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INSURANCE AND THE UTILIZATION OF MEDICAL SERVICES AMONG THE SELF-EMPLOYED

Craig William Perry
Harvey S. Rosen*

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CESifo
Center for Economic Studies & Ifo Institute for Economic Research
Poschingerstr. 5, 81679 Munich, Germany
Phone: +49 (89) 9224-1410 - Fax: +49 (89) 9224-1409
e-mail: office@CESifo.de
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Abstract

There has been substantial public policy concern over the relatively low rates of health insurance coverage among the self-employed in the United States. We use data from the Medical Expenditure Panel Survey conducted in 1996 to analyze how the self-employed and wage-earners differ both with respect to insurance coverage and utilization of a variety of health care services. Our results suggest that for the self-employed, the link between insurance and utilization of health care services is not as strong as assumed in the policy debate. For a number of medical care services, the self-employed have the same rates of utilization as wage-earners, despite the fact that they are substantially less likely to be insured. And when the self-employed are less likely than wage-earners to utilize a particular medical service, the differences are generally less than one would expect solely on the basis of the difference in insurance coverage rates. The self-employed thus appear to be able to finance access to health care from sources other than insurance. Further, analysis of out-of-pocket expenditures on health care suggests that doing so does not lead to substantial reductions in their ability to consume other goods and services. Finally, there is no evidence that children of the self-employed have less access to health care than the children of wage-earners. Hence, the public policy concern over the relative lack of health insurance among the self-employed may be somewhat misplaced.

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Craig William Perry
Princeton University Investment Co.
22 Chambers Street
Princeton, NJ 08542
cwperry@princeton.edu

Harvey S. Rosen
Department of Economics
Princeton University
Princeton, NJ 08544
hsr@princeton.edu

1. Introduction

About 44.2 million Americans, over 16 percent of the population, lack any kind of medical insurance. This phenomenon is central to policy debates about health care. As President Clinton observed, "This is a problem that America cannot let go." Self – employed people have received particular attention in this context because of their lower than average insurance rates—only 68 percent of those under 63 years of age had any coverage in 1996, according to our tabulations from the Medical Expenditure Panel Survey.

The principal public policy response to the situation of the self-employed has been to subsidize their purchases of health insurance through the personal income tax. Currently, self-employed workers are allowed to deduct 60 percent of their health-insurance premiums, which is up from 45 percent in 1998. According to recent legislation, this figure is scheduled to increase to 70 percent in 2002 and 100 percent in 2003 and thereafter. [1] Rules Committee Chairman David Dreir hailed the bill's passage by saying: "The American people are concerned that they can't gain access to quality health care...Accessibility is our key. We're moving toward it" (Murray and McGinley [1999]). According to news reports, insurance companies have been lobbying the congress to accelerate this schedule[2], and during her brief run for the Republican presidential nomination, Elizabeth Dole supported this proposal.

Congressman Dreir's statement is useful because it spells out clearly the putative reasoning behind the policy of subsidizing insurance purchases for the self-employed—lack of insurance translates into lack of utilization of health care. It is, in fact, well

[1] See Internal Revenue Service Code section 162(1).

documented that the self-employed are less likely to be insured than wage-earners, even after taking into account their differing demographic characteristics (Holtz-Eakin, Penrod, and Rosen [1996] and Hamilton [2000]). However, it is not obvious that, for this group of people, lack of insurance does indeed translate into lack of utilization of health care services. Health care, after all, can be financed from sources other than insurance. In fact, we know of no research that examines whether the self-employed utilize health services less than their wage-earning counterparts. This paper investigates the links between health insurance and utilization among the self-employed. The centerpiece of the study is a statistical analysis of the differences in utilization rates for various medical services between the self-employed and wage-earners.

This topic falls squarely within the agenda suggested by Musgrave's [1959] famous tripartite model of the public sector. In particular, "The manager of the Allocation Branch must determine what adjustments in allocation are needed, ...and what revenue and expenditure policies are required to achieve the desired objectives" (p. 5). In our context, the manager needs to decide whether to adopt a tax subsidy for the purchase of a particular commodity (health insurance) for a particular group of the population (the self-employed). To make this determination, the manager requires certain information about the allocation of this commodity under the status quo, and providing that information is the goal of this paper.

Section 2 provides a brief review of previous literature. Section 3 outlines the empirical strategy and describes our data set, the 1996 wave of the Medical Expenditure Panel Survey (MEPS). The MEPS has rich information on individuals' utilization of a variety of medical services, including a set of important diagnostic tests. Section 4

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[2] See *Wall Street Journal*, October 7, 1999.

discusses econometric issues and presents the results. The main finding is that even though the self-employed are less likely to have insurance than wage-earners, the gap in the utilization of health care services is generally much smaller than the gap in insurance. Indeed, for some important services, there is no substantial gap at all. In Section 5 we turn to the closely related question of whether the medical expenditures incurred by the self-employed substantially reduce their capacity to purchase other commodities, and find no evidence to support this concern. Further, in Section 6 we find that, to the extent that we are able to measure, the children of the self-employed are no less likely to have access to medical services than the children of wage-earners. Hence, concerns that the self-employed need insurance subsidies in order to increase their utilization of medical services, to maintain their standard of living, or to help their children obtain health care may be misplaced. Section 7 provides a summary and suggestions for future research.

2. Previous Literature

The determinants of health care utilization have been the subject of several studies. Kass, Weinick and Monheit [1999] used the MEPS data to examine differences in utilization rates by race. A noteworthy aspect of their study is that they moved beyond the conventional approach of considering only doctor visits or hospital admissions. Instead they studied a wide variety of health services, including diagnostic tests such as breast exams, which many medical practitioners view as being important for maintaining good health. Their analysis, however, was confined to comparisons of means by race. They did no multivariate analysis to take into account other variables that might affect utilization rates. Gilleskie [1997] studied utilization decisions in the context of worker

absentee decisions, but only considered doctor visits. Currie and Gruber's [1995] careful examination of the effect of changes in Medicaid eligibility on medical care utilization looked only at doctor visits and hospitalizations and focused on the low-income part of the population. None of these studies considered issues relating to self-employment.

Within a rather different institutional environment, Stabile [1998] examined the effects of the Canadian government's subsidies to employer-provided health insurance on individuals' decision to purchase insurance and their utilization of publicly-funded health services. He studied the impact of health status and supplemental health insurance coverage on doctor visits and hospital stays. Like the research in the U.S. context, Stabile did not consider issues related to the self-employed; indeed, he excluded them from his statistical analysis.

In short, the papers in the existing literature either look at a restrictive set of utilization measures or ignore the multivariate nature of the problem of explaining differential utilization rates across groups. What is more important given the public policy debate on subsidizing health insurance for the self-employed, none of them focuses on the links among insurance, utilization, and self-employment.[3]

3. Data

3.1 Description

Our basic empirical strategy is to see whether the differences between the self-employed and wage-earners in the utilization of various medical services are in line with their differential insurance rates. In short, are the differences in utilization rates about what we would expect given the differences in the rates of insurance coverage?

Implementing this strategy requires information on individuals' utilization of various medical services and insurance coverage, along with a set of exogenous characteristics that might be expected to influence utilization and insurance decisions. We draw upon the Household Component of the 1996 Medical Expenditure Panel Survey (MEPS). The panel consists of approximately 22,000 respondents who comprise 9,500 families. The respondents were asked a series of questions relating to their demographic characteristics, insurance coverage, employment status, and medical care use. We exclude from the sample those with missing information on education and insurance status as well as individuals who were not employed. Further, we exclude any persons younger than 18 and older than 62.[4] Those under 18 are unlikely to have developed a strong attachment to the labor market, and the decisions of those over 62 are complicated by impending retirement. All of these exclusions left a group of 9552 individuals, of whom 1158 (12%) were self-employed. This corresponds fairly closely to other estimates of the self-employment rate in 1996 (U.S. Bureau of the Census [1998, p. 412]).

As noted in section 2, most previous studies of access have relied on a very limited set of utilization measures. An important strength of the MEPS is that in addition to insurance status, it contains information on a large variety of medical services, including not only conventional items such as doctor visits and hospital stays, but also visits to other kinds of practitioners like dentists and chiropractors. As well, it provides data on the utilization of some important diagnostic procedures, such as breast examinations and blood pressure tests. Somewhat arbitrarily, we divide the procedures

[3] In contrast, there is a substantial literature on how the implicit subsidy for health insurance in the tax code affects insurance coverage for the self-employed. See, for example, Gruber and Poterba [1994] and Marquis and Long [1995].

into two groups. The first group, site-based services, consists of doctor visits, hospital admissions, hospital stays, chiropractor visits, optometrist visits, and alternative care. The second group, screening and preventative care services, consists of breast exams, physical exams, dentist visits, flu shots, mammograms, prostate exams, prescription medicine purchases, blood pressure checks, and cholesterol checks.[5]

Of course, utilization rates do not necessarily measure adequately the quality of services received. Two people who both visit the doctor during the year are not automatically receiving the same health care. For example, during a given visit, a physician might spend more time with an insured patient than an uninsured patient, or order more diagnostic tests for the former than the latter. In Section 5 below we examine this conjecture using data on expenditures per doctor visit. Another possible problem with studying utilization measures is that we ultimately care about the "output" health status rather than the health services "inputs" per se. This is a legitimate concern, and we have examined health outcomes in another paper (Perry and Rosen [2001]). However, access to health care is of independent interest, if for no other reason than it clearly drives the public policy debate. Recall Congressman Dreir's statement that was quoted above: "Accessibility is our key."

3.2 A Preliminary Look at the Data

Table 1 focuses on insurance coverage and rates of health care utilization by employment status. For each variable, column (1) shows the mean for the entire sample;

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[4]We lose 28 observations because of missing data on education, 3612 because of missing data on employment, 4 because of missing insurance data, and 10,034 from the exclusion of those over 62.

[5] For several of these procedures (e.g. breast exam, cholesterol check, prostate exam) the MEPS provides the history of utilization. That is, we know if the individual had the procedure within the past year, within

column (2) the mean for the self-employed; and column (3) the mean for wage-earners. The fourth column displays the t-statistics associated with the hypothesis that the means of the relevant variables are equal.

The first row of the table shows rates of insurance for each group. It is based on a dichotomous variable in the MEPS file that takes a value of one if the individual has health insurance coverage and zero otherwise. Specifically, the variable equals one if the individual is covered under Medicare, Medicaid, CHAMPUS/CHAMPVA[6], other public hospital/physician or private hospital/physician insurance. (An individual who receives spousal coverage is construed as being covered for purposes of defining this variable.) The results in the first row of the table indicate that the self-employed are substantially less likely than wage-earners to have any health insurance. Only 68 percent of the self-employed in our sample have insurance compared with 81 percent of the wage-earners. From column (4), this difference is significant at all conventional levels, a finding consistent with tabulations from other data sets.[7]

A key question is whether the relative lack of insurance on the part of the self-employed is associated with a commensurate lack of utilization of health services. The results in Table 1 are quite interesting in this respect. For some services (hospital admissions, hospital stays, cholesterol exams, dental checkups, mammograms, and optometrist visits), there are no statistically significant differences in utilization rates. Second, for other services, there are statistically significant differences, but the self-

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the past two years, within the past 5 years, more than 5 years ago, or never had one. Since we only have insurance data from the past year, we focus exclusively on utilization within the past year.

[6] CHAMPUS is a health benefits program designed to provide medical coverage for the dependents of active duty military servicemen/women. CHAMPVA is intended for dependents and survivors of severely disabled veterans..

[7] See, for example, Holtz-Eakin, Penrod, and Rosen's [1996] tabulations from the SIPP data or Health Insurance Association of America [1999].

employed have *higher* utilization rates (alternative care, prostate exams, chiropractor visits). Finally, in the cases where the utilization rates are statistically significantly lower for the self-employed, the percentage differences are often smaller than the percentage difference in insurance coverage. For example, the self-employed are 15.8 percent less likely to be insured, but only 6 percent less likely to have visited a doctor. The same pattern holds for blood pressure exams, physical exams, and prescription medicine purchases. Only for breast exams and flu shots are the percentage differences greater than the percentage difference in insurance rates.

In short, the tabulations in Table 1 suggest that despite their relatively low insurance rates, the self-employed are not necessarily less likely than their wage-earning counterparts to utilize a variety of health care services. Further, where the self-employed are statistically less likely to use services, the percentage differences are often less than the percentage differences in insurance rates.[8] That said, we should not make too much of the specific results in Table 1, because a variety of factors might influence utilization of health care services, and some of these could be correlated with self-employment status. Hence, while the results are suggestive, we now turn to a multivariate approach.

4. Multivariate Analysis of Utilization Rates

The preliminary calculations in Table 1 suggest that self-employed individuals' low propensity to have medical insurance does not necessarily translate into less utilization of medical services. But such univariate comparisons ignore the fact that

[8] We also did two-way comparisons of utilization rates by employment status and insurance status. For most services, the average utilization rates are less for the self-employed than for wage-earners, even when they have the same insurance status. This is consistent with the message of Table 1, that insurance cannot enitrely "explain" the differences between wage-earners and the self-employed. However, this finding

variables other than employment status may affect utilization rates. An appropriate empirical model should allow the probability that an individual utilizes a given medical service to depend on his or her relevant personal characteristics as well as self-employment status. We use the conventional probit model, which posits that the probability that individual *i* utilizes some service is given by

$$\text{Prob}\,(Util_i>0) = F[\beta X_i + \delta SE_i\,], \qquad (4.1)$$

where X_i is a vector of observable demographic characteristics, SE_i is a dichotomous variable equal to one if the individual is self-employed and zero otherwise, and F[ ] is the cumulative normal distribution.[9]

An important issue is what variables to include in the vector of demographic characteristics X_i. The MEPS contains fairly extensive demographic information. We attempted to select only those characteristics that were very likely to be exogenous to insurance and health care utilization decisions. Age is included because it affects the likelihood of needing health services—health problems tend to increase with age (Lakdawlka and Philipson [1998]). Also, certain procedures like mammograms and prostate exams become highly recommended only after certain ages are reached. We also include the square of age because previous research suggests that a quadratic function may be appropriate.[10] Education can be expected to influence both individuals' physical condition and their capacity to pay for care (Taubman and Rosen [1982]); hence we

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must be viewed with caution, because it is based on stratification by an endogenous variable (insurance status).

[9] White's correction is used to obtain heteroskedastic consistent standard errors.

include a set of dichotomous variables for educational attainment. There is some evidence that certain minority groups are less likely than others to obtain medical care (Kass, Weinick, Monheit [1996]). In order to allow for this possibility, we added a set of race/ethnicity dichotomous variables. Similarly, previous research suggests that the type of care a person receives varies by region, (Skinner and Wennberg [1998]; Cutler and Sheiner [1999]), so we enter a set of indicator variables for the region of the country in which the person lives.[11]

In addition, we add a dichotomous variable for the individual's sex, because women and men have different medical needs and risk preferences.[12] Finally, we include a dichotomous variable for marital status and a continuous variable for family size--number of adults plus dependents. Taubman and Rosen [1982] argue that there is reason to suspect marital status is correlated with differing levels of stress among individuals; similar reasoning suggests that it is reasonable to include family size as well.[13]

Our specification omits certain variables that have appeared as explanatory variables in several previous studies of health care utilization. For example, Stabile [1998] and Ross and Mirowsky [2000] include on the right hand side of their utilization equations indicator variables for the individual's insurance status, self-assessed health, and the presence of any chronic health conditions. Ross and Mirowsky include income as well. Such variables might very well be endogenous, however. As Gruber [2000, p. 46] notes, "insurance coverage itself may be a function of health status, leading to

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[10] We also entered age as a set of dichotomous variables instead of a quadratic, and it had no impact on our substantive results.
[11] The regional classifications correspond to those used by the Census Bureau.
[12] See Hagan, Simpson, and Gillis [1987] and Barber and Odean [2000] on differences in risk preferences by sex.

endogeneity bias in estimates of the effects of insurance on health and on the utilization of medical care." In the same way, there is a substantial literature documenting the links between income and health status, but the direction of causality is not known. (See, for example, Deaton and Paxson [1999] and Ettner [1996].) To the extent that individuals' incomes are low because they are in poor health (and utilizing health care services intensively), then income is an endogenous variable and should be excluded from the reduced form. [14]

It is not clear whether there are available any compelling instruments for income, health status, and insurance status in this context. We try to include only exogenous variables on the right hand side of equation (4.1). While this makes it difficult to attach a structural interpretation to the results, it does increase the likelihood of obtaining consistent parameter estimates. [15]

Table 2 lists the right hand side variables, and presents summary statistics broken down by self-employment status. For each variable, the first column shows the mean value for the entire sample; the second and third columns show the means for the self-employed and wage-earners, respectively. The fourth column has t-tests on the differences in the means between columns (2) and (3). The table suggests that, in certain respects, the self-employed and wage-earners are fairly similar—levels of educational

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[13] However, one can imagine that marital status and family size may be endogenous to medical services utilization. We therefore estimated our models without these two variables. Doing so had no impact upon the substantive results.

[14] As an experiment, we estimated our canonical model including income on the right hand side. We found that while income was positively related to insurance coverage and utilization, our substantive results did not change. In the same spirit, we also augmented the equation with dichotomous variables for the industry in which the individual worked. This, too, left our substantive results unchanged.

[15] Despite the likely endogeneity of insurance status, for the sake of completeness, we estimated the basic equation including the insurance dichotomous variable and its interaction with the self-employment indicator on the right hand side. As expected, for most health care services, insurance increases the probability has a positive and significant coefficient. Importantly, the results with respect to the impact of self-employment are very similar to those reported below.

attainment, family size, and distribution across regions are roughly the same. On the other hand, the two groups differ in terms of race, sex, and marital status. The self-employed are more likely to be white, male, and married with a spouse present. Further, the self-employed tend to be older (5.2 years) on average than wage-earners. These findings on demographic differences between self-employed and wage-earning individuals generally echo those of previous research; see, e.g., Fairlie and Meyer [1999].

A relevant question in this context is whether there is unobservable heterogeneity with respect to the utilization of health care services. Do the self-employed and wage-earners differ systematically in their underlying demands in a way that cannot be captured by the covariates in Table 2? In particular, might there be unobservable variables that drive both the demand for health care services and the propensity to become self-employed? Suppose, for example, that self-employment requires a lot of energy and vigor. Healthy people (who tend not to demand many medical services) will therefore tend to enter self-employment, *ceteris paribus*. The self-employed, then, utilize fewer health services simply because they are healthier than wage-earners. Put another way, if there is some underlying relationship between health and employment status, it may muddy the interpretation of our results.

Previous research suggests that this is probably not much of a problem. Holtz-Eakin, Penrod, and Rosen [1996] employed both the Survey of Income and Program Participation (SIPP) and the Panel Study of Income Dynamics data to examine transitions from wage-earning to self-employment. Both data sets indicate that in a given year, those wage-earners who become self-employed in the future are not statistically different in

their health status or health care utilization from the ones who remain wage-earners.[16] This finding is confirmed by Perry and Rosen [2001], who analyze transitions from wage-earning to self-employment in the MEPS data. While these findings cannot definitively exclude the possibility of unobservable heterogeneity, they certainly provide no evidence that people who select into self-employment are systematically different with respect to health-related attributes.

4.2 Basic Results.

In the discussion surrounding Table 1, we used the (unadjusted) difference in the proportions of insured self-employed and wage-earning individuals as a baseline against which to measure (unadjusted) differences in utilization rates for various medical services. In analogy, our first multivariate analysis focuses on the probability of being insured; we then turn to the various utilization measures.

Insurance coverage. The results are presented in column (1) of Table 3. The figures are the marginal effects of each of the variables on the probability of having insurance coverage. Importantly, the coefficient on the self-employed variable is both negative and statistically significant. To put the coefficient of -0.203 in perspective, note that 80.9 percent of the wage-earners have insurance. Hence, the self-employed are 25.1 percent less likely to be insured, *ceteris paribus,* even after controlling for other variables such as education and race. This figure will serve as our benchmark for assessing the

[16] In the SIPP data, the health measures were combined days in bed during the last 4 months and a self-reported health status variable. The utilization measures were combined nights in a hospital in the last 4 (and 12) months and the combined number of doctor visits in the last 4 (and 12) months. In the PSID the health measures were hours of work lost due to illness and a self-reported health variable. The utilization measure was number of nights in the hospital during the year. These results are cited in Holtz-Eakin, Penrod and Rosen [1996]; more detailed documentation is reported in the National Bureau of Economic Research Working Paper with the same title, number 4880 (October 1994).

magnitudes of the differentials in utilization rates.

While not our main focus, the other coefficients in column (1) are of some interest. The coefficients on the age variables suggest that the probability of having insurance increases throughout the entire range of ages. (Although the quadratic term is negative, it does not dominate the positive linear term until 129 years.) The coefficient on the male variable suggests that men are 3.71 percentage points less likely to be insured than women. The coefficients on the education variables indicate that, relative to individuals without a high school degree, people with more education have higher coverage rates, a result consistent with previous research (Institute for the Future [2000, p. 23]).

Table 3 also reveals that family composition affects an individual's insurance status. *Ceteris paribus*, the probability of having insurance falls by 1.23 percentage points with each person added to the family. In addition, married individuals are 13.5 percentage points more likely to be insured than single individuals.[17] Since previous research has shown that spouses can often act as a source of insurance coverage for the self-employed (Perry and Rosen [2001]), this result is not surprising.

The coefficients on the race variables tell an interesting story. The point estimates for American Indians and Eskimos are negative, suggesting that they are less likely to have health insurance than whites (the omitted group). However, these coefficients are estimated imprecisely, probably due to the fact that the numbers of such individuals in our sample are very small. (See Table 2.) Blacks are 2.98 percentage points less likely to be insured than whites and Asians are over 6.45 percentage points less likely to be

[17] The results on family type, race/ethnicity and region are broadly similar to tabulations from the Current Population Survey for 1995 reported in Committee on Ways and Means [1998, p. 1105].

insured. The coefficient on the variable for "other races" is large--.20, but imprecisely estimated.

In terms of variation in coverage across region, we find that there are in fact substantial effects. Relative to those who live in the west (the omitted group), northeasterners are 3.2 percentage points more likely to have insurance and midwesterners are 5.15 percentage points more likely. Those who live in the south are just about as likely to have health insurance as those who live in the west.

Utilization. With the results on insurance coverage in hand, we now turn to the analysis of the various utilization measures. Column 2 of Table 3 reports the results for the probability of a doctor visit in 1996. The coefficient on the self-employment variable is negative (-.0585) and significant (t = -3.58). Given that the probability for a wage-earner visiting the doctor is 0.62, this implies that the self-employed are about 9.3 percent less likely to visit the doctor than wage-earners. While this is a nontrivial figure, it is considerably less than the differential in insurance probabilities. In short, just as suggested by the univariate comparisons in the first two rows of Table 1, insurance does not seem to drive all or even most of the self-employed/wage-earner differential in the likelihood of doctor visits.

Before turning to the other medical services, we discuss in passing the coefficients on the other variables in column (2). The linear term in age is negative, but it is dominated by the positive quadratic term starting at 27 years, i.e., throughout almost the entire range. This is consistent with one's priors that the utilization of health care services increases with age. Better educated people are more likely to visit the doctor, *ceteris paribus*—an individual with a masters degree is 20.6 percentage points more

likely to do so than a high school dropout. Further, for each additional family member, the likelihood that the individual visits the doctor falls by 3.38 percentage points. The coefficients on the race variables suggest that both Asians and blacks are less likely to visit their doctors than whites. The difference is 6.83 percentage points for Asians and 3.97 percentage points for blacks. Finally, the region variables are consistent with earlier research that documents the existence of substantial geographical variation in the utilization of health care services. Other things being the same, individuals who live in the Northeast and Midwest are 4.16 and 3.15 percentage points, respectively, more likely to have visited their doctor office than those who live in the West. There is not much difference between Southerners and Westerners along this dimension.

As stressed above, we are interested in a variety of medical services, not just doctor visits, so we next re-estimate the model for each of a series of utilization measures. These results are displayed in columns (3) through (7) of Table 3. Taken in conjunction with the insurance results in column (1), the coefficients on the self-employment variables in (3) through (7) suggest several related conclusions. First, for some services such as hospital admissions, hospital stays and optometrist visits, the differences in utilization probabilities between wage-earners and the self-employed are not statistically significant at conventional levels. The absence of any differences for optometrist visits comes as no surprise because they are generally not covered by insurance, but this is not the case for hospital admissions and hospital stays. Second, for two categories, visits to chiropractors and alternative care, the self-employed have higher utilization rates. We conjecture that relative price effects are at work here. To the extent that services in these categories are not covered by insurance for a particular individual,

they are expensive relative to other medical services that are. In effect, the prices of chiropractors and alternative care relative to conventional medical services are lower for those without insurance. Because the self-employed are less likely to be insured, then, their demand is higher than that of their wage-earning counterparts. Tastes may play a role here as well. The benefits from alternative medicine--acupuncture, massage, bio-feedback training, hypnosis, etc.--are far less well documented than those from conventional therapies. Schumpeterian tradition views the self-employed as being less risk-averse and more adventuresome than wage-earners; hence, they may find such treatments more attractive.

Table 4 presents the probit results for screening and preventative care utilization. In general, the self-employed are less likely to utilize such services than wage-earners. For three services (flu shots, mammograms, and prostate exams), the percentage differences are substantially greater than the percentage differences in coverage rates. For the remaining six, the percentage differences are about the same or smaller.

An important message from Tables 3 and 4 is that the utilization differentials vary across services. A natural question is whether the services with particularly large differentials are in some sense "important." Should there be public policy concern over the fact that the self-employed are substantially less likely than wage-earners to consume these particular services? The three services with the largest differentials in percentage terms are mammograms, prostate exams, and flu shots. The relative infrequency of mammograms and prostate exams seems a serious issue. It may be, however, that the figures in Table 4 overstate the differential for these two tests. They are generally recommended only for people over the age of 40. When we re-estimated the relevant

probit equations including only individuals over 40, we found that, within this age group, self-employed women are 14.4 percent less likely to have mammograms than their wage-earning counterparts, and self-employed men are 16.8 percent less likely to have prostate exams than their wage-earning counterparts. These figures are substantially smaller than those in Table 3. In any case, to the extent that there are substantial differentials in the utilization of certain tests, it is not clear that the solution is a special deduction for health insurance in the tax code. Targeted policies such as price subsidies might be more appropriate.

These judgments, of course, are subjective. It would be useful to be able to classify the various procedures with respect to their consequences for health outcomes, and see whether or not the self-employed are missing out on procedures that are particularly important. However, we know of no scheme for doing so. In any case, the key point is that, to the extent that gaps between the self-employed and wage-earners are present, they generally do not seem to be driven primarily by insurance, and their policy implications are not clear.

4.3 Alternative Specifications

We subjected our model to a variety of tests to see whether our substantive results were sensitive to changes in specification.

Males versus females. The canonical specification in Tables 3 and 4 imposes the constraint that men and women differ in their insurance coverage and utilization rates only by an intercept. However, medical conditions and risk aversion differ by sex, so the process governing the relationships among insurance, utilization, and employment status

may be different as well. We therefore re-estimated the basic specification separately by sex. The results are reported in the first two columns of Table 5. (In the interest of brevity, we report only the coefficients and standard errors of the self-employment variables.) The first row indicates that the relationship between self-employment and insurance status is about the same for men and women. Further, a glance down the two columns suggests that, in general, there are no substantial differences by sex in the magnitudes of the self-employment effects on the utilization of the various services.

Hours of work. It is well documented that the compensation packages of part-time workers are less likely than those of full-time workers to include benefits such as medical insurance (Campling [1987], Committee on Ways and Means [1998, p. 1107]). At the same time, hours of work might be correlated with self-employment status. In fact, the correlation in our data is 0.106. Hence, our estimates of the effects of self-employment on insurance coverage and utilization rates might be biased because of the failure to take into account differences in hours worked. We therefore augmented our basic specifications from Tables 3 and 4 with a set of dichotomous variables for hours worked per week.[18] Of course, hours of work might itself be endogenous--people who use health care intensively may be ill and work fewer hours, *ceteris paribus*. This is why we chose not to include it in our canonical model.

The coefficients on the self-employment variables associated with this specification are reported in the third column of Table 5. A quick comparison with the results in Tables 3 and 4 suggests that, for nearly every utilization measure, the inclusion of hours of work has barely any impact on the self-employment effect. The most

substantial changes occurred in the estimates for breast exams and cholesterol checks. Interestingly, in those cases, the coefficients on the self-employment variable become less negative once indicators for hours of work are included on the right hand side. The changes are on the order of 2 percentage points. Thus, the inclusion of hours of work in the model reduces the differences in utilization rates associated with self-employment.

Organizational form. So far, we have assumed that the self-employed are a homogeneous group with respect to their propensities to be insured and utilize health care services. However, self-employed individuals operate in different organizational forms--sole proprietorships, partnerships, and corporations--and the probability of being insured could vary with organizational form. In particular, those who are incorporated might be more likely to have insurance for two reasons. First, their expenditures for health insurance are fully deductible; for members of partnerships and sole proprietors, they are not. Second, to the extent that corporate enterprises have more employees, the owners can purchase insurance at advantageous group rates.[19] Under these assumptions, we can use the MEPS data on organizational form to examine further whether differences in insurance coverage drive differences in utilization. Specifically, to the extent that insurance is an important factor, one would expect incorporated self-employed individuals to utilize more medical services than their unincorporated counterparts, *ceteris paribus*.

To investigate this possibility, we augment our basic specification with a set of interactions between organizational form and self-employment status:

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[18] There are three indicator variables. The first is equal to one if the individual works between 20 and 35 hours per week; the second between 35 and 45 hours; and the third more than 45 hours. The omitted category is less than 20 hours per week.

[19] See Thomasson [2000] on the advantages of group coverage.

$$\text{Prob}\,(Util_i>0) = F[\beta X_i + \delta SE_i + \gamma SE_i*INCORP_i + \lambda SE_i*PROP_i\,]\,, \qquad (4.2)$$

where $INCORP_i$ is a dichotomous variable equal to one if an individual is incorporated, $PROP_i$ equals one if the individual is organized as a sole proprietor, and the other variables are as defined above. This augmented specification allows for differential effects by organizational form-- δ is the effect if the self-employed individual is in a partnership, $\delta+\gamma$ if incorporated, and $\delta+\lambda$ if a sole proprietor (all relative to being a wage-earner).

Table 6 reports the estimates of the key parameters of equation (4.2), δ, γ, and λ. The first row shows the results for the probability of having insurance. According to the point estimate in column (1), a self-employed individual in a partnership is 25 percentage points less likely to have insurance coverage than a wage-earner. From columns (1) and (2), an incorporated individual is only 15 percentage points(= -.25 + .10) less likely to have insurance, and from columns (1) and (3), a sole proprietor is 24.2 percentage points (= -.25 + .008) less likely, essentially the same figure as for a partner. Column (4) is the p-value of a chi-square test of the hypothesis that the effect of self-employment is zero; it is rejected at all conventional levels. Column (5) provides the p-value of the test of the hypothesis that the total effect for incorporated individuals is zero; and column (6) presents the result for sole proprietors. In both cases, one can easily reject the hypothesis that the effects are zero. The key result is that the data are consistent with our conjecture above: relative to their counterparts in partnerships and sole proprietorships, incorporated individuals are more likely to have insurance (although still less likely than wage-

earners).

Does this differential in insurance coverage translate into differential utilization of medical services for incorporated individuals? As we move down column (2) of the table, the answer is generally no. Except for blood pressure checks and flu shots, the interaction terms are statistically insignificant. Further, according to the figures in column (5), for about half the procedures, the incorporated self-employed have about the same utilization rates as wage-earners, despite the fact that their coverage rates are 15 percentage points less.

An important assumption behind this discussion is that operating in a corporate organizational form is primarily an indicator for insurance status. It could reasonably be argued, however, that it is mainly an indicator for income—self-employed individuals who have gotten to the stage where it is worthwhile to incorporate have higher incomes than partners and sole proprietors, *ceteris paribus*. Note that we would expect income and insurance to be working in the same direction as far as their effects on utilization of medical services—both would tend to have a positive effect. While this clouds the meaning of statistically significant interaction terms in column (2), it does not substantially affect our interpretation of insignificant effects—a zero is entirely consistent with no insurance effect. Hence, the results generally support the notion that insurance effects are not primarily driving utilization rate differentials.

Intensity of utilization: doctor visits. In general, the MEPS tells us only whether or not an individual utilized a given kind of health care, not how intensively. This accounts for our focus on the probabilities of using various medical services. However, information on the number of times that the individual went to the doctor is available.

We take advantage of these data to estimate how the self-employed differ from wage-earners with respect to the number of doctor visits. The idea is to see if our story on differences in the use of medical services changes when we allow the intensity of utilization to vary across individuals.

We employed the same explanatory variables as in our basic model, equation (4.1). A complication is introduced by the fact that a substantial number of observations are at zero hours (see Table 1). We therefore use a Tobit estimator. The results are reported in Table 7. The coefficient on the self-employment variable is negative and more than twice its standard error—the self-employed pay fewer visits to their doctors, *ceteris paribus*. To assess the quantitative significance of the coefficient, we began by computing the expected number of visits assuming SE is equal to zero and setting all the other variables at their means. We then repeated the exercise assuming SE is one. This exercise suggested that the impact of being self-employed is .03 fewer visits, or 1.09 percent.[20] Thus, when we take advantage of the extra information on intensity of utilization of doctor visits, it reinforces the results from Table 3 on the dichotomous choice—the differential between the self-employed and wage-earners with respect to doctor visits is less than the differential in rates of insurance coverage.

5. Health Care Expenditures

So far our focus has been on differential utilization rates. This reflects the dominant question in the public policy debate--do the relatively low rates of insurance among the self-employed reduce their access to health care? The MEPS data also contain

information about expenditures on health care, both out-of-pocket and total. Analysis of these data can cast further light on the question of whether a public policy response is required to the relatively low rates of health insurance among the self-employed.

To begin, we note that the debate over health care sometimes loses sight of the key function of insurance--to spread consumption over different states of the world. Hence, even if the self-employed have access to health care, we cannot necessarily be sanguine about their relative lack of insurance. We need to know if paying for health care causes serious reductions in their standard of living.

The MEPS data contain information about family out-of-pocket expenditures on health care (including expenses on insurance and medical services). To examine whether the self-employed's lack of insurance forces large reductions in their living standards, we began by analyzing how these expenditures vary with employment status. Specifically, we estimated a model in which individual out-of-pocket expenditures depend upon the same variables as the basic utilization equations of Table 3. Because a substantial number of individuals have zero out-of-pocket health care expenditures (21.7% percent), we again use the Tobit statistical model.

The result is reported in the first row of Table 8. The coefficient on the self-employment variable is positive and exceeds its standard error by a factor of about 5. This result confirms what intuition might suggest--the self-employed have more out-of-pocket health care costs than wage-earners, *ceteris paribus*. However, from a quantitative standpoint, the difference is not very large--using the same computational method as in Section 4.2, the expected difference in out-of-pocket expenditures is only

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[20]The expectations were computed according to the standard formula $E(Y)=F(\beta*X/\sigma)* \beta*X + \sigma*f(\beta*X/\sigma)$, where σ is the standard error associated with the Tobit index, F( ) is the cumulative normal distribution,

$84.42. A similar exercise indicates that total expenditures on health care are smaller for the self-employed, again as one might expect. The coefficient on the self-employment variable is reported in the second row of Table 8; it implies that expected total health care expenditures are $228 less for the self-employed.

In this context, it is perhaps more informative to ask how out-of-pocket expenditures *relative to income* depend on employment status. We therefore re-estimated the model with expenditures as a fraction of income on the left-hand side, again using a Tobit model.[21] The results are in the third line of Table 8. The coefficient on the self-employment variable is both positive and significant, indicating a higher fraction of out-of-pocket costs for the self-employed. However, again proceeding as in Section 4.2, we find that our results imply that, on average, the self-employed devote only 0.4 percent more of their incomes to out-of-pocket medical expenditures than wage-earners.

Because the purpose of insurance is to smooth consumption, if a substantial number of the self-employed experience major health expenditures relative to their incomes, we might be concerned even if, on average, the ratios of out-of-pocket expenditures to income are about the same. It is therefore useful to know more about the distribution of the ratio of out-of-pocket costs to income than its mean. Hence, we computed the ratio at various percentiles. Within the sample of wage-earners, the ratio of out-of-pocket costs to income at the 75th percentile is 0.0137; for the self-employed it is 0.0160. At the 90th percentile, the figures are 0.0347 and 0.0479 for wage-earners and the self-employed, respectively. It is hard to imagine that such differences are sufficient

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and f( ) is the standard normal distribution (Maddala [1983, p. 159]).

[21] For families with implausibly low incomes, the ratio of expenditures to income may be very high, possibly skewing the results. Hence, for this exercise, we exclude observations for which income is less than $5,000. This reduced the sample size by 601.

to merit public policy concern.[22]

Another problem in the interpretation of our results on utilization is that they do not take into account possible differences in the quality of services. For example, we showed in Table 3 that the self-employed were only about 9 percent less likely to visit the doctor than wage-earners. But what if the quality of their visits was lower because they lacked insurance? In the absence of insurance, perhaps the self-employed visit less experienced physicians who charge lower fees. Or perhaps a given physician demands a lower fee from an uninsured self-employed patient, but then spends less time with him or her.

The MEPS provides no direct way to investigate this issue. However, as a very rough measure for quality, we can compare total expenditures (i.e., out-of-pocket plus insurance) per doctor visit differ for wage-earners and the self-employed. Given that a "doctor visit" is far from a homogeneous commodity [23], it is not clear how much one can learn from such an exercise. Without making too much of it, therefore, we merely note that, conditional on making at least one visit to the doctor, mean expenditures per visit are $625.04 for wage-earners and $450.69 for the self-employed, a difference that is not statistically significant at conventional levels (t = 1.160). In this context, it is useful to recall from Table 4 that, for a variety of diagnostic tests, there are not substantial differences in utilization rates between wage-earners and the self-employed. To the extent that such tests themselves can be viewed as indicators of the quality of health care, the Table 4 findings are consistent with insubstantial differences in quality between the

[22] The distributions of the level of out-of -pocket expenditures are qualitatively similar. At the 75th percentile, expenditures are $454 and $335 for the self-employed and wage-earners, respectively. At the 90th percentile, the comparable figures are $1,877 and $1,226.

two groups.

6. Children's Issues

In recent years, much of the debate over health insurance has focused on the needs of children. For example, in the fall of 2000, the *New York Times* noted that "Health care for children has become a major issue in the presidential campaign" [Pear, 2000, p. A1]. Even if health services utilization is not a problem for the self-employed, one still might make a case for insurance subsidies if this promoted access to health care for their children. The MEPS data contain a set of questions relating to preventative care for children as well as information on their doctor and hospital visits.[24] In this section we examine how children's medical services utilization depends on their parents' employment status.

Because the relevant question is the impact on the child's utilization of the parents' self-employment status, we create a dichotomous variable, PARENTSE, which is equal to one if both parents are self-employed or only one parent works and he/she is self-employed, and equal to zero otherwise. Following the same strategy as before, we begin by asking how the probability of the child's having health insurance varies with PARENTSE, *ceteris paribus*. We estimate a probit model in which the probability of insurance coverage depends upon the child's age, race, sex, and region as well as PARENTSE. The coefficient on the self-employment variable only is reported in the first row of Table 9, and indicates that children of the self-employed are about as likely to

[23]See Eichner, McClellan and Wise [1999] for a careful analysis of sources of differences in health care expenditures among employer-provided health plans.
[24] The preventative care information is for children seven or under, and the doctor visit information is for children 17 and under.

have insurance coverage as wage-earners' children. In light of the insurance gap between self-employed and wage-earning adults (see Table 3), this result is striking. It suggests that parents place a premium on having their children insured. There is certainly anecdotal evidence to this effect. Several months ago, the *New York Times* interviewed a father who continued to purchase health insurance for his children even after a very substantial increase in the premium. The father observed, "these are my kids we're talking about here. You never know what might happen…I wouldn't dream of them being without insurance" (Verhovek [2000, p. A1]).

In short, whatever problems the self-employed have in getting insurance for themselves do not seem to stand in the way of their obtaining insurance for their children. With this information in hand, the rest of the analysis is somewhat anti-climactic. The next two rows indicate that the children of the self-employed are about as likely to visit the doctor or be admitted to the hospital as the children of wage-earners. Moving down the table, the children of the self-employed are more likely to receive hepatitis vaccinations, and have about the same probability of being vaccinated for measles/mumps/rubella. In short, analysis of this admittedly limited set of children's utilization measures suggests that a child-based justification for an insurance subsidy for the self-employed is implausible. Finally, according to the second to the last row of the table, out-of-pocket expenditures for children's medical expenses are no more of a burden (relative to income) for wage-earners than they are for the self-employed.

7. Conclusion

Using data from the 1996 Medical Expenditure Panel Survey, we have analyzed

differences between the self-employed and wage-earners with respect to insurance coverage and utilization of a variety of health care services. Our results suggest that for the self-employed, the link between insurance and utilization of health care services is weaker than some have suggested. For a number of medical care services, the self-employed had the same utilization rates as wage-earners, despite the fact that they were substantially less likely to be insured. In most cases where the self-employed did utilize services less, the insurance coverage rate differential was greater than the utilization differential. These findings were robust to a number of reasonable changes in the specification of our statistical model.

The self-employed thus appear to be able to finance access to health care from sources other than insurance. Perhaps the source is their own wealth, or perhaps they have better access to borrowing than wage-earners.[25] Interestingly, our analysis of health care expenditures suggests that whatever the source, the out-of-pocket costs that the self-employed incur for health care do not differ much from those of wage-earners, both in absolute terms and relative to income. Thus, the public policy concern with the relative lack of health insurance for the self-employed may be somewhat misplaced. Put another way, targeting health insurance subsidies at the self-employed may not be an efficacious way to increase their utilization of health care services. Neither does it seem to be needed to protect their standard of living.

Of course, as Fuchs [1998], Gruber [2000], and others have observed, despite the focus of the public policy debate on insurance coverage and utilization rates, what we ultimately care about are health outcomes. The extent to which medical care has a

positive effect on health is not clear. According to some estimates, access to health care accounts for only a relatively small part of health, and more important determinants are genetics, environment, and health behaviors (Institute for the Future [2000, p. 23]). A number of recent papers have come to this conclusion. For example, Joyce, Kaestner and Racine [1999] find that the health effects of the expansion of Medicaid coverage for children are unclear, and Meara [1998] shows that access to health care is less important than maternal behaviors when it comes to explaining low birth weights. An important question for future research is whether the large differences in their propensities to be insured lead to substantial differences in health status between wage-earners and the self-employed.[26]

[25] Recent press reports indicate that self-employed individuals are particularly likely to take advantage of "buyers' clubs" for health care services, which offer below-market prices on doctor visits, medical tests, and so on (Freudenheim, [2000, p. A1]). However, there are no data on the importance of this phenomenon.
[26] For some preliminary results along these lines, see Perry and Rosen [2001].

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Table 1*

Summary Statistics: Insurance and Utilization Rates of Health Care Services

	(1)	(2)	(3)	(4)
	Entire Sample	Self-Employed	Wage-Earners	Test Statistic of Difference in Means Between (2) and (3)
Insurance	.794 (.405)	.681 (.470)	.809 (.393)	-10.2
Doctor Visits	.623 (.485)	.585 (.493)	.628 (.482)	-2.79
Hospital Admissions	.0534 (.225)	.0423 (.201)	.0549 (.228)	-1.79
Hospital Stays	.0537 (.225)	.0440 (.205)	.0550 (.228)	-1.56
Chiropractor Visits	.0380 (.191)	.0604 (.238)	.0349 (.184)	4.27
Optometrist Visits	.0420 (.200)	.0458 (.209)	.0412 (.199)	.725
Alternative Care	.0652 (.247)	.100 (.300)	.0604 (.238)	5.15
Blood Pressure Exam	.713 (.452)	.662 (.473)	.720 (.449)	-4.08
Cholesterol Exam	.363 (.481)	.355 (.479)	.364 (.481)	-0.623
Breast Exam	.290 (.454)	.208 (.406)	.301 (.459)	-6.57
Physical Exam	.404 (.491)	.358 (.480)	.410 (.492)	-3.35
Dentist Checkup	.432 (.495)	.440 (.497)	.430 (.495)	0.643
Flu Shot	.166 (.372)	.142 (.349)	.169 (.375)	-2.33

Table 1 - continued

	(1)	(2)	(3)	(4)
	Entire Sample	Self-Employed	Wage-Earners	Test Statistic of Difference in means between (2) and (3)
Mammogram	.107 (.309)	.0959 (.295)	.109 (.311)	-1.30
Prostate Exam	.104 (.305)	.135 (.342)	.0994 (.299)	3.70
Prescription Medicine Purchase	.599 (.490)	.560 (.49)	.604 (.489)	-2.88

* Each entry in columns (1), (2), and (3) shows the proportion of the relevant group that utilized each health care service within the last year. Figures in parenthesis are standard errors. The first entry in each column shows the proportion of individuals who were covered by health insurance. Means for breast exams, prostate exams, and mammograms are taken only over the appropriate gender group. Column (4) shows t-tests on the differences in the means in columns (2) and (3).

Table 2*

Summary Statistics: Individual Characteristics by Employment Status

	(1)	(2)	(3)	(4)
	Entire Sample	Self-Employed	Wage-Earners	T-Test
Education				
No Degree**	.133 (.340)	.122 (.327)	.135 (.341)	-1.22
GED	.0440 (.205)	.0371 (.190)	.0450 (.207)	-1.21
High School Diploma	.504 (.500)	.485 (.500)	.506 (.500)	-1.34
B.A.	.172 (.377)	.174 (.379)	.172 (.377)	0.151
Masters	.0576 (.233)	.0690 (.254)	.0560 (.230)	1.79
PhD	.0146 (.120)	.0337 (.180)	.0119 (.109)	5.81
Other Degree	.0750 (.263)	.0794 (.271)	.0723 (.262)	0.609
Race				
American Indian	.0129 (.113)	.00604 (.0775)	.0138 (.117)	-2.20
Aleut, Eskimo	.000628 (.0250)	.000864 (.0294)	.000596 (.0244)	0.341
Asian or Pacific Islander	.0299 (.169)	.0320 (.176)	.0285 (.166)	0.663
Black	.123 (.329)	.0725 (.259)	.133 (.337)	-5.63
White	.833 (.373)	.881 (.315)	.825 (.380)	5.41

Table 2 - continued

	(1)	(2)	(3)	(4)
	Entire Sample	Self-Employed	Wage-Earners	T-Test
Other**	.00105 (.0323)	0	.00119 (.0345)	-1.18
Region				
Northeast	.190 (.392)	.203 (.402)	.188 (.391)	1.18
Midwest	.228 (.419)	.210 (.407)	.230 (.421)	-1.56
South	.353 (.478)	.317 (.465)	.358 (.479)	-2.75
West**	.23 (.42)	.27 (.44)	.22 (.42)	3.58
Other Demographic				
Male	.52 (.50)	.63 (.48)	.51 (.50)	7.92
Married with Spouse in House	.61 (.49)	.75 (.43)	.59 (.49)	10.2
Family Size	3.130 (1.568)	3.148 (1.603)	3.128 (1.564)	0.401
Age	38.6 (11.2)	43.2 (10.15)	38.0 (11.2)	14.9
Age Squared	1615.9 (887.3)	1966.6 (866.9)	1567.6 (879.2)	14.5

*Figures in each cell are means, with standard errors in parentheses. Except for family size, age, and age-squared, all variables are dichotomous. They equal one if the individual is in the category, and zero otherwise. Column (4) is a t-test on the differences in means in columns (2) and (3).
**Omitted from right hand side of regression models.

Table 3*

Probit Estimates for Insurance Coverage and for Site-Based Services Utilization

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Insurance Status	Doctor Visits	Hospital Admissions	Hospital Stays	Chiropractor Visits	Optometrist Visits	Alternative Care
Self-Employed	-.203 (.0160) [-25.1%]	-.0585 (.0163) [-9.32%]	-.0115 (.00618) [-20.9%]	-.0106 (.00626) [-19.2%]	.017 (.006) [48.7%]	.000133 (.00593) [3.23%]	.0322 (.00805) [53.3%]
Age	.00532 (.00249)	-.00842 (.00323)	-.00268 (.00136)	-.00278 (.00136)	.00148 (.00118)	-.00211 (.00118)	.00557 (.00242)
Age Squared	-.0000205 (.0000316)	.000155 (.0000409)	.0000375 (.000017)	.0000388 (.0000171)	-.0000198 (.0000144)	.0000318 (.0000143)	-.0000556 (.0000177)
GED	.0872 (.0129)	.146 (.0225)	.0157 (.0133)	.0157 (.0134)	-.0118 (.00902)	.0421 (.0203)	.0300 (.0183)
H.S. Diploma	.203 (.0111)	.129 (.0154)	-.00772 (.00668)	-.00750 (.00671)	.0161 (.00644)	.0330 (.00787)	.0185 (.00808)
B.A.	.197 (.00687)	.187 (.0156)	-.0114 (.00723)	-.0114 (.00727)	.0196 (.00949)	.0503 (.0141)	.0538 (.0136)
M.A.	.178 (.00579)	.206 (.0188)	-.00975 (.00963)	-.00980 (.00967)	.0282 (.0141)	.0738 (.0219)	.0726 (.0199)
PhD	.171 (.00581)	.204 (.0312)	.0175 (.0222)	.0246 (.0234)	-.00599 (.0158)	.0735 (.0363)	.0376 (.0283)
Other Degree	.157 (.00722)	.129 (.0109)	-.00417 (.00933)	-.00300 (.00948)	.0221 (.00122)	.0608 (.0191)	.0421 (.0161)

Table 3 - continued

	(1) Insurance Status	(2) Doctor Visits	(3) Hospital Admissions	(4) Hospital Stays	(5) Chiropractor Visits	(6) Optometrist Visits	(7) Alternative Care
Family Size	-.0123 (.00271)	-.0338 (.00355)	.00278 (.00145)	.00275 (.00146)	-.00542 (.00138)	-.00408 (.00138)	-.00866 (.00176)
American Indian	-.000836 (.0336)	.0556 (.0431)	.00806 (.0201)	.00808 (.0202)	-.0101 (.0131)	-.0166 (.0126)	-.00916 (.0206)
Aleut, Eskimo	-.0566 (.185)	.237 (.122)	.266 (.200)	.265 (.200)	--	--	.118 (.166)
Asian	-.0645 (.0289)	-.0683 (.0322)	-.0208 (.0101)	-.0210 (.0101)	-.0133 (.00766)	-.0179 (.00752)	.00963 (.0136)
Black	-.0298 (.0131)	-.0397 (.0161)	-.00806 (.0201)	-.00801 (.00625)	-.0187 (.00426)	-.0117 (.00523)	-.0192 (.00579)
Other	-.204 (.200)	-.198 (.202)	.0366 (.0833)	.0378 (.0843)	--	.112 (.143)	--
Northeast	.0320 (.0116)	.0416 (.0155)	.00868 (.00753)	.00850 (.00756)	-.00828 (.00464)	-.0141 (.00455)	-.0323 (.00434)
Midwest	.0515 (.0108)	.0315 (.0151)	.00248 (.00690)	.00242 (.00693)	.00980 (.00539)	-.0129 (.00447)	-.0284 (.00446)

Table 3 - Continued

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Insurance Status	Doctor Visits	Hospital Admissions	Hospital Stays	Chiropractor Visits	Optometrist Visits	Alternative Care
South	-.00371 (.0108)	.0256 (.0139)	.00934 (.00633)	.0103 (.00693)	-.0173 (.0426)	-.0224 (.00439)	-.0432 (.00474)
Male	-.0371 (.00808)	-.213 (.00987)	-.0375 (.00460)	-.0379 (.00462)	-.0117 (.00356)	-.0162 (.00390)	-.0387 (.00452)
Married	.135 (.0103)	.0963 (.0122)	.0167 (.00504)	.0167 (.00506)	.0107 (.00394)	.00309 (.00431)	-.0109 (.00452)
Log Likelihood	-4179	-5841	-1932	-1940	-1465	-1600	-2013
Observations	9552	9552	9552	9552	9536	9546	9500

*The coefficients give the marginal effects of the associated right hand side variable on the probability of being covered by insurance (column(1)) and on the probabilities of utilizing various services (columns (2) through (7)). The standard errors appear in parentheses. The figures in square brackets in the "self-employed" row give the implied percentage differences in the probabilities between self-employed and wage-earners.

Table 4*

Probit Estimates for Utilization of Screening and Preventative Care Services*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Breast Exam	Physical Exam	Dentist Visits	Flu Shot	Mammogram	Prostate Exam	Prescription Medicine Purchase	Blood Pressure Check	Cholesterol Check
Self-Employed	-.0800 (.0265) [-26.6%]	-.0649 (.0153) [-15.8%]	-.0159 (.016) [-3.70%]	-.0518 (.0101) [-30.7%]	-.0694 (.0345) [-63.6%]	-.0541 (.0140) [-54.4%]	-.0598 (.0164) [-9.90%]	-.0825 (.0155) [-11.5%]	-.0648 (.0155) [-17.8%]
Age	-.00596 (.00466)	-.0113 (.00323)	-.000880 (.0033)	-.00126 (.00249)	.143 (.0305)	.00495 (.00427)	-.0122 (.00326)	-.00579 (.00291)	.00496 (.00346)
Age Squared	.0000849 (.0000591)	.000198 (.0000403)	.0000257 (.00004)	.0000823 (.0000309)	-.00126 (.000306)	.000076 (.0000513)	.000204 (.0000411)	.000124 (.000037)	.0000843 (.000043)
GED	.0519 (.0383)	.0453 (.0290)	.109 (.031)	.0689 (.0267)	.00849 (.0702)	.127 (.0426)	.111 (.0252)	.0845 (.0197)	.0630 (.0308)
H.S. Diploma	.105 (.0240)	.0373 (.0163)	.212 (.017)	.0530 (.0131)	.0754 (.0376)	.0797 (.0195)	.0713 (.0158)	.0778 (.0137)	.0719 (.0170)
B.A.	.206 (.0229)	.0833 (.0198)	.347 (.018)	.0905 (.0182)	.144 (.0438)	.134 (.0272)	.127 (.0175)	.129 (.0132)	.131 (.0209)
M.A.	.257 (.0231)	.0994 (.0266)	.413 (.020)	.124 (.0260)	.167 (.0488)	.134 (.0374)	.141 (.0227)	.147 (.0153)	.164 (.0278)
PhD	.198 (.0524)	.169 (.0464)	.329 (.037)	.207 (.0457)	.347 (.0707)	.130 (.0604)	.149 (.0384)	.125 (.0280)	.188 (.0486)

Table 4 - continued

	(1) Breast Exam	(2) Physical Exam	(3) Dentist Visits	(4) Flu Shot	(5) Mammogram	(6) Prostate Exam	(7) Prescription Medicine Purchase	(8) Blood Pressure Check	(9) Cholesterol Check
Other Degree	.182 (.0258)	.0846 (.0245)	.277 (.023)	.0987 (.0229)	.194 (.0485)	.159 (.0371)	.101 (.0218)	.123 (.0155)	.104 (.0257)
Family Size	-.0391 (.00549)	-.00522 (.00357)	-.0230 (.004)	-.0137 (.00294)	-.0311 (.00913)	-.000731 (.00434)	-.0303 (.00362)	-.0226 (.00311)	-.00611 (.00381)
American Indian	-.0606 (.0648)	.0126 (.0460)	-.0573 (.046)	-.0106 (.0336)	-.139 (.0965)	.0572 (.0564)	-.0423 (.0442)	-.00438 (.0397)	.0784 (.0496)
Aleut, Eskimo	.179 (.154)	.314 (.166)	-.0809 (.194)	-.00964 (.127)	--	--	.0680 (.201)	.0570 (.168)	.447 (.157)
Asian	-.0334 (.0478)	.0171 (.0312)	-.0496 (.031)	.0322 (.0247)	-.0568 (.0686)	-.0615 (.0291)	-.119 (.0322)	-.0538 (.0297)	.0518 (.0324)
Black	.0886 (.0206)	.143 (.0163)	-.123 (.016)	-.0254 (.0116)	.0756 (.0344)	.0526 (.0216)	-.0555 (.0163)	-.00649 (.0146)	.101 (.0173)
Other	-.0404 (.287)	.138 (.172)	.101 (.195)	--	--	--	-.425 (.174)	.152 (.0918)	.333 (.160)
Northeast	.00891 (.0236)	.139 (.0164)	.0323 (.016)	-.0218 (.0114)	.107 (.0358)	.0846 (.0209)	.0191 (.0159)	.0534 (.0132)	.108 (.0172)

Table 4 - continued

	(1) Breast Exam	(2) Physical Exam	(3) Dentist Visits	(4) Flu Shot	(5) Mammogram	(6) Prostate Exam	(7) Prescription Medicine Purchase	(8) Blood Pressure Check	(9) Cholesterol Check
Midwest	-.0267 (.0225)	.0219 (.0156)	.0428 (.016)	-.00481 (.0112)	.0322 (.0344)	-.00220 (.0179)	.0549 (.0151)	.0519 (.0128)	.00487 (.0160)
South	-.0259 (.0207)	.0451 (.0142)	-.0469 (.014)	-.00810 (.0104)	.0214 (.0321)	.00854 (.0165)	.0370 (.0140)	.0403 (.0120)	.063 (.0148)
Male	--	-.119 (.0102)	-.122 (.010)	-.0466 (.00774)	--	--	-.210 (.0100)	-.166 (.00901)	-.0735 (.0106)
Married	.114 (.0169)	.0665 (.0119)	.0585 (.012)	.0183 (.00901)	.0926 (.0259)	.0730 (.0144)	.104 (.0123)	.0714 (.0112)	.0462 (.0125)
Log Likelihood	-2719	-6171	-6041	-4005	-1333	-2067	-5996	-4956	-5527
Observations	4352	9552	9552	9283	2060	5009	8110	9263	8976

*The coefficients give the marginal effects of the associated right hand side variable on the probabilities of utilizing various screening services. The standard errors appear in parentheses. The figures in square brackets in the "self-employed" row give the implied percentage differences in the probabilities between self-employed and wage-earners.

Table 5*

Self-Employment Effects in Alternative Specifications

	Females	Males	Hours
Insurance Coverage	-0.200 (0.0251)	-0.213 (0.0211)	-0.377 (0.0218)
Doctor Visits	-0.0645 (0.0245)	-0.0551 (0.0209)	-0.0895 (0.0171)
Hospital Admissions	-0.0166 (0.0112)	-0.0107 (0.00555)	-0.0133 (0.00623)
Hospital Stays	-0.0141 (0.0116)	-0.0100 (0.00558)	-0.0120 (0.00631)
Chiropractor Visits	0.0427 (0.0128)	0.00220 (0.00596)	--**
Optometrist Visits	0.00952 (0.0116)	-0.00270 (0.00585)	--**
Prescription Medicine	-0.0692 (0.0251)	-0.0535 (0.0208)	--**
Blood Pressure	-0.0636 (0.0221)	-0.0961 (0.0211)	-0.114 (0.0166)
Cholesterol Check	-0.0787 (0.0252)	-0.0585 (0.0194)	-0.0942 (0.0156)
Breast Exam	-0.0800 (0.0265)	--	-0.100 (0.0207)
Physical	-0.0360 (0.0258)	-0.0864 (0.0183)	-0.0824 (0.0157)
Alternative Care	0.0691 (0.0166)	0.0104 (0.00751)	0.0319 (0.00844)
Dentist Visit	0.0166 (0.0106)	0.00692 (0.0140)	-0.0282 (0.0162)
Flu Shot	-0.0649 (0.0168)	-0.042 (0.0122)	-0.0606 (0.00996)
Mammogram	-0.0694 (0.0344)	--	-0.0769 (0.0357)
Prostate Exam	--	-0.054 (0.014)	-0.0769 (0.0357)

* Columns (1) and (2) are the coefficients on the self-employment dichotomous variables when the probit equations from Tables 3 and 4 are estimated separately for males and females. Column (3) displays the

coefficients on the self-employment dichotomous variables from the probit equations of Tables 3 and 4 augmented with a set of dichotomous variables for hours worked. Coefficients are marginal effects on the respective probabilities, and figures in parentheses are standard errors.
**Coefficient cannot be estimated because of multicollinearity.

Table 6*

Differential Self-Employment Effects by Organizational Form

	(1) Self-employed (δ)	(2) Incorp*SE (γ)	(3) Proprietor-ship*SE (λ)	(4) Test of δ= γ= λ=0	(5) Test of δ+ γ =0	(6) Test of δ+ λ =0
Insurance Coverage	-0.25 (.045)	0.101 (.022)	.008 (.25)	0.0	.0018	0.0
Doctor Visits	-.0853 (.0459)	.0201 (.0508)	.0324 (.0461)	0.0032	.0277	.0094
Hospital Admissions	-.0235 (.0157)	-.0101 (.0231)	.0306 (.0333)	.0623	.0155	.7744
Hospital Stays	-.0167 (.0164)	-.0175 (.0188)	.0197 (.0280)	.0840	.0152	.8727
Prescription Medicine	-.056 (.047)	-.022 (.054)	.004 (.049)	0.0027	0.0074	0.0089
Chiropractor Visits	.032 (.019)	-.014 (.009)	-.008 (.01)	0.008	0.4132	0.0051
Optometrist Visits	.014 (.018)	-.012 (.013)	-.012 (.012)	0.8419	0.9615	0.9769
Cholesterol Check	-.0881 (.0439)	.0762 (.0567)	.00617 (.0509)	0.0001	0.5594	0.0
Breast Exam	-0.142 (.0775)	.118 (.0761)	.0468 (.0742)	0.0076	0.8913	0.0029
Blood Pressure Check	-.170 (.0452)	.108 (.0329)	.0646 (.0354)	0.0	0.2512	0.0
Physical	-.0866 (.0428)	.0503 (.0541)	.0152 (.0492)	0.0004	0.1677	0.0002
Alternative Care	.00989 (.0197)	.0142 (.0243)	.0264 (.0250)	0.0	0.037	0.0
Dentist Visit	-.0088 (.0436)	.0202 (.0520)	.00940 (.0473)	0.4201	0.7938	0.1119

Table 6 - continued

	(1) Self-employed (γ)	(2) Incorp*SE (γ)	(3) Proprietor-ship*SE (λ)	(4) Test of $\delta= \gamma= \lambda=0$	(5) Test of $\delta+ \gamma =0$	(6) Test of $\delta+ \lambda =0$
Flu Shot	-.106 (.0237)	.122 (.0606)	.0851 (.0522)	0.0	0.1501	0.0001
Mammogram	-0.147 (.0940)	.144 (.112)	.0703 (.105)	0.1313	0.9558	0.0592
Prostate Exam	-0.081 (.038)	.037 (.060)	.040 (.058)	0.0041	.0063	.0006

*These are the results for the self-employment variables when we augment our canonical model with interaction terms to control for differences in organizational form. (See Equation (4.2).) Column (1) gives the effects if the individual is in a partnership; column (2) if incorporated; and column (3) if a sole proprietor. In each cell, the figure is the marginal effect on the probability of the relevant left hand side variable, and the number in parentheses is the standard error. Columns (4) through (6) give the p-values of the associated tests.

Table 7*

Tobit Analysis of Doctor Visits

Self-Employed	-0.69 (0.25)	Asian	-1.442 (0.492)
Age	-0.0249 (0.0502)	Black	-0.862 (0.252)
Age-Squared	0.00128 (0.000625)	Other	-2.355 (2.849)
GED	1.745 (0.445)	Northeast	0.505 (0.251)
H.S. Diploma	1.603 (0.263)	Midwest	0.261 (0.24)
B.A.	2.643 (0.308)	South	0.0974 (0.221)
M.A.	3.516 (0.403)	Male	-3.238 (0.162)
PhD	3.264 (0.687)	Married	1.0343 (0.191)
Other Degree	1.550 (0.377)	Constant	0.173 (0.971)
Family Size	-0.450 (0.0586)		
American Indian	0.773 (0.710)	Obs.	9552
Aleut, Eskimo	3.879 (3.026)	Standard Error	7.189

*Left hand side variable is number of visits to the doctor. Estimation technique is Tobit, and figures in parentheses are standard errors of the coefficients.

Table 8*

Tobit Analysis of Medical Expenditures

Out-of-Pocket Expenditures	140.6
	(28.3)
Total Expenditures	-409.9
	(138.6)
Out-of-Pocket Expenditures/ Income	.00748
	(.00194)
Total Expenditures/Income	-.0168
	(.00843)

* This table reports the coefficients on the self-employment dichotomous variables from a series of Tobit equations in which the left hand side variables are as indicated in the first column, and the right hand side variables are the same as in Table 3. Figures in parentheses are standard errors.

Table 9*

Insurance and Medical Services for Children

	Coefficient (s.e.)	Obs.
Insurance Coverage	0.0400 (.0322)	5207
Doctor Visits	-0.0298 (0.0260)	5207
Hospital Admissions	-0.00914 (0.0173)	5207
Hepatitis Vaccination**	0.139 (.0454)	1888
Measles-Mumps-Rubella Vaccination**	0.0201 (0.0612)	2008
Out-of-Pocket Expenditures/Income	-0.00131 (0.00185)	5170
Total Expenditures/ Income	-0.0241 (0.0147)	5186

*This table shows the coefficient on the dichotomous variable for parents' self-employment status in each of a series of models estimated using as observations the children in the sample. Other covariates are child's age, race, sex, and region. The figures in the first five rows are the marginal effects from probit equations. The coefficients in the last two rows are from Tobit equations. Figures in parentheses are standard errors.

**These utilization measures were only recorded for children under the age of 7.