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MACROECONOMIC AND BUDGETARY IMPACTS OF SOCIAL SECURITY POLICIES, 1985-2010: A SIMULATION STUDY

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This paper is the second of a two-part study of the economic and budgetary impacts of the social security program during 1985-2010. The authors are grateful to Michael Boskin for comments and suggestions on the design of the study. Financial support was provided by the Center for Economic Policy Research at Stanford University.

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Macroeconomic and Budgetary Impacts of Social Security Policies, 1985-2010: A Simulation Study

ABSTRACT

This paper presents quantitative predictions from a general equilibrium macroeconomic model of the economic and budgetary impacts of changes in social security programs. The following policies are examined: increases in the contribution rates for the OASDI and HI trust funds, reductions in pension benefits under the OASDI and in hospital benefits under the HI programs, a one-year suspension of indexing of pension benefits, an increase in personal income taxation, and an offsetting increase in social security contributions and reduction in personal income taxes. The short- and long-term effects of each of these policies on aggregate economic activity and on federal receipts, expenditures and the deficit are analysed. A major advantage of the general equilibrium approach is the fact that the effects of a given policy change are evaluated without neglecting the strong interactions between the social security system and the economy as a whole.

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Macroeconomic and Budgetary Impacts of Social Security Policies, 1985-2010: A Simulation Study

By Robert M. Coen and Bert G. Hickman*

In this paper we present simulation analyses of the short- and long-term impacts of changes in social security contributions and benefits on the economy and the federal budget. In an earlier paper, the structure of the social security programs was incorporated into the Hickman-Coen Annual Growth Model and a forecast prepared for 1985-2010 (Coen and Hickman, 1985). That forecast is used as a baseline for the present series of policy scenarios concerning alternative methods of improving the solvency of the social security system. The principal advantage of undertaking these simulations in a general equilibrium model is the fact that the impact of a given policy change can be evaluated without neglecting the strong interactions between the social secrurity system and aggregate economic activity.

The Hickman-Coen Model

The model is designed for intermediate and long-run analysis of U.S. economic growth.[1] An integrated system of factor demand and production functions guarantees consistency among the growth trajectories of the capital and labor inputs and of output. The desired or equilibrium inputs are determined by output, the rate of technical progress, and the relative cost of labor and capital as measured by the

the price deflator of goods and the government wage are endogenous, the latter being linked to wages in the private sector. Unemployment benefits depend on the number of unemployed and the average benefit level, which is also linked to the private wage. Social security benefits are modeled in detail as explained in a later section of the paper. Federal interest payments are determined by endogenous measures of the federal debt and the effective interest rate. Nominal grants-in-aid to state and local governments are exogenous.

The model contains separate relationships to determine revenues from personal taxes, corporate taxes, indirect business taxes, contributions to unemployment insurance programs, and social security programs. In each case, tax receipts depend on an endogenous measure of the tax base and on an effective tax rate. Rates for corporate, indirect, and social security taxes are exogenous. The unemployment contributions rate adjusts endogenously, rising in response to spells of high payments of unemployment benefits. In the case of personal taxes, we use the effective rate that would be paid by a full-time single worker with only labor income, as a proxy for the effective rate for all taxpayers. Movements in this proxy rate reflect changes in the statutory rate schedule, including general surcharges or credits, changes in the standard deduction and personal exemption, and changes in labor income for a full-time worker. Beginning in 1985, the exemption, deduction, and taxable income brackets used in computing the effective rate are indexed to lagged changes in consumer prices, as specified under the 1981 tax legislation.

Taxes impinge on factor supplies as well as on aggregate demand in the model. Thus, the labor force participation rates in 16 age-sex groups are affected by the real after-tax wage rate. Employer contributions to social insurance funds raise the cost of labor. Investment in plant and equipment responds to changes in the investment tax credit, the rules governing the tax treatment of depreciation, and the corporate tax rate. In addition to these supply-side effects, factor inputs are also responsive to the aggregate demand shifts induced by tax changes in our general equilibrium model.

The Baseline Forecast, 1985-2010

In this section we summarize the main features of the baseline forecast and its fiscal assumptions. The reader is referred to our companion article (Coen and Hickman, 1985) for a detailed description of the economic and policy assumptions underlying the forecast and for an evaluation and comparison of our social security projections with the official estimates of the Trustees of the Old Age and Survivors Insurance and Disability (OASDI) and Hospital Insurance (HI) programs. In our judgement, these comparisons demonstrate that we have successfully integrated the demographic and programmatic assumptions of the official projections into our macroeconomic model, so that the baseline forecast may be used with considerable confidence as a benchmark for investigation of the economic and budgetary implications of possible changes in the

social security system.

The projected outcomes for key variables are shown in Table 1. The general pattern is for real growth at about 2.8 percent per year during the remainder of the eighties, decelerating to 2.3 percent in the nineties and to 1.8 percent thereafter. Inflation slows to a rate of about 3.4 percent for the remainder of this decade, rises to 4.3 percent in the early nineties, then moderates to 3.8 percent in 2001-2010. Unemployment declines from 7.4 percent in 1985 to 6.3 percent in 1990, and averages between 5.4 and 5.6 percent during 1991-2010. Long-term interest rates, as represented by Moody's Corporate Average, decline substantially over the forecast horizon, from 12.7 percent in 1985 to an average of 6.3 percent in the final decade. The federal deficit also falls over time, from a 1985 ratio to GNP of 4.9 percent to an average of 1.1 percent during 1996-2010.

This forecast was prepared prior to the enactment of the Balanced Budget and Emergency Deficit Control Act of 1985 (Gramm-Rudman-Hollings), which is intended to achieve a balanced federal budget by 1991. In the forecast, the growth rate of nominal federal purchases of goods and services is set exogenously and is assumed to decrease sharply after 1984-85, in order to decrease the federal deficit. After allowing for inflation, the result is an immediate sharp reduction in the rate of increase of real federal purchases, from a peak of 6.7 percent in 1985 to an average annual rate of 0.9 percent in 1986-1990. Real purchases show negative growth thereafter, despite an assumed increase in the growth of nominal federal

spending in 2001-2010. A faster reduction in government purchases, or a tax increase, could bring the deficit down more sharply, although at the expense of a temporary income loss before the exogenous increase in government saving induced a corresponding rise of private demand. Gramm-Rudman-Hollings includes a provision for delays in implementing the deficit reduction should real growth fall below one percent for two successive quarters or should a recession be forecast by the Office of Management and Budget or the Congressional Budget Office. The eventual outcome is highly uncertain, although the pressure of Gramm-Rudman-Hollings, unless it is repealed or substantially modified, will probably produce a faster reduction in the deficit than shown in the forecast.

The growth path of real output in this long-term forecast is primarily determined by supply factors, including population growth, labor force participation decisions, technical progress, and the economic incentives for capital deepening. Fiscal and monetary policies and international developments are also influential, however, since they affect the adjustment of aggregate demand to aggregate supply, with important consequences for the inflation and unemployment forecasts.

Table 2 summarizes the projections of the social security accounts and the federal budget as a whole. As may be seen from the first three lines of the table, a growing surplus is forecast for the OASDI program over the next 25 years. In contrast, an increasing deficit is projected for the hospital insurance (HI) program beginning in 1991, as shown in lines 4-6. The surpluses under OASDI outweigh the HI deficits,

so that the combined programs develop substantial surpluses both in dollars and relative to GNP.

How do the social security programs compare with the rest of the federal budget? Federal receipts from all sources except OASDHI contributions and federal expenditures for all purposes except OASDHI benefits are listed in lines 10 and 11. The corresponding totals including social security receipts and expenditures are given in lines 13 and 14. The share of social security contributions in total federal receipts is projected to rise during the next 15 years and to decline in 2001-2010 (line 16). The ratio of OASDHI benefits to total expenditures rises throughout the period (line 17). Thus the social security programs are projected to become increasingly important on both sides of the budget for the rest of this century and to remain above the 1985 levels in the first decade of the next century.

The surpluses on the combined social security accounts (line 9) serve as a partial offset to the deficits on other activities (line 12), substantially moderating the overall deficit (line 15). Thus much of the reduction in the overall deficit in our forecast for 1985-2000 stems from the growing OASDHI surplus, and the increase of the overall deficit during 2001-2010 is attributable to our assumed increase in federal purchases of goods and services rather than to the operation of the OASDHI programs.

Design of Policy Scenarios

Seven policy scenarios were undertaken for this study of the effects of revisions of social security contributions and benefits on aggregate economic activity and the Federal budget. Each scenario is compared with the baseline forecast in order to evaluate the impacts of a single policy action, except for one instance of offsetting changes in social security contributions and personal income taxes. All scenarios assume that monetary policy is unchanged in the sense that the nominal money supply (M1) grows at the same rate as in the baseline solution, so that interest rates respond endogenously to the various fiscal changes. In no case is any change introduced in the exogenous variables or constant adjustments, apart from the specific policy action in question. These are therefore unmanaged simulations of the pure model responses to the policy shocks, unaffected by ad hoc adjustments.

Scenario 1. This is the baseline forecast.

Scenario 2. The contribution rate for the Federal Hospital Insurance Trust Fund is raised by one percentage point (from 2.9 to 3.9) in 1987 and kept at the higher level through the remainder of the horizon. If the tax base for social security contributions were unchanged by the tax increase, the 1987 contributions to the fund would be raised by 18.9 billion dollars, and by more in subsequent years as the tax base grew. (Because of the induced drop in the base, the net gain for 1987 is estimated at 18.5 billion in the scenario. This small amount of erosion is typical of all the scenarios.)

Scenario 3. This is the same as Scenario 2, except that the increase of one percentage point in the contribution rate is assigned to the Old Age and Survivors Insurance and Disability Insurance Trust Funds. The economic impact is identical to Scenario 2, since contributions to the two funds are assumed to be indistinguishable to the tax payer and to be unrelated by him to his prospective benefit streams.

Scenario 4. This scenario assumes a permanent reduction in the level of the payment rate per hospital admission under Medicare beginning in 1987, which yields a first-year reduction in total hospital benefits equal to the increase of contributions under the preceding scenarios. Calibrating the policy actions this way facilitates comparison of their relative impacts on key variables, since the policy shocks are the same size. With the exception of number 6, the remaining scenarios are calibrated in the same fashion.

Scenario 5. The level of real per capita pension benefits under the Old Age and Survivors Insurance program is permanently reduced starting in 1987, with an initial impact equal to the health benefit reduction under Scenario 4.

Scenario 6. The indexation of pension benefits to the lagged inflation rate is suspended in 1987 and resumed thereafter. This action induces a once-for-all reduction in the level of benefits, with indexation resuming in 1988 from the reduced base in 1987. This scenario reduces old age pensions by 6 billion dollars in 1987, so the impact is only one-third as great as in the other scenarios.

Scenario 7. A permanent change in the effective rate of

personal income taxation is introduced in 1987, sufficient to yield an increase in personal tax receipts equal to the first year increases in social security contributions under Scenarios 2 and 3. Owing to the difference in the estimated tax bases in 1987, the equivalent increase in the effective personal tax rate is 0.6 instead of 1.0 percentage point. This scenario provides the basis for comparison of the effects of equivalent increases in payroll and income tax rates.

Scenario 8. The increase in the contribution rate for hospital benefits under the second scenario is combined with an offsetting decrease in the personal tax rate. This simulation is used to evaluate the effects of a switch in the payment of social security benefits from payroll taxation to income taxation.

Social Security Policies and Aggregate Economic Activity

The macroeconomic responses to the restrictive changes in Social Security contributions and benefits exhibit similar patterns in the various simulations, except for Scenario 8.[3] Real growth falls relative to the baseline forecast during the first two years of adjustment and then spurts during the two subsequent recovery years (Table 3). After these short-run adjustments, growth is resumed at the underlying baseline rate. The recovery from the second year trough is incomplete, however, so that a permanent shortfall in the level of output is observed even after growth is resumed at the original rate (Table 4).

The decline and recovery of output is mirrored in a rise and fall of the unemployment rate. By the fourth year, output recovery has reduced unemployment nearly to the baseline level, but a small increase persists through the 1990's as a counterpart to the lasting production shortfall.

The inflation rate rises or remains unchanged during the first year of adjustment to the various fiscal shocks, but it falls in all cases during the second year and remains lower thereafter (Table 3). The inflation gap persists through the year 2000 but does not grow. The permanent reduction in the inflation rate does, of course, result in a cumulative fall in the price level over the simulation horizon (Table 4).

These responses are in accord with the standard macroeconomic model of aggregate demand and supply under a regime of sticky prices and wages and with an unchanged nominal money stock. The increase in contributions or reduction in benefits reduces disposable personal income and consumption expenditure, depressing output and increasing unemployment. Prices are not depressed at first, because they are a markup on lagged as well as current labor cost, and because the induced cyclical decline in productivity offsets the induced wage decline, leaving current labor cost largely unaffected during the first year of adjustment.

The recession is prolonged and deepened in the second year owing to the lagged adjustments in consumption and investment demand to the initial loss of income. Wages are further depressed, productivity recovers as firms reduce hours and employment, and normal unit labor costs and prices are reduced.

The beginning of price deflation sets the stage for recovery. Interest rates fall (Table 4), partly because of the reduced transactions demand for money, but primarily because, with the nominal money stock unchanged, the supply of real money balances is increased by the induced fall in prices--the Keynes effect. Residential construction and automobile purchases are stimulated by the decline of interest rates, leading the recovery in the third and fourth years. The rebound is also assisted by induced increases in real exports and Federal purchases of goods and services as prices decline and nominal expenditures are sustained.

These equilibrating forces offset much, but not all, of the original decline in real activity. Real GNP remains permanently lower, with the induced reduction of consumption only partly offset by higher levels of real investment, exports and government purchases. This is because we have not imposed a unitary response of wage inflation to lagged price inflation in the labor-market Phillips curve--the statistically estimated elasticity is 0.6. Imposing a unitary elasticity would ensure a return of output to the baseline path but would not alter the nature or timing of the adjustment process nor significantly modify the time paths of prices, nominal GNP, or the fiscal accounts which are the principal concern of this paper.

The structure of decision making by households in the HC model partly explains the small estimated effects of changes in social security contributions and benefits on economic growth in the projections. The model does not embody the life cycle theory of consumption and saving, which predicts

that a social security system in which the present value of expected pension benefits equals the present value of expected taxes, would leave consumption and labor supply unaffected and reduce private saving by the amount of social security taxes. Moreover, if the stream of expected benefits exceeds that of taxes in present value, as has been true historically, consumption would also increase to augment further the reduction of saving.

Attempts to account quantitatively for the impact of expected future benefits on current saving rates have generally foundered on the extreme complexity of measuring the expected present value of future social security benefits. Because of this complexity, alternative plausible assumptions on how expectations of future entitlements are formed can lead to radically different time series estimates of the reduction in personal saving per dollar of social security wealth. Moreover, attempts to circumvent this difficulty by analyzing cross-sectional data on asset holdings have led to a preponderance of evidence that social security has little or no effect on personal saving and that key implications of the life cycle hypothesis are contradicted by household behavior.[4] These results suggest that households do not form long-term consumption plans as hypothesized in the life cycle model and instead either have a much shorter planning horizon because of information costs or uncertainty about the future, or else have such high subjective rates of discount that events more than a few years in the future have little effect on current decisions.

Thus the HC model assumes that household consumption decisions depend on current real disposable personal income, relative prices, interest rates, and lagged consumption and stocks of durable goods, but not on financial assets or wealth. The inclusion of lagged consumption in the equations for nondurables and services is consistent with the permanent income hypothesis, and that of lagged stocks in the durable goods equations with a capital stock adjustment process treating the acquisition of durable goods as a real investment decision. This means that the effects of changes in social security contributions and benefits operate on personal saving through the direct impacts of taxes and transfers on disposable income and the indirect impacts on prices, interest rates, and personal incomes.

As will be seen from the top panel of Table 5, the personal saving rate is depressed in the first year of adjustment to an increase in the HI or OASDI contribution rate (line 3) or the personal income tax rate (line 7). An equal decrease in saving is also found from an equivalent reduction in HI or OASDI benefits (lines 4 and 5), since the same direct reduction of disposable income is involved as for the tax increases. These first-year reductions in saving reflect the lagged adjustment of permanent income to current income in the case of nondurables and services and the lagged capital stock adjustment process in the case of consumer durable goods. After these initial declines, the saving rate returns to approximately the baseline level.

The equilibration of the personal saving rate does not

mean that private domestic investment also equilibrates, however. The fiscal changes have increased government saving and therefore national saving even though personal saving is largely unaffected. After the initial reductions of private investment induced by the decline of economic activity, the fall in interest rates gradually increases investment expenditure to provide an offset to the increase in government saving. As shown in the second panel of Table 5, the ratio of gross private domestic investment to GNP rises permanently as a result of the induced "flowing in"--the reverse of the crowding out that occurs when government saving is reduced--of investment expenditure. A somewhat smaller increase--about .2 in 1995--occurs also in the share of net exports.

The increase in the private investment share is concentrated on residential construction, which is sensitive to interest reductions in the model, whereas business fixed investment is not (the empirical evidence on the interest-inelasticity of business investment is documented in Coen and Hickman, 1981). The resources freed from consumption by the increase of government saving therefore serve to augment the nations' housing stock but not its potential GNP.

The civilian labor force is also affected somewhat by the changes in contributions or benefits under OASDHI programs (panel 3 of Table 5). It falls at first as labor force participation rates are reduced by the decrease in employment opportunities--the discouraged worker effect--but recovers subsequently to approximate equality with the baseline path. Since labor force participation is inelastic to changes in the

after-tax real wage (the overall elasticity is -.07, owing to a net exodus of young females from the labor force when the real wage rises) there is little difference between the effects of changes in the contribution rates and in benefits on labor supply.

Thus far we have stressed the basic similarities among the alternative policy scenarios, but three dissimilarities also deserve comment.

First, the initial impact of an increase in the social security contribution rate is to raise the price level despite the associated decline of output. This occurs because the increase in the employer's contributions raises the gross wage cost despite the fall in the wage net of the employer's contribution resulting from increased unemployment. Over time, however, continuing unemployment reduces the net wage sufficiently to depress the gross wage. The gross wage declines in the second year and the price level responds to the fall in unit labor cost beginning in the third year. Thus the long-run response to the payroll tax increase is dominated by the same wage-price-output adjustment process as occurs for a personal tax hike or a reduction in benefits.

Second, when offsetting changes are imposed in payroll and personal tax rates, as in Scenario 8, a complete standoff does not occur. Nevertheless, the results indicate that a shift from payroll to income taxation for supporting social security benefits would leave aggregate economic activity largely unaffected.

Third, the elimination of indexing of pension benefits in

1987 has a smaller absolute impact than the other policies. This is because even the complete elimination of indexing for one year has a smaller impact on 1987 benefits than is assumed in the other scenarios. The effects are smaller because the shock is smaller, and not because the response mechanism is different.

Social Security in the Federal Budget, 1987-2000

Annual projections of federal expenditures and receipts for social security and other purposes, as measured in the national income accounts, are shown in Table 6. They are taken from the baseline forecast of the Hickman-Coen Model. The estimates for social security are based on the same methodology about cost and income ratios as used in the official projections. Although the underlying ratios differ somewhat from the official figures, as explained in Coen and Hickman (1985), they are in general conformity with them. A comparison of our forecasts of the levels of payroll contributions and benefit payments with the official projections for 1985-1989 showed them to be in close agreement. A similar comparison cannot be made for the 1990's, since no official figures are published on the flows of contributions and benefits, as distinguished from the income and cost ratios. These flows depend, of course, not only on the underlying ratios, but also on the macroeconomic assumptions employed in our forecast. Since our macroeconomic forecast also departs from their economic assumptions in some respects, though again not

radically, it is difficult to judge precisely how far these figures differ from those implicit in the official projections, but they appear to be reasonable outcomes of the economic and programmatic assumptions embodied in the forecast.

Lines 1-3 of the table show the contributions, benefits, and surplus of the OASDI fund, lines 4-6 the same information for the HI fund, and lines 7-9, the combined totals for the entire social security system. The surplus of the OASDI fund rises steadily over the forecast horizon and is considerably larger than the deficit which emerges for the HI fund in the 1990's.

Federal receipts and expenditures for all other purposes than social security taxes and transfers are shown in lines 10-11, and the corresponding deficit is on line 12. Finally, the combined totals for all expenditures and receipts and the deficit as a whole are given in lines 13-15.

It will be seen that the projected surplus on the OASDI fund is a major factor in reducing the overall Federal deficit throughout the eighties and nineties. The size of the projected deficit on other programs is, of course, an outcome of the budgetary and monetary assumptions--themselves taken to be independent of the OASDI surplus--underlying the macroeconomic forecast. Nevertheless, the basic lessons from the table, that the social security programs are a large and vital element in the entire budget and that the OASDI surpluses inherent in the current law would go far toward offsetting deficits elsewhere, can scarcely be questioned. Indeed, it is the fact that the OASDI surpluses could be used for this

purpose that led to legislation in 1983 which mandates the removal of social security and hospital insurance from the unified budget in fiscal 1992.[5]

Policies to Improve the Solvency of the Social Security Funds

Given the huge projected surpluses under the OASDI program in Table 6, one may question further steps to increase the solvency of the social security system. In view of the expected deficits under the HI program beginning in the 1990's, however, attempts to curb the growth of expenditures or to increase the flow of revenues for Medicare may be anticipated. Accordingly, our primary attention in this section is devoted to Scenario 2, under which an increase in the contribution rate for the HI program is assumed, and to Scenario 4, with its assumed reduction in hospital benefits. Other aspects of social security financing will be treated in more summary fashion, however, for completeness and to gain additional insight into the role of social security in the budget and the economy.

At the baseline level of wage income, the one percentage point increase in the contribution rate for the HI program assumed in Scenario 2 would generate 18.9 billion dollars of additional revenue in 1987. When allowance is made for the induced reduction in national income from this uncompensated tax increase, however, the initial revenue gain is limited to 18.5 billion (Table 7, line 4). By the year 2000, the gain has

increased to 37.8 billion. Thus the higher contribution rate more than offsets the induced decline in the wage base for the HI program. In addition to these revenue gains, the HI surplus is augmented by the lower hospital payments resulting from the induced shortfall of national income, as may be seen from lines 5 and 6 of the table. A comparison with Table 6 indicates that the surplus from the tax increase would more than wipe out the deficits presently anticipated under the HI program.

Other feedback effects from this policy are also to be noted. The surplus on the OASDI program is reduced somewhat by the induced decline in the wage base for social security contributions, which reduces revenues by more than pension benefits, thereby offsetting about 10 percent of the gain on the HI program in most years. More important are the induced changes in receipts and expenditures outside the social security accounts, as shown in lines 10-12. A deficit on these programs offsets much of the social security surplus during the first 5 years, but as time passes the other Federal programs move into surplus to augment the gains generated under social security. After the first 5 years, the overall surplus is about the same as that on the HI program alone, as the losses from the marginal OASDI deficit are offset by the marginal surpluses outside the social security program.

Notice that the initial deficit on the other federal programs occurs because tax receipts decline more than expenditures. The revenue losses from reduced incomes continue to snowball over the forecast horizon, but after the first 5 years, expenditures outside the social security program fall

even faster, so that the balance shifts toward surplus. Most of this expenditure decline is accounted for by lower interest payments on the national debt, although some is due to lower prices for Federal purchases of goods and services. Both the price and interest rate reductions are due, of course, to the reduced level of economic activity resulting from the uncompensated increase in social security contributions. That is, an increase in the contribution rate is deflationary unless offset by countervailing fiscal or monetary policies, and the beneficial effects in this scenario on the HI and overall federal surpluses, and on interest rates and prices, are at the expense of lower levels of production and employment (Tables 3 and 4).

The story is much the same in Scenario 4, as may be seen in a glance at Table 8. This time the improvement in the balance of income and outgo on the HI program is due to reduced expenditures and the cumulative effects on the marginal HI surplus are larger, but the basic pattern and magnitude of the induced changes in the various budgetary items is similar to Scenario 2. As noted earlier, the same is true of the macroeconomic impacts of the two policies (Tables 3 and 4).

Thus from the standpoint either of the effects on the social security and general federal surpluses, or on economic activity, there is little to distinguish the two alternative policies for reducing the incipient deficits under the HI program. If it were to be decided that the deficits should be eliminated by direct changes in the HI program, the choice between the two approaches should be based on the welfare cost

of the foregone discretionary income from higher payroll contributions versus the welfare cost of lower hospital expenditures under Medicare, rather than on macroeconomic criteria.

Another alternative is to view the OASDI and HI programs as jointly financed entitlement programs with earmarked funding, and use the OASDI surpluses to offset the HI deficits. According to the official actuarial estimates, this could still leave intact a large element of net saving in the combined programs during the next 25 years, under the intermediate assumptions about economic and demographic conditions.[6]

Changes in OASDI Programs

Table 9 reports the fiscal impacts of a permanent increase of one percentage point in the contribution rate for the OASDI program. As stated earlier, the macroeconomic effects are precisely the same as for an equal increase in the HI contribution rate. Correspondingly, the impact on the overall budgetary surplus of the social security accounts is the same as before--it is only the allocation of the surplus between the OASDI and the HI Trust Funds which differs in the two cases. The allocation matters legally, of course, since the respective benefits are paid through the separate trust funds (although interfund loans are permissible under current law). Moreover, policymakers and the public may wish to treat the OASDI and HI programs as separate entities subject to their own budget constraints, in which case it may matter a great deal whether

costs and benefits are altered for one program or the other. The important point about Scenarios 2 and 4 is simply that a choice between the two taxes can be made without concern either for a differential impact on aggregate economic activity or on the balances of the overall social security accounts or the federal budget as a whole.

The consequences of a decision to reduce the level of real per capita retirement benefits under OASDI may be seen in Table 10. This scenario is analogous to the reduction in hospital payments under Scenario 4 and the shocks are scaled to produce about the same initial reduction in outlays in both cases. Since both shocks are transmitted as reductions in personal transfer payments, equal reductions should have equal effects on macroeconomic activity. The effects on overall activity (Tables 3 and 4) and the budget (Tables 7 and 10) are indeed quite similar during the early years, but as time passes the flow of payments falls further for the reduction in hospital payments than for pension benefits. This is because output, employment and prices fall somewhat more under the Medicare scenario, since the absolute size of the real shock increases faster over time than in the OASDI scenario owing to the scaling procedures for benefits under the two programs. If normalized each year for the size of the shock, the results would be equal insofar as the macro impacts on the economy and the combined social security and overall Federal budgets are concerned.

Under Scenario 6, the indexation of pension benefits under OASDI is assumed to be suspended in 1987. This would lower

the level of benefits once-for-all, with full indexation resumed in subsequent years from the reduced 1987 base. The outcome is reported in Table 11. The results closely resemble the pattern of the preceding scenario, of course, but the magnitude of the responses is lower since the shock is smaller. In order to scale the shock to be equal to that assumed in the other scenarios, indexation would have to be not merely suspended, but made negative in 1987.

Altering Personal Income Taxes

As discussed in a previous section, the long-term economic effects of raising payroll and income tax rates are quite similar, although in the short-run the payroll tax increases prices slightly whereas the income tax does not. A comparison of Table 12 for the income tax case with Table 7 (or Table 9) for the payroll tax reveals that the overall budgetary effects are also similar. In particular, the overall Federal surplus responds in much the same way to any of the three tax increases, although the gains are moderately larger for the personal tax hike. The initial improvement in each case is due to augmented receipts, but induced income reductions rapidly erode the consolidated revenue gains from all tax sources and soon convert them into steadily growing losses over the 1990's. Thus it is the cumulative fall of federal expenditures, especially on debt service as interest rates decline, which is the direct source of the continuing improvement in the budgetary position under any of the tax scenarios. Just as in

the case of an increase in social security taxes, an income tax hike is deflationary unless offset by countervailing fiscal or monetary actions, and the beneficial impacts on prices, interest rates, and the budget are at the cost of diminished production and employment.

Since the economic and budgetary impacts of income and payroll taxes are much the same, from this point of view it is largely a matter of an accounting classification whether the tax increase is assigned to one of the social security programs or to the category of general revenue. There are, of course, other relevant considerations for choosing among these possibilities, including the regressive character of payroll taxes as well as the considerations noted above concerning specific constraints on the social security programs.

The final scenario assumes that an increase in the HI contribution rate is offset by an equivalent reduction in the effective rate of personal income taxation. In view of the previous results in Tables 7 and 12, one would expect these opposing changes to cancel one another unless nonlinearities made for asymmetrical responses to increases and decreases in income taxes. The results in Tables 4 and 13 do indeed indicate a near standoff between the expansionary effects of the personal tax cut and the contractionary consequences of the payroll tax increase. The small net changes in output, prices and interest rates are accompanied by a moderate increase in the overall federal deficit, which is traceable primarily to higher interest payments associated with higher interest rates. These are small changes, however, so that it appears that

neither the level of macroeconomic activity nor the Federal budget balance would be importantly affected by a shift from payroll to income taxation in support of social security programs.

This last scenario provides an example of a countervailing fiscal policy to offset an increase in social security taxation. It is also possible, of course, to offset the deflationary effects of a tax increase with an expansionary monetary policy. As we showed in our earlier study of the of the major tax reforms enacted in 1981-82 (Coen and Hickman, 1984), a tighter fiscal and looser monetary policy can avoid the employment, income and revenue losses induced by higher tax rates and at the same time preserve the reductions in federal spending from lower interest rates. The particular policy mix analysed in the 1984 paper involved an increase in the personal income tax, but it is apparent from the similarity of the economic and budgetary impacts of the uncompensated income and payroll tax scenarios in the present paper that a similar conclusion would hold for a social security tax increase which was compensated by an increase in the money supply.

Conclusions

The consequences of changes in social security contributions and benefits are usually discussed without allowance for the reciprocal relations between the social security program and macroeconomic activity. In this study we have investigated seven different policy scenarios--six

involving a revision of OASDHI contributions or benefits and another assuming an equivalent change in the personal income tax--within a general equilibrium econometric model. With the exception of the suspension of indexation of pension benefits, the individual changes in contribution rates or benefits were calibrated to yield about the same impact on the social security surplus in the first year, so that the policy shocks are the same size in the short run. Except for the scenario with offsetting changes in the HI contribution and personal income tax rates, the assumed policies were all restrictive in the sense of increasing taxes or reducing transfers.

A principal finding is that the economic impacts are similar for the various independent policies, whether they involve changes in taxes or expenditures. Output and employment fall in the first two years but recover thereafter, though not without some net loss over the long run. Prices and interest rates are reduced permanently--a finding which is conditional on the assumption that nominal monetary growth is unchanged under the fiscal shocks. Personal saving and the labor force fall temporarily but are scarcely affected in the long run. A permanent increase occurs in the private investment ratio as a partial offset to the permanent increase in government saving.

Two scenarios dealt with actions to reduce the Medicare deficits projected for the 1990's. An increase of one percentage point in the HI contribution rate would generate rising surpluses from its inception in 1987 and would more than eliminate the prospective deficits. The same is true of an

equivalent reduction in HI benefits assumed to be initiated in 1987. The consolidated federal surplus does not rise as much as the HI surplus during the first five years, owing to offsetting induced deficits on other Federal programs, but the overall surplus about equals that of HI alone in the 1990's.

Equal absolute changes in the HI and OASDI contribution rates have identical impacts on economic activity and the overall social security and federal surpluses. This is because households are assumed not to translate changes in social security contributions into expected changes in future benefits and are therefore indifferent to (and probably ignorant of) the allocation between the HI and OASDI programs.

Insofar as the impact on aggregate activity and the overall budget is concerned, the long-term effects of equivalent changes in payroll and income tax rates are also similar, although in the short run the higher payroll tax increases prices whereas the income tax does not. For either income or payroll taxes, the lasting reductions in the federal deficit are attributable to the lower interest rates induced by the tax increases, since federal revenues rise only during the early years and actually fall cumulatively thereafter.

We have viewed social security in the context of overall federal finances as measured in the National Income Accounts. This is the appropriate concept for present purposes, since the analysis deals with the effects of changes in social security contributions and benefits on aggregate economic activity, including the feedbacks to other elements of federal

expenditures and receipts. In an attempt to foster greater independence of OASDHI from the general budgetary process, present law mandates the removal of social security from the unified budget in fiscal 1992. This will be more than an accounting change to the extent that it leads Congress and the Admininstration to reformulate policies on other budgetary items. It will continue to be necessary to examine the federal sector of the National Income Accounts, in which social security is consolidated with other receipts and expenditures, when investigating the impacts of the OASDHI programs on aggregate economic activity.

Footnotes

* The authors are respectively Professors of Economics at Northwestern University and Stanford University. They are grateful to Michael Boskin for comments and suggestions concerning the design of this study. Financial support for the study was provided by the Center for Economic Policy Research at Stanford University.

1. The original version of the model is fully documented in Hickman and Coen (1976).
2. See Coen and Hickman (1980a).
3. Since the economic impacts of scenarios 2 and 3 are identical, the results are shown only for scenario 2 in Tables 3-5.
4. See Aaron (1982) for a summary of the econometric evidence from both time-series and cross-sectional studies.
5. The issues concerning the treatment of social security in the budget are discussed in Munnell (1985).
6. The estimates are given in Appendix E of the 1985 Annual Report of the Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds. The projected surpluses for 1985-2009 would be followed by deficits in 2010-2059. See Munnell and Blais (1984) for a discussion of the long-term implications of the projected trends of saving and dissaving in the OASDI trust funds.

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Table 1. Key Macroeconomic Variables[a]

Year or Period	Real GNP (annual growth rates, %)	GNP deflator (annual growth rates, %)	Unemployment rate (%)	Long-term interest rate (%)	Federal surplus (N.I.A.) Level ($bil.)	Federal surplus (N.I.A.) % of GNP
1984	6.8	3.8	7.5	13.5	-176	-4.8
1985	2.9	3.5	7.4	12.7	-189	-4.9
1986	2.3	3.1	7.4	11.3	-180	-4.4
1987	3.3	3.0	7.1	10.1	-171	-3.9
1988	2.9	3.6	6.8	9.2	-160	-3.4
1989	2.8	3.7	6.5	8.7	-164	-3.3
1990	2.9	3.9	6.3	8.3	-155	-2.9
1986-1990	2.8	3.4	6.8	9.5	-166	-3.5
1991-1995	2.4	4.3	5.4	7.8	-134	-2.1
1996-2000	2.2	4.0	5.6	7.2	-82	-.9
2001-2010	1.8	3.8	5.4	6.3	-168	-1.2

a. Actual values for 1984.

Source: Social Security and Macroeconomic Activity in 1985-2010: A Forecast with the Hickman-Coen Annual Growth Model, CEPR Publication No. 50, Center for Economic Policy Research, Stanford University, June 1985 (revised December 1985).

Table 2. Social Security in the Federal Budget, National Income Accounts Concept
(Annual averages in billions of dollars)

	1985	1986-1990	1991-1995	1996-2000	2001-2010
1. Contributions for OASDI	190.0	241.3	347.9	477.0	723.3
2. OASDI benefits	179.2	216.4	287.1	372.1	565.0
3. OASDI surplus	10.8	24.9	60.8	104.9	158.3
4. Contributions for HI	45.0	58.7	81.4	111.6	169.2
5. HI benefits	47.0	56.0	88.9	136.9	238.8
6. HI surplus	-2.0	2.7	-7.5	-25.3	-69.6
7. Contributions for OASDHI	235.0	300.0	429.3	588.6	892.4
8. OASDHI benefits	226.2	272.4	376.0	509.1	803.8
9. OASDHI surplus	8.8	27.6	53.3	79.6	88.7
10. Other Receipts	533.4	631.3	867.4	1195.5	1871.5
11. Other expenditures	731.0	825.4	1054.8	1357.6	2128.6
12. Other surplus	-197.7	-194.1	-187.4	-162.1	-257.1
13. Federal receipts	768.4	931.3	1296.8	1784.2	2764.2
14. Federal expenditures	957.2	1097.7	1430.8	1866.6	2932.5
15. Federal Surplus	-188.8	-166.4	-134.0	-82.4	-168.3
Ratios (percent):					
16. OASDHI contributions to federal receipts	30.6	32.1	33.1	33.0	32.4
17. OASDHI benefits to federal expenditures	23.6	24.8	26.3	27.2	27.5
18. OASDHI contributions to GNP	6.0	6.4	6.6	6.6	6.5
19. OASDHI benefits to GNP	5.8	5.8	5.8	5.7	5.8
20. OASDHI surplus to GNP	0.2	0.6	0.8	0.9	0.7

Source: See Table 1. Details may not add to totals because of rounding.

Table 3. Estimated Effects of Changes in Social Security Benefits and Contributions on Growth, Inflation, and Unemployment

Scenario	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996-2000	2001-2010
Growth Rate (Baseline value and deviations)											
1. Baseline forecast	3.3	2.9	2.8	2.9	2.6	2.8	2.3	2.0	2.2	2.2	1.8
2. Increase HI contribution rate	-.8	-.3	.4	.2	.0	.0	.0	.1	.1	.0	.0
4. Reduce HI hospital payments	-.7	-.1	.4	.1	.0	-.1	.0	.1	.1	.0	.0
5. Reduce OASDI benefits	-.7	-.1	.4	.1	.0	-.1	.0	.1	.1	.0	.0
6. Suspend OASDI indexing in 1987	-.3	.0	.1	.1	.0	.0	.0	.0	.0	.0	.0
7. Increase personal income tax rate	-.8	-.1	.5	.1	.0	-.1	.0	.1	.1	.0	.0
8. Offset social security and income taxes	.0	-.2	-.1	.1	.1	.0	.0	.1	.0	.0	.0
Inflation Rate (Baseline value and deviations)											
1. Baseline forecast	3.0	3.6	3.7	3.9	4.1	4.4	4.6	4.7	4.5	4.0	3.8
2. Increase HI contribution rate	.2	-.2	-.5	-.5	-.4	-.4	-.3	-.4	-.4	-.3	-.1
4. Reduce HI hospital payments	.0	-.4	-.5	-.5	-.4	-.4	-.4	-.4	-.5	-.4	-.2
5. Reduce OASDI benefits	.0	-.4	-.5	-.5	-.4	-.3	-.3	-.4	-.3	-.3	-.1
6. Suspend OASDI indexing in 1987	.0	-.1	-.1	-.2	-.1	-.1	-.1	-.1	-.1	-.2	.0
7. Increase personal income tax rate	.0	-.4	-.5	-.5	-.3	-.3	-.3	-.3	-.3	-.3	-.1
8. Offset social security and income taxes	.2	.2	.1	-.1	-.1	-.1	.0	.0	.0	-.1	.0
Unemployment Rate (Baseline value and deviations)											
1. Baseline forecast	7.1	6.8	6.5	6.3	5.8	5.4	5.2	5.3	5.4	5.6	5.4
2. Increase HI contribution rate	.3	.5	.3	.2	.2	.2	.2	.1	.1	.1	.0
4. Reduce HI hospital benefits	.2	.4	.3	.2	.2	.2	.3	.2	.2	.2	.1
5. Reduce OASDI benefits	.2	.4	.2	.1	.2	.1	.2	.1	.1	.1	.0
6. Suspend OASDI indexing in 1987	.1	.1	.1	.0	.1	.0	.1	.0	.1	.1	.0
7. Increase personal income tax rate	.3	.4	.2	.1	.1	.1	.2	.1	.1	.1	.0
8. Offset social security and income taxes	.0	.1	.1	.1	.1	.0	.0	.0	.0	.1	.0

Table 4. Estimated Effects of Changes in Social Security Benefits and Contributions on Output, the Price Level, and the Long-Term Interest Rate

Scenario	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996-2000	2001-2010
Real GNP (Baseline value and deviations)											
1. Baseline forecast	1778	1830	1880	1935	1986	2041	2088	2131	2179	2327	2685
2. Increase HI contribution rate	-13	-18	-10	-6	-6	-7	-8	-8	-7	-5	-6
4. Reduce HI hospital payments	-12	-15	-8	-6	-8	-10	-11	-11	-11	-9	-10
5. Reduce OASDI benefits	-12	-15	-7	-5	-6	-8	-8	-8	-7	-5	-7
6. Suspend OASDI indexing in 1987	-4	-5	-2	-2	-2	-3	-4	-3	-3	-2	-3
7. Increase personal income tax rate	-13	-15	-6	-4	-6	-7	-8	-8	-7	-6	-7
8. Offset social security and income taxes	0	-3	-3	-2	-1	0	0	1	1	1	1
GNP Implicit Price Deflator (Baseline value and deviations)											
1. Baseline forecast	245.4	254.2	263.7	273.8	285.0	297.4	311.1	325.7	340.3	385.1	511.1
2. Increase HI contribution rate	.7	.3	-.9	-2.1	-3.2	-4.3	-5.5	-6.7	-8.1	-12.3	-21.8
4. Reduce HI hospital payments	.0	-.8	-2.2	-3.4	-4.5	-5.7	-7.1	-8.8	-10.5	-16.3	-30.3
5. Reduce OASDI benefits	.0	-.8	-2.1	-3.3	-4.4	-5.4	-6.6	-8.0	-9.4	-13.6	-22.8
6. Suspend OASDI indexing in 1987	.0	-.3	-.7	-1.0	-1.4	-1.8	-2.2	-2.7	-3.2	-5.0	-8.9
7. Increase personal income tax rate	.0	-.8	-2.2	-3.3	-4.4	-5.3	-6.6	-7.8	-9.2	-13.4	-22.7
8. Offset social security and income taxes	.2	.2	.1	-.1	-.1	-.1	.0	.0	.0	.0	.0
Long-term Interest Rate (Baseline value and deviations)											
1. Baseline forecast	10.1	9.2	8.7	8.3	8.0	7.8	7.8	7.8	7.7	7.2	6.3
2. Increase HI contribution rate	.0	-.1	-.3	-.5	-.6	-.7	-.9	-1.1	-1.2	-1.4	-1.8
4. Reduce HI hospital benefits	-.1	-.2	-.5	-.7	-.9	-1.0	-1.2	-1.4	-1.5	-1.9	-2.3
5. Reduce OASDI benefits	-.1	-.2	-.5	-.7	-.8	-.9	-1.1	-1.3	-1.4	-1.6	-1.8
6. Suspend OASDI indexing in 1987	.0	-.1	-.2	-.3	-.3	-.3	-.4	-.5	-.5	-.6	-.6
7. Increase personal income tax rate	.0	-.2	-.5	-.7	-.8	-.9	-1.1	-1.2	-1.3	-1.6	-1.8
8. Offset social security and income taxes	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2

Table 5. Estimated Effects of Changes in Social Security Benefits and Contributions on Saving, Investment, and the Civilian Labor Force

Scenario	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996-2000	2001-2010
Personal Saving Rate (Baseline value and deviations)											
1. Baseline forecast	5.1	5.2	5.4	5.3	5.3	5.3	5.2	5.1	5.1	5.0	4.9
2. Increase HI contribution rate	-.2	.0	.0	.1	.0	.0	.0	.0	.0	.1	.1
4. Reduce HI hospital payments	-.2	.0	.0	.1	.0	.0	.0	.1	.1	.1	.1
5. Reduce OASDI benefits	-.2	.0	.0	.1	.0	.0	.0	.1	.1	.1	.1
6. Suspend OASDI indexing in 1987	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0
7. Increase personal income tax rate	-.2	.0	.0	.1	.0	.0	.0	.1	.1	.1	.1
8. Offset social security and income taxes	.1	.0	-.1	.0	.0	.0	.0	.0	.0	.0	.0
Gross Private Investment Ratio (Baseline value and deviations)											
1. Baseline forecast	18.3	18.5	18.2	18.1	17.9	17.8	17.5	17.2	17.0	16.8	16.2
2. Increase HI contribution rate	-.2	-.2	.1	.3	.3	.2	.2	.2	.3	.3	.2
4. Reduce HI hospital payments	-.2	-.1	.2	.3	.3	.2	.2	.2	.3	.4	.3
5. Reduce OASDI benefits	-.2	-.1	.2	.3	.3	.2	.2	.2	.3	.4	.2
6. Suspend OASDI indexing in 1987	.0	.0	.1	.1	.1	.0	.3	.3	.2	.1	.1
7. Increase personal income tax rate	-.2	-.1	.3	.3	.3	.2	.2	.2	.3	.3	.2
8. Offset social security and income taxes	.0	-.2	-.1	.0	.0	.0	.0	.0	.0	.0	.0
Civilian Labor Force (Baseline value and deviations)											
1. Baseline forecast	117.9	119.5	121.1	123.0	124.2	125.5	126.8	128.2	129.9	134.7	142.3
2. Increase HI contribution rate	-.13	-.20	-.12	-.06	-.03	-.02	-.02	-.02	.00	.01	.01
4. Reduce HI hospital benefits	-.12	-.17	-.12	-.08	-.07	-.08	-.08	-.08	-.07	-.05	-.03
5. Reduce OASDI benefits	-.12	-.17	-.11	-.07	-.06	-.06	-.06	-.06	-.05	-.05	-.03
6. Suspend OASDI indexing in 1987	-.04	-.05	-.04	-.03	-.02	-.02	-.02	-.02	-.02	-.01	-.01
7. Increase personal income tax rate	-.13	-.18	-.10	-.06	-.05	-.05	-.05	-.06	-.05	-.03	-.01
8. Offset social security and income taxes	.00	-.01	-.02	.00	.02	.03	.04	.04.	.05	.04	.02

Table 6. Scenario 1--Social Security in the Federal Budget (Baseline Solution)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TXOASD$	215.5	244.3	260.3	284.5	303.4	324.6	346.8	369.9	394.9	420.6	447.7	476.0	505.6	535.3
TPOASD$	203.1	216.5	229.3	242.7	257.1	272.7	286.4	301.5	317.8	334.5	352.0	371.3	391.2	411.7
OASDBS$	12.3	27.8	31.0	41.9	46.3	51.9	60.5	68.5	77.1	86.1	95.8	104.7	114.4	123.6
TXOASH$	54.8	58.5	62.3	66.5	71.0	75.9	81.1	86.5	92.4	98.4	104.7	111.3	118.2	125.2
TPOASH$	50.0	55.0	60.1	66.2	72.9	80.3	88.3	97.0	106.1	115.8	125.9	136.6	147.6	158.8
OASHBS$	4.8	3.5	2.2	0.3	-1.9	-4.4	-7.2	-10.5	-13.8	-17.4	-21.2	-25.2	-29.3	-33.6
TXOAS$	270.3	302.8	322.6	351.1	374.4	400.5	427.9	456.5	487.3	519.0	552.4	587.3	623.8	660.5
TPOASNM$	253.1	271.5	289.4	308.9	330.0	353.0	374.7	398.5	423.9	450.3	477.9	507.9	538.8	570.5
OASB$	17.1	31.3	33.2	42.2	44.3	47.5	53.2	58.0	63.4	68.7	74.5	79.4	85.1	90.0
GRECFEX$	595.0	628.9	666.2	708.9	753.5	808.9	864.7	923.5	986.6	1052.9	1121.6	1192.7	1268.6	1341.6
GEXPFEX$	783.4	820.6	863.8	906.7	948.1	995.6	1050.0	1109.3	1170.9	1231.2	1293.1	1356.0	1420.3	1487.3
GBSFEX$	-188.5	-191.8	-197.5	-197.8	-194.6	-186.7	-185.3	-185.8	-184.3	-178.3	-171.6	-163.3	-151.7	-145.7
GRECF$	865.3	931.7	988.9	1060.0	1127.9	1209.5	1292.7	1380.0	1474.0	1572.0	1674.1	1780.1	1892.6	2002.2
GEXPF$	1036.6	1092.1	1153.2	1215.5	1278.1	1348.6	1424.7	1507.7	1594.8	1681.6	1771.0	1863.9	1959.0	2057.8
GBSF$	-171.3	-160.4	-164.3	-155.5	-150.1	-139.1	-132.0	-127.7	-120.8	-109.5	-96.9	-83.8	-66.4	-55.6

Table 7. Scenario 2--Increase HI Contribution Rate (Solution minus Baseline)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TXOASD$	-1.1	-2.2	-2.1	-2.9	-3.5	-4.9	-6.5	-8.1	-9.6	-11.2	-12.9	-14.5	-16.1	-17.0
TPOASD$	0.0	0.6	0.2	-0.8	-1.9	-2.8	-3.7	-4.7	-6.0	-7.2	-8.6	-9.9	-11.3	-12.7
OASDBS$	-1.1	-2.7	-2.3	-2.1	-1.6	-2.1	-2.8	-3.3	-3.6	-3.9	-4.3	-4.6	-4.8	-4.3
TXOASH$	18.5	19.5	20.8	22.0	23.4	24.6	25.9	27.3	28.8	30.4	32.1	33.8	35.7	37.8
TPOASH$	0.1	0.0	-0.2	-0.5	-0.8	-1.1	-1.5	-1.9	-2.4	-2.9	-3.5	-4.1	-4.6	-5.2
OASHBS$	18.4	19.5	21.0	22.6	24.2	25.8	27.4	29.3	31.3	33.4	35.6	37.9	40.3	43.0
TXOAS$	17.5	17.3	18.7	19.1	19.8	19.7	19.4	19.2	19.3	19.2	19.2	19.3	19.5	20.8
TPOASNM$	0.1	0.5	0.0	-1.3	-2.7	-3.9	-5.2	-6.7	-8.4	-10.2	-12.0	-14.0	-16.0	-17.9
OASB$	17.4	16.7	18.7	20.4	22.6	23.6	24.6	25.9	27.7	29.4	31.2	33.3	35.5	38.7
GRECFEX$	-6.7	-11.7	-11.5	-13.9	-18.0	-22.8	-28.4	-34.1	-40.4	-46.2	-52.2	-58.1	-63.3	-68.4
GEXPFEX$	1.7	0.1	-5.6	-11.6	-17.2	-23.2	-29.9	-37.5	-45.0	-52.1	-58.6	-64.2	-68.9	-72.2
GBSFEX$	-8.5	-11.9	-5.9	-2.3	-0.8	0.4	1.5	3.3	4.6	6.0	6.3	6.1	5.5	3.7
GRECF$	10.7	5.5	7.2	5.2	1.9	-3.1	-9.0	-14.9	-21.1	-26.9	-33.0	-38.7	-43.8	-47.7
GEXPF$	1.8	0.7	-5.6	-12.9	-19.9	-27.1	-35.2	-44.2	-53.4	-62.3	-70.6	-78.2	-84.8	-90.1
GBSF$	8.9	4.9	12.8	18.2	21.8	24.0	26.1	29.3	32.3	35.4	37.6	39.4	41.0	42.4

TABLE 8. Scenario 4--Reduce HI Hospital Benefits (Solution minus Baseline)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TXOASD$	-1.3	-2.4	-2.5	-3.6	-4.4	-6.2	-8.0	-9.8	-11.7	-13.7	-16.4	-18.5	-20.5	-22.5
TPOASD$	0.0	0.0	-0.6	-1.7	-2.9	-3.9	-4.9	-6.2	-7.7	-9.4	-11.1	-13.0	-15.0	-16.9
OASDBS$	-1.3	-2.4	-1.9	-1.9	-1.6	-2.3	-3.1	-3.6	-4.0	-4.3	-5.3	-5.4	-5.5	-5.6
TXOASH$	-0.3	-0.6	-0.6	-0.8	-1.0	-1.4	-1.9	-2.3	-2.7	-3.2	-3.8	-4.3	-4.8	-5.3
TPOASH$	-18.4	-20.3	-22.4	-24.8	-27.4	-30.4	-33.6	-37.2	-40.9	-44.9	-49.1	-53.5	-58.0	-62.7
OASHBS$	18.0	19.7	21.8	23.9	26.4	28.9	31.8	34.9	38.2	41.7	45.2	49.1	53.2	57.4
TXOAS$	-1.6	-3.0	-3.1	-4.4	-5.5	-7.6	-9.9	-12.1	-14.5	-16.9	-20.3	-22.8	-25.3	-27.7
TPOASNM$	-18.4	-20.3	-23.0	-26.5	-30.3	-34.3	-38.6	-43.4	-48.6	-54.3	-60.2	-66.5	-73.0	-79.5
OASB$	16.7	17.3	19.9	22.1	24.8	26.6	28.7	31.2	34.2	37.4	39.9	43.7	47.7	51.8
GRECFEX$	-7.3	-11.8	-12.5	-15.9	-20.7	-27.1	-33.5	-40.8	-48.5	-56.1	-63.9	-71.5	-79.0	-85.8
GEXPFEX$	-0.6	-4.2	-10.6	-16.9	-23.0	-29.8	-38.1	-47.3	-56.6	-65.6	-74.1	-81.5	-87.7	-92.4
GBSFEX$	-6.7	-7.6	-1.9	1.0	2.2	2.8	4.5	6.5	8.1	9.5	10.1	9.9	8.7	6.6
GRECF$	-9.0	-14.8	-15.5	-20.3	-26.2	-34.7	-43.4	-53.0	-62.9	-73.0	-84.2	-94.3	-104.3	-113.5
GEXPF$	-19.0	-24.5	-33.5	-43.4	-53.3	-64.1	-76.6	-90.6	-105.2	-119.9	-134.3	-148.0	-160.7	-171.9
GBSF$	10.0	9.6	18.0	23.1	27.1	29.4	33.2	37.7	42.3	46.8	50.1	53.7	56.4	58.4

Table 9. Scenario 3--Increase OASDI Contribution Rate (Solution minus Baseline)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TXOASD$	17.7	17.8	19.2	19.8	20.7	20.8	20.9	21.1	21.5	21.8	22.2	22.7	23.3	24.7
TPOASD$	0.0	0.6	0.2	-0.8	-1.9	-2.8	-3.7	-4.7	-6.0	-7.2	-8.6	-9.9	-11.3	-12.7
OASDBS$	17.7	17.2	19.0	20.6	22.5	23.6	24.6	25.9	27.5	29.1	30.8	32.6	34.6	37.5
TXOASH$	-0.3	-0.5	-0.5	-0.7	-0.8	-1.2	-1.5	-1.9	-2.2	-2.6	-3.0	-3.4	-3.8	-4.0
TPOASH$	0.1	0.0	-0.2	-0.5	-0.8	-1.1	-1.5	-1.9	-2.4	-2.9	-3.5	-4.1	-4.6	-5.2
OASHBS$	-0.4	-0.5	-0.3	-0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.7	0.9	1.2
TXOAS$	17.5	17.3	18.7	19.1	19.8	19.7	19.4	19.2	19.3	19.2	19.2	19.3	19.5	20.8
TPOASNM$	0.1	0.5	0.0	-1.3	-2.7	-3.9	-5.2	-6.7	-8.4	-10.2	-12.0	-14.0	-16.0	-17.9
OASB$	17.4	16.7	18.7	20.4	22.6	23.6	24.6	25.9	27.7	29.4	31.2	33.3	35.5	38.7
GRECFEX$	-6.7	-11.7	-11.5	-13.9	-18.0	-22.8	-28.4	-34.1	-40.4	-46.2	-52.2	-58.1	-63.3	-68.4
GEXPFEX$	1.7	0.1	-5.6	-11.6	-17.2	-23.2	-29.9	-37.5	-45.0	-52.1	-58.6	-64.2	-68.9	-72.2
GBSFEX$	-8.5	-11.9	-5.9	-2.3	-0.8	0.4	1.5	3.3	4.6	6.0	6.3	6.1	5.5	3.7
GRECF$	10.7	5.5	7.2	5.2	1.9	-3.1	-9.0	-14.9	-21.1	-26.9	-33.0	-38.7	-43.8	-47.7
GEXPF$	1.8	0.7	-5.6	-12.9	-19.9	-27.1	-35.2	-44.2	-53.4	-62.3	-70.6	-78.2	-84.8	-90.1
GBSF$	8.9	4.9	12.8	18.2	21.8	24.0	26.1	29.3	32.3	35.4	37.6	39.4	41.0	42.4

Table 10. Scenario 5--Reduce OASDI Benefits (Solution minus Baseline)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TXOASD$	-1.3	-2.4	-2.4	-3.4	-4.1	-5.7	-7.3	-8.8	-10.4	-12.0	-13.7	-15.3	-16.9	-17.8
TPOASD$	-18.8	-20.0	-21.8	-24.1	-26.4	-28.7	-30.8	-33.2	-35.8	-38.6	-41.4	-44.5	-47.6	-50.8
OASDBS$	17.5	17.7	19.4	20.7	22.2	23.0	23.5	24.4	25.5	26.6	27.7	29.1	30.7	33.0
TXOASH$	-0.3	-0.6	-0.6	-0.8	-1.0	-1.3	-1.7	-2.1	-2.4	-2.8	-3.2	-3.6	-4.0	-4.2
TPOASH$	-0.1	-0.2	-0.5	-0.8	-1.1	-1.4	-1.8	-2.3	-2.7	-3.3	-3.8	-4.4	-5.0	-5.6
OASHBS$	-0.3	-0.3	-0.1	0.0	0.1	0.1	0.1	0.2	0.3	0.5	0.6	0.8	1.1	1.4
TXOAS$	-1.7	-2.9	-2.9	-4.2	-5.1	-7.0	-8.9	-10.9	-12.8	-14.8	-16.9	-18.9	-20.9	-21.9
TPOASNM$	-18.9	-20.3	-22.3	-24.8	-27.4	-30.1	-32.6	-35.4	-38.6	-41.9	-45.2	-48.9	-52.6	-56.3
OASB$	17.2	17.3	19.3	20.6	22.4	23.1	23.6	24.6	25.8	27.0	28.4	30.0	31.7	34.4
GRECFEX$	-7.7	-12.1	-12.4	-15.5	-19.9	-25.1	-30.5	-36.2	-42.0	-47.7	-53.4	-58.9	-63.8	-68.4
GEXPFEX$	-0.6	-4.2	-10.5	-16.5	-22.2	-28.4	-35.5	-43.3	-51.0	-58.1	-64.6	-70.0	-74.4	-77.3
GBSFEX$	-7.1	-7.9	-1.9	1.0	2.3	3.3	5.0	7.1	9.0	10.4	11.1	11.1	10.6	8.9
GRECF$	-9.4	-15.1	-15.3	-19.7	-24.9	-32.1	-39.4	-47.1	-54.8	-62.5	-70.3	-77.8	-84.7	-90.3
GEXPF$	-19.5	-24.5	-32.8	-41.3	-49.6	-58.4	-68.1	-78.8	-89.5	-100.0	-109.8	-118.9	-127.0	-133.7
GBSF$	10.1	9.4	17.4	21.6	24.7	26.4	28.7	31.7	34.8	37.4	39.5	41.1	42.3	43.3

Table 11. Scenario 6--Suspend OASDI Indexing in 1987 (Solution minus Baseline)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TXOASD$	-0.4	-0.8	-0.8	-0.9	-1.2	-1.5	-1.9	-2.2	-2.5	-2.9	-4.0	-4.3	-4.7	-5.1
TPOASD$	-6.2	-6.6	-7.2	-7.9	-8.7	-9.5	-10.2	-11.0	-12.0	-12.9	-14.0	-15.2	-16.3	-17.5
OASDBS$	5.7	5.8	6.4	7.0	7.5	8.0	8.3	8.8	9.4	10.0	10.0	10.8	11.6	12.4
TXOASH$	-0.1	-0.2	-0.2	-0.2	-0.3	-0.3	-0.4	-0.5	-0.6	-0.7	-0.9	-1.0	-1.1	-1.2
TPOASH$	0.0	-0.1	-0.2	-0.3	-0.4	-0.5	-0.6	-0.8	-1.0	-1.2	-1.4	-1.6	-1.9	-2.1
OASHBS$	-0.1	-0.1	0.0	0.0	0.1	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.8	0.9
TXOAS$	-0.5	-1.0	-1.0	-1.2	-1.5	-1.8	-2.3	-2.7	-3.1	-3.6	-4.9	-5.3	-5.8	-6.3
TPOASNM$	-6.2	-6.6	-7.3	-8.2	-9.1	-10.0	-10.8	-11.8	-12.9	-14.1	-15.4	-16.8	-18.2	-19.6
OASB$	5.7	5.7	6.3	7.0	7.6	8.1	8.5	9.1	9.8	10.5	10.5	11.4	12.4	13.3
GRECFEX$	-2.5	-4.0	-4.1	-5.3	-6.8	-8.5	-10.8	-13.1	-15.5	-17.9	-20.1	-22.4	-24.7	-26.7
GEXPFEX$	-0.2	-1.4	-3.6	-5.7	-7.7	-10.0	-12.7	-15.8	-19.0	-22.1	-25.2	-27.8	-29.9	-31.4
GBSFEX$	-2.3	-2.6	-0.6	0.4	0.9	1.5	1.8	2.6	3.5	4.2	5.1	5.4	5.1	4.6
GRECF$	-3.1	-5.0	-5.1	-6.5	-8.2	-10.3	-13.1	-15.8	-18.6	-21.5	-25.0	-27.7	-30.6	-33.0
GEXPF$	-6.4	-8.1	-10.9	-13.8	-16.8	-20.0	-23.5	-27.6	-31.9	-36.2	-40.6	-44.6	-48.0	-51.0
GBSF$	3.3	3.1	5.8	7.4	8.5	9.7	10.3	11.7	13.3	14.7	15.5	16.8	17.5	18.0

Table 12. Scenario 7--Increase Personal Income Tax Rate (Solution minus Baseline)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TXOASD$	-1.4	-2.5	-2.3	-3.3	-4.1	-5.6	-7.2	-8.7	-10.3	-11.3	-13.0	-14.6	-16.2	-17.1
TPOASD$	0.0	0.0	-0.6	-1.8	-2.9	-3.7	-4.6	-5.7	-6.9	-8.2	-9.5	-10.9	-12.4	-13.8
OASDBS$	-1.4	-2.5	-1.7	-1.5	-1.2	-1.8	-2.5	-3.0	-3.4	-3.1	-3.5	-3.7	-3.8	-3.3
TXOASH$	-0.4	-0.6	-0.6	-0.8	-1.0	-1.3	-1.7	-2.0	-2.4	-2.6	-3.0	-3.4	-3.8	-4.0
TPOASH$	-0.1	-0.2	-0.5	-0.8	-1.1	-1.4	-1.8	-2.2	-2.7	-3.2	-3.8	-4.4	-5.0	-5.6
OASHBS$	-0.3	-0.3	-0.1	0.0	0.1	0.1	0.1	0.2	0.3	0.6	0.7	1.0	1.2	1.6
TXOAS$	-1.8	-3.0	-2.9	-4.1	-5.0	-6.9	-8.8	-10.7	-12.7	-13.9	-16.0	-18.0	-20.0	-21.1
TPOASNM$	-0.1	-0.2	-1.1	-2.6	-3.9	-5.1	-6.4	-7.9	-9.6	-11.4	-13.3	-15.3	-17.4	-19.4
OASB$	-1.7	-2.8	-1.8	-1.5	-1.1	-1.7	-2.4	-2.8	-3.1	-2.5	-2.7	-2.8	-2.7	-1.7
GRECFEX$	11.0	7.8	9.3	7.6	4.8	1.5	-2.1	-5.9	-9.7	-13.8	-17.7	-21.2	-24.0	-26.6
GEXPFEX$	-0.6	-4.3	-10.8	-16.8	-22.3	-28.4	-35.4	-43.2	-50.8	-58.0	-64.6	-70.4	-75.2	-78.4
GBSFEX$	11.6	12.1	20.2	24.4	27.1	29.8	33.3	37.2	41.1	44.2	46.9	49.3	51.2	51.8
GRECF$	9.2	4.8	6.5	3.5	-0.2	-5.4	-10.9	-16.7	-22.4	-27.7	-33.8	-39.2	-44.0	-47.7
GEXPF$	-0.7	-4.6	-12.0	-19.4	-26.2	-33.5	-41.8	-51.1	-60.4	-69.4	-77.9	-85.7	-92.6	-97.8
GBSF$	9.9	9.3	18.4	22.9	26.0	28.1	30.9	34.4	38.0	41.7	44.1	46.6	48.5	50.1

Table 13. Scenario 8--Offset Social Security and Personal Income Taxes (Solution minus Baseline)

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
TXOASD$	0.3	0.3	0.8	1.0	1.2	1.2	1.3	1.4	1.4	1.5	1.5	1.5	1.5	2.2
TPOASD$	0.0	0.5	0.9	1.0	1.0	1.0	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.1
OASDBS$	0.3	-0.2	0.0	0.0	0.1	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	1.1
TXOASH$	19.0	20.3	21.7	23.3	24.8	26.6	28.4	30.3	32.3	34.4	36.6	38.9	41.3	43.9
TPOASH$	0.2	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4
OASHBS$	18.8	20.0	21.5	23.0	24.6	26.3	28.1	30.0	32.0	34.1	36.3	38.5	40.9	43.5
TXOAS$	19.3	20.5	22.6	24.3	26.0	27.8	29.6	31.6	33.7	35.8	38.1	40.4	42.8	46.0
TPOASNM$	0.2	0.8	1.1	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.3	1.4	1.4	1.5
OASB$	19.2	19.8	21.4	23.0	24.7	26.6	28.4	30.4	32.5	34.6	36.8	39.0	41.4	44.6
GRECFEX$	-17.8	-19.7	-21.2	-22.0	-23.4	-25.3	-27.4	-29.5	-31.8	-34.0	-36.4	-38.8	-41.2	-44.3
GEXPFEX$	2.4	4.7	5.8	5.9	6.0	6.1	6.5	6.8	7.3	7.8	8.3	8.6	8.8	8.9
GBSFEX$	-20.2	-24.4	-27.0	-28.0	-29.4	-31.5	-33.8	-36.3	-39.1	-41.8	-44.7	-47.4	-50.0	-53.2
GRECF$	1.5	0.9	1.4	2.3	2.6	2.5	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.7
GEXPF$	2.6	5.5	6.9	7.2	7.2	7.4	7.6	8.0	8.5	9.0	9.6	10.0	10.2	10.4
GBSF$	-1.1	-4.6	-5.5	-5.0	-4.6	-4.9	-5.4	-5.9	-6.6	-7.2	-7.9	-8.4	-8.7	-8.7

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