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ABSTRACT

In this paper, we provide an assessment of the effect of Medicare Part D on the previously uninsured. We examine the effect of gaining prescription drug insurance as a result of Medicare Part D on use of prescription drugs, use of other medical services, and health for a nationally representative sample of Medicare beneficiaries. Given the heightened importance of prescription drugs for those with chronic illness, we provide separate estimates for those in poorer health. We find that gaining prescription drug insurance through Medicare Part D was associated with an 63% increase in the number of annual prescriptions, but that obtaining prescription drug insurance is not significantly related to use of other health care services or health, as measured by functional status and self-reported health. Among those in poorer health, we find that gaining prescription drug insurance was associated with a 56% increase in the number of annual prescriptions, and is not significantly related to health. For this group, there is some evidence that prescription drug insurance was associated with a decrease in the use of outpatient services.

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Introduction

The Medicare Modernization Act of 2003 (MMA) created a prescription drug benefit—Medicare Part D—for the elderly. The creation of Medicare Part D was motivated by the relatively large fraction of elderly without prescription drug coverage, the growing financial burden of prescription drug spending among the elderly, and the significant and growing clinical importance of prescription drugs. Around the time of passage of the MMA, approximately one-third of seniors did not have prescription drug insurance (Khan and Kaestner 2009; Levy and Weir 2009). The lack of prescription drug coverage resulted in significant out-of-pocket spending on prescription drugs; among the elderly without prescription drug insurance, 50% had annual out-of-pocket spending on prescription drugs of $1,200 or more in 2003 (Safran et al. 2005).[1] Considering that median income of the elderly at this time was approximately $16,000, out-of-pocket spending for prescription drugs represented a significant financial burden for a non-trivial share of the elderly population.[2] The financial burden was particularly large for those with low-incomes, and elderly persons with chronic diseases for which prescription drugs are essential to maintaining good health.

The financial uncertainty associated with the use of prescription drugs to treat illness suggests that Medicare Part D is likely to have had significant benefits for those without prescription drug insurance prior to Part D. In addition to the financial (insurance) benefits, Medicare Part D may have had significant health consequences, as the program likely increased access and use of prescription drugs that can improve health. However, Medicare Part D is a costly program. Part D provided a subsidy to all Medicare beneficiaries even though approximately two-thirds of Medicare enrollees had prescription drug benefits prior to creation of Part D and would have likely continued to have such benefits in the absence of Part D.[3] The universal nature of the subsidy significantly raised the cost of providing prescription drug

[1] These figures are for those who reported prescription drug use.
[2] The $16,000 figure is from EBRI Employee Benefit Research Institute Notes, Volume 28, No. 5, May 2007. http://www.ebri.org/pdf/notespdf/EBRI_Notes_05-2007.pdf, website last accessed May 12, 2010.
[3] Insurance market failures related to adverse selection provide a partial rationale for government intervention in the prescription drug insurance market, and is an explanation for why the government effectively mandated participation through the use of stiff financial penalties.

insurance to the "newly insured" because for each newly insured person, the government provided a subsidy to two other persons who already had insurance. Medicare Part D had a net-cost of approximately $50 billion in 2009, and a recent report from the U.S Department of the Treasury indicated that Medicare Part D has a projected, net present-value deficit (liability) of $7.2 trillion.[4]

The size and potential significance of Medicare Part D has generated interest in its effects. The overarching question is whether the benefits of the program justify the costs. Within this larger question is a narrower one of particular salience: what did Medicare Part D do for those who did not have, or would not have, prescription drug insurance without it? While Part D benefits were extended to all Medicare enrollees, it was the group of seniors that lacked prescription drug insurance that were a central concern of policy makers and that motivated the creation of Part D. Evidence at the time suggested that elderly without prescription drug insurance were particularly likely to forego buying essential medications, and that this adversely affected their health and increased their use of other medical services (Soumerai et al. 2006; Piette et al. 2004; Adams et al. 2001).

In this paper, we provide an assessment of the effect of Medicare Part D on the previously uninsured. We examine the effect of gaining prescription drug insurance as a result of Medicare Part D on use of prescription drugs, use of other medical services, and health for a nationally representative sample of Medicare beneficiaries in the years 2000 to 2007. Given the heightened importance of prescription drugs for those with chronic illness, we provide separate estimates for those in poorer health. Importantly, our analysis of the effects of prescription drug insurance on the use of health care services other than prescription drugs will provide evidence on whether prescription drugs, on average, are a complement or substitute with other types of health care such as inpatient services. This is a question for which there is limited evidence, but great policy interest. Conventional wisdom maintains that the provision of prescription drug insurance will result in improved prescription drug adherence and less use of medical services that may substitute for prescription drugs. Similarly, our analysis of the effect of

[4] A Citizen's Guide to the 2009 Financial Report of the U.S. Government, http://www.fms.treas.gov/fr/09frusg/09frusg.pdf, website last accessed March 12, 2010.

Medicare Part D and prescription drug insurance on elderly health will add to a sparse literature concerned with this fundamental issue.

Results are as follows. For the entire sample, we find that gaining prescription drug insurance through Medicare Part D was associated with an 63% increase in the number of annual prescriptions, but that obtaining prescription drug insurance is not significantly related to use of other health care services or health, as measured by functional status and self-reported health. Among those in poorer health, we find that gaining prescription drug insurance was associated with a 56% increase in the number of annual prescriptions, and is not significantly related to health. For this group, there is some evidence that prescription drug insurance was associated with a decrease in the use of outpatient services.

Prescription Drug Insurance, Use of Prescription Drugs and Health Among the Elderly

Previous studies using representative samples of elderly, which are surprisingly few in number, have produced a range of estimates of the effect of prescription drug insurance on prescription drug use.[5] Lillard et al. (1999) used a sample of older persons drawn from the 1990 wave of the Panel Study of Income Dynamics and found that prescription drug coverage (versus no coverage) increased the probability of any use of prescription drugs by 12%. Similarly sized estimates were reported by Yang et al. (2006) and Khan and Kaestner (2009), and both of these studies used a representative sample of Medicare beneficiaries from 1992 to 2000 (or 2001). Yang et al. (2006) reported that prescription drug insurance increased expenditures on prescription drugs by approximately 7% per year, and Khan and Kaestner (2009) reported that prescription drug insurance was associated with a 4% to 10% increase in the utilization of prescription drugs depending on the type and generosity of the coverage. In contrast, Shea et al. (2007) reported that prescription drug insurance is associated with a 50% increase in the number of prescriptions used among a sample of Medicare beneficiaries in 1999.

[5] We limit the review to studies that examined a representative sample of elderly and methods that accounted in some way for the non-random choice of prescription drug insurance, and we do not review studies of the effect of prescription drug insurance on elderly persons with specific illnesses (e.g., Stuart et al. 2004; Hsu et al. 2006; Tjia and Briesacher 2008; and Zhang et al. 2009).

Other studies have focused on the effect of changes in cost sharing for elderly in specific prescription drug insurance plans. Johnson et al. (1997) and Hsu et al. (2006) examined changes in cost-sharing for those enrolled in Kaiser-Permanente managed care plans. Johnson et al. (1997) reported that a $2 (66%) increase in co-payment among members of Kaiser-Permanente Northwest Division (e.g., Portland and Seattle) between 1988 and 1990 resulted in an 8% decrease in prescription drug use. Hsu et al. (2006) examined the impact of benefit caps on prescription drug use among elderly enrolled in Kaiser-Permanente Northern California Division, and found that caps lowered expenditures on prescription drugs by 31%. Chandra et al. (2007) examined employees in the California Public Employees Retirement System and found that a doubling of co-payment from approximately $7 to $14 reduced drug utilization by 6% for PPO participants and 20% for HMO participants, although the latter patients had a lower baseline co-payment.

Recently, a few studies examined the effect of Medicare Part D on prescription drug use. Lichtenberg and Sun (2007) and Yin et al. (2008) used a difference-in-difference approach limited to persons who purchased prescription drugs at Walgreens; Lichtenberg and Sun (2007) compared the elderly to non-elderly and Yin et al. (2008) compared the elderly to the near-elderly (age 60 to 63). The results of these studies indicated that Medicare Part D was associated with between 5.9% (Yin et al. 2008) and 12.8% (Lichtenberg and Sun 2007) increase in prescription drug use of elderly. Madden et al. (2008) examined pre- to post-Medicare Part D changes in cost-related medication non-adherence (CRN) using a sample of Medicare enrollees from the Medicare Current Beneficiary Surveys of 2004 to 2006. They reported that there was a significant decrease in CRN between 2004 and 2006 with a larger decrease between 2005 and 2006 (22%) than between 2004 and 2005 (9%). Note that these three studies did not examine the effect of prescription drug insurance (versus no insurance) on use of prescription drugs, but were limited to an analysis of the effect of being eligible for, or enrolled in, Medicare Part D. Because approximately two-thirds of the elderly and an even greater number of the non-elderly had prescription drug insurance prior to Part D, these analyses imply much larger effects on drug use of moving from uninsured to insured. For example, if we assume that 20% of the elderly moved from uninsured to

insured as a result of Part D (see Zhang et al., 2009 who cite this figure and Table 1 in the text), then the results of these studies suggest that the effect of gaining insurance is the following: an increase in prescription drug use of 30% for Yin et al. (2008); an increase in prescription drug use of of 65% for Lichtenberg and Sun (2007); and a decrease in CRN of 110% for Madden et al. (2008).

The only study we are aware of that examined the effect of Medicare Part D on the uninsured is Zhang et al. (2009) who examined the impact of Part D among elderly enrolled in Kaiser-Permanente Northern California Division. These authors found that moving from uninsured to insured was associated with a 74% increase in drug spending. Note that the estimates of the effect of prescription drug insurance in this study, and the effect implied by the results in Lichtenberg and Sun (2007), Yin et al. (2008) and Madden et al. (2008) are much larger than those found in earlier, pre-Part D studies (except for Shea et al. 2007).

While the magnitude of the effect of prescription drug insurance on use of prescription drugs may be uncertain, few would argue with the general conclusion drawn from results reported in the past literature that prescription drug insurance is associated with an increase in use of prescription drugs. More uncertain, and arguably more important, is the effect of prescription drug use on the use of other health care services and health. Presumably, the goal of Medicare Part D is to provide elderly greater financial access to prescription drugs that are necessary to improve health. The evidence on this point is limited, and the results from previous study are inconsistent (Goldman et al. 2007). Briesacher et al. (2005), Soumerai et al. (1991) and Johnson et al. (1997) did not find any effect of prescription drug insurance or a change in prescription co-payment on hospitalization. Chandra et al. (2007) reported that an increase in co-payments for physician visits and prescription drugs increased the probability of hospitalization by 6%. Yang et al. (2006) found that prescription drug coverage decreased mortality slightly. Hsu et al. (2006) found that, among the elderly enrollees of Kaiser-Permanente Northern California Division, capping prescription drug benefits increased the probability of having glycated hemoglobin ≥8% by 23 percent. Khan et al. (2008) found that prescription drug insurance had no effect on self reported health or functional status of Medicare beneficiaries. Finally, Zhang et al. (2009) using a

similar sample from Kaiser Permanente as Hsu et al. (2006) reported that gaining prescription drug use was associated with a 7% decline in medical (non-pharmacy) spending.

This brief review of the literature has revealed the following. First, while there is consistent evidence that prescription drug insurance is associated with an increase in prescription drug use, the magnitude of the association remains in doubt because previous studies have produced a surprisingly wide range of estimates even for purportedly representative samples of elderly persons in similar time periods. Second, there are relatively few studies of the effect of prescription drug insurance on use of other medical services for representative samples of elderly, which is something noted by Goldman et al. (2007) in their often cited review article. Studies that have examined narrower samples such as those from a specific insurance plan have not produced a consistent set of findings. Third, there are even fewer studies that examined the effect of prescription drug insurance on health of a general population of elderly. This is a notable gap because it is not clear that prescription drug use will improve health even if it increases use of prescription drugs. The increased use of prescription drugs induced by insurance may be of marginal value, and may be associated with changes in behavior (e.g., diet and exercise) that offset the benefits of greater use. Moreover, evidence form clinical trials that link prescription drug use to improved health are almost always conducted on relatively small and unrepresentative samples that make generalizing the findings from these studies tenuous. Finally, there has been only one assessment of the effect of Medicare Part D on the previously uninsured, and this study was limited to persons enrolled in the Kaiser-Permanente Northern California Division Medicare plan (Zhang et al. 2009).

Overall, the previous literature concerned with the effect of prescription drug insurance on the use of prescription drugs, use of other medical services and health of the elderly is limited. Here, we begin to address this shortfall of evidence by examining the effect of prescription drug insurance using the plausibly exogenous change in prescription drug insurance engendered by Medicare Part D. We will exploit the natural experiment of Medicare Part D to obtain quasi-experimental estimates of the effect of prescription drug insurance on prescription drug use, use of other medical services and health for a

representative sample of elderly from the Medicare Current Beneficiary Survey (MCBS) from years 2000 to 2007.

Empirical Strategy

We exploited the natural experiment afforded by Medicare Part D, which was fully implemented in 2006, to estimate the effect of prescription drug insurance on use of prescription drugs, use of other medical services and health of the elderly. We used pooled, cross-sectional time-series data from the MCBS and multivariate regression methods in the context of a difference-in-differences research design to obtain estimates of interest. Algebraically, the regression model used in our analysis is the following:

$$PRES_{it} = \alpha + \sum_{k=2}^{4} \gamma_k \hat{UNIN}_{kit} + \sum_{t=2001}^{2007} \beta_t YEAR_t + \sum_{t=2001}^{2007} \sum_{k=2}^{4} \delta_{kt} (\hat{UNIN}_{kit} * YEAR_t) + X_{it}\lambda + v_{it}$$

(1) $i = 1,..., N$

$t = 2000,...,2004,2006,2007$

In equation (1), the number of prescription drugs used by person i in year t ($PRES_{it}$) depends on the predicted probability of being uninsured prior to Medicare Part D ($\hat{UNIN}_{kit}$), which is measured as a set of dummy variables that indicate which quartile of the distribution of the probability of being uninsured a person is in, year effects ($YEAR_t$), interactions between the predicted likelihood of being uninsured prior to Part D and year ($\hat{UNIN}_{kit} * YEAR_t$), and other measured demographic and socioeconomic factors (X_{it}) such as age, race, marital status and income. Note that we do not use data from 2005 because in 2005, prescription drug discount cards were available to Medicare beneficiaries, but we are unable to accurately identify who did or did not have a (subsidized) discount card. The predicted likelihood of being uninsured is constructed from observable characteristics (i.e., X_{it}), and we describe how we

calculated this variable more fully below.[6] While we have written equation (1) with reference to prescription drugs as the dependent variable, analogous models will be estimated for the other outcomes of interest: hospitalization, outpatient visits, activities of daily living (ADL), instrumental activities of daily living (IADL), and self-reported health. For some of these outcomes, we will have data only through 2006.[7]

In terms of the difference-in-differences research design, the treatment and comparison groups in our analysis are identified by the predicted likelihood of being uninsured prior to Medicare Part D. Those who are more likely to be uninsured prior to Medicare Part D will be more likely to gain prescription insurance as a result of Part D. We divide the sample into quartiles depending on the predicted probability of being uninsured. Those in bottom quartile (reference category) have the lowest probability of being uninsured prior to Medicare Part D and are the least likely to be affected by Medicare Part D. Those in the top quartile are the most likely to be uninsured prior to Medicare Part D and are most likely to be affected by Medicare Part D. Specifically, they are the most likely to gain prescription drug insurance. The use of quartiles is less restrictive than using a continuous index in equation (1), which assumes a linear relationship between the predicted probability of being uninsured and the outcome.

The identifying assumption of the difference-in-differences approach is that, in the absence of Medicare Part D, changes in prescription drug use (and other outcomes) are the same for the treatment and comparison groups. While we cannot test this assumption definitively, we can test whether the coefficients on the interaction effects in years prior to 2006 (i.e., prior to Medicare Part D) are statistically significant. These interaction effects measure whether the changes in outcomes, for example prescription drugs, are the same for the treatment and comparison group in years prior to Medicare Part D. We report the statistical tests related to this assumption below, but note here that in all cases, we are unable to reject

[6] As we describe below, we predict the probability of being uninsured using combinations (interactions) of variables in the X_{it} vector, and because we do not include all these combinations in equation (1), we can estimate the main effect associated with the predicted probability of being uninsured ($\hat{UNIN}_{it}$).

[7] Information on prescription drug use comes from the MCBS Cost and Use data set, and the 2007 information is not yet available. Therefore, the analysis of prescription drug use, we limit the analysis to the years 2000 to 2006. Similarly, the analysis of hospitalization and outpatient visits are limited to the years 2000 to 2006.

the null hypothesis that the pre-2006 interactions are jointly zero, which is evidence supportive of our research design. On the other hand, the coefficient on the interaction between the predicted probability of being uninsured and the post-2006 year dummy variables are expected to be non-zero. For example, when prescription drug use is the dependent variable, we expect this interaction to be positive—those likely to be uninsured prior to 2006 will gain insurance as a result of Medicare Part D, and increase use of prescription drugs.

The difference-in-differences approach also assumes that the comparison group is unaffected by Medicare Part D. In our case, those who have prescription drug insurance prior to Medicare Part D are assumed to be unaffected by it. This assumption is consistent with evidence in Levy and Weir (2009). Using data from the Health and Retirement Survey, Levy and Weir (2009) showed that was there was little "crowd out" of private, employer-sponsored insurance as a result of the creation of Medicare Part D. The incentives in Part D for employers to maintain prescription drug benefits appeared to be effective. We find similar results in our data. Nevertheless, our results are strictly interpretable as a comparison of changes in outcomes for those who obtained prescription drug coverage through Medicare Part D to changes in outcomes for those who had prescription drug insurance pre- and post Medicare Part D. If the nature of that prescription drug insurance changed pre- to post Part D this may have changed outcomes for this group too. We expect any changes to be small.

To construct the predicted likelihood of being uninsured prior to Medicare Part D, we used the following regression model:

$$UNIN_{it} = \mu + \sum_{t=2001}^{2003} \rho_t YEAR_t + X_{it}\pi + e_{it} \quad (2)$$

$$i = 1,...,N$$

$$t = 2000,2001,2002,2003$$

In equation (2), the probability that person i is uninsured prior to Medicare Part D—we used the years 2000 to 20003—depends on year effects and demographic and socioeconomic factors (X_{it}). We used a slightly more complicated specification than that described in equation (2). Specifically, we included

several interactions between the demographic and socioeconomic variables (e.g., race by education). We constructed the predicted probability of being uninsured using the parameter estimates from equation (2) except for the estimates associated with year effects (i.e., we used the year 2000 mean level of uninsured). The predicted probability of being uninsured is equal to:

(3) $\hat{UNIN}_{it} = \hat{\mu} + X_{it}\hat{\pi}$.

Thus, our measure of the predicted likelihood of being uninsured is just a linear combination of (exogenous) demographic and socioeconomic characteristics, and our treatment and comparison groups are identified by this index (quartiles of distribution). However, because we used a more complex function of the observable variables to predict the probability of being uninsured, we can include the predicted probability of being uninsured in equation (1)—it is not a perfect linear combination of the vector of variables included in that model. Including the predicted variables in the regression is also a parsimonious way to control for these more complex interactions between the socioeconomic and demographic factors.

If all persons who were uninsured prior to Medicare Part D, gained insurance as a result of Part D, then equation (1) would provide an estimate of the effect of prescription drug insurance on prescription drug use. However, not all uninsured persons gained prescription insurance as a result of Part D and estimates from equation (1) may be thought of as an estimate of the "intention to treat." To identify the effect of prescription drug insurance on the use of prescription drugs and other outcomes of interest (i.e., treatment on the treated), we can use an instrumental variables (IV) approach. We can instrument for prescription drug insurance using the Medicare Part D natural experiment. Specifically, we can estimate the following:

(4) $PRES_{it} = \alpha + \phi_1 INSURED_{it} + \phi_2 \hat{UNIN}_{it} + \sum_{t=2001}^{2007} \beta_t YEAR_t + X_{it}\lambda + v_{it}$

(5) $INSURED_{it} = \alpha + \sum_{k=2}^{4} \gamma_k \hat{UNIN}_{kit} + \sum_{t=2001}^{2007} \theta_t YEAR_t + \sum_{t=2001}^{2007}\sum_{k=2}^{4} \delta_{kt}(\hat{UNIN}_{kit} * YEAR_t) + X_{it}\lambda + v_{it}$

Equation (5) is the first stage that is used to predict prescription drug insurance status.[8] The excluded instruments are the interaction terms between predicted probability of being uninsured and the year effects. As was the case for equation (1), we can include it in equation (4) because it is constructed using interactions between demographic and socioeconomic characteristics that are excluded from equation (4).

The validity of the IV approach described by equations (4) and (5) depends on two conditions: whether the instruments are sufficiently correlated with prescription drug insurance, and whether the instruments can be legitimately excluded from the second stage. Estimates of equation (5), which we present below, reveal that the instruments are strongly correlated with prescription drug insurance status. All other estimates of the interaction effects are very small and statistically insignificant. As to the validity of the exclusion restriction, evidence we referred to earlier supports the validity of this assumption. Estimates of equation (1), which we present below, show that the interaction effects between the dummy variables indicating the quartiles of the predicted probability of being uninsured and year dummy variables are not statistically significant for years prior to 2006. This is evidence to support the assumption that in the absence of Medicare Part D, trends in prescription drug use (and other outcomes) would be similar for those more or less likely to be uninsured prior to Medicare Part D.

Data

Data for the analysis comes from the Medicare Current Beneficiary Survey (MCBS) from years 2000 to 2007. We omit the year 2005 because of the availability, and significant use, of drug discount cards that were provided automatically to some Medicare enrollees (e.g., Medigap policy holders) and were available by purchase to others (Thomas et al. 2005). The data we have available is unable to accurately identify whether a respondent had a drug discount card, and so we omit this year for analysis.[9] The MCBS is the only nationally representative survey that exclusively focuses on Medicare enrollees (aged 65 years and above, and disabled). Individuals are drawn using stratified random sampling from an

[8] Note that we have used some of the same symbols as before to denote parameters in order to conserve on notation.
[9] The discount card program first became available on June 1 2004 and was in operation for the full year of 2005.

enrollment list of persons entitled to Medicare on January 1st of that year. The stratified sampling ensures that the sample is representative of all geographical areas and age groups. Each year, a supplemental sample is added to account for attrition, maintain an average sample size of 12,000 individuals, and to ensure that the sample remains representative of the current Medicare population. We use a sample of non-institutionalized persons 65 to 85 years of age who have complete year information. We omit people who were ever on Medicaid, living in community, or had end stage renal disease as these groups are quite dissimilar to other respondents.[10] We also use a sample of relatively sicker individuals, which we refer to as the chronically ill sample. These are persons who reported three or more chronic illnesses (e.g., hypertension).

Each sampled individual is interviewed face-to-face three times per year for four years. After four years, the individual is retired from the survey and a new panel is added. Data is released in two file formats, Access to Care and Cost and Use. Cost and Use provides detailed description of the respondent's insurance status including prescription insurance, health status, medication utilization, other health care utilization, and demographic and socioeconomic characteristics. Access to Care provides the same information except the utilization data. We used the Cost and Use files from 2000-2006 and Access to Care file for year 2007. These are the latest available data.

A particular strength of the MCBS is the validity checks performed by CMS. Respondents are asked to show receipts, bills, drug vials, and any related paperwork to document prescription drug use and drug insurance. The use of Computer Assisted Personal Interview program and prescription bills, vials, and bottles enhances the accuracy of the collected information during the interview process. After the interview, CMS uses the administrative claims database and other algorithms to clean, supplement, and validate the data. These validity checks have greatly reduced missing information and improved accuracy of the survey (Eppig and Chulis 1997).

[10] Reports by Kaiser Family Foundation and GAO suggest that there were transition issues for the Medicaid population (see http://www.kff.org/medicaid/upload/7454.pdf, website last accessed May 13, 2010). For this, and because Medicaid population is very different, we exclude these individuals from the analysis.

MCBS respondents report up to five sources of non-Medicare insurance and prescription drug coverage. The respondent reported the start and stop dates of the insurance and whether this source of insurance provided prescription drug coverage. Based on this information, we assigned a person to insured or uninsured category for each month in the survey. If they had prescription drug insurance for at least six months in a year, we will assign them to the insured category.[11]

As noted, we examine several dependent variables. Prescription drug use is measured by the self-reported annual total number of prescription drugs dispensed. Outpatient visits is the annual total number of outpatient visits. Hospitalization is a binary variable indicating hospitalization in the last year. We also use self reported measures of health such as general health status, activities of daily living (ADL), and instrumental activities of daily living (IADL). General health status (excellent/very good/good/fair/poor) measures self reported health compared to individuals in the same age group. ADL is composite score indicating problems in eating, dressing, bathing, walking, transferring into and out of a chair, and using the toilet. IADL represents problems in making meals, using the phone, going shopping, managing money, and doing light and heavy housework. The scores on the ADL and IADL can range from 0 to 6.

Regression analyses also include controls for demographic and socioeconomic characteristics including age, sex, race, education, urban residence, income, marital status, and smoking status. These variables are included in the models as dummy variables.

Medicare Part D and Prescription Drug Insurance Coverage

We begin the presentation of results by demonstrating, as others have, that Medicare Part D had significant effects on prescription drug insurance, and that its effect was concentrated among those with a high predicted likelihood of being uninsured prior to 2006 when Medicare Part D was fully implemented (Levy and Weir 2009). Table 1 presents the mean rate of uninsured by year for the entire sample and by

[11] The Access to Care file does not provide such detailed monthly information on prescription drug insurance. Therefore, for 2007 we assigned them to the insured or uninsured group using self reported insurance status. The two different data sources yield slightly different definitions for prescription drug coverage, however, these differences are small.

quartile of the probability of being uninsured prior to Part D. The figures in Table 1 indicate a steep decline in the rate of uninsured between 2004 and 2007. Prior to 2006, there is relatively little trend in the rate of uninsured. More importantly, there are significant differences in the changes in the proportion uninsured for those more or less likely to be uninsured prior to Medicare Part D. Among those in the bottom quartile of the distribution of the probability of being uninsured prior to Part D, the change in the proportion uninsured between 2004 and 2006 (2007) was -13.9 (-12.3) percentage points. Among those in the top quartile of this distribution, the change in the proportion uninsured between 2004 and 2006 (2007) was -31.3 (-32.3) percentage points. For the entire sample, the proportion uninsured declined by approximately 20 percentage points between 2004 and 2006. Similar changes occur between 2004 and 2007. Finally, although we do not show it, we found little change in the type of prescription drug insurance, which is similar to Levy and Weir (2009). This is important because it supports the assumption of our empirical approach, which assumes that Medicare Part D did not significantly affect those with prescription drug insurance prior to Part D.

We calculate difference-in-difference (DD) estimates of the effect of Medicare Part D on prescription drug insurance in Table 1 for the change in prescription drug insurance between 2004 and 2006 and between 2004 and 2007. The comparison group is those in the first quartile of the probability of being uninsured—i.e., those least likely to be uninsured prior to Part D. The DD estimates associated with the 4th minus 1st quartiles are -17.3 for 2004 to 2006 and -20.0 for 2004 to 2007. Both are statistically significant.

The descriptive information in Table 1 is consistent with results from a regression model predicting prescription drug insurance coverage. Table 2 presents selected estimates of equation (5), which is reproduced here for clarity:

$$(5)\quad INSURED_{it} = \alpha + \sum_{k=2}^{4} \gamma_k \hat{UNIN}_{kit} + \sum_{t=2001}^{2007} \theta_t YEAR_t + \sum_{t=2001}^{2007} \sum_{k=2}^{4} \delta_{kt} (\hat{UNIN}_{kit} * YEAR_t) + X_{it}\lambda + v_{it}$$

Estimates were obtained by Ordinary Least Squares (OLS) regression methods, and we present separate estimates for the entire sample and those in poorer health, which we define as those with three or more

chronic illnesses. We refer to the latter group as the "chronically ill" sample. Standard errors are clustered on the individual.

For the complete sample, estimates in the left panel of Table 2 have a clearly identified pattern. The more likely a person was of being uninsured prior to Part D, as measured by the quartiles of the distribution of being uninsured, the more likely they were to gain prescription drug insurance subsequent to Part D. For example, estimates associated with being in the top quartile of the distribution of the probability of being uninsured are 0.178 in 2006 and 0.208 in 2007. Relative to those in the bottom quartile of the probability of being uninsured, those in the top quartile were approximately 20 percentage points more likely to gain prescription drug insurance subsequent to Part D. Note also, that these estimates are almost exactly what is reported in Table 1 in the columns labeled "Dif-in-Dif." Adjusting for covariates has little effect on estimates. A point to note about Table 2 is that the strong correlation between the interaction terms in 2006 and 2007 demonstrate that the IV approach we employ later is reasonable in terms of the correlation between the instrument (essentially the 2006 and 2007 interactions) and prescription drug insurance coverage.

Estimates (not shown) associated with the interactions between the probability of being uninsured and the year dummy variables prior to 2006 are not statistically significant and small in magnitude. In Table 2, we report the p-value associated with the test that the pre-2006 interactions between the predicted probability of being uninsured and year dummy variables are jointly zero. The p-value for this test for the complete sample is 0.84, and for the chronically ill sample 0.72. This result provides support for the overall research design, which is based on the Medicare Part D natural experiment and the assumption that pre- to post-Medicare Part D, those in different quartiles of the distribution of the probability of being uninsured would have similar trends in outcomes.

For the chronically ill sample, we obtained similar results, as shown in the right panel of Table 2. The more likely a chronically ill person, here defined as a person with three or more chronic illnesses, was of being uninsured prior to Part D the more likely they were to gain prescription drug insurance

subsequent to Part D. Estimates associated with being in the top quartile are 0.215 in 2006 and 0.234 in 2007.

Notably, our results are very similar to the descriptive results reported by Levy and Weir (2009) in their analysis of data from the Health and Retirement Survey. To make a better comparison, we re-estimated equation (5) using a continuous index of the probability of being uninsured. The coefficient on the interaction between this index and the 2006 and 2007 year dummies was approximately 0.6, which indicates a take-up rate of Medicare Part D of 60%, which is exactly the figure reported by Levy and Weir (2009).

Medicare Part D, Prescription Drug Insurance and Use of Prescription Drugs

Table 3 reports the average number of annual prescriptions by year and by quartile of the probability of being uninsured. For this outcome, we only have data through 2006. During the pre-Medicare Part D period, we observe a slightly rising number of annual prescriptions, but between 2004 and 2006 there is a significant increase in the use of prescription drugs. Notably the jump in prescription drug use between 2004 and 2006 is largest for those most likely to be uninsured prior to 2006. Difference-in-difference estimates are also presented. These estimates are consistent with the hypothesis that those who were most likely to gain prescription drug insurance experienced the largest increases in prescription drug use, although estimates are not statistically significant.

In Table 4, we present regression estimates of the effect of prescription drug insurance on annual use of prescription drugs for the entire sample and the sample of chronically ill. Estimates are obtained by OLS methods using two research designs: difference-in-differences (equation 1) and instrumental variables (equation 4).[12]

[12] We assessed whether the skewed nature of the distribution of prescription drug use affected estimates by estimating a non-instrumental variables version of equation (4) by OLS and Poisson (robust methods to construct standard errors). Estimates from the two methods were virtually identical suggesting that the skewed nature of distribution was not affecting estimates. We prefer OLS to Poisson methods because in the difference-in-differences context, the two methods will lead to different inferences because OLS is based on absolute differences and Poisson is based on relative differences. While baseline levels of prescription drug use are relatively similar between

As with prescription drug insurance, estimates associated with the interaction terms between the quartiles of the probability of being uninsured and the year 2006 dummy variables reveal a clear pattern; those more likely to be uninsured prior to 2006 have a larger increase in the number of prescription drugs used between 2004 and 2006 than those less likely to be uninsured. Estimates associated with the interactions between the top quartile and the year 2006 dummy variable are 2.33 for the full sample and 3.78 for the sample of chronically ill persons. Neither estimate is statistically significant. Estimates (not shown) associated with the interactions between the quartiles of the probability of being uninsured and years prior to 2006 are not statistically significant and most are small in magnitude. Tests of significance cannot reject that the pre-2006 interaction effects are jointly zero, and the p-values, which are presented in Table 3, are 0.59 for the full sample and 0.57 for the sample of chronically ill persons. Note that the p-values associated with the test of the joint significance of the year 2006 interactions are much smaller, although these estimates too are not significant at conventional levels. These results support the assumption underlying the difference-in-differences approach that in the absence of Medicare Part D trends in prescription drug use are similar for those more or less likely to be without prescription drug coverage prior to Part D.

The instrumental variables (IV) estimates of the effect of prescription drug insurance on prescription drug use are 14.4 for the full sample and 18.3 for the sample of chronically ill persons and both are highly significant. These effects are large; obtaining prescription drug insurance through Medicare Part D is associated with an increase in the number of annual prescription drugs of approximately 60% relative to the mean for both the full sample and sample of chronically ill persons. The magnitude of these estimates is similar to those reported in other studies related to Medicare Part D; for example, Zhang et al. (2009) found that moving from uninsured to insured was associated with a 74% increase in drug spending for those enrolled in Kaiser-Permanente Northern California Division.

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uninsured and insured, there are sufficient differences to make OLS and Poisson estimates somewhat dissimilar, although qualitatively the same. We think it is preferable to focus on absolute differences and OLS estimates.

Medicare Part D, Prescription Drug Insurance and Use of Other Services

A prominent hypothesis related to prescription drug insurance is that the financial access to prescription drugs afforded by insurance results in greater and more appropriate (e.g., better adherence) use of prescription drugs, and that this increase in use has positive spillovers on the use of other services, for example, less use of inpatient services (Chandra et al. 2007; Zhang et al. 2009). Here, we examine whether prescription drug insurance is associated with a change in the probability of being hospitalized in the last year and the number of outpatient physician visits. For these outcomes, we only have data through 2006, as the 2007 data are not yet available.

Table 5 presents descriptive information. In the case of hospitalization, the figures in Table 5 suggest little change, if anything a slight decrease in the probability of hospitalization between 2000 and 2006, and DD estimates are zero. For outpatient visits, there is an increase in the number of visits over time and those more likely to be uninsured report more visits than those less likely to be uninsured (in every year). The change in outpatient visits between 2004 and 2006 is similar to the change in visits between earlier years. DD estimates are small and not statistically significant.

Table 6 presents estimates from the regression model and these estimates are obtained by OLS regression methods.[13] We focus on the instrumental variables estimates. For the full sample, the IV estimate of the effect of prescription drug insurance on the probability of hospitalization is positive, but not statistically significant. The magnitude of the estimate is non-trivial; prescription drug insurance is associated with a 10 percentage point increase in the probability of hospitalization, which relative to the mean represents a 55 percent effect size. Our inability to reject an effect of this magnitude suggests that we lack sufficient statistical power to detect reliably small to modest effects. The absence of adequate statistical power also makes it difficult to assess the evidence as to whether the research design is valid for hospitalization. In column (1), estimates associated with the interactions between the quartiles of the predicted probability of being uninsured and year effects prior to 2006 are not statistically significant,

[13] In the case of outpatient visits, we also assessed whether estimates were sensitive to the estimation method using the same approach as described in footnote 9.

which is consistent with a valid approach, but we cannot reject the null hypothesis that the interactions between the quartiles of the probability of being uninsured and the year 2006 dummy variable are jointly zero. The instrumental variables estimate of the effect of prescription drug insurance on the probability of hospitalization for chronically ill persons is 0.13, or approximately 55% of the mean, and not statistically significant. Overall, we are reluctant to draw inferences from these estimates because of the absence of sufficient statistical power.

The IV estimates of the effect of prescription drug insurance on the number of outpatient visits are -0.64 and -3.08 for the full and chronically ill samples, respectively. The latter estimate, -3.08, is large—nearly twice the mean and 40% of a standard deviation—but only marginally significant (p-value=0.14). In this case too, we have limited statistical power, but we have sufficient power to detect effect sizes that are approximately 50% of a standard deviation. Our reading of the evidence is that among the chronically ill, prescription drug insurance is associated with a reduction in outpatient visits.

Medicare Part D, Prescription Drug Insurance and Self-rated Health

Arguably, the most important goal of subsidizing prescription drug insurance as in Medicare Part D is to provide the financial ability to purchase prescription drugs that maintain, or slow the deterioration, of the health of elderly persons. As noted there are few studies of this issue. We examine the association between prescription drug insurance and three health measure that are all self reported: general health status (1 excellent, 5 poor), the number of limited activities of daily living (ADL); and the number of limited instrumental activities of daily living (IADL). ADL and IADL range from zero to six. For these outcomes we have data that extend through 2007.

Table 7 presents descriptive information for ADLs and IADLs by year and quartile of the probability of being uninsured. Overall, there seems to be a slight improvement in functional status over the 2000 to 2007 period, as the mean number of ADLs and IADLs is declining. There is also evidence that those more likely to be uninsured prior to Part D have worse functional health than those less likely to be uninsured (in each year). Changes in functional status between 2004 and 2006 and 2004 and 2007

are small—always less than 10% of a standard deviation (approximately 1.1) and not very different from year-to-year changes in earlier periods. Consistent with these facts, DD estimates are small and not statistically significant with one exception. The 4th minus 1st quartile DD estimate with respect to IADLs indicates that those more likely to obtain prescription drug insurance through Medicare Part D experienced a relative decline in functional status (a positive 0.11 DD estimate).

Regression estimates of the effect of prescription drug insurance on functional health are shown in Table 8. Here too, we focus on IV estimates. The IV estimates are all positive, suggesting that those who gained prescription drug insurance experienced a relative decline in functional status, but not statistically significant. Estimates are also relatively small in magnitude—always less than 20% of a standard deviation of ADLs and IADLs. In terms of assessing the validity of the IV estimates, the tests of the joint significance of the pre-2006 interactions all indicate no difference between the treatment and comparison groups, which is a result that is consistent with a valid IV approach. However, we do face somewhat of a problem with statistical power, for example, standard errors of the IV estimates suggest that we are unable to detect reliably an effect size smaller than 40% of a standard deviation.

The final analysis we present is for general health status. Descriptive information is presented in Table 9. Figures in Table 9 suggest little trend over time in general health status. However, as for other measures of health and outpatient visits, there is evidence that those more likely to be uninsured prior to Medicare Part D were less healthy (in each year). Year-to-year changes in general health are small and this conclusion applies to changes in health status between 2004 and 2006 and 2004 and 2007. With one exception, there is little evidence of particularly marked changes in health pre- to post Medicare Part D. The exception is that among those most likely to be uninsured prior to Part D, there is a significant worsening of between 2004 (2006) and 2007. This significant change is reflected in the DD estimates associated with the 4th minus 1st quartile difference. This estimate is 0.11 and statistically significant. Table 10 presents regression estimates of the effect of prescription drug insurance on general health status. IV estimates are positive, relatively small (20% of a standard deviation) and not statistically

significant. We view these results as evidence that obtaining prescription drug insurance through Medicare Part D had little effect on general health status.

Conclusions

The growing clinical and financial importance of prescription drugs motivated the creation of a prescription drug benefit for elderly under Medicare Part D. While Medicare Part D is for all seniors, it was those who lacked prescription drug insurance prior to Part D that were of central concern to policymakers. In this paper, we assessed the effects of Medicare Part D on this group. Specifically, we obtained estimates of the association between prescription drug insurance provided by Medicare Part D (versus no coverage) on the use of prescription drugs, use of outpatient and inpatient services, and health, as measured by functional status and general health ratings. We also quantified the change in prescription drug insurance coverage that resulted from Medicare Part D.

To obtain the estimates of interest, we exploited the natural experiment afforded by Medicare Part D and the fact that most elderly had prescription drug insurance prior to Medicare Part D. This enabled us to compare changes in outcomes between those more or less likely to gain prescription drug insurance as a result of Medicare Part D. We then used these differential responses to Medicare Part D to identify the effect of prescription drug insurance on outcomes. We provided substantial evidence that this empirical approach was valid.

We found that prescription drug insurance is associated with a significant increase in the use of prescription drugs. Our estimates suggest that gaining prescription drug coverage through Medicare Part D was associated with approximately a 60% increase in the use of prescription drugs for both the general population of elderly and those in poorer health (chronically ill sample). In absolute terms, prescription drug insurance was associated with a larger increase in prescription drug use among those in poorer health. Our estimates are in line with the only other study that we know of that examined this same question; Zhang et al. (2009) reported that gaining prescription drug insurance through Medicare Part D

was associated with a 74% increase in spending on prescription drugs for enrollees in a Kaiser Permanente plan in Northern California.

It is not surprising to find that prescription drug insurance is associated with an increase in prescription drug use, although the magnitude of the increase may be somewhat surprising. Arguably the more interesting question is whether this relatively large increase in prescription drug use associated with gaining prescription drug insurance was associated with changes in the use of other health care services and changes in health. To investigate this issue we examined the association between prescription drug insurance and the use of outpatient services, hospitalization, functional health and general health status.

Overall, we found little evidence that prescription drug insurance was associated with these outcomes, although in the case of hospitalization we lacked sufficient statistical power to detect reliably effects that would be clinically and economically important. In the case of outpatient visits, there was some evidence that gaining prescription drug insurance was associated with a decrease in outpatient visits among those in poorer health. For this group prescription drug insurance was associated with three less outpatient visits per year, which is approximately 40% of a standard deviation fewer visits. If true, this would be an important additional benefit of prescription drug coverage as it implies that prescription drugs are a substitute for outpatient care, and that part of the cost of Medicare Part D will be offset by savings in this area.

With regard to health, we found no evidence that prescription drug insurance was associated with an improvement of health, although health was crudely measured by self-reported functional status (ADLs and IADLs) and general health status. If anything, estimates suggested that gaining prescription drug insurance was associated with worsening health. These findings raise questions as to the value of the large increase in prescription drug use that was associated with prescription drug coverage gained through Medicare Part D. Taken at face value, these results suggest that much of the additional use of prescription drugs that results form gaining prescription drug insurance is relatively low value in terms of health benefits. While we acknowledge the serious limitations of our health measures, the absence of any evidence that health improved as a result of gaining prescription drug coverage should at a minimum,

motivate much more study of the issue. It is an issue of central importance to assessing the efficacy of Medicare Part D and there is insufficient exiting evidence to inform policy.

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Table 1
Proportion of Medicare Enrollees without Prescription Drug Insurance
By Likelihood of Being Uninsured Prior to Medicare Part D

	2000	2001	2002	2003	2004	2006	2007	2006-2004	Dif-in-Dif	2007-2004	Dif-in-Dif
Full Sample	33.3	32.2	31.5	31.1	31.1	10.7	11.1	-20.4		-20.0	
1st Quartile Uninsured	18.6	19.5	17.9	19.0	19.2	5.3	6.9	-13.9		-12.3	
2nd Quartile Uninsured	26.0	26.1	24.8	25.2	25.2	9.0	10.1	-16.2	-2.3	-15.1	-2.8
3rd Quartile Uninsured	33.4	31.3	32.5	31.2	33.7	12.5	12.0	-21.2	-7.3***	-21.7	-9.5***
4th Quartile Uninsured	50.9	50.2	50.7	50.2	49.7	18.5	17.4	-31.3	-17.3***	-32.3	-20.0***

Source: MCBS Survey Cost and Use File 2000-2006 and MCBS Access to Care File 2007
Notes: Uninsured is defined as probability of uninsured prior to Medicare Part D and is a function of demographic and socioeconomic characteristics and their interactions. There is some inconsistency among the figures because of rounding.
*0.05 < p-value <=0.10; ** 0.01 < p-value <=0.05; *** p-value <=0.01

Table 2
Estimates of the Effect of Medicare Part D on the Probability of Having Prescription Drug Insurance

Variable	Full Sample	Chronically Ill
2nd Quartile Uninsured*Year 2006	0.027	0.057**
	(0.018)	(0.023)
3rd Quartile Uninsured*Year 2006	0.050***	0.054**
	(0.019)	(0.025)
4th Quartile Uninsured*Year 2006	0.178***	0.215***
	(0.021)	(0.027)
2nd Quartile Uninsured*Year 2007	0.032*	0.062***
	(0.018)	(0.024)
3rd Quartile Uninsured*Year 2007	0.072***	0.097***
	(0.018)	(0.024)
4th Quartile Uninsured*Year 2007	0.208***	0.234***
	(0.020)	(0.027)
P-Value, Joint Test of Significance, Year 2006,2007 Interactions	0.000	0.000
P-Value, Joint Test of Significance, Pre-Year 2006 Interactions	0.84	0.72
Number of Observations	42,081	23397

Source: MCBS Survey Cost and Use File 2000-2006 and MCBS Access to Care File 2007
Notes: Dependent variable is whether person has prescription drug insurance. Estimates are from an OLS (linear probability) regression. Reference category is 1st Quartile Uninsured. Covariates are: female, age dummy variables, race categories, marital status, income categories, education categories, rural, smoking status, and year fixed effects. Robust standard errors are in parentheses.
*0.05 < p-value <=0.10; ** 0.01 < p-value <=0.05; *** p-value <=0.01

Table 3
Number of Annual Prescriptions of Medicare Enrollees
By Likelihood of Being Uninsured Prior to Medicare Part D

	2000	2001	2002	2003	2004	2006	2006-2004	Dif-in-Dif
Full Sample	24.4	25.0	25.8	26.6	26.6	32.1	5.5	
1st Quartile Uninsured	22.6	24.1	24.3	25.4	25.5	30.2	4.7	
2nd Quartile Uninsured	24.7	24.0	26.3	26.0	25.7	30.8	5.1	0.4
3rd Quartile Uninsured	25.3	25.8	26.0	27.5	27.4	33.4	6.0	1.3
4th Quartile Uninsured	24.6	25.1	26.6	27.5	28.2	34.8	6.6	1.9

Source: MCBS Survey Cost and Use File 2000-2006 and MCBS Access to Care File 2007
Notes: Uninsured is defined as probability of uninsured prior to Medicare Part D and is a function of demographic, socioeconomic characteristics and their interactions. There is some inconsistency among the figures because of rounding.
*0.05 < p-value <=0.10; ** 0.01 < p-value <=0.05; *** p-value <=0.01

Table 4
Estimates of Effect of Prescription Drug Insurance on Annual Number of Prescription Drugs

	Full Sample		Chronically Ill	
	OLS-DD	OLS-IV	OLS-DD	OLS-IV
Prescription Drug Insurance		14.41**		18.28**
		(6.37)		(7.62)
2nd Quartile Uninsured*Year 2006	0.008		0.476	
	(1.31)		(1.92)	
3rd Quartile Uninsured*Year 2006	1.12		3.485	
	(1.38)		(2.019)	
Top Quartile Uninsured*Year 2006	2.33		3.783	
	(1.45)		(2.146)	
P-Value, Joint Test of Significance, Year 2006 Interactions	0.34		0.13	
P-Value, Joint Test of Significance, Pre-Year 2006 Interactions	0.59		0.57	
Number of Observations	34893		19477	
Mean (Std. Dev.) of Dep. Var. for Uninsured in 2003	23.48		32.75	
	(21.92)		(23.40)	

Source: MCBS Survey Cost and Use File 2000-2006
Notes: Reference category is 1st Quartile Uninsured. Covariates are: female, age categories, race categories, marital status, income categories, education categories, rural, smoking status, and year fixed effects. Robust standard errors are in parentheses.
*0.05 < p-value <=0.10; ** 0.01 < p-value <=0.05; *** p-value <=0.01

Table 5
Probability of Hospitalization and Number of Annual Outpatient Visits of Medicare Enrollees
By Likelihood of Being Uninsured Prior to Medicare Part D

Hospitalization	2000	2001	2002	2003	2004	2006	2006-2004	Dif-in-Dif
Full Sample	0.18	0.18	0.18	0.18	0.16	0.16	0.0	
1st Quartile Uninsured	0.15	0.16	0.14	0.16	0.14	0.14	0.0	
2nd Quartile Uninsured	0.20	0.18	0.20	0.17	0.17	0.17	0.0	0.0
3rd Quartile Uninsured	0.18	0.17	0.18	0.19	0.16	0.16	0.0	0.0
4th Quartile Uninsured	0.17	0.20	0.19	0.18	0.19	0.19	0.0	0.0
Annual Outpatient Visits								
Full Sample	3.52	3.74	3.86	3.97	3.91	4.07	0.16	
1st Quartile Uninsured	3.06	3.35	3.53	3.43	3.55	3.65	0.10	
2nd Quartile Uninsured	3.24	3.43	3.64	3.84	3.83	3.86	0.03	-0.07
3rd Quartile Uninsured	3.65	3.84	4.00	4.18	4.04	4.45	0.41	0.31
4th Quartile Uninsured	4.03	4.26	4.24	4.48	4.26	4.49	0.23	0.14

Source: MCBS Survey Cost and Use File 2000-2006
Notes: Uninsured is defined as probability of uninsured prior to Medicare Part D and is a function of demographic and socioeconomic characteristics and their interactions.
*= 0.05 < p-value <=0.10; **= 0.01 < p-value <=0.05; ***= p-value <=0.01

Table 6
Estimates of Effect of Prescription Drug Insurance
on the Probability of Hospitalization and Number of Outpatient Visits

	Full Sample				Chronically Ill			
	Hospitalization		Outpatient Visits		Hospitalization		Outpatient Visits	
	OLS DD	OLS-IV	OLS DD	OLS-IV	OLS DD	OLS-IV	OLS DD	OLS-IV
Prescription Drug Insurance		0.101		-0.640		0.127		-3.08
		(0.084)		(1.675)		(0.103)		(2.09)
2nd Quartile Uninsured	0.014		-0.248		-0.009		0.001	
*Year 2006	(0.019)		(0.405)		(0.028)		(0.677)	
3rd Quartile Uninsured	-0.003		-0.072		-0.002		-0.405	
*Year 2006	(0.019)		(0.392)		(0.029)		(0.677)	
4th Quartile Uninsured	0.026		-0.294		0.021		-0.569	
*Year 2006	(0.020)		(0.408)		(0.030)		(0.640)	
P-Value, Joint Test of Significance, Year 2006 Interactions	0.47		0.87		0.78		0.70	
P-Value, Joint Test of Significance, Pre-Year 2006 Interactions	0.11		0.98		0.99		0.37	
Number of Observations	34893		34893		19477		19477	
Mean (Std. Dev.) of Dep. Var. for Uninsured in 2003	0.18		3.99 (7.19)		0.24		5.14 (8.05)	

Source: MCBS Survey Cost and Use File 2000-2006
Notes: Reference category is 1st Quartile Uninsured. Covariates are: female, age categories, race categories, marital status, income categories, education categories, rural, smoking status, and year fixed effects. Robust standard errors are in parentheses.
*0.05 < p-value <=0.10; ** 0.01 < p-value <=0.05; *** p-value <=0.01

Table 7
Number of Instrumental Activities of Daily Living (IADLs) and Activities of Daily Living (ADLs)
of Medicare Enrollees By Likelihood of Being Uninsured Prior to Medicare Part D

ADLs	2000	2001	2002	2003	2004	2006	2007	2006-2004	Dif-in-Dif	2007-2004	Dif-in-Dif
Full Sample	0.47	0.46	0.47	0.46	0.43	0.43	0.42	0.00		-0.01	
1st Quartile Unin.	0.36	0.36	0.34	0.34	0.32	0.36	0.29	0.04		-0.03	
2nd Quartile Unin.	0.42	0.42	0.47	0.45	0.44	0.46	0.43	0.02	-0.02	-0.01	0.02
3rd Quartile Unin.	0.49	0.50	0.51	0.48	0.45	0.44	0.48	0.01	-0.03	0.03	0.06
4th Quartile Unin.	0.58	0.51	0.54	0.56	0.51	0.49	0.53	-0.02	-0.06	0.02	0.05
IADLs											
Full Sample	0.60	0.60	0.63	0.57	0.56	0.56	0.57	0		0.01	
1st Quartile Unin,	0.41	0.42	0.42	0.41	0.41	0.43	0.39	0.02		-0.02	
2nd Quartile Unin,	0.52	0.58	0.63	0.57	0.59	0.55	0.59	-0.04	-0.06	0	0.02
3rd Quartile Unin,	0.68	0.67	0.70	0.62	0.61	0.62	0.62	0.01	-0.01	0.01	0.03
4th Quartile Unin,	0.76	0.71	0.74	0.71	0.66	0.67	0.75	0.01	-0.01	0.09	0.11*

Source: MCBS Survey Cost and Use File 2000-2006
Notes: Uninsured is defined as probability of uninsured prior to Medicare Part D and is a function of demographic, socioeconomic characteristics and their interactions.
*= 0.05 < p-value <=0.10; **= 0.01 < p-value <=0.05; ***= p-value <=0.01

Table 8
Estimates of Effect of Prescription Drug Insurance
on the Number of Instrumental Activities of Daily Living (IADLs) and Activities of Daily Living (ADLs)

	Full Sample				Chronically Ill			
	IADL		ADL		IADL		ADL	
	OLS DD	OLS-IV	OLS DD	OLS-IV	OLS DD	OLS-IV	OLS DD	OLS-IV
Prescription Drug Insurance		0.196		0.047		0.154		0.009
		(0.200)		(0.176)		(0.268)		(0.238)
2nd Quartile Uninsured*Year 2006	-0.045		-0.017		-0.019		-0.008	
	(0.056)		(0.051)		(0.089)		(0.082)	
3rd Quartile Uninsured*Year 2006	-0.004		-0.050		0.012		-0.052	
	(0.058)		(0.051)		(0.094)		(0.086)	
4th Quartile Uninsured*Year 2006	-0.032		-0.086		0.026		-0.118	
	(0.062)		(0.057)		(0.100)		(0.903)	
2nd Quartile Uninsured*Year 2007	0.043		0.033		0.081		0.051	
	(0.052)		(0.047)		(0.083)		(0.075)	
3rd Quartile Uninsured*Year 2007	0.034		0.062		0.040		0.042	
	(0.053)		(0.047)		(0.089)		(0.079)	
4th Quartile Uninsured*Year 2007	0.096		0.028		0.152		0.055	
	(0.058)		(0.052)		(0.093)		(0.084)	
P-Value, Joint Test of Significance, Year 2006, 2007 Interactions	0.22		0.10		0.61		0.41	
P-Value, Joint Test of Significance, Pre-Year 2006 Interactions	0.73		0.83		0.49		0.28	
Number of Observations	42030		42041		23362		23374	
Mean of Dep. Var. for Uninsured in 2003	0.60		0.45		0.91		0.67	
	(1.26)		(1.07)		(1.49)		(1.26)	

Source: MCBS Survey Cost and Use File 2000-2006

Notes: Reference category is 1st Quartile Uninsured. Covariates are: female, age categories, race categories, marital status, income categories, education categories, rural, smoking status, and year fixed effects. Robust standard errors are in parentheses.

*0.05 < p-value <=0.10; ** 0.01 < p-value <=0.05; *** p-value <=0.01

Table 9
Self-reported Health Status (1 Excellent, 5 Poor) of Medicare Enrollees
By Likelihood of Being Uninsured Prior to Medicare Part D

	2000	2001	2002	2003	2004	2006	2007	2006-2004	Dif-in-Dif	2007-2004	Dif-in-Dif
Full Sample	2.59	2.58	2.56	2.54	2.52	2.51	2.54	-0.01		0.02	
1st Quartile Uninsured	2.37	2.36	2.34	2.37	2.37	2.36	2.34	-0.01		-0.03	
2nd Quartile Uninsured	2.54	2.55	2.52	2.50	2.50	2.49	2.52	-0.01	0.00	0.02	0.05
3rd Quartile Uninsured	2.63	2.64	2.62	2.59	2.56	2.55	2.59	-0.01	0.00	0.03	0.06
4th Quartile Uninsured	2.77	2.73	2.76	2.75	2.69	2.70	2.80	0.01	0.02	0.11	0.14*

Source: MCBS Survey Cost and Use File 2000-2006
Notes: Uninsured is defined as probability of uninsured prior to Medicare Part D and is a function of demographic and socioeconomic characteristics and their interactions.
*= 0.05 < p-value <=0.10; **= 0.01 < p-value <=0.05; ***= p-value <=0.01

Table 10
Estimates of Effect of Prescription Drug Insurance on Health Status

	Full Sample		Chronically Ill	
	OLS DD	OLS-IV	OLS DD	OLS-IV
Prescription Drug Insurance		0.226		0.193
		(0.173)		(0.198)
2nd Quartile Uninsured*Year 2006	-0.009		-0.054	
	(0.051)		(.069)	
3rd Quartile Uninsured*Year 2006	-0.025		0.029	
	(0.052)		(0.072)	
4th Quartile Uninsured*Year 2006	-0.039		-0.051	
	(0.056)		(0.075)	
2nd Quartile Uninsured*Year 2007	0.061		0.054	
	(0.049)		(0.066)	
3rd Quartile Uninsured*Year 2007	0.038		0.056	
	(0.050)		(0.069)	
4th Quartile Uninsured*Year 2007	0.080		0.121	
	(0.052)		(0.071)	
P-Value, Joint Test of Significance, Year 2006, 2007 Interactions	0.25		0.13	
P-Value, Joint Test of Significance, Pre-Year 2006 Interactions	0.84		0.28	
Number of Observations	41936		23305	
Mean (Std. Dev.) of Dep. Var. for Uninsured in 2003	2.56 (1.05)		2.87 (1.02)	

Source: MCBS Survey Cost and Use File 2000-2006 and MCBS Access to Care File 2007
Notes: Reference category is 1st Quartile Uninsured. Covariates are: female, age categories, race categories, marital status, income categories, education categories, rural, smoking status, and year fixed effects. Robust standard errors are in parentheses.
*0.05 < p-value <=0.10; ** 0.01 < p-value <=0.05; *** p-value <=0.01