Medical Out-of-Pocket Expenses, Poverty, and the Uninsured*

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Abstract

The National Academy of Sciences (NAS) Panel on Poverty and Family Assistance argued that the current official U.S. poverty measure should be updated to capture changes in the population's healthcare costs and needs; families with sufficiently high medical out-of-pocket (MOOP) expenditures may be 'poor' even though they are not counted as such. This research offers three distinct advances toward achieving the NAS recommendations as they concern MOOP spending. Firstly, this paper uses the newly collected MOOP expenditure data from the CPS ASEC, and analyzes its quality vis-à-vis alternative sources. Secondly, poverty estimates that incorporate the MOOP spending data from the CPS ASEC are produced in such a way as to be consistent with the NAS recommendations. These direct estimates are an improvement over previous estimates, conditional on obtaining high-quality data, because modeling MOOP expenditures from other surveys is not needed. Third, this paper investigates how the distribution of MOOP expenditures, and the poverty estimates, change when it is assumed that the uninsured have the spending patterns of the insured. The main results are: 1) the new MOOP expenditure data is high quality; 2) incorporating observed MOOP expenditures increases the incidence of poverty across the population by approximately two percentage points over the official measure; 3) counterfactual estimates of *non-premium* MOOP expenditures for the uninsured does not significantly affect poverty estimates; and 4) counterfactual estimates of *premium* MOOP expenditures for the uninsured exert significant upward pressure on the poverty rate.

*This paper is released to inform interested parties of ongoing research and to encourage discussion of work in progress. Any views expressed on statistical and methodical issues are those of the authors and not necessarily those of the U.S. Census Bureau.

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1 Introduction

Medical out-of-pocket (MOOP) spending may reach a non-trivial share of overall expenditures, especially for low-income families. Among insured families, on average, half of total MOOP spending is on health insurance premiums (Banthin et al., 2008). In some cases, health events may result in high non-premium MOOP spending—regardless of health insurance coverage status. For example, researchers estimated that approximately half of all U.S. bankruptcies in 2001 involved medical debt and approximately 75 percent of the people affected had health insurance coverage at the onset of their illness (Himmelstein et al., 2005). Others have identified correlations with health events and significant wealth losses (Cook et al., 2010; Smith, 1999). In short, MOOP spending lowers family resources such that available income for food and shelter decreases—namely, components used to measure poverty status.

Given this reality, the National Academy of Sciences Panel on Poverty and Family Assistance made several recommendations concerning the incorporation of MOOP spending into an alternative measure of poverty (Citro and Michael, 1995). The NAS recommended approach is to include *actual* MOOP spending as a limitation on resources: total family income minus total family MOOP spending, which is the numerator of a poverty rate. The fundamental advantage of the NAS recommended approach is that the distribution of actual MOOP spending is preserved. Nonetheless, others have argued that expected MOOP spending should be incorporated into the poverty thresholds (i.e., the denominator of a poverty rate). The argument for incorporating expected MOOP spending in the threshold is that some families under-consume medical services; in particular, people have unmet medical needs because, in part, they do not have health insurance coverage (e.g., Banthin, 2004).

This research offers three general refinements to incorporate MOOP expenditures into the poverty measure. Firstly, this work uses the newly added questions collected in the 2010 Current Population Survey Annual Social and Economic Supplement (CPS ASEC). These new questions are designed to directly calculate the Supplemental Poverty Measure (SPM) and MOOP spending. This work investigates the quality of the new MOOP spending data vis-à-vis alternative well-known and high-quality data sources. Secondly, the effect of incorporating the new MOOP spending data into the poverty estimates is investigated using the NAS recommendation. That is, observed total family MOOP spending is subtracted from family income, and the official thresholds are used to measure the change in the incidence of poverty. This simple estimation offers an improvement over previous attempts that depended on model-based methods, conditional collecting high-quality MOOP expenditure data in the CPS ASEC.

The third and final component to this research incorporates the notion that some families

would (on average) have higher MOOP spending if they were less resource constrained, and investigates to what extent this constraint exerts downward pressure on poverty status. It is also an explicit research priority outlined by the Interagency Technical Working Group on Developing a Supplemental Poverty Measure (U.S. Census Bureau, 2010). Based on the premise that people with health insurance coverage are less constrained in consuming medical services, a counterfactual distribution of non-premium expenditures for the uninsured is estimated based on their income and demographic characteristics. To investigate the robustness of the results, two methodologies are implemented: predictive mean matching, and propensity score matching. These counterfactual distributions are then subtracted from total family income to investigate how the poverty estimates are affected. As a last step, non-group premiums are imputed for uninsured family units, and are added to the counterfactual non-premium MOOP spending distributions for the uninsured, in order to investigate how both adjustments affect the poverty estimates. Overall, this effort highlights the potential impact on the SPM if the uninsured population's MOOP spending was more like that of the insured.

Results indicate that the newly collected MOOP spending data in the 2010 CPS ASEC data are high quality, yet some (minor) areas of data improvement are identified, and remedies implemented. After incorporating the new MOOP spending data, the incidence of people in poverty increases from 14.3 percent in the official measure to 16.4 percent in the alternative measure of poverty (that *only* accounts for MOOP spending). The counterfactual distributions of non-premium MOOP spending for the uninsured did not significantly change the poverty rate, compared to the estimates using the uninsured's observed non-premium MOOP spending. However, the (modeled) non-group premium expenditures for the uninsured exert significant upward pressure on the poverty rate among the uninsured and the overall population.

2 Previous Research: the CPS, MOOP, Poverty, and MOOP Spending Adjustments for the Uninsured

Banthin et al. (2000) investigates the effects of including (mean and median) MOOP expenditures (by family type) to the poverty thresholds using the 2000 Current Population Survey (CPS; reference year 1999), Consumer Expenditure Survey (CE), and the 1996 Medical Expenditure Panel Survey (MEPS)—MOOP expenses are estimated using the latter two surveys. The authors explicitly add a "standard, unsubsidized insurance package" to non-premium MOOP expenses reported by uninsured families (Banthin et al., 2000, p.9).[1] Specifically, the authors' derive counterfactual premium expenditures based on employer-based premium prices, yet include es-

[1]Note that the 1996 MEPS *did not* collect out-of-pocket premium expenses for respondents receiving health insurance from their current employer/union, which changed in post 1996 surveys.

timates of the employer contribution. Without the uninsured adjustment, including MOOP into the thresholds increases the estimate of individuals in poverty by approximately 1.7-2.9 percentage points over the official measure, depending on data source and method (Banthin et al., 2000, table 6). The additional adjustment for uninsured premium spending increases the poverty estimates by approximately 3.1-3.7 percentage points over the official measurement, depending on the method implemented.

Betson (2001) is an early attempt to model total MOOP expenditure data using the CE. The model incorporates statistical matching (random assignment) to create synthetic MOOP expenditure data for CPS ASEC respondents. The sample is separate for families headed by non-elderly versus elderly adults. MOOP spending is modeled at the family level in two steps to account for zero spending and non-zero spending. Since this model has been used extensively for imputing MOOP spending values to CPS respondents.

Short (2001), in part, incorporates total family MOOP spending into the poverty estimates for the 1999 population by 1) using the Betson model that matches MOOP spending values to CPS respondents and subtracts it from family income (MOOP Subtracted from Income; MSI), and 2) developing new poverty thresholds (MOOP in the Thresholds; MIT). Short simultaneously includes adjustments for work related expenses, housing subsidies, and geographic adjustments for living expenses. Given these additional (non-MOOP spending related) adjustments, a direct investigation of how incorporating *only* MOOP expenses affect the official poverty estimate unclear. Nonetheless, the MOOP adjustment makes a large contribution relative to the others. Using the Betson model, the poverty rate among all people increased by 0.2 percentage points using the MSI method and by 0.8 percentage points using the MIT method.

Although widely used, the Betson model has been criticized on many grounds. For example, O'Hara and Doyle (2001) suggest that modeling MOOP spending based on individual characteristics is more appropriate than family-level characteristics, and that predictive mean matching may be a more appropriate matching method. They investigate the effect of incorporating MOOP spending on estimated poverty rates using the SIPP, MEPS, and CE (reference period 1996), and use several different methodologies—the Betson model, predictive mean match, and a special case of predictive mean matching—for creating synthetic MOOP spending for SIPP respondents. They incorporate MOOP spending by subtracting total family MOOP spending from total family income (i.e., MSI approach), and apply the official poverty thresholds. The MOOP adjustment increases the estimated incidence of people in poverty by approximately 1.5 to 1.9 percentage points over the official measurement across the entire population (O'Hara and Doyle, 2001, table 3), depending on the matching method and MOOP data source.

More recently, O'Donnell and Beard (2009) reaffirm that predictive mean matching is more

appropriate than random assignment, used in the Betson model. They also concluded that using up-to-date data are essential for good estimates, compared to the Betson model which uses a CPI adjustment to the CE for imputation. Short (2010) incorporates the predictive mean matching model in O'Donnell and Beard (2009) for MOOP spending and applied it to the 2008 CPS ASEC (reference year 2007). That research incorporates several adjustments in response to the Measuring American Poverty Act. The MOOP spending adjustment effect on the poverty estimate cannot be isolated because the adjustments on the alternative poverty estimates were done simultaneously, as in Short (2001). However, MOOP spending is one of the largest components to the new adjustment. When all adjustments are taken into account, the poverty rate increases by 2.8 percentage points over the official measure (Short, 2001, table 7).

3 Data Sources

To evaluate the quality of the newly collected MOOP spending data in the Current Population Survey Annual Social and Economic Supplement (CPS ASEC), it is compared to well-known high-quality alternatives. Specifically, the CPS ASEC is benchmarked to the most recently available information in the Medical Expenditure Panel Survey (MEPS), and the Survey of Income and Program Participation (SIPP), Medical Spending and Utilization Module. There are similarities and differences across these three surveys, which lead to predictable differences in MOOP spending estimates (discussed below). All monetary values in the SIPP and the MEPS have been converted to constant 2009 US dollars by applying the CPI all items (series id: CUUR0000AA0) and the CPI Medical Care index (series id: CUUR0000SAM) to the income and MOOP spending data, respectively (Bureau of Labor Statistics, 2010).[2]

3.1 The Current Population Survey, Annual Social and Economic Supplement, 2010

The Annual Social and Economic Supplement to the Current Population Survey (CPS ASEC) is a nationally representative survey of the civilian, non-institutionalized U.S. population. The CPS ASEC is mostly administered in March although some data are collected in February and April. This paper uses the data collected in 2010, and the corresponding reference period for the respondents is from January to December of 2009. Approximately 77,000 households were

[2]The estimates in this paper (which may be shown in the text, figures, and tables) are based on responses from samples of the population and may be different from actual values because of sampling variability or other factors. As a result, apparent differences between the estimates for two or more groups may not be statistically significant. All comparative statements have undergone statistical testing and are significant at the 90 percent confidence interval unless otherwise noted. Standard errors were calculated using each survey's appropriate method: replicate weights for the CPS (U.S. Census Bureau, 2009b) and the SIPP (U.S. Census Bureau, 2009a), and using the survey design (PSUs and strata) for the MEPS (Machlin et al., 2005).

interviewed (approximately 210,000 individuals, belonging to almost 85,500 'families').[3] The CPS ASEC is the official survey used for the national poverty and health insurance coverage estimates.

In 2010, the CPS ASEC began collecting MOOP expenditure data in order to integrate these expenses into the SPM. MOOP expenditure questions in the survey are general, and are captured in three separate questions. Respondents eighteen years old and older are asked to report total health insurance premium expenditures over the year, for all health insurance policies—private and public—except Medicare Part B premiums. Two separate questions on total non-premium MOOP expenditures (paid for by anyone in the household) are asked of respondents, depending on whether they are older/younger than fifteen years old.[4] No distinction is made for the type of non-premium MOOP spending (e.g., doctor visit versus medical supplies). A final question probes whether any MOOP expenses (premium and/or non-premium) were, or will be, reimbursed; and if so, how much.

Respondents in the CPS ASEC report their health insurance coverage status—private policy, Medicare, Medicaid, a form of Veterans' coverage, or no coverage—as having been covered for at least one day in the reference period.[5] From this information, three mutually exclusive coverage categories are constructed. Individuals are defined as having 'private insurance' regardless if they also have any form of public insurance. 'Public insurance' status is defined as having any form of public insurance, and no private insurance, and 'uninsured' is the residual group. Similarly, three mutually exclusive groups are constructed to summarize family coverage. Privately insured families are defined as those were at least one member has a private policy. Similarly, publicly insured families are those where at least one member has a public policy, and not a private policy. Uninsured families are those where all members report no insurance coverage.

3.2 The Survey of Income and Program Participation, Medical Spending and Utilization Module

The Survey of Income and Program Participation (SIPP) is a multi-year panel survey with quarterly interviews (i.e., waves) following the same individuals. The population in SIPP is representative of the civilian non-institutionalized U.S. population. This paper uses the SIPP 2004 panel, wave six topical module, which includes the survey's most recent medical expenditure

[3]The term 'family' used in this paper includes 'single individuals' and 'secondary individuals' and is therefore not equivalent to the definition of family used in the CPS.

[4]The question for children under 15 years old is worded slightly differently than that for respondents aged 15+, yet it essentially collects the same information.

[5]Health insurance coverage estimates using the CPS ASEC are based on a reference period, and are not 'point in time' estimates as derived from the American Community Survey (ACS) (see DeNavas-Walt et al., 2010).

information (discussed below). The reference period for wave six is October 2004 to January 2005. Wave six of the 2004 panel interviewed approximately 49,500 households (95,000 individuals in approximately 40,400 'families').

The wave six topical module includes questions on the utilization of medical services, and additional follow-up questions on medical expenses, for all family members. This format of questioning is intended to facilitate accurate reporting of non-premium MOOP spending. Like the CPS ASEC, gross MOOP expenditures are collected separately for non-premium and premium expenses. Respondents are given the opportunity to report if they were, or will be, reimbursed for any of the MOOP expenses; and if so, how much. Total net MOOP spending is calculated by adding gross premium and non-premium expenses, less reimbursements. Finally, MOOP expenditures are reported for the previous twelve months.

Health insurance coverage information in the SIPP is collected for each month of a given quarter. Respondents are asked if they were covered, by insurance type, for at least one day of a given month. In an effort to be as consistent as possible with the CPS ASEC, three mutually exclusive health insurance coverage indicators for individuals and families are created in the same way as described in the CPS ASEC (discussed above).

3.3 The Medical Expenditure Panel Survey

The Medical Expenditure Panel Survey (MEPS) is a two-year rotating panel, with five equally spaced interview collection periods, and it is a nationally representative sample of the civilian, non-institutionalized population. The survey collects detailed information on medical care utilization and expenditures by source of payment, and is considered one of the highest quality household surveys collecting MOOP expenditures (Cohen et al., 2009). Cross-sections of the 2007 MEPS Household Component (MEPS-HC) data are used. The data cover the reference period of January to December 2007 and is constructed from rounds three, four, and five of panel 11 and rounds one, two, and three of panel 12.[6] The final sample includes approximately 29,000 individuals, or about 12,000 CPS-like 'families.'[7]

Non-premium MOOP expenditures in the MEPS is collected at the event level (e.g., doctor visit), and is consequently able to distinguish spending by type of service.[8] In addition to being able to study types of non-premium MOOP spending, the data includes a large range of "small" (e.g., less-than $100) spending amounts. Similarly, out-of-pocket health insurance premium

[6] A round is the same concept as a wave in SIPP.

[7] In the MEPS it is possible to redefine families using the same definition as the CPS. Weights are also provided for each family definition, and this analysis makes use of those weights.

[8] The MEPS non-premium MOOP spending categories are: office- and hospital-based care, home health care, dental services, vision aids, and prescribed medicines.

expenditures are collected for each policy member-policy-round. Premium information in the MEPS is limited to spending to private health insurance policies, versus both private and public policies combined.

Health insurance coverage information in the MEPS is also refined. At each round of interviewing, respondents report their coverage status, by type, for each month; i.e., monthly estimates are available for the entire year. The annual summary of insurance status indicators is available on the public use file and they are constructed from the monthly coverage information.[9] From this information, three mutually exclusive groups are constructed—privately insured, publicly insured and not privately insured, and uninsured—for individuals and families in the same way as discussed above for the CPS ASEC and the SIPP.

3.4 Pertinent Conceptual Differences across the CPS ASEC, the SIPP, and the MEPS

3.4.1 Reference Periods

The most obvious difference across the three samples is with respect to the reference periods of data collection. This is most relevant insofar as the distributions of MOOP spending may not be stable, even after accounting for inflation, between October 2004 (the earliest period of MOOP spending in the SIPP) to December 2009 (the latest month for the CPS ASEC).

The economic crisis beginning in 2007, and ensuing rising unemployment, was accompanied by 1) an increase in the (population) uninsured rate from 2008 to 2009; 2) a significant change the composition of medical insurance coverage—private coverage decreasing and public coverage increasing (DeNavas-Walt et al., 2010), and 3) possibly reduced consumption of routine medical treatment (Lusardi et al., 2010; Wall Street Journal, 2010), and likely reduced spending on medical services and equipment than before the recession. Given these changes, it is anticipated that the SIPP MOOP spending distributions may be different from that in the MEPS, and the CPS ASEC due to the different reference periods.

3.4.2 Premium & Non-Premium MOOP Spending

A fundamental and important distinction between the MEPS and the other two surveys is how the former collects MOOP spending. Non-premium spending in the MEPS is collected at the event level versus one summary question for all aggregated non-premium spending. It is anticipated that the MEPS data, with its more refined method, will gather more accurate estimates—especially for "small" spending—compared to the CPS ASEC and the SIPP. Similarly, the

[9]For example, if an individual had Medicare for at least one day of one month over the entire year, the annual summary indicator for Medicaid equals one.

MEPS premium expenses are collected for each policy member-policy-round versus a summary question that asks about expenses on all policies combined. The likely outcome will be the collection of more accurate data on private premium expenditures.

Another substantive difference between the MEPS and the CPS ASEC/SIPP is with respect to premium expenditures. The MEPS only collects MOOP premium spending on private health insurance policies versus both private and public policies combined. Therefore it is anticipated that the largest discrepancies in measured premium spending will be among the elderly, who are mostly covered by Medicare, and typically have their premiums deducted from their monthly Social Security Retirement benefit. In other words, total premium spending measured in the MEPS among the elderly may be consistently lower than that measured in the SIPP and possibly the CPS ASEC *if* respondents report Part B premiums.

Finally, the components of total MOOP spending—premium and non-premium—in the CPS ASEC, and the SIPP, is reported gross of reimbursements. Respondents are then given the opportunity to indicate whether they will be reimbursed for any of the given expenses (premium and/or non-premium); and if so, how much. Total net MOOP spending estimates are obtained by subtracting the reported reimbursements. It is therefore not possible to achieve net premium and non-premium expenditure estimates.[10] Therefore, this difference may have the effect of inflating the SIPP figures with respect to the MEPS.

4 Methodology

4.1 Direct MOOP Spending Estimates & Poverty

Each survey is analyzed to identify the differences/similarities in the unconditional distributions of MOOP expenditures including the total, premium, and non-premium spending. The unadjusted mean and median statistics of MOOP spending by commonly studied demographic information is reported. Individual- and family-level statistics are of interest insofar as the former may produce differences in the latter. Family-level statistics are of primary interest, as 'poverty' is defined at the family-level. Kernel density estimates of MOOP spending for each survey are investigated to detect differences across the entire distribution. Finally, direct poverty estimates using the new data are presented by subtracting the *actual* total family MOOP spending from total family income, per the NAS recommendations.

[10] Reimbursements collected in the 2010 CPS ASEC were positive for about 0.5 percent of the population, and mostly were greater than the total amount of MOOP spending in these cases. Therefore, this paper does not make use of the reimbursement data in the 2010 CPS ASEC, as its quality is questionable.

4.2 Counterfactual Estimates: Uninsured Non-Premium Spending Adjustment

The second component of this paper addresses the questions: 1) What would the distribution of non-premium MOOP spending among uninsured children and non-elderly adults look like if they had the spending patterns of their insured counterparts?; and 2) If the uninsured had the former distribution of MOOP spending, how would the incidence of poverty change, if at all? For robustness checking, two separate methodologies are implemented to estimate a counterfactual distribution of non-premium MOOP spending for the uninsured: propensity score matching and predictive mean matching. Finally, this analysis is limited to the non-elderly population as the elderly are almost universally insured by Medicare.

4.2.1 Propensity Score Matching

Following the standard 'propensity score matching' (PSM) application proposed in Dehejia and Wahba (2002), the first estimate is the 'propensity score' (i.e., the predicted probability) that an individual has any form of health insurance, conditional on demographic information that is correlated with health insurance coverage. Separate model specifications are implemented for children versus non-elderly adults. This estimation takes the form of a standard logit model:

$$\text{logit}(p) \equiv \log\left(\frac{1}{1-p}\right) = \mu + \boldsymbol{\beta}'\mathbf{x} \tag{1}$$

where p is the probability that the individual respondent has (any form) of health insurance, Pr[Insured=1]; $\mathbf{x}$ is a vector of demographic characteristics correlated with health insurance status, which is different for children[11] versus non-elderly adults;[12] $\boldsymbol{\beta}$ is a vector of parameters to be estimated; and μ is the intercept term corresponding to having any form of health insurance—

[11] Covariates for children aged 0-18 include: natural log of total CPS-family income; number of individuals in the CPS family aged 0-18, 19-64, and 65+; highest educational attainment of all family members (less-than High School Diploma, High School Diploma equivalent/Associates Degree, Bachelor's Degree, Master's/Professional Degree or Ph.D.); Self-Reported Health Status (Excellent, Very Good, Good, Fair, or Poor); age (0, 5-9, 10-13, 14-18); sex, race/ethnicity (white non-Hispanic, black non-Hispanic, other non-Hispanic, and Hispanic); and Census region of residence (Northeast, Midwest, West, and South).

[12] Covariates for adults aged 19-64 include: natural log of total CPS-family income; number of individuals in the CPS family aged 0-18, 19-64, and 65+; marital status (married versus not married); highest educational attainment (less-than High School Diploma, High School Diploma equivalent/Associates Degree, Bachelor's Degree, Master's/Professional Degree or Ph.D.); Self-Reported Health Status (Excellent, Very Good, Good, Fair, or Poor); reported disability (difficulty doing errands OR trouble dressing or bathing OR memory trouble OR trouble walking/climbing stairs); age (19-24 reference group, 5 year interval dummies thereafter); sex; race/ethnicity (white non-Hispanic, black non-Hispanic, Other non-Hispanic, and Hispanic); Census region of residence (Northeast, Midwest, West, and South); employment status (employed, self-employed, unemployed, not in labor force, and full time student); number of employees working for employer (<25, 25-99, 100-499, 500+); and occupation dummy for wholesale/retail trade.

public and/or private. Equation (1) can be re-written in terms of the propensity score as follows:

$$\hat{p} = \frac{1}{1 + e^{\hat{\boldsymbol{\beta}}'\mathbf{x}}}, \tag{2}$$

where $\hat{p}$ and $\hat{\boldsymbol{\beta}}$ are estimated via Maximum Likelihood using SAS.

After estimating the propensity scores, the uninsured ($\hat{p}_U$) are matched to the insured ($\hat{p}_I$) using the SAS user-written algorithm 'Greedy Match' (Mayo Clinic, 2003), which is an application of one-to-one 'case-control' matching (discussed below). Finally, after the appropriate matches are made, the actual non-premium MOOP spending values of the matched insured individuals ('controls') are donated to their uninsured counterparts ('cases').

4.2.2 Predictive Mean Matching

This application of 'predictive mean matching' (PMM) closely follows the method initially developed in Rubin (1986) and Little (1988). In this work, child and non-elderly-adult non-premium MOOP spending are modeled as a function of known demographic controls, *conditional on being insured*. Our model specification of choice, based on experimentation with alternative specifications, is a one-part Generalized Linear Model (GLM), with a log-link, and an assumed Poisson error term.[13] Explicitly, the model takes the following form:

$$\ln(E[\mathbf{s}|\text{ Insured} = 1]) = \boldsymbol{\beta}'\mathbf{x} \tag{3}$$

where $\mathbf{s}$ is total non-premium MOOP spending in 2009 US dollars, $\hat{\boldsymbol{\beta}}$ is a vector of parameters to be estimated, and $\mathbf{x}$ is a vector of demographic controls that are highly correlated with non-premium MOOP spending. The controls are defined in the same way as those in equation (1) for children and non-elderly adults, respectively.

Once the parameters have been estimated for the models that are restricted to insured non-elderly adults ($\hat{\boldsymbol{\beta}}^I_A$) and insured children ($\hat{\boldsymbol{\beta}}^I_C$), the predicted values for the insured ($\hat{\mathbf{s}}_I$) are calculated, as well as for the uninsured ($\hat{\mathbf{s}}_U$), who were excluded from the fit of the model. In other words, predicted values of MOOP spending are obtained for the insured and the uninsured using the model parameters for the insured. The predicted mean values of the uninsured ('cases'; $\hat{\mathbf{s}}_U$) are matched with those of the insured ('controls'; $\hat{\mathbf{s}}_I$) using the Greedy Match algorithm. Finally, the uninsured children and non-elderly adults ('cases') are given the *actual* non-premium spending values associated with their (one-to-one) matched insured counterparts ('controls').

[13] The Poisson specification is based on a Park test, and closely follows standard applications in the literature for modeling MOOP expenditures (e.g., Buntin and Zaslavsky, 2004; Manning and Mullahy, 2001).

4.2.3 *G Match Algorithm*

Greedy Match, or gmatch, is a user written macro in the SAS programming language that performs 'case-control' matching using the 'greedy' algorithm (Bergstralh and Kosanke, 1995). A given case is matched with the closest control—in this case, the minimum difference between propensity scores/predicted means of the uninsured (cases; U) and the insured (controls; I). More formally, for a each case $i \in U$, the minimum distance (i.e., match) between the propensity score (or predicted mean) among all possible matches $j \in I$ in the control group is calculated as

$$\forall i \in U \wedge j \in I : \min\{\mathbf{D}\},$$

where $\mathbf{D}$ is a vector if distances for each case and potential control, and the calculated distance for a given case i and control j in vector $\mathbf{D}$ is simply expressed as

$$D_{i,j} = |X_i^U - X_j^I|.$$

In this application we perform one-to-one case-control matching and it is equivalent to 'nearest neighbor' matching. Once a match is made, the process continues with the next remaining (i.e., unmatched) case and the remaining controls. This algorithm is appropriately named "greedy," as once it finds a match, that match is never broken. It is considered the best among the remaining possible matches, independent of the possible impact on potential future matches.[14]

4.3 *Premium Expenditures and the Uninsured*

The third component of this paper investigates: 1) What the distribution of premium expenditures would be for uninsured 'benefit units' (discussed below), if they were assigned (modeled) premium values reflecting current average prices within the non-group (i.e., direct purchase) health insurance market?; and 2) How would this premium adjustment, together with the non-premium adjustment (section 4.2), further affect the poverty estimations? Premium assignments are model-based imputations (discussed below). A 'benefit unit' is defined here as a group of individuals that are on—or would be on, in the case of the uninsured—the same non-group health insurance policy. Possible benefit unit structures created for the uninsured include single person units, spouses without children, single adults with children, and spouses with children.

First, non-group health insurance premiums are modeled via Weighted Least Squares (WLS) for non-elderly policyholders, and respective beneficiaries, using the CPS ASEC data.[15] Fol-

[14] For further reading on the greedy match algorithm, and competing matching algorithms, see Rosenbaum (1989) and the references therein.

[15] The sub-sample for this exercise is limited to non-group non-elderly policyholders who report non-zero pre-

lowing typical insurance policy structure, two models are estimated based on whether the policy is a single (i.e., non-family) or family policy. Covariates included in each respective model are intended to capture common underwriting practices—namely, age, health, and the number of people on a given policy (America's Health Insurance Plans, 2009; Merlis, 2005; Monheit and Cantor, 2004). The family model is specified as the following:

$$y_i = \mathbf{X}_i\boldsymbol{\beta}_1 + \mathbf{M}_i\boldsymbol{\beta}_2 + \mathbf{H}_i\boldsymbol{\beta}_3 + \epsilon_i, \tag{4}$$

where y_i indicates total premium expenditures for (family policy) policyholder i; $\mathbf{X}_i$ is a vector that indicates the number of individuals included on the non-group policy in a given age group (0-18, 19-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64); $\mathbf{M}_i$ is a vector indicating whether the policy holder is married; $\mathbf{H}_i$ is a vector indicating the number of individuals on the policy reporting "Fair" or "Poor" health; and ϵ_i is the error term.

The model for single (non-family) non-group policyholders is a special case of the specification above, where 1) the vector $\mathbf{X}_i$ collapses to dummy variables indicating whether policyholder i's age falls within a given age range (the reference age group is less-than 18), and 2) $\mathbf{M}_i$ is omitted.[16]

Finally, 'benefit units' are constructed among the uninsured children and non-elderly adults in the CPS ASEC. Using the parameter estimates from the models described above, the models are fit to the uninsured benefit units to obtain predicted non-group premium values (imputations) for the uninsured benefit units. Uninsured children with associated family income below (state specific) income eligibility levels for Children's regular Medicaid and children's CHIP-funded expansions are excluded from this exercise (Kaiser Family Foundation, 2010).

5 Results

5.1 Direct Estimates

5.1.1 Demographic Information: 2010 CPS ASEC, 2007 MEPS, and 2004 SIPP

Table 1 reports nationally representative summary statistics of commonly constructed demographic information—health insurance status, health, age, geography, education, and race/ethnicity—for individuals from the 2010 CPS ASEC, 2007 MEPS and 2004 SIPP (Wave 6). Among all

mium spending and no other form of health insurance. Edited (imputed) data is also excluded. A WLS model is used to impute premium values, and not a matching model, namely because the number of uninsured benefit units ('cases') far exceeds the number of non-group policies ('controls') for a typical PSM/PMM application.

[16]Based on experimentation with alternative specifications, we omit health status as it didn't significantly contribute to the non-family model.

these categories, the most obvious difference in the estimates across surveys is for health insurance status, which is anticipated (discussed in Section 3.4). For example, the percentage of people in the CPS ASEC covered by a private health insurance policy (63.9 percent) is larger than that reported in the MEPS (61.7 percent), yet smaller than that reported in the SIPP (71.5 percent). The percentage of CPS ASEC respondents that report having public health insurance coverage and no private coverage (19.4 percent) is lower than in the MEPS (20.6 percent), and higher than in the SIPP (13.4 percent). Given these differences in the insurance coverage composition, it is anticipated that direct MOOP spending estimates by group may also differ across surveys.

Despite the aforementioned differences in health insurance coverage status, the remaining demographic information in Table 1 is comparable *in magnitude* across all three surveys. For example, 5.7 percent of respondents fall into the Other race/ethnicity category (i.e., non-white, non-black, non-Hispanic) in the CPS ASEC, which is lower than in the MEPS (6.8 percent), and the SIPP (6.5 percent). Differences in the estimates across surveys for the remaining information on health, age, geography, education, and race/ethnicity are smaller in magnitude, although statistically significant in the CPS-SIPP comparison, and generally insignificant for the CPS-MEPS comparison.

Table 2 reports family characteristics as families are the relevant unit of analysis for the official poverty measure. Like the individual-level statistics, the largest difference across surveys is among the insurance status estimates. For example, 68.4 percent of families in the CPS ASEC have at least one privately insured member, compared to 66.2 percent in the MEPS, and 77.5 percent in the SIPP. Other differences in the estimates that stand out (in magnitude) include health (CPS versus SIPP only), family size (CPS versus SIPP only), having a bachelors degree, and 'other non-Hispanic' family members. CPS ASEC families are less likely to have someone with a Bachelor's degree (21.6 percent) compared to the MEPS (24.8 percent) or the SIPP (23.0 percent). CPS ASEC families are less likely to have a non-black, non-white, non-Hispanic member (5.7 percent) compared to the MEPS and the SIPP (both 7.3 percent). Despite these statistically significant differences, mostly in the CPS-SIPP comparison, the magnitude of the (significant) differences in estimates across surveys are small—especially when considering the differences in reference periods.

5.1.2 MOOP Spending: 2010 CPS ASEC, 2007 MEPS, and 2004 SIPP

Table 3 reports statistics on individual-level MOOP spending for all three surveys by components—premium spending and non-premium spending—as well total MOOP spending. All monetary statistics are expressed in real 2009 US dollars. Total and non-premium MOOP spending es-

timates are reported for the entire population, while premium spending is restricted to ages 18 years old and older.

Differences in the estimates of average total MOOP spending per person is not statistically significant over the three different surveys (Table 3). Nonetheless, there are notable differences across surveys when investigating the entire distribution of spending. There are fewer people that have zero total MOOP expenditures reported in the MEPS (19.8 percent) than the CPS ASEC (35.9 percent) or the SIPP (34.5 percent). This difference is likely due to the fact that the MEPS collects non-premium MOOP expenditures at the event-level, as opposed to a single summary question as in the CPS ASEC and the SIPP (see Section 3.4).

Figure 1 graphs the weighted kernel density estimates of the (natural log of) total MOOP spending for the three surveys. The MEPS density estimate, the dash-dot line in Figure 1, has a much fatter left tail, and crosses the CPS distribution at about 4.5; this estimate of ln(MOOP) is approximately $90.

Average premium spending ($) per person (aged 18+) is not statistically different across all three surveys, reported in Table 3; nor is the percent of people that report zero premium spending in the CPS-SIPP comparison. However, the proportion of zero spending is higher in the CPS compared to the SIPP, which most likely reflects the significant decrease in private insurance coverage over the different survey reference periods (table 1). These similarities are surprising in that: 1) the CPS ASEC and SIPP are gross measurements, while the MEPS figures are net, and 2) the MEPS includes only premium expenditures on private insurance policies. This may reflect that CPS respondents are not reporting Medicare Part B premiums (as instructed), and that the reimbursement information collected in the SIPP is limited to a small number of respondents.

Estimates of non-premium MOOP spending per person are not statistically different across surveys (Table 3). However, there are stark differences in the proportion of reported spending equal to zero ($0) across surveys: 42.2 percent (CPS ASEC), 23.4 percent (MEPS), and 40.7 percent (SIPP). Differences in the components of total MOOP spending are also apparent when visually investigating the entire distributions, as shown in the kernel density graphs each distribution (premium and non-premium spending) in Figure 2. The major differences in total MOOP spending across surveys lies with non-premium spending (left panel, Figure 2)—premium spending distributions are much more similar in shape and proportion of reported zero ($0) values (left panel, Figure 2). For non-premium spending, graphed in the right panel of Figure 2, the left tail of the distribution is much larger in the MEPS than the distributions graphed in the other two surveys.

Table 4 reports family-level statistics on per-capita family income, income to poverty ratios

(IPR), and MOOP spending. Estimates of average family income per member are similar across surveys: $30,460 (CPS ASEC), $30,245 (MEPS; not statistically different from CPS estimate), and $29,659 (SIPP; statistically different from the CPS estimate). The percentage of families with an IPR less than 150 percent is 25.4 percent for the CPS ASEC compared to 23.5 percent MEPS; on this dimension, the CPS ASEC and the SIPP are not statistically different.

Family-level total MOOP spending estimates ($)—and its two subcomponents, premium and non-premium spending—are not statistically different across the three surveys (Table 4). Differences across surveys are pronounced in the percentage of zero values, which stems from differences in non-premium spending. In the CPS ASEC, 29.2 percent of families report zero non-premium expenditures, compared to 9.3 percent in the MEPS, or 26.7 percent in the SIPP. As discussed above, this difference is mostly a result of the differences in survey design; i.e., the MEPS collects spending at the event level whereas the CPS ASEC and the SIPP collects spending at the aggregate level.

In short, there are noticeable differences in the distributions of MOOP expenditures in the new CPS ASEC questions compared to the MEPS and the SIPP. Nonetheless, the MOOP spending data collected in the CPS ASEC compares well with well-known high-quality sources, such as the MEPS. This is encouraging, especially considering the *much* greater level of detail used in collecting MOOP spending information in the MEPS versus the CPS ASEC and the SIPP.[17]

5.1.3 MOOP Spending Among the Insured & the Uninsured

It is important to emphasize that the distributions of (non-premium) MOOP spending are much different by insurance status. The uninsured population is younger, less educated, and more likely to be non-white than the insured population. Given these differences, it is anticipated that non-premium MOOP expenditures among the uninsured are different than the insured. For example, average non-premium MOOP spending per person for the insured in the CPS ASEC is $696 (37.7 percent of respondents report zero spending) among the insured compared to $417 (64.4 percent zeros) among the uninsured (not reported).

Given the demographic differences of the uninsured, compared to the insured, there are at least two compelling arguments as to why the insured spend more on average than the uninsured. One reason is that younger people tend to have better health. Given that the uninsured are disproportionately young, this lends to lower spending. Another reason may be that the

[17] We also investigated the differences in total family-level MOOP spending over all three surveys, and the synthetic series created by the Betson model mentioned in section 2. The Betson model, for example, *underestimates* average total family-level spending per family by approximately 34 percent, and is greater for families without an elderly member. Finally, the comparison of kernel density estimates reveal that the shape of the distribution of data created by the Betson model is much different than any of the empirical distributions studied here.

uninsured, on average, have relatively less resources (e.g., income and wealth), and may simply forgo needed medical care and therefore spend less.

Figure 3 graphs kernel density estimates of (the natural log of) non-premium spending for the non-elderly by insurance status, and clearly illustrates the differences in the distributions. In terms of the shape of the distributions among non-zero values, the uninsured distribution (dashed line) has (slightly) fatter tails, and appears to be shifted left compared to the insured group (solid line). The other salient difference—not included in the density estimates—is the proportion of zero ($0) spending by insurance status: 32.7 percent for the insured compared to 63.7 percent for the uninsured. In other words, differences in average spending per person are largely driven by the much larger proportion of uninsured respondents reporting zero non-premium MOOP spending.

5.2 Counterfactual MOOP Estimates and Poverty[18]

5.2.1 Uninsured Non-Premium MOOP Expenditure Adjustment & Poverty

Table 5 reports average non-premium MOOP spending by level of aggregation (individuals 0-64 and families without elderly members), insurance status, and method of counterfactual adjustment among the uninsured—Propensity Score Match (PSM) and Predictive Mean Match (PMM).[19] Average non-premium MOOP spending per person among the uninsured increases by over $100 per person after the PSM adjustment (from $415 to $535), which is in part due to a decrease in zero spending values (64.5 percent to 45.7 percent). Qualitatively similar findings are seen for the PMM adjustment. Note that one large reason why the unconditional distributions, after the adjustment, do not match exactly by insurance status is because a disproportionate number of the uninsured are relatively young.

Average non-premium spending per non-elderly family, reported in Table 5, increases by approximately $150 after the adjustment; $719 to $863 for the PSM adjustment and to $829 for the PMM adjustment, which is largely due to a decrease in zero spending (57.8 percent to 35.2 percent with the PSM adjustment and to 32.6 percent for the PMM adjustment). Figure 4 graphs the kernel density estimates of the natural log of non-elderly family-level non-premium spending for insured families, uninsured families, and uninsured families post PSM and PMM

[18] Model estimations used for the uninsured counterfactual MOOP spending adjustments are available to the interested reader in Appendix A, and are not discussed here.

[19] Recall that 'uninsured families' are only those where all members are uninsured, and partially insured families are defined as insured. Therefore the uninsured adjustment for non-premium spending also affects spending estimates among (partially) insured families. Finally, families with at least one member age 65+, and one less-than 65, are excluded in the tables/figures, and therefore do not reflect the entire universe of individuals who received a non-premium MOOP adjustment.

adjustment. Here it is clear that the distributions at the family-level are very different by insurance status, and that the PSM and PMM adjustments result in qualitatively very similar distributions. The distribution of insured family spending is to the right of uninsured families, reflecting greater spending, and the adjustment for uninsured families' pulls in the right tail slightly—all while increasing the number of positive spending families.

Table 6 reports poverty estimates for individuals and families, and for several different populations of interest, excluding and including MOOP spending, and the counterfactual estimates for the uninsured. As published in DeNavas-Walt et al. (2010), the official estimate of the percentage of people in poverty in 2009 (for the entire population) is 14.3 percent (shown in column 1). Incorporating MOOP expenditures increases the estimate to 16.4 percent (shown in column 2). This is a statistically significant increase of 2.03 percentage points (column 5). Similar increases in the poverty rate are estimated among children (20.6 to 22.5 percent), non-elderly adults (12.8 to 14.4 percent), and the non-elderly (15.1 to 16.8 percent).

Accounting for MOOP expenditures at the family level, the poverty rate increases. Among all families, 15.6 percent are estimated as being in poverty using the official poverty measure (Table 6, column 1), which increases to 17.9 percent after incorporating MOOP spending. Families without an elderly member experience a smaller increase (17.2 to 18.8 percent), yet the incidence is higher for these families compared to families with an elderly member (not reported). Finally, there is no statistically significant increase in the estimated poverty rate after incorporating MOOP expenditures among uninsured families without an elderly member. This lack of increase can be explained by the fact that MOOP spending is significantly lower for the uninsured compared to the insured.

Columns (3) and (4) of Table 6 report the poverty estimates after incorporating the non-premium MOOP adjustment for the uninsured using PSM and PMM methods, respectively. Compared to the direct poverty estimates which include MOOP spending in column (2), the poverty estimates after the uninsured adjustment do not significantly change (columns 6 and 7). The (raw and statistically insignificant) increase over these three groups falls in the range of approximately one-fourth to two-thirds of a percentage point (columns 6 and 7).

It is surprising that the non-premium MOOP spending adjustment does not have a larger effect on the estimated poverty rate. However, this is most likely because the uninsured are (mostly) young, and their matched insured counterparts (i.e., 'controls') have similar attributes—including low non-premium MOOP spending. Said differently, there are *few* families whose estimated change in non-premium MOOP spending—on average, an increase of $100 per uninsured person (Table 5)—positions them in poverty.

5.2.2 *Uninsured Premium MOOP Expenditure Adjustment & Poverty*

Table 7 reports average premium spending for non-elderly adults and families, by insurance status. In this table, the uninsured statistics reflect the counterfactual premium imputations (discussed in section 4.3).[20] The premium imputations for the uninsured result in average spending per person that more than double that for insured individuals: $2,646 compared to $1,066. This increase is, in part, anticipated as comprehensive non-group (direct purchase) health insurance policies are typically much more expensive than what individuals would pay in the in the group market; e.g., through an employer, where the employer makes a (large) contribution. Average spending per non-elderly family, is also much higher for the imputed uninsured group: $3,632 versus $1,777. Finally, Table 8 reports total MOOP spending by insurance status, where both adjustments (non-premium and premium) are combined for the uninsured group. The increase in total spending among the uninsured is driven by the premium imputations, and not the non-premium expenditure adjustment. Depending on the method, average total expenditures for the uninsured increases to approximately $2,800 per uninsured non-elderly person compared to $1,350 for the insured.

Table 9 reports revised poverty estimates, where poverty rates increase for individuals and families. For example, the estimated percentage of people in poverty, for the entire population, increases to 18.2 percent (PSM adjustment, column 2) compared with the direct estimate of 16.4 that incorporates actual total MOOP spending (column 1). This is a statistically significant increase of 1.8 percentage points. Among the remaining sub-populations, the increase in the poverty rate is of similar magnitude, with the exception of the non-elderly uninsured and Hispanic populations. By design, the uninsured people have the largest increase. Using the PSM non-premium adjustment, column 3, there is an estimated 8.1 percentage point increase in the poverty rate for non-elderly uninsured individuals, and a 8.8 percentage point increase for non-elderly uninsured families, relative to the direct estimates that incorporate observed MOOP spending (column 1). Results incorporating the PMM adjustment are qualitatively similar. Finally, Hispanics experience such a large increase as they are one of the largest uninsured groups.

6 Discussion

Using the newly collected MOOP spending data in the 2010 CPS ASEC, this paper offers four new and salient findings. The first is that the new MOOP spending data is high quality compared

[20] Approximately 37.5 million (weighted) premiums were imputed, corresponding to approximately 45 million non-elderly uninsured individuals.

to alternative well-know high-quality sources—namely the SIPP and the MEPS. However, there are several areas where the new data differs across sources. For example, there is less "small" spending in the CPS ASEC versus the MEPS, which is likely an artifact of the differences in how the survey collects MOOP spending information across surveys. In response to such differences, the Census Bureau has made several fine-tuning adjustments for the 2011 CPS ASEC survey with the intention of improving the data quality. One change is to include three MOOP-related questions versus the two in the 2010 survey: one question on over-the-counter (OTC) spending, a second for spending on non-OTC medical equipment and services, and a final question on premium expenditures.

The second main finding from this research is that incorporating actual MOOP spending into the poverty estimate, using the NAS recommended method, increases the estimated incidence of people in poverty by approximately two percentage points (reference year 2009) relative to the official measure—from 14.3 to 16.4 percent. The magnitude of this increase is in line with previous research using synthetic MOOP data. This finding, however, offers a measure how including *observed* MOOP spending affects the estimated incidence of poverty.

The third main finding addresses how the distribution of non-premium MOOP spending changes among the uninsured assuming they have the spending patterns of their insured counterparts, and how that counterfactual distribution affects the estimated incidence of poverty. Using two methodologies, the results indicate that (on average) non-premium MOOP spending increases by approximately $100 to $120 per (non-elderly) uninsured person. Nonetheless, there is no statistical evidence that such increases would in turn increase the incidence of poverty. These findings are robust to the choice of matching methodology. However, the non-premium spending adjustment may be a lower bound to an adjustment that incorporates a complete elimination of resource constraints. The matching models account for the family income (per person) associated with an insured versus uninsured respondent, and low-income insured individuals may also be constrained. Similarly, this work does not address low spending due to being 'underinsured' (Banthin, 2004).

Our final result is that poverty rates sharply increase across the entire population when (modeled) non-group health insurance premium costs are included in the uninsured MOOP expenditures. For example, combining both counterfactual MOOP estimates—non-premium and premium spending simultaneously—increases the estimated population poverty rate by an additional 1.8 percentage points over the aforementioned rate including observed MOOP expenditures (16.4 to approximately 18.2 percent). The increase in the estimated poverty rate among non-elderly uninsured adults is (by design) much greater. These estimates are consistent with the notion that a reason the uninsured do not purchase health insurance is that they are

resource constrained. This hypothesis is corroborated by previous work that identifies that the price elasticity of demand for non-group insurance is generally very inelastic (Congressional Budget Office, 2005), and that low-income families without access to employer based plans are very unlikely to take-up non-group policies versus higher-income families (Kaiser Family Foundation, 2008).

One limitation regarding our counterfactual estimates of non-premium and premium MOOP spending is that they are purely statistical estimates, and do not incorporate/model economic behavior, such as partial or general equilibrium effects. In other words, this application is more similar to the statistical methods developed and applied in Barsky et al. (2002) or DiNardo et al. (1996). This limitation is most concerning in terms of non-group premium prices in the event that the uninsured all enter the non-group market, which would likely affect overall non-group premium prices.

Another limiting aspect of this work concerns the models used to impute non-group premium values for the uninsured. Underwriting practices for non-group policies are extremely heterogeneous by state, due to state-specific underwriting laws (Merlis, 2005). This leads, in part, to large variation in average non-group premium prices by state (e.g., America's Health Insurance Plans, 2009, table 3). Given the CPS ASEC's small sample size for non-group coverage, it is impossible to capture this state-specific heterogeneity.

Another factor taken into account in general underwriting practices is the applicant's health, which may lead to a rejection, or higher premium rates, or possibly coverage exclusions. Although the model controls for respondents' health, data limitations do not permit an estimate to control for uninsured respondents who were rejected, or those with limited non-group coverage. Further, the proxy for health (self-reported health status) may be too general to capture the specific health conditions leading to rejections, differences in prices, and/or policy exclusions.

A final point concerning non-group premiums is that there is an abundance of research identifying a positive correlation between higher incomes and better health outcomes (e.g., Deaton, 2003, 2002). Given this fact and current underwriting practices, it is anticipated that the uninsured—with their relatively lower incomes—would pay relatively higher premiums in the non-group market. The net effect of all the aforementioned limitations regarding the premium imputations is unclear, as not all of them would affect prices in the same direction.

Future research will evaluate the fine-tuning and quality of the 2011 CPS ASEC MOOP expenditure data. Additionally, the feasibility of using outside data sources which collect information on non-group health insurance policies will be evaluated in order to address the aforementioned limitations.

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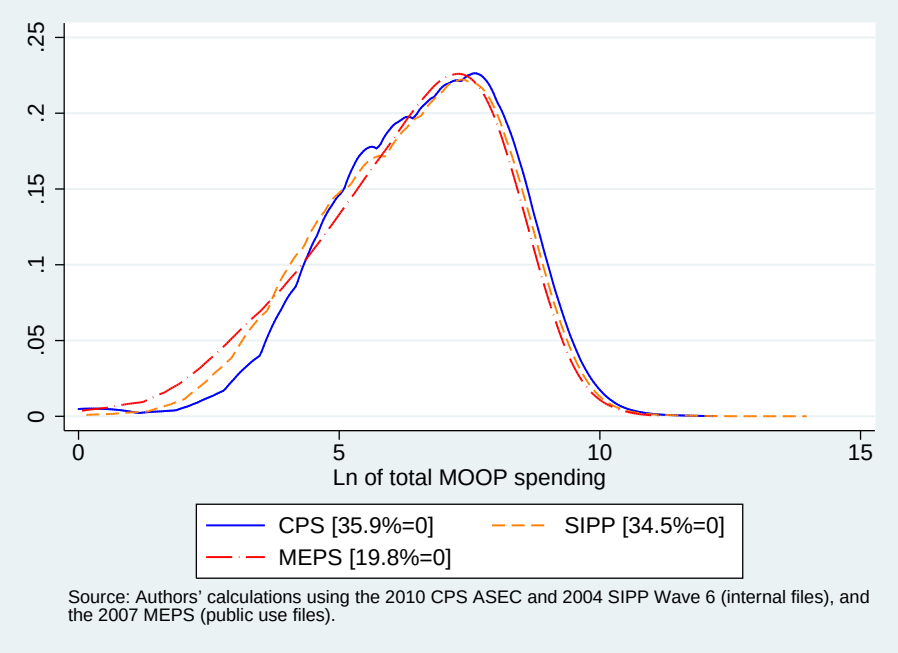

Figure 1: Kernel density estimates of total individual-level MOOP spending

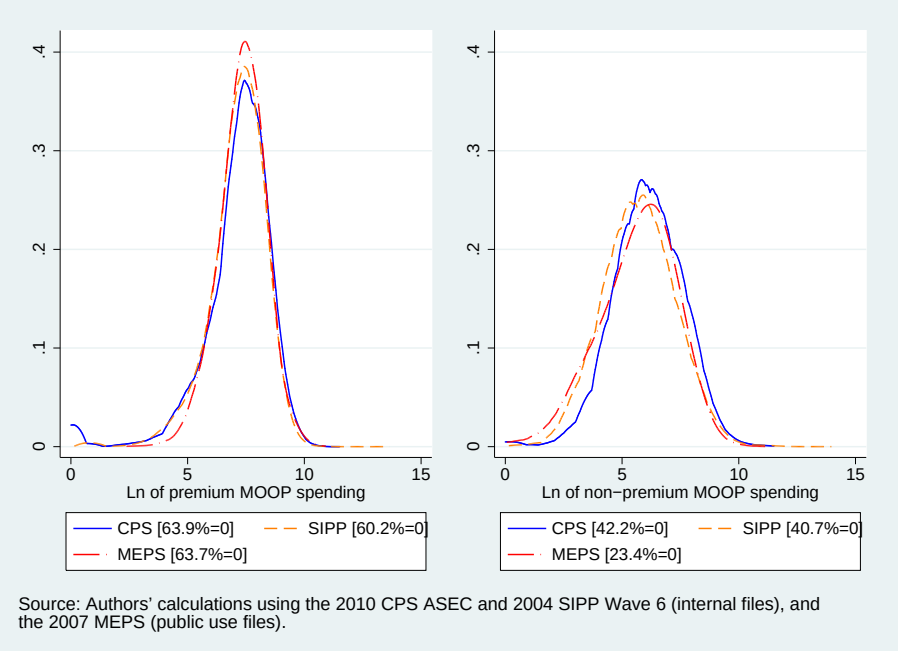

Figure 2: Kernel density estimates of individual-level premium and non-premium spending

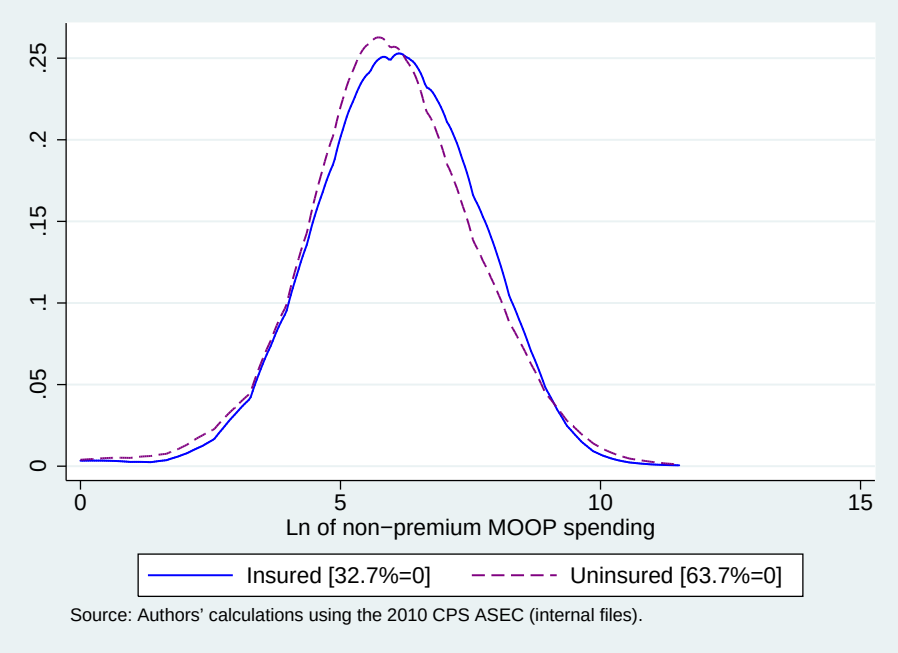

Figure 3: Distributions individual-level non-premium spending for children and non-elderly adults 0-64, by insurance status

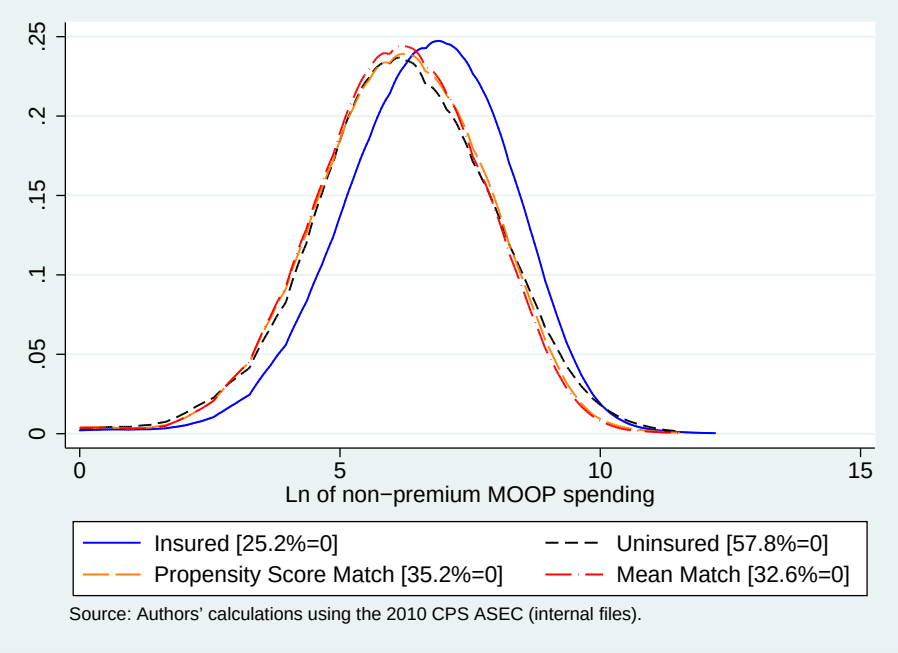

Figure 4: Distributions of non-elderly family-level non-premium MOOP spending by insurance status & counterfactual

Table 1: Summary of individual-level demographic statistics: 2010 CPS ASEC, 2007 MEPS, and 2004 SIPP Wave 6

	2010 CPS ASEC			2007 MEPS			2004 SIPP W6			CPS-MEPS		CPS-SIPP	
	Avg	s.e.†	p50	Avg	s.e.‡	p50	Avg	s.e.†	p50	Δ Avg		Δ Avg	
Health Insurance Status (%)													
Private insurance	63.9	0.21	1.0	61.7	0.62	1.0	71.5	0.25	1.0	2.3	**	-7.6	**
Public & no private insurance	19.4	0.17	0.0	20.6	0.42	0.0	13.4	0.16	0.0	-1.2	*	6.0	**
Uninsured	16.7	0.14	0.0	17.8	0.42	0.0	15.0	0.22	0.0	-1.1	*	1.6	**
Health (%)													
Reporting "poor" or "fair" health	11.7	0.12	0.0	11.0	0.26	0.0	11.3	0.13	0.0	0.7	*	0.4	*
Age													
Age in years	36.9	0.01	36.0	37.0	0.25	36.0	36.4	0.01	36.0	-0.1		0.6	**
Age $<$ 18 years old (%)	24.7	0.03	0.0	24.5	0.35	0.0	25.2	0.02	0.0	0.1		-0.5	**
Age $\geq$ 18 years old (%)	75.3	0.03	1.0	75.5	0.35	1.0	74.8	0.02	1.0	-0.1		0.5	**
Age $\geq$ 65 years old (%)	12.7	0.03	0.0	12.8	0.33	0.0	12.1	0.00	0.0	-0.2		0.6	**
Geography (%)													
Northeast	18.0	0.04	0.0	18.1	0.66	0.0	18.5	0.00	0.0	-0.2		-0.5	**
Midwest	21.7	0.04	0.0	21.9	0.79	0.0	22.3	0.00	0.0	-0.2		-0.6	**
South	36.9	0.05	0.0	36.7	0.86	0.0	36.1	0.00	0.0	0.3		0.8	**
West	23.4	0.04	0.0	23.3	0.74	0.0	23.1	0.00	0.0	0.1		0.3	**
Lives in Metropolitan Area	84.3	0.51	1.0	83.9	0.96	1.0	82.9	0.96	1.0	0.3		1.4	
Education (%)													
Bachelor's Degree	17.1	0.12	0.0	17.1	0.39	0.0	15.1	0.18	0.0	-0.1		2.0	**
Master's/Professional Degree/Ph.D.	8.8	0.10	0.0	9.0	0.32	0.0	7.9	0.13	0.0	-0.2		0.9	**
Race & Ethnicity (%)													
White, Non-Hispanic	65.9	0.06	1.0	65.6	0.82	1.0	66.9	0.07	1.0	0.3		-1.0	**
Black, Non-Hispanic	12.3	0.03	0.0	12.2	0.53	0.0	12.1	0.05	0.0	0.1		0.2	**
Hispanic	16.1	0.00	0.0	15.4	0.65	0.0	14.6	0.00	0.0	0.7		1.5	**
Other, Non-Hispanic	5.7	0.06	0.0	6.8	0.39	0.0	6.5	0.05	0.0	-1.1	**	-0.7	**
N	209,802			29,370			94,617						
Population Estimate	304,279,918			301,309,149			292,140,273						

†s.e. obtained using replicate weights (Fay's Method)
‡s.e. obtained by incorporating Strata and PSUs
** p$<$ 0.01, * p$<$0.05, + p$<$0.1 (two-tailed test)
Notes: All statistics are at the individual level. Education statistics are conditional on age=18 (N CPS=159,609; MEPS=21,094; SIPP=74,042).
Source: Weighted statistics from the 2010 CPS-ASEC, 2004 SIPP Wave 6 (internal files), and 2007 MEPS (public use file).

Table 2: Summary of family-level demographic statistics: 2010 CPS ASEC, 2007 MEPS, and 2004 SIPP Wave 6

	2010 CPS ASEC§			2007 MEPS¶			2004 SIPP W6			CPS-MEPS		CPS-SIPP	
	Avg	**s.e.†**	**p50**	**Avg**	**s.e.‡**	**p50**	**Avg**	**s.e.†**	**p50**	**Δ Avg**		**Δ Avg**	
Health Insurance Status of Family (%)													
Member with private insurance	68.4	0.23	1.0	66.2	0.57	1.0	77.5	0.23	1.0	2.2	**	-9.1	**
Member with public & no private insurance	18.7	0.19	0.0	21.1	0.46	0.0	12.8	0.18	0.0	-2.3	**	5.9	**
All members uninsured	12.9	0.16	0.0	12.7	0.41	0.0	9.7	0.18	0.0	0.1		3.2	**
Health (%)													
Member reporting "poor" or "fair" health	20.8	0.20	0.0	21.1	0.47	0.0	21.8	0.22	0.0	-0.2		-1.0	**
Family Age Structure & Size													
At least one member $\geq$ 65 years old (%)	22.2	0.10	0.0	21.7	0.49	0.0	21.6	0.08	0.0	0.5		0.7	**
Number of members per family	2.3	0.01	2.0	2.3	0.02	2.0	2.3	0.00	2.0	0.0		-0.1	**
Single person family (%)	40.1	0.27	0.0	39.1	0.65	0.0	38.4	0.07	0.0	0.9		1.7	**
More than 3 members in family (%)	19.5	0.16	0.0	19.7	0.47	0.0	21.5	0.16	0.0	-0.2		-1.9	**
Geography & Tenure (%)													
Northeast	18.2	0.10	0.0	18.2	0.62	0.0	18.8	0.13	0.0	0.0		-0.6	**
Midwest	22.3	0.11	0.0	22.3	0.76	0.0	22.5	0.13	0.0	0.0		-0.1	
South	36.6	0.14	0.0	36.5	0.81	0.0	36.2	0.15	0.0	0.1		0.5	*
West	22.9	0.11	0.0	23.0	0.77	0.0	22.6	0.15	0.0	-0.1		0.3	
Metropolitan Area	84.0	0.52	1.0	83.8	0.93	1.0	82.7	0.94	1.0	0.2		1.3	
Highest Educational Attainment of All Family Members (%)													
Bachelor's Degree	21.6	0.18	0.0	24.8	0.57	0.0	23.0	0.26	0.0	-3.2	**	-1.4	**
Master's/Professional Degree/Ph.D.	13.4	0.14	0.0	13.0	0.45	0.0	12.3	0.20	0.0	0.5		1.1	**
Race & Ethnicity (%)													
White, Non-Hispanic family member	72.1	0.13	1.0	71.6	0.75	1.0	73.0	0.16	1.0	0.6		-0.8	**
Black, Non-Hispanic family member	12.7	0.09	0.0	12.5	0.52	0.0	12.3	0.10	0.0	0.2		0.4	**
Hispanic family member	13.8	0.08	0.0	13.8	0.56	0.0	12.8	0.12	0.0	0.0		0.9	**
Other, Non-Hispanic family member	5.7	0.05	0.0	7.3	0.36	0.0	7.3	0.10	0.0	-1.6	**	-1.7	**
N	85,427			11,873			40,385						
Population Estimate	132,466,719			130,346,831			126,440,638						

†s.e. obtained using replicate weights (Fay's Method)
‡s.e. obtained by incorporating Strata and PSUs
§'Single individuals' and 'secondary individuals' are referred to as "single families." 'Related sub-families' are excluded.
¶MEPS families are defined in the same way as CPS families.
** p<0.01, * p<0.05, + p<0.1 (two-tailed test)
Notes: All statistics are at the family level. 'Secondary Individuals' = 15 years old excluded from sample.
Source: Weighted Statistics from the 2010 CPS-ASEC, and 2004 SIPP Wave 6 (internal files), and the 2007 MEPS (public use files).

Table 3: Individual-level MOOP spending

	2010 CPS ASEC				2007 MEPS				2004 SIPP W6				CPS-MEPS		CPS-SIPP	
	Avg	**s.e.†**	**p50**	**N**	**Avg**	**s.e.‡**	**p50**	**N**	**Avg**	**s.e.†**	**p50**	**N**	**Δ Avg**		**Δ Avg**	
Total MOOP Spending (All Ages)																
Total MOOP§(2009 $)	1,306	11.23	200	209,802	1,311	20.17	372	29,370	1,265	29.95	174	94,617	-4.80		40.97	
Ln of MOOP	6.57	0.01	6.80	133,888	6.27	0.02	6.55	21,701	6.42	0.01	6.56	62,044	0.30	**	0.15	**
Total MOOP=$0 (%)	35.93	0.21	0.00	209,802	19.78	0.41	0.00	29,370	34.52	0.38	0.00	94,617	16.15	**	1.41	*
Premium Spending (Ages 18+)																
Premium spending§(2009 $)	871	6.83	0	149,071	872	16.26	0	20,870	884	15.15	0	69,530	-0.68		-12.73	
Ln of premium spending	7.10	0.01	7.35	54,110	7.34	0.01	7.39	6,580	7.16	0.01	7.24	28,061	-0.23	**	-0.05	**
Total premium spending=$0 (%)	63.93	0.18	1.00	149,071	63.71	0.42	1.00	20,870	60.24	0.27	1.00	69,530	0.23		3.69	**
Non-Premium Spending (All Ages)																
Non-premium spending§(2009 $)	649	9.51	100	209,802	649	13.42	175	29,370	659	29.32	58	94,617	0.48		-9.81	
Ln of non-premium spending	6.10	0.01	6.21	97,266	5.66	0.02	5.84	20,753	5.71	0.01	5.67	56,279	0.44	**	0.39	**
Non-premium spending=$0 (%)	42.16	0.23	0.00	209,802	23.44	0.43	0.00	29,370	40.72	0.44	0.00	94,617	18.72	**	1.44	*

†s.e. obtained using replicate weights (Fay's Method)

‡s.e. obtained by incorporating Strata and PSUs

§All monetary values are expressed in real 2009 USD. MEPS and SIPP responses have been inflated, using the CPI, medical care index. SIPP total spending and all MEPS statistics are net of reimbursements; and all CPS ASEC statistics, and SIPP premium and non-premium statistics, are gross of reimbursements.

** p<0.01, * p<0.05, + p<0.1 (two-tailed test)

Notes: All statistics are at the individual level.

Source: Weighted Statistics from the 2010 CPS-ASEC, and 2004 SIPP Wave 6 (internal files), and the 2007 MEPS (public use files).

Table 4: Family-level income and MOOP spending

	2010 CPS ASEC				2007 MEPS				2004 SIPP				CPS-MEPS		CPS-SIPP	
	Avg	s.e.†	p50	N	Avg	s.e.‡	p50	N	Avg	s.e.†	p50	N	Δ Avg		Δ Avg	
Per Capita Family Income																
Family Income/# family members§(2009 $)	30,460	177	21,557	85,427	30,245	380	22,867	11,873	29,659	253	21,285	40,385	215.00		801.00	**
Ln (family Income/# family members)	9.93	0.00	10.02	82,926	9.97	0.01	10.07	11,622	9.89	0.01	10.00	39,023	-0.04	*	0.04	**
Family Income to Poverty Ratio	3.93	0.02	2.86	85,427	3.90	0.05	3.03	11,873	3.82	0.03	2.83	40,209	0.03		0.11	**
Family Income to Poverty Ratio < 1.5 (%)	25.36	0.19	0.00	85,427	23.45	0.55	0.00	11,873	25.12	0.25	0.00	40,385	1.91	**	0.25	
Total Family MOOP Spending																
Total family MOOP§(2009 $)	2,985	26	1,352	85,427	2,921	48	1,678	11,873	2,916	70	1,278	40,385	63.62		68.42	
Ln of family MOOP	7.43	0.01	7.70	68,763	7.24	0.02	7.57	10,998	7.33	0.01	7.58	32,877	0.19	**	0.10	**
Total family MOOP=$0 (%)	20.33	0.23	0.00	85,427	6.93	0.31	0.00	11,873	19.05	0.34	0.00	40,385	13.40	**	1.28	**
Family Premium Spending																
Family premium spending§(2009 $)	1,505	12	230	85,427	1,480	31	364	11,873	1,526	27	418	40,385	25.16		-20.29	
Ln of family premium spending	7.26	0.01	7.56	47,576	7.48	0.02	7.56	5,758	7.35	0.01	7.49	23,025	-0.23	**	-0.10	**
Family premium spending=$0 (%)	45.41	0.25	0.00	85,427	46.51	0.60	0.00	11,873	43.47	0.34	0.00	40,385	-1.10	+	1.94	**
Family Non-Premium Spending																
Family non-premium spending§(2009 $)	1,480	22	400	85,427	1,441	28	693	11,873	1,523	68	349	40,385	38.45		-43.05	
Ln of family non-premium spending	6.66	0.01	6.80	61,345	6.48	0.02	6.73	10,737	6.46	0.01	6.55	29,858	0.18	**	0.20	**
Family non-premium spending=$0 (%)	29.18	0.26	0.00	85,427	9.29	0.35	0.00	11,873	26.65	0.44	0.00	40,385	19.89	**	2.54	**

†s.e. obtained using replicate weights (Fay's Method)

‡s.e. obtained by incorporating Strata and PSUs

§All monetary values are expressed in real 2009 USD. MEPS and SIPP responses have been inflated, using the CPI, medical care index. SIPP total spending and all MEPS statistics are net of reimbursements; and all CPS ASEC statistics, and SIPP premium and non-premium statistics, are gross of reimbursements.

** $p<0.01$, * $p<0.05$, + $p<0.1$ (two-tailed test)

Notes: All Statistics are at the family level. 'Secondary Individuals' = 15 years old excluded from the CPS sample.

Source: Weighted Statistics from the 2010 CPS-ASEC, and 2004 SIPP Wave 6 (internal files), and the 2007 MEPS (public use files).

Table 5: Non-premium MOOP spending by insurance status, with and without counterfactual adjustment

	(1)		(2)		(3)		(4)	
	Insured		**Uninsured**		**Uninsured w/ PSM non-premium Adj.**		**Uninsured w/ PMM non-premium Adj.**	
	Avg	**s.e.†**	**Avg**	**s.e.†**	**Avg**	**s.e.†**	**Avg**	**s.e.†**
Non-Premium Spending per Person (Ages 0-64)								
Non-premium spending (2009 $)	616	10	415	17	535	12	521	11
Non-premium spending=$0 (%)	38.87	0.25	64.48	0.46	45.71	0.32	41.81	0.32
N	155,027		32,524					
Population Estimate	215,278,113		49,928,231					
Non-Premium Spending per Non-Elderly Family‡								
Non-premium spending (2009 $)	1,489	26	719	38	863	26	829	29
Non-premium spending=$0 (%)	25.24	0.27	57.77	0.72	35.23	0.54	32.64	0.56
N	58,533		10,140					
Population Estimate	86,286,795		16,721,096					

†s.e. obtained using replicate weights (Fay's Method)
‡Families with an elderly member are excluded, and therefore the family-level statistics reflect a smaller number of individuals than what is reported for the individual-level statistics above.
Notes: 'Families' as defined here include: Primary Families, Primary Individuals, Unrelated Subfamilies, and Secondary Individuals.
Source: Authors' calculations. Weighted Statistics from the 2010 CPS-ASEC.

Table 6: Poverty estimates (%) incorporating MOOP spending, and the uninsured non-premium spending adjustment

	(1)		**(2)**		**(3)**		**(4)**		**(5)**		**(6)**	**(7)**
	Official Measure		**Including MOOP Spending**		**MOOP w/ PSM Non-Premium Adjustment**		**MOOP w/ PMM Non-Premium Adjustment**		(2)-(1)		(3)-(2)	(4)-(2)
	Est.	**s.e.†**	**Est.**	**s.e.†**	**Est.**	**s.e.†**	**Est.**	**s.e.†**	**Δ**		**Δ**	**Δ**
Individuals												
Total Population	14.34	0.16	16.37	0.17	16.50	0.17	16.40	0.17	2.03	**	0.13	0.03
Children (0-18)	20.61	0.32	22.51	0.34	22.65	0.34	22.46	0.34	1.90	**	0.14	-0.05
Adults (19-64)	12.81	0.16	14.41	0.17	14.55	0.17	14.47	0.17	1.59	**	0.14	0.06
Non-Elderly (0-64)	15.13	0.18	16.82	0.19	16.96	0.19	16.84	0.19	1.68	**	0.14	0.03
White, Non-Hispanic	10.15	0.19	11.85	0.20	11.84	0.20	11.84	0.21	1.70	**	-0.01	0.00
Black, Non-Hispanic	26.13	0.68	27.97	0.67	28.00	0.67	27.79	0.68	1.83	+	0.04	-0.18
Other, Non-Hispanic	13.96	0.78	15.48	0.78	15.97	0.79	15.74	0.79	1.52		0.49	0.26
Hispanic	25.73	0.58	27.31	0.61	27.98	0.61	27.52	0.61	1.58	+	0.67	0.21
Uninsured	27.35	0.44	29.14	0.43	29.70	0.44	29.36	0.43	1.79	**	0.56	0.22
Families‡												
Total Population	15.64	0.16	17.94	0.17	18.03	0.17	17.98	0.17	2.30	**	0.08	0.03
Non-Elderly	17.15	0.19	18.81	0.20	18.91	0.20	18.85	0.21	1.66	**	0.10	0.04
Non-Elderly & Uninsured	34.50	0.57	35.76	0.57	36.18	0.57	35.97	0.57	1.27		0.42	0.21

** p<0.01, * p<0.05, + p<0.1 (two-tailed test)
†s.e. obtained using replicate weights (Fay's Method). The covariance of the estimates are not accounted for in the difference in mean tests (columns 5-7), and the s.e. for the differences are larger as a result.
‡'Families' as defined here include: Primary Families, Primary Individuals, Unrelated Subfamilies, and Secondary Individuals.
Source: Authors' calculations. Weighted Statistics from the 2010 CPS-ASEC (internal files).

Table 7: Premium MOOP spending by insurance status & counterfactual

	Insured		Uninsured w/ Premium Adj.	
	Avg	**s.e.†**	**Avg**	**s.e.†**
Premium Spending per Person (Ages 18-64)				
Premium spending (2009 $)	1,066	8	2,646	9
Total premium spending=$0 (%)	57.37	0.21	12.92	0.20
N	100,271		26,944	
Population Estimate	148,142,183		42,484,889	
Premium Spending per Non-Elderly Family‡				
Premium spending (2009 $)	1,777	14	3,632	26
Total premium spending=$0 (%)	36.25	0.28	0.44	0.06
N	58,533		10,140	
Population Estimate	86,286,795		16,721,096	

†s.e. obtained using replicate weights (Fay's Method)
‡Families with an elderly member are excluded, and therefore the family-level statistics reflect a smaller number of individuals than what is reported for the individual-level statistics above.
Notes: 'Families' as defined here include: Primary Families, Primary Individuals, Unrelated Subfamilies, and Secondary Individuals.
Source: Authors' calculations. Weighted Statistics from the 2010 CPS-ASEC (internal files).

Table 8: Total MOOP spending by insurance status & counterfactual

	Insured		Uninsured w/ Premium & PSM non-premium Adj.		Uninsured w/ Premium & PMM non-premium Adj.	
	Avg	**s.e.†**	**Avg**	**s.e.†**	**Avg**	**s.e.†**
Total MOOP Spending per Person (Ages 0-64)						
Total MOOP§(2009 $)	1,350	12	2,801	15	2,787	16
Total MOOP=$0 (%)	32.33	0.23	12.60	0.23	12.33	0.24
N	155,027		32,524			
Population Estimate	215,278,113		49,928,231			
Total MOOP Spending per Non-Elderly Family						
Total MOOP§(2009 $)	3,266	30	4,495	39	4,461	42
Total MOOP=$0 (%)	15.01	0.23	0.30	0.05	0.35	0.06
N	58,533		10,140			
Population Estimate	86,286,795		16,721,096			

†s.e. obtained using replicate weights (Fay's Method)
‡Families with an elderly member are excluded, and therefore the family-level statistics reflect a smaller number of individuals than what is reported for the individual-level statistics above.
§Average total MOOP spending per person is not equal to the sum of its parts because 1) the universe for reported premium & non-premium spending is not the same, and 2) some imputed premium values are assigned to individuals less-than 18 years old.
Notes: 'Families' as defined here include: Primary Families, Primary Individuals, Unrelated Subfamilies, and Secondary Individuals.
Source: Authors' calculations. Weighted Statistics from the 2010 CPS-ASEC (internal files).

Table 9: Poverty estimates (%) with uninsured premium & non-premium MOOP spending adjustments

	(1)		(2)		(3)		(4)		(5)	
	Including Observed MOOP Spending (No Adj.)		**MOOP Spending w/ Premium & PSM Non-Premium Adj.**		**MOOP Spending w/ Premium & PMM Non-Premium Adj.**		(2)-(1)		(3)-(1)	
	Est.	**s.e.†**	**Est.**	**s.e.†**	**Est.**	**s.e.†**	Δ		Δ	
Individuals										
Total Population	16.37	0.17	18.18	0.18	18.15	0.18	1.81	**	1.78	**
Children (0-18)	22.51	0.34	24.39	0.35	24.32	0.35	1.88	**	1.81	**
Adults (19-64)	14.41	0.17	16.46	0.18	16.42	0.19	2.05	**	2.02	**
Non-Elderly (0-64)	16.82	0.19	18.82	0.20	18.77	0.20	2.00	**	1.96	**
White, Non-Hispanic	11.85	0.20	13.10	0.21	13.10	0.22	1.25	**	1.25	**
Black, Non-Hispanic	27.97	0.67	30.08	0.68	30.17	0.69	2.12	*	2.20	*
Other, Non-Hispanic	15.48	0.78	17.24	0.81	17.32	0.82	1.76		1.84	
Hispanic	27.31	0.61	32.07	0.62	31.72	0.63	4.76	**	4.41	**
Uninsured	29.14	0.43	37.22	0.50	37.02	0.50	8.08	**	7.88	**
Families‡										
Total Population	17.94	0.17	19.65	0.17	19.60	0.17	1.70	**	1.66	**
Non-Elderly	18.81	0.20	20.84	0.21	20.76	0.21	2.03	**	1.96	**
Non-Elderly & Uninsured	35.76	0.57	44.59	0.62	44.15	0.60	8.83	**	8.39	**

†s.e. obtained using replicate weights (Fay's Method). The covariance of the estimates are not accounted for in the difference in mean tests (columns 4 & 5), and the s.e. for the differences are larger as a result.
‡'Families' as defined here include: Primary Families, Primary Individuals, Unrelated Subfamilies, and Secondary Individuals.
Source: Authors' calculations. Weighted Statistics from the 2010 CPS-ASEC (internal files).

Appendix A

The following tables report model estimates used for the uninsured MOOP spending adjustments. Tables A.1 and A.2 present the logit model estimations used to derive the propensity score of being insured for non-elderly adults (19-64) and children (0-18), respectively (discussed in section 4.2.1). Tables A.3 and A.4 present the GLM Log Link non-premium MOOP spending models, conditional on having health insurance, used for the Predictive Mean Match for non-elderly adults (19-64) and children (0-18), respectively (discussed in section 4.2.2). And finally, Tables A.5 and A.6 present WLS models for non-group health insurance premium spending used for the uninsured premium adjustment/imputations for family and non-family policies, respectively (discussed in section 4.3). Regression results in the latter two tables do not take into account the complex survey design of the CPS ASEC (i.e., replicate weights), namely because the models are only used for imputation purposes.

Table A.1: Logit model for propensity score of having health insurance, adults 19-64

	Coefficient	s.e.†	
Natural Log of Family Income	0.200	0.007	**
Number of Family Members (per age group)			
age≤18	0.066	0.011	**
18≤age≤64	-0.195	0.016	**
age≥64	-0.363	0.034	**
Marital Status (Married=1)	0.823	0.028	**
Education (reference = less than H.S. Equivalent)			
H.S. Equivalent/Associate's Degree	0.485	0.033	**
Bachelor's Degree	1.073	0.042	**
Master's/Professional Degree/Ph.D.	1.399	0.064	**
Health Status (reference = Excellent)			
Very Good	-0.175	0.029	**
Good	-0.383	0.031	**
Fair	-0.236	0.041	**
Poor	-0.088	0.073	
Disability	0.877	0.051	**
Age (reference = 19-24)			
25-29	-0.086	0.042	*
30-34	-0.032	0.048	
35-39	0.126	0.047	**
40-44	0.267	0.048	**
45-49	0.392	0.047	**
50-54	0.543	0.049	**
55-59	0.614	0.054	**
60-64	0.847	0.057	**
Male	-0.195	0.018	**
Race & Ethnicity (reference = White, Non-Hispanic)			
Black, Non-Hispanic family member	-0.220	0.033	**
Hispanic family member	-0.928	0.032	**
Other, Non-Hispanic family member	-0.385	0.054	**
Residence (reference = South)			
Northeast	0.579	0.037	**
Midwest	0.378	0.033	**
West	0.324	0.033	**
Employment Status (reference = unemployed)			
Employed (Excluding self-employed)	0.282	0.081	**
Self-employed	-0.172	0.046	**
Not in labor force	0.564	0.037	**
Full Time Student	1.580	0.060	**
Employer Number of Employees (reference = 0)			
<25 workers	-0.177	0.082	*
25-99 workers	0.454	0.088	**
100-499 workers	0.770	0.083	**
500+ workers	1.067	0.082	**
Industry: Wholesale & Retail Trade	-0.106	0.031	**
Intercept	-2.107	0.091	**
N	123,097		

** p<0.01, * p<0.05, + p<0.1

†s.e. obtained using replicate weights (Fay's Method)

Notes: Logit model is estimated only on insured non-elderly adults aged 19-64. Dependent variable identifies that the individual has health insurance (any type).

Source: Authors' calculations using the 2010 CPS-ASEC (internal files).

Table A.2: Logit model for propensity score of having health insurance, ages 0-18

	Coefficient	**s.e.†**	
Natural Log of Family Income	0.124	0.009	**
Number of Family Members (per age group)			
age=18	0.027	0.030	
18≤age≤64	-0.258	0.028	**
age≥64	-0.543	0.059	**
Max Education Family Members (reference = less than H.S. Equivalent)			
H.S. Equivalent/Associate's Degree	0.244	0.074	**
Bachelor's Degree	0.868	0.104	**
Master's/Professional Degree/Ph.D.	1.244	0.115	**
Health Status (reference = Excellent)			
Very Good	0.013	0.055	
Good	-0.107	0.061	+
Fair	0.448	0.154	**
Poor	0.161	0.356	
Age (reference = 1-4 years old)			
infant	-0.349	0.085	**
5-9	-0.197	0.050	**
10-13	-0.303	0.057	**
14-18	-0.568	0.051	**
Male	-0.016	0.030	
Race & Ethnicity (reference = White, Non-Hispanic)			
Black, Non-Hispanic family member	-0.205	0.074	**
Hispanic family member	-0.651	0.061	**
Other, Non-Hispanic family member	-0.403	0.108	**
Residence (reference = South)			
Northeast	0.582	0.073	**
Midwest	0.430	0.074	**
West	0.396	0.059	**
Intercept	1.240	0.125	**
N	63,733		

** p<0.01, * p<0.05, + p<0.1

†s.e. obtained using replicate weights (Fay's Method)

Notes: Logit model is estimated only on insured children aged 0-18. Dependent variable identifies that the individual has health insurance (any type).

Source: Authors' calculations using the 2010 CPS-ASEC (internal files).

Table A.3: GLM Log Link non-premium MOOP spending model, insured adults 19-64

	Coefficient	s.e.†	
Natural Log of Family Income	0.152	0.021	**
Number of Family Members (per age group)			
age≤18	-0.019	0.016	
18≤age≤64	-0.063	0.018	**
age≥64	-0.050	0.045	
Marital Status (Married=1)	0.102	0.037	**
Education (reference = less than H.S. Equivalent)			
H.S. Equivalent/Associate's Degree	0.234	0.067	**
Bachelor's Degree	0.397	0.070	**
Master's/Professional Degree/Ph.D.	0.491	0.073	**
Health Status (reference = Excellent)			
Very Good	0.089	0.033	**
Good	0.552	0.063	**
Fair	0.857	0.057	**
Poor	1.023	0.104	**
Disability	0.120	0.056	*
Age (reference = 19-24)			
25-29	0.110	0.155	
30-34	0.291	0.148	*
35-39	0.259	0.158	
40-44	0.275	0.156	+
45-49	0.293	0.160	+
50-54	0.511	0.164	**
55-59	0.604	0.166	**
60-64	0.627	0.164	**
Male	-0.156	0.021	**
Race & Ethnicity (reference = White, Non-Hispanic)			
Black, Non-Hispanic family member	-0.404	0.043	**
Hispanic family member	-0.434	0.040	**
Other, Non-Hispanic family member	-0.347	0.074	**
Residence (reference = South)			
Northeast	-0.383	0.041	**
Midwest	-0.151	0.050	**
West	-0.032	0.048	
Employment Status (reference = unemployed)			
Employed (Excluding self-employed)	0.228	0.133	+
Self-employed	0.280	0.061	**
Not in labor force	0.004	0.053	
Full Time Student	-0.018	0.165	
Employer Number of Employees (reference = 0)			
<25 workers	-0.174	0.129	
25-99 workers	-0.188	0.128	
100-499 workers	-0.205	0.132	
500+ workers	-0.189	0.125	
Industry: Wholesale & Retail Trade	0.015	0.044	
Intercept	4.318	0.218	**
N			

** p<0.01, * p<0.05, + p<0.1

†s.e. obtained using replicate weights (Fay's Method)

Notes: GLM log link model is estimated only on insured (any type) non-elderly adults aged 19-64. Dependent variable equals total non-premium MOOP spending (2009 $).

Source: Authors' calculations using the 2010 CPS-ASEC (internal files).

Table A.4: GLM Log Link non-premium MOOP spending model, insured children 0-18

	Coefficient	**s.e.†**	
Natural Log of Family Income	0.317	0.056	**
Number of Family Members (per age group)			
age≤18	-0.131	0.020	**
18≤age≤64	-0.185	0.031	**
age≥64	-0.204	0.070	**
Max Education Family Members (reference = less than H.S. Equivalent)			
H.S. Equivalent/Associate's Degree	0.557	0.128	**
Bachelor's Degree	0.869	0.127	**
Master's/Professional Degree/Ph.D.	0.902	0.128	**
Health Status (reference = Excellent)			
Very Good	0.116	0.041	**
Good	0.577	0.074	**
Fair	1.599	0.154	**
Poor	1.832	0.195	**
Infant (reference = age>1 year old)	0.077	0.081	
Male	0.004	0.042	
Race & Ethnicity (reference = White, Non-Hispanic)			
Black, Non-Hispanic family member	-0.557	0.070	**
Hispanic family member	-0.298	0.087	**
Other, Non-Hispanic family member	-0.226	0.069	**
Residence (reference = South)			
Northeast	-0.189	0.069	**
Midwest	-0.044	0.052	
West	-0.043	0.056	
Intercept	2.061	0.650	**
N			

** p<0.01, * p<0.05, + p<0.1

†s.e. obtained using replicate weights (Fay's Method)

Notes: GLM log link model is estimated only on insured children aged 0-18. Dependent variable equals total non-premium MOOP spending (2009 $). Model is limited only to insured individuals (any type).

Source: Authors' calculations using the 2010 CPS-ASEC (internal files).

Table A.5: Non-group premium expenditure model (WLS), family policies

	Coefficient	s.e.	
Number of Individuals on Policy (per age group)			
0-18	686.8	143.5	**
19-34	357.1	238.0	
35-39	1,162.9	350.6	**
40-44	1,169.3	321.7	**
45-49	2,207.2	303.4	**
50-54	2,099.9	314.8	**
55-59	1,854.6	341.1	**
60-64	3,672.7	373.2	**
Married	1,157.4	427.2	**
Number of Individuals on Policy Reporting Fair/Poor Health	2,111.0	969.0	*
Intercept	1,062.5	522.6	*
N	1,005		
Adjusted R-Squared	0.16		

** p<0.01, * p<0.05, + p<0.1
Notes: WLS model is estimated only for policyholders of family non-group health insurance policies. Dependent variable is total premium spending (2009 $).
Source: Authors' calculations using the 2010 CPS-ASEC (internal files).

Table A.6: Non-group premium expenditure model (WLS), single person policies

	Coefficient	s.e.	
Age of Policyholder (reference = age 15-18)			
19-34	407.4	1,470.6	
35-39	1,217.0	1,493.5	
40-44	2,504.9	1,485.8	+
45-49	2,206.0	1,481.3	
50-54	2,810.6	1,478.2	+
55-59	2,932.2	1,477.8	*
60-64	4,110.3	1,475.9	**
Intercept	1,262.1	1,466.0	
N	1,564		
Adjusted R-Squared	0.20		

** p<0.01, * p<0.05, + p<0.1
Notes: WLS model is estimated only for policyholders of single (non-family) non-group health insurance policies. Dependent variable is total premium spending (2009 $).
Source: Authors' calculations using the 2010 CPS-ASEC (internal files).