

The Implicit Tax on Work at Older Ages

Abstract - Encouraging work at older ages is a crucial policy goal for an aging society, but many features of the benefits and tax system discourage work. This study computes the implicit tax rate on work at older ages, broadly defined to include standard income and payroll taxes as well as changes in future Social Security benefits, employer-provided pension benefits, and health benefits associated with an additional year of employment. The results show that the implicit tax rate on work increases rapidly with age, rising from 14 percent at age 55 for a typical man to nearly 50 percent at age 70.

INTRODUCTION

One way of relieving the economic pressures created by an aging population would be to encourage workers to delay retirement. As society grows older, there is increasing concern about the ability of workers to pay enough taxes to support future retirees and other government functions. Over the next 50 years, for example, the number of Social Security beneficiaries per 100 workers will rise from 30 to 50, assuming current employment patterns persist (Board of Trustees, 2006). Older Americans could limit the impact of these demographic trends by working longer. People who work an extra year produce goods and services that can support their own current consumption and help cover the costs of retirement programs and other government efforts.

Enticing workers to delay retirement depends crucially on the individual returns to work at older ages. As work pays more, in terms of current after-tax earnings and increments to future retirement benefits, people may become increasingly willing to sacrifice leisure and remain at work to obtain richer consumption opportunities both today and later in retirement.¹ Rising tax rates can discourage work by reducing the share of output that workers take home. Earnings at older ages can be taxed in the traditional way, with payments to the Internal Revenue Service (IRS), or they can be “taxed” through reductions in future Social Security and other retirement benefits.

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¹ By increasing income, however, higher after-tax compensation can lead people to consume more goods and services as well as more leisure, reducing hours of work. But higher returns to work will raise work hours and delay retirement as long as the impact of the increased price of leisure (the substitution effect) outweighs this income effect. Studies show that workers generally retire if they would lose future pension or Social Security benefits by remaining at work (Lumsdaine and Mitchell, 1999).

The complex interaction between wages, benefits, and taxes determines how much work pays at older ages. Working an additional year will generally increase future Social Security benefits, for example, but the relationship between work history and Social Security is complex, and sometimes depends on the spouse's employment. Those who have earned much less over their lifetimes than their spouses might not gain any Social Security benefits from an additional year of work, because they receive benefits based solely on their spouses' earnings. In addition, many traditional defined benefit (DB) plans penalize those who continue on the job after they qualify for full retirement benefits, reducing the lifetime benefits they receive from the plan. Many workers receive valuable health benefits from their employers, and the loss of these benefits when they retire can provide strong incentives to remain on the job before they qualify for Medicare benefits at age 65.

This article describes the combined impact of Social Security, Medicare, employee benefits, and the tax system on the financial incentive to work for representative adults age 55 and older. We compute the implicit tax rate on work, broadly defined to include standard income and payroll taxes as well as changes in future Social Security benefits, employer-provided pension benefits, and health benefits associated with an additional year of employment. We measure how work incentives vary by life expectancy, Social Security take-up age, pension plan type and contributions, earnings level, access to employer-sponsored health insurance and retiree health benefits, health status, and marital status. We also examine how selected policy reforms, such as eliminating the payroll tax and the taxation of Social Security benefits, could improve work incentives at older ages. Although previous research has examined how Social Security, employer pensions, employer health benefits, and taxes individually

discourage work at older ages, this article is the first effort to measure the combined impact of these various disincentives and to express them as a tax rate. For example, most studies of how Social Security and pensions affect retirement decisions have ignored the role of taxes and Medicare (e.g., Coile and Gruber (2004), Friedberg and Webb (2005), Samwick (1998)).

SOCIAL SECURITY, TAXES, AND EMPLOYEE BENEFITS

The provisions of Social Security, tax law, and employer benefit policies influence the returns to work at older ages. The rules are complex, however, and the impact varies by age, income, and marital status.

Social Security

Social Security benefits depend on the employment and earnings history of both the beneficiary and spouse. Individuals qualify for future benefits based on their own earnings once they accumulate 40 quarters of covered employment. Benefits are calculated in three steps, beginning with the computation of average wage-indexed monthly earnings (AIME) from the highest 35 years of indexed earnings. The second step uses AIME to compute the primary insurance amount (PIA), the monthly benefit payable at the normal retirement age (NRA). The benefit formula is progressive, providing a higher PIA as a share of lifetime earnings for those with low lifetime earnings than for those with high lifetime earnings. The last step computes the actual Social Security benefit by applying actuarial adjustment factors to the PIA depending on the age of benefit take-up. Social Security reduces payments for those who collect benefits before the NRA and increases benefits for those who do not begin collecting until after the NRA, because delaying retirement reduces the number of monthly payments received.

Social Security also pays auxiliary benefits to eligible spouses, divorced spouses, and survivors of retired workers, based on the current or former spouse's earnings. Unless reduced for early retirement, benefits paid to current and divorced spouses equal one-half of the (ex)-spouse's PIA and benefits paid to survivors equal the deceased spouse's full PIA. Auxiliary benefits are then reduced by the amount of benefits one receives as a retired worker.

The impact of an additional year of work on future Social Security benefits depends on one's own earnings history, the spouse's earnings history, and the age one chooses to begin collecting benefits. Because AIME is based on a worker's highest 35 years of earnings, working an extra year will not raise future Social Security benefits unless current earnings exceed adjusted earnings in the least remunerative of the 35 years already used in the computation. In addition, those with substantially lower lifetime earnings than their spouses receive benefits based on their partners' earnings histories, and gain no additional Social Security benefits from work.

Delaying benefit take-up increases the size of the monthly Social Security check for beneficiaries, up to age 70. A worker born in 1950 (who faces an NRA of 66) would receive monthly Social Security payments equal to only 75 percent of her PIA if she claimed benefits at age 62, the earliest possible age (see Table 1). But she

would receive 132 percent of her PIA if she delayed claiming benefits until age 70. (Delaying take-up beyond age 70 does not lead to any additional increases in benefits.) Thus, those who postpone collecting benefits until they leave the labor force will raise the value of their monthly benefit checks by working an extra year, but they also reduce the number of lifetime payments they receive. The optimal take-up age depends in part on mortality expectations: Those who reach quite advanced ages will gain more from claiming later than those who die earlier. Evidence shows that many people could raise the value of their lifetime Social Security benefits by claiming at older ages (Coile, Diamond, Gruber, and Jousten, 2002).

Taxes

Earnings are subject to both payroll and income taxes. Workers and their employers each pay a flat Social Security tax equal to 6.2 percent of earnings and a flat Medicare tax equal to 1.45 percent of earnings. Earnings above a specified level are exempt from Social Security taxes but not Medicare taxes. The taxable ceiling, which rises each year by the percentage change in the average economy-wide wage, is \$94,200 in 2006. Although employers nominally pay half of the payroll tax, most economists believe that employers offset their share of the tax bill by reducing wages below the level they would have

TABLE 1
EFFECTS OF EARLY OR DELAYED SOCIAL SECURITY TAKE-UP ON BENEFITS
FOR A WORKER BORN IN 1950

Take-Up Age	Reduction in Monthly Benefits (%)	Benefits as a Share of PIA (%)
62	25	75
63	20	80
64	13.33	86.67
65	6.67	93.33
66	0	100
67	-8	108
68	-16	116
69	-24	124
70	-32	132

Source: Social Security Administration (2004).

paid in the absence of the payroll tax. Thus, workers ultimately pay the entire payroll tax themselves, and we include employer contributions in our measure of the implicit tax rate.

Workers also pay federal and state income tax on their earnings and some of their retirement benefits.² The federal income tax is progressive, exempting from taxation the first \$16,900 of income in 2006 for married couples. Marginal tax rates in 2006 range from a low of ten percent, for those with limited incomes, to a top rate of 35 percent for high-income taxpayers. Social Security benefits are generally not subject to the federal income tax, except for high-income beneficiaries, particularly those who continue to work or receive generous pension benefits. If adjusted gross income (AGI) plus tax-exempt interest income and one-half of Social Security benefits ("modified AGI") fall below \$25,000 for single taxpayers or \$32,000 for couples, beneficiaries pay no federal income taxes on their Social Security. However, up to 50 percent of Social Security income is taxable for single taxpayers with modified AGI between \$25,000 and \$34,000 (or between \$32,000 and \$44,000 for couples). Up to 85 percent of Social Security income is taxable for single taxpayers with modified AGI over \$34,000 (or \$44,000 for couples). These income thresholds are fixed, and do not grow with wages or prices. As wages and Social Security benefits increase over time with prices and productivity, a growing share of beneficiaries will pay taxes on their Social Security benefits.

Employee Benefits

Employers typically offer their workers nonwage benefits, principally health insurance and pension plans. These benefits often influence the returns to work.

Health Benefits

Almost two-thirds of employers offered health insurance benefits to their workers in 2004, at an average per worker monthly cost of about \$300 for single coverage (Kaiser Family Foundation and Health Research and Educational Trust, 2004). The average cost is higher for older workers, because they tend to use more health services than younger workers. Most employees who choose to participate in employer-sponsored health plans must make explicit contributions to offset part of the cost. The average monthly contribution in 2004 for single coverage reached nearly \$50. The share of health insurance costs that workers explicitly pay themselves is of less economic relevance here, however, because workers generally pay the entire cost of their health benefits, either explicitly or implicitly in the form of lower wages. Basic economic theory predicts that employers in competitive labor markets pay compensation equal to workers' productivity, and payments in the form of health benefits and other types of nonwage compensation are offset by lower wages. Although anti-discrimination laws forbid firms from charging older workers higher contributions than younger workers, employers may compensate for the high cost of providing health benefits to older workers by limiting wage growth at older ages.

Perhaps most importantly, employer health benefits grant workers access to group insurance plans. Nongroup insurance policies typically charge higher premiums than group policies because nongroup plans face high administrative expenses and tend to attract intensive users of health services, who gain the most from health insurance. Insurance companies often try to deter high-cost policyholders by charging higher premiums to

² Our analysis ignores state and local taxes, because they vary widely across jurisdictions. Forty-one states and the District of Columbia subject earnings to state income taxes (Tax Policy Center, 2003). Many localities do not tax residents' income.

those with pre-existing health problems or denying them coverage altogether, for even relatively minor health conditions (Chollet and Kirk, 1998).³ The group market is especially advantageous to workers with health problems, because it is illegal for employers to deny them coverage or require them to make higher contributions than workers in good health.

Workers with employer health insurance generally forfeit their benefits when they retire, and the loss of access to the group insurance market raises the cost of retiring before age 65. At 65, however, virtually all Americans qualify for Medicare benefits, eliminating the need to obtain primary coverage in the nongroup market. Some employers offer retiree health benefits to their workers, enabling them to continue their employer health insurance coverage after they retire until they qualify for Medicare benefits at age 65. Some retiree health plans also supplement Medicare benefits after age 65. Workers with retiree health benefits do not lose access to the group market if they leave the labor force before qualifying for Medicare. Consequently, retiree health benefits reduce incentives to work.

Workers with employer-sponsored health coverage forfeit their Medicare benefits when they remain on the job beyond age 65. Federal law mandates that employer-sponsored health insurance be the primary payer of medical expenses for active workers ages 65 and older. Medicare becomes secondary coverage, paying only for Medicare-covered services not included in the employer benefits package.

Pension Plans

About one-half of full-time workers participate in employer-sponsored pension plans (Copeland, 2002). There are two general types of pensions: defined con-

tribution (DC) plans and traditional DB plans. In DC plans, which include 401(k) plans and are now the most common type of retirement benefit, employers (and generally employees) make tax-deferred contributions to a retirement account in the participant's name, often specified as a particular share of salary or a given dollar amount. At retirement, workers receive the funds that have accumulated in their accounts. They can use these funds to purchase annuities, although few do (Johnson, Burman, and Kobes, 2004). Income from DC accounts is taxable upon withdrawal. Workers face tax penalties if they withdraw funds before age 59 and one-half, but penalties are waived if they receive benefits as annuities.

Traditional DB plans provide workers with lifetime annuities that begin at retirement and pay benefits typically expressed as a multiple of years of service and earnings received near the end of the career (e.g., one percent of average salary over the final three years on the job times years of service). Participants cannot collect benefits until they reach the plan's retirement age. Some plans allow workers to collect reduced benefits at specified early retirement ages. Income from DB plans is not taxable until it is received in retirement.

Pension wealth—the present discounted value of the stream of future expected benefits—tends to grow slowly in DB plans for young workers, increases rapidly at older ages once workers approach the plan's retirement age, and often declines if the worker remains on the job past the retirement age. Pension wealth is minimal at younger ages because junior employees typically earn low wages and have completed only a few years of service. In addition, future benefits are discounted many years into the future. Wealth rises rapidly as workers age and accumulate tenure.

³ Some states require insurers to provide coverage to all who apply and forbid insurers from charging higher premiums to those with health problems.

An additional year on the job increases traditional pension benefits not only by adding an additional percentage of pay, but also by raising the value of previous benefit accruals by a combination of real wage growth and inflation. This increment is often substantial for workers with lengthy job tenures. Pension wealth also increases as workers approach retirement age and benefits are no longer discounted far into the future.

Workers in traditional DB plans often lose pension wealth if they stay on the job beyond a certain age or seniority level. Growth in promised annual retirement benefits slows at older ages as wage growth declines. Some plans also cap the number of years of service that workers can credit toward their pensions, and others cap the share of pre-retirement earnings that the plan will replace in retirement. In addition, for every year that workers remain on the job past the plan's retirement age, they forego a year of benefits. Pension wealth declines when the increase in annual benefits from an additional year of work is insufficient to offset the loss from the reduction in the number of pension installments.

Pension wealth in DC plans, which simply equals the value of the account balance, grows each year by the value of employee and employer contributions to the plan and by the investment returns earned on the account balance. Although sharp changes in investment returns can lead to discontinuities in DC plan wealth, it does not systematically increase prior to the retirement age or fall thereafter.

Previous Literature

Although numerous studies have examined how our system of taxes and transfers affects work incentives, previous research has not measured the combined impact of Social Security, taxes, and employee benefits on the returns to work at older ages. Gokhale, Kotlikoff, and Sluchynsky

(2002), for example, compare lifetime earnings for a representative two-earner couple to lifetime taxes and the lifetime value of transfer payments they lose because of work, and conclude that workers give up nearly 50 cents in tax payments and foregone transfers for every dollar they earn. The authors do not, however, examine returns to work at older ages, or how returns vary with age. A number of studies have investigated the impact of financial incentives on retirement behavior, especially the role of Social Security and employer-sponsored pension and health plans (Coile and Gruber, 2004; Johnson, Davidoff, and Perese, 2003; Lumsdaine, Stock, and Wise, 1992, 1994; Samwick, 1998; Stock and Wise, 1990). These studies ignore the role of taxes and (generally) Medicare, and do not report how total returns to work change as adults age. Our approach is similar to the analysis of Diamond and Gruber (1999), who compute implicit tax rates for prototypical workers, but they ignore the role of federal income taxes and employer-sponsored pension and health insurance plans, which have important effects on work incentives.

METHODS

We define the tax on earnings as the difference between the amount of compensation employers pay and the total value of wages and nonwage benefits that workers take home. The implicit tax rate T at age t can be expressed as:

$$[1] \quad T_t = \frac{EP_t + WP_t + F_t}{C_t} + \frac{L_t + M_t - SS_t - H}{C_t},$$

where C_t is total compensation at age t , EP_t is the payroll tax paid by the employer, WP_t is the payroll tax paid by the employee, F_t is federal income tax, L_t is the marginal accrual at age t in lifetime federal

income taxes on future Social Security and pension benefits, M_t is the loss of Medicare benefits from working at age t , SS_t is the marginal accrual in Social Security wealth from working at age t , and H_t is the savings from group health insurance at age t . Total compensation consists of cash earnings plus the employer's share of payroll taxes and health insurance premiums. For workers in DC plans, total compensation includes the employer's contribution to the plan. For those in DB plans, total compensation includes the change in lifetime pension wealth.⁴

The first term in equation [1], the ratio of payroll and federal income taxes to total compensation, is the standard measure of the federal tax rate, which we adjust to account for the impact of changes in net Social Security wealth and health insurance costs. The computation reduces the tax by the increase in the present discounted value (PDV) of future Social Security benefits associated with an additional year of work (SS_t), but raises the tax measure by the PDV of future federal income taxes that will be paid on Social Security and pension benefits (L_t). We increase the tax measure for workers with employer health insurance by the value of Medicare benefits lost each year after age 65 (M_t), because Medicare-eligible workers with employer health benefits must forego Medicare when they remain at work.⁵ Finally, workers with employer health insurance coverage can obtain less expensive health benefits than those forced to turn to the costly and inefficient nongroup market. We reduce taxes for workers with employer health benefits by the value of the savings they realize in the group insurance market (H_t). We view increments to Social Security wealth, loss of Medicare benefits, and savings

from access to group insurance as taxes (either positive or negative) because they alter net compensation without changing employer payments.

We compute implicit tax rates for prototypical adults at each age between 55 and 70. The calculations for any given age assume that workers retire at the end of the year and begin collecting retirement benefits the next year, if eligible. If too young to collect benefits when they retire, they begin collecting as soon as they qualify. They always take up Social Security by age 70, even if they are still working, because there is no gain from postponing beyond age 70. The analysis assumes a personal discount rate of two percent, and an inflation rate of three percent. We report all financial amounts in constant 2004 dollars.

We focus on a base case, defined as a man born in 1950 (and, thus, 55 years old in 2005), in good health and subject to average mortality risks for his birth cohort. To avoid having to make assumptions about spousal earnings, we assume that our base case worker is unmarried. He has worked continuously since age 22, earns moderate wages (typical of a man with some post-secondary education but less than four years of college), has employer-sponsored health insurance but is not entitled to retiree health benefits, and has participated in a DC plan since age 35. Like others born in 1950, he can first collect full Social Security benefits at age 66 and reduced benefits at age 62.

The base case assumes the employer contributes eight percent of earnings each year to the DC plan and the worker contributes nothing. The account balance earns interest at the nominal rate of five percent per year. The worker takes an actuarially fair single-life annuity at retire-

⁴ Because DB pension wealth often increases sharply just before the retirement age and falls rapidly at older ages, the total compensation profile and implicit tax rate profile exhibit discontinuities for workers in traditional DB plans.

⁵ We set M equal to zero for workers younger than 65 and those who lack employer-sponsored health insurance.

ment, based on a real interest rate of two percent, but his benefits are not indexed to inflation. We assume that benefits are fully subject to the federal income tax when he retires.⁶ The base-case worker does not save outside of Social Security or his employer's retirement plan.

To examine the sensitivity of our findings, we also compute returns to work for other prototypes, which vary by earnings, pension plan type and contributions, life expectancy, Social Security take-up age, marital status, access to employer-sponsored health insurance and retiree health benefits, and health status. One of the alternative pension scenarios assumes that the worker contributes eight percent of his salary to the DC plan, in addition to the employer contributions. Other pension scenarios consider a worker in a traditional DB plan that pays retirement benefits equal to one percent of average salary received during the final three years on the job times years of service, with full benefits payable beginning at age 62. One variant includes an early retirement option that pays reduced benefits as early as age 55, as long as participants have completed 25 years of service.⁷ We assume that the worker joins the firm at age 35. The data appendix provides additional details about the measures.

The analysis concludes with simulations of the impact of potential policy reforms on the implicit tax on work at older ages. For our base-case worker, we model the impact of the elimination of the income tax on Social Security benefits, the elimination of the payroll tax (for both Social Security and Medicare) after the NRA, and the designation of Medicare as the primary payer of health care costs for eligible beneficiaries regardless of work status. We also model the impact of implementing all three reforms together.

ESTIMATED TAX ON WORK AT OLDER AGES

Before examining how our comprehensive tax rate measure changes with age for our representative worker, we consider how federal income taxes and employee payroll taxes alone relate to earnings at older ages (see Table 2). Column 1 reports taxable earnings, which fall slowly with age in real terms because the steady but modest nominal-wage increases experienced by our base-case worker fail to keep pace with inflation. As a result, he earns \$12,000 less in real terms at age 70 than at age 55. Column 2 reports employee payroll taxes, set at 7.65 percent of earnings, and column 3 reports federal income taxes. At age 55, our representative worker pays 22.8 percent of his earnings to payroll and federal income taxes (column 6). At age 61 (in 2011), his direct tax rate increases to 23.7 percent, primarily because of the expiration of the 2001–3 tax cuts after 2010. The tax rate then falls slowly as his real earnings decline. Our assumption that workers take up Social Security benefits at age 70 (because they gain nothing from further delay) increases their current federal income tax liabilities, pushing the direct tax rate on work at age 70 to nearly 40 percent.

This simple measure of the tax on work, which is the rate that most workers probably perceive, is incomplete because it ignores employer pension and health benefits, the employer share of the payroll tax, and the impact of continued employment on Social Security and Medicare benefits. Table 3 shows how our broader measure of the implicit tax rate on work changes with age. The table reports total compensation (column 5) and its components, the total tax on work (column 13) and its components, and the implicit tax rate (column 14).

⁶ A portion of the benefits would not be taxable if the worker made after-tax contributions to the plan, but most workers contribute only before-tax dollars.

⁷ The reduction factor is four percent per year.

TABLE 2
DIRECT TAX ON WORK AT OLDER AGES, BASE CASE

Age	Earnings (\$)	Employee Payroll Taxes (\$)	Federal Income Tax (\$)	Take-Home Pay (\$)	Tax on Work (\$)	Direct Tax Rate (%)
	(1)	(2)	(3)	(4)=(1)-(2)-(3)	(5)=(1)-(4)	(6)=(5)/(1)
55	50,996	3,901	7,716	39,379	11,617	22.8
56	49,938	3,820	7,518	38,600	11,338	22.7
57	49,657	3,799	7,499	38,359	11,298	22.8
58	48,436	3,705	7,200	37,531	10,905	22.5
59	47,243	3,614	6,981	36,648	10,596	22.4
60	46,119	3,528	6,738	35,853	10,266	22.3
61	45,798	3,504	7,339	34,956	10,842	23.7
62	45,457	3,477	7,281	34,698	10,759	23.7
63	44,574	3,410	7,064	34,100	10,474	23.5
64	43,709	3,344	6,863	33,502	10,207	23.4
65	42,860	3,279	6,654	32,927	9,932	23.2
66	42,027	3,215	6,163	32,649	9,378	22.3
67	41,212	3,153	5,935	32,124	9,088	22.1
68	40,411	3,091	5,711	31,609	8,802	21.8
69	39,627	3,031	5,491	31,104	8,522	21.5
70	38,857	2,973	11,892	23,992	14,865	38.3

Source: Authors' computations.

Note: Estimates are for a representative unmarried male worker in good health with a DC pension plan and no retiree health insurance. Financial amounts are expressed in constant 2004 dollars.

Employer contributions to health insurance and the pension plan and the employer's share of payroll taxes raise total compensation for our base-case worker. The share of total compensation paid in the form of cash wages falls steadily with age because employers contribute more in health insurance premiums for older workers than younger workers. At age 55, total compensation exceeds wages by 23 percent, and non-cash compensation is divided fairly evenly among employer payroll taxes, health insurance contributions, and pension contributions. At age 70, by contrast, compensation exceeds wages by 36 percent, with health insurance contributions accounting for more than half of all non-cash compensation. Because of rising health insurance contributions, real total compensation falls more slowly with age than real cash earnings.

Changes in Social Security wealth substantially alter the implicit tax rate over time. Through his mid 50s, Social Security wealth for our base-case individual grows rapidly with additional work. Each added year of employment replaces a year of

zero earnings in the Social Security formula, substantially increasing future benefits. By age 57, however, our base-case worker—who has worked continuously since age 22—has accumulated 35 years of covered employment, the maximum number of years in the benefits formula. Each additional year of employment increases future benefits only by the amount that earnings in the current year exceed indexed earnings in the least remunerative year. As a result, the real increment to Social Security wealth from an added year of employment declines from \$5,367 at age 56 to \$1,887 at age 57. It continues to fall through age 61.

From ages 62 to 69, Social Security raises monthly payments for those who delay claiming benefits to compensate them for the reduction in the number of lifetime payments they will receive. As a result, our representative individual can generally raise his Social Security wealth by working an additional year at ages 62 to 66. The increases in monthly payments, however, are insufficient to fully compensate single men who delay benefit take-up

TABLE 3
IMPLICIT TAX ON WORK AT OLDER AGES, BASE CASE

Age	Earnings (\$)	Employer Payroll Taxes (\$)	Employer Health Ins. Contrib. (\$)	Employer Pension Contrib. (\$)	Total Compensation (\$)	Total Payroll Taxes (\$)	Federal Income Tax (\$)	Increment to SS Wealth (\$)	Increment to Future Federal Taxes (\$)	Lost Medicare Benefits (\$)	Savings from Group Health Insurance (\$)	Net Compensation (\$)	Tax on Work (\$)	Implicit Tax Rate (%)
	(1)	(2)	(3)	(4)	(5)= (1)+(2)+ (3)+(4)	(6)	(7)	(8)	(9)	(10)	(11)	(12)=(5)-(6)- (7)+(8)- (9)-(10)+(11)	(13)= (5)-(12)	(14)= (13)/(5)
55	50,996	3,901	3,889	4,080	62,866	7,802	7,716	5,533	0	0	1,046	53,926	8,939	14.2
56	49,938	3,820	4,020	3,995	61,773	7,640	7,518	5,367	0	0	1,084	53,065	8,707	14.1
57	49,657	3,799	4,155	3,973	61,583	7,597	7,499	1,887	0	0	1,123	49,496	12,086	19.6
58	48,436	3,705	4,295	3,875	60,311	7,411	7,200	1,314	171	0	1,163	48,007	12,304	20.4
59	47,243	3,614	4,440	3,779	59,077	7,228	6,981	934	416	0	1,205	46,590	12,487	21.1
60	46,119	3,528	4,589	3,689	57,925	7,056	6,738	452	461	0	1,232	45,354	12,571	21.7
61	45,798	3,504	4,744	3,664	57,709	7,007	7,339	239	417	0	1,293	44,478	13,231	22.9
62	45,457	3,477	4,904	3,637	57,474	6,955	7,281	370	1,671	0	1,356	43,292	14,182	24.7
63	44,574	3,410	5,069	3,566	56,619	6,820	7,064	3,760	3,054	0	1,421	44,862	11,756	20.8
64	43,709	3,344	5,240	3,497	55,789	6,687	6,863	1,724	3,024	0	1,493	42,432	13,357	23.9
65	42,860	3,279	5,416	3,429	54,984	6,558	6,654	-138	3,122	5,178	0	33,334	21,650	39.4
66	42,027	3,215	5,900	3,362	54,504	6,430	6,163	1,242	3,403	5,641	0	34,109	20,395	37.4
67	41,212	3,153	6,414	3,297	54,076	6,305	5,935	-771	2,993	6,132	0	31,940	22,136	40.9
68	40,411	3,091	6,940	3,233	53,675	6,183	5,711	-2,602	2,613	6,635	0	29,932	23,743	44.2
69	39,627	3,031	7,480	3,170	53,308	6,063	5,491	-4,340	2,256	7,151	0	28,007	25,301	47.5
70	38,857	2,973	8,033	3,109	52,971	5,945	11,892	313	1,028	7,680	0	26,739	26,232	49.5

Source: Authors' computations.

Note: Estimates are based on a representative unmarried male worker in good health with a DC pension plan and no retiree health insurance. Computations for any given age assume that workers retire at the end of the year and begin collecting retirement benefits the next year, if eligible. Financial amounts are expressed in constant 2004 dollars.

at ages 67 to 69. Although the adjustments are designed to be actuarially fair across the entire population, raising monthly payments just enough to offset exactly the reduction in the number of lifetime payments, they are not fair for single men, who have higher mortality rates than women. The loss of Social Security wealth increases the implicit tax rate on work by a few percentage points for single men in their late 60s.

Even while our representative worker is in his mid 50s and Social Security wealth is growing, the increment to wealth falls short of the Social Security portion of his payroll taxes. The worker and his employer each pays 6.2 percent of cash wages to Social Security, amounting to \$6,324 in annual payments when he is 55. (Column 6 in Table 3 shows *total* payroll taxes, including the portion that finances Medicare, not Social Security payroll taxes alone.) These tax payments are nearly \$800 more than the increment to his Social Security wealth. At age 69, when he loses more than \$4,300 in Social Security wealth by remaining at work, he pays more than \$4,900 in annual Social Security taxes.⁸

Future income tax liabilities offset part of any increase in future retirement benefits associated with an additional year of work. As shown in column 9, increments to the PDV of lifetime federal tax liabilities are quite small between ages 55 and 61 because his annual pension and (future) Social Security income would be modest and taxed only lightly if he stopped working at a relatively young age. Each additional year of work would raise future retirement income and, thus, future tax liabilities because of the progressivity of the tax code. For example, working an additional year at age 66 would raise the PDV of future income taxes by \$3,403.

Employer health insurance coverage reduces the implicit tax workers pay before age 65, but raises it once they would otherwise qualify for Medicare coverage. Employer coverage allows workers to avoid the inefficient nongroup insurance market, where coverage is about 20 percent more expensive than in the group market. We estimate that access to the group insurance market saves our base-case worker in good health about \$1,000 per year at age 55, reducing the implicit tax rate by 1.7 percentage points. Cost savings rise with age as expected health services use increases, reaching nearly \$1,500 per year at age 64. These savings lower the implicit tax rate by 2.7 percentage points. Beginning at age 65, however, employer-sponsored coverage forces the worker to forfeit Medicare benefits. The annual value of these lost benefits amounts to \$5,178 at age 65, increasing the implicit tax rate on work by 9.4 percentage points, and rises by age 70 to \$7,680, equal to 14.5 percent of total compensation.⁹

The total implicit tax rate grows rapidly with age. At age 55, the implicit tax rate stands at only 14.2 percent, much less than the 22.8 percent rate reported in Table 2 that most workers probably perceive themselves as paying. The implicit rate is relatively low at age 55 because our worker reaps tax bonuses from his growing Social Security wealth and savings from access to the group insurance market. The implicit tax rate grows to 21.7 percent by age 60 and to 23.9 percent by age 64, as the increment to Social Security wealth slows. With the loss of Medicare benefits, the tax rate soars to 39.4 percent by age 65, and generally increases thereafter, reaching 47.5 percent at age 69. Our assumption that workers take up Social Security ben-

⁸ These comparisons do not necessarily imply that Social Security is a bad deal for our representative worker, however. Early in his career, the increment in Social Security wealth far exceeds his annual Social Security payroll taxes. Over his lifetime, he could receive more from Social Security than he puts in.

⁹ Note that the value of employer health insurance contributions slightly exceeds the loss in Medicare benefits at every age because the employer plan that our base-case worker receives is somewhat more generous than Medicare.

efits at age 70 (because they gain nothing by delaying further) increases their current federal income tax liability, pushing the implicit tax rate on work at age 70 to nearly 50 percent.

High tax rates may provide strong disincentives to work at older ages. In combination with declining real wages, rising tax rates on work cut real net compensation for our base-case worker approximately in half between ages 55 and 70. However, previous studies give mixed results on the impact on work. On the one hand, overall male labor supply may not be very responsive to the net wage. A recent review finds that across about 20 studies, the median estimate of own wage labor supply elasticity was only 0.08 for men (Blundell and MaCurdy, 1999). This elasticity implies that the cumulative work disincentives between ages 55 and 70 reduce male labor supply by only about four percent. On the other hand, retirement decisions appear to be more responsive to changes in net compensation. Gustman and Steinmeier's (2001/2002) estimates of the impact of changes in Social Security and pension wealth on work decisions imply an elasticity of about 0.42. This elasticity suggests that the implicit tax on work at age 70 increases retirement rates about 21 percent, relative to what they would be if age-70 work were instead taxed at the same rate as age-50 work. In truth, workers may respond as a group to social and tax signals—e.g., tending to retire if their friends retire—a type of effect that cannot easily be captured in simple comparisons of individual responses to tax rates.

ESTIMATED TAX RATES FOR ALTERNATIVE WORKERS

To test the sensitivity of our estimated work incentives to the characteristics of our base-case worker, we measure the returns to work for typical workers who differ from our base case by earnings,

pension plan, life expectancy, Social Security take-up age, marital status, access to retiree and employer-sponsored health insurance, and health status. In each case, we vary only one characteristic of the worker, holding all others constant. Although particular rates vary, our basic result remains the same throughout: Tax rates increase with additional years of work.

Earnings

Table 4 shows how the implicit tax on work varies by earnings. Our base-case worker, who earns moderate wages, receives annual earnings of \$50,996 at age 55 (in 2004 dollars), typical for a man with some post-secondary education (but less than four years of college). At the same age, a typical male worker with less than a high-school degree earns only \$29,502 (our low-wage scenario), and another with a college education earns \$75,066 (our high-wage scenario). The implicit tax rate through age 64 increases with earnings because of the progressivity in the federal income tax code and the Social Security benefit formula, which disproportionately raises the accrual in Social Security wealth for those with limited earnings. At age 55, for example, our high-wage earner faces an implicit tax rate of 22.7 percent, compared with only 8.5 percent for our low-wage earner. Tax-rate differences by earnings are muted after age 65, however, because workers at all earnings levels face the same absolute loss of Medicare benefit by remaining employed, and the loss is larger relative to earnings for those near the bottom of the earnings distribution.

Pension Plans

Table 5 reports the impact of alternative pension plans on implicit tax rates for our representative worker. Because employer-sponsored pension plans provide tax-deferred compensation, he

TABLE 4
IMPLICIT TAX RATE ON WORK AT OLDER AGES, BY EARNINGS

Age	Annual Earnings (\$)			Implicit Tax Rate (%)		
	Base Case	Low	High	Base Case	Low Earner	High Earner
55	50,996	29,502	75,066	14.2	8.5	22.7
56	49,938	28,929	73,945	14.1	8.4	23.1
57	49,657	28,368	72,415	19.6	14.4	24.2
58	48,436	27,817	71,423	20.4	14.8	25.0
59	47,243	27,277	71,631	21.1	15.4	27.1
60	46,119	26,747	71,990	21.7	15.5	28.2
61	45,798	26,228	72,267	22.9	16.0	29.8
62	45,457	25,718	72,467	24.7	15.3	30.6
63	44,574	25,219	71,060	20.8	8.1	26.8
64	43,709	24,729	69,680	23.9	11.5	29.0
65	42,860	24,249	68,327	39.4	35.0	38.8
66	42,027	23,778	67,000	37.4	32.7	36.8
67	41,212	23,316	65,700	40.9	38.6	39.6
68	40,411	22,863	64,423	44.2	46.9	44.1
69	39,627	22,420	63,173	47.5	52.6	48.2
70	38,857	21,985	61,946	49.5	48.3	50.2

Source: Authors' estimates.

Note: The base-case worker is an unmarried man in good health with moderate earnings, a DC pension plan, and no retiree health insurance. Other cases are identical to the base case except for earnings level. Computations for any given age assume that workers retire at the end of the year and begin collecting retirement benefits the next year, if eligible. Financial amounts are expressed in constant 2004 dollars.

TABLE 5
IMPLICIT TAX RATE ON WORK AT OLDER AGES, BY PENSION PLAN (%)

Age	Base Case	No Pension	DC Plan, Worker Contributes 8%	DB Plan With Early Retirement Option	DB Plan Without Early Retirement
	(1)	(2)	(3)	(4)	(5)
55	14.2	15.2	14.9	16.9	16.9
56	14.1	15.1	16.9	16.9	16.9
57	19.6	21.0	24.0	21.7	21.7
58	20.4	21.5	25.2	22.3	22.3
59	21.1	21.8	25.7	15.6	22.8
60	21.7	22.3	26.8	28.7	23.3
61	22.9	23.7	28.3	30.3	24.5
62	24.7	23.2	28.7	30.9	30.9
63	20.8	16.4	22.1	22.8	22.8
64	23.9	19.8	25.0	26.2	26.2
65	39.4	35.9	42.3	45.7	45.7
66	37.4	33.2	42.6	42.9	42.9
67	40.9	37.7	47.5	48.7	48.7
68	44.2	41.9	50.7	54.1	54.1
69	47.5	46.0	51.3	59.0	59.0
70	49.5	50.5	47.3	60.8	60.8

Source: Authors' estimates.

Note: The base-case worker is an unmarried man in good health who has been working for the current employer since age 35. He earns moderate wages and has a DC pension plan into which his employer contributes 8% of his salary, but he makes no contributions. Other cases are identical to the base case except for the pension plan. The DB plans pay full benefits equal to 1% of final three years of earnings times years of service beginning at age 62. The early retirement option pays benefits as early as age 55 after 25 years of service. Computations for any given age assume that workers retire at the end of the year and begin collecting retirement benefits the next year, if eligible.

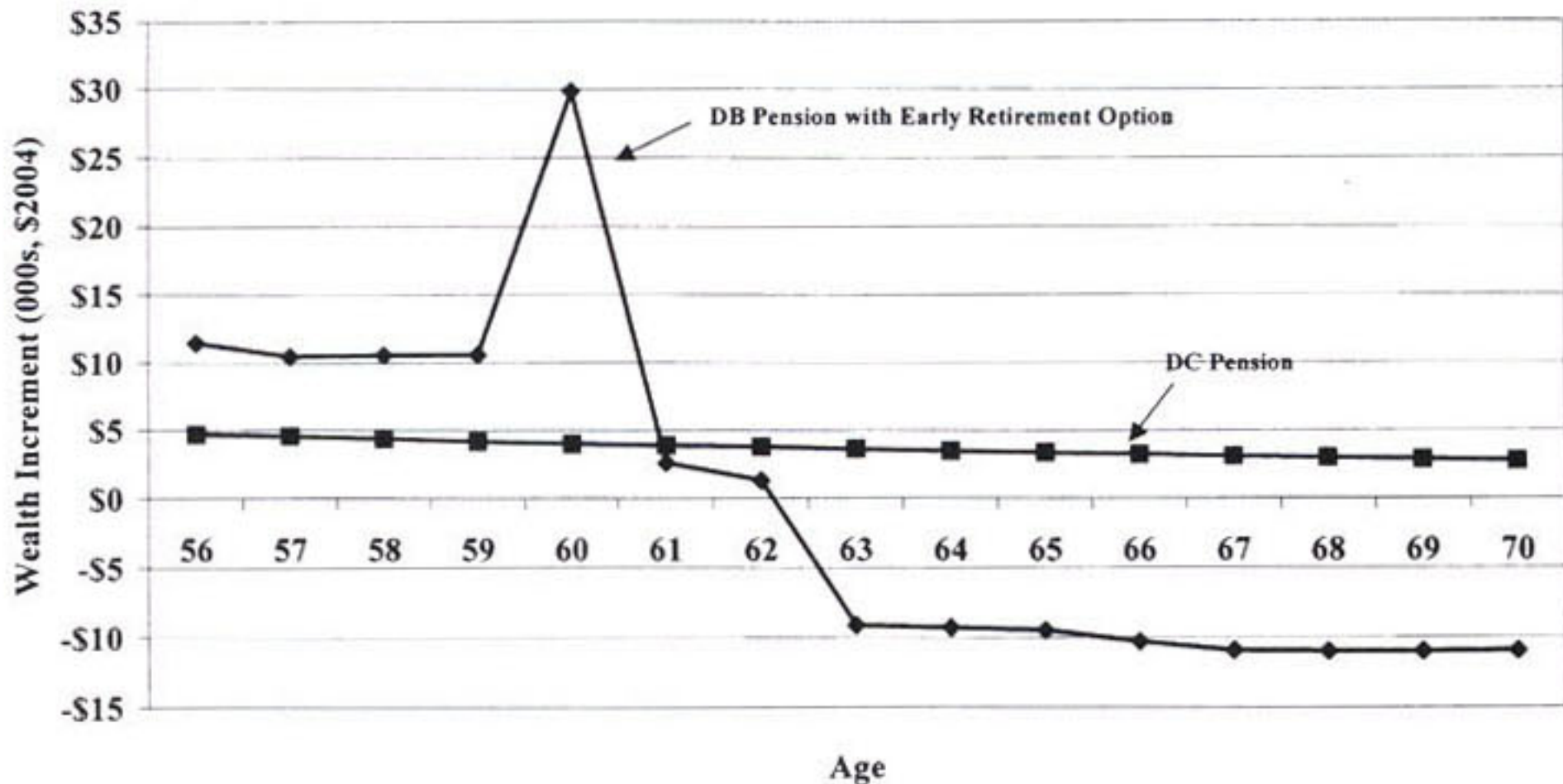
faces higher tax rates on work before age 62 when his employer does not offer a plan (column 2) than when the employer offers a DC plan (column 1). However, each additional year of participation in a pension plan increases future federal tax liabilities, because pension funds are taxable when they are withdrawn. Increases in pension income can also raise the share of Social Security benefits subject to federal taxation. As plan participants work beyond age 61 and accumulate significant pension income, their future tax payments outweigh the advantages of tax-deferred compensation. As a result, they face higher implicit tax rates on work after age 61 than those without any pension plans.¹⁰

Employee contributions to the DC plan increase tax rates on work at older ages. Column 3 of Table 5 reports implicit tax rates for our representative worker

when he contributes eight percent of his gross earnings to his retirement plan, tax deferred, in addition to his employer's contributions. (In the base case, only the employer contributes to the plan.) Tax-deferred DC plan contributions lower his federal income taxes while he works, but the relatively high pension benefits he receives in retirement increase the tax burden by even more when he stops working. As a result, the implicit tax rate on work is as many as seven percentage points higher for the DC plan contributor than the DC plan participant who does not contribute (and simply spends his earnings when he receives them).

DB pension plans often lower the returns to work at older ages, because plan participants generally lose pension wealth if they remain on the job beyond the plan's normal retirement age. Figure 1 shows the annual increment to real pension wealth

Figure 1. Increment to Pension Wealth, by Plan Type



Source: Authors' computations.

Note: The chart shows pension wealth for a man born in 1950 who began working for the employer at age 35. The DB plan pays benefits equal to the number of years of service times 1% of average salary earned during the last three years of service. Full benefits are paid beginning at age 62. Reduced benefits are available after 25 years of service, when the worker reaches age 60. Contributions to the DC plan total 8% of salary, and earn interest at a real rate of 2% per year.

¹⁰ Our representative worker does benefit from the tax-deferred savings vehicle. However, once the account balance is large enough, the plan raises his implicit tax rate on work above that faced by someone else without a 401(k) plan who receives the same cash wage (and, thus, receives less total compensation.)

from an additional year of work for our base-case worker, who participates in a DC plan, and for an otherwise identical worker who participates in a DB plan with an early retirement option that pays full benefits equal to one percent of final average salary times years of service. Our representative worker qualifies for full benefits at age 62 and reduced benefits at age 60 (after 25 years of service). Real pension wealth in the DC plan grows steadily over time, increasing more slowly at older ages as real earnings decline. The pattern is much more erratic for the DB plan. The annual increment to DB wealth is about \$10,000 when the worker is in his late 50s, and then spikes upward to \$30,000 at age 60, when he qualifies for early retirement benefits. The annual wealth increment falls to \$2,500 at age 61, and for every year he remains on the job after age 62 he loses about \$10,000 in pension wealth.

The implicit tax rate faced by our DB plan participant drops sharply at age 59 as his pension wealth spikes, but rises above the rate faced by the DC plan participant in later years (see column 4 in Table 5). From ages 60 to 62, for example, the DB plan participant faces a tax rate of about 30 percent because the slow growth or loss of pension wealth reduces his compensation. His tax rate jumps to 46 percent at age 65 and to 61 percent at age 70. The loss of DB pension wealth substantially increases the tax on work at older ages, and helps explain why workers in DB plans tend to retire earlier than those in DC plans (Friedberg and Webb, 2005).

Column 5 reports implicit tax rates on work for a DB plan without an early retirement option. The presence of the early retirement option sharply decreases the tax on work just before the early retirement age, when pension wealth spikes,

but increases the tax rate in the years between the early and normal retirement ages, when the growth in pension wealth is relatively small.¹¹

Life Expectancy

Table 6 shows how the implicit tax rate on work varies by life expectancy, Social Security take-up age, marital status, access to health insurance, and health status. For our alternative life-expectancy case, we use average female mortality rates for the 1950 birth cohort, instead of average male rates. Women born in 1950 who survive to age 55 can expect to live 3.2 years longer than men (Bell and Miller, 2002). Mortality rates affect Social Security wealth, annual pension income, and annual income taxes paid in retirement. Although the increase in life expectancy does not change the monthly Social Security benefit, it increases Social Security wealth by raising the expected number of payments. Pension wealth is identical in each scenario, because employers contribute the same eight percent of earnings each year to the DC plans. However, the annuity that each individual purchases with DC plan assets is based on sex-specific survival probabilities, and we assume that insurance companies can identify the retiree with relatively high life expectancy as a woman. Consequently, the high-life-expectancy person receives lower annual pension income and faces lower income taxes in retirement than the base-case. The gain in Social Security wealth and the decrease in lifetime federal taxes lowers the implicit tax rate for the worker with high life expectancy by as many as seven percentage points below the rate faced by the single man with average life expectancy.

¹¹ One-year pension wealth accruals, which we compute here, do not fully capture the work incentives introduced by DB pensions. For example, the expected growth in pension wealth several years into the future may induce workers to remain on the job, even when the annual wealth accrual is small (see, e.g., Gustman and Steinmeier (2001/2002)).

TABLE 6
 IMPLICIT TAX RATE ON WORK, BY SEX, AGE OF SOCIAL SECURITY TAKE-UP, MARITAL STATUS, HEALTH INSURANCE, AND HEALTH STATUS (%)

Age	Base Case	High Life Expectancy	Takes Up Social Security by Age 65		Married		Retiree Insurance	No Employer Insurance	Health Problems
			Average Life Expectancy	High Life Expectancy	Wife Does Not Work	Wife Has Same Earnings			
			(3)	(4)	(5)	(6)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
55	14.2	12.8	14.2	12.8	6.5	22.2	15.9	16.9	5.5
56	14.1	12.7	14.1	12.7	6.5	22.5	15.9	17.0	4.9
57	19.6	19.1	19.6	19.1	14.2	26.9	21.4	23.0	10.1
58	20.4	19.8	20.4	19.8	15.0	27.3	22.3	24.0	10.4
59	21.1	20.3	21.1	20.3	15.6	27.8	23.2	25.1	10.6
60	21.7	21.4	21.7	21.4	15.0	29.5	23.8	25.9	10.6
61	22.9	22.7	22.9	22.7	16.8	31.7	25.2	27.4	11.4
62	24.7	18.3	24.7	18.3	18.0	28.3	27.0	29.6	12.7
63	20.8	13.8	20.8	13.8	1.8	26.1	23.3	25.6	8.1
64	23.9	19.2	23.9	19.2	2.8	26.6	26.6	29.4	10.7
65	39.4	34.7	40.6	37.1	23.0	39.1	39.4	33.2	39.4
66	37.4	32.2	46.2	46.3	37.3	21.3	37.4	30.4	37.4
67	40.9	36.5	46.3	46.9	41.5	25.3	40.9	33.6	40.9
68	44.2	40.3	46.5	47.1	45.4	29.1	44.2	36.6	44.2
69	47.5	44.0	46.8	47.5	49.4	32.9	47.5	39.6	47.5
70	49.5	50.1	47.1	47.7	54.3	49.4	49.5	41.3	49.5

Source: Authors' estimates.

Note: Computations for any given age assume that workers retire at the end of the year and begin collecting retirement benefits the next year, if eligible. The base-case worker is an unmarried man in good health, earns moderate wages, and has a DC pension plan and employer-sponsored health insurance, but no retiree health insurance. He does not take up Social Security benefits until he stops working, but no later than age 70. Other cases are identical to the base case except for the specified characteristic.

Social Security Take-Up Age

The timing of Social Security benefit take-up affects the size of both current and future benefits, up to age 70. Here we compare our base-case worker who waits to take up Social Security benefits until he stops working (but not later than age 70) with an average-life-expectancy man and a high-life-expectancy man who take up Social Security benefits by age 65 even if they remain at work (see columns 3 and 4). As reported earlier in Table 1, claiming at age 65 reduces monthly benefits by 29 percent compared with claiming at age 70. However, the impact on Social Security wealth is more complicated. Although those who claim Social Security benefits at age 65 while they are still working receive lower annual benefits than those who wait to claim, they will receive more payments over their lifetimes. Claiming benefits by age 65 instead of age 70 also raises income tax liabilities while working because taxable income includes both earnings and some portion of Social Security benefits. Once early claimants stop working, however, they pay lower income taxes than those who claim later, because their Social Security benefits will be lower.

Claiming benefits by age 65 instead of by age 70 raises the implicit tax rate on work at ages 65 to 68 for men with average life expectancies, because current tax liabilities soar. At ages 69 and 70, however, single employed men can lower their implicit tax rates on work by taking up benefits at age 65. Single men lose thousands of dollars in Social Security wealth if they do not claim benefits at age 69, and 70-year-old workers pay higher taxes if they take up benefits at age 70 than if they first receive them at age 65, because annual benefit payments are much larger for those who delay.

Single workers with relatively high life expectancies are always better off by waiting to claim, up to age 69, instead of taking up benefits at age 65. They gain more from the monthly benefit increases that Social Security provides to those who delay claiming beyond the NRA. At age 70, however, high-life-expectancy workers who wait to claim benefits face higher implicit tax rates on work than those who claim at age 65 because their relatively high benefit payments increase their marginal income tax rates.

Marital Status

Table 6 also reports the impact of marital status on the costs and benefits of additional work. We compare our representative unmarried man to another man identical in all respects except that he is married to a woman of the same age. We first assume that his wife does not work. In the tax rate calculation, marriage affects only federal income taxes and Social Security benefits. The tax system provides a marriage bonus to this particular couple, which pays lower taxes than our base-case worker simply because they are married. The married couple also benefits from the Social Security auxiliary spouse benefit. At age 62, the wife becomes entitled to spouse benefits based on her husband's earnings, even though she has never worked.¹² The combination of lower income taxes and a larger Social Security accrual lowers the implicit tax rate for the married worker with a nonworking spouse below the rate faced by our base-case single worker, through age 65.

Implicit tax rates are significantly higher, however, for a married man whose wife works. We assume that the wife has the same earnings stream as the husband, and that she stops work and starts collecting

¹² If the husband dies, the wife becomes entitled to widow benefits based on his earnings. These benefits are factored into our calculation of lifetime Social Security benefits, along with the husband and wife's individual survival probabilities.

Social Security and pension benefits at age 62. We treat the husband as the marginal worker and measure the work incentives that he faces assuming that his wife's labor supply is fixed. Under these assumptions, his implicit tax rate is substantially higher than those for unmarried men and men married to women who do not work. From ages 55 to 63, the husband with the working wife pays higher income taxes and accrues less Social Security wealth with each additional year of employment than other workers because of the progressivity of the tax code and the Social Security system.

Retiree Health Insurance Benefits

The availability of retiree health benefits reduces incentives to work before age 65. Workers at firms that offer retiree health benefits retain access to the group insurance market even if they retire before qualifying for Medicare benefits. Because they do not need to stay employed to avoid the inefficient nongroup market, the savings from access to the group market does not reduce the implicit tax they face on employment. Granting our representative worker access to retiree health benefits raises the tax on work by about two percentage points above the rate faced by our base-case worker, who loses his employer-sponsored coverage when he retires. The increase in the tax rate reduces incentives to work. In fact, workers with access to retiree health benefits generally retire earlier than other workers (Johnson, Davidoff, and Perese, 2003).

The lack of any health insurance coverage from an employer reduces the implicit tax on work after age 65 because workers without employer-sponsored coverage do not forfeit Medicare benefits by remaining at work. At younger ages, however, they face higher implicit tax rates than workers with employer coverage because they do not gain the benefits of access to

the group market by remaining in the labor force.

Health Status

The presence of health problems substantially raises returns to work for those with employer-sponsored health benefits. Workers with health problems face lower implicit tax rates because continued employment generates large savings in health insurance premiums through access to the group insurance. If they retire before qualifying for Medicare coverage, their health problems would force them to pay exorbitant premiums for nongroup coverage, assuming they do not qualify for Medicare's disability benefits. Health status differences in implicit tax rates disappear at age 65, when Medicare eligibility begins. Although people with health problems face strong financial incentives to work, they may be less productive and earn lower wages than those in good health.

POLICY SIMULATIONS

Table 7 reports the impact of potential policy reforms on the implicit tax on work at older ages, including eliminating the income tax on Social Security benefits, eliminating the payroll tax after Social Security's NRA, and designating Medicare as the primary payer of health care costs for eligible beneficiaries regardless of work status. Each of these reforms would increase work incentives by lowering the implicit tax. Changing Medicare payment rules would have the largest impact, reducing the implicit tax on work at ages 65 and older by generally more than ten percentage points. For example, at age 68 the proposed Medicare reform would reduce the tax from 44.2 to 31.9 percent. Eliminating the payroll tax after the NRA would reduce the tax rate by about ten percentage points at ages 66 and older

TABLE 7
 IMPLICIT TAX ON WORK AT OLDER AGES, UNDER ALTERNATIVE POLICY REFORM OPTIONS (%)

Age	Current Law	Elimination of Income Tax on Social Security Benefits	Elimination of Payroll Tax After Normal Retirement Age	Designate Medicare as Primary Payer Regardless of Work Status	Enact All Three Policy Reforms
	(1)	(2)	(3)	(4)	(5)
55	14.2	14.2	14.2	14.2	14.2
56	14.1	14.1	14.1	14.1	14.1
57	19.6	19.6	19.6	19.6	19.6
58	20.4	20.4	20.4	20.4	20.4
59	21.1	21.1	21.1	21.1	21.1
60	21.7	21.7	21.7	21.7	21.7
61	22.9	22.6	22.9	22.9	22.9
62	24.7	22.0	24.7	24.7	21.9
63	20.8	16.7	20.8	20.8	14.7
64	23.9	20.8	23.9	23.9	19.2
65	39.4	35.2	39.4	30.0	29.2
66	37.4	32.9	27.2	27.1	11.4
67	40.9	37.1	31.1	29.6	15.0
68	44.2	41.0	34.7	31.9	18.2
69	47.5	44.8	38.3	34.0	21.2
70	49.5	36.5	40.6	35.0	11.7

Source: Authors' estimates.

Note: Estimates are for our base-case worker, defined as an unmarried man in good health who takes up Social Security benefits at age 62 or when he stops work (whichever comes later, but no later than age 70). He earns moderate wages and has a DC pension plan and employer-sponsored health insurance, but no retiree health insurance. Computations for any given age assume that workers retire at the end of the year.

for our base-case worker, who qualifies for full Social Security benefits at age 66. Eliminating the federal income tax on Social Security benefits would reduce the tax on work by about three to four percentage points at ages 62 and older. Exempting all Social Security benefits from the federal income tax would have no effect before age 61 because our base-case worker does not accumulate enough retirement wealth to make his Social Security benefits subject to the income tax under current law if he stops working at a young age. The impact would be largest at age 70, when all covered workers collect Social Security and the earnings of our base-case worker make more than half of his benefits taxable.¹³

Combining all three reforms would cut the implicit tax on work at older ages by more than half. At age 68, for example, implementing these three reforms would

reduce the tax rate for our base-case worker from 44.2 to 18.2 percent, a lower tax rate than he faces in his late 50s.

CONCLUSIONS

One way of relieving the economic pressures created by an aging population without cutting retirement benefits would be to encourage workers to delay retirement. Working longer increases the net output and productivity of the economy, generates additional payroll and income tax revenue, and reduces the average number of years in which people receive retirement benefits. As policymakers look for ways to discourage retirement, understanding the work incentives built into the current system of taxes and benefits becomes crucial.

This study shows that Social Security, federal taxes, and employee benefits create

¹³ As noted earlier, there is no gain from delaying Social Security take-up beyond age 70.

work disincentives for older adults. The implicit tax rate on work increases rapidly at older ages, nearly doubling between ages 55 and 64 for a typical male worker and more than doubling between ages 64 and 70. Implicit tax rates at older ages are especially high for workers in traditional DB pension plans and those married to working partners with similar earnings.

A number of policy and economic changes in recent years appear to encourage work at older ages. These changes include the growth in DC plans and decline in DB plans, the erosion in retiree health insurance coverage, increases in Social Security's NRA, and reductions in the prevalence of Social Security auxiliary benefits as more married women work at relatively high wages. Existing changes, however, are probably insufficient. Additional options to encourage work at older ages include the creation of a payroll tax credit for older workers, who often pay much more in payroll taxes than they receive in incremental Social Security wealth. We estimate that eliminating the payroll tax for workers older than Social Security's NRA would reduce the implicit tax on work at older ages by about ten percentage points. This reform would not necessarily reduce total tax revenue because it could draw a substantial number of older workers into the labor market and lead to higher income tax revenue.

The elimination of the requirement that Medicare serve as the secondary payer for workers with employer-sponsored coverage could prove even more effective at encouraging work at older ages. The high cost of medical insurance for older workers discourages employers from retaining or hiring workers over age 65. Allowing Medicare to be the primary payer would lower employment costs and reduce the implicit tax rate faced by typical older workers by more than ten percentage points.

Reducing regulatory barriers to work at older ages could also be fruitful. There are many regulatory barriers that employers

face that discourage phased retirement (e.g., the tax code, the Employee Retirement Income Security Act of 1974 [ERISA], and the Age Discrimination in Employment Act [ADEA]). These regulations prevent workers from collecting their DB pensions while continuing to work for the plan sponsor, forcing workers to either retire or lose substantial pension wealth. Addressing these regulations may encourage more flexible work arrangements and continued work for older workers. Employers could also be given greater flexibility in controlling their health costs when they hire older workers (Penner, Perun, and Steuerle, 2002).

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DATA APPENDIX

The analysis combines data from several sources to compute the implicit tax rate on work.

EARNINGS AND SOCIAL SECURITY

Annual earning histories, reported in Table A1, come from the Social Security Administration's Model of Income in the Near Term (MINT4). Earnings are based on the average of nonzero historical and projected earnings between ages 22 and 70 for male workers born in 1951 (Toder, Thompson, Favreault, Johnson, Perese, Ratcliffe, Smith, Uccello, Waidmann, Berk, Woldemariam, Burtless, Sahm, and Wolf, 2002).¹⁴ Low-wage earners are based on a sample of men who did not complete high school, moderate-wage earners are men who attended college but did not complete four years of study, and high-wage earners are men who completed four or more years of college. Based on these earnings, we compute Social Security benefits using a detailed calculator that incorporates the 2002 Social Security trustees' assumptions about future price and wage growth.¹⁵

PAYROLL AND FEDERAL INCOME TAXES

The analysis estimates federal payroll and income tax liabilities using the Urban-Brookings Tax Policy Center's microsimulation model. The model is a detailed tax calculator that captures most features of the federal individual income tax system. It reflects tax law as of July 1, 2004, as enacted through 2015, including the expiration of the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) and Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA) tax cuts in 2010. For projections in 2016 and later, we hold constant the 2015 tax rates and adjust the brackets as

¹⁴ We use MINT4 earnings between ages 22 and 62 and assume that earnings after age 62 increase by one percent per year in nominal terms. In the few cases where earnings in MINT4 decline from one age to the next before 62, we smooth earnings growth between the years in which earnings increase.

¹⁵ Our Social Security estimates are based on the assumption that current-law benefits will be payable throughout the projection period. However, the Social Security actuaries project that the program's trust funds will be exhausted by 2040 and that benefits would need to be reduced immediately by 13.3 percent in order for the trust funds to remain solvent (Board of Trustees, 2006). Our estimates, then, may overstate future benefits, although both Republican and Democratic leaders have promised to protect the benefits promised to Americans now nearing retirement.

TABLE A1
REAL ANNUAL EARNINGS FOR PROTOTYPICAL WORKERS, BY AGE (\$)

Age	Low Wage	Moderate Wage	High Wage
22	9,860	14,912	8,652
23	11,505	17,078	13,248
24	12,490	18,658	17,458
25	14,551	21,003	21,061
26	15,246	23,267	24,380
27	17,363	25,082	27,437
28	18,681	27,310	31,502
29	18,645	29,245	35,117
30	19,389	32,753	39,097
31	19,517	33,729	43,129
32	19,620	34,536	45,149
33	19,192	36,464	47,955
34	20,995	38,154	48,434
35	22,908	38,446	49,649
36	23,116	39,196	52,309
37	23,292	40,405	54,658
38	23,439	40,877	54,274
39	23,558	41,233	56,096
40	23,050	41,573	56,665
41	22,552	43,482	58,356
42	23,258	43,214	57,138
43	22,713	43,845	57,023
44	22,467	44,377	58,030
45	22,797	45,410	59,351
46	23,540	46,416	61,042
47	24,547	47,456	61,781
48	26,845	48,450	63,388
49	28,020	48,946	65,006
50	27,287	50,102	65,849
51	28,515	52,632	76,956
52	31,290	54,345	77,148
53	30,682	53,169	76,480
54	30,086	52,073	75,785
55	29,502	50,996	75,066
56	28,929	49,938	73,945
57	28,368	49,657	72,415
58	27,817	48,436	71,423
59	27,277	47,243	71,631
60	26,747	46,119	71,990
61	26,228	45,798	72,267
62	25,718	45,457	72,467
63	25,219	44,574	71,060
64	24,729	43,709	69,680
65	24,249	42,860	68,327
66	23,778	42,027	67,000
67	23,316	41,212	65,700
68	22,863	40,411	64,423
69	22,420	39,627	63,173
70	21,985	38,857	61,946

Source: Authors' estimates, from Toder et al. (2002).
Note: Earnings are expressed in constant 2004 dollars.

appropriate for expected inflation. Parameters that are not currently indexed for inflation, including the Social Security taxation thresholds, are held at their 2015 values. We do, however, price index the provisions of the alternative minimum tax (AMT) after 2015, even though these provisions are not currently indexed. The

computations for the base-case worker assume that in 2004 he receives interest and dividend income of \$271; reports capital gains of \$367; and pays \$1,271 in state and local taxes, \$718 in property taxes, and \$2,719 in mortgage interest, equal to the average amounts for a single man in his age group and income bracket, according

to IRS Statistics of Income data. We hold these values constant in real terms as he ages. The analysis excludes state and local taxes.

HEALTH INSURANCE COSTS

Employer-sponsored health benefits affect work incentives by increasing total compensation, providing savings to workers who would otherwise purchase expensive nongroup insurance policies, and forcing workers ages 65 and older to give up Medicare benefits. Our estimates of health insurance cost assume that private insurance costs increase by two percent per year in real terms, and that the growth in Medicare costs follows the assumptions used by the Medicare trustees (Medicare Board of Trustees, 2004).

Total compensation includes employer contributions to health benefits, which increase with the age of the worker because older adults are relatively heavy users of health services. We set the average employer contribution to \$3,140 in 2004, the average across all employers in a recent survey (Kaiser Family Foundation and Health Research and Educational Trust, 2004). We assume that this average amount corresponds to contributions for a worker who is 40 years old, the mean age of the labor force. We increase real costs by 1.4 percent per year of age, the average increment observed in a recent random sample of nongroup policies (Johnson, Moon, and Davidoff, 2002). The annual contribution for a 54-year-old worker in 2004, then, would equal \$3,815. Employee contributions for health insurance are set equal to \$558 in 2004, the average annual value in the Kaiser survey (Kaiser Family Foundation and Health Research and Educational Trust, 2004). We assume that all workers pay the same contribution, regardless of age (although contributions do increase over time with the growth in health care spending).

Savings from access to the group market equal the difference between the total cost of employer-sponsored insurance and the price older adults face in the private nongroup market. The total cost of employer coverage is the sum of employer contributions and employee contributions. Premiums in the nongroup market come from a survey of policies collected from an online insurance service (Johnson, Moon, and Davidoff, 2002). Nongroup premiums vary by age and health status. Premiums are about twice as high for those with health problems as for those in good health.

The value of Medicare benefits is set equal to average age-specific Medicare expenditures net of required premiums. Mean cost estimates by age for Medicare Part A (which primarily covers hospital stays) and Part B (which covers outpatient services) were provided by the Medicare actuaries.¹⁶ We subtract the cost of Part B premiums paid by beneficiaries, which totaled \$66.60 per month in 2004. We also include the value of Medicare Part D, which covers some prescription drug costs beginning in 2006. We value the drug benefits at three times the premiums paid by beneficiaries, which are set to cover 25 percent of program costs. The Medicare Board of Trustees (2004) projects Parts B and D premiums for future years.

An alternative scenario assumes that the employer offers retiree health benefits. We set contributions for retiree benefits before individuals qualify for Medicare at about \$1,350 per year in 2002, the average amount paid for retiree benefits by respondents ages 55 to 64 in the Health and Retirement Study (HRS). Once they qualify for Medicare benefits at age 65, the annual cost drops to about \$970 in 2002, again the mean value among covered HRS respondents.

¹⁶ Private communication.