The Impact of Employer-Provided Health Insurance on Dynamic Employment Transitions

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ABSTRACT

We estimate the impact of employer-provided health insurance (EPHI) on the job mobility of males over time using a dynamic empirical model that accounts for unobserved heterogeneity. Previous studies of job-lock reach different conclusions about possible distortions in labor mobility stemming from an employment-based health insurance system: a few authors find no evidence of job-lock, although most find reductions in the mobility of insured workers of between 20 and 40 percent. We use data from the National Longitudinal Survey of Youth which includes variables describing the health insurance an individual holds, as well as whether he is offered insurance by his employer. This additional information allows us to model the latent individual characteristics that are correlated with the offer of EPHI, the acceptance of EPHI, and employment transitions. Our results provide an estimate of job-lock unbiased through correlation with positive job characteristics and individual specific turnover propensity. We find no evidence of job-lock among married males, and produce small estimates of job-lock among unmarried males of between 10 and 15 percent.

I. Introduction

Job-lock is described in the economics literature as a reduction in worker mobility arising from the perceived risk of losing health insurance. More

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specifically, if wages do not perfectly offset differences in the valuation of health insurance across different jobs, then individuals with employer-provided health insurance are described as job-locked if they do not change jobs even when new employment opportunities with higher match-specific productivity arise (Gruber and Madrian 1994). These employees stay in their current jobs for fear of losing and being unable to obtain health insurance coverage.[1] If employer-provided health insurance (EPHI) is preventing the reallocation of workers to productivity-enhancing jobs, then it is likely to have negative welfare consequences. Given the large proportion of Americans younger than age 65 who are covered by EPHI, should we be concerned about possible distortions in labor mobility stemming from the employment-based health insurance system?

Despite very little research among economists prior to 1993 that attempted to measure whether employees were locked into their jobs by acceptance of their employer's health insurance coverage, the federal government passed the Consolidated Omnibus Budget Reconciliation Act (COBRA) in 1985 which provides employees who leave their jobs with access to their employer's health insurance coverage.[2] The federal government has continued to make health insurance accessible to individuals changing jobs by passage of the Health Insurance Portability and Accountability Act (HIPAA) in 1996. The prime objective of this legislation was to make health insurance portable and continuous for employees, and to eliminate the ability of insurance companies to reject coverage for individuals because of a pre-existing condition.[3]

Although such laws have made it easier for individuals to make employment transitions, there is no consensus in the economics literature as to whether such legislation was necessary. That is, estimates of job-lock (the reduced probability of exiting one's current job) range from zero percent to as high as 50 percent for some groups of workers. A major concern in the existing job-lock literature is devising a method for estimating job-lock which overcomes the almost certain correlation between EPHI and factors which affect mobility independently from health insurance. The literature identifies two primary explanations for why the coefficient on EPHI may be biased. First, as emphasized by Madrian (1994), health insurance is likely correlated with unobserved positive job characteristics which tend to reduce mobility. The use of difference in difference techniques in the literature is a direct response

1. An individual might risk losing health insurance (or his preferred health insurance plan) for several reasons: insurance may not be portable from job to job; it is common for insurance policies to exclude preexisting conditions; there may be a waiting period for coverage on new jobs, regardless of preexisting condition status; he may lack insurance during unemployed job search; or he may have a preference for a particular plan which might not be offered by another employer.

2. In particular, it requires that employers with 20+ employees allow employees who leave their jobs for any reason (other than gross misconduct) or their dependents to have continuing coverage in the employer's health insurance plan for 18 (or 36) months with the insured person paying the full cost of coverage at no higher than 102 percent of the employer's costs.

3. While the statute has exceptions, the ability to deny health insurance to new employees because of preexisting conditions has been considerably limited. For all plan years starting after June 30, 1997, employers and health insurers now may, with respect to a participant or beneficiary, impose a preexisting condition exclusion only if: the exclusion relates to a condition (whether physical or mental) for which the participant or beneficiary received medical advice, diagnosis or treatment within the last six months; the exclusion lasts for no more than 12 months after the enrollment date; and the length of the exclusion is also reduced by the period of time for which the participant or beneficiary had health insurance coverage before the enrollment date.

to this concern under the assumption that this approach negates the influence of other employment factors which affect mobility, such as pensions, by comparing two groups which presumably have similar characteristics.[4] Second, as first noted by Buchmueller and Valletta (1996), EPHI may be correlated with individual specific turnover propensity. They argue that because turnover is costly to a firm providing health insurance (due to reasons such as enrollment costs), employers may prefer workers with low quit propensity and thus require a probationary period prior to coverage by EPHI or screen applicants based on job history. As a result, part of the lower mobility observed among employees holding EPHI may be attributable to low turnover propensity, not job-lock. The inclusion of tenure as a proxy for turnover propensity has been the dominant response to this issue.

We assert that our empirical approach, which is different from methods used in this literature, allows for improved estimates of job-lock by explaining dynamic employment transitions over time, including important (often omitted) job characteristics, modeling the endogeneity of the offer and acceptance of health insurance, and (unrestrictively) controlling for unobserved heterogeneity. We use data from the National Longitudinal Survey of Youth (NLSY) to estimate yearly transitions from employment to the same job, a new job, or non-employment from 1989 to 1993. Our work offers two contributions to the brief but controversial literature on job-lock. (1) We use data from a source that has not been used in published studies of job-lock to reconcile the extent to which health insurance influences employment transitions. The NLSY data allow for longitudinal, dynamic analysis of employment behavior as well as inclusion of important job characteristics (such as the offer of EPHI) that have been omitted from previous studies. We find no evidence of job-lock among married males, and produce small estimates of job-lock among unmarried males of between 10 and 15 percent. (2) We employ an estimation technique that accounts for the possibility that the holding of employer-provided health insurance, as well as the offer of such insurance, is endogenous to employment transitions: the unobserved factors that affect employment decisions may be correlated with the unobserved determinants of the offer and the acceptance of employer coverage. In addition to finding little to no evidence of job-lock among married males when we account for unobserved heterogeneity, we find smaller estimates of job-lock among unmarried males when this heterogeneity is modeled.

In Section II we describe a theoretical model of the dynamic employment behavior of individuals which is the basis for our empirical work. We approximate the theoretical value functions describing employment transitions to form the dynamic empirical model which is detailed in Section III. The data used in estimation of the empirical model are described in Section IV, and Section V discusses our findings. We conclude in Section VI.

4. Most authors in this literature employ difference in difference estimators to measure job-lock using data from one year (Cooper and Monheit 1993; Madrian 1994; Holtz-Eakin 1994; Buchmueller and Valletta 1996; Kapur 1998; and Anderson 1998). Only two authors have examined mobility decisions over time using panel data methods (Anderson 1998 and Slade 2000) and only one has considered the endogeneity of health insurance coverage (Slade 2000).

II. A Dynamic Model of Employment Transitions

In this section, we present a simple theoretical model of the dynamic employment decisions of individuals in the presence of uncertainty about health transitions and offers of health insurance.[5] While this decision-making behavior is likely to be associated with other life changing choices such as marriage and fertility, these endogenous transitions are not modeled explicitly. The purpose of the model is to demonstrate that *availability* of health insurance through one's own employer and the ability to secure insurance through an alternate source have important dynamic consequences that affect job mobility.

A. The Decision and Information Sets

The model assumes two possible employment states upon entering period *t:* employed and not employed.[6] Three health states exist: good, bad, and deceased. Prior to realization of his health state at the beginning of period t, an individual makes a decision about current period employment and health insurance, conditional on the characteristics of the job offer in hand.

The employment alternatives available to an individual who was previously employed are to be nonemployed, to take a new job, and to continue working in his period $t-1$ job, and are denoted $j = 0$, 1, and 2, respectively. Individuals who were previously nonemployed do not have the third employment option. Characteristics of any job may include number of hours, wages, health insurance coverage, pension coverage, and other nonwage benefits, among other things. For simplicity we differentiate jobs by the availability of employer-provided health insurance. Jointly with the employment decision, an individual may choose to be uninsured, to hold EPHI offered by his current employer, or to hold health insurance that is not tied to his current employer. Insurance alternatives are denoted $i = 0$, 1, and 2, respectively. An indicator function, $d_t(i, j)$, describes the health insurance and employment decision of an individual in period t. That is, $d_t(i, j) = 1$ if alternatives i and j are chosen in period t and $d_t(i, j) = 0$ if alternatives i and j are not chosen in the period. Alternatives are mutually exclusive (that is, $\sum_{i=0}^{2}\sum_{j=0}^{2} d_t(i, j) = 1, \forall t$).

State variables define the information available to an individual at the beginning of each period t. The information available to an individual upon entering period t includes: the previous health state (h_{t-1}), accumulated job tenure (x_{1t}), accumulated work experience (x_{2t}), an indicator of whether EPHI is offered by one's period $t-1$ employer (O_t), the availability of an alternate source of health insurance (A_t), and exogenous characteristics (Z_t).

The transition from health state h in period $t-1$ to health state h' in period t is denoted $\pi_t^{hh'}$ where $\pi_t^{h0} + \pi_t^{h1} + \pi_t^{h2} = 1 \ \forall h, \forall t$. Health insurance may influence health transitions by affecting the out-of-pocket costs of medical care which serve as inputs to the health production process. Accumulated tenure at period t measures the number of uninterrupted periods that the individual has been employed with the same employer up to period t. Work experience, on the other hand, measures all

5. See Blau and Gilleskie (2001a and 2001b).

6. No distinction is made between being unemployed and being out of the labor force.

periods in an employed state. Admittedly, this model is a partial equilibrium model in which firm behavior (for example, the offer of employer-provided health insurance O_t) is exogenous (but stochastic).[7] Alternate sources of health insurance, A_t, are exogenous and include, for example, insurance through a spouse's employer. The space of all possible states at the beginning of period t is S_t, where $s_t = (h_{t-1}, x_{1t}, x_{2t}, O_t, A_t, Z_t) \in S_t$. The way in which these state variables influence current decisions as well as future expectations is described below.

B. An Individual's Optimization Problem

The per-period utility associated with each alternative available in period t is given by $U^h(C_t, d_t, Z_t, \varepsilon_t^h) = \bar{U}_{ij}^h(C_t) + \varepsilon^{hij}$ where C_t is consumption of a composite commodity, d_t is a vector of the current choice indicators, Z_t is a vector of observed exogenous characteristics, and ε_t is a vector of utility shocks. Health status alters the utility received from each alternative. At the extreme, the utility of a deceased individual is assumed to be zero.

The budget constraint is given by

$$(1)\quad C_t = N_t + w_t(x_{1t}, x_{2t}, h_t, O_t)(1 - d_t(i, 0)) - c_t d_t(i, 1)1(x_{1t} = 0) - p_t^i(1 - d_t(0, j)) - m_t(h_t, d_t(i, j)) \;\forall\; t, i, j$$

where N_t is nonearned income and earnings, $w_t(x_{1t}, x_{2t}, h_t, O_t)$, depend on tenure, experience, health, and the availability of EPHI. There is a cost, c_t, associated with taking a new job (for example, the loss of accumulated, nontransferable fringe benefits) and a premium, p_t^i, associated with each health insurance alternative. Out-of-pocket medical care expenses, $m_t(h_t, d_t(i, j))$, depend on health and health insurance in the current period.

The characteristics of new jobs are observed by the individual (but unobserved to the econometrician) and he compares expected discounted lifetime utility associated with each employment and insurance alternative for each new job type. New jobs are differentiated by whether they offer employer-provided health insurance ($O_t^n = 1$) or not ($O_t^n = 0$).

We employ a dynamic programming formulation implied by Bellman's Principal. The Expected Present Discounted Value (EPDV) of lifetime utility consists of the current period utility of entering the period in health state h and choosing alternatives i and j, plus the discounted expected value of the optimal employment-insurance decision in period t given the probabilistic health state in period $t + 1$. More specifically, the EPDV of lifetime utility from choosing health insurance i and employment j in period $t < T$, given health status h and new job characteristics O_t^n, is written

$$(2)\quad V_{ij}^h(s_t, \varepsilon_t | O_t^n) = \pi_t^{h0}[\bar{U}_{ij}^0(C_t) + \varepsilon_t^{0ij} + \beta V^0(s_{t+1})] + \pi_t^{h1}[\bar{U}_{ij}^1(C_t) + \varepsilon_t^{1ij} + \beta V^1(s_{t+1})]$$

7. The empirical model allows for the endogeneity of the observed offer of health insurance. Individuals can influence the observed availability of EPHI by choosing a particular employment option. An equilibrium model of job search in which firm behavior is also endogenous is presented by Dey and Flinn (2000).

where β is the discount factor and the value of utility in the deceased health state, $V^2(s_t)$, is zero. Maximal expected value of lifetime utility at the beginning of period t, conditional on entering the period in health state h and conditional on the characteristics of the new job, is

$$(3) \quad V^h(s_t|O_t^n) = E_{t-1}[\max[V_{ij}^h(s_t, \varepsilon_t|O_t^n), \forall i, \forall j]].$$

Unconditional on the characteristics of the new job, the EPDV of lifetime utility is

$$(4) \quad V^h(s_t) = \sum_{l=0}^{1} p(O_t^n = l)V^h(S_t|O_t^n = l)$$

where $p(O_t^n = l)$ is the probability a new job offers health insurance. With a few simplifying assumptions one can derive implications of the model.[8] We find that the availability of EPHI (whether a firm offers insurance or not) increases the value of lifetime utility and decreases the probability of leaving the current job. That is, group insurance is typically less costly than other sources of health insurance which raises current period utility, and the availability of insurance, regardless of whether it is taken, increases the future value of staying with that job because EPHI remains an option. Insurance from an alternate source increases the probability of leaving one's current job because job offers from employers who provide insurance are stochastic, but (by assumption) coverage from a nonemployer source is not.

III. The Empirical Model

In this section we introduce two new strategies for generating unbiased estimates of job-lock. Our first strategy involves a unique feature of the National Longitudinal Survey of Youth in relation to the data sources used in previous papers: the availability of information on whether EPHI is *offered* by the respondent's current employer, as well as whether such insurance is *held* by a respondent. Our second strategy improves upon the first by correctly modeling the correlation of the offer of EPHI with unobserved individual characteristics. We also allow these individual unobservables to influence employment transitions, the takeup of EPHI, and the holding of health insurance from a non-employer source.

A. Strategy 1: Controlling for the Availability of EPHI

The value functions defined in the previous section explicitly detail how past behavior, current decisions, and future expectations influence the value of utility associated with each alternative in each period. A Taylor series approximation to the explicit functions detailed above allow us to specify the value of choosing health insurance alternative i and employment alternative j in period t as $V_{ijt} = s_t\gamma_j + u_{ijt}$ where s_t

8. Specifically, we assume that employment is preferred to non-employment and that being insured is preferred to having no insurance. Basically these assumptions imply that work provides positive returns and that individuals benefit from provision of group insurance by an employer (where $p_t^{ij} \leq \pi^{h1}(1 - \theta^{ij})m$, and θ^{ij} is the percent of total medical care costs for which the employee is responsible). See Blau and Gilleskie (2001a) for a more detailed discussion.

is the vector of state variables previously defined.[9] Recall that the state variables include an indicator of whether EPHI is offered by one's period $t-1$ employer (O_t) and the availability of an alternate source of health insurance (A_t). These variables have direct effects on current period utility but also may affect current behavior because they determine expectations of future values of random variables (for example, the employment and health insurance choice set).

Initially, we explain transitions from employment to the same job, a new job, or nonemployment, allowing both the availability of employer-provided health insurance and the coverage by such insurance to influence employment choices. However, we do not model the endogeneity of the offer or the takeup of employer-provided health insurance. Because our first strategy focuses only on the employment decision (which reflects the literature), we simplify the indicator function to reflect the employment choice only [that is, $d_t(j) = 1$ if employment alternative j is chosen in period t and $d_t(j) = 0$ if alternative j is not chosen in the period]. We also define I_t to reflect the (exogenous) decision to hold EPHI if it is available and include it in s_t. Thus, we denote the probability of choosing employment alternative j in period t as

$$(5)\quad p(d_t(j) = 1 | O_t, I_t, A_t) = p(V_{jt} > V_{j't}, \forall j' \neq j) = \frac{\exp(s_t\gamma_j)}{\sum_{j'=0}^{2} \exp(s_t\gamma_{j'})}$$

where the u's are assumed to be independently Extreme Value distributed.

Estimation of this single multinomial logit equation includes no attempt to explicitly model the unobserved individual heterogeneity that likely biases the coefficients of interest on endogenous, but assumed exogenous, variables. We do, however, follow suggestions in the literature to control for "good job" characteristics and turnover propensity by including other observed job attributes and variables describing an individual's employment history. The purpose of this initial analysis is to illustrate how inclusion of the "offered EPHI" variable influences estimates of job lock.[10]

In the empirical model we include variables indicating both the availability of health insurance from an employer, O_t, and the holding of employer-provided health insurance, I_t (henceforth referred to as "offered EPHI" and "holds EPHI"). There are two ways to interpret the coefficient on the "offered EPHI" variable in the context of job-lock. Our first interpretation rests on the assumption that the offer of insurance should not hinder mobility; job-lock becomes an issue only if insurance is accepted. The offer of insurance will, however, be associated with positive job characteristics which reduce mobility. It is not the holding of health insurance that is correlated with positive job characteristics, but the offer of such insurance. The coefficient on the "offered EPHI" variable therefore indicates the magnitude of the mobility-restraining effects of the unobserved positive job characteristics associated

9. Approximation to the theoretical value functions is discussed in the review chapter by Miller (1999).
10. We recognize that most of the literature does not distinguish between different destinations from one's current job, but, rather, models quit probabilities only. The results and discussion from binary logit models of quit decisions are available from the authors. However, the multinominal logit specification is consistent with our fuller set of jointly estimated equations described below, and is therefore the form of our main equation. It also allows for a wider range of analysis than the simple logit specification (see Section VC).

with the offer of insurance, while the coefficient on the "holds EPHI" variable provides an estimate of job-lock unbiased through correlation with positive job-characteristics. We refer to this interpretation as the correlation interpretation.

Our second interpretation of the "offered EPHI" variable suggests that the offer of EPHI has value independent of holding EPHI. As suggested by the theoretical model, the option to accept EPHI in the future may hold positive utility for an individual. Under this *option-value* interpretation, the marginal effect of the offer of EPHI on mobility is correctly considered a component of the full job-lock effect: the coefficients on both the offer and holding of EPHI are used in the estimate of job-lock. Each interpretation has a potential weakness. The correlation interpretation possibly misses the option value of EPHI and may thereby understate the magnitude of job-lock, whereas the option value interpretation may capture the correlation between the offer of EPHI and unobserved positive job characteristics and thereby overstate the magnitude of job-lock. The two interpretations should therefore be viewed as generating a conservative and liberal estimate of job-lock, respectively.

B. Strategy 2: Modeling of the Availability of EPHI

Regardless of the interpretation, inclusion of the "offered EPHI" variable eliminates the bias in the coefficient on the "holds EPHI" variable only if one is willing to believe that the offer of EPHI is an exogenous variable that is correlated with the latent "good job" characteristics. Although correlation is likely, exogeneity is not. Thus, we explore a second strategy that admits the endogenity of the offer of EPHI, as well as other important variables influencing mobility decisions. As mentioned above, individual specific turnover propensity which influences observed employment transitions, is captured in the literature by previous employment status and tenure. These variables, however, are endogenous. In order to avoid bias associated with the correlation between employer-provided insurance and unobserved "good job" characteristics and individual specific turnover propensity, we use the longitudinal observations on individuals from the NLSY and a discrete factor random effects procedure to model the permanent unobserved heterogeneity of these individuals which influences employment decisions over time. This strategy is detailed below.

We recognize that the error terms in the theoretical model (utility function errors, as well as errors in the insurance offer probabilities and health transition probabilities) should be decomposed into a permanent unobserved component (μ) and random noise (u) and that this permanent heterogeneity may affect different outcomes differently (hence, we use the factor loadings, ρ, on the permanent factor, μ). More specifically, an approximation to the value of choosing health insurance alternative i and employment alternative j, in period t, conditional on having been in employment state k in period $t-1$, is $V_{ijkt} = s_t\eta_{jk} + \rho_{ijk}\mu + u_{ijkt}$. We explicitly include the previous employment state k because we intend to model transitions from employment and nonemployment in order to accurately capture observed (endogenous) employment outcomes. The unobserved permanent error captures individual characteristics that are correlated with having a "good job" and latent turnover propensity.

We assume that conditional on the unobserved heterogeneity, the joint probability of the employment and health insurance choice can be decomposed into the marginal probability of choosing employment alternative j and the probability of choosing

health insurance alternative i conditional on the current employment choice. The probability of making a transition from employment state k to destination j in period t is

$$(6)\quad p(d_t(j) = 1|k, O_t, I_t, A_t) = p(V_{jkt} > V_{j'kt}, \forall j' \neq j) = \frac{\exp(s_t\eta_{jk} + \rho_{jk}\mu)}{\sum_{j'=0}^{J_k-1} \exp(s_t\eta_{j'k} + \rho_{j'k}\mu)}$$

where J_k is the number of employment alternatives available to an individual in state k, and the u's are assumed to be independently Extreme Value distributed. These assumptions yield a pair of dynamic multinomial logit models of probabilistic transitions from employment and from nonemployment.[11] Additional logit equations for the probability of availability of EPHI ($p(O_t = 1)$), acceptance of EPHI ($p(I_t = 1)$), and holding a nonemployer source of insurance ($p(A_t = 1)$) are jointly estimated with the employment transitions and depend on the unobserved individual heterogeneity.[12]

This second stategy improves our preliminary analyses by modeling the unobserved individual characteristics that affect the employment transition decision, the offer of EPHI, the holding of EPHI, and the holding of health insurance from a nonemployer source. If these latent characteristics affect current employment decisions, then they are likely to be correlated with initial tenure and employment status which summarize the individual's employment history up to the first year of our data. We further believe that marital status might be endogenous and hence, model it jointly with the other equations and separately explain transitions from employment by marital status.

We allow the equations of our empirical model to be linked by dependence on the common unobserved factor which is treated as a random effect and is integrated out of the model. We follow Mroz (1999), Mroz and Guilkey (1992), and Heckman and Singer (1984) in approximating the distribution of the unobserved permanent heterogenity (μ) by a step function. The points of support of the distribution, the factor loadings in each equation, and the probabilities associated with each point of support are estimated jointly with the other parameters. This procedure addresses the joint endogeneity of outcomes arising from common unobserved factors, but imposes no distributional assumption (such as joint normality) on the unobserved factors. As demonstrated by Mroz, this method creates little bias or efficiency loss when normality is the correct distribution and performs better than maximum likelihood estimators when the true distribution of the unobservables is not normal. In Section V, we refer to the single multinomial logit equation as our nonheterogeneity model and the set of nine jointly estimated equations as our heterogeneity model.[13]

11. The models are dynamic because of the (testable) assumption that the probability of choosing employment alternative j today depends on the employment state occupied in the previous period, and because s_t contains lagged endogenous variables such as whether a current employer offers EPHI and tenure.

12. The theoretical model implies that health is stochastic and suggests that transitions between health states be modeled with these transitions being a function of choices made by the individual and the unobserved heterogeneity. Unfortunately, there are only crude measures of health in the NLSY (see Section IV) and we did not see the value of complicating the empirical model further by modeling these transitions. Blau and Gilleskie (forthcoming) model the joint endogeneity of health and employment and allow for very detailed measures of health.

13. The nine equations are specified in Tables A2 and A3.

	Offered EPHI		
Holds EPHI	Yes: $O_t = 1$	No: $O_t = 0$	
Yes: $I_t = 1$	A	—	—
No: $I_t = 0$	B	C	D

Figure 1
Matrix Defining Conditioning Arguments in Predicted Probabilities

C. Alternative Measures of Job-Lock

The dual strategies we employ allow us to generate a coefficient on the health insurance variable which is unbiased by the problems identified in the literature. As a result, we depart from the literature and interpret the coefficient on the "holds EPHI" variable as a measure of job-lock.[14] We are able to generate an unbiased measure of job-lock without resorting to a difference in difference (DD) test. DD tests are very sensitive to the way in which they are specified and when specified correctly the range of possible analyses is often quite limited. For instance, in order to obtain a strictly correct DD specification, Kapur (1998) is forced to restrict her analysis to married, dual-earner respondents who hold health insurance. In addition, the reliance on DD tests has forced authors of previous papers to estimate the *incremental* effect on job-lock of various conditions such as having a pregnant spouse or holding insurance through a spouse's employer. They do not provide a *general* estimate of job-lock. Our estimation strategy allows us to avoid the sample selection issues inherent in DD tests and to produce measures of job-lock that are applicable to a broad segment of the labor market without fear that our broad inclusion has biased our results.

Because we recognize different interpretations of the "offered EPHI" variable, we provide several measures of job-lock to reflect these interpretations. Based on estimated coefficients, we can construct predicted probabilities of employment outcomes. The matrix in Figure 1 depicts the probabilities that can be predicted conditional on whether or not an individual was offered EPHI and whether or not such EPHI was accepted.

Note that it does not make sense for an individual to hold EPHI if it was not offered. The *correlation* interpretation measure of job-lock is constructed as the percent difference in turnover probability between those who were offered EPHI and accepted it (element A) versus those who were offered and declined EPHI (element B). Both groups were offered EPHI and, as a result, this measure of job-lock does not contain the effect of the offer of insurance. The difference between the elements A and B measures only the effect of holding EPHI. This measure presumes that the "offered EPHI" variable serves only to measure positive job characteristics. The

14. Buchmueller and Valletta (1996) tentatively accept the coefficient on health insurance as a measure of job-lock for sole-earner married and single respondents.

Table 1
Measures of Job-Lock

Name	Description	Formula
Job-lock 1	Correlation interpretation	$\frac{p(d_t(j=2)\neq 1 \mid O_t=1, I_t=1) - p(d_t(j=2)\neq 1 \mid O_t=1, I_t=0)}{p(d_t(j=2)\neq 1 \mid O_t=1, I_t=1)}$
Job-lock 2	Option value interpretation	$\frac{p(d_t(j=2)\neq 1 \mid O_t=1, I_t=1) - p(d_t(j=2)\neq 1 \mid O_t=0, I_t=0)}{p(d_t(j=2)\neq 1 \mid O_t=1, I_t=1)}$
Job-lock 3	Average measure	$\frac{p(d_t(j=2)\neq 1 \mid O_t=1, I_t=1) - p(d_t(j=2)\neq 1 \mid I_t=0)}{p(d_t(j=2)\neq 1 \mid O_t=1, I_t=1)}$
Job-lock 4[a]	Effect of holding EPHI	$\frac{p(d_t(j=2)\neq 1 \mid I_t=1) - p(d_t(j=2)\neq 1 \mid I_t=0)}{p(d_t(j=2)\neq 1 \mid I_t=1)}$
Offer effect	Pure effect of "offered EPHI"	$\frac{p(d_t(j=2)\neq 1 \mid O_t=1, I_t=0) - p(d_t(j=2)\neq 1 \mid O_t=0, I_t=0)}{p(d_t(j=2)\neq 1 \mid O_t=1, I_t=0)}$
Non-EPHI Effect	Effect of ins from other source	$\frac{p(d_t(j=2)\neq 1 \mid A_t=1) - p(d_t(j=2)\neq 1 \mid A_t=0)}{p(d_t(j=2)\neq 1 \mid A_t=1)}$

Note: The probability of *not* staying in the same job is denoted $p(d_t(j=2)\neq 1|\cdot)$.
In the multinominal logit model, this probability is calculated as $(1 - p(d_t(j=2)=1|\cdot))$.
O_t denotes whether EPHI is offered by one's $t-1$ employer.
I_t denotes whether EPHI is held in $t-1$.
A_t denotes whether insurance from a non-employer source is held in $t-1$.
a. This measure is calculated for Specifications 1 and 4 only (in Section V); these specifications do not include the "offered EPHI" variable as a regressor.

option value interpretation measure of job-lock is constructed as the percent difference in mobility between those who were offered and accepted EPHI (element A) and those who were not offered EPHI (element C). This measure contains the full effect of holding insurance—the value of actually being insured as well as the option value. Including the effect of the "offered EPHI" variable in this measure allows for the offer itself to have value, but also reflects the offer variable's correlation with positive job characteristics. Finally, we construct a job-lock measure which we view as an average, or compromise, between the correlation and option value measures. The average measure is constructed as the percent difference in mobility between those who were offered and accepted EPHI (element A) and those who do not hold EPHI (element D) regardless of whether it was offered or not. We also calculate the pure effect of the "offered EPHI" variable on mobility. Under the correlation interpretation, this pure effect calculation serves as an estimate of the extent to which the "holds EPHI" coefficient would be biased, in the absence of the "offered EPHI" variable, through correlation with positive job characteristics. Although the existing literature universally assumes that this correlation exists, we are able to quantify it. The effect is calculated as the percent difference between elements B and C. Table 1 summarizes these measures.[15]

IV. Description of Data

We estimate our model using data from the National Longitudinal Survey of Youth (NLSY). The NLSY is a nationally representative sample of 12,686 young men and women interviewed on a yearly basis since 1979. Detailed health insurance questions are first available in 1989 and, hence, our sample covers 1989–93. We restrict our analysis to males who are not in school, in the armed forces, or self-employed.[16] We are forced to drop a small number of observations for missing tenure and for an observed health insurance status that does not agree with employment status, marital status, or health insurance availability at the current job. Finally, because our empirical model is dynamic and we model the accumulation of state variables over time, we retain only respondents for whom a continuous panel of observations can be constructed.[17] We are left with 4,422 individuals who contribute

15. Of the three measures of job-lock constructed, the *correlation* interpretation measure is our clear preference for two reasons. First, it avoids the issue of correlation with unobserved positive job characteristics. Second, estimation of our model strongly suggests that the offer of EPHI has importance only through its correlation with positive job characteristics and does not hold significant option value for the individuals in our sample. Unless explicitly stated, all future references to the estimate of job-lock refer to our preferred *correlation* interpretation estimate.

16. The sample used in estimation includes the oversample of civilian Hispanics, blacks, and economically disadvantaged white youth that are not eliminated due to other restrictions. The respondents are age 24 to 35 over our sample period, and thus our estimates of job-lock refer to young males. In fact, quit rates among these young workers are 22 percent for married males and 36 percent for unmarried males. Quit rates from other data sources used in this literature are between 16 and 24 percent.

17. Although information on employment transitions is available every year, several important health insurance questions are not asked in 1991. Thus, we cannot measure the extent to which EPHI explains employment transitions from 1991 to 1992. The construction of all variables is performed prior to eliminating observations for the 1991–92 transition. That is, tenure, the number of jobs, and employment status for 1992 (which explain the 1992–93 transition) are determined correctly using all of the available information. We simply do not attempt to explain the 1991–92 transition. Results using an imputed value of health

Table 2
Observed Employment Transitions of Males

		Transition in Year $t + 1$ to		
Employment State at t	Percent	Same Job	New Job	Not Employed
Employed	88.90	71.49	21.80	6.71
Not employed	11.10		39.90	60.10
Married				
Employed	94.71	77.90	17.88	4.22
Not employed	5.29		50.18	49.82
Not married				
Employed	83.08	64.18	26.28	9.54
Not employed	16.92		36.69	63.31

up to three employment transitions for a total of 10,700 person-year observations.[18]

The main dependent variable measures an individual's employment destination in year t given his employment status in year $t - 1$. Although weekly employment information is available in the NLSY, important variables pertaining to health insurance coverage are available only during the survey week for which the Current Population Survey (CPS) is replicated for the NLSY respondents. In order to utilize the health coverage information, we define labor market transitions in yearly increments with employment status corresponding to the week of the CPS replication. If a respondent who is employed at the time of the CPS replication has a different employer at the subsequent replication, then he is coded as having transitioned to a new employer. If he is not employed at the subsequent replication, then he is coded as having transitioned to nonemployment.[19] Table 2 describes the transitions pooled over all years. Individuals who are not married are more likely to change jobs if employed and less likely to enter employment if not employed. Noticable differences in transition rates by year include a smaller reentry to employment from 1990 to 1991 and a smaller exit from employment from 1992 to 1993. The former is likely to be correlated with the relatively higher unemployment rates in the early 1990s. The latter is likely to be correlated with the large censoring of nonemployed individuals by 1992 and the subsequent retention of individuals who are employed.[20]

insurance in 1991 and including the 1991–92 transition in estimation were not different from the results reported in the paper.

18. More specifically, we have observations on 4,422 individuals in 1989, 3,574 individuals in 1990, and 2,704 individuals in 1992.

19. It is possible that some respondents transitioned multiple times during the year. Due to the lack of health insurance variables for jobs held subsequent to the CPS interview but before the CPS interview of the following year, we are unable to use these transitions in our empirical model.

20. We do not jointly estimate an equation for attrition in our set of estimated equations in the heterogeneity model. Failure to model the endogeneity of attrition does not bias our results if the attrition can be explained by observable variables.

Table 3
Health Insurance Characteristics of Employed Males

	Married (5,068)	Not Married (4,444)
Offered EPHI at current job	86.11	73.87
Accepted EPHI	86.37	87.54
EPHI covers spouse	53.71	0
EPHI covers children	45.84	4.61
Insurance from other source	20.05	9.90
Of those with EPHI at t	(3,769)	(2,874)
Employment choice at $t + 1$		
Same job	82.99	74.18
New job	13.80	19.21
Nonemployed	3.21	6.61
Of those without EPHI at t	(1,299)	(1,570)
Employment choice at $t + 1$		
Same job	63.13	45.86
New job	29.72	39.24
Nonemployed	7.16	14.90
Of those offered EPHI at t	(4,364)	(3,283)
Employment choice at $t + 1$		
Same job	81.26	71.31
New job	15.35	21.17
Nonemployed	3.39	7.52
Of those offered EPHI at t who declined	(595)	(409)
Employment choice at $t + 1$		
Same job	70.25	51.10
New job	25.21	34.96
Nonemployed	4.54	13.94

The health insurance variables are a major focus of this research in terms of explaining employment transitions. They are also key endogenous (and therefore dependent) variables in the set of jointly estimated equations that allows for and estimates the unobserved heterogeneity of individuals. Table 3 presents summary statistics relevant to health insurance coverage. The summarized variables include the offer of health insurance from the current employer, the acceptance of such insurance (that is, the respondent holds EPHI), and the holding of coverage from a source other than the respondent's employer. A significant proportion of the sample who are offered EPHI decline the coverage (about 13 percent for both married and unmarried males). Married individuals are more likely to hold insurance from another source and this insurance is likely to be obtained through an employed spouse. Both married and unmarried males are less likely to leave their employer if they hold EPHI. However, the quit rate is essentially unchanged for those offered EPHI regardless of

whether they accept it. Males who decline EPHI are more likely to leave their employer than those accepting EPHI. Married men tend to switch jobs rather than enter nonemployment; unmarried men transit to new jobs as well as to nonemployment.

The NLSY contains a wide range of work-related variables that are important in controlling for possible correlation between individual specific turnover propensity, employer-provided health coverage, and employment.[21] The most significant employment-related variables are the vector of fringe benefits and two variables for tenure. Although their inclusion in our model follows Buchmueller and Valletta (1996) and Anderson (1998) (who also uses the NLSY), we include a more extensive vector than either of these earlier papers. The offered fringe benefits include pensions, training/educational opportunities, sick leave, life insurance, and profit sharing.[22] We include a continuous tenure variable as well as a dummy for less than one year of tenure. Exploiting the panel structure of the NLSY, we further control for turnover propensity by including variables for the number of jobs ever held by the respondent interacted with age dummies.[23] In the nonheterogeneity model these variables may be correlated with "good jobs" and turnover propensity, but are treated as exogenous. Our estimated set of equations, however, allows for permanent unobserved heterogeneity and these employment-related variables serve as additional controls to our explicit modeling of the unobserved individual characteristics that affect mobility.[24]

V. Results and Discussion

In this section we first present and discuss the estimation results from the non-heterogeneity model (a single multinomial logit equation describing transitions from employment) in order to motivate the use of the "offered EPHI" variable. We then discuss results from the heterogeneity model (the set of nine jointly estimated equations) that allows for endogeneity of several important variables that explain employment transitions.

A. The Nonheterogeneity Model

Table 4 presents results based on the estimation of our empirical model without permanent unobserved heterogeneity. It should be emphasized that these results are

21. Appendix Table A1 displays summary statistics for the employment, demographic, and other variables included in the empirical models.

22. A table describing the correlation among offered fringe benefits, including the offer of employer-provided health insurance, is available from the authors. Although positively correlated, there is substantial variation in the fringe benefit packages offered by employers.

23. The number of jobs held in a lifetime is correlated with turnover propensity. However, this correlation is dependent on age. The younger the individual, the more likely that a given number of previous jobs indicates a high turnover propensity. We address this concern by interacting the number of jobs ever held with three age dummies.

24. The theory suggests that health status is an important determinant of employment and health insurance choices. Unfortunately the NLSY data contain no measures of health status. To address this we use three related variables, presence of a health limitation, body mass index (BMI), and crack use, which are biological and behavioral determinants of health, respectively.

Table 4
Selected Parameter Estimates from the Nonheterogenity Employment Model
(The multinomial logit outcome is defined as transition from employment to the listed destination.)

	Specification 1		Specification 2		Specification 3		Specification 4		Specification 5	
	Same Job	Not Employed	Same Job	Not Employed	Same Job	Not Employed	Same Job	Not Employed	Same Job	Not Employed
Offered EPHI			0.319	−0.426***	−0.070	−0.356			−0.142	−0.060
			(0.138)	(0.263)	(0.154)	(0.288)			(0.149)	(0.214)
Holds EPHI	0.440	0.239***	0.254	0.528**	0.110	0.580*	0.125	0.578	0.520	−0.208***
	(0.104)	(0.196)	(0.133)	(0.269)	(0.136)	(0.272)	(0.144)	(0.295)	(0.134)	(0.195)
Holds non-EPHI	−0.242	0.266***	−0.283	0.317***	−0.310	0.335***	−0.288	0.342***	0.037	−0.149
	(0.111)	(0.205)	(0.113)	(0.206)	(0.113)	(0.206)	(0.140)	(0.270)	(0.128)	(0.189)
Pension					0.185	−0.066	0.147	−0.162	0.032	−0.281
					(0.108)	(0.214)	(0.112)	(0.223)	(0.107)	(0.172)
Training					0.163	−0.117	0.163	−0.097	0.240	−0.028
					(0.094)	(0.193)	(0.101)	(0.207)	(0.095)	(0.156)

			0.264	−0.367	0.263	−0.149	0.352	0.124
Sick leave			(0.097)	(0.188)	(0.107)	(0.210)	(0.094)	(0.145)
			0.293	0.134	0.247	0.110	0.179	0.365
Life insurance			(0.117)	(0.227)	(0.122)	(0.240)	(0.112)	(0.174)
			0.134	−0.049***[a]	0.202	0.024***[a]	0.083	0.022***[a]
Profit sharing			(0.100)	(0.209)	(0.105)	(0.220)	(0.102)	(0.167)
In(Likelihood)	−2,838.9364	−2,832.9288	−2,800.3999		−2,201.5511		−3,331.8011	
Simulations								
Job-lock 1		−0.1231	−0.0094				−0.3583	
Job-lock 2		−0.4410	0.0016				−0.2775	
Job-lock 3		−0.1796	−0.0088				−0.3356	
Job-lock 4	−0.3054				−0.0254			
Offer effect		−0.2831	0.0109				0.0595	
Non-EPHI effect	0.1371	0.1587	0.1692		0.1817		−0.0360	

Note: Standard errors are in parentheses.
*** indicates joint significance at the 1 percent level;
** 5 percent level;
* 10 percent level.
a. indicates that the joint significance test refers to the vector of five fringe benefits.

potentially biased due to the failure to address the potential endogeneity of key explanatory variables. The results serve as an illustration of the effect of the "offered EPHI" variable while using controls for the bias associated with positive job characteristics and turnover propensity that are comparable to the rest of the job-lock literature (that is, other fringe benefits and tenure). Coefficient estimates, with standard errors in parentheses, are presented for the "same job" and "nonemployed" outcomes; the "new job" outcome is the base case. The joint significance of the coefficients, based upon likelihood-ratio tests, is included. We calculate each (relevant) measure of job-lock (as described in Table 1) and quantify the effect of the offer variable when appropriate. In addition, we discuss the marginal effect of holding non-EPHI health insurance on turnover propensity.[25]

Following the previous literature, we begin our analysis by focusing on married men. Specification 3 of Table 4 is our preferred empirical model which includes the fringe benefits and the "offered EPHI" variable.[26] We first discuss Specification 1 which is our preferred model minus the vector of fringe benefits and the "offered EPHI" variable. The coefficients on "holds EPHI" are jointly significant and imply a 31 percent reduction in mobility for those who hold employer-provided insurance. In light of our discussion above and suggestions from the literature, this estimate of job-lock is undoubtedly biased. Specification 2 adds in the "offered EPHI" variable. The offer variable is jointly significant at the one percent level. The correlation interpretation measure of job-lock is 12 percent—a substantial reduction from the job-lock measure based on Specification 1. A likelihood ratio test indicates that the coefficients on the "holds EPHI" variable are jointly significant only at the five percent level as opposed to significance at the one percent level when the "offered EPHI" variable was not included. The simulations suggest that the offer of insurance reduces mobility by 28 percent. For our sample of married men this figure represents the bias in the "holds EPHI" variable that would result in the absence of information on the offer of insurance. The differences between Specifications 1 and 2 suggest that the "offered EPHI" variable has considerable power to reduce the bias in the coefficient on employer coverage arising from correlation with positive job characteristics. Of course, this specification does not allow us to interpret the significance of the "offered EPHI" variable as capturing correlation with positive job characteristics or as the offer itself having value.

Specification 3 reflects our preferred specification, which includes a vector of five fringe benefits offered by employers in addition to health insurance coverage. An important finding based on estimation of Specification 3 is the ability of the vector of fringe benefits to completely eliminate the explanatory power of the "offered

25. The predicted probabilities for the elements of the mobility matrix in Figure 1 and those reflecting the effect of the "offered EPHI" and "holds non-EPHI" variables are constructed as follows. Once we obtain parameter estimates we can predict the probability of each outcome for each individual. In the simulations, we allow individuals in our sample to retain all of their individual characteristics and recode only the variable or variables of interest for the entire sample. For example, in order to generate the transition probability for state A in the mobility matrix, we set the "offered EPHI" and "holds EPHI" variables to one. We then predict the transition probabilities for each individual and average over the full sample.

26. The complete list of estimated coefficients from our preferred specification is the same as those in the transitions from employment equations in Table A2. Complete tables of estimation results are available upon request from the authors.

EPHI'' variable. The coefficient for this variable in the same job outcome approaches zero and jointly the coefficients are statistically insignificant. On the other hand, the vector of fringe benefits is significant at the one percent level. These results suggest that the offer of EPHI does not hold significant option value for the individuals in our sample. We conclude that the significance of the ''offered EPHI'' variable in Specifications 1 and 2 is due to the failure to properly control for ''good job'' characteristics. Specification 3 therefore provides support for a correlation interpretation of the ''offered EPHI'' variable, as opposed to an option value interpretation. We also find that the inclusion of a multitude of job specific variables, particularly fringe benefits, results in no evidence of job-lock for married men.[27] The difference between Specifications 2 and 3 provides additional evidence that Buchmueller and Valletta's (1996) emphasis on the inclusion of fringe benefits in a properly specified model of job-lock is correct. An unreported specification which omits the fringe benefit variables, with the exception of pensions, suggests that, at least for our sample of relatively young individuals, the inclusion of only pensions, as in Buchmueller and Valletta (1996), may be insufficient. A more complete vector of fringe benefits is required to properly control for the bias associated with positive job characteristics.[28]

A noteworthy feature of Specifications 1, 2, and 3 is the significance of the nonemployer provided health insurance coefficients. In Specification 3, the coefficients are jointly significant at the one percent level. Nonemployer coverage produces a positive marginal effect on mobility of 17 percent. The result suggests that individuals who hold non-employer insurance are more likely to transition than those who do not hold such coverage. Specification 4 is useful in interpreting this result; it is the preferred specification restricted to only those who were offered EPHI by their current employer.

The results from Specification 4 are similar to those from Specification 3 with regard to the nonemployer coverage variable. One could interpret the significance of this variable as reflecting that individuals who lack access to employer coverage find coverage from a non-employer source and leave their current employer in hope of obtaining employer-provided health insurance. Finding significance of the non-EPHI variable in a model estimated only on those offered EPHI (Specification 4) reveals that this interpretation may be flawed and suggests two refinements. First, it is possible that individuals who hold nonemployer coverage when they have access to employer coverage do so because they are dissatisfied with the employer coverage. They transition at a higher rate in order to obtain better employer coverage. We refer to this phenomenon as job-push, but it is important to distinguish this from Anderson's (1998) job-push. Anderson defines job-push as affecting individuals who lack

27. We run a number of unreported specifications to check the robustness of our conclusions. Specifically, we run separate specifications which exclude those who transitioned involuntarily, include coverage of spouse and children by the respondent's employer-provided insurance plan, and omit linear tenure to address the concern it may be capturing part of the job-lock effect (Buchmueller and Valletta 1996). None of these specifications changes the results or our conclusions from Table 4.

28. It should also be noted that the addition of the ''offered EPHI'' variable to Specification 2 (as compared to Specification 1) doubles the positive effect of holding EPHI on transitions to nonemployment. The vector of additional fringe benefits (Specification 3) alters the coefficient for this destination very little as opposed to the large reduction in the estimated coefficient on ''holds EPHI'' for the same job outcome. These results provide additional evidence that explanations of job mobility benefit from the knowledge of whether EPHI is offered to, as well as whether it is held by, an employee.

health insurance. They exit jobs in which they do not have access to employer-provided health insurance because they do not hold insurance from another source. Our version of job-push works in an opposite manner—indeed our estimated coefficient is opposite in sign from Anderson's.[29] The second possibility is that individuals who intend to exit their current job in the near future hold other insurance so as not to experience a spell where they are uncovered. The nonemployer coverage variable acts as an indicator of a high turnover propensity. We turn to the discrete factor random effects model, which explicitly models turnover propensity, for clarification between the job-push and indicator theories.[30]

Specification 5 is the preferred specification estimated on the sample of unmarried men. The results are different from those for married men. Although as in Specification 3, the inclusion of fringe benefits eliminates the power of the "offered EPHI" variable, it does not eliminate the significance of the "holds EPHI" variable. The coefficients on the "holds EPHI" variable are jointly significant (at the 1 percent level) and result in an estimate of job-lock of 36 percent. Unlike married males, an alternate source of health insurance has no effect on mobility of unmarried males. Our results suggest that the situation faced by married and unmarried males is very different. There may be several reasons for this. Married males may have unobserved characteristics that make them more productive (and more likely to be married) relative to unmarried men (see Korenman and Neumark 1990 and Mroz 1999). As a result, married men may generally find and retain better jobs which tend to offer health insurance. In addition, married men potentially have another source of health insurance in their spouses. Even if their spouses do not work or hold employer-provided coverage of their own, the potential for them to do so is always there.

In order to provide a more direct comparison to the job-lock literature, we perform a number of unreported DD tests based on Madrian's (1994) methodology. Using Specification 3, we run separate DD tests which interact the "holds EPHI" variable with "holds another source of health insurance," "holds spousal employer-provided coverage," and "number of children." We also perform two very precise DD tests by interacting "holds EPHI that covers the respondent's children" with the "number of children" and "holds EPHI that covers the respondent's spouse" with a variable denoting a pregnant spouse. The interaction term fails to obtain statistical significance in any of these runs. In addition, the inclusion of the interaction terms produces little change in the estimated coefficients on our key explanatory variables. While the row difference job-lock estimates range from 18 to −0.05 percent, the simple

29. In order to further explore the different effect of the other health insurance variable in our and Anderson's results, we run an unreported specification restricted to those who were not offered EPHI. This is the group, under Anderson's job-push theory, which would be most susceptible to job-push. Anderson's theory would predict that holding other health insurance would reduce the probability of turnover. Instead, holding other health insurance increases mobility by ten percent (although the vector of coefficients is significant only at the ten percent level). In general, Anderson produces mobility effects of between 20 and 40 percent, but attributes up to half of this job-lock as her job-push. Our different results may be due to a different methodology, analysis of different years of the NLSY sample, and inclusion of fewer fringe benefits by Anderson.

30. Specification 4 also provides verification that our preferred measure of job-lock (Job-lock 1) is unbiased through correlation between the "offered EPHI" variable and positive job characteristics. The possibility of positive job characteristic bias is greatly reduced because every individual in the sample holds a job which offers EPHI. The estimate of job-lock is very similar to that produced by Specification 3.

and adjusted difference-in-difference estimates all approach zero and most have the incorrect sign. Finally, we include a DD test interacting "holds EPHI" and "holds another source of health insurance" in Specification 1 which is the most similar to Madrian's specification. Again, the DD test provides no evidence of job-lock.[31]

To summarize, our results suggest that young married men do not suffer from job-lock. One explanation is that as a relatively productive and, in our sample, young group, they have little difficulty obtaining health coverage at alternative employers and are therefore not job-locked. Health insurance is, however, important to them as shown by the importance of the nonemployer health coverage variable. For married men, the issue is a form of job-push or indication of turnover propensity, not job-lock. Unmarried males, on the other hand, do suffer significant levels of job-lock. It is important to note that these conclusions are tentative. With the exception of the inclusion of variables for tenure, we have not controlled for latent individual specific turnover propensity, nor have we modeled the endogeneity of important explanatory variables. We turn to our heterogeneity model for a more complete examination of employment transitions and its effect on our estimates of job-lock.

B. The Heterogeneity Model

An important aim of our analysis is to account for the possibility that the holding of health insurance, as well as the offer of health insurance, is endogenous; the results from the nonheterogeneity model are likely to be biased if the endogeneity of explanatory variables is ignored. That is, something unobserved about the individual may be affecting both an endogenous variable (for example, the holding of EPHI) as well as the outcome of interest (for example, the employment transition). Such permanent unobserved heterogeneity is likely to influence observed health insurance coverage ("holds EPHI"), the offer of health insurance ("offered EPHI"), and health insurance coverage from a non-employer source ("holds non-EPHI").[32] Because we have observations on individuals over time, the employment transitions themselves define endogenous tenure and the employment state in each period. An individual's employment state and tenure entering the first year of our sample, how-

31. We repeated Specifications 1–5 using a logit model as opposed to a multinomial logit model. A transition was defined as a move from employment to a new employer or to nonemployment (that is, a quit). This definition follows Madrian (1994), Holtz-Eakin (1994), and Buchmueller and Valletta (1996); it appears that Kapur (1998) and Anderson (1998) also define transitions in this manner, although neither explicitly states this. The results are remarkably similar to the multinomial logit results. We also estimated logit models where a transition was defined as a move from employment to a new employer; those who transition to non-employment are dropped from the sample. The estimates of job-lock for married men are somewhat stronger than the multinomial logit estimates. However, the estimate of job-lock from Specification 3 is only 10 percent using the correlation interpretation measure and three percent using the option value interpretation measure, and these estimates are based on statistically insignificant coefficients. The results for the unmarried men are very similar to the multinomial logit results. These results are available from the authors.

32. Admittedly, holding health insurance from a nonemployer source depends on the availability of such insurance which should be treated as endogenous in a manner similar to the offer of EPHI. Unfortunately we do not have this information. We attempt to control for the availability by including an indicator of whether the spouse works in the heterogeneity model. This variable is assumed (incorrectly) to be exogenous; perhaps replacement of this variable with the spouse's age and education (the reduced form) would be more appropriate.

ever, are defined by the same employment transition process that is being modeled, and are therefore likely to be influenced by the permanent unobservables.[33] We jointly estimate these initial conditions with the per-period transitions from employment and from nonemployment, the per-period offer of EPHI, the per-period acceptance of EPHI if employed and offered insurance, and the per-period insurance status from an alternate source.[34]

A likelihood ratio test confirmed that we should allow separate equations for transitions from employment by marital status. Because marital status is endogenous and possibly affected by the same unobservables influencing employment transitions, job characteristics, and observed health insurance choices, we include an equation for marital status.[35]

Table 5 presents results based on joint estimation of the set of nine equations with controls for unobserved heterogeneity.[36] We discuss the same health insurance and fringe benefits variables presented in Table 4 above; estimates and standard errors for all variables in each of the nine equations are presented in Appendix Tables A2 and A3.

Controlling for unobserved heterogeneity results in different coefficient estimates for married and unmarried males compared to the nonheterogeneity model. The significance of the estimates is similar to that from the non-heterogeneity model, except that the ability of the "holds non-EPHI" variable to explain transitions for males falls. The different coefficient estimates produce differences in our predictions of job-lock. The model suggests that job-lock is nonexistent for married males even after controlling for possible correlation among unobserved characteristics influencing observed health insurance status, tenure, and employment transitions. This procedure produces smaller estimates of job-lock of between 10 and 15 percent for unmarried males (versus 28 and 36 percent in the non-heterogeneity model). The estimated impact of non-EPHI falls for both married and unmarried males. That is, married males are 12 percent more likely to leave their current job (versus 17 percent in the nonheterogeneity model) and unmarried males are 7 percent less likely to leave their job (versus four percent in the nonheterogeneity model) when they hold another source of health insurance. This reduction in the estimated effect of non-EPHI on the mobility of married males suggests that the results from the nonheterogeneity model may be correlated with a high turnover propensity—our indicator theory. Job-push, as we define it, however, is still prevalent for married men.

33. The use of a permanent factor accounts for correlation between the endogenous explanatory variables and the employment transitions that is induced by permanent unobserved heterogeneity, but it does not account for correlation due to time-varying unobservables.

34. In unreported results (available upon request) we added an equation explaining wages in the joint estimation. The results did not change significantly.

35. There are three sources of identification in this estimated set of equations: exclusion restrictions, covariance restrictions, and the nonlinearity of the logit and multinomial logit equations and the discrete factor specification. The factor structure imposed on the unobservables defines the covariance restrictions. Variables included in the reduced-form equations for endogenous explanatory variables and the initial conditions, but excluded from the employment transition equations, are body mass index, crack use, ever convicted of a crime, spouse's age, and household status at age 14 (lived with both parents, one parent/two adults, one parent only, other).

36. The results presented are from a model with four points of support in the discrete distribution of one unobserved permanent heterogeneity factor. Five points of support did not significantly improve the likelihood function.

Table 5
Selected Parameter Estimates from the Heterogenity Model

	Married			Not Married		
	Transitions from Employment To			Transitions from Employment To		
	Same Job		Not Employed	Same Job		Not Employed
Offers EPHI	−0.055	(0.155)	−0.373 (0.553)	−0.143	(0.150)	−0.044 (0.339)
Holds EPHI	−0.011	(0.144)	0.838 (0.523)**	0.522	(0.141)	−0.072 (0.343)***
Holds non-EPHI	−0.198	(0.122)	0.075 (0.355)**	0.033	(0.145)	−0.436 (0.437)
Pension	0.173	(0.112)	−0.045 (0.466)	0.032	(0.108)	−0.261 (0.248)
Training	0.159	(0.098)	−0.095 (0.413)	0.235	(0.096)	−0.027 (0.173)
Sick leave	0.264	(0.098)	−0.374 (0.284)	0.351	(0.094)	0.123 (0.172)
Life insurance	0.289	(0.118)	0.145 (0.387)	0.179	(0.116)	0.367 (0.435)
Profit sharing	0.137	(0.104)	−0.049 (0.435)***[a]	0.084	(0.102)	0.028 (0.221)***[a]
Simulations						
Job-lock 1	0.0360			−0.1462		
Job-lock 2	0.0364			−0.1078		
Job-lock 3	0.0358			−0.1351		
Offer effect	0.0004			0.0353		
Non-EPHI effect	0.1225			−0.0712		

Note: Standard errors are in parentheses.
*** indicates joint significance at the 1 percent level;
** 5 percent level;
* 10 percent level.
a. indicates that the joint significance test refers to the vector of five fringe benefits.

We can further understand the heterogeneity model by examining the predicted probabilities of each modeled outcome conditional on each discrete mass point of the distribution of unobserved heterogeneity. Table 6 indicates that individuals with unobserved characteristics at the right of the distribution (mass point 4) are more likely to be employed and to have more years of job tenure in 1989. In each year, they are more likely to be offered EPHI, to accept EPHI, and to have another source of health insurance. Similarly, they are more likely to remain in the same job, or to reenter employment if they become nonemployed. These individuals are also more likely to be married. This finding supports Mroz' (1999) finding in a simple example of the effect of marriage on wages: unobserved heterogeneity influences both marriage probabilities and employment outcomes.

C. Examination of Different Destinations

The multinomial logit specification of the main employment transition equations allows us to examine not only the impact of EPHI on quits but also the impact on the type of quit. That is, is EPHI inhibiting moves to a new job or to non-employment? Table 7 summarizes the job-lock measures in Tables 4 and 5, and also reports the percentage change in probabilities associated with movement to the specific desti-

Table 6
Heterogeneity Model Predictions by Mass Point

	Initial Employment			Offered EPHI		Holds EPHI		Holds Other Insurance		Marital Status	
	Y	N	Initial Tenure	Y	N	Y	N	Y	N	Y	N
Observed	0.866	0.134	3.019	0.804	0.196	0.869	0.131	0.821	0.179	0.500	0.500
Predicted	0.866	0.134	2.947	0.796	0.204	0.768	0.232	0.757	0.243	0.503	0.497
Mass point 1	0.515	0.485	1.443	0.464	0.536	0.126	0.874	0.173	0.827	0.032	0.968
Mass point 2	0.803	0.197	2.451	0.715	0.285	0.599	0.401	0.598	0.402	0.242	0.758
Mass point 3	0.901	0.099	3.018	0.826	0.174	0.852	0.148	0.824	0.176	0.515	0.485
Mass point 4	0.965	0.035	3.759	0.920	0.080	0.977	0.023	0.967	0.033	0.895	0.105

	Married Employed Transitions to			Not Married Employed Transitions to			Nonemployed Transitions to	
	Same Job	New Job	Nonemployed	Same Job	New Job	Nonemployed	Nonemployed	New Job
Observed	0.779	0.179	0.042	0.642	0.263	0.095	0.601	0.399
Predicted	0.740	0.189	0.071	0.647	0.268	0.085	0.538	0.462
Mass point 1	0.537	0.214	0.249	0.601	0.238	0.161	0.759	0.241
Mass point 2	0.694	0.208	0.098	0.636	0.260	0.104	0.619	0.381
Mass point 3	0.756	0.190	0.054	0.650	0.270	0.080	0.528	0.472
Mass point 4	0.816	0.161	0.023	0.664	0.281	0.056	0.408	0.592

Estimated Heterogeneity Distribution

	Estimated Mass Point	Transformed Mass Point	Estimated Prob Weight	Transformed Prob Weight
Mass point 1	0.000 (0.000)	0.000	1.906 (0.191)	0.062
Mass point 2	−0.260 (0.067)	0.435	1.492 (0.137)	0.275
Mass point 3	0.754 (0.055)	0.680	1.378 (0.183)	0.417
Mass point 4	1.000 (0.000)	1.000	—	0.246

Table 7
Job-Lock Measures by Destination

	Percentage Change in the Probability of		
	A Quit	A New Job	Nonemployed
Results from heterogeneity model			
Married			
Job-lock 1	0.0360	−0.0299	0.1923
Job-lock 2	0.0364	−0.0026	0.1290
Job-lock 3	0.0358	−0.0228	0.1749
Offer effect	0.0004	0.0265	−0.0785
Non-EPHI effect	0.1225	0.1087	0.1577
Not married			
Job-lock 1	−0.1462	−0.1480	−0.1381
Job-lock 2	−0.1078	−0.1042	−0.1241
Job-lock 3	−0.1351	−0.1349	−0.1359
Offer effect	0.0335	0.0382	0.0123
Non-EPHI effect	−0.0712	0.0206	−0.4862
Results from nonheterogeneity model			
Married			
Job-lock 1	−0.0094	−0.1132	0.3685
Job-lock 2	0.0016	−0.0424	0.1617
Job-lock 3	−0.0088	−0.0943	0.3021
Offer effect	0.0109	0.0636	−0.3273
Non-EPHI effect	0.1692	0.1258	0.3135
Not married			
Job-lock 1	−0.3583	−0.2868	−0.5816
Job-lock 2	−0.2775	−0.1909	−0.5474
Job-lock 3	−0.3356	−0.2579	−0.5779
Offer effect	0.0595	0.0745	0.0216
Non-EPHI effect	−0.0360	0.0039	−0.1371

nations. We discuss results from the heterogeneity model and present results from the preferred specification of the non-heterogeneity model for completeness.

The results suggest that EPHI has virtually no impact on the mobility of married males into new jobs. However, married men who hold EPHI are between 13 and 19 percent *more* likely to enter nonemployment than those who do not have EPHI. Evidence from Gruber and Madrian (1994) suggests that continuation coverage (COBRA) serves to mitigate job-lock. That is, reductions in job mobility are smaller when COBRA health insurance is available. We agree that COBRA is likely to affect employment transitions. Our multinomial logit approach of distinguishing among employment destinations suggests that one channel through which this occurs is by encouraging job transitions that involve a spell of nonemployment. COBRA enables

individuals with EPHI to leave their employer for nonemployment without forfeiting health insurance (for a period of 18 months). In order for us to infer a positive impact of COBRA on utility-enhancing mobility, COBRA should have a positive effect on reentry to employment of nonemployed individuals. We find that health insurance from a former employer significantly (at the 10 percent level) increases the probability of moving from nonemployment to employment (see Appendix Table A2). The data do not indicate that this insurance is COBRA, but it is likely. COBRA allows transitions that might involve nonemployment and is a policy that is less costly, and potentially less distorting to labor demand, than requirements that employer coverage be portable.

It appears that EPHI inhibits transitions from employment to the different destinations equally among unmarried males: transitions to a new job and to nonemployment are reduced by 14.8 and 13.8 percent respectively. Interestingly, however, the nonheterogeneity model suggests that EPHI reduces mobility into nonemployment more than it reduces mobility into a new job. This finding may be related to the smaller prevalence of insurance from a nonemployer source among unmarried males. Modeling of the endogeneity of a nonemployer source appears to reduce the bias associated with correlation with unobserved characteristics that explain the lack of such a source.

VI. Conclusion

Our findings convince us that young married men who hold employer-provided health insurance are not locked into their jobs. Such health insurance, however, is likely to reduce the mobility of unmarried males by 10 to 15 percent. One explanation for the different results by marital status is the idea that something unobserved influences marital status as well as employment choices in such a way that EPHI is "too good" to risk losing. Perhaps these males believe that they would have more difficulty finding a new job that offers health insurance as is suggested by our heterogeneity model and the results in Table 6. Our controls for unobserved heterogeneity in the estimated set of structural equations that allows the offer of EPHI, as well as accepting EPHI, having another source of insurance, tenure, and marital status, to be endogenous, produce an estimate of job-lock that is substantially smaller than the model that does not control for unobserved individual characteristics.

If insurance-induced job-lock does indeed reduce mobility, we agree with Gruber and Madrian (1994) and Holtz-Eakin (1994) that such job-lock is a short-run problem. (Our estimates from a model of annual transitions indicate that job-lock is not relevant for married males and is small for unmarried males, but analysis of shorter time intervals might produce different findings.) The requirement that EPHI be portable and void of preexisting conditions clauses, while noble, has costly implications for employers and might not be necessary to promote unrestricted mobility between jobs. Although the NLSY data do not allow us to quantify the effect of COBRA on employment transitions, Gruber and Madrian find evidence that this short-run solution has the ability to increase mobility among those who have insurance. This legislation may be sufficient to alleviate job-lock when it exists. Our results suggest that

EPHI *encourages* transitions from employment to nonemployment among married males; this movement might be explained by the federal requirement of temporary continuation coverage. We also find evidence that insurance from a former employer (potentially temporary COBRA coverage) promotes reentry to employment.

As we demonstrate, it is important to have detailed employment characteristics describing both an individual's employment history and the fringe benefits offered by his firm. Few data sets provide this detail for a nationally representative sample. Also deficient in datasets that do offer such detail is useful information on health and medical care expenditures. The 1996 Medical Expenditure Panel Survey, which updates the 1987 NMES with design enhancements and expanded questions, contains interviews with employers and information about other health plans available to, but not chosen by, employed respondents. This information may enable researchers to identify different valuations of health insurance among individuals. This promising dataset will be useful in future studies of health insurance and its effects on job mobility.

Table A1
Sample Statistics

Variable	Married		Not Married	
	Employed (5,068)	Not Employed (283)	Employed (4,444)	Not Employed (905)
Employment related variables				
Pension	0.649	—	0.495	—
Training	0.523	—	0.404	—
Sick leave	0.635	—	0.544	—
Life insurance	0.734	—	0.582	—
Profit sharing	0.330	—	0.278	—
Maternity leave	0.469	—	0.401	—
Child care	0.051	—	0.056	—
Tenure	4.188	—	2.929	—
Tenure ≤ 1	0.279	—	0.435	—
Number of jobs ever held	6.860	7.435	7.320	6.914
Service occupation	0.084	—	0.153	—
Manufacturing industry	0.281	—	0.224	—
State/local government	0.100	—	0.087	—
Federal government	0.026	—	0.024	—
Very unsatisfied with job	0.017	—	0.029	—
Union	0.174	0.117	0.147	0.053
<3.0% unemployment rate	0.021	0.011	0.033	0.023
3.0–5.9% unemployment rate	0.527	0.484	0.566	0.591
6.0–8.9% unemployment rate	0.315	0.328	0.292	0.280
>9.0% unemployment rate	0.137	0.177	0.109	0.106
AFDC	0.013	0.141	0.007	0.015
SSI	0.011	0.085	0.014	0.120
Food stamps	0.041	0.261	0.027	0.094
Welfare	0.049	0.300	0.034	0.165
Unemployment compensation	0.052	0.145	0.065	0.064
Disability	0.041	0.113	0.027	0.071
Demographic variables				
Age	29.461	28.767	28.614	28.417
Years of education = 0–5	0.006	0.004	0.003	0.006
Years of education = 6–8	0.033	0.085	0.029	0.064
Years of education = 9–11	0.105	0.230	0.132	0.295
Years of education = 12	0.449	0.484	0.453	0.450
Years of education = 13–15	0.196	0.120	0.194	0.122
Years of education = 16	0.136	0.035	0.133	0.038
Years of education = 17+	0.075	0.042	0.057	0.027
Black race	0.170	0.265	0.347	0.550
Other race	0.063	0.106	0.052	0.069
South	0.375	0.431	0.367	0.361
Rural	0.230	0.283	0.157	0.178
Health limitation	0.025	0.078	0.034	0.082
Number of children	0.948	1.208	0.134	0.137

Table A1 (*continued*)

Variable	Married		Not Married	
	Employed (5,068)	Not Employed (283)	Employed (4,444)	Not Employed (905)
Other variables				
Any crack use	0.007	0.018	0.023	0.053
Crack use missing	0.004	0.014	0.006	0.009
Ever convicted of crime	0.073	0.124	0.077	0.156
Crime info missing	0.031	0.042	0.028	0.053
Body Mass Index (BMI)	25.527	25.121	24.827	25.131
BMI missing	0.030	0.039	0.031	0.025
Spouse's age	27.608	26.367	—	—
Spouse's age missing	0.022	0.046	—	—
Spouse works	0.457	0.332	—	—
Mom's years of education	10.249	9.403	10.215	8.864
Mom's education missing	0.063	0.071	0.069	0.126
Dad's years of education	9.788	8.491	9.436	7.072
Dad's education missing	0.113	0.159	0.154	0.283
Lived with whom at age 14				
Both parents	0.753	0.661	0.670	0.513
Two adults (one parent)	0.087	0.113	0.096	0.118
One parent only	0.127	0.155	0.191	0.298
Other	0.028	0.067	0.036	0.062
Missing	0.005	0.004	0.007	0.009

Table A2
Results for Additional Regressors in the Employment Transition Equations of the Heterogeneity Model

Variable	Married Employed Males Transition to		Not Married Employed Males Transition to		Nonemployed Males Transition to Employment
	Same Job	Nonemployed	Same Job	Nonemployed	
Employment Related Variables					
Tenure	0.091 (0.022)	0.027 (0.080)	0.104 (0.027)	−0.002 (0.051)	—
Tenure ≤ 1	−0.460 (0.113)	0.107 (0.570)	−0.614 (0.109)	−0.106 (0.235)	—
Number of jobs * age(24–28)	−0.064 (0.013)	−0.008 (0.042)	−0.061 (0.011)	−0.030 (0.018)	—
Number of jobs * age(29–32)	−0.067 (0.011)	−0.019 (0.021)	−0.054 (0.011)	−0.049 (0.017)	—
Number of jobs * age(33–36)	−0.067 (0.021)	−0.041 (0.063)	−0.016 (0.025)	0.030 (0.036)	—
Service occupation	−0.507 (0.143)	−0.137 (0.460)	−0.115 (0.109)	0.253 (0.169)	—
Manufacturing industry	0.228 (0.101)	0.090 (0.284)	0.351 (0.105)	0.545 (0.195)	—
Wage rate	0.486 (0.155)	−0.554 (0.433)	0.502 (0.156)	−0.131 (0.598)	—
Union	0.344 (0.137)	0.391 (0.485)	0.290 (0.139)	0.233 (0.344)	—
Very unsatisfied with job	−1.325 (0.270)	0.135 (0.542)	−1.136 (0.232)	0.497 (0.399)	—
Welfare	−0.308 (0.170)	0.422 (0.557)	−0.191 (0.206)	0.096 (0.593)	—
AFDC	—	—	—	—	−0.104 (0.743)
Unemployment compensation	—	—	—	—	0.588 (0.874)
Disability	—	—	—	—	−0.556 (0.526)
Spouse's EPHI	—	—	—	—	0.835 (0.659)
Former employer's insurance	—	—	—	—	0.894 (0.513)
Spouse's former employer's insurance	—	—	—	—	1.680 (0.996)
Private insurance	—	—	—	—	0.951 (0.723)

Public insurance	—	—	—	—	−0.569 (0.475)
<3.0% unemployment rate	−0.076 (0.266)	0.005 (0.628)	−0.255 (0.209)	−0.525 (0.578)	−0.009 (0.693)
3.0–5.9% unemployment rate	0.005 (0.102)	0.134 (0.359)	−0.061 (0.095)	−0.157 (0.176)	0.156 (0.230)
6.0–8.9% unemployment rate	−0.020 (0.142)	0.289 (0.462)	−0.035 (0.143)	0.383 (0.344)	0.199 (0.444)
Spouse works	0.082 (0.089)	0.035 (0.285)	—	—	—
Demographic variables					
Age	0.904 (0.306)	−0.264 (0.600)	0.253 (0.354)	0.762 (0.583)	−0.285 (0.479)
Age squared/100	−1.518 (0.529)	0.412 (1.109)	−0.443 (0.623)	−1.309 (1.025)	0.476 (0.836)
Years of education = 0–5	−0.268 (1.399)	−0.571 (1.277)	0.102 (1.412)	0.611 (1.029)	−0.250 (0.997)
Years of education = 6–8	−0.104 (0.222)	0.140 (0.443)	0.131 (0.230)	0.488 (0.384)	−0.352 (0.726)
Years of education = 9–11	−0.113 (0.140)	0.280 (0.336)	0.029 (0.123)	0.359 (0.229)	−0.421 (0.219)
Years of education = 13–15	−0.143 (0.113)	−0.239 (0.337)	0.031 (0.108)	−0.360 (0.235)	0.256 (0.267)
Years of education = 16	−0.048 (0.139)	−0.602 (0.362)	−0.199 (0.132)	−0.538 (0.501)	0.835 (0.460)
Years of education = 17+	−0.023 (0.175)	−0.913 (0.516)	−0.373 (0.172)	−1.008 (0.583)	0.756 (0.470)
Black race	−0.374 (0.117)	0.524 (0.409)	−0.196 (0.095)	0.548 (0.174)	−0.766 (0.219)
Other race	0.141 (0.180)	0.493 (0.381)	−0.075 (0.181)	0.170 (0.315)	−0.163 (0.721)
South	0.012 (0.089)	−0.169 (0.302)	−0.081 (0.086)	−0.260 (0.221)	0.211 (0.179)
Rural	−0.041 (0.102)	0.015 (0.362)	−0.060 (0.111)	−0.285 (0.374)	−0.249 (0.256)
Health limitation	−0.023 (0.250)	0.972 (0.388)	−0.088 (0.213)	0.228 (0.473)	−0.159 (0.747)
Number of children	0.141 (0.058)	−0.078 (0.147)	−0.045 (0.098)	0.010 (0.147)	0.274 (0.126)
Married	—	—	—	—	−0.656 (0.339)
Other variables					
Year 1989	−0.378 (0.135)	−0.550 (0.426)	−0.176 (0.128)	−0.230 (0.259)	−0.038 (0.292)
Year 1990	−0.161 (0.129)	0.018 (0.424)	0.133 (0.124)	0.423 (0.230)	−0.679 (0.279)
Constant	−12.678 (4.446)	4.370 (8.441)	−2.677 (5.032)	−11.285 (8.303)	3.463 (6.860)
Factor loading ρ	0.944 (0.335)	−2.221 (0.761)	−0.026 (0.326)	−1.286 (0.554)	1.771 (0.520)

Table A3
Results for All Regressors in Other Equations of the Heterogeneity Model

Variable	Initially Employed	Initial Tenure	Offered EPHI	Holds EPHI	Holds Other Insurance	Married
Employment Related Variables						
Tenure ≤ 1	—	—	−0.922 (0.065)	—	—	—
Number of jobs * age(24–28)	—	—	—	−0.032 (0.013)	0.001 (0.010)	—
Number of jobs * age(29–32)	—	—	—	−0.048 (0.010)	0.018 (0.009)	—
Number of jobs * age(33–36)	—	—	—	−0.041 (0.021)	0.036 (0.017)	—
Service occupation	—	—	−0.158 (0.092)	—	—	—
Manufacturing industry	—	—	1.431 (0.093)	—	—	—
Government job	—	—	0.807 (0.131)	—	—	—
Union	—	—	1.673 (0.139)	—	—	—
<3.0% unemployment rate	0.312 (0.389)	−0.351 (0.495)	—	—	—	—
3.0–5.9% unemployment rate	−0.279 (0.131)	0.106 (0.113)	—	—	—	—
6.0–8.9% unemployment rate	−0.812 (0.183)	−0.010 (0.170)	—	—	—	—
Demographic Variables						
Age	0.068 (0.033)	0.316 (0.022)	0.020 (0.018)	1.099 (0.369)	0.848 (0.301)	0.491 (0.332)
Age squared/100	—	—	—	−1.651 (0.639)	−1.369 (0.520)	−0.519 (0.572)
Years of education = 0–5	−0.836 (0.983)	−0.435 (0.964)	−1.629 (0.424)	0.354 (0.881)	1.051 (0.830)	−1.031 (0.874)
Years of education = 6–8	−1.171 (0.262)	−0.372 (0.338)	−1.370 (0.169)	−0.781 (0.336)	0.341 (0.267)	−0.797 (0.393)
Years of education = 9–11	−0.884 (0.151)	−0.649 (0.140)	−0.792 (0.101)	−0.621 (0.174)	−0.051 (0.142)	−1.289 (0.255)
Years of education = 13–15	0.631 (0.195)	−0.289 (0.122)	0.601 (0.097)	0.394 (0.144)	0.064 (0.120)	0.629 (0.211)

Years of education = 16	1.176 (0.396)	−0.326 (0.145)	1.297 (0.132)	0.879 (0.177)	0.336 (0.146)	0.922 (0.228)
Years of education = 17+	0.362 (0.632)	−1.033 (0.216)	1.512 (0.217)	1.209 (0.369)	0.408 (0.268)	0.957 (0.489)
Black race	−1.264 (0.144)	−0.672 (0.116)	−0.151 (0.081)	−0.480 (0.127)	−0.847 (0.109)	−2.368 (0.203)
Other race	−0.544 (0.278)	−0.230 (0.199)	−0.087 (0.140)	−0.207 (0.212)	0.459 (0.189)	−0.205 (0.293)
South	0.159 (0.116)	0.018 (0.097)	0.154 (0.072)	−0.173 (0.104)	0.372 (0.089)	0.520 (0.139)
Rural	0.095 (0.143)	0.182 (0.113)	0.104 (0.088)	0.063 (0.127)	0.086 (0.108)	0.476 (0.172)
Health limitation	−0.629 (0.331)	—	—	−0.459 (0.410)	−0.835 (0.174)	−0.033 (0.372)
Number of children	0.322 (0.082)	0.219 (0.054)	0.139 (0.044)	0.472 (0.071)	0.612 (0.055)	3.635 (0.139)
Married	−0.374 (0.231)	−0.224 (0.152)	—	−1.244 (0.449)	−2.328 (0.357)	—
Other variables						
Any crack use	−0.235 (0.511)	−0.394 (0.593)	—	—	—	—
Crack use missing	−0.318 (0.823)	1.241 (0.998)	—	—	—	—
Ever convicted of crime	−0.712 (0.163)	−0.880 (0.159)	—	—	—	—
Crime information missing	−0.640 (0.480)	0.002 (0.356)	—	—	—	—
Body Mass Index (BMI)	—	0.049 (0.012)	0.016 (0.009)	—	0.007 (0.010)	0.045 (0.015)
BMI missing	—	1.278 (0.439)	0.445 (0.328)	—	0.505 (0.397)	1.659 (0.555)
Spouse's age	—	—	—	−0.040 (0.015)	−0.042 (0.012)	—
Spouse's age missing	—	—	—	−1.089 (0.555)	−0.893 (0.440)	—
Two adults (one parent)	—	—	—	—	—	0.078 (0.182)
One parent only	—	—	—	—	—	−0.169 (0.145)
Other	—	—	—	—	—	0.050 (0.336)
Missing	—	—	—	—	—	−0.704 (0.657)
Year 1989	—	—	0.173 (0.098)	−0.071 (0.123)	−0.248 (0.101)	−0.376 (0.135)
Year 1990	—	—	0.094 (0.090)	0.041 (0.112)	−0.046 (0.090)	0.189 (0.114)
Constant	−1.435 (0.920)	−8.230 (0.680)	−2.047 (0.609)	−18.918 (5.355)	−13.969 (4.377)	−20.144 (4.935)
Factor loading ρ	3.678 (0.435)	2.316 (0.306)	3.255 (0.235)	6.630 (0.432)	6.473 (0.297)	11.855 (0.684)

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