Comments and replies

Comment—Defining health insurance affordability: Unobserved heterogeneity matters^{☆,☆☆}

Ralph Bradley *

US Bureau of Labor Statistics, 2 Massachusetts Avenue NE, Washington, DC, United States

A B S T R A C T

Affordability is a vague concept. Bundorf and Pauly [Bundorf, M.K., Pauly, M.V., 2006. Is health insurance affordable for the uninsured? Journal of Health Economics 25 (4), 650–673] address this problem by establishing clear working definitions of affordability, and they use these definitions to estimate the percent of the uninsured who can afford insurance. When they establish their definitions of affordability, they use a microeconomic model that omits essential characteristics of the health insurance market. This comment suggests alternative definitions that better incorporate the structure of the health insurance market, discusses both endogeneity and specification problems that might occur when implementing their econometric model to estimate the fraction of "uninsured afforders," and then recommends ways to reduce omitted variable bias and endogeneity bias.

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It is conventional wisdom that the 47 million uninsured Americans cannot afford health insurance. However, when pundits use the word "afford", there is no clear definition of affordability; it is at best a subjective notion. Bundorf and Pauly (2006) (here in after referred to as BP) help correct this by establishing alternative definitions of affordability, and then by estimating the fraction of the uninsured who can afford coverage. They "find that, depending on the definition, health insurance was affordable to between one-quarter and three-quarters of the uninsured." This range seems quite large and indeed violates conventional wisdom.

Their study provides us with a good start and a rational way to specify affordability. Yet, defining affordability is a complex and controversial issue, and hopefully, their work will not be the "last word," but instead, will inspire further research in this area.

Health insurance is complex, and tractable analysis requires simplification. However, BP make simplifications that omit essential elements of the health insurance market. They use a simple micromodel with divisible goods and no market failures. Under their model, consumer decisions should be Pareto optimal. Yet, they advocate compulsory insurance. But this would induce welfare losses since their model has a Pareto optimal equilibrium. BP do not account for unobservable heterogeneous characteristics and insurance prices that affect both insurance choice and utility levels. Since affordability depends on exceeding a certain utility, we cannot determine with certainty if one can afford health insurance. At best, we can integrate out the "unobservables" and then estimate a probability that one can afford health insurance.

BP's empirical model that estimates the incidence of uninsured afforders suffers from endogeneity bias, omitted variables and identification problems. In this discussion, I account for unobserved heterogeneity in consumer characteristics, health

plan quality, and health plan prices that lead to endogenous regressors of an insurance choice model. I treat health insurance as a discrete choice where unobserved heterogeneity can induce market failure. Although BP acknowledge that their insurance choice equation might suffer from omitted variable bias, their specification and endogeneity problems could lead to the counter intuitive result that those with poor health status have lower propensity to purchase insurance.

Section 1 discusses the key characteristics that are missing in BP's alternative definitions of affordabilty. In this section, I present a simple discrete choice model of health insurance choice that replaces their model of two divisible, normal and homogeneous goods. Section 2 uses the theoretical model established in Section 1 to reframe their definitions of affordability. Section 3 reviews their econometric methods that estimate the percent of the uninsured who can afford insurance. Finally, Section 4 discusses how the definitions and estimations of affordability can be used to set policy that can increase insurance participation and social welfare at the same time.

1. Respecifying the model for insurance affordability

BP define two basic notions of affordability, normative and behavioral. In their normative definition, there is a "special good" (health insurance in their study) denoted as x^h with price p^h and a numeraire composite good denoted G. For the normative definition there are "socially defined minimum quantities of the special good" denoted as $\bar{x}^h$ and the composite good denoted as $\bar{G}$. The special good is "normatively" affordable for income y if

$$y \geq p^h \bar{x}^h + \bar{G} = \bar{y}. \tag{1}$$

BP criticize this normative definition because if one has income $\bar{y}$, there is no guarantee that she will buy $\bar{x}^h$ and $\bar{G}$. Therefore, they offer an alternative "behavioral" definition. When preferences are heterogeneous, individuals with the same income will choose different combinations of x^h and G. Using their notation, the heterogeneous preference parameter θ represents "the intensity of a consumer's preference(s) for x^h." The demand for the special good is represented in functional form as $x(p^h, y, \theta)$. When this heterogeneity occurs, different individuals will have different income expansion paths and not everyone will purchase the bundle $\{\bar{x}^h, \bar{G}\}$ with income $\bar{y}$. For a given income, y, the special good is "behaviorally" affordable if

$$x(p^h, y, \theta_M) \geq \bar{x}^h, \tag{2}$$

where θ_M is the median of the random variable θ. Let $\bar{y}' = \{y : x(p^h, y, \theta_M) = \bar{x}^h\}$. Then if an individual has income greater than $\bar{y}'$, the special good is "behaviorally" affordable. Like their normative definition, their behavioral definition only requires that income be above a set level.[1]

Both their normative and behavioral definitions are based on a microeconomic model where the price of the special good, p^h, is the same for all individuals, and both the special good and the composite good are divisible and normal. Therefore, one can use standard calculus to derive the consumer's optimal choice. Their model does not incorporate uncertainty nor does it allow for market failure. One cannot divorce market failure and affordability of health insurance because it could be market failure that is at least part of the reason that many are uninsured. Hansen and Keilding (2002) show that mandating compulsory coverage without correcting for market failures, as BP have advocated, can result in welfare losses. Rothschild and Stiglitz (1976) and Cochrane (1995) derive policies that both expand coverage and increase welfare through implementing schemes that correct market failure through internalizing the social costs of the low risk population's change of insurance status.

BP treat the special good, x^h, as a divisible and homogeneous good. But, the insurance choice cannot be based on this traditional microtheory. Health insurance is a discrete rather than a continuous choice and one cannot apply standard first order calculus methods to determine demand. BP recognize this when they implement their discrete choice econometric model, but it is not easy to reconcile their empirical results to the microfoundations of their definitions of affordability.

Furthermore, one cannot use a fixed p^h in either the theoretical or empirical model. Insurance prices vary by individual for many reasons. As BP note, the price of health insurance is the premium minus the expected benefits. For employer sponsored group plans, the premium for each particular type of policy (say a family PPO from Aetna) is fixed across all employees within a particular firm. If the employees within this firm face different health risks, and therefore different expected benefits, then the low risk employees will be paying higher prices even though the premium itself is the same across all employees. This can lead the low risk group to under insure, and/or health plans to discourage(encourage) the high(low) risk employees to join their plan. Another source of price variation across individuals occurs because premiums for employer sponsored plans are proprietary information, and this allows an insurer to price discriminate across firms. Thus, two individuals with equal health risks and expected benefits can pay different prices for the same policy because they work for two different firms.[2]

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[1] In BP's words, "if the consumer with median level of preference intensity purchases at least the adequate quantity of the special good *at a particular level of income*, the good is said to be affordable to individuals *at that level of income*." In order for this definition to work, all consumers must be paying the same price for the special good.

[2] There are additional sources of price variation such as employer restrictions of plan choice, employer efficiencies, and employer negotiating power with plan carriers. Health plans sold in the individual non employer sponsored market can adjust premiums based on observable indicators of risk. However, the individual market is very small relative to the group market. Thus, my model here will reflect the employer sponsored market.