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EMPLOYMENT-CONTINGENT HEALTH INSURANCE, ILLNESS, AND LABOR SUPPLY OF WOMEN: EVIDENCE FROM MARRIED WOMEN WITH BREAST CANCER

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SUMMARY

We examine the effects of employment-contingent health insurance (ECHI) on married women's labor supply following a health shock. First, we develop a theoretical framework that examines the effects of ECHI on the labor supply response to a health shock, which suggests that women with ECHI are less likely to reduce their labor supply in response to a health shock, relative to women with health insurance through their spouse's employer. Second, we empirically examine this relationship based on labor supply responses to breast cancer. We find that health shocks decrease labor supply to a greater extent among women insured by their spouse's policy than among women with health insurance through their own employer, suggesting that ECHI creates incentives to remain working when faced with a serious illness. Copyright © 2006 John Wiley & Sons, Ltd.

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INTRODUCTION

For the majority of non-elderly Americans, health insurance is either contingent upon their employment or is provided via the employment of a family member such as a spouse or parent (Kaiser Family Foundation, 2004). Past research has examined the labor supply behavior of individuals who have employment-contingent health insurance (Cooper and Monheit, 1993; Gruber and Madrian, 1994; Kapur, 1998; Adams, 2004), and of individuals dependent upon another's policy (Wellington and Cobb-Clark, 2000; Buchmueller and Valletta, 1999; Chou and Staiger, 2002). The effects of health on labor supply have also been studied (Bradley *et al*., 2005a; Ettner *et al*., 1997; Vijan *et al*., 2004). Absent from this literature, however, is an assessment of how the two – health and employment-contingent health insurance – interact to alter labor supply after an adverse health shock is experienced by an otherwise healthy employed individual.[1] Such information would help policy makers understand some of the incentives and possible pitfalls that employment-contingent health insurance creates.

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[1] Several studies have examined the relationship between access to retiree health insurance and early retirement decisions (Gruber and Madrian, 1995; Karoly and Rogowski, 1994; Rogowski and Karoly, 2000). These studies find that access to retiree health insurance induces early retirement. One study, using the Health and Retirement Study, incorporated the effect of health status; coefficients for measures of poor health were statistically insignificant (Rogowski and Karoly, 2000).

An adverse health shock creates a need for convalescence, but with employment-contingent health insurance (ECHI) an individual may need to continue working to preserve insurance to cover current medical expenses, and to minimize risk for financial loss in the future – risk likely perceived as greater because of the health shock. Because many women obtain insurance through their spouse's employment, while others obtain it through their own employment, the labor supply response of married women to illness – and how that response depends on the source of the health insurance – provides a natural context for studying the relationship between health, health insurance, and labor supply. In this paper, we study labor supply decisions made in such a context. We collected data with which to compare the effects of a health shock – namely, breast cancer – on the labor supply of married women 6, 12, and 18 months following diagnosis, relative to their labor supply prior to diagnosis, along with data on whether their health insurance comes through a spouse's employment or the woman's employment.

Breast cancer is an important health condition to study for three main reasons: its occurrence is nearly random and women are treated with similar regimens of surgery, chemotherapy, and radiation; it is a prevalent disease affecting working age women; and there is a concerted societal effort dedicated to reducing breast cancer's burden. An examination of how affected employed women change their labor supply and whether this change is related to their source of health insurance lends insight into how the incentives that ECHI creates influence labor supply responses to disease. Although left for future research, differences in labor supply responses may have implications for health outcomes.

This paper is organized as follows: first, we outline a theoretical model of how a health shock might alter labor supply, and how this response varies when health insurance is contingent upon employment or instead is provided via a spouse's employment; second, we describe the samples used for the empirical investigation; third, we present our methods for the empirical analysis; fourth, we show our results; and finally, we discuss potential policy implications of our findings.

THEORETICAL FRAMEWORK

In this section, we consider the joint effect of health status and health insurance on labor supply. The theoretical framework of Becker (1964) and Grossman (1972) supports the intuition that poor health decreases labor supply by diminishing tastes for work, raising the marginal value of leisure time, and increasing time required for health maintenance. However, when an ill employee has insurance, the employee has some protection against health-related financial loss. Under this circumstance, if the insurance is contingent upon continued employment, an employee may forgo health care or convalescence that requires extended time away from work and instead devote time towards work in order to preserve health insurance coverage. We have developed a model that shows, formally, that this intuitive reasoning is likely to hold (Bradley *et al.*, 2005b). Here, we simply outline the key ideas.

We conceptualize a health shock as potentially having two effects. First, from the perspective of the individual, assume that utility is defined over consumption, leisure, and health, and that health is produced by combining leisure and medical goods or services. One effect of an adverse health shock is that the contribution of leisure to the production of health increases; for example, consider the need for rest to convalesce. Clearly, this effect generates an incentive to reduce labor supply. Second, a negative health shock may reduce productivity and hence the wage. As long as the substitution effect dominates the income effect in the labor supply decision, this creates an additional incentive to reduce labor supply.[2]

When health insurance comes through the spouse's employer, its availability does not depend on hours worked and there is no discontinuity in the budget constraint. The woman solves the standard

[2] We also consider the possibility that an adverse health shock implies lower utility from any combination of consumption, leisure, and health. This may partially offset the incentive to reduce labor supply (increase leisure). Thus, ultimately, the effect of a health shock on labor supply is an empirical question, although the influences outlined in the main text seem likely to dominate, at least in the absence of the constraint imposed by ECHI.

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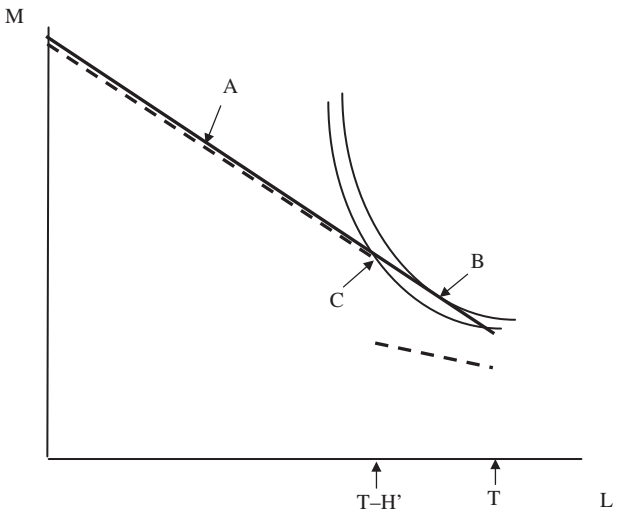

Figure 1. Changes in Labor Supply with and without ECHI

utility maximization problem facing consumption prices, the price of leisure (the wage), and the prices of medical goods or services, which are lowered because of the availability of insurance. Prior to the health shock she may choose either an interior solution with positive labor supply or a corner solution with zero labor supply. In response to the health shock, a previously employed woman will reduce her labor supply.

With ECHI, the continued availability of health insurance depends on continuing to work some minimum number of hours, such as the level that makes one a full-time worker. For a woman originally working more than this minimum number – which must hold if she has ECHI – there is a discontinuity in the budget constraint at the minimum hours number. On the segment of the budget constraint where hours are below the level needed to maintain insurance, the prices of medical goods and services are higher, effectively, because of the absence of insurance. This lowers the real value of the wage and of unearned income. Thus, there is an incentive to reduce labor supply to this point and no further. This leads to the prediction that, relative to women with health insurance through a spouse, women with ECHI will reduce their labor supply by less in response to an adverse health shock.

If we consider utility maximization only over a medical good or service (M) and leisure (L), then we can depict the budget constraints graphically. Figure 1 displays the two budget constraints. The solid line is the budget constraint when insurance comes through the husband. Define T as the endowment of time, y as unearned income, w as the wage, p as the relative price of M, and τ as the share of the cost of M covered by insurance. On the M-axis, the budget constraint has height $\{wT+y\}/p(1-\tau)$, or full income divided by the effective price of medical services. At $L=T$, it has height $y/p(1-\tau)$, or exogenous income divided by the effective price of medical services. The budget constraint has slope $-w/p(1-\tau)$, the real wage in terms of the price of medical services.

The dashed line is the budget constraint when insurance comes through the woman's employer. Denote by H' the minimum hours constraint for maintaining ECHI. Then the budget constraint is the same for $L<T-H'$, at which point it jumps down to a line with slope $-w/p$, as the real wage is lower with no insurance. Its height at $L=T-H'$ is $\{wH'+y\}/p$ and its height at $L=T$ is y/p.

Suppose that the woman's utility maximizing choice is originally at A. After a health shock, the change in tastes leads to the indifference curves depicted. For example, these indifference curves are

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drawn relatively steeply to indicate that the value of leisure is now (after the shock) quite high.[3] If health insurance comes through the spouse, then the woman faces the solid budget constraint, and her optimal choice is now point *B*. But if the woman instead has ECHI, the same labor supply choice would force her onto the lower portion of the dashed budget constraint. As drawn, her utility is higher at the discontinuity point labeled *C*, in which case her labor supply declines by less in response to the adverse health shock.[4]

We have made several simplifications. First, we have not considered the possibility that public health insurance may be an option for some women who lose coverage through their employer, possibly even creating an incentive for low-wage workers to reduce or cease labor supply. Second, our model does not apply to insurance arrangements such as those under the provisions of the Health Insurance Portability and Accountability Act (HIPAA) of 1996, which allows employees to add to their insurance policy (if it covers families) a spouse or other dependents who lose job-related coverage. Workers with non-employed spouses or employed spouses without health insurance (or without health insurance that covers family members) would not benefit from HIPAA's provisions – leaving many without protection against loss of health insurance.[5] Under these circumstances, the predictions of the theoretical model should still hold, on average, although they should be stronger for the subset of women who do not have the option of switching to their husband's policy under HIPAA.

Third, we ignore the option of purchasing health insurance if one loses ECHI, because these policies are often expensive and are restrictive relative to employer-provided policies. Health insurance obtained through the Consolidated Omnibus Reconciliation Budget Act (COBRA), for example, is an inferior substitute (possibly considerably so) for health insurance paid for by one's employer. COBRA policies are often expensive and only last for 18 months following termination of employment, although under some circumstances this time may be extended. Thus, although some women who lose ECHI might be able to obtain short-term insurance via COBRA, the qualitative results of the model should still hold.

Finally, the provisions of the Family and Medical Leave Act (FMLA) may allow employees the opportunity to reduce labor supply, for a limited period of time, without interruption in their health insurance benefits. Under FMLA, covered employers (e.g. all employers with 50 or more employees) must grant an eligible employee up to 12 work weeks of unpaid leave during any 12-month period for health-related reasons (U.S. Department of Labor, 2005). Women with ECHI who would otherwise work throughout their treatment and illness might, instead, use their medical leave and then return to work. This would dampen but not eliminate the effects of ECHI that the model predicts.

In the next section, we describe the data used to estimate the effects of health shocks on labor supply. In the case of breast cancer, the health shock should not disable the worker (although chemotherapy may temporarily do so), but it will require expensive medical treatment that may last 6 months or longer, and it will increase the risk of future medical costs and disability. The theory suggests that women are likely to reduce labor supply in response to a health shock, although less so when health insurance is contingent upon own employment. Ultimately, though, this question must be examined empirically.

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[3] One might imagine that the value of medical services also increases substantially; with only two dimensions, we lose the comparison with other consumption goods. Also, note that here we do not depict the effect of a health shock that affects the wage. The basic argument is the same, however.

[4] It is possible that the indifference curves would be steep enough that the woman with ECHI would maximize utility along the lower portion of the budget constraint, but clearly there will be a good deal of bunching of labor supply at $L = T - H'$ (point *C*).

[5] In our sample, among the husbands of women with health insurance through the wife's employer, 68% were covered exclusively through their wife's policy and only 38% worked for employers that offered health insurance. Thus, a relatively large share of women with ECHI would not have had the option of switching to their husband's policy.

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DATA

We use longitudinal data to study differences in the labor supply response to a cancer health shock between married women who have ECHI and those who have health insurance through their spouse's employment. Women newly diagnosed with breast cancer were identified, shortly after diagnosis, from the Metropolitan Detroit Cancer Surveillance System (MDCSS), a population-based registry that covers over 4 million people within the Detroit Metropolitan area. MDCSS is a participant in the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) program, and as such is held to high standards of completeness. Study eligibility criteria were age range of 30–64, English-speaking, and either employed or with an employed spouse at the time of diagnosis; 495 employed women were enrolled. The procedures for subject identification and recruitment, and information on the very high response rates achieved, are described in detail elsewhere (Bradley *et al*., 2005c). Institutional review boards at Michigan State University, Wayne State University, and Virginia Commonwealth University reviewed and approved the procedures for collecting the data required for this study.

We aimed to conduct the first interview 6 months following diagnosis, but allowed subjects to be between 4 and 7 months past diagnosis at the time of the interview. The first interview included a retrospective set of questions on labor market participation 3 months prior to diagnosis and a nearly identical set of questions on labor market participation as close as possible to 6 months after diagnosis. The second and third interviews asked the same questions about labor market participation approximately 12 months and 18 months after diagnosis, as well as some additional questions. The longitudinal structure of the interviews records when labor supply changes occurred relative to the breast cancer diagnosis documented in the cancer registry. The retrospective portion of the first interview required that breast cancer subjects recall their labor supply (employment and weekly hours) approximately 9 months prior to the interview; recall over a period of this length appears relatively reliable, although the literature indicates that there is some tendency for workers to overstate past hours (Duncan and Hill, 1985). Part of the questionnaire we used to collect employment and insurance data was based on the Current Population Survey (CPS), using a similar order and following similar skip patterns (U.S. Department of Labor, 2003). In our sample, the earliest diagnosis month and year was June 2001 and the latest diagnosis month and year was April 2002. The period covered by the retrospective part of this study was between March 2001 and January 2002.

Ideally, our sample would consist of women who would – except for the effects of health insurance source – respond similarly to breast cancer. This ideal can only be fully met with randomization by source of health insurance, which we do not have. Instead, we attempted to obtain such a sample by selecting from the original sample only women who were married and who were employed in the period just before diagnosis with cancer, and who were either insured through their own employer ($n = 76$) or through their spouse's employer ($n = 125$). The labor supply changes between these two insurance groups are likely to be most similar, in contrast to, for example, unmarried women, or married women insured through other types of policies. We can, of course, control for observable differences in characteristics that may be associated with source of health insurance and may also influence the labor supply response to breast cancer. We also consider other evidence that attempts to account for possible differences associated with ECHI. Table I reports how the final study sample was obtained given our selection criteria.

EMPIRICAL SPECIFICATIONS

The study outcomes are employment and weekly hours worked following diagnosis, in both cases measured as changes relative to a pre-diagnosis baseline. Employment is defined two ways. First, employment is defined as working for pay or profit. Alternatively, it is defined to also include having a

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Table I. Sample selection, breast cancer

Selection criteria	Breast cancer sample
Completed all 4 interviews	451
Remained married throughout study period	284
Employed at baseline	242
Insured by either own or spouse ECHI	212
Under age 65 at baseline	211
No missing hours	209
No missing income	201

job at which the subject is not currently working. The latter option allows for situations such as a leave of absence under the provisions of FMLA or temporary disability due to cancer and its treatment – cases in which employees remain attached to their job and may not disrupt health insurance benefits during their leave.

The outcomes are modeled as functions of control variables (X), source of health insurance (ECHI, set equal to one for women with insurance through their own employer, and zero for women with insurance through their husband's employer), and unobserved influences (ε). We estimate the probability of employment (E) 6, 12, and 18 months following diagnosis for women employed 3 months prior to diagnosis, using

$$Pr(E_{ij} = 1 | ECHI_{i1}, E_{i1} = 1, X_i), j > 1 \quad (1)$$

where the 'i' subscript denotes individuals, and the 'j' subscript denotes periods. The 1 subscript in equation (1) refers to the pre-diagnosis period. ECHI is based on insurance source 3 months prior to diagnosis – not on the insurance source following diagnosis. These equations are estimated as linear probability models. The coefficient of interest is that of the dummy variable (ECHI) indicating whether or not health insurance is contingent on own employment. The 6-month period reflects a time when the health shock is likely to be most acute and treatment will be ongoing for women receiving chemotherapy. The 12- and 18-month periods reflect a time when most treatments are complete and the ill effects, except for those women with recurrent disease, should be much smaller.

In an expanded version of these models, breast cancer is specified categorically to represent *in situ*, local, regional, and distant stages. These four stages are summary stages indicating progression in metastases. The model includes interactions between the dummy variable for ECHI and dummy variables for cancer stage, allowing us to ask whether the labor supply response differential associated with ECHI varies by disease severity.

We assume that the same variables that affect employment also affect weekly hours worked (H), and estimate two different types of models for percent changes in hours – one that conditions on employment post-diagnosis, and one that does not.[6] In the unconditional models, weekly hours worked post-diagnosis are zero for women who report that they are not employed and women who report that they have a job but are not working. Otherwise, the specifications of the hours models are the same as for the employment models. We clearly want to look at changes in hours from the pre-diagnosis to the post-diagnosis period, rather than just post-diagnosis hours, in case pre-diagnosis hours differ across the two insurance groups. These models are estimated using ordinary least squares regression with heteroscedasticity robust standard errors.[7]

[6] We also estimated models for the raw change in weekly hours worked. The results were qualitatively similar (results not shown).

[7] The models we estimate can be interpreted as fixed effects (first-differenced) models in which the change in employment or hours can differ with the source of health insurance. We identify the effect of health insurance source on the change in employment because it can only affect employment (or hours) post-diagnosis, given that we condition on initial employment. Similarly, the control variables (discussed more below) pick up differences in the probability of a change in employment (or differences in the change in hours). The differences associated with source of insurance are the key focus of our paper.

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Control variables

In all estimations, because there are observable differences between women with ECHI and women insured through their spouse, we control for individual characteristics including age, education (no college degree, college degree or higher), number of children under age 18, and household income.[8] Education, the presence of small children, and household income (attributable to the husband or unearned sources) all may affect a woman's market wage or reservation wage and hence influence whether she remains at work (or changes her hours) in response to a health shock. Age is specified as a continuous variable. Household income is measured as income from all sources (including earnings) from all members in the household in the year *prior* to diagnosis. The maximum household income category recorded in the interview was $75 000. Household income was categorized as household income greater than or equal to $75 000 or household income less than $75 000.[9] In addition, we include a variable indicating if the woman was employed in a white-collar occupation prior to diagnosis, which may be correlated with the offer of health insurance.

It is possible that the most dedicated workers remain at work regardless of their cancer diagnosis, whereas those who already tended to work less are more likely to reduce their hours. Furthermore, differences in this dedication could be correlated with ECHI. Therefore, in the equations for changes in weekly hours worked, we also account for variation in hours worked in the pre-diagnosis period, either by including a control variable for hours worked at baseline or by estimating the model on full-time workers alone.

Selection by health insurance source

It is possible that women with ECHI are more career-oriented than other women, which may be the reason they have jobs that offer health insurance or have chosen to rely on their own job for health insurance. In this case, these women might be more likely to work following a breast cancer diagnosis regardless of their health insurance source. Alternatively, jobs where health insurance is offered may be more desirable than jobs where health insurance is not offered; for example, they may be less physically demanding. If so, then again we might observe that women who have ECHI are less likely to reduce employment or hours, but this may not be attributable to the economic incentives associated with this source of health insurance.

To examine these possible sources of covariation between factors affecting labor supply and ECHI, we assessed women's degree of job involvement (Lodahl and Kejner, 1965) and the degree to which women's jobs involved physical activity, using questions that were included in our survey. For the job involvement measure, women were asked if they strongly agreed, agreed, disagreed, or strongly disagreed with five statements regarding their attitudes toward their jobs that reflect both commitment and the quality of the job. We tested whether women's responses to the job involvement questionnaire were independent of their source of health insurance, and could not reject independence for any of the five statements; the statements and these results are reported in Appendix A.

In addition, we estimated models of responses to the job involvement questions using ordered probit models with the same control variables as used in the labor supply models, including ECHI as an independent variable (results not shown). The coefficient for ECHI was not statistically significant in any of the five models, again indicating no differences in responses based on the source of health insurance.

[8] We also specified the presence of children under age 18 years as a dummy variable. The results were qualitatively similar (results not shown). In addition, we estimated models with controls for the month and year of the observation; these did not enter the models significantly and their inclusion or exclusion did not influence the other estimates (results not shown).

[9] We estimated models with a number of different categorizations of income, and the results (not shown) were insensitive. In some estimations, we controlled for spouse characteristics such as age, education, race, health status, and union membership. The results were qualitatively similar (results not shown).

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Finally, we measured the extent of physical activity required on the job by asking women to report the number of hours and minutes per day, prior to diagnosis, that they spent sitting, standing, walking on level ground, walking on uneven ground, and climbing stairs. The results are reported in the top panel of Appendix B. Women with ECHI spent slightly more hours per day sitting than women with health insurance through their husband (4.26 hours versus 3.46 hours, $p = 0.04$). Otherwise, the two groups of women appear equivalent; the means are close and the differences are statistically insignificant. In addition, we asked job task questions paralleling those in the Health and Retirement Study. These questions asked if the woman agreed with statements such as 'My job involves a lot of physical effort.' The response categories were all/almost all of the time, most of the time, some of the time, or none/almost none of the time, for the following tasks: physical effort, lifting heavy loads, stooping, kneeling, crouching, intense concentration/attention, data analysis, keeping up with the pace set by others, and learning new things. For most of these measures, the differences between the two insurance groups were small and not statistically significant, as reported in the bottom two panels of Appendix B. Moreover, there is not a clear indication that women with ECHI are in better jobs with less physical effort; for example, the estimates indicate that these women report more physical effort and concentration, but less heavy lifting, and more learning new things (which we suspect is a positive job attribute). We are therefore reasonably comfortable in assuming that different labor supply responses based on source of health insurance are not attributable to selection into different insurance groups based on job commitment or job quality, or differences in physical demands of jobs.

Another possible source of selection by source of health insurance could arise from the slight non-random incidence of breast cancer. In particular, women with a family history of breast cancer may perceive their risk for the disease to be greater. In cross-sectional studies of women with breast cancer, only 5% to 10% have a mother or sister with breast cancer, and about twice as many have either a first-degree relative or a second-degree relative with breast cancer (Yang *et al.*, 1998; Colditz *et al.*, 1993; Slattery and Kerber, 1993; Johnson *et al.*, 1995). In a pooled analysis of 38 studies, the relative risk of breast cancer conferred by a first-degree relative with breast cancer was 2.1 ($p < 0.01$) (Pharoah *et al.*, 1997). Therefore, family history plays a role in the risk for breast cancer, but that role is minor in terms of absolute risk. Nevertheless, the perception of increased risk may influence selection of health insurance source. For example, a woman with a family history of breast cancer may choose to be covered by her spouse's policy so that the risk of losing health insurance is not linked to her ability to work. Women with a family history of breast cancer may also anticipate choosing a more aggressive treatment regimen, which may require that they take additional time away from work, reinforcing the incentive to have health insurance through a spouse.

In this case, we would still find the hypothesized relationship between health insurance source and the response to a health shock. It would still reflect the problem that ECHI creates an incentive to continue working in the face of such a shock – but in this case it is an incentive to which women anticipating a health shock necessitating relatively more time away from work respond ex ante. That is, this scenario does not undermine a causal interpretation of the link between ECHI and the labor supply response to the health shock; these same women, if insured through their own employer, would reduce their labor supply by less.

RESULTS

Table II reports descriptive statistics for the pooled sample and the sample stratified by health insurance source. The majority of women with breast cancer was diagnosed with early stage disease (*in situ* or local) and had health insurance through their spouse's employer. Because few women in the sample had

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Table II. Descriptive statistics

	(1) Full sample ($N = 201$)	(2) Employment-contingent health insurance ($N = 76$)	(3) Health insurance through spouse's employer ($N = 125$)
Breast cancer			
In situ	27.86%	35.53%	23.20%
Local	43.78%	42.11%	44.80%
Regional	26.37%	19.74%	30.40%
Distant	1.99%	2.63%	1.60%
Health insurance			
Own employer	37.81%	N/A	N/A
Spouse employer	62.19%	N/A	N/A
Offered health insurance	68.19%	100.00%	48.80%
Spouse offered health insurance	73.13%	28.95%	100.00%
Mean age	49.58 (7.06)	51.69 (6.08)***	48.42 (7.37)
Race/ethnicity			
White, Hispanic, non-black	86.57%	82.89%	88.80%
African-American, non-Hispanic	13.43%	17.11%	11.20%
Education			
No high school diploma	3.48%	1.32%*	4.80%
High school diploma	23.88%	21.05%*	25.60%
Some college	28.86%	22.37%*	32.80%
College degree	43.78%	55.26%*	36.80%
Number of children <18	0.64 (0.93)	0.45 (0.84)**	0.76 (0.96)
Household income			
$\leq$ \$20 000	1.00%	1.32%	0.80%
\$20 001 to \$74 999	36.82%	38.16%	36.00%
$\geq$ \$75 000	62.19%	60.53%	63.20%
Employment characteristics			
Working at 6 months	72.64%	77.63%	69.60%
Working at 12 months	83.08%	89.47%*	79.20%
Working at 18 months	84.08%	92.11%**	79.20%
Working or employed at 6 months	84.58%	90.79%*	80.80%
Working or employed at 12 months	87.06%	90.79%	84.80%
Working or employed at 18 months	86.57%	93.42%*	82.40%
Weekly hours worked			
Pre-diagnosis	36.93 (12.27)	42.47 (7.97)***	33.56 (13.20)
6 months	23.78 (17.90)	29.89 (18.20)***	20.06 (16.72)
12 months	28.66 (17.14)	35.73 (15.18)***	24.36 (16.88)
18 months	29.58 (16.52)	37.08 (13.19)***	25.02 (16.72)
Occupation status			
White collar	66.17%	69.74%	64.00%
Blue collar or others	33.83%	30.26%	36.00%

Notes: ECHI = employment-contingent health insurance. 'Others' under occupation status refers to subjects who reported their jobs as neither white nor blue collar. Column (2) is compared to column (3) for statistical testing using the χ^2 test for categorical variables and the two-sample test for continuous variables. Standard deviations of continuous variables are shown in parentheses. *Statistically significant difference in column (2) versus column (3) $p<0.10$, **$p<0.05$, ***$p<0.01$.

distant stage disease, we combined regional and distant stages together. Approximately 68% of the women had a job that offered health insurance although only 38% of the women were insured through their own employer, and 73% of their husbands had employers that offered health insurance.

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When we stratify the sample by health insurance source (columns 2 and 3), women with ECHI were approximately 3 years older, had fewer children under age 18, and were better educated. A higher percentage of women with ECHI were diagnosed with earlier stage cancers relative to women with insurance through their spouse, but this difference was not statistically significant.

Of greater relevance to the outcomes we study, women with ECHI worked approximately 9 more hours per week, in the pre-diagnosis period, than women with health insurance through their spouse. Similarly, more women with health insurance through their spouse worked part-time (defined as less than 32 hours per week) in the pre-diagnosis period relative to women with ECHI (40% versus 7%, results not shown). As noted above, these hours differences are the motivation for either including a control for pre-diagnosis hours worked or restricting the sample to women who worked full-time in the pre-diagnosis period in our models for changes in hours.

Employment

The top panel of Table III reports estimates of the linear probability models for the likelihood that women were working one or more hours per week 6, 12, and 18 months following diagnosis.[10] These models focus on women with breast cancer, and estimate the difference in the labor supply response based on whether or not they have ECHI. As background for interpreting these results, we have also compared labor supply changes for women with cancer – both with and without ECHI – to a control group of women without cancer. The estimates generally indicated that both groups of women with cancer reduced their labor supply relative to the control group of healthy women, or, at 12 months following diagnosis, did not change their labor supply (see Appendix C). Thus, in the regressions reported below, a *positive* coefficient on the indicator for ECHI implies a *smaller* labor supply reduction; it is this differential response to cancer that is the focus of this paper.

Turning to these results, at 12 and 18 months following diagnosis, women with ECHI are statistically significantly more likely to be employed relative to women with insurance through their spouse (columns 3 and 5). Columns 2, 4, and 6 contain interaction terms between ECHI and cancer stage. We observe that ECHI reduces the likelihood that cancer is associated with lowered employment, especially at 18 months post-diagnosis. That is, ECHI moderates (perhaps considerably) the labor supply reduction that occurs in response to breast cancer.

The lower panel of Table III defines 'employed' more broadly – women are considered employed even if they have a job at which they are not currently working. This specification accounts for women who took a leave of absence, but did not sever ties with their employer – women who, under the provisions of FMLA, would not experience a change in their health insurance benefits for at least 12 weeks. When we measure employment this way, we might expect a sharper difference between the employment response of women with and without ECHI. The effect of ECHI is positive and statistically significant in all three time periods (columns 1, 3, and 5), indicating that women with ECHI are more likely to remain attached to their jobs rather than to quit work altogether, particularly at 6 months following diagnosis. The interaction terms between ECHI and stage are positive and statistically significant for regional and distant stage cancers, and at 6 and 12 months post-diagnosis these terms are considerably larger for this second definition of employment.

We next consider an expanded specification of the employment models that allows us to address three issues. First, we want to revisit the question of job quality – namely, whether women with ECHI have better jobs and that is why they are less likely to leave employment following a health shock. In particular, instead of having all women with insurance through the spouse's employer as the omitted reference category, we use the narrower category of women with insurance through the spouse's

[10] Linear probability models are robust under weaker conditions than are probit models, which depend for consistency on distributional assumptions. Also, probit models introduce an added complication because the magnitude of the interaction effect in nonlinear models does not equal the marginal effect of the interaction term and can even turn out to be of opposite sign (Ai and Norton, 2000). Regardless, estimates are very similar using probit or logit models.

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Table III. Linear probability models predicting employment 6, 12, and 18 months following diagnosis

Independent variables	6 months ($N=201$)		12 months ($N=201$)		18 months ($N=201$)	
Specification 1: Working	(1)	(2)	(3)	(4)	(5)	(6)
ECHI	0.10 (0.07)	0.03 (0.10)	0.13 (0.05)***	0.06 (0.08)	0.17 (0.05)***	−0.02 (0.09)
Local	N/A	−0.11 (0.10)	N/A	−0.09 (0.08)	N/A	−0.16 (0.09)*
Regional/distant	N/A	−0.40 (0.11)	N/A	−0.19 (0.10)*	N/A	−0.25 (0.10)**
Local × ECHI	N/A	0.004 (0.14)	N/A	0.05 (0.11)	N/A	0.21 (0.12)*
Regional/distant × ECHI	N/A	0.11 (0.18)	N/A	0.15 (0.13)	N/A	0.31 (0.13)**
Specification 2: Working or have a job, but not currently working						
ECHI	0.11 (0.05)**	0.03 (0.07)	0.09 (0.05)*	−0.04 (0.06)	0.15 (0.05)***	0.03 (0.08)
Local	N/A	−0.09 (0.08)	N/A	−0.14 (0.06)**	N/A	−0.12 (0.09)
Regional/distant	N/A	−0.29 (0.10)***	N/A	−0.27 (0.08)	N/A	−0.19 (0.10)**
Local × ECHI	N/A	0.01 (0.11)	N/A	0.09 (0.10)	N/A	0.13 (0.11)
Regional/distant × ECHI	N/A	0.22 (0.13)*	N/A	0.29 (0.11)***	N/A	0.21 (0.12)*

Notes: ECHI = employment-contingent health insurance. White standard errors are in parentheses. Other covariates included but not reported are age, African-American, college graduate, children under age 18, household income $\geq$ \$75 000, and white collar occupation. Omitted categories are *in situ* cancer (columns 2, 4, and 6), spouse insurance, white/other, no college education, household income less than \$75 000, and blue collar or other occupation. *Statistically significant $p<0.10$, **$p<0.05$, *** $p<0.01$.

employer who were not offered health insurance from their own employer. We then add a dummy variable that identifies women with insurance through the spouse's employer who *were* offered health insurance from their own employer. If the offer of insurance is associated with better jobs, then these latter women presumably have better jobs. If differences in labor supply response are associated with job quality rather than incentives posed by ECHI, then the difference between women with and without the offer of health insurance – among those with health insurance through their spouse – should mirror the overall difference between women with and without ECHI.[11]

Second, one concern is that there are differences between health insurance policies. A possible alternative explanation of the smaller employment declines for women with ECHI, documented in Table III, is that these policies are inferior to policies for women insured through their spouses. For example, if the policies for women with ECHI cover fewer treatments, or expose women to more financial risk, then this could explain the muted labor supply response, rather than the incentives to keep working to maintain insurance. We do not have information on policies, but to address this issue we distinguish – among women with ECHI – between those whose husbands were or were not offered health insurance by their own employer (if employed). We do not know whether the insurance policies offered to the husband always would have covered the wife. However, for women with ECHI whose husbands were offered health insurance but who chose their own employer's policy over that offered to their husbands, we would expect that, on average, these ECHI policies are better.[12] Consequently, if we

[11] The cell sizes were as follows: women with ECHI, but whose husband's employer offers health insurance ($n = 40$); women with ECHI and whose husband's employer (if employed) does not offer health insurance ($n = 36$); women who are offered health insurance through their employer, but chose to be insured through their spouse's employer ($n = 61$); and women who are not offered health insurance through their employer and are insured through their spouse's employer ($n = 64$).

[12] An alternative reason that women whose husbands are offered health insurance chose ECHI is that their policies cost less. However, this does not necessarily negate the validity of our test, since employers that offer comprehensive health insurance policies may also be more likely to pay a higher portion of the policy cost than firms that offer less generous policies. That is, a lower price for health insurance may imply a lower quality policy. Unfortunately, we do not have information on price or characteristics of health insurance policies.

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Table IV. Linear probability models predicting employment 6, 12, and 18 months following diagnosis controlling for the option of switching to husband's policy

Independent variables	6 months ($N = 201$)	12 months ($N = 201$)	18 months ($N = 201$)
Specification 1: Working	(1)	(2)	(3)
Health insurance through spouse, but wife offered health insurance through her employer	−0.04 (0.09)	0.10 (0.07)	−0.09 (0.07)
ECHI & husband offered health insurance	0.19 (0.08)**	0.15 (0.08)*	0.12 (0.07)*
ECHI & husband not offered health insurance	−0.04 (0.10)	0.21 (0.07)***	0.12 (0.06)**
Specification 2: Working or have a job, but not currently working			
Health insurance through spouse, but wife offered health insurance through her employer	−0.04 (0.08)	0.02 (0.07)	−0.08 (0.07)
ECHI & husband offered health insurance	0.12 (0.07)*	0.08 (0.07)	0.10 (0.06)
ECHI & husband not offered health insurance	0.06 (0.07)	0.11 (0.07)*	0.12 (0.06)**

Notes: ECHI = employment-contingent health insurance. White standard errors are in parentheses. Other covariates included but not reported are the same as in Table III. Omitted categories are white/other, no college education, household income less than $75 000, blue collar occupation, and health insurance through spouse and wife not offered health insurance through her employer. *Statistically significant $p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

find evidence that women with ECHI are more likely to be employed post-diagnosis *only* when their husbands were not offered insurance, then lower quality of policies available to women with ECHI could explain the results, rather than labor supply incentives.

Third, we might expect women with ECHI and no access to health insurance through a spouse to have a greater likelihood of employment than women with ECHI and access to a spouse's policy. In the former case, these women experience a greater degree of 'job lock' because they have no other option for health insurance.

The evidence in Table IV sheds light on these issues. First, the estimates in the first row of each panel in Table IV address the issue of job quality. There are only small and insignificant differences between those with insurance through the spouse, who were or were not offered ECHI. These results suggest, again, that the key difference is whether or not health insurance is contingent on employment, rather than job characteristics that might be associated with ECHI.

Second, almost all of the estimates in the next two rows for each specification show that women with ECHI, regardless of whether their husband is offered health insurance, are more likely to be employed in the periods following diagnosis relative to the group with insurance through a spouse and the wife not offered insurance through her employer.[13] The estimates indicate that, at 12 and 18 months following diagnosis, the difference in the employment response is as large or larger for women with ECHI for whom the husband is not offered insurance. The reverse is true for the estimates at 6 months following diagnosis. Overall, there is no clear indication that the labor supply reduction is smaller for those with ECHI but whose husbands are not offered health insurance, as we might expect if differences in health insurance policies rather than the employment-contingent nature of health insurance were driving the results.

Third, the evidence in Table IV indicates that we do not observe a strong 'job lock' effect. However, at 12 and 18 months following diagnosis, in three out of four cases the coefficient estimates for women with ECHI and husbands that are not offered health insurance are larger, in the direction that is consistent with the results based on comparing women with and without ECHI

[13] The estimates are reported relative to the group with health insurance through their spouse, but the wife not offered insurance through her employer. Relative to the other group with health insurance through their spouse, the table shows that the difference is larger in 4 out of 6 cases.

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(and in the fourth there is no difference). Unfortunately, it is not straightforward to interpret these estimates. We do not know how many spouses that are offered individual health insurance are also offered family coverage and we do not know the extent to which the spouse's employer subsidizes the cost of family coverage. It is possible that the cost of family coverage could be substantial relative to the cost of individual coverage. Furthermore, a switch from one health insurance policy to another may also involve a switch in health care provider, which may be undesirable. Because of these concerns, coupled with the small sample sizes, we do not view this evidence as decisive, and regard our evidence based on whether or not women have ECHI as stronger; at the same time, this alternative approach merits further investigation with new data sources that address the problems we have noted.

Finally, we noted earlier that HIPAA might diminish the extent to which women with ECHI continue working following a breast cancer diagnosis, because they can switch to a husband's health insurance policy if offered. The last two rows for each specification in Table IV indicate that the labor supply response to a health shock is muted for women with ECHI regardless of whether their husbands were offered health insurance through their job, suggesting that HIPAA does little to affect the relationship between the labor supply response to a health shock and ECHI.

Weekly hours worked

Table V reports unconditional and conditional specifications for percent changes in weekly hours worked for women with breast cancer 6, 12, and 18 months following diagnosis. The coefficients from the unconditional models reflect the employment effects of ECHI as well as changes in weekly hours worked. In both estimations, women with ECHI reduced their weekly hours worked by less than women with health insurance through their spouse. However, the unconditional hours changes, which also incorporate employment changes, provide the strongest evidence that labor supply reductions are muted for those with ECHI, since these specifications show that the difference between those with and without ECHI is significant in the 6-,12-, and 18-month post-diagnosis periods.

To obtain a more homogenous sample with respect to pre-diagnosis hours worked, we repeated the hours estimations on women employed full-time (32 or more hours per week). The lower panel of

Table V. Percent change in weekly hours worked 6, 12, and 18 months following diagnosis, by insurance source, unconditional and conditional models

Independent variables	6 months	12 months	18 months
Full sample	(1)	(2)	(3)
Unconditional model	($N = 201$)	($N = 201$)	($N = 201$)
ECHI	14.86 (7.06)**	16.91 (6.49)***	21.00 (6.36)***
Conditional on working	($N = 146$)	($N = 167$)	($N = 169$)
ECHI	10.14 (4.13)**	6.47 (4.82)	7.42 (4.34)*
Full-time workers sample			
Unconditional model	($N = 144$)	(N = 144)	($N = 144$)
ECHI	10.98 (7.61)	13.73 (6.34)**	17.45 (6.14)***
Conditional on working	($N = 106$)	($N = 123$)	($N = 124$)
ECHI	7.39 (4.57)	6.73 (3.78)*	2.49 (3.48)

Notes: ECHI = employment-contingent health insurance. The percent hours changed is defined as ((6-,12- or 18-month reported weekly hours worked minus baseline weekly hours worked) ÷ baseline weekly hours worked) × 100. Other covariates included but not reported are the same as in Table III with the exception of the inclusion of pre-diagnosis weekly hours worked in the full-sample estimates (top panel). Omitted categories are spouse insurance, white/other, no college education, household income less than $75 000, and blue collar or other occupation. Models were also estimated including interactions of stage with ECHI, but these estimates had large standard errors, and are not reported in the table.*Statistically significant $p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

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Table V reports that the labor supply changes for these women are fairly consistent with the labor supply changes observed using the full sample – especially with respect to the unconditional estimates. Thus, the analysis of weekly hours provides further evidence that ECHI creates an incentive to maintain labor supply when faced with an adverse health shock. In addition, the unconditional estimates for weekly hours worked, which take into account the transition from employment to non-employment, are considerably larger than the conditional estimates for hours worked. These findings imply that among women initially working full-time, a transition to non-employment is less likely among women with ECHI, paralleling the unconditional hours results.

CONCLUSIONS AND DISCUSSION

Our empirical analysis of health, health insurance, and labor supply indicates that a negative health shock, as reflected in a diagnosis of breast cancer, decreases labor supply to a greater extent among women insured by their spouse's health insurance policy than among women with health insurance through their employer (employment-contingent health insurance, or ECHI). Moreover, the difference in employment responses associated with source of health insurance is greater for women with advanced-stage diseases – suggesting that even women who required aggressive treatment were sensitive to ECHI in making their labor supply decisions in the post-diagnosis period.

ECHI appears to create an incentive to remain at work or to reduce labor supply more modestly when faced with an adverse health shock. The health and productivity implications of this apparent consequence of ECHI are yet to be measured. For example, it is possible that women with health insurance through their employer reduce their treatment by eliminating doses of radiation or courses of chemotherapy in order to maintain their labor supply. Anecdotally, a few women spontaneously confided to the study interviewers that they quit their treatment because it interfered with their jobs. Such trade-offs between treatment and work may set the stage for recurrent disease in the future. From the employer's perspective, employees who work when ill may be less productive than they would have been if they had returned to work at a later time.

Women with health insurance through a spouse were more likely to become non-employed or, if they remained employed, to reduce their hours considerably relative to women with ECHI. The non-employment effect was persistent and of considerable magnitude at 12 and 18 months following diagnosis.[14] We speculate that the persistent non-employment effect may reflect the difficulty of returning to the labor force after leaving work and receiving breast cancer treatment. This behavior plausibly favors health, but may jeopardize one's employment prospects and unambiguously reduces wage income. In light of the labor supply findings with respect to health insurance source, the development of policies that offer alternatives other than working at a level that ensures continued health insurance may be a worthwhile pursuit. Policies such as extended sick leave, which encourage workers to remain attached to their jobs instead of quitting altogether, may also be worthwhile. Of course the case for such policies would be strengthened by evidence that the differences in labor supply responses are in fact associated with health outcomes.

There are a number of other potential policy implications of our findings. First, one approach to decreasing the number of uninsured Americans is to expand employer-based health insurance coverage. A number of states have attempted to mandate that all employers with a certain number of employees

[14] To provide some perspective, the difference in the probability of employment between the two health insurance groups is considerably larger than the national unemployment rate. Moreover, the average duration of spells of unemployment in progress in July 2003 was 19.3 weeks (Unemployment Duration, 2006), which is shorter than the spell of non-employment suggested by our results regarding lower employment at 12 and 18 months (although we do not know that women necessarily were non-employed continuously).

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offer health insurance to their workers. Massachusetts succeeded in passing a broad mandate (as did Hawaii long ago), and Maryland enacted a much narrower one. California, Oregon, and Washington have considered but failed to pass versions of such mandates (in some cases, by narrow margins), and health insurance mandates are being actively considered in other states. Our findings suggest that policies that encourage employer-provided health insurance may also want to reduce the dependence of ill workers on remaining employed in order to retain their insurance. Examples include reducing the cost of COBRA or creating state-level equivalents, extending COBRA's coverage period, requiring employers to continue insurance after a worker becomes ill, and protection of job rights of the returning worker.

Second, the evidence suggests that HIPAA's provision that allows women to gain health insurance through a spouse's employer does little to diminish the influence of ECHI on women's labor supply behavior following an adverse health shock, as the results vary little depending on whether or not their husband's employer offered health insurance to which HIPAA would allow them to switch. HIPAA's provisions offer no benefit to vulnerable working women with a non-employed spouse or those with an employed spouse without health insurance through their employer, or, of course, women without a spouse. If the diminished labor supply reductions for those with ECHI are associated with health sacrifices in the short-term, then ECHI may lead to higher costs for individuals, their families, and society in the long-run. Alternatively, ECHI may offer an unexpected benefit to employers by increasing employee retention and reducing absenteeism – even when employees are ill.

Aside from the broader policy implications of the proposed study, there is also a practical clinical benefit from our results. Among persons 40 to 59 years of age, most of whom are in the workforce, the probability of developing cancer is 1 in 12 (American Cancer Society, 2005). Thus, it is useful to assist these patients in preparing for and managing their disease and side effects of treatment, which will in turn reduce the economic impact of cancer on individuals and their families. The results of our study can help inform patients and physicians about the likely consequences of cancer and its treatment for work behavior.

Selection bias is perhaps the greatest threat to the interpretation of our findings. The evidence based on both the source of insurance (own employer or spouse's) and who was offered insurance helps to bolster a causal interpretation of the findings. We also considered the possibility that women with ECHI are more attached to their jobs or have more desirable jobs, but did not observe statistically significant differences between the two groups of women – lending further credence to a causal interpretation of the findings. However, we cannot completely rule out non-causal explanations of our findings. More exhaustive measures of work history or job satisfaction could shed more light on this issue. Finally, our attempts to grapple with the selection issue are somewhat hindered by small sample sizes.

To our knowledge, this is the first study to prospectively and longitudinally examine how the labor supply responses of individuals experiencing a health shock depend on the source of health insurance. The findings underscore the labor supply incentives posed by employment-contingent health insurance. There may be potential benefits to employers from creating an incentive for employees to remain working after a health shock. However, the principal effect may be a health toll on individuals who remain working because of the incentives posed by health insurance that is contingent on continued employment. In future research we hope to collect new data with which to more fully understand the health consequences of employment-contingent health insurance.

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APPENDIX A: COMPARISON OF JOB INVOLVEMENT RESPONSES BY INSURANCE SOURCE

Question	Response category	Employment-contingent health insurance ($N = 76$) (%)	Health insurance through spouse's employer ($N = 125$) (%)	p-value for test of independence
1. 'The major satisfaction in my life comes from my job'	Strongly agree	11.84	7.26	
	Agree	44.74	33.87	
	Disagree	34.21	43.55	
	Strongly disagree	9.21	15.32	0.18
2. 'The most important things that happen to me involve my work'	Strongly agree	6.58	2.42	
	Agree	27.63	21.77	
	Disagree	55.26	62.90	
	Strongly disagree	10.53	12.90	0.36
3. 'I'm really a perfectionist about my work'	Strongly agree	31.58	34.15	
	Agree	53.95	55.28	
	Disagree	13.16	10.57	
	Strongly disagree	1.32	0.00	0.57
4. 'I live, eat, and breathe my job'	Strongly agree	2.63	0.81	
	Agree	13.16	12.20	
	Disagree	55.26	47.97	
	Strongly disagree	28.95	39.02	0.41
5. 'I am very much involved personally in my work'	Strongly agree	28.95	25.00	
	Agree	61.84	53.23	
	Disagree	9.21	20.97	
	Strongly disagree	0.00	0.81	0.14

Notes: Responses were missing for 1 woman with spouse ECHI for questions 1, 2, and 5; and responses were missing for 2 women with spouse ECHI for questions 3 and 4. p-values are from χ^2 test of independence.

APPENDIX B: COMPARISON OF JOB TASKS BY INSURANCE SOURCE

Job quality measures	Employment-contingent health insurance ($N = 76$)	Health insurance through spouse's employer ($N = 125$)	p-value for test of equality
Physical activity, mean (SD)			
Time spent sitting	($N = 74$) 4.26 (2.54)	($N = 119$) 3.46 (2.54)	0.036
Time spent standing	($N = 73$) 2.06 (2.08)	($N = 120$) 2.18 (2.05)	0.687
Time spent walking	($N = 75$) 2.00 (1.88)	($N = 122$) 2.16 (1.81)	0.535
Job tasks, %	($N = 75$)	($N = 123$)	
Physical effort	60.0	57.7	0.752
Heavy lifting	29.3	34.2	0.482
Stooping	54.7	56.9	0.758
Concentration	97.3	91.1	0.137[a]

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Job quality measures	Employment-contingent health insurance ($N=76$)	Health insurance through spouse's employer ($N=125$)	p-value for test of equality
Analysis	85.3	78.1	0.207
Keeping up with the pace set by others	65.3	67.5	0.756
Learning new things	94.7	83.7	0.025[a]
Job tasks among women who remained employed, %	($N=69$)	($N=99$)	
Physical effort	60.3	53.4	0.387
Heavy lifting	27.9	30.3	0.742
Stooping	54.4	54.6	0.986
Concentration	98.5	91.9	0.084[a]
Analysis	85.3	79.8	0.363
Keeping up with the pace set by others	64.7	63.6	0.887
Learning new things	94.1	84.9	0.083[a]

Notes: Number of women reporting that their job involved the task all/almost all of the time, most of the time, or some of the time. These questions were asked at 12 months following diagnosis. For continuous variables two-sided t-test was used; for categorical variables χ^2 test of independence was used.
[a]Indicates Fisher's exact test because one cell size is smaller than 5.

APPENDIX C: LABOR SUPPLY COMPARISONS BETWEEN WOMEN WITH BREAST CANCER AND NON-CANCER CONTROLS 6 AND 12 MONTHS FOLLOWING DIAGNOSIS/CURRENT POPULATION SURVEY MIS 5/ CURRENT POPULATION SURVEY MIS 8

	Employment-contingent health insurance	Health insurance through spouse's employer
Employment 6 months following diagnosis/MIS 5	($N=265$)	($N=348$)
Specification 1: Working	−0.17 (0.06)***	−0.19 (0.05)***
Specification 2: Working or have a job, but not currently working	−0.04 (0.04)	−0.11 (0.04)***
% change in hours worked unconditional on employment 6 months following diagnosis/MIS 5	−24.60 (5.84)***	−39.98 (6.36)***
% change in hours worked conditional on employment 6 months following diagnosis/MIS 5	($N=236$) −7.46 (2.73)***	($N=291$) −23.02 (5.51)***
Employment 12 months following diagnosis/MIS 8	($N=259$)	($N=310$)
Specification 1: Working	0.05 (0.05)	−0.05 (0.04)
Specification 2: Working or have a job, but not currently working	0.02 (0.04)	−0.04 (0.04)
% change in hours worked unconditional on employment 12 months following diagnosis/MIS 8	−4.49 (5.34)	−18.30 (6.12)***
% change in hours worked conditional on employment 12 months following diagnosis/MIS 8	($N=227$) −4.21 (3.17)	($N=262$) −12.59 (5.26)**

Notes: Coefficients reported are for the dummy variable indicating women with breast cancer. We constructed control groups from respondents to the CPS March supplement residing in Primary Metropolitan Statistical Areas and Metropolitan Statistical Areas in the Great Lakes region. One control group consists of CPS March supplement respondents in their 4th month ('month-in-sample' (MIS) 4) and MIS 5 to be consistent with the 9-month span between the cancer subjects' pre- and post-diagnosis information. We extracted insurance information from MIS 1, 2, or 3 for a subset of respondents in MIS 4 whose March supplement questionnaire occurred prior to MIS 4. A second control group uses respondents' employment information from March MIS 1 through 4 matched to MIS 8. The resulting control sample represents a 15-month window for those in MIS 1 in March, a 14-month window for those in MIS 2, a 13-month window for those in MIS 3, and a 12-month window for those in MIS 4. Robust standard errors are in parentheses. Control variables are age, African-American, college graduate, number of children under age 18, and household income $<\$75\,000$ (as well as pre-diagnosis hours of work in the change in hours equations). Omitted categories are non-cancer, white/other, no college education, and household income less than \$75 000. *Statistically significant $p<0.10$, **$p<0.05$, *** $p<0.01$. An earlier paper (Bradley *et al*., 2005b) provides a complete description of this analysis.

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