MACROECONOMIC EFFECTS OF H.R. 5376: THE BUILD BACK BETTER ACT

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EXECUTIVE SUMMARY

In this paper, we use the Diamond-Zodrow computable general equilibrium model of the U.S. economy to simulate the dynamic macroeconomic effects of H.R. 5376, the Build Back Better Act as passed by the U.S. House of Representatives on November 19, 2021. The macroeconomic effects of the plan reflect the net impact of (1) the increases in distortionary taxation of business, capital and labor income used to finance increased expenditures, and (2) the increase in government transfer payments and a potential small increase in the public capital stock.

The macroeconomic effects of H.R. 5376 as passed by the House of Representatives leads to long run reductions in GDP (by 0.5 percent), private investment (by 1.8 percent), the stock of ordinary capital (by 1.4 percent), hours worked (by 0.3 percent), and labor compensation (by 0.8 percent). Relatively mobile firm-specific capital increases by 0.1 percent ten years after enactment and by 0.6 percent in the long run. Transfer payments increase by 6.5 percent in the ten years after enactment and by 2.2 percent in the long run. The debt-to-GDP ratio increases by roughly four percentage points from 89.5 to 93.6 percent. Using the additional revenues from distortionary tax increases to reduce the debt-to-GDP ratio or investing $130 billion into infrastructure, which makes private capital more productive, reduces the negative effects only slightly. For example, assuming roughly half of the increase in revenues is used to reduce debt for 20 years results in a decrease in GDP of 0.4 percent in the long run.

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I. OVERVIEW

In this paper, we examine the dynamic macroeconomic effects of H.R. 5376, the Build Back Better Act as passed by the U.S. House of Representatives on November 19, 2021. The Joint Committee on Taxation (hereafter JCT, 2021) provides estimates of the tax provisions in H.R. 5376. The tax provisions fit into four sections with descriptive headings as follows: infrastructure financing and community development, green energy, the social safety, and responsibly funding our priorities. The estimates of the provisions in the first three sections imply that federal revenues will decline by roughly $530 billion from 2022 to 2031. The provisions in the fourth section, mainly tax increases, increase federal revenues by $1,476 billion. All together, the provisions raise revenues by $946 billion from 2022 to 2031. The Congressional Budget Office (hereafter CBO, 2021) estimates that enacting this legislation would increase deficits by $365 billion from 2022 to 2031 (not including net effects of increased IRS enforcement and outlays). This implies an increase in transfer payments equal to $1,311 billion from 2022 to 2031. We produce simulations of (1) the Build Back Better Act as passed by the House for two different assumptions about the nature of spending increases and (2) a plan that uses roughly half of the revenue increases (about $1,110 billion over 20 years) for deficit reduction from 2022 to 2041 and uses the remaining revenues to increase transfer payments. We assume that the increase in revenues is permanent and either increase transfers or reduce debt after year 2031.

The analysis is performed in the context of an extended version of the Diamond-Zodrow (DZ) dynamic, overlapping generations, computable general equilibrium (CGE) model of the U.S. economy. The basic model is designed to examine both the short run and the long run macroeconomic effects of tax policy changes. The model is capable of examining the economic effects of certain changes in the tax treatment of international income and government investment expenditures that increase the public capital stock and enhance the productivity of private labor and capital.

The paper proceeds as follows. In the following section, we describe the features of the fiscal plan that we analyze. Section III provides a brief description of our computable general equilibrium model. The simulation results are reported in Section IV. The final section summarizes the results and offers some caveats.

II. DETAILS OF THE FISCAL PLAN ANALYZED

The tax and the expenditure components of the fiscal plan we analyze are detailed below.

A. Tax Changes

We include all of the major elements of H.R. 5376, with the exception of changes in spending and revenue that results from the increase in IRS funding and the drug pricing provisions. JCT (2021) groups the tax provisions into the following four sections—infrastructure financing and community development, green energy, the social safety, and responsibly funding our priorities. The estimates of the provisions in the first three sections roughly aggregate to a $530 billion decline in federal revenues from 2022 to 2031. The provisions in the fourth section, mainly tax increases, increase federal revenues by $1,476 billion from 2022 to 2031. Summing these numbers implies a total increase in revenues of $946 billion from 2022 to2031.

As shown in JCT (2021), the estimated revenue changes for each of the four sections are:

- The section on infrastructure financing and community development reduces revenues by $28,715 million.
- The section of green energy reduces revenues by $311,741 million.
- The section on increasing the social safety reduces revenues by $189,625 million.
- The section on responsibly funding our priorities increases revenues by $1,476,096 million.

We allocate the revenue changes in JCT (2021) across the five production sectors in the model—owner housing (OH), rental housing (RH), non-corporate (NC), corporate competitive (CP), and the international corporate imperfectly competitive sector (CM). Within each model sector, the revenue changes are input as production deductions, investment credits, or changes in the relevant tax rate. This results in $16 billion in housing credits, $258 billion in noncorporate revenues related to rate changes and roughly another $92 billion in deductions and credits, $374 billion in corporate rate reduction split between the CP and CM sectors, and $233 billion in revenue increases in the CM sector through changes in rates, deductions and credits. In addition, revenue increases in the CM sector are related to increasing the effective tax rate on global intangible low-taxed income (GILTI) to 15 percent, the imposition of GILTI on a country-by-country basis, modifications to base erosion and anti-abuse tax rules, and other provisions that change deductions and credits specific to the CM sector (or the tax treatment of international income). In addition, we account for provisions that affect individuals directly as either changes in individual tax rates or transfer payments.

B. Expenditure Changes

CBO (2021) estimates that enacting this legislation would increase deficits by $365 billion from 2022 to 2031. Relative to the revenue provisions discussed above, this implies that spending increases are equal to $1,311 billion to hit the deficit target of $365 billion from 2022-

2031 in the model. This is roughly in line with estimates used by Durante et al. (2021) net of tax credits and shown in Table II.1. Table II.2 shows net revenue, net outlays, and net deficit effects for the two scenarios that differ based on the net effect on deficits.

Table II.1. Spending in the House Build Back Better Act, 2022-2031

Spending Item	Spending (Billions)
Family benefits (childcare, paid leave, universal pre-K)	$585 billion
Climate spending	$235 billion
Medicaid home and community-based services	$150 billion
Medicare hearing benefit	$35 billion
Affordable housing support	$175 billion
Health-care workforce spending	$25 billion
Workforce spending	$40 billion
Immigration reform	$110 billion
Other spending/investments	$110 billion
Total Spending	**$1.48 trillion**
Total Spending Including Tax Credits	**$2.14 trillion**

Source: Tax Foundation (Durante, Alex, Cody Kallen, Huaqun Li, William McBride, Alex Muresianu, Erica York, and Garrett Watson, 2021), https://taxfoundation.org/build-back-better-plan-reconciliation-bill-tax/.

Table II.2 Net Revenue, Net Outlays, and Net Deficit Effects

($ billions)

Scenario	Net Revenues	Net Outlays	Deficit
Budget effects of H.R. 5376 as passed by the House 2022-2031 (before macroeconomic effects)	$946	$1,311	$365
Taxes			
Sections I-III in JCT (2021)	-$530		
Section IV in JCT (2021)	$1,476		
Outlays (with $130 billion invested in infrastructure)			
Transfer Payments		$1,311 ($1,181)	
Govt. Infrastructure Investment		$0 ($130)	
Budget effects of H.R. 5376 paired with Debt Reduction 2022-2031 (before macroeconomic effects)	$946	$446	-$500
Outlays			
Transfer Payments		$446	
Govt. Infrastructure Investment		$0	
Debt Reduction 2032-2043	$1,154	$544	-$610
Debt Reduction 2022-2043	$2,100	$990	-$1,110

The DZ model explicitly includes two types of government spending: (1) transfer payments made to individuals and (2) government public investment expenditures that directly affect private sector productivity. We begin by assuming that all spending in the Build Back Better Act is transfer spending as opposed to investments in productive government infrastructure that increases the productivity of private capital. The major provisions of the Build Back Better Act that would be most likely to increase the productivity of private investment are the provisions that fund universal preschool or climate spending. However, it is not clear that either of these provisions would lead to a significant increase in the productivity of private capital. For example, CBO (2021) states that:

> "Universal preschool for children ages 3 to 5 could have a positive effect on their earnings as adults, but any effect would probably be smaller, on average, than what some studies have found for existing programs.
>
> - Children from low-income families benefit the most from preschool but are less likely than children from higher-income families to attend preschool without financial assistance. Many of those children are served by Head Start under current law, so universal preschool would probably not change the future earnings of those children.
> - The adult earnings of children from higher-income families are less affected by preschool attendance. Those children typically do not have access to federally subsidized preschool under current law, but many still attend preschool. Universal preschool would extend federal subsidies to children from those higher-income families, but it would probably not change their future earnings substantially."

Given these reasons, it seems most prudent to treat spending on universal preschool as a transfer payment in the model as opposed to a new public investment in human capital. The provisions on climate spending cut across a variety of areas from work force development, climate justice, electric vehicle tax credits, relief for taxpayers for severe weather events, electrifying the federal fleet of vehicles, investing or subsidizing various infrastructure projects, and many more. To account for the fact that a fraction of this spending could impact the productivity of private capital, we provide simulation results assuming that $130 billion of spending is modeled as new infrastructure investment.

We assume that the revenue raised from the tax changes enacted from 2022 to 2031 are permanent, which may understate the revenue increases after the first decade from 2022 to 2031. For example, the extension of the child tax credit for a single year adds about $90 billion in tax expenditures in the second decade after enactment (from 2032 to 2043). Note this is vastly different from assuming that the child tax credit is permanent, which would cost roughly $1.6 trillion from 2022 to 2031. After 2031, in benchmark simulations, transfer payments adjust to hold the government debt-to-GDP ratio constant in the long run. We also examine the case in which roughly half of the increase in revenues (about $1,110 billion from 2022 to 2043) are used for debt reduction for 20 years after enactment, and then transfers are adjusted to hold the debt-to-GDP ratio constant after that time.

III. OVERVIEW OF THE DIAMOND-ZODROW MODEL

This section provides a short description of the model used in this analysis.[1] We first provide a description of the basic model and then describe the extensions to explicit consideration of government public investment that enhances the productivity of private sector labor and capital. Key parameter values used in the simulations are provided in the appendix.

Versions of the model have been used in analyses of tax reforms by the U.S. Department of the Treasury (President's Advisory Panel on Federal Tax Reform, 2005), the Joint Committee

[1] For more details, see Zodrow and Diamond (2013), Diamond and Zodrow (2015), and Gunning, Diamond, and Zodrow (2008). The model combines various features from other broadly similar CGE models, including those constructed by Auerbach and Kotlikoff (1987), Goulder and Summers (1989), Goulder (1989), Keuschnigg (1990), and Fullerton and Rogers (1993).

on Taxation (2005), and in numerous recent tax policy studies (Diamond and Zodrow, 2007, 2008, 2013, 2014, 2015, 2018, 2020, 2021; Diamond, Zodrow, Neubig, and Carroll, 2014; Diamond and Viard, 2008).

The domestic component of the DZ model includes both corporate and non-corporate composite consumption goods and owner-occupied and rental housing. The corporate sector is subject to the corporate income tax and subdivided into domestic and multinational firms as described below, and the "non-corporate" sector – which includes S corporations as well as LLCs, LLPs, partnerships and sole-proprietorships – is taxed on a "pass-through" basis at the individual level. Firms combine labor and several different types of capital to produce their outputs at minimum after-tax costs. The time paths of investment are determined by profit-maximizing firm managers who take into account all business taxes as well as the costs of adjusting their capital stocks, correctly anticipating the macroeconomic changes that will occur as a result of any change in the tax structure. Firms finance their investments with a mix of equity and debt, choosing an optimal debt-asset ratio that balances the costs and benefits of additional debt, including its tax advantages.

On the consumption side, household supplies of labor and saving for capital investment and demands for all housing and non-housing goods are modeled using an overlapping generations structure. A representative individual in each generation (1) spends a fixed number of years working and in retirement, (2) makes consumption and labor supply choices to maximize lifetime welfare subject to a lifetime budget constraint that includes personal income and other taxes and a fixed number of hours available for work and leisure, and (3) makes a fixed "target" bequest.

The government purchases the composite goods and makes transfer payments, which it finances with the corporate income tax, a progressive tax on labor income after deductions and exemptions, and constant individual-level average marginal tax rates applied to capital income in the form of interest receipts, dividends, and capital gains. The modeling of corporate income tax revenues includes explicit consideration of deductions for depreciation or immediate expensing for both new and old assets (which are treated separately), other production and investment incentives, and state and local sales, income, and property taxes. As described in Diamond and Zodrow (2021b), the model also includes explicitly the effects of government public investment expenditures, including their effects on private sector productivity. The key parameter value in modeling the effect of government investment expenditures is θ_G, the constant elasticity of private sector output with respect to an increase in the stock of public capital. This paper uses a value of θ_G =0.06, which is the long run value assumed by CBO (2016). Finally, our analysis follows CBO in assuming that one-third of national public investment expenditures are offset by reductions in state and local public expenditures

The DZ model also includes a simplified foreign or "rest-of-the-world" (RW) sector, with international trade and capital movements between the US and RW. The model includes US and foreign multinational enterprises (MNEs), both parents and subsidiaries, which determine the allocation across the US and RW of relatively mobile firm-specific capital (*FSK*) that earns above-normal returns as well as the allocation of less mobile ordinary capital that earns normal returns.[2] *FSK* captures a wide variety of intangibles, including patents, copyrights, designs, or other proprietary technology, R&D spending, new software, unique data bases, brand names and

[2] The assumption of differential international mobility of capital follows Becker and Fuest (2011); see also Zodrow (2010).

trademarks, and good will and reputation, which are coupled with unique managerial or organizational skills or knowledge of production processes and distribution networks to create a factor that is assumed to be fixed in total supply and grows at the exogenously specified growth rate (and is thus independent of any tax changes), is unique to the firm, and allows it to permanently earn above-normal returns.[3] The model also allows for income shifting by MNEs in response to tax differentials across countries,[4] the use of intermediate goods that are traded between the affiliates of the MNEs,[5] and international trade in the goods produced by the MNEs in the US and RW. To simplify the analysis, RW is modeled as consisting entirely of the MNE sector (both US-MNE subsidiaries and RW-MNE parents); we thus effectively assume that the remainder of RW is unaffected by the tax reforms in the United States that we analyze. We assume that the tax system in RW is fixed and thus does not respond to changes in the US tax structure. In particular, the US tax reforms considered in this paper include an increase and expansion of the existing U.S. minimum tax regime on foreign source income (global intangible low-taxed income or GILTI). We do not consider the possibility, currently being discussed, of the enactment of similar minimum taxes in the OECD, perhaps coordinated with the United States; if enacted, these taxes would have the effect of dampening to some extent the tax-induced outflows of firm-specific capital that occur in our model.

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[3] The modeling of firm-specific capital generally follows Bettendorf, Devereux, van der Horst, Loretz, and de Mooij (2009), de Mooij and Devereux (2011), Auerbach and Devereux (2018), and McKeehan and Zodrow (2017). Numerous recent analyses have stressed the increasing importance of the combination of intellectual capital and organizational and managerial skill, including an OECD study by Demmou et al., (2019) as well as Hassett and Shapiro (2011), Peters and Taylor (2017), and Ewens et al. (2020). These studies suggest that such firm-specific capital may be 40 percent or more of total capital.

[4] For recent discussions of the controversial issue of the extent of income shifting by US multinationals, see Dharmapala (2014, 2018), Clausing (2020a, b), and Blouin and Robinson (2020).

[5] The inclusion of intermediate goods in the production functions of MNE parent firms and subsidiaries follows Desai, Foley, and Hines (2009).

Note that the model includes several fundamental assumptions that are typical of such dynamic computable general equilibrium (CGE) models, including those used by the Joint Committee on Taxation (see Diamond and Moomau (2003) and Auerbach and Grinberg (2017) for general discussions) and the Congressional Budget Office (Nelson and Phillips, 2019), as well as the models cited above. Specifically, all markets are assumed to be in equilibrium in all periods, and the economy must always begin and end in a steady-state equilibrium, with all of the key macroeconomic variables growing at an exogenous growth rate that equals the sum of the population and productivity growth rates. Note that this implies that tax changes do not affect the long term growth rate in the economy; for example, a tax reform might increase the levels of GDP relative to the steady state levels in the absence of reform for many years after the enactment of reform, but eventually GDP will grow at the fixed steady state growth rate of the economy.

Our model also assumes a full employment equilibrium in the labor market in each period and thus is not well suited to analyzing fiscal policies designed to stimulate an economy with high unemployment. Any simulated changes in hours worked necessarily reflect changes in labor supply and demand in response to tax-induced changes in prices and incomes within the context of a full-employment economy. These include the effects of any increases in government transfers, which reduce labor supply as individuals choose to “consume” more leisure because their income level has increased.

IV. Simulation Results

In this section we report the results of three simulations. In each case, we assume the tax changes described above are permanent and finance permanent increases in transfer payments. We consider the following reforms:

(1) H.R. 5367 as passed by the House.

(2) H.R. 5367 as passed by the House assuming that $130 billion of government expenditures represent an increase government spending that increases the productivity of private capital.

(3) H.R. 5367 assuming half of revenue increases (roughly $1.,110 billion) are used to reduce the deficit for 20 years after enactment ($500 billion in the first 10 years and $610 billion in second decade after enactment).

In the second simulation, the increase in federal public sector investment of $130 billion over 10 years results in a permanent increase in the size of the public capital stock.[6] Federal public investment is offset by one-third due to reductions in state and local public investment, and is phased in over the ten-year period. Transfer payments are adjusted (after year ten in the first two simulations and after year 20 in the third simulation) in all three simulations to hold the debt-to-GDP ratio constant.

A. Macroeconomic Effects of H.R. 5367

The macroeconomic effects of the tax and expenditure changes that are roughly equivalent to H.R. 5367 are shown in Table IV.1. In this case, GDP decreases by 0.2 percent in the year after reform, by 0.2 percent in 2028, by 0.4 percent in 2033, by 0.4 percent in 2043, and

[6] Note that we assume that federal government investment increases permanently to cover depreciation on the increase in the public capital stock attributable to the 10-year increase in federal government net investment.

by 0.5 percent in the long run. Aggregate private consumption of goods and services increases by 0.1 percent in the year after reform, and is then relatively flat, but eventually decreases by 0.2 percent in 2043, and by 0.3 percent in the long run. Total private investment decreases by 1.2 percent in the year after reform, by 1.3 percent in 2028, by 1.4 percent in 2033, by 1.6 percent in 2043, and by 1.8 percent in the long run. The net stock of imported ordinary capital is unchanged. The stock of ordinary capital decreases by 0.1 percent in the year after reform, by 0.2 percent in 2028, by 0.4 percent in 2033, by 0.8 percent in 2043, and by 1.6 percent in the long run. The stock of FSK (highly mobile intangible capital) decreases by 0.1 percent in the year after reform, but then increases as the GILTI and related international tax provisions reduce the incentive for capital to locate abroad. FSK increases by 0.2 percent in 2033, by 0.5 percent in 2043, and by 0.6 percent in the long run.

Table IV.1 Macroeconomic Effects of H.R. 5367 with All Spending Treated as Transfers
(Percentage changes in aggregate variables, relative to steady state with no reform)

Variable % Change in Year:	**2023**	**2028**	**2033**	**2043**	**2073**	**LR**
GDP	-0.2	-0.3	-0.4	-0.4	-0.5	-0.5
Private consumption	0.1	0.0	0.0	-0.2	-0.3	-0.3
Private investment in ordinary *K* in US	-1.2	-1.3	-1.4	-1.6	-1.8	-1.8
Stock of imported ordinary *K* in US	0.0	0.0	0.0	0.0	0.0	0.0
Stock of ordinary *K* in US	-0.1	-0.2	-0.4	-0.8	-1.2	-1.4
Stock of *FSK* in US	-0.1	0.0	0.2	0.5	0.6	0.6
Employment (hours worked)	-0.4	-0.4	-0.4	-0.3	-0.3	-0.3
Labor compensation	-0.3	-0.3	-0.3	-0.4	-0.7	-0.8
Real wage	0.1	0.1	0.1	-0.1	-0.4	-0.4
Total public capital stock	0.0	0.0	0.0	0.0	0.0	0.0
Transfers	6.5	6.5	6.5	1.6	1.5	1.8
Debt-to-GDP ratio	90.0	90.4	92.3	93.8	93.9	93.9

The simulation results also indicate that the reform would lead to a decrease in hours worked by 0.4 percent in the year after reform, by 0.4 percent in 2028, and by 0.3 percent in the long run. The real after-tax wage increases by 0.1 percent during the first ten years after reform, but declines by 0.1 percent in 2043, and by 0.4 percent in the long run. Declines in hours worked and the real wage lead to a decrease in labor compensation of 0.3 in the year after reform, by 0.3 percent in 2033, and by 0.8 percent in the long run. Transfer payments increase by 6.5 percent in each of the first ten years, by 1.6 percent in 2043, and by 1.8 percent in the long run. The debt-to-GDP ratio increases from 89.5 percent in the initial steady state to 93.9 percent in the long run.

Table IV.2 Macroeconomic Effects of H.R. 5367 with $130 Billion Treated as Infrastructure

(Percentage changes in aggregate variables, relative to steady state with no reform)

Variable % Change in Year:	**2023**	**2028**	**2033**	**2043**	**2073**	**LR**
GDP	-0.2	-0.3	-0.3	-0.4	-0.5	-0.5
Private consumption	0.0	0.0	-0.1	-0.2	-0.3	-0.2
Private investment in ordinary *K* in US	-1.3	-1.4	-1.5	-1.6	-1.8	-1.8
Stock of imported ordinary *K* in US	0.0	0.0	0.0	0.0	0.0	0.0
Stock of ordinary *K* in US	-0.1	-0.3	-0.4	-0.8	-1.3	-1.4
Stock of *FSK* in US	-0.1	0.0	0.1	0.5	0.6	0.6
Employment (hours worked)	-0.4	-0.4	-0.3	-0.3	-0.3	-0.3
Labor compensation	-0.3	-0.3	-0.3	-0.4	-0.6	-0.7
Real wage	0.1	0.1	0.1	0.0	-0.3	-0.4
Total public capital stock	0.1	0.2	0.5	0.6	0.6	0.6
Transfers	5.9	5.9	5.9	1.0	1.1	1.7
Debt-to-GDP ratio	90.1	90.5	92.5	94.2	94.3	94.3

The macroeconomic effects of H.R. 5367 assuming that $130 billion of spending is investment in productive government capital are shown in Table IV.2. The results are broadly similar, but slightly smaller, relative to the results in Table IV.1. In this case, the key parameter is the constant elasticity of private sector output with respect to an increase in the stock of public capital (θ_G). We assume θ_G =0.06 to match the value used by CBO (2016). In addition, transfer payments in the first ten years after reform are smaller and the debt-to-GDP ratio is 4.8 percentage points higher in the long run.

B. Macroeconomic Effects of H.R. 5367 with Deficit Reduction for 20 years

The macroeconomic effects of H.R. 5367 with half of increased revenues (roughly $1,110 billion) used for deficit reduction (as recently suggested by Senator Joe Manchin) is shown in Table IV.3. In this case, GDP decreases by 0.2 percent in the year after reform, by 0.3 percent in 2028, by 0.3 percent in 2033, by 0.4 percent in 2043, and by 0.4 percent in the long run. Aggregate private consumption of goods and services is unchanged in the year after reform, but decreases by 0.1 percent in 2028, by 0.2 percent in 2033, by 0.3 percent in 2043, and by 0.3 percent in the long run. Total private investment decreases by 1.0 percent in the year after reform, by 1.1 percent in 2028, by 1.1 percent in 2033, by 1.2 percent in 2043, and by 1.1 percent in the long run. The net stock of imported ordinary capital is unchanged. The stock of ordinary capital decreases by 0.1 percent in the year after reform, by 0.2 percent in 2028, by 0.3 percent in 2033, by 0.6 percent in 2043, and by 0.8 percent in the long run. The stock of FSK (highly mobile intangible capital) is unchanged in the year after reform, but then increases as the GILTI and related international tax provisions reduce the incentive for capital to locate abroad. FSK increases by 0.3 percent in 2033, by 0.5 percent in 2043, and by 0.6 percent in the long run.

The simulation results also indicate that the reform would lead to a decrease in hours worked by 0.4 percent in the year after reform, by 0.4 percent in 2028, and by 0.4 percent in the long run. The real after-tax wage increases by 0.1 percent during the first twenty years after reform, but returns to the steady state level in the long run. As a result, labor compensation decrease by 0.2 in the year after reform, by 0.2 percent in 2033, and by 0.4 percent in the long run. Transfer payments increase by 2.4 percent in each of the first twenty years, and by 6.2 percent in the long run. The debt-to-GDP ratio decreases from 89.5 percent in the initial steady state to 86.4 percent in the long run.

Table IV.3 Macroeconomic Effects of H.R. 5367 with Deficit Reduction

(Percentage changes in aggregate variables, relative to steady state with no reform)

Variable % Change in Year:	**2023**	**2028**	**2033**	**2043**	**2073**	**LR**
GDP	-0.2	-0.3	-0.3	-0.4	-0.5	-0.4
Private consumption	0.0	-0.1	-0.2	-0.3	-0.3	-0.3
Private investment in ordinary *K* in US	-1.0	-1.1	-1.1	-1.2	-1.1	-1.1
Stock of imported ordinary *K* in US	0.0	0.0	0.0	0.0	0.0	0.0
Stock of ordinary *K* in US	-0.1	-0.2	-0.3	-0.6	-0.8	-0.8
Stock of *FSK* in US	0.0	0.2	0.3	0.5	0.6	0.6
Employment (hours worked)	-0.4	-0.4	-0.3	-0.3	-0.4	-0.4
Labor compensation	-0.2	-0.2	-0.2	-0.3	-0.3	-0.4
Real wage	0.1	0.1	0.1	0.1	0.0	0.0
Total public capital stock	0.0	0.0	0.0	0.0	0.0	0.0
Transfers	2.4	2.4	2.4	2.4	5.8	6.2
Debt-to-GDP ratio	89.7	89.6	89.1	87.2	86.4	86.4

V. CONCLUSION

In this paper, we use the Diamond-Zodrow computable general equilibrium model of the U.S. economy to simulate the dynamic macroeconomic effects of H.R. 5367, the Build Back

Better Act. The macroeconomic effects of H.R. 5376 as passed by the House of Representatives leads to long run reductions in GDP (by 0.5 percent), private investment (by 1.8 percent), the stock of ordinary capital (by 1.4 percent), hours worked (by 0.3 percent), and labor compensation (by 0.8 percent). Relatively mobile firm-specific capital increases by 0.1 percent ten years after enactment and by 0.6 percent in the long run. Transfer payments increase by 6.5 percent in the ten years after enactment and by 2.2 percent in the long run. The debt-to-GDP ratio increases by roughly four percentage points from 89.5 percent to 93.6 percent. Using the increase in revenues from distortionary tax increases to reduce the debt-to-GDP ratio or investing $130 billion in infrastructure, which makes private capital more productive, reduces the negative effects only slightly. GDP still decreases by at least 0.4 percent in the long run in either case, as other important economic aggregates also decline (such as hours worked and the capital stock).

We conclude with some caveats. In our view, dynamic, overlapping generations computable general equilibrium models of the type used in this analysis are one of the best tools available to analyze the real economic effects of tax policy changes such as those analyzed in this study. In particular, such models provide a rich structure based on fundamental economic theory that captures many of the complex and interacting effects of changes in fiscal policy, including their dynamic and intergenerational effects, in a comprehensive general equilibrium framework. Such models, including our version, can also be used to analyze the intragenerational and intergenerational distributional effects of changes in fiscal policy, although we do not do so in this study.

Nevertheless, the results of any study that attempts to model the effects of corporate and individual income tax changes as well as changes in government expenditures including those that increase the stock of public capital in today’s highly complex and internationally integrated economy are subject to uncertainty, and this analysis is no exception. In particular, such results always depend on the details of the policy proposed and how they are modeled, including how the revenues are used, the structural assumptions that characterize the model, and the specific model parameters that are utilized in the simulations.

APPENDIX

Table A. Parameter Values Used in the DZ Model

Symbol	Description	Value
Utility Function Parameters		
ρ	Rate of time preference	0.015
σ_U	Intertemporal elasticity of substitution (EOS)	0.50
σ_C	Intratemporal EOS	0.80
σ_H	EOS between composite good, housing	0.30
σ_N	EOS between corporate composite good and noncorporate good	2.00
σ_{NS}	EOS between subsidized and nonsubsidized noncorporate good	2.00
σ_M	EOS between M-sector and C-sector corporate goods	2.00
σ_I	EOS between domestic and foreign produced goods	5.00
σ_R	EOS between rental and owner-occupied housing	1.50
α_C	Utility weight on the composite consumption good	0.73
α_H	Utility weight on non-housing consumption good	0.48
α_{NS}	Utility weight on subsidized non-corporate consumption good	0.50
α_N	Utility weight on composite corporate good	0.62
α_M	Utility weight on M-sector corporate good	0.42
α_R	Utility weight on owner-occupied housing	0.76
α_{LE}	Leisure share parameter of time endowment	0.30

Production Function Parameters		
ε_C, ε_M	EOS for C-sector and M-sector corporate goods	1.00
ε_N	EOS for noncorporate good	1.00
ε_H, ε_R	EOS for owner and rental housing	1.00
ε_G	EOS for government-produced goods	1.00
γ_C	Capital shares for C-sector corporate goods	0.27
γ_N	Capital share for noncorporate good	0.30
γ_H, γ_R	Capital share for owner and rental housing	0.98
γ_G	Capital share for government-produced good	0.64
$\beta_X, \beta_N, \beta_H$	Capital stock adjustment cost parameters	5.0, 10
ζ	Dividend payout ratio in corporate sector	0.40
b_C, b_N, b_H, b_R	Debt-asset ratios	0.35, 0.40
β_d	Cost of excessive debt parameter	0.30
γ_{KM}	Capital share parameter in M-sector composite *KEL* factor	0.27
γ_{MK}	*KEL* share parameter in M-sector production function	0.66
γ_{MI}	Intermediate good share in M-sector production function	0.05
	Other Parameters	
ε_K	Portfolio elasticity for ordinary capital	1.0
ε_{FSK}	Portfolio elasticity for firm-specific capital	2.0
n	Exogenous growth rate (population plus productivity)	2.0
θ_G	Output elasticity of public capital	0.06
ϕ^{GSL}	Share of federal investment offset by state/local reductions	0.33

DISCLAIMER

This study uses the Diamond-Zodrow model, a dynamic computable general equilibrium model copyrighted by Tax Policy Advisers, LLC, in which the authors have an ownership interest. The terms of this arrangement have been reviewed and approved by Rice University in accordance with its conflict of interest policies.

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