accountability Act of 1996). Known as Archer medical saving accounts (MSAs), these accounts set aside pre-tax contributions from employers and employees specifically for medical expenses. MSAs received favorable tax treatment only when coupled with high-deductible health insurance policies. Modern MSAs differ from Archer MSAs in this regard. Most do not require enrollment in a specific variety of insurance policy. Additionally, some MSAs allow unspent money to accumulate while others revert unused funds to employers. Health reimbursement arrangements (HRAs) operate similarly, except that funding comes entirely from employer contributions, and ownership remains with employers. The most recent iteration of the MSA, health savings accounts (HSAs), came about as part of the Modernization of Medicare Act of 2003. HSAs expanded the scope of employers permitted to offer MSAs, and existing MSAs were grandfathered into HSAs.

The nomenclature of tax-preferred medical finance accounts lends itself to ambiguity. The term MSA sometimes references a specific type of account but the term also functions as an umbrella for all types of medical savings vehicles. Following convention in the health economics literature, the remainder of this paper uses the term MSA in the latter context, generally defined as any tax-preferred saving account for health expenditures. Two reasons motivate this decision. First, the National Longitudinal Survey of Youth makes no distinction between different tax-preferred accounts. Unfortunately, this variable fails to distinguish differing levels of cost sharing. However, we include controls (discussed below) that attempt to compare varying benefit package designs. Second, despite subtle differences, the accounts mentioned above seek to increase cost consciousness by emphasizing out-of-pocket financing, often associated with increased cost sharing.

Ostensibly, the Modernization of Medicare Act of 2003 prevents those who dually enroll in both MSAs and high deductible health plans from skimping on preventative care. Under the act, insurance companies may exempt expenditures on preventative care from the deductible (Davis, 2004). However, over half of all MSA adopters enroll in plans which omit such exclusions (Fronstin and Collins, 2006). Thus, for many, MSA enrollment could have a pernicious effect on preventative care utilization, potentially resulting in higher long-run expenditures.

3 Literature Review

The relatively recent inception of MSAs limits the amount of literature pertinent to the current analysis. In an early paper on the topic, Cardon and Showalter (2001) estimate a model of flexible spending account (FSA) enrollment using data from a medium-sized insurance company for the calendar year 1996. The results show that the demand for FSAs increases with income and the age of enrollees, with demand reaching its maximum at 42 years of age. By expanding on this research, Cardon and Showalter (2003) present a theoretical model questioning whether there exists a positive relationship between FSA demand and income. Under certain calibrations of this model, the results support a negative relationship between income and demand. This suggestion undercuts the conventional wisdom, which suggests higher enrollment rates for wealthy individuals.

Parente *et al*. (2004) estimate CDHP demand models using data on University of Minnesota employees. They find a positive relationship between CDHP enrollment and income, but health and age seemingly do not affect CDHP enrollment. Thus, CDHPs attract the wealthy but not necessarily the young and healthy. Buntin *et al*. (2006) review the existing literature on the cost and quality effects of CDHPs and find mostly mixed results. Hamilton and Marton (2008) estimate FSA demand models using data from a large public university in the southeastern U.S. These models indicate that nonwhites participate in FSAs less often, and have smaller contributions when they do enroll.

Two recent papers estimate the welfare effects of flexible spending accounts. After correcting for selection bias, Jack *et al*. (2006) find, at best, a neutral effect on welfare. Using firm-level data on FSA enrollment, they conclude that FSA growth could account for a portion of the recent increase in health insurance costs borne by employees. Assuming an environment-absent selection bias, Cardon and Showalter (2007) present a model which demonstrates an association between FSA enrollment and modest welfare gains.

Although not specifically targeted at preventative care utilization, Feldman *et al*. (2007) estimate health care demand models for enrollees in consumer driven health plans (CDHP). Armed with data from a large private sector employer, they find current plan designs do not significantly discourage hospital utilization. Furthermore, in most categories, CDHP enrollees spend more than PPO enrollees. Feldman *et al*. speculate that plan design, specifically the relatively small deductible, hindered the effectiveness of the cost sharing regime.

Regarding preventative care, Rowe *et al*. (2008) present descriptive statistics comparing the preventative care utilization of enrollees in cost-sharing regimes to that of non-enrollees. Rowe *et al*. (2008) find that enrollees in an HRA utilize cancer screening services and diabetes-specific preventative services at rates similar to non-enrollees. However, Trivedi *et al*. (2008) find that cost sharing regimes decrease the probability of mammogram utilization, a critical preventative service, by 8%.

By focusing on basic preventative services, routine physicals and child doctor visits, this paper adds a broad based estimation to the literature discussed above. Furthermore, attempts to control for endogeneity, discussed below, seek to uncover the association between CDHPs and preventative care utilization.

4 Data

Unfortunately, most health care surveys, notably the widely-used Medical Expenditure Panel Survey, do not publish nationally representative information on consumer driven financing vehicles. However, the National Longitudinal Survey of Youth (NLSY) began asking respondents in 1998 whether they had a “medical savings account” through their employers. Although the NLSY lacks detailed information on health care utilization, it collects data on the most important form of preventative care, routine physicals. The NLSY also solicits information on doctor visits of children.

The present analysis utilizes data drawn from the 1998, 2000, 2002, 2004, and 2006 years of the 1979 National Longitudinal Survey of Youth (NLSY), which originally consisted of 12,686 individuals between the ages of 14 and 21 in 1979 (or approximately ages 41 and 48 in 2006). The NLSY has interviewed this cohort annually or biennially since 1979.

The survey contains detailed information about labor market attachment, employment traits, and demographic characteristics. Since the majority of MSAs require separate insurance policies, and because nearly all MSAs are offered through employers, the estimation sample focuses on individuals who are employed at least 35 hours per week and are covered through a current or former employer's insurance policy (or spouse's current or former employer's insurance policy). The sample under consideration excludes individuals with family incomes of less than 5 dollars per working hour or more than 1000 dollars per working hour.

The NLSY offers several advantages for the present study. First, in contrast to data used in previous studies on MSAs, the NLSY enables nationally representative estimation when weighted. Second, starting in 1998, roughly corresponding with the establishment of MSAs by Kassebaum-Kennedy, the NLSY began asking respondents the following question: "Have you (or your employer) set up a medical savings account (msa) to help pay your health care expenses?". The question's vagueness should encompass all of the various incarnations that have evolved since the late 1990s. As the sample focuses on privately insured individuals, respondents answering "no" to this question are enrolled in private insurance, but not in an MSA. Third, although the NLSY does not record detailed information on health care consumption or expenditures, it asks respondents several questions related to the utilization of certain preventative services. This study utilizes two of these questions. The first, asked of all respondents beginning in 2002, measures the amount of time since the respondent's last physical exam. The second question, asked of all mothers, measures the amount of time since a biological child was taken to a doctor.

The NLSY over samples blacks, Hispanics, and low-income whites. The weighted means presented in Table 1 verify national representation. The proportion of children who have visited doctors in the previous 6 months does not vary with regard to MSA status. Conversely, the proportion of individuals who have had physicals in the previous two years is slightly larger among MSA enrollees, defying a priori expectations. However, this does not suggest a causal effect, as MSA enrollees and non-enrollees differ across several other dimensions. For example, the average MSA enrollee obtains more education, earns a higher income, and marries more often than non-enrollees. Each of these characteristics probably exert some influence on preventative care utilization. The descriptive statistics discussed here highlight the importance of controlling for socioeconomic characteristics that might also affect health care demand.

Table 1: Sample means: respondents are privately insured through employers

	Does not have MSA n = 15,490	Has MSA n = 1,775
Had a physical in the last two years (2002 or later)	0.79	0.82
Brought any child to doctor in last 6 months (for mothers)	0.51	0.51
Age	41.0	41.7
Years of education	13.8	14.9
Income (in 1000s)	73.7	106.2
Female	0.42	0.38
Black	0.11	0.08
Hispanic	0.03	0.01
Married	0.68	0.77
Divorced/Separated	0.20	0.13
Family size	3.13	3.35
Metropolitan residence	0.95	0.97
Employer has multiple locations	0.75	0.85
Firm size (in 100s)	6.4	10.8

5 Economic Model and Implementation

The model presented here is based, in part, on the model developed by Cardon and Showalter (2001) which illustrates the effect of FSA participation on health care expenditures. The models below estimate preventative care utilization by individual i in year t (y_{it}) based on the following equation:

$$y_{it} = c_i + X_{it}\beta + \gamma MSA_{it} + \varepsilon_{it} . \quad (1)$$

Two measures of preventive care are considered: (1) whether the individual had a physical in the previous two years, and (2) among mothers, whether any child had a physician visit in the previous six months. The term X_{it} denotes a vector of explanatory variables with coefficient vector β, c_i measures individual-specific fixed effects, and ε_{it} is a random disturbance term.

The variable MSA_{it} signifies a dichotomous indicator of MSA enrollment, assuming a value of one if the respondent is currently enrolled in an insurance policy which includes an MSA, and 0 if the respondent is enrolled in an insurance policy which does not include an MSA. The main parameter of interest, γ, measures the association, if any, between MSA enrollment and health care consumption. Cardon and Showalter's model emphasizes that individuals choose FSAs based upon expectations about future health care needs, at least in part. Thus, endogeneity could result from the inclusion of FSA enrollment in health care demand models. This analysis estimates equation (1) using several different approaches, each representing an attempt to purge such endogeneity.

5.1 Ordinary Least Squares (OLS)

First, simple OLS estimates are calculated by setting $c_i = 0$ for all i and treating the sample as a pooled cross section. OLS estimates suffer from bias, however, if $E[\varepsilon_{it} | MSA_{it}] \neq 0$. For example, if people enroll in MSAs based on expectations of future health expenses, then a correlation is likely to exist between the disturbance term and MSA enrollment. Therefore, OLS does not produce causal estimates, but OLS estimates serve as an important benchmark for gauging the correlation between MSA enrollment and preventative care utilization.

5.2 Instrumental Variables (IV)

The second estimation approach attempts to purge this bias by exploiting additional variables, or instruments, which are correlated with MSA enrollment but remain uncorrelated with health care utilization. Two such variables are used: (1) a dichotomous indicator of whether the firm at which the person is employed has multiple locations; and (2) the number of employees (in 100s) at the person's place of employment. Sample means of these two variables, presented at the bottom of Table 1, indicate that they are related to MSA enrollment. Firms with more locations and larger workforces offer MSAs more often, presumably because firm size is related to increased insurance options (Gates *et al.*, 2008). Firm size and related variables serve as instruments in similar studies on employee insurance choice (Johnson and Crystal, 2000; Olson, 2002; Deb and Trivedi, 2006).

Appropriate instruments must be correlated with MSA enrollment, but must not be correlated with health care utilization. A first stage F-test, calculated to determine whether the two instruments jointly affect the probability of MSA enrollment, verifies the first condition. In the physical exam model, this test produces a p-value smaller than 0.00001, indicating that the instruments strongly predict insurance status. Additionally, in the child doctor visit model, the F-test produces a p-value of 0.34, indicating that the instruments are relatively weak in the child models.

A Hansen (1982) test of over-identifying restrictions confirms the second condition. The null hypothesis for the Hansen test states that the instruments do not affect utilization; a rejection of the null hypothesis casts doubt on instrument validity. In the physical exam model, the test statistic yields a p-value of 0.17. Thus, the instruments do not significantly affect utilization after conditioning on observed covariates. Therefore, they should serve as appropriate instruments. Similarly, in the child doctor visit model, the test statistic produces a p-value of 0.58.

As with most non-experimental instruments, questions of validity may arise. First, Gruber and Levitt (2000) explicate the joint occurrence of employment and insurance determinations. This calls into question the appropriateness of employment characteristics as identifiers of insurance status. The present analysis avoids the majority of this concern, as the estimation draws from a sample made up of employed, privately insured individuals. Second, an individual may choose a particular employer, perhaps a company with a large workforce, because his/her health status creates a preference for job stability, or because some occupations impose lower health risks (Deb and Trivedi, 2006). These concerns require a re-estimation which exploits “internal instruments” (Lewbel, 2004).

5.3 Internal Instruments

Conventional IV model identification requires external instruments. However, Lewbel (2004) demonstrates that when the error term in the first stage regression exhibits heteroskedasticity, IV estimation can occur without external instruments.

Heteroskedasticity in the first stage imposes variation that is uncorrelated with the error term in the second-stage regression.[3]

Consider the following triangular system where the time subscript is suppressed for notational simplicity,

$$MSA_{it} = X_i'\beta_1 + \varepsilon_{i1}, \tag{2}$$
$$y_i = X'_i\beta_2 + \gamma MSA_i + \varepsilon_{i2}. \tag{3}$$

Lewbel suggests the following two-step estimator. In step one, equation (2) is estimated via OLS. By letting $\hat{\varepsilon}_{i1}$ stand for the estimated residuals from this regression, the second step involves IV estimation of equation (3) using X_i and $(X_i - \overline{X})\hat{\varepsilon}_{i1}$ as instruments, where $\overline{X}$ represents the sample mean of X_i. Standard errors are calculated via bootstrap. Thus, consistent estimation of γ occurs without the availability of external instruments, requiring only that the ε_{i1} exhibit heteroskedasticity. A standard Breusch and Pagan (1979) test, which follows a $\chi^2(1)$ distribution, confirms the presence of first stage heteroskedasticity, as is common in linear probability models. The test statistics, shown at the bottom of Tables 2 and 3, allow overwhelming rejection of homoskedasticity. Therefore, the method of internal instruments should provide proper identification.

The Lewbel method does not guarantee “good” instruments. F- and Hansen tests verify the validity of the internal instruments. For both the physical exam and child doctor visit models, the F-test returns a p-value of less than 0.00001, indicating that the internal instruments significantly affect MSA enrollment. The Hansen test produces p-values of 0.14 in the physical exam model and 0.98 in the child doctor visit model, indicating that the internal instruments have a minimal impact on the outcome variables, conditional on other explanatory variables. Thus, the internal instruments appear valid.

[3] Although Lewbel generalized the specific model estimated in this paper, his work builds on a large base of literature regarding the utilization of information on higher moments to achieve identification. Previous work on this subject includes Vella and Verbeek (1997), Dagenais and Dagenais (1997), Lewbel (1997), Cragg (1997), Sentana and Fiorentini (2001), Rigobon (2000, 2002, 2003), Hogan and Rigobon (2003), Klein and Vella (2003).

5.4 Fixed Effects

Finally, allowing variation in c_i across individuals exploits the longitudinal nature of the NLSY data. Such an estimation purges unobserved heterogeneity that simultaneously affects MSA enrollment and utilization from the model, as long as heterogeneity is time invariant. For example, individuals who display strong predispositions to visit doctors may also strongly prefer certain insurance plans. If these preferences remain constant across time then fixed effects estimates control for them. However, unobserved heterogeneity is likely to exhibit at least some time variation due to evolving market and political preferences for tax-preferred accounts. The changing design of MSAs across time could also influence preferences for MSAs, potentially introducing unobserved heterogeneity. Nevertheless, the availability of longitudinal data provides a unique opportunity to corroborate results from the other identification approaches.

6 Results

Table 2 presents linear probability estimates of equation (1) for which y_{it} is a dichotomous indicator of whether individual i had a physical exam in the last two years. The sample focuses on the years 2002, 2004, and 2006, as the NLSY did not collect information on physical exams prior to 2002. The table presents estimates from all four estimation methods discussed in Section 3.

6.1 Control Variables

Control variable coefficient estimates remain robust across the four specifications. The results confirm a positive relationship between age and the probability of having a physical, and a negative relationship between family size and the probability of having a physical. Income influences the probability of having a physical in a small but positive direction in both the OLS and fixed effects models. Females, blacks, and Hispanics display higher probabilities of having physicals compared to their male and nonblack/nonhispanic counterparts. Married individuals are approximately

5 percentage points more likely to have physicals compared to individuals who have never been married, but this effect increases almost five-fold when fixed effects are taken into account. Similarly, being divorced or separated apparently has no effect, but including fixed effects isolates a large and significant impact of marital status. Finally, education returns are insignificant in three of the four models, the exception being that an additional year of education increases the probability of having a physical by 3 percentage points in the fixed effects specification.

Table 2: Linear probability estimates: did respondent have a physical in the last two years? (n = 9,827)

	OLS		IV		Internal IV		Fixed Effects	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Has MSA	0.029**	0.012	0.256	0.210	0.038	0.035	0.015	0.016
Age	0.009**	0.002	0.008**	0.002	0.009**	0.002	0.011**	0.002
Years of education	0.000	0.002	–0.003	0.003	0.000	0.002	0.027**	0.010
Income (in 1000s)	0.000*	0.000	0.000	0.000	0.000	0.000	0.000*	0.000
Female	0.129**	0.009	0.133**	0.010	0.130**	0.009		
Black	0.127**	0.009	0.131**	0.010	0.127**	0.010		
Hispanic	0.064**	0.019	0.076**	0.023	0.064**	0.020		
Married	0.050**	0.015	0.051**	0.016	0.050**	0.015	0.229**	0.066
Divorced/Separated	0.021	0.015	0.022	0.015	0.021	0.014	0.216**	0.068
Family size	–0.006*	0.004	–0.007*	0.004	–0.006*	0.004	–0.011	0.008
Metro residence	0.030	0.052	0.037	0.051	0.031	0.052	0.014	0.068
Constant	0.275**	0.093	0.312**	0.100	0.276**	0.091	–0.213	0.188
Breusch-Pagan test					808.16			

*: p < .10
**: p < .05

6.2 MSA Enrollment & Routine Physicals

The OLS estimate suggests an association between MSA enrollment and a 3 percentage point increase in the probability of having a physical in the previous two years. This estimate corroborates the sample means reported in Table 1, adding that this effect persists when controlling for socioeconomic variables. As argued above, however, the OLS estimate does not imply a causal relationship. Individuals who possess unobserved (by the researcher) propensities to enroll in MSAs may obtain more (or fewer) physical exams. The other three specifications attempt to control for these unobserved factors.

The IV estimate appears implausibly large in magnitude, being approximately 8 times larger than the OLS estimate. However, the large IV estimate differs insignificantly from zero. The other two specifications, internal IV and fixed effects, produce results that are positive and similar in magnitude to OLS estimates, but insignificantly different from zero.

None of the three specifications presented here perfectly controls for unobserved heterogeneity. While the instruments used in the IV estimate satisfy the validity tests, the implausibly large magnitude of the IV estimate calls into question the appropriateness of the exclusion restrictions. The internal IV instruments, which also satisfy the instrument validity tests, achieve identification through statistical, rather than economic, sources. The fixed effects specification produces consistent results as long as unobserved heterogeneity affecting MSA enrollment remains time-invariant. The fixed effects remove a significant amount of heterogeneity, but given evolving health care markets and the political treatment of MSAs, some will inevitably remain. These concerns notwithstanding, none of the specifications, including OLS, produce a negative relationship between MSA enrollment and the probability of having a physical exam. Therefore, the complaint that MSAs reduce the usage of routine preventive care seems difficult to corroborate.

6.3 MSA Enrollment & Child Doctor Visits

Do parents enrolled in MSAs respond to increased cost sharing by reducing health care for their children? The estimates presented in Table 3 address this question. The dichotomous dependent variable indicates whether a mother has taken a dependent child to a doctor in the last six months, the frequency recommended by the American Medical Association. This estimation produces imprecise coefficients relative to those presented in Table 2. OLS, IV, and fixed effects return negative, but statistically insignificant, coefficients for MSA enrollment. As with the physical exam models, IV estimates seem implausibly large in magnitude. By contrast, internal IV estimation produces a positive, albeit insignificantly different from zero, coefficient. Thus, there is little evidence to suggest that family MSA enrollment impedes children's access to physician visits. However, the number of physician "visits", alone, crudely measures physician services. Thus, these results do not address whether MSA enrollment leads to fewer services after the initial physician contact.

Table 3: Linear probability estimates: did respondent take a child to the doctor in the last 6 months? (n = 2,479)

	OLS		IV		Internal IV		Fixed Effects	
	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.	Coeff.	St. Err.
Has MSA	–0.027	0.036	–2.637	1.727	0.022	0.090	–0.087	0.059
Age	0.002	0.003	0.011	0.009	0.002	0.003	0.006	0.006
Years of education	0.004	0.005	0.025	0.017	0.004	0.005	–0.037	0.025
Income (in 1000s)	0.000	0.000	0.003	0.001	0.000	0.000	0.001	0.001
Black	0.079**	0.025	0.136**	0.058	0.077**	0.025		
Hispanic	0.046	0.045	–0.060	0.092	0.048	0.045		
Married	–0.003	0.044	0.067	0.089	–0.005	0.044	0.161	0.311
Divorced/Separated	0.050	0.042	0.123	0.087	0.048	0.042	0.167	0.304
Family size	0.021**	0.009	0.007**	0.017	0.022**	0.009	0.018	0.030
Metro residence	–0.065	0.057	–0.029	0.088	–0.065	0.057	–0.085	0.096
Constant	0.299**	0.152	–0.279	0.489	0.310**	0.152	0.588	0.495
Breusch-Pagan test					202.97			

*: p < .10
**: p < .05

6.4 Robustness

A number of robustness checks support the estimates above. First, grouping observations by MSA enrollment status leaves enrollment in other insurance plans, and any heterogeneity resulting from such enrollment, unobserved. Testing for interactions between MSA enrollment and enrollment in other forms of insurance required the addition of variables for PPO status and HMO status. The inclusion of these variables provided results similar to the baseline specification. The final estimation omits these variables.

Second, Parente *et al*. (2004) suggest that individuals may exhibit “pent-up” demand when initially enrolling in flexible spending accounts. Because MSAs place few restrictions on expenditures, MSA enrollment could induce spending on previously unavailable health care options, increasing overall expenditures. This paper tests this hypothesis by replacing MSA_{it} with MSA_{it-1} in the estimates presented above. Including this modification exhibits results similar to the baseline specification, indicating that demand-related preferences remain relatively constant across the term of enrollment in MSA.

Third, during the time period under examination, some tax-preferred savings accounts rolled over at the end of a calendar year, such that unused funds remained available, while other accounts specified that unused funds must be forfeited. Unfortunately, our data do not allow a direct comparison between roll-over and non-roll-over accounts. However, because these two types of accounts might exert disparate impacts on health care consumption, models were estimated, similar to those described in the previous paragraph, but with particular emphasis on subjects who changed their MSA status. These models offer an informal method for testing whether subjects store up unspent funds to be used across different years. The results from this robustness check produced estimates similar to those reported above.

Finally, previous research suggests that unionized firms offer MSAs at lower rates than non-union firms (Cress, 2009). This correlation, combined with data from the NLSY regarding union membership, indicates that union status could function as an additional instrument in the second stage estimation. However, the estimate excludes union status because this variable fails the Hansen test of instrument validity, suggesting union status may be correlated with the demand for preventative care. Furthermore, estimates including union status as an instrument returned results similar to the baseline specification.

7 Discussion

The controversy over health care financing will remain relevant in the foreseeable future. The Organisation for Economic Co-operation and Development reports that in the United States health care expenditures increased from 5 percent of Gross Domestic Product in 1960 to more than 15 percent in 2005. As baby boomers reach retirement age and become eligible for Medicare, projections indicate that health care spending will continue to increase, potentially accounting for 20% of GDP by 2015 (Borger *et al*., 2006).

The results presented above demonstrate, perhaps for the first time, the lack of a direct relationship between MSA enrollment and preventative care utilization. Each of the assessments above provide support for this conclusion, particularly the internal IV and fixed effects models. What is most noteworthy is that none of the estimations suggest a negative correlation between preventative care utilization and MSA enrollment. Although they fail to prove that MSA enrollees do not skimp on preventative care, these results cast doubt on the criticism that MSAs decrease utilization of necessary preventative services.

Understanding the scope of the NLSY data provides a context for these results. Initially, the age of the individuals under consideration ranges between 33 and 40 in 1998, or between 43 and 50 in 2008. The data restricts national representation of estimated coefficients to this subset of the population. Although constraining in certain respects, this limitation allows for the interpretation of results with respect to workers for whom preventative health care decisions carry significant ramifications. Thus, the results above indicate that when health care decisions are subject to significant scrutiny, MSA enrollment and prevention remain unrelated.

In addition, the NLSY data draws no distinction between different varieties of health savings vehicles. Although this omission prevents interpretation of and comparison between specific plan designs, the current paper lays the groundwork for such analysis as data become available. Furthermore, answering the thrust of the question at hand, in regard to the relationship between marginal cost and preventative care utilization, relies heavily on commonalities between MSAs. Thus, in lieu of emphasizing the impacts of marginal changes in implementation, the breadth of the MSA_{it} variable focuses the present analysis on potential ramifications of paradigmatic shifts.

Alternatively, the lack of an association between MSA enrollment and preventative care utilization could suggest that MSAs fail to effectively increase cost sharing. The introduction of an MSA on top of, not in lieu of, traditional insurance policies subsidizes demand (Remler and Glied, 2006). However, if MSAs reduce the marginal cost of care, perhaps by financing co-payments with pre-tax dollars, one would expect a positive association between enrollment and demand. Thus, the results above encourage a more thorough examination of benefit design.

Finally, the nature of the NLSY data requires viewing the interpretations from a past-oriented perspective. The data permit the conclusion that MSA enrollment, as implemented, did not encourage skimping on preventative care. However, MSAs impose market discipline only when price conscious consumers represent enough market share to make price competition profitable. The threshold at which MSA enrollment could restore discipline in health care markets remains unquantified. Thus, the results above fall short of holistically endorsing widespread adoption.

Within the limitations and respecting the caveats described above, the results presented in this paper provide evidence that individual (privatized) financing of health care decisions need not be traded off with preventative care. This conclusion may defy a priori expectations, especially given the complaints from MSA critics. However, these results remain preliminary within the larger context of health care finance research. The literature on MSAs could benefit significantly from further research. Further research could address whether MSAs act as substitutes or complements to conventional insurance plans. Another pressing issue remains the influence that MSA enrollment has on prices and the amount of pricing information available to consumers. Better information acts as a catalyst for improved decision making on the part of governments, employers and individuals. Thus, gaining insights into the incentives inherent in the health care system represents a critical first step toward expanding access to health care and improving health outcomes.

References

Borger, C., S. Smith, C. Truffer, S. Keehan, A. Sisko, J. Poisal, and K. Clemens, (2006), “Health Spending Projections through 2015: Changes on the Horizon,” *Health Affairs*, 25, w61-73.

Breusch, T. S. and A. R. Pagan, (1979), “A Simple Test for Heteroscedasticity and Random Coefficient Variation,” *Econometrica*, 47, 1287-1294.

Buntin, M. B., C. Damberg, A. Haviland, K. Kapur, N. Lurie, R. Mcdevitt, and M. S. Marquis, (2006), “Consumer-Directed Health Care: Early Evidence about Effects on Cost and Quality,” *Health Affairs*, 25, w516-530.

Cardon, J. H. and M. H. Showalter, (2001), “An Examination of Flexible Spending Accounts,” *Journal of Health Economics*, 20, 935-954.

Cardon, J. H. and M. H. Showalter, (2003), “Flexible Spending Accounts as Insurance,” *Journal of Risk & Insurance*, 70, 43-51.

Cardon, J. H. and M. H. Showalter, (2007), “Insurance Choice and Tax-Preferred Health Savings Accounts,” *Journal of Health Economics*, 26, 373-399.

Cragg, J., (1997), “Using Higher Moments to Estimate the Simple Errors-in-Variables Model,” *Rand Journal of Economics*, 28, S71-91.

Cress, J. R., (2009), “Consumer-Driven Health Plans: Employer Take-up and Average Contributions,” *Compensation & Benefits Review*, 41, 55-61.

Dagenais, M. G. and D. L. Dagenais, (1997), “Higher Moment Estimators for Linear Regression Models with Errors in the Variables,” *Journal of Econometrics*, 76, 193-221.

Davis, K., M. M. Doty, and A. Ho, (2005), “How High Is too High? Implications of High-Deductible Health Plans,” *The Commonwealth Fund*, No. 816.

Davis, K., (2004), “Consumer-Directed Health Care: Will It Improve Health System Performance?” *Health Services Research*, 39, 1219-1234.

Deb, P. and P. K. Trivedi, (2006), “Specification and Simulated Likelihood Estimation of a Non-Normal Treatment-Outcome Model with Selection: Application to Health Care Utilization,” *Econometrics Journal*, 9, 307-331.

Feldman, R., S. T. Parente, and J. B. Christianson, (2007), “Consumer-Directed Health Plans: New Evidence on Spending and Utilization,” *Inquiry*, 44, 26-40.

Feldstein, M., (1973), “The Welfare Loss of Excess Health Insurance,” *The Journal of Political Economy*, 81, 251-280.

Fronstin, P. and S. R. Collins, (2006), “Early Experience with High-Deductible and Consumer-Driven Health Plans: Findings from the EBRI/Commonwealth Fund Consumerism in Health Care Survey,” *EBRI Issue Brief*, No. 288.

Gates, S. M., K. Kapur, and P. Karaca-Mandic, (2008), “Consumer-Directed Health Plans and Health Savings Accounts: Have They Worked for Small Business?” *Forum for Health Economics & Policy*, 11, Article 4.

Gruber, J. and L. Levitt, (2000), “Tax Subsidies for Health Insurance: Costs and Benefits,” *Health Affairs*, 19, 72-85.

Gruber, J., (2010), "The Tax Exclusion for Employer-Sponsored Health Insurance," *NBER Working Paper*, No. 15766.

Hamilton, B. H. and J. Marton, (2008), "Employee Choice of Flexible Spending Account Participation and Health Plan," *Health Economics*, 17, 793-813.

Hansen, L. P., (1982), "Large Sample Properties of Generalized Method of Moments Estimators," *Econometrica*, 50, 1029-1054.

Hogan, V. and R. Rigobon, (2003), "Using Unobserved Supply Shocks to Estimate the Returns to Education," Unpublished Manuscript.

Jack, W., A. Levinson, and S. Rahardja, (2006), "Employee Cost-Sharing and the Welfare Effects of Flexible Spending Accounts," *Journal of Public Economics*, 90, 2285-2301.

Johnson, R. W. and S. Crystal, (2000), "Uninsured Status and Out-of-Pocket Costs at Midlife," *Health Services Research*, 35, 911-932.

Klein, R. and F. Vella, (2003), "Identification and Estimation of the Triangular Simultaneous Equations Model in the Absence of Exclusion Restrictions through the Presence of Heteroskedasticity," Unpublished Manuscript.

Lewbel, A., (1997), "Constructing Instruments for Regressions with Measurement Error When No Additional Data Are Available, With an Application to Patents and R&D," *Econometrica*, 65, 1201-1214.

Lewbel, A., (2004), "Identification of Heteroskedastic Endogenous or Mismeasured Regressor Models," Unpublished Manuscript.

Olson, C. A., (2002), "Do Workers Accept Lower Wages in Exchange for Health Benefits?" *Journal of Labor Economics*, 20, S91-114.

Parente, S. T., R. Feldman, and J. B. Christianson, (2004), "Employee Choice of Consumer-Driven Health Insurance in a Multiplan, Multiproduct Setting," *Health Services Research*, 39, 1091-1112.

Pauly, M. V., (1986), "Taxation, Health Insurance, and Market Failure in the Medical Economy," *Journal of Economic Literature*, 24, 629-675.

Remler, D. and S. Glied, (2006), "How Much More Cost Sharing Will Health Savings Accounts Bring?" *Health Affairs*, 25, 1070-1078.

Rigobon, R., (2000), "Identification through Heteroskedasticity: Measuring "Contagion" Between Argentinean and Mexican Sovereign Bonds," *NBER Working Paper*, No. 7493.

Rigobon, R., (2002), "The Curse of Non-Investment Grade Countries," *Journal of Development Economics*, 69, 423-449.

Rigobon, R., (2003), "Identification through Heteroskedasticity," *Review of Economics and Statistics*, 85, 777-792.

Rowe, J. W., T. Brown-Stevenson, R. L. Downey, and J. P. Newhouse, (2008), "The Effect of Consumer-Directed Health Plans on the Use of Preventive and Chronic Illness Services," *Health Affairs*, 27, 113-120.

Sentana, E. and G. Fiorentini, (2001), "Identification, Estimation and Testing of Conditionally Heteroskedastic Factor Models," *Journal of Econometrics*, 102, 143-164.

The Children's Partnership, (2006), "Health Savings Accounts & High Deductible Health Plans: How They Affect Children," The Children's Partnership.

Trivedi, A. N., W. Rakowski, and J. Z. Ayanian, (2008), "Effect of Cost Sharing on Screening Mammography in Medicare Health Plans," *New England Journal of Medicine*, 358, 375-383.

Vella, F. and M. Verbeek, (1997), "Rank Order as an Instrumental Variable," Unpublished Manuscript.