

NBER WORKING PAPER SERIES

EMPLOYEE COST-SHARING AND THE
WELFARE EFFECTS OF FLEXIBLE SPENDING ACCOUNTS

William Jack
Arik Levinson
Sjamsu Rahardja

Working Paper 11315
<http://www.nber.org/papers/w11315>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 2005

We thank Luca Anderlini, Phil Cross, Nada Eissa, Randy Ellis, Luca Flabbi and Sherry Glied for discussions and comments. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

©2005 by William Jack, Arik Levinson, Sjamsu Rahardja. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

Employee Cost-Sharing and the Welfare Effects of Flexible Spending Accounts
William Jack, Arik Levinson, Sjamsu Rahardja
NBER Working Paper No. 11315
May 2005
JEL No. D60, H21, I18

ABSTRACT

In recent years, employees have been shouldering an increasing share of the costs of employee-provided health care. At the same time, more and more employers have been allowing employees to pay their out-of-pocket health care costs using pre-tax earnings, through tax-subsidized flexible spending accounts (FSAs). We use a cross-section of firm-level data from 1993 to show empirically that these FSAs can explain a significant fraction of the shift in health care costs to employees, and to evaluate the welfare impact of this shift. Correcting for selection effects, we find that FSAs are associated with insurance contracts with coinsurance rates that are about 7 percentage points higher, relative to a sample average coinsurance rate of 17 percent. Meanwhile, coinsurance rates net of the subsidy are approximately unchanged, providing evidence that FSAs are welfare-neutral.

William Jack
Department of Economics
Georgetown University
Washington, DC 20057
wgj@georgetown.edu

Arik Levinson
Department of Economics
Georgetown University
Washington, DC 20057
and NBER
aml6@georgetown.edu

Sjamsu Rahardja
The World Bank
1818 H St., NW
Washington, DC 20433
srahardja@worldbank.org

1 Introduction

A large majority of individuals who have private health insurance in the US are covered by employer-provided plans. While this remains true, trends over the last two decades suggest that employees are shouldering an increasing share of the costs of health care. For example, the share of workers with employer-provided health insurance who paid no portion of the premium fell from 44 percent in 1982 to 28 percent in 1998 (Gruber and McKnight, 2003). In addition, more than half (51 percent) of large firms surveyed in 2003 were very likely to increase the share of premiums paid by their employees, while 15 percent intended to increase employees' coinsurance rates, and 20 percent expected to increase out-of-pocket payments for prescription drugs. Between 2001 and 2004 coinsurance rates for prescription drugs rose from 18 to 20 percent for generics, 21 to 26 percent for preferred drugs (i.e., those included on a formulary list), and from 24 to 31 percent for non-preferred drugs (Kaiser Family Foundation and HRET, 2004, page 116).

Employees bear insurance costs either by sharing (nominally) in the payment of premiums,¹ or by being exposed to out-of-pocket costs when they use medical services, and the examples above indicate that changes are occurring on both these margins. Some attention has been given in the literature to the increase in the first component (the share of premiums), focusing on changes in tax rates, demographic trends, and eligibility for public insurance such as Medicaid (Gruber and McKnight, 2003). In this paper, we focus on the

¹ In principle, under certain circumstances the whole premium may be borne by the employee in the form of lower wages (Gruber, 1994), but employee heterogeneity could complicate the economic incidence somewhat.

second component - out-of-pocket costs borne by employees. We examine the extent to which tax policy, in the form of Flexible Spending Accounts, can account for the pattern of out-of-pocket costs, and we consider the efficiency properties of the subsidy.

Employer-provided health insurance was first subsidized through the tax system under Section 106 of the 1954 Internal Revenue Service Act. The act exempts health insurance premiums paid by the employer from the employee's taxable income. As purchases of health insurance are effectively subsidized at the employee's marginal income tax rate, it is widely believed (e.g., Pauly, 1986) that the subsidy induces individuals to buy insurance through their employers, and to buy more generous insurance than they otherwise would.²

In 1978, Section 125 of the Internal Revenue Code extended the tax exemption for health insurance. Premium payments nominally made by an employee are now excludable from taxable income, so that the full premium receives a subsidy at the employee's marginal tax rate, independent of whether it is paid by the employer or employee.

Section 125 was not, however, limited to premium payments, and other out-of-pocket health expenditures were made excludable from taxable income. Individuals who are offered access to so-called Flexible Spending Accounts (FSAs) can make annual contributions from pre-tax income. These tax-free funds can be used to offset qualified medical expenses, including deductibles, copayments, and coinsurance obligations that are part of an insurance policy, or simply to pay for other uninsured medical expenses.³

² It is useful to distinguish between changes in generosity on the extensive and intensive margins - plan generosity falls if certain services (mental health, maternity, etc.) are removed from coverage, or if the share of costs of services covered by the plan falls.

³ Any unused funds in the FSA are forfeited at the end of the year, inducing individuals first to be

As marginal tax rates have fallen since the late 1970s, the incentives to purchase plans that cover a large share of incurred costs have been attenuated, which could explain the shift towards higher out-of-pocket expenditures. At the same time, the use of FSAs has grown. According to the 1993 Robert Wood Johnson Employer-Provided Health Insurance survey, about 22 percent of employers administered FSAs in 1993. The Kaiser Family Foundation reports the share of employers offering FSAs in 2003 by firm size, and finds rates of 83 percent for very large firms (up from 69 percent in 1999), 76 percent for large firms, 57 percent for midsize firms, and 14 percent for small firms. Government spending due to FSAs is significant. Tax expenditures for cafeteria plans, to which contributions for both medical care and dependent care expenses can be made, amounted to an estimated \$17 billion in 2004 (Joint Committee on Taxation, 2003).

Few studies have investigated the effects of FSAs on employer-provided health insurance. Levy (1998) argues that a firm is more likely to offer an FSA if it employs more workers with a high demand for insurance. She also finds that for firms that offer FSAs, employee premium contributions increase with the marginal tax rate. Cardon and Showalter (2001) examine the determinants of employee participation in an FSA program. Their findings suggest that participation increases with income and to a certain extent the foreknowledge of medical expenditures. Dowd, et al. (2001) study the effects of Section 125, but focus on the subsidy to employee-paid premiums, instead of the subsidy to out-of-pocket expenses.

realistic when making initial FSA allocations, and second to accelerate expenditures near the end of the year if by then health expenses have turned out to be smaller than expected. (Recent proposed changes include allowing \$500 of unused FSA contributions to be rolled over to subsequent years without penalty.) Despite these non-linearities in the subsidy regime, in most of this paper we treat the deduction of out-of-pocket expenses as open-ended.

They find that the employee-paid premium subsidy, like the exclusion of employer-paid premiums, distorts employees' insurance decisions.

Two studies have suggested explanations for the rise in employee contributions to employer-provided health insurance, though neither focuses on FSAs. Gruber and McKnight (2003) find that falling marginal income tax rates, rising HMO penetration, increasing Medicaid eligibility, and rising health care costs explain more than half of the run-up in employee contributions. Dranove et al. (2000) show that the rise in two-income households explains part of the shift, as employers try to induce their employees to rely on their spouses' employers' benefits. Our study is the first to look at FSAs as a cause of the rise in out-of-pocket health care costs.

Identifying the effect of FSAs on health insurance choices is important for two reasons. First, it improves our understanding of trends in coverage rates over time and the likely effects of tax policy changes on insurance coverage. The second reason is more normative. If, by subsidizing out-of-pocket expenditures, FSAs induce further over-consumption of medical care, then FSAs will exacerbate the distortion associated with the existing subsidy to premiums. But FSAs could induce individuals to purchase plans with higher nominal coinsurance rates. If the plan characteristics respond enough to the subsidy, then effective (i.e., net-of-subsidy) coinsurance rates could increase.

If this FSA effect increases net coinsurance rates, it can partially correct the distortion introduced by the premium subsidy. Even though individuals would face higher out-of-pocket expenses, they would be better off. This theoretical possibility was first identified

by Jack and Sheiner (1997), and is investigated empirically here.

We estimate the effect of an employer offering an FSA on the coinsurance rate associated with the employer's health plans. In the process we use IV techniques to account for selection effects. (More generous employers are likely to both provide "better" insurance, including lower coinsurance rates, and to offer FSAs.) Our estimates suggest that FSAs increase the coinsurance rate for the average health care plan by 7.3 percentage points. This is large, since the average coinsurance rate for the sample of all firms is about 17 percent. Not only is the nominal coinsurance rate higher in the presence of FSAs, but it is sufficiently higher that the *effective* (net-of-subsidy) coinsurance rate is approximately unchanged. This suggests that FSAs are welfare-neutral, due to the presence of the pre-existing premium subsidy.

2 Insurance choice in the presence of FSAs

In this section we summarize the model of Jack and Sheiner (1997), which informs our empirical research. We start by recalling that a fully efficient insurance policy equalizes an individual's expected marginal utility of income across uncertain states of nature. Ideally, the implied redistribution across states would be effected via lump-sum state-contingent transfers. In practice income is transferred to states of high health needs (bad states) by paying for incurred costs. Because this can lead to over-consumption of care (i.e., moral hazard), insured individuals are often required to share some of the costs of care, even in bad states (Pauly, 1968). Such cost sharing exposes individuals to some risk, but reduces the costs associated with moral hazard.

Jack and Sheiner analyze this trade-off in a simple model in which insurance contracts are characterized by a premium and a coinsurance rate - the latter being the proportion of incurred medical costs that must be paid out-of-pocket by an individual. Consider then a world where individuals face uncertain health care needs. A simple way to model this is to assume that the cost or price of improving health is uncertain, and is represented by a parameter $\theta \in [\theta_0, \theta_1]$. Thus, if H is an individual's level of health and C is his consumption of other goods, then his expenditure is $C + \theta H$. To attain the same level of health, an individual with worse health status i.e., higher θ , must spend more, θH , on medical care.⁴

The representative consumer's (state-independent) utility is $U(C, H)$. Income, denoted by W , is exogenous and fixed. Given a coinsurance rate of κ and premium P , in health state θ a consumer chooses health and consumption by solving the following problem:

$$\max_{C, H} U(C, H) \quad \text{s.t.} \quad W - P = C + \kappa \theta H.$$

Demand for health is denoted $H(\kappa \theta, W - P)$, and demand for the consumption of other goods is $C(\kappa \theta, W - P)$. Indirect utility is $V(\kappa \theta, W - P) = U(C(\kappa \theta, W - P), H(\kappa \theta, W - P))$.

The consumer chooses κ and P to maximize expected utility, $\Psi(\kappa, P)$, subject to the

⁴ This interpretation can be derived from a simple health production function model. Assume that θ represents generic health status, and health H , is produced under constant returns to scale from inputs z , with

$$H = f(z, \theta) = z/\theta.$$

Thus θ determines the productivity of health inputs. If input prices are p , then the minimum cost of attaining health H in state θ is $c(H, \theta) = p\theta H$. If p is normalized to unity, θ can be interpreted as the price of health.

insurer's zero profit condition:

$$\max_{\kappa, P} \Psi(\kappa, P) = \int_{\theta_0}^{\theta_1} V(\kappa\theta, W - P)dF \quad \text{s.t.} \quad P = (1 - \kappa) \int_{\theta_0}^{\theta_1} \theta H dF \quad (1)$$

where θ is distributed according to the cdf $F(\cdot)$. After rearranging and applying Roy's identity (see Jack and Sheiner, page 209), the optimal coinsurance rate satisfies

$$\text{cov}(q, \alpha) = -\bar{\alpha}(1 - \kappa) \frac{d\bar{q}}{d\kappa}, \quad (2)$$

where $q \equiv \theta H$ is health spending, and $\alpha \equiv V_2$ is the marginal utility of income, both of which are state-dependent. Bars denote means. The left hand side is a measure of the expected utility cost of a marginal increase in the coinsurance rate, holding health expenditures in each state, q , constant. The right hand side is the corresponding marginal benefit of such an increase, deriving from the premium savings associated with reduced consumption of medical care when the coinsurance rate rises.

Figure 1 illustrates the optimal choice of insurance contract. In this figure, expected utility is increasing towards the origin. Π is the zero profit locus. (Though we have drawn Π as a straight line for expositional clarity, in fact it will be convex. If people respond to lower coinsurance rates by purchasing more health care, then decreases in coinsurance rates require successively larger premium increases in order to remain actuarially fair.) When the coinsurance rate is one, there is no insurance, so the premium is zero. The premium is highest when the individual is fully insured against medical costs ($\kappa = 0$). Assuming expected utility $\Psi(\kappa, P)$ is well-behaved, the optimal coinsurance rate is simply characterized by the first order condition (2), located at point A and denoted κ^* .

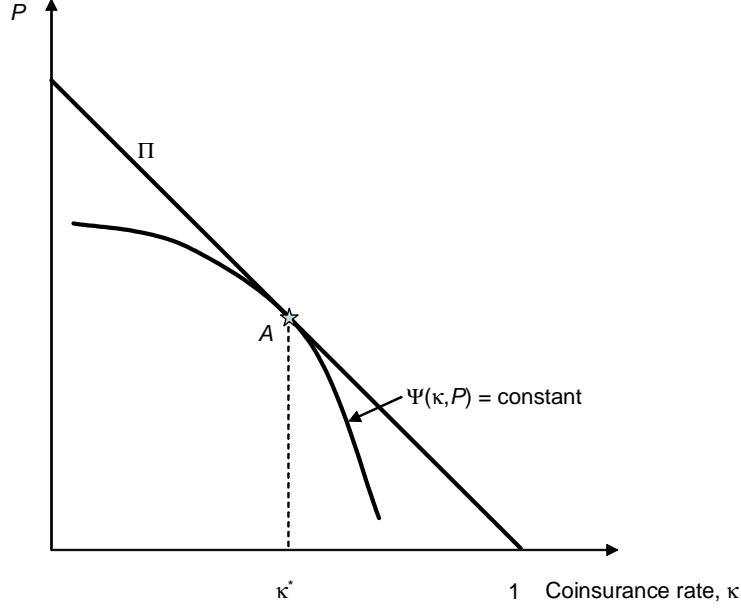


Figure 1: The optimal insurance policy

The effects of the subsidy to the purchase of insurance arising from the exclusion of employer and employee premium payments can best be anticipated by focusing on the *net* premium, $\tilde{P} = P(1 - \tau)$, where τ is the individual's marginal income tax rate. The zero profit constraint faced by insurers can be written, in terms of the net premium, as

$$\frac{\tilde{P}}{(1 - \tau)} = (1 - \kappa)\bar{q} \quad (3)$$

where \bar{q} is expected health expenditures, and is a function of the coinsurance rate and the individual's income net of insurance premiums and taxes paid. This net income, in turn, is $W - (\tilde{P} + T)$, where T is a lump-sum tax used to finance the subsidy. In figure 2 the vertical axis measures the total *ex ante* payment associated with the purchase of health insurance, $\tilde{P} + T$. The effect of the subsidy is thus to flatten and shift the zero profit line

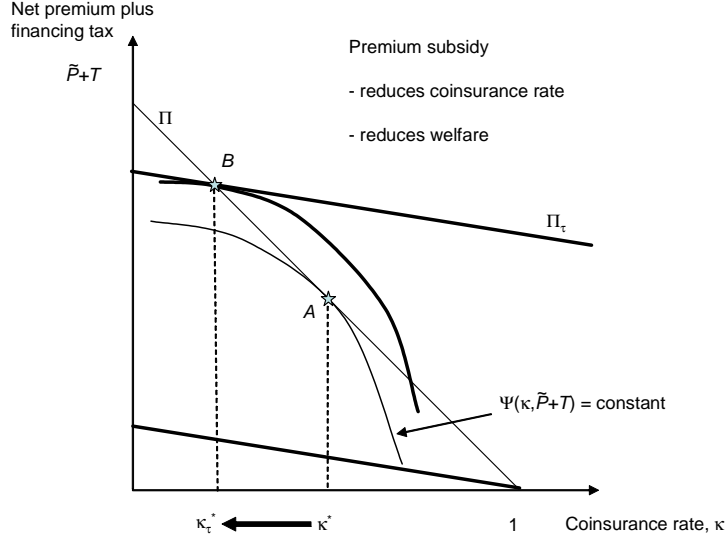


Figure 2: Optimal insurance when premiums are subsidized at a rate τ

in figure 1.^{5,6} The zero profit line in the presence of the premium subsidy is denoted Π_τ . The optimal choice of insurance policy (at point B) must still lie on the old zero profit line Π , but at a point where the individual's indifference curve is tangent to Π_τ . As long as the individual's preferences over κ and $\tilde{P}+T$ are well behaved, the subsidy induces individuals to choose more generous insurance, $\kappa_\tau^* < \kappa^*$ (see Jack and Sheiner, Proposition 1). Naturally, this premium subsidy, financed by a lump-sum tax is welfare-reducing, because it distorts individuals' incentives to purchase efficient health insurance policies.

Finally, if out-of-pocket expenditures are also subsidized, say at a rate σ , then the zero profit line rotates and shifts once again, this time as shown in figure 3 to Π_τ^σ . In this figure, as before, the net premium (plus lump-sum tax) is shown on the vertical axis, while now

⁵ This can most easily be seen by supposing that \bar{q} is fixed, and comparing equation (3) with the constraint in (1).

⁶ Without taking account of the tax revenue required to finance this subsidy, the new budget line would pivot around the point $\kappa = 1$. However, this would be of limited use for welfare analysis.

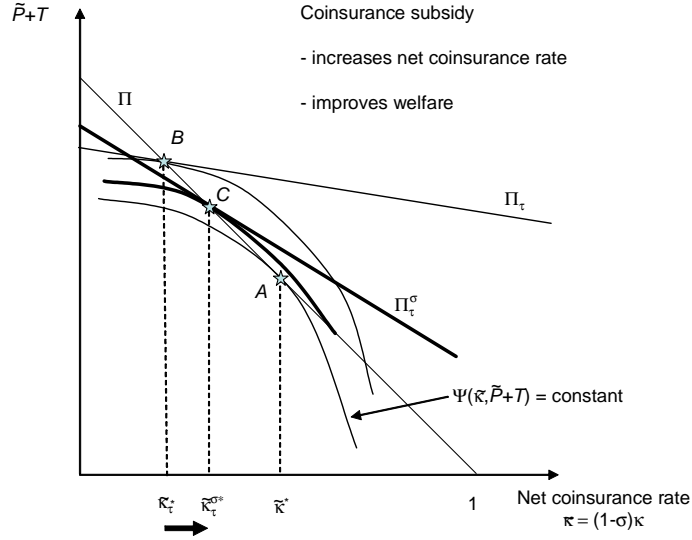


Figure 3: Optimal insurance when premiums are subsidized at a rate τ and coinsurance payments are subsidized at a rate σ

the *net* coinsurance rate $\tilde{\kappa} = (1 - \sigma)\kappa$ is shown on the horizontal axis. The zero profit condition, in terms of \tilde{P} and $\tilde{\kappa}$, is

$$\frac{\tilde{P}}{(1 - \tau)} = \left(1 - \frac{\tilde{\kappa}}{(1 - \sigma)}\right) \bar{q} \quad (4)$$

The effect of the σ -subsidy is to steepen the budget line compared with Π_τ , simply because a change in net coinsurance rate of $d\tilde{\kappa}$ corresponds to a larger change in the gross rate, $d\kappa = d\tilde{\kappa}/(1 - \sigma)$, which generates a correspondingly larger change in the premium. (Again, think of \bar{q} as being fixed and compare conditions 3 and 4.) The optimal insurance policy (point C) again must lie on the old zero profit line Π , but at a point where the individual's indifference curve is tangent to Π_τ^σ .

As drawn in figure 3, the effect of the subsidy to out-of-pocket payments is to increase the optimal coinsurance rate by so much that the *net* coinsurance rate, $\tilde{\kappa}_\tau^{\sigma*}$ rises above that

prevailing under the premium subsidy regime alone, $\tilde{\kappa}_T^*$. This result relies on consumer indifference curves in $(\tilde{\kappa}, \tilde{P} + T)$ -space becoming successively steeper as we move down the original budget line. Jack and Sheiner (Proposition 2) show that if the demand for health care is inelastic with respect to the out-of-pocket price, then a small coinsurance subsidy, $\sigma > 0$, does in fact induce such a change in the net coinsurance rate. In sum, FSAs can partially undo the negative efficiency effects of premium subsidies. However, it is also possible that indifference curves in $(\tilde{\kappa}, \tilde{P} + T)$ -space could become steeper near the top of the original zero profit line. In this case, the σ -subsidy would induce a lower choice of net coinsurance rate, and would be welfare-reducing. The measured effect of FSAs on net coinsurance rates can thus be used to assess the welfare effects of the tax policy.

3 Data and Empirical Strategy

The previous section demonstrates two important potential consequences of the growth of flexible spending accounts. First, the increasing subsidy to out-of-pocket expenses could explain part of the nominal shift in health care costs from employers to employees. It would be ironic if public policy were in part accountable for this phenomenon that has, rightly or wrongly, generated so much concern. Second, it is possible that the incremental subsidy to out-of-pocket expenses, in the form of FSAs, mitigates the welfare loss from the underlying subsidy to premiums. As illustrated by figure 3, the resulting shift towards insurance policies with higher coinsurance rates and lower premiums would be efficiency enhancing so long as the net coinsurance rate with the subsidy in place is higher than the gross coinsurance rate

would have been without the subsidy.

3.1 Data

To investigate these issues empirically we use the 1993 Employer Health Insurance Survey (EHIS) from the Robert Wood Johnson Foundation. The EHIS is a cross-section of firm-level data on health insurance plans offered by employers in 10 U.S. states. The survey has two parts. The first has information about health insurance plans, including their coverage, premiums, and coinsurance rates. The second part contains information about the firms, including their industrial classifications, employees, payrolls, unionization rates, and organizational forms.

We focus on a subsample of the EHIS comprising 6525 firms that offer health insurance to their employees, have payrolls per worker greater than the full-time minimum wage, and offer at least one insurance plan that is not an HMO or a PPO. In this sample, 25.8 percent of the plans are associated with firms that offer employees access to FSAs, and the firms offer a total of 7391 different insurance plans.

Table 1 provides descriptive statistics for these data. Consistent with our expectations based on section 2, health insurance plans offered by firms with FSAs have lower premiums and higher coinsurance rates. Of course, plans associated with FSAs also differ in many other respects. They are more likely to cover certain services, and the firms that offer them have more and better-paid employees, have been in existence longer, and are less likely to be unincorporated and for-profit.⁷

⁷ For Blue Cross/Blue Shield policies only, the coinsurance rates are 15.1 for the 1791 plans with FSAs,

The key determinant of the value of the FSA subsidy, and of the welfare consequences of FSAs, is the marginal income tax rate faced by the plan’s members, τ . Since we do not know the true marginal tax rates faced by each plan’s members, we use the NBER TAXSIM model to construct a proxy. First we compute the average earned income per worker for each firm, and we assume this constitutes these employees’ entire incomes. We then let TAXSIM compute the federal and state marginal tax rates by assuming that all workers are single taxpayers with no dependents and standard deductions. Finally, we add 7.65 percent to account for payroll taxes (6.2 percent for Social Security and 1.45 percent for Medicare).⁸

These calculated average marginal tax rates vary across health plans due to differences in firms’ payrolls and in states’ marginal tax rates. Firm differences account for about 85 percent of the variation in τ , and state differences account for the remainder. As table 1 shows, individuals with health plans associated with FSAs have higher estimated marginal tax rates.

Table 1 shows that health plans associated with FSAs have higher coinsurance rates, lower premiums, and members that are likely to face higher marginal tax rates. To ask whether FSAs may have caused the increase in employee out-of-pocket payments, and whether the net after-tax coinsurance rate is higher than the gross rate would be without the FSA subsidy, we need to control for differences between firms with and without these accounts.

and 17.0 for the 506 plans without. The difference (of means) is easily statistically significant. Of course, we do not want to interpret this literally any more than the difference in coinsurance rates for *all* plans in table 1.

⁸ While we do not attempt to approximate the economic incidence of these taxes, it does not matter what fraction we add to state and federal taxes so long as we use the same fraction for all of the plans. We revisit this issue below when we discuss the effect of FSAs on net-of-tax coinsurance rates.

3.2 Empirical strategy

Ideally, we would like to assess the effect of subsidizing out-of-pocket expenses (offering an FSA) on the average health care plan’s coinsurance rate. Estimating this average treatment effect faces two distinct problems, one relating to endogenous regressors, and the other to selection effects.

First, since coinsurance rates and premiums are structurally related through the zero profit constraint (illustrated in figure 1), an econometric model that hopes to identify the effect of FSAs on coinsurance rates must control also for premium differences across plans, among other characteristics. However, the observed variation in premiums is unlikely to be exogenous, and a simple OLS estimate of the premium effect may be biased, thereby contaminating the estimate of the FSA effect. Instead, we estimate a reduced form where the coinsurance rate is estimated as a linear function of exogenous variables that affect premiums, and which should not in theory affect the coinsurance rate. These include state indicator variables (to account for regional health care cost differences), plan coverage, firm size and unionization rates.

The second obstacle to estimating whether coinsurance rates are higher for firms with FSAs is that firms’ decisions to offer FSAs are not exogenous. Some firms may simply have better employee benefits than others. These “good” firms may have more generous health insurance plans, lower coinsurance rates, FSA programs, and a host of other unmeasured attributes. An unmeasured characteristic such as this, which is correlated with both the propensity to offer FSAs and to have low coinsurance rates, will likely bias any estimate of

the impact of FSAs on coinsurance rates against finding a positive effect. In other words, for the average firm, adopting an FSA could in theory cause it to have higher coinsurance rates. But firms that have adopted FSAs are the generous ones, which also have lower coinsurance rates. A simple regression of coinsurance rates that fails to account for the endogenous decision to adopt an FSA will likely understate the positive effect of FSAs on coinsurance rates.

To control for the endogeneity of FSAs, we use the procedure outlined in Heckman and Robb (1985) for dealing with discrete endogenous variables. We first estimate a probit of whether or not the firm has an FSA, and we include in that regression a set of instruments that are not included in the determinants of coinsurance rates. These instruments include the firm’s age, whether the firm has plants located in other states, whether the firm has local competitors, and the percentage of the firm’s employees eligible for health insurance. These firm characteristics predict the likelihood of a firm offering an FSA, but are unlikely to be related to the coinsurance rates of employees.

We make two alternative parametric assumptions in estimating the treatment effect. Our first is that the treatment effect is independent of the observable characteristics X ,

$$\kappa = X\beta + F\gamma + \nu \tag{5}$$

where X is a matrix of covariates, F is a vector of dummy variables equal to one if the plan’s firm has an FSA, and γ is the parameter we are interested in. We still cannot estimate (5) using OLS, because $\text{corr}(F, \nu) \neq 0$. Unobserved characteristics of firms that make them likely to provide generous benefits including FSAs and low coinsurance rates will bias estimates of

γ . Instead, we predict the binomial indicator F using a probit regression, including variables Z not included in X . We then use the predicted probabilities as instruments in (5).

Our second specification weakens the ignorability of treatment assumption inherent in (5). We continue to assume that in the absence of an FSA the conditional expectation of a plan's coinsurance rate is a linear function of observable covariates. However, we now allow the treatment effect itself to be related to the covariates.

$$\kappa = X\beta + F\gamma + F(X - \bar{X})\delta + e \quad (6)$$

where γ is the average treatment effect (or more precisely, the treatment effect at the average value of the covariates). We estimate (6) instrumenting for F .

In sum, the methodology is as follows. First we estimate $P(FSA = 1|X, Z)$ by a probit, where Z is a vector of instruments. Second, we estimate equations (5) and (6) using instrumental variables, where the difference is that (6) includes interactions between the FSA dummy and the difference between the covariates and their means.

As instruments we use the age of the firm, dummy variables for whether the firm has out-of-state locations or in-state competitors, and the percentage of employees eligible for health insurance. Firm age works well as an instrument because older firms are more likely to offer FSAs, but it is difficult to imagine reasons why older firms should have different coinsurance rates from newer firms, all else equal. We include a dummy variable for multi-state firms, because they might have economies of scale in administering payroll programs such as FSAs, and on the theory that having affiliates in multiple states is more likely exogenous than the level of employment. A dummy variable for the presence of in-state competitors captures the

degree of local labor market competition, putting pressure on companies to provide benefits such as health insurance and FSAs. Finally, the percentage of the firm’s employees eligible for health insurance should increase the firm’s tendency to administer an FSA. All of the results that follow are robust to the exclusion of any one of these instruments, and none of them are statistically significant themselves when included in (5) and (6).

Table 2 presents the results of this first-stage probit, which estimates the probability that a firm offers an FSA. The unit of observation is a firm-specific health insurance plan. The first five covariates listed in table 2 are the instruments, Z , and are excluded from the second stage regressions of coinsurance rates. Health insurance plans are more likely to be associated with firms that offer FSAs if those firms are older, have more employees eligible to participate in health insurance benefits, have locations in multiple states, and have local competition. Each 10 years of firm age adds about 1.5 percentage points to the probability that a firm offers an FSA. Each 10 percent increase in the share of employees eligible for health insurance adds about 1 percentage point to the probability of offering an FSA. And having no identified competitors subtracts about 11 percentage points from the probability of offering an FSA. These firm characteristics are clearly correlated with the probability that the firm offers an FSA. Our assumption, tested below, is that they are uncorrelated with the error term in equations (5) and (6).

Turning to the exogenous covariates in table 2, each 10 percent increase in our estimate of employees’ marginal tax rates increases the probability of a firm offering an FSA by 3 percentage points. Each 10 percent increase in the fraction of female employees increases

the FSA probability by 0.6 percentage points. Plans associated with non-profit firms are 8 percentage points more likely to have FSAs. The more benefits a plan offers, the more likely it is to be associated with an FSA: prescription drug coverage increases FSA probabilities by 3 percentage points; alcoholism coverage increases it by 7 percentage points; and maternity benefits by 11 percentage points.

Some characteristics decrease the probability that a firm offers an FSA. A 10 percent increase in union membership decreases the FSA probability by 0.5 percentage points. A 10 percent increase in the fraction of workers 55 or older decreases the FSA probability by 1.5 percentage points. Unincorporated firms are 5 percentage points less likely to offer FSAs.

Firms in mining and manufacturing, and transport and communications, are more likely to have FSAs than the omitted industry, agriculture. Firms in North Dakota are more likely to have FSAs, while in other states are less likely to have FSAs than the omitted state, Colorado.

Our next step is to use the predicted probabilities of a plan being provided in conjunction with an FSA, using the coefficients in table 2, in an IV estimation of equations (5) and (6).

3.3 Results

Table 3 presents our central estimates of equations (5) and (6). As a benchmark, column (1) presents a simple OLS version of (5), not accounting for the selection by firms as to whether or not to offer an FSA. The dependent variable is the coinsurance rate, expressed as a number between 0 and 100. The coefficient on the FSA dummy indicates that health insurance plans associated with firms that offer FSAs have coinsurance rates that are 0.74

percentage points greater than otherwise similar plans without FSAs. Though the coefficient is statistically significant and in the direction we expect, the magnitude is quite small.

Column (2) of table 3 runs the same OLS specification, but includes interactions between the FSA dummy and the difference between each of the firm and insurance-plan characteristics and its mean, as in equation (6). Because the interaction included is differences-from-means, we can interpret the FSA coefficient (1.365) in the same way as when the interaction was not included, as an average treatment effect. Here the average treatment effect has risen as a result of including the interactions, from .74 to 1.36, but it remains small.

Of course, the decision to offer an FSA is not exogenous, and may be based on unobserved firm characteristics that also affect the coinsurance rates. In fact, we suspect that the OLS results in columns (1) and (2) understate the true effect of FSAs on coinsurance rates, because firms that have adopted FSAs have generally more generous benefits, including low coinsurance rates. Hence, we do not emphasize these first two benchmark columns.

Column (3) of table 3 shows the results of an instrumental variables estimation of equation (5), using the predicted probabilities from table 2 as instruments. The average health care plan has a coinsurance rate that is 4.07 percentage points higher when offered in conjunction with an FSA than in the absence of an FSA, controlling for observable characteristics of firms, and for the selection by firms as to whether to offer an FSA. The average coinsurance rate in the sample is 17 percent, so a 4 percent increase amounts to a substantial average treatment effect (more on magnitudes below).

In column (4) of table 3 we estimate equation (6) using IV, including interaction terms

between the predicted FSA probability and the difference between the exogenous variables and their means. While few of the interactions are individually statistically significant, an F -test rejects the joint hypothesis that all of these interactions have zero effect on coinsurance rates. In other words, the covariates X have different overall effects on coinsurance rates depending on whether the health insurance plan is associated with an FSA. Omitting the interactive terms biases the results in column (3). The average treatment effect reported in column (4) of table 3 suggests that when provided in conjunction with FSAs, plans have coinsurance rates that are 7.3 percentage points higher than in the absence of FSAs.

At the bottom of column (3) we report the F -statistic from a Wu-Hausman test of the exogeneity of the FSA regressor in column 1, easily rejecting unbiasedness and consistency for the OLS approach. Note also that the coefficients in columns (3) and (4) are larger than their OLS versions in columns (1) and (2), suggesting that the endogeneity of FSAs biases the OLS approach against finding a large average treatment effect. To interpret the size of this effect more concretely, we turn to an explicit discussion of magnitudes.

3.4 Magnitudes and welfare implications

In the theory illustrated in figure 3, the subsidy to out-of-pocket costs increases the optimal coinsurance rate by so much that the *net* coinsurance rate rises above what it would have been absent the subsidy. Under the assumptions of inelastic demand for health care made by Jack and Sheiner (1997), subsidizing out-of-pocket costs increases the net coinsurance rate in this way, and is efficiency enhancing in the presence of a pre-existing premium subsidy.

To assess whether in fact net coinsurance rates rise as a consequence of FSAs, consider

the relationship between the predicted gross and net rates, evaluated at the means of the covariates. The predicted gross coinsurance rate with FSAs is simply the predicted gross rate without FSAs plus the average treatment effect, γ , measured in column (4) of table 3 as 7.3 percentage points,

$$\hat{\kappa}^1 = \hat{\kappa}^0 + \gamma.$$

The net coinsurance rate is just the gross rate times $(1 - \bar{\tau})$ for plans with FSAs (where $\bar{\tau}$ is the average marginal tax rate faced by individuals in those plans), and the gross rate itself for plans without FSAs,

$$\begin{aligned}\tilde{\kappa}^0 &= \hat{\kappa}^0 \\ \tilde{\kappa}^1 &= \hat{\kappa}^1(1 - \bar{\tau})\end{aligned}$$

where net rates are denoted by a \sim .

The difference between the predicted net coinsurance rates of a plan with the average covariates with and without an FSA is defined as

$$\Delta\tilde{\kappa} = \tilde{\kappa}^1 - \tilde{\kappa}^0.$$

In the top panel of table 4 we present estimates of $\Delta\tilde{\kappa}$. Using our specification from table 3, column (4), the expected net coinsurance rate without an FSA is 15.6 percent (column (2)), while with an FSA it is 15.71 percent (column (3)). The difference, $\Delta\tilde{\kappa}$, is 0.15 percentage points. Though positive, this increase is small and statistically significant, indicating that the FSA subsidy neither increases nor decreases net coinsurance rates. This calculation of $\Delta\tilde{\kappa}$ depends on the tax rate. If we include all of the payroll taxes (15.3 percent), then

the net coinsurance rate rises to 17.5 percent (instead of the 15.7 percent in table 4), and our estimate of $\Delta\tilde{\kappa}$ suggest that net coinsurance rates rise by 1.9 percentage points, though this effect remains statistically insignificant. If we include none of the payroll taxes, the net coinsurance rates fall to 14.0 percent, and $\Delta\tilde{\kappa}$ suggests net coinsurance rates fall 1.6 percentage points, also statistically insignificant. In sum, FSAs appear to have increased health insurance plans' coinsurance rates by a sufficient amount to erase the tax advantages of participating in the plans. As suggested by figure 3, the FSA subsidy to out-of-pocket costs is therefore welfare-neutral.

3.5 Robustness

In our main estimate, in column (4) of table 3, state dummy variables serve multiple purposes. They capture all of the unobserved characteristics of states that affect coinsurance rates. Our primary purpose for including them is as a measure of health care costs, which appear to differ substantially across states. To try to capture health care cost differences more directly, in our first robustness test we include a measure of state health care costs instead of state dummies.

State health costs come from the Prospective Payment System (PPS), a part of the reimbursement calculation for Medicare that contains data on physicians' total remuneration and total physicians' hours. We use this to calculate an hourly reimbursement rate for physicians' time, which we take as a measure of health care costs in each state. In row (2) of table 4 we report the FSA coefficient (γ) from a version of equation (6) where this hourly doctor cost is included as a covariate. Substituting this proxy for health costs in lieu of our

state dummies does not alter the estimated average treatment effect of FSAs. If anything it raises the estimate (from 7.3 to 8.3).

As a second robustness test, in row 3 of table 4 we report the predicted effect of FSAs on coinsurance rates if we use a linear probability model to predict FSA choice at the first stage, instead of a probit. The estimated effects are little affected by this change in specification.

A final set of robustness checks uses alternative sets of instruments for predicting FSAs. Recall that the instruments used in table 2 include (i) the firm’s age, (ii) the percent of employees eligible for health insurance, (iii) whether the firm has locations in other states, and (iv) whether the firm has a competitor in the same state. In the bottom panel of table 4 we report the average and net treatment effects for alternative sets of instruments, where each alternative involves dropping one of the original set. In each case, we include the dropped instrument in the second-stage coinsurance regression, and for each specification its coefficient is small and statistically insignificant. The estimates are all similar, and result in large, statistically significant average treatment effects. Moreover, each estimate results in a small and statistically insignificant net treatment effect, suggesting that FSAs have had little effect on welfare.

4 Conclusions

Individuals with private health insurance in the United States have been paying an increasing share of their health care expenses out of pocket over the last decade. While this is likely due to a number of factors (demographics, falling tax rates, changes in the organization

of health care delivery, etc.), one factor that may be important is the growth of Flexible Spending Accounts, which subsidize out-of-pocket payments. The potential role of this subsidy suggests that the observed shift to uninsured expenses may be partly illusory – net of the subsidy, out-of-pocket expenses have remained approximately constant.

In this paper, we have used cross-sectional data from an employer survey to address the link between the availability of FSAs and coinsurance rates. Of course, without panel data we cannot be definitive about the recent evolution of insurance arrangements in the US. Nevertheless, the cross-sectional analysis is instructive. We find, for example, that when health insurance is offered in conjunction with an FSA, the coinsurance rate is higher. Correcting for selection bias, the FSA effect is statistically significant and economically large: coinsurance rates are on average about 7.3 percentage points higher with FSAs than without (compared to a sample average of 17 percent). In addition, our results suggest that the shift to out-of-pocket spending is approximately welfare neutral, as the net-of-subsidy coinsurance rate is approximately equal for plans offered in the presence of FSAs.

Why might FSAs not increase net-of-tax coinsurance rates and welfare? For one, not all employees participate in the plans. Our measured effect, 7.3 percentage points, would surely be higher if all employees participated. Second, average marginal tax rates probably overstate the benefits of FSAs, because the plans involve complicated reimbursement accounts and a use-it-or-lose-it feature. If FSAs benefited all employees or were a straightforward tax deduction, their gross effect might be larger, and net-of-tax coinsurance rates and welfare might well increase.

Finally, we believe there is a curious irony in the gap between our findings here and the public concern about shifting health care costs from employers to employees. First, it is ironic that public policy in the form of FSAs is accountable for part of the transfer of costs to employees. Second, the fact that the shift is large enough to offset the subsidy (FSAs do not cause net coinsurance rates to fall) means that the shift in costs may not be a cause for concern. In this case, however, FSAs do not seem to lower welfare, and could even increase it, since they partially offset the distortionary effect of the tax subsidy given to employer-paid health insurance premiums.

References

- Cardon, James and Mark Showalter (2001): "An examination of flexible spending accounts," *Journal of Health Economics* 20: 935-954
- Cooper, Phillip and Barbara Schone (1997): "More offers, fewer takers for employment-based health insurance: 1987 and 1996," *Health Affairs*, 16, 142-149
- Dowd, Brian, Roger Feldman, Matthew Maciejewski, and Mark Pauly, (2001): "The effect of tax-exempt out-of-pocket premiums on health plan choice," *National Tax Journal* 54(4): 741-756.
- Dranove, David, Kathryn Spier and Laurence Baker (2000): "'Competition' among employers offering health insurance," *Journal of Health Economics*, 19: 121-140.
- Feenberg, Daniel and Elisabeth Coutts. "An Introduction to the TAXSIM Model", *Journal of Policy Analysis and Management*, 12(1).
- Gruber, Jonathon (1994): "The incidence of mandated maternity benefits," *American Economic Review*, 84(3), 622-41
- Gruber, Jonathon and Robin McKnight (2003): "Why Did Employee Health Insurance Contributions Rise?" *Journal of Health Economics*, 22(6), 1085-1104
- Heckman, James J. and Richard Robb (1985). "Alternative methods for estimating the impact of interventions," in James J. Heckman and Burton Singer (eds.), *Longitudinal Analysis of Labor Market Data*. Cambridge University Press 1985, Cambridge.

Jack, William and Louise Sheiner (1997): "Welfare-improving health expenditure subsidies," *American Economic Review*, 87(1), 206-21

Joint Committee on Taxation (2003): "Estimates of Federal Tax Expenditures for Fiscal Years 2004-2008," JCS-8-03, US Government Printing Office, Washington DC.

Kaiser Family Foundation and Health Research and Educational Trust (2004): *Employer Health Benefits: 2004 Annual Survey*, Menlo Park, California, and Chicago, Illinois

Levy, Helen (1998): "Who pays for health insurance? Employee contributions to health insurance premiums," Working Paper #398, Industrial Relations Section, Princeton University

Pauly, Mark (1968): "The economics of moral hazard: comment," *American Economic Review*, 58, 531-37

Pauly, Mark (1986): "Taxation, health insurance and market failure in the medical economy," *Journal of Economic Literature*, 24, 629-675

Wooldridge. Jeffrey M. (2002). *Econometric Analysis of Cross Section and Panel Data*. MIT Press, Cambridge, Massachusetts.

Table 1. Data Summary Statistics

	No FSA [n=5487]		With FSA [n=1904]	
	Mean	Std.dev	Mean	Std.dev
Insurance plan characteristics				
Single premium	160.3	77.1	152.7*	66.6
Family premium	392.4	159.7	385.1 [†]	135.5
Coinsurance rate ^a	16.8	10.7	17.7*	8.7
Copayment	8.38	5.36	8.85	4.33
Deductible	349.7	399.0	347.6	365.9
Employer share of single premium	83.3	25.4	80.5	21.9
Employer share of family premium	64.7	34.6	64.8	27.8
Blue Cross/Blue Shield	0.33	0.47	0.27*	0.44
Covers prescription drugs	0.83	0.37	0.92	0.26
Covers prenatal	0.88	0.32	0.96*	0.19
Covers dental	0.28	0.45	0.35*	0.48
Covers maternity	0.88	0.32	0.97*	0.16
Covers alcoholism related illness	0.86	0.35	0.95*	0.21
Limits out-of-pocket expenses	0.89	0.31	0.95*	0.21
Firm characteristics				
Number of plans offered	1.46	0.92	2.4*	1.81
Proportion of self insured	0.21	0.40	0.53*	0.50
Number of employees in the location	48.2	163.7	178.2*	426.0
Firm's age	29.6	27.5	47.0*	40.2
Percent employees older than 54 years old	11.9	16.7	9.87*	11.8
Percent female employees	40.7	28.8	45.0*	29.8
Percent employees joining labor union	6.5	21.2	8.6*	21.8
Marginal tax rate (%)	31.3	7.4	33.0*	7.9
Payroll per worker (000)	25.4	17.9	28.7*	19.5
Percent employees eligible for HI	86.7	23.2	90.0*	18.6
Percent with corporate type	0.80	0.40	0.80	0.40
Percent with un-incorporated type	0.11	0.32	0.05*	0.22
Percent with non-profit type	0.09	0.29	0.15*	0.36
Percent with no competitor in the state	0.82	0.38	0.76*	0.43
Percent have location in other states	0.38	0.49	0.69*	0.46

Source: RWJ Employer Health Insurance Survey 1993.

Notes: Private firms offering health insurance with non-missing values of variables above. 7391 insurance plans for 6525 firms, 1489 of which offer an FSA program. States are CO, FL, MN, NM, NY, ND, OK, OR, VT and WA.

*, [†] difference of sample means or proportions is significant at 5% and 10%, respectively

^a Twenty percent (1456) of the plans had coinsurance rates of zero.

Table 2. First-Stage Probit of FSA Offering

Instruments		Un-incorporated	-0.171* (0.069)
Firm's age	0.005* (0.001)	Non-profit type	0.238* (0.068)
Percent employees eligible for health insurance	0.003* (0.001)	Construction	0.076 (0.162)
Has location in other states	0.544* (0.038)	Mining & manufacturing	0.472* (0.142)
No competitor within state	-0.103* (0.050)	Transport and communications	0.622* (0.149)
No competitor	-0.293* (0.102)	Wholesale trade	0.096 (0.145)
Exogenous regressors		Retail trade	0.151 (0.141)
Marginal tax rate	0.010* (0.003)	Finance & real estate	0.583* (0.141)
Percent employees joining labor union	-0.002* (0.001)	Professional services	0.436* (0.144)
Payroll per worker (000)	0.000 (0.001)	Other services	-0.014 (0.173)
Percent employees older than 54 years old	-0.005* (0.001)	Florida	-0.201* (0.091)
Percent female employees	0.002* (0.001)	Minnesota	0.037 (0.087)
Number of employees in the location	0.007* (0.001)	New Mexico	-0.271* (0.088)
Blue Cross/Blue Shield	-0.136* (0.042)	New York	-0.430* (0.086)
Covers prescription drugs	0.116* (0.058)	N. Dakota	0.186* (0.082)
Covers prenatal	0.005 (0.115)	Oklahoma	-0.251* (0.093)
Covers dental	0.014 (0.038)	Oregon	-0.146 (0.093)
Covers maternity	0.458* (0.125)	Vermont	-0.206* (0.087)
Covers alcoholism related illness	0.248* (0.066)	Washington	-0.303* (0.097)
Limits out-of-pocket expenses	0.270* (0.071)	Constant	-2.890* (0.228)
N		7,391	
Pseudo-R2		0.171	
Chi-2		1104.3	

Robust standard error in parenthesis. * significant at 5%.

Table 3. Estimation Results of the Coinsurance Equation

Dependent variable: coinsurance rate	OLS		IV	
	(1)	(2)	(3)	(4)
FSA	0.742* (0.262)	1.365* (0.342)	4.069* (1.005)	7.312* (1.927)
Percent employees joining labor union	-0.011* (0.005)	-0.012 [†] (0.006)	-0.010 [†] (0.005)	-0.006 (0.009)
Marginal tax rate	0.026 (0.024)	0.023 (0.028)	0.010 (0.025)	0.020 (0.042)
Payroll per worker (000)	-0.009 (0.010)	0.001 (0.012)	-0.010 (0.010)	-0.006 (0.018)
Percent employees older than 54 years old	-0.011 (0.007)	-0.012 (0.008)	-0.008 (0.008)	-0.005 (0.012)
Percent female employees	0.007 (0.005)	0.009 (0.006)	0.004 (0.005)	0.005 (0.010)
Number of employees in the location	0.006 (0.004)	0.009 (0.007)	-0.004 (0.005)	-0.015 (0.038)
Blue Cross/Blue Shield	-1.174 (0.286)	-1.586* (0.332)	-0.967* (0.299)	-2.090* (0.508)
Covers prescription drugs	0.204 (0.401)	0.332 (0.445)	0.063 (0.402)	-0.541 (0.687)
Covers prenatal	0.690 (0.841)	1.008 (0.905)	0.682 (0.839)	3.199 [†] (1.672)
Covers dental	-0.252 (0.252)	-0.557 [†] (0.315)	-0.297 (0.255)	-1.137* (0.542)
Covers maternity	-1.577 [†] (0.898)	-1.205 (0.938)	-2.016* (0.900)	-3.115 [†] (1.838)
Covers alcoholism related illness	0.408 (0.424)	0.650 (0.458)	0.162 (0.431)	0.478 (0.697)
Limits out-of-pocket expenses	1.620* (0.461)	1.591* (0.487)	1.369* (0.472)	2.209* (0.799)
Unincorporated type	-1.761* (0.433)	-1.593* (0.479)	-1.525* (0.443)	-2.098* (0.735)
Non-profit type	-0.350 (0.451)	-0.229 (0.542)	-0.597 (0.460)	0.490 (0.965)
FSA*Dev[Marginal tax rate]	--	0.003 (0.041)	--	-0.054 (0.100)
FSA*Dev[Payroll per worker (000)]	--	-0.033 [†] (0.018)	--	-0.020 (0.044)
FSA*Dev[Percent unionized]		0.002 (0.012)		-0.008 (0.030)

(continued)

(Table 3 continued)

	(1)	(2)	(3)	(4)
FSA*Dev[Percent employees >54 years old]		0.003 (0.018)		0.003 (0.051)
FSA*Dev[Percent female employees]		-0.007 (0.009)		-0.010 (0.027)
FSA*Dev[Number of employees in the location]		-0.003 (0.008)		0.009 (0.050)
FSA*Dev[Blue Cross/Blue Shield]		1.510* (0.555)		5.080* (1.622)
FSA*Dev[Covers prescription drugs]		-0.732 (0.966)		2.973 (3.024)
FSA*Dev[Covers prenatal]		-1.872 (2.400)		-13.689 [†] (7.571)
FSA*Dev[Covers dental]		1.059 (0.503)		2.633 (1.445)
FSA*Dev[Covers maternity]		-5.930 (3.296)		-0.999 (13.610)
FSA*Dev[Covers alcoholism related illness]		-2.132 [†] (1.166)		-3.137 (3.844)
FSA*Dev[Limits out-of-pocket expenses]		0.087 (1.426)		-6.515 (4.912)
FSA*Dev[Unincorporated type]		-1.370 (1.075)		4.571 (3.464)
FSA*Dev[Non-profit type]		-0.280 (0.834)		-3.374 (2.321)
Industry dummies (9)	yes	yes	yes	yes
State dummies (10)	yes	yes	yes	yes
N	7391	7391	7391	7391
F-test	7.25*	5.44*	7.36*	5.05*
Wu-Hausman endogeneity test of FSA (and interaction variables) Ho: regressors are endogenous			10.29*	2.59*
F-test Ho: interaction terms = 0		2.24*		2.07*

Robust standard error in parenthesis, *, [†] significant at 5% and 10% level, respectively.

Table 4. Magnitudes and robustness checks

	Average increase in gross coinsurance rate (γ)	$E[\kappa_i^0]$	$E[1 - \tau_i]E[\kappa_i^1]$	Increase in <u>net</u> coinsurance for average plan: $E[1 - \tau_i]E[\kappa_i^1] - E[\kappa_i^0]$
	(1)	(2)	(3)	(4)
Table 3 column 4	7.31 (1.93)	15.56 (0.46)	15.71 (1.06)	0.15 (1.16)
Include physician costs in place of state fixed effects	8.27 (2.18)	15.47 (0.52)	16.30 (1.21)	0.83 (1.32)
First stage as linear probability model	8.38 (2.35)	15.20 (0.63)	16.20 (1.26)	1.00 (1.41)
<u>Dropping instruments:</u>				
Firm's age	6.76 (2.38)	15.60 (0.62)	15.36 (1.25)	-0.24 (1.40)
Percent employees eligible for health insurance	7.43 (2.00)	15.55 (0.46)	15.79 (1.11)	0.24 (1.20)
Has location in other states	6.96 (2.82)	15.70 (0.61)	15.57 (1.56)	-0.13 (1.67)
Competitor in state	6.84 (1.88)	15.65 (0.46)	15.45 (1.03)	-0.20 (1.13)

Notes: The average marginal tax rate (State plus Federal plus 7.65 percent Social Security and Medicare) in the sample is 31.3 percent, so $E[1 - \tau_i] = 0.687$ in column (3).

The dropped instruments were included in the 2nd stage coinsurance rate regressions, and none were statistically significant.