The following is a collection of short readings provided by Richard Prisinzano for his September 26, 2018 presentation at Penn's Tax Law and Policy Workshop on the Penn Wharton Budget Model. The first three readings concern the model, the remaining present results. Please see the bookmarks tab in this file for easy navigation and an overview. All readings are also available from the http://www.budgetmodel.wharton.upenn.edu.

MICROSIMULATION

The Penn Wharton Budget Model microsimulation (PWBMsim) is a model of the United States economy capable of projecting a rich array of demographic and economic variables. Its key goal is to capture the effects of government tax and spending policies under projections of the nation's evolving demographic and economic landscape. The PWBMsim is able to capture and analyze both the micro-distributional and macroeconomic effects of alternative fiscal policies. This document describes the goals of the PWBMsim and provides an overview of how it is constructed.

OBJECTIVE

Many public and private institutions are engaged in public policy research. However, we perceive many shortcomings in the models and approaches that are being used to generate estimates of national economic performance and government budget projections. This results in policymakers not receiving the most accurate and reliable advice on the effects of alternative public policies at the micro- and macro-economic levels.

PWBMsim's objective is to create a computational

tool that incorporates all of the necessary details about the nation's economic and demographic profile and to integrate those data in an internally consistent manner. At the same time, the tool should be sufficiently easy to use by policymakers and the interested public to explore the implications of a wide array of economic policy issues. The key medium-term goal of `PWBMsim` is to build a model with sufficient detail and flexibility to estimate the economic effects of alternative federal budget policies.

METHODS

`PWBMsim` uses information from U.S. micro-data surveys to construct (in computer storage) a representation of the U.S. population and economy using simulation methods. At the micro-level, `PWBMsim` constructs a population of individuals for the initial year (1996) organized into families of various types. `PWBMsim` uses micro data information from many sources (described below). One key data source are the publicly available annual CPS surveys, which contain samples of U.S. residents that are representative of the United States resident (non-institutionalized) population in various years since 1964. `PWBMsim` uses CPS micro-data surveys beginning in 1996.

Individuals in `PWBMsim` are assigned attributes such as race, gender, immigration status, family type, education, etc. When each individual is created, the attributes are assigned in sequence, and each new attribute assignment is conditioned

and each new attribute assignment is conditioned on a suitable collection of previously assigned attributes. The assignments are done according to corresponding conditional frequency distributions of those attributes as observed in micro-data sources. Applying this procedure to each attribute (as described in greater detail in Appendix 1) yields `PWBMsim's` 1996 U.S. population. Such a simulated population of individuals matches the U.S. population quite closely as demonstrated later in this document.

`PWBMsim` incorporates most of the key attributes at the family and individual level and aggregates them to generate estimates of macroeconomic and demographic indicators – levels and growth rates of the U.S. population, labor-force, employment, population dependency ratios, GDP, worker compensation, the economy's capital stock, taxable income, federal revenues, federal spending, and other variables of interest. To do so `PWBMsim` draws micro-data information from many national surveys beyond the CPS, such as the Panel Study of Income Dynamics (PSID), the Survey of Consumer Finances (SCF), the Survey of Income and Program Participation (SIPP), the Consumer Expenditure Survey (CEX), and others.

A detailed tool for analyzing federal budget policies must comprehensively include federal government tax and spending programs. When fully developed `PWBMsim` will provide policymakers and the public with a tool to explore systematically the effects of different fiscal policies

on the federal budget and the performance of the U.S. economy at both micro- and macro-economic levels.

INDIVIDUALS AND FAMILIES

On the micro-economic side, `PWBMsim` models the evolution of many demographic variables for families and individuals. The microsimulation model begins with a population of simulated individuals as of 1996, which are drawn to resemble the characteristics of the U.S. population in that year. The family head is created and the immigration-status attribute (whether foreign-born) is assigned first. This assignment is done based on the frequency of foreign-born individuals in CPS1996. Next, the family-type attribute is assigned to the family head, that is, whether the head will be a single individual or a single-headed individual (with children) or a married individual with or without children in year 1996. Again, the random assignment of family-type is controlled by the frequency of alternative family types in CPS1996. Depending on the family-type assigned, other family members are created in a similar way. All family individuals are assigned other attributes such as ethnicity, gender, education level, disability status, employment status, work weeks in the year, and so on (see Appendix 1).

Once all 1996 population attributes are assigned, the simulated population is transitioned through subsequent years. The annual transitions involve deciding whether each attribute of each individual

changes in the following year and how it changes. Each person becomes older by 1 year (aging), some women give birth (fertility), some individuals die (mortality), singles marry, married individuals divorce, children and adults acquire education, children move out of their parent families as they enter adulthood; adult and near-adult individuals work, some become disabled, workers earn wage and non-wage compensations, consume and save, new individuals immigrate, non-natives changes immigration status, some of them emigrate, and so on.

All year-over-year transitions of individual-level demographic and economic attributes are governed by micro-data information on transition rates across alternative attribute states. For example, `PWBMsim` calibrates individuals' educational attainment by estimating rates of transition across single years of education from one (at age 6) through 18 through adulthood and beyond. Such Markov transition probabilities govern the evolution of variables such as marriage, divorce, labor-force entry and exit, immigration and emigration, entry into and exit from disability, and so on, where each transition is calibrated according to conditional transition rates calculated from micro-data surveys. As another example, labor-force status of adult males and females are distinguished between four states (not-working/wage-only worker/self-employed worker/both wage and self-employment) and these states are distinguished by the person's immigrant

status, family type (single- or dual-headed family), gender, ethnicity, age group, and education group. Such a fine-grained decomposition of attributes, into states by population subgroups, accommodates a large variety of potential interactions in the future evolution of attributes across states for different population subgroups.

The conditioning variables for each transition rate structure (to distinguish transitions for different population subgroups by age, ethnicity, gender etc.) are selected based on information about the "variables that matter." For example, if the transition rates into and out of disability are no different for males and females, gender is not used as a conditional variable for calculating transition probabilities into and out of disability.

A marriage component explicitly captures the evolution of racial and income composition of families. Here, in a search and matching component of the model, unmarried singles are randomly paired with prospective partners, with whom they may form matches. The match probabilities are calibrated to match the observed joint demographic composition of male and female married couples. The microsimulation model therefore captures important dynamics introduced into the demographic makeup of the United States through assortative pairing of singles by income and race.

Ethnicity is a key factor for calibrating "meeting" rates of potential married couples; and educational

attainment is included in conditioning marriage acceptance rates. See the section on marriage calibrations below for a more detailed discussion of the marriage “meeting and acceptance” model. See also Appendix 2 for a detailed definition of transition probabilities by attribute and the corresponding conditioning variables. (See Appendix 3 for a description of `PWBMsim`’s marriage-divorce modules.

Markov transition rates governing annual changes in attribute states are estimated separately for different historical phases within the time span 1996-2016. The transition outcomes of `PWBMsim` are validated by comparing the distributions of attributes across states generated by `PWBMsim` and the distributions estimated from CPS micro-data. For all demographic and economic attributes variables, trends in Markov transition probabilities are projected forward into the future, allowing the microsimulation model to capture interactions between attributes as they evolve through the years. This process generates projections of all demographic attributes of the population at the micro-level, thus characterizing the likely future path of the nation's demographic profile. Of course, because the simulation involves random assignment government by conditional distribution functions and Markov transition probabilities, each forward simulation incorporates "simulation variation" in outcomes. Running many such forward simulations yields an estimate of the potential range of projected outcomes for each

micro-level attribute and each aggregated (macroeconomic) variable arising from the trends and attribute interactions built into `PWBMsim`.

`PWBMsim` includes a labor market component, which governs the evolution of employment, unemployment, wages, and self-employment earnings. Individuals transition to and from employment, conditional on their employment history, their family status, race, and other associated demographic characteristics. For those who are employed in a given year, each worker's labor contribution (or a "core labor input" index to be applied to labor hours) is estimated using coefficients from a regression model of observed wage earnings (from appropriately harmonized CPS micro-data on wages during 1996-2016) on all of workers' demographic characteristics. Thus, each `PWBMsim` worker's labor input is influenced by the entire constellation of demographic and economic characteristics, and not just by a few selected ones – such as age and education that is standard in estimating labor input indexes. (Appendix 4 provides details on the earnings regression model.)

ESTIMATION OF MACROECONOMIC VARIABLES

On the macroeconomic side, the `PWBMsim` projects macroeconomic aggregates such as GDP, employment, work-hours, the capital stock, the capital-labor ratio, and labor productivity. It also constructs projections of federal budget aggregates such as total revenues, expenditures,

the federal deficit, and government debt.

Several models have been constructed by government agencies and think tanks in order to study the budgetary and distributional implications of government policies. The microsimulation model distinguishes itself in explicitly modeling a much richer set of economic and demographic variables, as well as the interactions between these variables. A key feature of `PWBMsim` is the integration of all micro-level attributes within a growth model. This enables the model to capture and project the implications of projected changes over time in the composition of micro-demographic and economic attributes for overall labor productivity and economic growth. This is vastly different from the procedures adopted by other “forecasting” efforts – of imposing assumed rates of labor-force participation, employment, and productivity growth estimated from historical information. A notable feature of `PWBMsim` is the consistency in its micro-demographic, macroeconomic, and federal budget projections.

At the macro level, a neoclassical production function is used to aggregate upward individual labor into macroeconomic variables. The model takes labor earnings, capital, and multifactor productivity as inputs into gross domestic product. The growth rate of multifactor productivity is calibrated to match data from the Bureau of Labor Statistics multifactor productivity accounts. The labor share of output is aggregated from individual

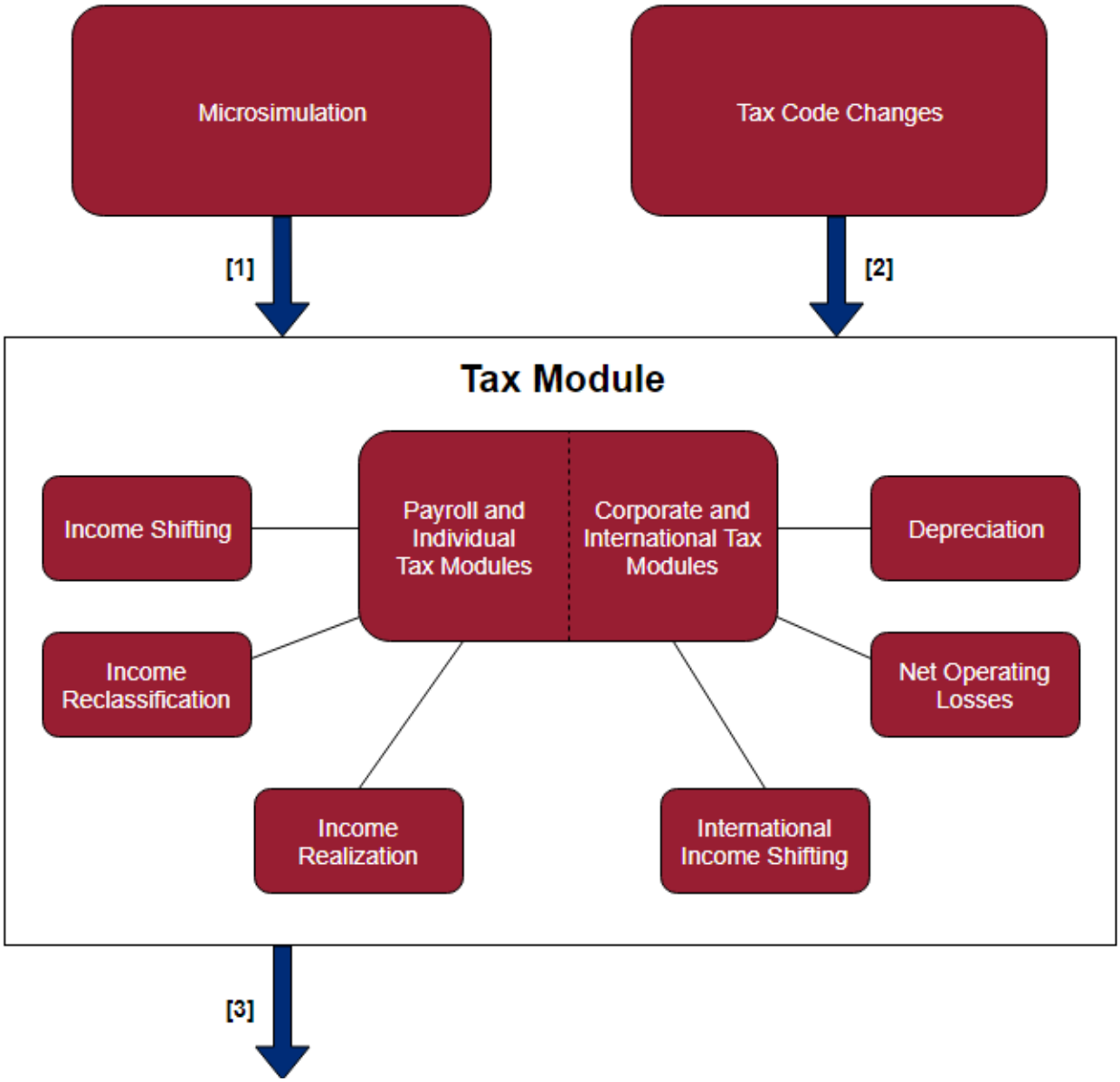
earnings in the economy. The capital share is projected forward, based on historical data and the resulting level of capital earnings set to match labor earnings. Together, these three factors enter into a production function to produce projected gross domestic product.

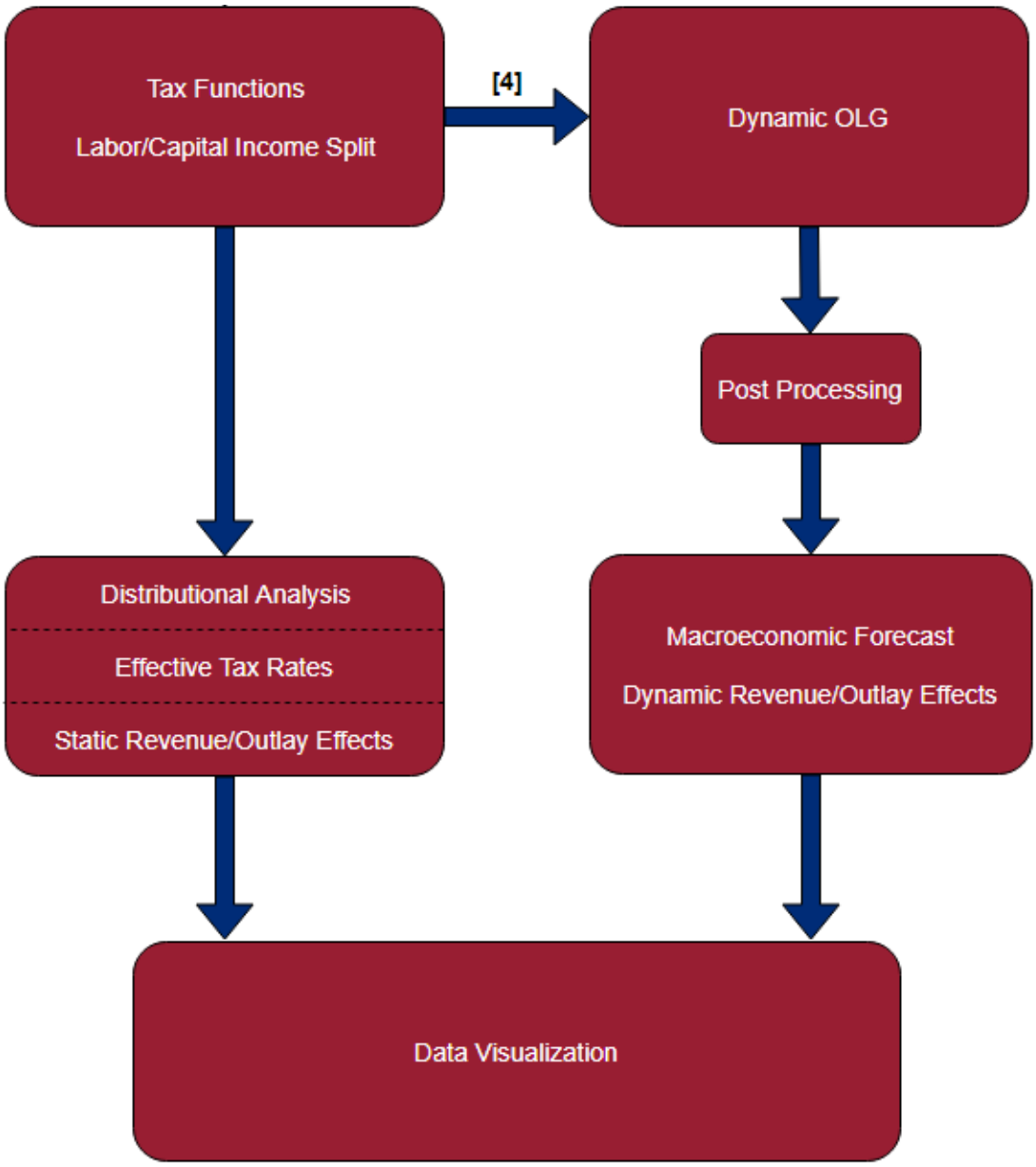
In the remainder of this document, the technical details of the microsimulation model are described in more detail. It begins with an overview section, describing the model in generality. Following sections describe in more detail the individual components of the model.

Tax Module

Penn Wharton Budget Model's Tax Module (PWBM-TM) uses a highly detailed simulation and projection of U.S. demographics from the Penn Wharton Budget Model Microsimulation model (PWBMsim). PWBM-TM incorporates the details from PWBMsim to forecast federal tax revenues attributable to different types of tax filers (individuals, families, head of households). It also allows an attribution by type of tax paid (income, payroll, business source). PWBM-TM uses PWBMsim output to split total income into business and labor income. Subsequently, business income is allocated across organizational form and subjected to corporate level taxation, where appropriate.

PWBM-TM uses PWBMsim inputs to better inform PWBM's dynamic OLG model. The dynamic OLG model uses the tax functions generated by the PWBM-TM to produce a baseline of the U.S. macroeconomy and to calculate how changes in tax policy affect the U.S. macroeconomy accounting for how the changes feed back into the federal budget. Any discussion of fiscal policy is incomplete without considering the feedback effects estimated by the dynamic model (also called dynamic feedback effects or dynamic scoring). A careful analysis of any contemplated policy change includes the estimated macroeconomic feedback from those policy changes that affect revenues and outlays and is essential to understanding the true effect of any policy decision.





[1] The Microsimulation outputs a myriad of variables. These variables include information on households (wage, gender, kids, etc.) as well as macroeconomic series.

[2] These changes can take many forms. Examples include changes in statutory rates, deduction allowances, or credit eligibility.

[3] The outputs of the Tax Module include revenues, outlays, and distributional analytics.

[4] Revenues, outlays, and tax rates

Microsimulation

PWBMsim produces a set of individuals and families that are designated as tax filers. PWBM-TM uses these filers to forecast federal tax revenues. The tax filing units are not of interest independently for PWBM-TM. PWBM matches these tax filing units with the Internal Revenue Service (IRS) Statistics of Income (SOI) data. The SOI makes available a representative sample of the individual income tax-filers. This Public Use File (PUF)

allows PWBM to forecast the line items necessary to calculate a filer's tax liability. It also gives PWBM enough information to model changes in the tax code that directly affect individuals. The latest version of this PUF is for tax year 2010.[1]

Static: Individual and Payroll

PWBM-TM uses income information from PWBMsim to subject each filing unit to the tax code. PWBM-TM calculates tax liability for each filing unit by accounting for the relevant income tax bracket, preferred tax rate, deduction, credits and the alternative minimum tax (AMT). By utilizing the associated schedules, PWBM-TM also accounts for business income/loss derived from corporate and non-corporate entities.

A tax filer's labor income is subject to either Federal Insurance Contributions Act (FECA) or Self Employment Contributions Act (SECA)[2] taxes. The tax rate applied depends on the total amount of labor income. The Social Security portion of FICA or SECA taxes is applied to income below a limit set by the IRS. PWBM forecasts this limit beyond the current tax year using PWBMsim's estimate of the growth of nominal wages. The Medicare portion of FICA and SECA is not subject to an income limit.

A tax filer's capital income is also subject to the requisite taxes. These taxes include the preferential rate on capital gains and dividends and the Net Investment Income Tax (NIIT). Capital income is derived from either corporate or non-corporate entities. Most corporations pay dividends or capital gains to owners net of a corporate level tax. Pass-through entities, sole proprietorship, partnerships and S corporations are not subject to an entity level tax. However, sole proprietorship and most partnership income is subject to payroll tax. Only S corporation income is subject to neither payroll nor an entity-level tax. PWBM-TM accounts for each of these tax situations.

The application of the tax rates under current law to the income projected from PWBMsim results in the baseline or current law projection. The current law projection is then adjusted as one or more proposed changes to the tax code are implemented. When changes to the tax code are considered, PWBM addresses potential behavior of tax filers.

Income Shifting due to Organizational Form

As an example, PWBM-TM is calibrated to reflect the current structure of business organization. The structure is dependent upon both the taxes faced by capital income received from both corporate and pass-through entities. As the relative difference in these taxes change, PWBM-TM applies an income-shifting elasticity to the baseline of business income. The result is a new income allocation between corporate and pass-through business form and therefore, new growth rates for corporate and pass-through income. This methodology is set forth in the literature and described in more detail here.

Proposals affecting Types of pass-through businesses

PWBM uses available data to account for changes in the tax code that affect certain industries or sectors. A recent proposal limited the types of pass-through businesses that benefit from a lower tax rate.[3] PWBM uses the aggregate share of net income by industry to limit the amount of income subject to the lower rate.

In both the above cases, PWBM is limited by the available data. A tax filer's schedule E contains aggregate amounts of pass-through income. That is, if a tax filer is in multiple businesses, the data will reveal only the total net income. It does not allow a decomposition into X net income from business A and Y income from business B. As such, the income shifted to or from corporate form cannot be properly allocated to certain

businesses and certain tax filers. Therefore, PWBM allocates the income shift by shares of aggregate net income. This difficulty is also present in limiting pass-through businesses subject to certain proposed provisions. Given the absence of information on specific pass-through businesses, the income subject to the relevant provisions is limited by determining the aggregate share of net income of those businesses and then applying that share to all pass-through income.

Income Reclassification

PWBM accounts for behavior related to income reclassification. As the relative tax rates change, tax filers may be induced to not only change the organizational form of their businesses but also change their employment status and form a pass-through business to take advantage of lower tax rates. PWBM considers the effort involved in starting a business as well as the non-monetary benefits of employment in determining the amount of this income reclassification. The model randomly selects wage earners with high enough income and subsequently reclassifies the wage income. The percentage of wage earners selected increases over time. The share of wage earners reclassifying does not equal one since PWBM believes there are certain occupations and jobs that will not allow this reclassification.

Income Realization

The economics literature has found evidence that individuals respond to tax changes by adjusting the timing of income realization. Therefore, PWBM-TM models this behavior. PWBM-TM uses a supporting model to adjust income levels across time. The amount of income that moves across time is dependent upon the Elasticity of Taxable Income (ETI). PWBM-TM implements an elasticity in the middle of the range of estimates.[4]

Distributional Analysis

The individual side of PWBM-TM produces two distributional measures. The first measure is the traditional distributional measure. It indicates the share of the total value of the tax change that accrues to various income groups. The second measure is the share of tax paid by certain income groups. Both measures are calculated directly as part of PWBM-TM's standard output. PWBM is equipped to provide any output that relates taxes to filing status, income group or type of income.

Static: Corporate and International

Corporate Data

Unfortunately, there is no available microdata for business entities. PWBM uses the aggregate SOI data to forecast the line items on business tax forms. These forms include the various 1120s as well as the 1065 and the associated schedules. PWBM utilizes the available SOI data to distinguish among entities by certain characteristics. These characteristics include major and minor industry defined by two-digit and three-digit North American Industry Classification System (NAICS) code and size by both total assets and business receipts. PWBM creates cross-tabulations by merging the available size and industry data to create distinctions between firms by size, industry and size *and* industry. This disaggregation allows PWBM to use models that forecast business activity and tax liability for each of these sub-aggregate groups. For pass-through entities (1065, 1120-S, 1120-REIT, 1120-RIC), the aggregate amounts are shared out to ultimate taxpayers when the data is available. PWBM also split the sub-aggregate data by 1120 filers excluding REITs, RICs and S corporations. The data is available from the IRS tax stats website.

Corporate Liability

Corporate income tax is estimated using the sub-aggregate data. Each sub-aggregate model simulates a single representative corporation's behavior. Total corporate liability is calculated by combining the results from each sub-aggregate model. In this way, the PWBM-TM allows for heterogeneity across firms in forecasting income and deductions.

Depreciation

An important aspect of the corporate model is the benefit of depreciation. PWBM uses a model that forecasts the usage of 15 different classes of investments with differing depreciation schedules across the sub-aggregate groups. The corporate tax module uses this model to adjust the amount of depreciation deductions as the incentives for investment change. For example, under a temporary expensing provision, the expectation is that corporations would move investment corporations would have undertaken in later years into years where immediate expensing is allowed. The amount of timing shift is estimated by PWBM using historical data.[5]

Net Operating Losses (NOLs)

NOLs are also an important aspect of the corporate tax code because it allows corporations to smooth income across a number of years (two years back and up to 20 years forward). As such, it is important to model the use of NOLs. In modeling the use of NOLs, PWBM relies upon the literature on the differential tax treatment of losses for corporations.[6] PWBM uses the analysis in the literature to model limitations on the use of NOLs for each sub-aggregate group.[7]

Other Deductions

PWBM forecasts other deductions on the sub-aggregate business returns by estimating the relationship between the deductions and macroeconomic variables forecasted by PWBMsim. These deductions include the net interest and the research and experimentation deductions among others.

Effective Tax Rates

PWBM's corporate tax module produces average effective tax rates (ETR). The nature of the sub-aggregate models based on PWBM's merging of available SOI data allows for a calculation of ETRs by size, industry or size and industry. Each sub-aggregate model projects income and expenses and therefore, liability (as noted here).

International Income Shifting

The modeling of international income shifting is not unlike the modeling of organizational form shifting mentioned above and described in detail here with the relevant tax rate comparison between the U.S. and a worldwide rate. The economics literature has produced a number of semi-elasticities for the relationship between profits and tax rates of foreign countries. PWBM uses an elasticity in the middle of the range of estimates (0.8) to calibrate the corporate tax module.[8] As the U.S. corporate tax rate falls/increases, the model increases/decreases the amount of corporate income on the representative 1120. This change in income represents both repatriation of income by U.S. multinationals and increased investment by foreign multinationals (1120-F).[9]

PWBM-TM Output

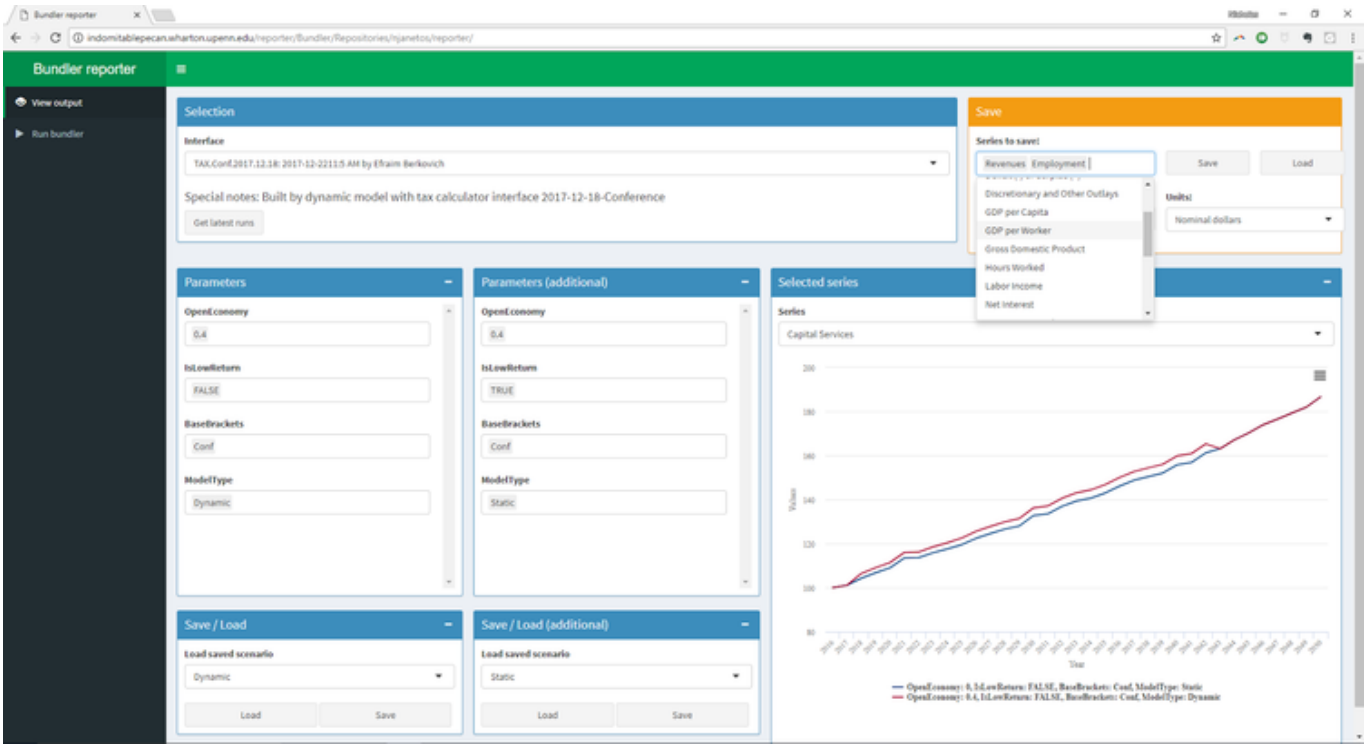
The combination of the individual, corporate and international simulators produce the static revenue and outlay effects that would result from a change in either the macroeconomy as forecasted by the PWBMsim or the tax code. These changes are described in the distributional analysis of the changes, the change in marginal and average tax rates and the change in corporate ETRs. The results are also used to construct tax functions that are used as an input to PWBM's dynamic model. These tax functions describe the tax rates faced by both labor and capital income. The results of PWBM-TM are useful for any discussion of policies that affect the tax code. This usefulness is evident in the distributional display and data visualization. However, policy analysis that does not consider how proposed policy changes affect both the macroeconomy and feed back into the federal budget is incomplete.

Dynamic OLG Model

PWBM's dynamic OLG model is detailed here. PWBM-TM's tax functions are an important input into PWBM's dynamic general equilibrium OLG model since the tax functions account for household and firm heterogeneity. This model is used to evaluate proposed policy changes over long time horizons by calculating the macroeconomic effects of those policy proposals on individual households and the macroeconomy. These macroeconomic effects feed back into the budget primarily through changes to interest rates and wages. This type of analysis is important in understanding the true budgetary effect of any policy change that affects the macroeconomy (including changes to outlays and revenues as well as changes that affect immigration or national infrastructure). By allowing for the macroeconomic feedback associated with any policy change, the dynamic OLG model better describes the timepath of the variables of interest than an independent static model. The model traces the timepath by allowing the behavioral responses of households to change economic aggregates prices and economic aggregates and therefore, the path of the economy. The dynamic OLG uses the tax functions, the revenues and the outlays from PWBM-TM to produce two sets of results: static and dynamic. The former is the set of results from the dynamic model that does not allow agents to optimize their behavior. The latter is the set of results from the dynamic model that does allow agents to optimize their behavior.

Post Processing

Our dynamic OLG model does not explicitly account for all of the demographic richness present in PWBMsim due to computational constraints. In the final, post-processing step, we combine the output of the dynamic OLG model and PWBMsim to produce predictions which incorporate the demographic richness of the PWBMsim with the dynamic effects of the OLG model. In post processing, the percent changes in macroeconomic and budget aggregates between the static and the dynamic versions of the dynamic OLG models are calculated. These 'deltas' reflect the macroeconomic feedback effects present in the economy. Tools developed by PWBM combine PWBMsim with the dynamic OLG by using the deltas.This approach captures the richness of detail in the microsimulation model along with the behavioral changes observed in the dynamic OLG model. Our data visualization tool (pictured) automatically compiles the results for use by our researchers.



1. The 2012 data has been ordered. ↩

2. PWBM-TM also accounts for the associated SECA deduction. ↩

3. This proposal was included in the Tax Cuts and Job Act of 2017. ↩

4. "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review," Emmanuel Saez, Joel Slemrod and Seth Giertz, Journal of Economic Literature 50(1), 2012, 3-50 ↩

5. The analysis PWBM performed also benefited greatly from conversations with Matthew Knittel and from the work of Kitchen and Knittel (2016): https://www.treasury.gov/resource-center/tax-policy/tax-analysis/Documents/WP-110.pdf. ↩

6. See "The Implications of Tax Asymmetry for U.S. Corporations," Michael Cooper and Matthew Knittel, National Tax Journal, March 2010, 63(1), 33-62 for a full discussion of the relevant literature. ↩

7. PWBM benefited greatly from conversations with Matthew Knittel of Pennsylvania's Independent Fiscal Office as well as Treasury experts. ↩

8. See Dowd, Tim and Landefeld, Paul and Moore, Anne, Profit Shifting of U.S. Multinationals. Journal of Public Economics. 2/2017. ↩

9. PWBM is unable to distinguish due to lack of data. ↩

DYNAMIC OLG

Download a detailed white paper (https://pwbm.squarespace.com/s/2018-08-03-DynamicModel-Documentation.pdf)

The dynamic version of PWBM (https://static1.squarespace.com/static/55693d60e4b06d83cf793431/t/5a79c0cc419202954d04f789/1 is based on an overlapping-generations (OLG) model where households maximize their welfare in a forward-looking manner. Households respond to policy changes by altering how much to work and save, given wages and interest rates. These choices are made given the amount of income, time, assets, technology, and skills that households possess and the prices, wages, interest rates and uncertainties that households face, both today and in the future. These feedback effects can change the size of the economy, economic growth, distribution of income and federal revenues.

PWBM's dynamic model has unique features. First, the OLG model includes numerous types of households that vary by income as well as key demographics. Households face uncertainty today and in the future about their income and longevity. Second, the model carefully analyzes key features of changes to tax, Social Security and immigration policy. Finally, the PWBM model allows for unbalanced reforms that increase or decrease government debt.

Our model is calibrated to empirical measures (http://budgetmodel.wharton.upenn.edu/issues/2016/9/13/setting-behavioral-responses-in-pwbms-dynamic-simulations) of the responsiveness of labor and savings to changes in after-tax wages and interest rates. The responsiveness of labor to changes in after-tax wages' default value is 0.5. The responsiveness of savings to changes in interest rates' default value is 0.5. Users can choose the openness of the U.S. economy to international capital flows. The openness of the U.S. economy to international capital flows' default value is 40 percent. The return to capital's default value is the risk-free rate of return.

Integration between PWBM's dynamic model and static model is achieved by first running the OLG model in "static" mode, in which households do not alter their economic choices, and then running the model in "dynamic" mode, in which households are allowed to alter their economic choices. The differences between the two are then layered on top of the static microsimulation results. This approach captures the richness of detail in the microsimulation model along with the behavioral changes observed in the OLG model.

LEARN MORE INFORMATION ABOUT PWBM'S DYNAMIC OLG MODEL (HTTPS://PWBM.SQUARESPACE.COM/S/2018-07-06-DYNAMICMODEL-DOCUMENTATION.PDF)

Summary

This brief reports Penn Wharton Budget Model's (PWBM) static and dynamic analysis of the Tax Cuts and Jobs Act (TCJA), reported by the conference committee on December 15, 2017. The TCJA increases debt by between $1.9 trillion to $2.2 trillion over the next decade.

Key Points

- By 2027, under our standard economics assumptions, we project that GDP is between 0.6 percent and 1.1 percent larger, relative to no tax changes. Debt increases between $1.9 trillion and $2.2 trillion, inclusive of economic growth.
- By 2040, we project that GDP is between 0.7 percent and 1.6 percent larger under our baseline assumptions, and debt increases by $2.2 to $3.5 trillion.

The Tax Cuts and Jobs Act, as Reported by Conference Committee (12/15/17): Static and Dynamic Effects on the Budget and the Economy

Introduction

Penn Wharton Budget Model (PWBM) previously reported static analysis and dynamic analysis of the House Tax Cuts and Jobs Act (TCJA), as of November 5, 2017. That analysis was updated when the bill was changed by the 1st amendment and the 2nd amendment, and reported out of the Ways and Means Committee on November 9, 2017.

Penn Wharton Budget Model (PWBM) previously reported static and dynamic analysis of the Senate Tax Cuts and Jobs Act (TCJA), as of November 9, 2017. The bill was amended on November 15, 2017, thereby generating updates to static and dynamic analysis. Our static and dynamic analysis was also updated for amendments when the bill was passed by the Senate on December 2, 2017.

This brief reports our static and dynamic analysis for the bill reported by the conference committee on December 15, 2017. Readers are encouraged to read some of our previous analyses for related definitions used in this brief.

Conference Agreement

The TCJA would change U.S. individual, corporate, and international taxes.

For individuals, the bill would keep seven tax brackets with new rates. The top rate would be lowered from 39.6% to 37 percent and the exemption from the Alternative Minimum Tax (AMT) would be increased. The standard deduction would be roughly doubled and personal exemptions would be eliminated. For households who itemize deductions, the cap on the Mortgage Interest Deduction would be reduced to $750,000 in mortgage debt and up to $10,000 of State and Local taxes could be deducted. The Child Tax Credit would increase to $2,000, the amount refundable to $1,400 and begin to phase out at $400,000 of income. Households would be able to deduct 20 percent of the first $315,000 in income from pass-through businesses. The

individual mandate for health insurance would be repealed and estate tax exemptions would increase. For individuals, many provisions would sunset in 2026.

For corporations, the bill would introduce a tax rate of 21 percent, down from 35 percent and eliminate the corporate AMT. The bill would extend, expand and then phase out bonus depreciation. The net interest deduction would be capped at 30 percent of income. For multinational corporations, a territorial tax system would be introduced with a deemed repatriation tax of eight percent for non-cash and 15.5 percent for cash assets.

Modeling Sunsets in the Dynamic Model

To maintain consistency with budget reconciliation requirements, the TCJA involves numerous major expiry of provisions (sunsets). However, in making those amendments, the bill's creators announced that they expect that sunsetting provisions would eventually be extended. We, therefore, model the *dynamic* (economic) effects of the amended bill as households and investors *expecting* no sunsets prior to the sunset dates. However, to be consistent with the actual bill, the sunsets then *unexpectedly* expire as scheduled. This modeling approach is generally more favorable for generating positive growth relative to alternatives.

Revenue Effects: Static and Dynamic

PWBM reports the static effects on revenues with and without changes to federal outlays in Table 1. Including outlay effects is consistent with the Joint Committee on Taxation's estimates, which finds that the TCJA reduces revenue by $1,456 billion from 2018 to 2027. PWBM's static model projects that, including outlay effects, the bill reduces revenue by $1,968 billion over the first 10 years. Not including outlays, PWBM finds a $2,209 billion revenue loss over the first 10 years.

Between PWBM and JCT, there are considerable differences in the estimated costs of individual items, especially the individual AMT. These differences are due to several factors: interactions when changing multiple parts of the tax code at the same time; moderately different macroeconomic forecasts and parameters; and PWBM's forecast of demographic changes compared to JCT's focus on tax filers.

Table 1: Estimates of the Effect of the Tax Cuts and Jobs Act on Federal Tax Revenues Relative to Current Policy 1

	Revenue Effect 2018-2027 (billions of $)		Revenue Effect 2018-2040 (billions of $)
Tax Provision	**JCT**	**PWBM**	**PWBM**
Individual			
New tax rate and bracket structure	-1,214	-1,307	-1,364
Expand the standard deduction and repeal personal exemptions	491	438	438
Index tax provisions to chained CPI	134	88	765
New pass-through business deduction	-415	-542	-758
Pass-through business loss limits	150	140	114
Expand Child Tax Credit (CTC) and new non-child dependent credit	-573	-511	-532
Repeal and modifications to itemized deductions	668	459	496
Increase Alternative Minimum Tax (AMT) exemption phaseout threshold 2	-637	-317	-313
Reforms to certain deductions and credits 3	25	26	9
Reforms to certain individual tax expenditures, including the ACA's individual mandate 4 5	328	328	1,169
Estate Tax Exemption Doubled 6	-83	-83	-83
Subtotal	*-1,127*	*-1,281*	*-59*
Corporate			
Reduce corporate tax rate to 21%, repeal corporate AMT	-1,389	-1,435	-4,185
Net interest deduction capped at 30% of income	253	193	753
Changes to the treatment of investment	-86	-180	-152
Modification to net operating loss deductions	201	145	169
Amortize research & experimentation costs	120	51	88

	Revenue Effect 2018-2027 (billions of $)		Revenue Effect 2018-2040 (billions of $)
Tax Provision	**JCT**	**PWBM**	**PWBM**
Repeal of Domestic Production Deduction	98	100	300
Reforms to certain business tax expenditures 7	149	148	584
Subtotal	*-654*	*-978*	*-2,443*
International 8			
Territorial System	-224	-173	-509
Special one-time repatriation rate	339	254	232
Other international reforms 9	210	210	772
Subtotal	*324*	*291*	*495*
TOTAL (with Outlay Effects)	**-1,456**	**-1,968**	**-2,007**
REVENUE (Total without Outlay Effects)	**-1,649**	**-2,209**	**-3,077**

Note: Effects on federal outlays include tax refunds and the repeal of the individual mandate for health insurance.

Table 2 shows that over the 10-year budget window ending in 2027, the TCJA is, on a dynamic basis, projected to reduce federal tax revenues between $1.8 trillion (high initial return to capital) to $2.0 trillion (low initial return to capital). Over this period, debt rises by more, between $1.9 trillion to $2.2 trillion, due to debt service. By 2040, revenue falls between $1.5 trillion to $2.4 trillion, whereas debt increases by $2.2 trillion to $3.5 trillion.

Table 2: TCJA Effects on Revenue and Debt Relative to Current Policy

	Cumulative Revenue (billions of $)			Change in Debt (billions of $)		
	Static	**Dynamic**		**Static**	**Dynamic**	
Years		**High return to capital**	**Low return to capital**		**High return to capital**	**Low return to capital**
2018-2027	-$2,209	-$1,786	-$2,038	$2,387	$1,941	$2,238
2018-2040	-$3,077	-$1,540	-$2,442	$4,005	$2,181	$3,466

Note: The revenue estimates in this table focuses on the official definition of “revenue” and, therefore, does not incorporate changes in outlays. Table 1 reports static analysis both inclusive and exclusive of changes in outlays. Changes in debt include changes in outlays. Consistent with our previous dynamic analysis and the empirical evidence, the projections above assume that the U.S. economy is 40 percent open and 60 percent closed. Specifically, 40 percent of new government debt is purchased by foreigners.

Economic Effects

The Tax Cuts and Jobs Act has effects beyond federal revenues, including effects on GDP, labor income and U.S. capital services, as summarized in Table 3. By 2027, GDP is between 0.6 percent and 1.1 percent larger than current policy in that year. By 2040, GDP is between 0.7 percent and 1.6 percent larger than current policy in that year.

Table 3: TCJA Effects on Key Macroeconomic Variables Relative to Current Policy in Year Shown

	GDP (% change)		Labor Income (% change)		Capital Services (% change)	
Year	**High return to capital**	**Low return to capital**	**High return to capital**	**Low return to capital**	**High return to capital**	**Low return to capital**
2027	1.1%	0.6%	1.1%	0.6%	2.4%	0.8%
2040	1.6%	0.7%	1.6%	0.7%	4.5%	1.3%

Note: Percentage change relative to current policy in 2027 and 2040, respectively. Consistent with our previous dynamic analysis and the empirical evidence, the projections above assume that the U.S. economy is 40 percent open and 60 percent closed. Specifically, 40 percent of new government debt is purchased by foreigners.

Table 3 shows changes in the level of GDP in the shown years relative to current policy. An alternative measure, as shown in Table 4, is to examine changes in the *annual growth rate* of GDP that is needed to produce the different levels shown in GDP over time. PWBM finds that over the next 10 years, average annual GDP growth will be 0.06 percentage points to 0.12 percentage points higher under TCJA than with no tax changes. However, from 2028 to 2040, average annual GDP growth will be 0.01 percentage points to 0.03 percentage points larger than under current law, due to the effects of larger debt.

Table 4: TCJA Effects on Average Annual GDP Growth Relative to Current Policy over Period of Time Shown

	Average Annual GDP Growth Rate (percentage point change)	
	Dynamic	
Years	**High return to capital**	**Low return to capital**
2018-2027	0.12	0.06
2028-2040	0.03	0.01

Note: Percentage point change relative to current policy from 2018–2027 and 2028–2040, respectively. Consistent with our previous dynamic analysis and the empirical evidence, the projections above assume that the U.S. economy is 40 percent open and 60 percent closed. Specifically, 40 percent of new government debt is purchased by foreigners.

Conclusion

Penn Wharton Budget Model's dynamic analysis projects that The Tax Cuts and Jobs Act increases federal debt in both the short- and long-run relative to current policy. In the near term, there is a small boost to GDP, but that increase diminishes over time.

1. PWBM's integrated model includes both revenue and spending policy. For our tax simulator, we model "current law" that allows tax provisions to expire as scheduled, consistent with JCT's approach. For our spending side, we model "current policy" that does not, for example, allow changes to mandatory changes when, for example, the Social Security's trust funds are exhausted. For debt calculations and dynamic analysis, this integration provides a more holistic analysis since some government benefit formulas, including the initial calculation of Social Security benefits upon retirement, are explicitly tied to the growth in average wages throughout a participant's lifetime. ↩

2. Absent other changes, PWBM's estimate of the revenue loss of repealing the individual AMT compared to baseline is $515 billion. ↩

3. Reforms to certain credits and deductions includes requiring Social Security numbers for for each child to claim refundable portion of CTC and repeal of the moving expense deduction. ↩

4. Reforms to certain exclusions includes repeal of exclusion for employer-provided bicycle commuter fringe benefit, qualified moving expense reimbursements, modified exclusion of gain from sale of a principal residence, repeal of the ACA individual mandate, and other provisions. ↩

5. For these items PWBM applies PWBM's macroeconomic forecast to JCT estimates. ↩

6. For these items PWBM applies PWBM's macroeconomic forecast to JCT estimates. ↩

7. For these items PWBM applies PWBM's macroeconomic forecast to JCT estimates. ↩

8. PWBM's estimates include lower cross-border profit flows than JCT's. ↩

9. For these items PWBM applies PWBM's macroeconomic forecast to JCT estimates. ↩

Summary

PWBM estimates that "Tax Reform 2.0" will lose $614 billion in revenue over the next 10 years, lose $3,831 billion in revenue by 2040, and slightly contract the economy, by about 0.6 percent to 0.9 percent by 2040.

Key Points

- Recently, the House Ways and Means Committee introduced "Tax Reform 2.0" that includes new incentives to start up a business, enhanced savings accounts and makes permanent the individual tax cuts in the 2017 Tax Cuts and Jobs Act.
- In April of 2018, PWBM anticipated and estimated the effects of the largest piece of this legislation that makes the TCJA individual tax cuts permanent.
- This brief updates that analysis for the new 10-year budget window and incorporates the rest of the provisions in "Tax Reform 2.0."

Analysis of "Tax Reform 2.0"

Introduction

Recently, the House Ways and Means Committee introduced a set of legislation under the flag "Tax Reform 2.0". The legislation is broken into three pieces:

- Start-up deduction: H.R. 6756, expands the deduction allowance for start-up costs associated with new business by allowing a larger deduction for organizational costs and the transfer of credits in the case of an ownership change.
- Enhanced savings accounts: H.R. 6757, modifies rules associated with retirement savings, including removes barriers for employers to offer retirement plans, creates new tax advantaged savings accounts, and allows for increased savings by older individuals and for education.
- Making the Tax Cuts and Job Act (TCJA) individual tax cuts permanent: H.R. 6760, extends permanently the individual provisions of The Tax Cuts and Jobs Act that are set to expire in 2025.

Previous Analysis

In our previous brief, released in April of 2018, PWBM anticipated and estimated the effects of the third piece of this set of legislation that makes the TCJA individual provisions permanent. That estimate summarized revenue effects for the 10-year budget window, between 2018 - 2027, as as well as over the longer period 2018 - 2040.

This brief updates that estimate for the new 10-year budget window, between 2019 - 2028, as well as 2019 - 2040. This brief also incorporates all of the Tax Reform 2.0 provisions, including the start-up deduction and enhanced retirement savings. As such, we provide the first non-governmental analysis of the entire Tax Reform 2.0 package, as estimated by the government's tax experts at the Joint Committee on Taxation (see their analysis for H.R. 6756, H.R.

6757 and H.R. 6760). The JCT projects a slightly larger revenue loss over the next 10 years and does not provide an estimate for years beyond 2028.[1]

Updated Analysis

Table 1 shows that PWBM estimates that Tax Reform 2.0 will cost $614 billion in lost revenue over the next 10 years on a conventional (or "static") basis. The lion's share of that lost revenue comes from making the TCJA individual tax cuts permanent. However, there is considerable cost beyond the budget window. We project a conventional revenue loss of $3,831 billion between 2019 and 2040, and so about 84 percent of the entire revenue loss comes after 10 years.

Table 1: Estimates of Tax Reform 2.0 Provisions on Federal Tax Revenues Relative to Current Policy[2]

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Tax Provision	Revenue Effect 2019-2028 (billions of $)	Revenue Effect 2019-2040 (billions of $)
New tax rate and bracket structure	-557	-3,825
Expand the standard deduction and repeal personal exemptions	203	1,291
New pass-through business deduction	-187	-1,158
Pass-through business loss limits	72	487
Expand Child Tax Credit (CTC) and new non-child dependent credit	-225	-1,307
Modifications to itemized deductions	248	1,845
Increase Alternative Minimum Tax (AMT) exemption phaseout threshold	-158	-1,077
Reforms to certain deductions and credits	11	66
Double estate tax exemption	-21	-205
Universal Savings Accounts (USA)	-7	-20
Expansion of Deduction for Start-Up costs	-4	-12
Other changes	-12	-44
TOTAL (with Outlay Effects)	**-638**	**-3,959**
REVENUE (Total without Outlay Effects)	**-614**	**-3,831**

Note: Effects on federal outlays include tax refunds. Reforms to certain credits and deductions includes requiring Social Security numbers for for each child to claim refundable portion of CTC and repeal of the moving expense deduction.

Incorporating Dynamic Effects

As noted, both of these measures are conventional estimates that do not incorporate the dynamic effects on the economy from the provisions in Tax Reform 2.0. Table 2 of our previous brief, however, showed that making the TCJA individual tax cuts permanent actually lost *more* revenue on a dynamic basis than on a static basis, that is, these tax cuts produced a *negative dynamic score*. The reason is that a permanent reduction in income taxes is less stimulating to economic growth than, for example, spending the same amount of revenue on a reduction to effective business tax rates, which was the main focus of the original TCJA. At the same time, extending the individual tax cuts generates a considerable amount of additional debt that creates a drag on capital formation. The net effect is that the economy actually grows less (see Table 4 in our previous analysis) after this tax cut rather than more.

The first two provisions in the Tax Reform 2.0 are intended to provide additional incentives to grow the capital stock by encouraging new business formation and grow savings. But they are too small to make a meaningful impact to the economy relative to making the individual tax cuts permanent. Moreover, from an incentive basis, Universal Savings Accounts are less additive to the economy than first meets the eye. The previous evidence suggests that a considerable amount of savings in tax-deferred retirement plans were not new but merely represented a shift of savings from taxable plans.

Consistent with our previous analysis, we continue to project that Tax Reform 2.0 will, therefore, reduce GDP by 2040 between 0.6 percent and 0.9 percent relative to current law (which includes the original TCJA law passed December, 2017).

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1. Traditionally, the JCT reports “TOTAL (with Outlay Effects),” as shown in our Table 1, whereas PWBM tends to focus on the more conventional “REVENUE” line shown in Table 1. For comparison, JCT reports a “TOTAL (with Outlay Effects)” revenue loss of $657 billion, compared to our estimate of $638 billion. ↩

2. PWBM’s integrated model includes both revenue and spending policy. For our tax simulator, we model “current law” that allows tax provisions to expire as scheduled, consistent with JCT’s approach. For our spending side, we model “current policy” that does not, for example, allow changes to mandatory spending when, for example, the Social Security’s trust funds are exhausted. For debt calculations and dynamic analysis, this integration provides a more holistic analysis since some government benefit formulas, including the initial calculation of Social Security benefits upon retirement, are explicitly tied to the growth in average wages throughout a participant's lifetime. ↩

Key Points

- We project that the Tax Cuts and Jobs Act (TCJA) will cause 235,780 U.S. business owners---77 percent of whom have incomes of at least $500,000---to switch from pass-through entity owners to C-corporations, primarily to take advantage of sheltering their income from tax by converting to C-corporations.
- The biggest switchers include doctors, lawyers and investors, especially if owners can afford to defer receipt of business income to a later year. Other business owners, who are qualified to use the 20 percent deduction for pass-through business income, including painters, plumbers, and printers, are more likely to remain as pass-through entities.
- We project that about 17.5 percent of all pass-through Ordinary Business Income will switch to C-corporations.

Summary

We project that the recent tax act will cause at least 235,780 individual business owners to switch from owners of pass-through entities to C-corporations, representing about 17.5 percent of Ordinary Business Income from pass-throughs.

Projecting the Mass Conversion from Pass-Through Entities to C-Corporations

Introduction

The Tax Cuts and Job Act (TCJA), which came into effect on January 1, 2018, lowers the corporate tax rate from a top rate of 35 percent to a rate of 21 percent. As a result, earlier this year, two prominent private equity firms, Ares and KKR, converted from a partnership to a C-corporation. Other firms, especially service firms with high income owners who do not have access to the new law's 20 percent deduction for pass-through income, are also considering the same move.

Penn Wharton Budget Model (PWBM) previously reported both the static and dynamic effects of the TCJA as well as the effective tax rates by industry before and after passage of the bill. The TCJA changed the relative tax rates faced by pass-through businesses (S-corporations, partnerships and sole proprietorships) and C-corporations. Our previous analyses of the TCJA include this type of income shifting and reclassification at the macroeconomics level, and we previously reported the methods we used to make our estimates.

This brief reports the *number and types of businesses* that benefit the most under the new tax law and are, therefore, mostly likely to change their form of organization. Business owners can use a simplified version of PWBM's tax module to compare average tax rates as a C-corporation versus a pass-through entity. The calculations presented in this brief use the full power of PWBM's tax module.

The Taxation of Business Income

Pass-through businesses and C-corporations are taxed differently. Pass-through business income is taxed only at the owner level,[1] whereas C-corporate income is taxed first at the corporate level and then again at the owner level when profits are distributed.

Prior to the passage of the TCJA, C-corporate income faced a combined corporate and owner tax rate which was often higher than the tax rate faced by pass-through business income. Therefore, prior to the passage of the TCJA, the U.S. tax code encouraged certain businesses to prefer pass-through form over C-corporate form. Indeed, pass-through businesses became increasingly prominent over time. In 1980, 17 percent of businesses were C-corporations. But, by 2013, only 5 percent of businesses were C-corporations. Similarly, C-corporations accounted for 79 percent of business income in 1980 but only 50 percent in 2013.[2] The increasing importance of pass-through businesses has been attributed to changes in liability laws,[3] differential treatment of wages and profits,[4] and the disparity in taxation of business income.[5] It is the latter explanation that we explore in this brief.

The TCJA introduced a provision known as Section 199A which allows certain owners of pass-through businesses to deduct up to 20 percent of qualified business income from their overall taxable income.[6] Many lawyers and economists have noted the potential tax arbitrage opportunities that Section 199A presents. In particular, the TCJA provides strong incentives for businesses to either convert to a C-corporation or recharacterize income received by businesses limited under the provision.[7] Other papers have presented examples of the tax faced by business income received by different tax units under alternative organizational forms.[8]

This brief adds to the growing body of research surrounding business entity choice under the TCJA. The advantage of our analysis is that we use PWBM's tax module---which is calibrated to IRS microdata---rather than simple examples to model business organizational decisions. For each simulated tax unit with pass-through income, we are able to calculate the average tax rate on pass-through income before and after the passage of the TCJA and then estimate the average rate if they instead organized as C-corporations. We also present breakdowns based on pass-through type and under different scenarios where firms are able to retain earnings to benefit from tax deferral. Taken as a whole, this brief presents a more detailed picture of which kinds of businesses have the greatest tax incentives to reorganize under the TCJA.

TCJA Changes Incentives to Organize as C-Corporation

The TCJA produces significant tax savings for many pass-through businesses to reorganize as C-corporations. The process of reorganizing for tax purposes is largely costless since the introduction of the 'check the box' elections in 1996.

The TCJA changed both the corporate and individual rates, so that there is now little difference between the tax rates paid on C-corporate and pass-through business income. For example, Table 1 shows that in 2017, C-corporate income faced a top tax rate that was 7.1 percentage points higher than the top tax rate faced by pass-through business income. In 2018, the top tax rate faced by C-corporate income is actually 1 percentage point *lower*. In 2018, under the TCJA, some pass-through businesses qualify for a deduction of 20 percent which lowers the top marginal rate on pass-through business income to 29.6 percent.[9] The difference between net tax rates on C-corporations and pass-through businesses is larger (11.4 percent) for pass-through businesses that qualify for the deduction, but still less than in 2017. This change in relative tax rates may make organizing as a C-corporation more appealing, particularly if a business's marginal rate is considerably lower than the statutory tax rate or the individual owner faces a lower individual tax rate on qualified dividends and/or long-term capital gains.

Table 1: Top Statutory Tax Rates in 2017 and 2018

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	0% Retained Earnings				
	2017		2018		
Type of Tax	**C-Corporation**	**Pass-through**	**C-Corporation**	**Pass-Through**	**with 20% Deduction**
Entity Tax	35.0%	0.0%	21.0%	0.0%	0.0%
Individual Tax	20.0%	39.6%	20.0%	37.0%	29.6%
Net Investment Income Tax	3.8%	3.8%	3.8%	3.8%	3.8%
Net Rate	**50.5%**	**43.4%**	**39.8%**	**40.8%**	**33.4%**
Rate Differential		*7.1*		*-1.0*	*6.4*
	100% Retained Earnings				
	2017		**2018**		
Entity Tax	35.0%	0.0%	21.0%	0.0%	0.0%
Individual Tax	0.0%	39.6%	0.0%	37.0%	29.6%
Net Investment Income Tax	0.0%	3.8%	0.0%	3.8%	3.8%
Net Rate	**35.0%**	**43.4%**	**21.0%**	**40.8%**	**33.4%**
Rate Differential		*-8.4*		*-19.8*	*-12.4*

Calculating the Tax Rates for Different Types of Businesses

Under the U.S. tax code, C-corporate profits are taxed once at the entity level and then again at the individual level as either a dividend or capital gain. It is important to consider both layers of taxation in analyzing the costs and benefits of C-corporation status. It is also important to consider the fact that an owner of a C-corporation can retain any or all of the profits in the corporation

and defer taxation. Therefore, the rate faced by C-corporate income is a function of the corporate rate, the dividend rate, the capital gains rate and the benefit from retained earnings as illustrated in equation 1:

$$\tau nc = \tau c + (1 - \tau c)(\alpha \tau d + (1 - \alpha)\beta \tau cg) \qquad (1)$$

Here, τnc is the net corporate rate, cis the statutory corporate rate, τc the tax rate of dividend income, τcg is the tax rate on capital gains income, α is the share of corporate income paid out as dividends and β is a measure of the benefits to capital gains deferral.10

Retaining earnings in a corporation is a benefit to C-corporate form. Pass-through businesses by definition do not allow retained earnings; all income passes through to the owner and is taxed in the year it is earned. Our analysis considers three scenarios for retained earnings: No retained earnings (all income is paid out in the year it is earned), 100 percent retained earnings (no income is paid out in the year it is earned) and 52 percent retained earnings (the average dividend payout rate from 1959-2015).

We follow the methodology set forth by Cooper et al., (2015) to assign a tax rate to types of income allocated from specific pass-through entities. Data limitations do not allow identification of the type of income from specific types of entities other than *Ordinary Business Income* (OBI), which is a business' main source of income, which is derived from normal operations of a business.11 Unidentified income includes capital gains, dividends and interest. However, both capital gains and qualified dividends already face the lowest possible rate (0 percent/15 percent/20 percent) if received through a pass-through business and, therefore, would not benefit from conversion. Moreover, interest income and ordinary dividends face ordinary rates, and so conversion may lower the tax rate faced by this income. But, this type of income can't be identified from the available data.

We consider the total dollar amounts of partnership, sole proprietorship and S-corporation OBI as eligible for conversion to a C-corporation. The income earned by a single member LLC or sole proprietorship is easy to convert to C-corporate income since there are no partners to consider. Since a partner's taxation is independent of the other partners in the partnership and a partner can be either an individual or an entity, a partner can convert their own income to corporate form. In the case of S-corporations, the conversion to C-corporation is more complicated since multiple individuals can be shareholders of S-corporations and any conversion requires the agreement of each shareholder. However, the average S-corporation only has 1.7 shareholders and are by definition closely held. Additionally, it is likely that each shareholder faces similar rates. As such, we consider each S-corporation shareholder as the lead owner and therefore, able to make the conversion decision and consider the OBI earned as eligible for conversion.12

For each type of pass-through business, we subject OBI from that type of business to the corporate tax structure in place prior to January 1, 2018. We also subject a portion of the after tax profits to the relevant dividend rate faced by the individual owner. The portion subjected to the dividend tax is determined by the three retained earnings scenarios mentioned above.

To estimate the firms that switch from pass-through to C-corporation, we need to correct for the fact that some business owners were failing to minimize taxes prior to the passage of the TCJA. Toward that end, for each business owner, we first calculate a tax rate differential between the 'net corporate rate' (both layers of tax) and the individual rate as a pass-through entity *before* the passage of the TCJA (the "pre-TCJA tax rate differential"). Similarly, we calculate a tax rate differential between the 'net corporate rate' (both layers of tax) and the individual rate as a pass-through entity after the passage of the TCJA (the "post-TCJA tax rate differential"). We assume that business owners for whom the pre-TCJA tax rate differential was negative (i.e., these business owners failed to minimize taxes) do not switch entity types. Business owners, for whom the pre-TCJA tax rate differential was positive *and* the post-TCJA tax rate differential is negative, are then assumed to switch.

Pass-Through Business Income is Concentrated Among High Earners

Cooper et al. (2015) noted that pass-through business income in 2010 was concentrated among high earners. Because of this concentration, most pass-through business income is subject to the highest marginal tax rates in the individual income tax code and likely not able to use the new pass-through deduction.

This finding is reflected in Table 2. Income from pass-through businesses is largely received by tax units with *Adjusted Gross Income* (AGI) above $100,000. Filers above this AGI cutoff receive over 90 percent of partnership and S-corporation OBI and over 50 percent of sole proprietorship OBI. On average, these filers receive just over $160,000 of partnership OBI, just over $200,000 of S-corporation OBI and just under $51,000 of sole proprietorship OBI.

Table 2: Returns with pass-through income, by AGI (2018)

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Pass-through type

With partnership income ▼

	With partnership income (Billions of $)			With S-corporation income (Billions of $)			With sole proprietership income (Billions of $)		
AGI	**Number of Returns**	**Partnership OBI**	**AGI**	**Number of Returns**	**S-corporation OBI**	**AGI**	**Number of Returns**	**Sole proprietership OBI**	**AGI**
$0 or negative	58,046	$4	-$29	78,617	$6	-$29	351,288	$5	-$41
$0-$100K	1,201,380	$20	$61	1,417,118	$34	$76	13,131,504	$176	$473
$100K-$250K	1,025,626	$40	$162	1,244,574	$69	$194	3,321,428	$104	$488
$250K-$500K	446,157	$55	$157	442,246	$63	$153	656,999	$58	$220
$500K-$1M	246,182	$62	$170	203,146	$59	$140	163,829	$26	$110
$1M-$2.5M	118,849	$64	$177	101,777	$72	$151	59,026	$15	$86
$2.5M+	42,771	$83	$308	39,809	$146	$307	16,732	$10	$117

The Incentive for Business Reorganization

Figure 1 presents the results of the tax experiment where all after tax income is distributed as qualified dividends to the individual owner. Use the drop down box to select results for partnership, S-corporation and sole proprietorship OBI. For each AGI class, the rate differential is highest in 2017, under pre-TCJA law, (red column) since the reduction of the corporate rate is larger than the reduction of the individual rates. The lone exception is the lowest AGI class which is hurt by the elimination of the graduated corporate rates present in the 2017 tax code. The blue columns represent the average rate differential in 2018, under the new tax code. The fact that the average differential is smaller in 2018 indicates that the incentive to file taxes as a pass-through business is smaller than in 2017. The grey column represents the average rate differential if there were no deduction for pass-through income in 2018 under the new tax code. This column coarsely represents the group of filers whose deduction is limited by either income or business type.. These differentials suggest that businesses that are unable to use the pass-through deduction face less of an incentive to file taxes as a pass-through business.

Figure 1: C-Corporation - Pass-Through Business Tax Rate Differential: 0% Retained Earnings

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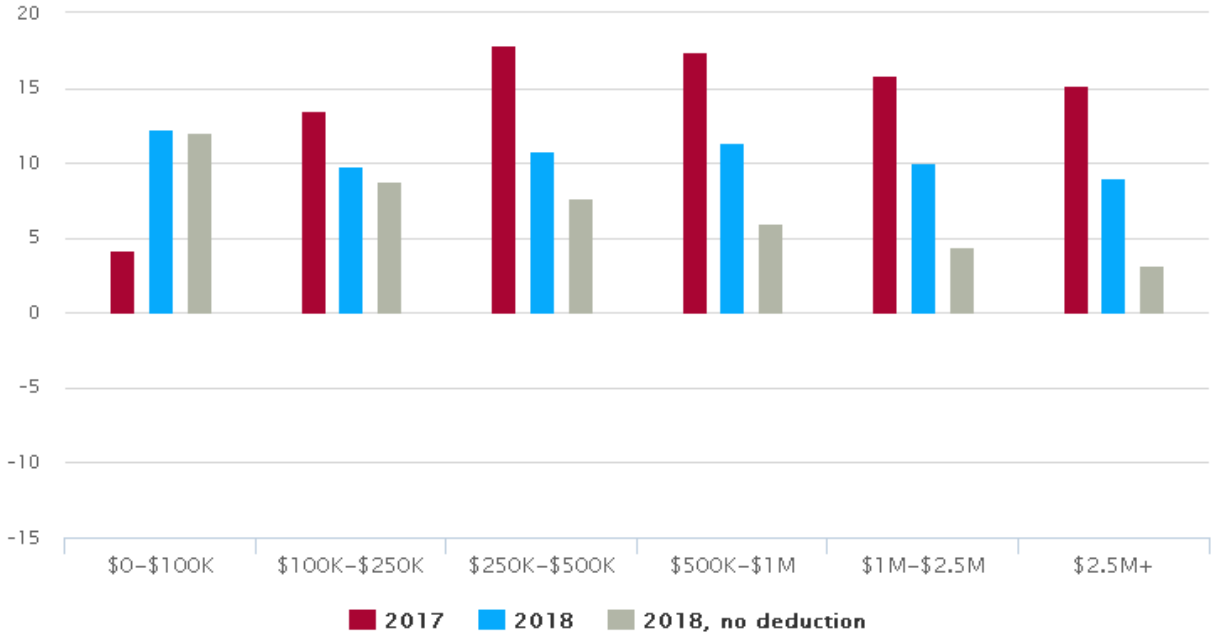
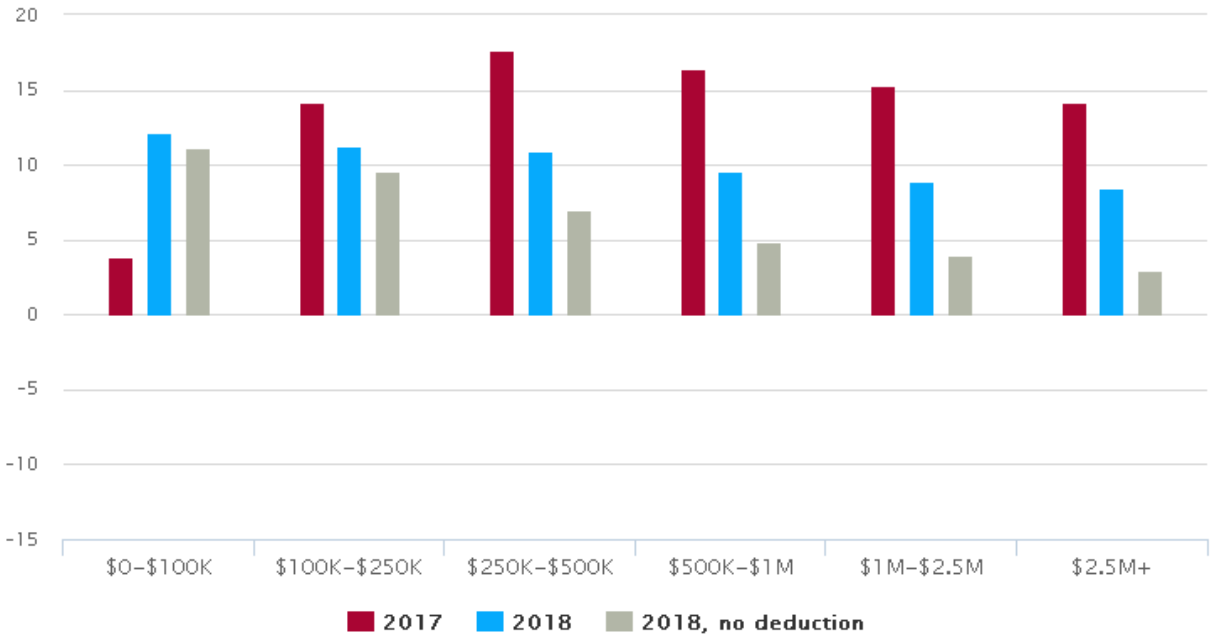
Pass-through type

Partnership ▼

Partnership



S-Corporation



Sole Proprietorship

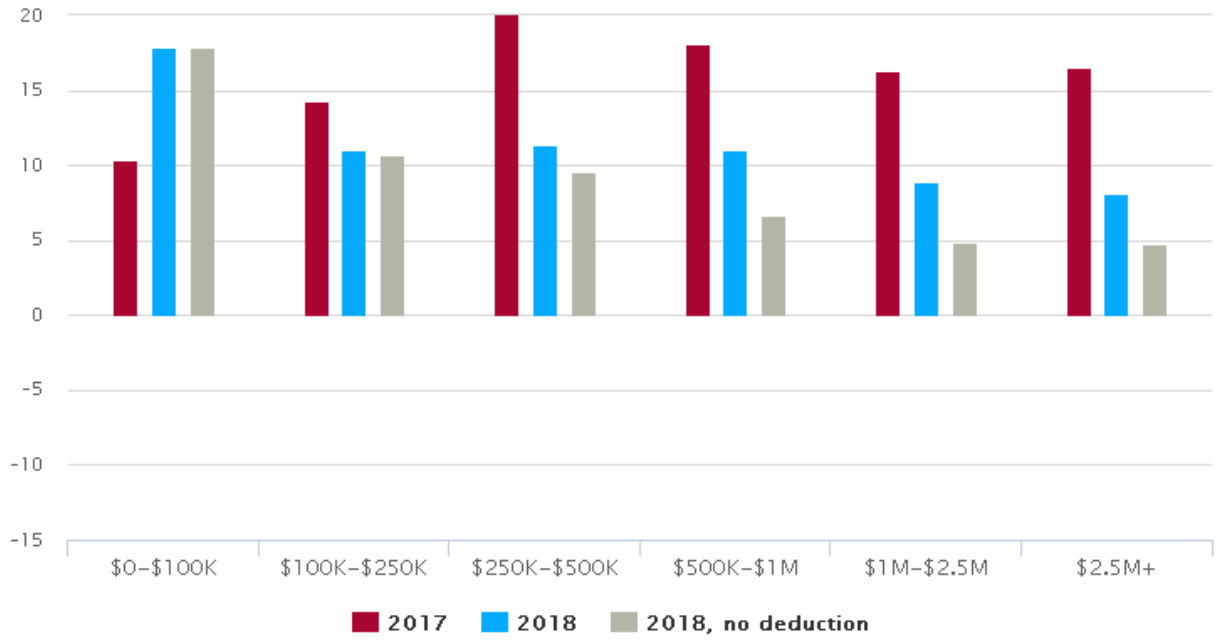


Figure 2 presents the average rate differentials by AGI class for the experiment where no after tax income is distributed as dividends to individual owners. Under this experiment, it is clear that tax units with more than $500,000 in AGI benefit from filing taxes as a C-corporation since the rate differential is actually negative no matter the type of pass-through business. However, for S-corporation OBI, the benefit to filing as a C-corporation is clear for tax units with more than $250,000 in AGI.

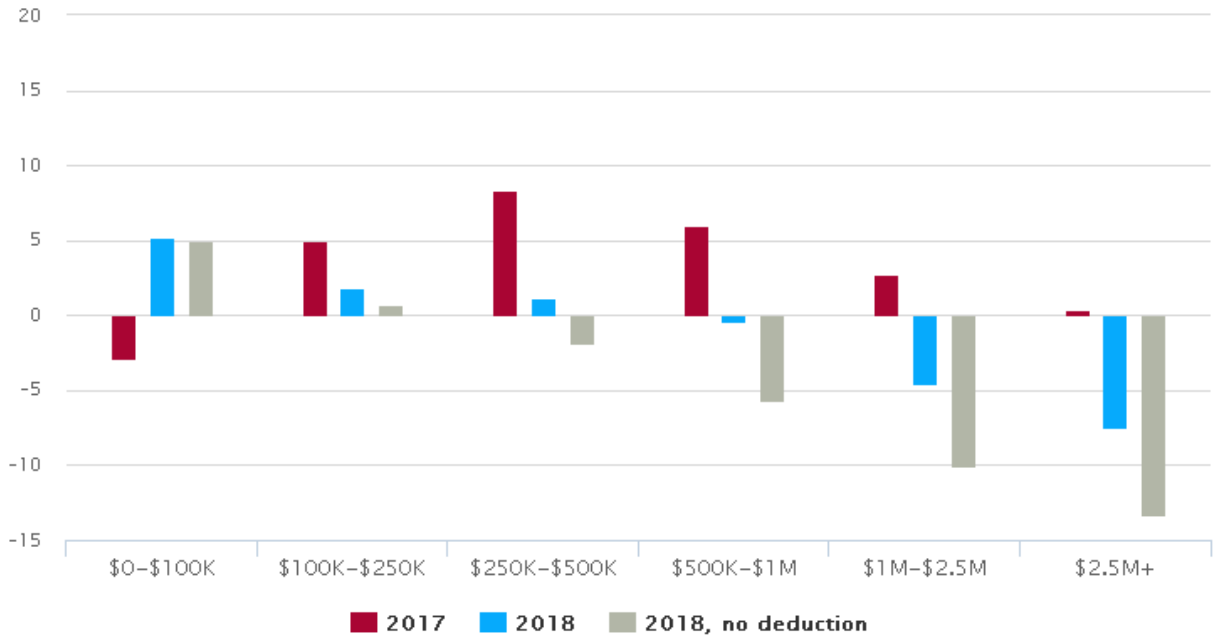
Figure 2: C–Corporation – Pass–Through Business Tax Rate Differential: 100% Retained Earnings

DOWNLOAD DATA

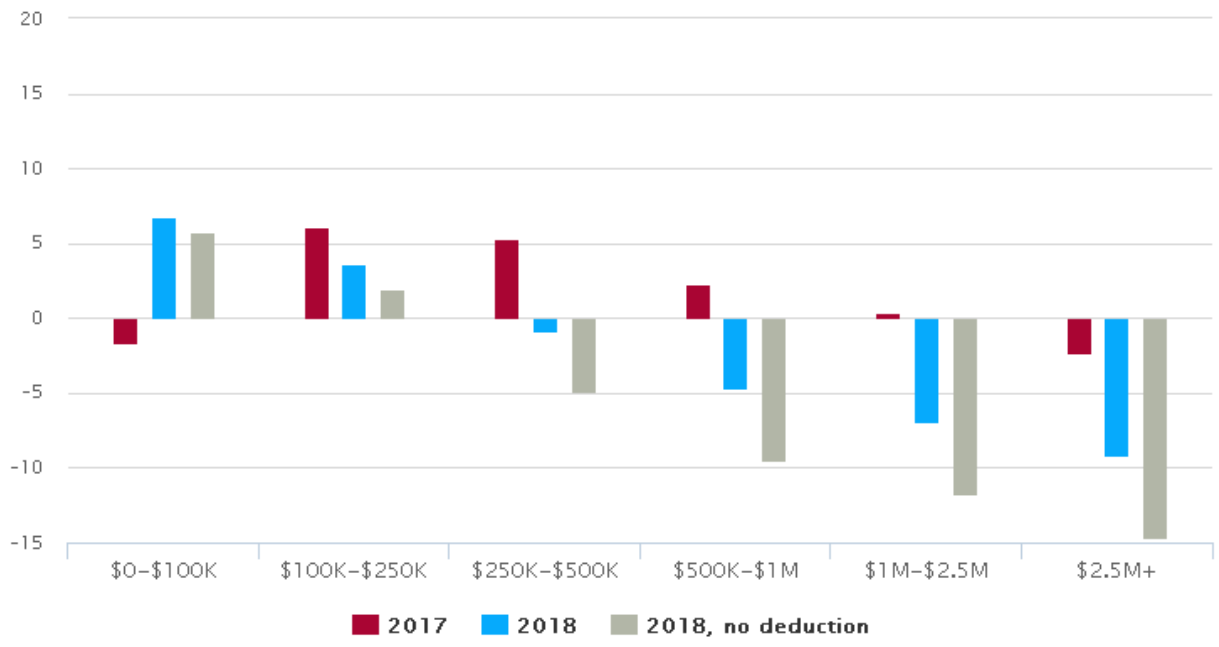
Pass-through type

Partnership ▼

Partnership



S-Corporation



Sole Proprietorship

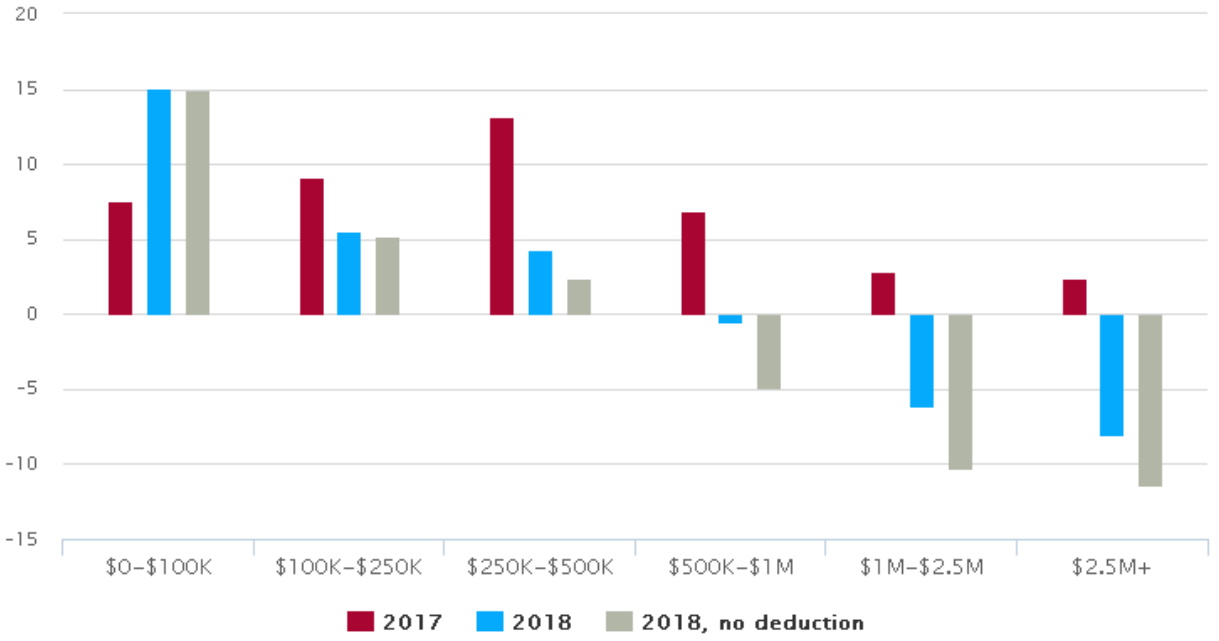


Figure 3 presents the average rate differentials by AGI class for the experiment where an 'average' amount of income is retained in the C-corporation (52 percent). Tax units with more than $2,500,000 in AGI clearly benefit from filing taxes as a C-corporation for those units with Partnership OBI while for S-corporations and sole proprietorships, that cutoff is $1,000,000 in AGI.

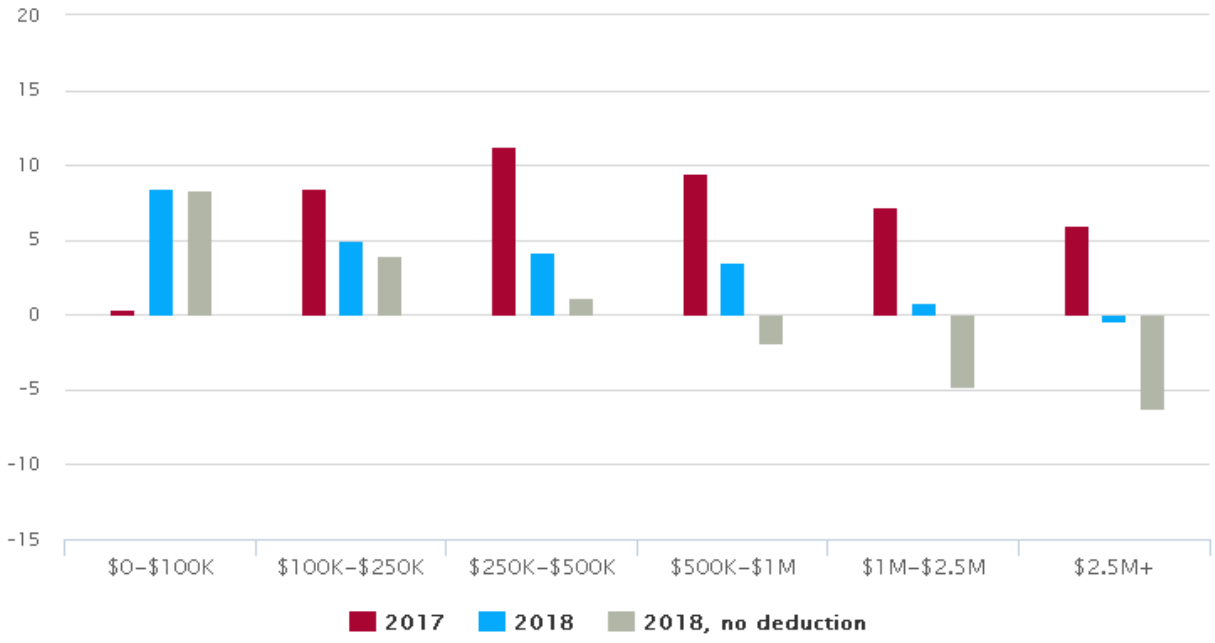
Figure 3: C-Corporation - Pass-Through Business Tax Rate Differential: 52% Retained Earnings

DOWNLOAD DATA

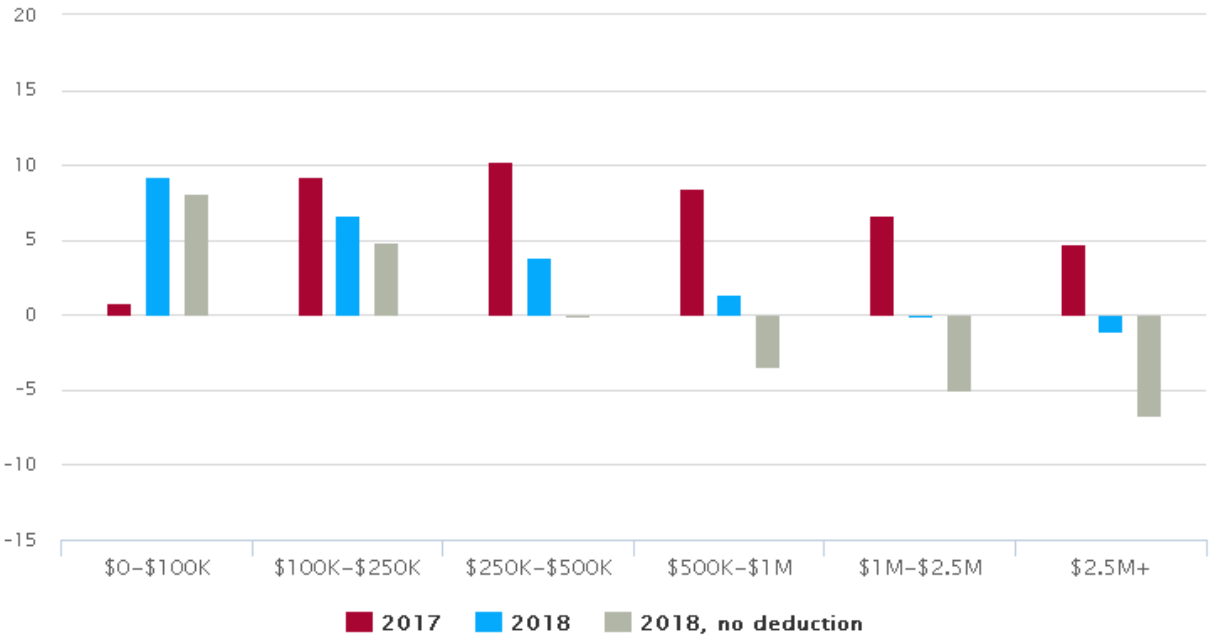
Pass-through type

Partnership ▼

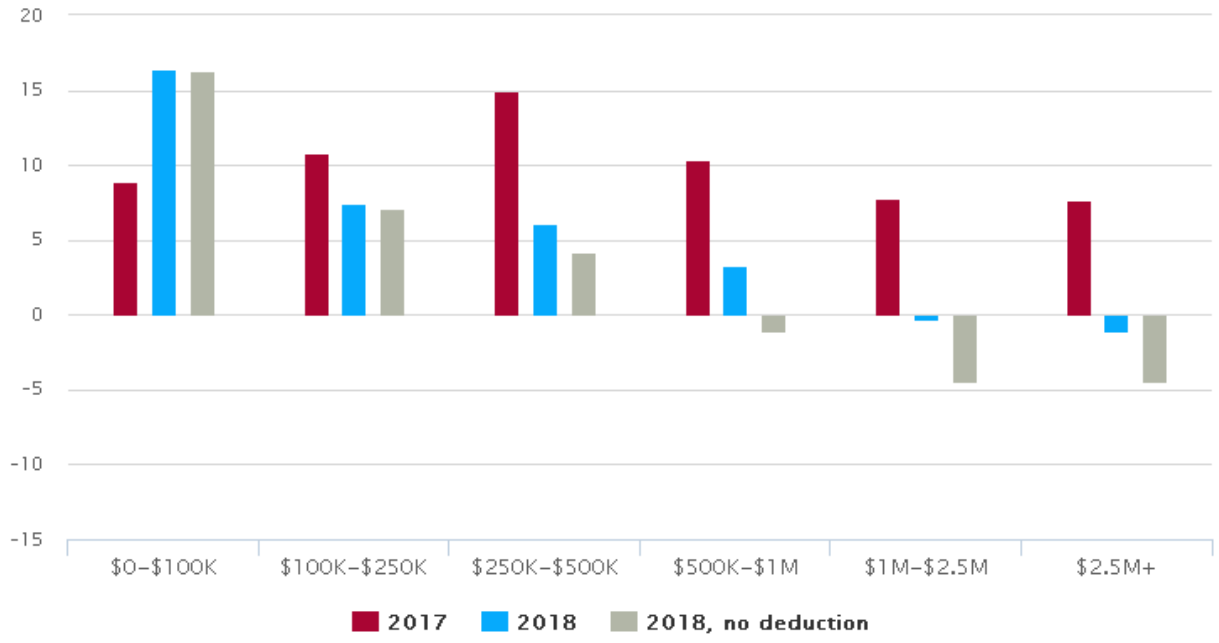
Partnership



S-Corporation



Sole Proprietorship



Number of Business who Benefit from Reorganization

Who benefits from reorganization depends on the particular circumstances of individual filers. Namely, the type of business they operate, their total taxable income and their willingness to defer income. The clear beneficiaries are those for which the difference between the net corporate rate and the pass-through rate was positive under old tax law and is negative under new tax law. We find that if owners of pass-through businesses defer 52 percent of their after tax income from the pass-through businesses, 235,780 of the 24.4 million business owners clearly benefit from reorganization.13 The group that benefits from reorganization is largely high income filers with 77 percent receiving at least $500,000 in AGI. This result is reflective of the ability of high income filers to defer income and the income limitations on the 20 percent deduction. It may also reflect the fact that high income earners are more likely to have income from businesses that are disallowed from the 20 percent deduction.

Conclusion

Prior to the TCJA, pass-through businesses were growing remarkably over time. We project that the TCJA will reverse this trend. In particular, we project that 235,780 individual business owners---especially higher income business owners or service providers---will switch from owners of pass-through entities to C-corporations, representing about 17.5 percent of Ordinary Business Income from pass-throughs.

Business owners can use a simplified version of PWBM's tax module to compare average tax rates as a C-corporation versus a pass-through entity.

[Updated 6/13/2018 to include additional information about methodology and net tax rates.]

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1. In the case of partners in partnerships that are C-corporations, the income is taxed at the corporate level and would therefore, be taxed twice. ↩

2. Author's calculations using SOI-IRS data. This pattern has been noted by DeBacker, Jason, and Richard Prisinzano. "The Rise of Partnerships." *Tax Notes* 147, no. 13 (2015); Prisinzano, Richard, Jason DeBacker, Jason, John Kitchen, Matthew Knittel, Susan Nelson, and James Pearce. "Methodology to Identify Small Businesses," n.d., 27; and Nelson, Susan C. "Paying Themselves: S Corporation Owners and Trends in S Corporation Income, 1980-2013," 2016, 29. ↩

3. DeBacker and Prisinzano (2015) ibid. ↩

4. Nelson (2016) ibid. ↩

5. Prisinzano, Richard and James Pearce. 2018. "Tax Based Switching of Business Income." PWBM Working Paper, no. 2018-2. Philadelphia, PA: Penn Wharton Budget Model (March). Available at http://budgetmodel.wharton.upenn.edu/papers/2018/3/16/w2018-2, Goolsbee, Austan. "Taxes, Organizational Form, and the Deadweight Loss of the Corporate Income Tax." *Journal of Public Economics*, 1998; Mackie-Mason Jeffrey K., & Gordon Roger

H. (2012). How Much Do Taxes Discourage Incorporation? *The Journal of Finance*, 52(2), 477–506; Carroll, Robert, and David Joulfaian. "Taxes and Corporate Choice of Organizational Form," 1997, 24; Feldstein, Martin, Louis Dicks-Mireaux, and James Poterba. "The Effective Tax Rate and the Pretax Rate of Return." *Journal of Public Economics* 21, no. 2 (July 1, 1983): 129–58; Feldstein, Martin S., and Joel Slemrod. "Personal Taxation, Portfolio Choice, and the Effect of the Corporation Income Tax." *Journal of Political Economy* 88, no. 5 (1980): 854–66. ↩

6. The 20 percent deduction is limited by the taxable income the filer receives ($157,500/$315,000, single/joint), the W-2 wages the business pays, and whether the business is a service business. The PWBM tax module accounts for each of these limitations. ↩

7. Kamin, David, David Gamage, Ari D. Glogower, Rebecca M. Kysar, Darien Shanske, Reuven S. Avi-Yonah, Lily L. Batchelder, et al. "The Games They Will Play: Tax Games, Roadblocks, and Glitches Under the New Legislation." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, December 7, 2017 and Looney, Adam. "The next Tax Shelter for Wealthy Americans: C-Corporations." *Brookings* (blog), November 30, 2017. ↩

8. Repetti, James R. "The Impact of the 2017 Act's Tax Rate Changes on Choice of Entity." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, March 5, 2018. Borden, Bradley T. "Choice-of-Entity Decisions Under the New Tax Act." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, February 7, 2018. ↩

9. The top individual income tax rate is now 37 percent, so .37 x (1 - 0.2) = 29.6 percent. ↩

10. This methodology follows Prisinzano and Pearce (2018), Goolsbee (1998) ibid, Mackie-Mason and Gordon 2012) ibid, Carroll and Joulfaian (1997) ibid and Feldstein et al. (1983). ↩

11. This measure excludes income the business receives from capital gains, interest and qualified dividends. ↩

12. It is important to note that the income PWBM can not identify from pass-through entities includes income that faces preferential rates and therefore, faces optimal rates if received through a pass-through (0 percent/15 percent/20 percent vs. 21 percent). PWBM can not identify interest income which face ordinary rates and may face a lower rate if converted and retained in a C-corporation. ↩

13. An individual tax return may have multiple ownership shares from any individual type of pass-through entity as well as ownership shares from multiples types of pass-through entities. We consider the conversion of each type of business entity separately. As such, an individual return may be counted more than once in the calculation of business owners. ↩

For Every Gain, a Loss: New IRS Regulations Reduce the Cost of Tax Cuts For Pass-Through Business Owners

By Richard Prisinzano and John Ricco

The passage of the Tax Cuts and Jobs Act brought with it a new 20 percent deduction for income earned from a pass-through business. The IRS recently released proposed regulations that clarify some of the issues associated with the new deduction. Our model suggests that depending on the effectiveness of the regulations, the overall cost of the deduction could be reduced between $54 and $65 billion over the 10-year budget window.

Since its passage, there has been considerable discussion about the strategies taxpayers could take to lower their tax liability related to this deduction.1 The legislation defines the income eligible for the deduction as "Qualified Business Income" (QBI). Any income earned from a pass-through business is QBI if the income is earned as an owner rather than as an employee and the taxpayer's income falls below $157,500/$315,000 (single/married). If a taxpayer's income is above $157,500/$315,000 (single/married) then the income derived from a Specified Service Trade or Business (SSTB) is not QBI and does not qualify for the 20 percent deduction.

Two of the tax strategies that PWBM accounted for in our score of this provision are the conversion of employees to contract workers and 'cracking'. The first strategy involves employees creating new pass-through entities while maintaining their jobs in order to take advantage of the deduction. The second strategy involves splitting a business into two parts. The first part earns allowable QBI (like rental income or income from custodial services) and charges the highest defendable rate to the part of the business that earns disallowed QBI (like medical or legal services).2 Using this strategy, service providers can move profits away from the SSTB to a business that produces QBI to take advantage of the deduction.

The recently released IRS proposed regulations address these strategies. The regulations outline a set of rules to prevent abuse of the deduction. In general, the rules disallow the deduction if the employer-employee relationship pre- and post- conversion does not materially differ.3 In a similar way, the regulations limit the usefulness of the 'crack and pack' strategy. The regulations stipulate that if a business earning allowable QBI has at least 50 percent common ownership with an SSTB and provides 80 percent of its "property or services" to the commonly-owned SSTB it earns income from, then the business is considered an SSTB. Additionally, if a business has at least 50 percent common ownership with an SSTB any income earned from that SSTB is ineligible for the deduction.

The effectiveness of these proposed regulations will ultimately be decided by IRS action either through audit or litigation. However, it is useful to consider the potential revenue consequences of these regulations. As noted above, our previous estimates account for both of the above strategies. In order to estimate the potential revenue effects we remove certain behavior. We neither allow employees to convert to a pass-through with their current employer nor allow businesses to use the cracking strategy. If the IRS regulations successfully limit this behavior, the former potentially saves $13 billion in revenue over the 10-year budget window while the latter potentially saves $52 billion over the 10-year budget window, each relative to our baseline estimate that includes avoidance behavior. These effects are an upper bound, depending on if the regulations successfully limit behavior, on the revenue gains of the proposed regulations.

It is also important to consider the behavior of businesses that can not utilize the deduction. As we noted in our recent brief, those individuals and businesses that can not utilize the deduction have a greater incentive to elect to be taxed as C-corporations. The recent regulations identify those individuals and businesses more clearly. As such, we estimate that $11 billion in tax revenues is lost as these businesses convert to C-corporate status. This behavior yields a potential net revenue gain from the proposed regulations of $54 billion over the 10-year window.

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1. See Kamin, David, David Gamage, Ari D. Glogower, Rebecca M. Kysar, Darien Shanske, Reuven S. Avi-Yonah, Lily L. Batchelder, et al. "The Games They Will Play: Tax Games, Roadblocks, and Glitches Under the New Legislation." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, December 7, 2017. https://papers.ssrn.com/abstract=3084187. ↩

2. Cracking is often used with 'packing.' Kamin et al use the term 'crack' to describe the strategy as we present it and 'packing' to describe a strategy where a disallowed service goes 'in-house' by adding allowable QBI to the SSTB. It is not clear from the regulations whether packing is disallowed. See Kamin et al for more details. ↩

3. As Tony Nitti notes, the regulations only address current employer-employee relationships; it does not stop employees from starting a relationship with a new firm. See Nitti, Tony. "IRS Provides Guidance On 20% Pass-Through Deduction, But Questions Remain." Forbes. Accessed August 22, 2018. https://www.forbes.com/sites/anthonynitti/2018/08/09/irs-provides-guidance-on-20-pass-through-deduction-but-questions-remain/. ↩

PWBM WORKING PAPER SERIES

TAX BASED SWITCHING OF BUSINESS INCOME

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Working Paper 2018-2
http://budgetmodel.wharton.upenn.edu/papers/2018/3/16/w2018-2

PENN WHARTON BUDGET MODEL
220 South 40th Street, Suite 250
Philadelphia, PA 1910
March 2018

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ABSTRACT

Discussions of genuine tax reform often focus upon broadening the individual and corporate tax bases and lowering tax rates. These discussions also tend to assume that reform will be “revenue neutral”, meaning that the new tax structure would generate the same receipts for the government as the old structure. Because firms can currently either incorporate or operate as a pass-through entity, one question that results from these discussions is how firms will react to the relative change in the corporate and non-corporate tax rates. Our results suggest that a 10 percent reduction in the tax wedge between the net corporate and individual tax rate will result in a 0.5 to 0.9 percent increase in the share of positive business income accruing to corporations.

I Introduction

Discussions of genuine tax reform often focus upon broadening the individual and corporate tax bases and lowering tax rates. These discussions also tend to assume that reform will be "revenue neutral", meaning that the new tax structure would generate the same receipts for the government as the old structure. Because firms can currently either incorporate or operate as a pass-through entity, one question that results from these discussions is how firms will react to the relative change in the corporate and non-corporate tax rates. As the wedge between the corporate and the non-corporate business tax rates changes, taxpayers have an incentive to move business income between the corporate and non-corporate business sectors. The dynamic revenue effect that results from this transfer of taxable income between the corporate and individual tax bases must be accounted for to ensure revenue neutrality. The size of this effect is a relatively open question, however, which is the motivation for this paper.

The theoretical effect that a change in the wedge between the corporate and non-corporate business tax rates has on the share of business income that accrues to corporations has been well known to economists for a long time, and there is a substantial literature that discusses it.[1] In fact, the literature that estimates the elasticity of taxable income for individual taxpayers implicitly includes the effect of individual tax rate changes on the flow of business income between the corporate and non-corporate sectors.[2] Because this literature only focuses on individual taxpayers and not businesses, it is impossible to decompose the elasticity into its constituent parts.[3] Although the broad elasticity of taxable income literature is well established, there have only been a couple of attempts to separately estimate the effect of changes in the wedge between the corporate and non-corporate business tax rates on the movement of business income between the corporate and individual tax bases. For simplicity, we call this this the elasticity of the corporate share of business income. Mackie-Mason and Gordon (1997) were the first to estimate this effect and used data from 1960 through 1987. Goolsbee (1998) did a similar analysis but used data from 1900 to 1939, because that period included more variation in the observed wedge between the corporate and non-corporate business tax rates. This paper updates the work of Mackie-Mason and Gordon (1997) using data from 1960 through 2012, but because we are motivated by the revenue estimating problems created by the transfer of business income between the corporate and individual tax bases, we discuss the effect that transactions costs should have on the elasticity of the corporate share of business income. In particular, we discuss the extent to which our empirical results are useful for estimating the revenue effects of major tax reform proposals which aim to drastically change the wedge between the corporate and non-corporate business tax rates. We also point out the

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[1] See Mackie-Mason and Gordon (1997), Goolsbee (1998), Gordon and Slemrod (2000), Carroll and Joulfaian (1997), Romanov (2006), Slemrod (1995), Slemrod (1996), Kopczuk (2004), Slemrod (1998), Slemrod (1992), Sammartino and Weiner (1997), and Carroll and Hrung (2005).

[2] See Gruber and Saez (2002), Auten and Carroll (1999), and Carroll and Hrung (2005). It is important to correct for the inclusion of tax baseswitching when using the elasticity of taxable income to calculate the dynamic revenue effects of a marginal tax rate change.

[3] There are a number of possible ways for individual taxpayers to respond to changes in the marginal tax rate, including adjusting labor supply, changing the composition of total compensation between wages and fringe benefits, adjusting investment portfolios, adjusting itemized deductions, and moving income between the corporate and individual tax bases.

importance of correcting partnership data for the double-counting of income, and show its effect on empirical results.

Section II presents a brief model of how the wedge between the corporate and non-corporate business tax rates should affect firm decisions to incorporate or become a pass-through entity, which directly affects the share of business income that accrues to corporations. This section also discusses the effects that transactions costs may have on firm decisions, and whether the elasticity of the corporate share of business income should be linear, non-linear, or even discontinuous as the change in the tax wedge increases. Section III outlines the empirical strategy that we use to estimate the elasticity of the corporate share of business income, which is very similar to that used by Mackie-Mason and Gordon (1997) and Goolsbee (1998). We also discuss the data in this section, focusing particularly upon the recent increase in the importance of non-individual partners in U.S. partnerships and why this must be addressed to prevent the double counting of business income. Section III presents the empirical results, including a discussion of their implications for stylized tax reform proposals. Section IV discusses the limitations of the analysis, especially with respect to its usefulness in estimating the revenue effects of tax reform proposals that include large changes in the tax wedge between corporate and non-corporate business income.

II A Firm's Choice of Business Structure

We present a simple model of a firm's choice of business structure following the work of Mackie-Mason and Gordon (1997) and Goolsbee (1998). The idea behind the model is that taxpayers will choose to incorporate only if the benefit to doing so is greater than the cost. A common assumption in models of a firm's choice of business form is that there are non-tax related benefits to incorporation. The reason for this is that corporate income is double taxed in the U.S. to such an extent that the net corporate tax rate has been significantly higher than the non-corporate business tax rate since at least the late 1950s. Thus, without a non-tax benefit to incorporation, it is hard to imagine why any business would be incorporated. It is generally argued that limited liability and access to broad capital markets are two important non-tax benefits to incorporation, although limited liability can now be gained through S-corporation status and some partnership forms. After outlining the model, we then discuss the potential role that transactions costs may play in an existing firm's decision to switch business form, and how this might affect the overall shape of the elasticity of the corporate share of business income.

1 A Simple Model of a New Firm's Choice of Business Structure

Because corporate business income is double taxed, the net tax rate on corporate business income is a function of the corporate tax rate(τ_c), the individual capital gains tax rate(τ_{cg}), and the individual dividends tax rate(τ_d). Because only a portion of corporate income is paid out as dividends and unrealized capital gains benefit from tax deferral, the net corporate tax rate (τ_{nc}) can be written:

(1) $$\tau_{nc} = \tau_c + (1 - \tau_c)\,(\,\alpha\,\tau_d + (1 - \alpha)\beta\,\tau_{cg}\,)$$

where α is the share of corporate income paid out as dividends and β is a measure of the benefits of capital gains deferral.

Assume that a firm earns income I regardless of its business structure. Further assume that corporate firms also receive a non-tax related benefit G. The taxpaying owners of a firm will choose to incorporate when:

(2) $$G + (1 - \tau_{nc})I \geq (1 - \tau_i)\, I, (2)$$

where τ_i is the individual income tax rate. Rearranging this expression shows that the decision to incorporate is a function of the wedge between the net corporate and individual tax rates:

(3) $$\frac{G}{I} \geq \tau_{nc} - \tau_i = W,$$

where W is the aforementioned tax wedge.

Another useful way to express the idea of the tax wedge is as the additional after-tax benefit of a dollar non-corporate business income relative to a dollar of corporate business income. Defining this expression to be T, it can be written as:

(4) $$T = \frac{(1 - \tau_i) - (1 - \tau_{nc})}{1 - \tau_{nc}} = \frac{W}{1 - \tau_{nc}}$$

Either way one thinks about it, the model suggests that the share of business income accruing to corporations should be responsive to changes in W (or T). It is this relationship that we attempt to estimate in the Results section.

2 Transactions Costs of Changing Business Structure

The simple model described above may be useful for thinking about the choices facing a new firm, but the situation facing existing firms may be more complex. First, there are likely to be transactions costs to switching business form for already existing firms. While the transactions costs for switching from pass-through status to corporate status may have been diminished somewhat with the introduction of "check-the-box" regulations, the transactions costs involved in turning a publicly held corporation into a pass-through entity are likely to be quite large.

Because a large percentage of corporate income is earned by a relatively small number of firms, transactions costs could discourage the switching of much of this corporate income to non-corporate income even when increases in W are relatively large. At some point, though, increases in W are likely to become so large that the tax savings from going private would cover the transactions costs of switching out of the corporate form. It is at least plausible for many corporations to bunch around such a point, creating the possibility of a tipping point whereby a substantial fraction of corporations would suddenly switch structure. That is, at some point the tax wedge, W, could be so large that most taxpaying owners of existing corporations would

prefer to change their business structure to pass-through form. These ideas could be formalized in a multi-period model where a firm makes an initial decision about its structure in period with imperfect information about the tax structure in subsequent period. In later periods the firm would have to choose whether or not to switch its structure given changes in the tax structure and the transactions costs associated with the switch.

If we suppose that new firms do not face the same transactions costs problems that existing firms do, then we should expect new firms to respond to small changes in the business tax wedge, while existing firms would not respond until the change in the tax wedge was larger. This line of reasoning suggests that the effect of a change in the tax wedge,W, on the share of business income going to corporations should not be linear, but rather non-linear and possibly discontinuous. If one thinks of the current state of the world as an equilibrium, we might expect small changes in the tax wedge to produce small shifts in the share of business income going to corporations as new firms change their incorporation behavior. This behavior was explored in Carroll and Joulfaian (1997). As changes in the tax wedge get larger, however, we should see the shifting of business income increase as larger firms respond, until some point after which most of the shifting has occurred. In addition, because (as we argue above) the transactions costs are likely to be larger for corporations than for pass-through entities, the tax wedge effect may not be symmetrical, meaning that it might be easier for pass-through entities to switch status than for corporations.

Figure I presents a graphical representation of these ideas. The x-axis measures the tax wedge between corporate and non-corporate business income, W. Assume that $W = 0.09$ is the current tax wedge or steady-state. The y-axis measures the percentage of business income that is from corporations. The figure shows that at the current tax wedge, $W = 0.09$, 48 percent of business income goes to the corporate sector. The figure is drawn to show that small changes in the tax wedge, say from 0.06 to point 0.12, result in only small changes in the percentage of income that goes to corporate firms. As the change in the tax wedge increases, however, the change in the percentage of business income going to corporations accelerates, becoming almost a cliff. Although this is only a rough representation of the ideas discussed above, it hopefully gives an indication of the dynamics that are possible as the result of significant changes in the business tax structure.

One last issue that should be discussed is whether or not all firms would incorporate (or become pass-through entities) if the tax wedge was small (or large) enough. Figure I is drawn so that even for very small or very large tax wedges, not all business income is in either the corporate or non-corporate sectors. One rationale for such behavior is that there may be small businesses that find it prohibitively expensive in terms of transactions costs to be a corporation (think about the bookkeeping costs, for example). Alternatively, there may be some very large corporations that would have trouble becoming a pass-through entity that could support its structure. Fortunately, it seems unlikely that policymakers would legislate such a lopsided tax wedge. If policymakers were interested in a real overhaul of business taxation, it is more likely that they would legislate a single tax structure for all businesses.[4]

[4]A large change in the corporate rate might induce entities to 'check the box' and as a result, few if any firms would structure as a pass through.

Although we have no concrete idea about the shape of the elasticity of the corporate share of business income to the tax wedge between corporate and non-corporate business income, we think the above discussion provides a useful framework within which to consider the empirical results. As we will discuss in more detail below, there has not been much variation in the business tax wedge in the U.S. over the past fifty years, which makes it impossible to estimate the elasticity of the corporate share of business income to the tax wedge for changes in the tax wedge that are outside of the observed range. The implications of all of this will be discussed further in the Limitations section.

III Empirical Strategy

1 Empirical Model

Our estimation strategy is similar to that of Mackie-Mason and Gordon (1997) and Goolsbee (1998). Defining C to be the percentage of business income (or loss) that is in the corporate sector, we assume that it is a function of the wedge between the corporate and non-corporate business tax rates (W), a function of time (t), the percentage change in gross domestic product (GDP), and the rate of inflation (i):

(5) $$C_t = \alpha_0 + \alpha_1 t + \alpha_2 t^2 + \alpha_3 GDP_t + \alpha_4 i_t + \gamma W_t + \epsilon_t,$$

where ϵ is a normally distributed error term. The coefficient on the tax wedge, γ, should be negative when C measures the corporate share of positive business income, because a larger tax wedge should imply that a smaller share of business income goes to corporations. γ should be positive when C measures the corporate share of negative business income, because a larger tax wedge should imply that a larger share of business income goes to corporations. The real GDP and inflation measures are meant to control for macroeconomic fluctuations that affect the distribution of business income across the corporate and non-corporate sectors. The time trend is intended to control for changes in the non-tax related benefits of incorporation, such as the benefit from limited liability or better access to capital markets.

It should be noted that at least some of the time series data in equation 5 is likely to be non-stationary. Thus, spurious correlation is a potential problem. An alternative specification would difference each data series until stationarity is achieved and estimate the following regression:

(6) $$\Delta C_t = \beta_0 + \beta_1 \Delta GDP_t + \beta_2 \Delta i_t + \gamma \Delta W_t + \nu_t ,$$

where $\Delta C_t = C_t - C_{t-1}$ and ν is a normally distributed error term. Again, γ ought to be negative (positive) when C measures the corporate share of positive (negative) business income, because an increase in the tax wedge should cause a decrease (increase) in the share of positive (negative) business income going to corporations.

2 Data Sources and Issues

2.1 Business Income and Loss

We collected income and loss data by type of business entity from the Statistics of Income Bulletin and other various Internal Revenue Service publications for the period 1959 through 2012. We group businesses into four groups: C-corporations, S-corporation, partnerships, and sole proprietorships. We also split the data into firms with positive income and firms with negative income. These data are presented in figures II and III. The figure shows that the percentage of business income accruing to corporations has declined steadily since the mid-1980's, while the share going to partnerships has increased gradually over the same period.

One problem with the data in figures 2 and 3 is that there is likely to be some double-counting of income due to the fact that some firms may be partial owners of other firms. Partnership income is likely to be the biggest problem. Because partnerships, C-corporations, and S-corporations can all be partners in a partnership, any partnership income that is distributed to these types of partners will be double-counted. To see if this double-counting problem bias's our estimates, we use the Statistics of Income (SOI) Partnership Tax Files for the years 1988 through 2012 to recalculate income and loss after excluding payments to corporate partners, partnership partners, and exempt organization partners.[5] The intent is to include only income that "passed-through" to individual income tax returns, and thus faced the individual income tax.

While there is also a double-counting issue with C-corporations because they pay dividends to one another, this double-counting is likely to be small, because corporations receive a "dividends received deduction" that is used to off-set much of the double-counting.[6] There should not be a double-counting problem with S-corporation income, because, in general, only individuals may be shareholders in an S-corporation. The same is true of sole proprietorships.

Figures IV and V present the data after correcting for the double-counting of partnership income after 1987.[7] Comparing figure IV to figure II shows that for positive income there is very little difference between the published SOI data and the corrected data in 1988, meaning that we do not have worry about a seam problem when combining the pre-1988 published SOI data with the post-1988 corrected data. Correcting the partnership data does seem to have a significant effect on the share of business income that accrues to the various business forms, especially after 1995. Unfortunately, a comparison of figures III and V shows that correcting for double-counting causes a significant change in the shares of losses going to the various business types starting in 1988. In particular, the share of losses going to partnerships decreases significantly and the share going to corporations increases significantly in the first year of corrected data. Because of this seam problem, we will only use the corrected data for losses for the years 1988 to 2012.

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[5] The income definition we use is line 1of the Analysis of Net Income on Form 1065 and the associated analysis by partner type (line 2).

[6] The dividends received deduction is between 70 percent and 100 percent of the dividends received, depending upon how much of the dividend-paying corporation is owned by the dividend-receiving corporation.

[7] We were only able to correct the data starting in 1988 because prior to that distributed income was not attributed to the various types of partners.

Descriptive statistics for the sample are presented in table I. We present the descriptive statistics for three periods: (i) 1959-1986; (ii) 1986-2012; and (iii) 1959-2012. Between 1959 and 1986, corporations received 65% of positive business income, but between 1986 and 2012 corporations received only 49% of positive business income. The percentage of positive business income going to sole proprietorships also decreased across the two sub-periods (from an average of 22% to 16%) while share going to S-corporations (2% to 12%) and partnerships (11% to 23%) both increased.[8]

This suggests that the largest change in the decision to incorporate occurred with the 1986 tax reform but the share of corporate income remains relatively the same. The relative share of positive business income going to partnerships and S-corporations have been more volatile in the post 1986 time period. As one might expect, the largest variation occurs in the share of business losses accruing to the various business types.

2.2 Tax Rates

As our main measure of the individual marginal tax rate, τ_i, we use the average marginal tax rate for the top 1 percent of taxpayers by income, as computed by Emmanuel Saez (2004). Saez's data series stops in 2000, so for 2001 through 2012 we use the U.S. Treasury Department's Individual Tax Model (ITM) to calculate the MTR for the top 1 percent of taxpayers by income.[9] In our sensitivity analysis we also use the average marginal tax rate for the top 5 percent and the top 0.5 percent of taxpayers by income as computed by Saez (2004), with the post-2000 data also augmented as above. The individual marginal tax rate series is also used as the marginal tax rate on dividends, τ_d, through 2002. After 2002 we use the 15 percent marginal rate on dividends that was legislated by JGTRRA 2003.[10,11] For the marginal tax rate on capital gains we use the effective tax rate applying to high-income taxpayers, including the effects of provisions that alter effective rates for significant amounts of gains, including capital gains exclusions (1959-1986).[12]

To calculate the net corporate tax rate, τ_{nc} , we need measures of the share of corporate income paid out as dividends (α in equation 1) and the value of capital gains deferral (β in equation 1). To measure α we use data from the National Income and Products Accounts (NIPA) published by the Bureau of Economic Analysis (BEA). Specifically, we calculated the share of after-tax corporate profits that were paid out as dividends.[13] As figure VI shows, this series is not particularly smooth, which is more likely due to year-to-year fluctuations in corporate profits as opposed to year-to-year fluctuations in dividends which tend to be much smoother. Instead of using this series as is, we assume that the appropriate measure of α is what is expected by taxpayers, which should be much smoother than the actual dividend payout series in figure VI, because individuals will expect averages as opposed to actuals. Thus, we use a regression-smoothed estimate of the dividend payout ratio where only time and time-squared are

[8] The increase in the prevalence of partnerships is discussed in detail in DeBacker and Prisinzano (2015).
[9] For more information on the U.S. Treasury Department's individual tax model, see Cilke and Wyscarver (1987).
[10] The Jobs and Growth Tax and Reconciliation Relief Act (JGTRRA) of 2003 lowered the top marginal tax rate on long-term capital gains and dividends to 15 percent, among other tax changes.
[11] The American Taxpayer Relief Act of 2012 did not extend the 15% rate of Capital Gains and Dividends.
[12] These were provided by Gerald Auten.
[13] These are lines 19 and 20 of NIPA table 1.10. “Gross Domestic Income by Type of Income”.

included in the regression. In our sensitivity analysis we also use the actual NIPA dividend payout series and the average dividend payout ratio over the period 1959 to 2012 (51 percent).

In the literature, it is often assumed that the benefits of capital gains deferral, β, is 0.25. This value is attributed to Poterba et al (1983), who make a "quite conservative assumption" that the effective rate on capital gains is roughly 20 to 25 percent of the statutory rates. We follow this convention and use 0.25 as our measure of β in the main results, but use alternate assumptions in our sensitivity analysis to demonstrate its effect on the results.

III Results

We present a number of sets of results below. First, we estimate the effect of the tax wedge on the corporate share of business income using equation 5 for both the published SOI data and the SOI data corrected for the double-counting in the partnerships data. Second, to verify that the results are the not affected by spurious correlation from non-stationary data, we estimate the effect of changes in the tax wedge on the change in the corporate share of business income using equation 6 for both sets of data. Following Mackie-Mason and Gordon (1997), we perform separate regressions and present separate results for the corporate share of positive business income and the corporate share of negative business income.

1 Corporate Share Regressions

We estimate equation 5 using a regression procedure that corrects for first-order serial correlation in the residuals. Tables II.A and II.B present the estimates for positive income using both the Prais-Winsten correction procedure and the Cochrane-Orcutt correction procedure. Regardless of which data and serial correlation correction method are used, the coefficient estimate on the tax wedge, W, is negative, as theory predicts, and it is statistically significantly different from zero at the 95 percent confidence level. The negative coefficient estimate means that an increase in the tax wedge (perhaps due to an increase in net corporate tax rate relative to the individual marginal tax rate) decreases the share of business income accruing to corporations. The implied elasticities associated with the estimates are given at the bottom of the table. The elasticity of -0.0942 using the corrected SOI data and the Prais-Winsten correction tells us that a 10 percent increase in the tax wedge should decrease the share of business income going to corporations by .942 percent.

Comparing the results using the original data and the corrected data shows that the coefficient estimate and the implied elasticity are larger using the corrected data. This suggests that the effect of the tax wedge on the percentage of positive business income going to corporations is stronger than the published SOI data suggests. The elasticity using the published SOI data is roughly 14 percent smaller than the elasticity using the corrected data. If one were to use the elasticity calculated from the published SOI data to estimate how much income should move between the corporate and non-corporate business sectors for a given tax change, he or she would understate the amount.

Tables III.A and III.B presents similar results for the share of business losses accruing to corporations. The coefficient estimates are positive, as theory predicts, but they are not

statistically significantly different from zero at the 95 percent confidence level using either data. The elasticity estimate of 0.0563 using the corrected SOI data suggests that a 10 percent increase in the tax wedge, W, would lead to a 0.56 percent increase in the share of business losses accruing to corporations. Comparing the results using the published SOI data and the corrected SOI data show that the estimates using the published data are roughly equal but the estimates are imprecise.

2 Change in the Corporate Share Regressions

As a check to see that the results presented above are not due to spurious correlation, we tested all of the variables for stationarity using Dickey-Fuller tests. The corporate share of business income, C, the tax wedge, W, and the percent change in inflation, i, were all non-stationary, which suggests that we should worry about spurious correlation. These variables were made stationary by first-differencing. We then estimated equation 6 with a first-order auto-regressive specification.

Tables IV.A and IV.B present the estimates for positive business income using both the original SOI data and the SOI data corrected for double-counting in the partnership data. As was the case for the results in section 1, the coefficient estimate on the change in the tax wedge, ΔW, is negative as theory predicts, and it is statistically significantly different from zero at the 95 percent confidence level. The negative coefficient estimate means that a positive change in the tax wedge (perhaps due to an increase in the net corporate tax rate relative to the individual marginal tax rate) leads to a negative change in the percentage of business income accruing to corporations. The implied elasticities associated with the estimates are given at the bottom of the table. The elasticity of -0.0537 using the corrected SOI data tells us that a 10 percent increase in the tax wedge should decrease the share of business income going to corporations by 0.54 percent. It turns out that the elasticity estimates ignoring non-stationarity are considerably higher than the elasticities that address stationarity. Although we conclude that spurious correlation does not seem to be driving the results presented in section 1, it does appear to bias the results. Thus, we consider the estimates in this section to be more reliable.

As was the case in section 1, comparing the results using the original data and the corrected data in tables IV.A and IV.B show that the coefficient estimate and the implied elasticity are larger using the corrected data. As we stated above, if one were to use the elasticity calculated from the published SOI data to estimate how much income should move between the corporate and non-corporate business sectors for a given tax change, he or she would understate the amount.

It should be stressed that using published SOI data without correcting for the double-counting in the partnership data yields elasticity estimates that are too small. In addition, ignoring non-stationarity also yields elasticity estimates that are too small. However, looking across the specifications and data we can see a naïve approach would yield an elasticity that is too high. Using the published SOI data and ignoring non-stationarity (table II.A) yields an elasticity of -0.0826, while using the corrected SOI data and addressing stationarity (table IV.B) yields an elasticity of -0.0537. The biased elasticity estimate is roughly 54 percent larger than the unbiased estimate.

Tables V.A and V.B presents similar estimates for the share of business losses that accrue to corporations. Addressing stationarity in the published SOI data yields a parameter estimate on W that is not statistically significantly different from zero at the 95 percent confidence level, although the estimate does have the correct sign according to economic theory.

3 Stylized Tax Reform Example

Under 2012 law, the top corporate was 35%; the share of corporate dividends paid out of corporate profits after tax was 40.4%; the marginal dividend and capital gains rates were 15% and the top marginal individual rate was 31.5. The net corporate rate was 40.9% and the tax wedge was .0935.[14] If the corporate rate were to drop by 10 percentage points to 25%, the new net corporate rate would 31.8% and the tax wedge would be .0025. Using the estimated effect from table IV.B, this implies an additional 3.4% of total business income would accrue to corporations. In 2012, there was 2.61 trillion of net business income implying almost 90 billion would accrue to corporate form. The amount is higher if only positive income is considered (115 billion).

IV Limitations

The empirical work in section IV suggests that a 10 percent reduction in the tax wedge between the net corporate and individual tax rate, W, should result in a 0.5 to 0.9 percent increase in the share of positive business income accruing to corporations. The applicability of this estimate to future changes in the tax wedge, W, must be understood in terms of the range of changes in W that have been observed over the past fifty years and the range of changes in W that policymakers hope to achieve (or at least propose).

Unfortunately, over the past fifty years or so the tax wedge has varied between 0.04 and 0.21, with the maximum wedge occurring in 1963 and the smallest wedge occurring in1979. The majority of changes in the tax wedge have been no more than .02 in absolute value. More importantly, no change in the tax wedge has ever been permanent, meaning that there has not been much of an incentive for firms to change their incorporation status in anticipation of long-term changes. The closest thing to permanent change has been the Bush tax cuts of 2001 and 2003, but these tax changes were allowed to expire in 2012.

It is also the case that over the past fifty years the U.S. has not seen the tax wedge turn negative, meaning that the net corporate rate is below the individual rate, but this is exactly what some policymakers have recently proposed. Predicting the effects of reducing the tax wedge to 0 or even lower is impossible given the limited data we observe over the past fifty years. It is not possible to estimate the non-linear effects of the tax wedge on the corporate share of positive business income.

[14] This calculation assumes β = .25.

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TABLES

Table I: Summary Statistics

			Income	C Corp	S Corp	Sole Prop	Partnership
1959-1986	*Positive*	Mean	240.919	0.651	0.023	0.215	0.112
		SD	148.850	0.037	0.009	0.032	0.020
	Negative	Mean	-67.680	0.561	0.048	0.145	0.246
		SD	78.654	0.075	0.009	0.038	0.096
1986-2012	*Positive*	Mean	1758.929	0.494	0.124	0.155	0.227
		SD	908.549	0.066	0.030	0.038	0.069
	Negative	Mean	-526.146	0.499	0.112	0.070	0.319
		SD	290.846	0.054	0.018	0.013	0.049
Total	*Positive*	Mean	971.813	0.575	0.071	0.186	0.167
		SD	993.383	0.095	0.055	0.046	0.076
	Negative	Mean	-288.423	0.531	0.079	0.109	0.281
		SD	310.675	0.072	0.035	0.047	0.085

Table II.A: Corporate Share of Positive Business Income

	OLS		Prais-Winsten		Cochrane-Orcutt	
Tax Wedge	**-0.5903**	**-0.5169**	**-0.3714**	**-0.3627**	**-0.3974**	**-0.3887**
	0.093	0.097	0.123	0.121	0.138	0.137
Post 1986	.	**-0.0667**	.	-0.0131	.	-0.0109
		0.027		0.014		0.014
Time	0.002223	0.0024	**0.0060**	**0.0060**	0.0035	0.0037
	0.002	0.002	0.003	0.003	0.006	0.006
Time-Squared	-0.0001	-0.0001	-0.00015	-0.00015	-0.0001	-0.0001
	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
GDP	-0.00002	-0.00002	0.000000	0.000000	-0.000002	-0.000002
	0.00002	0.00002	0.00003	0.00003	0.00003	0.00003
Inflation	0.000492	0.0009	-0.0019	-0.001815	-0.0009	-0.0009
	0.0011	0.0011	0.0017	0.0017	0.0025	0.0025
Intercept	**0.7361**	**0.7153**	**0.7110**	**0.7080**	**0.7229**	**0.7194**
	0.0176	0.0177	0.0315	0.0307	0.0387	0.0378
ρ			0.7151	0.7102	0.7088	0.7047
D-W Statistic			1.63	1.62	1.63	1.62
Elasticity	**-0.1345**	**-0.1178**	**-0.0846**	**-0.0826**	**-0.0905**	**-0.0886**

Table II.B: Corporate Share of Positive Business Income

Adjusted Data

	OLS		Prais-Winsten		Cochrane-Orcutt	
Tax Wedge	**-0.6323**	**-0.5634**	**-0.4787**	**-0.4573**	**-0.5175**	**-0.4942**
	0.077	0.082	0.102	0.101	0.111	0.111
Post 1986	.	**-0.0626**	.	-0.0313	.	-0.029050
		0.022		0.018		0.018
Time	0.001984	0.0022	0.0043	0.0043	0.0017	0.0020
	0.002	0.002	0.002	0.002	0.004	0.004
Time-Squared	0.0000	0.0000	-0.00003	-0.00003	0.0000	0.0000
	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
GDP	-0.00002	-0.00002	-0.000016	-0.000017	-0.000018	-0.000019
	0.00002	0.00002	0.00003	0.00003	0.00003	0.00003
Inflation	0.000001	0.0004	-0.0014	-0.001111	-0.0003	-0.0002
	0.0011	0.0010	0.0014	0.0014	0.0019	0.0019
Intercept	**0.7495**	**0.7299**	**0.7325**	**0.7248**	**0.7438**	**0.7352**
	0.0144	0.0149	0.0253	0.0244	0.0275	0.0268
Rho			0.6059	0.5893	0.5915	0.5764
D-W Statistic			1.65	1.62	1.64	1.64
Elasticity	**-0.1303**	**-0.1161**	**-0.0986**	**-0.0942**	**-0.1066**	**-0.1018**

Table III.A: Corporate Share of Negative Business Income

	OLS		Prais-Winsten		Cochrane-Orcutt	
Tax Wedge	**0.3476**	**0.3777**	0.2121	0.2630	0.0690	0.1116
	0.194	0.215	0.206	0.195	0.216	0.213
Post 1986	.	-0.0274	.	**-0.0675**	.	-0.043962
		0.072		0.028		0.027
Time	-0.007602	-0.0075	-0.0090	-0.0084	-0.0365	-0.0348
	0.004	0.004	0.006	0.006	0.022	0.022
Time-Squared	0.0001	0.0001	0.00022	0.00023	0.0004	0.0004
	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
GDP	0.00000	0.00000	-0.000040	-0.000042	-0.000050	-0.000050
	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004
Inflation	-0.000618	-0.0005	0.0034	0.003463	0.0113	0.0110
	0.0021	0.0021	0.0039	0.0039	0.0072	0.0074
Intercept	**0.6118**	**0.6032**	**0.5643**	**0.5519**	0.7576	**0.7399**
	0.0377	0.0438	0.0705	0.0685	0.1473	0.1548
Rho			0.8485	0.8503	0.8115	0.8122
D-W Statistic			1.40	1.43	1.11	1.11
Elasticity	**0.0744**	**0.0808**	**0.0454**	**0.0563**	**0.0148**	**0.0239**

Table IV.A: Change in Corporate Share of Positive Business Income

	OLS		Prais-Winsten		Cochrane-Orcutt	
Tax Wedge	**-0.3206**	**-0.3210**	**-0.3100**	**-0.3096**	**-0.3070**	**-0.3073**
	0.141	0.143	0.139	0.141	0.139	0.142
Post 1986	.	-0.0130	.	-0.0141	.	-0.013000
		0.018		0.018		0.019
Time	-0.001059	-0.0008	-0.0010	-0.0007	-0.0011	-0.0008
	0.001	0.001	0.001	0.001	0.001	0.001
Time-Squared	0.0000	0.0000	0.00001	0.00001	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GDP	0.00001	0.00001	0.000013	0.000013	0.000013	0.000013
	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004
Inflation	-0.001751	-0.0024	-0.0021	-0.002808	-0.0021	-0.0028
	0.0044	0.0045	0.0046	0.0047	0.0046	0.0047
Intercept	0.0118	0.0104	0.0117	0.0102	0.0130	0.0113
	0.0060	0.0063	0.0063	0.0066	0.0075	0.0081
Rho			0.0559	0.0582	0.0563	0.0582
D-W Statistic			1.98	1.98	1.98	1.98
Elasticity	**-0.0285**	**-0.0285**	**-0.0275**	**-0.0275**	**-0.0273**	**-0.0273**

Table IV.B: Change in Corporate Share of Positive Business Income

Adjusted Data

	OLS		Prais-Winsten		Cochrane-Orcutt	
Tax Wedge	**-0.3817**	**-0.3821**	**-0.3789**	**-0.3788**	**-0.3780**	**-0.3786**
	0.126	0.127	0.125	0.127	0.125	0.127
Post 1986	.	-0.0148	.	-0.0156	.	**-0.0155**
		0.018		0.019		0.019
Time	-0.000377	-0.0001	-0.0004	-0.0001	-0.0004	-0.0001
	0.001	0.001	0.001	0.001	0.001	0.001
Time-Squared	0.0000	0.0000	0.00000	0.00000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GDP	-0.00001	-0.00001	-0.000010	-0.000009	-0.000010	-0.000009
	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004
Inflation	-0.001965	-0.0027	-0.0021	-0.002822	-0.0021	-0.0028
	0.0043	0.0044	0.0044	0.0045	0.0044	0.0046
Intercept	**0.0078**	0.0062	0.0078	**0.0062**	**0.0082**	0.0062
	0.0060	0.0062	0.0061	0.0064	0.0073	0.0078
Rho			0.0267	0.0309	0.0268	0.0309
D-W Statistic			1.98	1.98	1.98	1.98
Elasticity	**-0.0541**	**-0.0542**	**-0.0537**	**-0.0537**	**-0.0536**	**-0.0537**

Table V.A: Change in Corporate Share of Negative Business Income

	OLS		Prais-Winsten		Cochrane-Orcutt	
Tax Wedge	0.1745	0.1764	0.0882	0.0886	0.0474	0.0475
	0.232	0.238	0.210	0.212	0.207	0.208
Post 1986	.	0.0572	.	0.0402	.	0.0079
		0.040		0.052		0.044
Time	0.0000	-0.0011	-0.0015	-0.0020	0.0014	0.0013
	0.002	0.002	0.003	0.003	0.002	0.002
Time-Squared	0.0000	0.0000	0.00003	0.00003	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GDP	-0.00005	-0.00005	-0.000051	-0.000052	-0.000057	-0.000057
	0.00005	0.00005	0.00006	0.00006	0.00005	0.00006
Inflation	0.0073	0.0101	0.0138	0.014607	0.0136	0.0137
	0.0065	0.0070	0.0071	0.0074	0.0068	0.0071
Intercept	-0.0059	0.0003	0.0030	0.0061	**-0.0372**	**-0.0358**
	0.0193	0.0209	0.0338	0.0342	0.0156	0.0169
Rho			0.3497	0.3206	0.3311	0.3253
D-W Statistic			1.98	1.98	1.98	1.98
Elasticity	**0.0049**	**0.0050**	**0.0025**	**0.0025**	**0.0013**	**0.0013**

Table V.B: Change in Corporate Share of Negative Business Income

Adjusted Data

	OLS		Prais-Winsten		Cochrane-Orcutt	
Tax Wedge	0.1468	0.1501	0.0349	0.0694	-0.0093	0.0098
	0.213	0.223	0.198	0.212	0.195	0.202
Post 1986	.	**0.1013**	.	0.0841	.	0.0501
		0.050		0.059		0.054
Time	0.000192	-0.0017	-0.0010	-0.0019	0.0017	0.0007
	0.002	0.002	0.003	0.003	0.002	0.002
Time-Squared	0.0000	0.0000	0.00002	0.00003	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GDP	-0.00003	-0.00003	-0.000032	-0.000034	-0.000038	-0.000040
	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004
Inflation	0.006832	0.0118	0.0123	0.013461	0.0123	0.0129
	0.0060	0.0068	0.0069	0.0072	0.0066	0.0070
Intercept	-0.0080	0.0030	-0.0011	0.0046	-0.0381	-0.0285
	0.0198	0.0207	0.0318	0.0276	0.0149	0.0134
Rho			0.2965	0.1819	0.2872	0.2188
D-W Statistic			1.98	1.98	1.98	1.98
Elasticity	**0.0032**	**0.0033**	**0.0008**	**0.0015**	**-0.0002**	**0.0002**

FIGURES

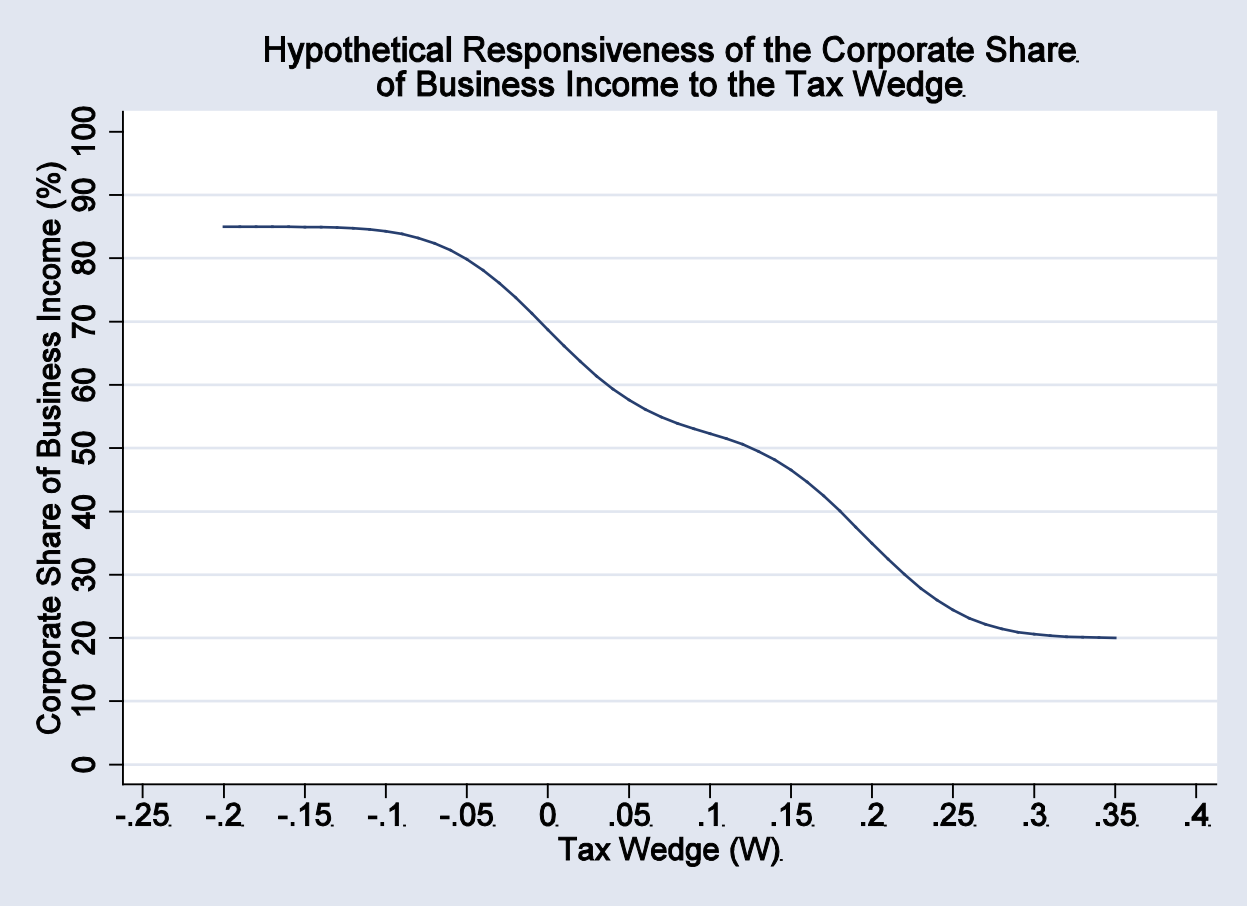

Figure I

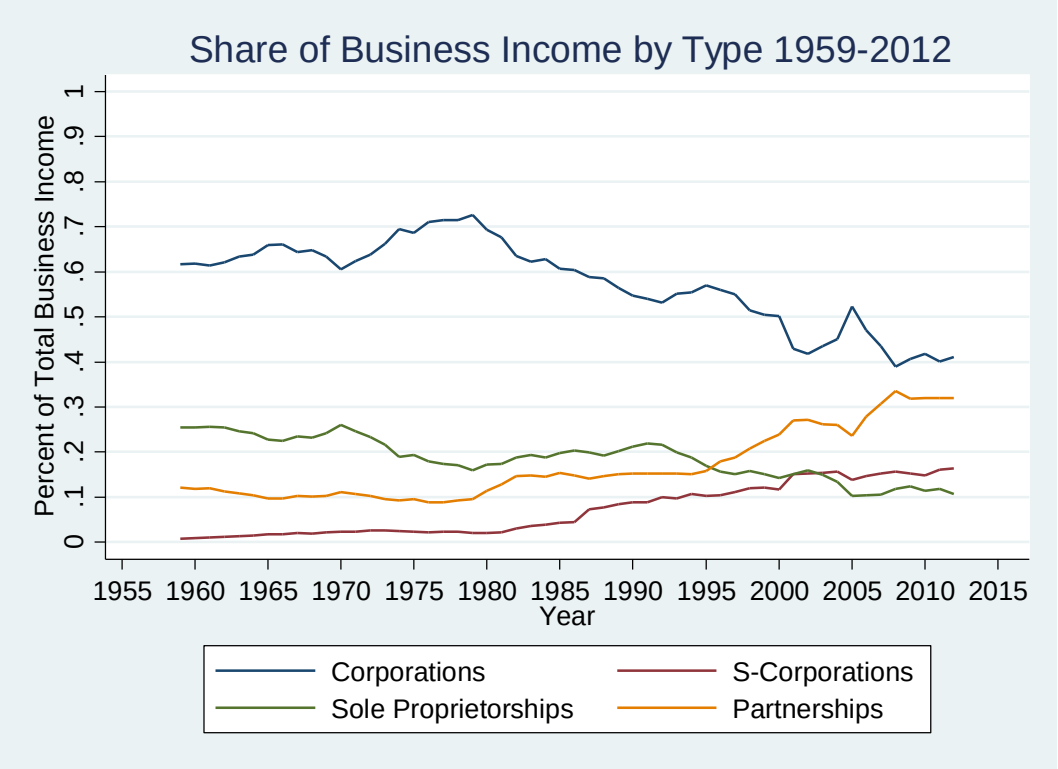

Figure II

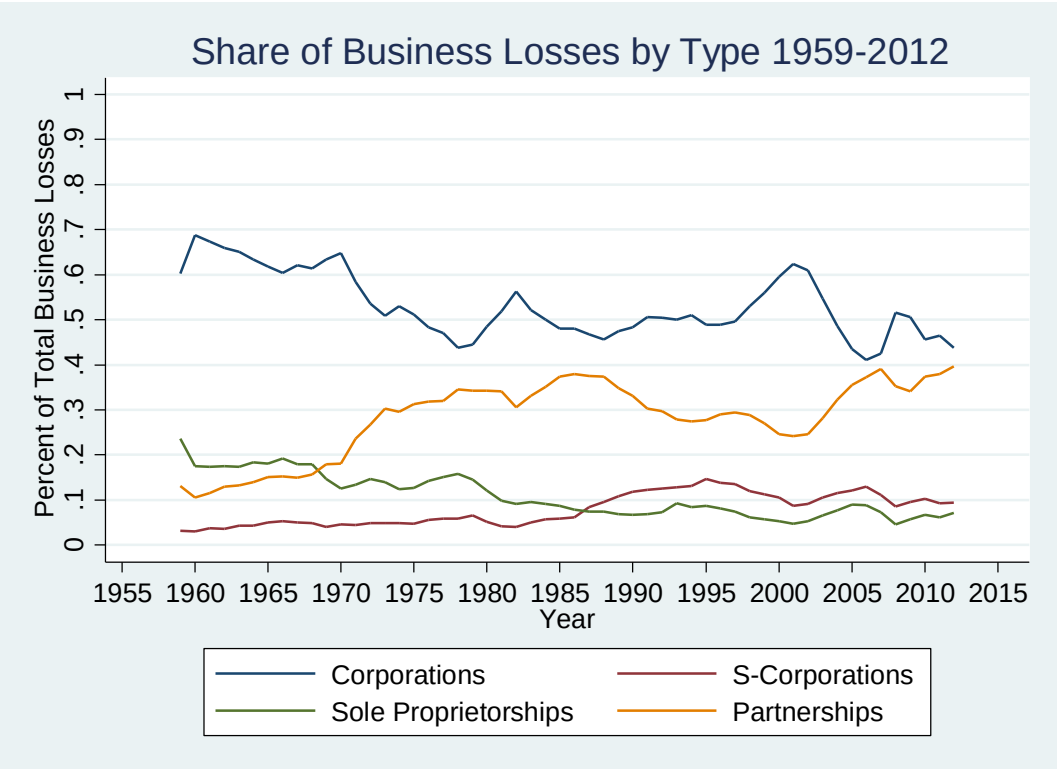

Figure III

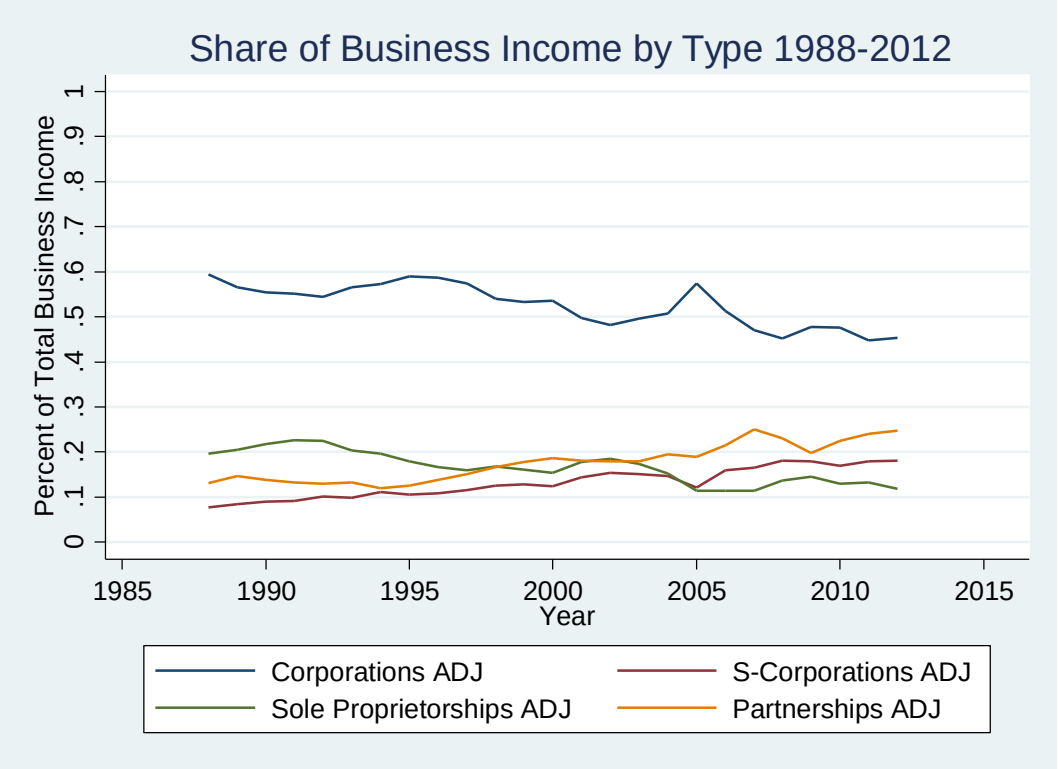

Figure IV

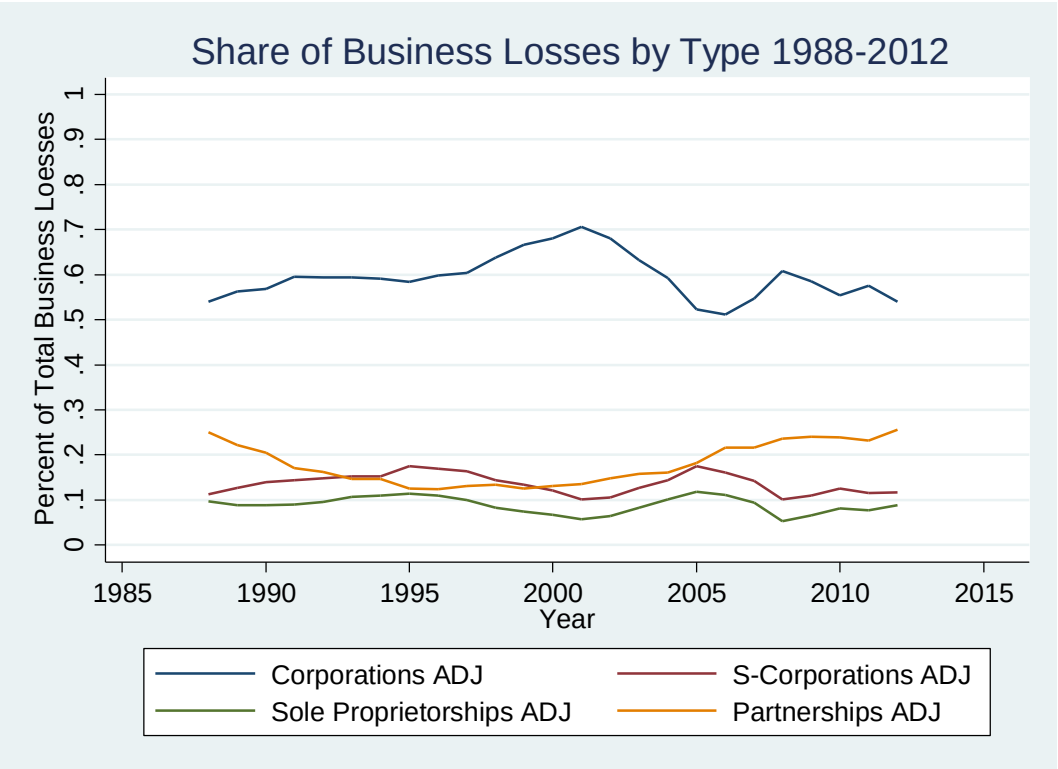

Figure V

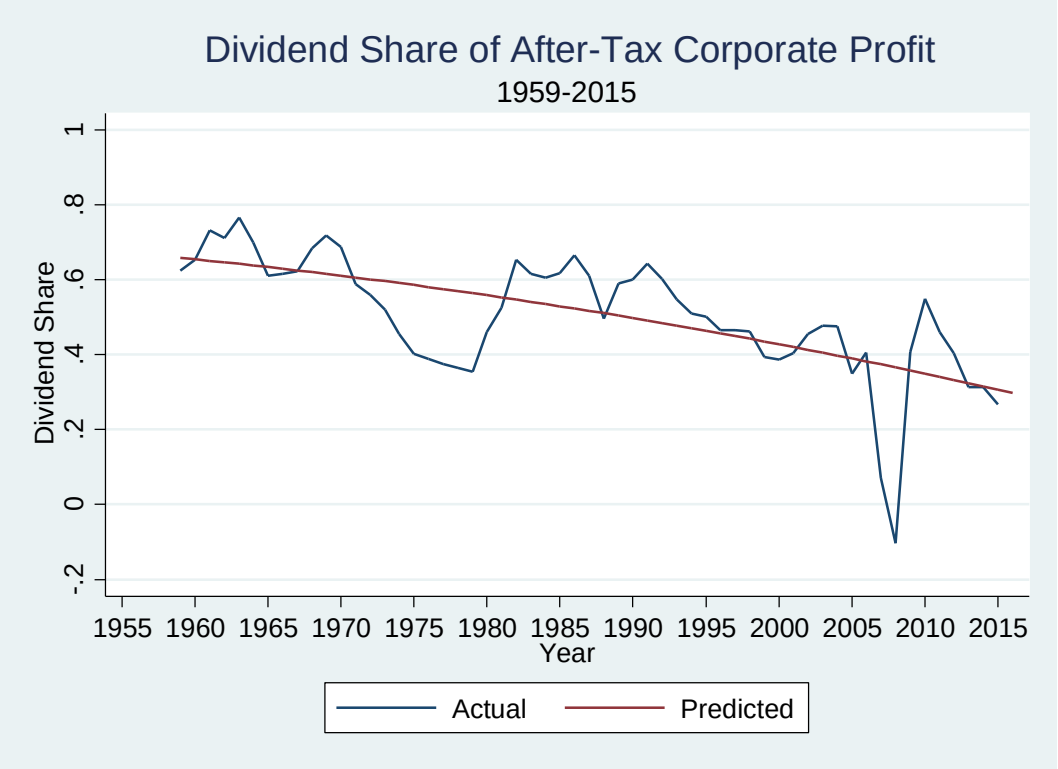
Dividend Share of After-Tax Corporate Profit
1959-2015
Dividend Share
-.2
0
.2
.4
.6
.8
1
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year
Actual
Predicted

Figure VI

No Bang for the Bucks - Indexing Capital Gains Doesn't Lead to Economic Growth

By John Ricco, Efraim Berkovich and Richard Prisinzano

The New York Times reports that the Trump administration is exploring indexing capital gains to inflation. On March 23, 2018, PWBM scored a similar proposal on a purely static basis at $102 billion, which does not include the potential impact on economic growth. In this blog entry, we use PWBM's OLG model to explore the dynamic effects of capital gains indexation, which includes the impact of the proposed policy change on economic growth. We project that this policy change will produce no meaningful economic feedback effect over the next decade.

We model two different versions of capital gains indexation policy. The first is a "retroactive" version where all capital gains, including gains from past investments, are eligible for inflation indexation. The second is a "prospective" version where asset basis is only adjusted for inflation which occurs after policy implementation, which we assume starts on January 1st, 2019. Of course, both policies increase the after-tax return to additional savings decisions by the same amount. However, the retroactive policy also gives an effective lump-sum tax rebate to previous investment, which produces more debt relative to the prospective version.

As Table 1 shows, on a static basis, we estimate that the retroactive policy costs $95 billion over 2019-2028, whereas the prospective policy costs $49 billion over that same timeframe. The $95 billion static estimate is slightly smaller than our previous estimate of $102 billion for a few reasons: we have updated our methodology for imputing real asset basis; we now include a behavioral response in capital gain realizations[1]; and we are now examining a budget window starting in 2019 as opposed to 2018.

Table 1. The Effects of Indexing Capital Gains on Revenue and Debt Costs Relative to Current Policy (billions of current dollars)

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	Cumulative revenue change				Change in debt			
	Retroactive		Prospective		Retroactive		Prospective	
Year	Static	Dynamic	Static	Dynamic	Static	Dynamic	Static	Dynamic
2019-2028	-$95	-$96	-$49	-$49	$108	$110	$54	$55
2019-2038	-$227	-$232	-$158	-$158	$299	$306	$197	$199

Consistent with the empirical evidence, the dynamic projections above assume that the U.S. economy is 40 percent open and 60 percent closed. Specifically, 40 percent of new government debt is purchased by foreigners. The dynamic projections above assume a high rate of return to private capital.

Table 1 also presents revenue estimates on a dynamic basis, which includes economic feedback effects. Notice the revenue loss does not differ meaningfully between the static and dynamic measures over the next 10 years. Table 2 gives the reason: we estimate that indexation spurs roughly zero net additional economic growth during the 10-year budget window.

Table 2. The Effects of Indexing Capital Gains on Key Macroeconomic Variables Relative to Current Policy in Year Shown (percent change)

DOWNLOAD DATA

	Change in GDP		Change in labor income		Change in capital services	
Year	**Retroactive**	**Prospective**	**Retroactive**	**Prospective**	**Retroactive**	**Prospective**
2028	-0.01%	0.00%	-0.01%	0.00%	-0.02%	0.01%
2038	-0.04%	-0.01%	-0.04%	-0.01%	-0.10%	-0.01%

Consistent with the empirical evidence, the dynamic projections above assume that the U.S. economy is 40 percent open and 60 percent closed. Specifically, 40 percent of new government debt is purchased by foreigners. The dynamic projections above assume a high rate of return to private capital.

Why are the estimated effects on economic activity so small? As Gravelle (2018) notes, indexing capital gains to inflation is more limited in its potential for growth effects compared to other types of tax cuts on capital:

> *...unlike some other tax cuts (such as expensing or corporate rate cuts) that occur at the firm level and have the potential to draw capital from abroad as well as potentially increase saving, capital gains are on the savers side, which means their effects operate solely through saving with some of that saving leaking into investments in other countries.*

In fact, looking beyond the usual 10-year window, Table 1 shows that the retroactive policy loses an additional $5 billion on a dynamic basis over the next 20 years. The reason is that additional debt accumulation reduces private capital formation at a greater rate than the positive impact of a slightly higher after-tax returns to savings coming from indexation.

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1. We use a realization elasticity with respect to a rate cut of -0.66 per Bakija and Gentry (2014). Gravelle (2018) argues that indexation would have a smaller impact than a pure rate cut. To the extent this assertion is correct, our estimate is an upper bound on the realization response and therefore, a lower bound on the revenue loss. ↩