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TAX SUBSIDIES TO EMPLOYER-PROVIDED HEALTH INSURANCE

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ABSTRACT

This paper investigates the current tax subsidy to employer-provided health insurance, and presents new evidence on the economic effects of various tax reforms. It argues that previous analyses have overstated the tax subsidy to employer-provided insurance by neglecting the substantial and growing importance of after-tax employee payments for employer-provided insurance, as well as the tax subsidy for extreme medical expenses, which discourages insurance purchase. Even after considering these factors, however, the net tax subsidy to employer-provided insurance is substantial, with tax factors generating an average reduction of approximately thirty percent in the price of this insurance. Reducing the tax subsidy, either by capping the value of employer-provided health insurance that could be excluded from taxation, or eliminating the exclusion entirely, would have substantial effects on the level of employer-provided insurance and on tax revenues.

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The value of employer-provided health insurance is excluded from an individual's federal and state taxable income, and from the Social Security tax base. These exclusions provide an incentive for individuals and firms to structure compensation arrangements so that employees receive employer-provided insurance, rather than cash compensation that they may ultimately use to finance their health care or health insurance purchases. This incentive has important economic implications because medical care financed by insurance will generally be overconsumed due to low copayment rates under traditional insurance policies. Tax incentives for employer provision of health insurance have therefore been cited, for example by Feldstein (1973), Pauly (1986), and Phelps (1992), as encouraging over-insurance and ultimately over-consumption of medical services.

Given the central role of this tax incentive in the medical economy, it is important both to measure it and to analyze how it would be affected by various policy reforms. This task is a complicated one, however, because the tax system subsidizes medical care purchases in two ways. The first is the exclusion from income and payroll taxes of all employer insurance premium payments, as well as some fraction of employee payments for employer-sponsored insurance. The second is the deductibility of individual expenditures on medical care and medical insurance that exceed some minimum threshold, currently 7.5 percent of Adjusted Gross Income (AGI). The net tax incentive for insurance purchase depends on the subsidy for employer-provided insurance relative to that for health care purchase if an individual self-insures. Most previous analyses of the tax incentive for employer-provided health insurance have focused only on the first tax incentive.

This paper presents new evidence on the net tax subsidy to employer-provided health insurance, as well as new estimates of the likely effects of various tax policy reforms. We do so by combining information from the 1987 National Medical Expenditures Survey (NMES) with data from the IRS Individual Tax Model file to estimate how the tax system affects the after-tax price of health insurance relative to the after-tax price of out-of-pocket health care spending. We aggregate respondents in the NMES into health insurance units, then use the NBER TAXSIM model to estimate the tax saving to each from employer provision of health insurance. Our procedure preserves the rich cross-sectional variation in household spending on medical care better than approaches that impute insurance and medical care outlays to households in other data sets.

This paper is organized as follows. In section one, we sketch the analytical framework that we use to measure the net tax subsidy to employer-provided health insurance. We define the tax subsidies to employer-provided insurance, employer-sponsored insurance that is paid for by the employee, and out-of-pocket spending on health insurance and health care. We then measure the net tax price of employer-provided insurance as a function of these subsidies. Section two describes the data sets we analyze and outlines our algorithm for measuring the tax subsidies.

The third section reports the basic results of our analysis. We begin by providing estimates of the marginal subsidy to additional insurance purchases, since this is the margin of overinsurance of most concern to health policy analysts. We then describe the recent evolution of this subsidy. We compare the period before the

Tax Reform Act of 1986 when the top marginal tax rate under the personal income tax was 50 percent to the late 1980s, when the 1986 tax rate reductions were fully phased in, and to 1994, after several increases in marginal tax rates had brought top marginal tax rates to, or above, 40 percent. We thereby illustrate how changes in the tax structure can affect the magnitude of the tax subsidy to employer-provided health insurance.

Section four describes the effect of various tax policy reforms on the net tax subsidy to health insurance purchase, and reports illustrative calculations of how such reforms might affect the demand for health insurance. We consider capping the value of insurance benefits that are exempt from federal income taxation, as well as including the full value of employer provided health insurance in both the FICA and federal income tax bases. We describe how these changes would affect the marginal subsidies to employer-provided health insurance, and, under plausible assumptions about the price elasticity of demand for this insurance, we illustrate the effect of such reforms on insurance demand. Although there is no definitive empirical evidence on the price elasticity of demand for health insurance, so we present calculations under using several values spanning results in the existing literature. The concluding section summarizes our findings and outlines several directions for future research.

1. The Tax Subsidy to Employer-Provided Health Insurance

Employer-provided insurance is one of many ways of financing medical care services. It is therefore important to distinguish between subsidies to the purchase

of health insurance and subsidies to the consumption of health care more generally. A change in the after-tax price of insurance can alter the financing of any given set of medical services, and, since it changes the composite price of medical care, it may also affect the level of health care services consumed.[1] Our analysis is limited to the former effect, the impact of taxation on the financing of medical care. We assume that changes in the level of employer-provided health insurance would be offset by similar changes in household out-of-pocket spending, with little or no change in the level of health care consumed. We therefore understate the effect of tax reforms on the demand for health insurance, since shifts in the aggregate demand for medical care would reinforce changes in the level of insurance demand following a tax reform.

We define the tax subsidy to insurance purchase in terms of the relative after-tax price of financing health care with insurance, and without insurance on an out-of-pocket basis. Our approach does not consider how the tax subsidy to employer-provided insurance affects the after-tax price of medical care, which prevents us from analyzing how insurance tax reforms would affect aggregate medical care spending.[2]

The current U.S. tax system subsidizes both employer-provided health insurance

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[1]This distinction parallels a familiar analysis in the taxation of corporate capital income. Changing the tax treatment of debt would lead both to a shift in financing, i.e. differential use of debt and equity, as well as a shift in the ultimate level of real investment.

[2]The after-tax price of medical care at the time of consumption depends on whether the patient is insured, the copayment rate and deductible level for the patient's health insurance (if insured), and whether the patient itemizes tax deductions and claims the medical expense deduction. For those who purchase insurance, there is also an ex ante price of medical care, distinct from the price at the time of consumption, that includes the price of purchasing insurance.

and out-of-pocket medical spending. Employees with employer-provided health insurance are not required to include the value of this insurance in their taxable income for federal and state income taxation, or in their wage tax base for the payroll tax.[3] The Joint Committee on Taxation estimates that in fiscal 1994, federal revenues from the personal income tax and payroll tax were nearly $90 billion lower as a result of these exclusions (Congressional Budget Office (1994a)). The tax system also subsidizes out-of-pocket spending on health insurance and medical services by allowing an itemized deduction for medical expenses. Itemizers can deduct expenditures on medical care and directly-purchased health insurance in excess of 7.5 percent of Adjusted Gross Income (AGI) from their federal taxable income. The revenue cost of this provision, less than $4 billion in 1994, is much smaller than that for employer-provided insurance.

Our definition of the tax subsidy to employer-provided insurance considers both the after-tax cost of both employer-provided insurance and the after-tax cost of out-of-pocket medical spending. We do not consider individually-purchased health insurance, on the grounds that higher load factors and less favorable tax treatment than for employer-provided insurance make this a dominated option for those who seek insurance.

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[3]Employer provided health insurance was encouraged by the 1942 Stabilization Act, which placed limits on wage increases but allowed employers to offer insurance plans to their employees. Scofea (1994) provides an introduction to the history of employer-provided health insurance in the United States.

1.1 The After-Tax Cost of Employer-Provided Insurance

We consider an individual with a federal marginal income tax rate on earned income of τ, a net-of-federal tax state income tax rate of τ_s, and employer and employee rates of payroll tax each equal to τ_{ss}. We assume that labor income taxes and payroll taxes are fully borne by labor, so that when an employer provides insurance that costs E dollars, the employee's wage is reduced by $E/(1+\tau_{ss})$[4]. The employer is indifferent between purchasing one dollar of insurance or paying wages of $1/(1+\tau_{ss})$, since each dollar of wages requires a payroll tax payment as well. The change in the employee's after-tax wage income per dollar of employer-provided insurance, dw_{AT}/dE, is therefore:

$$\frac{dw_{AT}}{dE} = \frac{1 - \tau - \tau_s - \tau_{ss}}{1 + \tau_{ss}} . \qquad (1)$$

Many previous studies of taxation and employer-provided health insurance, including Feldstein and Allison (1973), Taylor and Wilensky (1983), Holmer (1984), and Burman and Williams (1994), have used dw_{AT}/dE or some variant of it to define the tax subsidy to employer-provided insurance. A parallel assumption is made in the literature on taxation and the demand for fringe benefits more generally.[5]

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[4]Several recent studies, notably Gruber and Krueger (1991) and Gruber (1994), support this assumption with respect to various types of employer mandates.

[5]Woodbury and Hammermesh's (1992) study of how the Tax Reform Act of 1986 affected the demand for fringe benefits vs. wage income at universities is a recent example in this tradition. Earlier studies that adopt similar approaches but sometimes omit either the state tax or payroll tax include Sloan and Adamache (1986) and Long and Scott (1982).

While the reduction in after-tax wages per dollar of employer-provided insurance is a key factor determining the after-tax price of such insurance, it is not the only one. We identify two other factors that affect the after-tax cost of employer-provided health insurance, and that consequently affect the relative price of this insurance vis-a-vis self insurance. First, because insurance firms include a load factor in their policy prices, the expected value of medical care outlays from one dollar of spending on medical insurance is less than the expected value from one dollar of out-of-pocket medical spending. The load factor, λ, reflects costs of administering an insurance plan, the profits of the insurer, and any other expenses incurred in minimizing the health risk of a given group to the insurer. This load factor affects the after-tax cost of employer provided insurance relative to self-insurance of medical care costs.

Second, contrary to the assumption of complete employer provision of insurance above, employees pay a substantial and rising fraction, currently about 15 percent, of the premiums for employer-provided insurance. Blostin, Grant, and Wiatrowski (1992) report that in 1989, nearly half of the employees who received employer-provided health care benefits contributed to the cost of individual coverage, while for two thirds of these workers, contributions were required for family coverage. Approximately three quarters of these employee premiums are paid after-tax, and paying them is a requirement of taking advantage of the favorable tax treatment of employer-provided insurance.[6] Employees who must make post-tax contributions to

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[6]The Bureau of Labor Statistics (1993) reports that approximately 33% of employees of firms with more than 100 employees, and 20% of employees of firms with fewer than 100 employees, can deduct their own premium payments from taxes.

their employer-provided insurance receive favorable tax treatment of a smaller fraction of their health insurance than those employees whose insurance is fully provided by the employer. Recognizing employee contributions to the cost of employer-provided insurance therefore raises the after-tax price of this insurance. In defining the after-tax price of insurance, we use G to denote employee payments for employer-provided group insurance, and E to denote employer payments. We assume that a fraction δ of employee premiums can be paid for on a pre-tax basis through cafeteria plans and other tax-favored arrangements.

One question that arises in considering employee payments for health insurance is why employers structure health plans with such payments, despite their tax inefficiency. There are at least two possible reasons. First, within any workplace, different workers will place different values on the benefit of health insurance coverage. Unless employers can selectively lower the wages of only those employees who value insurance coverage, employers who pay the full cost of insurance will disproportionately attract workers with a high value of insurance. Employers may view this outcome as unattractive, for example because the workers who value insurance the most may be less healthy and therefore less productive workers. Cost-sharing can be an effective mechanism for reducing the selection effects associated with health insurance provision.

These are employees who can pay their premiums through cafeteria plans provided by their employers. We are not able to identify which employees can make pre-tax premium payments in the data below, so we randomly assign individuals with employee premiums between the pre-tax and post-tax groups with a probability of .25 for the first group.

A second reason for employers to require some employee contributions relates to employee choice of health care plan. Many employers offer a choice across plans of differing generosity and cost. Employers may not be able to pay lower wages to employees who choose higher cost plans, and cost sharing can be used to induce choice of cost-effective insurance.

Recognizing both the load factor on employer-provided insurance and the existence of employee contributions to such insurance yields the following expression for the after-tax price of employer-provided insurance:

$$P_{\text{Health Insurance}} = \left(\left[\frac{1 - \tau - \tau_s - \tau_{ss}}{1 + \tau_{ss}}\right] * \left(\frac{E + \delta * G}{E + G}\right) + \frac{(1 - \delta) * G}{E + G}\right) * (1 + \lambda) \; . \quad (2)$$

We define the tax subsidy to employer-provided insurance by comparing this after-tax price with the after-tax cost of self insurance.

1.2 The After-Tax Cost of Out-of-Pocket Medical Spending

It is widely recognized that the income tax code provides a form of insurance against large medical costs by permitting a deduction against taxable income for medical expenditures above a certain share of AGI. This provision of the tax code discourages insurance purchase, since it lowers the after-tax cost of paying high medical expenses out of pocket. Bradford (1984), and more recently Kaplow (1991, 1992), discuss the implicit insurance in the tax system, but none of the previous studies of the tax subsidy to employer-provided insurance have considered this aspect of the income tax code.

The tax subsidy to out-of-pocket medical expenses depends on whether a taxpayer itemizes. For a non-itemizer, the after-tax cost of such spending is one dollar. For itemizers, however, the after tax cost of the marginal dollar of out-of-pocket medical spending is $(1-\alpha r)$, where r is the federal marginal tax rate and $\alpha = 1$ if the marginal dollar of spending exceeds the AGI floor and zero otherwise. We assume that medical expenses cannot be deducted in computing state taxable income.

For an individual considering the purchase of insurance, α is unknown. It is determined by the individual's taxable income and realized need for medical services during a tax year. If F denotes the AGI threshold above which medical expenses are deductible and T the individual's total medical spending, then the probability that the last dollar of health expenditures will be tax deductible ($\alpha = 1$) equals the probability that $(T - F) > 0$.[7] This is the probability that the marginal dollar of health costs covered by employer-provided insurance would have been deductible if it had been incurred on own account. We have no direct information on how individuals form expectations of α in contemplating insurance purchases. We therefore assume rational expectations about actual spending during the year, calculate actual values of α for all households in our data sample, and use these values in place of expected

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[7]Total medical spending is E + G + O, where E is the value of employer-provided insurance, G is personal spending on group insurance premiums, and O is individual out-of-pocket health care spending. We assume that out-of-pocket spending for those with employer-provided insurance would not be affected by a shift to self-insurance. The tax-deductible share of the additional medical spending that would result from reduced employer-provided insurance depends on the probability that E + G + O - F > 0, rather than the probability that E + G - F > 0.

values in calculating the after-tax price of insurance.[8]

Individuals with health insurance typically face lower marginal costs of health care services at the time of consumption than individuals without such insurance. This may affect their demand for medical services, and it suggests that total medical outlays, T above, may be a function of an individual's insurance regime. We address this by computing α under two different assumptions about the link between price at time of consumption and medical spending. We first assume that total medical spending is unaffected by the presence or absence of health insurance. Our second case assumes that the price elasticity of demand for medical care services is -0.33.[9] Our findings are relatively insensitive to our assumption about the link between insurance status and T, because in for most households α is zero.

The foregoing discussion focuses on the after-tax cost of a marginal dollar of health care spending, which we label *marginal* α. This should be distinguished from the fraction of insured spending that would be tax deductible if the individual were not insured, (T-F)/T, which we label *average* α. Both marginal and average α range between zero and one. Marginal α describes the after-tax cost of the medical expenses that an individual would incur if employer-provided health insurance coverage were reduced by one dollar, and the resulting drop in insured

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[8]Newhouse et al. (1989) report that the best predictor of current medical spending is past spending.

[9]We measure the marginal copayment rate for those with insurance as the ratio of their out-of-pocket medical spending to total medical spending. This is likely to be closer to the average than to the marginal copayment rate, but we do not have any further information in our data set to improve this imputation.

medical care were replaced with out-of-pocket spending. Marginal α will only equal unity if the insured individual already has out-of-pocket spending in excess of the AGI floor. Relatively few insured individuals are in this situtation. *Average* α corresponds to the after-tax cost of replacing all insured medical expenditures with out-of-pocket spending. Average α will be positive whenever total medical spending, including insurance, exceeds the AGI floor. When we tabluate the tax subsidy to employer provided insurance in Tables 4 and 5 below, we use average α in our expressions for the after-tax price. For analyzing the effect of tax caps on insurance spending, however, we use marginal α in our calculations, since individuals are adjusting insurance purchases on the margin. Using marginal α may cause us to overstate the subsidy to insurance, and therefore the reduction in insurance that results from tax caps, if tax policy changes are not marginal.

1.3 The Relative After-Tax Price of Insurance

We define the relative after tax-price of employer provided insurance as the ratio of the after-tax price of this insurance to the after-tax cost of out-of-pocket medical spending:

$$P_{relative} = \frac{\left(\left[\frac{1 - \tau - \tau_s - \tau_{ss}}{1 + \tau_{ss}}\right] * \left(\frac{E + \delta * G}{E + G}\right) + \frac{(1 - \delta) * G}{E + G}\right) * (1 + \lambda)}{1 - \alpha * \tau} . \qquad (3)$$

If the tax code treated insurance premia and medical expenditures symmetrically, for example if neither were deductible from taxable income or if both could be excluded

from federal and state taxable income and from the payroll tax wage base, then the cost of insurance relative to the direct outlays on medical care would be $P_{relative} = 1 + \lambda$. We therefore consider the tax-induced distortion in the relative price of insurance to be $[P_{relative}/(1 + \lambda) - 1]$, where $P_{relative}$ is given by equation (3).

Our measures of the after-tax price of health insurance and the relative price of insurance suffer from at least four limitations. First, we fail to distinguish between marginal purchases of incremental employer-provided insurance and the discrete decision to purchase such insurance. The load factors on marginal insurance purchases may be lower than average loads if these loads in part reflect administrative costs that do not rise when a policy becomes more extensive.

Second, we assume that when expenditures on employer-provided insurance fall, employer (E) and employee (G) spending decline in equal proportion. In fact, many employers contribute a flat amount to their group health insurance plans, and employees contribute the differential cost between the plan that they choose and the lowest cost option. In such cases, if G is not tax deductible, then there is no tax subsidy to insurance on the margin. Thus, our results below will overstate the average tax subsidy to workplace insurance.

Third, our formulation ignores the possibility that individuals may be able to pay for their out of pocket medical costs with pre-tax dollars, as for example with medical spending accounts that are provided in some cafeteria plans. This will also lead us to overstate the tax subsidy to insurance by understating the tax benefit of self-insurance. Unfortunately, we have no data on the structure of employer contributions

or the availability of such pre-tax out-of-pocket arrangements.

Finally, we exclude any possible link between changes in the tax treatment of employer-provided insurance and the aggregate level of health care spending. We emphasize the relative cost of employer-provided insurance versus out-of-pocket spending, but our estimates of the after-tax price of employer-provided health insurance, $P_{\text{health insurance}}$ in equation (2), could also be used to assess the effects of insurance tax treatment on the demand for medical care.

2. Data Sources on Medical Care Spending and Tax Rates

This section describes our methodology for estimating the various parameters, such as marginal tax rates, load factors, and probabilities that medical expenditures are deductible from income taxes, that enter our expression for the relative price of employer-provided health insurance. Because our analysis requires detailed information on the pattern of health care expenditures as well as the tax circumstances of individuals and households, we use the U.S. Treasury Individual Tax Model and the NBER TAXSIM program to impute tax rates to family units in the 1987 National Medical Expenditure Survey (NMES). We then draw on the information on health insurance and health care spending in this data base to analyze the effect of tax subsidies to employer-provided health insurance.

2.1 The NMES Sample

We are not aware of any data set that includes detailed information on health

insurance coverage, health care spending, and federal income tax status. The NMES is the best available household-level data base on health care spending. This is a nationally representative household survey followed roughly 20,000 families during 1987. It gathered information on the demographic and economic characteristics of both family units and individual family members, including information on labor force attachment and income by source. It also collected detailed data on insurance plans, and these data were cross-checked against information collected from insurance sources such as employers or insurance companies. The NMES includes information on expenditures on a variety of types of medical care. Most of this information was also cross-checked by interviews with medical providers.

To impute tax information such as marginal tax rates and itemization status to survey respondents in the NMES, we aggregate individual NMES respondents into "health insurance units" or HIUs. These units include the family head, his or her spouse, any children under age 19, and full-time students until they reach age 23. There may be multiple family heads within a household, for example when elderly parents live with a younger nuclear family. We limit our sample to employed individuals, and exclude the self-employed, families with someone who is aged 65 or over and therefore eligible for Medicare, families with anyone who is eligible for Medicaid, and families with missing information on insurance status.

Table 1 shows the quantitative importance of the various data restrictions that we have imposed in selecting our sample. The NMES universe contains 20,028 health insurance units who represent a total of 168.5 million family heads and spouses.

Since family heads and spouses are the only relevant decision-makers for insurance purchases, we use only their sample weights in making our calculations. We define families as employed if either the head or spouse is employed, and as self-employed if both the family head and spouse are self-employed.

We define families as insured if both the family head and that person's spouse report that they aer insured in the fourth round of the survey, and if they report some spending, either by their employer or by themselves, on employer-provided group health insurance. Our analysis excludes some employed families who purchase individual insurance only, since we are focusing on the tax incentives for employer-provided insurance. We define families as uninsured if they report both the family head and spouse to be uninsured and have no employer-provided insurance. Since the NMES does not report insurance plan information for all persons, our definition excludes relatively more insured persons from the sample than uninsured persons.[10] Our final sample has 5,961 health insurance units, representing a total of 71.1 million household heads and spouses.

Table 2 presents information on the insurance status of the individuals in the employed family units in our NMES sample. Just over 82% of our population-weighted sample, or 58.4 million household heads or their spouses, are part of an employed household and have employer-provided insurance. Our analysis suggests that 12.7 million employed individuals are uninsured. This translates into a higher

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[10]We also exclude NMES families with sample weights of zero. These are families that were added to the NMES during the survey year, for example because they moved into an existing NMES household as a sub-family.

fraction of employed individuals classified as uninsured than some other sources, but the disparity is explained by our stringent criteria for defining a household as insured.[11] Within the sub-sample that report some employer-provided insurance, 42 percent have employer contributions only for insurance, and 52 percent have both employer and own contributions. Only 5 percent of the households in our sample report paying the full cost of employer-provided insurance themselves.

Table 3 reports the distribution of spending on tax-subsidized employer-provided insurance in our NMES sample. The subsample used to construct this table is the set of all individuals who are employed and who we classify as covered by employer-provided insurance. The first column shows the value of employer contributions for insurance (E) and the second shows the value of both employer contributions and pre-tax contributions by employees (E + δG). While the NMES figures are measured in 1987 dollars, all results in this paper have been inflated to 1994 dollars using the growth in personal health spending over the 1987-1994 period.[12]

Table 3 shows that the mean value of employer-provided health insurance is $4249. The mean value of employer and pre-tax employee spending is approximately

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[11]Our analysis yields estimates of the number of uninsured employed individuals that are similar to those in other studies.

[12]The Congressional Budget Office (1993) presents data on private health insurance expenditures in 1987 ($155 billion), along with forecasts for 1993 ($289 billion) and 1995 ($343 billion). We estimate 1994 expenditures by interpolating between the 1993 and 1995 forecasts; this yields $316 billion. We then use the ratio of 1994 to 1987 spending, $316/$155, or 2.039, to impute the distribution of 1987 spending to 1994. The estimates in Table 3 may overstate actual employer contributions for insurance, given the rising role of insurance cost shifting to employees.

5 percent higher ($4483). The distribution of this tax subsidized spending is somewhat skewed, as is revealed by the lower median values. Nearly ten percent of the sample reports employer contributions worth more than $8000 per year, and more than one quarter report values of less than $2000.

2.2 Tax Rate Estimation

To estimate the marginal federal tax rate facing each NMES household, we must estimate each household's federal taxable income. The NMES reports information on a variety of family income flows, such as wage income, dividend income, and interest income, although it does not contain nearly as much detail on income sources as a tax return. In particular, it does not report capital gains income, which we set equal to zero.[13]

The NMES also asked respondents whether they itemized deductions for income tax purposes. This is a critical input to our calculation of both tax rates and the probability of deducting out-of-pocket medical expenditures. The NMES figures for itemization differ from those in the IRS Individual Tax Model, although we did not find any systematic pattern in the differences. In 1987, 58.1 percent of the joint filers in the IRS Tax Model data base, excluding those who claimed any household members

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[13]Imputing capital gains income to individuals by income category made little difference to the estimates of after-tax insurance prices in Gruber and Poterba (1994). Besides capital gains, TAXSIM uses a number of other income items reported on a tax return, such as contributions to IRAs and Keogh accounts and self-employed business deductions, to compute taxable income and marginal tax rates. We set any tax return item for which we do not have information in the NMES equal to zero in estimating taxable income.

aged 65 or over, itemized deductions; the figure is 48.5 percent in the NMES. This pattern is reversed for non-joint filers, with the NMES itemizing share 18.3 percent and the IRS Tax Model share 16.9 percent, again excluding those aged 65 and over. If the NMES understates the incidence of itemization, our results will tend of overstate the tax subsidy to employer-provided insurance.

We conduct our analysis using the reported 1987 data on medical care and insurance spending (inflated to 1994 levels, as described above), but we consider the tax subsidy to health insurance under several different income tax regimes. We ask what the tax subsidy to the level of health insurance purchased in 1987 would have been if households faced the tax rates that they faced in 1986, 1989, and 1994. To do this we "age" taxable income in the NMES data base to 1986, to analyze the tax code in effect before the Tax Reform Act of 1986 (TRA 1986), to 1989, when TRA 1986 was fully effective, and to 1994, the most recent tax year. Our aging procedure is a simplified version of that developed by Lindsey (1987). We assume that each family's AGI changes from year to year in the same way that average per capita AGI changes between years.

Our estimate of the marginal state tax rate facing each household is less precise than our estimate of the federal tax rate. The NMES does not report the respondent's state of residence, but rather reports four Census regions. We therefore create twelve "stylized families", six joint filers and six single filers, at different income levels. We use TAXSIM to estimate state-specific marginal tax rates for each of these stylized families, and we then compute state population-weighted averages within each

Census region for each of these family types. We then assign one of these averages to each NMES household by identifying them as similar to one of the stylized households.

Our calculation of each individual's marginal Social Security tax rate follows Feldstein and Samwick (1992a). They note that the statutory Social Security tax rate is not the true marginal rate, since prospective benefits are linked to taxes paid. This linkage varies according to income and gender, since the benefit formula is redistributive and since on average women live longer and therefore receive a higher present discounted value of benefits than men. The Social Security system also redistributes across households with different configurations of primary and secondary earners, since secondary earners receive the higher of their benefits and one-half of the benefits of the primary earner. Feldstein and Samwick find that effective marginal tax rates vary from negative values (subsidies to labor supply) for some households, to the statutory marginal tax rate for other households. As a result, our tax prices would be misspecified if we used the statutory Social Security tax rate.[14] We estimate the effective marginal Social Security tax rate facing each NMES respondent using data that Feldstein and Samwick (1992b) present on tax rates by age, sex, and family labor supply.[15]

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[14]Using statutory tax rate without adjustment ignores the fact that higher Social Security tax collections today will be offset by higher Social Security benefit payouts in the future.

[15]We assign the Feldstein-Samwick (1992b) effective tax rate for single men to single men or to families where the wife earns more than one-half of the husband's earnings. We assign their rate for women to single women, and their rate for men

Individuals also pay payroll taxes for Disability Insurance and for Medicare Hospital Insurance. We accounted for the former by grossing up the Feldstein-Samwick net tax rates by the ratio of the statutory tax rate for both OASI and disability insurance to the statutory OASI tax rate, under the assumption that disabiilty insurance tax/benefit linkages follow the same pattern as those for OASI.[16] For individuals with labor income in excess of the taxable Social Security maximum, we set r_{ss} equal to zero. In the latter case, there is no tax-benefit linkage, since all citizens receive Medicare at age 65 regardless of their work history. We therefore use the statutory Medicare tax rate in our calculation.

2.3 Comparison With Earlier Studies

Our methodology differs from that in the Congressional Budget Office's (1994b) study of tax subsidies to health insurance, the most prominent recent study of related issues, in using the NMES as the central data base for analysis. The CBO study imputed information from both the NMES and individual tax records to a third data

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with dependent spouses to those families where the wife's earnings are less than one half the husband's earnings. One limitation of this approach is that we are using point-in-time labor supply to proxy for the relative earnings of husbands and wives over their lives, but that is all that is available in the NMES.

[16]This is a crude assumption since DI benefits accrue to a different population, with many more young men, than OASI benefits. In addition, there are other limitations to the Feldstein/Samwick net tax rate calculation, such as the fact that some Social Security benefits accrue to dependents of contributors, and the fact that Social Security may substitute for an imperfect private market for real annuities and therefore have an above-market value to recipients. Since using the Feldstein-Samwick adjustment does not affect our results substantially, we do not feel that these are critical problems.

set, the Current Population Survey (CPS). This has the advantage of providing more detailed income information than the NMES, as well as a larger sample of respondents and the associated opportunity for more precise within-group analysis. But it has the disadvantage of compressing the substantial heterogeneity across individuals in their health care spending, and the correlation of that spending with health insurance circumstances, in the process of imputation. In addition, the CPS does not report itemization status, while the NMES does. Given our limited objective in analyzing tax subsidies to employer-provided health insurance, and our focus on national aggregates, we would not gain substantially from access to the additional information that is potentially available in the CPS.

Our analysis is closer in spirit to Taylor and Wilensky's (1983) study of tax incentives and employer-provided health insurance than to the recent CBO (1994b) study. Although Taylor and Wilensky (1983) did not consider a number of the factors we described above, such as the role of insurance loads, state taxes, and the share of employee-paid health insurance premiums, they did use an earlier data set similar to the NMES, the 1977 National Medical Care Expenditure Survey (NMCES), as the basis for their study. They imputed information on tax status to households in the NMCES and computed a variety of summary statistics on tax subsidies to health insurance.

3. New Estimates of the Tax Subsidy to Employer-Provided Health Insurance

We summarize our analysis of the tax subsidy to employer-provided insurance by reporting average values of the after-tax relative price of employer-provided insurance and out-of-pocket medical spending, $P_{relative}$, under two different assumptions about the effect of insurance status on total medical spending. Recall from the discussion above that these summary statistics use information on average, rather than marginal, α. To permit comparison with earlier studies, we also report the sample average of the change in after-tax employee wage income for each dollar of employer-provided health insurance (dw_{AT}/dE).

Table 4 presents these summary statistics when each of the NMES families is assigned its federal marginal tax rate for 1986, 1989, and 1994. We report both the average value of the relative after-tax price of insurance and out-of-pocket care, as well as the cross-sectional standard deviation of this price. We distinguish two subgroups of the employed population, those with and without insurance, and tabulate results separately for each.

The results for employed insured families, using the 1994 federal tax code, illustrate our general findings. The average value of the reduction in after-tax wage income per dollar of employer spending on health insurance is .659. This implies that federal income and payroll taxes, and state income taxes, place a 34.1 percent tax wedge between the after-tax cost of all other goods (1) and the after-tax cost of employer provided health insurance. There is substantial disparity across households in the magnitude of this subsidy: the standard deviation of dw_{AT}/dE is .152.

Comparing the results for 1986 with those for either 1989 or 1994 demonstrates that the tax rate reductions in TRA86 raised the after-tax wage cost of employer-provided benefits by an average of about three cents per dollar.[17] The changes in the structure of tax rates between 1989 and 1994, because they were concentrated on a small group of high-income households, did not substantially afffect the average after-tax wage cost.

The two lower rows of Table 4 present our estimates of $P_{relative}$ from equation (3). This ratio is substantially higher than the after-tax wage cost of employer provided health insurance benefits because it multiplies the after-tax wage cost by $(1+\lambda)$ to reflect the insurance load factor, because it includes less favorably taxed employee contributions for health insurance in the numerator, and because the denominator, $(1-\alpha\tau)$, is less than one.

The average value of $P_{relative}$ for the 1994 tax code is .828 if we assume that medical spending is unaffected by whether or not an individual is insured; it falls to 0.809 if we assume that spending would be reduced, since the tax subsidy to self-insurance is then less valuable. There is somewhat more heterogeneity in these measures than in the simple after-tax wage cost measures in the first row; the standard deviation of $P_{relative}$ is .184 when insurance status does not affect medical care needs, and .188 when we allow this type of feedback. Moreover, the average value of $P_{relative}$ rises less between 1986 and 1989 than the after-tax wage cost of

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[17]This is consistent with Hausman and Poterba's (1987) finding that TRA86 actually raised marginal tax rates for more than one third of taxpayers. For most of those who received rate reductions, these reductions were relatively small.

health insurance. This is because TRA86 reduced marginal tax rates for some households, but it also raised the AGI threshold for deducting medical expenses from 5 percent to 7.5 percent. This reduced α, thereby raising the after-tax cost of out-of-pocket medical care and partly offsetting the change in marginal rates.

We have also assessed the sensitivity of these results to variation in other tax parameters. We analyzed the effect of changing the AGI threshold for medical expenses, assuming 1994 tax rates, to illustrate how this aspect of the tax code affects incentives for insurance purchase. Lowering the AGI threshold from 7.5 percent to 2 percent, the pre-1983 level, raises the average value of $P_{relative}$ for the insured employed from .828 to .890 when we assume a zero price elasticity of medical care demand, and from .809 to .862 when we assume an elasticity of -0.33. This policy change therefore has a much larger effect than the change in marginal tax rates under TRA86. It suggests that our recognition of the role of tax subsidies to out-of-pocket spending can be an important determinant of the after-tax price of insurance, even though at the current level of the medical expense deduction threshold, this effect is relatively small.

We also tried replacing the Feldstein/Samwick Social Security tax rate with the statutory tax rate. This has very little effect on our results for the insured employed, because much of this group has earnings high enough to make the Social Security tax an effective tax at the margin.

The two panels of Table 4 make it possible to compare the average relative prices for the insured and uninsured employed groups. The uninsured employed face

higher average prices for employer-provided insurance than do their insured counterparts. This is because they are on average in lower income groups, and therefore face lower marginal tax rates, than the insured employed. Some of the observed relationship, of course, could reflect a demand curve for health insurance: those who face higher prices are less likely to buy insurance. Without more detailed analysis, however, it is impossible to disentangle the heterogeneity and demand curve effects.

For the uninsured employed, using statutory Social Security tax rates in place of the Feldstein/Samwick adjusted rates causes a substantial increase in the measured tax subsidy to insurance. This is because a substantial fraction of the uninsured employed have earnings in the range over which the present discounted value of the Social Security benefit increment associated with an additional dollar of earnings offsets a substantial fraction of Social Security tax payments.

One reason for measuring the tax subsidy to employer-provided insurance is to estimate the efficiency cost associated with this tax expenditure. Table 5 presents the first step in any such calculation, our estimate of the price distortion induced by the tax system. Recall that if there were no tax distortions, $P_{relative} = 1 + \lambda$. We therefore use our estimate of $P_{relative}$ with the actual tax system to compute $P_{relative}/(1+\lambda) - 1$. The average value of this distortion declined from approximately .29 in 1986 to 0.27 by 1989; it has changed relatively little since then. It is notable that this estimate of the tax distortion is <u>smaller</u> than $1 - dw_{AT}/dE$, the distortion that is associated with the standard analysis of the tax incentive for fringe benefit provision

(the first row). In 1994, for example, the estimated tax subsidy is 20% smaller than the traditional measure of the tax price. Since the deadweight loss from this subsidy rises with the square of the size of the subsidy, our calculations imply that the deadweight loss from tax subsidization is roughly 40% less than would be implied using the change in after-tax wages.

Our estimate of the distortion based on $P_{relative}$ changes less between 1986 and 1989 than the average value of dw_{AT}/dE because we recognize the role of employee contributions to employer-provided health insurance, which dampen the tax subsidy, and because we include the 1986 increase in the AGI threshold for deducting out-of-pocket medical expenses in our analysis of the relative price of insurance. Our estimates therefore imply that the reduction in deadweight loss from the package of tax changes under the Tax Reform Act of 1986 is much smaller than might be supposed based only on a comparison of dw_{AT}/dE at different points in time.

4. Capping the Amount of Tax-Exempt Employer-Provided Health Insurance

The revenue loss associated with the tax expenditure for employer-provided health insurance, and a perception that over-insurance has contributed to the rise in U.S. health care costs during the last two decades, has led to numerous proposals to alter the current tax treatment of employer provided health insurance. One of the most common reform proposals, and one discussed at length in the Congressional Budget Office (1994b), is capping the value of employer provided insurance that could be excluded from taxable income. One special case of such caps would be complete

inclusion of the value of employer-provided insurance in employee taxable income. In this section, we use our augmented NMES data base to explore how various tax caps would affect the after-tax price of employer provided health insurance, the demand for such insurance, and tax revenues.

There are many ways to tax employer-provided health insurance. Burman and Williams (1994) provide a detailed discussion of several options, including changes in the corporate tax deductibility of such insurance payments, as well as including some or all of the value of these benefits in the personal income tax base. Our analysis focuses on the case in which employers report the value of employer-provided insurance benefits along with an employee's wage income, and in which these benefits are then incorporated in the federal and state income tax base and the federal payroll tax base. In principle, there is no reason that employer provided insurance needs to be taxed in all three forms, and one could disentangle the revenue effects associated with different types of incremental tax changes. We discuss the importance of the relative sources of revenue below.

By considering the case in which tax caps are implemented through the personal income tax, analysis applies to tax caps that are specified for tax filing units rather than individuals. Such family-level caps would be very difficult to implement through any system that relied on changes in the corporate rather than personal income tax. If caps were applied to individuals rather than families, two-earner couples in which both earners had an opportunity to receive employer-provided insurance could reduce the impact of the caps by choosing two individual policies

rather than a single family policy. Caps on tax-unit health insurance benefits such as those we consider provide a strong incentive for households with two earners to eliminate duplicative insurance coverage, since such insurance is likely to provide relatively little health benefit but could lead to a substantial increase in taxable income.

4.1 Analyzing Tax Caps

At the outset, we should recognize several basic points about tax caps. First, the cap should not affect the behavior of anyone who receives employer-provided health insurance benefits worth less than the cap.[18] Second, absent income effects, no one whose employer-provided health insurance exceeds the cap value prior to imposition of the cap should reduce their insurance outlays to less than the capped level. A system of tax caps would provide strong incentives for employers and employees to restructure benefits packages to reduce the fraction of health insurance value that exceeds the cap, and to maximize the chance that the cost of coverage above this cap is paid by the employee, who may have an opportunity to deduct some insurance costs as itemized medical deductions.[19] One example of such a reaction

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[18]It is possible that caps on the excludable amount of employer-provided health insurance may reduce the demand for generous coverage from some employees who previously received benefits worth more than the cap, and that this will work through the negotiation process that results in a benefits and wage package to reduce the level of health benefits.

[19]We consider a tax cap that applies to federal and state income taxes, as well as payroll taxes. If the cap were only applied to federal income taxes, the incentive to reduce health insurance value above the capped amount would be correspondingly

would be scaling back the set of services covered by the employer-provided insurance plan, while introducing a cafeteria plan to allow workers to pay some of these costs with pre-tax dollars. We ignore any such responses to tax caps in computing the revenue and behavioral effects below, but they could be important in practice.

We estimate how tax caps of various dollar amounts would affect the average after-tax relative price of health insurance and out-of-pocket spending by setting the relative tax price for any NMES family with employer-provided insurance above the cap to $(1+\lambda)/(1-\alpha\tau)$. This is just the expression for the after-tax cost of health insurance in equation (3), with $\tau = \tau_s = \tau_{ss} = 0$ in the numerator. Since the families who are most likely to be affected by any cap are those with high incomes, high marginal tax rates, and therefore high values of the tax subsidy before the cap, the change in the average after-tax relative price of insurance can be substantial even if the number of households affected by the cap is small. Throughout our tax cap analysis we use *marginal* α in evaluating equation (3), since this is the appropriate parameter for evaluating a marginal reduction in spending on employer-provided insurance as would be associated with a tax cap.

After describing the change in the after-tax relative price of employer-provided health insurance associated with the tax caps, we present illustrative calculations of how these caps would affect the demand for employer-provided insurance. We assume that caps would apply to all employer-provided insurance that was subsidized before the cap was enacted, regardless of whether this insurance was paid for by

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smaller.

employers or employees making pre-tax contributions.[20]

For each NMES family, we compute the marginal after-tax relative price of employer-provided insurance under the status quo ($P_{relative,0}$) and under the assumption that employer provided insurance above the cap is included in taxable income ($P_{relative,1}$). If these two prices are identical, we assume that the individual would not change his demand for employer-provided insurance (E_0). If the two prices are different, however, we estimate the individual's demand for health insurance at the new price as

$$E_1 = \max (C, E_0*[1 + \eta*(P_{rel,1}/P_{rel,0} - 1)]) \qquad (4)$$

where C denotes the level of the cap. The parameter η is the uncompensated price elasticity of demand for health insurance. We do not consider any income effects on the demand for insurance that might be associated with the introduction of tax caps. If E_1 is greater than C, then we take E_1 as the new level of employer-provided insurance. If E_1 is less than C, however, we assume that $E_1 = C$, and that the individual will locate at the kink point on the budget set. To find the aggregate change in the demand for employer-provided insurance as a result of a cap on the value of excludable benefits, we compute the sample-weighted sum of the changes in E_1 across all NMES households.

Our calculations make the strong assumption that each household affected by

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[20]Excluding pre-tax employee contributions from the tax cap would result in a simple tax avoidance strategy. Firms would reduce their employer-provided health insurance but permit employees to purchase equivalent insurance on a pre-tax basis. This would circumvent the tax caps.

the tax cap can adjust the quantity of employer-provided health insurance that it receives in response to this tax policy change. This assumption is unrealistic, since most workplaces offer only a few discrete choices with respect to health insurance coverage. Moreover, since individual employees cannot determine what benefits package their employer will offer, changes in the tax circumstances of an individual worker may not be reflected in a differential level of employer-provided insurance. Recognizing the important heterogeneity in tax preferences and insurance demand within workplaces, and incorporating this into the analysis, is therefore an important direction for future work.

A critical parameter in our calculation is η, the price elasticity of demand for health insurance. There are relatively few estimates of this parameter, and available estimates differ substantially; see Gruber and Poterba (1994) for a detailed review. There are also many different margins along which employers might alter their health insurance offerings, and it is not clear that elasticities of demand would be the same on all margins. For example, employers could reduce the value of insurance coverage provided to their workers by limiting the set of services covered, by raising copayment rates or deductibles, or by requiring a higher employee contribution for a given insurance policy. Previous studies, and our analysis below, treats adjustments on all of these margins as equivalent.

Previous cross-sectional studies of the price elasticity of demand for health insurance can be grouped into three types.[21] The first set of studies compare the

[21]There are also a number of time series studies, such as Turner (1987).

quantity of health insurance demanded by high- and low-income households that face different marginal tax rates; these studies have produced a wide range of elasticity estimates.[22] The second set of studies consider evidence from hypothetical offers of supplemental insurance to participants in the RAND Health Insurance Experiment, reported in Marquis and Phelps (1987). This randomized experiment assigned individuals to plans with different copayment rates, with an out of pocket maximum of up to $1000. At the end of the experiment, individuals were presented with hypothetical offers for supplemental insurance to lower their out-of-pocket exposure; the price of these offers varied across participants. The resulting elasticity of demand for the quantity of supplemental insurance was -0.6.

The third source of information on the price elasticity of demand is evidence from the takeup of price subsidies that were offered to small firms under experimental pilot projects. Thorpe et al. (1992) find an elasticity of demand of insurance coverage of between -0.07 and -0.33 for these firms. Gruber and Poterba (1994) suggested a price elasticity of demand for insurance coverage of -1.0 or greater in absolute value for self-employed individuals, focusing on tax changes to identify shifts in the after-tax price of insurance for this group. In light of this variation, we set η = -0.5 in our baseline case, and we also report analyses using values of -1.0 and -0.2.

The final aspect of the tax caps that we consider is their effect on total revenue

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[22]Examples of other studies that estimate the price elasticity of demand include Taylor and Wilensky (1983), who report an elasticity of -0.2; Woodbury (1983), who reports -1.7 to -3.5; Holmer (1984), who reports -0.16; Sloan and Adamache (1986), who report -0.6; and Woodbury and Hamermesh (1992), who report -2 to -3.

collections. We combine FICA, federal income tax, and state income tax revenue in our tabulations. Tax caps affect tax revenues in two ways. First, they collect taxes directly on employer-provided health insurance benefits that are valued at more than the tax cap. In addition, however, if some employees decide to reduce their demand for employer-provided health insurance as a result of the tax cap and its associated increase in the marginal cost of insurance, then their taxable wages will rise as their employer-provided health insurance benefits decline. We assume that any reduction in employer-provided insurance will be reflected dollar-for-dollar in pretax wage payments to workers.

The relative importance of the taxes collected on insurance benefits worth more than the cap and on increased taxable wages depends on the price elasticity of demand for health insurance. The total revenue collected as a result of the tax cap is independent of this elasticity, however, and just depends on the total value of employer-provided health benefits above the tax cap in the pre-cap setting, i.e., the sum of (E_0 - cap) across households.

Finally, one important caveat to the results below is that we are using the total insurance expenditures of the health insurance unit (HIU) to identify the effect of tax caps. For some of the HIUs in our sample, insurance expenditures reflect employer-provided insurance coverage to both spouses. A cap that was imposed on each spouse separately would therefore have smaller effects than those estimated

below.[23] For our base case described below, only 16% of HIUs (21.5% of couples) have multiple insurance policies. Among those couples who face binding tax caps, however, 32% have more than one policy (this is 24% of our total sample). This calculation overstates the effect of dual policies, since in some families with dual coverage, both spouses may have policies that exceed the cap. The problem of dual policies therefore does not appear to be an important limitation in applying the calculations reported below.

4.2 Results on Tax Caps

Table 6 presents our basic findings on tax caps for the case with a price elasticity of demand for health insurance equal to -0.5. The first row shows the after-tax relative price of health insurance, and the second row reports the standard deviation of this relative price across households. Rows three and four show the percentage of employed workers, and the percentage of employed insured workers, who would be constrained by the tax caps.

We consider four tax caps, all denominated in $1994.[24] Our base case,

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[23]If the cap were imposed on insurance spending by tax filing unit, as it would be if it were implemented through the individual income tax system, then the cap would apply to total family insurance spending. This would create a strong incentive for families to drop duplicative insurance policies, and might lead to a larger response in the quantity of insurance demanded as a result of the tax cap.

[24]By inflating 1987 expenditures in the NMES by the deflator for personal health care spending, we effectively index the tax caps to the medical cost deflator. If tax caps were indexed to the Consumer Price Index rather than an index of medical care costs, the caps would become more stringent over time if health care inflation continues to outpace overall inflation.

shown in the second column of Table 6, follows the caps suggested by the CBO (1994a): $4000 per year for joint filers, $1600 per year for single filers, and $3400 per year for heads of household. We then show the effects of (a) doubling these caps (first column), (b) halving these caps (third column), and (c) setting the caps to zero, so that all employer-provided health insurance benefits are included in taxable income.

The results show that even tax caps that affect relatively few households can have substantial effects on the average relative after-tax price of employer-provided health insurance. The $8000/3200/6800 cap, which would have been binding for 14.4 percent of employed insured workers in 1987, raises the average value of $P_{relative}$ from .802 under the status quo to .856. The cap analyzed by the CBO has an even larger effect, with $P_{relative}$ rising to 1.019.[25] This cap would affect over one-half of insured employees. Introducing caps first increases the variance of the relative after-tax price in the population, but as the share of households affected by the cap rises and more and more households face $(1+\lambda)/(1-\alpha\tau)$ as their relative tax price, the variance declines. In the rightmost column, which corresponds to eliminating the tax subsidy for employer-provided insurance, the variance of after-tax relative prices falls substantially.

The fifth and sixth rows of Table 6 report our estimates of the change in the level of employer-provided insurance associated with each set of tax caps. For the base case, for example, we calculate that the average reduction in insurance spending

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[25]The relative price of insurance can be greater than one because of the loading factor on insurance and the subsidization of self-insurance.

will be $857 per insured employee, or $50 billion. Because tax caps affect only a fraction of those employees with employer-provided health insurance, the decline in insurance levels for those who are affected by the caps is substantially larger than the average decline for all employees.

The entries in the last column of rows five and six warrant particular note. Our estimates with a price elasticity of insurance demand of -0.5 suggest that eliminating the tax exemption for employer-provided health insurance would reduce the aggregate value of this insurance by 25.1 percent. This corresponds to an average per capita reduction of $1126.[26]

The next three rows, rows seven through nine, present information on the revenue effects of changing the tax treatment of employer-provided insurance. We present the total revenue collected per insured employee (row nine) as well as the decomposition of this revenue between the tax on insurance premia above the cap and the tax on higher wages that result from reductions in employer-provided insurance. The last three rows in the table report the aggregate revenue consequences of each of these policies. We report the total increase in federal income tax and payroll tax revenue, as well as the small increase in state income tax

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[26]Table 6 indicates that the average change in employer-provided insurance for those affected by the elimination of tax exclusion is larger than the average change for all employed insured. There are 256 NMES respondents who report that they are insured by their employers, and who have some out of pocket spending on insurance, but who report zero employer contributions for their insurance. The three-quarters of this group for whom out of pocket insurance spending is not tax-preferred will be unaffected by the repeal of the tax exemption.

revenue, associated with each of these policies.

The entry in the last row and column of Table 6 shows that we estimate that elimination of the tax exemption for employer-provided insurance would have raised $99.8 billion ($1994). More than two thirds of this revenue is raised from taxes on the insurance that remains in force after the tax subsidy is removed. This estimate is about one-third higher than the estimate presented in the Congressional Budget Office (1994b), even though the CBO includes both the revenue collected by taxing employer-provided insurance and the revenue collected from higher wage taxes. The CBO excludes some employer-provided insurance, that for persons in insurance that may not be employment-related, and so begins with a smaller annual flow of employer-provided insurance than we do.[27] Our estimates are only 10% larger than the Joint Committee on Taxation's estimates of the total revenue cost of the tax expenditure for employer-provided insurance.[28]

The revenue estimates for various tax cap proposals provide an indication of how much revenue could be raised by each alternative. Our base case

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[27]Another potential difference between our estimates and those of the CBO relates to our estimate of the pre-reform distribution of insurance spending. We use the actual reported distribution of employer-provided insurance premiums in the NMES, while the CBO made adjustments that lowered the estimated expenditures for high income (and high tax rate) families. We are grateful to Roberton Williams for suggestions with regard to these disparities.

[28]There is one reason to suspect that our results may underestimate the change in taxes from tax caps. We calculate the revenue effects of taxing health insurance spending by multiplying changes in taxable income by the taxpayer's current marginal tax rate, ignoring any movements across tax brackets that might result from taxation of employer-provided insurance. Since the tax code is progressive, this should lead our calculations to underestimate the actual revenue gain.

4000/1600/3400 cap raises roughly one-third as much revenue as the total elimination of the tax exclusion for employer-provided insurance. A much higher tax cap of 8000/3200/6800 only raises $9.5 billion.

It is also quite interesting to consider the implications of alternative plans for insurance expenditures and revenue raising. The base case plan, which affects only 62% of insured workers, reduces insurance expenditures by 76% as much as removing the tax exclusion altogether. This is because, due to the somewhat skewed distribution of insurance spending, the 38% of HIUs that are not affected by the cap do not spend much on insurance. On the other hand, fully removing the tax exclusion raises three times as much revenue. Thus, as the tax cap is tightened, there will be smaller marginal gains in terms of reducing "overinsurance", but larger gains in terms of revenues.

The estimates in Table 6 assume that the price elasticity of demand for health insurance is -0.5. This is not a behavioral parameter that commands a strong empirical concensus, so we also present estimates of the change in insurance demand and the mix of increased revenues for two alternative elasticity estimates: -0.2 and -1.0. Table 7 presents these results. With a price elasticity of -1.0, we find that eliminating the tax exclusion for employer provided insurance results in a decline of $2246 in the quantity of insurance purchased, which is a fifty percent reduction. With an elasticity of -0.2, not surprisingly, the quantity adjustment is much smaller and corresponds to approximately a 10 percent decline in the value of employer-provided insurance. Whether this entire reduction in employer-provided insurance

translates into a greater share of medical care being purchased on an out-of-pocket basis depends on whether individuals replace some employer-provided insurance with directly purchased insurance, an issue that we have not yet explored.

The source of increased revenue, whether taxation of insurance premia or taxation of higher wages, also is sensitive to our assumed elasticity. Using the elasticity of -1.0, more than half of the new revenue generated from eliminating the tax subsidy comes from taxing wages, while with an elasticity of -0.2, almost ninety percent of the revenue comes from the tax on insurance benefits. As we noted earlier, the total revenue collected is not sensitive to our elasticity assumptions, only the decomposition across revenue sources.[29]

We have also explored the sources of increased revenues under our tax cap plans. For our base case plan (4000/1600/3400), approximately 56% of the revenues raised are federal income tax revenues. Another 33% are raised by the Social Security and Medicare taxes, with the remaining 11% being raised by state taxes. The distribution is very similar for alternative tax caps.

One final aspect of taxing employer-provided health insurance that our data can inform concerns the distribution of binding tax caps across income classes. Table 8 presents summary statistics on this issue. Each column corresponds to a different set of tax caps from the previous tables, but now the entries show the fraction of NMES families in a given income category that would be constrained by each cap. For our

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[29]In practice our estimates of the total revenue collected do differ slightly when we vary the elasticities, as a result of rounding error at different steps of the estimation.

base case 4000/1600/3400 cap in the second column, for example, the table shows that the cap would bind for 27.1 percent of the families with incomes between $10,000 and $20,000, compared with 67.8 percent of those with incomes between $75,000 and $100,000. The sample sizes for high income groups in the NMES are relatively small, but the results at least illustrate the general pattern across income classes. All of the tax caps except the highest are binding for the majority of HIUs by approximately $35,000 in family income; removing the tax exclusion entirely binds for the majority of families with more than $10,000 of income.[30]

The rising incidence of binding caps at higher income levels reflects both the rising probability of having employer-provided insurance at higher income levels, and the rising value of average premiums conditional on such insurance. In order to separate these factors, the second panel Table 8 repeats these calculations for those with insurance. Here we can see that all except the most generous tax caps bind for the majority of insured persons at any income level, and the gradient with respect to income is much less steep.

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[30]One potentially puzzling feature of Table 8 is the failure to observe "100 percent" for each of the entries in the last column of the second panel. This disparity arises because there are some NMES respondents who have employer provided health insurance, but who report zero employer expenditure (E). They do report positive out-of-pocket spending (G) on insurance, but given our assumption that only one quarter of households with such expenditures make them on a pre-tax basis, even a zero tax cap does not bind for 75 percent of these households.

5. Conclusion

Our analysis emphasizes two aspects of the current tax subsidy to employer-provided health insurance, and presents new evidence on the economic effects of various tax reforms. The conceptual points we emphasize suggest that the current federal tax code subsidizes employer-provided insurance less than many previous analyses would suggest. This is because a substantial and growing share of employees who receive employer-provided insurance must pay for part of this insurance with their own after-tax dollars, and because the tax code also provides a deduction for extreme medical expenses, thereby to some degree discouraging individuals from purchasing health insurance. Our empirical analysis of the effect of capping the value of employer-provided health insurance that could be excluded from taxation, or eliminating the exclusion entirely, suggests that these reforms could have substantial effects on the level of employer provided insurance.

There are a number of important issues associated with both the determinants of the level of employer-provided insurance, and the effect of tax reforms on this insurance, that we have not addressed. One issue is the role of joint decision-making in workplace benefits. We have not considered how to aggregate the heterogeneous changes in tax incentives for employer-provided insurance that would accompany many tax cap plans into decision rules for firms. We have also stopped short of asking whether changes in tax incentives would lead to different combinations of workers into firms or health insurance units. If tax reform led to greater heterogeneity in worker tastes for employer-provided health insurance, employers might respond by

offering larger menus of insurance policies. This could be important for revenue estimation, and could also have welfare implications.

A second important issue concerns general equilibrium effects in the health insurance markets. If a substantial number of currently insured workers decide not to purchase insurance under some of the tax reforms we consider, it is possible that the load factor facing those who remain in the insured pool may change. This could affect the demand for health insurance even by those who do not face tax caps.

A third issue is modelling the appropriate demand response to changes in the tax price of insurance. We have assumed a constant elasticity demand function and applied this elasticity equally to "looser" and "tighter" caps. In fact, individuals may be quite elastic with respect to insurance coverage on the margin, but less elastic when it comes to dropping their insurance entirely. Extending this analysis to consider a richer range of responses to different tax caps is an important step for future research.

Finally, this paper represents a strictly positive exercise and we have not considered any of the interesting normative issues surrounding the tax treatment of health insurance. One important argument for subsidizing workplace insurance is that workplace pooling, which is largely exogenous to underlying health, avoids the classic adverse selection problems in individual insurance markets. Rothschild and Stiglitz (1976) discuss the theoretical possibility that private insurance markets may fail, but there is little empirical evidence on the extent of such failures and their welfare consequences. Such an argument would imply welfare losses if the removal of this

tax subsidy led to the breakup of workplace pools. What is not clear, however, is the extent to which the tax subsidy, as opposed to other gains from pooling, is responsible for holding workplace pools together. If they can be measured, these pooling gains must be weighed against the distortions from excess consumption of medical care in deciding on the optimal level of tax subsidies.

More generally, the question of whether private insurance purchases should be subsidized depends on a host of unresolved issues, such as the degree to which uninsured individuals consume uncompensated care, how the costs of such care are shifted to paying health care consumers, the role of health insurance in affecting labor market behavior, and the other positive and negative externalities that a more insured population may provide. All of these issues require further investigation.

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Table 1: Sample Size and Sample Limitations, 1987 NMES

	Families in NMES Sample	Weighted to Represent U.S. Population (millions)
Total NMES Sample	20,028	168.5
- Households with Anyone Aged > 64 or oldest member < 18	(5,688)	(32.6)
Subtotal	14,340	135.9
- Medicaid Households	(617)	(3.5)
Subtotal	13,723	132.4
- Nonrespondents to Insurance Status Questions on NMES Wave IV	(2716)	(11.4)
Subtotal	11,007	121.0
- Families That Are Neither "Insured" nor "Uninsured" by Our Definitions	(3,856)	(41.9)
Subtotal	7,151	79.2
- Self-employed families	(136)	(1.6)
Subtotal	7,015	77.5
- Unemployed families	(770)	(6.5)
Subtotal	6,245	71.1
- Families with Zero Weight	(284)	(0.0)
FINAL SAMPLE	5,961	71.1 million

Source: Authors' tabulations using 1987 NMES. Weighted totals are weighted by sum of head and spouse weights.

Table 2: Health Insurance Status of Employed Individuals in the 1987 NMES

Only Employer Premiums (E>0, I+G=0)	24.8 million [1936]
Only Individual Premiums (E=0, G>0)	3.0 million [228]
Employer and Individual Premiums (E>0, G>0)	30.6 million [2360]
Uninsured (E=G=0) & Self-Reported Uninsured	12.7 million [1437]
TOTAL	71.1 million [5961]

Notes: Estimates are based on authors' tabulations from the 1987 National Medical Care Expenditure Survey. Health insurance units, weighted to reflect the sampling probabilities of family heads and spouses, are the basis for tabulations. Calculations exclude individuals in households with anyone above the age of 65.

Table 3: Distribution of Expenditures on Employer-Provided Health Insurance, 1987 NMES Converted to $1994

Percentile	Employer Spending	Employer Plus Pretax Employee Spending
5%	0	602
10	1020	1250
25	1877	2044
50	3816	4130
75	5872	6021
90	7950	8130
95	9920	10159
Mean	4249	4483

Source: Authors' tabulations using 1987 National Medical Expenditure Survey data. Estimates for 1994 are based on the ratio of total private health insurance spending in 1994 to 1987, as projected in Congressional Budget Office (1993).

Table 4: Tax Subsidies to Employer-Provided Health Insurance

	Employed Insured			Employed Uninsured		
	1986	1989	1994	1986	1989	1994
Change in After-Tax Wage Per Dollar of Employer-Provided Health Insurance	0.627 (.152)	0.661 (.153)	0.659 (.162)	0.804 (.220)	0.823 (.241)	0.825 (.281)
Relative After-Tax Price of Employer-Provided Health Insurance Assuming:						
η = 0 to Impute Health Spending if Uninsured	0.811 (.200)	0.830 (.185)	0.828 (.188)	0.936 (.189)	0.950 (.202)	0.950 (.231)
η = -.33 to Impute Health Spending if Uninsured	0.785 (.192)	0.811 (.180)	0.809 (.184)	0.941 (.189)	0.953 (.201)	0.955 (.228)

Source: Authors' tabulations based on imputation of tax rates to households in 1987 National Medical Expenditure Survey. Each entry reports the weighted average using NMES sampling weights for family heads and spouses to replicate U.S. population characteristics. Column headings indicate which year's federal income tax and payroll tax schedule was used in constructing marginal tax rates.

Table 5: Tax Distortions in the Relative After-Tax Price of Employer-Provided Health Insurance

	1986	1989	1994
Change in After-Tax Wage Per Dollar of Employer-Provided Health Insurance	0.373	0.339	0.341
Relative After-Tax Price of Employer-Provided Health Insurance Assuming:			
η = 0 to Impute Health Spending if Uninsured	0.290	0.271	0.273
η = -.33 to Impute Health Spending if Uninsured	0.316	0.290	0.292

Source: Authors' tabulations based on imputation of tax rates from various years to households in 1987 National Medical Expenditure Survey. Each entry reports the difference between the price of insurance with no tax subsidy (1 for the first row, and 1.101 for the second two rows) and the price with the tax subsidy. Sample is employer insured individuals.

Table 6: Effect of Capping Employer-Provided Health Insurance Deduction
Assumptions: 1994 Tax Code, Price Elasticity of Insurance Demand = -0.5

	Tax Cap Parameters ($1994)			
	Joint = 8000 Single = 3200 HH Head = 6800	Joint = 4000 Single = 1600 HH Head = 3400	Joint = 2000 Single = 800 HH Head = 1700	Fully Taxed
Relative After-Tax Price of Employer-Provided Insurance	0.856 (.198)	1.019 (.172)	1.087 (.108)	1.111 (.060)
% of Employed Workers Affected	0.118	0.511	0.653	0.788
% of Employed Insured Affected	0.144	0.622	0.861	0.960
Changes in Insurance Demand:				
* Average Δ in E	-270	-857	-1092	-1126
* Average Δ in E if a Change	-1966	-1446	-1339	-1232
Tax Increase Per Insured Employee:				
* Tax on Insurance Benefits	39.8	230.0	630.8	1209.5
* Tax on Higher Wages	122.3	377.8	483.8	499.0
* Total	162.1	607.8	1114.6	1708.5
Aggregate Revenue Raised:				
* Tax on Insurance Benefits	2324	13,430	36,832	70,622
* Tax on Higher Wages	7141	22,060	28,249	29,136
* Total	9465	35,490	65,081	99,758

Notes: Insurance market responses assume a price elasticity of demand of -0.5 for employer-provided insurance. The base case value for the relative after-tax price in the first row, for the case with unlimited tax exclusion, is 0.828 (.183) as is shown in Table 4. Revenue effects on wage taxes assume that wages rise by the full amount of any reduction in employer-provided insurance. See text for further details.

Table 7: Sensitivity of Results on Capping Employer-Provided Health Insurance Deduction To Assumptions About Price Elasticities of Insurance Demand

	Tax Cap Parameters			
	Joint = 8000 Single = 3200 HH Head = 6800	Joint = 4000 Single = 1600 HH Head = 3400	Joint = 2000 Single = 800 HH Head = 1700	Fully Taxed
	Elasticity = -1.0:			
Changes in Insurance Demand:				
* Average Δ in E	-345	-1285	-1991	-2246
* Average Δ in E if a Change	-2529	-2185	-2443	-2457
Tax Increase Per Insured Employee:				
* Tax on Insurance Benefits	6.5	54.5	236.5	720.3
* Tax on Higher Wages	153.6	557.4	868.3	993.1
	Elasticity = -0.2:			
Changes in Insurance Demand:				
* Average Δ in E	-137	-379	-440	-452
* Average Δ in E if a Change	-1005	-635	-539	-494
Tax Increase Per Insured Employee:				
* Tax on Insurance Benefits	92.8	450.3	911.4	1513.7
* Tax on Higher Wages	63.1	168.1	195.0	200.3

Notes: Revenue effects on wage taxes assume that wages rise by the full amount of any reduction in employer-provided insurance. See text for further details.

Table 8: Distribution of Binding Tax Caps By Family Income Class ($1994)

AGI Class	Level of Tax Caps ($1994, Joint Filers/Single Filers/Household Heads) 8000/3200/6800	4000/1600/3400	2000/800/1700	0/0/0
All				
< 10K	3.4	17.9	26.5	30.3
10-20K	5.9	27.1	43.7	50.9
20-30K	10.4	47.6	68.9	75.8
30-40K	10.3	53.4	75.9	86.1
40-50K	13.0	59.9	82.8	92.9
50-75K	14.2	63.0	84.9	94.2
75-100K	19.9	67.8	86.1	94.1
> 100K	19.0	66.4	85.5	95.3
TOTAL	11.8	51.1	70.6	78.8
Insured Only				
< 10K	9.9	53.2	78.6	89.9
10-20K	10.9	50.0	80.5	93.9
20-30K	13.0	59.0	85.4	94.0
30-40K	11.5	59.8	84.9	96.4
40-50K	13.6	63.1	87.1	97.6
50-75K	14.6	64.6	87.1	96.7
75-100K	20.6	70.3	89.2	97.5
> 100K	19.3	67.5	86.9	96.9
TOTAL	14.4	62.2	85.9	96.0

Source: Authors' calculations using 1987 NMES data. Each entry shows the percentage of employed individuals who would be affected by tax caps of the magnitudes indicated. Results in the last column of the lower panel are not equal to 100.0 because there are 181 NMES respondents reporting employer provided insurance but no spending (E = G = 0).