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IS HEALTH INSURANCE
AFFORDABLE FOR THE UNINSURED?

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ABSTRACT

In this paper, we investigate the meaning of "affordability" in the context of health insurance. Assessing the relationship between the affordability of coverage and the large number of uninsured in the U.S. is important for understanding the barriers to purchasing coverage for the uninsured and evaluating the role of policy in reducing this number. We propose several definitions of affordability and examine the implications of alternative definitions on estimates of the proportion of currently uninsured who are unable to afford coverage. We find that, depending on the definition, health insurance was affordable to between one-quarter and three-quarters of the uninsured in 2000.

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Why don't all Americans have health insurance? In contrast to almost all other countries,

obtaining health insurance is not compulsory for the bulk of the US population. Even so, at any

point in time about 85 percent of the population is, in some fashion, able and willing to obtain

coverage. In such a highly prosperous country, why does the remaining 15 percent of

consumers behave differently? Since there are potentially adverse consequences when some

fail to obtain coverage for effective medical care, this is a question of considerable policy

significance.   It has policy significance as well for other countries using or contemplating

greater use of voluntary health insurance purchases in private markets.

Many have suggested that a primary reason for the relatively large and growing number of

uninsured Americans is that private health insurance is "unaffordable" for them. However,

neither a definition of affordability nor methods to identify those for whom health insurance is

affordable currently exist. Clearly, adults in low-income households are more likely to be

uninsured than those in higher income households. However, not all uninsured adults are in

low-income families. Indeed, if low income is defined by the federal poverty line, only 22% of

non-elderly uninsured adults are in families with incomes below 100% of the poverty line, and

30% percent are in families with incomes above 300% of the poverty line. Although income is

related to the purchase of coverage, clearly it is not the only factor driving coverage decisions.

Assessing the role of affordability in the large number of uninsured Americans requires a

definition of the factors which make health insurance affordable to some but not others.

Despite the ambiguity surrounding the meaning of affordability, it is clear that some notion of

"affordability" is important in policy discussions. For example, in commenting on a proposal

to extend income tax deductibility or excludability of health insurance premiums to people who purchase individual insurance, Representative Charles Rangel expressed the view that, because tax deductibility is most important for people with incomes high enough to itemize deductions, this policy "would mostly benefit people who can already afford premiums" even if they are not currently choosing to buy insurance (Anderson, 2000). At the other extreme, political scientist Judith Feder criticized proposals for tax credits for insurance purchases by low-income people as similar to "offering a 10-foot-rope to people in a 30-foot-hole. The vast majority of the uninsured cannot afford to buy insurance…" (quoted in Toner, 2000). While the term "affordability" is in common use in policy discussions, it does not have a precise definition, either in those discussions or in more rigorous analysis. Yet, without such information, it is not possible to determine the extent to which the affordability of health insurance is the primary barrier to obtaining coverage for the uninsured or to choose among alternative ways to deal with the problem of the uninsured.

In this paper we do not propose to discover a single definitive meaning of affordability. However, we offer different ways to frame the concept, based on a variety of different assumptions about citizen values. These methods may be applicable not only to health insurance but to other goods and services which might be subject to means-tested subsidies.

We then show how those concepts can be applied to data on private health insurance coverage in the US population. We demonstrate that, under a wide range of plausible normative assumptions, many, perhaps even most, of the uninsured in the US are in households that can afford coverage ("uninsured afforders"), but there are also many persons who have obtained

adequate coverage but have inadequate incomes ("insured non-afforders"). The former group might be targets for mandates or, at least, alternatives to generous subsidies, while the latter group might be thought even more deserving of a subsidy than those only induced to buy insurance by a lower net price. Moreover, it is plausible that the reaction of uninsured afforders to a given subsidy program might differ from that of uninsured non-afforders.

I. The meaning of affordability

To our knowledge, there is neither a lengthy nor a rigorous definition or discussion of "affordability" in economics. The concept is most frequently discussed in connection with housing, because programs to subsidize housing expenses in the United Kingdom and the United States have statutory language that includes the term "affordability" in the statement of program objectives—to make housing "affordable." ("Affordability" has also been discussed in connection with telephone service, food, nursing home insurance, and a variety of other products and services.) Some analysts have offered fairly specific interpretations of this term: "affordability" is present when households "are able to occupy housing that meets well-established (social sector) norms of adequacy (given household type and size) at a net rent that leaves them enough income to live on without falling below some poverty standard" (Bramley, 1991, p. 16). "Enough income," "adequate (quantity and quality of) housing," and "some poverty standard" are socially defined in this interpretation. Other definitions are less precise about income levels but more illuminating in terms of sources for social standards: "'Affordability is concerned with securing some given standard of housing at a price or rent

which does not impose, in the eyes of some third party (usually government) an unreasonable burden on household incomes" (MacLennan and Williams, 1990, p. 9).

In a sense, the concept here is a normative ability-to-pay concept similar to that discussed (though not especially well) in taxation theory. People can afford to do something (pay their taxes, pay for health insurance, pay for housing) if they are "able" to sacrifice other things to pay the price. And one is able to pay the price if the amount remaining after paying for insurance out of a given income is enough to buy some adequate or benchmark quantity of other things. The taxation analogue is not perfect, since the normative theory of taxation assumes that ability to pay is continuous: some are more able to pay than others. Presumably this ability relates to the value of whatever is left. What is fully consistent with the theory of taxation is that affordability depends on more than the price of the required product; it also depends on the price of the other products and on some of the external circumstances of the buyer, such as family size, level of local taxation and cost of living.

With these considerations in mind, we now turn to a diagrammatic analysis suggested by Hancock (1993) to illustrate this meaning of affordability, as well as some alternative definitions. Let us first assume that we are comparing households identical in terms of the insurance premiums they face and demographic composition. It is probably most useful to think of the quantity of insurance as representing "insured dollars" of medical expenditures. Given the common premium P per dollar of expected benefit, given a definition of a minimum adequate quantity of insurance X, and given a definition of a minimum adequate quantity of

spending on other goods G (at a price of $1), we can normatively define the minimum income level Y* at which insurance can be afforded as:

$$Y^* = PX^* + G^*, \tag{1}$$

where X* and G* are the minimum adequate quantities of the two goods in question. This definition would say that all households with incomes below Y* cannot afford adequate insurance.[2] In figure 1, given the relative price of insurance P as indicated by the slope of budget lines, the level of Y* is as indicated.

If everyone who had income of Y* actually purchased exactly the quantities G* and X*, and everyone with higher incomes purchased at least those amounts (represented by the Engel curve, OE), consumer purchasing behavior would coincide exactly with the chosen definitions of adequate income and health insurance coverage. We could unequivocally say that all people with incomes below Y* cannot afford insurance and all people with incomes above Y* can do so. Everyone who cannot afford insurance would not be insured, and everyone who can afford insurance would be insured. The normatively optimal subsidy to achieve the minimum consumption of both health insurance and other goods would raise all incomes to Y*. Note that the optimal subsidy could well be larger than the premium for adequate coverage PX*, since it would need to be enough to induce and allow the family to spend both PX* and G*. Note also that this nice crisp result requires two things: that only income matters for demand (so everyone at a given income level does approximately the same thing), and that the mix of spending at a given income level just matches the normative ideal.

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[2] Of course, the alternative to insured medical expenditures is usually not zero medical expenditures, but some smaller expected value of benefits (because of moral hazard), representing greater risk but lower total expected spending (because of insurer administrative cost). We ignore this complexity in what follows.

Both requirements, however, may be violated both in theory and in practice. First, the purchasing behavior of consumers may differ from the normatively chosen ideal. Suppose OE' rather than OE describes the relationship between income and the allocation between insurance and other consumption for all consumers. As drawn, at income level Y* people buy less than the ideal amount of insurance (although they choose more than adequate levels of the other good). This leads to a second definition of affordability, one based not on what people could buy but rather on what they actually do buy. The income at which health insurance is "behaviorally affordable" is Y**, where the Engel curve, OE', hits the minimum quantity of insurance. In this case, the normatively "insurance-adequate" income is less than that indicated by the behavioral definition. If the Engel curve were on the other side of OE, income would not be "other-goods-adequate."

In addition, although demand in reality is related to income, it surely is not perfectly related to income (given relative prices) because of differences in tastes. Thus some people with high incomes do not buy insurance they can afford because they do not have a taste for that product. Conversely, some people at a low-income level may purchase insurance because they have a strong taste for it.

In the general case, we suggest an alternative definition of the circumstances in which insurance is affordable. Suppose the line OE' represents the allocation between health insurance and other goods and services for the household at each income level that is median in its spending on insurance. People at various income levels (facing the same price and similar

in other respects) who choose the consumption bundle in the area A may be said to be uninsured afforders, while those who choose bundles in the area B are insured non-afforders.

Thus, a simple interpretation of affordability would be to say that, if most people (50 percent plus ε) at a given income level who are observed to face otherwise similar economic circumstances do obtain adequate insurance, then everyone at that income level in those circumstances can afford coverage. A more general application of the same concept is to say that insurance is affordable to a given population in a given set of observed economic circumstances if the proportion p (usually greater than or equal to 0.5) obtains coverage. We call this proportion the affordability threshold. Under this definition, which we shall call the "behavioral" definition, some people may not do what they can afford to do because of the unmeasured influences we call tastes. As we shall see, empirically this definition depends on the precision with which we can predict purchase with a subset of observable variables unrelated to tastes.

Figure 2 summarizes the alternative definitions and introduces some terminology. The "insurance-income" lines E show possible relationships between income and the proportion of a population (or the probability of a consumer) having health insurance. Assume that risk levels, medical care costs, and family composition are all held constant. Income level Y* corresponds to the level at which the household has just enough income to buy the normatively ideal amount of health insurance and other goods.

8

Line E_1 illustrates the case in which the normative and behavioral definitions of "affordability" coincide: almost everyone with income below Y* does not buy insurance and almost everyone with income above Y* does buy insurance (and, perforce, consumes the right amount of other goods).

In contrast, if the line is like E_2, there will be many people who would be labeled normatively as "insured non-afforders": they may buy coverage, but have too little to spend on other goods. However, income predicts the purchase of health insurance relatively well. Thus, under a behavioral definition, relatively few "uninsured afforders" or "insured non-afforders" exist, although the income at which health insurance is affordable is somewhat lower than the normatively chosen level (Y*). E_3 is the reverse case; using the normative definition, there are some "uninsured afforders" with incomes high enough to buy insurance and the normatively ideal level of other goods, but who do not buy the right amount of insurance. However, using the behavioral definition, there are relatively few "uninsured afforders" or "insured non-afforders". Yet, the behavioral definition suggests that the normative standard for income is too low.

Line E_4 shows a case where there are *both* "insured non-afforders" and "uninsured afforders." However, the behaviorally-determined level of income at which most people can afford coverage coincides with the normatively determined one, at Y*. Finally, line E_5 shows a case in which there are "some insured non-afforders," "more uninsured afforders," *and* the definitions do not coincide.

In the empirical analysis which follows, we will therefore be looking for two things: first, do "insurance proportion-income" relationships display, other things equal, the strong inflection which is consistent with clearly classifying the population into afforders, non-afforders, or both? Second, do the normative and behavioral definitions coincide? We will show that the data give negative answers to both questions, and suggest that the relationship is most like that shown in E_5.

II. Implementing the Definitions of Affordability

For both the normative and behavioral definitions, we ideally should have a precise description of the target or benchmark level of coverage. After all, a low-income person could buy a policy with a $5000 deductible (at a low premium), and be classified as "insured." And yet that level of coverage would probably be generally regarded as normatively deficient, particularly for low-income individuals, probably by reference to some prior goal for a limit on out of pocket payment relative to income (for example, Farley, 1985). Similar considerations apply for other cost-sharing provisions such as coinsurance rates and stop loss coverage.

The normative definition also requires the specification of the minimum amount of spending on other types of consumption. For this, it seems reasonable to use the poverty line definition (or some multiple of it). Embedded in that definition, and possibly of merit in its own right[3], is a determination of the minimum amount of spending needed to achieve a set of objectives for nutrition, housing, etc. In this analysis, we assume that the U.S. poverty level thresholds

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[3] For a detailed discussion of issues related to the measurement of poverty more generally, see Citro and Michael, 1995.

describe the total income available for other consumption, not including spending on health insurance premiums, but including out-of-pocket expenditures for health care services, assuming the minimum level of coverage.

Although the behavioral definition avoids the normative choice of the minimum amount of spending on other types of consumption, it does require identifying the degree of similarity which must exist among identified types of consumers in their purchasing behavior in order to define coverage as affordable. It also requires identifying the set of individual characteristics to consider when identifying similar consumers. Clearly, income and price affect the affordability of coverage. Other significant influences on the demand for insurance have less clear implications. We know that education, ethnicity, and many other things affect the demand for insurance. Should these characteristics also be said to affect affordability? There will also be some unobservable influences on demand. The size and nature of these influences are presumably relevant for affordability; those due to differences in risk (not taken into account by insurers) might be interpreted differently from those related to pure tastes. In all these cases the judgment of how to treat these other factors will be both behavioral and normative.

We clearly want to define affordability in terms of the relative prices prevailing for insurance and for other goods. (We ignore the possibility that the social definition of the benchmark minimum quantity might itself depend on prices, as suggested by Whitehead (1993).) Both the insurance premium and the loading, the difference between the expected benefits and the premium, are relevant to the discussion of the affordability. The premium represents the foregone consumption of other goods and services due to the purchase of health insurance.

Although higher premiums make health insurance less affordable by reducing the amount of consumption available for the purchase of other goods and services, they do not necessarily reduce the likelihood of purchase. In fact, high-risk individuals, either due to poor health or the existence of dependents, facing higher premiums than low risk people, may effectively face a lower *price* if their premiums do not fully reflect their greater expected health expenditures. The reason, of course, is that, without insurance, the unsubsidized high risk household faces out-of-pocket medical expenses, which also can take a larger (expected) bite out of other consumption. Thus, while higher premiums due to higher risk may make health insurance less affordable in the normative sense, individuals facing higher premiums for such reasons may be more likely to purchase coverage due to its lower price; for them, health insurance is more affordable in the behavioral sense.

Institutional features of health insurance markets in the U.S. also affect both the affordability of coverage and our ability to measure it. In most cases, we do not observe the premium people pay for coverage. Most people obtain their coverage through an employment-based group and pay for it through lower money wages. As a result, we often do not know the precise premium the person pays, nor do we know how or whether the premium is related to the person's risk level. In addition, the price of coverage, independent of health risk, varies depending on the setting in which coverage is purchased. While most people obtain coverage through an employer due to the tax advantages of employer-sponsored coverage and the existence of economies of scale in the purchase of group coverage, some purchase health insurance in the more expensive individual market. Because the premium for similar coverage differs between the two markets, this raises the question of what the relevant premium is for those without

health insurance. The assumption that the uninsured are able to obtain coverage in an employment-based group may be unrealistic for many low-income workers in industries or occupations in which employers rarely offer coverage in the current market. However, the decisions of employers are likely to reflect the preferences of workers, suggesting that the reason that many low-income workers do not obtain coverage from an employer has to do with the affordability of coverage in the employment-based, rather than the individual, market.

When assessing the affordability of health insurance, family structure also plays a role in both the premium and the income available for consumption. There are some peculiar features of the institutional structure of insurance pricing, especially that concerned with the definition of who is and is not included in family coverage at a family premium. In particular, children above the age of 18 who are not full-time students are generally not eligible for coverage under their parents' policy, which significantly increases the price of coverage for these individuals. This feature of the market affects both the behavioral and normative definition of affordability. Another relating to family structure is how to attribute family or household income to individuals within the group. For example, in the case of the adult child living with parents, is the individual's own income or the income of the family relevant in assessing affordability? In the case of unrelated members of a household, is the income of the household or the individual the relevant benchmark? In both cases, economies of scale will reduce the income necessary for other consumption for individuals living in a group situation, implying a role for family and household structure under a normative definition. This question, however, is certainly not unique to assessing the affordability of health insurance, but affects the analysis of the incidence of poverty more generally.

A final factor affecting the analysis of the affordability of health insurance is the fact that the person may have available free care, in the form of charity or bad debt care, which furnishes an alternative to private insurance coverage. The uninsured may also be eligible or believe they are eligible for publicly funded coverage from state Medicaid programs in the event of an illness even if they are currently unenrolled. Such free care, to varying degrees, affects the utility a person will experience in the "no insurance" state and, thus, the likelihood of purchase. Generally, the uninsured person will consume less medical care than if insured; in this sense as well the failure to purchase insurance releases resources that can be spent on other goods. The availability of free care is related to some characteristics we can measure, such as income. But the actual insurance purchase decision may be affected by variations in the "quality" of this other option. By raising the relative price of health insurance, access to uncompensated care reduces the likelihood of purchase, making health insurance less affordable in the behavioral definition. Using the normative definition, access to uncompensated care does not directly affect the affordability of coverage.

III. Empirical Analysis of Affordability
A. Methods

In order to show how the normative and behavioral definitions might work in practice and what insights they might yield, we apply them to data from the 2001 Current Population Survey (CPS), which provides information on the insurance status of the population during 2000. The CPS is the dataset most commonly used to measure the number of uninsured and changes over

time in that number.[4] For this illustration, we focus on adults between the ages of 25 and 64.

All results are weighted to be nationally representative, and standard errors are corrected for the

use of the household as the sampling unit.

A.1. The Normative Definition

We use the money income thresholds used by the U.S. Census Bureau to measure the extent of

poverty in the U.S. population to implement our normative definition of affordability. We use

these standards, which vary by family size and composition, but not geographically, to define

the level of spending necessary to achieve a minimum level of consumption of other goods and

services. We adjust the standard calculation of family income used to compute poverty levels,

however, to reflect the income available for consumption after the purchase of health insurance.

For those with individually purchased coverage and the uninsured, we reduce family income by

an estimate of the premium each family member would pay for coverage in the individual

market. The data for the premium estimates were collected from on-line insurance brokers

during February, 2001.[5] The dataset includes 7,162 premium quotes for 747 individuals.

Premium quotes were customized based on smoking status, age, sex, and geographic regions.

For each individual, premium quotes were gathered for multiple plans with varying copayments

and deductibles as well as for PPOs and FFS plans. These data were used to estimate a model

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[4] The health insurance questions on the Current Population Survey were revised in the 2000 survey to ask a final verification question for individuals reporting no coverage. Analysis of the results suggests that this verification question significantly decreases the number of uninsured, particularly among higher income families (Nelson and Mills, 2001). The results presented in this paper are based on the revised methodology.
[5] More information on the data collection is available in Pauly, et al. (2002). We thank David Song for providing the regression models used in this analysis.

of premiums, conditioning on individual and plan characteristics. We then used this model to predict the premium in the individual market for each adult in the dataset without employer-sponsored coverage, assuming the individual purchased a PPO with a $20 copayment and $500 deductible. The average of predicted annual premiums for individuals in our dataset is $2317 and ranges from $649 to $5,702. (The measure of affordability is not very sensitive to the precise specification of the benefits package.)

For those with employer-sponsored coverage, we reduce reported income by an estimate of the employee premium contribution only since employer contributions to premiums are not included in the reported income in the CPS. The CPS provides information on whether the employer contributed all, some, or none of the premium for those with employer-sponsored coverage in their own name. For those with dependent coverage, we assume they obtained coverage through the family member with the most attractive employer contribution. For each adult with employer-sponsored coverage we reduce reported income by $2426, the average premium for single employer-sponsored coverage, for those reporting the employer made no contribution and $487, the average employee premium contribution conditional on a contribution required, for those reporting that the employer contributed some of the premium (Kaiser Family Foundation, 2000). We reduce family income for each individual by the sum of the estimated payments for individual coverage for those without employer-sponsored coverage and employee contributions for those with employer-sponsored coverage for each adult in the family. In our analysis, we vary the ratio of adjusted family income to poverty threshold from 1 to 3 in defining the minimum level of consumption of other goods to examine the effects of alternative normative choices.

A.2. The Behavioral Definition

Our implementation of the behavioral definition is based on the following choice model:

$$y_i^* = U_{iI} - U_{iU} = \beta X_i + \varepsilon_i \tag{2}$$

where U_{iI} and U_{iU} represent the utility of being insured and uninsured, respectively, X_i represents a vector of individual characteristics that affect the value (net of the premium) of being insured relative to being uninsured, and ε_i represents the error term reflecting random influences or "tastes." (Implicitly, the benchmark policy here is the average one people actually buy.) We do not observe the "utility difference" y_i^*. Instead, we observe the choice of insurance y_i given by:

$$y_i = 1 \text{ if } y_i^* \rangle 0$$
$$y_i = 0 \text{ otherwise} \tag{3}$$

This implies that $Pr(y_i = 1) = Pr(\beta' x_i + \varepsilon_i > 0)$. Assuming that the errors follow the logistic distribution, we can estimate $Pr(y_i=1)$ by maximizing the log of the likelihood function:

$$L = \prod_{y_i=1} \frac{\exp(\beta' X_i)}{1 + \exp(\beta' X_i)} \prod_{y_i=0} \frac{1}{1 + \exp(\beta' X_i)} \tag{4}$$

We then use the estimated coefficients $\hat{\beta}$, the estimate of β, to calculate for each observation in our data set the estimated probability of having more insurance $\hat{p} = Pr(y_i = 1)$. If $\hat{p}$ exceeds the affordability threshold, we identify the individual as able to afford health insurance.

This simplified model illustrates the methods we will use in the empirical work, but it is subject to some ambiguity and qualification. Most obviously, consumers in the US can usually choose

from a variety of health plans (or from a variety of jobs offering different health plans). A

person is reported as "insured" in all databases if the person is covered by a policy that

provides some reimbursement of general medical and surgical expenses. The level of

reimbursement to the provider, the level of out of pocket payment by the patient, and the limits

on choice of physicians and hospitals vary widely across plans. In theory, a person will only be

uninsured if *none* of the policy-premium combinations available make the person better off

than being uninsured.

This phenomenon raises three complications for our empirical analysis. First, the impact of

particular characteristics on the likelihood of purchase may vary across plans and policies.

Second, we generally do not have a precise measure of the coverage obtained, and not everyone

obtains a standard or uniform plan. And third, the public policy interpretation of purchase of

low but positive amounts of coverage is unclear, since we have no precise definition of optimal

coverage (or "underinsurance" or "overinsurance"). The Current Population Survey (CPS) data

we will use for our illustration does not distinguish among plan types or coverage levels. We

can say that classifying someone as "insured" who obtains a policy that might be judged as

inadequate probably overstates the affordability of insurance, but little more can be said

without better data.

An additional consideration in implementing the behavioral definition is the treatment of the

availability of public coverage. A significant portion of the under-65 population has publicly

provided health insurance, primarily through state Medicaid programs. Ideally, estimates of the

affordability of coverage using the behavioral definition would include the choices made by

these individuals if they were not covered by public programs. Because we know relatively little about the purchasing behavior of these individuals in the absence of public insurance, we exclude them from our analysis. Thus, our results can only be generalized to the population currently not enrolled in public programs. A related issue is the interpretation of individuals who have or think they have implicit Medicaid coverage, in the sense that they would be enrolled in Medicaid if they sought care. In our analysis, they are treated as uninsured. Both theory and empirical evidence suggest that the availability of public coverage reduces demand for private health insurance by reducing the cost of being uninsured (Cutler and Gruber, 1997). Thus, in the behavioral model, implicit public coverage makes health insurance less affordable overall. Whether we should control for the availability of public coverage for those currently not enrolled, however, is ultimately a normative question. Arguably implicit public coverage is similar to the availability of uncompensated care. To the extent that it increases the price of private coverage, from a behavioral perspective, it should be included in the model only if the policy under consideration is removing the availability of publicly funded coverage.

The definition of affordability obviously depends on the set of characteristics that is held constant in the classification. In the empirical model, X_i represents individual characteristics that affect the value of being insured. In our behavioral definition of affordability, we would like to include individual characteristics that are proxies for income or premiums. For example, if only income is included as a characteristic as in our example, some people with incomes a little above the $25,000 cutoff who rationally and understandably do not buy coverage because they face unusually high premiums will be classified as people who could have afforded coverage but chose not to take it. X_i, however, will also include individual characteristics that

we may not want to include. For instance, if people with high levels of education with a given family income and insurance premium are more likely than average to buy coverage, we probably do not want to say that better educated people at that income level are better able to afford coverage. In summary, we do not want to control for all observable characteristics that are correlated with the purchase of coverage in defining affordability. Thus, in the empirical work, we divide characteristics into those we surely would want to include and those other characteristics we can measure and which are actually or potentially related to insurance purchase, other things equal, but are unlikely to represent income or price proxies.

We estimate four different models that roughly correspond to four different categories of variables. The first model includes only measures of the resources available to the individual for the purchase of health insurance. In this, as well as subsequent models, we include family income and family income squared to capture non-linearities in the effect of income on the probability of obtaining coverage. We adjust family income by adding the value of health insurance for those with employer-sponsored by identifying the number of individuals in the family covered by a group policy in either their own name or as a dependent. We add $2,426 to the family income for each adult and $1,499 for each child with employer-sponsored coverage requiring no employee contribution, and $1,948 and $525 for adults and children covered by employer-sponsored policies requiring an employee premium contribution (Kaiser Family Foundation, 2000). Once again, for dependent coverage, we assume dependents receive coverage through the family member with the most favorable premium contribution. This approach ignores potential variation by health risk in the incidence of premiums in employer sponsored coverage on wages.

Family income, however, may not be an accurate measure of individual resources for a number of reasons. First, the size of a family will affect the availability of resources for any single individual. A better measure of income would control for the number of individuals in the family, and the "poverty line" definition of family income makes this adjustment to some extent. To control further for this in the behavioral definition, we include the number of adults in the household, the number of children in the household, and the square of each.

The difference between household and family income also generates questions regarding the appropriate measure of income. For example, college roommates would be identified as members of a single household in the CPS. Although they most likely do not share all household resources, suggesting that household income would overstate their resources, they are likely to have greater income available for the purchase of health insurance due to economies of scale in group living. Based on these types of examples, others have proposed that family income more accurately reflects the resources available to individuals (Fronstin and Christensen, 2000). In other circumstances, however, family income may understate an individual's resources. For example, unmarried couples may effectively pool their income and make joint purchasing decisions, yet be identified in the survey as unrelated household members. Although the price of health insurance may be higher to these individuals than to married couples if they are not eligible for their partner's plan, not including the income of the additional adult most likely understates their total resources. In our analysis, we chose to explicitly test the hypothesis of the effect of incremental household income or persons on an individual's probability of obtaining coverage, rather than assume that one measure of income

was more accurate than the other. Thus, in our models, we include family income as well as the difference between household and family income for each individual.

Both household and family income in the behavioral analysis are adjusted for the availability of employer-sponsored coverage among household members. Using this approach, we are able to test whether, on average, incremental income provided by non-related household members increases the probability of an individual obtaining private health insurance. We also control for the relationship of the individual to the household head, including indicators of whether the individual is an adult child, other relative, or non-relative. While these variables may control for price in the sense that an adult child, for example, is unlikely to be covered under a parent's policy (Schroeder, 2000), they may also control for allocation of resources within the household. For example, an adult child may be more likely to obtain coverage than other relatives or non-relatives.

The most difficult question, and one that clearly indicates an important conceptual distinction between the normative and behavioral definitions of affordability, concerns the appropriate treatment of the insurance "price." The most appropriate price measure is unclear, both in the theory and in the empirical literature. There is, we believe, universal agreement that if the premium paid by individuals of identical risk (expected benefits) for identical coverage differs, that difference in premiums—the so-called "loading"—does represent a variation in price. Not only should the person's income spendable on other things be reduced if the premium is higher for this reason, the likelihood that the person would buy insurance is also reduced; both definitions coincide.

The ambiguity arises if premiums vary for given nominal coverage because risk (and benefits expected from insurance) also varies across persons. A normative definition would appear to treat this reason for premium variation in the same way as in the previous case. Whether a person faced a higher premium because of higher age, or higher average medical costs in their town, those higher premiums regardless of cause reduce income spendable on other things and make those people less likely to be ones who can afford coverage by the normative definition. However, if higher premiums for older people reflected the same (or even lower) loading than for otherwise similar younger people, the older people might well be more likely to choose to buy coverage. So older people would be normative non-afforders but behavioral afforders. Even if the loading did not vary by age, both low risks (who were counted as normative afforders) and high risks (who were counted as normative non-afforders) might buy coverage. So the behavioral definition would yield fewer non-afforders than the normative one.

The level of the premium, given loading, may not be wholly meaningless for behavior. There may be income effects from the level of the premium. What might happen (although we do not know for sure) is that risk (given loading) and income may interact. Above some income level, older people paying higher premiums would be more likely to be insured, but as income falls low enough the high premiums of insurance would have a kind of income (or survival) effect that more than offsets the lower loading, and older people would be less likely to obtain coverage.

We see no easy theoretical way to resolve this definitional conundrum. We therefore treat two different kinds of premium proxies (since our data do not provide direct information on either premiums paid by buyers or premiums faced by non-buyers), entering first proxies for loading and then adding proxies for expected expenditures (risk or premiums, given loading) to the behavioral model. The proxies for loading are employment status and employment size. Non-workers and part time or part year workers are less likely to be offered coverage from an employer, and as a result, face higher premiums in the individual market and forego the tax advantages associated with employer-sponsored coverage. The self-employed face similar barriers. Because the price of coverage is lower to large than to small groups, workers in small firms also face higher premiums for similar plans purchased by workers in large firms. In addition, per enrollee premiums may be lower for individuals purchasing family coverage than those purchasing single coverage. Thus, we include an indicator of marital status. We treat these ambiguous price measures as one set of predictors.

The other set includes measures of expected expense which may or may not affect premiums or loadings. We include self-reported health status, age, and sex in our models. Premiums and expected benefits may also differ across individuals based on area-level medical costs. While these differences could be due to higher local input prices, they may also be driven by more intensive and/or higher quality care. While it is clearer that we should control for the former than the latter in the definition of affordability, in practice, it is difficult to isolate the two. Thus, in the third model, we also adjust for geographic differences in the affordability of coverage by including state identifiers and indicators of MSA size, realizing that these variables are likely to control for differences in both input prices and quality.

Finally, we consider a set of individual characteristics that are associated with the likelihood of obtaining coverage, but are unlikely to be proxies for income or the price of health insurance under any definition. These include race, education, and citizenship. While these characteristics may affect premiums, they are also likely to be proxies for the value individuals place on health insurance or their costs of obtaining coverage. For example, if minorities have greater difficulty accessing either health insurance or health care providers, receive fewer services when they do access these providers, or are more likely to consume health services not covered by traditional plans, they may place a lower value on the expected benefits of purchasing health insurance. If non-citizens have fewer opportunities for employment in firms offering coverage, they will be less likely to purchase coverage. Whether one would want to label minority families at a given income level as non-afforders, but label white families at the same income level as afforders, is a difficult issue. We provide measures both excluding and including such variables.

B. Results

We use the poverty thresholds as a normative standard of the minimum level of consumption net of the purchase of health insurance, and we reduce family income by the estimated cost of purchasing health insurance for uninsured and individually insured family members as well as those covered by public programs to make family income more comparable between those with and without employer-sponsored coverage. Table 1 demonstrates the effect of making this adjustment. We find that the purchase of health insurance would increase the poverty rate for

adults aged 25 to 64 from 8.5% to 10.5%, and that the adjustment has the largest effect on poverty estimates for the near elderly. Accounting for spending on health insurance increases the poverty rate by 37% for individuals 60-64. The poverty line definition also adjusts for some but not all aspects of household composition.

In table 2, we present the results of the normative definition of affordability and examine the relationship between the normative definition and actual purchasing behavior. The results suggest that differences exist among individuals in similar adjusted (for insurance premium) incomes in their actual purchasing behavior. For example, among individuals in families with income below 1.5 times the poverty level, significant proportions both are covered by private health insurance (36%) and are uninsured (40%). This normative standard is not very effective in predicting actual purchasing behavior; many of those "unable to pay" for insurance, based on only income and family size, actually purchase coverage. These differences in actual behavior may be driven by differences in unmeasured income or wealth, premiums, prices, or tastes. In addition, the choice of the normative standard has implications for the extent to which actual behavior conforms to the normative definition of affordability.

If we define health insurance as unaffordable to individuals in families with income below poverty level, health insurance is unaffordable to 10.5% of all adults aged 25-64. The majority of those who cannot afford health insurance by this definition are uninsured or covered by public programs, and only 28.5% purchase private health insurance. While purchasing behavior conforms rather well with the normative standard in the sense that many of those for whom health insurance is unaffordable do not purchase coverage, a large proportion of the

uninsured are identified as able to afford health insurance. Using this normative definition of affordability, 70.9% of the currently uninsured are able to afford coverage. There are not many false positives (unafforders who pay for coverage) but there are many false negatives (afforders who do not buy). If we increase the normative definition of affordability to family income exceeding three times the poverty threshold, the proportion of uninsured afforders declines to 0.277, but the proportion of privately insured non-afforders then increases to 0.572. The conclusion: using commonly accepted normative standards, we find that, overall, health insurance is affordable to many of the uninsured. Depending on the normative definition chosen, between 28% (<3 times poverty level) and 71% (< 1 times poverty level) of the uninsured could have afforded health insurance (Table 2).

In table 3, we present the results of several behavioral models, varying the set of control variables included in the model and the affordability threshold. Setting the affordability threshold at 0.5 and including only controls for financial resources, based on average premiums, we find that health insurance was affordable to 76.3% of the uninsured. Adding proxies for loading (Financial Resources and Loading in Table 3) results in a 0.099 decline in the proportion of the uninsured classified as able to afford coverage to 0.664 when the affordability threshold is set at 0.5. As the affordability threshold increases, however, the effect of adding the loading proxies on the proportion of the uninsured identified as able to afford coverage declines. For example, when the threshold is set at 0.8, the proportion of the uninsured classified as able to afford coverage declines by 0.001, from 0.250 to 0.249, when the loading proxies are added to the model, whereas the decline is larger at $p=0.5$. Adding the proxies for expected expenditures further reduces the proportion of the uninsured we classify as

able to afford coverage from 0.664 to 0.622 when the affordability threshold is set at 0.5. Once again, increasing the threshold reduces the magnitude of the effect of adding these controls on the proportion of the uninsured classified as able to afford coverage. Adding the final set of individual characteristics—tastes and ethnicity—has relatively little effect on the proportion of the uninsured classified as able to afford coverage, particularly when the affordability threshold is set high. With the threshold set at 0.5, the proportion of the uninsured identified as able to afford coverage drops from 0.622 to 0.591. Although the adjustment for education, ethnicity and citizenship has a relatively small effect on the overall proportion of the uninsured identified as able to afford coverage, it does change the composition of those identified as afforders and non-afforders. While the proportion of the uninsured identified as "afforders" declines by only 3 percentage points when adding the final set of controls when p=0.50, 11% of the uninsured population is classified differently using the model without education, citizenship, and ethnicity than when using the model including these variables. The remaining half to quarter of the uninsured who are afforders are those who have reasons or causes for not purchasing which we cannot identify.

Finally, the results of the behavioral models containing the adjusted income and price variables underlying the calculations in Table 3 are presented in Table 4. As hypothesized, higher income individuals are more likely to obtain coverage. Higher family income is associated with a higher probability of obtaining coverage. We also find evidence that the income of unrelated household members is positively associated with the probability of an individual obtaining private coverage. The variables measuring incremental household income are statistically significant predictors of the probability of obtaining coverage. The number of

adults in the household also affects the probability of obtaining private coverage. Holding household income constant, individuals in larger households are less likely to purchase health insurance. Adults who are not the primary householder or the spouse of the primary householder are less likely to purchase health insurance, and this is true for both related and non-related adults. The magnitude of the effect of these household relationships, however, declines as controls for other individual characteristics are added to the model, suggesting that a large portion of the effect is driven by the characteristics of individuals rather than their household relationship.

As hypothesized, higher loading is associated with a lower likelihood or purchasing coverage. Married individuals are more likely than single individuals to have private health insurance. (This result is consistent with the hypothesis that the price (loading) of health insurance is higher to those not covered under a family policy.) As others have found, the likelihood of obtaining private health insurance for full-time workers increases with the size of an individual's employer. Firm size has a positive, but smaller, effect for part-time or part-year workers. These results are consistent with the hypothesis that employment-based coverage is more affordable than individually purchased coverage due to the lower loading of premiums.

As noted above, we do not have strong prior hypotheses on the relationship of risk to the likelihood of having coverage. To the extent that premiums are higher for higher risks (either through explicit risk rating in nongroup markets or risk-related reductions in money wages in group markets) those with higher predicted health expenditures both pay more but get more benefit from coverage (relative to lower risks). Value and "affordability" thus have opposite

influences. In contrast, if net premiums do not vary with risk, we would expect higher risks to be more likely to have coverage than lower risks.

We actually find that those who might be thought to be higher risks based on their age and sex are more likely to have coverage. In general, younger adults are less likely than older adults to have health insurance. In addition, younger women are more likely than younger men to have coverage, while older men are more likely to have coverage than older women. This result is not consistent with the hypothesis that, using a behavioral definition, higher premiums make coverage less affordable. Independent of these demographic characteristics, however, health status also affects the probability of obtaining coverage, with individuals reporting worse health states less likely to have private health insurance. This suggests that health insurance is less affordable to those in poor health, and could be driven by either higher premiums or greater difficulty in finding and maintaining employment for these individuals. That is, since the survey measures realized health status, not necessarily the health status an insurer might have known about, it may be that people who are unexpectedly sick lose their job and then lose coverage.

To sum up: using either the normative or behavioral definition, we find that a significant portion of the uninsured could have afforded coverage, although the magnitude of the estimate varies considerably depending on the choice of the normative parameters in each model. In addition, the composition of the population identified as able to afford coverage varies between the two methods. Identifying health insurance as affordable to those with incomes at or above 1.75 times the poverty line, we find that 51% of the uninsured could have afforded coverage.

Using the behavioral model with the affordability threshold set at 0.6 and including financial resources, premium proxies, and geographic indicators, a similar proportion, 0.50, of the uninsured are identified as able to afford coverage. Underlying these similar estimates, however, are differences in the composition of the uninsured identified as able to afford coverage. Among the uninsured, 35% and 36% are identified as not able and able, respectively, to afford coverage in both definitions. Fifteen percent are classified as able to afford coverage using the normative model but not able to afford coverage using the behavioral model. The remaining 14% are classified as able to afford coverage using the behavioral approach, but not able to afford coverage using the normative model.

IV. Conclusions

Our results demonstrate that the "affordability" of health insurance, as measured in several ways, is not an especially good predictor of a person's obtaining coverage. Lack of "affordability" is an important barrier, but not the only or even the major barrier to obtaining coverage for all, or even most, of the uninsured. We examine both normative and behavioral definitions of affordability and a range of normative parameters for each. Using federal poverty guidelines as a normative standard for adequate levels of consumption after the purchase of health insurance, we find that actual purchasing behavior often conflicts with the normative standard. For example, while 36% of individuals in families with income of two times poverty level or less are uninsured, 44% have private coverage. Using the normative standard, many people who cannot afford health insurance actually purchase coverage and many people who can afford coverage remain uninsured.

Using the behavioral definition of health insurance as affordable if the majority of people in similar circumstance purchase coverage, we find that coverage was affordable to over 50% of the uninsured in 2000. Although increasing the affordability threshold reduces the proportion of the uninsured classified as able to afford coverage, even when the threshold is set at a relatively high level, a substantial portion of the uninsured is identified as able to afford coverage. For example, when this threshold is set at 0.8, in other words, 80% of individuals with similar characteristics purchase private health insurance, approximately one-quarter of the uninsured are still classified as able to afford coverage.

Although both definitions suggest that the lack of health insurance among many Americans is due not exclusively to the affordability of coverage, important differences exist between the two approaches in the factors making health insurance more or less affordable to individuals. Using either definition, health insurance is more affordable to those with higher incomes. The effect of premiums on affordability, however, is more complex. Using a normative approach, higher premiums, due to either higher loading or higher expected expenditures, make health insurance less affordable, as individuals purchasing health insurance have less income available to spend on other goods and services. (This effect is especially important for non-group health insurance.) Using a behavioral definition, however, the components of premiums have different effects on the affordability of coverage. Higher loading, holding expected expenditure constant, reduces the probability that an individual purchases private coverage, making health insurance appear to be less affordable. Higher expected expenditures, in contrast, may increase the measured affordability of coverage if the value individuals place on coverage exceeds the

higher premium associated with higher expected expenditures. Similar considerations apply when analyzing the effects of access to uncompensated care. While access to uncompensated care has no effect on the affordability of coverage using the normative definition, it decreases the affordability of coverage using a behavioral approach if it makes individuals less likely to purchase coverage.

The differences in the size and composition of the uninsured population identified as afforders using the different models we estimate raises questions regarding the role of omitted variables in our model. Our model (or any model) is clearly unlikely to control for all characteristics of individuals that affect the likelihood of the purchase of health insurance, and we have found evidence that these omitted variables are quantitatively important. The interpretation of omitted variables, however, depends on what we do not know—what they are. If they are related to premiums or income, policy would presumably be different than if they were related to unobserved tastes. If omitted variables cause us to overestimate income or underestimate premiums for particular segments of the population, our estimates of the extent to which health insurance is affordable for the uninsured will be biased upward. Other types of omitted variables, however, may be of less concern. Another important issue is the definition of the minimum level of coverage. Unfortunately, our dataset does not offer information about plan characteristics that would allow us to examine the implications of alternative definitions of minimum coverage standards on affordability.

Deciding for whom health insurance is affordable is ultimately a normative decision on the part of policymakers and society. We believe that our definitions, however, offer researchers and

policymakers a positive empirical framework with which to begin to evaluate this question by basing the definition of affordability on the behavior of other consumers with similar characteristics, rather than an arbitrarily chosen income threshold. In addition, our approach allows for differences among individuals in the premiums they pay for coverage to be determinants of the affordability of health insurance, and we find empirical evidence supporting the importance of accounting for these differences.

Implementing our definition, however, does require normative judgments. Not surprisingly, the choice of the affordability threshold in our model has important implications for the results. Setting the threshold higher generally makes health insurance less affordable and reduces the proportion of the uninsured we identify as able to afford coverage, but increases the proportion of the uninsured identified as unable to afford the purchases they actually make. Our definition requires a normative choice about the degree to which common behavior must exist among consumers to define health insurance as affordable to an individual. Our definition also requires choosing the set of individual characteristics to include in the model. While we believe that few would argue against including those that are obvious measures of income and loading, others, such as age, education or ethnicity, may be more controversial. Our definition alone cannot provide guidance as to whether they should be included. At a minimum, we believe further research is necessary to identify the factors underlying the decision of these individuals to choose not purchase coverage. As a result, we present both sets of results and let the reader interpret the findings with respect to the affordability of coverage.

Policymakers designing interventions intended to reduce the number of uninsured will be confronted both with these differences in definition among the uninsured population in the affordability of coverage and with the failure of any definition to exactly classify individuals or predict actual behavior. Prioritizing those who cannot afford coverage in allocating scare resources may be preferable to many from a normative perspective, but our results suggest this approach will be difficult to implement. Making insurance affordable for everyone by these definitions will not come close to achieving universal coverage. Dramatic reductions in the number of uninsured will require policies targeted to both those who can and cannot afford coverage. If policymakers and society prefer to limit subsidies to those who cannot afford coverage, compulsory mechanisms, such as individual mandates, may be more appropriate for those who can afford coverage.

Acknowledgements

References

Anderson, C., 2000. Health-care tax package in negotiation. The Philadelphia Inquirer, October 21, A2.

Bramley, G., 1991. Bridging the Affordability Gap in 1990: An Update of Research on Housing Access, BEC Publications, Birmingham, England.

Citro, C.F., Michael, R.T. (Eds), 1995. Measuring Poverty: A New Approach, National Academy Press, Washington, D.C.

Cutler, D.M., Gruber, J., 1997. Medicaid and private insurance: evidence and implications. Health Affairs 16(1), 194-200.

Farley, P., 1985. Who are the Uninsured? Milbank Quarterly 63(3), 476-504.

Fronstin, P., Christensen, R., 2000. The relationship between income and the uninsured. EBRI Notes 21(3), 1-3.

Hancock, J.E., 1993. 'Can pay? Won't pay?' or economic principles of 'affordability.' Urban Studies 30(1), 127-145.

The Kaiser Family Foundation and Health Research and Educational Trust, 2001. Employer Health Benefits: 2000 Annual Survey, Menlo Park, CA, The Kaiser Family Foundation.

MacLennan, D. Williams R., (Eds) 1990. Affordable Housing in Britain and America, Joseph Rowntree Foundation, York.

Nelson, C.T., Mills, R.J., 2001. The March CPS Health Insurance Verification Question and its Effect on Estimates of the Uninsured. U.S. Bureau of the Census, Housing and Household Economic Statistics Division, Washington, D.C.

Pauly, M.V., Herring, B.J., Song, D., 2002. Health insurance on the internet and the economics of search. Unpublished.

Schroeder, S.A., 1999. The American paradox: lack of health insurance in a land of plenty. In: The Robert Wood Johnson Foundation Annual Report 1999: Americans Without Health Insurance: Myths and Realities. Robert Wood Johnson Foundation, Princeton, NJ, pp. 3-17.

Toner, R., 2000. The 2000 campaign: health. The New York Times, November 5, 45.

Whitehead, C.M.E., 1991. From need to affordability: an analysis of U.K. housing objectives. Urban Studies 28(6), 871-887.

Figure 1
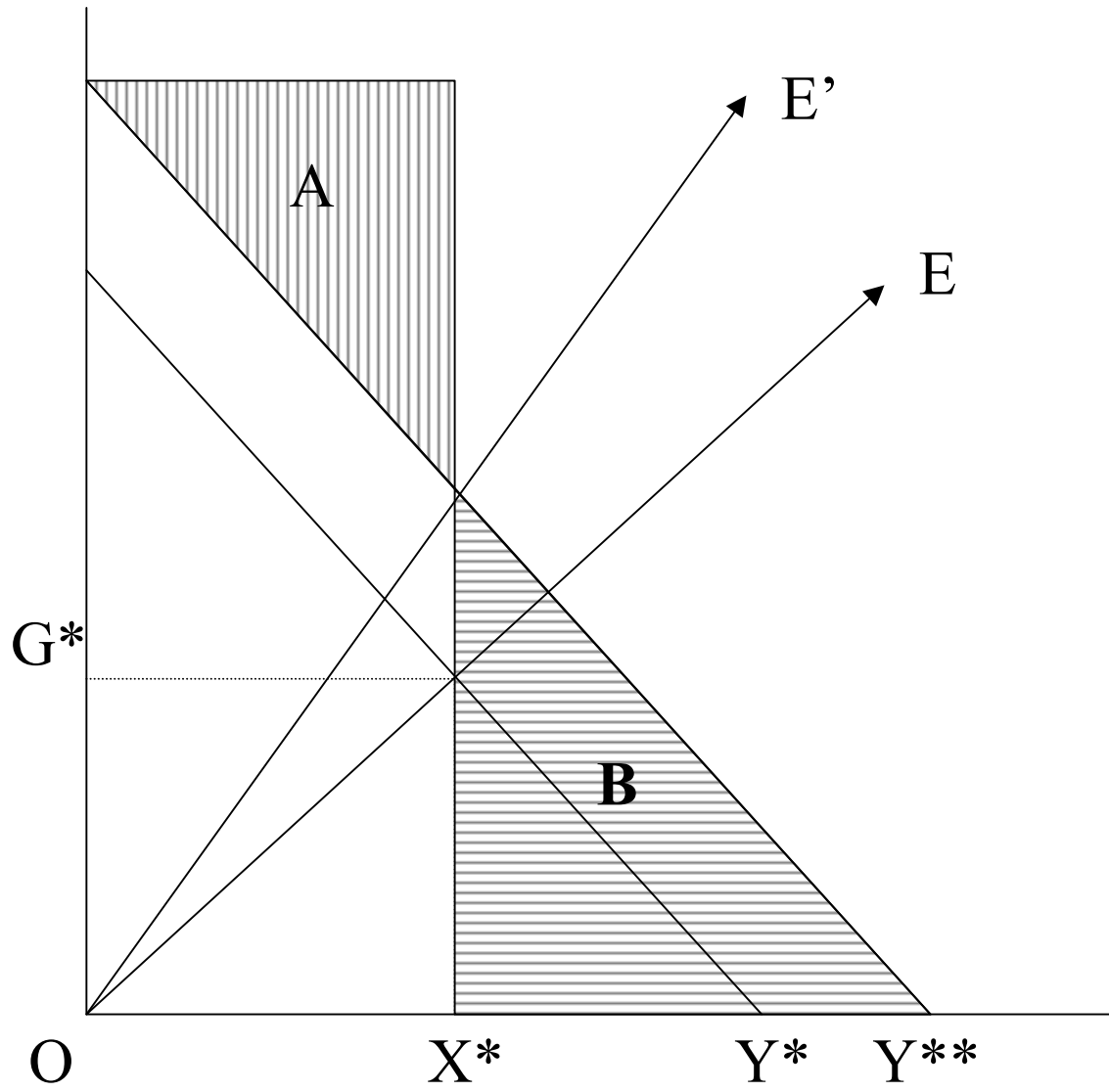
% With Health
Insurance

Figure 2

100

50

E_2

E_1

E_4

E_5

E_3

Y^*_{norm}
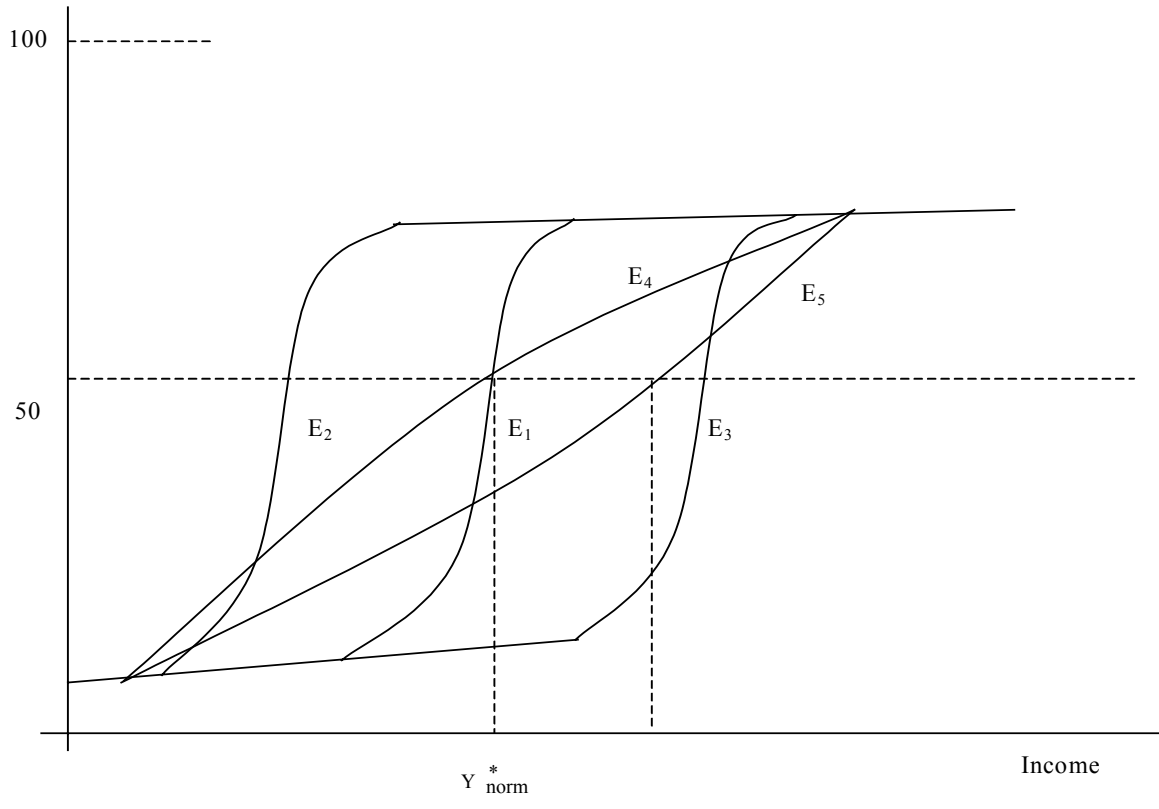
Income

Table 1

Adjusting Poverty Indicators for the Availability of Health Insurance

Ratio of Family Income to Poverty Threshold

Study Sample: Adults Aged 25-64	< 1		< 1.5		< 2		< 3	
	Standard	**Adjusted**	**Standard**	**Adjusted**	**Standard**	**Adjusted**	**Standard**	**Adjusted**
All	0.085	0.105	0.151	0.171	0.223	0.244	0.384	0.401
25-34	0.104	0.122	0.183	0.203	0.272	0.295	0.464	0.478
35-44	0.083	0.099	0.150	0.166	0.223	0.241	0.395	0.408
45-54	0.064	0.081	0.115	0.134	0.169	0.188	0.298	0.315
55-59	0.088	0.113	0.144	0.172	0.206	0.231	0.339	0.363
60-64	0.102	0.140	0.185	0.219	0.259	0.300	0.430	0.455

Data Source: 2001 Current Population Survey

Table 2

Normative Definition of Affordability and Purchasing Behavior

Sample: Population 25- 64			Insurance Status			
		% of population	Private	Public	Uninsured	% of Uninsured
Non-Afforders	≤ poverty level	0.105	0.285	0.307	0.440	0.291
	≤ 1.5 times poverty level	0.171	0.361	0.273	0.401	0.434
	≤ 2 times poverty level	0.244	0.444	0.234	0.358	0.553
	≤ 3 times poverty level	0.401	0.572	0.178	0.286	0.723
Afforders	> poverty level	0.895	0.831	0.075	0.125	0.709
	> 1.5 times poverty level	0.829	0.859	0.064	0.108	0.566
	> 2 times poverty level	0.756	0.881	0.056	0.094	0.447
	>3 times poverty level	0.599	0.909	0.047	0.073	0.277

Source: 2001 Current Population Survey

Table 3

Behavioral Definition of Affordability

Proportion Classified as Able to Afford Coverage

Affordability Threshold

	p=0.5		p=0.6		p=0.7		p=0.8	
	All	Uninsured	All	Uninsured	All	Uninsured	All	Uninsured
Financial Resources	0.938	0.763	0.888	0.608	0.807	0.425	0.669	0.250
Financial Resources and Loading	0.913	0.664	0.863	0.525	0.793	0.384	0.688	0.249
Financial Resources, Loading and Premiums	0.905	0.622	0.858	0.500	0.793	0.373	0.696	0.246
Financial Resources, Loading, Premiums, and Other	0.899	0.591	0.855	0.482	0.797	0.365	0.706	0.242

Sample: Adults aged 25-64 with no public health insurance

Financial Resources: Family Income, Incremental Household Income, Household Size and Structure

Financial Resources and Loading: Financial Resources plus marital and employment status, including employer size

Financial Resources, Loading, and Premiums: Financial Resources and loading plus age, sex, and self-reported health status

Financial Resources, Loading, Premiums, and Other: Financial Resources, Loading, Premiums plus race, citizenship and education

Table 4

Affordability Models

Dependent Variable: Private Health Insurance
Study Sample: Individuals 25-64 without public health
  insurance
Maximum Likelihood Logit

Variable	Model 1 Coeff.	Std. Err.	Model 2 Coeff.	Std. Err.	Model 3 Coeff.	Std. Err.	Model 4 Coeff.	Std. Err.
Financial Resources								
Family Income	0.0458	0.0013	0.0374	0.0012	0.0354	0.0013	0.0291	0.0013
Family Income^2	-0.0001	0.0000	-0.0001	0.0000	-0.0001	0.0000	-0.0001	0.0000
Incremental Household Income	0.0127	0.0015	0.0166	0.0016	0.0176	0.0017	0.0128	0.0018
Incremental Household Income^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of Adults (household)	-0.5054	0.0536	-0.7866	0.0569	-0.7985	0.0588	-0.5665	0.0633
Number of Adults (household)^2	-0.0015	0.0084	0.0368	0.0080	0.0443	0.0081	0.0331	0.0089
Number of Children (household)	0.0059	0.0298	-0.0594	0.0309	0.0382	0.0344	0.1276	0.0354
Number of Children (household)^2	-0.0278	0.0076	-0.0198	0.0076	-0.0324	0.0083	-0.0405	0.0084
Adult Child	-1.1526	0.0629	-0.6810	0.0722	-0.5017	0.0755	-0.6705	0.0765
Other Relative	-1.4822	0.0724	-1.0993	0.0772	-1.0090	0.0792	-0.8421	0.0824
Non-relative	-0.3709	0.0620	-0.2421	0.0658	-0.1908	0.0670	-0.2174	0.0687
Loading								
Married Spouse Present			0.6993	0.0494	0.6625	0.0511	0.6380	0.0530
Non-worker			-1.5097	0.0763	-1.6260	0.0809	-1.6697	0.0816
Non-working spouse			0.1716	0.0763	0.1996	0.0799	0.2434	0.0815
Part-time or Part-year			-0.1230	0.0590	-0.1815	0.0606	-0.2018	0.0617
PTPY: firm size 10-24			-0.2626	0.1074	-0.3059	0.1096	-0.3382	0.1130
PTPY: firm size 25-99			-0.5968	0.1042	-0.6000	0.1054	-0.6452	0.1083
PTPY: firm size 100-499			-0.7929	0.1117	-0.7827	0.1136	-0.8424	0.1165
PTPY: firm size 500-999			-0.5656	0.1773	-0.5631	0.1814	-0.6458	0.1831
PTPY: firm size 1000+			-0.7290	0.0879	-0.7114	0.0892	-0.7568	0.0904
Firm size under 10			-1.6940	0.0552	-1.7324	0.0561	-1.7709	0.0569
Firm size 10-24			-1.3213	0.0657	-1.3001	0.0668	-1.2633	0.0686
Firm size 25-99			-0.7477	0.0647	-0.7381	0.0654	-0.6678	0.0668
Firm size 100-499			-0.2446	0.0711	-0.2877	0.0718	-0.2321	0.0736
Firm size 500-999			-0.1498	0.1108	-0.1584	0.1115	-0.1190	0.1105
Premiums								
Male 31-35					0.1718	0.0690	0.1832	0.0708
Male 36-40					0.3430	0.0691	0.3367	0.0705
Male 41-45					0.3630	0.0698	0.3240	0.0716
Male 46-50					0.5135	0.0735	0.4475	0.0750
Male 51-55					0.6983	0.0846	0.6403	0.0870
Male 56-60					0.7374	0.0909	0.6815	0.0935
Male 61-64					0.9279	0.1091	0.8760	0.1116
Female 25-30					0.2864	0.0615	0.2216	0.0632
Female 31-35					0.3920	0.0687	0.3514	0.0707
Female 36-40					0.4921	0.0685	0.4264	0.0698
Female 41-45					0.5669	0.0703	0.4819	0.0720
Female 46-50					0.7521	0.0759	0.6632	0.0778
Female 51-55					0.7592	0.0805	0.7020	0.0826
Female 56-60					0.6708	0.0860	0.5996	0.0877
Female 61-64					0.7787	0.0958	0.7329	0.0976
Health status-very good					-0.1734	0.0423	-0.1168	0.0430
Health status-good					-0.4396	0.0439	-0.3389	0.0451
Health status-fair					-0.5398	0.0621	-0.4045	0.0635
Health status-poor					-0.3378	0.0945	-0.2085	0.0954
Other								
Black							-0.3704	0.0536
Other Race							-0.3331	0.0826
Hispanic							-0.3690	0.0525
Foreign-born citizen							-0.1518	0.0707
Foreign-born non-citizen							-0.6675	0.0564
Education <9							-0.6261	0.0634
Education <12							-0.5082	0.0486
Education some college or college grad							0.3250	0.0410
Education graduate school							0.6064	0.0859
Constant	0.753	0.071	2.068	0.084	1.581	0.110	1.831	0.120
Geography								
State Fixed Effects and MSA size indicators					x		x	
N	59,843		59,843		59,843		59,843	

Data Source: 2001 Current Population Survey