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Flexible Spending Accounts and Adverse Selection

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Abstract

I model the interaction of flexible spending accounts (FSAs) and conventional insurance in a simple discrete loss setting with asymmetric information. I show that FSA availability can break a separating equilibrium, even when one would otherwise exist, because high-risk types might prefer the lower-coverage contract supplemented with FSA funds. In this case there may exist a Pareto-inferior separating equilibrium. It is also shown that FSA availability alters the optimal pooling contract. Employers can reduce coverage levels, raising expected utility for low-risk types, and can compensate high-risk types by offering supplemental FSA coverage. Thus, it is possible that FSAs strengthen pooling contracts.

Flexible spending accounts (FSAs) for health care expenses offer an attractive way to avoid taxes. According to the Kaiser Family Foundation's *Employer Health Benefits 2007 Annual Survey*, 22 percent of all firms offering health insurance benefits offered FSAs as an option to their employees, but 73 percent of large firms (200 or more workers) offered FSAs. The advantage to the employee can be significant, although there is a financial risk. The advantage is that qualified expenses escape both state and federal income taxation and also all payroll taxes; the risk is that unused funds are forfeited to the employee's firm. Employers also avoid payroll taxes on employee elections.

FSA participation decisions are made concurrently with insurance plan choices each year during the firm's open enrollment period. Therefore, these decisions are made jointly and with the same information. Because FSAs reduce out-of-pocket costs, their availability should have predictable effects on insurance choices. Yet there is little theoretical or empirical work on the interaction of FSAs and insurance. Cardon and Showalter (2001) look at FSA usage patterns conditional on insurance choices, whereas Hamilton and Marton (2008) use panel data to examine the joint insurance/FSA choice.

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I build on a simple insurance model used in Cardon and Showalter (2003). In that article individuals choose FSA participation levels in order to cover their out-of-pocket expenditures, taking the level of insurance coverage as given. It is shown that FSAs can be considered as a type of insurance, with FSA election amounts increasing in the level of risk, in risk aversion, and in the marginal tax rate, but decreasing in income level if risk aversion is decreasing in absolute risk aversion.

This article extends these results by allowing for endogenous insurance choice. I show that supplemental FSA coverage has the potential to break an existing separating equilibrium. In this case, there may exist a Pareto-inferior separating equilibrium. It is possible that FSA coverage can change the optimal pooling contract. Specifically, an employer can make both high (H) and low (L) risk types better off by reducing coverage, which L types prefer, and allowing H types to supplement partial insurance using FSA. Such a change may help to stabilize and strengthen risk pooling arrangements by making it less likely that L types will exit the pool.

MODEL

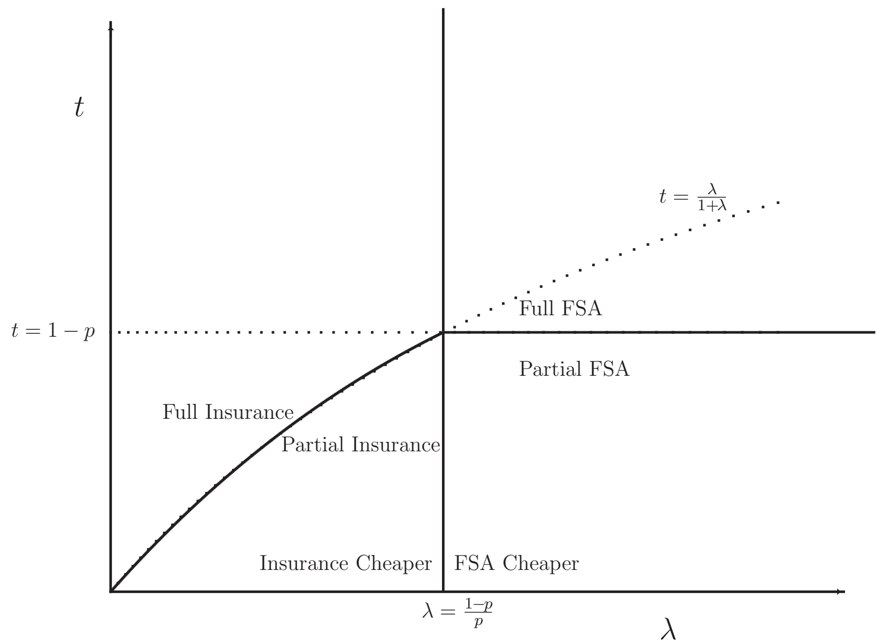
An individual with initial, pretax income $I > 0$ and tax rate t faces a loss $X < I(1-t)$ that occurs with probability p. The individual has preferences defined over consumption C, represented by a smooth, concave utility function $U(C)$ with $U' > 0$ and $U'' < 0$. I assume that the individual is offered employment-based insurance contract with total premium πq, where π is the premium per unit of coverage and q is the amount of coverage. Consumption is equal to $C_2 = (I - \pi q)(1-t) - X + q$ if the loss occurs and $C_1 = (I - \pi q)(1-t)$ if no loss. The individual's problem is to choose q to maximize expected utility

$$EU(q) = pU(C_2) + (1-p)U(C_1). \tag{1}$$

Full insurance is when consumption is constant across states, or when $C_1 = C_2 = (I - \pi X)(1-t)$. I assume a proportional loading factor, λ, which allows premiums to vary from actuarially fair levels. The premium per unit of coverage is $\pi = (1+\lambda)p$. Because the premium is paid out of pretax dollars, the implicit subsidy reduces the perceived unit premium to $\pi(1-t)$. The premium would be actuarially fair as perceived by the individual if $\pi(1-t) = p$, or if $(1+\lambda)(1-t) = 1$, which is the condition for a (risk-averse) individual to choose full insurance.

The individual is also eligible to participate in an FSA program that allows the loss (or a portion of the loss) to be paid out of pretax dollars. The FSA election amount F must be chosen prior to the realization of the loss, at the same time q is chosen. Losses in excess of F are not covered, and unused funds are forfeited. It might be useful to think of FSAs as subsidized self-insurance or precautionary savings. Cardon and Showalter (2001) show that a risk-averse individual choosing FSA only will fully insure ($F^* = X$) if $p \geq 1-t$, and partially insure if $p < 1-t$. This suggests that FSAs are excellent for covering high-probability events. Consumption is $C_2 = I(1-t) - X + tF$ if the loss occurs and $C_1 = (I-F)(1-t)$ if no loss. A unit of FSA coverage costs $1-t$, and this cost is independent of risk, whereas a unit of standard insurance coverage costs $(1-t)(1+\lambda)p$, or $(1-t)\pi$. This implies that insurance coverage will be cheaper if $(1+\lambda)p \leq 1$, or for $\lambda \leq \frac{1-p}{p}$. Figure 1 characterizes optimal choices in terms of the loading factor λ and the tax rate t when FSAs are offered alongside traditional

FIGURE 1
Insurance and FSA Choices



insurance and where both q and F can be chosen freely. Bold lines determine the boundaries of the four regions, whereas dotted lines are simply for reference. The curve $t = \frac{\lambda}{1+\lambda}$ marks the boundary between full and partial insurance, the horizontal line ($t = 1 - p$) marks the boundary between full and partial FSA coverage, and the vertical line ($\lambda = \frac{1-p}{p}$) marks the boundary where insurance is cheaper than FSA. For low λ, insurance is cheaper, and the choice is between full or partial insurance. For high λ, FSAs dominate, and the choice is between full and partial FSA coverage. Note that since premia (prices per unit of coverage) for both insurance and FSAs are linear in the amount of coverage, as long as individuals are allowed to choose q and F freely there will be no mixed coverage.[1]

HIGH- AND LOW-RISK TYPES

Now suppose there are two types of individuals, high-risk (H) types with loss probability p^H and low-risk (L) types with probability p^L. Expected utility for each type is

$$EU^i(q) = p^i U(C_2) + (1 - p^i)U(C_1), \quad i = H, L, \tag{2}$$

and it is well known that the marginal rate of substitution between consumption in the two states is

[1] This is not the case with continuous losses, and true mixed coverage is a possibility.

$$MRS^i = -\left(\frac{dC_2}{dC_1}\right)^i = \frac{(1-p^i)}{p^i}\frac{U'(C_1)}{U'(C_2)}, \quad i = H, L. \tag{3}$$

For any state-contingent consumption pair (C_1, C_2), $MRS^H < MRS^L$, so H-type indifference curves are flatter. These are shown in Figures 2–4. Without insurance or FSA coverage, consumption is at O. Given type-specific premia π^i and tax rate t, the odds line for an H type starts at point O and has slope $-\frac{1-\pi^H(1-t)}{\pi^H(1-t)}$, whereas the odds line for an L type has slope $-\frac{1-\pi^L(1-t)}{\pi^L(1-t)}$. As before, the premium per unit of coverage for each type is $\pi^i = (1+\lambda)p^i$, for $i = H, L$. Consider three cases defined by the relative costs of insurance and FSA coverage:

Case I. FSA premium is higher per dollar of coverage than insurance for both H and L types: $\frac{t}{1-t} < \frac{1-\pi^H(1-t)}{\pi^H(1-t)} < \frac{1-\pi^L(1-t)}{\pi^L(1-t)}$.

Case II. FSA premium less than or equal to insurance for H types but greater than insurance for L types: $\frac{1-\pi^H(1-t)}{\pi^H(1-t)} \leq \frac{t}{1-t} < \frac{1-\pi^L(1-t)}{\pi^L(1-t)}$.

Case III. FSA premium less than or equal to insurance for both H and L types: $\frac{1-\pi^H(1-t)}{\pi^H(1-t)} < \frac{1-\pi^L(1-t)}{\pi^L(1-t)} \leq \frac{t}{1-t}$.

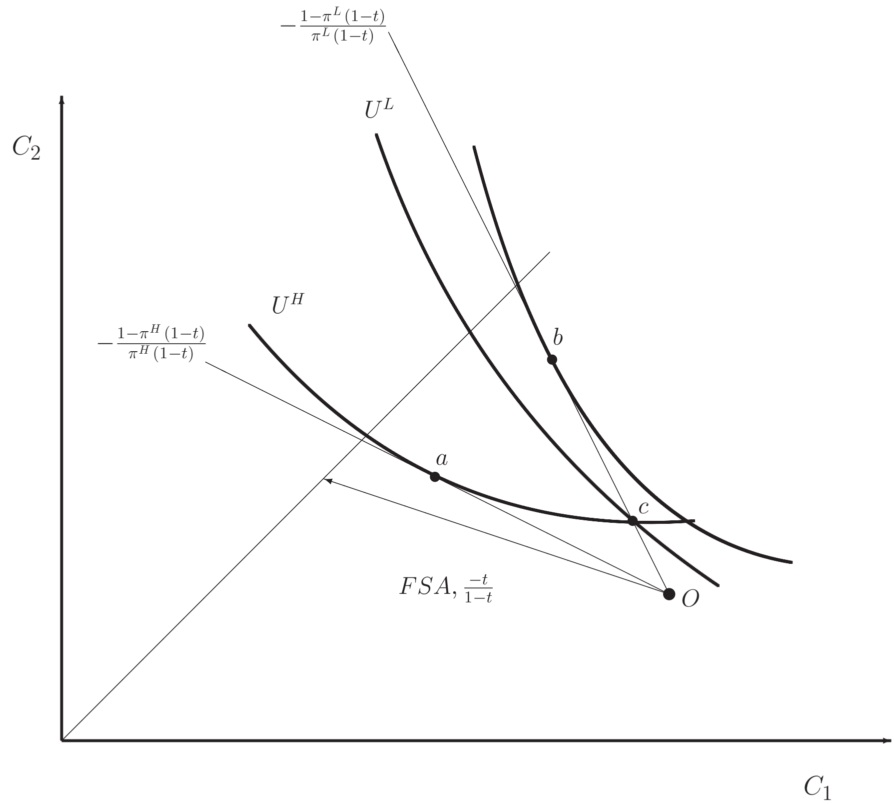
Also shown in Figure 2 is the odds line for an FSA in Case I, where the FSA is dominated by insurance for both types. Use of FSA instead of insurance implies choosing a point on the FSA odds line starting at O, which raises C_2 while lowering C_1. Case I is likely to be the leading, most interesting case. For example, for FSA to be cheaper than insurance for a consumer facing a loading factor of 0.25, the consumer would need $p > 0.8$. For higher values of p^i or λ the FSA odds line might be steeper than those for insurance, indicating that FSA coverage is cheaper. With public information about risk types, Case II implies that H types would choose FSA over insurance, and in Case III both High and L types would choose FSA over insurance.

With public information about risk types, consumers of each type will choose a contract on the appropriate odds line. If insurance, including the tax subsidy, is actuarially fair for each type ($(1-t)(1+\lambda) = 1$), optimal contracts will be full coverage on the 45° line. If premia are better than fair, and if consumers cannot overinsure, then $q = X$ and the indifference curve will not be tangent to the odds lines as they cross the 45° line. For less than fair insurance, contracts are at a and b as shown in Figure 2.

Asymmetric Information: Separating Equilibria

Now consider asymmetric information about types as in the standard Rothschild–Stiglitz (1976) model. As shown in that article, there may exist a separating contract in which the insurer offers contracts (a, c). I assume that the proportion of H types is high enough so that the separating equilibrium exists. Equilibrium requires that each type is on its respective odds line in order to satisfy the insurer's zero-profit

FIGURE 2
Separating Equilibrium Without FSA

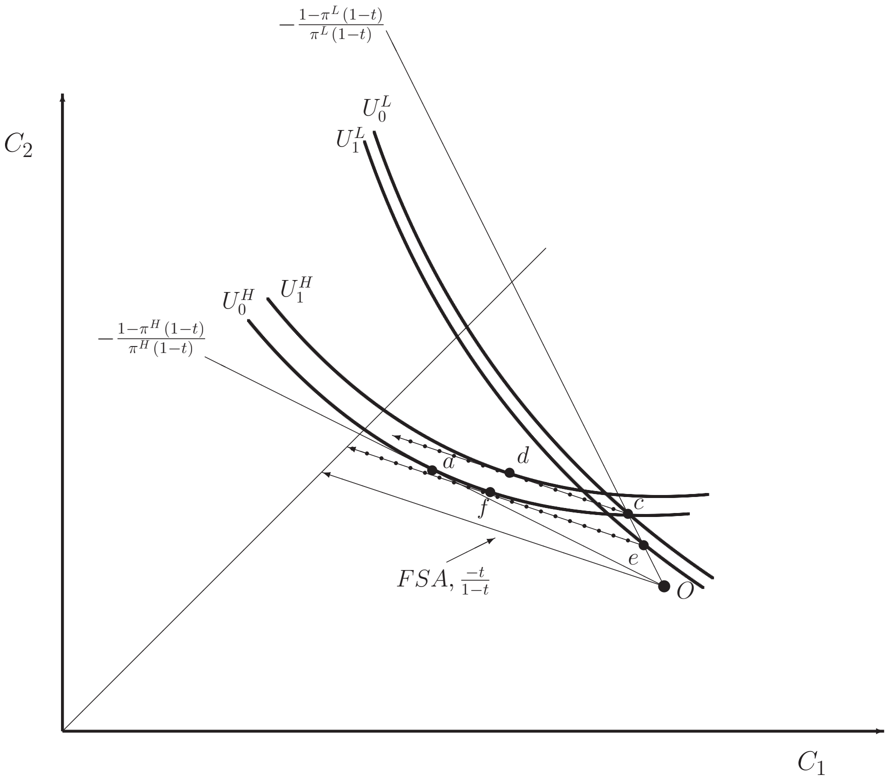


condition,[2] that H types weakly prefer higher coverage at a to c, and that L types prefer lower coverage at c to a. Given the constraint that the contract for each type is on the appropriate odds line, the set of Rothschild–Stiglitz set of separating contracts (a, c) is Pareto optimal.

Now suppose supplemental FSA coverage is offered to both types in addition to the aforementioned contracts, so that equilibrium also requires that each type choose its optimal FSA allocation. Given an insurance contract, supplemental FSA funds can be used move to the left along the odds line that begins at the state-contingent consumption pair determined by the insurance contract. This shown in Figure 3 as the dotted arrows emanating from points c and e. For the example shown in Figure 3, the original separating equilibrium (a, c) is broken by the introduction of the FSA, since H types will deviate to contract c supplemented with FSA. This allows them state-contingent consumption at d. The condition for this that $\frac{t}{1-t} > MRS^H$ at c.

[2] The fair odds line with $\lambda = 0$ is implied by a zero expected profit condition when there are no fixed or variable costs associated with providing insurance.

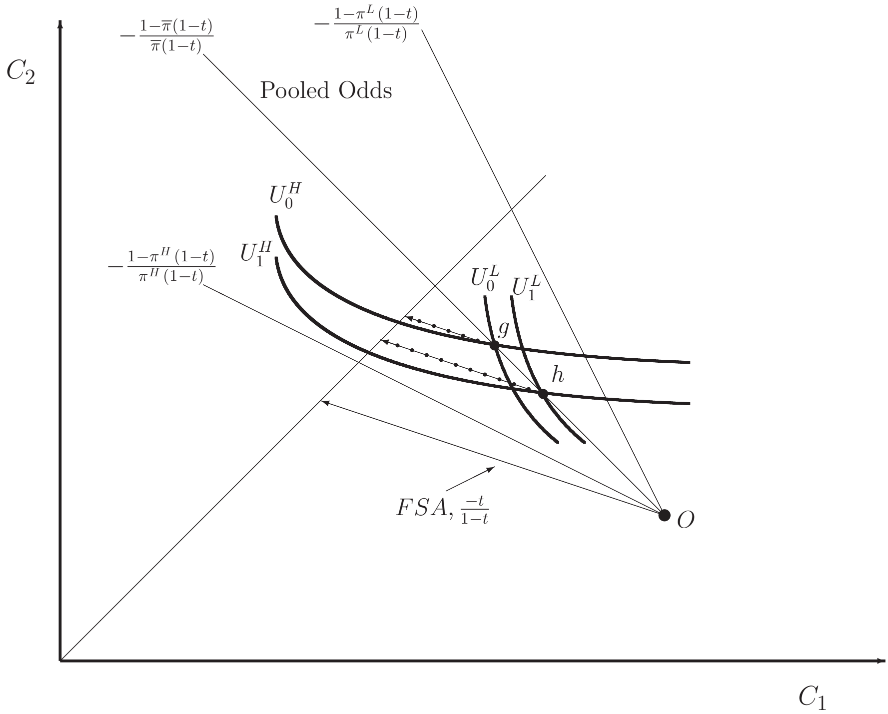
FIGURE 3
Separating Equilibrium With FSA



Note that although $\frac{t}{1-t} < \frac{1-\pi^H(1-t)}{\pi^H(1-t)} = MRS^H$ at a, convexity of preferences implies that MRS^H declines along indifference curve U_0^H as we move toward c.

Because we have assumed that FSA coverage costs more than insurance for both H and L types (Case I), there does exist a separating equilibrium given by contracts (a, e). Suppose a high-risk consumer deviates from a to contract e. Supplemental FSA funds allow the consumer to reach state-contingent consumption at point f, which yields the same utility, U_0^H, as at point a. Low types will not deviate from e to a, and they will not use supplemental FSA so long as $\frac{t}{1-t} \leq MRS^L$ at e. Hence, neither high nor low types have an incentive to deviate from separating equilibrium (a, e). Optimal FSA usage for both types is zero. Given Case I, the point e lies between c and O. Thus the separating equilibrium when supplemental FSA coverage is offered is Pareto-dominated by the no-FSA equilibrium, since H types are no better off and L types are strictly worse off when FSAs are introduced. Intuitively, in a separating equilibrium L types can obtain the low-risk premium only by accepting lower coverage. If H types can supplement lower coverage with FSA funds, L types must be offered even lower

FIGURE 4
Pooling Equilibrium



coverage to prevent high types from trying to pool. In this case, we should expect the firm to drop FSAs as an option.[3]

Asymmetric Information: Pooling Equilibria

Now consider a pooling equilibrium as shown in Figure 4. Rothschild and Stiglitz (1976) show that competitive pooling equilibria do not exist. However, since FSAs are always offered by employers in the group insurance market, I assume that employer contributions to insurance premia and the implicit tax subsidy of employer-provided insurance ensure that outside options are not viable for either type. The pool is made of a fraction μ of H-type employees and $1-\mu$ L-type employees. The employer offers a level of coverage q^* at the pooled premium per unit of coverage $\overline{\pi} = (1+\lambda)[\mu p^H + (1-\mu)p^L]$, with q^* chosen to maximize weighted expected utility of the consumers, so that the employer balances the welfare of each type:

$$V(q) = \mu EU^H(q) + (1-\mu)EU^L(q).$$

[3] It is easy to see, also, that no separating equilibrium exists for Case II. In this case, FSA coverage is cheaper than insurance for H types, but H types will always prefer to imitate L types and supplement with FSA. For Case III, of course, FSA is cheaper than insurance for both types.

This is shown in Figure 4 along with pooled odds line at point g. Note that, at g, H types prefer higher coverage given the pooled premium, whereas L types prefer lower coverage at the same premium. Also shown are FSA odds lines (dotted arrows) assuming Case I. The function $V(q)$ is concave in q if the consumers are risk averse. The first-order condition is

$$V'(q^*) = \mu[p^H U'(C_2)[1-(1-t)\overline{\pi}] + (1-p^H)U'(C_1)(t-1)\overline{\pi}]$$
$$+ (1-\mu)[p^L U'(C_2)[1-(1-t)\overline{\pi}] + (1-p^L)U'(C_1)(t-1)\overline{\pi}] = 0,$$

which can be rearranged to obtain

$$\frac{1-(1-t)\overline{\pi}}{(1-t)\overline{\pi}} = \frac{\mu(1-p^H) + (1-\mu)(1-p^L)}{\mu p^H + (1-\mu)p^L} \frac{U'(C_1)}{U'(C_2)}.$$

If $\frac{t}{1-t} > MRS^H$ at the pooling contract g, then H types will supplement partial coverage in the pooled insurance contract, allowing them to achieve a higher level of utility. L types will not supplement unless $\frac{t}{1-t} > MRS^L$ at g. To prove that FSAs will alter the employer's optimal contract, assume that H types will choose at least a small amount of FSA, whereas L types will not. We treat F as a parameter and use standard comparative statics analysis. For H types and for small F, $C_1 = (I - F - \overline{\pi}q^*(F))(1-t)$ and $C_2 = (I - \overline{\pi}q^*(F))(1-t) - X + q^*(F) + tF$. Then we find that $\frac{\partial q^*}{\partial F}$ has the same sign as

$$\frac{\partial^2 V}{\partial q \partial F} = \mu\left[p^H U''(C_2)[1-(1-t)\overline{\pi}]\, t(1-p^H)U''(C_1)\overline{\pi}(1-t)^2\right] < 0.$$

Hence, $\frac{\partial q^*}{\partial F} < 0$, and the employer will reduce coverage in the pooling equilibrium. Because H types gain from supplemental FSA coverage, the employer shares that gain with L types, lowering insurance coverage by moving to a contract at point h. For some contract in between g and h both H and L types will be better off because of FSA coverage, even though only H types use it. One interpretation of this result is that FSAs make it easier for employers to offer pooled coverage. Employers accommodate the preference of L types by lowering coverage and offer FSAs to compensate H types.

The aforementioned result assumes that an outside insurance option is not viable. If, instead, we assume that L types can opt out the pool, then they must be offered a contract that yields a minimum utility level, say $\underline{U}^L$. Again, FSAs might raise the expected utility of H types by allowing them to supplement the coverage offered in the contract that satisfies this constraint.

CONCLUSION

As shown earlier, FSAs can affect insurance markets in important ways even when they are less attractive than traditional insurance. In a discrete loss setting, FSAs will be more attractive to high-risk consumers, since the price of a unit of coverage depends only on the tax rate. Given asymmetric information about risk types, FSAs can break an existing separating equilibrium, leading in one case to a new separating equilibrium that is in fact Pareto-dominated by the no-FSA equilibrium. In this case, FSAs could well be withdrawn as an option by an employer. On the other hand, when a pooling contract is offered by an employer, FSAs do offer the potential to raise expected utility for both risk types.

A more general model would account for continuous loss distributions and for moral hazard. As noted earlier, the former leads to prices per unit of insurance coverage that are not constant, although FSA prices remain dependent on the tax rate alone. Moral hazard tends to favor partial insurance coverage, and thus to increased consumer interest in supplemental FSA coverage. Cardon and Showalter (2007) examine health savings accounts (HSAs) using simulation methods. HSAs are similar to FSAs in that they offer a subsidized, self-insurance alternative to traditional insurance contracts. They find that HSA availability does not necessarily break a separating equilibrium and that, similar to the aforementioned result, HSAs do alter the pooling contract. Whether both risk types are better off depends on the parameters of the combination HSA/insurance plan offered by the employer.

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