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The interaction of partial public insurance programs and residual private insurance markets: evidence from the US Medicare program

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Abstract

A ubiquitous form of government intervention in insurance markets is to provide compulsory, but partial, public insurance coverage and to allow voluntary purchases of supplementary private insurance. This paper investigates the effects of such programs on insurance coverage for the risks not covered by the public program, using the example of the US Medicare program. I find that Medicare does not have substantial effects—in either direction—on coverage in residual private insurance markets. In particular, there is no evidence that Medicare is associated with reductions in private insurance coverage for prescription drug expenditures, an expenditure risk not covered by Medicare. Medicare is, however, associated with a shift in the source of prescription drug coverage, from employer-provided coverage to Medicare HMOs.

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1. Introduction

The standard economic rationale for government intervention in insurance markets is the presence of adverse selection. Compulsory insurance coverage offers a potential solution to the sub-optimal insurance coverage that adverse selection can produce. Indeed, in his seminal article on adverse selection, *Akerlof (1970)* points to the potential for the US Medicare program—which provides compulsory public health insurance to all individuals

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over age 65—to overcome adverse selection problems in private health insurance markets for the elderly and thus to improve welfare.

In practice, the vast majority of compulsory public insurance programs provide only partial insurance coverage. For example, Medicare pays for only half of all medical expenditures for the elderly, and leaves them exposed to substantial medical expenditure risk. The same is true of public health insurance programs in Canada, Australia, and the United Kingdom. Many other types of public insurance programs also provide incomplete insurance. Around the world, defined benefit Social Security systems provide only partial annuitization for the elderly. Public disability insurance in both the US and Canada provides only limited insurance against lost wages and increased medical costs. In all of these instances, individuals have the option of buying supplemental insurance in the private market to “top up” their public insurance coverage.

Yet, we have no empirical evidence of the consequences of such partial programs for the workings of the private insurance market and hence for total insurance coverage.¹ A primary concern is that these programs—designed to increase insurance coverage—may in fact impair the functioning of the residual private market. In particular, if the private insurance market suffers from adverse selection, the introduction of a compulsory public program providing partial coverage may reduce the willingness of lower risk individuals to pool with higher risk individuals for coverage for the remaining residual risk; if lower risk individuals drop out of the residual private market, this market may unravel partly or completely. The public program could thus produce declines in total insurance coverage for some groups of privately-insured individuals. This deleterious effect on the residual private market could partially or completely counteract any welfare gains from the increased insurance coverage provided through the public program. On the other hand, if the public program *reduces* the extent of unraveling in the residual private insurance market, the welfare gains from the program would exceed those stemming directly from the publicly-provided insurance. Theoretically, either effect may obtain.

Given the theoretical ambiguity, this paper looks empirically at the effect of Medicare on the residual private health insurance market. Empirical evidence of the effect of partial public insurance on the residual private insurance market has important implications for the welfare consequences of existing programs, such as Medicare and Social Security. For example, it is possible that Medicare, which does not provide prescription drug coverage, may be partly responsible for the limited nature of private prescription drug coverage among the elderly. Understanding the impact of partial public insurance is also crucial for optimal policy design of future public insurance programs. For example, proposals for a Medicare prescription drug benefit almost always involve a less-than-comprehensive benefit and optional supplemental coverage; the desirability of such a program depends in part on how the private market for supplementary drug coverage is likely to function relative to the market for any drug coverage.

I begin in Section 2 with some brief background on Medicare and on the private insurance market for supplementary coverage. Section three considers theoretically the potential

¹ There is, however, evidence of the effect on private insurance coverage of partial public insurance programs (such as Medicaid) that may be used as an *alternative* to any private insurance (Cutler and Gruber, 1996).

impact of partial public insurance on coverage in the residual private market in the presence of adverse selection.

Section 4 describes the empirical approach. I follow a panel of retirees from the Health and Retirement Survey (HRS) over a 2-year period to examine the effect of the discrete change in Medicare coverage that occurs when they turn 65 on their private health insurance coverage. To control for any confounding effects that aging or the passage of time may have on the demand and supply of private health insurance, I compare changes in private health insurance for retirees who become covered by Medicare between interviews to changes in private health insurance for two control groups of retirees who do not become covered by Medicare between interviews. One control group consists of retirees originally aged 60–62, who are not covered by Medicare in either interview; the other control group consists of retirees aged 65–67, who are covered by Medicare in both interviews.

Section 5 presents the main results. The principal finding is that Medicare does not appear to impair the functioning of the residual private insurance market. Medicare is not associated with declines in the overall rate of private health insurance coverage, or in the rate of prescription drug coverage. Moreover, there is no evidence that Medicare is associated with declines in health insurance for the lower risk (healthier) individuals. This suggests that Medicare does not produce an unraveling of the adverse selection equilibrium in the residual private market. There is, however, evidence that Medicare is associated with a shift away from employers as the *source* of private retiree health insurance coverage, primarily toward Medicare HMOs but also toward the non-group market.

Section 6 briefly investigates other channels—such as consumer misinformation or fixed costs of insurance policies—through which the public program may affect the residual private market. The last section summarizes the main findings and discusses their potential generalizability.

2. Background on the US Medicare program and private health insurance

The US Medicare program provides partial public health insurance coverage to the elderly and to the disabled. This paper focuses on the elderly. The discrete change in eligibility at age 65 provides a mechanism for distinguishing the effects of Medicare from other (continuous) effects of aging. Essentially all individuals aged 65 or older are covered by Medicare. This is not surprising, since Medicare Part A (which primarily covers non-physician inpatient hospital care expenses) is financed through payroll taxes on the employed while Medicare Part B (which primarily covers physician fees for covered services) is heavily subsidized (U.S. House of Representatives, 1998).

Although essentially universal among the elderly, Medicare coverage is far from comprehensive. Indeed, Medicare pays for less than half of the health care costs of the elderly and provides substantially less coverage than most private insurance held prior to age 65 (Piacentini and Foley, 1992). Gaps in Medicare coverage fit into three main categories. First, there are cost-sharing provisions—annual deductibles and uncapped co-payments—for the hospital and physician services that Medicare covers. Second, there are certain health services that Medicare covers only partially and/or with severe restrictions, such as care in a skilled nursing facility or home health care. Third, there are certain health services—

primarily outpatient prescription drugs and long-term care—which Medicare does not cover. By contrast, most (85%) of private retiree health insurance policies for individuals prior to age 65 cover prescription drugs, although, like Medicare, they provide little long-term care coverage.

Given these gaps in Medicare coverage, it is not surprising that private coverage to supplement Medicare is widespread. About 85% of the non-disabled, non-indigent retired elderly who are recently covered by Medicare (i.e. ages 65–67) have some supplementary private insurance. This “Medigap” coverage is provided either through an insurance policy from a current or former employer or union (56%), an insurance policy purchased directly from an insurance company (26%), or a Medicare HMO (16%).² Medicare HMOs cover Medicare services and also an expanded benefit package in exchange for limiting the individual to a network of providers and sometimes for a premium as well.

3. Theoretical impact of partial public insurance programs on markets with adverse selection

The partial public insurance programs that I consider theoretically are, like Medicare, universal and compulsory. They provide essentially first-dollar coverage (with perhaps some small deductible), but provide less than full insurance against the risk that they cover.³ They also allow the purchase of voluntary private insurance policies to supplement the compulsory public insurance.

In a model with perfect competition, constant returns to scale, perfect capital markets and symmetric, full information, the introduction of such a program should affect insurance coverage only by mechanically increasing insurance coverage for individuals whose private insurance coverage would otherwise have been less than the publicly-provided amount. The program should have no effect on total insurance coverage for those who would otherwise have private insurance coverage that exceeds the amount provided by the public program.

Once we depart from this benchmark model, however, it is possible to generate predictions—in either direction—for the effect that partial public insurance programs will have on total insurance coverage. This paper focuses primarily on the interaction of a partial public insurance program with a residual private insurance market when the private market suffers from adverse selection. The impact of adverse selection on the overall effect of the public program is of particular interest since the economic rationale for compulsory public insurance stems from its potential to overcome the private market problems created by adverse selection. Moreover, a substantial empirical literature has documented the presence of adverse selection in the US private health insurance market (see [Cutler, in press](#) for a review).⁴

² Author’s calculations from the 2000 HRS. See [Section 4](#) for more details about the sample.

³ An alternative form of a partial public insurance program is one that covers catastrophic expenditures above a high deductible and allows private markets to supply “low end” policies. A rich theoretical debate on the efficiency of such plans can be found in [Besley \(1989\)](#), [Selden \(1993\)](#), [Blomqvist and Johannson \(1997\)](#), and [Selden \(1997\)](#).

⁴ Although most of this literature pertains to the pre-65 private health insurance market, there is also evidence of substantial adverse selection in the post-65 private insurance market (e.g. [Ettner, 1997](#)).

3.1. Partial public insurance programs in markets with adverse selection: existing theory

Existing models of asymmetric information yield ambiguous predictions for the impact of the public insurance program on insurance coverage for risks not covered by the public program. Broadly speaking, the impact of the public program depends on whether insurance companies are restricted to linear pricing schedules or whether they can offer exclusive contracts and therefore a convex pricing schedule; this is an open empirical question.⁵

For the case of a private insurance market with non-exclusive contracts (i.e. linear pricing), [Abel \(1986\)](#) shows formally that partial insurance provided by the public program exacerbates adverse selection pressures in the residual private market. As a result, the residual private market can unravel partly or completely. Intuitively, the introduction (or expansion) of a partial public insurance program reduces individual exposure to risk, and thus reduces the consumer surplus from purchasing private insurance at a given price. When facing a common price for insurance, this consumer surplus is lowest for lowest risk individuals, and zero by definition for the lowest-risk individual who chooses to purchase the insurance. By reducing consumer surplus, the public program thus induces the lowest risk individuals to drop out of the private market; this drives up the equilibrium price of insurance and thus prompts further declines in private coverage.

If, instead, insurance companies are capable of enforcing exclusive contracts (i.e. offering a convex pricing schedule), partial public insurance programs can have the opposite effect on the private insurance market. [Wilson \(1977\)](#) provided the striking result that when there is a pooling equilibrium in a private insurance market with adverse selection, the government can always Pareto dominate such an equilibrium by providing partial insurance at the market odds price and allowing the private market to provide supplemental insurance coverage.⁶ This theoretical result has been cited in support of the welfare-enhancing potential of a variety of partial public insurance programs that allow for private supplementation such as mandatory, non-discriminatory Social Security programs with voluntary private annuity markets (see for example [Eckstein et al., 1985](#)) and compulsory partial health insurance coverage with supplementary private markets (see for example [Neudeck and Podczeck, 1996](#)). The intuition for the Wilson result stems from the assumption in the model that individuals may only hold one private health insurance policy; the introduction of the partial public insurance program thus allows individuals to hold *two* policies (one private, and one public), and can therefore produce improvements over the private market equilibrium ([Finkelstein, 2002a](#)).⁷

3.2. The relationship between the publicly-covered risk and the residual risk

Both [Abel \(1986\)](#) and [Wilson \(1977\)](#) assume that there is one homogenous risk that the public and private programs may insure. In practice, however, the risks insured by

⁵ More generally, [Chiappori \(2000\)](#) notes that the distinction between exclusive and non-exclusive contracts is a critical one in models of asymmetric information of insurance markets.

⁶ [Eckstein et al. \(1985\)](#) discuss the full range in the amount of partial public coverage for which this result holds.

⁷ A key requirement, therefore, for the potential for the public policy to be Pareto-improving is that individuals are restricted to only one private insurance policy. This assumption appears to be valid for health insurance markets ([Finkelstein, 2002a](#)).

the public program and those potentially insured by the residual private market, while related, may not be the same. This is particularly true of health insurance programs. The expenditure risk covered by Medicare (specifically, hospital, and doctor expenditures) is not identical to that potentially covered by the residual private market (specifically, the cost-sharing provisions of the public program and prescription drug expenditures.) This affects the potential theoretical impact of the partial public program on insurance coverage in the residual market.

In the case of Medicare, two factors in particular are likely to be important. Both stem from the fact that prior to age 65, the private insurance market bundles the insurance for risks subsequently covered by Medicare (namely physician and hospital risks) with insurance for the risks not covered by Medicare (namely prescription drug coverage and cost-sharing provisions of Medicare).⁸ The first factor is that there is considerably less variance in the expenditures not covered by Medicare than in the expenditures covered in the pre-65 private insurance market.⁹ Medicare thus forces an unbundling of the (lower variance) residual risks for prescription drug expenditures and cost-sharing expenditures from the (higher variance) physician and hospital expenditure risks. As a result, the insurance value of the residual risk—which increases in the variance of these expenditures—is likely to be lower than the insurance value for the combined expenditures. This increases the likelihood that Medicare will produce declines in residual insurance coverage, especially among lower risk individuals.¹⁰

The second factor is the substitutability or complementarity of spending. The co-payments and deductibles of the public program that private insurance may cover are clearly complements to the publicly-covered expenditures. Prescription drugs may be either a substitute for or complement to hospital or physician care. In some cases, taking a drug may substitute for a surgical procedure or reduce the risk of hospitalization. In other cases, the demand for physician care may increase when prescription drug coverage is available.

To the extent that Medicare expenditures and the residual expenditures are substitutes, Medicare may reduce the marginal demand for insurance against the residual risk, thus producing declines in insurance coverage. These declines may be particularly pronounced among the lower risk, if, as in the [Abel \(1986\)](#) model, a common price for insurance is charged to all risk types. If the two expenditures are complements, however, coverage of one risk by the compulsory public program will increase the marginal utility of insurance against the other risk, and hence increase insurance demand. More importantly, any increased expenditures on Medicare-covered services induced by the (complementary) residual private insurance policy are borne by the public program, and therefore do not increase the price of the private policy. This “moral hazard subsidy” ([Pauly, 1974](#)) of the private residual market

⁸ This bundling of the two expenditure risks in the pre-65 private health insurance market may be due to economies of scale and scope in the production of insurance policies. It may also be due to the types of relationships between the two risks discussed in the remainder of this section.

⁹ Prescription drug expenditures are considerably more predictable than general medical expenditures ([Ettner \(1997\)](#), [Pauly and Zeng \(2002\)](#)). The deductibles and co-payments from the public program that the residual market may cover are also of lower variance than the full hospital and doctor expenditure risk.

¹⁰ Conceptually, the same effect obtains with a homogenous risk as well, since any public coverage reduces individuals' exposure to risk and thus their insurance demand ([Abel, 1986](#)); when the residual expenditure risk is also a component of total expenditures that has very low variance, however, this effect is exacerbated.

by the public program encourages private insurance for those services. It could, therefore, be an important factor in combating any declines in residual private insurance coverage that Medicare might otherwise be expected to produce. Moreover, when there are heterogeneous consumers with private information about their risk type, there may be welfare gains from the moral hazard subsidy since absent the subsidy, the insurance may be priced too high to attract low risk individuals. The subsidy may, therefore, play an important role in inducing low risk individuals to remain in the residual market and thus preventing this market from unraveling (Marquis, 1992).

4. Empirical approach

4.1. Data and sample definition

The data are from the Health and Retirement Survey. The HRS is a national panel data set that began in 1992 with a sample of primary interviewees aged 51–61 and their spouses. I use data from three waves: 1996, 1998, and 2000; earlier waves do not have information on prescription drug coverage.

The basic empirical strategy is to compare private health insurance markets for retirees who are covered by Medicare with those for retirees who are not covered by Medicare. I follow a panel of retirees originally aged 60–67 over a 2-year period. Retirees who are 63 or 64 in the first interview (the “treatment group”) become covered by Medicare between interviews. This discrete change in Medicare coverage at age 65 is used to identify its effects. I compare the changes in private health insurance for retirees who become covered by Medicare between interviews to changes for two control groups who are close in age to the treatment group but do not experience any change in Medicare coverage between interviews. The Younger Control Group consists of retirees aged 60–62 in the first interview who are, therefore, not on Medicare in either interview. The Older Control Group consists of retirees who are 65–67 in the first interview who are therefore covered by Medicare in both interviews. This comparison is designed to isolate the effect of Medicare from other effects of aging and the passage of time on private health insurance markets. For example, during the time period under study, there has been a significant decline in the number of employers who offer health insurance to their retirees of any age.¹¹ Were I to merely examine changes in private health insurance coverage for retirees who become covered by Medicare over this time period without comparing it to the control groups of retirees who do not become covered by Medicare, the analysis would conflate any such time series trends with the estimated effect of Medicare.

I use the three waves of the HRS panel to form two, two-wave “stacked” panels. Some individuals therefore appear in two separate observations (in differences); indeed, the 2999 observations (in differences) in the data represent 2174 unique retirees.¹²

¹¹ See <http://www.ahcpr.gov/news/press/pr2002/insprepr.htm>.

¹² In 1998, two new cohorts representing individuals born between 1924 and 1930 and individuals born between 1942 and 1947 were added to the sample and the entire sample was merged with the AHEAD sample which consists of individuals born before 1924. As a result some of the older individuals are only surveyed in 1998 and 2000 and therefore do not have repeat observations (in differences).

I restrict my sample in three main ways. All restrictions are made based on status at the first interview.¹³ First, the sample is limited to retirees, whom I define based on their self-reporting of their retirement status. This restriction avoids confounding the effect of Medicare with the effect of retirement. Medicare is the primary payer for retirees with retiree health insurance at age 65 and over and employers can—and do—offer different health insurance packages to retirees based on Medicare eligibility. They can also charge age-based prices for any health insurance offered, as long as this is actuarially based.¹⁴ Second, I further limit the sample to individuals who do not report themselves as disabled, since disabled individuals may be covered by Medicare regardless of age.

Finally, the sample is limited to people who are not covered by military health insurance and are not eligible for Medicaid, the public health insurance program that covers certain classes of poor people. This last restriction must be made with some care as Medicaid eligibility expands at age 65.¹⁵ In order not to confound any effects of Medicare coverage at age 65 with those of expanded Medicaid eligibility at age 65, I limit the sample to retirees who, based on their income and assets, would not meet the criteria for Medicaid eligibility at age 65, regardless of their current age.¹⁶

4.2. Empirical approach

The basic specification for any one of the three groups of interest—the treatment group, the younger control group, or the older control group—is as follows:

$$\Delta y_i = \beta_0 + \delta \Delta X_i + \varepsilon_i \quad (1)$$

The key parameter of interest is the constant, β_0 , which reflects the average change in the dependent variable for the group, after controlling for the effects of changes in other covariates. ΔX controls for changes in household income between interviews.

When I combine the estimates from the treatment and the control groups into one difference-in-differences estimate, I estimate:

$$\Delta y_i = \beta_0 + \delta \Delta X_i + \gamma \Delta \text{MEDICARE}_i + \varepsilon_i \quad (2)$$

¹³ Throughout this paper I use the term “first interview” or “first wave” to refer to the first observation in time of the two observations on an individual. The observations may either come from the 1996 and 1998 surveys (in which case the “first interview” is the 1996 survey) or they may come from the 1998 and 2000 surveys (in which case the “first interview” is the 1998 survey).

¹⁴ The description of regulations for retiree health insurance before and after age 65 is based on a review of the relevant parts of ERISA, IRA non-discrimination rules, and the ADEA, as well as on conversations with program officials in the offices that oversee these regulations.

¹⁵ In practice, this expansion is not large: Medicaid coverage rises from 6% of individuals aged 45–64 to 8.9% of individuals aged 65 and older (U.S. House of Representatives, 1998).

¹⁶ I choose the income and asset thresholds to exclude individuals who—if they were age 65—would either be eligible for full Medicaid or for QMBY (which covers Medicare part B premiums and co-payments for part A and part B). I do not exclude individuals who would be eligible for SLMBY, since these individuals only receive a slight income transfer through the payment of the part B premium. In results not reported here, I find that the results are not sensitive to more restrictive income and resource floors to exclude people who would be eligible for SLMBY as well.

$\Delta\text{MEDICARE}_i$ is an indicator variable that is equal to one if the individual is in the treatment group, and thus experienced a change in Medicare status between interviews.

When I estimate Eq. (1) for the treatment group, β_0 reflects the combined effects of becoming eligible for Medicare and any effects of aging or the passage of time. The identifying assumption in Eq. (2) is that any effects of aging or the passage of time are the same for retirees aged 60–62 and aged 65–67 as they are for retirees aged 63 and 64. Under this assumption, β_0 now measures the aging and time effects and γ measures the effect of a change in Medicare coverage.

I estimate Eqs (1) and (2) by OLS. I adjust the standard errors for correlation within the error term across observations (in differences) for the same individual. I estimate all regressions using the HRS weights for the first interview.

4.3. Dependent variables

The two main dependent variables used in this paper are both changes in binary measures of private health insurance coverage. I begin by looking at the impact of Medicare coverage on changes in whether the individual has *any* private health insurance coverage. I define private health insurance coverage as private insurance coverage for acute medical care (i.e. not including long-term care insurance policies). These include policies provided through a current or former employer, a Medicare HMO, or purchased directly through an insurance company; the source of the coverage is identifiable in the data.

An analysis of the effect of Medicare on changes in whether the individual has any private health insurance coverage may provide an incomplete picture of the effect of Medicare on private insurance coverage if the nature of the private coverage changes substantially. As is typical of most survey data, the HRS does not provide an overall measure of the amount of coverage provided by the individual's policy. As a proxy for the impact of Medicare on the amount of coverage provided by the private policy, the other main dependent variable examined is the change in private coverage for prescription drugs. Prescription drugs represent the largest gap in Medicare coverage that, prior to age 65, tends to be covered by the same insurance product that covers the services subsequently-covered by Medicare; 85% of the retiree private insurance prior to Medicare covers prescription drugs and prescription drug insurance is not sold as a stand-alone product. For reasons discussed in greater detail in Appendix A, I define individuals as having prescription drug coverage if they either report having such coverage or are in a Medicare HMO. Appendix A explores several alternative approaches to measuring prescription drug coverage and reports that the principal findings are not sensitive to the choices made.

4.4. Descriptive statistics

Table 1 provides some summary statistics. The middle column shows sample averages for the treatment group. The other two columns show the sample average for the younger and older control groups. The racial, gender, educational, and income composition of the three groups is very similar. The proportion in worse health tends to increase with age, which is not surprising. The only other noticeable difference between the groups—apart from their age—is that the observations from the older control group

Table 1
Sample statistics

	Younger control group: retirees under age 65 in both interviews	Treatment group: retirees who turn 65 between interviews	Older control group: retirees aged 65 and older in both interviews
Average age (wave 1)	61.3	63.5	65.9
Percent from 1996 to 1998 surveys	0.51	0.53	0.32
Percent male	0.51	0.49	0.56
Percent white	0.91	0.90	0.90
Median household income in first wave (\$)	37573	33512	32568
Educational attainment in first wave			
Less than high school	0.20	0.22	0.24
High school grad	0.38	0.40	0.34
Some college	0.17	0.19	0.19
College grad +	0.25	0.19	0.23
Self-reported health in first wave			
Fair or poor	0.15	0.18	0.21
Good	0.31	0.31	0.34
Very good or excellent	0.54	0.50	0.44
<i>N</i> (in differences)	860	841	1278

All means are weighted.

are disproportionately from following retirees from the 1998 to 2000 survey. This simply reflects the fact that younger retirees “age into” the older control group by the second pair of surveys. To investigate whether the findings are sensitive to this compositional change, I ascertained that the estimated effects of Medicare do not vary across pairs of adjacent surveys.

5. Main results

5.1. Changes in private health insurance coverage

Table 2 presents evidence of the effect of Medicare on having private health insurance. The first three columns show the estimated change in private insurance coverage between interviews separately for each of the control groups and for the treatment group. The final column shows the difference-in-difference estimate of the change in private insurance coverage for those who turn 65 between interviews relative to the change in private insurance coverage for those in the control groups. In this specification, the coefficient of interest is that on Δ MEDICARE. Under the identifying assumptions, it reflects the effect of becoming covered by Medicare on private insurance coverage.

The top two panels show results—without and with covariates respectively—when the dependent variable is changes in whether the individual has *any* private health insurance

Table 2
Effect of Medicare on private health insurance coverage

	Younger control group: retirees under 65 in both interviews	Treatment group: retirees who turn 65 between interviews	Older control group: retirees 65 and over in both interviews	Difference-in-differences estimate
Dependent variable: change in whether have any private health insurance coverage				
Whole sample, without covariates				
β_0	−0.021** (0.009)	0.025* (0.014)	0.023*** (0.009)	0.006 (0.006)
Δ MEDICARE	–	–	–	0.019 (0.016)
Mean private health insurance (wave 1)	0.893	0.850	0.873	0.872
<i>N</i> (in differences)	854	825	1245	2924
Dependent variable: change in whether have any private health insurance coverage				
Whole sample, with covariates				
β_0	−0.021** (0.009)	0.024* (0.014)	0.023*** (0.009)	0.006 (0.007)
Δ MEDICARE	–	–	–	0.019 (0.016)
Mean private health insurance (wave 1)	0.892	0.849	0.873	0.872
<i>N</i> (in differences)	850	820	1241	2911
Dependent variable: change in private prescription drug coverage				
Whole sample, with covariates				
β_0	−0.031** (0.014)	0.019 (0.020)	0.007 (0.012)	−0.008 (0.009)
Δ MEDICARE	–	–	–	0.027 (0.024)
Mean drug coverage (wave 1)	0.785	0.695	0.693	0.719
<i>N</i> (in differences)	850	820	1241	2911

Notes: The first three columns present the results of estimating Eq. (1). The fourth column presents the results from estimating Eq. (2). Estimation is by OLS. Standard errors are in parentheses. They are adjusted for heteroscedasticity and for correlation within the error term across observations (in differences) for the same individual.

*** Denote significance at the 1% levels.

** 5% levels.

* 10% level.

coverage.¹⁷ There is little evidence of an aggregate effect of Medicare coverage on this margin. This is the case both when the treatment group alone is analyzed and in the difference-in-differences specification; this similarity alleviates concerns that the results hinge critically on the untestable identifying assumption. The difference-in-differences results suggest that Medicare coverage is associated with a statistically insignificant 2% point increase in private health insurance coverage. We can reject—at the 95% confidence level—an effect of Medicare on private health insurance coverage that is larger than a 1% point decline or a 5% point increase.

The lack of an effect of Medicare on whether individuals have any private health insurance may mask effects of Medicare on the nature of this coverage. Therefore, the bottom panel of Table 2 investigates the effect of Medicare on private prescription drug coverage. There is little evidence to suggest that Medicare is associated with a change in prescription drug coverage. The point estimate indicates a (statistically insignificant) 3% point increase in prescription drug coverage associated with Medicare coverage, and we can reject with 95% confidence a decrease that is larger than 2% points or an increase that is larger than 7% points. Consistent with this small estimated impact of Medicare (and the fact that the only other covariate in the regression is a change in household income), the R^2 of the difference-in-difference regressions in Table 2 is quite small (less than 0.01).

5.2. The potential for unraveling: results by health status

The aggregate results suggest that there is no net effect of Medicare on the residual private insurance market. However, it is possible that these aggregate results mask differential effects for individuals of different risk levels. As discussed above, one concern with a partial public insurance program is that it may be particularly likely to produce declines in residual private insurance coverage among lower risk individuals. I therefore examine whether Medicare has a differential effect on private insurance coverage for individuals of different health status. I measure health status based on self-reported health status (poor or fair, good, very good or excellent) at the time of the first interview.

Table 3 shows the impact of Medicare by self-reported health status on whether the individual has any private health insurance coverage. Table 4 shows the same analysis when the dependent variable is changes in whether the individual has private prescription drug coverage. There is no evidence of declines in insurance coverage among the lower risk (healthier) individuals. This does not appear to reflect merely issues of sample size, and hence limited power to detect statistically significant declines. Even the *point estimates* (either for the treatment group alone or in the difference-in-differences specifications) in Tables 3 and 4 indicate that Medicare is almost always associated with an *increase* in insurance coverage; in the 2 (out of 12) cases in which it may be associated with a decline, this decline is less than -0.5% points. Indeed, for those who report themselves to be highest risk (i.e. in fair or poor health), Medicare is associated with a *statistically significant* 12–14% point *increase* in prescription drug coverage (i.e. in fair or poor health). However, this finding is not robust to an alternative definition of health status, based on the number (out of a possible seven) of chronic health conditions reported. With this measure, the analysis

¹⁷ All subsequent results in the paper control for covariates; the results are never sensitive to these controls.

Table 3
Effect of Medicare on any private health insurance, by self reported health status

Health	Younger control group: retirees under 65 in both interviews	Treatment group: retirees who turn 65 between interviews	Older control group: retirees 65 and over in both interviews	Difference-in-differences estimate
Fair or poor				
β_0	−0.059* (0.032)	0.046 (0.041)	0.018 (0.021)	−0.009 (0.018)
Δ MEDICARE	–	–	–	0.050 (0.046)
Mean private health insurance (wave 1)	0.817	0.696	0.860	0.805
<i>N</i> (in differences)	141	160	267	568
Good				
β_0	−0.012 (0.014)	0.038 (0.023)	0.022 (0.017)	0.011 (0.012)
Δ MEDICARE	–	–	–	0.025 (0.027)
Mean private health insurance (wave 1)	0.863	0.854	0.851	0.855
<i>N</i> (in differences)	274	270	430	974
Very good or excellent				
β_0	−0.016 (0.12)	0.012 (0.017)	0.026** (0.013)	0.008 (0.009)
Δ MEDICARE	–	–	–	0.004 (0.021)
Mean private health insurance (wave 1)	0.930	0.901	0.895	0.907
<i>N</i> (in differences)	435	390	543	1368

Notes: See notes to Table 2. Dependent variable is change in whether individual has any private health insurance coverage. Health status is defined based on self-reported health status in first interview. All results include controls for covariates.

Table 4
Effect of Medicare on private prescription drug coverage, by self reported health status

Health	Younger control group: retirees under 65 in both interviews	Treatment group: retirees who turn 65 between interviews	Older control group: retirees 65 and over in both interviews	Difference-in-differences estimate
Fair or poor				
β_0	−0.057 (0.039)	0.120*** (0.048)	−0.016 (0.025)	−0.025 (0.021)
Δ MEDICARE	–	–	–	0.140*** (0.054)
Mean drug coverage (wave 1)	0.705	0.542	0.700	0.658
<i>N</i> (in differences)	141	160	267	568
Good				
β_0	−0.037 (0.024)	−0.005 (0.036)	0.003 (0.022)	−0.011 (0.016)
Δ MEDICARE	–	–	–	0.004 (0.041)
Mean drug coverage (wave 1)	0.776	0.730	0.677	0.718
<i>N</i> (in differences)	274	270	430	974
Very good or excellent				
β_0	−0.026 (0.020)	0.0004 (0.028)	0.019 (0.017)	−0.00006 (0.013)
Δ MEDICARE	–	–	–	−0.0001 (0.033)
Mean drug coverage (wave 1)	0.812	0.729	0.702	0.744
<i>N</i> (in differences)	435	390	543	1368

Notes: See notes to Table 2. Dependent variable is change in whether individual has private prescription drug coverage. Health status is defined based on self-reported health status in first interview. All results include controls for covariates.

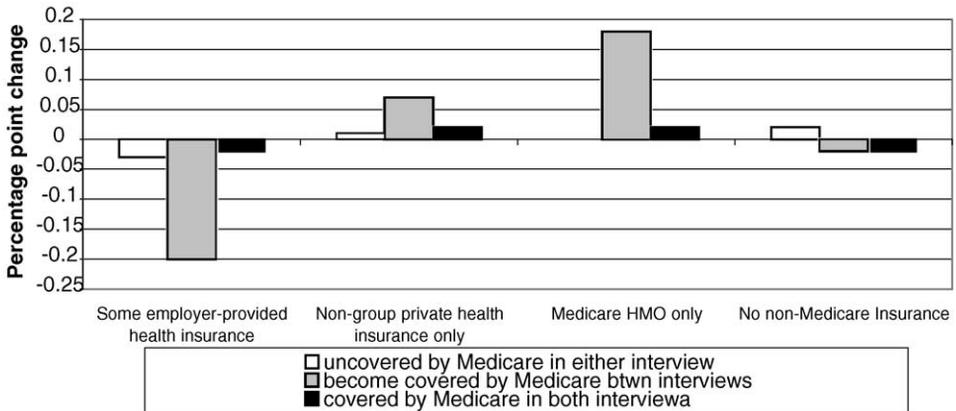


Fig. 1. Changes in sources of insurance coverage for retirees over 2-year period.

(not reported here) indicates similar (statistically insignificant) increases in private health insurance or in private prescription drug coverage for individuals with different numbers of chronic conditions.¹⁸

Taken together therefore, the results in Tables 2–4 suggest that Medicare does not produce an unraveling of the residual private insurance market. There is no statistical or substantive evidence of a decline in insurance coverage for the lower risk individuals (or indeed for any individuals).

It is somewhat surprising that we do not find the public program associated with an unraveling of the residual private insurance market relative to the pre-65 private insurance market, given in particular the greater predictability of the residual risk relative to the combined risk. It may be that the moral hazard subsidy of the private residual insurance market by the public program sufficiently reduces the price of the private insurance to induce lower risk individuals to continue pooling with higher risk individuals in the private market, despite the lower insurance value. Institutional changes in the structure of private health insurance at age 65 may also be an important factor. The next section considers the potential role of these institutional changes.

5.3. Medicare and changes in the source of insurance coverage

In thinking about how to generalize these findings to other partial public health insurance programs, it is important to consider the changes in the *source* of insurance coverage that are also associated with Medicare. Fig. 1 provides a graphical illustration. For retirees who

¹⁸ In results not reported, I also find evidence that Medicare is associated with a statistically significant increase in prescription drug coverage among the lowest income group; I find no evidence of a differential impact of Medicare (either substantively or statistically) by other characteristics such as gender, race, marital status, size of firm the individual worked in prior to retirement, or year of starting interview. The differential results by health status do not appear to be driven primarily by the relationship between income and health status; when I estimate Eq. (2) including a complete set of interactions of health group and of income group with all of the regressors, I continue to find a statistically significant increase in prescription drug coverage among the least healthy.

Table 5
Effect of Medicare on private prescription drug coverage by source of insurance coverage

Sample	Individuals who have employer-provided health insurance in both waves	Individuals who do not have employer-provided health insurance in both waves
Whole sample	0.040 (0.030) ($N = 1460$)	0.028 (0.037) ($N = 1451$)
Health: fair or poor	0.144** (0.070) ($N = 237$)	0.130* (0.078) ($N = 331$)
Health: good	0.071 (0.045) ($N = 499$)	-0.018 (0.071) ($N = 475$)
Health: very good or excellent	-0.008 (0.044) ($N = 723$)	-0.0001 (0.052) ($N = 645$)

Notes: All cells report the coefficient on Δ MEDICARE from estimation of Eq. (2) on the sample described. All regressions control for covariates.

become covered by Medicare, there is a pronounced shift away from employer-provided insurance. By contrast, there is little change in the source of insurance coverage for individuals in either of the two control groups. This raises the possibility that the shift away from employer-provided health insurance for the treatment group is a causal effect of Medicare. For example, since Medicare coverage at age 65 requires the firm to redesign the private health insurance plan for retirees so that it now “wraps around” Medicare, Medicare coverage may be associated with a change in the costs and premiums of the private plan.¹⁹

Fig. 1 indicates that the shift away from employer-provided coverage associated with Medicare is primarily toward coverage by Medicare HMOs; there is also a slight increase in coverage in the individual (non-group) market. Almost all individuals in a Medicare HMO during the time period studied had prescription drug coverage (see Appendix A). Medicare HMOs—which, definitionally, cannot exist prior to Medicare coverage at age 65—may therefore play an important role in explaining why Medicare is not associated with declines in prescription drug coverage. Since Medicare HMOs may reduce some of the other benefits available through traditional Medicare—such as choice of physician—individuals in Medicare HMOs may be choosing to get prescription drug coverage at the expense of benefits that the public program would otherwise provide.

In addition to the emergence of Medicare HMOs, the regulation of the non-group insurance market also changes with the introduction of Medicare. After age 65, only 10 standardized plans may be offered in the non-group market; in addition, during the first 6 months of Medicare coverage, these non-group policies must be offered to any applicant at the same, community-rated price.

As one way of potentially isolating the effects of Medicare from the effects of these changes in the non-employer-provided health insurance options associated with Medicare coverage, Table 5 examines the effect of Medicare on prescription drug coverage for retirees who have employer-provided health insurance in both waves; this group (representing half the total sample) is the largest sub-sample with the *same source* of insurance coverage in both waves. For comparison purposes, Table 5 also shows the effect of Medicare for retirees

¹⁹ I cannot distinguish in these data whether the shift away from employer-provided retiree health insurance when Medicare coverage begins stems from reduced offering or reduced take-up. However, evidence on employer offering of retiree health insurance to retirees under and over age 65 indicates that offer-rates are quite similar for these two groups. (U.S. Department of Labor, 1999a,b).

who do not have employer-provided health insurance in both waves (the other half of the sample). Of course, such an analysis should be interpreted with caution, as retention of employer coverage is likely to be an endogenous outcome.

For both sub-samples, the results indicate the same patterns as the overall sample. Specifically, there is no evidence that Medicare is associated with a decline in prescription drug coverage for any health category and there is evidence that Medicare is associated with a statistically significant increase in prescription drug coverage for the least healthy (highest risk). The fact that the effect of Medicare on prescription drug coverage looks similar when the sample is restricted to retirees who retain employer-provided health insurance suggests that the results for the whole sample are not driven entirely by regulatory changes in the non-group market or the emergence of Medicare HMOs in the over-65 market. It also suggests that the results for the whole sample are not driven primarily by the shift from employer-provided coverage to coverage by Medicare HMOs.²⁰

5.4. *Specification checks*

I performed a battery of tests to investigate the robustness of the results reported above. Here, I briefly describe the potentially most important of these tests. A primary concern is that while Medicare coverage applies only to the individual, private insurance is often held jointly by a married couple. Retirees may be affected by Medicare at ages other than 65 if their spouse turns 65 and was the source of the private insurance coverage. Similarly, if a spouse retires between interviews, this may affect insurance coverage for the other member of the couple.²¹ To address these concerns, I re-estimated Eq. (2) limiting the sample to retirees who, in the first wave, neither cover their spouses nor receive coverage from their spouse or to retirees whose spouses are either also retired in the first wave or not in the labor force. None of the results discussed above is sensitive to any of these restrictions.²²

6. Other potential effects of partial public insurance programs on private insurance markets

The main focus of the paper is the potential for Medicare to produce an unraveling of the adverse selection equilibrium in the residual private insurance market. However, there are several other venues by which public insurance provision may affect private insurance markets. Here, I briefly discuss the results of some indirect tests of two of these alternative mechanisms.

First, if individuals mistakenly believe that the public program provides comprehensive coverage, then the introduction of a partial public insurance program may produce declines

²⁰ Since some retirees with employer provided health insurance may receive that coverage after age 65 through a Medicare HMO, I also tried further restricting the sample to those who have employer-provided coverage in both rounds and do not report having a Medicare HMO as well. The results looked similar to those reported.

²¹ Every individual in the main sample is retired, but the spouse is not necessarily retired.

²² In the interest of brevity, I do not report the results from these tests. These results—as well as a description of some of the additional specification tests—can be found in the working paper version of this paper (Finkelstein, 2002b).

in total insurance coverage and in welfare for individuals who originally had more private insurance than the amount provided by the public program. This type of misinformation suggests that declines in private insurance coverage should be particularly pronounced among individuals who are least likely to be aware of the limitation of the public program.

I consider two possible approaches to measuring potential misinformation effects. First, individuals with lower educational attainment or individuals who do not regularly use prescription medicine may be expected to be less aware of the fact that Medicare does not cover prescription drugs, and therefore more likely to drop prescription drug coverage once covered by Medicare. However, I find no substantive or statistical evidence of this; these results are reported in more detail in Finkelstein (2002b). Second, I examine the impact of Medicare on private long-term care insurance coverage. Like prescription drug coverage, long-term care insurance is not provided by Medicare; however, unlike prescription drug coverage, long-term care insurance is sold as a separate product from acute medical care insurance both before and after age 65. Therefore, any effect of Medicare on long-term care insurance is less likely to reflect other factors such as the unbundling of the compulsory and residual risks. Table 6 presents estimates of the effect of Medicare on coverage for

Table 6
Effect of Medicare on private insurance coverage for long-term care

	Younger control group	Treatment group	Older control group	Difference-in-differences estimate
Whole sample				
β_0	-0.005 (0.013)	0.036** (0.015)	-0.006 (0.009)	-0.006 (0.007)
Δ MEDICARE	-	-	-	0.041** (0.017)
Mean LTC coverage (wave 1)	0.127	0.110	0.144	0.130
<i>N</i> (in differences)	816	798	1230	2844
Less than high school				
β_0	-0.015 (0.033)	0.036 (0.022)	-0.024 (0.018)	-0.025 (0.016)
Δ MEDICARE	-	-	-	0.056* (0.030)
Mean LTC coverage (wave 1)	0.087	0.044	0.091	0.077
<i>N</i> (in differences)	173	186	310	669
High school graduate				
β_0	-0.023 (0.019)	0.011 (0.022)	0.008 (0.015)	-0.005 (0.012)
Δ MEDICARE	-	-	-	0.018 (0.027)
Mean LTC coverage (wave 1)	0.130	0.103	0.102	0.111
<i>N</i> (in differences)	311	309	408	1028
Some college or more				
β_0	0.015 (0.020)	0.061** (0.026)	-0.006 (0.015)	0.002 (0.012)
Δ MEDICARE	-	-	-	0.059* (0.031)
Mean LTC coverage (wave 1)	0.146	0.151	0.209	0.176
<i>N</i> (in differences)	329	296	490	1115

Notes: See notes to Table 2. The dependent variable is changes in private long-term care insurance coverage. Educational attainment is based on reports in the first interview. All regressions control for covariates.

Table 7
Effect of Medicare on health insurance that does not cover prescription drugs

	Younger control group: retirees under 65 in both interviews	Treatment group: retirees who turn 65 between interviews	Older control group: retirees 65 and over in both interviews	Difference-in-differences estimate
Whole sample				
β_0	0.009 (0.013)	0.006 (0.018)	0.017 (0.010)	0.014* (0.008)
Δ MEDICARE	–	–	–	–0.007 (0.021)
Mean insurance coverage (wave 1)	0.109	0.154	0.180	0.152
<i>N</i> (in differences)	850	820	1241	2911
Health: fair or poor				
β_0	–0.002 (0.033)	–0.074** (0.035)	0.034 (0.022)	0.016 (0.018)
Δ MEDICARE	–	–	–	–0.090** (0.041)
Mean insurance coverage (wave 1)	0.112	0.154	0.161	0.148
<i>N</i>	141	160	267	568
Health: good				
β_0	0.025 (0.022)	0.042 (0.029)	0.020 (0.019)	0.022 (0.014)
Δ MEDICARE	–	–	–	0.020 (0.034)
Mean insurance coverage (wave 1)	0.086	0.125	0.174	0.137
<i>N</i>	274	270	430	974
Health: very good or excellent				
β_0	0.008 (0.018)	0.011 (0.026)	0.007 (0.016)	0.007 (0.012)
Δ MEDICARE	–	–	–	0.005 (0.031)
Mean insurance coverage (wave 1)	0.120	0.172	0.193	0.164
<i>N</i>	435	390	543	1368

Notes: See notes to Table 2. The dependent variable is changes in coverage for health insurance that does not cover prescription drugs. Health status is defined based on self-reported health status in first interview. All results control for covariates.

long-term care insurance.²³ I present results both for the whole sample and separately by educational attainment, since we might expect the least educated to be most likely to be misinformed. There is no evidence that long-term care insurance coverage declines—for any education level—when retirees become covered by Medicare, as might be expected if they mistakenly believe that Medicare now covers them for long-term care expenses. To the contrary, there is evidence of a statistically significant 4% point (35%) increase in long-term care insurance coverage associated with Medicare coverage. This may be due to the “focusing” event provided by Medicare coverage that causes individuals to rethink their health care needs as elderly individuals.

A second mechanism by which Medicare may impact the residual private market is if there are substantial fixed costs to insurance policies. By decreasing the amount of exposed risk, the partial public insurance program decreases the willingness to pay the fixed cost for private coverage for the residual risk. As a result, the public program may produce declines in total insurance coverage for some individuals who originally had more private insurance than the amount provided by the public program. These declines should be particularly pronounced for those with less comprehensive insurance coverage prior to the partial public program and for lower risk individuals.²⁴

Table 7 therefore examines the effect of Medicare on private insurance coverage that does not cover prescription drugs, and is therefore less comprehensive than private insurance that covers prescription drugs. In the sample as a whole, the top panel indicates no evidence that Medicare is associated with a change—in either direction—in health insurance that does not cover prescription drugs. Nor is there evidence of relative declines in this insurance among the most healthy (lowest risk).²⁵ It may be that there are not substantial fixed costs to insurance provision deterring purchase. Alternatively, these smaller policies—which mostly cover the co-payments and deductibles of the public program—may have an even larger moral hazard subsidy which offsets any declines that fixed costs would otherwise produce.

7. Conclusion

Compulsory public insurance programs that provide only partial coverage but allow private supplementary insurance are prevalent in many countries for both health-related and mortality-related risks. Theoretically, the effects of such programs on insurance coverage in the residual private market are ambiguous. Perhaps most strikingly—given that the primary economic rationale for these public programs is to counteract the effects of adverse selection which produces sub-optimal coverage in private insurance markets—these programs may in principle result in either increases or decreases in private insurance coverage for the residual

²³ Long-term care insurance coverage in the HRS is measured by the following question: “Not including government programs, do you now have any insurance which specifically covers any part of personal or medical care in your home or in a nursing home for a year or more?”

²⁴ This latter prediction holds both in models of asymmetric information in which the low risk have less insurance than the high risk (see e.g. Rothschild and Stiglitz (1976)) and in models with symmetric information.

²⁵ Table 7 presents the results for self-reported health status. There is also no evidence of large declines among the least healthy as measured by number of reported chronic conditions (results not shown).

risk. Yet the effect of partial public insurance programs on supplementary insurance markets has received little, if any, empirical attention.

This paper begins to address this void by examining the effects of the partial public health insurance coverage for the elderly provided by the US Medicare program on the residual private health insurance market for the elderly. I find that Medicare is not associated with substantive changes in whether individuals have any private health insurance. It is also not associated with substantive changes in private insurance coverage for prescription drugs, one of the largest health expenditures left uncovered by the public program. A particular concern was that lower risk individuals would be less willing to pool with higher risk individuals in the insurance market for the residual risk than for a more comprehensive insurance package, and that this would result in an unraveling of the residual private insurance market. However, I found no evidence of declines in insurance coverage for any risk group, and even some evidence of increases in insurance coverage for the highest risk groups.

These results, therefore, suggest that the partial public insurance provided by the Medicare program does not appear to impair the functioning of the residual private insurance market. In the context of understanding health insurance coverage for the elderly, these results suggest that the partial nature of Medicare coverage does not appear to be responsible for the limited private prescription drug coverage for the elderly. More generally, the results in the paper provide what is, to my knowledge, the first empirical evidence on how partial public insurance programs affect the equilibrium in the residual private insurance market.

At least two factors, however, are likely to be important in considering how generalizable these findings are to the effects of other partial public insurance programs on the relevant residual private market. First, Medicare coverage is associated with a shift away from employer-provided health insurance coverage primarily toward coverage by Medicare HMOs—which by definition are not available prior to Medicare coverage—but also slightly toward the non-group market, which is regulated differently for the under age 65 and over age 65 markets. Although there is no evidence of differential effects of Medicare on prescription drug coverage for retirees moving between markets relative to those who stay within the employer-provided market, it seems likely that the effects of other partial public insurance programs may well vary to the extent that they are associated with different changes in the source of private coverage. It also suggests that the impact of Medicare on prescription drug coverage might be quite different in the absence of Medicare HMOs.

Second, it seems likely that the nature of the relationship between the risk covered by the public program and by the residual private market plays an important role in the effect of the partial public program. In the case of the Medicare program, the moral hazard subsidy of the residual private market by the public insurance program may be important in inducing individuals to remain in the market, particularly given the greater predictability of the residual expenditure which should otherwise have reduced the residual insurance demand. An important question for further work is whether, absent such subsidies, partial public insurance programs would produce substantially more unraveling in residual private insurance markets. This seems particularly important in thinking about the effects of partial public insurance programs for risks other than medical expenditures—such as defined benefit Social Security programs—where such subsidies may not exist.

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Appendix A. Measuring prescription drug coverage in the HRS

Two issues arise in measuring prescription drug coverage in the HRS. First, the form of the survey questions suggests that the HRS will tend to systematically miss drug coverage from individuals who get this coverage through a Medicare HMO, especially if this Medicare HMO is not provided through an employer.

To elicit information on drug coverage, the HRS inquires about private prescription drug coverage for those who are covered by employer-provided health insurance (question R27), those who are covered by Medicare and have non-group private health insurance (question R46e), and those who are not covered by Medicare and are covered by non-group private health insurance (question R55f). However, individuals in a Medicare HMO (i.e. respond affirmatively to question R11), are not asked if they have prescription drug coverage through the Medicare HMO.

Data from the 1996 MCBS indicates that almost all (95%) of individuals in a Medicare HMO have drug coverage. Among those in the HRS who report having both a Medicare HMO and employer coverage, 91% report drug coverage. However, the survey will miss people who have Medicare HMOs that are not provided through an employer; this is about 13% of the sample that is over age 65. I adjust the HRS data to reflect this mis-measurement: I assign all individuals in a Medicare HMO drug coverage.

Second, information about drug coverage is available not only based on the self-reported answers to questions about drug coverage described above, but also based on information about covered expenses. For those who report regularly taking prescription medications, the HRS asks whether these costs are covered at all, partly, or not all by health insurance (question E21).

Since Medicare does not cover prescription drugs and individuals eligible for Medicaid are excluded from the sample, answers to question E21 present another way to measure whether individuals have private insurance that covers prescription drugs. In principle, utilization of both measures might be desirable. However, a measure based on reimbursements presents two difficulties. First, for individuals who do not report regularly using prescription drugs (about 30% of my sample), this measure yields no information on drug coverage. Since individuals who do and do not regularly use prescription drugs may differ in other ways, use of this measure could bias the measure of drug coverage. Second, this measure may underreport coverage for individuals who have prescription drug coverage but face a high deductible, and therefore have not had any covered expenses in a given period. I therefore define drug coverage based on self-reported measures.

The definition of drug coverage used in the paper is, therefore, that individuals are coded as having prescription drug coverage if they either report coverage for prescription drugs or are in a Medicare HMO.

I ascertained that the main results in the paper were not sensitive to the precise definition of prescription drug coverage. In particular, I ascertained that the results in the paper for prescription drug coverage were not sensitive to any of the following alternative definitions of prescription drug coverage:

- Individuals are defined as having drug coverage if they report drug coverage; they are coded as a 0.9 for drug coverage if they do not report drug coverage but are in a Medicare HMO.
- Individuals are defined as having drug coverage if they report drug coverage or if they are in a Medicare HMO but do not also report having employer-provided health insurance coverage.
- Individuals are defined as having drug coverage if they either report having drug coverage, are in a Medicare HMO, or report some prescription drug expenses covered by insurance.

References

- Abel, A.B., 1986. Capital accumulation and uncertain lifetimes with adverse selection. *Econometrica* 54 (5), 1079–1097.
- Akerlof, G., 1970. The Market for Lemons: quality, uncertainty and the market mechanism. *Quarterly Journal of Economics* 74, 488–500.
- Besley, T., 1989. Publicly provided disaster insurance for health and the control of moral hazard. *Journal of Public Economics* 39, 141–156.
- Blomqvist, A., Johannson, P.-O., 1997. Economic efficiency and mixed public/private insurance. *Journal of Public Economics* 66, 505–516.
- Chiappori, P.-A., 2000. Econometric models of insurance under asymmetric information. In: Georges, D. (Ed.), *Handbook of Insurance Economics*. Kluwer Academic Publishers, London.
- Cutler, D., Gruber, J., 1996. Does public insurance crowd out private insurance? *Quarterly Journal of Economics*.
- Cutler, D. Health care and the public sector. In: Auerbach, A., Feldstein, M. (Eds.), *Handbook of Public Economics*, vol. 4. North Holland, Amsterdam, in press.
- Eckstein, Z., Eichenbaum, M., Peled, D., 1985. Uncertain lifetimes and the welfare enhancing properties of annuity markets and social security. *Journal of Public Economics* 26, 303–326.
- Ettner, S., 1997. Adverse selection and the purchase of Medigap insurance by the Elderly. *Journal of Health Economics* 16, 542–562.
- Finkelstein, A., 2002a. When can partial public insurance produce Pareto improvements? NBER Working Paper 9035.
- Finkelstein, A., 2002b. The interaction of partial public insurance programs and residual private insurance markets: evidence from the US Medicare program. NBER Working Paper 9031.
- Marquis, M.S., 1992. Adverse selection with a multiple choice among health insurance plans: a simulation analysis. *Journal of Health Economics* 11, 129–151.
- Neudeck, W., Podczeczek, K., 1996. Adverse selection and regulation in health insurance markets. *Journal of Health Economics* 15, 387–408.
- Pauly, M., 1974. Overinsurance and public provision of insurance: the roles of moral hazard and adverse selection. *Quarterly Journal of Economics* 88 (1), 44–62.
- Pauly, M., Zeng, P., 2002. Adverse selection and the death of stand-alone prescription drug insurance. Unpublished Manuscript.
- Piacentini, J., Foley, J., 1992. *EBRI Databook on Employee Benefits*, second ed.
- Rothschild, M., Stiglitz, J., 1976. An essay on the economics of imperfect information. *Quarterly Journal of Economics* 90, 629–649.
- Selden, T., 1993. Should the government provide catastrophic insurance? *Journal of Public Economics* 51, 241–247.

- Selden, T., 1997. More on the economic efficiency of mixed public/private insurance. *Journal of Public Economics* 66, 517–523.
- US Department of Labor, 1999a. *Employee Benefits in Small Private Establishments*, 1996.
- US Department of Labor, 1999b. *Employee Benefits in Medium and Large Private Establishments*, 1997.
- US House of Representatives, 1998. *Green Book*.
- Wilson, C., 1977. A model of insurance markets with incomplete information. *Journal of Economic Theory* 16, 167–207.