

# Appendix

## Detailed Descriptions of Research Reviewed in *Job Lock and Employer- Provided Health Insurance: Evidence from the Literature*

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## List of Acronyms

ACA	Affordable Care Act
ACS	American Community Survey
BRFSS	Behavioral Risk Factor Surveillance System
CBO	Congressional Budget Office
COBRA	Consolidated Omnibus Reconciliation Act of 1985
CPS	Current Population Survey
EPHI	Employer-provided health insurance
HRS	Health and Retirement Study
IHCP	Individual Health Coverage Plan
JOLTS	Job Openings and Labor Turnover Survey
MEPS	National Medical Expenditure Panel Survey
NLSY	National Longitudinal Survey of Youth
NMES	National Medical Expenditure Survey
OECD	Organization for Economic Cooperation and Development
PSID	Panel Study of Income Dynamics
SCHIP	State Children's Health Insurance Program
SIPP	Survey of Income and Program Participation
SIPP-EWH	Survey of Income and Program Participation, Education and Work History
SIPP-CJR	Survey of Income and Program Participation, Characteristics of Jobs from Which Retired

### About the Future of Work@50+

This report is part of the Future of Work@50+ Initiative. This is a multiyear initiative that examines the challenges and opportunities facing older workers. For other reports and information, visit: <http://www.aarp.org/futureofwork>.

AARP's Public Policy Institute informs and stimulates public debate on the issues we face as we age. Through research, analysis, and dialogue with the nation's leading experts, PPI promotes development of sound, creative policies to address our common need for economic security, health care, and quality of life.

The views expressed herein are for information, debate, and discussion, and do not necessarily represent official policies of AARP.

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# I. The Impact of Employer-Provided Health Insurance on Job Changes

This section summarizes some of the key research on the extent to which job lock related to employer-provided health insurance (EPHI) discourages workers from changing jobs. It is not intended to be a comprehensive review of the literature.

## **MADRIAN: ARE MARRIED MEN MORE LIKELY TO CHANGE JOBS IF THEIR SPOUSE HAS INSURANCE?**

In 1993, Madrian published a study that shaped most of the subsequent work on the topic of job lock. The study examined the extent to which EPHI reduced job turnover among married men ages 20–55, using 1987 data from the National Medical Expenditure Survey (NMES). It looked at differences in voluntary job-leaving rates among married men who did and did not fall into the following categories:

- a) workers with access to other forms of insurance;
- b) workers with large families; and
- c) workers with pregnant spouses.

The dependent variable was voluntary job changes, defined as either switching to a new job or being unemployed after a voluntary quit. These three groups of workers were selected because they had characteristics that should have made them less dependent (in the case of having access to other forms of insurance) or more dependent (in the other two cases) on EPHI.

This sort of test demonstrates a way of trying to get around the problem associated with making a simple comparison of the rate of job changes

among workers who have EPHI and workers who do not. The comparison groups were designed to control for differences in personal characteristics among workers. In the case of the workers who have access to other forms of insurance (typically through a spouse's insurance), it is reasonable to believe that married men who have a spouse with insurance are not different as a group from married men who have a spouse without insurance, since they have little control over their spouse's employment situation.<sup>1</sup>

The other distinctions are intended to control for situations in which health insurance would likely be much more valuable. In the second set of tests, Madrian looked at the difference in job-leaving rates among workers with five or more children compared with workers with one child or none. She looked at this difference in job-leaving rates among men ages 20–55 for the group that did not have EPHI and the group that did have EPHI. The assumption is that EPHI would be more valuable for workers with large families than for other workers. We might expect that workers with large families will be less mobile in general since they will not want to take the risk of missing a paycheck. Also, job changes that involve moving are more difficult when many children are involved.

However, if EPHI has a job-lock effect, then the difference in job-leaving rates between men with large families and men with small families should be even larger among the group with EPHI than for the group without, because EPHI would give men a further reason not to want to leave their jobs.

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1 The analysis controls for the education levels of the men in the sample, so in principle we would be comparing the rate of job changes among married men with college degrees who have EPHI and who have a spouse with EPHI with the rate of job changes among married men with college degrees who have a spouse without EPHI. This should help control for the fact that more educated men are likely to be married to more educated women, who therefore are also likely to have higher-paying jobs. Having a better-paid spouse would likely make it easier for men to leave their jobs without having a new job already arranged. The analysis also included other controls like age and industry to ensure that these factors might not have distorted the results.

It is the same situation with respect to having a pregnant spouse. We would expect that EPHI would be more valuable to men with a pregnant spouse than to men without a pregnant spouse. The spouse may have complications during her pregnancy that require medical attention or the newborn baby may have medical issues requiring care. In addition, the normal costs of prenatal care and delivery can be a considerable expense. For these reasons, it is likely that the difference in job-leaving rates between men without pregnant spouses and men with pregnant spouses will be larger for men with EPHI than for men without EPHI, if there is an EPHI-related job-lock effect.

Before reviewing the results of the Madrian study, it is worth making a few additional points about the nature of these tests. First, this study, like much subsequent research, focused on the job-changing patterns of prime-aged married men. This group was chosen for several reasons.

First, for the time period in question, the overwhelming majority of men, especially married men, worked at jobs that offered EPHI. This means relatively few married women would have had a spouse without EPHI. As a result, constructing a similar comparison between a group of married women who could get insurance through a spouse and a group of married women who could not get insurance through a spouse would not have been possible.

The reason for choosing married men as opposed to all men is that married men as a group are expected to have different job-changing behavior from unmarried men. And, of course, only married men can have access to insurance through a spouse.

The age cutoff of 55 was used to avoid retirement-related complications. Few men retire by age 55. This means that when men under 55 leave their jobs, they almost certainly intend to find other jobs, not begin retirement.

It is also worth noting that the analysis focused on voluntary job leavers, excluding people who were laid off or fired. This is important because job leaving due to layoffs or firing is out of the worker's control.<sup>2</sup> If a job-lock effect existed that reduced the likelihood that workers would look for new jobs, but our test included people who had been dismissed from their jobs by their employers, then finding this effect in the data would be much more difficult. Typically, close to half of job changes are due to layoffs or dismissals, so keeping this group of involuntary job leavers in the sample could have had a significant effect on the results.

Finally, the importance of the sample size is worth noting. In examining the effect of EPHI on job leaving, we are looking at one factor among many that we think may affect workers' decisions to look for new jobs. If we looked at just a small group of workers, then the effect of EPHI on job leaving would be difficult to detect, even if it occurred. The other factors that affect job leaving would be so large that the impact of EPHI might not be visible in the data.

This problem arises with any statistical test. All of the other factors that affect job leaving are like smoke that makes it more difficult to see the true effect of EPHI on job leaving. The larger the sample, the easier it is to see through the smoke.<sup>3</sup> That is why we generally would view the results from large samples as being more meaningful than the results from small samples. The sample size for this study was 2,978 men, which is smaller than the sample size used in most of the other studies included in this analysis.

All three sets of tests used in the Madrian study found significant evidence of job lock. Men with EPHI who had access to insurance through a spouse had a much higher rate of turnover than men with EPHI who did not have insurance through a spouse. The study also found that having EPHI led to a much sharper drop in turnover for men with large families compared

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2 The distinction between a voluntary quit and a dismissal is never perfect. Sometimes an employer will give a worker the option of quitting to avoid having to be fired. The data in this and other surveys generally rely on the worker's self-reporting.

3 The possibility also exists that a small sample may cause us to see a relationship that is not really there. For example, if we were looking at the effect of eating bread on health, and it turned out that our group of bread eaters were also professional basketball players, then we would wrongly be led to believe that eating bread led to extraordinary health. If we had a very large sample, then we could be reasonably confident that the number of professional basketball players that might show up in either the group of bread eaters or the control group of non-bread eaters was too small to affect the results. As a general rule in a well-designed study, a small sample size will make it more difficult to find an effect that is actually present than to wrongly find an effect that does not really exist.

with men who did not have EPHI. And it found that, while having a pregnant spouse reduced the rate of turnover among men, the drop was considerably sharper in a comparison among men who had EPHI. The study structured the tests in several different ways and still found similar results, indicating that the findings were not a statistical fluke.

Exact estimates differed among the tests and across specifications, but most of the tests implied that EPHI reduced the annual rate of turnover by between 25 and 30 percent. Since the annual turnover rate for the group without EPHI was 16 percent, Madrian's results imply that EPHI reduces the rate of annual turnover by roughly 4 percentage points, to 12 percent.

The impact of this reduction in turnover would increase substantially over time as shown in figure 3 in the report.<sup>4</sup> Based on Madrian's results, after 5 years, we would expect that less than 42 percent of workers without EPHI would still be at the same job. By contrast, almost 53 percent of workers with EPHI would be at the same job. If changing jobs is associated with better employment or a better work-life situation, then this gap would imply a substantial cost due to EPHI-related job lock.

No single study can ever be conclusive, but Madrian's analysis shaped much future research. The fact that the results were similar using different tests provides reason to believe that the job-lock effect the study found is real. It is also worth noting that the data for the analysis is from 1987, a period in which the average price of a premium was a little more than one-third as large relative to wages, as is the case today. Also, jobs that had EPHI were far more common in 1987 than today, especially for men. This means that any job-lock effect that was present in 1987 would likely be considerably larger in the labor market as it exists today. However the Consolidated Omnibus Reconciliation Act of 1985 (COBRA), the Health Insurance Portability and Accountability Act (HIPAA), and various state-level reforms of the insurance market would be factors reducing the extent of job lock insofar as they were effective.

## **DO JOB TENURE AND OTHER FACTORS MISSED BY MADRIAN AFFECT THE JOB LOCK HYPOTHESIS?**

One problem with the tests used in the Madrian study is that the data set they used, the NMES, includes no information on job tenure. This raises the possibility that the job-lock effect found in the study may be due in part to the effect of tenure. Workers who have long tenure at a job will generally be reluctant to give it up, since it usually means that they will be favored in many circumstances, like the ordering of layoffs, over workers with less tenure. Since most workers with long tenure also have EPHI, a risk exists that the tests in the Madrian study were mixing the two effects.

Buchmueller and Valletta (1996) attempted to address this potential source of bias in Madrian by using data from the Survey of Income and Program Participation (SIPP). SIPP tracks individuals and their families for 4 years. Unlike the NMES data used by Madrian, SIPP includes data on tenure and also on pension coverage, another variable that Buchmueller and Valletta used in their analysis.

The study also noted that the results in Madrian may be somewhat problematic because many workers are offered coverage but turn it down. It reported that 20 percent of the men and 29 percent of the women in the NMES who are covered by their spouses' policies rather than their own were offered coverage and turned it down. This would mean, for example, that many men who report that their spouses do not have insurance might in fact have the option to be covered by their spouses' insurance if it became necessary.

While failing to account for the effect of tenure and pensions may have led Madrian's tests to exaggerate the extent of job lock, ignoring the fact that many spouses could get insurance on their jobs would understate the extent of job lock. The reason is that many of the married men in Madrian's analysis who she had treated as though they could not get insurance through their spouses did in fact have this option. This group would presumably be as likely to change jobs as married men whose spouses did get insurance

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4 Job Lock and Employer-Provided Health Insurance: Evidence from the Literature, by Dean Baker, March 30, 2015. Accessed at: <http://www.aarp.org/futureofwork/>.



through their jobs. By including men who were not subject to job lock in the group who might be subject to job lock, her tests understated the true size of the job-lock effect.

Buchmueller and Valletta also noted that many job changes for married couples are joint decisions. They reported that, of the 288 husbands and 406 wives who changed jobs in their 1,566 two-earner families, 104 did so jointly. This means that joint job change accounted for 36 percent of husbands' job changes and 26 percent of wives' job changes among two-earner couples in their sample.

The study used the 1984 SIPP wave. It included only people who were employed on the survey's start date, either part time or full time. It excluded the self-employed and military, as well as workers employed in agriculture and construction. The latter exclusion was justified by the peculiarity of construction employment. Construction workers have frequent turnover but often have health insurance coverage through union-sponsored plans. Construction workers accounted for 7.4 percent of men and 1.2 percent of women in the sample. The sample used in the study had 4,208 men and 3,362 women ages 25–54.<sup>5</sup> It treated a departure, whether to unemployment, nonemployment, or a new job, as a transition, not distinguishing between voluntary and involuntary departures. The analysis covered the 12 months from August 1984 to August 1985.

While the Madrian study used a difference-in-difference methodology, comparing the rate of job changing among men without access to other insurance to the rate among men with access, Buchmueller and Valletta tried to measure the job-lock effect directly by including variables on pension coverage and tenure. Their study also modeled a job-change decision as a joint decision for two-earner households. This approach allowed for estimates of job lock for both married and single men and women.

The study found mixed evidence of job lock among married men in two-earner couples, and no evidence among married women in two-earner

couples. Limited evidence was found for job lock among single-earner married men and single men. The strongest evidence for job lock was among single women, with the coefficients highly significant in every specification. In the cases where no evidence of job lock was found, the implied effect on turnover was a reduction of 30–50 percent, a range consistent with, if somewhat larger than, the findings in Madrian.

While this study can be taken as consistent with Madrian's finding of job lock, some notable differences exist. Madrian was examining job lock only among married men. Buchmueller and Valletta found only mixed evidence of job lock among married men in either two-earner or single-earner couples. In this area of overlap, the findings are only loosely consistent. The strongest evidence of job lock occurs for single women, a group that Madrian did not examine.

Some troubling aspects were included in the findings. The coefficient of the wage variables in most of the regressions was not significant. This means that the study did not find the wage workers earned affected the rate at which they leave their jobs. As a practical matter, it is implausible that a higher wage did not reduce turnover. Holding other factors constant, workers would have been less likely to leave a high-paying job than a low-paying one. By contrast, the pension variable was highly significant and negative in every regression, meaning that access to pensions had a strong negative effect on turnover.

The pension variable may have been acting as a proxy for a good job and in this way picking up some of the effect on turnover that was actually attributable to wages. If so, then the pension variable may also have been picking up some of the effect of EPHI on turnover. This would mean that these tests would have led to a measure of the impact of EPHI on turnover that was lower than the true effect.<sup>6</sup>

Treating all departures as voluntary is the other issue that may represent somewhat of a problem in this analysis. Data from the Bureau of Labor

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5 The study uses age 25 as a cutoff in order to be able to include pension coverage as a variable. The question on pension coverage was not asked of people under age 25.

6 It is worth remembering that in 1984, the year being analyzed, the overwhelming majority of pensions were defined benefit plans, which likely had greater value to workers, since workers have a guarantee of the income they will receive in retirement.



Statistics Job Openings and Labor Turnover Survey (JOLTS) show that close to 40 percent of departures are involuntary. The JOLTS data go back only to 2000, but if the proportion of departures that were involuntary was the same in 1984 as it has been in the past 14 years, then a large percentage of the departures included in the Buchmueller and Valletta analysis were not voluntary. If this is the case, then the measure of EPHI-related job lock in this study would be lower than the true impact, since health insurance-related job lock cannot be a factor in involuntary departures.<sup>7</sup>

On the whole, the Buchmueller and Valletta study can be taken as providing evidence for a substantial job-lock effect, even if it did not find evidence of job lock among the same groups as Madrian. Most of the factors that might have led to a bias in the study's estimates would have made the measured impact of the EPHI variable smaller, indicating that the true effect might have been larger than was picked up in this analysis.

### **DO WORKERS LEAVE GOOD JOBS TO GET INSURANCE?**

Anderson (1997) followed Madrian in focusing on how the mobility of men is affected by access to EPHI. However, instead of examining job lock, Anderson looked for evidence of "job push." Job push is a situation in which workers leave a job, in which they might otherwise be satisfied, in order to gain access to EPHI. Anderson notes evidence of a greater frequency of job changes for men without EPHI in a year in which their spouse is pregnant, than in the prior or subsequent year.<sup>8</sup> This finding suggests that they may have sought a job with EPHI during the period of the pregnancy.

Insofar as this sort of job push exists, it is useful to quantify it for two reasons. First, it implies some economic cost if workers who are otherwise satisfied with a job feel a need to seek new employment as a way of getting access to insurance. In principle, we want workers to decide

between jobs based on the compensation and features of the job, not because of their need for health insurance. Second, some measures of job lock may be biased by failing to take into account job push in the comparison group. This is most notable with the estimates made in Madrian (1994) that calculated differences in differences between job turnover rates for married men with pregnant spouses for those with EPHI and those without EPHI. Insofar as a job-push effect exists for men without EPHI, the turnover rate for this group would be inflated in the year in which their spouse is pregnant. Therefore, Madrian's comparison would have exaggerated the true size of the job-lock effect.

To test the impact of job push on turnover, Anderson constructed a hazard model that estimated the probability that a job spell will end. The model included a variety of individual characteristics, such as age, race, and education, as well as a range of job characteristics, such as industry, pay, union, and EPHI. The data are taken from the National Longitudinal Survey of Youth (NLSY). The sample included men who were ages 20–27 in 1989. Workers in agriculture and construction were excluded, as were the self-employed. The unit of observation was job spells, with a limit of two per person. This gave a total of 5,305 job spells.

Anderson found a substantial negative effect of EPHI on turnover in a model with a limited set of job characteristics. However, the model also found a strong positive effect of having a pregnant spouse, supporting the view that men with pregnant spouses are more likely to change jobs. When this tendency of men without insurance to change jobs was factored into the analysis, the implied job-lock effect of EPHI was somewhat smaller. The measured impact was little changed in models that added controls for life insurance, job satisfaction, or paid vacation. The study also included a separate set of regressions using a different structure, which had similar results.<sup>9</sup>

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7 There is also the issue that many voluntary departures are not entirely voluntary. An employer may encourage a worker to leave in order to avoid being fired. There is no obvious way to deal with this problem in the data. It would also lead to an overstatement of the voluntary turnover rate and an understatement of the extent of EPHI-related job lock.

8 Women also may have sought out jobs that provided insurance before becoming pregnant or during pregnancy, but these tests focused on the behavior of married men.

9 The other set of tests were probit regressions that examined the probability of workers leaving their job over the course of the year. The first set of tests used a proportional hazard model for the likelihood that an employment spell would end.

The results in Anderson can be seen as largely consistent with the findings in Madrian and Buchmueller and Valletta. While also finding clear evidence of job lock, it suggests a way in which the Madrian estimates could exaggerate the true effect, by failing to account for a job-push effect in a comparison group that does not have EPHI. It is also important to recognize that this sample was exclusively young workers. The average age for the sample in 1989 was just 25. It is unclear whether this biased the findings, and if so in which direction, but it might be wrong to extrapolate findings on job lock among workers in their twenties to the workforce as a whole.<sup>10</sup>

It is also worth noting that this study did not distinguish between voluntary and involuntary departures. This could be a problem with a sample that was overwhelmingly composed of young workers, especially in a sample period that included a recession. (The recession was dated as beginning in June 1990.) Young workers are especially likely to be laid off in a recession. As was the case with Buchmueller and Valletta, the measure of the extent of job lock would have been understated if a substantial portion of the departures was involuntary.

### **JOB CHANGES AS A FUNCTION OF THE EXPECTED GAIN OR LOSS OF EPHI**

Monheit and Cooper (1994) estimated the impact of both job lock and job push, as described by Anderson, through a model that estimated the likelihood of moving based on the predicted value of workers' wage and fringe benefits, including health insurance, at new jobs, compared with the value of the wage and fringe benefits the workers received at their current jobs. This model required constructing predicted values for each worker based on age, experience, education, and a set of other labor market variables. The likelihood of a voluntary move was then seen as a function of the difference between the predicted wage at a new job compared with the current wage and the likelihood of getting EPHI on a new job compared with whether or not the worker had health insurance at their current job, along with a series of other variables.

The Monheit and Cooper analysis is an interesting approach to the issue, since workers facing job lock are not making job changes they would otherwise make. The job lock means that they presumably have the option of finding a better job given their skills and experience, which is effectively what this study tried to test. It is worth noting that the Monheit and Cooper methodology would have picked up only part of the job-lock effect. In many cases, workers might prefer a different job for reasons not captured in these compensation measures. For example, workers may have to commute a long distance to their jobs or they may dislike their current bosses. These reasons, which would not have been captured in the tests in this study, often lead workers to look for new jobs.

The study used the 1987 NMES. The sample included 7,758 wage earners, consisting of 1,217 voluntary job changers and 6,541 wage earners who remained at the same job through 1987, a voluntary turnover rate of 15.7 percent. The study counted only workers who were continually employed as voluntary job changers, excluding those who had a spell of unemployment between jobs. The workers were all ages 25–54.

Monheit and Cooper found results similar to Madrian (1993). The study found married men who expected to lose coverage were 2.7 percentage points less likely to change jobs, and those who expected to gain coverage were 6.0 percentage points more likely to change jobs, as shown in table A-1.

Married women who expected to lose coverage were 5.0 percentage points less likely to change jobs, and those who expected to gain coverage were 4.5 percentage points more likely to change jobs. Single men who expected to lose coverage were 4.5 percentage points less likely to change jobs, and those who expected to gain coverage were 8.9 percentage points more likely to change jobs. Single women who expected to lose coverage were 5.8 percentage points less likely to change jobs, and those who expected to gain coverage were 7.8 percentage points more likely to change jobs. The estimates for married men are comparable to those found by Madrian. Madrian's study found a somewhat larger reduction in the rate of turnover for married men,

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10 Young workers in general have much lower health care expenses than older workers, which suggests that job lock would have been less of a factor among this group.

TABLE A-1  
**Percentage-Point Change in Annual Rate of Job Change**

Marital Status	Gender	Group	Percentage-Point Change
Married	Men	Expecting to Gain Coverage	6.0
		Expecting to Lose Coverage	-2.7
	Women	Expecting to Gain Coverage	4.5
		Expecting to Lose Coverage	-5.0
Single	Men	Expecting to Gain Coverage	8.9
		Expecting to Lose Coverage	-4.5
	Women	Expecting to Gain Coverage	7.8
		Expecting to Lose Coverage	-5.8

Source: Monheit and Cooper (1994).

a 4.0 percentage-point drop compared with a 2.7 percentage-point decline in Monheit and Cooper. However, Madrian's methodology showed a higher rate of turnover since it included people who had a spell without work between jobs. The exclusion of this group from the sample would likely have led to a downward bias in the estimate of the job-lock effect since it understated the rate of turnover in the comparison group. Clearly, some portion of workers who left a job without a new position arranged did so voluntarily.<sup>11</sup> Presumably, married men who were concerned about losing coverage did not leave a job without having a new job arranged, so the inclusion of workers who had a period of voluntary nonemployment would likely have increased the gap in turnover rates between married men who expected to lose coverage and those who did not. However, the Monheit and Cooper estimate of a job-lock effect applied only to married men who expect to lose coverage, whereas the Madrian estimate applied to all married men with EPHI.

The finding of substantial job-lock effects for single men is striking. The size of this effect was estimated to be 67 percent higher than the effect for married men. It is difficult to explain a gap of this size going in this direction (i.e., that single men are far more likely to be locked into a job with EPHI than married men). This should raise concerns as to whether the EPHI variable might have been a proxy for other aspects of a good job. The estimates of the job-lock effect for women, both married and single, were higher than for men, with the difference being much larger for married women than single women. On the job-pull question, all groups were more likely to change jobs if they expected to gain coverage, but single men were most affected by this job-pull effect. This also seems

implausible, since this is the group expected to have the lowest health care costs.

In sum, Monheit and Cooper have an interesting approach to measuring the extent to which a job-lock effect exists, but the relative size of the estimates do raise questions about accuracy of the specification. Taken at face value, the results found substantial evidence of job-lock effects for both men and women, married and single; however, they showed these effects to be largest for single men, the group facing the lowest health care costs. For this reason, the findings must be viewed with caution.

### THE IMPACT OF BEING OFFERED EPHI ON JOB TURNOVER

Gilleskie and Lutz (2002) followed Anderson in using the NLSY to test for evidence of job lock. The major innovation of this analysis was to use data on whether workers were offered insurance on their jobs, as opposed to just looking at whether they had insurance. It also constructed a model that attempted to explicitly account for differences among individuals by examining their patterns of job tenure since they had been in the sample. It also distinguished between transitions to a new job and transitions to nonemployment. The sample included 4,422 males, which gave it 10,700 person-year observations, over the period 1989, 1990, and 1992. (The year 1991 was excluded

11 The Bureau of Labor Statistics data on the percentage of unemployment due to job losers as opposed to job leavers show a ratio of just over three to one for 1987. If job losers spent more time on average finding new jobs, then the ratio of workers who had a spell of unemployment because they lost their job, as opposed to left voluntarily, would be lower than the ratio at a point in time.

because the question on health insurance coverage was not asked.) The sample excluded military, agriculture, and self-employed workers. The analysis also included a lengthy set of job characteristics to determine job quality, including pension coverage, sick leave, life insurance, training, and profit sharing.

In a test that included only married men, and excluded job-quality measures or the offer of health insurance variable, Gilleskie and Lutz found a substantial and highly significant job-lock effect.<sup>12</sup> They estimated that married men with EPHI were 31 percent less likely to leave their jobs than married men without EPHI. They also found a strong effect of the availability of insurance from another source on increasing turnover. However, a regression that included the offered insurance variable substantially reduced the size and statistical significance of the job-lock effect. The implied direct reduction in turnover due to EPHI in this specification was just 12 percent. However, this test also found that being offered EPHI, but not accepting it, also led to a substantial reduction in turnover. In other words, workers appeared to value being at a job where they had the option to get EPHI, even if they did not currently have it. If the impact of EPHI is combined with the impact of being offered but not accepting it, the combined effect implies a 44 percent reduction in turnover. This test also found that having access to other health insurance led to a large and statistically significant increase in turnover.

The evidence for a direct effect of EPHI on turnover fell further in a specification that included a full set of job-quality characteristics. In this test, the coefficient of the EPHI variables was significant only at the 10 percent level, and the implied reduction in turnover was just 9 percent. The coefficient of the offered EPHI variable was altogether insignificant in this specification. In a fourth specification that excluded the offered EPHI variable, the coefficients on the EPHI variables were positive although they were no longer significant.

Interestingly, the coefficient of a variable measuring the impact of having other health insurance was highly significant in all four

specifications, each time showing that access to other insurance substantially increased the likelihood of turnover. A final specification looking at unmarried men found substantial evidence of job lock. In this specification, the coefficient of the EPHI variable was significant at the 1 percent level and implied a reduction in turnover of almost 36 percent. This was the only specification in which the coefficient of the holding-other-insurance variable was not significant, although this may have been partly due to the relatively small number of unmarried men who had access to insurance other than through their employers.

In a separate set of regressions, Gilleskie and Lutz replicated the difference-in-difference tests from Madrian (1993), using their full set of job-quality variables. They reported finding no evidence of reduction in turnover associated with EPHI. They also found the same result in their model, which assumed that unobserved differences existed among workers. In this model, transitions among married men with EPHI were no less frequent than for those without EPHI. This model also found no significant impact for access to health insurance from a source other than the employer.

For the most part, the results in Gilleskie and Lutz can be seen as providing evidence against the existence of substantial EPHI-related job lock for married men; however, ironically, they did seem to find strong evidence of job lock in the case of unmarried men. While they dismissed this evidence in their discussion of the test, the result was significant at the 1 percent level.

### **DISTINGUISHING THE EPHI JOB-LOCK EFFECT FROM THE EFFECT OF HAVING A GOOD JOB**

The most obvious potential issue with Gilleskie and Lutz's analysis is that it included a large number of job characteristics that tend to go along with EPHI, and these other variables were picking up the effect that actually was attributable to EPHI.<sup>13</sup> This would be comparable to measuring the impact of a college degree on earnings in a test that included a number of factors that are strongly associated with having a college degree, like good grades in high school, good scores on standardized exams, and an upper-middle-class

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12 They used multinomial logit regressions for their analysis.

13 This is the problem of multicollinearity.



background. Unless we had a very large sample, we might find that a college degree had very little impact on earnings, since almost everyone in the sample who came from an upper-middle-class background with good test scores and good grades would also have a college degree.

This could well be an issue with the tests in Gilleskie and Lutz. As noted earlier, Buchmueller and Valletta found a substantially lower estimate of job lock when they included a pension variable. Apparently, the inclusion of additional job quality measures, such as paid sick days, vacations, and profit sharing, in addition to pensions, further lowers the measure of the job-lock effect.

Clearly, two issues are worth distinguishing in this sort of analysis. On the one hand, there is the issue of the job-lock effect associated with EPHI. On the other hand, there are factors that make a job a good job, which include EPHI. Since most of the jobs that have these other benefits will also offer EPHI, an ideal test might simply combine the other factors into some sort of index, so that it is possible to get a clean comparison of turnover rates between good jobs that offer EPHI and good jobs that do not offer EPHI, but are in other ways comparable. The tests in Gilleskie and Lutz do not allow for this sort of clean comparison.

Two other issues are worth noting with the sample Gilleskie and Lutz used. First, they reported substantially higher quit rates for the individuals in their sample than were generally found for the same age groups. They indicated a quit rate of 22 percent for married males and 36 percent for unmarried males. This compared with quit rates they found in other sources of 16 percent for married males and 24 percent for unmarried males.<sup>14</sup> They attributed these higher quit rates to the oversampling of African Americans, Hispanics, and disadvantaged white youths in the Panel Study of Income Dynamics (PSID). Given the fact that the turnover rates are roughly one-third higher for the Gilleskie and Lutz sample than for this age group as a whole, it may not be appropriate to extrapolate from their sample to the larger population.

The other sampling issue that could be important is the substantial number of people who dropped out of the sample over the 3 years that Gilleskie and Lutz examined. They reported observations on 4,422 individuals in 1989, 3,574 individuals in 1990, and 2,704 individuals in 1992.<sup>15</sup> This implies that more than 40 percent of the sample had dropped out by the third year of observations. It would have been worth examining whether the characteristics of those remaining in the sample were different in any notable way from those who had dropped out. This could be an especially important issue if turnover was correlated with dropping out of the survey. In that case, the sample in the last 2 years would likely have been missing much of the turnover from the initial group.

In sum, this analysis found mixed evidence of job lock. In a simple regression without controlling for job quality, the analysis found substantial evidence of job lock for married men. However, this relationship became much smaller in size and less significant statistically when a set of job-quality variables was included. Even with this set of job-quality variables included, Gilleskie and Lutz did find substantial evidence of job lock for single men.

## MEASURING THE IMPACT OF EPHI ON JOB TENURE

Okunade and Wunnava (2002) also found substantial evidence of EPHI-related job lock in their study. The novel aspect to the approach in this study was to examine tenure as a continuous variable rather than looking at job change as a discrete variable. In this way, a job-lock effect from EPHI would show up as a longer period of tenure even after controlling for other factors. The study used the 1996 NLSY. It restricted the sample to whites to remove the possibility of race-based differences in job-lock effects or tenure decisions.<sup>16</sup> The sample separately regressed tenure among white men and white women who were employed in the private sector full time in 1995. Like past analyses, it excluded workers employed in agriculture. The sample included 949 men and 766 women who would have been ages 28–35 in 1995, the base year for the analysis.

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14 This discussion is found in footnote 16 of the article.

15 See footnote 18 in Gilleskie and Lutz (2002).

16 It's not clear why this route was chosen over simply using an indicator variable for race.

The analysis found a substantial and statistically significant job-lock effect for both men and women. For men, the study found that EPHI was associated with a 51.7-week increase in tenure; while for women, the increase was 65.9 weeks. These results constituted an increase in tenure of 17.5 percent and 24.0 percent, respectively, when compared with the average for both groups. The tests found that most of the variables had the effect found in other analyses, although some of the results are surprising. (For men, the effect of union membership on tenure was positive, but nowhere close to significant. Almost all other analyses find that union membership has a strong positive relationship with tenure.)

While these results are interesting, the design did not avoid some of the complexities in measuring the EPHI lock-in effect. Most important, it did not make any effort to control for differences among workers. The design did show that workers who had EPHI in 1995 had been at their jobs longer, but this did not provide any way to distinguish between the situation where workers stayed at their job because of EPHI or, alternatively, that workers who valued stability chose jobs that offered EPHI. While using tenure as a continuous variable is an interesting method, serious problems arise when using it to look backward. The analysis appears to be based exclusively on whether workers had EPHI in calendar year 1995. Many workers may have been employed at jobs where they had EPHI in 1995, but did not have it in prior years. Insofar as this was the case, the estimates would have understated the true effect on EPHI on tenure.

This approach also did not allow for any distinction between voluntary and involuntary job changes. Many of the workers with short periods of tenure were likely dismissed from prior jobs. In this case, the workers did not decide to have short tenure. If workers who have troubled employment histories are less likely to have jobs that have EPHI, then the estimate of the impact of EPHI on tenure would have been exaggerated.

In short, while the Okunade and Wunnava finding of substantial increases in tenure associated with EPHI is interesting, it cannot be assigned much weight because of serious methodological flaws. In particular, the lack of any sort of control for differences among workers did not allow for any distinction between the case where more stable workers are attracted to jobs that offer EPHI and the case where EPHI discourages workers from changing jobs.

### **THE EVIDENCE AGAINST JOB LOCK: HOLTZ-EAKIN**

While all of the above studies found some evidence of job lock, another line of studies found little or no evidence of job lock. The first and most important in this line is a study by Douglas Holtz-Eakin.<sup>17</sup> Holtz-Eakin (1993) used the PSID to detect evidence of job lock, looking at job changes in 1984. The data set contained 5,037 prime-age workers (ages 25–54). The study largely replicated the difference-in-difference tests used in Madrian (1993). It examined 1- and 3-year transition rates (defined as having a new employer), comparing the rates for those with and without EPHI and then examining the differences in transition rates between men with spouses with EPHI and those without.

Using this analysis, Holtz-Eakin did not find any evidence of job lock. In a test that did not include controls for individual or job characteristics, Holtz-Eakin found a small but statistically insignificant reduction in 1-year turnover rates for men who both had EPHI and had a spouse with EPHI.<sup>18</sup> When a full set of controls was included, Holtz-Eakin found the expected positive relationship on turnover for workers who had both EPHI and a spouse with EPHI, but the relationship was not close to being statistically significant.<sup>19</sup> In the tests with female workers, Holtz-Eakin found a negative relationship between turnover and having both EPHI and a spouse with EPHI. This result was the opposite of the job-lock effect, although it was not statistically significant. (This was true for tests both with and without controls.)

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17 Holtz-Eakin was a professor at Syracuse University at the time; he later served briefly as the chief economist to President George W. Bush and was also the director of the Congressional Budget Office.

18 The analysis uses probit regressions for all its tests.

19 It is worth noting that one of the controls is for dental insurance coverage. A problem of multicollinearity is possible, since considerable overlap is likely between workers who have health insurance coverage and workers who have dental insurance coverage.



In a set of regressions looking at transitions over a 3-year period, Holtz-Eakin found that, for both men and women, the relationship between turnover and having both EPHI and a spouse with EPHI was negative, albeit statistically insignificant. In short, no evidence whatsoever showed any job-lock effect in these regressions.

Holtz-Eakin then examined the interactions among a series of health-related variables and EPHI, such as poor health status, deteriorating health status between 1982 and 1984, and children. In principle, this would have tested whether people with special need of health insurance were less likely to leave jobs that have EPHI than other workers with EPHI. In most cases the coefficients were positive, implying that people with EPHI who were likely to have special need for insurance were actually more mobile than people without these needs. In some of the regressions, this relationship was statistically significant. In no cases did Holtz-Eakin find a statistically significant relationship that supported the job-lock view.

The findings of this analysis initially seem to provide rather compelling evidence that EPHI-related job lock is not an important factor in the labor market; however, several aspects of the study are troubling. Most notably, most of the regressions did not find a statistically significant negative relationship between mobility and EPHI even before controlling for other factors.<sup>20</sup>

This finding is disturbing because virtually all the research on this topic has found a strongly significant negative relationship between EPHI and turnover before controlling for other factors. There is little doubt that workers are less likely to leave a job with EPHI than one without EPHI; the question that the research seeks to answer is whether this negative relationship is caused by EPHI. The fact that this study did not find clear evidence of this negative relationship suggests that the sample or the data could have been flawed. It is also worth noting, as pointed out by Buchmueller and Valletta, the sample used

by Holtz-Eakin showed a rate of EPHI close to 50 percent, as opposed to 70–80 percent for the same age group in other surveys.

Gruber and Madrian (2002) pointed to problems with the PSID as a useful data set for measuring turnover, noting serious measurement errors. Gruber and Madrian also pointed to problems with the second set of tests that sought to measure the extent of a job-lock effect for people who had special need of EPHI because of bad health. First, this group was small, with less than 3.0 percent of men or married women reporting poor health in either 1984 or 1986. (The share for single women was slightly over 5.0 percent.)<sup>21</sup> In addition, this group tended to have erratic employment patterns (poor health can force people to leave employment). For these reasons, it is not clear whether these tests based on health status are useful.

The findings of the Holtz-Eakin study argue against the existence of any substantial EPHI-related job-lock effect. However, enough issues have arisen about the peculiarities of the PSID in this context that it is difficult to view these results as very compelling.

### **THE EFFECT OF PREGNANCY AND POOR HEALTH ON JOB CHANGES**

Several other studies followed Holtz-Eakin (1993) in including variables for health status as a measure of the need for health insurance instead of more indirect measures like family size or pregnancy. Kapur (1998) used this approach in replicating the analysis in Madrian (1994). Kapur constructed three measures for having high need of health insurance based on data from the 1987 NMES. The first measure was a medical conditions index based on the number of chronic illnesses in the family. The second measure was a medical conditions index constructed by assigning a cost to the chronic conditions identified in the first index. The third measure was an index of medical utilization based on the cost of the medical care received by individuals in the prior

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20 The coefficient of the EPHI variable in the married male regressions was significant at the 1.0 percent level for both 11-year and 3-year transitions. For single males, the coefficient was significant at the 5.0 percent level for 3-year transitions. All of the coefficients in the other regressions were insignificant, with the coefficient the EPHI variable in the 1-year regression for married women actually being positive.

21 Interestingly, Holtz-Eakin showed that nearly all (92.9 percent) married women reported a deterioration in health between 1984 and 1986. That finding does not seem plausible, suggesting some problem with the sample.

year. This index assigned prices to doctor visits, nights spent in hospitals, and other medical care identified in the survey. Workers were classified as sick in these measures if they were above the 75th percentile on an index.

Kapur used this sickness variable as the basis for a test that compared job transition rates among men with EPHI for those with and without access to spousal health insurance. In this test, sickness was expected to be negatively associated with job changes since those with high measures on this sickness index should have had more need of health insurance than those with lower measures. However, this impact on turnover should have been smaller for those with access to insurance through a spouse than those without access.

Kapur's tests found no evidence to support the job-lock view. All three tests found that, among those classified as sick by these measures, having spousal health insurance increased the rate of job transitions. However, for all three tests the size of the impact was small and nowhere near statistically significant. Kapur also included a set of tests for the whole sample, both insured and uninsured. These tests showed the expected strong negative relationship between EPHI and turnover in all three regressions. (The coefficients were all significant at the 1.0 percent level.) However, no significant relationship was found between the combined effect of being sick and EPHI. In fact, in one of the tests, the relationship went the opposite direction of the job-lock view, with sick people with EPHI being more likely to leave their jobs, although the effect was not statistically significant.

The study then conducted a similar replication of the Madrian tests for turnover for families with large numbers of children and for workers with pregnant spouses. In the case of large families, the regression that replicated the Madrian test yielded similar results to Madrian, indicating substantial job lock. The study then showed the results of a regression that also included a separate variable for having health insurance that covers family members. In this regression the measure of the job-lock effect became smaller and statistically insignificant. Kapur also showed the results of two other regressions that measured the impact of spousal health insurance on mobility among men with EPHI. These also found a small but statistically insignificant increase in mobility.

A last set of regressions also found little evidence of job lock. The tests in this case used what Kapur considered a better measure of the time a spouse is pregnant, by including spells of pregnancy that were in progress at the end of 1987. (Madrian only used spells that resulted in a birth in 1987.) These tests also found little evidence of job lock.

Kapur concluded that the study results were not consistent with job lock being a serious impediment to mobility in the labor market, at least for the married men included in its sample. While many of the findings did point in that direction, there are important grounds for caution. Given the infrequency of high medical expenses among prime-age workers, the first set of tests used a small sample. Furthermore, serious illnesses may lead to more frequent turnover, which was the result found by Holtz-Eakin. If bad health causes people to change jobs more frequently, presumably because they find it difficult to work regularly, this method of measuring the impact of EPHI on mobility would have understated the true effect, since bad health would have forced people to leave their jobs.

The second set of tests, which examined the impact of the interaction of large families and EPHI on mobility, provided ambiguous results at best. Kapur found that the measure of the job-lock effect became insignificant when a variable was included for workers who had family coverage at their workplace. Kapur saw this as a proxy for having a good job. (In other words, people were not leaving their jobs because they were good jobs, not just because they had EPHI.) While that was perhaps the case, existing regression variables already served as reasonable proxies for having a good job.

As was the case with Gilleskie and Lutz, Kapur may have introduced so many variables associated with having a good job that it would not be possible to pick up the effect of EPHI in a relatively small sample. These tests were restricted to married men with insurance and used separate variables for having access to spouses' insurance and a separate variable for workers who have both access to spouses' insurance and large families, and both tests found the expected signs on both variables. Kapur viewed only the coefficient on the interactive term as a measure of job lock, which was insignificant in both cases. Arguably, the correct measure would have been the sum of the

coefficients. Given the limited sample size (2,231 in one set of regressions and 1,349 in another set), it would be surprising if an interactive term could have picked up much difference in turnover rates between large families and other families among workers whose spouses had insurance.

Finally, the set of regressions that examined the impact of pregnancy on turnover seem to be an improvement over the tests in Madrian. However, it is not clear how a period of pregnancy coupled with the time after childbirth should be expected to affect turnover. While health insurance is clearly more valuable during pregnancy, once a healthy child is born (which is the outcome in the vast majority of cases) EPHI would become considerably less valuable. If workers tend to leave jobs after their spouses have a child, then it would not be surprising to find little evidence of job lock for a period that includes both a pregnancy and the period after childbirth.

### **IS THERE EVIDENCE THAT JOB LOCK AFFECTS WAGES?**

Berger, Black, and Scott (2004) also attempted to measure the extent of job lock using direct measures of health status. This study used the 1987 and 1990 waves of the SIPP to look for evidence of job lock. A novel aspect of the study was the effort to find evidence of lower wages among workers who might have been subject to job lock. The rationale was that, if workers were being prevented from changing jobs out of fear of losing access to insurance, then they should have garnered lower wages in their current jobs than in the alternative employment they would have found if they could change jobs. The study included both a set of regressions that looked at tenure in the SIPP and wages as a function of access to health insurance, and a variety of other variables on the workers' own health as well as the health of their spouses and children that were available in the SIPP.

The first set of tests in the analysis looked at the probability of leaving jobs based on a variety of such individual variables as age, gender, and education.<sup>22</sup> The main results were reported for a sample of workers that was ages 18 and older, but

the study indicated that the analysis was repeated with samples of workers ages 25 and older and 35 and older with little difference in results. The sample size for the regressions for both males and females was well over 18,000 workers with more than 300,000 person-months. As with other work with the SIPP, these regressions did not distinguish between voluntary and involuntary turnover.

The study first used a set of regressions that followed Madrian (1993) in testing the effect of spousal health insurance and family size on tenure for individuals with health insurance. In both cases it found evidence of a job-lock effect, with access to spousal insurance increasing turnover for workers with insurance and large family size reducing turnover. The effect was somewhat stronger and more statistically significant for men than for women. The study then tested for the impact of a number of health-related variables, for both the worker and family members, on turnover for workers with health insurance coverage. In every case, the coefficient of the test results was insignificant, and often found bad health associated with increased turnover. The authors took this finding as evidence against the existence of an EPHI job-lock effect.

The wage regressions were similar in structure to the regressions for job tenure<sup>23</sup> with weekly earnings as the dependent variable. The regressions found the predicted strongly positive relationship between EPHI and wages, but little else that was directly consistent with job lock. In the regressions for both men and women that interact spousal insurance and family size with EPHI, the coefficients were significant but with the wrong sign (that is, the opposite of the predicted job-lock effect). The workers who appeared to be subject to job lock also had higher wages. The coefficients that the authors took as the key variables—worker's own health insurance interacted with spouse's health insurance and a family health problem—were generally insignificant or marginally significant with the wrong sign for a job-lock effect. The study viewed this as evidence for rejecting the hypothesis of a substantial job-lock effect.

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22 The tests use a hazard model.

23 The log of weekly earnings is the dependent variable in the wage regressions.

A few issues on the set of tests in this analysis are worth noting. First, the turnover measures are likely somewhat problematic since they would have included involuntary job loss in addition to voluntary turnover, which would have biased downward any measure of job lock. Second, as noted previously, a relatively small number of people have serious health conditions during their prime working years and their work patterns may be somewhat erratic as a result of their health conditions. Holtz-Eakin found substantial evidence of increased turnover among people with health problems.

The wage regression findings are interesting and certainly do not appear to support a job-lock effect. One possible issue is the inclusion of a set of industry and occupation controls in the regressions. This means that the study was comparing the wages of workers within the same industry and occupation. It is possible that job lock prevented workers from moving to higher-paying industries or occupations. It would be interesting to see if the absence of these industry and occupation controls would have affected the findings. Such a test would compare wages of workers who appeared to be job locked with those who did not appear to be job locked across industries and occupations, holding factors like experience and education constant. In the same vein, one of the control variables was average weekly hours. Since one of the factors that limits many workers' earnings is the inability to work more hours, it would have been worth testing whether the measure of earnings was notably different if hours were not included as a control.

The other striking aspect of these regressions is that often the coefficients were large in magnitude and highly significant, but in opposite directions. This could be evidence that the regressions were picking up spurious correlations. For example, in the set of wage regressions for female workers, the regression that used child health problems as the health-related variable (table 6, panel B, column 3, in the study) found that having a child with a health problem was associated with a 14.1 percent reduction in weekly earnings. However, the coefficient of the interacted EPHI variable was

0.168, which implies that workers with a child health problem and EPHI had 16.8 percent higher weekly earnings. Both were significant at the 1.0 percent level. (The regression also included a separate EPHI variable, the effect of which was also found to be large and highly significant.)

Taken together, these results imply that a worker who has a child with a health problem but also has EPHI has earnings that are roughly 2.7 percent higher than other workers with EPHI.<sup>24</sup> It does not seem plausible that having a child with a health problem would systematically lead to higher wages. This sort of finding raises questions about the reliability of these tests.

If the sample sizes of workers who fell into these categories were relatively small, then it is possible that a large degree of overlap existed between workers who have the health conditions listed and have EPHI, so that these regressions were not picking up the true size of either the health effects or the combined effect of the health issues and EPHI. It would be interesting to see separate tests that include just the health conditions without tying them to EPHI to see if the same wage effects still occur.

The results in Berger, Black, and Scott can be seen as consistent with Madrian (1993) in that they found indirect measures of the need for health insurance suggest the presence of job lock. However, following Holtz-Eakin and Kapur, Berger, Black, and Scott found that direct measures of health conditions show no evidence of job lock. The big contribution of this study compared with prior work was its examination of the impact of job lock on wages. The regressions found no evidence that job lock had reduced wages in the manner predicted.

### **SUPPORTING EVIDENCE FOR JOB LOCK: DO SMALL EMPLOYERS DISCRIMINATE BASED ON HEALTH CONDITIONS?**

Kapur (2004) did not directly measure EPHI-related job lock. Instead, her study examined whether evidence existed for discrimination in hiring based on pre-existing medical conditions. Specifically, it examined whether a difference

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24 In another case, a regression for male wages that included spousal functional limitations as the health variable (table 5, panel A, column 6, in the study) had a highly significant coefficient of 0.043 on the health problem variable, while the coefficient of the health-problem variable interacted with own insurance was -0.055, although this was only marginally significant.



occurred in the likelihood that a worker with medical conditions would be hired at a large or small firm, depending on whether the firms offered insurance. The argument would have been that adding a worker with a pre-existing condition would have little or no effect on insurance costs at large firms, whereas it could have a substantial impact on insurance costs at small firms. Therefore, if insurance costs are an issue, we should expect to see a difference between the ratio of workers with serious health conditions employed in large and small firms, conditional on whether the small firms offer insurance. The study further examined whether health insurance reforms in the group market, which limit the ability of insurers to deny coverage for pre-existing conditions, affected employment patterns.

The study used two data sets for this analysis: (1) the 1987 NMES, which featured data on medical conditions and expenditures for 14,000 households as well as employment data including establishment size; and (2) the 1996 Medical Expenditure Panel Survey (MEPS), which featured data on medical expenditures for 10,500 households. In both cases, the main set of regressions used 25 employees as the cutoff between large and small firms, since this is usually the point below which insurers do underwriting.<sup>25</sup> The MEPS included data on whether insurance was offered, which was used as the main variable in the analysis. For most of the NMES sample, information is available only on whether workers had EPHI. In both samples, all individuals ages 18–65 who worked at least some point during the year were included in the sample.

The results of the regressions with NMES provide some evidence of employment distortions resulting from insurance costs. Those regressions found that workers with higher premium conditions were significantly less likely to be employed at small firms that provided workers with EPHI than at firms that did not. The coefficient for higher premium conditions in the EPHI sample was 0.805 compared with 0.903 in the sample for workers employed in small firms that did not offer health insurance. The difference

was significant at the 1 percent level. This finding means the ratio of workers with conditions that would lead to higher premiums who are employed at small firms, compared with workers with such conditions at large firms, is significantly lower at firms that offer EPHI than at firms that do not. The other two health variables included in the analysis—exclusion conditions and denial conditions—also showed a lower ratio of small-firm employment to large-firm employment for firms where workers had insurance than for firms where they did not, although the differences were not statistically significant.

The tests with the 1996 MEPS sample also found evidence of distortions, but in this case only with the denial conditions variable. The ratio of small-firm to large-firm employment for denial conditions was 0.775 in the case of firms that offered insurance and 0.998 for firms that did not offer insurance. This difference was also significant at the 1 percent level. The differences in the coefficients for the other two variables were insignificant, with the difference in the coefficient for the ratio of small-firm to large-firm employment for exclusion conditions going the wrong way.

The study then repeated the same tests using data on expenses for each set of conditions. It found a similar pattern, although the difference of the coefficients in the MEPS sample for denial conditions was significant only at the 5 percent level.

This analysis provided evidence consistent with the existence of distortions in the labor market resulting from differences in insurance costs depending on workers' health. The set of tests using the 1987 NMES showed the distortions appearing with respect to health conditions that would raise premiums. The 1996 MEPS sample showed a difference only for denial conditions. This outcome would be consistent with the predicted impact of insurance reform in the small-group market. State-level reforms passed in the intervening years limited the ability of insurers to deny insurance for pre-existing conditions. This meant that, if firms hired workers with medical conditions that would likely result in higher

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25 There is an issue that some firms have establishments with fewer than 25 workers, but may have multiple establishments in the same area, which they pool together for insurance purposes. Insofar as this may have been the case, the tests in this study would have understated any small-firm effect on employment.

health care costs, they could anticipate it would lead to an increase in their insurance rates. This would give them an incentive to discriminate in hiring. This study found evidence that this is in fact what happened.

This study is interesting in the context of an analysis of the job-lock effect, since it indicates that workers with health problems would have reason to be concerned about their ability to get hired at a company that offers EPHI. If a substantial group of employers (small firms who offer health insurance) discriminate against workers with health conditions, then it would be reasonable to expect that workers with health conditions would be more reluctant to seek new employment than other workers.<sup>26</sup>

### **DOES MEDICAID ELIGIBILITY AFFECT JOB LOCK?**

Hamersma and Kim (2009) used the changes in state Medicaid eligibility cutoffs to measure the impact of access to Medicaid coverage on job changes in the years 1996–2005. The study first constructed a data set with state limits on eligibility for the years in the study. It used a sample of working parents ages 20–54 with children at home, with initial incomes of between 50 percent and 200 percent of the poverty level. The analysis used the 1996 and 2001 SIPP panels, which gave a total sample of 16,838 male observations (on 3,836 individuals) and 20,781 female observations (on 5,582 individuals).

The tests in the analysis measured the likelihood of turnover.<sup>27</sup> The logic of the test was that when the cutoffs were raised, a larger percentage of these people would be eligible for Medicaid and therefore not dependent on EPHI. If EPHI is associated with job lock, then increased Medicaid eligibility would lead to an increase in turnover. The regression included a variety of individual characteristics, state unemployment rate and trend variables, and eligibility cutoffs for Medicaid. The analysis included separate regressions for men, married women, and single women. In each case, the tests were restricted to workers who reported having EPHI. The changes in Medicaid eligibility

had no significant effect on the rate of turnover for either men or married women; however, the study found a significant positive effect on turnover rates for unmarried women. The implied effect was roughly a 4 percent increase in turnover rates for every \$100 increase in the monthly threshold. This finding is robust to a variety of alternative specifications. The lack of an impact among married women is likely explained by the fact that their spouses would typically have had EPHI, and therefore eligibility for Medicaid was of less value.

The analysis also constructed a sample of workers without EPHI to determine if access to Medicaid affected job push, with workers leaving jobs in order to get health insurance. The analysis found no evidence of a significant effect on job changes for either single or married women; however, the coefficient for men was marginally significant and negative, implying a reduction in turnover of 3.0 percent for each \$100 increase in monthly eligibility limits. In an alternative specification, the coefficient for this variable was somewhat more significant, although the estimated size of the effect was somewhat smaller.

This analysis provided a simple and interesting test for job lock. It might be expected that the impact of changes in Medicaid eligibility on turnover would have been tempered to some extent by the lack of information. Specifically, all workers would not have been immediately aware of a change in their eligibility status, so the measured effect in this analysis was likely smaller than what it would be if the workers knew with certainty of their access to insurance at a point in time. The fact that workers do not have full knowledge of their eligibility for Medicaid would imply that the actual impact of insurance not related to employment on mobility (increasing it in the case of single women with EPHI and decreasing it in the case of men without EPHI) is likely to be larger than is shown in this analysis. Also, since job change in this analysis included both voluntary and involuntary job changes, the actual impact of increased Medicaid eligibility would be larger than shown in this analysis, since it would not be expected to have an impact on involuntary job changes.

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26 It generally would be illegal to discriminate against workers with health conditions in hiring. Also, many health conditions may not be obvious to employers until after a worker is hired. However, neither of these facts means that employers will not discriminate in hiring a person with a serious health condition if they know of it before the person is hired.

27 The analysis uses probit regressions.



## **DID THE STATE CHILDREN'S HEALTH INSURANCE PROGRAM AFFECT JOB LOCK?**

Bansak and Raphael (2008) examined the impact of the State Children's Health Insurance Program (SCHIP) on job turnover rates among married men. SCHIP was put into effect at the end of the 1990s. It expanded the share of children eligible for public insurance from 30 percent in 1996 to 50 percent in 2000. It provided an opportunity to test for the presence of job lock, since the program would have allowed many moderate-income parents to have insurance for their children independent of their employment.

To test for the presence of job lock, the study used SIPP data from 1996 and compared it to SIPP data for 2001. The measure of job turnover was whether workers indicated they were employed by the same firms in the last wave of the year as in the first wave. (Workers who were not employed were dropped from the sample.)

The study used a sample of married men with children who would have qualified for SCHIP under the criteria in place in 2001. Its key test was whether the change in turnover rates for married men whose spouses did not have EPHI increased from 1996 to 2001 by more than the turnover rate for married men whose spouses did have EPHI. The hypothesis was that the former group would be more subject to a job-lock effect, and therefore should see a large increase in turnover after the introduction of SCHIP. The study also used a smaller subgroup of married men with SCHIP-eligible children who had EPHI from their employers.

In a comparison without controls for job and individual characteristics, the study found a large and highly significant increase in the turnover rate of married men with children who qualified for SCHIP between the two periods. The difference in the increase in turnover between the men whose spouses did not have EPHI and spouses who did was economically large and highly significant. It implied an increase in turnover of more than 80 percent after the implementation of SCHIP. Interestingly, when the sample was restricted to married men with EPHI, the study found the somewhat smaller and less significant effect, although the implied increase in turnover after SCHIP was still more than 50 percent.

The study then conducted a set of tests that included a full set of controls for individual and job characteristics. The absolute size of the differences in differences was comparable to what the analysis found in the tests without controls, regardless of the specific structure of the regression. As with the uncontrolled sample, the size of the effect was both considerably larger and more highly significant in the whole sample than in the sample that was restricted to married men with health insurance.

A final set of tests used triple differences in differences, comparing the change in turnover among men whose spouses did not have EPHI with men whose spouses did have EPHI for married men above the eligibility cutoff and married men below the cutoff. This set of tests also showed highly significant results for the whole sample, but smaller and less significant results for the sample of married men with EPHI.

While the study took its finding to be evidence of a substantial job-lock effect, some aspects of the analysis are disconcerting. First, the extension of SCHIP provided insurance only to children. Parents understandably would have been concerned about insuring their children, but losing a job with insurance would still have potentially left the jobholders and their spouses without insurance. The size of the estimated effects on turnover puts the findings in this study at the high end of the range of studies that tried to measure the impact of turnover of insurance that applied to the whole family, which does not seem plausible.

The other problem with this study is that the effects on turnover were consistently found to be much smaller for the people who would ordinarily be the most affected by job lock: married men with EPHI. This result is difficult to understand. If the evidence of job lock is being driven primarily by the difference in turnover rates by married men without EPHI (who presumably would not be subject to job lock), then the result is rather troubling. It appears turnover rates are being affected by another factor that is not being picked up by the control variables used in the study. For this reason the results in this paper are interesting, but must be viewed with caution.

## II. The Impact of Employer-Provided Health Insurance on Entrepreneurship

This section summarizes some of the key research on the extent to which job lock related to EPHI discourages entrepreneurship. It is not intended to be a comprehensive review of the literature.

### THE CASE AGAINST A JOB-LOCK EFFECT ON ENTREPRENEURSHIP: HOLTZ-EAKIN, PENROD, AND ROSEN

Holtz-Eakin, Penrod, and Rosen (1996) is the first paper in the literature to directly test for an effect of EPHI on self-employment. It used a strategy similar to the one that Madrian (1993) and Holtz-Eakin (1993) used to test for the impact of EPHI on job turnover. The study used the SIPP as its primary data set for analysis but also used the PSID to check its results. The SIPP sample used employed people (excluding agriculture) ages 18–62, in the years 1984–86. The sample included 21,467 observations in the first year of the analysis (wave 3 of the SIPP), with 2,078 people classified as being self-employed.<sup>28</sup>

The summary statistics showed that, in keeping with other analyses, the self-employed were considerably more likely to be uninsured than other workers, at 17.9 percent for the self-employed compared with 10.4 percent for other workers. The self-employed in the sample were also somewhat older and better educated than other workers.

A test was conducted to see whether workers with EPHI were more likely to transition to self-employment if they had access to health insurance through their spouses. The test did find that EPHI reduced the probability of transitioning to self-employment. While it found that having access to insurance through a spouse increased the probability of turning to self-employment, for both workers with and without EPHI, in neither case was the effect statistically significant. A separate set of tests used just workers with

EPHI. These tests then examined the impact of a variety of factors likely to lead to a higher need for health insurance, such as doctor visits, days in the hospital, and number of children. The study tested whether, in cases where workers would be expected to have a high need for health insurance, access to insurance through a spouse affected their decision to transition to self-employment. In none of the cases did the study find a statistically significant relationship.

The analysis performed similar tests with the PSID sample, also finding no evidence of job lock. It is worth noting that the negative relationship between transitions to self-employment and EPHI was considerably weaker in the PSID sample than in the SIPP. This raises serious questions about the PSID's usefulness for this sort of analysis. Since there is little dispute that having EPHI is negatively associated with transitioning to self-employment, the disputed issue in the literature is the extent of causation. If the PSID only weakly showed the negative relationship, then it suggests that its sample might not be representative.

The findings in Holtz-Eakin, Penrod, and Rosen certainly provided no evidence that EPHI is an obstacle to self-employment. However, several factors make these results less compelling. First, the transition to self-employment is not very common (it is considerably rarer than changing jobs). As a result, the total number of workers reported as transitioning to self-employment in the SIPP sample was just 296 (1.5 percent of the original sample of wage earners). It is not clear that a test that examines difference in differences when both the worker and spouse have insurance, as opposed to just the worker or spouse having insurance, has much power. (A comparison without control variables showed that the transition rate to self-employment was significantly higher for those with coverage through a spouse than for those

28 In cases where workers were both employed and self-employed, they were categorized based on how they worked the most hours.

without.)<sup>29</sup> Since transitioning to self-employment is a relatively rare event, there is limited ability for these tests to determine the relevant factors. It also is worth noting that being self-employed can be either a voluntary decision or an involuntary result of job loss. While there may be no easy way to control for the latter, the fact that becoming self-employed may not have been a voluntary decision will make these tests less accurate.

The same set of issues arises with the medical conditions included as proxies for a high need for insurance. The share of workers with serious health issues is relatively small. The numbers among these groups who would be expected to become self-employed in the absence of job-lock considerations in a sample of this size would be very limited. (If 5 percent of the sample had a specific health condition, and we expected this group to become self-employed at the same rate as the sample as a whole in the absence of job-lock considerations, then 15 workers with the health condition would be expected to transition to self-employment.) Therefore, even if job-lock issues are discouraging workers with special need for insurance from becoming self-employed, it is not clear that we would find an effect in these tests.

In short, this analysis certainly is not consistent with EPHI posing a substantial obstacle to self-employment; however, its results are far from conclusive. Given the limited number of people who transition to self-employment, the evidence on this issue is not entirely compelling. It is also important to note that, given the lower cost of health care relative to the median wage in the 1980s, an absence of job lock in that decade would not necessarily provide much evidence about job lock in the 2000s.

### **DOES MEDICARE FOSTER ENTREPRENEURSHIP?**

Fairlie, Kapur, and Gates (2011) used the Current Population Survey (CPS) to examine the transition from employment to self-employment. The study used two separate types of tests. It first took advantage of the longitudinal features of the CPS to construct matched samples for the March survey, the month in which the survey collects data on health insurance. The second test used the discontinuity in health insurance coverage at age

65, when workers become eligible for Medicare. If job lock is a factor impeding entrepreneurship, then rates of transition to self-employment should increase as workers reach their 65th birthday. Because the CPS is a much larger data set than either the SIPP or the PSID, these tests had considerably greater power.

The first set of tests followed the difference-in-difference approach used in Madrian (1994) and elsewhere. It assessed the probability of a transition to self-employment using three different measures: having access to insurance through a spouse, having a family member in bad health, and the number of people in the family in bad health. The study pooled data over the years 1996–2006 and used separate regressions for men and women. The sample size of employed men ages 25–64 was 81,214. The sample size of employed women was 75,317.

The basic regression for both men and women found an economically large and statistically significant effect of having spousal insurance for workers with EPHI. For men, the implied job-lock effect was a 2.0 percentage-point reduction in the probability of transitioning to self-employment against a baseline transition rate of 4.0 percent. For women, the reduction was 1.75 percentage points against a baseline transition rate of 2.3 percent. Both results implied a substantial negative impact of EPHI on entrepreneurship. The test that examined the impact of health conditions among workers with EPHI found a negative effect for men, consistent with job lock, although the results were not statistically significant. The effect for women was a small positive, but also not close to being statistically significant.

The study then conducted separate regressions that included only people with health insurance and then only those with spouses who were employed full time. In the regressions with the men in the sample, not having access to insurance through a spouse and not having insurance through a spouse together with a health problem were found to have a statistically significant negative impact on becoming self-employed. The regressions with women found statistically significant evidence of job lock in the sample that included only women

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29 See footnote 19 in Holtz-Eakin, Penrod, and Rosen (1996).

with EPHI, but not the sample that had only women with spouses employed full time.

The analysis then turned to the rate of transition to self-employment among workers as they turn age 65. Using a number of specifications, the analysis found an economically large and statistically significant increase in self-employment just as workers turn 65 and become eligible for Medicare. The analysis also found that no comparable change in self-employment occurs around other landmark birthdays such as 55 or 75. The robustness of this result indicates solid support for EPHI as a major obstacle to entrepreneurship.

On the whole, Fairlie, Kapur, and Gates provide solid evidence for a substantial degree of EPHI-related job lock discouraging entrepreneurship. The use of the CPS provides a much larger data set to examine the issue than others that are more frequently used. This analysis will suffer from the high non-match rate in the CPS (around 25 percent of the people in the survey could not be matched from one year to the next, according to the study), but there is less reason to believe that starting a business is associated with changing one's residence (a major reason for non-matches) than changing a job. The CPS is almost certainly a better data set for examining the former than the latter.

While the study's findings on the extent to which having access to spousal insurance increases the probability of transition to self-employment for workers with EPHI seem robust, its findings on the impact of turning age 65 on self-employment seem especially compelling. It is difficult to envision a plausible explanation for this relationship that does not involve EPHI-related job lock. (It might have been useful to include a test to determine whether the age 65 impact was stronger among those who did not have a spouse with insurance, as would be expected.) In any case, this study strongly supports the existence of EPHI-related job lock in reducing the rate of small business creation.

### **DID REFORM OF NEW JERSEY'S INSURANCE MARKET FOSTER ENTREPRENEURSHIP?**

DeCicca (2010) examined changes in the pattern of self-employment in New Jersey compared with neighboring states in the period after its creation of the Individual Health Coverage Plan (IHCP) in 1993, which fundamentally reformed the individual

insurance market. The IHCP effectively established a degree of community rating (it limited exclusion periods), allowing individuals with pre-existing conditions to buy insurance at a standard rate.

DeCicca used the Behavioral Risk Factor Surveillance System (BRFSS) for the years 1991 to 1996. The BRFSS is not generally used for labor market analysis, but it does include a question on self-employment. DeCicca's strategy was to compare the change in self-employment in New Jersey in the period after 1993 with the change in comparison groups using, alternatively, Pennsylvania, the Mid-Atlantic States, the entire Northeast, and the country as a whole. His sample consisted of individuals ages 25–59. This gave a sample size of 18,409 for the Pennsylvania comparison, 40,880 for the Mid-Atlantic States, 66,893 for the Northeast region, and 382,670 for the country as a whole.

In a simple comparison, New Jersey showed a substantial increase in self-employment (20.3 percent) in the years immediately after the implementation of IHCP, whereas no remotely comparable increase occurred in any of the comparison groups. A set of regressions using the four reference groups supported this finding, showing an increase in self-employment of 16–20 percent. A separate analysis found that the impact of the reforms dwindled through the year 2000 (although still significant). This result is consistent with a situation where adverse selection led to increases in the cost of health insurance in the individual market, effectively undermining the usefulness of the reform.

The analysis then performed a set of tests to examine the difference in impact of IHCP across demographic groups. These tests found that the impact on self-employment was greater on single individuals than on married people, a result consistent with the expectation that married individuals are likely to be able to get insurance through their spouses. It also found that the impact on self-employment was larger among people who smoked at least half a pack of cigarettes a day than nonsmokers, that it was larger among people who were obese than non-obese, and larger among people ages 50 or older than people under age 50. Each of these findings is consistent with the notion that EPHI job lock is discouraging self-employment, as each of these



populations is likely to have greater need for health insurance than their comparison group.

This analysis provided an interesting and simple set of tests that strongly support the view that EPHI is discouraging self-employment. In principle, there is no reason that the IHCP should have been associated with a larger increase in self-employment in New Jersey than elsewhere, unless the easier access to insurance in the individual market made individuals more willing to take the risk of starting their own businesses. The fact that this effect seemed to dwindle as these reforms fell victim to adverse selection, causing higher insurance prices, is further support for this interpretation.

### **DID LETTING KIDS STAY ON THEIR PARENTS' INSURANCE FOSTER ENTREPRENEURSHIP?**

Baily (2013) used the American Community Survey (ACS) to test whether the Affordable Care Act's (ACA's) extension of coverage to children up to age 25 on their parents' insurance had an impact on self-employment for the 19–25 age group. The analysis tested for this effect by comparing the change in self-employment among people ages 19–25 between the period of January 2005 to September 2010, and the period of September 2010 to December 2011. In the latter period, these people would have been eligible for coverage on their parent's insurance due to the ACA provision.

The study compared the change in self-employment among this group with the change in self-employment among a control group (people ages 27–33) over the same period. The ACA was useful for this analysis since it had a large sample that made it possible to detect meaningful differences in a relatively rare event. (Self-employment among the 19–25 age group is less than 2.5 percent in the ACS.) The ACS gave a sample of 2,637,376 for the initial analysis.

The original set of regressions found highly significant coefficients for the variable for self-employment among the 19–25 age group for the period after September 2010.<sup>30</sup> The size of the effect ranged from 0.32 to 0.58 percentage points,

implying an increase in self-employment of 13–24 percent. The study then analyzed the impact on men and women in this age group separately. It found that the impact of the ACA provisions was considerably larger and more significant in the regression for women than for men. The implied effect was an increase in self-employment of 25–32 percent for women. This result is consistent with the fact that health care expenses tend to be considerably higher for women in this age group. As a result, access to health insurance is likely to be more important for women than men.<sup>31</sup>

These results generally hold up across a series of robustness tests with the exception of a test where the treatment group was narrowed to those ages 23–25 with the control group restricted to those ages 27–29. In this case, the results became insignificant. This could be explained by the fact that the 27–29 age group was a better match for the labor market experience of the treatment group than the larger 27–33 age group, which would be an argument that these tests did not provide evidence of job lock. Alternatively, it may be explained by the fact that the extension of insurance coverage means less to someone who is 23–25, and who may be on their parents' insurance for only a relatively short period of time, than it does for someone who is 19 or 20. This latter explanation seems more plausible, since a large portion of this smaller sample would have consisted of people approaching their 26th birthday, for whom the ACA provision would mean little. It may also be the case that people in the older age group were less likely to turn to their parents for insurance.

On the whole, this analysis seems to provide strong support for the existence of EPHI-related job lock among this age group. This would be a striking finding, since health care costs are much lower on average for people ages 20–25 than for older workers. Also, the ACA provision would not benefit everyone in this age group, since many would not have either parents with insurance or parents who would agree to have their insurance extend to their adult children. Undoubtedly, many people were also unaware of this provision in the ACA.

30 The study uses linear probability, probit, and logit regressions,

31 Controlling for age, health care costs are generally higher for women than men, but the percentage differences are especially large at young ages, in part due to pregnancies (Yamamoto, 2013).

Inclusion of a clear break of 6–8 months around the effective date of the ACA provision would have been useful in the analysis. The fact that workers knew that they could be covered under their parents' plan in a matter of months may have affected their decisions on self-employment before the effective date. Similarly, many people in this age group likely were not aware of the provision the day it first became effective. Both of these factors would lead to a lower measured effect of the ACA provision on self-employment.

### **DO TAX BREAKS ON HEALTH INSURANCE FOSTER ENTREPRENEURSHIP?**

Heim and Lurie (2010) looked for evidence of health insurance-related job lock by examining the impact a change in the tax code that increases the generosity of the deduction for individual health insurance has on self-employment. A change in the law enacted in 1998 increased the portion of deductible premiums from 25 percent to 60 percent in 1999, 70 percent in 2002, and 100 percent in 2003. These changes did not directly affect access to insurance in the case of workers with medical problems, so in that sense this analysis did not directly test EPHI-related job lock as it is normally conceived. Rather, this analysis effectively assessed the responsiveness of self-employment to the after-tax cost of health insurance.

The analysis used the tax filing from the Continuous Work History Subsample. It constructed a sample where the primary and secondary filers (in the case of joint returns) were ages 25–59 in the 6 years of the analysis, 1999–2004. This gave a sample of 236,878 returns from 48,396 different taxpayers.

The analysis used three different definitions of self-employment: self-employment business income above \$5,000, a majority of business income from self-employment, and all business income from self-employment. It also distinguished between tax filers who claimed the insurance deduction from those who did not, as well as married and single individuals. (Joint filers were treated as a unit since information on individual earnings from self-employment was not collected.)

Across a variety of specifications, the impact of the after-tax cost of health insurance was considered highly significant and economically important. The analysis found that the increase

in the percentage of insurance that could be deducted increased the rate of self-employment by between 9.1 percent and 14.9 percent. This was due to an increase in the rate of entry to self-employment of 0.8 percentage points and reduced probability of exit from self-employment of 2.8 percentage points.

These results are not directly applicable to the issue of job lock as generally conceived, but this analysis does indicate that the decision to experiment with self-employment and to remain self-employed is very sensitive to the price of health insurance. This finding lends credibility to other research showing that access to insurance from sources other than employers can have a large impact on self-employment.

### **DO COUNTRIES WITH NATIONAL HEALTH INSURANCE HAVE MORE ENTREPRENEURS?**

Schmitt and Lane (2009) also did not provide a direct measure of job lock. Their paper compiled a set of statistics from the Organization for Economic Cooperation and Development (OECD) on the relative importance of small businesses and self-employment in the United States compared with other OECD countries. The paper showed that, by a variety of measures—the percentage of workers who reported being self-employed, the percentage of workers in manufacturing who were employed in small firms, and even the percent of employment in high-tech services in small businesses—the United States ranked near the bottom in the OECD studies. The low ranking in the percentage of small business employment in the high-tech sector was especially striking both because of the prominence of the U.S. tech sector internationally and because the results cannot be affected by family businesses that have been passed on for generations.

These findings are relevant for an assessment of job lock and entrepreneurship because they suggest that the United States is faring worse in promoting entrepreneurship and small businesses than other wealthy countries. While it does not follow that EPHI is necessarily the reason, the United States does stand out among its peers as being the only country not to provide near-universal health insurance. It is at least plausible that this is an important factor in explaining the relatively weak performance of the United States in various measures of entrepreneurship.



### III. Employer-Provided Health Insurance and Labor Supply

This section summarizes some of the key research on the extent to which EPHI distorts labor markets by leading people to work, or work full time, in situations where they would either not work or work part time if a well-functioning individual insurance market were in place. It is not intended to be a comprehensive review of the literature.

#### RETIREMENT: DOES EPHI CAUSE WORKERS TO DELAY RETIREMENT?

Madrian (1994) used the 1987 NMES and two topical modules from the 1984 SIPP—the Education and Work History (SIPP-EWH) (which was included with the third wave of the SIPP) and the Characteristics of Jobs from Which Retired (SIPP-CJR) (which was included in the 1984, 1985, and 1986 waves of the SIPP)—to estimate the effect of access to retiree health care benefits on the age of retirement. The analysis exclusively examined the retirement history of men, since in the 1980s they were more likely to have lengthy labor market experience. The basic NMES sample included 1,539 men ages 55–84 who reported ever having been retired. The SIPP-CJR included a sample of 2,009 men ages 55–84 who did not work in the prior quarter. The SIPP-EWH sample included 2,243 men in this age group who reported receiving pension income.

Three basic problems arose in using these samples to examine the impact of health insurance on the age of retirement. First, the possibility exists that workers selected jobs with generous retirement benefits because they wanted to retire early. In this case, earlier retirement among those with access to retiree benefits would be explained by differences among workers, not access to benefits. The analysis proceeded on the assumption that this is not likely to be a major issue since most of the workers in the sample had long tenures in their jobs. If differences in workers' attitude

toward retirement benefits affected the jobs they took in their thirties, then it would pose a problem for the analysis in this study.

There is also the problem that retiree health benefits are likely correlated with the generosity of pension benefits. In that case, workers may be more prone to retire early because they have generous pension benefits, as opposed to retiree health benefits. The analysis attempted to control for this problem, but the data did not allow for a simple measure of pension generosity.

Second, the decision to retire early will be influenced by health considerations that will in turn affect mortality. This means that many workers who retired early would not have been included in the sample, since they had died. The direction of bias from this exclusion is not clear, but it does mean that the individuals in the sample were not a random cross-section of retirees.

Third, the sample looked only at retired workers. It by definition excluded people who were still working. Again, the direction of bias from this exclusion is not clear. The analysis attempted to address this issue through statistical techniques and also by constructing a smaller sample of older workers where the portion still working would be small.

Most of the analysis followed the strategy of regressing the age of retirement against a series of individual characteristics as well as access to retiree health benefits. Some of the specifications controlled for the fact that some older workers were still employed. The other method for controlling for this problem was to restrict the sample to older workers (ages 75–84). In all but one case, the tests showed that access to retiree health benefits led to a substantially earlier age of retirement.<sup>32</sup>

32 The one exception was a regression that examined workers who had only defined contribution pensions. It included a small sample (just 276 workers). This sample was likely atypical, since in 1984 relatively few retirees would have had only a defined contribution pension.

The analysis concluded that access to retiree health benefits had reduced the age of retirement by an average of roughly 1 year. However, it is not clear that this conclusion can be held with great confidence given the limited ability to control for differences among workers. It is at least plausible that retiree health benefits were an important factor attracting workers who wanted to retire early.

The other important factor to consider in assessing this analysis is that these workers would have been making decisions about retirement when health care was far less expensive than it is today. The people who were living in retirement in the years covered in this study (1984–86) made their decisions about retirement in earlier years, presumably mostly in the 1970s and in some cases as far back as the 1960s.<sup>33</sup> Given the enormous increase in the cost of health insurance relative to wages over the past 4 decades, it is certainly plausible that access to insurance would be a far more important factor in the retirement decision in 2014 than was the case for workers in the mid-1980s.

Blau and Gilleskie (2001) used the Health and Retirement Study (HRS) to estimate the effect of access to retirement health insurance on the retirement decisions of men ages 51–62 in 1962. The analysis used answers from three sets of interviews, roughly a year apart, to see whether workers transitioned from employment to retirement or in the opposite direction. There were 4,080 men in the first interview in this age group with full data, 3,630 men in the second interview, and 3,606 men in the second wave.

The analysis found that for men in the younger ages in this sample, access to retiree health insurance discouraged transitions either to alternative employment or to retirement. However, this finding was reversed for the older workers in this sample. After age 57, access to retiree health insurance increased the probability of retirement.

This analysis strongly supports the view that retiree health coverage leads to earlier ages of retirement. It estimated that a male worker with continual access to retiree health insurance coverage paid by the employer after age 51

would retire, on average, 1.8 years earlier than a worker without coverage and 1.5 years earlier when factoring in the possibility of re-entry after retirement. These results are robust to a variety of specifications.

### **DOES LETTING RETIREES BUY INTO THEIR EMPLOYERS' INSURANCE ENCOURAGE EARLY RETIREMENT?**

Gruber and Madrian (1995) used data from the CPS to assess the extent to which laws allowing workers to retain employer coverage affect the retirement decision. The analysis used men ages 55–64 from Merged Outgoing Rotation Group between the years 1980 and 1990. This provided a sample of 214,508 men. The analysis used two measures of retirement. In one measure, a person was counted as being retired if they report being retired. The alternative measure was if they report being out of the labor force.

The study took advantage of differences in state laws before 1986 requiring access to EPHI after the end of employment. It used years before 1986 because after that year COBRA applied rules nationally requiring access to continued coverage for at least 18 months after the termination of employment.<sup>34</sup>

The results indicated that the extension of coverage by 1 year increased the probability of being retired for men in this age group by 1.1 percentage points, or 5.4 percent of the baseline probability of being retired. This result holds up in a variety of specifications.

Because of its large sample size, this analysis gives important insight into the impact of access to health insurance on retirement decisions. It is worth noting that the issue being examined here was simply access to insurance, not actually the provision of insurance. In effect this test was measuring the impact of being able to buy insurance at a community-rated price. It suggested that this option alone would have a substantial impact on labor market outcomes.

Rogowski and Karoly (2000) used the 1992 and 1996 panels of the HRS to examine retirement

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33 Someone who was 80 in 1985 may have decided to retire at age 62 in 1967.

34 The analysis uses a probit regression that controls for individual characteristics, with the dependent variable as the probability of being retired at various ages.

patterns among older men. The analysis looked at men who were working more than 35 hours in 1992 and were ages 55–60, so that they would be ages 59–64 in 1996. This gave a sample of 2,638 men. They were classified as retired in the second year only if they answered that they were out of the labor force and retired.

The tests in the study included a standard set of individual and industry controls. The tests also controlled for pension coverage and EPHI. The analysis found that retiree health benefits increased the probability of retirement in this sample by 66 percent. It also found that those with access to other insurance were 44 percent more likely to retire in this period. In both cases the comparison was with workers who had EPHI, but no other form of health insurance.

This analysis is interesting but certainly cannot be taken as conclusive. It made no effort to control for the possibility that workers who want to retire early opt for jobs that offer retirement health benefits. Nonetheless, it is another analysis that shows a clear correlation between access to health insurance and early retirement.

### **DOES MEDICARE HASTEN RETIREMENT?**

Rust and Phelan (1997) used data from the Retirement History Survey to examine the extent to which access to Social Security and Medicare affects the timing of retirement decisions. The survey interviewed a panel of 11,000 households of individuals ages 58–63 in 1969 and then re-interviewed them at 2-year intervals. This study focused only on the retirement patterns of male heads of households. It also excluded households with access to defined benefit pensions, since the survey did not contain full information on the benefit levels and rules governing retirement. This exclusion removed 44 percent of the sample, which left a sample size of 2,599 men with a total of 7,574 observations.

The study then constructed a dynamic programming model in which households maximize utility subject to their wages, assets, health conditions, access to EPHI, retirement health benefits, Social Security, Medicare, and Medicaid. After estimating parameters for the sensitivity to each parameter, the study then compared predicted transitions from full-time employment to either part-time employment or nonemployment.

The analysis found that Social Security was a major factor in the decision to retire early. It also found that Medicare explained a substantial bump in retirements at age 65. It noted that this increase in retirements was largest among people without retirement health insurance and people who rated themselves as being in poor health. The latter was considered especially important, since the model assumed that people are risk averse and people in poor health are far more likely to face substantial health care bills. It noted that, if Medicare benefits were taken at their average value, it would be difficult to see them as playing an important role in retirement decisions. However, because of the large dispersion in health care expenses, and the incompleteness of the insurance market, access to Medicare would be important to many workers in poor health.

This analysis provides interesting but limited evidence that Medicare and retirement health insurance play important roles in the retirement decision. The main problems result from the constrained nature of the sample and also the fact that the data primarily came from the early 1970s. As noted, the sample excluded all men with defined benefit pensions. It also excluded those on Social Security disability. This was most of the sample. Since defined benefit pensions were generally associated with more stable employment histories, it is questionable how much can be extrapolated from a sample that contained mostly men with more erratic histories.

The issue of the time period covered in the analysis is important for the obvious reason that health care costs have risen enormously relative to income since the period covered in this study. In this sense, it is interesting the study found strong evidence of an impact of retiree health care benefits and Medicare on the retirement decision. Any impact that these factors may have had in the early 1970s would almost certainly be far stronger in the 2000s due to the sharp rise in health care costs.

### **THE IMPACT OF NON-EMPLOYER-PROVIDED INSURANCE ON THE LABOR SUPPLY OF MARRIED WOMEN**

Buchmueller and Valletta (1999) used the 1993 April CPS Benefits Supplement to examine the effect of spouses' health insurance on the labor supply of married women. The study examined the extent to which having insurance through a

spouse increased the likelihood that women would work part time rather than full time, or not work at all. The analysis looked at prime-age women (ages 25–54) with a working spouse. It excluded the self-employed and people who had received public health insurance in the prior year. This gave a sample of 6,400 couples with an employment rate of 65.0 percent for the women.

A simple analysis of sample means showed the women whose spouses did not have insurance were considerably more likely to work and to work full time than women whose spouses did have insurance. Of women whose spouses did not have insurance, 70.1 percent were employed, compared with 62.5 percent of women with spouses with insurance. The share of women whose spouses lacked insurance who worked more than 30 hours per week was 64.3 percent, compared with 52.3 percent of women whose spouses had insurance.

The study's estimation strategy included a set of standard labor market variables for wives, along with husbands' hours, labor income, and family income, in addition to a health insurance variable. An initial test showed that husbands' insurance reduced the wives' labor supply by approximately 36 percent. This result held up across a variety of specifications, although in most cases the impact on the wives' labor supply was smaller. Also, the impact on labor supply was smaller for couples without children.

The study then conducted a separate set of tests that categorized five possible states for wives: not working, working 1–34 hours per week without insurance, working 1–34 hours with insurance, working more than 34 hours without insurance, and working more than 34 hours with insurance. This was done to distinguish a case where a wife may have had to work more hours because of a need for income as opposed to the need for insurance. (If the reason for working more hours was to gain income, then the likelihood of wives working more than 34 hours at jobs with or without insurance should not have been affected by whether their husbands had insurance.)

The coefficients were highly significant and implied a comparable reduction in labor supply to the earlier set of tests. The likelihood of a wife working at a full-time job with insurance was 11 percentage points lower (26 percent) for

women whose husbands had insurance than those whose husbands did not. As in the earlier set of regressions, the effects were much larger in families with children and especially with two or more children. These results were not changed when different hour breaks were used in the regressions.

This analysis provided strong evidence that husbands' insurance had a large influence on the labor market decisions of married women, with the impact being primarily on families with children. The estimated size of the reduction in labor supply was 15–36 percent, which corresponded to a sharp reduction in the likelihood that wives will take a full-time job.

Olson (1998) also looked at the impact of spousal insurance on the hours worked by women. This study used the March CPS to compile a sample of 22,272 married couples, with 15,620 wives reporting usual hours above zero. The study initially performed a set of parametric tests using probit and Tobit models with controls for education, race, region, and other standard variables. Each regression found a large and highly significant negative effect of spousal insurance on wives' labor supply. The analysis noted that the negative size of this effect was far too large to be explained by an income effect, since the relationship between wives' labor supply and spouse's income was much weaker.

The study then conducted a series of semiparametric tests of the impact of spousal coverage on wives' labor supply. It found that the greatest impact was on the probability of wives working 35–40 hours a week, the range that is generally necessary to receive EPHI. It estimated that this effect was roughly 10 percent, meaning that the percentage of wives who did not have insurance through their spouses who worked 35–40 hours a week would fall by roughly 10 percent if they suddenly had access to insurance.

This interesting analysis provides a useful complement to the Buchmueller and Valletta study. The results are certainly consistent with the size of the effects shown by that analysis.

### **DO WOMEN WHO PREFER FAMILY WORK SEEK OUT HUSBANDS WITH EPHI?**

Cebi (2011) examined the effect of spousal insurance on married women, attempting to control for differences between women that are unmeasured



in other analyses. Specifically, it considered the possibility that women with a strong preference for family work over labor market participation tended to marry men who would get health insurance. If women's preferences for staying home with kids affects the likelihood of marrying a man with EPHI, it would lead tests to show a negative correlation between spousal insurance and labor force participation that was not actually the result of insurance. To test the possibility of endogeneity in the wife being covered by the husband's insurance, the study used the 1979 NLSY. The analysis used data from interviews conducted between 1989 and 2000, years in which the primary respondents would have been ages 24–43. The sample included 2,189 married women. The analysis also used the 2000 March CPS Annual Demographic Supplement. This sample included 19,515 married women ages 25–64.

The analysis conducted an initial set of tests examining the effect of spousal coverage on the likelihood of married women working and the likelihood of their working full time if they did work. The tests showed large negative effects from spousal coverage, comparable to the effects found in other analyses. These effects were somewhat larger in the NLSY data, which was expected given the younger average age for this group.

The analysis then turned to the possibility that the husbands' coverage was in fact endogenous. It found support for this view from the fact that a set of indirect regressions found smaller and less significant impacts of husbands' insurance on wives' work.<sup>35</sup> It is not clear that these tests can be interpreted in this way. Indirect tests will generally yield smaller and less statistically significant coefficients. Furthermore, some of the results of these tests were implausible on their face. For example, in one case the results showed that husbands' insurance has a positive and highly significant impact on wives' work.

The issue raised in this analysis is clearly an important one and should pose a caution on accepting the results of other studies on the impact of access to insurance on the labor supply of married women. However, enough problems exist in the construction of this analysis that its results should not be accepted at face value.

## THE IMPACT OF MEDICAID ON THE LABOR SUPPLY OF SINGLE WOMEN

Montgomery and Navin (2000) looked at the impact of differences in the generosity and coverage across states for Medicaid and other benefits on the labor supply of single women. The study used the March CPS for the years 1980 to 1993 to construct a sample of 47,839 single women ages 18–65 with at least one child under the age of 15. It then took advantage of the differences among states in Medicaid, food stamps, and Aid for Families with Dependent Children to test for the impact on labor supply. It separately regressed employment and average hours worked among the employed to determine both the impact on the employment decision and the choice of hours among those working.

In a first set of regressions using individual characteristics, which pools workers without controlling for distinct state-level effects, the study found highly significant negative relationships between all the social support variables and employment. While the regressions on hours also showed a strong negative relationship for most of the social support variables, only the regression using overall Medicaid generosity variable (payments per person) was significant. The variables that measured the generosity of benefits per child, family, or adult, excluding the over-65 population, were not significant.

The study then conducted a set of tests using state-level random effects and fixed effects. In both cases, the coefficients of the Medicaid variables fell in size by at least an order of magnitude. In almost all of the regressions, the coefficients were not close to being statistically significant. The study then looked explicitly at eligibility, with a variable that measured the extent to which rules were changed to increase or decrease eligibility. The coefficient of this variable in the employment regressions was in all cases positive. It was also positive and highly significant in regressions that included state and year variables. The coefficient of the Medicare generosity variable (using per-person expenditures) was also positive and significant in an hours regression. Otherwise, the Medicare coefficients of the Medicare generosity variables

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35 Specifically, the study used two-stage least squares regressions that use as instruments husbands' part-time employment or self-employment.

were insignificant in the regressions with state and year controls.

This analysis is interesting in its finding that increased Medicaid coverage had the effect of increasing labor supply of single mothers. However, this study really cannot answer important questions of causation. The increase in eligibility could have been associated with an increased commitment to the working poor and may also have involved other work supports such as childcare or counseling. No effort was made to control for this possibility (which would not be simple), so it cannot be assumed that the causation ran from increased coverage to increased employment and hours worked.

In addition, the limited within-state variation may have made it difficult to pick up effects of generosity on labor supply and hours worked. For example, if a change went into effect midyear, the full effect on the labor supply may not have been felt until the following year; however, the methodology used in this study would have been measuring the effect only for the year the change was made. If this is the case, the coefficients would have been biased toward zero. While this analysis does seem to imply that Medicaid does not have a large negative effect on labor supply, its findings cannot be taken as conclusive.

Meyer and Rosenbaum (1999) conducted a similar analysis using both the March CPS and the CPS Outgoing Rotation Group to measure the factors determining the change in employment between 1984 and 1996 among single mothers. The study looked at a variety of policies, including the Earned Income Tax Credit, access to welfare, training, and childcare. As a control group, the study looked at changes in employment in single parents without children. The analysis found that changes in Medicaid eligibility generally had little effect on employment. Together, increased eligibility for welfare and Medicaid was estimated as accounting for between 9 percent and 15 percent of the increase in employment of single mothers over this period, but the Medicaid variable alone was generally negative and insignificant. This finding might support the view that the positive coefficients on eligibility

in Montgomery and Navin were the result of not controlling for the introduction of other work supports.

### **THE IMPACT OF EPHI ON WORK FOR PEOPLE WITH MEDICAL CONDITIONS: THE CASE OF CANCER**

Bradley et al. (2007) examined the impact of spouses' health insurance on labor force participation among married women who experienced a health shock. The health shock used in the analysis was a breast cancer diagnosis. The study used data from Metropolitan Detroit Cancer Surveillance System to construct a sample of 446 employed women ages 30–64 who were diagnosed with breast cancer. Of this group, the analysis focused on the labor force participation patterns of 74 women who had insurance through their employers and 126 women who were insured through their spouses' employers. Women who purchased insurance individually, had publicly provided insurance, or were uninsured were excluded from the sample, as were women who had insurance through both their employers and their spouses' employers.

The analysis matched these women with a control group from the March CPS to compare changes in labor force participation patterns. The analysis included a standard set of controls for individual characteristics. It found that a diagnosis of breast cancer had a much smaller effect on both the probability of employment and the decline in hours worked for the women who had EPHI than for women who had insurance through their spouses. In fact, in some of the specifications, the effect of a diagnosis of breast cancer on the probability of employment was positive and significant. In all cases, the diagnoses had a much larger negative impact on both employment and hours for women with insurance through their spouses.<sup>36</sup>

While the sample size for this analysis is limited (it is also based exclusively on data from the Detroit Metropolitan area), it strongly suggested that the need for employer-based health insurance may lead patients to work in situations where they need rest to recover from a disease. The

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36 The analysis included a questionnaire asking the women a series of questions about their commitment to their jobs. The questionnaire found no significant differences in job commitment between the women with insurance through their employers and those with insurance through their spouses.



fact that some of the specifications indicated an increase in employment probabilities among women diagnosed with cancer, would suggest that insurance had become so valuable to these women that even when faced with a serious illness they were more committed to remaining employed than they had been when they were healthy.

Tunceli et al. (2009) used a sample of older cancer survivors (ages 55–62 in 2002) to examine the impact of EPHI on employment patterns. The sample, the Penn State Cancer Survivor Study, was drawn from cancer patients in northeast and central Pennsylvania in 1997–99. The sample members were re-interviewed in 2002 and asked about their work histories between the base year (1997–99) and 2002, as well their original health insurance statuses. This produced a sample of 153 men and 223 women. The work history of this sample was then matched against samples constructed from the HRS for the same period.

The study tested the difference in the rate of exit from the labor force, transition from full-time to part-time work, and job changes. In all cases, the study found that dependence on EPHI substantially reduced the rate of transitions. The negative effect of EPHI was considerably larger for men than women for exits from the labor force and job changes, although it was somewhat smaller for transitions to part-time work. The difference in exit rates was 29.2 percentage points for men and 17.2 percentage points for women. For job changes it was 33.4 percentage points for men and 26.4 percentage points for women. And for transitions to part time, the uncontrolled difference in differences was 25.0 percentage points for men and 22.3 percentage points for women. This analysis provides compelling evidence of a strong job-lock effect for cancer survivors. The relatively small sample makes it more difficult to detect a job-lock effect, suggesting that there is little ambiguity that EPHI makes cancer survivors more closely tied to their jobs.

### **THE IMPACT OF EPHI ON LABOR SUPPLY OF PEOPLE FACING SERIOUS HEALTH PROBLEMS**

Bradley, Neumark, and Motika (2011) performed a similar analysis examining the impact of EPHI on the labor supply response of men with health shocks. This analysis distinguished between the effects of diagnoses that imply higher future health costs but no current effect on morbidity

and diagnoses that imply a near-term effect on morbidity. Its data came from the HRS from 1996 to 2008, examining married men at 2-year intervals. To be included, the men must have been in good health at the first interview. The sample included 1,582 men. Of these, 1,379 had EPHI at the first interview, while 203 were covered by their spouses' insurance.

The analysis measured the difference in employment transitions among men with health shocks and EPHI and men with health shocks and access to insurance through their spouse. The model included a set of controls for age, education, and job characteristics.

The analysis distinguished three types of health shocks:

1. a drop in self-rated health from good or excellent to fair or poor;
2. a new diagnosis of cancer, lung disease, angina, congestive heart failure, or stroke; and
3. at least 2 consecutive nights spent in the hospital on two occasions.

The analysis found that the difference in employment after 2 years was little different for men with EPHI and those with access to insurance through a spouse in the case of diagnoses of cancer or lung disease. There also was no statistically significant difference in employment probabilities based on insurance status for those with a period of hospitalization or a new diagnosis. However, when the group was restricted to those with new diagnoses and no incidents of hospitalization, the group with EPHI had a statistically significant increase in employment relative to the group with access to insurance through a spouse. The analysis also found that men with EPHI were more likely to report a loss of insurance after a health shock.

This analysis presents limited evidence that men will feel the need to work in spite of an illness in order to maintain their insurance coverage. The evidence is limited, since several of the specifications found no significant difference between those with access to coverage through a spouse and those without. The paper noted that this finding could have been partially attributable to classification error, since in many cases the spouse may not have had secure attachment to the labor force, and therefore access to insurance

could not have been guaranteed. It is also worth noting that the sample sizes for each of these subgroups were small. For example, 72 of the men were diagnosed with cancer and 35 were diagnosed with lung disease. This provided a very small sample to detect differences in employment patterns between those with access to insurance through a spouse and those without access. On the whole, the results in this study can be seen as suggestive, but far from conclusive.

Stroupe, Kinney, and Kniesner (2001) combined three samples they constructed of people who either themselves suffered from a serious medical condition or had a family member who suffered from a serious medical condition. The samples were put together based on surveys taken in Indiana in 1994. The surveys asked respondents about their insurance and employment histories dating back to 1984. The sample consisted of 605 respondents ages 18–64.

The analysis estimated the likelihood of a person leaving work or changing jobs in a given year, controlling for a standard set of job and personal characteristics. (Data on age were not collected, so it was not included in the analysis.) The first set of tests separately compared the rates at which men and women left their jobs after the diagnosis of an illness, depending on whether they had EPHI. The tests found that the sample of men with EPHI was roughly 40 percent less likely to leave their jobs than the sample without EPHI. The tests for women found a comparable impact for EPHI. In both cases the results were highly significant. In another set of tests conducted with these data, the results were more ambiguous.

This analysis does provide further evidence of job lock among workers suffering from serious medical conditions or with family members suffering from such conditions. However, the mixed results make its findings less compelling. Assuming EPHI-related job lock does in fact exist for workers with serious illnesses, it would not be surprising that it would be difficult to detect in a sample of this size. In addition to the limited size of the samples, a serious problem of measurement error is likely when workers are asked to look back over 10 years at their employment histories and their histories of health insurance coverage. These factors would substantially reduce the likelihood of finding job lock even if it were present.

## THE IMPACT OF EPHI ON LABOR SUPPLY OF PEOPLE WITH DISABILITIES

Perry, Kenney, and Tereshchenko (2009) examined the impact of incidents of disability on earnings, government benefits, and work hours. While the study focused on the former two issues, it also included an analysis of access to health insurance on work hours after the onset of a disability.

The analysis used the 1996 and 2001 SIPP panels. The key variable is the onset of disability, which is defined as a positive answer to the following question: “Does [respondent] have a physical, mental, or other health condition that limits the kind or amount of work [respondent] can do?”

The sample included 29,656 working parents who did not have an onset of disability and 2,577 who did. For purposes of the impact of EPHI on the labor supply of people with disabilities, only the latter group was of interest. The analysis examined this issue by first using a simple regression comparing the decline in hours worked depending on the insurance status. In a regression with no controls, the sample with EPHI had a slightly smaller decline in hours worked than the sample with private insurance other than EPHI. The decline in hours was considerably larger for workers who either had public insurance or were uninsured. In a set of regressions that controlled for job and individual characteristics, the gap in hours reduction between workers with EPHI and other private insurance became larger and highly significant (2.66 hours per week for workers with other insurance compared with 3.55 hours per week for workers who relied on EPHI). Expressed as percentage of time worked, this gap would almost certainly have been larger, since more of the workers without EPHI were part time. The reduction in hours for workers who had public insurance or were uninsured was even larger (8.10 and 8.91 hours, respectively).

Consistent with other analyses, this study found that EPHI is associated with less of a decline in hours for workers suffering from a disability or medical condition. This finding supports the view that people who would otherwise opt to take more time away from work to better deal with a health condition work longer hours in order to maintain their access to health insurance.

## LABOR SUPPLY AND ACCESS TO PUBLIC INSURANCE

While the analyses discussed above examined evidence where older workers, married women, or people with health conditions or disabilities worked more than they would otherwise in order to get health insurance, Garthwaite, Gross, and Notowidigdo (2013) in effect examined the opposite situation. Their study examined the extent to which a loss of public coverage led people to seek employment or to increase the number of hours they work in order to gain access to EPHI.

Tennessee provided the basis for a natural experiment when it revoked Medicaid benefits for 170,000 childless adults over a 3-month period beginning in July 2005. The Medicaid program, TennCare, is similar in structure to the ACA in that it provides income-based subsidies that decline as income rises, rather than setting a strict income-based cutoff. Before the 2005 disenrollment, the program provided insurance subsidies for childless adults earning up to 200 percent of the poverty level. For this reason, the response of labor supply might be indicative of what can be anticipated to happen in reverse with the ACA.

The analysis used the March CPS from 2000 to 2007 to get labor market variables and the Annual Social and Economic Supplement to get data on income, poverty, and health insurance. It constructed a comparison group of 17 southern states. The study then compared labor market trends in Tennessee with these 17 other states before and after the cutbacks in the TennCare program. The analysis also compared the difference between the changes in the labor market in Tennessee for adults with children and adults without children, since adults with children would not be affected by the cutback while adults without children would be. The sample was composed of individuals ages 21–64 without advanced degrees. While the sample size for the CPS is 50,000 households, the analysis was conducted using the state-year means for different demographic groups.

The analysis found a large and statistically significant increase in employment after the disenrollment period. Overall employment rates rose for this group by 2.5 percentage points (from

a base of just under 67 percent) compared with the control group of southern states. For adults without children, the increase was 4.6 percentage points, from a base of just over 64 percent. The analysis found that almost all the increase in employment was among people working more than 20 hours a week. The change in the percentage of people working less than 20 hours a week was small and statistically insignificant. A large increase also occurred in the percentage of people working at jobs that provided health insurance, suggesting that this was a major motivation of increased work. The analysis also found that the employment effect occurred primarily with older people and people who reported being in bad health, the portion of the population for whom health insurance has the greatest value. The employment effect on people ages 20–39 and people who reported being in excellent health was not statistically significant.

This analysis provides compelling evidence that there is a large labor supply response to health insurance. If workers can gain access to insurance without working or by working fewer hours, then a substantial number would opt to do so. This is especially the case with older workers and people in poor health. Obviously, health insurance is especially important for this segment of the population. These are also the people who would have the most difficulty working and therefore can be expected to reduce their hours if they do not need to work as much to obtain insurance coverage.

The Garthwaite, Gross, and Notowidigdo study is cited by the Congressional Budget Office (CBO; 2014) in its analysis of the labor market impact of the ACA. This analysis noted a number of groups that were likely to reduce their labor supply as a result of the ability to buy insurance with subsidies through the exchanges. In particular, the CBO study noted the likelihood of the second earners in low-income, two-parent families to reduce their labor supply. It also pointed to evidence that older workers and people in bad health were likely to reduce their labor hours or leave the labor force altogether.

CBO's bottom-line numbers projected a 1.5–2.0 percent decline in total hours worked in the next decade, when the impact of the ACA is fully felt. They also projected that this decline in hours worked will be associated with a

1.0 percent decline in compensation. While this implies a modest increase in average hourly compensation of 0.5–1.0 percent, CBO attributed this change mostly to a composition effect. Its analysis assumed that the decline in labor supply will come mostly from less-productive workers; therefore, the average compensation of those remaining in the labor force will be higher.<sup>37</sup>

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37 There is some reason to believe that an increase in wages will occur for less-educated workers. Garthwaite, Gross, and Notowidigdo (2013) noted a sharp drop in wages in Tennessee relative to other southern states after the Medicaid cutbacks. This would not be a surprising result, the study finds, based on the increase in labor supply. The implication would be that the drop in labor supply from the ACA might lead to some increase in wages for less-educated workers.



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