TAX POLICY CENTER
URBAN INSTITUTE & BROOKINGS INSTITUTION

ACCOUNTING FOR THE BENEFIT OF RETIREMENT SAVING INCENTIVES IN DISTRIBUTION TABLES

Technical Methodology Report

Eric Toder and Surachai Khitatrakun

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ABSTRACT

This paper describes the updated methodology that the Urban-Brookings Tax Policy Center (TPC) uses to estimate the benefits taxpayers receive from proposals that allow them to save through a qualified retirement savings plan. We present tables comparing how we currently measure these benefits and explain the rationale for the current method and how it improves upon the previous method TPC used and addresses some problems that were inherent in the previous method.

BENEFITS OF RETIREMENT SAVING PLANS

An income tax imposes a tax on individuals' earnings and on their returns from investments. Under the general principles of an income tax, deposits to investment accounts would come from after-tax earnings and income investors accrue within the accounts would be taxable annually. Amounts investors withdraw from the accounts would be tax-free because they come from previously taxed income.

Qualified retirement savings plans receive favorable tax treatment compared with general principles of income taxation. Earnings that workers deposit in a qualified retirement savings account and the investment income they accrue within the account are tax-exempt, while amounts they withdraw from the account in retirement are taxable. We call these deductible plans because contributions to the account by both employers and employees are deductible and contributions by employers are also exempt from the taxable income of employees.[1] Deductible plans include employer-funded defined benefit (DB) plans[2]; employer- sponsored defined contribution (DC) plans[3] established under Sections 401(k), 403(b), and 457 of the Internal Revenue Code (referred to below as 401k plans)[4]; qualified retirement plans for the self-employed (QRPs or Keogh Plans); and deductible individual retirement accounts (IRAs).[5]

Under an alternative type of qualified retirement plans, called Roth plans after its original sponsor in the U.S. Senate, contributions to the plans come from workers' after-tax earnings, but both income that participants accrue within the plans and amounts they withdraw from the plans are tax-free. We refer to these as back-loaded plans because they exempt from tax amounts participants withdraw from the plans instead of the earnings that they deposit. Back-loaded plans include Roth IRAs and Roth 401(k) plans. Only employee contributions to 401(k) plans may qualify for back-loaded treatment; employer contributions to qualified plans can only be subject to rules for deductible plans.

Saving in qualified retirement plans provides two types of benefits compared with saving outside of qualified plans. First, investment income of participants accrues tax-free within all qualified plans, while annual income from saving that they would otherwise accrue outside of a qualified plan is taxable annually under general rules for taxing interest income, dividends, and realized capital gains. Second, for deductible plans only, workers can defer the tax that would otherwise be payable on earnings deposited in the plan until they withdraw funds in retirement, when they may be in a lower marginal income tax rate bracket than when working.

Back-loaded plans may, however, allow individuals to accumulate more tax-free income from saving than deductible plans for two reasons. First, equal dollar limits on contributions to both types of plan allow workers facing a positive income tax rate who contribute at the maximum to deposit more after-tax dollars in back-loaded accounts than deductible accounts. The same maximum allowable contribution therefore finances more retirement consumption under a back-loaded account than under a deductible account because withdrawals from a back-loaded account are tax-free. Second, the tax code requires individuals to begin withdrawals from a

deductible plan at age 70 ½ (72 for taxpayers who reached age 70 ½ in 2020 or later), based on formulas the IRS establishes using an assumed interest rate and life expectancy, while there is no requirement to withdraw money from a back-loaded account during a worker's lifetime. This allows participants in a back-loaded plan to earn more tax-free investment income after age 70 ½ (or 72) than they could under a deductible plan.

A simple example illustrates the difference between the two types of qualified plans and saving outside of qualified plans for a worker who sets aside $5,000 of her pretax earnings for retirement saving at age 40 and withdraws the funds for consumption at age 65 (table 1). We assume the worker faces a marginal tax rate on additional taxable income of 25 percent during working years and 20 percent during retirement. In the ordinary savings account, she pays a marginal rate of 25 percent on the $5,000 of earnings and saves the remaining $3,750, which accumulates at a rate of 6 percent per year before tax, or 4.5 percent after-tax. The amount in the account grows to $11,270 by age 65. There is no tax upon withdrawal.

In the deductible plan, the worker pays no tax on amounts she contributes to the account and, therefore, deposits in the account the full $5,000 of pretax earnings. Money in the account accrues at the pretax annual rate of 6 percent, reaching $21,459 at age 65. She then pays a 20 percent tax on withdrawal, leaving a net amount of funds available for consumption in retirement from the initial contribution of $17,167. In the back-loaded account, the worker deposits $3,750 of after-tax earnings, which also earns a 6 percent annual rate of return, allowing her to accumulate $16,095 by age 65. There is no tax upon withdrawal.

Both the deductible and back-loaded plans allow the worker to accumulate significantly more net retirement wealth than could be earned outside of either type of qualified retirement plan because capital income earned within qualified plans accrues tax-free. The deductible plan is slightly more favorable than the back-loaded plan because the present value of the contribution is taxed at a 20 percent rate under the deductible plan instead of 25 percent. If, in contrast, if the worker remained in the same 25 percent income tax bracket in retirement as during her working years, the amount of retirement consumption she could finance would be the same under both types of qualified plans.

If the statutory contribution limit is the same for both plans, however, a back-loaded plan can yield more retirement benefits than a deductible plan for a taxpayer seeking to save more than the contribution limits for qualified plans. This is possible even if the taxpayer will be in a lower marginal rate bracket in retirement than during her working years. Suppose, for example, a taxpayer wants to save $10,000 after-tax, but may only contribute a maximum of $5,000 to either a back-loaded or deductible account, with the remaining saving done through an ordinary savings account (table 2). Again, we assume the taxpayer contributes to the account at age 40, withdraws the money for consumption at age 65, earns a pretax rate of return of 6 percent on savings, and faces marginal tax rates on both earnings and investment income of 25 percent during working years and 20 percent in retirement.

If the taxpayer deposits $5,000 in a deductible account, it only costs her $3,750 because she receives a tax deduction worth 25 percent of the contribution. This leaves her with $6,250 to deposit in an ordinary savings account. If, instead, she chooses to deposit $5,000 in a back-loaded account, she gets no immediate deduction and thus has only $5,000 left to deposit in an ordinary savings account.

In this example, the taxpayer fares better using the back-loaded account than the deductible account even though her marginal tax rate is lower in retirement than in working years. She ends up with total consumption at age 65 of $36,487 from investing her qualified contributions in a back-loaded account, compared with consumption of $35,591 from investing them in a deductible account.

The intuition for this result is that the same maximum of $5,000 represents more after-tax dollars when contributed to a back-loaded account ($5,000) than when contributed to a deductible account ($3,750). This means that a higher percentage of her net saving benefits from tax-free accrual when contributed to the back-loaded account than to the deductible account. In this example, the benefit of accruing income tax-free on a larger share of wealth outweighs the benefit of deferring tax on the contribution until retirement. If the marginal rate remained at 25 percent in retirement, the relative benefit of contributing to a back-loaded instead of a deductible account would be even larger ($36,487 of retirement consumption, compared with $34,878).

If the marginal tax rate in retirement is sufficiently lower than the marginal tax rate when working, however, the worker may be better off saving in a deductible plan than a back-loaded plan. For example, if the marginal tax rate in retirement is only 15 percent, she nets $37,024 from using a deductible account, compared with $36,487 for a back-loaded account.

WHY EFFECTS ON CURRENT YEAR TAX LIABILITY ARE AN INCORRECT MEASURE OF THE BENEFITS FROM CONTRIBUTING TO QUALIFIED RETIREMENT PLANS

In most cases, when Congress enacts a tax cut, TPC assigns a benefit in the current year to the taxpayer that is equal to her change in tax liability. For example, if a taxpayer has income of $50,000 in the current year and the average tax rate on income she pays is reduced from 20 percent to 15 percent, TPC assigns her a benefit from the tax change of $2,500 (5 percent of $50,000). That benefit is equal to the current year reduction in taxes the government collects.

If Congress makes retirement incentives more generous, however, or changes the form of the incentive from a deductible to a back-loaded plan, the change in tax liability in the current year does not properly measure the benefit the taxpayer receives for two reasons. First, the change in current year tax liability does not account for the fact that she will face a tax upon withdrawal from a deductible plan, but not from a back-loaded plan. Therefore, using the change in tax liability as a measure of benefit significantly overstates the benefit of

contributing to a deductible plan instead of a back-loaded plan. Second, for both types of plan, the change in current year tax liability fails to account for the benefit the taxpayer receives from being able to earn tax-free investment income until withdrawal on amounts contributed to the plan. That is, the tax exemption of investment income allows her to accrue more retirement income when saving within a qualified plan than when saving outside a qualified plan.

HOW TPC MEASURES THE BENEFIT FROM POLICIES THAT INCREASE ALLOWABLE CONTRIBUTIONS TO RETIREMENT SAVING PLANS

TPC makes two adjustments to current year tax liability to measure the benefit to taxpayers of tax law changes that allow more contributions to qualified retirement saving plans. First, we make a simple adjustment to account for future taxes that will be paid on withdrawals from a deductible plan. Second, we use a common method to compute the benefit of accruing income tax-free within either account, compared with accruing income at an after-tax rate outside of a qualified plan.

Current Year Tax Saving

Suppose the new tax law allows the taxpayer to contribute an additional amount equal to D dollars to a deductible plan. If t_c = the marginal tax rate in the year the taxpayer contributes to the account, then the reduction in her current year tax liability from the contribution is equal to D* t_c. In contrast, there is no reduction in current year tax liability from the same amount contributed to a back-loaded account. To measure the benefit from contributing to the two types of savings in an equivalent way, we need to account for the future tax that will be paid when money is withdrawn from the deductible plan. Therefore, we compute the reduction in current year burden from contributing to a deductible account as equal to D*(t_c – t_r), where t_r is the estimated tax rate when withdrawing funds in retirement.

For example, if, in response to a provision that increases the allowable deduction to a deductible or back-loaded account, taxpayer A contributes an additional $5,000 to a deductible account and taxpayer B contributes an additional $5,000 to a back-loaded account and both taxpayers are in the 35 percent income tax bracket, then the current year reduction in tax liability will be $1,750 for taxpayer A and zero for taxpayer B. If we assume, however, that taxpayer A will be in the 28 percent bracket when she withdraws the funds in retirement, the benefit we assign to her from the deduction will be only $350 (35 percent – 28 percent = 7 percent of $5,000) because that is the net tax saving she receives from deferring tax on her contribution until retirement when she will be in a lower tax bracket. Thus, we measure the benefit from deferral of taxation until retirement as the contribution amount multiplied by the difference between the marginal tax rate the worker pays when working and the marginal rate she will face in retirement.

Higher Investment Income from Current Year Contribution

The bigger source of benefit from qualified plans is that they enable savers to accrue income at a higher rate of return than in a non-qualified account. The benefit can be measured as the increase in the present value of future retirement income from one year's contribution because of the ability to accrue investment income at a pretax instead of an after-tax rate of return.

It is easiest to use the example of a back-loaded retirement account to illustrate how to calculate this benefit because deposits to both back-loaded and ordinary savings accounts come from after-tax earnings, and withdrawals in retirement from both types of account are tax-free. But there is a simple translation from back-loaded to deductible accounts. Every dollar deposited in a back-loaded account is equivalent to $(1-t_r)$ dollars deposited in a deductible account, where t_r is the marginal tax rate on income withdrawn from the deductible account in retirement.

One problem with measuring the benefit this way is that it overstates the benefit from saving in a qualified account relative to the taxpayer's current income. This overstatement occurs because the benefit comes in the form of a reduction in taxes that would be paid on *future* income from this year's saving, while our income measure only includes current income, not the sum of current income and future income from this year's saving.

Ideally, we would measure tax burdens using a broader measure of income and taxes that includes both future income and future tax liability. In practice, however, correcting the income measure we use in the TPC model is not possible because we do not have current data on the saving of all taxpayers. Instead, in computing the benefit of retirement savings incentives, we only have imputed data on contributions to qualified plans, not on contributions to both qualified plans and other investment accounts. And consumers of distributional tables generally understand the income measure used in these tables to reflect current income, not some hybrid measure of current and future income. This structure permits users to view the income measure as reflecting some notion of current economic well-being.

Therefore, to address this inconsistency between a measure of the change in current tax liability that counts the future benefit from increased saving within a qualified plan and an income measure that counts only current income, we scale back the measured benefit so that ratio of the adjusted benefit to current income is the same as the ratio of the original measured benefit to the sum of current income and the present value of the total gain in the value of the account. We illustrate this calculation below.

We also exclude from baseline tax liability any reduction in taxation of future capital income attributable to baseline contributions to qualified plans. Instead, we count in the baseline measure of tax burdens the benefit of past contributions by including in our income measure the tax-free income people currently receive from assets in qualified retirement saving plans.

The benefit from accruing income tax-free within a qualified plan varies positively with the rate of return on saving, the marginal tax rate the taxpayer faces on an additional dollar of taxable investment income, and the

number of years for which income accrues tax-free. Increases in all three of these variables increase the difference between the amount of retirement income financed by a contribution to a qualified plan and the amount financed by the same amount of saving outside of a qualified plan.

EFFECTS OF MARGINAL TAX RATES ON THE BENEFIT FROM ACCESS TO A QUALIFIED RETIREMENT PLAN

First, we illustrate how we compute the effects of increasing allowable contributions to a back-loaded plan[6] for taxpayers facing different marginal tax rates (table 3). In all of these examples, for simplicity of illustration, we assume the taxpayer withdraws all the money from the account at age 65. In the Individual Tax Model, TPC assumes the taxpayer withdraws the funds as an actuarially fair annuity beginning at age 65, which provides a larger benefit to saving in a qualified plan than the assumption of a lump-sum withdrawal because, with an annuity, the taxpayer has more years to accrue income tax-free within the plan.

In the example, taxpayers face a graduated income tax rate schedule with an exemption of $25,000 and marginal rates of 10, 20, 30, and 40 percent. We compare three taxpayers: A middle income earner with earnings of $75,000 facing a marginal tax rate of 20 percent on additional income (taxpayer one), an upper-middle income earner with earnings of $150,000 facing a marginal tax rate of 30 percent on additional income (taxpayer two), and an upper-income earner with earnings of $300,000 facing a marginal tax rate of 40 percent on additional income (taxpayer three). We assume the Congress has just passed a tax law allowing all three taxpayers to switch an additional $5,000 of planned saving from an ordinary savings account to a back-loaded qualified retirement plan. All three taxpayers are 40 years old, plan to reinvest all income from this year's contributions to the account for 25 years, and then plan to retire and withdraw all the funds from the account at age 65. We assume a pretax rate of return of 6 percent in both the qualified account and ordinary savings accounts.

At a 6 percent rate of return, all three taxpayers would, from their $5,000 of saving, accumulate $21,459 of wealth in their qualified plan by age 65. Discounted at the pretax yield of 6 percent, the present value of their future wealth is $5,000. If, alternatively, they had to invest outside of a qualified plan, all taxpayers would accrue less wealth at age 65, but the taxpayers with the lower marginal tax rates would accrue more wealth than the taxpayers with higher marginal rates. Taxpayer one would accrue $16,144 of wealth at age 65 (at an after-tax yield of 4.8 percent), compared with $13,985 for taxpayer two (earning an after-tax yield of 4.2 percent), and $12,105 for taxpayer three (earning an after-tax yield of 3.6 percent). Discounting at the pretax return of 6 percent, the present value of the $5,000 of savings if invested outside of a qualified plan is $3,761 for taxpayer one, $3,258 for taxpayer two, and $2,820 for taxpayer three. Thus, taxpayer three benefits the most from the ability to invest in a qualified plan. The present value of access to the qualified plan (the difference between the present value of wealth inside and outside of the qualified plan) is $1,239 for taxpayer one, $1,742 for taxpayer two, and $2,180 for taxpayer three.

The present value at age 40 of the realized gain within the account is the increase in the value of the account when withdrawn at retirement, discounted back to age 40, or:

$$PV(G) = ((D*(1+r)^n) - D)/((1+r)^n) = D - D/(1+r)^n,$$

where PV(G) is the present value of the future realized gain in the value of the account (defined as the difference between the amount withdrawn and the amount deposited), D = the amount deposited, r = the pretax rate of return, and n= the number of years between deposit and withdrawal.

With D = $5,000, r = 0.06, and n=25, the present value at age 40 of the future realized gain is $3,835. Adding that to current earnings, we calculate adjusted income as $78,835 for taxpayer one, $153,835 for taxpayer two, and $303,835 for taxpayer three. When we calculate the benefit as a share of this adjusted income for each taxpayer, and then multiply this amount by current income, we obtained scaled values of the benefit relative to current income of $1,178 for taxpayer one, $1,698 for taxpayer two, and $2,152 for taxpayer three.

EFFECTS OF HOLDING PERIOD ON THE BENEFIT FROM ACCESS TO A QUALIFIED RETIREMENT PLAN

Next, we illustrate how the benefit from access to a qualified retirement savings account varies depending on the number of years in which wealth accrues within the plan (table 4). Again, consider three taxpayers, all benefiting from the opportunity to save $5,000 more within a back-loaded qualified retirement account. All three have annual earnings of $150,000, pay taxes of $20,000 on their earnings, receive a pretax return of 6 percent on investments, face a marginal tax rate of 30 percent on additional income, and plan to withdraw funds from the account when they retire at age 65. Taxpayer A is age 25 years, Taxpayer B is 40, and Taxpayer C is 60. By age 65, taxpayer A's $5,000 deposit will increase to $51,429 over 40 years, Taxpayer B's deposit will increase to $21,459 over 25 years, and Taxpayer C's deposit will increase to $6,691 over 5 years. If saved outside of a qualified plan, the corresponding wealth figures would be $25,923 for the 25-year-old, $13,985 for the 40-year-old, and $6,142 for the 60-year-old.

The present value of the benefit from access to the qualified account increases with the holding period (in this example, declines with the age of the contributor) – it is $2,480 for the 25-year-old, $1,742 for the 40-year-old, and $410 for the 60-year-old. With more years to accrue tax-free instead of taxable income, access to the retirement account, per dollar of saving, is much more valuable for the younger than for the older taxpayers. Adjusting for the present value of the realized gain from the deposit when measuring each taxpayer's income, the present value of the benefit is $2,407 for the 25-year-old, $1,698 for the 40-year-old, and $407 for the 60-year-old.

TREATMENT OF THE EFFECTS OF RETIREMENT TAX INCENTIVES ON BASELINE TAX LIABILITY

The previous section describes how TPC measures the benefits of tax law changes that increase allowable contributions to qualified retirement saving plans. This section describes how TPC treats retirement saving in determining baseline incomes and tax burdens.

Adjustments TPC Currently Makes

Retirement saving incentives in the tax law affect TPC's baseline incomes and taxes in two ways. First, the income measure TPC uses, expanded cash income (ECI), includes an imputation for income earned within qualified retirement saving plans. We impute to the tax model assets held within DC plans, based on data reported in the Federal Reserve Board's Survey of Consumer Finances (SCF)[7] and impute rates of return to those assets based on historical returns on equities and bonds. We impute annual increases in the value of DB pension wealth (measured as the expected present value of future retirement benefits from DB plans) following an SCF methodology and calibrate it to match data from the Federal Reserve Bank's Financial Accounts of the United States, combined with simulations of income from pension plans from the Urban Institute's Dynamic Simulation of Income (DYNASIM) model[8]. Investment income accrued within qualified retirement saving plans is tax-exempt, so including this income in ECI reduces baseline effective tax rates for tax units with this income in the TPC individual income tax model.

Second, for taxpayers who make tax-deductible contributions to qualified retirement plans or receive tax-exempt contributions from their employers, we include amounts contributed in income and then impute a tax that would be paid when those funds are withdrawn in retirement. Because investment values accrue at a pretax rate within qualified plans, the present value of future withdrawals will equal the value of contributions. In computing the tax on these withdrawals, we assume that taxpayers without any contributions to back-loaded qualified accounts will face marginal tax rates in retirement equal to 80 percent of their current marginal tax rate. Thus, counting both the exemption and the deduction, contributions to plans are treated as if 20 percent of the contribution were tax-exempt when calculating the baseline tax burden.

For example, if a taxpayer contributes $5,000 to a deductible IRA and is in the 25 percent tax bracket, her tax paid for purposes of computing the current year revenue effect would decline by $1,250. In calculating the effect on her tax burden, however, we would impute a future tax liability of $1,000, so the net effect of the contribution would be to reduce her tax burden by $250.

An Adjustment TPC No Longer Makes

We do not, however, adjust baseline tax burdens to reflect the future tax saving from baseline contributions to qualified plans. When we did make such an adjustment, it created anomalies caused by the fact that the tax savings imputed were not aligned properly with the taxpayer's current income because retirement savings tax

benefits change in the same direction as tax rates. This sometimes led to anomalous results for simulations of tax proposals not directly related to retirement saving. For example, our estimates could show, incorrectly, that some taxpayers benefited from an increase in marginal income tax rates.

This benefit from an increase in marginal tax rates reflected the fact that for some taxpayers a higher marginal tax rate raised the present value of the reduction in future tax liability from saving within a qualified account by more than it raised the tax paid on current income. The error came from treating the present value of the reduction in future tax liability as if it were a current tax liability, when it in fact it simply reflected the fact that exemption of taxes on future income would be worth more if those taxes were higher. In effect, the taxpayer was given credit for the reduced burden of higher future taxes from exempting investment income in qualified retirement accounts, but not assigned a positive burden for those higher taxes absent the exemption.

To illustrate with a simple example, consider a 25-year-old with low earnings who is currently contributing $5,000 to a back-loaded qualified retirement savings account (table 5). The taxpayer has $30,000 of current earnings and pays a current income tax of $500, imposed at a rate of 10 percent on income in excess of a $25,000 exemption. If she deposits $5,000 in a qualified account and the rate of return is 6 percent, her wealth will increase to $51,429 by age 65. If the same money had been deposited outside a qualified account, the after-tax yield would have been 5.4 percent and she would have accrued $40,982 by age 65. The present value of increased retirement wealth from saving within a qualified account is $1,016. If we were to subtract this saving from her current tax liability of $500, her net current tax burden would be calculated as -$516.

Now, suppose the marginal tax rate on income is increased to 20 percent. Her current tax liability increases to $1,000. But because she now would have accrued income at a lower yield (4.8 percent) outside of a qualified account, the present value of saving in a qualified account increases by $815, from $1,016 to $1,831, or by $315 more than her increased current tax liability. Her current tax burden falls to $831, a decline of $315 due to the increase in the marginal tax rate.

Yet, despite this calculation, the higher marginal tax rate does not improve the taxpayer's well-being. It raises her current liability and it leaves the actual taxes she pays on her return to saving unchanged. She is only deemed to be "better off" because her position is improved relative to what it would had been if she had not had access to a qualified plan.

The bottom rows of the table show what would have happened if we had scaled back her benefit from the qualified plan to make it the same share of her current income as it is of the sum of her income plus the present value of future income from current saving. This scaling procedure reduces the estimated benefit from access to a qualified plan, but still shows the taxpayer receiving a net reduction in tax burden from the increase in marginal tax rates.

To reiterate, there is no perfect solution when one is trying to incorporate the future benefit of tax policies into a distributional model based on a comparison of current year income and taxes. We have concluded,

however, that the most accurate representation is to count the benefit to changes to retirement saving incentives in computing the distributional effects of tax law changes, to count the income accrued from past contributions in the baseline computations of income and tax burdens, but to omit from baseline tax burden calculations the hypothetical future benefits due to the fact that future returns to some current contributions are tax-exempt instead of taxable.

TABLE 1

Comparison of Different Treatments of Retirement Saving

	Ordinary savings account	Deductible qualified retirement plan	Roth retirement plan
Pre-tax earnings deposited	$5,000	$5,000	$5,000
Working age marginal tax rate	25%	25%	25%
Net deposit to account	$3,750	$5,000	$3,750
Pretax return in account	6.0%	6.0%	6.0%
After-tax return in account	4.5%	6.0%	6.0%
Age when deposited	40	40	40
Age when withdrawn	65	65	65
Asset value at withdrawal	$11,270	$21,459	$16,095
Net amount withdrawn assuming the retirement age marginal tax rate is:			
20%	$11,270	$17,167	$16,095
25%	$11,270	$16,095	$16,095

TABLE 2

Comparison of Benefits between Deductible and Roth Accounts

	Taxpayer chooses deductible:			Taxpayer chooses back-loaded:		
	Qualified account deposits	Ordinary saving deposits	Total	Qualified account deposits	Ordinary saving deposits	Total
Net Saving in account at age 40	$3,750	$6,250	$10,000	$5,000	$5,000	$10,000
Deposit in account at age 40	$5,000	$6,250	$11,250	$5,000	$5,000	$10,000
Assets at Age 65	$21,459	$18,784	$40,243	$21,459	$15,027	$36,487
After-tax net wealth at age 65 assuming the retirement age marginal tax rate is:						
20%	$17,167	$18,784	*$35,951*	$21,459	$15,027	**$36,487**
25%	$16,095	$18,784	*$34,878*	$21,459	$15,027	**$36,487**
15%	$18,240	$18,784	**$37,024**	$21,459	$15,027	*$36,487*

Note: This table compares three taxpayers who want to save $10.000 with a maximum allowable contribution of $5,000. The pretax rate of return is 6 percent and all three taxpayers face a marginal tax rate in their working years o 25 percent.

TABLE 3

Present Value of Preference for Back-Loaded Qualified Retirement Saving Account at Different Income Levels and Marginal Tax Rates

	Middle-income earner	Upper-middle-income earner	High-income earner
Earnings	$75,000	$150,000	$300,000
Marginal tax rate on additional income	20%	30%	40%
Current tax liability	$5,000	$20,000	$65,000
Wealth at age 65, qualified account (present value)	$21,459 ($5,000)	$21,459 ($5,000)	$21,459 ($5,000)
Wealth at age 65, ordinary savings account (present value)	$16,144 ($3,761)	$13,985 ($3,258)	$12,105 ($2,820)
Present value of benefit	$1,239	$1,742	$2,180
Present Value of Realized Gain from Saving	$3,835	$3,835	$3,835
Adjusted present value of income	$78,835	$153,835	$303,835
Benefit as share of income	1.57%	1.13%	0.72%
Adjusted present value of benefit	$1,178	$1,698	$2,152

Assumptions in Table 3:

- Tax rate schedule = 0% on income up to $25,000, 10% on income between $25,000 and $75,000, 20% on income between $75,000 and $150,000, and 30% on income of $150,000 and $300,000, and 40% on income of $300,000 and over;
- Pretax interest rate = 6%;
- Amount deposited = $5,000;
- Age at deposit = 40;
- Age at withdrawal = 65;
- Wealth at age 65, qualified account = $D*(1+r)^n$, where D = the amount deposited, r = the pretax interest rate, and n is the number of years in the account;
- Present value of wealth at age 65, qualified account = $D*(1+r)^n/ (1+r)^n = D$;
- Wealth at age 65, ordinary savings account = $D*(1+r(1-t))^n$, where t = the taxpayer's marginal tax rate on investment income;
- Present value of wealth at age 65, ordinary savings account = $D*((1+r(1-t))^n)/((1+r)^n)$;
- Present Value of Benefit = (Present value of wealth at age 65, qualified account) – (Present value of wealth at age 65, ordinary savings account);

- Present value of realized gain from saving = $D-(D/(1+r)^n)$;
- Adjusted income equals earnings plus present value of realized gain from saving; and
- Adjusted present value of benefit = (Present value of benefit)*(Income/Adjusted Income);

TABLE 4

Present Value of Preference for Back-Loaded Qualified Retirement Saving Account at Different Ages: Upper Middle-Income Earner

	25-year-old	40-year-old	60-year-old
Earnings	$150,000	$150,000	$150,000
Marginal tax rate on additional income	30%	30%	30%
Current tax liability	$20,000	$20,000	$20,000
Wealth at age 65, qualified account (present value)	$51,429 ($5,000)	$21,459 ($5,000)	$6,691 ($5,000)
Wealth at age 65, ordinary savings account (present value)	$25,923 ($2,520)	$13,985 ($3,258)	$6,142 ($4,590)
Present value of benefit	$2,480	$1,742	$410
Present value of income from saving	$4,514	$3,835	$1,264
Adjusted present value of income	$154,514	$153,835	$151,264
Benefit as share of income	1.60%	1.13%	0.27%
Adjusted present value of benefit	$2,407	$1,698	$407

We make the following assumptions in table 4:

- Tax rate schedule = 0% on income up to $25,000, 10% on income between $25,000 and $75,000, 20% on income between $75,000 and $150,000, and 30% on income of $150,000 and $300,000, and 40% on income of $300,000 and over;
- Pretax interest rate = 6%;
- Amount deposited = $5,000;
- Age at withdrawal = 65;
- Wealth at age 65, qualified account = $D*(1+r)^n$, where D = the amount deposited, r = the pretax interest rate, and n is the number of years in the account;
- Present value of wealth at age 65, qualified account = $D*(1+r)^n/ (1+r)^n = D$;
- Wealth at age 65, ordinary savings account = $D*(1+r(1-t))^n$, where t = the taxpayer's marginal tax rate on investment income;
- Present value of wealth at age 65, ordinary savings account = $D*((1+r(1-t))^n)/((1+r)^n)$;

- Present Value of Benefit = (Present value of wealth at age 65, qualified account) – (Present value of wealth at age 65, ordinary savings account);
- Present value of realized gain from saving = $D-(D/(1+r)^n)$;
- Adjusted income equals earnings plus present value of realized gain from saving; and
- Adjusted present value of benefit = (Present value of benefit)*(Income/Adjusted income)

TABLE 5

Effect of Increase in Marginal Tax Rate on 25-Year Old Low-Income Earner with Present Value of Tax-Exempt Saving in the Baseline

	Current Law	Increase in Marginal Tax Rate	Effect of Policy Change
Earnings	$30,000	$30,000	$30,000
Marginal tax rate on additional income	10%	20%	+ 10 percentage points
Current tax liability	$500	$1,000	$500
Wealth at age 65, qualified account (present value)	$51,429 ($5,000)	$51,459 ($5,000)	0 (0)
Wealth at age 65, ordinary savings account (present value)	$40,982 ($3,984)	$32,615 ($3,169)	-$8,367 (-$815)
Present value of benefit	$1,016	$1,831	$815
Net Tax Burden	-$516	-$831	-$315
Present value of realized gain from saving	$4,514	$4,514	$0
Adjusted present value of income	$34,514	$34,514	$0
Benefit as share of income	2.94%	5.30%	2.36%
Adjusted present value of benefit	$883	$1,590	$707
Adjusted Net Tax Burden	-$383	-$590	-$207

We make the following assumptions in table 5:

- Tax rate schedule = 0% on income up to $25,000, 10% on income over $25,000 in base case and 20% on income over $25,000 in policy alternative;
- Pretax interest rate = 6%;
- Amount deposited = $5,000;
- Age at deposit = 25;
- Age at withdrawal = 65;
- Wealth at age 65, qualified account = $D*(1+r)^n$, where D = the amount deposited, r = the pretax interest rate, and n is the number of years in the account;

- Present value of wealth at age 65, qualified account = $D*(1+r)^n/ (1+r)^n = D$;
- Wealth at age 65, ordinary savings account = $D*(1+r(1-t))^n$, where t = the taxpayer's marginal tax rate on investment income;
- Present value of wealth at age 65, ordinary savings account = $D*((1+r(1-t))^n)/((1+r)^n)$;
- Present Value of Benefit = (Present value of wealth at age 65, qualified account) – (Present value of wealth at age 65, ordinary savings account);
- Net tax liability = Current tax liability minus Present value of benefit;
- Present value of realized gain from saving = $D-(D/(1+r)^n)$;
- Adjusted income equals earnings plus present value of realized gain from saving;
- Adjusted present value of benefit = (Present value of benefit)*(Income/Adjusted income) ;
- Adjusted net tax liability = Current tax liability minus Adjusted present value of benefit

NOTES

[1] Contributions by both employees and employers to qualified plans are exempt from income taxes, but only contributions by employers are exempt from payroll taxes. The discussion in this paper applies to income taxes only. The TPC individual tax microsimulation model, however, also accounts for effects of policy changes on payroll tax liability.

[2] Under an employer-funded defined benefit (DB) plan, the employer promises employees an annual pension benefit in retirement, based on the employees' years of service and annual earnings over some period (typically the average of the highest earning three or five years of employment with the firm). Employers' contributions to a fund established to finance the benefits are deductible to the employer and tax-free to the employee and investment earnings within the fund are tax-exempt. Pension benefits paid in retirement are taxable income to the retirees.

[3] Under a DC plan, employers and/or employees contribute to an account in the employees' names. The employees generally bear the risk for investment outcomes within their accounts.

[4] Under 401(k) plans, employees make voluntary contributions to accounts established by their employers. Employers may make non-elective (i.e., fixed) or matching contributions to their employees' accounts.

[5] Under QRPs or IRAs, self-employed individuals or employees establish and make contributions to their own qualified accounts.

[6] As noted above, an increased allowable contribution of D dollars to a back-loaded plan is equivalent to an increased allowable contribution of $D/(1-t_r)$ dollars to a deductible plan, where t_r is the marginal tax rate the taxpayer would face when withdrawing assets for consumption in retirement, because both would finance the same amount of income in retirement if the rates of return were the same within each account.

[7] See Federal Reserve Board, Survey of Consumer Finances, at https://www.federalreserve.gov/releases/z1/

[8] A description of the Urban Institute's DYNASIM model can be found at: https://www.urban.org/research/data-methods/data-analysis/quantitative-data-analysis/microsimulation/dynamic-simulation-income-model-dynasim

ABOUT THE AUTHORS

Eric Toder is an Institute fellow at the Urban Institute and co-director of the Urban-Brookings Tax Policy Center. In this position, he oversees TPC's modeling team, serves as its leading expert on corporate and international taxation and tax compliance issues, and authors and directs research studies. Before joining Urban, Toder held a number of senior-level position in tax policy offices in the US government and overseas, including service as deputy assistant secretary for tax analysis at the US Department of the Treasury, director of research at the Internal Revenue Services, deputy assistant director of the Tax Analysis Division at the Congressional Budget Office, and consultant to the New Zealand Treasury. He received his PhD in economics from the University of Rochester.

Surachai Khitatrakun is a senior research associate in the Urban-Brookings Tax Policy Center, where is he specializes in analysis of retirement savings incentives and retirement policy. He received his PhD in economics from the University of Wisconsin.

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