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## The Distributional Effects of the Trump and Clinton Tax Proposals
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| Abstract: | The major U.S. candidates for President in 2016 have proposed important changes in the Federal tax code. Hillary Clinton would raise the top personal income tax rates; Donald Trump would cut these taxes, and set a 15% tax on business income. Over a ten-year period, Clinton's proposals would raise Federal tax revenue by a total of $816 billion, while Trump's tax changes would lower tax revenue by $9.8 trillion.<br>We show that 86% of the incremental tax burden of Clinton's modest tax increases would fall on those in the top tenth of the income distribution. Seven-tenths of Trump's tax cuts would accrue to the top decile, who would gain over $15,000 annually per person; those in the poorest 40% would gain less than $500 each. |

# The Distributional Effects of the Trump and Clinton Tax Proposals

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# The Distributional Effects of the Trump and Clinton Tax Proposals

## Abstract

Hillary Clinton and Donald Trump, the Democratic and Republican candidates for President of the U.S. in 2016, have proposed several changes in the Federal tax code. Hillary Clinton would add a personal income tax surcharge of 4% on high annual incomes, limit the tax benefits of non-charitable deductions, set a minimum tax rate of 30% on taxpayers earning more than a million dollars a year, increase the tax rates on capital gains for taxpayers in the top tax bracket, and expand the base of the estate tax. Donald Trump would reduce the number of personal income tax rates, increase the standard personal deduction, cut all taxes on business income to no more than 15%, and abolish the inheritance tax.

Using a tax calculator model, we estimate that the static effects of these very different changes: over a ten-year period, Clinton's proposals would raise Federal tax revenue by a total of $816 billion, an increase of 1.9% over projected baseline revenue, while Trump's tax changes would lower tax revenue by $9.8 trillion. Clinton's higher taxes would reduce incomes and revenue somewhat, while Trump's tax cuts would potentially boost output substantially.

Using an extended simulation model, we find that 86% of the incremental tax burden of Clinton's tax increases would fall on those in the top tenth of the income distribution; most other taxpayers would see only minor changes in their tax burdens, and the revenue and redistributive effects of her proposed changes are thus relatively modest. Meanwhile, 70% of Trump's tax cuts would go to those in the top decile, and the effects are large, with gains of over $15,000 annually per person for this group, compared to gains of less than $500 per person for the poorest 40% of the population. On tax policy, the two candidates offer strikingly different visions.

## Introduction

Both Hillary Clinton and Donald Trump, the main candidates running for election for president in the U.S. in 2016, have offered substantive proposals for changing the structure of federal taxes. In this paper we measure the distributional effects of their proposals. In line with the popular perception, we find that the Clinton changes would have a modest effect in reducing inequality by raising more revenue from those at the top of the income distribution, while the Trump changes would provide substantial benefits to those at the top, but little to those at the bottom, of the distribution.

There is a growing perception that fruits of the economic growth in the U.S. over the past generation have accrued disproportionately to the well-off. This has put the question of inequality back on the political agenda. Since tax policy offers one of the few short-term tools for altering the distribution of (after-tax) income, it is important to measure the extent to which politically-important tax proposals may influence inequality.

In the next section we lay out the tax proposals of the two candidates. Given the complexity of the tax code, and the extensive nature of the proposed changes, it is not straightforward to measure their impact. In the subsequent section we explain how we calculate the revenue effects, and we report the results. This is followed by a section in which we tackle the more difficult job of measuring distributional effects, where we set out our methodology, and introduce the data needed in order to apply. The findings are summarized in the penultimate section, we offer some conclusions in the final part of the paper.

## The Tax Proposals

The tax proposals of the two candidates differ sharply, and we summarize them in this section.

***Personal Income Tax***

Some of the key features of the Federal personal income tax are set out in Table 1. Taxpayer income from labor and capital is adjusted for certain expenses to give adjusted gross income; from this one subtracts personal exemptions and deductions – which may be itemized, or use a standard rate – to get taxable income, which is then subject to marginal tax at rates that start at 10%, and rise to 39.6% on the highest incomes. The tax rates on capital gains are somewhat lower – shown in the square brackets in Table 1 – but there is an additional 3.8% tax on investment income for high-income taxpayers.

Some households are eligible to claim refundable tax credits, such as the earned income tax credit; Erb (2015) provides some details. Indeed low-income households are on average net beneficiaries under the personal income tax, as we document in more detail below (see Table 4).

The main changes proposed by Clinton are:

1. To add a surcharge of 4% on adjusted gross annual income above $5 million.

2. To limit the tax saved by deductions to at most 28% of the value of those deductions; currently it would be worth more for households in a tax bracket higher than 28%.

3. To apply the "Buffett Rule" that would ensure that all taxpayers with a modified adjusted gross income of $1 million or more would pay at least 30% of their income in taxes.

4. To raise the tax rates applicable to capital gains for those in the top income tax bracket, by applying the standard tax rate to capital gains on assets held less than two years (rather than the current one year), and phasing in the preferential capital gains rates gradually so that they would only apply completely to assets held for six or more years.

5. To repeal the carried interest provision, which allows general partners in some businesses to book most of their earnings as (low-taxed) capital gains rather than labor income.

These changes are summarized in the middle panel of Table 1.

The Trump proposal would introduce just three non-zero tax rates (12%, 25%, and 33%). The standard deductions, which are currently $6,300 for single filers and $12,600 for married filing jointly, would rise to $20,000 and $40,000 respectively. Itemized deductions would be capped at $100,000 for a single filer, and at $200,000 for a married couple filing jointly, and the Alternative Minimum Tax would be abolished. The details are set out in Table 1. Trump would also cap the tax on business income at 15%, and would presumably maintain relatively low tax rates on dividends and capital gains.

Figure 1 illustrates some of the proposed changes in marginal tax rates. The top line shows the current rates, which Clinton would retain. The central dot-dash line shows the marginal rates proposed by Trump; and the lower dashed line reflects the tax rate on long-term capital gains proposed by Clinton. In all cases the steps shown in Figure 1 reflect the brackets that would apply to a married couple with two children, filing jointly.

### Corporate Income Tax

The corporate income tax applies to limited-liability C-corporations, and starts at 15% for taxable income below $50,000 per year, eventually rising to 35% (for corporate income above $18.3 million annually). Most C corporations are large, so in 2013 the average tax rate was 34.8% (IRS-SOI 2016, Table 5). When state and local corporation income taxes are included, the statutory rates in the United States are the highest of all Organization for Economic Co-operation and Development (OECD) countries, and this has led to widespread calls for reforming this tax (Angelini and Tuerck 2015).

The Clinton proposal would make only a few changes to the tax code that applies to corporations – eliminating some tax incentives for fossil fuels, and making it harder to avoid U.S. taxes by holding profits overseas. The Joint Committee on Taxation (2015) estimated the lost Federal revenue

due to the fossil fuel tax incentives at $3.1 billion in 2015; we use this value, adjusted for inflation, in our

estimates below.[1]

**TABLE 1**
**Personal Income Tax Rates and Brackets - Currently (2016) and Under Clinton and Trump Proposals**

| | Tax brackets ($ of taxable income per year) | | | |
| | Single | Married filing jointly | Married filing separately | Head of household |
|---|---|---|---|---|
| **Current rates/brackets** | | | | |
| 10% [0%] | 0 - | 0 - | 0 - | 0 - |
| 15% [0%] | 9,275 - | 18,550 - | 9,275 - | 13,250 - |
| 25% [15%] | 37,650 - | 75,300 - | 37,650 - | 50,400 - |
| 28% [15%] | 91,150 - | 151,900 - | 75,950 - | 130,150 - |
| 33% [15%] | 190,150 - | 231,450 - | 115,725 - | 210,800 - |
| 35% [15%] | 413,350 - | 413,350 - | 206,675 - | 413,350 - |
| 39.6% [20%] | 415,050 - | 466,950 - | 233,475 - | 441,000 - |
| *Memo items* | | | | |
| Standard deduction | 6,300 | 12,600 | 6,300 | 9,300 |
| Personal exemption | 4,050 | 4,050 | 4,050 | 4,050 |
| **Clinton's proposed changes & additions** | | | | |
| Top tax bracket | | | | |
| 43.6% | 2,500,000 | 5,000,000 | 2,500,000 | 2,500,000 |
| Minimum 30% average rate | 1,000,000 | 1,000,000 | 1,000,000 | 1,000,000 |
| **Capital gains for top tax bracket** | *Applicable tax rate* | | | |
| Asset held up to 2 years | 47.4% | | | |
| Asset held 2-3 years | 39.8% | | | |
| Asset held 3-4 years | 35.8% | | | |
| Asset held 4-5 years | 31.8% | | | |
| Asset held 5-6 years | 27.8% | | | |
| Asset held 6+ years | 23.8% | | | |
| **Trump rates/brackets** | | | | |
| 12% [0% on div/Kgain] | 0 - | 0 - | 0 - | 0 - |
| 25% [15% on div/Kgain] | 37,650 | 75,300 | 37,650 | 50,400 |
| 33% [20% on div/Kgain] | 190,150 | 231,450 | 115,725 | 210,800 |
| *Memo items* | | | | |
| Standard deduction* | 20,000 | 40,000 | 20,000 | 30,000 |
| Personal exemption | 4,050 | 4,050 | 4,050 | 4,050 |

*Notes:* Figures in square brackets refer to rate applicable to capital gains. Investment income is subject to an additional tax of 3.8% if the married taxpayer filing jointly has a modified adjusted gross income exceeding $250,000 ($150,000 for married filing separately, $200,000 for others). div/Kgain = dividends and capital gains. Standard deduction (or itemized deductions) and personal exemptions are deducted before the taxes are applied. Under current rules, exemptions are phased out at high incomes (between $311,300 and $433,800 for a married couple filing jointly, for instance). The Trump proposal would limit tax on business income to no more than 15%.
*Sources:* Top panel: US Tax Center (2017). Middle panel: Clinton (2016). Bottom panel: Cole (2015), National Taxpayers Union (2015), Trump (2016).

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[1] Specifically, we include the tax expenditures related to expensing exploration and development costs, the excess percentage over cost depletions, the amortization of geological and geophysical expenditures, the amortization of air pollution control facilities, and the depreciation recovery 15-year MACRS for national gas distribution lines. See Joint Committee on Taxation (2015), Table 1.

**Figure 1  Marginal Personal Income Tax Rates, 2017**
Top solid line: current personal income tax rates, and those proposed by Clinton. Middle dot-dash line: Trump's proposed personal income tax rates. Lower dashed line: Clinton's proposed long-term capital gains tax rate. These are for a married couple with two children, filing jointly. *Sources:* Current rates: US Tax Center (2017). Clinton rates: Clinton (2016). Trump rates: Cole (2015), National Taxpayers Union (2015), Trump (2016).

Trump proposes to cut the corporate tax rate to a flat rate of 15%.  He would also expand the base on which corporation income tax is levied. Taxable income is measured as receipts minus the cost of goods sold, as well as other expenses including salaries, rent, depreciation, and interest paid on debt. He would "phase in a reasonable cap on the deductibility of business interest expenses" (NTU 2015, p.1), but details are lacking; in the simulations discussed below, we assume that a "reasonable" rule would only allow half of interest payments by businesses to be deductible, and note that that would also protect corporate income tax revenues to a significant degree (Bachman et al. 2016b).

*Estate Tax*

Currently, this tax is levied, upon death, on estates worth more than $5.45 million. The statutory tax rate begins at 18% but rises to 40% on the value of estates in excess of $6.45 million. With careful estate planning, much of the tax can be avoided, so in practice only an estimated 0.2% of estates pay this tax (Huang and Debot 2015).

Initially, Clinton proposed a reduction of the threshold to $3.5 million, and a new top statutory rate of 45%, which would return the tax structure to the one in effect in 2009. In September 2016 she called for higher rates, reaching 65% on estates worth $500 million or more, but our analysis uses the rates from her original proposal. The Trump proposal would abolish the estate tax.

*Import Tariffs*

In some of his speeches, Donald Trump has proposed levying tariffs on imports from China (at a 45% rate), Mexico (35% rate on cars), and Japan (rate not specified). The effects of such changes have been analyzed elsewhere (Tuerck et al. 2016), but we have not included them in our study, largely because we consider that they represent bargaining stances, rather than serious proposals that are expected to be implemented.

# Revenue Effects

How much would tax revenue change as a result of the Clinton or Trump tax changes? To answer this question, we have developed a tax calculator model that allows us to simulate the effects of the changes, which may then be compared with a suitable baseline.

*Tax Calculator Model*

The tax calculator model is designed to compute the tax revenue collected under the proposed tax structures. No changes are made to revenue from excise or payroll taxes. Under the Trump proposal, estate tax revenue goes to zero. Otherwise, we assume that the base of taxable estates is in proportion to declared household income from capital to the extent that it exceeds 5% of the threshold (currently $5.45 million, but $3.5 million under the Clinton proposal).

The calculation of personal income tax revenue follows the format of the IRS 1040 forms and the main accompanying schedules. For each household in our database – which largely comes from the IRS public use sample for 2009 (the most recent available) – we first estimate the tax due under existing law, by building up adjusted gross income, adjusting for such features as exemptions, deductions (including phase-outs), the alternative minimum tax, and special capital gains tax rates, and then applying the current tax rate schedule. We then do the same calculations – using the program we have built in Stata – using the proposed tax rules and rates: for example, for the Trump case we remove the alternative minimum tax, change deductions and exemptions, apply the new tax brackets and rates, and

so on. By comparing the new with the old revenue we can measure the overall effect on revenue (suitably calibrated to match observed revenue), and the distributional effects.

For the corporation income tax we use the Joint Committee on Taxation (2015) estimates to account for the Clinton changes to fossil fuel incentives. The Trump changes are more complicated to measure: we first project investment (using the real growth rate of 2.3% observed for 2008-2014) into the future, and apply the historical profit rate to estimate corporate income. We then add in half of interest costs (which are assumed to be no longer deductible) and depreciation, introduce expensing, and apply a 15% tax rate.

The effects of any tax change proposal can be divided into "static" and "dynamic" effects. Static effects are calculated on the assumption that the tax change leads to no change in behavior by taxpayers, and this serves as our starting point. However, economic agents do respond to tax changes, and a dynamic revenue estimate takes this into account. The measurement of the growth effects of the Clinton and Trump tax proposals is best done with a computable general equilibrium (CGE) model, and we generate results from a CGE model like that used by Bachman et al. (2016a) in order to generate the dynamic estimates reported below. A summary of the CGE model is provided in the Appendix. The tax changes affect incomes, which are then used in the tax calculator to estimate a revised set of tax revenues, by tax and for each household in our database. In practice the inclusion of dynamic effects moderates the revenue impact of tax changes by about 15% at most.

The tax changes are then compared with a suitable baseline over time, which we take to be the Congressional Budget Office (CBO) revenue forecasts published in March 2016 (CBO 2016). The results are shown in Table 2, where the total revenue over the coming decade is broken down by main source of tax revenue. This is a common way to present the results, because it allows for long-term tax changes to "settle in", and for dynamic effects to operate more fully. However, in the bottom row of Table 2 we show the overall revenue effects expected in 2017 if the tax changes were put in place then. Over the

decade that spans 2017-2026, total Federal revenue is expected to total $42.1 trillion, of which just over

half is attributable to individual income taxes and a further 32% to payroll taxes.

We estimate that individual income tax revenue would increase by 3.2% under the Clinton

proposals, relative to current rules (or by 2.5% in the "dynamic" scenario).  Overall, Federal revenue

under the Clinton taxes would be 1.8% above the CBO projections, representing an increase of $816

billion over a ten-year period (1.5% above CBO projections), or $615 million under a dynamic projection.

In 2017, revenue would be over $40 billion higher than in the baseline case.

The CBO projects deficits averaging 3.9% of GDP over the decade ahead, raising publicly-held

debt from 75% of GDP in 2016 to 86% by 2026. With the revenues generated by the Clinton proposals,

and assuming no offsetting change in spending, deficits would be smaller (3.5% of GDP) and debt would

be 82% of GDP a decade from now.

The last three columns of Table 2 simulate the effects of the Trump tax proposals on revenue.

We estimate that Federal personal income tax revenue would fall by 31% under the Trump proposals,

relative to current rules. Corporate income tax revenue would fall sharply, under a 15% flat tax with

expensing, even if half of interest is no longer deductible before tax. Overall, Federal revenue with the

Trump taxes would be 23% below the CBO projections, or a reduction of $9.8 trillion over a ten-year

period, or at least $700 billion in 2017.

**TABLE 2**
**Revenue and Budgetary  Projections: Baseline, Clinton, and Trump Proposals**

|  | | Clinton | | Trump | | |
| --- | --- | --- | --- | --- | --- | --- |
|  | CBO | Static | Dynamic | Static | Dynamic 1 | Dynamic 2 |
|  | | | *Billions of dollars, 2017-2026* | | | |
| Individual income taxes | 21,682 | 22,375 | 22,230 | 14,891 | 15,643 | |
| Corporate income taxes | 3,988 | 4,030 | 4,031 | 1,272 | 1,305 | |
| Estate and gift taxes | 249 | 330 | 325 | 0 | 0 | |
| Payroll taxes | 13,508 | 13,508 | 13,460 | 13,508 | 14,021 | |
| Other taxes | 2,663 | 2,663 | 2,659 | 2,663 | 2,733 | |
| **So:  Total tax revenue** | **42,089** | **42,906** | **42,705** | **32,333** | **33,703** | |
| **Total spending** | **51,373** | **51,171** | **51,198** | **53,090** | **52,655** | **44,408** |
| Deficit/GDP (%) | 3.9 | 3.5 | 3.6 | 8.7 | 7.5 | 4.2 |
| Debt/GDP (% eop) | 85.6 | 80.3 | 81.9 | 124.7 | 108.8 | 81.5 |

| Memo: Tax revenue, 2017 | 3,508 | 3,557 | 3,550 | 2,703 | 2,801 | 2,801 |

The Trump tax proposals would have a major impact on the budget deficit, or on spending. If non-interest spending is maintained, the deficit under the Trump plan would average 8.7% of GDP over the coming decade, and publicly-held debt would rise to 125% of GDP by 2026 (or 109% of GDP if dynamic effects are taken into account; this is the "Dynamic 1" case). Alternatively, if spending is trimmed in line with the reduction in revenues – the "Dynamic 2" scenario in Table 2 – there would be a 14% fall in federal spending, which could not be accommodated by only reducing "discretionary" spending items.

## Measuring the Distributional Effects of Tax Changes

To measure the distributional effect of the Clinton and Trump tax proposals, we need to work out how the changes would affect different groups in society, from poor to rich. For this it is necessary to construct a dataset that includes information, for a sample of households, on income and expenditure.[2] Then it is possible to construct variables that mirror the incidence of taxes on each household in the sample, allocate the tax burden to each household, and summarize the results in a helpful way.

### *Constructing the Dataset*

The central component of our database is the Internal Revenue Service (IRS) Individual Public-Use Micro-Data files on individual federal income tax returns for 2009 – the most recent year for which such data are available (IRS 2016). This file has records on 217 variables for 152,526 tax filers. The IRS masks the numbers somewhat, to ensure that they cannot be used to identify any given taxpayer; it uses "topcoding" to set a ceiling on the reported values of many of the variables, which reduces the precision

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[2] The Trump tax proposals are targeted at changing taxes on income. However, when the effects of the tax changes on GDP and hence spending are taken into account, it is helpful to have information on expenditures as well.

of simulations based on these data. The file oversamples high-income tax filers, but provides weights that allow us to adjust for this over-sampling.

Not all of these filers represent complete households, which is the unit of interest to us when looking at income distribution. So we exclude the 5,541 cases of tax returns filed by dependents (typically children). We also drop the 3,039 cases of married couples filing separately, because we cannot associate these returns with those of their partners, which would be needed to create household-level variables. We are thus left with a total of 143,948 tax returns that may be taken to represent households, and we adjust the sample weights to reflect these changes.

The IRS dataset provides a good deal of information on sources of income and on the direct taxes paid by individuals, which is why it is so useful in measuring the effects of eliminating direct taxes, but it does not include information on non-filers. To fill this gap we turned to the Current Population Survey (CPS) for 2009, from which we extracted records of households that did not file a federal tax return (CPS 2016). By adding 11,480 non-filers from the CPS, we created a new dataset with 155,428 observations. The non-filers typically have too little income to be required to file an income tax return, but some may have large amounts of non-taxable income such as tax-free bonds, or may be wealthy and living off their capital. Since the IRS and CPS datasets have a number of variables in common, we were able to combine them into a single dataset. The CPS sample is also weighted, and we adjusted the weights for the combined sample appropriately.

The IRS/CPS dataset is not yet complete, for two reasons. First, the measures of income do not, for instance, include in-kind contributions such as employer contributions to health insurance, or food stamps. Second, they do not have information on spending, which would be useful if one wants to measure the incidence of taxes that fall on outlays rather than income. A solution to this problem, following Feenberg et al. (1997), is to create a synthetic measure of spending, drawing on information from the 2009 Consumer Expenditure Survey (CES). Part of the CES collects detailed information on

household expenditures from a sample of households – 35,227 in 2009 – who respond to a questionnaire, for most spending headings, including food, as well as income (CES 2016). Many of the spending categories are also top-coded, to preserve confidentiality.

Since the households sampled in the CES are not the same as those in the IRS/CPS dataset, it is necessary to establish a "matching" procedure that assigns observations on spending from the CES to each observation in the IRS/CPS dataset. The imputation procedure works as follows:

1. We created a measure of household income that was highly comparable, both in the CES and IRS/CPS files, and allocated this income to ten categories.[3] We cross-tabulated this with information on whether a household received interest income (yes/no), and whether it received income from social security or pensions (yes/no). This created forty distinct cells – for instance, households in the $40,000-49,999 income bracket who received interest income but did not get any social security income, and so on. All households in the CES and IRS/CPS were assigned to one of these forty cells.

2. For each household in the IRS/CPS dataset we randomly chose an observation from the corresponding cell in the CES dataset, and assigned the data for the CES variables to the IRS/CPS household.

The result of this procedure is a dataset that has detailed information from tax filings (for most cases) as well as imputed information on expenditure (and some other components of income). The variables in step 1 were chosen after some modest experimentation: the goal is to choose a small number of variables that may be found in both the IRS/CPA and CES datasets, and that correlate well with spending. A regression of the log of household spending on the income categories crossed interest

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[3] The categories of family income in 2009 are: 0-, 10,000-, 20,000-, 30,000-, 40,000-, 50,000-, 60,000-, 75,000-, 100,000-, and 150,000-.

income and pensions gives an adjusted $R^2$ of 0.58, which represents an acceptable, yet parsimonious, model.

### *Measuring wellbeing*

In order to measure the distributional effects of tax changes, one needs a measure of wellbeing. Many past studies have used adjusted gross income (AGI), in part because it is readily available (in the IRS and CES datasets), but also because it captures many of the main components of income. However, it is incomplete, which is why, starting in 2004, the Tax Policy Foundation (TPF) created a broader measure that it called *cash income*, and that consists of AGI plus tax-exempt interest and social security income, IRA contributions, the employer share of payroll taxes, and a number of other adjustments (Rosenberg 2013, Table 1). More recently, the TPF has begun to use a measure that they refer to as *expanded cash income*, which also includes employee and employer contributions to health insurance, food stamps, and some other items.

We have created a similar measure, which we call *broad income*. It includes the same components as expanded cash income except for certain pension accruals (for which we do not have information), and corporation income tax liability (which we do not consider to be relevant, since corporate distributions included are already net of tax). On the other hand we do include an estimate of the value of Medicaid and Medicare coverage, which is clearly a component of a household's wellbeing.

Our second adjustment is to divide household income by the square root of the number of household members, in order to arrive at a measure of *broad income per adult equivalent*. Household size is actually a censored number, so the only available categories are 1, 2, 3, 4, and 5-or-more, but the number of large families is relatively modest – about 5% of households in our combined file – so any errors that are induced by this are manageable. There are other approaches to measuring adult equivalences, but our approach has been widely used in studies in the U.S. (Chanfreau and Burchardt 2008), recognizes the importance of economies of scale in consumption, and has been used in recent

studies by the OECD (OECD c.2012). The main conclusions of our study are not substantially changed if one uses income per capita instead of income per adult equivalent.

Table 3 divides the sample into ten equal groups (deciles), from lowest to highest income per adult equivalent. For each decile it shows income per adult equivalent, and per capita. Also shown are expenditure per adult equivalent, and per capita, where expenditure is based on the imputation procedure outlined above. As expected, spending rises as income increases, but less quickly, a pattern also noted by Feenberg et al. (1997). Households in the lowest deciles appear to spend more than their incomes, presumably by dipping into their savings, and/or borrowing.

**TABLE 3**
**Income and Expenditure by Decile, 2009**

| | Broad income: | | Expenditure | |
|---|---|---|---|---|
| | per adult equivalent | per capita | per adult equivalent | per capita |
| Deciles | | | | |
| 1 (poor) | 814 | 637 | 17,673 | 15,217 |
| 2 | 12,648 | 9,596 | 18,313 | 14,612 |
| 3 | 18,268 | 14,669 | 20,105 | 16,690 |
| 4 | 23,571 | 19,215 | 22,646 | 19,023 |
| 5 | 29,631 | 23,643 | 25,310 | 20,732 |
| 6 | 36,973 | 29,411 | 29,087 | 23,670 |
| 7 | 46,029 | 36,294 | 33,604 | 27,077 |
| 8 | 57,929 | 44,841 | 39,057 | 30,732 |
| 9 | 76,740 | 58,343 | 47,809 | 36,906 |
| 10 (rich) | 173,591 | 127,889 | 70,290 | 53,284 |
| Total | 47,619 | 36453 | 32,395 | 25,799 |

*Note:* Deciles refer to income per adult equivalent. *Source:* Authors' calculations based on IRS public use file (IRS 2016), Current Population Survey (CPS 2016), and Consumer Expenditure Survey (CES 2016), all for 2009. Only positive incomes are included.

### *Attributing Tax Incidence*

Our interest is in who actually bears the burden of taxes (effective incidence), which is not necessarily the same as the legal burden (statutory incidence). For instance, in a formal sense payroll taxes are paid in part by employers and in part by employees; yet most analyses of the effective incidence of payroll taxes assume that essentially all of the effective burden of these taxes falls on employees.

We make the following assumptions about the incidence of the main Federal taxes:

1. *Personal income tax.* This tax is assumed to fall on the income earner. Our tax calculator model computes the amount of this tax directly.

2. *Estate and gift tax.* Following Feenberg et al. (1997) we assume that this tax falls on persons with large amounts of income from capital. We construct a variable (*capinc*) that is the sum of income from dividends (IRS variable E00600), interest (E00300+E00400), capital gains (E01000), positive income from S-corporations and partnerships (E26390), and positive income from rents and royalties (E25850). We allocated the tax in proportion to the extent to which *capinc* is greater than 5% of $5.45 million (in 2015 prices). The tax is levied only on large fortunes, and only on those who are receiving enough capital income to imply that they have a sufficiently large fortune are likely to be subject to this tax.

3. *Payroll taxes.* Social Security and Medicare taxes are levied on wages at a rate of 15.3 percent (including the employer's contribution) up to $106,800 (in 2009) and at a rate of 2.9 percent on wages above that level. For single individuals it is straightforward to compute the estimated payments of these taxes, but for married couples filing jointly it is more difficult, since we do not have information about the labor income of each. In allocating this tax, we assumed that all the household wages are attributable to a single wage earner, a simplification that somewhat underestimates the relative burden of this tax on multi-earner households.

4. *Corporate income tax.* There is no consensus on the appropriate way to measure the incidence of the corporate income tax. The traditional view, as developed by Harberger (1962), notes that although a tax on corporate profits appears to burden only the owners of corporations, in reality it hits all owners of capital. The assumption here is that capital is immobile internationally, which was barely plausible in the early 1960s, and is an untenable assumption now. If capital is perfectly mobile internationally, then the net return to capital will be equalized (on a risk-adjusted basis) throughout the world. The tax then gets shifted back onto labor, particularly in

the case of tradable goods, where firms have a limited capacity to increase their selling prices (Harberger 2006).

Although short-term financial capital is highly mobile, there is far less mobility over the long term (Obstfeld 1993), which is why the real return to capital has not been equalized across countries. Thus, we have taken an intermediate position between the extreme assumptions of perfect capital mobility on the one hand and perfect capital immobility on the other. We assume that half of the incidence of the U.S. corporate income tax is borne by capital owners in the U.S., and the remainder is shifted onto labor. The CBO assumes that a quarter of the incidence of this tax falls on labor (Randolph 2006), while the U.S. Treasury puts the proportion at 18% (Keightly and Sherlock 2014, pp. 16-17). The results of our study are relatively robust to the assumption made here.

5. *Excises and Other Federal Taxes.* We make the straightforward assumption that the burden of federal excise taxes is in proportion to spending by households. This is a rather crude proxy for the true tax base for these taxes, but sufficient for the purposes of this paper, given that the Trump tax proposals do not envisage changes in indirect taxes such as excises.

The proxies for the tax bases (not shown here) are then used to allocate the incidence of taxes across deciles.

### The Incidence of Federal Taxes

The resulting estimated current distribution of Federal taxes, by decile, is set out in Table 4. The revenue totals are shown at the bottom, and in the body of the table there is a percentage breakdown of tax incidence both overall (the "Total Federal" column) and by tax. The final column shows the distribution of income per adult equivalent. The most affluent tenth of the population receives 36.5% of all income and pays 52.7% of all Federal taxes; this alone makes the Federal tax system progressive (in the sense that tax payments relative to income rise as income rises). Taxes on personal income, and on

estates/gifts, are especially progressive, while payroll and excise taxes are not. The distribution of

Federal tax payments, and of income, are shown side by side in Figure 2, which shows clearly the overall

progressivity of the system.

**TABLE 4**
**Estimated Incidence of Federal Taxes (2017), percentage breakdown**

| Tax | Personal income | Payroll | Corporate income | Estate & gift | Excise & other | Total Federal | Memo: Total income |
|---|---|---|---|---|---|---|---|
| Deciles | | | | | | | |
| 1 (poor) | -1.8 | 1.6 | 2.6 | 5.4 | 5.0 | 0.3 | 1.1 |
| 2 | -3.6 | 4.3 | 1.7 | 0.0 | 5.7 | 0.2 | 2.6 |
| 3 | -2.0 | 5.0 | 2.0 | 0.1 | 6.0 | 1.2 | 3.6 |
| 4 | -0.7 | 5.8 | 2.4 | 0.1 | 6.6 | 2.2 | 4.5 |
| 5 | 0.5 | 7.8 | 3.3 | 0.1 | 7.6 | 3.6 | 5.8 |
| 6 | 1.9 | 10.4 | 4.8 | 0.1 | 8.8 | 5.4 | 7.3 |
| 7 | 4.0 | 13.4 | 6.5 | 0.1 | 10.3 | 7.7 | 9.1 |
| 8 | 7.5 | 16.9 | 8.8 | 0.1 | 12.2 | 11.0 | 11.7 |
| 9 | 15.0 | 17.8 | 12.9 | 0.3 | 15.2 | 15.6 | 15.7 |
| 10 (rich) | 79.4 | 17.0 | 54.9 | 93.7 | 22.6 | 52.7 | 38.5 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Total, $bn | 1744.0 | 1140.1 | 356.9 | 20.9 | 246.1 | 3508.1 | |

*Note:* Deciles refer to income per adult equivalent. *Source:* Authors' calculations based on IRS public use file (IRS 2016), Current Population Survey (CPS 2016), and Consumer Expenditure Survey (CES 2016), all for 2009. Only positive incomes are included.

Figure 2 about here

**Figure 2. Estimated Distribution of Federal Taxes Compared With Income, 2017**

*Source: Source:* Authors' calculations based on IRS public use file (IRS 2016), Current Population Survey (CPS 2016), and Consumer Expenditure Survey (CES 2016), all for 2009. Only positive incomes are included.

## The Distributional Effects of the Clinton and Trump Tax Proposals

We now turn to measuring the distributional effects of the Clinton and Trump tax proposals, looking first

at individual taxes, and then at the net overall impact of the proposed changes.

### Personal income tax

Table 5 shows the estimated revenue from the individual income tax in 2017. The "baseline" columns takes the CBO projection for total revenue ($1,744 billion) and allocates this across the deciles using the estimated tax payments from our tax calculator model. We then re-compute each person's expected tax payment (or credits) using the Clinton and Trump brackets, rates, and rules, making adjustments for deductions along the lines they propose.

The Clinton tax changes would raise revenue to $1,784 billion (or to $1,780 billion in the dynamic case that supposes GDP would be reduced by 0.8% by the tax increases). Almost all of the incremental personal income tax (86% of the net) would be paid by those in the top decile; this group currently pays almost 80% of all Federal personal income taxes.

**TABLE 5**
**Personal Income Tax Revenue, by Decile, $ billions, 2017**

| | Baseline | | Clinton plan: static change | | | | Clinton: Dynamic | |
|---|---|---|---|---|---|---|---|---|
| | Revenue | | Revenue | | Change | | Revenue | |
| **Clinton** | $ bn | *%* | $ bn | *%* | $ bn | *%* | $ bn | *%* |
| Deciles | | | | | | | | |
| 1 (poor) | -32 | *-1.8* | -31 | *-1.8* | 0.6 | *1.6* | -32 | *-1.8* |
| 2 | -63 | *-3.6* | -63 | *-3.5* | 0.1 | *0.3* | -63 | *-3.6* |
| 3 | -36 | *-2.0* | -36 | *-2.0* | 0.1 | *0.4* | -36 | *-2.0* |
| 4 | -12 | *-0.7* | -12 | *-0.7* | 0.3 | *0.7* | -12 | *0.7* |
| 5 | 8 | *0.5* | 8 | *0.5* | 0.4 | *0.9* | 8 | *0.5* |
| 6 | 33 | *1.9* | 34 | *1.9* | 0.6 | *1.4* | 34 | *1.9* |
| 7 | 69 | *4.0* | 70 | *3.9* | 0.9 | *2.4* | 70 | *3.9* |
| 8 | 132 | *7.5* | 133 | *7.4* | 1.1 | *2.8* | 133 | *7.5* |
| 9 | 261 | *15.0* | 262 | *14.7* | 1.4 | *3.5* | 263 | *14.8* |
| 10 (rich) | 1,384 | *79.4* | 1,418 | *79.5* | 34.0 | *86.1* | 1,415 | *79.5* |
| Total | 1,744.0 | *100.0* | 1,783.5 | *100.0* | 39.5 | *100.0* | 1,779.5 | *100.0* |
| **Trump** | $ bn | *%* | $ bn | *%* | $ bn | *%* | $ bn | *%* |
| Deciles | | | | | | | | |
| 1 (poor) | -32 | *-1.8* | -39 | *-3.3* | -7 | *1.3* | -38 | *-3.0* |
| 2 | -63 | *-3.6* | -80 | *-6.6* | -16 | *3.0* | -76 | *-6.0* |
| 3 | -36 | *-2.0* | -45 | *-3.7* | -9 | *1.6* | -43 | *-3.4* |
| 4 | -12 | *-0.7* | -20 | *-1.7* | -7 | *1.3* | -19 | *-1.5* |
| 5 | 8 | *0.5* | -3 | *-0.3* | -11 | *2.0* | -2 | *-0.2* |
| 6 | 33 | *1.9* | 13 | *1.1* | -21 | *3.8* | 14 | *1.1* |
| 7 | 69 | *4.0* | 40 | *3.3* | -29 | *5.4* | 41 | *3.2* |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8 | 132 | *7.5* | 101 | *8.4* | -31 | *5.6* | 102 | *8.1* |
| 9 | 261 | *15.0* | 260 | *21.7* | -1 | *0.2* | 261 | *20.7* |
| 10 (rich) | 1,384 | *79.4* | 971 | *81.0* | -414 | *75.8* | 1,019 | *81.0* |
| Total | 1,744 | *100.0* | 1,198 | *100.0* | -546 | *100.0* | 1,258 | *100.0* |

*Note:* Deciles refer to income per adult equivalent. *Source:* Authors' calculations based on IRS public use file (IRS 2016), Current Population Survey (CPS 2016), and Consumer Expenditure Survey (CES 2016), all for 2009. Only positive incomes are included.

By way of contrast, the Trump tax cuts would cut revenue to $1,198 billion (or $1,258 billion in the dynamic case where the tax cuts are thought to raise income by about 4%). We calculate that 75% of the benefits would go to those in the top decile.

### *Corporate income tax*

The distributional effects of the proposed Clinton changes in the corporate income tax are shown in Table 7. The data here refer to C-corporations, and not to partnerships or S-corporations, which are taxed at the individual level and so subsumed into the analysis of the personal income tax. The only changes incorporated here are the elimination of fossil fuel tax incentives, and the "dynamic" changes that result from the overall effects of the tax changes on economic activity. The revenue and distributional effects are slight.

**TABLE 6**
**Corporation Income Tax Revenue, by Decile, $billion, 2017**

| | Baseline Revenue | | Clinton, dynamic | Trump, static | Trump, dynamic |
|---|---|---|---|---|---|
| | $ bn | *%* | $ bn | $ bn | $ bn |
| Deciles | | | | | |
| 1 (poor) | 9.3 | *2.6* | 9.4 | 3.1 | 3.1 |
| 2 | 6.1 | *1.7* | 6.2 | 2.0 | 2.1 |
| 3 | 7.1 | *2.0* | 7.2 | 2.4 | 2.4 |
| 4 | 8.5 | *2.4* | 8.6 | 2.8 | 2.9 |
| 5 | 11.9 | *3.3* | 12.0 | 4.0 | 4.0 |
| 6 | 17.0 | *4.8* | 17.2 | 5.7 | 5.8 |
| 7 | 23.2 | *6.5* | 23.5 | 7.7 | 7.9 |
| 8 | 31.5 | *8.8* | 31.9 | 10.5 | 10.7 |
| 9 | 46.1 | *12.9* | 46.5 | 15.3 | 15.6 |
| 10 (rich) | 196.1 | *54.9* | 198.1 | 65.2 | 66.5 |

| | | | | | |
|---|---|---|---|---|---|
| Total | 356.9 | *100.0* | 360.5 | 118.6 | 121.0 |

*Note:* Deciles refer to income per adult equivalent. *Source:* Authors' calculations based on IRS public use file (IRS 2016), Current Population Survey (CPS 2016), and Consumer Expenditure Survey (CES 2016), all for 2009. Only positive incomes are included.

Trump would institute of a flat 15% tax on corporate income, with "reasonable" limits on interest deductibility (which we assume means halving the interest deduction), and expensing of investment. We estimate that revenue would fall by $238 billion to $119 billion (or $121 in the dynamic scenario), with over half the benefits accruing to those in the top decile.

### *Estate and gift tax*

The Clinton proposals would reduce the threshold at which one has to pay the estate tax from the current $5.45 million to $3.5 million; and would raise the top marginal rate from 40% to 45%. The distributional effects are shown in Table 7, and show that revenue would rise by about a quarter. Because it is levied on large fortunes, this tax falls almost entirely on those in the top decile of the income distribution. The Trump plan would eliminate the estate tax (and by implication, the gift tax too). Table 7 shows that the abolition of this tax would be a boon to wealthy Americans.

Neither Clinton nor Trump envisage changes in Federal payroll or excise/other taxes. However, we have included the baseline revenue from these taxes in the last two columns of Table 7, for comparative purposes. When added to the totals in the first columns of Tables 5, 6, and 7 we get total Federal tax revenue by decile.

**TABLE 7**
**Estate and Gift Tax, Payroll Tax, and Excise Tax Revenue, by Decile, $billion, 2017**

| | Estate and Gift Tax | | | | Payroll tax | Excise/Other tax |
|---|---|---|---|---|---|---|
| | Baseline | | Clinton plan | Trump plan | | |
| | *Revenue, $ bn* | *%* | *Revenue, $ bn* | *Revenue, $ bn* | *Revenue, $ bn* | *Revenue, $bn* |
| Deciles | | | | | | |
| 1 (poor) | 1.1 | 5.4 | 1.3 | 0.0 | 18.8 | 12.3 |
| 2 | 0.0 | 0.0 | 0.0 | 0.0 | 48.7 | 14.0 |
| 3 | 0.0 | 0.1 | 0.0 | 0.0 | 56.9 | 14.7 |
| 4 | 0.0 | 0.1 | 0.0 | 0.0 | 65.9 | 16.3 |
| 5 | 0.0 | 0.1 | 0.0 | 0.0 | 89.1 | 18.7 |
| 6 | 0.0 | 0.1 | 0.0 | 0.0 | 118.6 | 21.7 |

| | | | | | |
|---|---|---|---|---|---|
| 7 | 0.0 | 0.1 | 0.0 | 0.0 | 152.7 | 25.2 |
| 8 | 0.0 | 0.1 | 0.0 | 0.0 | 192.8 | 30.1 |
| 9 | 0.1 | 0.3 | 0.1 | 0.0 | 203.1 | 37.5 |
| 10 (rich) | 19.6 | 93.7 | 22.9 | 0.0 | 193.5 | 55.6 |
| Total | 20.9 | 100.0 | 24.5 | 0.0 | 1140.1 | 246.1 |

*Note:* Deciles refer to income per adult equivalent. *Source:* Authors' calculations based on IRS public use file (IRS 2016), Current Population Survey (CPS 2016), and Consumer Expenditure Survey (CES 2016), all for 2009. Only positive incomes are included.

### *Overall Distributional Effect of the Clinton and Trump Tax Proposals*

The key findings of the report are brought together in Table 8. The first column shows existing revenue per capita, by decile; it is obtained by adding up the value of revenue for the five main taxes, as shown in Tables 5, 6, and 7, and dividing by the population in each decile. This serves as the baseline against which to measure the distributional effects of the Clinton and Trump tax proposals.

The second column shows the estimated revenue in 2017 if the proposals of Clinton (top panel) and Trump (bottom panel) were implemented. They incorporate the "dynamic" effects on economic activity.

Under the Clinton proposals, federal tax revenue would rise by $45 billion (0.8%) in 2017, and of this incremental burden, 86% would be borne by those in the top decile. The first column of numbers in Table 8 shows the total amount of tax paid per person (in 2017) by decile: the amounts rise from $197 in the lowest decile to $52,082 in the highest decile. The effect of the Clinton proposals would be to raise taxes in most deciles, but especially for those in the highest decile, whose taxes would rise by an average of $991 each, equivalent to 1.9% of their current Federal tax payments. The slight reductions in tax payments for those in deciles 2 and 3 occur not because tax rates would fall, but because the dynamic effects of the tax changes would reduce taxable income, which effect dominates for households in these deciles. On average, taxes would rise by just over $120 per person per year, equivalent to 0.17% of income; for most deciles the increase is less than 0.05% of income, but it rises to 0.42% in the top decile.

The Trump tax changes would reduce federal tax revenue by just over $800 billion in 2017, and an estimated 70% of the gains would accrue to those in the top decile, while the poorest half of the population would get 10% of the benefits from the tax cuts (Table 8, bottom panel). Taxes would fall in every decile, providing gains of under $500 per person in the bottom 40% of the income distribution, but of more than $15,000 per person for those in the top decile. Averaged over the ten deciles, the tax burden would fall by 20%. The final column in Table 8 shows that the average tax cut comes to 3.2% of income, but exceeds 6% in the top decile.

**TABLE 8**
**Changes in Taxes Paid: Clinton Proposals (Dynamic) vs. Current Rules, 2017**

| | Tax paid: current rules | Tax paid: Clinton proposal | Change in tax paid | % change in tax paid | % of tax increases | Tax change as % of income |
|---|---|---|---|---|---|---|
| | *dollars per capita in 2017* | | | *percentages* | | |
| Deciles | | | | | | |
| 1 (poor) | 197 | 212 | 16 | 7.9 | 1.4 | 0.19 |
| 2 | 108 | 104 | -4 | -3.4 | -0.3 | -0.02 |
| 3 | 776 | 774 | -1 | -0.2 | -0.1 | -0.00 |
| 4 | 466 | 466 | 1 | 0.1 | 0.1 | 0.00 |
| 5 | 8,701 | 8,716 | 15 | 0.2 | 1.3 | 0.03 |
| 6 | 8,032 | 8,050 | 18 | 0.2 | 1.6 | 0.03 |
| 7 | 9,978 | 10,009 | 31 | 0.3 | 2.7 | 0.05 |
| 8 | 13,345 | 13,382 | 36 | 0.3 | 3.1 | 0.04 |
| 9 | 17,695 | 17,743 | 49 | 0.3 | 4.2 | 0.04 |
| 10 (rich) | 52,082 | 53,073 | 991 | 1.9 | 86.0 | 0.42 |
| Total/Avg | 10,827 | 10,950 | 123 | 0.8 | 100.0 | 0.17 |
| | Tax paid: current rules | Tax paid: Trump proposal | Change in tax paid | % change in tax paid | % of tax cuts | Tax change as % of income |
| | *dollars per capita in 2017* | | | *percentages* | | |
| Deciles | | | | | | |
| 1 (poor) | 197 | -99 | -296 | -150.4 | 1.8 | -3.6 |
| 2 | 108 | -296 | -404 | -374.5 | 2.5 | -2.3 |
| 3 | 776 | 527 | -248 | -32.0 | 1.7 | -0.9 |
| 4 | 466 | 388 | -78 | -16.7 | 1.6 | -0.2 |
| 5 | 8,701 | 7,411 | -1,290 | -14.8 | 2.3 | -2.9 |
| 6 | 8,032 | 6,685 | -1,347 | -16.8 | 4.0 | -2.5 |
| 7 | 9,978 | 8,319 | -1,659 | -16.6 | 5.6 | -2.5 |
| 8 | 13,345 | 11,554 | -1,791 | -13.4 | 6.4 | -2.2 |
| 9 | 17,695 | 16,662 | -1,032 | -5.8 | 4.0 | -1.0 |
| 10 (rich) | 52,082 | 36,185 | -15,897 | -30.5 | 70.1 | -6.7 |
| Total | 10,827 | 8,645 | -2,182 | -20.2 | 100.0 | -3.2 |

*Note:* Deciles refer to broad income per adult equivalent. Totals reflect sampling weights, and may not sum to column totals. *Source:* Authors' calculations based on IRS public use file (IRS 2016), Current Population Survey (CPS 2016), and Consumer Expenditure Survey (CES 2016), all for 2009. Only positive incomes are included.

Where it is possible to make appropriate comparisons with the results of other studies, our findings appear to be most plausible. The Tax Foundation estimates that, over the decade 2017-2026, the Clinton proposals will raise just $191 billion additional revenue (Pomerleau and Schuyler 2016), while the Tax Policy Center puts the incremental revenues at $1,077 billion (Auxier et al. 2016). Our estimates fall between these extremes. A consistent finding is that the bulk of the tax burden falls on the top decile; here the differences across studies reflect both the variations in revenue estimates, as well as somewhat different approaches to dividing the population into deciles.

## Conclusions

The tax proposals of Hillary Clinton and Donald Trump are strikingly different. The Clinton proposals are quite modest: federal revenue would increase by just 1.5% – about $600 billion in total over the coming decade – and while 86% of the incremental burden would fall on those in the top tenth of the income distribution, the net effect on the national distribution of income would be small.

The Trump proposals are sweeping. They would reduce Federal tax revenues by an estimated $8.4 trillion over a ten-year period. This represents a 20% reduction in tax revenue relative to the CBO forecasts (or a 23% reduction if there were no dynamic revenue effects), and would have to be accompanied either by a sharp reduction in Federal spending, or by allowing unsustainably large budget deficits.

The lion's share of the tax reductions – 70 percent – would flow to those in the top tenth of the income distribution.  By the usual standard for income equality, the proposed changes would thus be sharply regressive, and substantial. The typical person in the top decile would get over $15,000 in tax cuts, compared to less than $500 per person for those in the poorest 40% of the population.

Although our conclusions are rooted in high-quality data, from the IRS public use sample, the Current Population Survey, and the Consumer Expenditure Survey, they rest of course on the

assumptions we make about effective incidence, and on the are heavily dependent on the assumptions

we make about tax incidence, the way we measure broad income, the method used to adjust for adult

equivalence, and on our interpretation of how some of the unspecified details of the tax plans would be

implemented. None of these are likely to undermine our key conclusion: judged purely by the

distributional effects, the Clinton tax changes would add marginally to the progressivity of the system,

while the Trump changes would be regressive.

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# Appendix. Measuring Dynamic Tax Effects

Tax changes alter the behavior of firms and households, but to measure these effects one needs a consistent and complete model of the economy. For this purpose we use a version of the dynamic computable general equilibrium (CGE) model built by Bhattarai et al. (2017/forthcoming), which provides further details. The essential features of this market-clearing model are as follows:

Infinitely-lived households maximize the present value of their utility, which they derive from consumption and leisure. In each year, households decide how much to work, and they then allocate their spending to goods and services, produced and/or imported in 27 sectors (such as agriculture, apparel, health, and so on), and to saving. Firms produce goods for domestic sale and export, combining intermediate inputs, in fixed proportions, with capital and labor (in flexible proportions) to maximize profit. The government taxes income, sales, and business income, and uses the proceeds to buy goods and services, employ labor and capital, and make transfers (such as pensions) to households. After 33 years (i.e. by 2050) the economy is assumed to reach a steady state annual growth rate of 3%.

Most of the relationships use constant elasticity of substitution production or utility functions, with elasticities drawn from the literature. Optimized over 2017 through 2050, the model has 50,662 variables, and solves to give unique and stable equilibria for simulations with, and without, tax changes.

The model is calibrated using data from a 55×55 social accounting matrix, updated to 2017, which tracks the financial flows in the economy in a consistent manner. The model is implemented in GAMS (General Algebraic Modeling System), and uses the specialized MPSGE (Mathematical Programing System for General Equilibrium Analysis) module (GAMS 2017; Rutherford 1997).
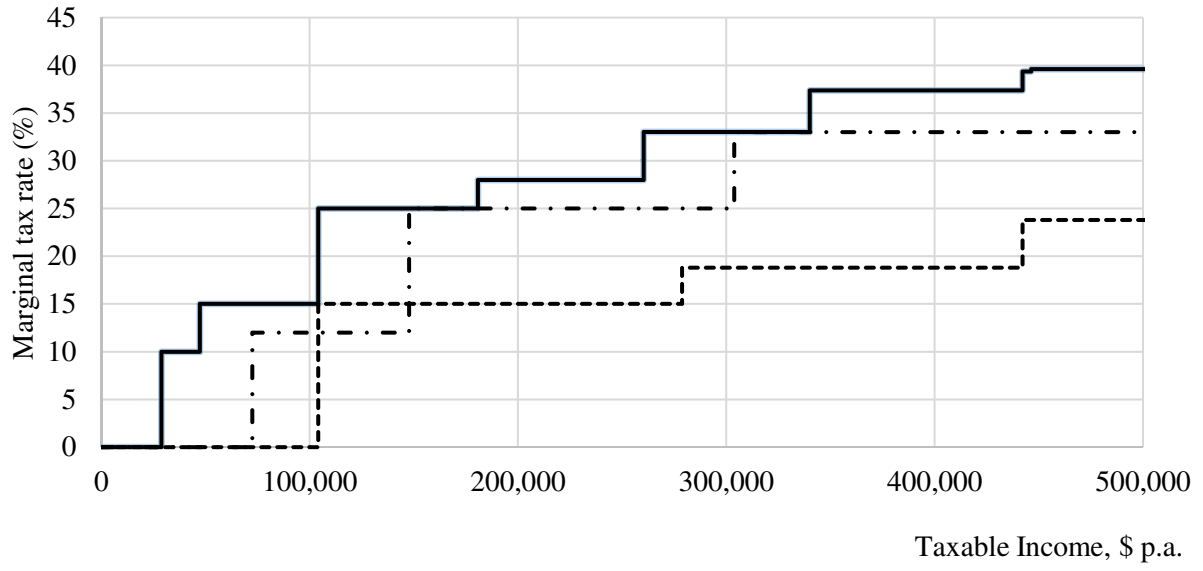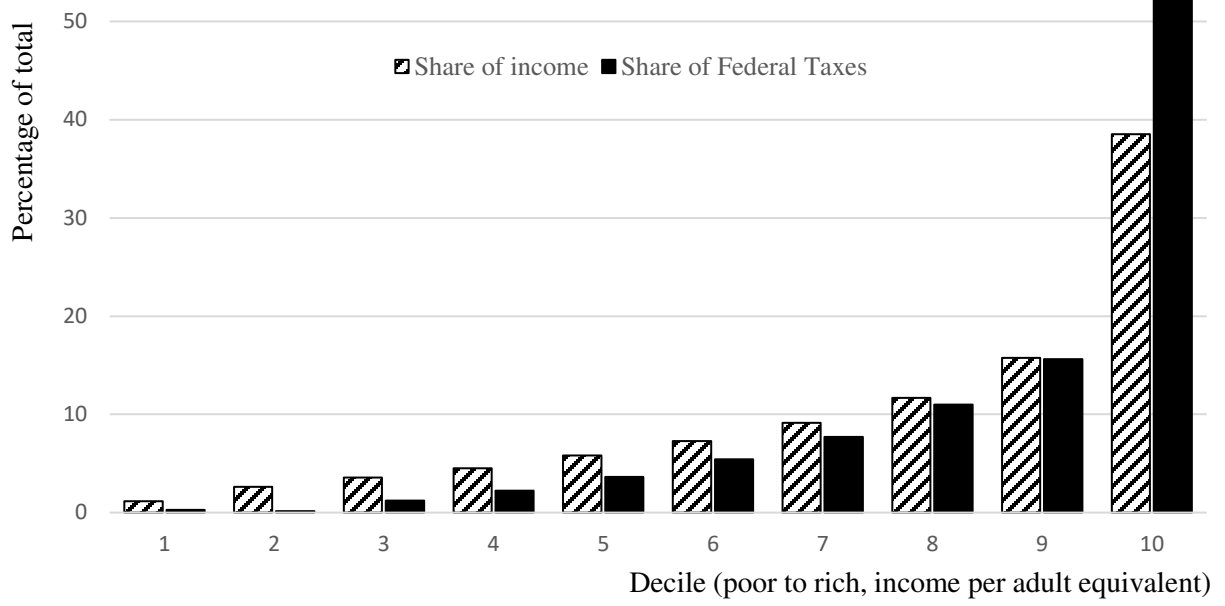
Figure 1

Response to reviewer

In the most recent round, the reviewer made the following recommendations. Our responses are shown in italics.

1. Write out all acronyms at first use, no matter how common, such as OECD and MACRS.
*Done.*

2. Figure 1 still lacks a data source note and indication of data years analyzed. Figure 2 requires the same. Data source notes for figures and tables should not refer to other figures and tables. Each figure and table must be able to stand alone. Check all figures and tables.
*Done, for all cases.*

3. The appendix should appear after the references.
*Done.*

4. All quotes in the paper, such as on page 6, require the exact page number of the quote. Thus, NTU 2015, p. ___.
*Done. This was the only case where it was needed.*