Policy Analysis

Cato Institute Policy Analysis No. 193:
The Economic Impact of Replacing Federal Income Taxes with a Sales Tax

April 15, 1993

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Executive Summary

This study examines the crisis in U.S. saving, its implications for the nation's economic performance, and the contribution our current tax structure has made to the crisis. A computer simulation model is used to evaluate a proposal to raise U.S. saving by replacing all federal personaland corporate income taxes with a national retail sales tax.

The findings are quite dramatic. The shift in tax structures is predicted, in the long run, to raise the stock of U.S. capital by at least 29 percent and potentially by as much as 49 percent and to raise U.S. living standards by at least 7 percent and potentially by as much as 14 percent.

A national sales tax would eliminate many of the distortions of current income taxes. It would do away with the differential tax treatment of corporate and noncorporate businesses, which distorts business decisions; of capital gains and dividends, which affects decisions about retaining earnings; and of investment in equipment, structures, and inventories. A sales tax would also end encouragement of current relative to future consumption, the tax exemption for health insurance premiums, and the work disincentive associated with the progressivity of the present tax structure.

A national sales tax could be made progressive by combining it with a refundable tax credit. Each household could file a form requesting the tax credit and receive a check from the Internal Revenue Service equal to the amount of credit for which the household qualified.

Introduction

This study considers the impact on U.S. saving, investment, and growth of the total elimination of federal personal and corporate income taxes in favor of a uniform national sales tax. The national sales tax would be paid at the cash register by all consumers when they purchased goods and services from retail establishments. Sales of all goods and services would be taxed at the same rate. Elimination of all federal income taxation in the United States would end taxation of all capital income, including capital gains. In the short run, the rate of the proposed national sales tax would be roughly 17 percent. Over time, as the replacement of the income tax by the sales tax stimulated economic growth, the national sales tax rate would, according to the predictions of this study, fall to 11 percent.

A full switch to a national sales tax would represent a radical departure from current fiscal arrangements, but nothing short of radical change will ever transform the tangled provisions of the income tax code into a clear and simple

system of taxation. A national sales tax might be the one tax that would have enough clarity and simplicity to put an end to our politicians' constant, and very costly, tinkering with taxes. In choosing a national sales tax we also would finally be making a choice between taxing consumption and taxing income, and we would be picking the tax base, namely consumption, that is most conducive to growth of saving, investment, labor supply, and output.

Switching to a national sales tax from the income tax would also improve the efficiency of the economy by eliminating a host of economic distortions that have arisen under our current tax structure. Of course, a national sales tax would introduce distortions of its own, but the net impact of replacing federal income taxes with a national sales tax would, it appears, be a significant overall reduction in the misallocation of economic resources.

There are two main arguments against a proportional national sales tax. The first is that it would reduce the progressivity of the tax system. The second is that an immediate switch from the existing tax system to a national sales tax would lead to the shifting of tax burdens to older generations that have already paid income taxes on their earnings and now would have to pay a second large tax on their earnings as they consumed them during retirement.

The first concern--the lack of progressivity of a proportional national sales tax--has been overstated, because progressivity has been measured in terms of annual, rather than lifetime, income. At some point, all income is consumed. In any case, a national sales tax could be made progressive by combining it with a refundable tax credit. Each household would file a form requesting the tax credit and receive a check from the Internal Revenue Service equal to the amount of the credit for which the household qualified. The value of the tax credit could be fixed per household, independent of the household's income, or graduated (made to decline as the household's income increased). In addition, the value of the household credit might depend on the number of children and other dependents in the household.

In principle, if the tax credit were set sufficiently high, the same degree of progressivity that characterizes our current income tax system could be achieved with a national sales tax and a graduated refundable tax credit. The need for, and the stigma associated with, our welfare system could also be eliminated.

The second concern associated with switching tax regimes, the shifting of greater tax burdens to the current elderly, could be addressed by compensating them directly (e.g., by raising their Social Security benefits).

Rather than consider in detail all the arguments for and against a national sales tax, I will examine the dimensions of the current U.S. saving crisis and how our failure to save is affecting our rates of investment and productivity growth. Then I will address the saving, investment, labor supply, and output implications of a switch to a national sales tax.

The Crisis in U.S. Saving and Investment

In 1991 the U.S. net national saving rate was just 1.7 percent--the lowest rate observed in the post-World War II period.[1] While 1991 was marked by recession, as Figure 1 shows, the U.S. saving rate had been below 4 percent for each of the previous six years. In contrast, the U.S. saving rate averaged 9.1 percent between 1950 and 1970 and 8.5 percent between 1970 and 1980.

The saving rate is important because domestic saving, together with the saving invested in the United States by foreigners, provides the funds that business uses to engage in investment--to purchase new machines, build new factories, and the like. Economists refer to the stock of computers, machines, factories, real estate, and the like as capital stock. Since capital and labor are the two primary inputs to production, the larger its capital stock, the larger will be the economy's output and the greater will be the productivity of labor, since labor productivity is measured as output per unit of labor. Higher labor productivity translates into higher real wages. So less saving means less investment, less investment means less growth of capital stock, less growth of the capital stock means less growth of output and labor productivity, and less growth of labor productivity means less growth of real wages.

Figure 1
U.S. Rates of National Saving and Domestic Investment, 1950-91

(Graph Omitted)

Source: Calculated from data obtained from The Economic Report of the President, 1991 and 1992.

The national saving crisis has indeed produced a crisis in national investment. Last year's rate of domestic investment, 2.0 percent of net national product, set a dismal postwar record. Since 1980 our domestic investment rate has averaged 5.6 percent per year, compared with 8.2, 7.9, and 7.9 percent in the 1950s, 1960s, and 1970s, respectively. Thanks to the inflow of foreign capital, U.S. domestic investment did not decline during most of the 1980s as sharply as did U.S. saving. In Figure 1 the rate of domestic investment is measured as the vertical difference between the investment rate and the saving rate curves. That vertical distance reached a postwar high of 3.4 percent of net national product in 1987. In that year, as well as in 1986, foreigners financed more investment in the United States than did Americans. The desire of foreigners to invest in the United States has, however, waned. Since 1988 the rate of foreign investment in the United States has fallen, leaving the bulk of U.S. domestic investment to be financed by meager U.S. saving.

Nations that fail to invest experience relatively slow growth in real wages. Since 1970 the productivity of U.S. workers has increased at just over 1 percent per year, which is only 40 percent of the productivity growth rate recorded from 1950 through 1969 and only about a third of the Japanese rate over that period. Labor productivity ultimately determines how much firms will pay for labor. So the decline in the productivity growth rate has meant a slower rate of growth of wages. Since 1975 total compensation (wages plus fringe benefits) per employee in the United States has increased, in real terms, by less than 3 percent. That is a very poor record considering that in the 15 years before 1975 total real compensation per worker rose by 35 percent.

The Choice of Tax Base and Its Impact on Saving

To understand the different tax bases available to government and how they affect saving decisions, consider a government that wants to tax all output at a fixed rate (t). It can levy a tax at rate t on output as it is sold by firms to the private sector, or it can levy a tax at rate t on the factors of production--labor and capital--as they receive the proceeds from the sale of output in the form of wage income and capital income. A third possibility is to tax income recipients when they use their income to purchase goods and services or to acquire assets (i.e., when they save). Since what is saved is invested (i.e., saving equals investment), the hypothetical government can also tax income by taxing consumption plus investment.

A little math helps to clarify the equivalency of those four ways of taxing output:

$$Y = Yl + Yk = C + S = C + I$$

where

Y = aggregate output or income, Yl = aggregate labor income, Yk = aggregate capital income, C = aggregate consumption (including government con sumption), S = aggregate saving, and I = aggregate investment. Taxing output Y at flat rate t is equivalent to taxing both Yl and Yk at rate t, and both, in turn, are equivalent to taxing $C + S$ or $C + I$ at rate t.

But there is no requirement that government tax all output either directly, when it is produced and sold, or indirectly, when it is received as income or is used to purchase goods and services or acquire assets (finance investment). Government can, instead, choose to tax only a component of income. For example, it can choose to tax labor income, but not capital income. Or it can choose to tax only one use of income, say consumption, but not another, say investment.

If government chooses to tax consumption, it can do so directly, by taxing the purchase of goods and services, or indirectly, either by taxing income when it is received by individuals in the form of wage income and capital income, but allowing a deduction (or subtraction) for the saving those individuals do, or by taxing wage income at the personal level and capital income at the business level (before it is paid out), but allowing a deduction at the business level for investment. The equivalence of those ways of taxing consumption can be seen from our simple identity: consumption (C) equals income (Y) minus investment (S), but it also equals Yl plus the difference between Yk and I.

In the United States we have attempted to tax consumption indirectly both by allowing deductions from personal income taxes for certain forms of saving and by allowing full deductions from business profits taxes for certain forms of business investment. Except for gasoline and other federal excise taxes, the federal government has never attempted to tax consumption directly through a uniform national sales tax. A national sales tax is the most transparent method of taxing consumption. Unlike David Bradford's proposed progressive personal consumption tax, which would involve the filing of personal tax returns and thus could incorporate progressive tax rates, a uniform national sales tax would tax the consumption of all Americans at the same rate regardless of the level of their incomes or their consumption.[2] That potential inequity of a national sales tax could be addressed through the adoption of a household tax credit.

Given that government can tax consumption directly or indirectly and that it can do so at either progressive or proportional rates, why would it want to tax only output that is consumed and exempt from taxation output that is saved (invested)? The answer is that a consumption tax provides more incentive to save (invest) than does an income tax. As $Y = C + S$ indicates, taxing output can be viewed as taxing saving as well as consumption. Economists view saving, not as an end in itself, but as a means of financing future consumption. By taxing consumption and saving, an income tax effectively taxes future consumption twice, once when households save funds for future consumption and again when they engage in that consumption. Since current consumption is taxed only once, an income tax provides an incentive, at any point in time, to consume more now and save less for the future.

Consider the case of an individual who earns $10,000 and faces a 20 percent income tax. Suppose the individual is trying to decide how much of his $8,000 in after-tax income to consume this year and how much to consume next year. If he consumes it all this year, this year's consumption will be $8,000. Alternatively, if he consumes none of it this year, his consumption next year could be $8,000 plus the after-tax interest income he might earn by investing his $8,000 for one year and then paying income taxes on the interest earned. Suppose the interest rate is 10 percent. In a year, an $8,000 investment will earn $800 in pretax interest, of which 20 percent ($160) will have to be handed over to the government in income taxes. So saving $8,000 this year will finance only $8,640 ($8,000 + $800 - $160) in consumption next year. The ratio of next year's maximum consumption to this year's maximum consumption is $8,640/$8,000 = 1.08. Clearly, each dollar more that is consumed this year means $1.08 less to be consumed next year.

If the income tax were replaced by a 25 percent consumption tax, a dollar more consumed this year would mean $1.10 less to be consumed next year, implying a greater incentive to defer consumption under a consumption tax. If an individual spends all his $10,000 in income on this year's consumption, he'll end up consuming, after paying consumption taxes, $10,000/1.25 or $8,000. Alternatively, if the individual saves the entire $10,000 so as to maximize consumption next year, he will end up consuming, after paying consumption taxes, $11,000/1.25 or $8,800. So under consumption taxation the ratio of next year's maximum consumption to this year's maximum consumption is $8,800/$8,000 = 1.1. Every $1.00 of additional consumption this year means $1.10 less to be consumed next year.

In addition to providing better saving incentives, a consumption tax produces a one-time intergenerational redistribution from older generations to younger and future generations. That redistribution lowers aggregate consumption and raises national saving. The intergenerational redistribution occurs because older generations pay a larger share of consumption taxes than they do of income taxes. And intergenerational redistribution lowers aggregate consumption and raises national saving because older generations, whose members are closer to the ends of their lives, have a greater propensity to consume than do younger generations.[3] Thus, the proposed change in the tax structure would transfer resources from generations with high propensities to consume to generations with low propensities to consume.

The Legacy of Tax Flip-Flops-- A Hybrid U.S. Tax Structure

Over the past dozen years we Americans have had a great penchant for reforming our tax system. We did so in 1981, 1982, 1984, 1986, and 1990, and we may well do so again in 1993. We seemingly cannot decide whether our taxes are too high or too low, too progressive or too regressive, too replete with loopholes or too devoid of incentives. In addition, we seem unable to make up our minds whom--business or individuals--or what--income or consumption--we want to tax. And we cannot decide whether to tax all components of a given tax base, such as income from dividends and income from capital gains, at the same rate.

The products of that indecision are four. First, in reforming every couple of years the previous tax "reform," we fall to give any one set of tax incentives enough time to produce its intended result. Second, the prospect that a given tax incentive will be eliminated in the near future limits its effectiveness. Third, by continually changing taxes, we destabilize the overall economy or, at least, important sectors of the economy. Fourth, we enact partial, rather than full, reforms with the result that we arguably end up with a worse tax system than the one with which we started.

In 1981 we attempted to move the tax structure toward consumption taxation, not by taxing consumption directly, but by taxing income less investment, which, as indicated above, equals consumption. Our method of trying to tax the difference between income and investment involved increasing the tax deductibility of business investment. But in trying to provide those deductions, via the investment tax credit and other features of the Accelerated Cost Recovery System (ACRS), we went overboard. The result was a system that provided, in many cases, deductions that were too large and, consequently, too expensive in terms of lost revenues. As a result, we scaled back the ACRS with the Tax Equity and Fiscal Responsibility Act of 1982 and the Deficit Reduction Act of 1984. Then, in 1986, we completely reversed course by passing the Tax Reform Act. That new law reduced tax deductions for business investment to levels that were less generous than those available before enactment of the ACRS. The see-saw pattern of investment incentives led to over-expansion of certain sectors, such as real estate, in the early 1980s followed by a crash in the late 1980s. That explains, for example, the empty high-rise office buildings we now see in most major cities of the country.

In addition to destabilizing specific sectors of the economy, tax legislation of the 1980s (as well as the 1970s) has left us with a hybrid federal personal tax structure, with some features appropriate to an income tax and some appropriate to a consumption tax. The prime example is our treatment of tax-favored saving accounts, including IRAs, KEOGH accounts, 401K plans, and employer-provided pension plans. Because funds placed in those accounts are deductible from personal income taxes, those accounts afford consumption tax treatment (the taxation of Y - S) to saving.

The problem is that to truly tax output less saving (i.e., consumption), the government must permit deduction from income of net saving only (gross saving minus gross borrowing), not simply gross saving. But to ensure that households deduct only net saving, the government must require them to add to their taxable income any borrowing they do, be it in the form of a home mortgage, a car loan, or an outstanding credit card balance. The federal government has failed to do that.

The following distortions, which are contained in the current tax system, would be eliminated by switching to a national sales tax:

   -- the differential tax treatment of corporate and non- corporate business that distorts business ownership and control decisions;

   -- the differential tax treatment of capital gains and dividends that distorts firms' decisions about retaining earnings and prevents investors from selling shares of stock that have accrued capital gains;

   -- the encouragement of current relative to future con- sumption (the tax on saving) associated with the taxation of capital income;

   -- the differential tax treatment of investment in equipment, structures, and inventories;

   -- the work disincentive associated with the progressivity of our present tax structure;

   -- the distortion in corporate financial structure due to the deductibility of interest payments and the non-deductibility of dividends; and

   -- the tax-exempt status of health insurance premiums.

The distortion of labor supply incentives associated with income taxation would also be eliminated by the proposed tax shift. But a national sales tax would distort that margin of choice as well: the larger the national sales tax, the less consumption could be purchased for each dollar earned. So the incentive, at the margin, to earn more in order to

consume more is reduced. Because both the national sales tax and the income tax distort labor supply incentives, one needs to compare the efficiency gains from eliminating the income tax's distortion of labor supply with the efficiency losses caused by adding a national sales tax's distortion of labor supply. There is good reason to expect the tax shift to result in a net reduction in the distortion of labor supply. A national sales tax would extract a large share of its revenues from older people, many of whom are retired. As a result, the total tax that would need to be collected from working generations would be smaller under the national sales tax than it is under the income tax.

Simulating the Switch from Income Taxation to a National Sales Tax

The Auerbach-Kotlikoff computer simulation model can provide some sense of the potential effects on saving, investment, and growth of shifting to a national sales tax (a more detailed summary of the model is provided in the appendix).

In simulating the switch from income taxation to a national sales tax, one needs to specify the economy's initial position as well as the way the tax change takes place. Assume that the economy has a 15 percent proportional income tax and a 14 percent sales tax. The 15 percent income tax figure is based on the 1991 ratio of the sum of federal, state, and local personal and corporate income taxes to net national product. Of the 15 percentage point tax rate, 12 points are due to federal income taxation. In the simulations, the 12 percent federal income tax rate is eliminated in favor of a national sales tax.

The 14 percent initial sales tax figure is based on the 1991 ratio of the sum of federal, state, and local sales and excise taxes to total personal consumption.[4] In the simulations, the national sales tax is added to the 14 percent initial sales tax to determine the total sales tax. Initially, the 15 percent income tax and the 14 percent sales tax are used to finance government spending as well as to pay interest on the government debt. The level of government debt is initially set at 50 percent of output. During the transition to a national sales tax, the level of per capita government debt is held constant.[5] In addition to those features of fiscal policy, the economy is assumed to have a pay-as-you-go Social Security system with a 15 percent payroll tax rate.

Findings

Table 1 shows the transition path of the economy that results from replacing in year 0 the model's 12 percent rate of federal income taxation with a national sales tax, while maintaining a 3 percent rate of state and local income taxation. The new national sales tax rate is set at the level needed, in conjunction with the pre-existing 14 percent sales tax and the 3 percent state and local income tax, to continue to finance the same level of government spending as well as pay interest on the government debt. The first row in the table indicates the economy's initial (year 0) position. With no change in tax policy, the economy would remain in that position through time. Annual saving rates, annual interest rates, and tax rates are measured in percentage points. The units of measurement for the other variables are arbitrary, so each of those variables is described in terms of an index that has an initial (base-year) value of 100.

Initially, the economy features a 2.5 percent saving rate, a per capita capital stock of 100, a per capita labor supply of 100, a level of per capita output of 100, a real wage rate of 100, a real interest rate of 10.0 percent and a zero national sales tax rate. The 2.5 percent saving rate is close to the current U.S. rate of saving, and the 10.0 percent real interest rate is close to the annual real rate of return that has been earned, on average, on the U.S. capital stock in the postwar period.

The remaining rows in Table 1 show how each of the variables reacts to the introduction of a national sales tax. The major responses to the tax change are as follows:

Table 1
Results of Simulating an Immediate Switch from Federal Income Taxation to a National Sales Tax

Year	Saving Rate	Capital Stock Index[a]	Labor Supply Index[a]	Output Index[a]a	Wage Index[a]	Interest Rate	National Sales Tax Rate

0	2.5	100	100	100	100	10.0	0.0
1	7.6	100	104	103	99	10.3	17.4
2	7.2	102	104	104	99	10.1	16.7
3	6.9	104	104	104	100	10.0	16.2
4	6.6	106	104	105	101	9.8	15.8
5	6.4	108	104	105	101	9.7	15.4
10	5.3	115	103	106	103	9.2	13.9
20	3.9	123	102	107	105	8.6	13.3
60	3.0	128	101	107	106	8.3	11.3
90	3.0	129	101	107	106	8.3	14.3
150[b]	3.1	129	101	107	106	8.3	14.3

[a]The capital stock, labor supply, output, and wage figures are indices of the per capita values of those variables.
[b]Year 150 is the final steady state.

-- An immediate and dramatic increase, from 2.5 percent to 7.6 percent, occurs in the economy's saving rate. While the saving rate gradually declines after year 1, it remains above 5 percent through the 10th year of the transition. The long-run (year 150) value of the saving rate is 3.0 percent--20 percent greater than the year 0 value.

--Investment, and therefore capital stock, increases. By year 150 the switch in tax regimes leads to a 29 percentage point increase in per capita capital stock. The increase in capital stock is gradual; only about one-half of the ultimate increase occurs in the first 10 years of the transition.

-- The increase in capital stock raises the productivity of workers and thus their real wage. In the long run, real wages are 6 percentage points higher than they are initially. The new tax policy also lowers the return on capital.

-- The real interest rate falls by almost 2 percentage points in the course of the transition.[6] Although the real wage ultimately ends up 6 percentage points higher than it would have been without the tax change, for the first few years of the transition the real wage actually falls by 1 percentage point because agents respond to the prospect of higher real wages and higher short- term real interest rates by increasing their labor supply. In the short run, before capital stock has had much of a chance to increase, there is an increase in the supply of labor relative to the supply of capital. As a result, labor in the first few years of the transition becomes relatively abundant, meaning that the price it can command in the market--the real wage--falls. Eventually, as the interest rate falls, the incentive to work more in order to save more and receive higher rates of return on the additional saving diminishes. As a result, labor supply declines. In the long run, the supply of labor is only 1 percentage point greater than it is in year 0.

-- An increase in the per capita level of output results from changes in the supplies of capital and labor. Between year 0 and year 1, there is a 3 percentage point increase in output. In the following 10 or so years the switch in the tax structure raises the economy's growth rate by six-tenths of 1 percentage point per year. In the long run, the level of per capita output is 7 percentage points higher than it is in year 0.

-- The year 1 value of the national sales tax rate is 17.4 percent. But the rate declines through time, and its value ends up at 14.3 percent in the long run. The tax rate can decline because the growth of the economy permits a higher level of consumption and thus produces a higher consumption tax base. In addition, the reduction in the interest rate lowers required interest payments on the government's debt.

To summarize the findings in Table 1, the simulation of a switch to a national sales tax produces a significant increase

in saving, capital accumulation, the real wage, and the level of per capita income. Although the dynamics are nonlinear (e.g., labor supply first rises and then falls), all the results make intuitive sense.

Table 2 repeats the simulation run of Table 1 except that it eliminates state and local as well as federal income taxes and replaces all those taxes with a national sales tax. As a comparison of the two tables indicates, replacing all income taxes leads to larger long-run increases in capital stock, the real wage, and the level of per capita output than does simply replacing federal income taxes. For example, in Table 2 the long-run increase in the capital stock is 37 percentage points compared with 29 points in Table 1. The greater growth of output means that the national sales tax rate can fall even faster.

Table 2
Results of Simulating an Immediate Switch from Federal, State, and Local Income Taxation to a National Sales Tax

Year	Saving Rate	Capital Stock Index[a]	Labor Supply Index[a]	Output Index[a]a	Wage Index[a]	Interest Rate	National Sales Tax Rate
0	2.5	100	100	100	100	10.0	0.0
1	8.9	100	105	104	99	10.4	22.8
2	8.5	103	105	105	99	10.2	22.0
3	8.1	105	105	105	100	10.0	21.4
4	7.8	107	105	105	101	9.8	20.8
5	7.4	109	105	106	101	9.6	20.2
10	6.1	119	104	107	103	9.0	18.1
20	4.3	130	102	108	106	8.3	16.0
60	3.1	137	101	109	108	7.9	14.8
90	3.1	137	101	109	108	7.9	14.7
150[b]	3.1	137	101	109	108	7.9	14.7

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60	3.1	137	101	109	108	7.9	14.8
90	3.1	137	101	109	108	7.9	14.7
150[b]	3.1	137	101	109	108	7.9	14.7

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[a] The capital stock, labor supply, output, and wage figures are indices of the per capita values of those variables.
[b]Year 150 is the final steady state.

Maintaining a Constant National Sales Tax Rate

As an alternative to having the national sales tax rate decline through time, we might want to have a tax rate that was constant through time. I've used the model to simulate such a policy and found that if the tax rate is set equal to 16 percent, the model produces deficits in the short run, since the additional tax revenue raised with the 16 percent tax falls short of the loss in revenue occasioned by eliminating the 12 percent federal income tax. Over time, the growth of output and the consumption tax base associated with the reform raises the amount of revenue collected by the 16 percent tax. That permits the full retirement of the additional debt that is issued in the short run. In the constant-tax-rate simulation, the long-run capital stock and output levels are 27 and 6 percentage points higher, respectively, than their year 0 values. Those long-run increases may be compared with the 29 and 7 percentage point increases of Table 1.

Are the Results Reasonable?

Given the magnitude of the model's predicted response to a switch to a national sales tax, one might ask whether the results are really plausible or simply reflect some extreme assumptions about labor supply and saving behavior. Actually, the labor supply and saving responses assumed in the model are quite conservative. They are certainly well within the ranges of response that have been estimated in the empirical economics literature. In addition, the life-cycle used is the basic bread-and-butter model of neoclassical economics.[7]

There is, however, one feature of the model that may make the transition occur faster in the model than it would in the real world: the model's assumption that new capital can be immediately added to the existing stock of capital without the incursion of installation costs. As discussed elsewhere,[8] the addition of installation costs would slow the transition but not alter the magnitude of the long-run change in any of the economy's variables.

Another issue, which has not yet been addressed, is the progressivity of the income tax that is to be replaced. The model can handle progressive as well as proportional tax rates. In the case of a progressive income tax, the degree of progressivity of which is roughly comparable to that of the present U.S. income tax, the year 0 position of the economy from which the transition begins has a 2.2 percent, rather than a 2.6 percent, saving rate, a per capita capital stock that is 18.1 percentage points smaller, a per capita labor supply that is 5.2 percentage points smaller, a per capita output level that is 8.6 percentage points lower, a real wage that is 3.5 percent lower, and an interest rate of 10.4 percent rather than 9.4 percent. Since the switch from the progressive income tax to a proportional sales tax produces the long-run outcome indicated in the last row of Table 1, the saving, capital accumulation, and growth effects of the tax change are all magnified by assuming that the initial income tax is progressive. For example, the long-run increase in per capita capital stock is 49 percentage points, and the long-run increase in per capita output is 14 percentage points.

The Impact on the Initial Elderly

Although switching to a national sales tax has a lot to recommend it, its advantages do not include the treatment of the initial elderly who, as mentioned, end up paying much more in consumption taxes than they would have paid in income taxes. For example, in the simulation of Table 1, the oldest elderly in year 1, those who are age 55, suffer a 17 percent decline in their final year's consumption. There are different ways to avoid, or at least mitigate, redistribution away from those who are old at the time of the switch. One is to make additional transfer payments to the initial elderly by, for example, raising Social Security benefits. The problem with making transfer payments to the initial

elderly is that those payments will lead the elderly to consume more and the additional consumption will limit the increase in saving and capital accumulation.

Table 3 shows the transition arising from an immediate switch to a retail sales tax, with governmental transfer payments to all generations alive at the time of the transition to ensure that no generation is made worse off by the tax switch. The transfer payments are, of course, largest for the oldest generations alive at the time of the tax switch, since they do not benefit as much from the elimination of income taxes as do younger generations. While of compensation of the initial generations limits the additional saving generated by the sales tax, there remains, nonetheless, a substantial saving response. According to Table 3, there is a 20 percentage point increase in the economy's long-run capital stock. Although that is less than the 29 percentage point increase of Table 1, it is still quite substantial. With the compensation scheme in place, the long- run increase in per capita income is 6 percentage points (compared with 7 points with no compensation). If we replace all income taxes (state and local as well as federal) and also compensate the initial elderly, the long-run increase in capital is 33 percentage points, rather than the 37 percentage points given in Table 2, and the long-run increase in per capita output is 8 percentage points, rather than the 9 percentage points given in Table 2. To summarize, we can compensate initial generations as we switch to a national sales tax and still make future generations significantly better off. That reflects the inefficiency of an income tax structure relative to a consumption tax structure.

Table 3

Results of Simulating an Immediate Switch from Federal Income Taxation to a National Sales Tax with Full Compensation Paid to the Initial Elderly

Year	Saving Rate	Capital Stock Index[a]	Labor Supply Index[a]	Output Index[a]a	Wage Index[a]	Interest Rate	National Sales Tax Rate
0	2.5	100	100	100	100	10.0	0.0
1	5.9	100	104	103	99	10.2	16.9
2	5.7	101	104	103	99	10.1	16.4
3	5.5	103	103	103	100	10.0	16.1
4	5.4	104	103	103	100	9.9	15.8
5	5.2	105	103	104	100	9.8	15.5
10	4.5	110	103	105	102	9.5	14.4
20	3.7	116	102	105	103	9.1	14.2
60	2.8	120	102	106	104	8.8	12.4
90	2.8	120	101	106	104	8.8	12.4
150[b]	2.8	120	101	106	104	8.8	12.4

[a] The capital stock, labor supply, output, and wage figures are indices of the per capita values of those variables.
[b] Year 150 is the final steady state.

Conclusion

Our nation is facing a grave crisis with respect to its rate of saving. We are saving at record low levels, and unless we start saving more, we will continue our slide toward second-class economic status. A shift to a national sales tax has the potential for dramatically increasing our saving rate. It would do so by improving incentives to save. The distortion of saving behavior is so great under our current system of income taxation that it appears that we could switch to consumption taxation, fully compensate the initial elderly for their higher tax burden, and still end up with much higher rates of saving and capital accumulation and a higher level of per capita income.

Appendix: The Auerbach-Kotlikoff Dynamic Life-Cycle Simulation Model

The Auerbach-Kotlikoff model calculates the time path of all economic variables in an economy over a 150-year period. The model has 55 overlapping generations. Each adult agent in the model is considered for 55 years (from age 20 to age 75). The version of the model used here assumes a closed economy, (i.e., there are no net capital flows to or from other countries).

There are three sectors in the model: households, firms, and government. Households (adult agents) make decisions about how much to work and how much to save on the basis of the after-tax wages and after-tax rates of return they can earn in the present and the future on their labor supply and saving, respectively. The work decision involves not only deciding how much to work in the years that one is working but also when to retire. The model's particular form of consumption and leisure preferences that agents use in making their labor supply and saving decisions were chosen in light of evidence on actual labor supply and saving behavior.[9]

As agents age in the model, they experience a realistic profile of increases in wages. That age-wage profile is separate from the general level of wages, the time path of which is determined in solving the model. Fiscal policies affect households by altering their after-tax wages; their after-tax rates of return; and, in the case of consumption taxes, the after-tax prices of goods and services. The model is equipped to deal with income taxes, wage taxes, capital income taxes, and consumption taxes. It is also able to handle progressive as well as proportional tax rates.

The production sector is characterized by perfectly competitive firms that hire labor and capital to maximize their profits. The production relationships that underlie firms' hiring decisions and production of output are based on empirical findings for the United States. The government sector consists of a treasury that collects resources from the private sector to finance government consumption and an unfunded pay-as-you-go Social Security system that levies payroll taxes to pay for contemporaneous retiree benefits. The model does not distinguish federal from state and local government. Hence, when the model simulates the elimination of income taxation in favor of sales taxation, all state and local income taxes, as well as federal income taxes, are in effect replaced by the sales tax. There is no money in the model, and thus, no monetary policy. There is, however, government debt, and the model can handle deficit-financed tax cuts. It can also handle gradual phase-ins of one tax for the other.

The model handles a great number of complex processes, and its predictions need to be viewed cautiously for several reasons. First, the model does not deal with several of the real-world distortions associated with the income tax. For example, it does not distinguish corporate from noncorporate production, housing consumption from nonhousing consumption, different forms of corporate finance, different types of investment, or differences in capital gains and dividend tax rates. Nor does it permit the kind of tax arbitrage that is available to most tax-paying Americans through tax-deductible saving accounts.

Second, the model's agents are heterogeneous only with respect to their age. There are no welfare recipients or millionaires, whose saving and work behavior might differ dramatically from that of the model's agents. Third, the model does not include saving for purposes other than retirement, such as bequests. Fourth, the model does not incorporate uncertainty with respect to individual or macroeconomic outcomes. Fifth, the model ignores illegal tax avoidance, an issue that would certainly arise in implementing a national sales tax. Although the model abstracts from a small portion of reality, it can, nonetheless, suggest the degree to which a switch to consumption taxation from income taxation might raise U.S. national saving.

Notes

[1] The net national saving rate is defined as net national product less personal consumption expenditures less government purchases of goods and services divided by net national product. There are a variety of measures of U.S. saving. The net national saving rate is the most comprehensive mea sure of a country's saving.

[2] See David Bradford, U.S. Department of the Treasury, Blueprint for Basic Tax Reform (Washington: U.S. Government Printing Office, 1976).

[3] The finding of an increase in the propensity to consume is based on unpublished results of a study currently being

conducted by the author, John Sabelhaus, and Jagadeesh Gokhale on how the propensity to consume changes with age. The propensity to consume at age 20 is close to 3 percent; it rises to about 13 percent for people in their 80s and 90s.

[4] The taxes used in forming this ratio are indirect business taxes reported by the National Income and Product Accounts. Personal consumption is the National Income and Product Accounts' measure of expenditures on personal consumption minus its measure of indirect business taxes.

[5] This figure lies between the debt-to-output ratios suggested by calculating total government debt by adding estimates of state and local debt to the Office of Management and Budget's estimate of federal debt and adding estimates of state and local debt to estimates of total government debt derived from National Income and Products Account data.

[6] The decline in the real interest rate as well as the rise in the real wage rate would be smaller if the model were modified to permit international trade in goods and capital.

[7] Indeed, Franco Modigliani of MIT won the Nobel Prize in economics for developing the neoclassical model.

[8] Alan J. Auerbach and Laurence J. Kotlikoff, Dynamic Fiscal Policy (Cambridge: Cambridge University Press, 1987).

[9] All agents are assumed to have the same preferences, so differences in behavior across agents arise solely from differences in economic opportunities. Since all agents within an age cohort are assumed to be identical, differences in economic opportunities are present only across cohorts. Although some versions of the model consider children of the model's adult agents, in the simulation presented here, children are ignored and the number of adults is assumed to grow at a constant 1 percent rate.