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HEALTH INSURANCE AND THE LABOR MARKET

Jonathan Gruber

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ABSTRACT

A distinctive feature of the health insurance market in the U.S. is the restriction of group insurance availability to the workplace. This has a number of important implications for the functioning of the labor market, through mobility from job-to-job or in and out of the labor force, wage determination, and hiring decisions. This paper reviews the large literature that has emerged in recent years to assess the impact of health insurance on the labor market. I begin with an overview of the institutional details relevant to assessing the interaction of health insurance and the labor market. I then present a theoretical overview of the effects of health insurance on mobility and wage/employment determination. I critically review the empirical literature on these topics, focusing in particular on the methodological issues that have been raised, and highlighting the unanswered questions which can be the focus of future work in this area.

Jonathan Gruber
MIT Department of Economics
E52-355
50 Memorial Drive
Cambridge, MA 0242-1347
and NBER
gruberj@mit.edu

A distinctive feature of the health insurance market in the U.S. is the restriction of group insurance availability to the workplace, with few pooling mechanisms available for insurance purchase outside of work. As a result, ninety percent of the privately insured population currently obtains their insurance coverage through the workplace, either through their own employment or the employment of a family member (Employee Benefits Research Institute, 1996).

This restriction of health insurance purchase to the workplace setting has potentially quite important implications for the functioning of the U.S. labor market. Counting employer and employee insurance spending, health insurance amounts to 7.1% of compensation in 1996; this share has grown by over 300% over the past 30 years.[1] This large increase in health insurance costs has been derided by some as a drag on hiring and an impediment to our international competitiveness. Others have argued that these costs have been passed onto workers wages, resulting in the lack of wage growth witnessed by the U.S. economy in recent years.

Moreover, workplace pooling has been cited as a cause of potential labor market inefficiencies through reduced mobility. Workers are said to be "locked" into their jobs for fear of losing health insurance, and may be reticent to switch jobs, even if they have opportunities for higher productivity matches. As President Clinton said in motivating his health care reform plan of 1994: "Worker mobility is one of the most important values in an entrepreneurial society, where most jobs are created by small businesses. The present health care system is a big brake on that" (Holtz-Eakin, 1994). In addition, individuals receiving free public insurance on public assistance programs may be reticent to leave those programs for work since they cannot be assured of finding a job with insurance. As a result, a central feature of Clinton's proposed plan was a universal employer mandate, which would

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[1]National Income and Product Accounts data on health insurance component of wages and salaries. This share has declined by almost 10% from its peak in 1994 of 7.6% of compensation.

have made it possible for workers to maintain insurance coverage when they switched jobs, and guaranteed health insurance for those moving into the labor force.

Despite these concerns, until the late 1980s there was little research by economists on the effects of health insurance on the labor market. This deficiency has been remedied by a flurry of research activity over the past decade. Large literatures have emerged to investigate the impact of health insurance on mobility, earnings, employment, and hours. This substantial and growing body of work has dramatically increased our knowledge of how health insurance affects the functioning of the U.S. labor market. In addition, this literature has introduced wide variety of innovative techniques for dealing with the selection problem inherent in estimating the effect of health insurance on worker and firm behavior.

This paper critically reviews the literature on health insurance and the labor market, in four steps. First, in Part I, I provide a brief overview of the relevant institutional details on the U.S. health insurance market, and its interaction with the labor market. Then, in Part II, I present a theoretical overview of the effects of health insurance on the labor market, focusing in particular on two areas: mobility, and wage and employment determination. In Part III, I summarize the evidence on health insurance and job-job mobility. In Part IV, I turn to three other aspects of mobility that are affected by the restriction of health insurance offering to (some) workplaces: mobility from work to retirement; mobility from public assistance programs to work; and mobility by secondary earners into and out of the labor force. In Part V I review evidence on the effect of health insurance costs on labor market equilibrium outcomes: wages, employment, and hours. Part VI concludes by focusing on the priorities for future work in this area.

Part I: Background on Health Insurance and the Labor Market

A. Health Insurance Coverage

The distribution of health insurance coverage in the U.S. in 1995 is presented in the final column of Table 1, from Employee Benefits Research Institute (1996) tabulations of the March 1996 Current Population Survey (CPS).[2] 164 million people, or 71% of the non-elderly population, were covered by private health insurance. Of that total, 90% were covered through employer-provided insurance, roughly one-half in their own name and one-half through others. Another 38.4 million persons, or 17% of the non-elderly, have public coverage. This public coverage is obtained primarily from three sources. The first, and most important for the non-elderly population, is the Medicaid program, the state/federal program of health insurance for low income persons; this accounts for three-quarters of the public coverage of the non-elderly. The others are the Medicare program, which predominantly covers those over age 65 but also covers the disabled below age 65, and CHAMPUS/CHAMPVA, the insurance program for the dependents of military personnel. Finally, over 17% of the non-elderly population has no insurance coverage.

This table also documents the time series trends over the past 8 years in sources of insurance coverage.[3] Several trends are immediately apparent. There has been a substantial decline in the share of the population with employer-provided health insurance, from 71% in 1988 to 64% in 1995. This decline has been driven by falling employer-provided insurance coverage, with other private coverage rising over this period; and much of the decline of employer-provided coverage has not been declining

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[2]The subcategories of insurance do not add to the totals, since the CPS asks about insurance coverage at any point during the previous year, so that individuals may have had more than one type of coverage.

[3]The two sets of figures for 1992 reflect revisions of the results to reflect reweighting in accordance with 1990 Census population estimates.

coverage of workers, but rather of their dependents. There has also been a substantial rise in public coverage; this is completely driven by increases in the size of the Medicaid program.[4] Finally, the share of the non-elderly population that is uninsured has risen by 15% over this eight year period.

B. Features of Private Health Insurance Policies

There are several salient features of private insurance policies which are useful for understanding the potential impact of insurance on the functioning of the labor market. Traditionally, there were two types of private insurance plans. Blue Cross/Blue Shield plans, which dominated insurance markets in the pre-war period, charged "community rated" insurance premiums, whereby employers paid only the average expenditure for a broad risk class. Beginning in the 1940s, there was a rapid growth in commercial insurance companies who "experience rated" their customers, charging firms based on their actual (projected and past) cost experience. By the late 1980s, most Blue Cross/Blue Shield plans had also moved to experience rating for all large groups, and even for some smaller groups as well. Experience rating of small firms is particularly detailed; in the extreme, if a particular worker is found to be very costly, he may be "underwritten out" of the policy, or the entire group may be rejected (Congressional Research Service, 1988). Experience rating has been taken a step further by the growth in self-insurance of medical expenses across firms. In 1993, 19% of all firms self-insured, and 63% of firms with more than 500 employees did so (EBRI, 1995).

As a result of experience rating, there is tremendous dispersion in the cost of health insurance across firms, as documented by Cutler (1994). He finds that, for employer-provided individual insurance plans, the premium at the 90th percentile of the premium distribution is 2.5 times as large as

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[4]Recent research highlights one channel through which these trends might be linked: the "crowdout" of private insurance purchases by public insurance eligibility. This research is reviewed in Part IV.

the premium at the 10th percentile. Only a small share of this substantial variation can be explained by plan features, suggesting that most is due to experience rating.

A common feature of traditional insurance plans was unrestricted fee for service medicine: individuals could use the provider of their choice, and that provider was reimbursed based on his billed costs. The past twenty years, however, has seen a radical reorganization of private insurance towards the "managed care" model. Organizations such as Health Maintenance Organizations (HMOs) and Preferred Provider Organizations (PPO) have both restricted (to varying extents) patient choice or provider, and reimbursed providers on prospective fee schedules, not retrospective costs. Managed care is quickly becoming the dominant type of private insurance coverage; in 1993, 67% of persons covered by employer-sponsored health plans were enrolled in managed care (Health Insurance Association of America, 1996).

C. *The Role of the Workplace*

Why is the workplace the predominant source of private health insurance in the U.S.? There are at least two candidate explanations. The first is workplace pooling economies. There are enormous economies of scale in insurance purchase resulting from fixed costs in administration that must be paid for any size group. Large workplace pools also provides a means for individuals to purchase insurance without the adverse selection premium that insurers demand in the individual health insurance marketplace, since the unobservable components of health will average to zero in large groups. For smaller groups, on the other hand, there is the risk that insurance purchase is driven by the needs of one or two (unobservably) very ill employees, whose costs cannot possibly be covered by the premium payments of healthier workers. As the Congressional Research Service (CRS, 1988) reports, the loading factor on insurance purchases by the very smallest groups (firms with less than 5 employees)

is over 40% higher than that on very large groups (more than 10,000 employees), and the loading factor for individual insurance is even higher. Moreover, Cutler (1994) reports that the dispersion in health insurance premiums is much greater for small firms that for larger ones, which is consistent with greater adverse selection problems in the small group market.

The second is the tax deductibility of employer insurance purchases. Employer payments for insurance are not treated as taxable income to employees, unlike wages, which are taxed by both the OASDI payroll tax, and state and federal income taxes. This tax expenditure cost the government $60 billion in lost revenues in 1994 (Gruber and Poterba, 1996). As a result, there is a large subsidy to the purchase of insurance through the workplace as opposed to through extra-workplace groups. Gruber and Poterba (1996) estimate that the relative price of insurance at the workplace is 27% lower as a result of this tax subsidy.[5]

Despite this subsidy to employer payments, only a minority of employers currently pay all of the cost of health insurance, and employee contributions for insurance have been rising as a share of total insurance payments: in medium and large firms, the share of individual plans that are wholly employer financed has fallen from 74% in 1980 to 37% in 1993; for family plans, the decline has been from 52% to 21% (EBRI, 1995). Under Section 125 of the Internal Revenue Code, employee payments for insurance can be made tax deductible as well, but only roughly 25% of firms currently make employee premiums deductible.[6] Levy (1997) provides a detailed discussion of the two primary

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[5]The correct computation of this subsidy is somewhat subtle, as it involves incorporating the share of premiums paid by employees and the fact that uninsured employees can deduct some of their medical expenses through the income tax; see Gruber and Poterba (1996) for details. There is no work which has explicitly addressed the important question of the role of the tax subsidy in promoting workplace pooling, as opposed to other workplace pooling economies.

[6]Gruber and Poterba (1996). The reasons for such limited takeup of this option are unclear. It may have to do with more extensive regulatory and reporting requirements on Section 125 plans than on traditional insurance plans; alternatively, limited takeup may simply reflect imperfect knowledge about

motivations for taxable employee contributions: providing an incentive for employees to choose low cost plans within firms that offer several insurance options; and selecting out workers from the insurance pool who do not have a strong demand for insurance, allowing within-workplace sorting by insurance tastes. One source of such heterogeneity could be spousal coverage by insurance, as emphasized by Dranove and Spier (1996). Levy finds evidence to support both models of employee contributions.

Another important restriction on workplace insurance is anti-discrimination regulations, through Section 89 of the Internal Revenue Code (CRS, 1988). These regulations make it illegal to offer insurance selectively to highly compensated employees in the firm.[7] As a result, it is impossible to selectively offer insurance to only some employees, without making it a workplace wide option.

While insurance is predominantly obtained through the workplace, there is substantial variation across workplaces in insurance offering and employee takeup. This variation is documented in Table 2, which is tabulated from the April 1993 Employee Benefits Supplement to the Current Population Survey. Each cell gives the employee weighted mean of the variable listed in the first column, for the sample denoted in the first row. Overall, 72.5% of employees work in firms that offer health insurance. Of those firms that offer health insurance, 91% offer family coverage as well as individual coverage. Only 57% of workers are covered by insurance, however, for a takeup rate of less than 80%.

The reason for non-takeup is split roughly evenly between employee ineligibility and coverage

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the availability of this option.

[7]More specifically, non-highly compensated employees must constitute at least 50 percent of the group of employees eligible to participate in the plan; at least 90 percent of the employer's non-highly compensated employees must be eligible for a benefit that is at least 50 percent as valuable as the benefit made available to the highly compensated employee with the most valuable benefits; and the plan must not contain any provision relating to eligibility to participate that suggests discrimination in favor of highly compensated employees. Alternatively, so long as at least 80% of non-highly compensated employees benefit from the plan, it qualifies as well.

from other sources. Employee ineligibility typically arises from one of two sources. The first is pre-existing conditions exclusions, which state that the insurance plan will not cover the costs of illnesses existing before enrollment, for some period of time after enrollment.[8] The second is waiting periods (or tenure requirements) for coverage for new employees. As reported in General Accounting Office (1995), 62% of firms with more than 200 employees have a waiting period for coverage, although it is typically quite short (less than 3 months); and 60-70% of plans have a pre-existing conditions exclusion clauses, the majority of which last for 12 months or more.

These findings differ dramatically across firm size categories, however.[9] Coverage rates among the smallest (fewer than 10 employees) firms are only about 37%, while among the largest (greater than 250 employees) it is over 96%. The coverage rate grows rapidly across firm size categories; even among firms with 25-49 employees, over 80% offer insurance. Similarly, among those with insurance, the likelihood of being offered family coverage rises with firm size as well.

Interestingly, however, there is relatively little variation in takeup rates across firm size. The takeup rate is actually higher in the smallest firms that in the next two categories of firm size, and only in the very largest category of firm size is the takeup rate appreciably different than that of smaller firms. There are important differences in the reason for lack of takeup, however. Among small firms, employees are much more likely to not be taking up because of coverage from others, rather than being

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[8]As Gruber and Madrian (1994) report:

> "A *pre-existing condition* is generally defined as any medical problem that has been treated or diagnosed within the past six months to two years. In some cases it may be more broadly defined as any medical problem for which an individual has *ever* received care. It may also be extended to include medical conditions for which a prudent person would have sought care even if no physician was actually consulted. An insurance company may also require all employees to undergo medical examination, which it then uses to exclude certain medical conditions on an individual basis for the life of the contract. This practice is known as *medical underwriting*".

[9]These breakdowns refer to size of establishment, not total firm size.

ineligible. But there is a steady rise in ineligibility, and a fall in other coverage, as firm size grows, so that in the largest firms ineligibility is a much more important barrier to coverage. This pattern is explained by two phenomena. First, insurers offering policies to small firms insist that eligibility be loose and takeup high, to ensure that the policy does not just provide coverage for one or two sick employees (CRS, 1988). Second, employees at small firms, which traditionally offer less generous insurance plans, are more likely to rely on coverage from spouses than are employees at large firms with better plans.

A natural explanation for low rates of insurance offering at small firms is the much higher loading factors that they face when attempting to purchase insurance. Another explanation, offered by Long and Marquis (1992), is worker demand: they document that the types of workers who work at small firms have characteristics similar to those who work at large firms and decline coverage. This would be consistent with spousal insurance being the predominant cause of non-takeup at small firms.

Finally, it is important to highlight that insurance at even the smallest firms, and those that provide the least generous policies, is cheaper and more comprehensive than the typical individual insurance policy. Individual insurance generally costs at least 50% more than group policies. Moreover, individual policies are much less generous along a number of dimensions. Relative to group policies, non-group policies are only half as likely to have major medical coverage, coverage for physician visits, or coverage of prescription drugs; they are only two-thirds as likely to receive ambulance, mental health, and outpatient diagnostic service coverage. Furthermore, non-group policies generally feature both higher deductibles and higher copayments (Gruber and Madrian, 1994).

Part II: Health Insurance and Labor Market Equilibrium - Theory

A. Employer-Provided Health Insurance and Mobility

One of the potentially most important impacts of health insurance on the labor market is its effects on mobility. Concerns over "job lock", or health insurance-induced reductions in worker mobility, were a driving force behind calls for comprehensive health reform, and have motivated recent partial reforms of the individual insurance market. In this section, I outline the theoretical motivation for these concerns.

The very notion that health insurance is responsible for imperfections in the functioning of the U.S. labor market is somewhat curious. After all, health insurance is a voluntarily provided form of employee compensation. There is little discussion of the distortions to the labor market from cash wages. Why is health insurance different?

To see the difficulties introduced by health insurance in reality, it is useful to begin with a very stylized "pure compensating differentials" model (Rosen, 1986). I construct a highly stylized example in which there is no distortionary effect of health insurance on the labor market. I then relax the very strong assumptions that are required by this example, to illustrate the source of distortions to mobility.

In this example, health insurance coverage consists of a binary, homogeneous good; individuals are either covered or not, and if covered have the exact same insurance plans. Insurance is perfectly experience rated at the worker level. That is, firms essentially purchase insurance on a worker-by-worker basis, and are charged a separate premium for each worker. Jobs that offer health insurance feature a negative compensating wage differential. Moreover, each individual job (worker-firm match) can have its own compensation structure; firms can offer insurance to some workers and not others, and can pay lower wages to those workers whose insurance costs more. Individuals have preferences over wage compensation and health insurance:

$$(1) \qquad U_{ij} = U(W_{ij}, H_{ij})$$

where W_{ij} is the wage level of worker I at firm j, and H_{ij} is a binary indicator for insurance coverage

of worker I at firm j (H_{ij} = 1 or 0). The (pre-compensating differential) wage rate for each worker/job match is equal to the worker's marginal product at that job.

Given these preferences, individuals will desire health insurance coverage if there is a compensating wage differential ΔW_{ij} such that:

(2) $U(W_{ij} - \Delta W_{ij}, 1) - U(W_{ij}, 0) = V_{ij} \geq 0$

Suppose that there are a continuum of jobs in the economy, and that the labor market is perfectly competitive. Firms face identical worker-specific insurance price schedules; a given worker I incurs a cost of insurance $C_{ij} = C_i$ in whatever firm he works. In this world, firms will provide insurance to their workers if:

(3) $\Delta W_{ij} \geq C_i$

As a result of perfect competition, firms will bid the compensating differential down to the level C_i. Thus, all workers covered by insurance will earn exactly:

(4) $W_{ij} - \Delta W_{ij} = W_{ij} - C_i$

on whatever job they hold.

In this simplified model, there is no real effect of health insurance on the labor market equilibrium. The introduction of health insurance simply leads to lower wages for workers who value that insurance at its cost or more. If individuals wish to change jobs, they can simply ask their new employer to provide them with insurance and lower their wage by C_i. Workers for whom $V > 0$ are earning rents from the fact that they value insurance at above its costs, but firms cannot extract those rents, since workers will be bid away by other employers who charge them the appropriate compensating differential. Most importantly, there is no inefficiency from health insurance: since workers will pay the same compensating differential C_i wherever they work, they will choose the job with the highest level of wages W_{ij}. So workers will find the best job-specific matches, regardless of

their tastes for insurance.

This highly stylized model is useful for illustrating the conditions necessary to generate no mobility effects of insurance. But reality departs from this model in at least two important ways. First, employers are unable to completely set employee-specific compensation packages, offering insurance to some workers and not to others. As documented above, the Internal Revenue Code gives favorable tax treatment to employer expenditures on health insurance only if most workers are offered an equivalent benefits package. Moreover, the costs of administering such a complicated benefits system would absorb much of the rents that workers would earn from its existence. And the problems of preference revelation in this context are daunting; it is difficult in reality to see how firms could appropriately set worker-specific compensating differentials. This departure implies that there will be match-specific rents for workers attached to particular jobs.

Second, employers differ dramatically in the underlying costs of providing health insurance. As documented earlier, the loading factors on insurance purchase are substantially higher for small firms than for larger firms, and even conditional on observable factors there is huge variation in insurance premiums (Cutler, 1994). This variation arises from both unobserved differences in the relationship between firm characteristics and insurance supply prices, and from heterogeneity in the workforce along health dimensions. This implies that workers may be unable to obtain health insurance on comparable terms across jobs.

As a result of these two features, there will be matching of particular workers and firms in labor market equilibrium: those workers who most desire health insurance coverage will work at firms offering insurance, and those firms who can provide that insurance most cheaply will offer it. In the extreme case of a perfectly competitive labor market, there will be a market-wide compensating differential ΔW. Workers will only work at firms offering insurance if their valuation of insurance is

at least as great as this compensating differential, $V_{ij} > 0$. Firms will only offer insurance if the cost of insurance to that firm per worker, C_j, is less than the compensating differential, $C_j < \Delta W$. This is the compensating differentials equilibrium described by Rosen (1986). As highlighted by his discussion, in equilibrium all of the workers whose valuation of insurance V_{ij} is greater than ΔW will be earning rents from working at a job with health insurance; similarly, all firms whose costs of insurance C_j are below ΔW will earn rents.[10]

Adding these complications introduces the possibility of job lock. Suppose that an individual now holds job 0, but would be more productive on job 1 ($W_{i1} > W_{i0}$). The cost of insurance to firm 1 is much higher, however ($C_1 > C_0$). This high cost might arise from a high loading factor, or from the fact that the firm has a relatively unhealthy workforce and is experience rated. As a result, firm 1 does not offer insurance; even though this insurance would attract worker I, it will cost too much to provide for the rest of the workforce. And, most importantly, the insurance can't just be provided for worker I. As a result, if:

(2) $\quad U(W_{i0} - \Delta W, 1) - U(W_{i1}, 0) > 0$

then the worker will not switch jobs, even though he would be more productive on the new job. This is the welfare loss from job lock: productivity improving switches are not made.

Note that, in theory, firm 0 could extract the surplus from this worker, knowing that he will not move to firm 1. Full extraction of these rents would mean that there was no net "locking" of the employee into his job at firm 0. The key question, of course, is the extent to which firms can pay discriminate on the basis of the value of insurance. In practice, full rent capture on a worker-by-worker basis seems unlikely, due to preference revelation and administrative difficulties. I review some

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[10]Olson (1993) provides some supportive evidence for this self-selection model. He finds that workers with greater than expected health needs (wives whose husbands do not have health insurance, and who have less healthy children) self-select into firms that provide health benefits.

evidence below suggesting that rent capture across relatively broad demographic groups within the workplace is possible. But, as I highlight, the level at which pay discrimination by valuation of insurance occurs is an open question; so long as it doesn't occur on a person-by-person basis, there will be job lock.

It is important to note that this type of lock arises from any employee benefit where there is differential valuation across workers, differential costs of provision across employers, and the inability to set worker-specific compensation packages (ie. workplace safety, or location of the firm). The key insight is that in this situation, a firm cannot offer the benefit just to the marginal worker that it wishes to attract, leading to job-specific rents and job-lock. In practice, however, this effect is likely to be largest for health insurance, since both the variation in valuation across workers and the variation in costs of provision across firms are much higher than for other workplace amenities.

In theory, this problem only arises for workers considering switches from the sector providing insurance to the sector not providing insurance. But, even within the insurance providing sector, there may be job lock arising from the fact that health insurance coverage is not a homogenous good. For example, pre-existing conditions exclusions may leave the worker exposed for large medical costs if he switches to a new plan. There are also probationary periods for new coverage and (in the extreme) medical underwriting and exclusion of costly new employees from insurance coverage. And job changers may lose credit towards deductibles and out-of-pocket payment limits under their old plans, raising the out of pocket costs of medical care on a new job relative to an old one. In addition, health insurance is not a discrete choice but rather a continuum of policy features. The worker's current job may offer a wider range of insurance options that is not available at other jobs which offer insurance, making job switching unattractive, in particular if the worker is restricted (through a managed care plan) from using his traditional medical providers. Finally, the fact that insurance purchased in the individual

market is very expensive, less comprehensive, and potentially not even available to very unhealthy applicants, raises the costs of off-the-job search. This further mitigates against leaving a job that currently has insurance even if the next job will have insurance as well.

This last consideration highlights the fact that insurance may inhibit mobility along another dimension: in and out of the labor force. As a result of failures in the individual insurance market, those persons with high valuation of insurance, who will earn rents at insured jobs, will be reluctant to leave the workforce. This means, for example, that less healthy older workers will be unwilling to retire from firms that offer health insurance. This is a form of "lock" because even if the value of leisure is greater than the marginal product of labor for a given worker, the high cost of insurance may prohibit his leaving the job.

B. Health Insurance Costs and Labor Market Equilibrium

A pervasive feature of the health care sector over the past several decades has been health care cost increases that have exceeded the rate of inflation, often by large amounts. Health care costs have tripled as a share of GNP over the past 35 years (although cost growth has slowed recently). A natural question is the implications of this dramatic cost growth for the labor market.

To understand these implications, it is useful to draw on the seminal analysis of Summers (1989). Summers' paper, as well as a number of the papers referenced in this section, addressed the question of the effects of a government mandate that employers provide health insurance to their workers, but this can naturally be extended to consider the implications of rising employer insurance costs.[11] Summers' analysis is depicted in Figure 1, which shows supply and demand in the labor

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[11]There are a number of subtleties involved in comparing these cases, a point to which I return below.

market, with an initial equilibrium at (L_0, W_0); for the moment assume that labor supply consists simply of a (1,0) participation decision. An increase in the costs of providing insurance will raise labor costs, shifting the demand curve inwards, and leading to lower wages (W_1) and employment (L_1).

Summers' key insight, however, was that workers may also value health insurance more now that health care costs have increased, since the costs of being uninsured has risen.[12] As a result, they will increase their desired labor supply in order to obtain employer-provided coverage. This outward shift in supply lowers wages further (to W_2), but mitigates the loss of jobs. In fact, if workers value the increased insurance at its cost, this increase will be fully shifted to wages, with no effect on total employment. In principle, rising health insurance costs could increase employment: if individuals are risk averse, then increasing the size of the risk of being uninsured will raise the desire for insurance.[13]

Gruber and Krueger (1991) provide a formalization of this graphical analysis. Suppose that labor demand (L_d) is given by:

$$(5) \qquad L_d = f_d(W + C)$$

where W is wages and C is insurance costs. Further suppose that labor supply is given by:

$$(6) \qquad L_s = f_s(W + \alpha C)$$

where αC is the monetary value that employees place on health insurance. For determining the effect of rising costs on the labor market, the relevant concept is marginal α, the valuation of the marginal dollar of health insurance spending. A key determinant of marginal α will be the *source* of insurance cost increase. If insurance costs are increasing because of an underlying rise in the cost of valuable health care services, marginal α is likely to be high. However, if costs are rising because of increases

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[12]This effect will be augmented by income effects, since families are now poorer, increasing desired labor supply. For an analysis which incorporates this point, see Feldman (1993).

[13]Obviously this effect depends on how the coefficient of risk aversion changes with income.

in the cost of administering insurance, then marginal α will be close to zero, since the value of insurance has not risen relative to the alternative (self-insurance). For the purposes of this discussion, I assume that average and marginal α are equal; that is, that increases in the cost of insurance are valued in the same way as is the existing level of insurance spending.

Using this notation, it can be shown that:

$$(7) \qquad \frac{\delta W}{\delta C} = -\frac{\eta^d - \alpha\eta^s}{\eta^d - \eta^s}$$

where η^d and η^s are the elasticities of demand and supply for labor, respectively. This equation differs from the standard expression for the incidence of a tax on labor by the term $\alpha\eta^s$ in the numerator, which captures the increase in labor supply due to employee valuation of more expensive insurance. This leads to a change in employment of:

$$(8) \qquad \frac{\delta L}{L} = -\frac{\Delta C - \Delta W}{W^0} * \eta^d$$

where ΔW is the change in wages and W_0 is the initial wage level.[14]

It is clear from equation (7) that the reduction in wages will be less than the increase in costs if $\alpha < 1$. That is, if employees value the increased insurance at less than its cost to the employer the costs cannot be fully shifted to wages, leading to a fall in employment. However, if employees value this increase in the health insurance at its full employer cost ($\alpha = 1$), wages will fall by exactly the amount that costs rise, with no effect on employment; in principle, if $\alpha > 1$, employment could even rise. Thus, the implications of this basic model are that rising health care costs should lead to lower wages with an ambiguous effect on employment.

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[14]Subsequent models following this formulation have considered in more detail particular aspects of the incidence of increased employer costs. Gruber and Hanratty (1995) develop a model of payroll-tax financed national health insurance, and Anderson and Meyer (1996) illustrate the impact of payroll-tax financed unemployment insurance, for the case of differential employer experience rating (which is clearly appropriate to health insurance markets as well).

This analysis is obviously simplified along at least eight dimensions. First, labor supply is not simply a discrete choice, but rather a combination of participation and hours of work decisions.[15] Increases in costs will have effects on both the supply of and the demand for work hours conditional on participation.[16] From the employer perspective, increases in health insurance costs are an increase in the fixed cost of employment and are as a result more costly (as a fraction of labor payments) for low-hours employees. If employers are able to lower each worker's wages by the lump-sum increase in costs, then neither hours nor employment should change. However, if (as seems likely) employers are not able to implement a percentage reduction in pay that is inversely proportional to hours worked, then covered low hours workers will become more expensive. Employers will therefore desire increased hours by fewer workers, lowering the cost per hour of the health insurance for a given total labor supply.

Of course, if the wage offset is lower for low-hours workers, workers will demand the opposite outcome: there will be increasing demand for part-time work, with hours falling and employment increasing. Moreover, since part-time workers may be more readily excluded from health insurance coverage, there may also be a countervailing effect on the employer side, as full-time employees are replaced with their (uninsured) part-time counterparts. In this case as well, hours would fall and employment would rise. Thus, the effect on hours of work is uncertain.[17]

Second, employers may react along another dimension: dropping health insurance coverage

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[15]In fact, as Feldstein (1995) emphasizes, appropriately defined labor supply also includes other features such as choice of job and work effort. It is difficult to assess the impact, either theoretically or empirically, of rising health care costs on these dimensions.

[16]This discussion follows Gruber (1994a).

[17]This is obviously a simplified discussion of the complicated process by which hours is determined, but it captures the basic intuition. For models of health insurance and hours, see Cutler and Madrian (1996) or Hashimoto and Zhao (1996).

altogether. Increases in the cost of insurance will reduce the desire of employers to offer insurance, lowering the number of jobs offering insurance and raising the compensating differential. At the same time, as argued above, increases in costs may raise the demand for jobs that offer insurance, raising further the compensating differential and counteracting the decline in the number of jobs with insurance. As earlier, in principle increases in the cost of health care could actually raise the total demand for health insurance. So the net effect on employer insurance offering is ambiguous.

Third, this analysis has ignored existing constraints on compensation design in the labor market. For example, for workers already at the minimum wage, firms will be unable to shift to wages increase in the cost of health insurance.[18] Similarly, union contract or other workplace pay norms may interfere with the adjustment of wages to reflect higher costs. These institutional features could increase the disemployment effects of rising health costs.

Fourth, this analysis ignores heterogeneity across workers. Increases in the costs of health insurance may not be uniform throughout the workplace; for example, costs may rise more for family insurance than for individual coverage, or they may rise more for older workers than for younger workers. In the limit, with extensive experience rating, costs may rise for particular workers; for example, a worker may be diagnosed with cancer, substantially increasing firm average insurance expenses. Gruber (1992) extends the model of Gruber and Krueger (1991) to the case of two groups of workers, where costs increase for one and not the other. If there is group-specific shifting, then the solution collapses to the one group model. If not, however, the substitutability of these groups will also

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[18]As Gruber (1994c) discusses, however, this may not be a very important consideration empirically, since recent research suggests little employment effects in changes in the minimum wage (Card, 1992a,b; Katz and Krueger, 1992; Card and Krueger, 1994). This research is consistent either with a monopsony model of the low wage labor market, or with very inelastic demand for low wage labor; in either case, there will be little disemployment effect from increases in health care costs for minimum wage workers.

determine the resulting labor market equilibrium; in general, there will be effects on both the group for which costs increase and the group for which they do not.

In practice, there may be a number of barriers to group, and in particular individual-specific shifting. Most obviously, there are anti-discrimination regulations which prohibit differential pay for the same job across particular demographic groups, or which prevent differential promotion decisions by demographic characteristic.[19] Workplace norms which prohibit different pay across groups or union rules about equality of pay may have similar effects. Thus, a central question for incidence analysis is *how finely* firms can shift increased costs to workers' wages. If there is imperfect group or worker-specific shifting, there may be pressure on employers to discriminate against costly workers in their hiring decisions.

Fifth, this model assumes that the only dimension of compensation offset is wages. In fact, employers may offset rising health insurance costs along other dimensions, such as reducing the generosity of other benefits. Indeed, for fixed cost (per-worker) benefits such as vacation time or other workplace amenities, there will be a natural substitution that will not involve distorting the employment/hours margin.

Sixth, this discussion ignores taxes. As noted earlier, health insurance payments by employers are not treated as taxable income to the employee, while wages are. This means that a dollar of health insurance is worth more than a dollar of wages, increasing the extent to which individuals may be willing to forgo wages as health insurance costs rise.

Seventh, there may be general equilibrium consequences of rising health insurance costs. These considerations will arise from shifts in demand across firms where health care costs rise at different rates, and from substitution between labor and capital. General equilibrium analyses of health care costs

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[19]See Ehrenberg and Smith (1991) for a discussion of U.S. anti-discrimination legislation.

include Danzon (1989), Sheiner (1995b), and Ballard and Goodeeris (1993).

Finally, one issue that is ignored even by these general equilibrium analyses is changes in mobility. The net effect of increasing health care costs on mobility is ambiguous, and depends on the adjustment of the compensating wage differential and the rate of firm insurance offering. In addition, there may be effects on the insurance market itself which inhibit mobility: firms may find it more advantageous to pay fixed screening costs when insurance becomes more expensive. As emphasized by Triplett (1983), these mobility effects have a feedback implication for wage setting. Firms desire to minimize total costs, including the costs induced by high turnover. If increases in the cost/value of insurance lowers turnover, then firms may be willing to continue to offer insurance even if they are not able to lower wages by a comparable amount. This means that the measured cash wage offset may be lower than dollar for dollar, even if firms are seeing no net rise in labor costs.

C. Health Insurance Mandates

Rising uninsurance in the U.S. is a continuing source of policy concern. One frequently discussed approach to addressing this problem is mandating that employers provide health insurance to their workers. Over one-half of the uninsured are in families where the head is a full-time, full-year worker, and another quarter of the uninsured are in families where there is at least part-year and/or part-time attachment to a job (EBRI, 1996). Thus, a broad mandate to workers would potentially go a long way towards eradicating the problem of uninsurance. Moreover, in this era of tight fiscal budget constraints, an "off-budget" approach such as a mandate is politically appealing. It is perhaps for this reason that an employer mandate was the centerpiece of the failed Clinton health care reform effort of 1994.

At the most basic level, the effects of an insurance mandate can be modelled using the same

framework described above for rising health care costs; indeed, this was the original application of Summers' (1989) analysis. But in reality analyzing a mandate introduces several important complications. First, the value of α may be low when mandating the provision of insurance to firms that have chosen not to provide that insurance. As discussed earlier, these firms may face high costs of insurance and/or low worker demand (willingness to pay compensating differentials). Alternatively, however, Summers argues that α may still be close to one in these firms, since they may not be offering insurance due to adverse selection. Moreover, some part of these high loading factors in the uninsured sector are due to adverse selection, through fixed costs of screening potential enrollees. An employer mandate will substantially reduce the potential for adverse selection by making coverage close to universal; as a result, loading factors might fall, raising α.

Second, Summers' analysis applies to the case of a mandate to workers only. In reality, most mandate plans would make some effort to cover non-workers as well. For example, the Clinton reform plan would have offered substantial income-related subsidies for insurance purchase by non-workers. As the generosity of insurance for non-workers rises, it lowers the benefit linkage that causes small efficiency costs of mandates; if there is no need to go to work to obtain insurance, then labor supply will not rise. In the limit, with comparable coverage for workers and non-workers, there will be no linkage, and the mandate will simply operate as a standard tax on employers, with the resultant efficiency cost.

Third, a realistic mandate will have some mechanism for redistributing towards low wage workers for whom the increased compensating differential is particularly burdensome. The structure of the Clinton mandate provides a benchmark for understanding how these subsidies might be structured. There was a cap on employers' health insurance contribution as a share of payroll; firms with average payroll below a given threshold received a subsidy, and firms with average payroll above

the threshold purchased their own unsubsidized insurance. As Sheiner (1995b) highlights, this amounts to a tax on firm payroll below the subsidy level, since increases in payroll reduce the subsidy amount. As a result, this type of subsidy structure gives firms the incentive to split into high and low wage components, in order to maximize the subsidies for the low wage component and simply purchase unsubsidized insurance for the high wage component. In practice, such splits may be difficult, leading to incentives for sectoral shifts by workers in order to maximize homogeneity within firms.

Finally, Browning (1994) emphasizes that the efficiency cost of a mandate must be determined with reference to other pre-existing distortions in the labor market. The marginal deadweight loss of a distortionary intervention rises with the distance from the competitive equilibrium. Thus, if there is not full shifting to wages, mandates will have larger efficiency costs if they are imposed in a market which is already relatively far from competitive equilibrium due to labor market regulations and taxation.

Part III: Evidence on Health Insurance and Job-Job Mobility

Mobility from job to job and in and out of the labor force is a fundamental feature of the U.S. labor market. Over 20 million Americans change jobs each year. Nearly 12 million of those leave jobs with health insurance, and this group has 7 million dependents. And there are potentially millions more who do not leave jobs with health insurance because of fear of losing that coverage, or facing limitations on coverage at their new jobs.[20]

The key question which has been addressed by a small, but growing, literature is: what is the effect of health insurance on mobility decisions? There is considerable anecdotal evidence that "job lock" is an important phenomenon. Surveys have found that between 11 and 30 percent of individuals

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[20]Facts from GAO (1995).

report that they or a family member have remained in a job at some time because they did not want to lose health insurance coverage (Government Accounting Office, 1995). Twenty percent of those who reported job lock in their households cited preexisting conditions as the main reason for not changing jobs. The purpose of the empirical studies in this area is to assess whether these survey responses have real content for mobility decisions in the U.S.

A. Health Insurance and Job Mobility: Empirical Considerations

In theory, testing for the effects of health insurance on mobility is straightforward: one can simply assess whether individuals are less likely to leave jobs that offer insurance. If so, there is prima facie evidence that "job lock" exists.

This was the approach taken by the early literature on benefits and mobility. This literature was primarily focused on the effects of pensions on mobility, but one article, Mitchell (1982), employed this approach to look at the effect of health insurance benefits.[21] She found that having health insurance on the job resulted in a substantial 22% reduction in the odds of quitting that job for men, but the estimate was not significant; there was no effect for women. This finding highlights an important consideration throughout the literature on mobility: power. A number of studies find sizeable mobility effects that are not significant. Some authors refer to these findings as evidence of no effect, but this is not correct; in fact, estimates such as Mitchell's cannot rule out huge effects. Without sufficient precision, it is difficult to draw useful conclusions about health insurance and mobility.

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[21]Results for pensions are not necessarily informative in this context, since the explicit backloaded nature of defined benefit pension plans should increase the mobility-inhibiting feature of this benefit. For work on pensions (or total fringe payments) and mobility, see Bartell and Borjas (1977), Bartel (1982), Mitchell (1982,1983), and Gustman and Steinmeier (1987, 1993). Early work on this topic suggests that pensions significantly reduce quit rates, but Gustman and Steinmeier argue that this result is driven by higher compensation levels at firms that offer pension plans.

More recently, Cooper and Monheit (1993) augmented this approach to consider not only whether the worker held insurance on their current job, but the likelihood of finding insurance on the new job. They find very large (and significant) effects on mobility, with health insurance reducing the odds of job leaving by 23-39% across the different demographic groups that they study.

The problem with this approach is that of *selection*, both on the worker and firm side. We have already seen that, on average, the least healthy workers should choose to work at firms that offer health insurance. But underlying health may be correlated with mobility. An obvious dimension along with such a correlation exists is age: older workers are less healthy, and are less likely to change jobs. But this correlation may exist along dimensions unobserved to the econometrician as well. As a result, a finding that workers at firms that offer insurance are less likely to change jobs may simply reflect the fact that these are the least healthy, and therefore least mobile (for other reasons), workers.

Moreover, the firms that offer health insurance are not directly comparable to firms that do not. This point is illustrated in the lower two panels of Table 2, which show four characteristics of workers in firms that do and do not offer insurance: average weekly earnings; likelihood of firm-offered pension; likelihood of firm-offered short-term disability coverage; and likelihood of firm-offered long term disability coverage. The differences across these two types of firms is dramatic. Workers in firms that offer insurance have earnings that are over twice as high, and they are roughly *eight times* more likely to be covered by other benefits.

These differentials do not arise simply because of differences in the size of firms that offer and do not offer insurance. The remainder of these panels show wages and benefits offering within firms that do and do not offer insurance, divided by firm size category. Within every size category, wages are much higher and benefits much more generous at firms that offer health insurance relative to those that do not. These findings are consistent with the large labor economics literature on inter-industry

wage differentials, which documents persistent pay differences between "good" and "bad" jobs over space and time; this taxonomy could apply equally well to the rate of health insurance offering.[22]

As a result of these differentials, it is difficult to disentangle the effect of insurance per se on the mobility decision. If individuals are reticent to leave these "good" (high wage/generous benefit package) jobs for reasons other than health insurance, then this would be perceived as "job lock". What is needed to disentangle the effect of insurance per se is some way to control for the confounding influence of these other job characteristics.[23]

B. Solution: Variation in the Value of Health Insurance

While this selection problem was perhaps recognized, it was not seriously addressed by empirical economists until the early 1990s. At that point, a series of articles proposed to address this problem by application of "differences-in-differences" (DD) methodology. The idea of this approach is to find two groups for whom job-lock should operate differentially strongly, for example because the former group has much higher expected medical expenditures than the latter, but for whom the other characteristics of the "good jobs" that offer insurance should be valued equally. Then, one can contrast the effect of employer provided insurance on these two groups. If job lock is important, the reduction in mobility from employer-provided insurance should be much stronger for the group with high insurance valuation than for the comparison group.

This approach is illustrated nicely by Madrian (1994a). Consider the following matrix of

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[22]See, for example, Katz and Dickens (1987).

[23]Cooper and Monheit do attempt to control for selection on both the worker and firm side by including a number of controls for worker characteristics (including health status) and other firm benefits. The fact that estimates from Madrian (1994), using the same data set but a plausibly more convincing identification strategy, are similar suggests that the approach used by Cooper and Monheit may be sufficient to control for selection.

mobility rates:

	Employer-Provided Health Insurance	
Value of Health Insurance	No	Yes
High	M_{00}	M_{01}
Low	M_{10}	M_{11}

One approach to measuring job lock would be to compute (M_{01} - M_{00}), which would measure the effect of having employer-provided insurance on mobility rates for a group that should be job-locked. But this approach runs into the criticism levied above that the jobs that offer insurance may also offer other amenities which make job leaving unattractive. The advantage of differences-in-differences analysis is that this criticism can be addressed by using those with low value of insurance as a control group. That is, the difference (M_{11} - M_{10}) should not reflect job lock, but should reflect the other amenities of jobs that offer health insurance. Thus, by computing the difference of these differences, (M_{01} - M_{00}) - (M_{11} - M_{10}), one can measure the pure effect of job lock net of any other amenities. That is, by using the low valuation group as a control, one can hold constant the value of other job attributes, and identify separately the value of insurance.

More precisely, this approach suggests a regression specification of the following form:

(9) $\quad MOVE = f(\alpha + \beta_1 HI + \beta_2 VALUE + \beta_3 HI*VALUE + X'\delta + \epsilon)$

where MOVE is a dummy variable for job switching, HI is a dummy for having health insurance on one's job, VALUE is an index of the value of that insurance, and X is a set of person and/or job-specific covariates. In this formulation, β_1 captures the other aspects of jobs that affect mobility, and β_2 controls for secular differences in mobility rates between workers who do and do not value insurance. The interaction β_3 measures the differential value of having health insurance for those who value that insurance, relative to those who do not, which proxies for job lock.

Several studies using this approach are reviewed in Table 3. Madrian (1994a) employs three proxies for VALUE using data from the National Medical Care Expenditure Survey (NMES). This survey followed individuals for four quarters in 1987, and collected information on job transitions; it is also the best source of data (since its 1977 counterpart) on health insurance expenditures and health status. Her first proxy is an indicator for whether the spouse does not have insurance coverage: if spouses are insured, it lowers the value of own insurance, mitigating job lock. The other proxies are more direct indicators for potential medical expenditures (and thus the value of having insurance coverage): family size and pregnancy of the spouse. All three DD estimates yield significant and sizeable estimates, suggesting mobility reductions on the order of 30-67%.

Holtz-Eakin (1994) pursues the spousal insurance and health status interactions in the Panel Study of Income Dynamics (PSID) for 1984; this longitudinal survey also collects information on job transitions and health insurance coverage. He finds some evidence of job lock from the spousal insurance interaction over one year, but the effect is small (8.6% mobility reduction from no spousal insurance) and insignificant; and it is wrong-signed over a three year period. He also finds little effect from his health status interactions, although he only reports t-statistics and not coefficients so that it is hard to assess the magnitude of the results.

Anderson (1997) estimates the effect of job lock in the National Longitudinal Survey of Youth (NLSY), which follows a sample of 14-21 year olds in 1979 over the subsequent years. This provides the longest panel of longitudinal data that has been used to address this issue, allowing Anderson to estimate sophisticated hazard models of mobility. Following Madrian's pregnancy identification strategy, she estimates significant job lock: job lock among men with a pregnant spouse lowers mobility by about 34%. She also draws a potentially important distinction between "job lock" and "job push", where the latter is defined as individuals who leave jobs without health insurance because of a desire

for coverage; she finds that roughly half of the total effect estimated in her paper is actually "job push".

One potential problem with the use of the spousal insurance proxy is that spousal insurance is not exogenously assigned. It is therefore plausible that the effects of health insurance on mobility may differ across workers with and without spousal insurance for other reasons.[24] This point is addressed in more detail by Buchmueller and Valletta (1996). They also use spousal insurance as a proxy for VALUE in the Survey of Income and Program Participation (SIPP), which interviews individuals every four months for up to three years, collecting information on job transitions, insurance coverage, and health care utilization. They control for whether the job offers a pension, as well as job tenure, both important correlates of mobility. They also account for the potential endogeneity of spousal insurance through modeling the joint mobility decisions of husbands and wives. Their results are very similar to Madrian's in magnitude, with mobility reductions of 25-32% for dual earning men from no spousal insurance, and of up to 49% for dual earning women; they find little effect of accounting for potential endogeneity. This suggests that the omission of pensions and tenure in Madrian's estimation did not lead to significant bias, which is consistent with the assumption that the spousal insurance interaction proxies for job lock and not other job features. On the other hand, their estimates for men are not significant.[25]

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[24]For example, among the class of workers with health insurance, husbands with working wives may hold jobs with worse amenities along other dimensions, such as pay, which is why the wife is working. If this is not true for workers without health insurance, the DD estimate would understate the effect of health insurance, since the control group will be more "locked" into their job by the other amenities than will the treatments. Madrian (1994) addresses this point to some extent by conditioning on the wife's labor force status, but she does not control in detail for other amenities of either the husband's or wife's job. This point is made in Slade (1997) as well.

[25]Buchmueller and Valletta do also estimate job lock for sole earning men, single men, and single women, estimating mobility reductions on the order of 17% to 45%. But these models are identified only by the effect of insurance, and not by an interaction with VALUE, raising the identification problems noted earlier (particularly given the lack of controls for worker health status in these models).

This potential criticism is also levied by Kapur (1998). She addresses this question more directly in the NMES data by examining job lock only among those with insured spouses, using as the measure of value three different indicators of medical demand (such as the presence of chronic illness). She finds that in this sample there is little evidence of job lock, and her estimates are fairly precise. She also argues that Madrian's estimates using pregnancy and family size are biased, and she demonstrates that fixing these biases results in small and insignificant findings.

The other approach that has been taken in this literature is to rely on variation in the availability of government mandated continuation coverage. Over the past twenty years, states and the federal government have passed continuation of coverage laws which mandate that employers sponsoring group health insurance plans offer terminating employees and their families the right to continue their health insurance coverage through the employer's plan for a specified period of time. Although individuals must pay the full average cost of their group insurance, the price may be well below that of a policy purchased in the individual market, especially for individuals with high medical expenditures.[26] Moreover, as documented above, group insurance is typically much more generous than policies purchased in the non-group market along a number of dimensions, including the fact that pre-existing conditions exclusions and underwriting are much more severe in the individual market. Thus, having continuation of coverage benefits available provides a potentially valuable temporary source of portability for the worker who leaves his job. Indeed, Gruber and Madrian (1994, 1996) estimate takeup rates of continuation of coverage benefits to be roughly two-thirds among younger job leavers and retirees.

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[26]Gruber and Madrian (1994) estimate that the price of a family policy purchased in the non-group insurance market for a family policy for a 40 year old man with a wife and two children was 40% higher than the price of continuing group coverage; Gruber and Madrian (1996) estimate this differential to be 70% for a married couple with a 58 year old head.

Continuation of coverage laws generally apply to all separations (except those due to an employee's gross misconduct), although in some states benefits are restricted to those who leave their jobs involuntarily. They often also provide benefits to divorced or widowed spouses and their families. The first such law was implemented in Minnesota in 1974. More than 20 states passed similar laws over the next decade before the federal government, as part of its 1985 Consolidated Omnibus Reconciliation Act (COBRA), mandated such coverage at the national level. The state laws generally provided continuation coverage for 6-12 months, while the federal statute mandated such coverage for 18 months.

The availability of continuation coverage should mitigate job lock, by providing a temporary bridge to those who will be unemployed during their search, who will move to a job without coverage, or who will be at temporarily uncovered on their new job.[27] This suggests that a natural test for job lock is an assessment of whether easing job lock through continuation coverage affects mobility. The advantage of this approach relative to the DD tests denoted above is that the variation across states and over time in the availability of continuation coverage provides clearly exogenous variation in the extent of job lock. The disadvantage is that this is only limited portability, as opposed to the more permanent portability represented by (for example) spousal insurance coverage.

Gruber and Madrian (1994) model transition rates out of jobs as a function of the months of continuation coverage that are available, in the SIPP data for 1983-1989. They find a significant effect of continuation coverage on mobility rates: one year of such coverage raises mobility rates by 12-15%. Given that this is relatively limited portability, this is a sizeable effect, which is consistent with an important role for job lock. Gruber and Madrian (1997) follow on this analysis by considering

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[27]In principle, before 1990 COBRA coverage could not be continued if individuals found a new job that offered insurance, even if they were not yet covered by that insurance. In practice, it is difficult to know how well this provision was enforced.

specifically the impact of continuation of coverage mandates on transitions out of employment, as opposed to job-job movements. They find that a) almost all of the effect of continuation mandates is on movements out of employment; b) there appears to be relatively little effect on non-employment durations, conditional on separation; and c) continuation mandates are important in maintaining the insurance coverage of job leavers, particularly those who are subsequently non-employed for a year or more, where continuation coverage raises the odds of insurance coverage by 19%.

To summarize, the weight of the evidence on job lock suggests that it is a significant phenomenon, with employer-provided insurance reducing mobility by roughly 25-30%. But there remains considerable disagreement. This disagreement revolves around two issues. The first is the validity of spousal insurance as a proxy for value. Virtually all studies that have used spousal insurance as a value proxy have found significant job lock, and the estimates in Madrian (1994a) and Buchmueller and Valetta (1996) that attempt to control for omitted variables correlated with spousal insurance still yield large effects. But Kapur's (1998) criticism that the population with spousal insurance is simply not comparable to the population with such insurance has merit, and estimates that use other value proxies are somewhat more mixed. The second is power considerations, as highlighted by the fact that even the relatively large estimates for married men in Buchmueller and Valetta (1996) are not significant. Definitive resolution of this debate will require further investigation with larger samples in longitudinal databases like SIPP and NLSY, using the variety of identification strategies suggested in this literature.

D. Self-Employment Decisions

A related but distinct question to that of job-job mobility effects is the effect of health insurance on decisions to move into self-employment. The first study to examine this was Holtz-Eakin, Penrod,

and Rosen (1994) examined the transition to self-employment. Their estimates of this "employment lock" from the SIPP are quite large, ranging from 9.2% to 15.3%; but they are generally insignificant. Their estimates from the PSID are smaller and also insignificant, but the confidence intervals are once again very large.

A more recent study by Madrian and Lefgren (1998) revisits this issue using a larger number of years of SIPP data. They find somewhat larger effects that are statistically significant, due to the resulting increase in precision. For example, using the presence of spousal health insurance as a proxy for value, they estimate that job lock lowers transition rates to self-employment by 25%; they also find significant effects using family size and continuation of coverage mandates as value proxies.

D. Welfare Implications

While there is some uncertainty about the empirical importance of job lock, it pales in comparison to the uncertainty about its normative implications. On the one hand, reduced mobility should have negative implications for economic efficiency because workers are not moving to jobs where they are most productive for fear of losing health insurance. On the other hand, reduced mobility has the benefit that it allows firms to reap the benefits of firm-specific human capital investments. That is, by locking workers into their jobs, health insurance may induce firms to invest more in their firm-specific capital. As Madrian (1994a) notes, however, job lock is a particularly inefficient means of reducing employee turnover, since it is the least healthy employees who will stay in their jobs; it would be more efficient to use other mechanisms such as age-wage profiles or pension benefits to achieve this goal.

To the extent that there is inefficiency in job matching, the next question is the empirical magnitude of the efficiency loss. A number of studies document large wage gains from job-job

mobility, suggesting important efficiency costs to mobility restrictions through job lock. Bartel and Borjas (1977) estimate that individuals who report leaving their job because they found a better one (presumably the relevant population for computing the benefits of easing job lock) had wage gains that year that were 6% higher per year than those that stayed on their job. On the other hand, they found insignificant effects on future wage growth, suggesting that these gains were short lived. Bartel (1982) also finds wage gains of 3% for young male quitters, but not for mature men. And Topel and Ward (1992) find that job turnover among younger workers is critical to the process by which they settle into lifelong careers. They estimate that there are very large wage increases associated with job changing: quarterly wages rise by 11% for workers who change jobs, as compared to wage gains of roughly 1% for those who remain in their jobs. As a result more than one-third of early career wage growth is associated with job changing.

On the other hand, the literature on wages and mobility does find that the beneficial effects of mobility decline with age. Indeed, Topel and Ward find that the wage change with job changing is only one-third as large at 7.5-10 years of experience as at 0-2.5 years. Thus, the older workers for whom job lock may be most important are the ones for whom the costs of mobility restrictions may be lowest. This suggests that using average wage gains or productivity improvements from better job matching may overstate the benefits of reducing job lock.

Clearly, what is needed here is an empirical investigation of not whether job lock exists, but its implications for productivity. A suggestive piece of evidence on this front is provided by Gruber and Madrian (1997). They model the reemployment earnings of job leavers as a function of whether continuation coverage is available in the worker's state/year; does loosening job lock through providing continuation coverage improve subsequent job matches? They find that one year of continuation coverage availability doubles the reemployment earnings of job leavers who take up that coverage. This

very large finding suggests that job lock does have very important efficiency consequences; but the almost implausible magnitude also suggests the value of further investigation of this question.

Part IV: Health Insurance and Participation in the Labor Force and Public Assistance Programs

A. Health Insurance and Retirement

As highlighted in Part II, the existence of rents attached to jobs with health insurance implies that workers will be reluctant to move from these jobs out of the labor force. In particular, this effect might be strongest around the retirement decision, since older workers are the group which are earning the largest rents from within-workplace pooling of insurance purchase.[28] For retirement at age 65 or greater, individuals will have their basic medical needs covered by the Medicare program, so that there should be little net effect of on the job insurance on work decisions.[29] But for individuals contemplating early retirement, the presence of insurance on the job and the lack of insurance off the job may be an important deterrent to job leaving. This is because of the high and variable medical cost exposure for older individuals, as documented in Table 4, which shows a variety of indicators of health status by

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[28]Unless, of course, employers are able to shift the higher costs of experience rated insurance of older workers to their wages. Sheiner (1995a), in a paper discussed below, suggests that this is in fact the case. Even if there is shifting of employer costs to older workers, however, this group may still value employer-provided insurance particularly highly for two reasons. First, the variance of medical expenditures grows with age as well, raising the value of having insurance. Second, the differential cost of individual and group policies rises with age, so that even if they are paying for it, older workers would rather have group coverage than face the individual insurance market.

[29]There may be some remaining effect due to incompleteness in Medicare coverage; along a number of dimensions (high copayments and no prescription drug coverage), Medicare is less generous than existing employer-provided insurance plans.

age.[30]

There is a clear deterioration in health and increase in medical utilization/spending after age 55. Compared to those age 35-44, for example, those age 55-64 are: twice as likely to report themselves in fair health and four times as likely to report themselves in poor health; four times as likely to have had a stroke or have cancer, seven times as likely to have had a heart attack, and five times as likely to have heart disease; twice as likely to be admitted to a hospital (and spending twice as many nights in the hospital if admitted), and 40% more likely to have a prescribed medicine (and having twice as many medicines if they have a prescription). As a result, the medical spending of 55-64 year olds is almost twice as large, and twice as variable, as that of 35-44 year olds.

Despite their higher medical costs, the extent of insurance coverage among 55-64 year olds is similar to that of 25-54 year olds. Overall, 12 percent of 55-64 year olds are uninsured, compared to 15.4 percent of 25-54 year olds (Gruber and Madrian, 1995). Half of non-working older individuals are covered by employer-provided insurance, either in their own name or a spouse's, which reflects the fact that 45 percent of individuals work in firms that provide retiree health insurance (Madrian, 1994b). However, 31 percent of older non-workers are either uninsured (14 percent) or purchase insurance in the individual market (17 percent). It is these individuals who potentially find themselves in this situation who might be expected to remain on their (insured) jobs rather than retire, since, as documented above, individual insurance is both very expensive and much less generous than group coverage.[31]

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[30]This table summarizes Tables 1-4 in Gruber and Madrian (1996). Medical expenditures above age 65 is the value for age 65-74 in their Table 4.

[31]Gruber and Madrian (1996) document that a health insurance policy for a 58 year old man and his wife purchased on the individual market in Massachusetts in 1993 would cost $8640, which was 26% of the average family income of retired individuals age 55-64 in that state and year.

Furthermore, there is also considerable anecdotal evidence that health insurance should be an important determinant of retirement. In a Gallup poll, 63% of working Americans reported that they "would delay retirement until becoming eligible for Medicare [age 65] if their employers were not going to provide health coverage" despite the fact that 50% "said they would prefer to retire early - by age 62" (EBRI, 1990). Despite these persuasive arguments, and despite the existence of an enormous literature on the effects of health status on retirement decisions,[32] it is only over the past five years that researchers have focused on the effect of the availability of retiree health insurance coverage on the retirement decision.

The first approach to answering this question follows the original mobility literature (Mitchell, 1982) by modeling retirement decisions as a function of whether the worker has retiree coverage available. This approach is taken by Gustman and Steinmeyer (1994), Madrian (1994), Headen, Clark, and Ghent (1995), Hurd and McGarry (1996), Blau and Gilleskie (1997), and Rust and Phelan (1997). These studies universally find a very significant effect of retiree health insurance on retirement, particularly if the employer pays the full costs of this insurance. Gustman and Steinmeyer (1994) have the most mixed findings, depending on the concept employed: they find small effects on the average age of retirement, which falls by only 1.3 months, and on the share of the workforce retired at age 62, which rises by only 1 percentage point (2%); but they find large effects on the hazard rate at age 62, which rises by 6 percentage points (47%). The reason for this dichotomy is that part of the effect of retiree insurance in their model is to delay retirement until the age of eligibility, which is assumed to be age 62, so that the effect on the flow at 62 is much larger than the effect on the stock at that age. This large effect on hazard rates is confirmed by Blau and Gilleskie (1997), who find an 80% effect on

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[32]See, for example, Diamond and Hausman (1984); Bazzoli (1985); Bound (1989); and Stern (1989). See also the recent review in Currie and Madrian (1998).

the hazard rate if insurance is fully paid by the employer, and a 26% effect if it is only partially paid, and by Rust and Phelan (1997). Other studies, such as Madrian (1994), Headen Clark, and Ghent (1995), and Hurd and McGarry (1996), do find significant effects on the odds of being retired early (a stock measure, as opposed to the flow hazard rate) on the order of 20-50% (with one of Madrian's estimates as high as 80%).

The second approach is adopted by Karoly and Rogowski (1994), who use the SIPP data for 55-64 year olds to examine early retirement. They do not observe in these data whether individuals have retiree insurance available, so they form a proxy based on firm size, industry, and region. They then include this proxy in a reduced form regression for early retirement, so that these excluded variables are in essence serving as instruments for retiree coverage. They also estimate fairly large effects, with retiree coverage associated with an 8 percentage point (47%) rise in the odds of early retirement, and a 100% increase in the hazard at age 60.

The third approach, used by Gruber and Madrian (1995, 1996), is to model early retirement as a function of the availability of continuation coverage. Continuation coverage acts as partial retiree health insurance coverage, by allowing retirees to buy cheap group coverage to cover at least part of their retirement period. Gruber and Madrian use both CPS and SIPP data to estimate the effect of continuation coverage availability on both the stock of early retirees and flows into early retirement. They find that there are sizeable effects: one year of continuation coverage increased the hazard rate into retirement by 32%.

These three approaches each have potential weaknesses. The first approach suffers from the selection problems discussed under Part III.A. The potential importance of these problems is illustrated in the results of Blau and Gilleskie (1997), who find that the effects of retiree health insurance are not any larger for those in poor health than for those not in poor health; this suggests that much of the main

impact of retiree health insurance may be due to selection. This selection is ideally controlled for in the rich structural modeling of Gustman and Steinmeyer (1994) and Rust and Phelan (1997), but the lack of complete data on retiree health insurance characteristics in the older RHS data (such as data on the exact timing of insurance availability) hamper these efforts.[33] The second approach suffers from the fact that firm size, industry, and region may not be legitimate instruments for retiree coverage, since they may be independently correlated with other determinants of retirement (such as pension coverage).[34] And the third approach, while potentially the cleanest in terms of identification, can only provide a rough indication of the effect of retiree insurance coverage, since continuation benefits are so limited relative to full coverage. Nevertheless, despite these weaknesses, the papers broadly agree that health insurance is an important determinant of retirement decisions, with retiree health insurance raising the odds of early retirement by 20-50%, and the hazard rate into retirement by 50-100%.

A natural implication of these findings is that an explanation for the very high rates of retirement at age 65 is eligibility for the Medicare program. Blau (1994), for example, reports that one-quarter of men who are still working at age 65, the age of Medicare entitlement, retire within three months of their 65th birthday. And, as Lumsdaine, Stock, and Wise (LSW, 1996) note, retirement rates at age 65 are far in excess of what would be predicted based on the incentives inherent in Social Security and private pension plans. But early work by these authors in both this paper and LSW (1994) failed to find an important role for Medicare in retirement decision-making. In LSW (1994), the authors incorporate the valuation of Medicare into a structural retirement model estimated on data from one firm, and find

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[33]In addition, studies such as Madrian (1994) and Headen, Clark, and Ghent (1995) suffer from potential selection bias in the examination of workers that are both already retired (since the point of the paper is that retirement is correlated with retiree insurance) and alive (since retiree insurance may affect the odds that individuals are still living at the survey date).

[34]Karoly and Rogowski do include a variable for pension eligibility in their model, but the fact that it does not enter significantly raises questions about its validity as a control for the effect of pensions.

little effect on retirement behavior. This is perhaps unsurprising, however, since the firm that they use provides retiree health coverage. But in LSW (1996), the contrast the "excess" retirement at age 65 at firms that do and do not have retiree coverage, and they find no major differences, once again belying a causal role for Medicare.

More recent work, however, has begun to uncover evidence of the importance of Medicare which is consistent with the broader literature on health insurance and retirement. Rust and Phelan (1997), using a dynamic programming model, estimate that there is a large role for Medicare, and that it can in fact explain the extent of "excess retirement" at age 65. The major difference between this paper and the LSW work appears to be that in the Retirement History Survey there is much more evidence of differentially large spikes at age 65 for those without employer-provided retiree insurance than for those with this coverage. In addition, Madrian and Beaulieu (1998) find that men are significantly more likely to retire early if their spouse is over age 65, once again suggesting a significant role for Medicare.

Clearly, the next step for research in this area is to build on the strengths of the longitudinal data analysis in Gustman and Steinmeier and LSW, while taking more seriously issues of selection. This should be very feasible given the excellent new data on retirement, pension characteristics, and retiree health insurance in the new Health and Retirement Survey (HRS). Future work using this data, perhaps building on the identification strategies successfully employed in the "job lock" literature, will be useful in pinning down the magnitude of the retirement effect. In particular, an important priority is to further integrate the modeling of employer-provided retiree coverage and Medicare.

As with the mobility literature, there is also an important question here of how to interpret the welfare implications of these findings. For those without retiree coverage, the availability of lower cost group insurance on the job, but only expensive individual insurance after retirement, is a potential

source of inefficiency. The fact that workers respond so strongly to retiree coverage suggests that there may be large welfare gains from reducing this inefficiency by increasing the availability of group coverage for early retirees. That is, a policy of continuation coverage which was not limited to 18 months, but which extended until age 65, would increase welfare by "leveling the playing field" between working (where presumably the cost of insurance is paid through lower wages) and retirement (where it would be paid out of pocket).[35] At the same time, there are at least two mitigating factors that reduce the welfare cost of this "retirement lock". First, as noted above, reduced retirement may provide a mechanism for firms to reap the benefits of firm-specific human capital investments. Second, increases in retirement would decrease tax revenues from taxing the high earnings of older workers, which is not accounted for by workers in making their retirement decision, since they compare their after-tax earnings to the value of leisure.

B. Health Insurance and Public Assistance Participation

Another margin along which health insurance might affect labor supply is public assistance participation. A key feature of several public assistance plans is that, in addition to cash benefits, individuals qualify for Medicaid coverage of their medical expenses. The major plans that feature this linkage are cash welfare for low income single female-headed families, formerly Aid to Families with Dependent Children (AFDC) and currently Temporary Assistance for Needy Families, and Supplemental Security Income (SSI) for low income disabled persons and elderly. This coverage can amount to quite a valuable benefit, since Medicaid provides first dollar coverage of physician and

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[35]Indeed, Gruber and Madrian (1995) infer from the retirement response to continuation availability (relative to the response to pension wealth) that one year of continuation coverage is worth $13,600 to workers, a figure substantially above the $3600 in expected financial savings from having a continuation policy (relative to individual insurance).

hospital expenditures, as well as coverage of prescription drugs and other optional benefits (vision, dental care) in many states. In addition, the work opportunities available to potential AFDC and SSI participants are low-wage, low-skilled jobs without health coverage.[36] As a result, the linkage of Medicaid to public assistance participation both encourages non-workers to sign up for the programs, and taxes work among potential recipients. That is, there is a form of "welfare lock": individuals are reticent to leave government programs because they will lose their health insurance.

This effect is illustrated in Figure 2, from Yelowitz (1995). This figure shows the welfare receipt and work decisions of a single woman with children, who can receive AFDC if her income is below. This woman trades off utility from leisure and from consumption of goods that is financed from wage income or from welfare payments. The recipient faces a constant post-tax wage w^0. However, she is assumed to be unable to obtain a job with health insurance.[37]

At zero income, this woman receives a certain amount of cash welfare income from AFDC, as well as in-kind benefits, such as Food Stamps and Medicaid. As she earns labor income, her AFDC and non-Medicaid in-kind benefits are taxed away at a high marginal rate, so that her after-tax wage is $w^1 = (1-\tau_{AFDC})*w^0$.[38] Once she works more than $H_{breakeven}$, the hours of work where the entire welfare benefit is taxed away, she loses her AFDC eligibility, and hence her Medicaid benefits. This creates a dominated part of the budget set, known as the "Medicaid notch". This notch provides a major

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[36]I use AFDC to summarize the effects of AFDC/TANF, since all of the work in this area refers to the older program.

[37]Equivalently, she may be able to obtain a job with insurance, but only at a compensating differential which exactly equals her valuation of that insurance. Short, Cantor and Monheit (1988) find that 43% of people who left welfare were covered by private health insurance. Since only those with the best opportunities leave welfare, the likelihood of finding a job with insurance for the average welfare recipient, should they leave the program, is quite low.

[38]This marginal rate is 67% for the first four months, and 100% thereafter (after a basic exemption and some deductions for work and child care expenses).

disincentive to working her way off welfare. As Yelowitz documents, for a mother with 2 children in Pennsylvania in January, 1991, the woman would have to earn more than $5000 additional dollars off welfare to break even with her income on AFDC at point $H_{breakeven}$.

A number of studies have addressed the welfare lock question in the context of the AFDC program, as reviewed in Table 6. There have been three basic empirical approaches used in this literature. The first is to use differences in individual characteristics to predict who is likely to be "locked" into the AFDC program by Medicaid due to high medical spending, and then to assess differential participation rates by this imputed value of Medicaid. Ellwood and Adams (1992) follow this approach using administrative Medicaid claims data to examine exits from AFDC, and Moffitt and Wolfe (1992) model participation as a function of imputed value in the SIPP. The results are fairly similar, showing sizeable decreases in the likelihood of exiting AFDC as the imputed value of Medicaid rises.

The second approach is to abstract from individual health, and to use variation in the characteristics of state Medicaid programs to identify the value of Medicaid to the potential AFDC participant.[39] Blank (1989) was the first to pursue this approach, estimating models of AFDC participation and hours of work on average state Medicaid expenditures and the presence of a state Medically Needy program, which provides Medicaid to non-AFDC families if their income net of medical expenditures falls below a certain floor. She finds no effect of either policy variable on AFDC participation. Winkler (1991) also finds no effect of average expenditures on AFDC participation, but does find an effect of average expenditures on labor force participation, a finding echoed by Montgomery and Navin (1991) (albeit with a much smaller estimate). But there is no effect of Medicaid

[39]Features of the state Medicaid program are included in the set of variables used to predict Moffitt and Wolfe's (1992) index, but the papers discussed below use only state features for identification.

expenditures on participation in Montgomery and Navin's work once state fixed effects are included in the regression models.

The third approach that has been taken to this question extends the notion of using state parameters, to exploit the most dramatic change in insurance policy in the U.S. in the past 25 years: expansions of the Medicaid program to children and pregnant women living in non-public assistance receiving households. As described in more detail in Gruber (1996), these Medicaid expansions were phased in across the states since 1984, proceeding first by state option and then by federal mandate. By mid-1991, eligibility was extended to any child under age 6 or any pregnant woman (for the expenses of pregnancy only) in a family living below 133% of the poverty line, as well as to any child born after September 30, 1983 living below the poverty line, regardless of family composition. In addition, states had the option of expanding coverage even higher up the income distribution, an option taken up (in 1996) by over half the states. Currie and Gruber (1996a,b) estimate that as a result of these expansions by 1992 almost one-third of all children in the U.S. and almost one-half of pregnant women are eligible for Medicaid coverage of their medical expenses.

As Yelowitz (1995) notes, these expansions served to decouple Medicaid eligibility from AFDC receipt, thereby providing precisely the variation needed to separately identify the role of Medicaid from that of other factors in determining welfare participation. A key feature of these expansions was variation across the states in the timing and generosity of increased income limits. Indeed, there was even variation within states at a point in time, due to different age cutoffs for eligibility of children across the states. This allows Yelowitz to form plausibly identical groups of families, some of which (the "treatments") were able to leave AFDC and retain their Medicaid coverage, and others of which (the "controls") were not. And he finds significant effects of being in the treatment group on both AFDC participation and labor force participation: he estimates that increasing the income cutoff for

eligibility by 25% of the poverty line decreases AFDC participation by 4.6% and increases labor force participation by 3.3%.

A related approach is taken by Decker (1994). She examines the effect of the introduction of the Medicaid program in the late 1960s and early 1970s on AFDC participation in that era. Since the Medicaid program was phased in across the states over a period of several years, she is able to assess whether states that adopted Medicaid saw a subsequent increase in their AFDC rolls, relative to states that did not. In fact, she finds a very strong effect, with the introduction of Medicaid leading to a 6.4 percentage point (24%) rise in the odds that a single female head participates in AFDC.[40]

As with the retirement literature, these different approaches each have some potential weaknesses. A problem with the individual health valuation approach is it hinges on the assumption that a family's value of Medicaid does not capture other factors that determine AFDC participation. This is unlikely to be true, however, since individual health status (a key predictor of Medicaid valuation) will be independently correlated with desired labor supply and AFDC participation; as noted above, there is a large literature that finds a substantial negative effect of health status on labor force participation. Both studies recognize this potential problem, and attempt to address it by examining separately the effects of the family head's health status and that of the children in the family; Ellwood and Adams find that increases in expected children's spending had similar effects to their main findings, while Moffitt and Wolfe found effects that were only one-third as large for the children's component of their index as for the adult component.[41]

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[40]For this era, however, her results indicate that this increase is primarily due to increased takeup among those already eligible for AFDC, not due to reduced labor supply in order to make oneself eligible; but the labor supply effects are imprecisely estimated.

[41]Even this approach has the problem, however, that potential AFDC recipients may be reluctant to go to work if they have a sick child, regardless of Medicaid coverage.

There are potentially more serious problems with using average state Medicaid expenditure as a proxy for the value of the program to the typical family. This is a very noisy proxy for the underlying quality of the Medicaid package; as a result, measurement error will bias downwards the estimated effect of Medicaid. Moreover, much of the variation in this measure comes from variations in the underlying health of the Medicaid population, which will be spuriously correlated with participation decisions. For example, if the marginal persons joining Medicaid is healthier than the average person enrolled, then states with high participation will have low Medicaid costs, once again biasing against a finding of welfare lock.

Finally, while the use of legislative variation in Medicaid in the work of Yelowitz and Decker once again provides potentially the cleanest identification strategy, there is the problem of limited applicability. For example, the Yelowitz findings only apply to the marginal population made newly eligible for the expansions, which may not provide insight for the "harder core" of long-term AFDC enrollees. Nevertheless, the strong findings of this approach, as well as those of the health valuation approach, lead one to the conclusion that welfare lock is an empirically important phenomenon.

In a series of subsequent studies, Yelowitz has explored the effect of Medicaid on participation in other public assistance programs. The first is SSI; as Yelowitz highlights, this program is actually larger in dollar terms than is AFDC, and the same type of welfare-lock problem arises in this context. For elderly SSI recipients, this problem arises because the Medicaid coverage that they receive on SSI pays for their non-covered Medicare expenditures. Using an expansion of Medicaid for the elderly, Yelowitz (1996a) finds a non-trivial welfare lock for this population as well. For the disabled, who get Medicaid if on SSI, Yelowitz (1996b) follows the second approach noted above, using variation across states in the Medicaid spending to proxy for the program's generosity. But he addresses the problems with this approach by instrumenting average spending on the disabled by spending on blind recipients,

a proxy for program generosity that is uncorrelated with the disabled case mix, and which as a result solves the selection problem inherent in the average expenditures measure. He finds that instrumenting substantially raises his estimates (suggesting that the problems described above are real), and that growth in Medicaid generosity over 1987-1993 can explain almost all of the substantial growth in the SSI disabled caseload. Finally, Yelowitz (1996c) asks whether increased eligibility for Medicaid raises utilization of the food stamps program, both through reducing labor supply and increasing awareness of public assistance programs. Using the same estimation approach as Yelowitz (1995), he finds that Medicaid eligibility does increase food stamp participation, and that this increase occurs through both channels.

Thus, to summarize, this literature suggests that health insurance is a very important determinant of public assistance participation. This has two important welfare implications. First, it suggests that reduced public assistance expenditures may offset a share of the increased costs of expanding health insurance availability. Yelowitz (1995) estimates that expanding eligibility for Medicaid to all women and children with incomes below 185% of the poverty line in 1989 would have saved the government $410 in expenditures per female-headed household per year. Second, there may be non-financial costs to the increase in welfare dependence that results from welfare lock. A number of analysts have suggested a hysteresis-type model of welfare behavior, with exposure to the welfare system increasing future utilization, by both a mother and by her children as adults (Murray, 1984). Existing evidence on welfare dependence is mixed, with some recent studies concluding that there is little intergenerational transmission of welfare (Zimmerman and Levine, 1993). But this possibility highlights the benefits of moving welfare recipients off of the public assistance rolls through reducing welfare lock.

Reducing welfare lock through public insurance expansions can also have additional effects on labor market equilibrium, through adjustments of private insurance coverage and wages. As Cutler and

Gruber (1996a) note, the typical privately insured family pays for about one-third of its medical costs out of pocket, but Medicaid coverage is comprehensive and free. Moreover, two-thirds of those made eligible by the Medicaid expansions already had private insurance coverage. These facts highlight the possibility that expanded public insurance eligibility could "crowd out" private insurance coverage. Such crowdout could occur through employers dropping insurance coverage if a large share of their workforce is public insurance-eligible, or through employees not taking up somewhat costly employer coverage in the face of eligibility for free Medicaid coverage. Recent evidence suggests that crowdout is quite sizeable. Cutler and Gruber (1996a), who study the Medicaid expansions over the 1987-1992 period, find that for every two persons who joined the Medicaid program one person lost private insurance coverage; Currie (1996) and Rask and Rask (1995) also find large crowdout effects, although Dubay and Kenney (1997) find smaller effects.[42]

If there is crowdout, then public insurance expansions will not only reduce welfare lock, but will also potentially reduce job lock as well. By providing extra-workplace insurance coverage for workers or their dependents, Medicaid frees up workers to move to more productive positions. In addition, there may also be effects on wages and hiring, since employer insurance costs have been shifted to the government. As Cutler and Gruber (1996b) note, if the costs of health insurance are fully shifted to wages (as is supported by the literature reviewed below), then the Medicaid expansions provided a transfer of $1523 to the average family made eligible. If they are not shifted to wages, then they provide a subsidy to the hiring of the low wage workers who are likely to be eligible for the program,

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[42]See Cutler and Gruber (1997) for a response to Dubay and Kenney (1997). Cutler and Gruber's (1996a) results do not imply that one-half of those joining the Medicaid program came from being privately insured, since some of those losing their private coverage in response to the expansions may become uninsured. For example, a family may drop coverage when the children and wife become Medicaid eligible, with the husband becoming uninsured; alternatively, women may be uninsured when they are not pregnant, gaining Medicaid coverage when they are. See Cutler and Gruber (1996b) for a further discussion.

and who will therefore not take up costly employer-provided insurance. But there is no empirical work to date on the effect of the expansions on job mobility, wages, or employment determination.

C. *Health Insurance and Labor Force Participation and Hours Worked of Prime Age Workers*

Most of the interest in both academic and public policy circles around the labor force participation effects of health insurance has been focused on retirement and public assistance participation. But, in terms of the impacts on aggregate hours worked, the most important effects may well be on the work decisions of prime age workers, and particularly secondary workers. These effects arise because health insurance is generally offered for the entire family, so that having only one spouse with a job offering insurance is enough to provide the opportunity for coverage for the entire family. As a result, the availability and coverage of health insurance for primary workers may be a key determinant of the labor supply decisions of secondary earners in the family.

A small set of recent papers has investigated this question, focusing primarily on the effects of husbands' health insurance on the labor supply decisions of their wives; these studies are described in Table 7. The basic finding of all these papers is clear: wives whose husbands do not have health insurance are much more likely to work, to work more hours, and to be in jobs that offer health insurance. The magnitudes vary somewhat, but the effects are all large, with husband's insurance coverage being associated with a reduction in labor force participation ranging from 11-20%, and an additional reduction in conditional hours on the order of 5-20%. There is also evidence that wives are more likely to choose jobs with health insurance if their husbands are not covered (Schone and Vistnes, 1997), and that there is a small effect of the wife's insurance on the husband's labor supply decision (Wellington and Cobb-Clark, 1997).

A potential problem with all of these studies, however, is omitted variables that are correlated

with both the husband's insurance coverage and the wife's tastes for work; if husbands who demand "good jobs" are married to women who have preferences against market work, it could cause this result even in the absence of any causal role for health insurance. This issue is not completely satisfactorily addressed in any of these papers, but Buchmueller and Valetta (forthcoming) consider it most carefully. They find that a) these effects are strongest for those with larger families, which is consistent with the notion that it is health insurance valuation and not tastes for work driving the results; b) the effects of husband's insurance on wife's hours when the wife is in a job that does not offer insurance are positive, suggesting that any unobserved correlation biases against the finding of interest; and c) husband's insurance is associated only with a reduction in full-time work, and not a reduction in part-time work. There are alternative explanations that one could offer for each of these findings, but taken together they provide fairly strong support for the causal interpretation of their health insurance findings.

These findings have very important implications for the labor market impacts of health insurance policies, particularly policies such as national health insurance; if there is such "wife lock" in practice, it suggests that large scale insurance coverage expansion could cause a non-trivial reduction in the size of the labor force. Once again, however, the welfare implications are unclear. To the extent that health insurance is distorting women into the workforce, there are welfare costs for these families; and, if maternal time with children is important for child development, there are potentially even larger long run consequences for child development. On the other hand, the existing U.S. tax code includes several distortions against labor supply by married women, such as the marriage tax penalty against two earner couples and the inframarginality of Social Security tax payments by low earning spouses (Feldstein and Feenberg, 1996). As a result, this type of "lock" may be appropriately offsetting other distortions against spousal labor supply.

Part V: Evidence on Health Insurance and Wages, Hours, and Employment

The discussion in Part II highlighted a number of channels through which changes in health care costs, either through inflation in the health sector or government mandates, could affect the functioning of the labor market. In this section, I review the existing evidence on the labor market effects of changing health care costs. In particular, I focus on the key question of whether increases in health care costs are shifted to wages, or whether they are reflected through other channels such as hiring.

A. Time Series Patterns

The notion that there is a tradeoff between fringe benefit costs and wages is suggested by Figure 3, which presents a time series graph of employer-provided health insurance costs and wages. These data are from the Employment Cost Index series, which is based on an establishment-level survey carried out by the Bureau of Labor Statistics. The data cover all private sector employees.

For most of this time period, there is a strong negative relationship between the growth in employer health care costs and the growth in wages. In the early 1980s, these series do move together. But then health care cost growth slows in the 1984-87 period, and there is rapid wage growth in these years. Beginning in 1988, however, health care cost growth becomes very rapid, and there is a steep decline in real wages at this same time. Finally, health care cost growth slows in 1992, just as real wages flatten and even rise somewhat. While only suggestive, this time series pattern is certainly consistent with shifting of the costs of health insurance benefits to wages.

B. Health Insurance and Wages

Modeling the effect of health insurance costs on wages is a natural application of the compensating differentials framework described earlier. The standard compensating differentials

approach would involve a regression of wages on the existence or cost of health insurance. This is the approach followed by the first two studies described in Table 8, Leibowitz (1983) and Monheit et al. (1985). Both studies, however, find a wrong signed result: health insurance costs, or availability, are positively, not negatively, related to wages. A very different approach is taken by Woodbury (1983), who structurally models the substitutability of wages and fringes in firm-based data; he does find a high degree of substitutability between the two.

The finding of a wrong-signed wage offset reflects the difficulty faced by many empirical applications of compensating differentials theory: selection, on both the worker and firm side.[43] High productivity workers may choose to have some share of their compensation in benefits; indeed, given the progressivity of the tax schedule and the deductibility of benefits, the demand for benefits should rise with underlying productivity. And, as highlighted above, the "good jobs" that pay high wages are also the ones that offer generous benefits along a number of dimensions. What is required to identify the effect of health insurance costs on wages is exogenous variation in the cost of insurance.

A number of studies over the past decade have attempted to provide such exogenous variation, with results that are supportive of extensive shifting of insurance costs to wages. Eberts and Stone (1985) use variation in the cost of health benefits across school districts in New York from 1972-1977, controlling for unobserved worker and district characteristics by including district fixed effects, and by controlling for other benefits costs. They find that 83% of the increases in health costs across districts

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[43]See Smith (1979), Brown (1980), and Rosen (1986) for general discussions of estimating compensating differentials and reviews of past literature in this area. Triplett (1983) and Smith and Ehrenberg (1983) provide discussions of the estimation problems in the context of worker benefits. There has been more success documenting compensating differentials for job safety (see Viscusi, 1992 for a review) and for locational amenities (see Gyourko and Tracy, 1989). The literature on pensions and wages is much larger than that on health insurance and wages, and has produced mixed results; see Ehrenberg and Smith (1983), Kotlikoff and Wise (1985), Clark and McDermed (1986), Montgomery, Shaw, and Benedict (1990), and Gunderson, Hyatt, and Pesando (1992).

were reflected in lower wages.

One source of exogenous changes in employer costs is government mandated increases in the cost of insurance.[44] Gruber and Krueger (1991) identify the effect of increased insurance costs on wages by using increases in the employer costs of Workers' Compensation (WC) insurance across industries and states over time. WC provides cash benefits and health coverage to workers injured on the job, and much of the variation in costs in their data comes from increases in the health care component of this program. They focus on workers in five industries for which WC costs are high and rapidly growing; in some industries and states, these costs amounted to over 25% of payroll by 1987, the end of their sample period. They use both micro-data on wages (from the CPS) and aggregate data on employment and wages by state/industry (from administrative data on firm payrolls). They include state and industry fixed effects in their models, so that they are controlling for general differences in pay across industries and places, and estimating only how that pay changed when the costs of WC rose. In both datasets, they find that for these set of industries 85% of increases in workers compensation costs were shifted to wages; for a broader set of industries in the aggregate data, they estimate shifting of 56%.

Gruber (1994a) extends this approach to a group-specific health insurance mandate, mandated

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[44]This discussion focuses only on articles that pertain to health insurance mandates (or recent workers compensation mandates, where much of the variation comes from changes in health costs). There are a number of closely related studies which focus on the incidence of government mandates or payroll taxes that do not finance health benefits. Fishback and Kantor (1995) study the introduction of the workers' compensation program in the early 1900s, and find that most of the costs of this new insurance program were reflected in lower wages. Anderson and Meyer (1995) find that the incidence of the payroll tax used to finance unemployment insurance is mostly on wages. Holmlund (1983) uses time-series data on payroll taxes in Sweden to examine wage growth in a period when the payroll tax increased from 14 to 40%, and he estimates that 50% of this increase was shifted to wages in the short run. Hamermesh (1979) uses the variation in payroll tax rates due to the social security payroll tax limit to estimate wage offsets; his estimates indicate that from 0 to 35% of the social security tax is shifted to wages. Finally, Gruber (1997) estimates that the incidence of payroll taxation to finance social insurance programs in Chile was fully on wages, with little effect on employment.

comprehensive health insurance coverage for childbirth. Before the mid-1970s, coverage for the expenses of childbirth in health insurance plans was much less generous than coverage of other services, but a series of state laws after 1974, as well as a federal law in 1978, outlawed this practice. This substantially increased the cost of insuring a particular group of workers, women of child-bearing age (and their husbands, who may have covered these women on their health insurance plans). Gruber examines whether this exogenous increase in insurance costs was reflected in the relative wages earned by these affected groups. He does so by extending the DD approach discussed earlier to a "differences-in-differences-in-differences" approach, comparing the change in relative wages of these affected groups (relative to unaffected groups such as older workers and single men), in states with mandates relative to those without. Doing so, he finds that there is a significant relative decline in wages for married 20-40 year old women, whose costs rose most under this mandate. Using data on insurance costs to parameterize the cost of the mandate across the full sample of workers, he finds full shifting of these costs to wages.

Sheiner (1995a) also considers the question of group-specific shifting. She notes that groups with higher baseline insurance costs, such as older workers (relative to younger workers) and workers with family insurance coverage (relative to those with individual coverage), should see the greatest rise in insurance costs when there is a general rise in area medical prices. Using data on changes in insurance costs across cities, interacted with indicators for being in a high cost group, she finds that there is a relative decline in wages for high costs groups when area costs rise; her results indicate full shifting to wages for men, with mixed results for women. Olson (1994) focuses explicitly on women, and uses as an instrument for their health insurance coverage the coverage of their husbands; women whose husbands are uninsured are more likely to demand insurance, and may accept lower wages as a result. Indeed, using this instrument, Olsen finds a weakly significant 10% wage reduction associated

with insurance coverage; this is roughly the ratio of health insurance costs to wages for this group.

More recent work in this area has attempted to control for heterogeneity by using fixed effects for persons or jobs. Miller (1995) and Ryan (1997) pursue similar approaches in the Consumer Expenditure Survey (CEX) and the SIPP, respectively, first identifying a wrong-signed (positive) relationship between wage levels and health insurance offering, then showing that the relationship has the expected negative (and highly significant) sign in changes. Miller's estimated effect of an 11% wage effect seem somewhat large, given that his sample is a mix of married and single policies; and his estimate for men only is a very large 16%. Ryan finds much smaller effects for her full sample, with an offset of only $950 that is significantly smaller than average insurance costs; she also finds a much larger offset for single workers, which is counterintuitive given that their policies should be less expensive. These mixed results may reflect the fact that the studies control to some extent for worker characteristics, but not job characteristics; moreover, there may be changes in worker characteristics (e.g. productivity shocks, positive or negative) which are correlated with the change in jobs.

Buchmueller and Lettau (1997) take a different approach, using jobs as the unit of observation in a unique data set with job-specific information on wages and insurance costs over time. This allows them to control for good vs. bad jobs, although potential problems with worker selection into these jobs remains. Unlike Eberts and Stone (1985), however, they do not find the expected negative relationship between wages and health insurance costs.

The primary lesson from this literature is that estimating compensating differentials of this variety is very difficult, and requires sophisticated identification strategies for clean results. But the results that attempt to control for worker selection, firm selection, or (ideally) both, have produced a fairly uniform result: the costs of health insurance are fully shifted to wages. As with the mobility literatures reviewed earlier, each of these approaches has its limitations. The evidence from mandated

benefits relies on the exogeneity of the law changes with respect to labor market conditions, and only provides information for the marginal changes that are embodied by the mandates, and not average differences across employers in health insurance costs.[45] And the evidence using cross-city medical prices faces the problem that these prices may be determined by the city-specific labor market conditions that determine wages, due to the wage component of health care costs. Nevertheless, the uniformity of the conclusions across these very different strategies is striking.

C. *Health Insurance, Employment, and Hours*

A natural implication of the full shifting of the costs of insurance to wages is that there should be no effect on the equilibrium level of labor utilization. This contention is supported by two of the studies reviewed above. Gruber and Krueger (1991), using aggregate state/industry data, find no effect of changes in workers' compensation costs on employment levels. And Gruber (1994a) finds no effect of the "maternity mandates" on total hours of work. Thus, the result from the full valuation case of Summers (1989) is supported by the evidence: full shifting to wages with no effect on labor utilization.

As noted earlier, however, even if there is no effect on average, rising health insurance costs may change the compositional mix of employment and hours. There is a large literature on fringe benefits costs (and other fixed labor costs) and use of overtime labor, and the firm or industry level. This literature is reviewed by Ehrenberg and Schumann (1982). They update previous models of hours of work and fringe benefit costs using establishment data for 1976. They acknowledge the endogeneity

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[45]Neither of these counterarguments are likely to explain the findings of these papers, however. For example, it may be that governments tend to mandate benefits when the economy is doing poorly, causing a negative correlation between wages and mandates; but this explanation would predict a negative association between mandates and employment as well, which is not supported by the evidence discussed below. And, it seems likely that the increase in costs through mandates are valued less than the general cost differences across employers and over time (marginal α is smaller than average α), so that if anything these case studies understate average shifting to wages.

of fringe costs to hours of work (since non-fixed fringe costs such as pension contributions are themselves a function of earnings), and instrument by employee characteristics which are correlated with fringe demand. They find very large effects, indicating a 5-17% rise in overtime hours/worker in response to a 10% rise in fringe benefits costs.[46]

More recent research assesses the effect of fringe provision on use of part-time workers. Montgomery and Cosgrove (1993) find that increases in benefits costs decrease the share of hours at their sample of child care centers that are worked by part-time workers, which is consistent with employer preferences. But neither they nor Ehrenberg, Rosenberg, and Li (1988) find any effect of variations in the eligibility of part-time workers for benefits on the use of part-time workers. On the other hand, a recent paper by Buchmueller (forthcoming) finds in a sample of California employers that an increase in the cost of fringes that are provided to full time workers, relative to those provided to part-time workers, increases the share of part-time workers employed. Part of the reason for this change in results may be that the Buchmueller paper takes the additional step of attempting to account for the potential endogeneity of the eligibility determination. Overall, the literature in this area suggests strongly that employers are adjusting to increases in fixed employment costs by increasing hours, with somewhat more mixed evidence that employers are also responding by increasing the share of the workforce that is ineligible for benefits.

Several recent papers investigate more specifically the effect of health insurance costs on hours of work. Gruber (1994a) finds that mandated maternity health insurance led to an increase in hours and a decrease in employment, with total labor input held constant. This is consistent with the argument

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[46]This instrumental variables strategy may not be valid, however, if the employee characteristics that are correlated with fringe costs are also correlated with tastes for work hours; for example, older or higher wage workers may prefer more generous fringes and shorter work hours. But most stories of this type would suggest downward bias to their estimates, strengthening these results.

that the costs of the mandate were shifted to wages on average, but that employers responded along this compositional margin. Cutler and Madrian (1996) estimate time trends in hours of work by insurance status, as health care costs have risen over the 1980s, and find that hours of work have been rising much more rapidly for insured workers than for uninsured workers. They also find that hours rose the most in those industries where health care costs grew the most.[47] Thus, there appears to be strong evidence for a compositional shift towards more hours/worker as health care costs increase.

D. Unanswered Questions

While this literature has convincingly addressed the effect of insurance on wages, employment, and hours, there are a series of more detailed, yet very important, questions that have been largely ignored. First, what about other margins of response to increases in health care costs? One such margin is reduced insurance coverage. This reduction can occur along the coverage margin, as firms drop insurance altogether, or through changes in the structure of insurance plans, as firms increase employee cost-sharing or drop particularly expensive benefits.

There is a huge literature on the price elasticity of demand of both insurance coverage and total insurance expenditure; see Gruber and Poterba (1996) for a review. Unfortunately, this literature has not produced a consensus on the elasticity of demand for insurance at the firm level, with recent estimates ranging from -0.16 in Thorpe et al. (1992) to greater than -2 in Woodbury and Hamermesh (1992). Gruber (1994b) addresses this question in a particular context, by studying the effect of state-level laws in the U.S. that mandate employers who offer insurance to include certain benefits in their health insurance plans, such as coverage for alcoholism treatment or chiropractic visits. It has been

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[47]Their results for overall time trends appear to be driven by increases in overtime, which is consistent with the earlier literature on fringes and overtime. Their results are also reduced by about one-half when pensions are controlled for.

claimed that such "state mandated benefits", by forcing employers who would otherwise offer "barebones" insurance coverage to offer "cadillac" coverage, have led these employers to drop their insurance altogether; obviously, this would only be a problem if employees did not value the expanded benefits. Gruber studies the effect of the five highest cost state mandates on employer provision of health insurance, and finds that there was no significant effect of mandates on employer insurance coverage. This is consistent either with full employee valuation, or with a low elasticity of demand at the firm level. Gruber offers evidence to support the former view; even in the absence of state mandates, most firms voluntarily offer these mandated benefits.

Another important question is how finely the costs of health insurance can be shifted to wages. Gruber's (1994a) and Sheiner's (1995a) results confirm that group-specific shifting is possible, but do not offer much insight into how finely that shifting can occur. In particular, can firms go beyond broad demographic categorizations and actually reduce the wages of individuals workers who are particularly costly? If not, is there hiring discrimination against particularly costly workers?

There is also considerable uncertainty about the mechanisms of shifting to wages. How quickly does shifting to wages occur? Much of the debate over health care reform surrounded the immediate job impact of the Clinton mandate, not the five to ten year impacts, but no work in this literature separates the long and short run effects. Is there actual scope for nominal wage cuts when benefits rise, or does it occur only through the erosion of real wages (due to money illusion on the part of workers)? If it is the latter, then the underlying macroeconomic environment could have important implications for the efficiency of government intervention; mandates in inflationary periods may have smaller efficiency costs than mandates in non-inflationary periods.

An additional question of importance is the underlying structural mechanism behind a finding of full shifting to wages. In the simple labor market framework above, there are two reasons why

increased costs might be shifted to wages: because individuals value the benefits that they are getting fully; or because labor supply is perfectly inelastic.[48] Disentangling these alternatives is very important for future policy analysis. Consider the example of national health insurance, which is financed by a mandate, with an additional payroll tax to cover non-workers. If the full shifting documented earlier is due to full employee valuation with somewhat elastic labor supply, then national health insurance will have important disemployment effects, since labor supply will not increase in response to a benefit that is not restricted to workers. If full shifting is due to inelastic supply, however, then the population which is receiving benefits is irrelevant; in any case the costs will be passed onto workers wages, so national health insurance will not cause disemployment.

What is needed to convincingly disentangle these views is some variation in one or the other of these dimensions only. For example, is the incidence of employer mandates/payroll taxes significantly different across groups with plausibly different elasticities of labor supply, such as married men and married women? Past evidence is mixed here: Gruber (1994a) finds full shifting to married women, who have been estimated to have much more elastic labor supply than men, while Sheiner (1995a) finds less shifting to women than to men. Alternatively, is there differential incidence with respect to elements of a policy which are likely to be valuable, such as cash benefits for work injury, as opposed to elements which are less likely to be valued, such as insurance administrative loading factors?

Two recent studies of actual policy changes highlight the limitations of the literature reviewed here. Gruber and Hanratty (1995) study the implementation of National Health Insurance (NHI) in Canada in the late 1960s. NHI provided coverage to the entire population, financed through both income and payroll taxation. In addition, NHI was phased in over time across the Canadian provinces,

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[48]A third alternative for full shifting to wages would be perfectly elastic demand, but this would imply much larger disemployment effects than those found by Gruber and Krueger (1991) or Gruber (1994a).

allowing the authors to assess the effect on the labor market in a difference-in-difference framework, comparing outcomes in provinces that converted to NHI to outcomes in provinces that did not. In fact, they find that the implementation of NHI raised employment and wages. Similarly, Thurston (1997) examines the impact of an employer mandate on wages in Hawaii, and he finds that the most affected industries actually had faster wage growth than their counterparts in the continental U.S., although slower wage growth than less affected industries within Hawaii. One possible explanation for these findings is that there were unobserved labor demand shocks which offset the effects of these policy interventions. This is certainly supported by Thurston's within-Hawaii estimates, but given the consistent effects across Canadian provinces that implemented NHI at different times it is hard to see how it could be driving the Gruber and Hanratty (1995) results. An alternative explanation is that the benefits of dramatic increases in health insurance availability for the functioning of the labor market (ie. through reducing job lock, since insurance was employment-based in Canada before NHI) outweigh any costs in terms of disemployment.

Finally, this discussion has focused exclusively on efficiency, and ignored the equity implications of interventions such as mandated employer-provided health insurance. If the government is intervening to correct an insurance market failure, and the mandate is simply a means of financing that intervention, then shifting to wages can be viewed as the "price" that is being paid by workers for government provision of insurance. In the case of full valuation, perhaps due to adverse selection in the private insurance market, government mandates will be an efficient and equitable policy; the mandate is a perfect "benefits tax".

If the goal of a mandate is not to correct a market failure, however, but rather to provide benefits to some specific group in society, then full shifting to wages may not be viewed as a desirable outcome. Rather, this may be viewed as the mandate being "undone" by the adjustment of wages. In

this case, the additional deadweight loss from broad-based financing which does not have tax/benefit linkages may be a price that society is willing to pay in order to direct more resources towards one group. Thus, it is important to understand the goal of government mandate policy: is it to correct a market failure, or to redirect resources across groups?[49]

Part VI: Conclusions

While still in its infancy, the literature reviewed here has made enormous strides in increasing our understanding of the interaction between health insurance and the labor market. We have some evidence that non-universal employment-based health insurance limits job-job mobility and the ability of secondary earners to leave the labor force, with a stronger consensus that it limits retirement and movements off of public assistance programs. Moreover, increases in health insurance costs appear to be fully reflected in worker wages, with little net effect on labor supply, although with some shift in the composition of hours and employment. These findings have emerged from a variety of studies that have introduced an exciting new set of empirical techniques.

Nevertheless, while much has been learned, there remain important holes in this literature that need to be filled. These can be classified into four categories:

Replication. While there does appear to be a broad consensus on the basic effects of health insurance on the labor market, there is still disagreement about a number of particulars and magnitudes. For example, there remains considerable uncertainty about the importance of job lock, and estimates of the effect of health insurance on retirement vary substantially. This disagreement often stems from very

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[49]Vergara (1990) shows that, if the social welfare function values poor individuals more highly, it will in general be optimal to have some degree of public provision financed by income taxation instead of having all of the intervention financed by a mandate.

different methodological approaches applied to very different data sets. An important priority for future work is to reconcile these differences, using a broader range of approaches simultaneously on a number of different data sources.

Extension. Along some dimensions, this literature has raised more questions than it has answered. In particular, the focus has been on the effects of health insurance on the labor market, and not on the process by which those effects occur; for example, how do employers shift health care costs to wages? Also, there has been very little exploration of heterogeneity of responses; for which groups are the various forms of "lock" described above the most sizeable?

Theory. To some extent, the previous point reflects the atheoretical nature of this literature. While the empirical innovations in this area have been impressive, the theoretical advances have been much more modest. If this literature is to move beyond its infancy to a richer understanding of the process by which health insurance influences the labor market, a firmer theoretical underpinning will be necessary. Moreover, without an underlying theoretical framework, it is difficult to understand the welfare implications of these findings.

Policy. Finally, a central question for such an empirically-based literature is the policy implications of the findings. Despite the failure of sweeping health care reform, government intervention in the health insurance market is alive and well. This is witnessed by the recent passage of the Health Insurance Portability and Accountability Act of 1996 (H.R. 3103), which limits insurance companies' ability to

discriminate against children and adults with health problems.[50] But there is little work by economists that is devoted to simulating the effects of policies such as this one, building on the empirical results reviewed here. Moreover, there has been little attempt to contrast the costs and benefits of alternative policy approaches, such as insurance market reform versus expanded public health insurance coverage.

This laundry list should not be taken as a criticism of this literature, which has come a long way in a short time. Rather, it is a suggestion that there is still much work to be done in this exciting and extremely policy-relevant area.

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[50]In particular, group health plans are not allowed to exclude pre-existing conditions for more than 12 months, and this period is reduced by periods of prior, continuous coverage. In addition, insurers must allow individuals the right to convert from group to individual insurance coverage if they lose their group coverage and have exhausted their COBRA entitlement.

FIGURE 1

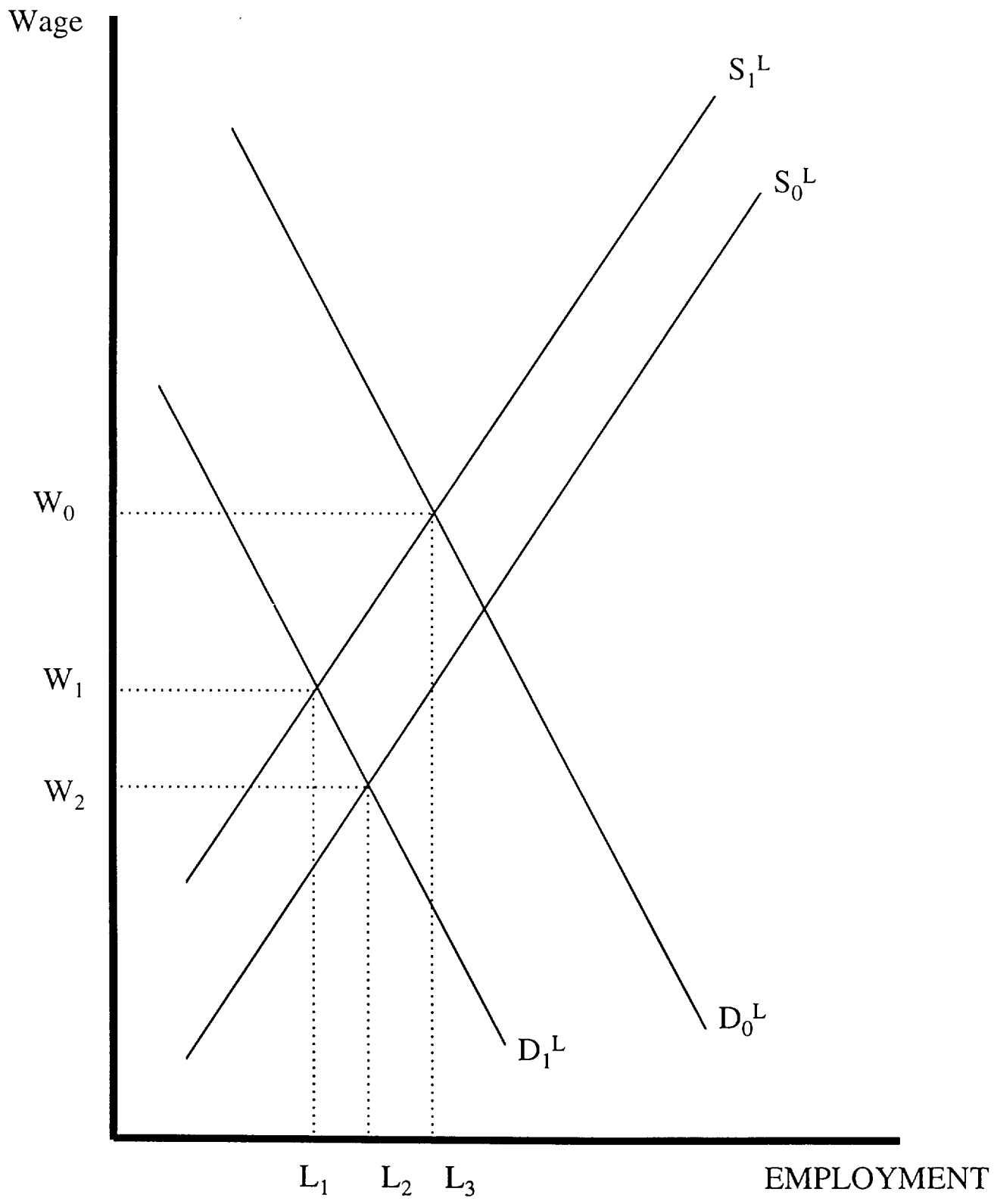
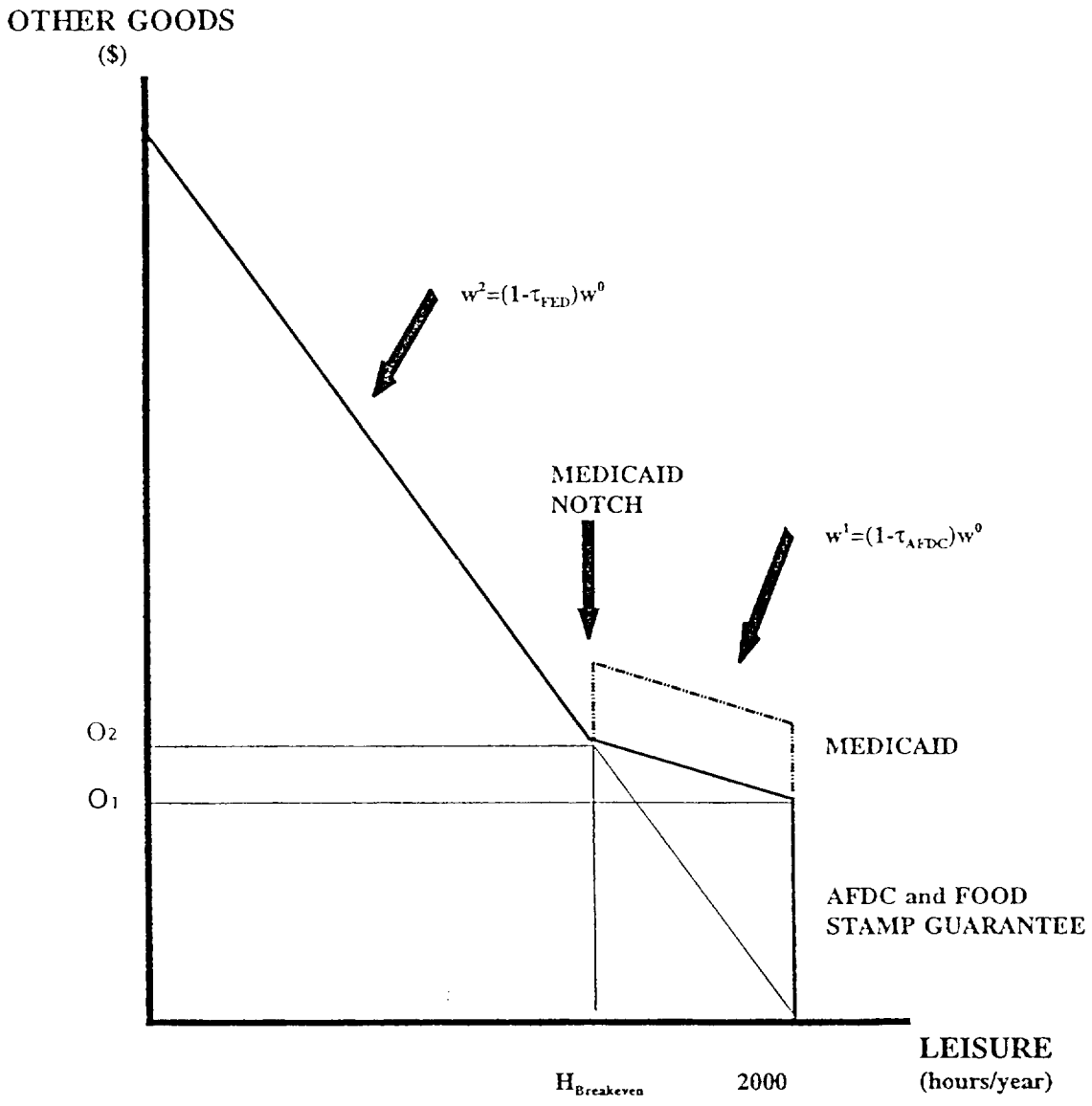


FIGURE 2


OTHER GOODS
($)
$w^2=(1-\tau_{FED})w^0$
MEDICAID
NOTCH
$w^1=(1-\tau_{AFDC})w^0$
O_2
O_1
MEDICAID
AFDC and FOOD
STAMP GUARANTEE
LEISURE
(hours/year)
$H_{Breakeven}$
2000

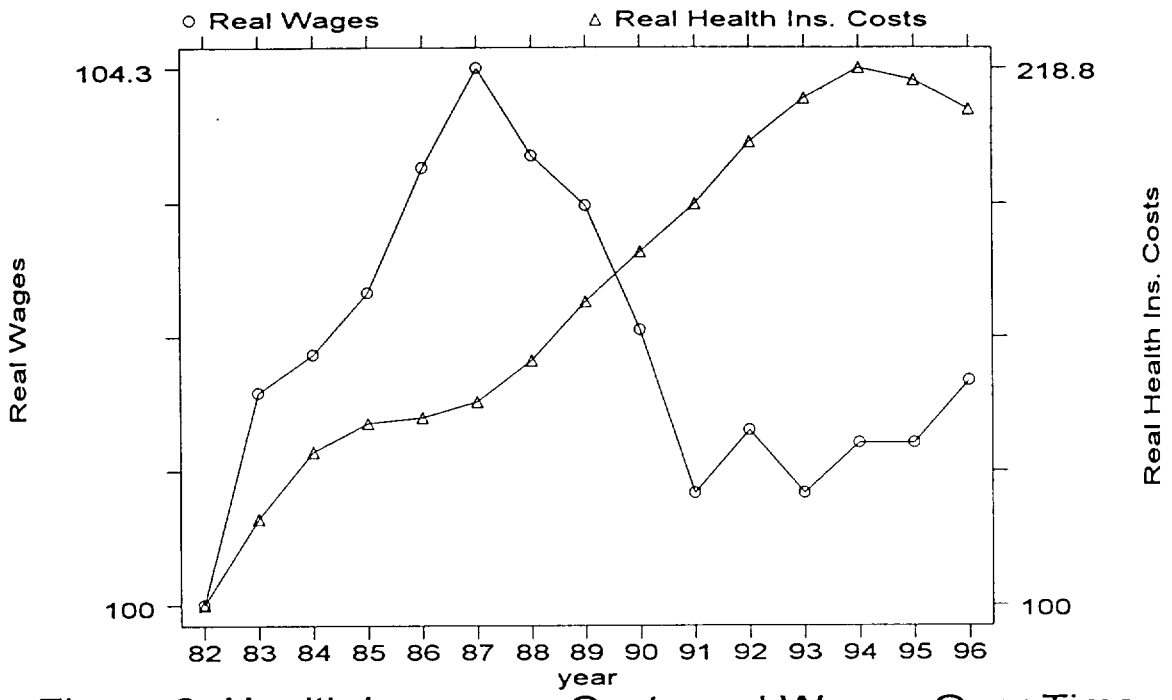


Figure 3: Health Insurance Costs and Wages Over Time

stata

Table 1: Sources of Health Insurance Coverage for Non-Elderly Population Over Time

	1988	1989	1990	1991	1992	1992 (revised)	1993	1994	1995
					Non-Elderly Persons (Millions)				
Population	213.8	215.7	217.8	220.0	222.5	225.5	228.0	229.9	231.9
Total Private	160.1	161.4	159.3	158.6	157.7	158.6	159.9	162.8	163.9
Employer	148.6	148.9	146.8	146.7	144.7	145.4	144.6	146.3	147.9
Own Name	70.8	71.3	70.4	70.3	68.9	69.0	72.2	75.2	75.9
Dependent	77.8	77.6	76.4	76.3	75.8	76.4	72.4	71.1	72.1
Other Private	11.7	12.6	12.6	12.0	13.1	13.3	15.4	16.4	16.0
Total Public	28.1	28.1	31.1	33.6	35.1	36.0	38.1	38.9	38.4
Uninsured	32.4	33.1	34.4	35.2	37.14	38.3	39.3	39.4	40.3
					Percentage of Non-Elderly Population				
Population	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Private	74.9	74.8	73.1	72.1	70.9	70.3	70.1	70.8	70.7
Employer	69.5	69.0	67.4	66.7	65.0	64.5	63.4	63.6	63.8
Own Name	33.1	33.1	32.3	32.0	31.0	30.6	31.7	32.7	32.7
Dependent	36.4	36.0	35.1	34.7	34.0	33.9	31.8	30.9	31.1
Other Private	5.5	5.8	5.8	5.5	5.9	5.9	6.7	7.1	6.9
Total Public	13.2	13.0	14.3	15.3	15.8	16.0	16.7	16.9	16.6
Uninsured	15.2	15.3	15.8	16.0	16.7	17.0	17.3	17.1	17.4

Notes: From EBRI (1996).

Table 2: Characteristics of Employer-Provided Health Insurance

	All Employers	Fewer than 10 Employees	10-24 Employees	25-49 Employees	50-99 Employees	100-249 Employees	250+ Employees
Offer Insurance	0.725	0.366	0.686	0.817	0.886	0.918	0.961
Family Cover Offered	0.912	0.822	0.877	0.898	0.909	0.942	0.960
Covered by Insurance	0.569	0.274	0.492	0.585	0.683	0.727	0.828
Takeup Rate	0.785	0.749	0.717	0.716	0.771	0.792	0.862
Why No Insurance?							
Ineligible	0.411	0.333	0.398	0.410	0.434	0.415	0.469
Other Coverage	0.413	0.469	0.411	0.388	0.407	0.407	0.397
Firm Offers Insurance							
Weekly Earnings	526.9	470.8	471.4	474.2	513.1	511.3	604.8
Firm Offers Pension	0.755	0.502	0.588	0.686	0.781	0.834	0.918
Firm Offers ST Disability	0.711	0.555	0.629	0.675	0.713	0.736	0.819
Firm Offers LT Disability	0.490	0.380	0.383	0.420	0.481	0.515	0.606
Firm Doesn't Offer Insurance							
Weekly Earnings	262.9	265.2	252.6	249.5	278.5	248.9	309.9
Firm Offers Pension	0.089	0.046	0.080	0.141	0.241	0.290	0.405
Firm Offers ST Disability	0.106	0.128	0.128	0.118	0.184	0.142	0.238
Firm Offers LT Disability	0.062	0.048	0.048	0.077	0.081	0.077	0.141

Note: Tabulations by author from April 1993 Current Population Survey Employee Benefits Supplement.

Anderson (1997)	NLSY (1979+); 20-40 males	Hazard DD model of job leaving, using pregnancy, family size, and self-reported health limitation	Signif. Mobility Reductions: Pregnancy: 34% Family Size: 37% (2 kids) Health Limit: 0% (insignif)
Gruber and Madrian (1997)	SIPP (1984-88); 25-54 males	Model effect of continuation mandates on health insurance coverage of non-employed, on transitions to non-employment, on total weeks of non-employment, and on re-employment earnings	One year of continuation cov: a) increases ins cov by 6.7% (19% for those non-empl. for > 1 year) b) increases transitions to non-employment by 14% c) increases weeks non-empl. by 15% d) increases reemp earnings by 100%
Kapur (1998)	NMES (1987); 20-55 married males, non self-employed	DD model using only those with no spousal insurance, with value proxied by medical conditions	Small and uniformly insignificant effects; often wrong-signed
Madrian and Lefgren (1998)	SIPP (1984-93); 20-64 persons	DD model of Transition to Self-Employment - Value proxies: a) Spousal Insurance b) Family Size c) Continuation Laws	Significant and large mobility reductions: a) 25% b) 18% (2 kids) c) 10% (1 year)

Notes: NMES = National Medical Expenditure Survey; PSID = Panel Study of Income Dynamics; SIPP = Survey of Income and Program Participation; NLSY = National Longitudinal Survey of Youth

Table 4: Health Risks by Age

	25-34	35-44	45-54	55-64	65+
Self-Reported Health					
Fair	9.5	11.9	15.6	24.9	36.1
Poor	1.1	1.5	4.1	6.4	11.4
Incidence of Specific Diseases					
Stroke	0.4	0.8	1.6	3.6	7.4
Cancer	1.6	2.4	4.7	9.7	13.3
Heart Attack	0.3	1.1	3.8	7.7	13.3
High Blood Pressure	10.1	18.2	29.1	41.9	49.8
Emphysema	0.4	1.0	2.6	5.2	8.0
Diabetes	1.7	3.0	5.7	9.8	14.7
Heart Disease	0.8	2.2	6.1	11.9	22.2
Health Care Utilization					
Admitted to Hospital?	9.2	6.8	8.7	11.0	20.1
Nights in Hospital	5.5	6.8	9.3	11.8	13.8
Prescribed Medicines?	52.9	55.6	61.1	71.1	81.9
Number of Medicines	5.2	6.6	11.5	14.7	18.5
Visit to Doctor?	64.1	67.1	71.1	77.9	85.8
Number of Visits	4.6	4.6	5.5	6.0	7.4
Medical Expenditures					
Mean	1176	1135	1395	2144	2877
Standard Deviation	4025	3537	4001	6532	7070

Notes: From Gruber and Madrian (1996)

Table 5: Research on Health Insurance and Retirement

Paper (date)	Data (Years), Sample	Empirical Strategy	Results
Gustman and Steinmeier (1994)	Retirement History Survey (1969-79); Males 58-63 in 1969	Structural estimation of retirement decision as function of value of retiree HI, controlling for pension value; simulation	1.3 month reduction in retirement age; 1 pp (2%) rise in stock of retired, 6 pp (47%) rise in hazard at age 62
Madrian (1994b)	NMES (1987) SIPP (1983-1986); Males age 55-84	Regression of age at retirement on availibility of retiree HI; limited pension controls	Age of retirement reduced by 0.7-1.4 years; 7.5 to 15 pp (44-88%) rise in early retirement
Karoly and Rogowski (1994)	SIPP (1983-1989); 55-64 Male Wage Earners	Model of early retirement on imputed probability of retiree HI coverage (by firm size, industry, and region); limited pension control	8 pp (47%) rise in early retirement; 100% rise in hazard at age 60
Gruber and Madrian (1995, 1996)	Current Population Survey (1980-90), SIPP (1983-89); 55-64 Working Males	Model of retirement status/rate as function of continuation of coverage availability; limited pension control	2.2 pp (32%) rise in hazard rate for one year of coverage
Lumsdaine, Stock, and Wise (1994, 1996)	Firm Data on Retirement, Pension Characteristics, and Retiree HI	Structural "option value" model of retirement decision, incorporating valuation of Medicare; contrast of retirement at 65 among firms with and without retiree HI	No evidence of a role for Medicare in explaining "excess" retirement at 65
Headen, Clark, and Ghent (1995)	August 1988 CPS Supplement; men & women 55-64	Ordered probit model of retirement and time retired as a function of whether worker has retiree HI	6 pp (35%) increase in odds of being retired; largest effects on being retired 10 years or more.
Hurd and McGarry (1996)	HRS (1992); full time men age 51-61 and women age 46-61	Model of intended retirement dates as a function of retiree health insurance availability	Fully employer-paid retiree HI raises odds of early retirement by 11 pp (21%); partially paid raises by 7 pp (15%)
Blau and Gilleskie (1997)	HRS (1992-94); men age 51-62.	Dynamic model of retirement behavior as a function of retiree health insurance availability	Fully employer-paid retiree HI raises odds of exit by 6 pp (80%); partially paid raises odds by 2 pp (26%).

Rust and Phelan (1997)	RHS (1969-79); men age 58-73 who have only SS and not private pension	Dynamic programming model of retirement as a function of retiree health insurance avability and Medicare	Retiree HI is a significant determinant of labor force exit; Medicare can explain "excess" retirement at 65
Madrian and Beaulieu (1998)	U.S. Census (1980 & 1990); married men age 55-69	OLS model of labor force participation as a function of spousal eligibility for Medicare	Significant effect of wife being over age 65 on husband's retirement decision; raises hazard at 60-62 by 25-50%; raises hazard at 63-65 by 10-20%.

Notes: NMES = National Medical Expenditure Survey; PSID = Panel Study of Income Dynamics; SIPP = Survey of Income and Program Participation; CPS = Current Population Survey; HRS = Health and Retirement Survey; RHS = Retirement History Survey

Table 6: Research on Health Insurance and Public Assistance Participation

Paper (date)	Data (Years), Sample	Empirical Strategy	Results
Ellwood and Adams (1992)	Medicaid claims data for GA & CA (1980-86); women receiving AFDC	Model of leaving AFDC on expected future medical expenses in the next three months based on medical usage of the previous six months	100% increase in expected medical costs lowers exit probability by 6.5%-11%
Moffitt and Wolfe (1992)	SIPP (1983-86)	Model AFDC and labor force participation on a family's predicted Medicaid and private insurance valuation based on family	Increasing value of Medicaid coverage by 33% raises AFDC participation by 2% and lowers LFP by 5.5%
Blank (1989)	National Medical Care Utilization & Expenditure Survey (1980); female heads	Model of AFDC participation on state Medicaid spending per recipient and presence of Medically Needy program	No effect of either program parameter
Winkler (1991)	CPS (1985); female heads	Model of both AFDC and labor force participation on state Medicaid spending per recipient and presence of Medically Needy program	No effects on AFDC participation; 10% increase in Medicaid spending reduces LFP by 0.9 to 1.3 pp
Montgomery and Navin (1996)	CPS (1987-92); female heads	Model participation on state Medicaid spending per recipient, with and without state fixed effects	no fixed effects: 10% increase in Medicaid spending = 0.36 pp reduction in participation fixed effects: insignificant
Yelowitz (1995)	CPS (1988-91); female heads	Model AFDC participation and labor force participation on eligibility for Medicaid expansions for children	Increasing income cutoff for eligibility by 25% of the poverty line decreases AFDC participation by 4.6% and increases labor force participation by 3.3%.
Decker (1993)	State AFDC caseload data (1964-74); CPS (1966-72) data on single female heads	Model state caseloads and individual AFDC participation as a function of introduction of Medicaid	Medicaid introduction led to 21% increase in caseloads, 6.4 pp (24%) increase in individual participation, insignificant LFP effects
Yelowitz (1996a)	CPS (1986-1991); age 65 plus	Model SSI participation as a function of QMB eligibility	QMB program led to a 1.7 pp (40%) reduction in SSI participation

Yelowitz (1996b)	CPS (1987-1993); 18-64	Model SSI participation as function of Medicaid expenditures, instrumented by expenditures on other groups	Rising medical costs explain 0.1 pp rise in participation
Yelowitz (1996c)	SIPP (1986-1994); 18-64	Model food stamps participation as function of Medicaid eligibility	Making all households eligible for Medicaid would raise FS participation by 0.59 pp (7.5%)

Notes: SIPP = Survey of Income and Program Participation; CPS = Current Population Survey

Table 7: Research on Health Insurance and Prime-Age Labor Force Participation

Paper (date)	Data (Years), Sample	Empirical Strategy	Results
Wellington and Cobb-Clark (1997)	CPS (1993); 25-62 year old husbands and wives	Model hours as a function of being covered by spouse's insurance policy	Husband's insurance = 20% reduction in LFP and 7-15% reduction in hours Wife's insurance = 4-9% reduction in LFP and 0-4% reduction in hours
Schone and Vistnes (1997)	NMES (1987); married women age 25-51	Joint model of hours of work and job choice as function of husband's insurance status	Husband's insurance = 14% reduction in LFP and 30% reduction in job with HI
Olson (1997)	CPS (1993); married women younger than 65	Model hours and participation as a function of husband's insurance status	Husband's insurance = 13% reduction in total hours; 11% reduction in LFP
Buchmueller and Valetta (1997)	CPS (1993); 25-54 year old married women	Model wife's hours and participation as a function of husband's insurance status	Husbands' insurance = 36% reduction in total hours and 12% reduction in LFP

Notes: NMES = National Medical Expenditure Survey; SIPP = Survey of Income and Program Participation; CPS = Current Population Survey

Table 8: Research on Health Insurance and Wages, Employment, and Hours

Paper (date)	Data (Years)	Empirical Strategy	Results
Leibowitz (1983)	RAND Health Insurance Study (1978); full-time workers	Model wages on health insurance premiums for full-time workers with health insurance	Positive correlation between wages and premiums
Monheit et al. (1985)	National Medical Care Expenditure Survey (1977); workers	Model wages on indicator for being offered health insurance	Positive correlation between wages and health insurance
Woodbury (1983)	BLS Employee Compensation Survey (1966-74); School Districts (1977)	Structural model of substitutability of wages and fringes	Wages and fringes are highly substitutable - elasticity of substitution greater than one
Eberts and Stone (1985)	New York City public school districts (1972-77); full time teachers	Model change in wages on change in in cost of health benefits across school districts	83% shifting of increases in health costs to wages
Gruber and Krueger (1991)	CPS, Employment & Earnings (1979-88); workers in 5 high WC cost industries	Model wages and employment on WC costs/payroll by industry/state/year; CPS: wages on costs; E&E: wages & employment on costs	CPS: 85% shifting to wages E & E: 56-86% shifting No employment effects
Gruber (1994)	CPS (1974-82); all 20-64	Model wages and labor supply on effect of maternity mandates: a) DDD for 20-40 women b) Cost of mandate for all	Full shifting to wages No effect on total labor supply: hours up, employment down
Sheiner (1994)	CPS (1990-91); 25-59 workers	Model wages as a function of city-specific costs times: a) age of worker b) marital status c) family vs. indiv coverage	Men: Full shifting to wages from (a)-(c) Women: Insignificant for (a) & (b), full shifting for (c)
Olsen (1994)	CPS (1982, 1992); working married women	Husband's insurance as instrument for wife's coverage in wage equation	Insurance for wife = 10% wage reduction

Miller (1995)	CEX (1988); non self-employed workers age 18+	Model wage levels and changes as a function of level and changes in insurance status	Positive levels relationship, negative in changes; losing health insurance = 11% wage increase overall; 16% for men vs. 7% for women.
Ryan (1997)	SIPP (1988); non-self employed men age 24-64	Model wage levels and changes as a function of level and changes in insurance status	Positive levels relationship, negative in changes; losing family coverage = $950 gain in wages; losing coverage for singles = $1640 gain
Buchmueller and Lettau (1997)	ECI panel data on jobs (1987-94); private sector jobs of 1500 hours +	Model changes in wages for job/firm pairs as a function of changes in cost of health insurance	Consistent positive relationship between wage changes and insurance cost changes
Ehrenberg and Schumann (1982)	Establishment data (1976)	Model log(overtime hours per workers) as function of fringe costs/wage ratio; OLS and instrument by worker characteristics (age, sex, median income)	10% rise in fringe/wage ratio = 4.8%-17% rise in overtime/worker in manufacturing; 7.8-12% in non-manufacturing.
Ehrenberg, Rosenberg, and Li (1988)	CPS (1983); non self-employed workers	Model relative part-time work on relative insurance coverage of part-time workers across industries	No effect of relative coverage of part-time workers on use of part-time workers
Montgomery and Cosgrove (1993)	205 Child Care Centers (1989)	Model part time work as a function of fringe benefits payments and eligiblity of part-timers for benefits	1% rise in benefits/wages = share of hours worked by part-timers falls 0.43%; no effect of eligibility for part-timers
Cutler and Madrian (1996)	CPS (1979-92); 25-54 non-self employed men	a) Time trends in hours by insurance status b) Differential health cost growth by industry	a) 0.7 hour/wk increase over 1980s b) 2.2 hour/wk increase over 1980s
Buchmueller (1998)	Survey of California employers with 3+ employees (1993)	Model part time work as a function of difference in fringe costs between full and part time workers (largely driven by part-time eligibility)	1% rise in relative full-time benefits costs = 1.09% rise in part-time work; elast is 1.19 for HI costs specifically

Notes: NMES = National Medical Expenditure Survey; PSID = Panel Study of Income Dynamics; SIPP = Survey of Income and Program Participation; CPS = Current Population Survey; CEX = Consumer Expenditure Survey; ECI = Establishment Cost Index

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