The Impact of Increased Tax Subsidies on the Insurance Coverage of Self-Employed Families

Evidence from the 1996-2004 Medical Expenditure Panel Survey

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ABSTRACT

The share of health insurance premiums that self-employed workers can deduct when computing federal income taxes rose from 30 percent in 1996 to 100 percent in 2003. Data from the 1996-2004 Medical Expenditure Panel Survey are used to show that the increased tax subsidy was associated with substantial increases in private coverage among self-employed workers and their spouses. Estimated effects on public coverage and the coverage of children were smaller in magnitude and less precisely estimated. Simulation results show that much of the post-1996 subsidy increase represented an inframarginal transfer to persons who would have had held private insurance anyway. Nevertheless, increased subsidization expanded private coverage by 1.1 to 1.7 million persons, at a cost per newly insured person less than $2,300 in all simulations—a cost below that found in simulations of more broadly based subsidies.

I. Introduction

Self-employed workers and their families have substantially lower private coverage rates than do employed workers and their families. In 2004, 77.9

percent of adults in employed families had private coverage versus only 47.9 percent of adults in self-employed families. The uninsurance rate for adults in employed families was 16.7 percent versus 40.2 percent among adults in self-employed families.[1] A main reason for these differences is that employed workers primarily obtain insurance through employer-sponsored groups with low administrative costs and minimal risk rating, whereas self-employed workers typically purchase nongroup or small-group coverage with much higher loads and more risk rating.[2] Another contributing factor, however, may be that one of the main public policy levers for health insurance—tax subsidization of private premiums—has historically been targeted at employed workers more than the self-employed (Monheit and Harvey 1993; Gruber and Poterba 1994; Burman et al. 2003).

In an effort to address this imbalance in tax subsidies, federal and state governments have gradually increased subsidies to self-employment coverage over the past two decades. The federal government enacted the first self-employment tax deduction of 25 percent in 1986, subsequently increasing the deduction to 30 percent by 1996 and 100 percent as of 2003. Many states also increased tax subsidies for premiums of the self-employed. Even so, health insurance tax subsidies for the self-employed continue to lag behind those for employer-sponsored insurance (ESI), because ESI is exempt from payroll taxation for Social Security and Medicare, whereas self-employed subsidies remain subject to the analogous self-employment tax. This has prompted calls for further subsidy equalization, even as large and growing aggregate tax expenditures for the employed, combined with declining employment-related coverage rates, have raised questions regarding whether the tax treatment of employed workers should be fundamentally restructured.[3]

Did subsidy increases for self-employed workers expand private coverage? Or was the main effect an income transfer to self-employed workers already purchasing coverage? Despite the magnitude of the subsidy increase – and the magnitude of uninsurance rates among the self-employed – this policy change has received little attention in the economics literature. The lone prior analysis is by Gruber and Poterba (G&P 1994), who used Current Population Survey data from the 1980s to examine the initial federal subsidy increase. To help fill this gap, I examine data from the 1996-2004 Medical Expenditure Panel Survey (MEPS), a data set that spans the period of greatest change in the self-employed health insurance deduction. I follow G&P's strategy of using employed workers and their families as controls for the self-employed treatment group. In addition, I refine their approach in several respects—changes necessitated in part because the post-1996 deductibility increases for the self-employed were phased in more gradually than the policy change G&P studied.

Tax-price elasticities for private coverage of the self-employed are found to exceed -1.0 and in some cases -2.0, depending on the tax price measure used and the choice of control group. Private coverage responses for children of the self-employed are smaller than those found for adults. Increased tax subsidies may also partially crowd out public coverage, especially among children, although the magnitude and

1. Author's calculations using 2004 Medical Expenditure Panel Survey (described below). See also Monheit and Vistnes (1997).
2. Pauly and Nichols (2002) and references therein.
3. Selden and Gray (2006) and references therein.

significance of this effect varies across models. Finally, the paper applies the estimated models to the 2004 sample of self-employed families to simulate the budgetary and coverage impacts of the post-1996 subsidy increase. The simulation finds that increased subsidization expanded private coverage by 1.1 to 1.7 million persons. While much of the post-1996 subsidy increase represented an inframarginal transfer to persons who would have had held private insurance anyway, the cost per newly insured person was less than $2,300 in all models. This is below the lowest cost per newly insured person in Gruber's (2005) simulations of more broadly based subsidies. Low costs per newly insured arise because estimated coverage responses are relatively large and because low private coverage rates among the self-employed helped to reduce inframarginal transfers. Subsidy-driven reductions in public coverage may have also helped reduce the net cost of the subsidy increase.

II. Tax Incentives for Health Insurance

For employed workers, employer contributions to ESI premiums are excluded from Social Security and Medicare payroll taxes (employer and employee), federal income taxes, and state income taxes. Employee contributions for ESI are often tax-preferred as well, through the use of Section 125 cafeteria plans. In contrast, until the mid-1980s the only federal tax subsidy for health insurance purchases by (unincorporated) self-employed workers was the itemized income tax deduction for excess medical expenditures—a deduction that likely played only a small role in their insurance demand.[4]

The Tax Reform Act of 1986 (TRA86) took the first step toward equalization by allowing self-employed workers to deduct 25 percent of their premiums from income prior to calculation of adjusted gross income (AGI). This percentage was increased to 30 percent by the start of my analysis in 1996, and then rose to 40 percent in 1997, 45 percent in 1998, 60 percent in 1999-2001, 70 percent in 2002, and finally 100 percent starting in 2003. During this time, many states also increased deductions for self-employment premiums from state income taxation. Despite these changes, subsidies for the self-employed are lower than for employed workers, because premiums remain subject to the self-employment tax.[5]

The "tax price" formalizes the cost in terms of (after-tax) consumption of spending a dollar on premiums:

$$(1) \quad TP(\underline{t}, \underline{\theta}) = \begin{cases} \dfrac{(1 - t^{FED} - t^{ST} - t^{SS})}{(1 + t^{SS})} & employed \\ \\ 1 - \theta^{FED} t^{FED} - \theta^{ST} t^{ST} & self-employed \end{cases}$$

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4. Medical expenditures and premiums in excess of 7.5 percent of adjusted gross income (AGI) could be treated as an itemized deduction on federal taxes throughout the period of this analysis. Many states had similar provisions.

5. Social Security and Medicare taxes for employed workers are paid through employer and employee payroll taxes, each at 7.65 percent, for a combined total of 15.3 percent (with an upper income phase out). The self-employment tax serves an analogous purpose and is also 15.3 percent (with an upper income phaseout).

where t^{FED}, t^{ST}, and t^{SS} are marginal tax rates for federal income, state income, and Social Security/Medicare.[6] The terms θ^{FED} and θ^{ST} are federal and state shares of premiums that self-employed workers can deduct from AGI—the focus of this analysis.[7]

An alternative measure is G&P's relative price of coverage (RP), which is the ratio of (a) the after-tax price of purchasing health care through an insurance plan to (b) the after-tax price of purchasing health care directly if one is uninsured.[8] Health care purchased through insurance coverage offers the advantage of tax subsidization, but it also entails the payment of an administrative load, which can be over 10 percent for group coverage and over 40 percent for nongroup coverage (Pauly and Percy 2000). In contrast, the uninsured pay no load, but health expenditures are only tax-preferred through the excess medical expenditure deduction on federal income taxes (with many states applying similar policies). In the widespread case in which employer and employee premium contributions are tax-preferred,

$$(2) \quad RP(TP, \underline{t}, \lambda, \omega, \underline{\delta}) = \frac{(1+\lambda)(1-\omega)\,TP(\underline{t}, \underline{\theta}) + \omega[1 - \delta^{PRIV}(t^F + t^{ST})]}{1 - \delta^{UNIN}(t^F + t^{ST})}$$

where ω is the share of health care paid as out-of-pocket copayments among insured workers (so that $1-\omega$ is the share covered by insurance), λ is the administrative load, δ^{PRIV} is the share of out-of-pocket spending that are itemized if the worker takes up coverage, and δ^{UNIN} is the corresponding share if not privately insured.[9] Through δ^{PRIV}, this approach incorporates the fact that before 2003 self-employed workers would have found it advantageous in some cases to treat premium expenses as itemizable excess medical deductions rather than partially deducting them as self-employed premiums.[10]

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6. Studies using the simple tax price include Gruber (2002); Gruber and Lettau (2004); Bernard and Selden (2003); Gruber and McKnight (2003); Chernew, Cutler, and Keenan (2005a,b). Royalty (2000) employs a similar approach of simply regressing coverage on the combined marginal tax rate.

7. Filers do not need to itemize deductions in order to benefit from this ''above the line'' deduction. The empirical work carefully accounts for the earned income tax credit (EITC). Prior to 2002, the EITC basis for employed workers included nontaxable compensation (such as employer premium contributions), so that the EITC was not affected by shifts in the compensation mix from cash wages to health benefits. Starting in 2002, nontaxed compensation for employed workers was excluded from EITC calculations, so that a shift from taxed to nontaxed compensation would reduce earnings on which the EITC is based. This greatly increased (reduced) the tax price of nontaxed benefits for workers in the phase-in (phase-out) ranges of the EITC. In all years, EITC calculations for self-employed workers were unaffected by their health insurance expenditures. See, for instance, Internal Revenue Service (2001, 2002).

8. G&P in turn cite Phelps (1992). See also Gruber and Poterba (1996a,b).

9. In the empirical work, I modify Equation 2 to allow for the share of employee premium contributions that are not tax-preferred (following G&P).

10. Apart from G&P, RP has primarily been used in simulations given its richer detail regarding loading factors, itemized deductions, and employer versus employee premium contributions (see, for instance, Gruber and Poterba 1996a,b, and Selden and Moeller 2000). Note that even this more detailed measure does not account either for the discounts that insurers typically negotiate or for the availability of public coverage and other public and private dimensions of the ''safety net.''

III. Data and Methods

The basic empirical strategy is to use data from the 1996–2004 MEPS[11] to estimate probit equations for coverage as a function of *TP* and *RP*, with employed workers or a subset thereof serving as a control group for the self-employed "treatment" group. MEPS is a stratified and clustered random sample of households. When combined with sample weights, each year of MEPS is designed to yield nationally representative estimates of insurance coverage, medical expenditures, insurance premiums, and a wide range of other health-related and socioeconomic characteristics for persons in the civilian, noninstitutionalized population. All standard errors and statistical tests have been adjusted for the complex design of MEPS, intrafamily correlation, and the fact that many individuals appear in two subsequent years of data.

Workers are defined as adults aged 19–64 who were employed at some point during the year. Workers' families are defined using "health insurance eligibility units," comprising persons who were related by blood, marriage, or adoption, and who would typically be eligible for coverage under a private family policy. As explained below, persons in families with both employed and self-employed workers are classified for the main estimates as being in employed families. Using this definition, the combined sample contains 100,223 adults in employed families, 7,271 adults in self-employed families, 56,600 children in employed families, and 3,805 children in self-employed families.[12]

Persons are deemed to have private (public) insurance if they held private (public) coverage at any point during the calendar year.[13] Thus, the uninsured are those lacking coverage for the entire calendar year.

State and year-specific tax simulations are performed using TAXSIM 6.4 (Feenberg and Coutts 1993).[14] These marginal tax rates are supplemented with information from state income tax booklets regarding the treatment of self-employed premium expenditures and excess medical deductions.

The probit equations for coverage include a self-employed dummy variable, categorical variables for sex, race/ethnicity, age (eight categories), education (no high school, high school or GED, any college, post-graduate), the number of adults in the family, the number of children in the family, disposable family income (11 categories), interest and dividend income (four categories), home ownership, and a dummy for sole proprietorships versus partnerships (for the self-employed). I also control for an expenditure-weighted index of age and self-reported health, summed within the family (12 categories).[15] Employment characteristics are from the first current

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11. For more on the MEPS see Cohen et al. (1996) and Cohen (1997).

12. Classifying workers solely on the basis of their own employment status, the (sample-weighted) percentage of all workers age 16 and over who are self-employed in MEPS was 8.2 percent in 1996 and 7.6 percent in 2003. These percentages are very close to the corresponding estimates from the Current Population Survey of 8.3 percent in 1996 and 7.5 percent in 2003 (calculated from Bureau of Labor Statistics 2004).

13. I count only private health insurance plans that provide hospital and physician coverage.

14. The National Bureau of Economic Research provides TAXSIM at http://www.nber.org/~taxsim (last accessed February, 2007).

15. The index weights are mean expenditures in a privately insured population by sex, age, and self-reported health. Using expenditure cell means as weights to measure self-reported health yields a cardinal measure that can easily be summed to create a family-level measure of risk. See Pauly and Herring (1999) and Bundorf, Herring, and Pauly (2005). Family rather than individual risk is used as a control variable, because obtaining health insurance is often (but not always) a family-level decision.

main job observed during the year. For dual earner families, I use the characteristics of the job that is most likely to offer coverage based on an auxiliary model of employer offers as a function of job characteristics (as in Rechovsky, Strunk, and Ginsburg 2005). The main estimates exclude persons in families in which there is a government employee.[16] Self-employed persons employed by incorporated establishments are classified as employed (consistent with tax law). Job characteristics include industry (12 dummies),[17] establishment size dummies (under 50, 50-199, 200 and over) fully interacted with an indicator for working at a multi-establishment firm, and hours worked (under 15, 15 to 34, 35 to 40, and over 40). The model also includes state dummies, to guard against state tax rates capturing spurious state characteristics,[18] and year dummies, to capture the average effect of medical care and premium inflation, among other changes. Because rising medical prices and premiums might have differentially affected the self-employed, I also interact the self-employment indicator with the (nationwide) Consumer Price Index for Medical Care.[19]

A. Calculating G&P's Relative Price

Although RP incorporates several important dimensions of insurance choice that are missing from the simple tax price, calculating this measure requires additional (prospective) information on expenditures and a more detailed tax simulation. I follow G&P in calculating RP using worker-specific marginal tax rates, combined with MEPS-based estimates of ω, δ^{PRIV}, and δ^{UNIN} computed as averages for the employed and self-employed groups within broad family-size and family income categories. Using sample averages is consistent with the idea that health insurance is purchased on a prospective basis. The administrative loading factors are assumed to be 12 percent for employment-related coverage and 40 percent for plans purchased by the self-employed.[20]

B. Changes in TP, RP, and Private Coverage—Implications for Model Identification

Table 1 gives selected sample means for 1996 and 2004 by employment status. TP and RP were both essentially constant among employed families, but declined significantly among self-employed families. TP and RP for the self-employed in 2004 remain well above the tax prices faced by the employed, primarily because self-employed premiums remained subject to self-employment taxation.

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16. At issue is whether the public sector is an appropriate control group for the self-employed. The impact of excluding these cases is very minor.
17. Actually, there are twice as many distinct industry dummy variables in order to accommodate the shift in industry coding between 2001 and 2002 from SIC to NAICS.
18. Small sample sizes for certain states necessitated combining nine of the state dummies into Census region dummies.
19. To enhance precision, models for children exclude this additional trend.
20. Pauly and Percy (2000) report loss ratios through 1995 showing a long-term downward trend to loading factors that are just slightly higher than these values. As a specification check, I considered smaller λ values in construction of RP, reflecting not only the possibility of lower loading factors but also the fact that health care purchased through insurance is typically purchased at a substantial negotiated discount to charges (see, for instance, Bernard and Selden 2006, and Anderson 2007). Results using λ=0 for employed and λ=0.2 for the self-employed yielded substantially similar results.

Table 1
Characteristics of Persons in Employed and Self-Employed Families, 1996 and 2004

	Persons in Employed Families[a]		Persons in Self-Employed Families[a]		Difference in Differences (D-C)-(B-A)
	1996 (A)	2004 (B)	1996 (C)	2004 (D)	
Tax prices[b]					
Simple tax price (TP)	0.668	0.681[§]	0.933[†]	0.828[§†]	−0.117[‡]
	(0.003)	(0.002)	(0.003)	(0.007)	(0.008)
Relative price (RP)	0.913	0.913	1.225[†]	1.123[§†]	−0.102[‡]
	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)
Insurance coverage (percent)					
Adults (19-64)					
Private	79.4	77.9	52.4[†]	47.9[†]	−3.0
	(0.8)	(0.6)	(2.8)	(2.6)	(3.6)
Public	6.9	7.7	9.6[†]	14.7[§†]	4.2
	(0.4)	(0.3)	(1.3)	(2.1)	(2.3)
Uninsured	15.7	16.7	39.7[†]	40.2[‡]	−0.5
	(0.6)	(0.5)	(2.7)	(2.3)	(3.3)
Children (0-18)					
Private	71.4	65.7[§]	49.2[†]	45.3[†]	1.8
	(1.5)	(1.1)	(5.3)	(4.9)	(6.5)
Public	21.7	31.6[§]	26.3	41.1[§]	4.9
	(1.3)	(1.1)	(4.4)	(4.9)	(6.3)
Uninsured	11.4	8.0[§]	26.7[†]	18.3[†]	−5.0
	(0.8)	(0.5)	(4.1)	(3.6)	(5.2)

Table 1 (*continued*)

	Persons in Employed Families[a]		Persons in Self-Employed Families[a]		Difference in Differences (D-C)-(B-A)
	1996 (A)	2004 (B)	1996 (C)	2004 (D)	
Other characteristics[b]					
Male (percent)	50.8	50.4	55.4†	55.6†	0.05
	(0.5)	(0.3)	(1.7)	(1.4)	(2.4)
Age 45 and older (percent)	27.5	33.8§	42.2†	45.1†	−3.3
	(0.7)	(0.7)	(2.6)	(2.2)	(3.4)
Race/ethnicity (percent)					
Hispanic	11.7	15.0§	10.9	12.2†	−2.0
	(0.8)	(0.8)	(1.7)	(1.4)	(1.9)
Black, non-Hispanic	10.3	10.1	9.2	8.7§	−0.3
	(0.7)	(0.6)	(1.5)	(1.0)	(2.1)
White & other	78.0	75.0§	79.9	79.0†	2.2
	(1.0)	(1.0)	(2.3)	(1.8)	(2.7)
Number of adults in family	1.69	1.64§	1.60†	1.46§†	−0.10‡
	(0.01)	(0.01)	(0.03)	(0.02)	(0.04)
Number of children in family	0.89	0.82§	0.87	0.75	−0.05
	(0.02)	(0.02)	(0.08)	(0.06)	(0.09)
Education[c] (percent)					
High school	77.6	75.6§	71.2†	73.2	3.9
	(0.8)	(0.6)	(2.8)	(2.1)	(3.5)
Any college	8.9	10.3	14.7†	11.8	−4.2
	(0.6)	(0.5)	(2.2)	(1.8)	(2.7)

High health risk[d] (percent)	20.2	20.4	22.0	19.8	−2.5
	(0.8)	(0.6)	(2.4)	(2.2)	(3.3)
Family income relative to Federal Poverty Line (percent)					
≤200 percent	26.6	23.7§	30.6	33.1†	5.4
	(1.0)	(0.7)	(2.7)	(2.3)	(3.6)
200–400 percent	35.3	34.2§	26.2†	32.5	7.3
	(0.9)	(0.7)	(2.5)	(2.3)	(3.8)
> 400 percent	38.1	42.1§	43.2	34.4§†	−12.7‡
	(1.1)	(0.9)	(3.0)	(2.4)	(3.9)
Asset income[e] > $100 (percent)	35.2	26.2§	37.2	27.3§	−0.9
	(1.0)	(0.9)	(2.8)	(2.5)	(3.9)
Part-time worker[f] (percent)	15.2	16.7	31.6†	27.6†	−5.5
	(0.6)	(0.5)	(2.4)	(2.1)	(3.4)
Dual earner family (percent)	42.9	40.2§	29.9†	13.2§†	−14.0‡
	(0.9)	(0.7)	(2.9)	(1.7)	(3.5)
Firmsize < 50[g] (percent)	22.6	22.7	98.3†	98.3†	−0.2
	(0.7)	(0.6)	(0.6)	(0.7)	(1.3)
Adult population (age 19-64)					
Total (millions)	101.6	115.5§	8.6	9.0	n.a.
	(3.4)	(4.3)	(0.5)	(0.5)	
Percentage	92.2	92.8	7.8	7.2	n.a.
	(0.5)	(0.4)	(0.5)	(0.4)	
Child population (age 0-18)					
Total (millions)	50.4	52.0	4.0	3.9	n.a.
	(2.0)	(1.8)	(0.4)	(0.4)	
Percentage	92.6	93.1	7.4	6.9	n.a.
	(0.7)	(0.6)	(0.7)	(0.6)	
Adult sample sizes (all years) Main analysis[h]	100,223			7,271	

Table 1 (*continued*)

	Persons in Employed Families[a]		Persons in Self-Employed Families[a]		Difference in Differences (D-C)-(B-A)
	1996 (A)	2004 (B)	1996 (C)	2004 (D)	
Propensity- matched analysis[i]	34,564		7,271		
Child sample sizes (all years)					
Main analysis[h]	56,600		3,805		
Propensity- matched analysis[i]	20,369		3,805		

Source: Standard errors (in parentheses) and statistical tests are adjusted for the complex design of the MEPS sample. Indicators of statistical significance: [§]significantly different at 5 percent level from 1996 estimate for same employment category; [†]self-employed estimate is significantly different at the 5 percent level from employed estimate in same year; and [‡]difference-in-differences significantly different from zero at the 5 percent level.
a. Estimates are for all persons in employed and self-employed families (not just the workers therein). Employed families include those with a mixture of employed and self-employed adults.
b. Computed using the adult sample. Means for children show similar patterns.
c. Estimate reflects adult in the family with the most education. High school category includes GED. Any college includes advanced degrees. Omitted category is no high school degree or GED.
d. Health risk for the family exceeds $6,000 based on average expenditures (in 2003 dollars) of privately insured persons of similar age, sex, and self-reported health.
e. Interest and dividend income summed within the family.
f. Estimate reflects employment status of adult in family who works the most hours.
g. Estimate reflects employment status of adult whose job is most likely to offer health insurance as determined by an auxiliary probit of offer on job characteristics. Category includes only single-location firms with fewer than 50 employees.
h. Sample sizes are for all years in the analysis.
i. Sample sizes for propensity-matched analysis exclude employed observations not on common support (observations with 0 likelihood of being self-employed).

Despite reductions in *TP* and *RP*, there was no corresponding increase in private coverage rates among the self-employed between 1996 and 2004. Indeed, private coverage declined slightly faster among adults in self-employed families than among adults in employed families. This difference is not statistically significant and can be almost entirely explained by changes in the composition of the self-employed.[21] Nevertheless, even adjusted private coverage rates provide no time-series evidence of a subsidy effect.

This absence of clear time-series evidence contrasts with G&P's finding that TRA86 was associated with an unadjusted 6.7 percent increase in self-employed private coverage rates relative to employed private coverage rates. One explanation is that whereas TRA86 was a discrete subsidy increase, the post-1996 subsidy increases were phased in gradually during a period with other important changes, such as expanded eligibility for public coverage and a 41.4 percent inflation-adjusted increase in the premiums paid by self-employed policyholders.[22] Although TRA86 only increased the deductible share from 0 to 25 percent, marginal tax rates were higher in the late 1980s, so that TRA86 led to a one-year reduction in *RP* that was nearly three quarters of the entire post-1996 reduction.

Despite the gradual nature of the post-1996 subsidy increase and the lack of compelling time-series evidence, the post-1996 changes nevertheless provide a valuable source of policy-driven tax price variation. The post-1996 changes generate larger subsidy differences than the cross-state variation upon which much of the ESI literature relies. Moreover, the nature of the policy change allows a simpler identification strategy than required in ESI studies (see below). For these reasons, and in view of the policy relevance of evidence regarding tax subsidies for small group and nongroup coverage, it remains useful to examine this change—so long as sufficient care is taken to avoid sources of confounding variation, both over time and across income brackets.

C. Controlling for Bracket Effects

The literature has long realized the potential for the tax price effect to be contaminated by omitted family characteristics that are correlated with both marginal tax rates and coverage (Feenberg 1989). In ESI studies, the obvious solution of including marginal tax rates as control variables is impractical due to high correlations with *TP* or *RP*. For example, regressing *RP* on marginal tax rates in my sample of employed workers yields an R^2 of 0.996. A common solution is to instrument for the tax price using state, state*year, or state*year*income decile variation in state tax schedules. This approach, while theoretically sound, relies on limited identifying variation – variation that might easily be contaminated by confounding state (or state*year) differences.

A major advantage of studying the self-employed deduction is that changes in $\underline{\theta}$ create variation in tax prices that is unrelated to marginal tax rates. One strategy used by G&P exploits this variation through multivariate difference-in-differences estimation that replaces the tax price with pre/post dummy variables. This solves the problem of confounding bracket effects. However, the cost of this arm's length approach is that pre/post dummy variables obscure the variation in how increased deductibility

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21. Changes in the composition of the self-employed group explain 4.41 percentage points of the 4.46 percentage point decline in private coverage.

22. Real growth from 1996 to 2004 in single premiums paid by self-employed workers in single-person firms (the group for which self-reported premium data are most complete). Premium growth is not adjusted for changes in the age or health risk of policyholders or for changes in benefits.

affected workers in different marginal tax brackets, and retaining this cross-sectional variation proves necessary for obtaining precise estimates in my post-1996 sample.[23] My strategy is instead simply to use marginal tax rates as control variables.[24] In the sample of adults in self-employed families, regressing *RP* on marginal tax rates yields $R^2 = 0.476$ (or $R^2 = 0.695$ for *TP*), so that tax price effects remain identified despite directly controlling for bracket effects.

D. Using Employed Workers as the Control Group

As G&P note, there are obvious drawbacks to using the entire employed sample as controls for the self-employed, given that employed workers acquire coverage through a complex process involving job choice, employer benefit design, and worker takeup (Pauly 1997). Of particular concern are families with workers employed by large firms (see Table 1), since large firms might have been less responsive than small firms or the self-employed to rapid premium increases. Other important differences between the treatment and control groups include income, part time employment, and number of working adults. For this reason, I also present results obtained by reweighting the control group to align with the self-employed sample's distribution of the estimated propensity for being self-employed.[25] The rationale for propensity-based reweighting is that it downweights observations in the control group that are different, based on observable characteristics, from observations in the treatment group.[26]

A final consideration regarding choice of control group regards the exogeneity of self-employment versus employment with respect to the tax subsidy. At issue is whether larger subsidies differentially induced persons with unobservably higher insurance demand to become self-employed. Holtz-Eakin, Penrod, and Rosen (1996) examine this issue, finding no evidence of a relationship.[27] Moreover, Table 1 shows that the percentage of self-employed in high health risk families—a group likely to have above average insurance demand—declined between 1996 and 2004 (though not significantly).[28] For these reasons, the analysis assumes there are no

23. My efforts to estimate DD models with MEPS data were unsuccessful. While some specifications yielded results similar to my main results, marginal effect and elasticity point estimates were highly sensitive to minor changes in the set of included control variables and standard errors were very large.

24. Thomasson (2003) also controls directly for marginal tax rates in her analysis of the initial codification of the employer exclusion in 1954. In that study, as in the present study, one can directly control for marginal tax rates because of a policy shift affecting how marginal tax rates affect the tax price.

25. The propensity score adjustment uses 100 points of support in increments of 0.01, aligning control group weight totals in each cell to those of the treatment group. The propensity model includes all control variables in the main regressions, plus *RP* computed as if both groups were self-employed. Employed group observations not on the common support were dropped from the analysis. For a recent application of propensity score reweighting in health economics, see Shen and Zuckerman (2005).

26. Doing so yields results that are very similar to the cruder approach of using small, single-location establishments as controls.

27. See also Meer and Rosen (2004).

28. This difference is not statistically significant. More rigorously, I estimated the probability of being self-employed as a probit function of nonemployment-related characteristics and the tax subsidy. The marginal effect of the tax subsidy was small, wrong-signed, and not significantly different from zero. As a further test, I included an indicator for being in the top quartile with respect to the predicted probability of having private coverage (estimated using only person characteristics and the self-employed sample), as well as its interaction with the tax subsidy. Marginal effects for both ''high-demand'' and ''lower-demand'' groups were again small, wrong-signed, and not statistically significant.

unobservable differences between the employed and self-employed that would confound estimation of tax price effects.

IV. Results

Table 2 presents *RP* results for workers in an effort to replicate as nearly as possible the results from Table V in G&P and to clarify other differences in my approach. The first row follows G&P's methodology, yielding a marginal effect of -0.344.[29] The associated elasticity is -0.409, obtained by multiplying the marginal effect times the sample average of *RP* and dividing by the sample average private coverage rate. In view of the differences in data source, period of analysis, and policy change being studied, these are remarkably close to G&P's findings of a marginal effect of -0.248 and an elasticity of -0.28.[30]

Three methodological changes yield substantially higher results. The first is to use the same coefficient estimates, but to compute the marginal effect and elasticity using only self-employed workers in 2004, rather than the entire sample of employed and self-employed workers.[31] Doing so yields a more policy-relevant effect of the treatment on the treated. This increases the marginal effect by a factor of nearly 1.5. Indeed, the elasticity more than doubles, because self-employed workers have higher *RP* and lower coverage rates than the overall sample. Adding marginal tax rates as control variables for confounding tax bracket effects yields a marginal effect of -1.077 and an elasticity of -2.041, with little loss of precision (the relative standard errors increase only slightly). In the final row of Table 2, I treat workers in mixed employed/self-employed families as if they were employed. On average across years, 42.2 percent of all self-employed workers are in mixed families (s.e.=0.8). Legally, self-employed workers are only eligible for the self-employed premium deduction if they do not have an employed spouse who is offered coverage. More fundamentally, mixed families look more like the employed than the self-employed on all relevant dimensions, including insurance coverage, and the main pathway to insurance coverage for these families is through ESI held by the employed spouse.[32] Refining the treatment group in this way yields an incrementally larger marginal effect of -1.121. The elasticity increases more, to -2.656, because private coverage rates in purely self-employed families are lower than in mixed families.

This elasticity might strike some readers as being implausible large. However, several comments are in order. First, whereas estimates at the top of Table 2 are close to G&P's RP results, their unadjusted difference-in-differences estimate of 0.067 (G&P, Table VI) translates into a self-employed marginal effect of -0.91 (dividing by the RP

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29. Following G&P, I calculate marginal effects by adding a small (0.01) increase in *RP* to each observation and computing the mean change in the predicted probabilities.

30. G&P report the semi-elasticity, which I have converted to an elasticity using coverage estimates for self-employed and employed workers from their Table IV.

31. The 2004 sample is used because the self-employed population changed over time and results for the most recent group of self-employed are most relevant for policy. Results for the entire group of self-employed, however, are very similar.

32. For example, the private coverage rate in 2004 among adults in mixed employment families was 82.9 percent (s.e.=2.0) versus 77.9 percent (s.e. 0.6) among all adults in employed families and 47.9 percent (s.e.=2.6) among adults in purely self-employed families.

Table 2
Impact of Methodology on Results for Private Coverage of Self-Employed Workers

Treatment Group	Marginal Tax Rates as Controls	Sample for Calculating Marginal Effect and Elasticity	Marginal Effect	Elasticity
All self-employed workers	No	All	-0.344^{***} (0.028)	-0.409^{***} (0.033)
All self-employed workers	No	Self-Employed	-0.502^{***} (0.041)	-0.951^{***} (0.084)
All self-employed workers	Yes	Self-Employed	-1.077^{***} (0.146)	-2.041^{***} (0.281)
Self-employed workers, except those with employed spouses	Yes	Self-Employed	-1.121^{***} (0.181)	-2.656^{***} (0.404)

Results based on G&P's relative price measure (*RP*), which measures the cost of acquiring health care if privately insured (inclusive of loading factors and all tax subsidies) divided by the cost of acquiring health care if uninsured (adjusting only for the potential itemization of excess medical spending). Marginal effects are changes in coverage probabilities in response to a 0.01 increase in the price. Elasticities computed by multiplying the marginal effect by mean price and dividing by mean coverage rate. Standard errors (in parentheses) are adjusted for the complex design of the survey using the method of balanced repeated replicates. ***Denotes significantly different from zero at 1 percent level.

difference-in-differences) and an elasticity of -1.74 (multiplying and dividing by average RP and average coverage, respectively). Furthermore, G&P's preferred and most frequently cited result is the unmarried worker semi-elasticity from their multivariate differences-in-differences model. That estimate, like the estimates at the bottom of Table 2, avoids both the problem of omitted marginal tax rates and the confounding effects of mixed employment among self-employed workers with employed spouses. Their semi-elasticity estimate of -1.78 is substantially larger than the semi-elasticity of -1.238 corresponding to the bottom row of Table 2.[33]

A second consideration is that RP-based estimates are intrinsically different from results based on *TP*, which are more commonly reported in the tax price literature. The *TP* model corresponding to the RP results in the last row of Table 2 yields a marginal effect of -1.023 (s.e.=0.192) and an elasticity of -1.783 (s.e.=0.326).[34]

Third, it is important to distinguish between *tax price* elasticities and *premium* elasticities. Premium elasticities reflect the impact on coverage of a one dollar

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33. Semi-elasticity is the marginal effect times the average price. Dividing G&P's semi-elasticity by their 52 percent average private coverage rate for unmarried self-employed workers yields an elasticity of -3.42. Note, however, that it is difficult to interpret G&P's multivariate DD results insofar as marginal effects were calculated based on changing only the interaction term in their probit equation (Ai and Norton 2003).
34. Adjusting the *RP* results using the average derivative of *RP* with respect to *TP* in the sample yields results very similar to those reported for *TP*, showing that the *RP* and *TP* results are essentially measuring the same responses.

increase in the premium and have generally been found to be smaller than -0.5 even in the small group and nongroup markets.[35] However, premium-based results frequently reflect changes in underlying medical costs, health risks, and benefits – all of which are likely to affect demand for coverage.[36]

Fourth, it is reasonable to expect larger marginal effects and elasticities for the self-employed than for the employed groups studied in most other tax price analyses. The entrepreneurial nature of the self-employed, combined with the small sizes of most self-employed enterprises and the higher loading factors they face, may translate into greater responsiveness to price signals. In fact, computing marginal effects and elasticities for *employed* workers based on the model at the bottom of Table 2 yields a marginal effect of -0.762 (s.e.=0.125) and an elasticity of -0.883 (s.e.=0.147). Corresponding *TP*-based estimates for employed workers are a marginal effect of -0.699 (s.e.=0.137) and an elasticity of -0.604 (s.e.=0.119). These are approximately at the midpoint of the tax price literature for *employed* workers, thereby providing an important validity check on the *self-employed* results.[37]

Table 3 expands the analysis to include all adults and children in self-employed (and employed) families. The main (sample weighted) results for adults mirror those for workers. In contrast, applying propensity score adjusted weights to the control group yields smaller marginal effects and elasticities. These estimates, however, have larger relative standard errors than the sample-weighted results, reflecting at least in part the smaller effective sample size in the propensity-weighted models.

The bottom portion of Table 3 presents results for children. Marginal effect point estimates are smaller for children than for adults, although the differences are not statistically significant. Smaller marginal effects for children's coverage are consistent with parents being more risk averse regarding children's coverage than adults in

35. A partial list of premium-based studies includes Chernew, Frick, and McLaughlin (1997); Short and Taylor (1989); Marquis and Long (1995, 2001); Feldman et al. (1997); Blumberg, Nichols, and Banthin (2001); Cooper and Vistnes (2003); Cutler (2003); Marquis et al. (2004); Monheit and Vistnes (2005); Buchmueller and Ohri (2006); Auerbach and Ohri (2006).

36. One study that does isolate the pure effect of premium changes finds an elasticity of only -0.16 (Buchmueller and Ohri 2006). However, this result is for early retirees aged 55-64, and the applicability to the self-employed is unclear.

37. Royalty's (2000) analysis of offers among employed workers between 1988 and 1993 finds a marginal effect of -0.90 with respect to the combined marginal tax rate (rather than *TP* or *RP*). Adjusting her estimates using the mean derivative of *TP* with respect to the combined marginal tax rate in my sample yields a *TP*-comparable marginal effect of -0.97. Gruber (2002) uses data on workers from 1988-1999 to find a *TP* offer effect of -0.94 and a *TP* effect on having private coverage from one's own employer of -0.69. A similar analysis by Gruber and McKnight (2003) for 1982-1996, with a somewhat different set of control variables, yields a marginal effect for coverage from one's own employer of -0.543. Bernard and Selden (2003) use data from 1987 and 1996 to find *TP*-based offer and private coverage marginal effects of -0.728 and -0.804 for employed workers. Chernew, Cutler, and Keenan (2005a) find a marginal effect for all adults of -0.52 (versus a wrong-signed effect in Chernew, Cutler, and Keenan 2005b). Gruber and Lettau (2004) use firm-level data to examine the effect of *TP* on offers to full-time workers, finding a marginal effect of -0.357. Their elasticity for employer premium contributions is -0.71. Thomasson (2003) finds an elasticity for employer offers of -0.54 from the 1954 codification of the employer exclusion (although many firms were already excluding premium based on court rulings). As a final check, I reestimate the model using only employed workers in single-location firms with fewer than 50 workers. The (*RP*) marginal effect for employed workers increases to -0.893 (s.e.=0.215), with an elasticity of -1.406 (s.e.=0.338), mirroring the findings in Bernard and Selden (2003) and Gruber and Lettau (2004) that marginal effects and elasticities are larger in smaller firms.

Table 3

Private Coverage Results for All Family Members

	Relative Tax Price (RP)[a]		Simple Tax Price (TP)[b]	
	Marginal Effect	Elasticity	Marginal Effect	Elasticity
Adults				
Sample-weighted controls	−1.134***	−2.658***	−0.940***	−1.624***
	(0.182)	(0.406)	(0.204)	(0.348)
Propensity-weighted controls[c]	−0.820***	−1.922***	−0.615***	−1.064***
	(0.255)	(0.589)	(0.235)	(0.411)
Children				
Sample-weighted controls	−0.611**	−1.511**	−0.561**	−1.053**
	(0.294)	(0.716)	(0.263)	(0.490)
Propensity-weighted controls[c]	−0.370	−0.919	−0.165	−0.311
	(0.315)	(0.805)	(0.282)	(0.546)

Marginal effects are changes in coverage probabilities in response to a 0.01 change in the price. Elasticities computed by multiplying the marginal effect by mean price and dividing by mean coverage rate. Standard errors (in parentheses) are adjusted for the complex design of the survey using the method of balanced repeated replicates. ***Denotes significantly different from zero at 1 percent level. **Denotes significantly different from zero at 5 percent level.
a. Relative price measures the cost of acquiring health care if privately insured (inclusive of loading factors and all tax subsidies) divided by the cost of acquiring health care if uninsured (adjusting only for the potential itemization of excess medical spending).
b. Simple tax price equals $(1 - t^{FED} - t^{ST} - t^{SS})/(1 + t^{SS})$ if employed or $1 - \theta^{FED} t^{FED} - \theta^{ST} t^{ST}$ if self-employed, where t^{FED}, t^{ST}, and t^{SS} are the marginal tax rates for federal income, state income, and Social Security/Medicare, and where θ^{FED} and θ^{ST} are the percentages of self-employed premiums excludable from federal and state income taxes.

general are about their own. Widespread children's eligibility for public coverage also may have weakened the relationship between the tax subsidy and coverage.

The models in Table 3 were reestimated under a variety of different specifications to gain additional insights. First, I refined the sample by excluding families that lacked a full-time worker, had a member who switched between self-employed and employed status during the year, or had a member with any of the following coverage types: coverage from a policyholder in a different household (as can happen after a divorce), retirement coverage (including Medicare for family members age 65 and over), TRICARE coverage, or COBRA coverage.[38] Part-time workers were far less likely than full-time workers to have been eligible for employment-related coverage, so that the employed group values of *TP* and *RP* may in essence introduce measurement error for these cases. Assigning appropriate prices is also complicated

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38. TRICARE is coverage for families of active duty and retired military personnel. COBRA coverage is for workers recently losing employment-related coverage due to a job change.

by changes in employment status during the year. With respect to the excluded forms of coverage, families with these coverage types may have faced coverage decisions that were less strongly driven by the tax subsidies associated with current employment. These forms of coverage were more prevalent than one might expect. Pooling across years, the percentages of adults in employed and self-employed families with coverage of these types are 8.3 percent (s.e.=0.2) and 12.7 percent (s.e.=0.7), respectively. The hypothesis is that responsiveness to incentives should be larger in the narrower sample, and the marginal effects and elasticities are indeed slightly larger (but not significantly). For example, the sample-weighted *RP* model for adults yields a marginal effect of -1.144 (s.e.=0.258) and an elasticity of -2.842 (s.e.=0.666).

Next, I experimented with using the mixed employment families as a control group for the purely self-employed.[39] This modestly reduced the estimated effects (but not significantly). For example, the *RP*-based model for adults yields a marginal effect of -0.810 (s.e.=0.257) and an elasticity of -1.897 (s.e.=0.593).

The results in Tables 2 and 3 impose the assumption that tax price responses of the employed and self-employed groups can be adequately modeled using a common tax-price coefficient in the probit equation. Interacting the self-employed indicator with the tax price in the *RP* model yields a significant coefficient on this interaction term, increasing the marginal effect to -1.641 (s.e.=0.433) and the elasticity to -3.845 (s.e.=0.977). In the *TP* model, the interaction term is not statistically significant, and the self-employed marginal effect decreases slightly to -0.861 (s.e.=0.501), with an elasticity of -1.487 (s.e.=0.867). Perhaps not surprisingly, these estimates are substantially less precise than the results in Table 3. However, they provide some reassurance that large self-employed responses are not solely artifacts of imposing a common tax price response in the probit equations.[40]

A. Results for Public Coverage

There has been substantial interest among economists and policymakers in the extent to which public coverage expansions ''crowd out'' private coverage. The reverse process can also occur, whereby increased subsidies for private coverage lead to reduced reliance on public coverage. Much of the tax price literature has ignored this possibility. A notable exception is Gruber (2002), who finds a (*TP*) public coverage marginal effect of 0.162 for employed adults. Table 4 presents results from reestimating the models from Table 3 using public coverage as the dependent variable.[41] Point estimates of adult responses are much smaller for public coverage than for private coverage, and the sample-weighted results are approximately in line with Gruber's finding. Point estimates also are much larger for children than for adults, as seems reasonable given that eligibility expansions were targeted more heavily at children.

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39. To some extent this is in the spirit of Holtz-Eakin, Penrod, and Rosen (1996), who argue that workers with employed spouses holding ESI coverage can serve as a control group for workers lacking spousal coverage in their analysis of transitions to self-employment.

40. Unlike estimates relying on a common price coefficient, the models estimated with separate price responses are fairly unstable across minor specification changes. I also tried estimating a completely separate model using just the self-employed sample, but this proved highly unstable and imprecise.

41. See also Gruber (2002).

Table 4

Public Coverage Results for All Family Members

	Relative Tax Price (RP)[a]		Simple Tax Price (TP)[b]	
	Marginal Effect	Elasticity	Marginal Effect	Elasticity
Adults				
Sample-weighted controls	0.133	1.016	0.289[**]	1.631[**]
	(0.114)	(0.855)	(0.119)	(0.650)
Propensity-weighted controls[c]	−0.049	−0.373	−0.032	−0.180
	(0.151)	(1.163)	(0.138)	(0.764)
Children				
Sample-weighted controls	0.406	1.165	0.620[**]	1.368[**]
	(0.289)	(0.859)	(0.275)	(0.646)
Propensity-weighted controls[c]	0.267	0.762	0.229	0.497
	(0.302)	(0.866)	(0.277)	(0.602)

Marginal effects are changes in coverage probabilities in response to a 0.01 change in the price. Elasticities computed by multiplying the marginal effect by mean price and dividing by mean coverage rate. Standard errors (in parentheses) are adjusted for the complex design of the survey using the method of balanced repeated replicates. [***]Denotes significantly different from zero at 1 percent level. [**]Denotes significantly different from zero at 5 percent level.

a. Relative price measures the cost of acquiring health care if privately insured (inclusive of loading factors and all tax subsidies) divided by the cost of acquiring health care if uninsured (adjusting only for the potential itemization of excess medical spending).

b. Simple tax price equals $(1 - t^{FED} - t^{ST} - t^{SS})/(1 + t^{SS})$ if employed or $1 - \theta^{FED} t^{FED} - \theta^{ST} t^{ST}$ if self-employed, where t^{FED}, t^{ST}, and t^{SS} are the marginal tax rates for federal income, state income, and Social Security/Medicare, and where θ^{FED} and θ^{ST} are the percentages of self-employed premiums excludable from federal and state income taxes.

However, the public coverage results are rarely significant and vary across model. In particular, the propensity-weighted models yield adult responses very close to zero. Thus, these results should not be viewed as strong evidence of reverse crowd out.

V. Simulation

Additional insight into the results in Tables 3 and 4 can be gained by simulating the budgetary and coverage effects of the post-1996 federal and state subsidy increases. The simulation population includes all self-employed persons in 2004 who were eligible for the health insurance subsidy and their family members.[42] The

42. This includes a small group of two-earner families with mixed employment in which the employed spouse was not eligible for ESI. I reedited MEPS insurance premiums for the entire subsidy-eligible group to ensure that self-employed or policyholders with missing premiums received imputed amounts from donors who were also self-employed (amounts on the public use file appear not to have been edited with this specific application in mind).

2004 status quo can be constructed simply by applying tax subsidy rules to premiums paid by eligible persons. The counterfactual is that federal and state deductibility had remained at 1996 levels (a change in $\underline{\theta}$ from Equation 1). Applying the estimated models to the sample of subsidy-eligible persons with private coverage, I compute the probability, conditional on having coverage in 2004, that the person would have been privately insured given 1996 subsidies.[43] I then consider two alternative scenarios. In case A, I ignore the possibility of reverse crowd out, assuming that all persons gaining private coverage due to the post-1996 subsidy increases would otherwise have been uninsured. In case B, I use the estimated public coverage models in Table 4, despite concerns about their reliability, thereby allowing for varying degrees of reverse crowd out.

Table 5 presents the simulation results. The top panel provides basic details regarding the baseline or status quo simulation. The total tax subsidy was $4.23 billion (2004 dollars).[44] Averaged over the 11.8 million subsidy-eligible persons observed to have private coverage, the average subsidy was $359.

The bottom panel of Table 5 shows the simulated impact of the post-1996 federal and state subsidy increases. Starting with case A, the total number of persons simulated to have gained private coverage from the post-1996 subsidy increases ranges from 1.1 million to 1.7 million, with simulations based on the propensity-weighted results yielding the smallest coverage increases. The cost of increasing the subsidy varies far less, ranging from $2.37 billion to $2.43 billion. Mirroring the pattern of simulated coverage changes, the cost per person who would otherwise have been uninsured ranges from $1,435 to $2,171. Because 80 to 90 percent of the simulation population would have had coverage in the absence of a subsidy increase, much of this cost can be viewed as an inframarginal transfer that ranged from a low of $186 dollars per person in the sample-weighted *RP* model to a high of $193 in the propensity-weighted *TP* model (not shown in table).

Case B allows subsidy changes to have affected public coverage. The private coverage increase is the same as in case A, but now reverse crowd out reduces public coverage by 0.1 million in the propensity-weighted models to 0.6 million in the sample-weighted *TP* model. The reduction in tax revenue is nearly the same as in case A.[45] However, the subsidy per insured person in 2004 is far below the average cost of public insurance ($1,818),[46] so that savings from reduced public insurance spending partially offset the revenue reduction. As a result, the total cost of the post-1996 subsidy increase ranges from $1.34 billion to $2.25 billion. For the sample-weighted models, reverse crowd out also reduces the cost per newly insured person to

43. Let A and B represent having private coverage at $\underline{\theta}$ 96 and $\underline{\theta}$ 04, respectively. From basic probability theory, $P(A) = P(A|B)P(B) + P(A|B')P(B')$. Assuming that higher subsidies cause no one to drop coverage, we have $P(A|B') = 0$, so that $P(A|B) = P(A)/P(B)$. Because these conditional probabilities do not exactly match the overall marginal effect from the 1996 to 2004 subsidy change, I adjust them downward by scaling factors ranging from 0.990 to 0.996 (depending on the model).

44. The federal-only subsidy for premiums, at $3.30 billion, is virtually the same as the corresponding Department of Treasury estimate of $3.33 billion for fiscal year 2004 (Office of Management and Budget 2006).

45. Allowing for reverse crowd-out slightly increases the revenue reduction, because uninsured persons have higher expected medical expense deductions.

46. This is weighted by the mix of children and adults simulated to be leaving public coverage.

Table 5
Simulated Impact of Post-1996 Changes in Federal and State Tax Subsidies, Self-Employed Families in 2004

Benchmark simulation (subsidy In 2004)

	Total (millions)	Share (percent)
Persons in eligible self-employed families	22.4 (1.2)	100.0
Privately insured	11.8 (0.9)	52.6 (2.3)
Publicly insured	6.0 (0.5)	26.6 (1.8)
Uninsured	6.4 (0.5)	28.5 (1.7)

	Federal Revenue Loss	State Revenue Loss	Total
Benchmark tax subsidy in 2004			
Premium subsidy ($ billions)	3.30 (0.29)	0.72 (0.08)	4.02 (0.35)
Excess medical expense subsidy ($ billions)	0.17 (0.05)	0.04 (0.01)	0.21 (0.06)
Total ($ billions)	3.47 (0.32)	0.76 (0.08)	4.23 (0.35)
Tax subsidy per insured person ($)			359 (26)

Impact of Subsidy Increase	Main Results (RP)	Main Results (TP)	Propensity-Weighted (RP)	Propensity-Weighted (TP)
Case A: No change in public coverage				
Coverage changes from subsidy increase				
Change in private (millions)	1.6 (0.1)	1.7 (0.1)	1.1 (0.1)	1.1 (0.1)
Change in public (millions)	NA	NA	NA	NA
Change in uninsured (millions)	−1.6 (0.1)	−1.7 (0.1)	−1.1 (0.1)	−1.1 (0.1)
Budgetary impact of subsidy increase				
Decreased tax revenue ($ billions)	2.43 (0.22)	2.42 (0.22)	2.39 (0.21)	2.37 (0.21)
Decreased public insurance spending ($ billions)	NA	NA	NA	NA
Net cost ($ billions)	2.43 (0.22)	2.42 (0.22)	2.39 (0.21)	2.37 (0.21)
Net cost per newly insured ($)	1,547 (117)	1,435 (117)	2,096 (163)	2,171 (174)
Case B: Subsidy reduces public coverage				
Coverage changes from subsidy increase				
Change in private (millions)	1.6 (0.1)	1.7 (0.1)	1.1 (0.1)	1.1 (0.1)
Change in public (millions)	−0.3 (0.02)	−0.6 (0.1)	−0.1 (0.01)	−0.1 (0.1)
Change in uninsured (millions)	−1.3 (0.1)	−1.1 (0.1)	−1.1 (0.1)	−1.0 (0.1)
Budgetary impact of subsidy increase				
Decreased tax revenue ($ billions)	2.45 (0.22)	2.48 (0.22)	2.40 (0.21)	2.38 (0.21)
Decreased public insurance spending ($ billions)	0.52 (0.07)	1.14 (0.15)	0.15 (0.02)	0.19 (0.02)
Net cost ($ billions)	1.93 (0.21)	1.34 (0.22)	2.25 (0.18)	2.20 (0.21)
Net cost per newly insured ($)	1,485 (149)	1,245 (215)	2,117 (176)	2,210 (193)

Standard errors (in parentheses) are adjusted for the complex design of the survey, but do not capture sampling variation in the coefficient estimates used to simulate coverage changes.

$1,245 or $1,485. For the propensity-weighted models, reverse crowd out modestly increases the cost per newly insured, because the cost per newly insured in case A exceeds the cost of public coverage.

The models yield a substantial range of estimates for the cost per newly insured person, from $1,245 to $2,210. Nevertheless, even at the upper end of this range, reducing uninsurance via increased subsidies for self-employed health insurance was less expensive than the simulated costs per newly insured person of $3,707 to $19,501 found by Gruber (2005) in his analysis of more broadly targeted reforms.[47] Intuitively, low private coverage rates in this population help to reduce inframarginal transfers to those who would have held coverage absent the subsidy increases, while the estimated tax subsidy responses yield relatively large increases in the number of persons with private coverage.

VI. Discussion

This paper presents new estimates of the subsidy responsiveness of coverage among the self-employed. The expanded tax deduction for premiums paid by self-employed workers provides a valuable ''natural experiment'' to estimate tax subsidy responses. Increased tax subsidies were associated with large increases in private coverage among the self-employed. Among adults in self-employed families, the main (sample-weighted) results indicate a marginal effect of -1.134 using G&P's relative price, with an associated elasticity of -2.658. The propensity score weighted model yields a somewhat smaller marginal effect of -0.820, with an elasticity of -1.922. Private coverage for children in self-employed families appears to be less sensitive to subsidies, although estimates for children tend to be less precise. In addition to these private coverage results, there is some evidence suggesting that tax subsidies may help ''crowd out'' public coverage, especially among children, although the magnitude and significance of this effect vary across specifications.

The post-1996 federal and state subsidy increases are simulated to have increased private coverage in 2004 by 1.1 to 1.7 million persons. Annual federal and state cost (in 2004 dollars) ranges from $1.9 billion to $2.4 billion, with one model yielding an estimate of $1.3 billion due to substantial estimated reductions in public coverage. As in any subsidy-based effort to expand private coverage, much of the cost arises from inframarginal transfers to families that would have held coverage even in the absence of a subsidy increase, and evaluating the merits of such transfers will depend largely on one's subjective valuation of increasing the horizontal equity between self-employed and employed families. Nevertheless, despite substantial inframarginal transfers, the cost per newly insured person ranged from $1,245 to $2,210—amounts that are below the costs found in comparable simulations of more broadly targeted subsidies.

The analysis stops short of making policy recommendations with respect to narrowing the remaining gap between subsidies for employed and self-employed workers by excluding self-employed premiums from the self-employment tax. The results

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47. These estimates are for reforms that would yield a net reduction in uninsurance of three million persons. Larger reductions in uninsurance are estimated to entail higher costs per newly insured.

suggest that removing this disparity might appeal to a broad constituency, combining proponents of entrepreneurship, advocates for children and families, and those seeking easily applied policy tools for helping to strengthen the private coverage market. However, the self-employment tax differs substantially from the income taxes that provide much of the identifying variation for the results in this paper. Like payroll taxes paid by employers and employed workers, the self-employment tax is constant across a wide range of income levels (with a phase-out only at high incomes). Allowing the self-employed to deduct premiums from the basis for this tax would have a more progressive incidence than the reforms to date, and the effect on coverage might therefore differ in unknown ways from the results presented here.

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