Technical Appendix: On Financing Retirement with an Aging Population[*]

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1. Introduction

This appendix provides additional details for our paper "On Financing Retirement with an Aging Population." Specifically, we provide more details on our data sources and construction of the model's national accounts and fixed asset tables, some balance sheet items, and sources underlying the demographic variables. We discuss in more detail the baseline parameterization and the methods used in computing the model equilibria. And, finally, we conduct a sensitivity analysis of the main results, providing details that are not in the main text. For those interested in trying their own experiments, we have also made the codes available at our website, www.minneapolisfed.org.

2. U.S. Data

Here, we describe the main sources of our data: the U.S. national income and product accounts, the fixed asset tables, several balance sheet items from the flow of funds, population statistics and projections, and employment and hours.

2.1. National Accounts and Fixed Assets

The primary source of data used in our model accounts is the *U.S. National Income and Product Accounts* (NIPA) and *Fixed Asset Tables* compiled by the Bureau of Economic Analysis. These data are published in their *Survey of Economic Business* (and online at www.bea.gov). We use estimates prior to the 2013 comprehensive revision (which is still ongoing). For certain imputations that we make, we also rely on data from the *Flow of Funds Accounts of the United States* compiled by the Federal Reserve Board of Governors and the *Statistics of Income* compiled by the Internal Revenue Service (IRS). The source is noted in the tables.

In Table A1—which is an expanded version of Table 1 in the main text—we provide all of the details of how we revise the NIPA to conform with theory. The main source of the domestic income data is the NIPA, Table 1.10. With labor income we include compensation of employees and 70 percent of proprietors' income. All other income is categorized as capital income, which is adjusted in two ways. First, we subtract taxes other than property tax from the NIPA measure of taxes on production and imports. Second, we impute capital services for consumer durables—which we treat as investment—and government capital. The imputed services are estimated to be 4 percent times the current-cost net stock of consumer durable goods and government fixed assets. These stocks are reported in the BEA's fixed asset tables. In addition, we need to include depreciation of consumer durables, which is reported in the flow of funds accounts. With these adjustments,

capital income is the sum of corporate profits, part of proprietors' income, surplus on government enterprises, rents, net income, property taxes, depreciation of capital, and imputed capital services.

On the product side, revisions must also be made with regard to sales taxes and capital services. The sales taxes are assumed to be primarily taxes on personal consumption expenditures.[1] We assume pro rata shares when assessing how much of the taxes are on durables, nondurables, and services. We include nondurables and services with consumption and durable goods with tangible investment. Therefore, we subtract sales taxes from both product categories. The imputed capital services only affect our measure of consumption which combines personal and government consumption from NIPA.

In the model, we distinguish between businesses that pay corporate income taxes (sector 1) and those that do not (sector 2). Businesses that pay corporate income taxes are Schedule C corporations. The others are Schedule S corporations, regulated investment companies, real estate investment trusts, proprietors, partnerships, household businesses, and government businesses. The BEA does not break out income and product data for Schedule C corporations, but the IRS does report data from tax returns separately for Schedule C corporations in the *Statistics of Income.* We use these return data to estimate investment and capital of our sector 1. In particular, we use the ratio of depreciable assets for Schedule C and all other corporations to estimate the ratios of stocks and investments in the model. According to the IRS, 83.5 percent of corporate depreciable assets are owned by Schedule C corporations. If we decompose gross private domestic investment into corporate and noncorporate components and assign 83.5 percent of corporate investment to Schedule C corporations, then we estimate that 0.069 GNPs of investment is done by Schedule C corporations. The remaining investment, 0.142 times GNP, is the sum of gross private domestic investment for other private business plus consumer durable goods net of tax, nondefense government gross investment, and net foreign investment.

Fixed assets and other capital stocks used in our analysis are shown in Table A2. In addition to fixed assets and consumer durables reported by the BEA, we include inventories, land, and intangible assets. The source of data for inventories is NIPA; the source of data for land values is the flow of funds; and the source of data for intangible capital is McGrattan and Prescott (2010). As with investment, we decompose corporate capital stocks into those of all other corporations by assuming that the ratio of corporate stocks is equal to the ratio of depreciable assets reported in corporate tax returns. We then add together capital stocks of non–Schedule C corporations and

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[1] Some taxes are assessed on purchases of goods and services that should in theory be subtracted from investment or government spending. Unfortunately, we do not have a breakdown by product category.

noncorporate businesses. This results in an estimate of 0.885 GNPs for tangible capital in Schedule C corporations and 3.232 GNPs for tangible capital in all other private businesses. Our estimate of 1.718 GNPs for the stock of intangible capital is based on our earlier work. We experimented with the share of this stock in our two sectors.

2.2. Balance Sheets

Table A3 lists balance sheet items that we reference in the paper, namely household net worth and government debt. The source of these data is the flow of funds accounts.

The first item is net worth of households, which also includes assets of nonprofit institutions. Households have tangible assets that averaged 1.79 times adjusted GNP over the period 2000–2010 and financial assets that averaged 3.16 times adjusted GNP. Subtracting liabilities of 0.86 GNPs implies a net worth of 4.1 GNPs over the same period.

The second item is end-of-period government debt, which averaged 0.549 GNPs over 2000–2010. Close to 70 percent of this debt is in the form of U.S. Treasury securities.

2.3. Population, Employment, and Hours

Using data from the U.S. Census, the Social Security Administration, NIPA, and the Bureau of Labor Statistics, we have estimates of population by age, survival probabilities, full-time equivalent employees, and annual hours of work. We summarize the relevant statistics for population, employment, and hours in Table A4 and in Figure A1.

According to U.S. Census estimates of the population, the annual growth rate in the population ages 16 to 64 over the decade 2000–2010 is a little over 1 percent per year, more specifically, 1.1 percent (see Table B-34 of the *Economic Report of the President,* 2012). The annual growth rate for the total population is slightly lower than 1 percent, more specifically 0.93 percent.

Survival probabilities are found in the period life tables used by the Social Security Administration. (See Bell and Miller, 2005, Table 6.) We take an average over males and females for the year 2010. This average is plotted in Figure A1.

Data on full-time equivalent (FTE) employees are found in the NIPA, Table 6.5. The number of FTE employees equals the number of employees on full-time schedules plus the number of employees on part-time schedules converted to a full-time basis. Over the period 2000–2010, the number of FTEs averaged 124 million.

The primary source of our annual hours of work series the U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings.* The raw data underlying the series are persons at work, aged 16 years and over, and average hours worked per week for persons at work. They are based on the Current Population Survey (CPS). Total hours for military are added using data on military personnel from the Department of Defense and an estimate of a 40-hour week. (See Prescott, Ueberfeldt, and Cociuba, 2005, for full details of the primary sources.)

2.4. Consistent Parameters

The parameters that govern preferences and technologies are set so that the model national accounts and fixed asset tables are consistent with the data in Tables A1–A4. To accomplish this, we added additional equilibrium conditions to the code for computing a balanced growth path. The additional conditions are as follows:

$$K'_{1T} = 0.885 \, \text{GNP} \tag{2.1}$$

$$K'_{2T} = 3.232 \, \text{GNP} \tag{2.2}$$

$$K'_{1I} = \omega \, 1.718 \, \text{GNP} \tag{2.3}$$

$$K'_{2I} = (1 - \omega) \, 1.718 \, \text{GNP} \tag{2.4}$$

$$wL = 0.585 \, \text{GNP} \tag{2.5}$$

$$L = L_1 + L_2 = 0.277, \tag{2.6}$$

where ω is a weight that we experiment with. The additional unknowns to be computed for the balanced growth path—in addition to the interest rate and one policy choice of the government that ensures budget balance—are the sectoral capital shares $(\theta_{1T}, \theta_{2T}, \theta_{1I}, \theta_{2I})$ and the preference parameters (α, β). The depreciation rates $(\delta_{1T}, \delta_{2T}, \delta_{1I}, \delta_{2I})$ can be pre-set so that the investment rates of the model match those of the United States. When computing these rates, we detrend the investments and stocks by dividing by population and technological growth. The technological growth rate is chosen to be 2 percent. That leaves only one technology parameter, namely θ_1. We arbitrarily set this parameter to 1/2 because we do not have Schedule C incomes and stocks broken out in the U.S. accounts. This is another parameter that we experiment with.

For baseline policy parameters, we need the defense and debt shares, tax rates, and transfers. The share of defense spending GNP, is set equal to 0.044, which is equivalent to the U.S. share from the NIPA shown in Table A1. The share of debt to GNP is 0.533, which is equivalent to the U.S. share from the flow of funds shown in Table A3, after dividing by the growth terms

$(1 + \gamma)(1 + \eta)$. Note that these shares depend on endogenously determined GNP, which must, in equilibrium, satisfy the resource constraint. The paths for tax rates and transfers differ depending on the policy experiment and are described in detail in the main text.

3. Computation

In this section, we provide details on computing equilibria for the balanced growth paths and then for the transitions.

3.1. Balanced Growth Paths

We have several codes at our website for computing balanced growth paths. They differ in the fixed-point method employed and in the choice of unknown variables. A fixed point is found for the equilibrium interest rate and for a residually determined variable, which is either common government transfers to households or the tax rate on consumption.

There are two fixed-point methods available: functional iteration and Newton-Raphson. The former simply updates the unknown variables iteratively as follows:

$$x^{k+1} = \omega x^k + (1 - \omega) \left(x^k - r \left(x^k \right) \right), \tag{3.1}$$

where x^k is the kth iteration of the unknowns, $\omega \in [0, 1]$ is a weighting parameter that aids convergence in many cases, and $r(x^k)$ are the first-order conditions that need to be satisfied by an appropriate choice of x^k. The Newton-Raphson method uses the following updating scheme:

$$x^{k+1} = x^k - [dr(x)/dx|_{x=x^k}]^{-1} r \left(x^k \right) \tag{3.2}$$

and, if necessary, a weighting parameter can be used to help with convergence:

$$x^{k+1} = \omega x^k + (1 - \omega) \left(x^k - [dr(x)/dx|_{x=x^k}]^{-1} r \left(x^k \right) \right). \tag{3.3}$$

The two first-order conditions $r(x)$ that have to be satisfied by x are (1) the condition that sets the return on tangible capital equal to its marginal product and (2) the condition that imposes government budget balance. After manipulating all the other necessary conditions, we can write a step by step algorithm needed to evaluate $r(x)$, starting with a guess for x, as follows:[2]

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[2] In order to be precise, assume that the second element of x is the level of common transfers given to the households.

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- Set the interest rate i equal to the first element of x.

- Set the common transfer ζ equal to the second element of x.

- Use the fact that after-tax returns on capital net of depreciation are equated to the interest rate to get the four capital rental rates (that is, for the two types of capital in the two sectors),

$$r_{1T} = i/\left(1 - \tau_1^\pi\right) - \delta_{1T}$$
$$r_{2T} = i/\left(1 - \tau_2^\pi\right) - \delta_{2T}$$
$$r_{1I} = i - \delta_{1I}$$
$$r_{2I} = i - \delta_{2I}.$$

- Use the capital share parameters to get estimates for the two ratios of sectoral labor inputs to total labor inputs,

$$L_1/L = \theta_{1L}\theta_1/\left(\theta_{1L}\theta_1 + \theta_{2L}\theta_2\right)$$
$$L_2/L = \theta_{2L}\theta_2/\left(\theta_{1L}\theta_1 + \theta_{2L}\theta_2\right),$$

where $\theta_{iL} = 1 - \theta_{iT} - \theta_{iI}$.

- Use the capital shares and capital rental rates to get estimates for ratios of capital stocks to compensation. Note that there are four ratios due to the fact that there are two types of capital and two sectors, that is,

$$K_{1T}/\left(wL_1\right) = \theta_{1T}/\left(\theta_{1L}r_{1T}\right)$$
$$K_{2T}/\left(wL_2\right) = \theta_{2T}/\left(\theta_{2L}r_{2T}\right)$$
$$K_{1I}/\left(wL_1\right) = \theta_{1I}/\left(\theta_{1L}r_{1I}\right)$$
$$K_{2I}/\left(wL_2\right) = \theta_{2I}/\left(\theta_{2L}r_{2I}\right).$$

- Use the aggregate production function, sectoral labor ratios, and capital-compensation ratios to get an intermediate variable, call it z,

$$z = 2\{[K_{1T}/\left(wL_1\right)]^{\theta_{1T}}\left[K_{1I}/\left(wL_1\right)\right]^{\theta_{1I}} L_1/L\}^{\theta_1}\{[K_{2T}/\left(wL_2\right)]^{\theta_{2T}}\left[K_{2I}/\left(wL_2\right)\right]^{\theta_{2I}} L_2/L\}^{\theta_2}.$$

Note that the coefficient of 2 is used to normalize the ratios of outputs (found below) but can be changed without loss of generality.

- Use capital shares and the intermediate variable z to get an estimate of the wage rate:

$$w = [z\left(\theta_{1L}\theta_1 + \theta_{2L}\theta_2\right)]^{1/(1-(1-\theta_{1L})\theta_1-(1-\theta_{2L})\theta_2)}.$$

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- Multiply the four ratios of capital stocks to compensation by the wage rate to get estimates of the capital-labor ratios, K_{1T}/L_1, K_{2T}/L_2, K_{1I}/L_1, and K_{2I}/L_2.

- Use the capital-labor ratios to construct ratios of intangible to tangible capital for the two sectors and the ratio of tangible capitals across the two sectors:

$$K_{1I}/K_{1T} = (K_{1I}/L_1) / (K_{1T}/L_1)$$

$$K_{2I}/K_{2T} = (K_{2I}/L_2) / (K_{2T}/L_2)$$

$$K_{2T}/K_{1T} = [(K_{2T}/L_2) / (K_{1T}/L_1)] [(L/L_2) / (L/L_1)].$$

- Multiply the intermediate variable z by the wage rate raised to a power to get the aggregate labor productivity, that is,
$$Y/L = zw^{(1-\theta_{1L})\theta_1 + (1-\theta_{2L})\theta_2}.$$

- Solve the household dynamic programming problem—assuming the set of asset choices are $\{a_i\}$ which are equally-spaced points on $[0, \bar{a}]$. The steps are as follows:

  ○ For the terminal value function v_J, assume that the optimal next period assets and current labor supply are both 0 (that is, if $J_r < J$) and that determines the final level of consumption via the household budget constraint.

  ○ Working backwards from $j = J$ to $j = 1$, iteratively solve

  $$v_j(a, s) = \max_{a',c,\ell}\{u(c, \ell) + \beta\sigma^j v_{j+1}(a', s')\}$$

  subject to the budget constraints

  $$a'\sigma^j = (1 + i) a + (1 - \tau^\ell) w\ell - (1 + \tau^c) c + \psi^j.$$

  The programs find the maximum in a brute-force way, which is slow, but ensures that inequality constraints on asset holdings are enforced.

  ○ At each step $j = J - 1, \ldots, 1$, store the optimal decision functions.

- Use the probabilities of survival and the growth rate in the population to determine the fraction of people in each age group j, call this μ^j, where $\sum_j \mu^j = 1$.

- Add everything up by summing up optimal choices for consumption, labor, and asset holdings, weighted by the μ^j's. This implies values for total consumption C, total labor L, and total beginning-of-period assets A.

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- Multiply the aggregate labor productivity Y/L by L to get total output, Y.

- Multiply the ratios of sectoral labor to total labor by L to get L_1 and L_2.

- Use the fact that assets are equal to business equity V plus government debt B in order to back out values for the capital stocks. In doing this, we need to remember that $B = \phi_B$ GNP and GNP is output less intangible investments. In other words, we have[3]

$$A = V + B$$

$$= V_1 + V_2 + \phi_B \text{GNP}$$

$$= V_1 + V_2 + \phi_B \left(Y - X_{1I} - X_{2I}\right)$$

$$= \left(1 - \tau_1^d\right)\left(K_{1T} + (1 - \tau_1^\pi)K_{2T}\right) + K_{2T} + \left(1 - \tau_2^d\right)K_{2I} + \phi_B \left(Y - X_{1I} - X_{2I}\right).$$

Also, note that on a balanced growth path, $X_{iI} = [(1+\gamma)(1+\eta) - 1 + \delta_{iI}]K_{iI}$. Using this fact plus the values for A and Y computed in the earlier steps we have:

$$K_{1T} = (A - \phi_B Y)/\{\left(1 - \tau_1^d\right)(1 + (1 - \tau_1^\pi)(K_{1I}/K_{1T}))$$

$$+ (K_{2T}/K_{1T}) + \left(1 - \tau_2^d\right)(K_{2I}/K_{2T})(K_{2T}/K_{1T})$$

$$- \phi_B\left[(1+\gamma)(1+\eta) - 1 + \delta_{1I}\right](K_{1I}/K_{1T})$$

$$- \phi_B\left[(1+\gamma)(1+\eta) - 1 + \delta_{2I}\right](K_{2I}/K_{2T})(K_{2T}/K_{1T})\}$$

$$K_{1I} = (K_{1I}/K_{1T})K_{1T}$$

$$K_{2T} = (K_{2T}/K_{1T})K_{1T}$$

$$K_{2I} = (K_{2I}/K_{2T})K_{2T}.$$

- Use the capital stocks, growth rates, and depreciation rates to compute the four investments

$$X_{1T} = \left[(1+\gamma)(1+\eta) - 1 + \delta_{1T}\right]K_{1T}$$

$$X_{1I} = \left[(1+\gamma)(1+\eta) - 1 + \delta_{1I}\right]K_{1I}$$

$$X_{2T} = \left[(1+\gamma)(1+\eta) - 1 + \delta_{2T}\right]K_{2T}$$

$$X_{2I} = \left[(1+\gamma)(1+\eta) - 1 + \delta_{2I}\right]K_{2I}.$$

- Use the capital stocks and labor inputs for the sectoral outputs and prices:

$$Y_i = K_{iT}^{\theta_{iT}} K_{iI}^{\theta_{iI}} L_i^{\theta_{iL}}$$

$$p_i = \theta_i Y/Y_i.$$

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[3] Note that here we are equating beginning of period stocks.

- Use output and the intangible investments to compute the NIPA analogues of GNP, accounting profits, and corporate dividends:

$$\text{GNP} = Y - X_{1I} - X_{2I}$$

$$\Pi_1 = p_1 Y_1 - wL_1 - \delta_{1T} K_{1T} - X_{1I}$$

$$D_1 = p_1 Y_1 - wL_1 - X_{1T} - X_{1I} - \tau_1^\pi \Pi_1$$

$$D_2 = p_2 Y_2 - wL_2 - \delta_{2T} K_{2T} - X_{2I}.$$

- Use GNP and age-dependent transfers to construct the variables relevant to the government budget constraint:

$$G = \phi_G \text{GNP}$$

$$B = \phi_B \text{GNP}$$

$$\Psi = \sum_j \mu^j \psi^j + \zeta.$$

- Construct the first-order conditions $r(x)$ as follows

$$r_1(x) = r_{1T} - \theta_{1T} \theta_1 Y / K_{1T}$$

$$r_2(x) = \Psi + G - \tau^\ell wL - \tau_1^d D_1 - \tau_2^d D_2 - \tau_1^\pi \Pi_1 - B' + (1+i) B - \tau^c C.$$

- Update x and check if the iterations have converged.

We add elements to $r(x)$ when we compute our initial baseline economy (with current demographics and current policy). Specifically, we add the constraints in (2.1)–(2.6) as residual equations in $r(x)$, and we add θ_{1T}, θ_{1I}, θ_{2T}, θ_{2I}, α, and β as unknowns in the vector x.

The Fortran programs for computing balanced growth equilibria are available at our website in the directory ./codes/balgrowth. The naming convention for the codes is bgxxyy.f90 with choices for xx and yy. The choices for xx, namely xx='tr' and xx='tc,' depend on whether the residual variable is the common transfer to households (tr) or the tax rate on consumption (tc). The choices for yy, namely yy='fi' and yy='nr,' depend on whether we employ a functional iteration update as in (3.1) or a Newton-Raphson update as in (3.2) or (3.3).

3.2. Transitions

For the dynamic case, we need to compute time paths $(t = 1, \ldots, T)$ across different birth cohorts. To speed up the computations, we wrote the transition code to take advantage of parallel processors, assuming they are available. To simplify the code (called tran.f90), we assumed that T/n cohorts would be assigned to each processor, where n is the number of processors. For example, if $T = 240$ and $n = 48$ (as is true in our case), then there would be 5 cohorts per processor. For cohorts alive at $t = 1$, computation is done starting with the initial conditions of our baseline economy.

The core of the computation in transition is the same as for the balanced growth paths, namely solving the household problem. But, in this case, we are solving the household problem for each cohort and, therefore, have to keep track of all variables by age and time.

The iterations for finding x_t to solve $r(x_t)$ are also similar except for the fact that now we keep track of time series for the unknown variables, and we add two other unknowns, namely the wage rate and GNP. We add these additional variables to the vector of unknowns because we cannot write all other variables explicitly in terms of the interest rate and the residual variable for government budget balance. In addition, we add two residual equations. First, we add an equation relating the wage rate in vector x to the marginal product of labor. Second, we add an equation relating GNP in vector x to output less intangible investments.

Otherwise, the steps are the same as in the case of the balanced growth path computation.

4. Sensitivity Analysis

In this section, we describe how the main results change as we change model assumptions. Specifically, we consider the versions of the benchmark model without annuity markets; with age-dependent labor productivities; with eventual profits tax rates that are nonzero; and with alternative preferences in which the labor supply elasticity is lower. In all of these cases we recalibrate parameters so that the model and data produce the same national account and fixed asset statistics.[4] We also consider a version of the model with one type of capital (tangible) and one business sector (Schedule C corporations). In this one-capital, one-sector version of the model we follow the literature and set parameters so that the capital-output ratio is 3 and we abstract from taxes on corporate distributions.[5]

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[4] This is not necessary for the experiments in which we vary the eventual profits tax rate.

[5] In earlier versions of the paper, we also experimented with varying parameters that are not easily estimated with the data we have. We lowered θ_1 and found almost no change in the results. We set the share of intangible

Table A5 summarizes the variations in the parameters for preferences and technologies across the versions of the model that we study.[6] Recall that α is the disutility of leisure, β is the discount factor, θ_1 is the income share of Schedule C corporations, θ_{1T} is the tangible capital share for Schedule C corporations, θ_{1I} is the intangible capital share for Schedule C corporations, θ_{2T} is the tangible capital share for other businesses, θ_{2I} is the intangible capital share for other businesses, δ_{1T} is the rate of tangible capital depreciation for Schedule C corporations, δ_{1I} is the rate of intangible capital depreciation for Schedule C corporations, δ_{2T} is the rate of tangible capital depreciation for other businesses, and δ_{2I} is the rate of intangible capital depreciation for other businesses. The parameter ζ is included in the case that we lower the labor supply elasticity. Preferences in this case are

$$u\left(c, \ell\right) = \log c + \alpha \left(1 - \ell\right)^{1-\zeta} / \left(1 - \zeta\right),$$

which nests the benchmark parameterization if we set $\zeta = 1$. The last parameter in Table A5 is an on-off switch for annuity markets. In the code, we nest the two extreme cases with and without annuity markets by setting the coefficient on next period assets equal to $1 - \lambda(1 - \sigma^j)$ in the individual budget constraints. The variation with no annuity markets has $\lambda = 0$. The variation of the benchmark model with age-dependent productivities uses Hansen's (1993) age-dependent efficiency weights ϵ^j for age j. (See Hansen 1993 for details on constructing these weights.) In this case, we replace wages $w\ell$ in the age-j household budget constraint with $w\ell\epsilon^j$.

We turn next to a summary of how the main results change for each of these alternative economies.

4.1. Balanced Growth Paths for Alternative Economies

The main results of our sensitivity analysis for balanced growth paths are reported in Table A6[7]

Panel A of Table A6 shows results for the model without annuity markets. The first set of rows in the table—listed under policy inputs—are identical to the benchmark model with the exception of the consumption tax rate. Recall that the consumption tax rate is set residually to

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capital in sector 2 equal to 0 while adjusting the share in sector 1 to keep the size of intangible capital fixed, and found almost no change in the results. We set the depreciation rates on tangible and intangible capital in sector 2 equal, adjusting the income shares to keep the size of intangible capital fixed, and again found almost no change in the results. Finally, we used different years for the life tables when modeling the new demographics. This did not make any difference once we changed the length of the work life to get a 2 to 1 ratio of workers to retirees.

[6] Demographic parameters, the growth rate of technology, and fiscal parameters are the same across the experiments. See Table 3 of the main text for these values.

[7] The comparable results for the benchmark parameters are reported in Table 5 in the main text.

ensure the government's budget is balanced. We find that the rates necessary for budget balance in the no-annuity case are lower for all policies when compared to the benchmark model. In terms of equilibrium outputs, we find slightly higher capital, labor, output, and household net worth. The no-annuity case also has higher welfare gains for the policy reforms. For example, with all three reforms, the gain of future cohorts is 28 percent of consumption, while the gain in the benchmark model is 25 percent.

Panel B of Table A6 shows results for the model with age-dependent productivities. The upper panel is the same as in the benchmark with the exception of the consumption tax rate which is only slightly lower under the future policies. There is little change in equilibrium outcomes and welfare gains for the policy reforms are only slightly lower.

Panels C and D of Table A6 show results for two experiments in which we vary the profits tax rate on the final balanced growth path. In the first case, we assume that the final tax rate is 12 percent. In the second case, we assume that the final tax rate is 4 percent. (See rows 1 and 3 of Panels C and D.) With more revenues coming from taxes on profits, the consumption tax rate needed to balance the budget is lower. We find that the equilibrium outcomes and welfare gains in these two experiments are barely distinguishable from the benchmark model.

Panel E of Table A6 shows results for a version of the model with the labor supply elasticity cut in half. The consumption tax rate is not much different from the benchmark. Not surprisingly, the main difference in this case is the impact of policy on labor supply. For example, when all reforms are implemented, the model predicts a 3 percent rise in the labor input whereas the benchmark model predicts a 9 percent rise. Output and household net worth are also lower but, given the fact that we cut the labor elasticity in half, the differences between these results and the benchmark results are surprisingly small. The same is true for the predicted welfare gains which remain high.

Results for the final experiment—with only one type of capital and one business sector—are shown in Panel F of Table A6. This is the typical case explored in the literature. Notice that the capital stock to GNP is 3 for the current U.S. policy. A continuation of policy leads to a fall in both the stock and GNP, with almost no change in the ratio. Policy reforms with FICA taxes eliminated produce increases in GNP but the maximum capital-output ratio is still only 3.9. The interest rate is much lower here than in the benchmark economies and the welfare gains for switching to a saving-for-retirement system are about half of what they are in the benchmark model.

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4.2. Transition Paths for Alternative Economies

The main results of our sensitivity analysis for transition paths are reported in Table A7 and Figures A2–A7.[8]

For completeness, we include all the results but, given there are twenty-four economies reported (six variations on parameters and 4 variations on future policies), we will only elaborate on two noteworthy findings. First, we can devise transition paths in all cases that are welfare improving for all birth-year cohorts. The specific details are shown in Table A7.[9] Second, the trick in all cases is to avoid increasing consumption taxes that negatively impact retirees by temporarily lowering implicit worker transfers.[10] In the case of the one-capital, one-sector model with a permanent drop in implicit transfers (last Panel D of Table A7), we also delay lowering the labor tax rate relative to the benchmark case. We do this to avoid high consumption tax rates on cohorts entering the workforce soon after the policy reforms are instituted.

The welfare analysis, cohort by cohort, is summarized in Figures A2–A7. Recall that welfare here is defined in terms of remaining lifetime consumption equivalents. As the figures show, welfare gains are positive for all existing and future birth-year cohorts in all variations of the model we consider.

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[8] The comparable results for the benchmark parameters are reported in Table 6 and Figure 2 in the main text.

[9] All codes are available at our website.

[10] In no cases do we lower transfers that are welfare or local public goods other than those targeted at retirees.

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Total Adjusted Income	1.000
Labor Income	.585
Compensation of employees (NIPA 1.10)	.531
Wages and salary accruals (NIPA 1.10)	.433
Supplements to wages and salaries (NIPA 1.10)	.099
70% of proprietors' income with IVA, CCadj (NIPA 1.10)	.053
Capital Income	.415
Corporate profits with IVA and CCadj (NIPA 1.10)	.073
30% of proprietors' income with IVA, CCadj (NIPA 1.10)	.023
Rental income of persons with CCadj (NIPA 1.10)	.017
Surplus on government enterprises (NIPA 1.10)	.000
Net income, rest of world (NIPA 1.13)	.007
Indirect business taxes	.072
Taxes on production and imports (NIPA 1.10)	.068
Less: Subsidies (NIPA 1.10)	.004
Business current transfer payments (NIPA 1.10)	.008
Less: Sales tax	.042
Federal excise taxes (NIPA 3.5)	.005
Federal customs duties (NIPA 3.5)	.002
State and local sales taxes (NIPA 3.5)	.029
Motor vehicle licenses (NIPA 3.5)	.001
Severance taxes (NIPA 3.5)	.001
Special assessments (NIPA 3.5)	.001
Other taxes on production and imports (NIPA 3.5)	.004
Consumption of fixed capital (NIPA 1.10)	.117
Consumer durable depreciation (FOF F.10)	.060
Statistical discrepancy (NIPA 1.10)	−.004
Imputed capital services[a]	.037
Consumer durable services	.013
Government capital services	.025

See table notes.

Total Adjusted Product	1.000
Consumption	.745
Personal consumption expenditures (NIPA 1.1.5)	.655
Less: Consumer durable goods (NIPA 1.1.5)	.081
Less: Imputed sales tax, nondurables and services	.037
Plus: Imputed capital services, durables[a]	.013
Government consumption expenditures, nondefense (NIPA 3.9.5)	.111
Plus: Imputed capital services, government capital[a]	.025
Consumer durable depreciation (FOF F.10)	.060
Tangible investment	.211
Gross private domestic investment[b] (NIPA 1.1.5)	.145
Schedule C corporations	.069
Other private business	.076
Consumer durable goods (NIPA 1.1.5)	.081
Less: Imputed sales tax, durables	.005
Government gross investment, nondefense (NIPA 3.9.5)	.025
Net exports of goods and services (NIPA 1.1.5)	−.042
Net income rest of world (NIPA 1.13)	.007
Defense spending	.044
Government expenditures, national defense (NIPA 3.9.5)	.044

Note: IVA, inventory valuation adjustment; CCadj, capital consumption adjustment; NIPA, national income and product accounts; FA, fixed assets; FOF, flow of funds. Expressions in parentheses are the data sources and table numbers.

[a] Imputed capital services are equal to 4 percent times the current-cost net stock of government fixed assets and consumer durable goods.

[b] The corporate share of gross private domestic investment is 56.5 percent. To determine the share of Schedule C corporations, we assume that the ratio of investments for these corporations and all other corporations is the same as the ratio of their depreciable assets. Based on balance sheet data from the IRS corporate tax returns, this would imply that 83.5 percent of corporate investment is made by Schedule C corporations.

Tangible Capital	4.117
Fixed assets, private[a] (FA 1.1)	2.193
Schedule C corporations	.674
Other private business	1.519
Fixed assets, government (FA 1.1)	.602
Consumer durables (FA 1.1)	.304
Inventories[a] (NIPA 5.7.5)	.134
Schedule C corporations	.103
Other private business	.031
Land[a]	.885
Schedule C corporations	.109
Other private business	.776
Nonfinancial corporate (FOF B.102)	.022
Nonfinancial noncorporate (FOF B.103)	.298
Households and nonprofits (FOF B.100)	.455
Intangible Capital	1.718
Plant-specific (McGrattan and Prescott, 2010)	1.198
Technology capital (McGrattan and Prescott, 2010)	.519
Total	5.835

Note: FA, fixed assets; FOF, flow of funds. Expressions in parentheses are the data sources and table numbers.

[a] The corporate shares of private fixed assets, inventories, and land are 36.8 percent, 92.1 percent, and 15.0 percent, respectively. In the case of inventories, we assume that 13 percent of farm inventories are corporate based on the ratio of corporate farmland and buildings relative to total corporate stocks reported in Table 828 of the *U.S. Statistical Abstract,* 2012. To determine the share of Schedule C corporations, we assume that the ratio of stocks for these corporations and all other corporations is the same as the ratio of their depreciable assets. Based on balance sheet data from the IRS corporate tax returns, this would imply that 83.5 percent of corporate capital is owned by Schedule C corporations.

Household Net Worth, end of period	4.100
Assets (FOF B.100)	4.947
Tangible	1.787
Financial	3.160
Liabilities (FOF B.100)	.856
Government Debt, end of period	.549
State and local municipal securities (FOF L.104)	.166
Federal Treasury securities (FOF L.105)	.381
Federal budget agency securities (FOF L.105)	.002

Note: FOF, flow of funds. Expressions in parentheses are the data sources and table numbers.

Population in millions	
All ages (ERP B-34)	296
Ages 16 to 64 (ERP B-34)	194
Population growth (%)	
All ages (ERP B-34)	.93
Ages 16 to 64 (ERP B-34)	1.09
Full-time employees in millions (NIPA 6.5)	124
Annual hours per population 16-64 (CPS, various)	1,442

Note: ERP, *Economic Report of the President*; NIPA, national income and product accounts; CPS, Current Population Survey. Expressions in parentheses are the data sources and table numbers. See Prescott et al. (2005) for the full details on primary sources.

	Benchmark Parameters[a]	No Annuity Markets	Age-dependent Productivities	Lower Labor Elasticity	One-Capital One-Sector[b]
α	1.143	1.127	1.166	0.756	1.247
β	0.987	0.993	0.991	0.989	0.990
θ_1	0.500	0.500	0.500	0.500	0.001
θ_{1T}	0.182	0.182	0.182	0.182	0.330
θ_{1I}	0.190	0.190	0.190	0.190	0.001
θ_{2T}	0.502	0.502	0.502	0.502	0.001
θ_{2I}	0.095	0.095	0.095	0.095	0.001
δ_{1T}	0.050	0.050	0.050	0.050	0.060
δ_{1I}	0.050	0.050	0.050	0.050	0.060
δ_{2T}	0.015	0.015	0.015	0.015	0.060
δ_{2I}	0.050	0.050	0.050	0.050	0.060
ζ	1.0	1.0	1.0	2.0	1.0
λ^c	1	0	1	1	1

[a] These are also the parameters used for cases with eventual tax rates on profits greater than zero.

[b] Parameters for the one-sector model are not recalibrated to fit the national account and fixed asset tables shown in Table A1 and A2. They are chosen to get a capital-output ratio of 3.

[c] A value for λ of 1 implies annuity markets are available and a value of 0 implies annuity markets are unavailable.

		A. No Annuity Markets			
		Future Policies with New Demographics			
			Eliminate FICA Taxes and		
	Current U.S.	Continue U.S. Policy	Medicare & Social Security	Plus cut Capital Taxes	Plus cut Implicit Transfers
POLICY INPUTS					
Tax rates					
Profits, Sched. C	.330	.330	.330	0	0
Distributions, Sched. C	.144	.144	.144	0	0
Distributions, other	.382	.382	.382	0	0
Labor	.382	.382	.276	.276	.156
Consumption	.056	.087	.032	.183	.120
Transfer-GNP ratios	.369	.397	.303	.303	.196
To workers	.234	.205	.205	.205	.132
To retirees	.136	.192	.098	.098	.063
EQUILIBRIUM OUTPUTS					
Consumption share	.745	.784	.764	.716	.710
Labor income share	.585	.576	.581	.576	.577
Capital stock to GNP	5.84	5.84	6.48	7.60	7.79
Tangible capital	4.12	4.13	4.65	5.89	6.04
Schedule C	0.89	0.88	0.96	1.09	1.11
Other business	3.23	3.25	3.68	4.80	4.93
Intangible capital	1.72	1.71	1.84	1.71	1.75
Labor input	1.00	0.90	1.00	0.99	1.11
GNP	1.00	0.93	1.13	1.29	1.47
Net worth	1.00	0.93	1.25	1.89	2.21
Interest rate (%)	4.67	4.51	3.91	4.46	4.31
WELFARE GAIN (%)	5.3	0	15.0	20.3	27.9

See table notes.

B. Age-Dependent Productivities

| | | Future Policies with New Demographics | | | |
| | | | Eliminate FICA Taxes and | | |
	Current U.S.	Continue U.S. Policy	Medicare & Social Security	Plus cut Capital Taxes	Plus cut Implicit Transfers
POLICY INPUTS					
Tax rates					
Profits, Sched. C	.330	.330	.330	0	0
Distributions, Sched. C	.144	.144	.144	0	0
Distributions, other	.382	.382	.382	0	0
Labor	.382	.382	.276	.276	.156
Consumption	.100	.135	.099	.281	.227
Transfer-GNP ratios	.369	.397	.303	.303	.196
To workers	.234	.205	.205	.205	.132
To retirees	.136	.192	.098	.098	.063
EQUILIBRIUM OUTPUTS					
Consumption share	.745	.781	.762	.716	.713
Labor income share	.585	.577	.581	.576	.577
Capital stock to GNP	5.84	5.93	6.52	7.61	7.70
Tangible capital	4.12	4.20	4.68	5.89	5.97
Schedule C	0.89	0.89	0.97	1.09	1.10
Other business	3.24	3.31	3.71	4.80	4.87
Intangible capital	1.72	1.72	1.84	1.72	1.73
Labor input	1.00	0.92	1.01	1.00	1.11
GNP	1.00	0.96	1.14	1.30	1.46
Net worth	1.00	0.98	1.26	1.90	2.16
Interest rate (%)	4.67	4.42	3.88	4.46	4.38
WELFARE GAIN (%)	3.6	0	14.4	17.5	23.5

See table notes.

C. 12 Percent Profits Tax Rate

| | | Future Policies with New Demographics | | | |
| | | | Eliminate FICA Taxes and | | |
	Current U.S.	Continue U.S. Policy	Medicare & Social Security	Plus cut Capital Taxes	Plus cut Implicit Transfers
POLICY INPUTS					
Tax rates					
Profits, Sched. C	.330	.330	.330	.120	.120
Distributions, Sched. C	.144	.144	.144	0	0
Distributions, other	.382	.382	.382	.120	.120
Labor	.382	.382	.276	.276	.156
Consumption	.100	.136	.097	.223	.173
Transfer-GNP ratios	.369	.397	.303	.303	.196
To workers	.234	.205	.205	.205	.132
To retirees	.136	.192	.098	.098	.063
EQUILIBRIUM OUTPUTS					
Consumption share	.745	.783	.765	.731	.727
Labor income share	.585	.576	.580	.577	.578
Capital stock to GNP	5.84	5.89	6.46	7.24	7.38
Tangible capital	4.12	4.17	4.62	5.50	5.61
Schedule C	0.89	0.89	0.96	1.04	1.06
Other business	3.23	3.28	3.67	4.45	4.55
Intangible capital	1.72	1.72	1.83	1.74	1.76
Labor input	1.00	0.91	1.00	0.98	1.10
GNP	1.00	0.94	1.12	1.23	1.39
Net worth	1.00	0.95	1.23	1.68	1.93
Interest rate (%)	4.67	4.46	3.93	4.34	4.23
WELFARE GAIN (%)	4.7	0	15.4	17.7	24.6

See table notes.

D. 4 Percent Profits Tax Rate

| | | Future Policies with New Demographics | | | |
| | | | Eliminate FICA Taxes and | | |
	Current U.S.	Continue U.S. Policy	Medicare & Social Security	Plus cut Capital Taxes	Plus cut Implicit Transfers
POLICY INPUTS					
Tax rates					
Profits, Sched. C	.330	.330	.330	.040	.040
Distributions, Sched. C	.144	.144	.144	0	0
Distributions, other	.382	.382	.382	.040	.040
Labor	.382	.382	.276	.276	.156
Consumption	.100	.136	.097	.262	.209
Transfer-GNP ratios	.369	.397	.303	.303	.196
To workers	.234	.205	.205	.205	.132
To retirees	.136	.192	.098	.098	.063
EQUILIBRIUM OUTPUTS					
Consumption share	.745	.783	.765	.721	.717
Labor income share	.585	.576	.580	.577	.577
Capital stock to GNP	5.84	5.89	6.46	7.47	7.60
Tangible capital	4.12	4.17	4.62	5.75	5.86
Schedule C	0.89	0.89	0.96	1.08	1.09
Other business	3.23	3.28	3.67	4.68	4.77
Intangible capital	1.72	1.72	1.83	1.72	1.74
Labor input	1.00	0.91	1.00	0.98	1.09
GNP	1.00	0.94	1.12	1.26	1.42
Net worth	1.00	0.95	1.23	1.80	2.07
Interest rate (%)	4.67	4.46	3.93	4.43	4.33
WELFARE GAIN (%)	4.7	0	15.4	18.0	24.9

See table notes.

		Future Policies with New Demographics			
			Eliminate FICA Taxes and		
	Current U.S.	Continue U.S. Policy	Medicare & Social Security	Plus cut Capital Taxes	Plus cut Implicit Transfers
POLICY INPUTS					
Tax rates					
Profits, Sched. C	.330	.330	.330	0	0
Distributions, Sched. C	.144	.144	.144	0	0
Distributions, other	.382	.382	.382	0	0
Labor	.382	.382	.276	.276	.156
Consumption	.099	.136	.098	.280	.228
Transfer-GNP ratios	.369	.397	.303	.303	.196
To workers	.234	.205	.205	.205	.132
To retirees	.136	.192	.098	.098	.063
EQUILIBRIUM OUTPUTS					
Consumption share	.745	.781	.760	.715	.710
Labor income share	.585	.577	.581	.577	.577
Capital stock to GNP	5.86	5.92	6.58	7.64	7.79
Tangible capital	4.13	4.20	4.72	5.92	6.04
Schedule C	0.89	0.89	0.97	1.10	1.11
Other business	3.24	3.31	3.75	4.82	4.93
Intangible capital	1.72	1.72	1.85	1.72	1.75
Labor input	1.00	0.90	0.96	0.95	1.03
GNP	1.00	0.94	1.09	1.24	1.36
Net worth	1.00	0.95	1.22	1.82	2.04
Interest rate (%)	4.67	4.43	3.83	4.44	4.31
WELFARE GAIN (%)	5.2	0	14.3	16.9	22.4

E. Lower Labor Supply Elasticity

See table notes.

		Future Policies with New Demographics			
			Eliminate FICA Taxes and		
	Current U.S.	Continue U.S. Policy	Medicare & Social Security	Plus cut Capital Taxes	Plus cut Implicit Transfers
F. One-Capital, One-Sector Model					
POLICY INPUTS					
Tax rates					
Profits, Sched. C	.330	.330	.330	0	0
Distributions, Sched. C	0	0	0	0	0
Distributions, other	0	0	0	0	0
Labor	.382	.382	.276	.276	.156
Consumption	.155	.198	.175	.253	.213
Transfer-GNP ratios	.369	.397	.303	.303	.196
To workers	.234	.205	.205	.205	.132
To retirees	.136	.192	.098	.098	.063
EQUILIBRIUM OUTPUTS					
Consumption share	.694	.718	.694	.659	.651
Labor income share	.670	.670	.670	.670	.670
Capital stock to GNP	3.00	3.05	3.35	3.81	3.91
Tangible capital	2.99	3.04	3.34	3.80	3.89
Schedule C	2.99	3.04	3.34	3.80	3.89
Other business	0.00	0.00	0.00	0.00	0.00
Intangible capital	0.01	0.01	0.01	0.01	0.01
Labor input	1.00	0.91	0.99	0.99	1.10
GNP	1.00	0.92	1.05	1.12	1.25
Net worth	1.00	0.93	1.15	1.37	1.57
Interest rate (%)	3.59	3.39	2.73	2.86	2.64
WELFARE GAIN (%)	6.9	0	8.3	9.0	13.3

Note: Values for labor input, GNP, and net worth are relative to the current U.S. economy.

A. Continue Current U.S. Policy with New Demographics

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.390	0.389	0.390	0.397	0.412	0.418
Profits, Schedule C	0.026	0.026	0.026	0.027	0.028	0.028
Distributions, Schedule C	0.004	0.004	0.004	0.005	0.006	0.006
Distributions, Other	0.094	0.094	0.094	0.094	0.094	0.094
Labor	0.224	0.223	0.223	0.222	0.221	0.220
Consumption	0.043	0.042	0.043	0.049	0.063	0.070
Transfers	0.369	0.369	0.370	0.376	0.390	0.397
To retirees	0.143	0.144	0.145	0.156	0.181	0.192
To workers	0.226	0.226	0.225	0.220	0.210	0.205
Interest on debt	0.025	0.025	0.025	0.024	0.024	0.024
Labor income	0.585	0.584	0.583	0.580	0.577	0.576
Capital income	0.415	0.416	0.417	0.420	0.423	0.424
Schedule C	0.121	0.122	0.123	0.125	0.129	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.743	0.746	0.751	0.764	0.780	0.784
Tangible investment	0.213	0.211	0.206	0.193	0.177	0.172
Intangible investment	0.135	0.134	0.132	0.126	0.119	0.117
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.142	4.143	4.143	4.144	4.141	4.127
Schedule C	0.889	0.889	0.888	0.886	0.884	0.881
Other business	3.253	3.254	3.255	3.257	3.257	3.246
Intangible capital	1.725	1.724	1.722	1.716	1.709	1.704
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.645	4.633	4.616	4.563	4.509	4.512
Wage rate	1.004	1.006	1.008	1.016	1.024	1.024
Labor input	0.993	0.991	0.985	0.959	0.916	0.899
GNP	0.995	0.996	0.994	0.980	0.949	0.933
Net worth	1.000	1.001	0.999	0.984	0.952	0.932

See table notes.

B. Eliminate FICA Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
Shares of GNP:						
Tax revenues	0.340	0.341	0.339	0.330	0.313	0.307
Profits, Schedule C	0.025	0.025	0.025	0.025	0.025	0.026
Distributions, Schedule C	0.003	0.003	0.003	0.004	0.004	0.005
Distributions, Other	0.095	0.094	0.094	0.093	0.092	0.092
Labor	0.162	0.162	0.162	0.161	0.161	0.160
Consumption	0.055	0.057	0.055	0.047	0.031	0.025
Transfers	0.321	0.321	0.320	0.316	0.307	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.178	0.178	0.179	0.185	0.199	0.205
Interest on debt	0.026	0.025	0.024	0.023	0.022	0.021
Labor income	0.588	0.587	0.587	0.585	0.582	0.581
Capital income	0.412	0.413	0.413	0.415	0.418	0.419
Schedule C	0.119	0.119	0.120	0.121	0.124	0.125
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.729	0.731	0.734	0.740	0.754	0.764
Tangible investment	0.228	0.226	0.222	0.216	0.202	0.193
Intangible investment	0.139	0.139	0.137	0.135	0.129	0.126
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.008	4.119	4.200	4.352	4.545	4.644
Schedule C	0.869	0.887	0.899	0.921	0.948	0.962
Other business	3.139	3.233	3.301	3.430	3.597	3.682
Intangible capital	1.694	1.722	1.741	1.775	1.815	1.835
Levels:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.904	4.718	4.583	4.347	4.050	3.909
Wage rate	0.971	0.995	1.014	1.048	1.095	1.119
Labor input	1.095	1.092	1.088	1.070	1.029	1.005
GNP	1.056	1.080	1.097	1.119	1.130	1.130
Net worth	1.033	1.081	1.116	1.172	1.226	1.248

See table notes.

C. Eliminate FICA and Capital Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.340	0.341	0.339	0.328	0.304	0.289
Profits, Schedule C	0.025	0.024	0.022	0.016	0.006	0.000
Distributions, Schedule C	0.003	0.003	0.002	0.002	0.001	0.000
Distributions, Other	0.095	0.093	0.089	0.068	0.021	0.000
Labor	0.162	0.163	0.163	0.163	0.160	0.159
Consumption	0.056	0.059	0.062	0.079	0.116	0.131
Transfers	0.321	0.321	0.320	0.316	0.307	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.178	0.178	0.179	0.185	0.199	0.205
Interest on debt	0.026	0.025	0.025	0.026	0.025	0.024
Labor income	0.588	0.590	0.592	0.592	0.581	0.576
Capital income	0.412	0.410	0.408	0.408	0.419	0.424
Schedule C	0.118	0.116	0.115	0.114	0.125	0.129
Other business	0.294	0.293	0.293	0.294	0.294	0.294
Consumption	0.727	0.727	0.722	0.703	0.694	0.716
Tangible investment	0.230	0.230	0.235	0.254	0.263	0.240
Intangible investment	0.141	0.144	0.147	0.148	0.127	0.118
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.013	4.138	4.254	4.628	5.389	5.887
Schedule C	0.870	0.894	0.916	0.978	1.059	1.093
Other business	3.142	3.245	3.338	3.650	4.330	4.794
Intangible capital	1.699	1.748	1.801	1.890	1.819	1.714
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.910	4.757	4.709	4.783	4.740	4.462
Wage rate	0.970	0.997	1.022	1.095	1.223	1.286
Labor input	1.097	1.097	1.100	1.088	1.028	0.990
GNP	1.056	1.083	1.108	1.174	1.263	1.289
Net worth	1.035	1.092	1.152	1.350	1.714	1.891

See table notes.

D. Eliminate FICA and Capital Taxes, Medicare, Social Security, and Implicit Transfers

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.340	0.339	0.333	0.297	0.217	0.175
Profits, Schedule C	0.025	0.024	0.022	0.016	0.005	0.000
Distributions, Schedule C	0.003	0.003	0.002	0.002	0.001	0.000
Distributions, Other	0.095	0.093	0.089	0.068	0.021	0.000
Labor	0.162	0.162	0.160	0.145	0.107	0.090
Consumption	0.056	0.058	0.060	0.067	0.082	0.085
Transfers	0.321	0.320	0.316	0.288	0.225	0.196
To retirees	0.143	0.142	0.140	0.122	0.082	0.063
To workers	0.178	0.177	0.176	0.166	0.143	0.133
Interest on debt	0.026	0.025	0.025	0.025	0.025	0.023
Labor income	0.589	0.590	0.592	0.594	0.583	0.577
Capital income	0.411	0.410	0.408	0.406	0.417	0.423
Schedule C	0.118	0.116	0.114	0.112	0.123	0.128
Other business	0.294	0.294	0.293	0.294	0.294	0.294
Consumption	0.726	0.724	0.717	0.693	0.681	0.709
Tangible investment	0.231	0.233	0.239	0.263	0.275	0.246
Intangible investment	0.141	0.145	0.149	0.152	0.131	0.120
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.014	4.146	4.268	4.653	5.439	6.032
Schedule C	0.871	0.895	0.919	0.983	1.067	1.111
Other business	3.144	3.251	3.350	3.670	4.372	4.920
Intangible capital	1.700	1.751	1.806	1.900	1.834	1.743
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.911	4.754	4.703	4.782	4.718	4.317
Wage rate	0.970	0.997	1.022	1.095	1.227	1.311
Labor input	1.099	1.102	1.110	1.132	1.131	1.110
GNP	1.057	1.086	1.118	1.218	1.388	1.471
Net worth	1.036	1.097	1.165	1.408	1.901	2.205

See table notes.

Table A7. Transition Results—Age-Dependent Productivities

A. Continue Current U.S. Policy with New Demographics

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.421	0.422	0.423	0.431	0.447	0.454
Profits, Schedule C	0.025	0.026	0.026	0.027	0.028	0.028
Distributions, Schedule C	0.004	0.004	0.004	0.005	0.005	0.006
Distributions, Other	0.094	0.094	0.094	0.094	0.094	0.094
Labor	0.224	0.223	0.223	0.222	0.221	0.220
Consumption	0.075	0.075	0.076	0.083	0.099	0.106
Transfers	0.369	0.369	0.370	0.376	0.390	0.397
To retirees	0.143	0.144	0.145	0.156	0.181	0.192
To workers	0.226	0.226	0.225	0.220	0.210	0.205
Interest on debt	0.025	0.025	0.024	0.024	0.024	0.024
Labor income	0.585	0.585	0.584	0.581	0.578	0.577
Capital income	0.415	0.415	0.416	0.419	0.422	0.423
Schedule C	0.121	0.121	0.122	0.125	0.128	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.741	0.744	0.749	0.760	0.775	0.780
Tangible investment	0.216	0.212	0.208	0.197	0.181	0.175
Intangible investment	0.136	0.134	0.132	0.127	0.121	0.119
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.170	4.170	4.164	4.171	4.197	4.195
Schedule C	0.894	0.893	0.892	0.891	0.893	0.892
Other business	3.276	3.277	3.273	3.280	3.304	3.303
Intangible capital	1.733	1.731	1.728	1.725	1.725	1.722
LEVELS:						
Fraction working	0.734	0.734	0.733	0.721	0.690	0.674
Interest rate (%)	4.610	4.597	4.589	4.538	4.444	4.427
Wage rate	1.009	1.011	1.012	1.020	1.034	1.036
Labor input	0.990	0.989	0.986	0.970	0.935	0.921
GNP	0.996	0.998	0.998	0.993	0.976	0.966
Net worth	1.005	1.007	1.006	1.001	0.989	0.977

See table notes.

B. Eliminate FICA Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.380	0.380	0.375	0.362	0.357
Profits, Schedule C	0.025	0.025	0.025	0.025	0.025	0.026
Distributions, Schedule C	0.003	0.003	0.003	0.004	0.004	0.005
Distributions, Other	0.095	0.094	0.094	0.093	0.092	0.091
Labor	0.162	0.162	0.162	0.161	0.161	0.160
Consumption	0.094	0.096	0.096	0.092	0.080	0.075
Transfers	0.329	0.329	0.328	0.322	0.309	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.186	0.186	0.187	0.191	0.200	0.205
Interest on debt	0.026	0.025	0.024	0.023	0.021	0.021
Labor income	0.588	0.587	0.587	0.585	0.583	0.581
Capital income	0.412	0.413	0.413	0.415	0.417	0.419
Schedule C	0.118	0.119	0.119	0.121	0.123	0.125
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.725	0.729	0.732	0.739	0.752	0.763
Tangible investment	0.231	0.227	0.224	0.218	0.204	0.194
Intangible investment	0.141	0.139	0.138	0.135	0.130	0.127
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.060	4.164	4.237	4.369	4.570	4.663
Schedule C	0.878	0.894	0.905	0.924	0.952	0.965
Other business	3.183	3.270	3.332	3.445	3.618	3.698
Intangible capital	1.708	1.734	1.751	1.780	1.821	1.839
LEVELS:						
Fraction working	0.734	0.734	0.733	0.721	0.690	0.674
Interest rate (%)	4.830	4.654	4.539	4.328	4.027	3.888
Wage rate	0.979	1.003	1.019	1.050	1.099	1.124
Labor input	1.081	1.078	1.078	1.068	1.033	1.009
GNP	1.050	1.075	1.093	1.119	1.137	1.139
Net worth	1.038	1.084	1.118	1.174	1.238	1.260

See table notes.

C. Eliminate FICA and Capital Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.380	0.380	0.376	0.366	0.360
Profits, Schedule C	0.025	0.024	0.022	0.016	0.006	0.000
Distributions, Schedule C	0.003	0.003	0.002	0.002	0.001	0.000
Distributions, Other	0.094	0.093	0.089	0.068	0.021	0.000
Labor	0.162	0.163	0.163	0.163	0.160	0.159
Consumption	0.095	0.098	0.103	0.127	0.178	0.201
Transfers	0.329	0.329	0.328	0.322	0.309	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.186	0.186	0.187	0.191	0.200	0.205
Interest on debt	0.026	0.025	0.025	0.025	0.025	0.024
Labor income	0.589	0.590	0.592	0.592	0.581	0.576
Capital income	0.411	0.410	0.408	0.408	0.419	0.424
Schedule C	0.118	0.116	0.115	0.114	0.124	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.724	0.726	0.722	0.703	0.693	0.716
Tangible investment	0.232	0.231	0.235	0.254	0.264	0.240
Intangible investment	0.142	0.144	0.148	0.148	0.127	0.118
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.064	4.178	4.280	4.628	5.388	5.880
Schedule C	0.879	0.900	0.920	0.978	1.059	1.092
Other business	3.185	3.278	3.359	3.650	4.330	4.788
Intangible capital	1.713	1.759	1.808	1.890	1.819	1.713
LEVELS:						
Fraction working	0.734	0.734	0.733	0.721	0.690	0.674
Interest rate (%)	4.836	4.699	4.676	4.781	4.744	4.465
Wage rate	0.979	1.005	1.026	1.096	1.223	1.285
Labor input	1.082	1.083	1.089	1.084	1.031	0.996
GNP	1.051	1.076	1.101	1.170	1.265	1.296
Net worth	1.039	1.093	1.149	1.344	1.715	1.898

See table notes.

D. Eliminate FICA and Capital Taxes, Medicare, Social Security, and Implicit Transfers

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.379	0.374	0.347	0.283	0.252
Profits, Schedule C	0.025	0.024	0.022	0.016	0.005	0.000
Distributions, Schedule C	0.003	0.003	0.002	0.002	0.001	0.000
Distributions, Other	0.094	0.093	0.089	0.068	0.021	0.000
Labor	0.162	0.162	0.160	0.145	0.107	0.090
Consumption	0.094	0.098	0.101	0.117	0.149	0.162
Transfers	0.329	0.328	0.323	0.294	0.227	0.196
To retirees	0.143	0.142	0.140	0.122	0.082	0.063
To workers	0.186	0.185	0.183	0.172	0.145	0.133
Interest on debt	0.026	0.025	0.025	0.026	0.025	0.023
Labor income	0.588	0.590	0.592	0.594	0.584	0.577
Capital income	0.412	0.410	0.408	0.406	0.416	0.423
Schedule C	0.118	0.117	0.114	0.112	0.123	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.723	0.724	0.719	0.696	0.684	0.712
Tangible investment	0.233	0.232	0.237	0.261	0.273	0.243
Intangible investment	0.142	0.145	0.149	0.151	0.130	0.119
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.066	4.184	4.285	4.631	5.396	5.967
Schedule C	0.879	0.901	0.922	0.979	1.061	1.103
Other business	3.187	3.283	3.364	3.652	4.335	4.864
Intangible capital	1.714	1.761	1.811	1.894	1.823	1.731
LEVELS:						
Fraction working	0.734	0.734	0.733	0.721	0.690	0.674
Interest rate (%)	4.834	4.694	4.677	4.805	4.765	4.382
Wage rate	0.978	1.003	1.024	1.092	1.222	1.300
Labor input	1.084	1.086	1.097	1.123	1.125	1.109
GNP	1.051	1.078	1.107	1.206	1.375	1.458
Net worth	1.040	1.096	1.157	1.386	1.866	2.163

See table notes.

TABLE A7. TRANSITION RESULTS—12 PERCENT PROFIT TAX RATE

A. Continue Current U.S. Policy with New Demographics

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.422	0.422	0.423	0.431	0.447	0.454
Profits, Schedule C	0.026	0.026	0.026	0.027	0.028	0.028
Distributions, Schedule C	0.004	0.004	0.004	0.005	0.005	0.006
Distributions, Other	0.094	0.094	0.094	0.094	0.094	0.094
Labor	0.224	0.223	0.223	0.222	0.221	0.220
Consumption	0.075	0.075	0.076	0.083	0.099	0.106
Transfers	0.369	0.369	0.370	0.376	0.390	0.397
To retirees	0.143	0.144	0.145	0.156	0.181	0.192
To workers	0.226	0.226	0.225	0.220	0.210	0.205
Interest on debt	0.025	0.025	0.025	0.024	0.024	0.024
Labor income	0.585	0.584	0.583	0.581	0.578	0.576
Capital income	0.415	0.416	0.417	0.419	0.422	0.424
Schedule C	0.121	0.122	0.123	0.125	0.128	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.743	0.746	0.751	0.762	0.777	0.783
Tangible investment	0.213	0.210	0.206	0.195	0.179	0.174
Intangible investment	0.135	0.134	0.132	0.127	0.120	0.118
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.150	4.151	4.148	4.154	4.170	4.165
Schedule C	0.891	0.890	0.889	0.888	0.889	0.887
Other business	3.260	3.261	3.259	3.266	3.282	3.278
Intangible capital	1.727	1.726	1.723	1.720	1.717	1.714
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.631	4.619	4.606	4.555	4.475	4.462
Wage rate	1.006	1.008	1.010	1.017	1.029	1.031
Labor input	0.991	0.988	0.982	0.960	0.921	0.905
GNP	0.995	0.995	0.992	0.981	0.958	0.945
Net worth	1.002	1.002	0.998	0.988	0.966	0.952

See table notes.

B. Eliminate FICA Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.381	0.380	0.375	0.363	0.357
Profits, Schedule C	0.025	0.025	0.025	0.025	0.026	0.026
Distributions, Schedule C	0.003	0.003	0.003	0.004	0.004	0.005
Distributions, Other	0.095	0.094	0.094	0.093	0.092	0.092
Labor	0.162	0.162	0.162	0.161	0.160	0.160
Consumption	0.094	0.096	0.096	0.091	0.080	0.075
Transfers	0.329	0.329	0.328	0.322	0.309	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.186	0.186	0.187	0.191	0.200	0.205
Interest on debt	0.026	0.025	0.024	0.023	0.022	0.021
Labor income	0.587	0.587	0.586	0.584	0.582	0.580
Capital income	0.413	0.413	0.414	0.416	0.418	0.420
Schedule C	0.119	0.119	0.120	0.122	0.124	0.125
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.728	0.731	0.734	0.741	0.755	0.764
Tangible investment	0.229	0.226	0.222	0.215	0.201	0.192
Intangible investment	0.140	0.139	0.137	0.134	0.129	0.126
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.037	4.147	4.220	4.353	4.529	4.616
Schedule C	0.874	0.891	0.902	0.921	0.946	0.958
Other business	3.163	3.256	3.318	3.432	3.583	3.658
Intangible capital	1.701	1.729	1.746	1.775	1.811	1.828
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.858	4.677	4.554	4.343	4.069	3.937
Wage rate	0.975	0.999	1.016	1.047	1.091	1.114
Labor input	1.084	1.079	1.075	1.057	1.020	0.997
GNP	1.051	1.072	1.088	1.106	1.116	1.117
Net worth	1.035	1.079	1.111	1.158	1.207	1.227

See table notes.

Table A7. Transition Results—12 Percent Profit Tax Rate (Cont.)

C. Eliminate FICA and Capital Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.381	0.380	0.376	0.365	0.360
Profits, Schedule C	0.025	0.024	0.023	0.019	0.012	0.009
Distributions, Schedule C	0.003	0.003	0.003	0.002	0.001	0.000
Distributions, Other	0.095	0.093	0.091	0.076	0.043	0.027
Labor	0.162	0.162	0.163	0.163	0.160	0.159
Consumption	0.094	0.098	0.101	0.116	0.149	0.164
Transfers	0.329	0.329	0.328	0.322	0.309	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.186	0.186	0.187	0.191	0.200	0.205
Interest on debt	0.026	0.025	0.025	0.025	0.024	0.023
Labor income	0.588	0.589	0.590	0.590	0.582	0.578
Capital income	0.412	0.411	0.410	0.410	0.418	0.422
Schedule C	0.118	0.117	0.116	0.116	0.124	0.128
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.727	0.728	0.726	0.715	0.713	0.732
Tangible investment	0.230	0.229	0.230	0.241	0.244	0.225
Intangible investment	0.141	0.143	0.144	0.144	0.127	0.120
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.039	4.159	4.255	4.540	5.117	5.501
Schedule C	0.875	0.897	0.916	0.965	1.023	1.044
Other business	3.164	3.262	3.339	3.575	4.094	4.458
Intangible capital	1.705	1.748	1.788	1.860	1.821	1.741
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.864	4.708	4.645	4.661	4.579	4.334
Wage rate	0.975	1.001	1.022	1.081	1.184	1.238
Labor input	1.086	1.083	1.083	1.069	1.017	0.985
GNP	1.051	1.074	1.095	1.143	1.208	1.231
Net worth	1.036	1.086	1.135	1.281	1.545	1.680

See table notes.

D. Eliminate FICA and Capital Taxes, Medicare, Social Security, and Implicit Transfers

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.379	0.375	0.346	0.282	0.252
Profits, Schedule C	0.025	0.024	0.023	0.019	0.012	0.009
Distributions, Schedule C	0.003	0.003	0.002	0.002	0.001	0.000
Distributions, Other	0.095	0.093	0.091	0.076	0.042	0.027
Labor	0.162	0.162	0.160	0.144	0.107	0.090
Consumption	0.094	0.097	0.099	0.106	0.119	0.126
Transfers	0.329	0.328	0.323	0.294	0.227	0.196
To retirees	0.143	0.142	0.140	0.122	0.082	0.063
To workers	0.186	0.185	0.183	0.172	0.145	0.133
Interest on debt	0.026	0.025	0.025	0.025	0.024	0.023
Labor income	0.588	0.589	0.591	0.591	0.584	0.579
Capital income	0.412	0.411	0.409	0.409	0.416	0.421
Schedule C	0.118	0.117	0.116	0.115	0.122	0.127
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.726	0.726	0.722	0.708	0.703	0.728
Tangible investment	0.230	0.231	0.234	0.248	0.254	0.229
Intangible investment	0.141	0.143	0.146	0.147	0.131	0.121
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.040	4.162	4.266	4.551	5.137	5.610
Schedule C	0.875	0.897	0.918	0.968	1.028	1.059
Other business	3.166	3.265	3.348	3.583	4.110	4.551
Intangible capital	1.705	1.749	1.792	1.866	1.828	1.764
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.864	4.708	4.646	4.674	4.587	4.227
Wage rate	0.975	1.001	1.022	1.079	1.183	1.257
Labor input	1.086	1.086	1.092	1.108	1.113	1.097
GNP	1.052	1.076	1.103	1.180	1.316	1.390
Net worth	1.036	1.090	1.146	1.325	1.690	1.930

See table notes.

A. Continue Current U.S. Policy with New Demographics

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.422	0.422	0.423	0.431	0.447	0.454
Profits, Schedule C	0.026	0.026	0.026	0.027	0.028	0.028
Distributions, Schedule C	0.004	0.004	0.004	0.005	0.005	0.006
Distributions, Other	0.094	0.094	0.094	0.094	0.094	0.094
Labor	0.224	0.223	0.223	0.222	0.221	0.220
Consumption	0.075	0.075	0.076	0.083	0.099	0.106
Transfers	0.369	0.369	0.370	0.376	0.390	0.397
To retirees	0.143	0.144	0.145	0.156	0.181	0.192
To workers	0.226	0.226	0.225	0.220	0.210	0.205
Interest on debt	0.025	0.025	0.025	0.024	0.024	0.024
Labor income	0.585	0.584	0.583	0.581	0.578	0.576
Capital income	0.415	0.416	0.417	0.419	0.422	0.424
Schedule C	0.121	0.122	0.123	0.125	0.128	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.743	0.746	0.751	0.762	0.777	0.783
Tangible investment	0.213	0.210	0.206	0.195	0.179	0.174
Intangible investment	0.135	0.134	0.132	0.127	0.120	0.118
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.150	4.151	4.148	4.154	4.170	4.165
Schedule C	0.891	0.890	0.889	0.888	0.889	0.887
Other business	3.260	3.261	3.259	3.266	3.282	3.278
Intangible capital	1.727	1.726	1.723	1.720	1.717	1.714
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.631	4.619	4.606	4.555	4.475	4.462
Wage rate	1.006	1.008	1.010	1.017	1.029	1.031
Labor input	0.991	0.988	0.982	0.960	0.921	0.905
GNP	0.995	0.995	0.992	0.981	0.958	0.945
Net worth	1.002	1.002	0.998	0.988	0.966	0.952

See table notes.

B. Eliminate FICA Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.381	0.380	0.375	0.363	0.357
Profits, Schedule C	0.025	0.025	0.025	0.025	0.026	0.026
Distributions, Schedule C	0.003	0.003	0.003	0.004	0.004	0.005
Distributions, Other	0.095	0.094	0.094	0.093	0.092	0.092
Labor	0.162	0.162	0.162	0.161	0.160	0.160
Consumption	0.094	0.096	0.096	0.091	0.080	0.075
Transfers	0.329	0.329	0.328	0.322	0.309	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.186	0.186	0.187	0.191	0.200	0.205
Interest on debt	0.026	0.025	0.024	0.023	0.022	0.021
Labor income	0.587	0.587	0.586	0.584	0.582	0.580
Capital income	0.413	0.413	0.414	0.416	0.418	0.420
Schedule C	0.119	0.119	0.120	0.122	0.124	0.125
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.728	0.731	0.734	0.741	0.755	0.764
Tangible investment	0.229	0.226	0.222	0.215	0.201	0.192
Intangible investment	0.140	0.139	0.137	0.134	0.129	0.126
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.037	4.147	4.220	4.353	4.529	4.616
Schedule C	0.874	0.891	0.902	0.921	0.946	0.958
Other business	3.163	3.256	3.318	3.432	3.583	3.658
Intangible capital	1.701	1.729	1.746	1.775	1.811	1.828
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.858	4.677	4.554	4.343	4.069	3.937
Wage rate	0.975	0.999	1.016	1.047	1.091	1.114
Labor input	1.084	1.079	1.075	1.057	1.020	0.997
GNP	1.051	1.072	1.088	1.106	1.116	1.117
Net worth	1.035	1.079	1.111	1.158	1.207	1.227

See table notes.

C. Eliminate FICA and Capital Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.381	0.380	0.376	0.365	0.360
Profits, Schedule C	0.025	0.024	0.022	0.017	0.008	0.003
Distributions, Schedule C	0.003	0.003	0.003	0.002	0.001	0.000
Distributions, Other	0.095	0.093	0.090	0.070	0.028	0.009
Labor	0.162	0.163	0.163	0.163	0.160	0.159
Consumption	0.095	0.098	0.102	0.123	0.168	0.189
Transfers	0.329	0.329	0.328	0.322	0.309	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.186	0.186	0.187	0.191	0.200	0.205
Interest on debt	0.026	0.025	0.025	0.025	0.025	0.024
Labor income	0.588	0.589	0.591	0.591	0.581	0.577
Capital income	0.412	0.411	0.409	0.409	0.419	0.423
Schedule C	0.118	0.117	0.115	0.115	0.125	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.727	0.727	0.724	0.708	0.700	0.722
Tangible investment	0.230	0.230	0.233	0.248	0.256	0.235
Intangible investment	0.141	0.143	0.146	0.146	0.127	0.118
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.039	4.161	4.265	4.596	5.290	5.750
Schedule C	0.875	0.897	0.918	0.973	1.046	1.076
Other business	3.165	3.264	3.348	3.623	4.244	4.675
Intangible capital	1.706	1.752	1.799	1.879	1.817	1.721
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.865	4.716	4.671	4.742	4.701	4.434
Wage rate	0.975	1.001	1.023	1.089	1.208	1.269
Labor input	1.086	1.084	1.085	1.072	1.016	0.980
GNP	1.051	1.074	1.096	1.153	1.232	1.258
Net worth	1.036	1.088	1.141	1.314	1.637	1.802

See table notes.

D. Eliminate FICA and Capital Taxes, Medicare, Social Security, and Implicit Transfers

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.379	0.379	0.375	0.347	0.283	0.252
Profits, Schedule C	0.025	0.024	0.022	0.017	0.008	0.003
Distributions, Schedule C	0.003	0.003	0.002	0.002	0.001	0.000
Distributions, Other	0.095	0.093	0.090	0.070	0.028	0.009
Labor	0.162	0.162	0.160	0.145	0.107	0.090
Consumption	0.094	0.098	0.100	0.113	0.139	0.150
Transfers	0.329	0.328	0.323	0.294	0.227	0.196
To retirees	0.143	0.142	0.140	0.122	0.082	0.063
To workers	0.186	0.185	0.183	0.172	0.145	0.133
Interest on debt	0.026	0.025	0.025	0.025	0.025	0.023
Labor income	0.588	0.590	0.591	0.593	0.584	0.578
Capital income	0.412	0.410	0.409	0.407	0.416	0.422
Schedule C	0.118	0.117	0.115	0.113	0.122	0.128
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.726	0.725	0.721	0.701	0.691	0.718
Tangible investment	0.231	0.231	0.236	0.256	0.267	0.239
Intangible investment	0.141	0.144	0.148	0.149	0.130	0.120
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.041	4.167	4.275	4.602	5.305	5.859
Schedule C	0.875	0.898	0.920	0.975	1.049	1.090
Other business	3.166	3.269	3.355	3.627	4.256	4.769
Intangible capital	1.707	1.754	1.803	1.884	1.823	1.743
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.865	4.714	4.668	4.762	4.715	4.326
Wage rate	0.975	1.001	1.023	1.087	1.209	1.289
Labor input	1.087	1.087	1.093	1.111	1.111	1.093
GNP	1.052	1.077	1.104	1.190	1.343	1.423
Net worth	1.037	1.092	1.151	1.358	1.790	2.071

See table notes.

A. Continue Current U.S. Policy with New Demographics

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.422	0.422	0.423	0.431	0.447	0.454
Profits, Schedule C	0.026	0.026	0.026	0.027	0.028	0.028
Distributions, Schedule C	0.004	0.004	0.004	0.005	0.005	0.006
Distributions, Other	0.094	0.094	0.094	0.094	0.094	0.094
Labor	0.224	0.223	0.223	0.222	0.221	0.220
Consumption	0.075	0.075	0.076	0.084	0.099	0.106
Transfers	0.369	0.369	0.370	0.376	0.390	0.397
To retirees	0.143	0.144	0.145	0.156	0.181	0.192
To workers	0.226	0.226	0.225	0.220	0.210	0.205
Interest on debt	0.025	0.025	0.024	0.024	0.024	0.024
Labor income	0.585	0.585	0.584	0.581	0.578	0.577
Capital income	0.415	0.415	0.416	0.419	0.422	0.423
Schedule C	0.121	0.122	0.122	0.125	0.128	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.742	0.745	0.749	0.761	0.776	0.782
Tangible investment	0.214	0.211	0.207	0.196	0.180	0.175
Intangible investment	0.135	0.134	0.132	0.127	0.121	0.119
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.166	4.167	4.167	4.175	4.198	4.197
Schedule C	0.893	0.893	0.892	0.892	0.893	0.892
Other business	3.273	3.274	3.275	3.283	3.305	3.305
Intangible capital	1.731	1.730	1.729	1.725	1.724	1.723
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.611	4.600	4.584	4.529	4.439	4.424
Wage rate	1.009	1.011	1.013	1.022	1.036	1.037
Labor input	0.984	0.981	0.975	0.954	0.914	0.896
GNP	0.991	0.991	0.989	0.980	0.957	0.942
Net worth	1.001	1.001	0.999	0.990	0.970	0.955

See table notes.

B. Eliminate FICA Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.360	0.361	0.361	0.360	0.358	0.356
Profits, Schedule C	0.025	0.025	0.025	0.025	0.025	0.025
Distributions, Schedule C	0.003	0.003	0.003	0.004	0.004	0.005
Distributions, Other	0.095	0.094	0.094	0.093	0.092	0.091
Labor	0.162	0.162	0.162	0.161	0.161	0.160
Consumption	0.075	0.077	0.077	0.077	0.076	0.075
Transfers	0.309	0.309	0.309	0.308	0.304	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.166	0.166	0.168	0.176	0.196	0.205
Interest on debt	0.026	0.025	0.024	0.023	0.021	0.020
Labor income	0.587	0.587	0.586	0.585	0.583	0.581
Capital income	0.413	0.413	0.414	0.415	0.417	0.419
Schedule C	0.120	0.120	0.120	0.121	0.123	0.125
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.733	0.734	0.735	0.740	0.752	0.761
Tangible investment	0.224	0.223	0.221	0.216	0.205	0.196
Intangible investment	0.138	0.138	0.137	0.135	0.130	0.127
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.054	4.139	4.210	4.360	4.590	4.714
Schedule C	0.876	0.889	0.900	0.922	0.955	0.973
Other business	3.178	3.250	3.309	3.437	3.635	3.742
Intangible capital	1.705	1.726	1.743	1.777	1.826	1.851
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.815	4.679	4.567	4.335	4.004	3.835
Wage rate	0.982	1.000	1.016	1.050	1.103	1.132
Labor input	1.062	1.058	1.054	1.031	0.984	0.957
GNP	1.038	1.054	1.067	1.082	1.088	1.089
Net worth	1.025	1.059	1.087	1.135	1.190	1.219

See table notes.

C. Eliminate FICA and Capital Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.360	0.361	0.361	0.362	0.361	0.360
Profits, Schedule C	0.025	0.024	0.022	0.016	0.006	0.000
Distributions, Schedule C	0.003	0.003	0.003	0.002	0.001	0.000
Distributions, Other	0.094	0.093	0.089	0.068	0.021	0.000
Labor	0.162	0.162	0.163	0.163	0.160	0.159
Consumption	0.075	0.079	0.084	0.112	0.173	0.201
Transfers	0.309	0.309	0.309	0.308	0.304	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.166	0.166	0.168	0.176	0.196	0.205
Interest on debt	0.026	0.025	0.025	0.026	0.025	0.024
Labor income	0.588	0.589	0.591	0.591	0.581	0.577
Capital income	0.412	0.411	0.409	0.409	0.419	0.423
Schedule C	0.119	0.117	0.115	0.115	0.125	0.129
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.731	0.730	0.724	0.705	0.693	0.714
Tangible investment	0.225	0.226	0.232	0.251	0.264	0.241
Intangible investment	0.140	0.143	0.146	0.147	0.127	0.118
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.060	4.156	4.259	4.618	5.384	5.912
Schedule C	0.878	0.896	0.917	0.976	1.058	1.096
Other business	3.182	3.260	3.343	3.642	4.325	4.816
Intangible capital	1.710	1.752	1.801	1.886	1.818	1.720
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.819	4.717	4.694	4.786	4.751	4.437
Wage rate	0.982	1.002	1.023	1.094	1.221	1.290
Labor input	1.063	1.061	1.061	1.043	0.983	0.950
GNP	1.038	1.055	1.074	1.127	1.207	1.242
Net worth	1.027	1.068	1.117	1.294	1.636	1.831

See table notes.

D. Eliminate FICA and Capital Taxes, Medicare, Social Security, and Implicit Transfers

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.360	0.360	0.356	0.332	0.278	0.252
Profits, Schedule C	0.025	0.024	0.022	0.016	0.005	0.000
Distributions, Schedule C	0.003	0.003	0.002	0.002	0.001	0.000
Distributions, Other	0.094	0.093	0.089	0.068	0.021	0.000
Labor	0.162	0.162	0.160	0.145	0.107	0.090
Consumption	0.075	0.078	0.082	0.102	0.144	0.162
Transfers	0.309	0.308	0.304	0.279	0.223	0.196
To retirees	0.143	0.142	0.140	0.122	0.082	0.063
To workers	0.166	0.166	0.164	0.157	0.140	0.133
Interest on debt	0.026	0.025	0.025	0.025	0.025	0.023
Labor income	0.588	0.590	0.592	0.593	0.583	0.577
Capital income	0.412	0.410	0.408	0.407	0.417	0.423
Schedule C	0.119	0.117	0.115	0.113	0.123	0.128
Other business	0.294	0.294	0.294	0.294	0.294	0.294
Consumption	0.730	0.728	0.721	0.698	0.683	0.709
Tangible investment	0.226	0.228	0.236	0.259	0.273	0.246
Intangible investment	0.140	0.144	0.148	0.150	0.130	0.120
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	4.061	4.164	4.275	4.649	5.440	6.038
Schedule C	0.878	0.898	0.920	0.982	1.067	1.112
Other business	3.183	3.266	3.355	3.668	4.372	4.926
Intangible capital	1.711	1.755	1.807	1.898	1.833	1.745
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	4.819	4.713	4.684	4.769	4.712	4.313
Wage rate	0.982	1.003	1.025	1.096	1.227	1.311
Labor input	1.064	1.064	1.068	1.071	1.049	1.027
GNP	1.039	1.058	1.081	1.157	1.290	1.364
Net worth	1.028	1.072	1.128	1.336	1.766	2.046

See table notes.

A. Continue Current U.S. Policy with New Demographics

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.416	0.416	0.417	0.425	0.441	0.448
Profits, Schedule C	0.051	0.051	0.051	0.050	0.050	0.050
Distributions, Schedule C	0.000	0.000	0.000	0.000	0.000	0.000
Distributions, Other	0.000	0.000	0.000	0.000	0.000	0.000
Labor	0.256	0.256	0.256	0.256	0.256	0.256
Consumption	0.109	0.109	0.111	0.119	0.135	0.142
Transfers	0.369	0.369	0.370	0.376	0.390	0.397
To retirees	0.143	0.144	0.145	0.156	0.181	0.192
To workers	0.226	0.226	0.225	0.220	0.210	0.205
Interest on debt	0.019	0.019	0.019	0.018	0.018	0.018
Labor income	0.670	0.670	0.670	0.670	0.670	0.670
Capital income	0.330	0.330	0.330	0.330	0.330	0.330
Schedule C	0.330	0.330	0.330	0.330	0.330	0.330
Other business	0.000	0.000	0.000	0.000	0.000	0.000
Consumption	0.691	0.693	0.696	0.705	0.715	0.718
Tangible investment	0.265	0.263	0.260	0.252	0.242	0.239
Intangible investment	0.001	0.001	0.001	0.001	0.001	0.001
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	3.026	3.027	3.027	3.035	3.047	3.047
Schedule C	3.026	3.027	3.027	3.035	3.047	3.047
Other business	0.000	0.000	0.000	0.000	0.000	0.000
Intangible capital	0.011	0.011	0.011	0.011	0.011	0.011
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	3.507	3.499	3.491	3.446	3.386	3.395
Wage rate	1.006	1.006	1.007	1.010	1.014	1.014
Labor input	0.987	0.984	0.981	0.961	0.925	0.909
GNP	0.991	0.989	0.986	0.969	0.936	0.920
Net worth	1.000	0.998	0.995	0.980	0.950	0.932

See table notes.

B. Eliminate FICA Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
Shares of GNP:						
Tax revenues	0.373	0.375	0.373	0.365	0.351	0.351
Profits, Schedule C	0.052	0.050	0.049	0.047	0.045	0.044
Distributions, Schedule C	0.000	0.000	0.000	0.000	0.000	0.000
Distributions, Other	0.000	0.000	0.000	0.000	0.000	0.000
Labor	0.185	0.185	0.185	0.185	0.185	0.185
Consumption	0.136	0.139	0.139	0.133	0.122	0.122
Transfers	0.329	0.329	0.327	0.319	0.304	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.186	0.186	0.186	0.188	0.195	0.205
Interest on debt	0.020	0.018	0.018	0.017	0.015	0.015
Labor income	0.670	0.670	0.670	0.670	0.670	0.670
Capital income	0.330	0.330	0.330	0.330	0.330	0.330
Schedule C	0.330	0.330	0.330	0.330	0.330	0.330
Other business	0.000	0.000	0.000	0.000	0.000	0.000
Consumption	0.680	0.682	0.684	0.685	0.691	0.695
Tangible investment	0.277	0.274	0.273	0.272	0.265	0.262
Intangible investment	0.001	0.001	0.001	0.001	0.001	0.001
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	2.954	3.050	3.097	3.188	3.301	3.341
Schedule C	2.954	3.050	3.097	3.188	3.301	3.341
Other business	0.000	0.000	0.000	0.000	0.000	0.000
Intangible capital	0.011	0.011	0.011	0.011	0.012	0.012
Levels:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	3.743	3.467	3.339	3.107	2.827	2.730
Wage rate	0.990	1.008	1.017	1.033	1.054	1.061
Labor input	1.067	1.062	1.060	1.049	1.015	0.991
GNP	1.055	1.069	1.076	1.082	1.068	1.050
Net worth	1.044	1.086	1.108	1.141	1.159	1.152

See table notes.

C. Eliminate FICA and Capital Taxes, Medicare, and Social Security

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
SHARES OF GNP:						
Tax revenues	0.373	0.375	0.373	0.366	0.352	0.351
Profits, Schedule C	0.052	0.050	0.047	0.034	0.009	0.000
Distributions, Schedule C	0.000	0.000	0.000	0.000	0.000	0.000
Distributions, Other	0.000	0.000	0.000	0.000	0.000	0.000
Labor	0.185	0.185	0.185	0.185	0.185	0.185
Consumption	0.136	0.140	0.142	0.147	0.158	0.166
Transfers	0.329	0.329	0.327	0.319	0.304	0.303
To retirees	0.143	0.143	0.141	0.131	0.109	0.098
To workers	0.186	0.186	0.186	0.188	0.195	0.205
Interest on debt	0.020	0.019	0.018	0.017	0.016	0.015
Labor income	0.670	0.670	0.670	0.670	0.670	0.670
Capital income	0.330	0.330	0.330	0.330	0.330	0.330
Schedule C	0.330	0.330	0.330	0.330	0.330	0.330
Other business	0.000	0.000	0.000	0.000	0.000	0.000
Consumption	0.680	0.681	0.679	0.666	0.656	0.658
Tangible investment	0.277	0.275	0.278	0.290	0.301	0.298
Intangible investment	0.001	0.001	0.001	0.001	0.001	0.001
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	2.954	3.054	3.116	3.303	3.638	3.796
Schedule C	2.954	3.054	3.116	3.303	3.638	3.796
Other business	0.000	0.000	0.000	0.000	0.000	0.000
Intangible capital	0.011	0.011	0.011	0.012	0.012	0.012
LEVELS:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	3.745	3.478	3.375	3.247	3.034	2.865
Wage rate	0.990	1.009	1.020	1.050	1.104	1.130
Labor input	1.068	1.063	1.063	1.054	1.019	0.993
GNP	1.056	1.070	1.081	1.104	1.123	1.120
Net worth	1.044	1.089	1.119	1.201	1.328	1.374

See table notes.

D. Eliminate FICA and Capital Taxes, Medicare, Social Security, and Implicit Transfers

	2011-20	2021-30	2031-40	2041-70	2071-99	∞
Shares of GNP:						
Tax revenues	0.373	0.373	0.368	0.339	0.274	0.243
Profits, Schedule C	0.052	0.050	0.047	0.033	0.009	0.000
Distributions, Schedule C	0.000	0.000	0.000	0.000	0.000	0.000
Distributions, Other	0.000	0.000	0.000	0.000	0.000	0.000
Labor	0.184	0.184	0.183	0.179	0.158	0.104
Consumption	0.136	0.139	0.138	0.127	0.107	0.139
Transfers	0.329	0.328	0.323	0.294	0.227	0.196
To retirees	0.143	0.142	0.140	0.122	0.082	0.063
To workers	0.186	0.185	0.183	0.172	0.145	0.133
Interest on debt	0.020	0.018	0.018	0.017	0.016	0.014
Labor income	0.670	0.670	0.670	0.670	0.670	0.670
Capital income	0.330	0.330	0.330	0.330	0.330	0.330
Schedule C	0.330	0.330	0.330	0.330	0.330	0.330
Other business	0.000	0.000	0.000	0.000	0.000	0.000
Consumption	0.679	0.679	0.674	0.658	0.651	0.650
Tangible investment	0.278	0.277	0.282	0.298	0.305	0.304
Intangible investment	0.001	0.001	0.001	0.001	0.001	0.001
Defense spending	0.044	0.044	0.044	0.044	0.044	0.044
Tangible capital	2.955	3.060	3.129	3.342	3.664	3.882
Schedule C	2.955	3.060	3.129	3.342	3.664	3.882
Other business	0.000	0.000	0.000	0.000	0.000	0.000
Intangible capital	0.011	0.011	0.011	0.012	0.012	0.012
Levels:						
Fraction working	0.745	0.744	0.742	0.727	0.692	0.676
Interest rate (%)	3.745	3.467	3.350	3.167	2.981	2.669
Wage rate	0.990	1.009	1.021	1.055	1.108	1.143
Labor input	1.069	1.066	1.070	1.082	1.088	1.097
GNP	1.057	1.074	1.091	1.139	1.203	1.251
Net worth	1.046	1.094	1.133	1.252	1.431	1.565

Note: The table displays averages over subperiods. Values for the wage rate, labor input, GNP, and net worth are relative to the current U.S. economy.

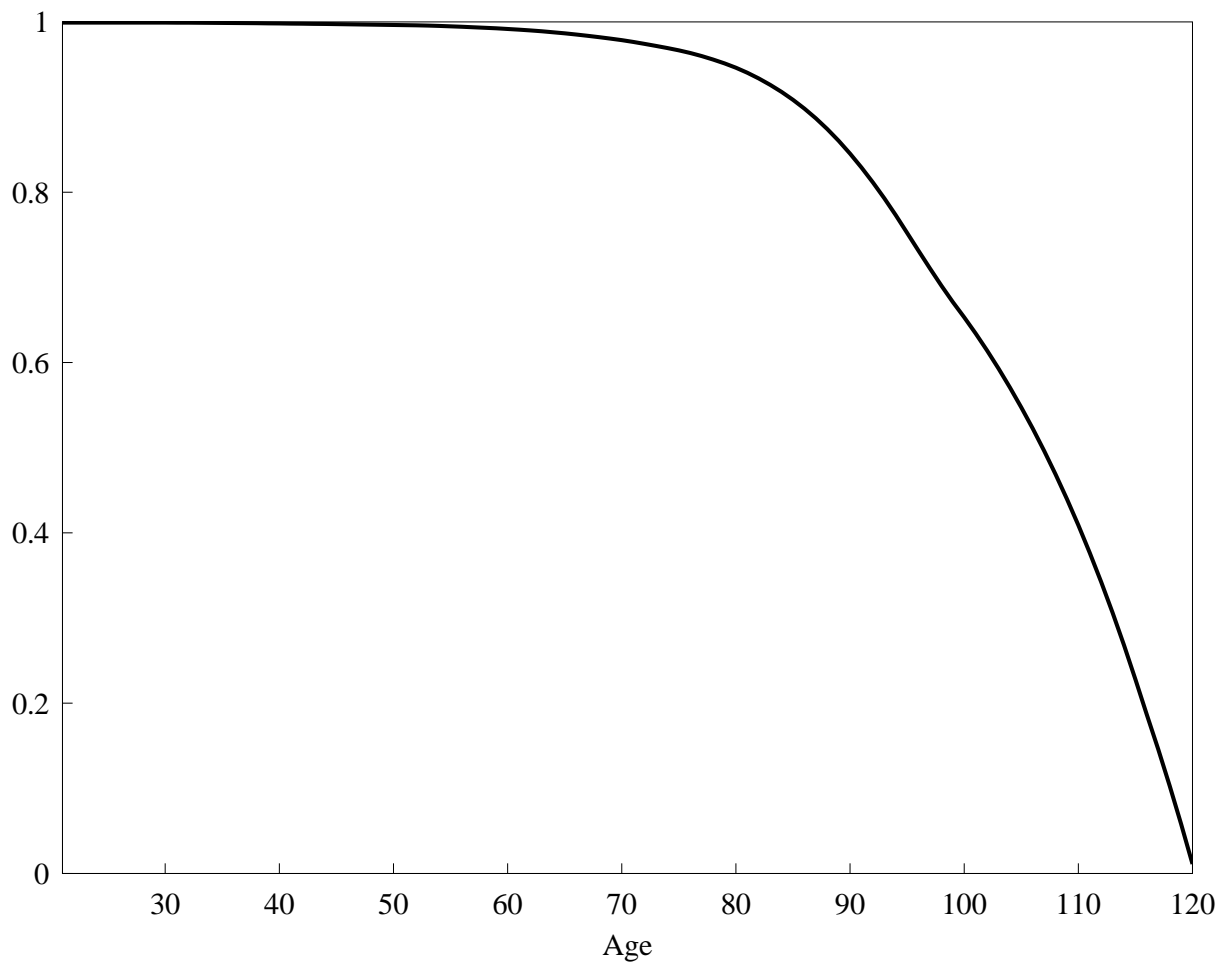FIGURE A1. ONE-YEAR SURVIVAL PROBABILITIES BASED ON 2010 LIFE TABLES

FIGURE A2. PERCENTAGE WELFARE GAINS BY COHORT FOR THREE ALTERNATIVE SAVING-FOR-RETIREMENT POLICIES — NO ANNUITY MARKETS
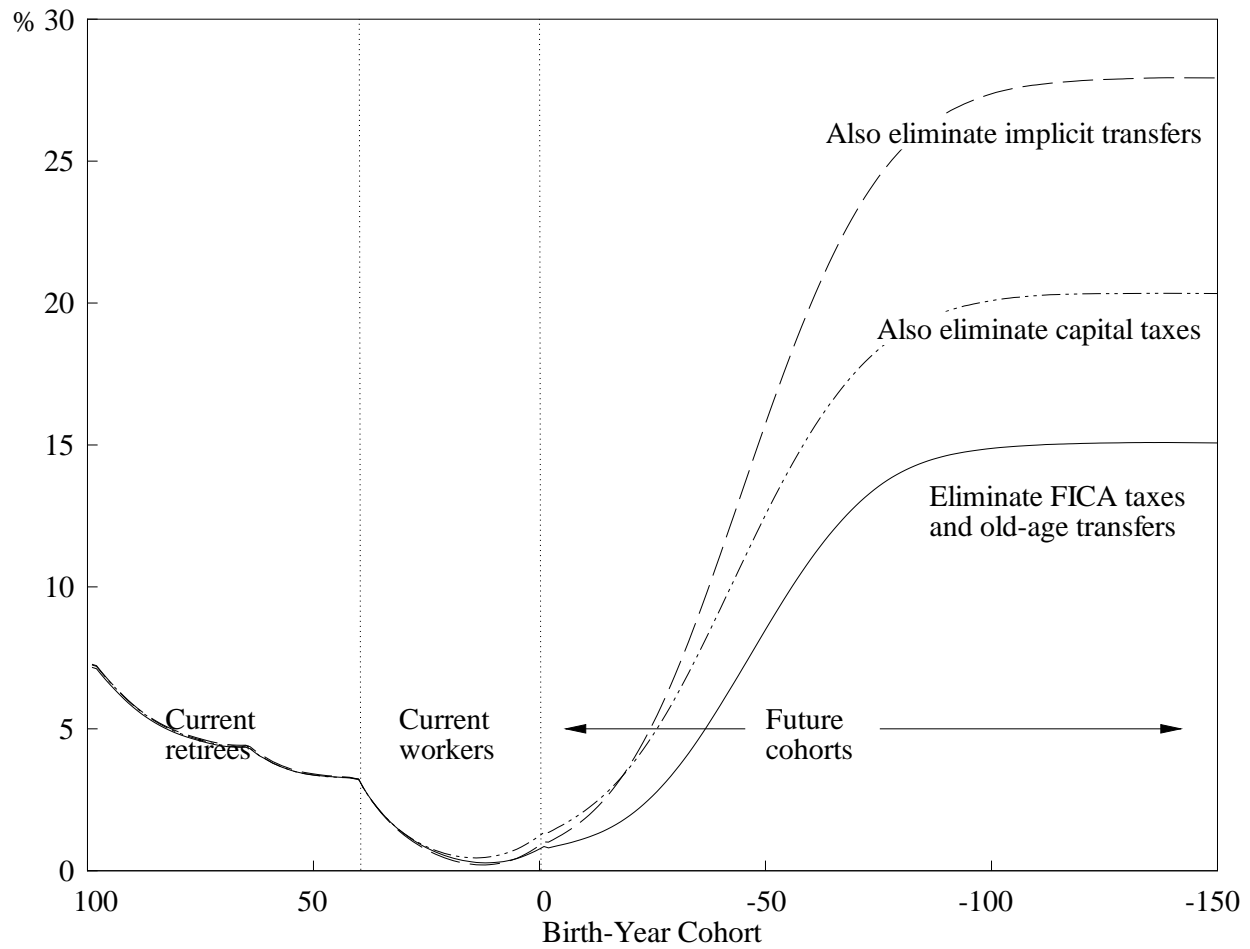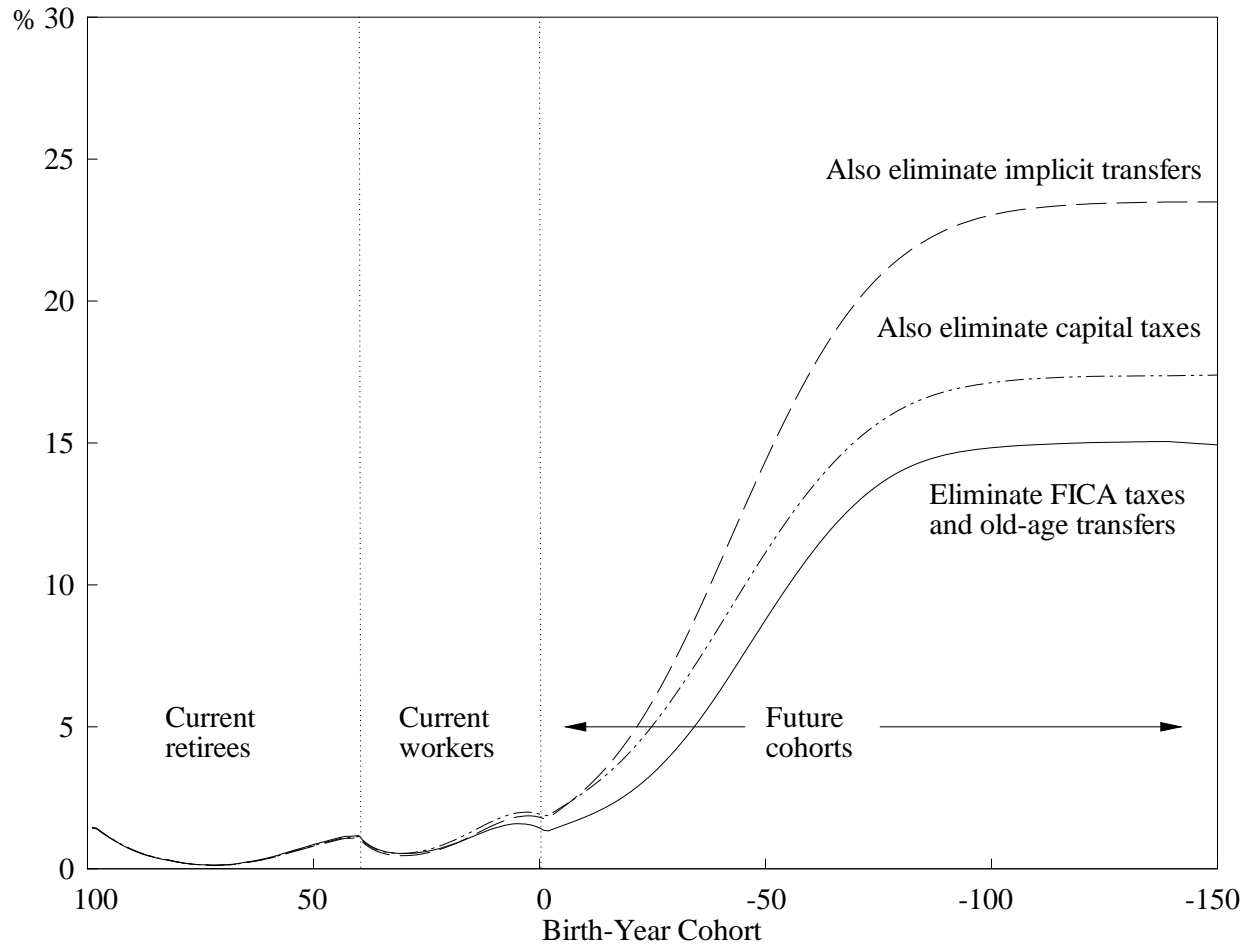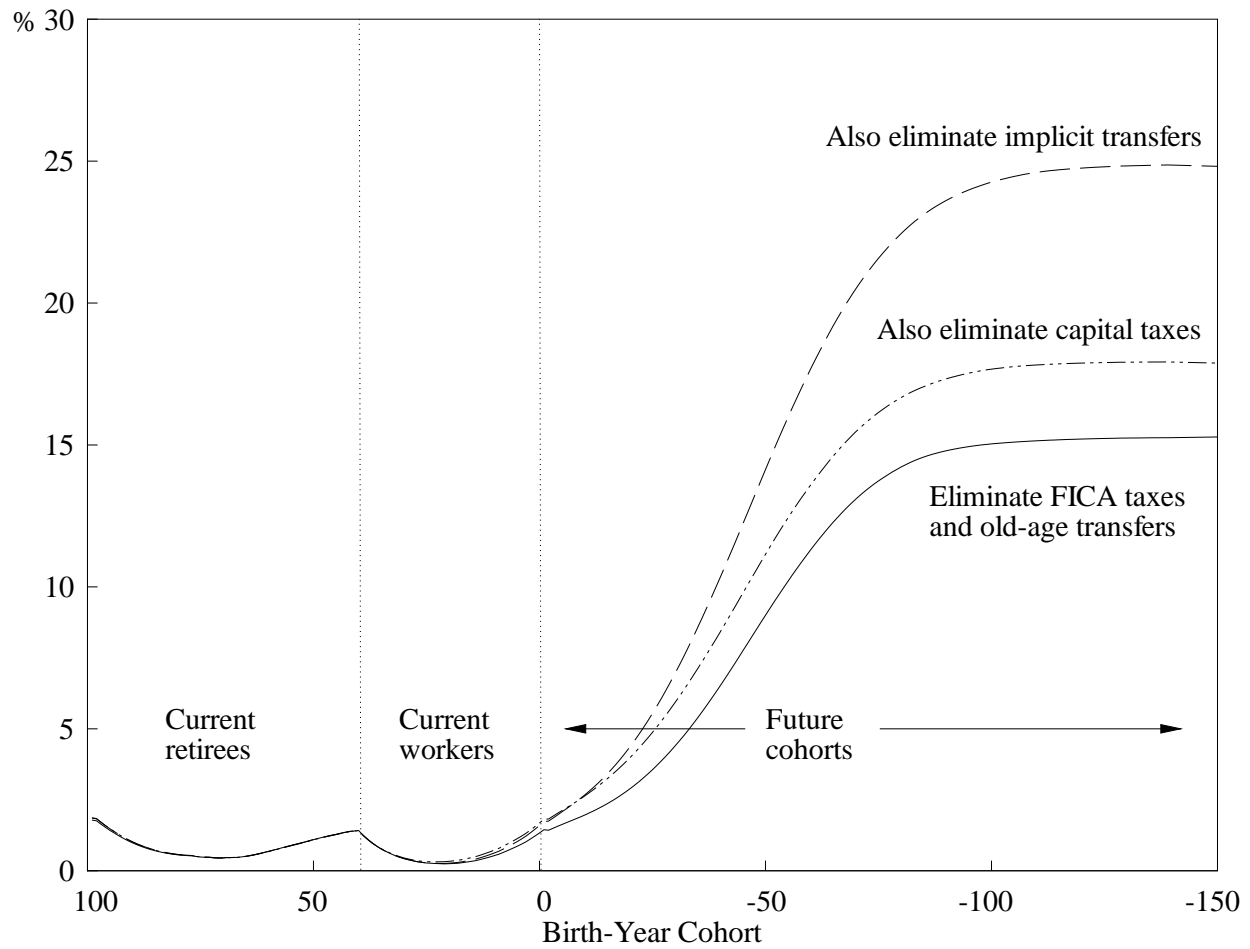
FIGURE A4. PERCENTAGE WELFARE GAINS BY COHORT FOR THREE ALTERNATIVE
SAVING-FOR-RETIREMENT POLICIES

12 PERCENT PROFITS TAX RATE

FIGURE A5. PERCENTAGE WELFARE GAINS BY COHORT FOR THREE ALTERNATIVE SAVING-FOR-RETIREMENT POLICIES — 4 PERCENT PROFITS TAX RATE
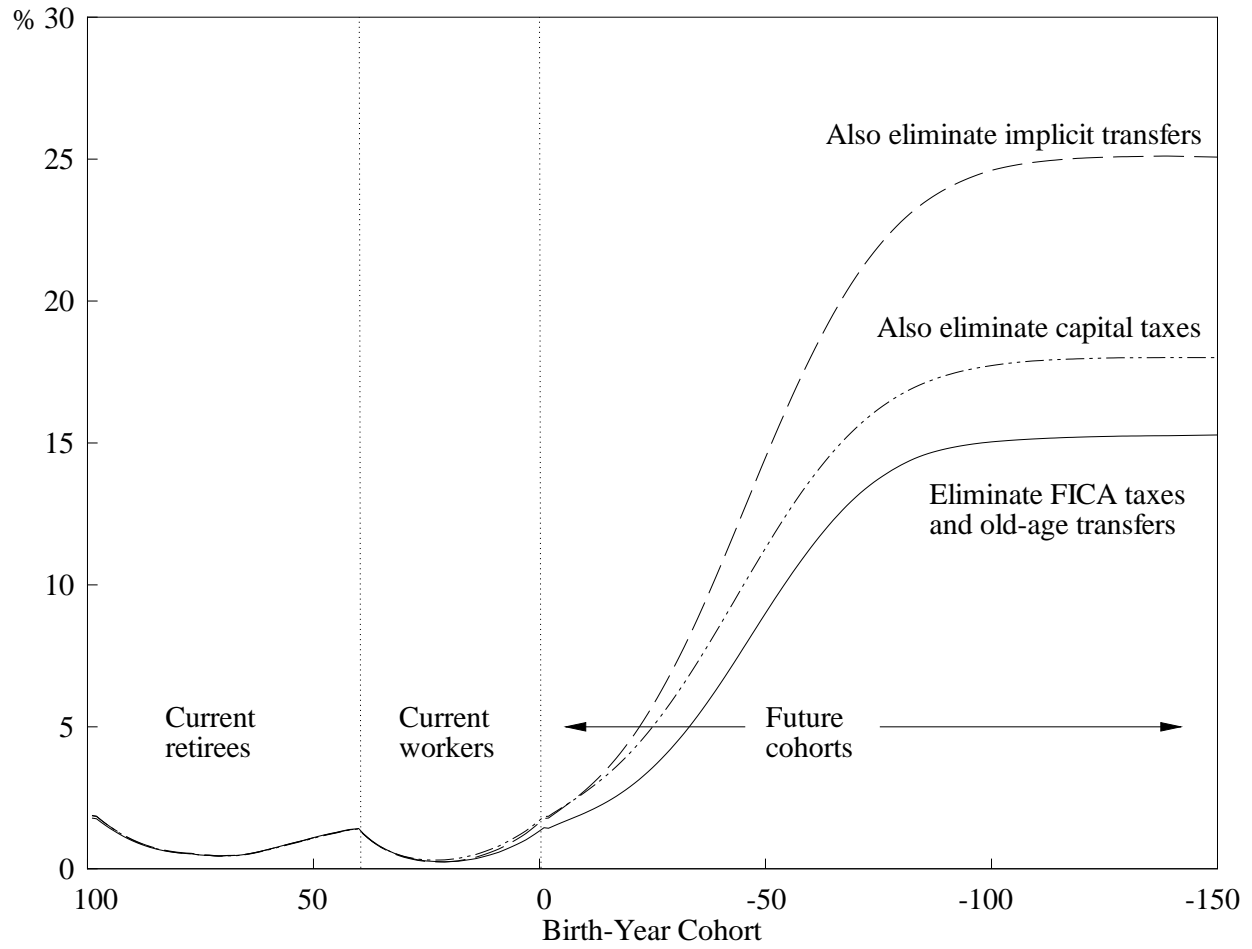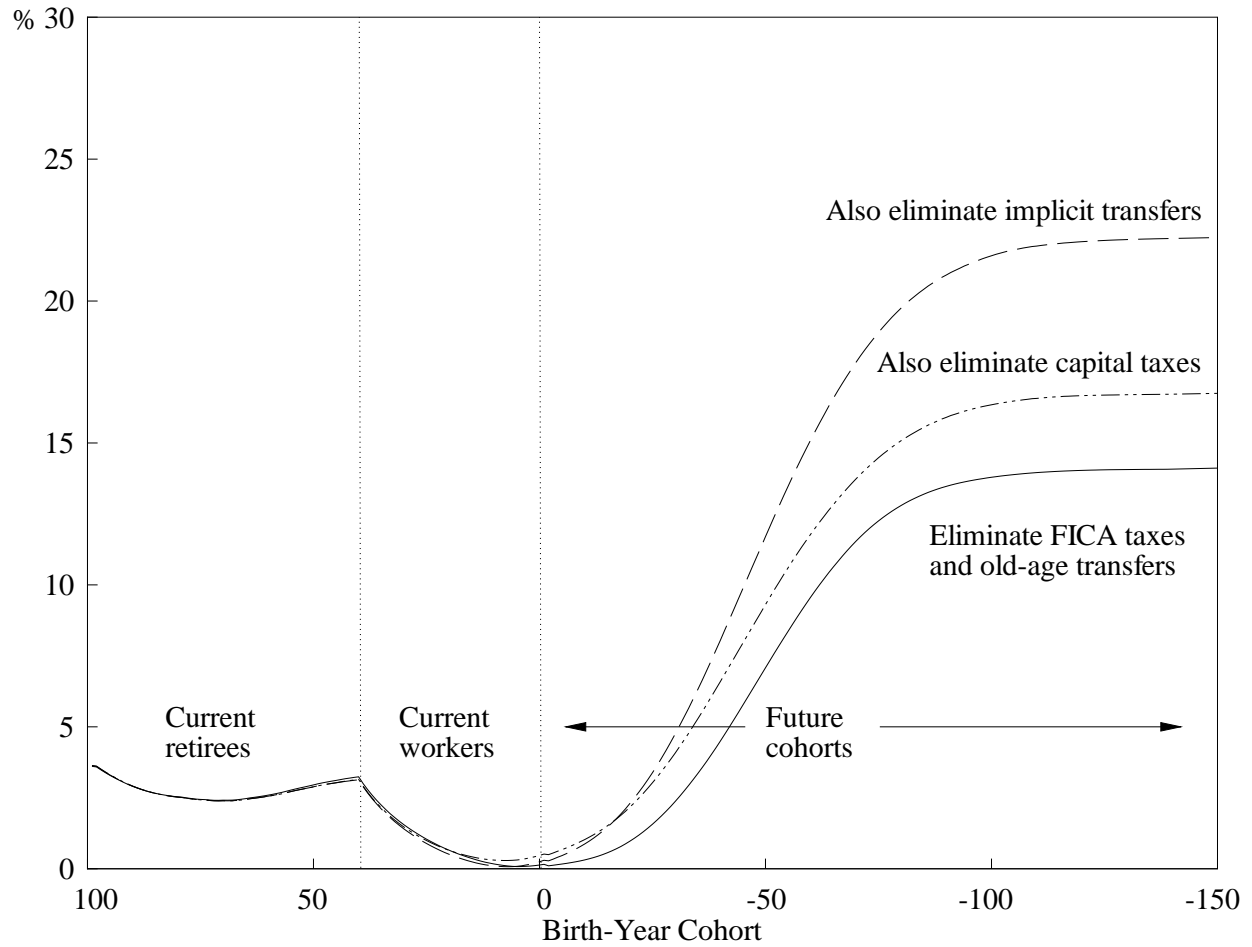
FIGURE A7. PERCENTAGE WELFARE GAINS BY COHORT FOR THREE ALTERNATIVE SAVING-FOR-RETIREMENT POLICIES ONE-CAPITAL, ONE-SECTOR MODEL