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AN ECONOMIC ANALYSIS OF THE ELIMINATION OF THE INDIVIDUAL INCOME TAX IN MISSISSIPPI*

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The Mississippi House of Representatives recently introduced and passed the Mississippi Tax Freedom Act. The legislation phases out the individual income tax over a period as short as ten years. To make up for lost revenue, the bill proposes raising the state sales tax and increasing additional miscellaneous taxes. In this paper, we provide a price theoretic analysis of the effects of the proposed tax reform. In particular, we focus our attention on the long-run implications for economic efficiency and tax revenue. Our results show that the tax reform is close to revenue-neutral. We find that the current tax system costs Mississippi approximately $371 million in 2019 dollars of lost real gross domestic product (GDP) per year relative to the proposed tax reform. It is important to note that we assume that tax reform affects the level of economic activity in the long-run rather than the growth rate. Furthermore, we do not model the effect of the tax on possible in-migration. To the extent the proposed reform increases the rate of economic growth and/or makes Mississippi a more attractive destination for residence, our estimates can be interpreted as a lower bound regarding the economic effects.

Executive Summary

Total sales and gross receipts, individual income, and corporation net income taxes account for 89% of total tax revenue on average in the State of Mississippi from 1950 to 2019.[1] In 2019, these three tax types account for 93% of total tax revenue. House Bill 1439, or the Mississippi Tax Freedom Act of 2021, aims to eliminate the individual income tax over ten years and raise sales tax rates to counter lost tax revenue. We model these three tax types in a macroeconomic model and consider the effects of the proposed tax change. We provide a theoretical analysis of the effects of these tax types and quantify the effects of implementing the proposed tax structure in House Bill 1439.

Our results are as follows:

- The three tax types interact to generate distortions in the economy's labor market and credit market.

    - The presence of three tax types and two distortions leads to double taxation.

- Elimination of the income tax improves efficiency in both markets, whereas raising the consumption tax reduces labor market efficiency.

    - The tax change leads to higher investment in the economy and qualitatively ambiguous effects within the labor market.

- Quantitatively, moving from the current tax system to the proposed tax system raises gross domestic product (GDP) in the State of Mississippi by $371 million per year in 2019 dollars

    - In other words, the current tax structure costs Mississippi $371 million per year of GDP in 2019 dollars.

    - The additional GDP from implementing the proposed tax structure is equivalent to a one time immediate transfer to every resident of the state of $2,983, or $8,077 per tax filer.

Note, we do not consider growth in the economy resulting from or potential migration to the state due to implementing the proposed tax change. Given this, we view our results as a conservative lower bound on the effect of implementing the proposed tax structure from House Bill 1439.

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1. See (MSSLGRTAX+MSTLINCTAX+MSCORPINCTX)/MSTOTLTAX from the Federal Reserve Economic Database (FRED) managed by the Federal Reserve Bank of St. Louis.

1 INTRODUCTION

In 2020, Mississippi Governor Tate Reeves announced a plan to phase out the state's individual income tax by 2030 (Reeves 2020). In the latest legislative session, the Mississippi House of Representatives introduced Bill 1439, The Mississippi Tax Freedom Act, which would phase out the state's individual income tax over at least a decade and replace lost revenue predominantly through an increase in the state's sales tax.[2] In February, the House of Representatives passed the bill, with 85 representatives voting in favor of the bill and 34 votes cast against it. The bill passed with some level of bipartisan support, with 71 Republicans and 13 Democrats voting in favor of the bill.[3] As of this writing, the bill is now under consideration in the Mississippi Senate.

This proposed tax reform aims to reduce inefficiencies in the state's tax system and establish a more competitive tax environment. In principle, a consumption-based tax system has some desirable characteristics in comparison to an income-based tax system. To understand why this is the case, consider that an income tax system taxes both labor income and income from savings. By taxing savings, income taxes reduce the after-tax rate of return on savings presently and in future periods. Due to the nature of compounding, the magnitude of the tax on savings income increases with the duration of savings. For example, suppose that a person saves $500 this year and earns 5 percent interest. This person would have $638.14 after five years and $814.45 after ten years. However, suppose that income taxes reduce the after-tax return on savings to 4 percent. In this case, the same person would have $608.33 after five years and $740.12 after ten years. For a person saving for five years, the tax reduces their savings by $29.81, or approximately $5.96 per year. For a person saving for ten years, the tax reduces their savings by $74.33, or $7.43 per year.

Another way of thinking about this is as follows. Savings is often used to finance future consumption. People save to buy a new car or so that they have money available to retire. A tax on savings income is equivalent to have a tax on consumption in which the tax *rate* increases each year. There is no obvious reason why one wants to tax consumption at higher and higher rates in the future. This distorts savings decisions, and the distortions are larger for those with a longer savings horizon. Thus, while all tax rates create distortions that reduce economic efficiency and therefore economic activity, distortions from taxing savings compound over time. For this reason, "there is a strong theoretical basis for thinking that consumption taxes will be more efficient than income

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2. *House Bill 1439*.
3. For context, 1 Republican and 29 Democrats voted against the bill.

taxes," Auerbach (2006, p. 23).

As a practical matter, concerns about economic efficiency matter because greater efficiency implies more economic activity. Thus, by reducing or eliminating taxes, policymakers can remove or eliminate distortions caused by taxation and increase economic activity. However, reducing or eliminating particular taxes will likely also result in lower tax revenue. Any tax reform needs to balance out considerations of efficiency and revenue. In fact, effective tax reform can increase economic activity without sacrificing revenue.

By eliminating individual income taxes and increasing the sales tax, the proposed tax reform in Mississippi can reduce inefficiencies in the tax system without losing tax revenue. Nonetheless, assessing this claim requires careful analysis. The purpose of this paper is to analyze the effects of eliminating the income tax in Mississippi on tax revenue and economic activity in a dynamic framework. We use a price theoretic approach in which we examine a simple model to compare the efficiency and revenue-generating properties of the tax system. Ideally, effective tax reform would increase both economic efficiency and tax revenue. We estimate the model using aggregate data for the state of Mississippi. We then use the model to consider the long-run implications of the tax on both economic activity and tax revenue. We also consider the transition path in moving from the current tax policy to the ultimate goal of eliminating the individual income tax.

We find that the tax reform leads to an increase in real gross domestic product (GDP), consumption, and investment. In addition, we find that the tax reform proposal is close to revenue-neutral. After summarizing the results of our model, we discuss some remaining issues related to our model and the proposed reform.

2   THE REFORM PROPOSAL

The Mississippi Tax Freedom Act aims to eliminate the individual income tax in a period as short as a decade. The proposed legislation does so by gradually increasing the personal exemption until the income tax is ultimately eliminated. Beginning in 2022, the personal exemption would dramatically increase to $47,700 for individuals, $95,400 for married couples, and $46,600 for heads of the household. According to Speaker of the House Philip Gunn, approximately 60% of Mississippians would not owe income taxes for the tax year 2022.[4] The individual income tax would continue to be phased out for

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4. Caleb Bedillion and Luke Ramseth. "Bill would eliminate Mississippi state income tax. Here's what you need to know." *Daily Journal*, February 23, 2021.

all taxpayers through increases in the personal exemption each year that are conditional on the state's revenue. Overall, this phase-out could last as short as a decade.

To make up for the lost revenue, the state government would increase the state sales tax from 7% to 9.5%, increase excise taxes on cigarettes by $0.50 per pack, and introduce a 15% excise tax on vapor products. Sales taxes on certain other goods would also be adjusted. The current sales tax on cars, trucks, planes, and mobile homes would increase from its current rate of 3% to 5.5%. The sales tax rate on farm equipment and manufacturing machinery would increase from 1.5% to 4%.

To counteract the potentially regressive nature of the sales tax increase, the state would gradually reduce the sales tax charged on groceries. The sales tax on groceries would immediately decline to 4.5%. The tax would decline to 4% in June 2024 and 3.5% in June 2026.

As noted above, while the initial increase in personal exemptions would exclude a majority of Mississippians from an individual income tax liability immediately, the remainder of the population would see its tax liability decline over time through subsequent increases in the personal exemption. The idea behind this phase-out is to ensure that the state can generate sufficient revenue over the short-run as it transitions away from the individual income tax.
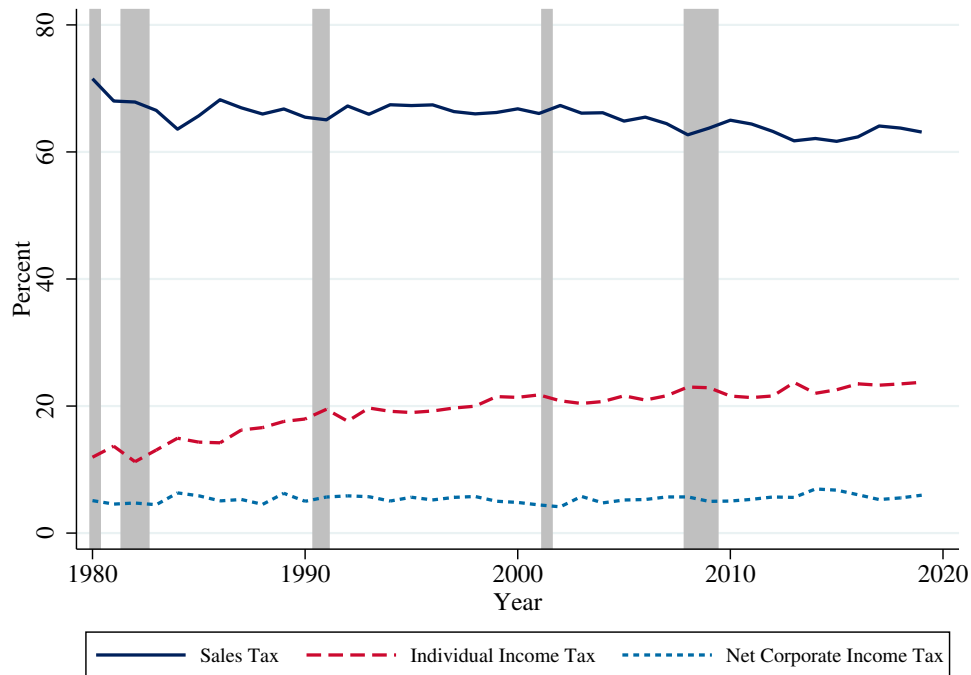

FIGURE 1: SHARE OF MISSISSIPPI TOTAL TAX REVENUES BY SELECTED SOURCE

Figure 1 plots the share of tax revenue provided by the state of Mississippi's three largest sources of tax revenue. As shown, the sales tax is already the most significant source of tax revenue in Mississippi, making up over 60% of tax revenue. The individual income tax is the second-largest source of tax revenue. The proposed tax reform would eliminate this second-largest source of revenue with the hope that the increase in the general sales tax and these other tax changes will be sufficient to make up for the lost revenue.

3   THE MODEL

Our model focuses on examining the relationship and possible trade-offs between inefficiencies and tax revenue. The model consists of a representative household, a representative firm, and the government. The household supplies labor and rents capital to the firm. The firm uses capital and labor to produce output. The government maintains a balanced budget. Government spending is financed by taxes on consumption (sales taxes), taxes on individual income, and taxes on corporate income. Time is discrete and infinite.

3.A   Households

The representative household is forward looking and maximizes its lifetime well-being. The household receives a positive utility flow from consumption and a negative flow from labor in each period. The household weights utility flows in future period t by β^t (for $\beta < 1$ the household values the present more than the future). Expected household lifetime well-being in the initial period is given by the weighted sum of lifetime utility flows:

$$(3.1) \qquad \mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left[\ln c_t - \frac{h_t^{1+\eta}}{1+\eta} \right]$$

where c is consumption, h is hours worked, and η is a parameter.

The household owns physical capital and rents this capital to the firm for production purposes. The household also supplies labor to the firm. The household pays taxes on consumption and income from capital rental and labor. The household saves via investment expenditure on new physical capital to be used in future production. The

household budget constraint is therefore given as:

$$\underbrace{(1-\tau_y)(w_t h_t + r_t K_t)}_{\text{income net of taxes}} = \underbrace{(1+\tau_c)c_t}_{\text{consumption expenditure cum taxes}} + \underbrace{i_t}_{\text{investment expenditure}}$$

where τ_y is the tax rate on income, w is the real wage, r is the rental rate on capital, K is capital, τ_c is the tax rate on consumption, and i is investment.

The future capital stock of the household includes new investment today and the current capital stock net of depreciation due to use in current production processes. Investment deviations from simply replacing depreciated capital are subject to a cost. The law of motion for the household's capital stock is:

$$\underbrace{K_{t+1}}_{\text{future capital}} = \underbrace{i_t}_{\text{investment}} \underbrace{- \frac{\psi}{2}\left(\frac{i_t}{K_t} - \delta\right)^2 K_t}_{\text{adjustment costs}} + \underbrace{(1-\delta)K_t}_{\text{current capital net of depreciation}}$$

Combining the law of motion of capital with the budget constraint yields:

$$(3.2) \qquad K_{t+1} = (1-\tau_y)w_t h_t - (1+\tau_c)c_t + \left[(1-\tau_y)r_t + 1 - \delta - \frac{\psi}{2}\left(\frac{i_t}{K_t} - \delta\right)^2\right]K_t$$

The objective of the household is to choose consumption, hours worked, and the future capital stock to maximize equation (3.1) subject to equation (3.2).

3.B *Firms*

The representative firm produces output according to an aggregate production function:

$$y_t = A_t K_t^{1-\alpha} h_t^{\alpha}$$

where y is output, $\alpha \in (0,1)$ measures the labor income share, and A is total factor productivity which evolves according to:

$$\ln A_t = (1-\rho)\ln A + \rho \ln A_{t-1} + e_t$$

where A (without the subscript) is the long-run steady steady level of total factor productivity and e_t is a random shock to productivity. Positive shocks to total factor productivity raise economy-wide production capabilities.

The firm faces short-run adjustment costs for labor. These costs are computed over

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the change in employment relative to current employment levels and are scaled by aggregate output. The firm does not take into consideration how its production scale decision affects the relative size of these costs, only how labor adjustment varies the cost. The labor adjustment cost is given as:

$$\frac{\phi}{2}\left(h_t - h_{t-1}\right)^2 y_t$$

The representative firm's objective is to maximize profit. The firm's problem is therefore to choose h_t and K_t to maximize:

$$\text{Profit} = y_t - w_t h_t - r_t K_t - \tau_f[y_t - w_t h_t - \mu r_t K_t] - \frac{\phi}{2}\left(h_t - h_{t-1}\right)^2 y_t$$

where τ_f is the corporate income tax and $\mu \in (0,1)$ is the fraction of interest that is tax deductible. Current employment decisions affect future firm profits. The firm discounts these effects by the discount rate in the economy, β.

3.C Government Budget Constraint

The state of Mississippi balances its budget. As a result, tax revenue is equal to government spending. The government's budget constraint is:

$$\underbrace{g_t}_{\text{government expenditure}} = \underbrace{\tau_y(w_t h_t + r_t K_t)}_{\text{individual income tax revenue}} + \underbrace{\tau_c c_t}_{\text{consumption tax revenue}} + \underbrace{\tau_f\left[y_t - w_t h_t - \mu r_t K_t\right]}_{\text{corporate income tax revenue}}$$

3.D Optimality and Equilibrium

1. Optimality Conditions The optimality conditions of the household are given as:

(3.3)
$$h_t^\eta = \frac{1 - \tau_y}{1 + \tau_c} w_t c_t^{-1}$$

(3.4)
$$c_t^{-1} = \beta \mathbb{E}_t\left[(1 - \tau_y)r_{t+1} + 1 - \delta - \frac{\psi}{2}\left(\frac{i_{t+1}}{K_{t+1}} - \delta\right)^2 + \psi\left(\frac{i_{t+1}}{K_{t+1}} - \delta\right)\frac{i_{t+1}}{K_{t+1}}\right]c_{t+1}^{-1}$$

Equation (3.3) states that the household supplies labor up to the point where the marginal cost to doing so, or the marginal dis-utility from labor, is equal to the marginal benefit. The marginal benefit of working for the household includes wages received, discounted

by income and sales taxes, multiplied by the marginal utility from the next unit of consumption due to increased labor income. Both income and consumption taxes reduce household labor supply by effectively discounting the household's current wage.

Equation (3.4) states that the household foregoes additional units of current consumption up to the point that the marginal cost to doing so is equal to the marginal benefit. The marginal cost of consumption today is future rental income, net of income taxes, and the fraction of capital available for subsequent production, net of adjustment costs, multiplied by the marginal utility flow from the next unit of future consumption of the household due to increased capital income. Future benefits are discounted to account for the time-value of resources. Income taxes on capital gains distort investment in the economy. Larger income taxes cause the household to reduce capital investment.

The optimality conditions for the firm are given as:

$$(3.5) \qquad w_t = \left[1 - \frac{\phi}{\alpha(1 - \tau_f)} \left(\left(1 + \beta \mathbb{E}_t \frac{y_{t+1}}{y_t} \right) h_t - h_{t-1} - \beta \mathbb{E}_t \frac{y_{t+1}}{y_t} h_{t+1} \right) \right] \alpha \frac{y_t}{h_t}$$

$$(3.6) \qquad r_t = (1 - \tau_f)(1 - \alpha) \frac{y_t}{K_t}$$

where we have assumed that $\mu = 0$. This assumption allows us to use the average effective corporate tax rate in our analysis. Equation (3.5) states that firms employ labor up to the point that the marginal product of an additional hour of labor, net of adjustment costs and corporate income tax effects, is equal to the marginal cost of paying for an additional hour of employment. Equation (3.6) states that firms employ capital up to the point that the marginal product of capital, discounted by the corporate tax rate, is equal to the marginal cost measured by the rental rate on capital. Higher corporate tax rates reduce firm capital demand.

2. *Equilibrium* An equilibrium in this economy is defined by the labor market equilibrium condition:

$$(3.7) \quad h_t^\eta c_t = \frac{1 - \tau_y}{1 + \tau_c} \left[1 - \frac{\phi}{\alpha(1 - \tau_f)} \left(\left(1 + \beta \mathbb{E}_t \frac{y_{t+1}}{y_t} \right) h_t - h_{t-1} - \beta \mathbb{E}_t \frac{y_{t+1}}{y_t} h_{t+1} \right) \right] \alpha \frac{y_t}{h_t}$$

and an optimal saving/investment decision:

$$(3.8) \qquad 1 = \beta \mathbb{E}_t \frac{c_t}{c_{t+1}} \left[(1 - \tau_y)(1 - \tau_f)(1 - \alpha) \frac{y_{t+1}}{K_{t+1}} + 1 - \delta - \frac{\psi}{2} \left(\frac{i_{t+1}}{K_{t+1}} - \delta \right)^2 + \psi \left(\frac{i_{t+1}}{K_{t+1}} - \delta \right) \frac{i_{t+1}}{K_{t+1}} \right]$$

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where government spending is equal to tax revenue:

(3.9)
$$g_t = (\tau_y - \tau_f) w_t h_t + \tau_y r_t K_t + \tau_c c_t + \tau_f y_t$$

subject to the production capacity of the firm, the law of motion for capital, and the time path of total factor productivity, which we treat as exogenous:

(3.10)
$$y_t = A_t K_t^{1-\alpha} h_t^\alpha$$

(3.11)
$$K_{t+1} = i_t + (1 - \delta) K_t$$

(3.12)
$$\ln A_t = (1 - \rho) \ln A + \rho \ln A_{t-1} + e_t$$

where aggregate economic activity is given as:

(3.13)
$$\left(1 - \frac{\phi}{2} (h_t - h_{t-1})^2\right) y_t = c_t + i_t + \frac{\psi}{2} \left(\frac{i_t}{K_t} - \delta\right)^2 K_t + g_t$$

Equations (3.7) through (3.13) are sufficient to solve for $\{K_t, h_t, y_t, A_t, i_t, c_t, g_t\}$.

It is clear from equations (3.7) and (3.8) how various taxes result in double taxation. From equation (3.7), the presence of the consumption and individual income taxes each create distortions between labor supply and labor demand that reduce hours worked in equilibrium. Furthermore, the corporate income tax amplifies the labor adjustment costs. It creates an additional distortion between labor supply and labor demand generating further underemployment during periods of economic transition. From equation (3.8), individual and corporate income taxes result in the double taxation of returns to capital. Each contributes to under-investment in the economy and dampens capital accumulation.

Eliminating the income tax while simultaneously increasing taxes on consumption creates an ambiguous effect on labor market efficiency. Whether or not such a shift improves efficiency in the labor market depends on the magnitude of the change in consumption taxes. However, eliminating the income tax results in additional investment, higher marginal products, and a transition to a higher steady state capital stock. All else equal, this also increases hours worked.

The transition path from one tax regime to another is also complicated because there are time-varying distortions associated with reallocating inputs in the production pro-

cess. Our model shows that these distortions are amplified by the distortion created by the corporate tax rate.

In short, the transition away from the individual income tax and toward a higher consumption tax involves several moving parts. Quantifying these countervailing effects requires model simulation.

3.E   Calibration and Estimation

Appendix A describes the steady state, or long-run equilibrium, of our model. The long-run equilibrium condenses to a system of four equations that includes four endogenous variables, $\{c, h, K, y\}$, five structural parameters, $\{\eta, \alpha, \beta, \delta, A\}$, and three policy parameters, $\{\tau_c, \tau_f, \tau_y\}$. The adjustment cost and total factor productivity process parameters, $\{\phi, \psi, \rho\}$, do not affect the long-run equilibrium. We estimate the model to identify these parameters.

Prior to estimation, we calibrate the model to target five data points specific to the state of Mississippi and rely on the macroeconomics literature to help us target the remaining parameters. We have a system of four equations with twelve unknowns implying a need for eight targets in total. Our principal focus is to accurately analyze the effects of income and consumption tax changes in the model. As a result, we focus on tax revenue and expenditure targets to guide the calibration of the policy parameters, $\{\tau_c, \tau_f, \tau_y\}$, and in turn, these four targets will imply a labor income share for the state of Mississippi, α. We also target an output level to match the total gross domestic product (GDP) in the state in 2019. We target the model to be consistent with the following characteristics of Mississippi's economy:

(i) Individual income tax share of adjusted total tax revenues for the state of Mississippi in 2019: 25.6%

(ii) Corporate income tax share of adjusted total tax revenues for the state of Mississippi in 2019: 6.4%

(iii) Total net corporate, individual, and consumption tax revenues to adjusted gross domestic product (GDP) for the state of Mississippi in 2019: 6.67%

(iv) Consumption share of adjusted GDP for the state of Mississippi in 2019: 83.4%

(v) Total adjusted GDP for the state of Mississippi in 2019: $115,379 million

Data for total tax revenue and revenues by tax type for the state of Mississippi is publicly available from the *Federal Reserve Economic Database (FRED)*, managed by the

TABLE 1: DATA SERIES AND CALCULATIONS

Panel A: DATA	
Variable	FRED Code
Total Taxes in Mississippi	MSTOTLTAX
Total Sales and Gross Receipts in Mississippi	MSSLGRTAX
Individual Income Taxes in Mississippi	MSINCTAX
Corporation Net Income Taxes in Mississippi	MSCORPINCTX
Total Gross Domestic Product for Mississippi	MSNGSP
Personal Consumption Expenditures: Total for Mississippi	MSPCE
Panel B: CALCULATIONS	
Model Consistent Data Point	Calculation
Adjusted Taxes in Mississippi	MSSLGRTAX+MSINCTAX+MSCORPINCTX
Adjusted Total Gross Domestic Product for Mississippi	MSNGSP-MSTOTLTAX+Adjusted Tax
Tax Revenue share of GDP	Adjusted Total Tax/Adjusted GDP
Individual Income Tax Share	MSINCTAX/Adjusted Total Tax
Net Corporate Income Tax Share	MSCORPINCTX/Adjusted Total Tax
Personal Consumption Expenditures share of GDP	MSPCE/Adjusted GDP

Federal Reserve Bank of St. Louis. Tax revenue data is provided by the state to the United States Census Bureau for the purposes of constructing the *Annual Survey of State Government Tax Collections (STC)*. FRED consolidates the data from this report, as well as over 788,000 other data series from 103 sources, and makes it readily available to the public. Panel A of Table 1 outlines the tax revenue data for the state of Mississippi we collect from FRED. In addition, we retrieve data on total consumption and GDP for the state. Data on Mississippi GDP and related series are computed by the Bureau of Economic Analysis as part of their construction of *GDP by State*.

Our calibration targets must be model consistent. By that, we mean that the model includes only three types of taxes: individual income, net corporate income, and sales. These three tax revenue sources account for 89% of total tax revenue for the state of Mississippi on average from 1942 to 2019. In 2019, these three revenue sources accounted for 93% of total tax revenue. We adjust total tax revenue to account for the fact that we have excluded miscellaneous taxes in the model. Panel B of Table 1 reports this adjustment and other data calculations. Concerning total taxes, we compute adjusted total taxes for the state of Mississippi as the sum of individual income, net corporate income, and sales tax revenues. Similarly, we must account for the fact that miscellaneous taxes support additional government spending in the state that is included the GDP measure. Making use of the balance budget requirement, we subtract total taxes for the state from GDP as retrieved from FRED and add back our adjusted tax measure. Effectively, this nets out

government spending supported from miscellaneous tax revenues from the measure of GDP for the state of Mississippi.

We use the shares of total tax revenue and the shares of GDP targets to calibrate parameter values for the tax rates on sales, individual income, and net corporate income. By doing so, we can obtain measures of the effective marginal tax rates. In addition, these four targets imply a value for the labor share of income for the state of Mississippi. We find the effective sales tax rate, τ_c, for the state of Mississippi to be 5.4%. Relative to the current statutory rate of 7%, this is low, but our measure accounts for the *variable sales tax rates* by products in the state. The effective individual income tax rate, τ_y, is 1.7%. Again, this is low relative to the marginal tax rates in the state, but measures the effective tax. Notably, the computed effective individual income tax rate perfectly matches the ratio of individual income taxes in Mississippi to total personal income in Mississippi (MSINCTAX/MSOTOT on FRED) in 2019. The effective corporate income tax rate, τ_f, is 2.7%. These effective tax rates imply a labor income share for the state of Mississippi, α, of 84.3%. Finally, we normalize the steady state level of technology such that steady state output equals adjusted GDP in the state of $115,379 in 2019 millions of dollars.

The remaining calibration targets include three targets standard to the macroeconomic literature. First, we assume the annualized net real return to capital ownership is 5% and we calibrate the model to a quarterly data frequency. This implies a value of the discount factor, β, of 0.9879. We assume capital depreciates 10% annually implying a value of the depreciation rate, δ, of 0.0241. Finally, η is the inverse Frisch elasticity, or the inverse elasticity of labor supply to wages. This elasticity measures how much households adjust labor supply in response to wage changes. We set η to 1, implying a Frisch elasticity of 1.

The "Baseline" column in Table 2 provides the values of real GDP, consumption, investment, government expenditure (tax revenue), the capital stock and labor income in per capital terms and in 2019 dollars based on the calibration of our model. The values closely match the actual data for state of Mississippi.

4   IMPLICATIONS

4.A   Long-Run Effects

As we stated in the introduction, the long-run implications of tax reform should focus on the changes in economic efficiency and tax revenue. Marginal tax rates drive

TABLE 2: STEADY STATE VALUES

Variable	Baseline	Only Income	Tax Reform
Output	$115,379	$115,750	$115,750
		(0.32%)	(0.32%)
Consumption	$96,217	$98,209	$96,450
		(2.07%)	(0.24%)
Investment	$11,466	$11,703	$11,703
		(2.07%)	(2.07%)
Total Tax Revenue	$7,696	$5,838	$7,597
		(-24.15%)	(-1.29%)
Physical Capital Stock	$475,486	$485,333	$485,333
		(2.07%)	(2.07%)
Labor Income	$97,281	$97,594	$97,594
		(0.32%)	(0.32%)
Sales Tax/g	68.0%	91.5%	93.5%
Ind. Inc. Tax/g	25.6%	0	0
Net Corp. Inc. Tax/g	6.4%	8.5%	6.5%

Notes: Long-run equilibrium values in 2019 millions of dollars. Values in parentheses are percentage change in the endogenous variable due to the considered tax change. Column 2 reflects calibrated values. Column 3 shows the effects of cutting the income tax rate to zero, $\tau_y = 0$. Column 4 shows the effects of raising the effective consumption tax rate by the statutory change of $9.57/7.07 = 35.36\%$, or imposing an effective marginal tax rate of $\tau_c = 7.36\%$ compared to the original effective rate of 5.44%.

a wedge between marginal benefits and marginal costs, reducing economic efficiency and economic activity. As a result, the government generates tax revenue at the expense of the loss in economic activity that would have taken place in the absence of the tax. When designing a tax system, one objective might be to design a system that generates as much revenue as possible with as few distortions in economic activity. Ideally, tax reform would increase both economic efficiency and tax revenue.

To analyze the long-run effects of the proposed tax reform, we solve for the long-run steady state equilibrium of the model under two different scenarios. Under the first scenario, the state of Mississippi only eliminates the individual income tax. In the second scenario, the individual income tax is eliminated, and the consumption (sales) tax increases. We can then compare and contrast each of these alternative long-run equilibria with the current tax policy's baseline equilibrium. Doing so allows us to compare and contrast the proposed tax reform effects on important economic variables.

The long-run values associated with the complete tax reform are shown in the column labeled "Tax Reform" in Table 2. As shown in the table, the tax reform increases real GDP, consumption, and investment. As shown in the table, the tax reform would increase real GDP by $371 million per year, consumption by $233 million per year, and investment by $237 million per year. In addition, our results imply that the tax reform is approximately revenue neutral with tax revenue (and therefore government expenditures) declining by 1%.

The effects of each component of the tax can be seen by comparing the scenario in which only the income tax is eliminated with the complete tax reform. As shown in the middle column of Table 2, the elimination of the income tax alone would reduce tax revenue by 24%. However, the increase in the sales tax is enough to recover nearly all of the revenue lost from eliminating the income tax. In addition, the effects on real GDP and investment are entirely driven by the elimination of the income tax. The elimination of the income tax also leads to a significant increase in comparison. Regarding the overall tax reform, the introduction of a consumption tax drives consumption lower, but consumption still increases relative to the current tax policy.

The increase in aggregate income is entirely driven by the increased economic efficiency of the proposed tax reform. To give the reader a sense of how much these efficiency improvements are worth to the average person in Mississippi, we estimate the present value of the increase in income that results from greater efficiency. Table 3 reports these figures. The present value of the additional income that the average Mississippian receives as a result of tax reform is $2,983 in 2019 dollars. This works out to

Variable	per Resident	per Filed Return
Output	$2,983	$8,077
Consumption	$1,874	$5,074

Notes: Lifetime equivalent economic value of cutting the income tax rate to zero, $\tau_y = 0$, and raising the effective consumption tax rate by the statutory change of $9.57/7.07 = 35.36\%$ for an effective rate of $\tau_c = 7.36\%$. The lifetime effect is the value of the perpetual long-run effect of the tax proposal at a real interest rate of 5% and average growth in real GDP per capita of 0.58%, the average growth rate in GDP per capita in Mississippi from 1997 to 2019.

$8,077 per filed tax return.[5]

4.B Short-Run Dynamics

The long-run comparisons in the previous section compare one steady state to another steady state. In reality, the policy change does not result in a "jump" from one steady state to the next. Rather, the shift from one steady to the next is gradual. To analyze the shift, we assume that both the increase in the sales tax and the elimination of the individual income tax are immediate. In reality, the individual income tax is phased out over time. Figure 2 shows the transitions of real GDP, consumption, and investment. We estimate the model to determine the degree of labor and investment adjustment costs, $\{\phi, \psi\}$, and include a range for the transition paths in the figure.

As shown in the figure, the increased tax on consumption initially lowers consumption due to the increase in the sales tax rate. However, the elimination of the income tax significantly increases investment and real GDP. This increase in aggregate income in the state causes consumption to gradually rise over time until it reaches a new, higher steady state equilibrium. The elimination of the individual income tax causes investment to "jump" immediately. This rise in investment causes the capital stock to increase towards its new, higher steady state value. As capital approaches its new steady state level, investment declines towards its new, higher steady value.

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5. Appendix D analyzes the sensitivity of these lifetime equivalent economic value figures to model parameterization.
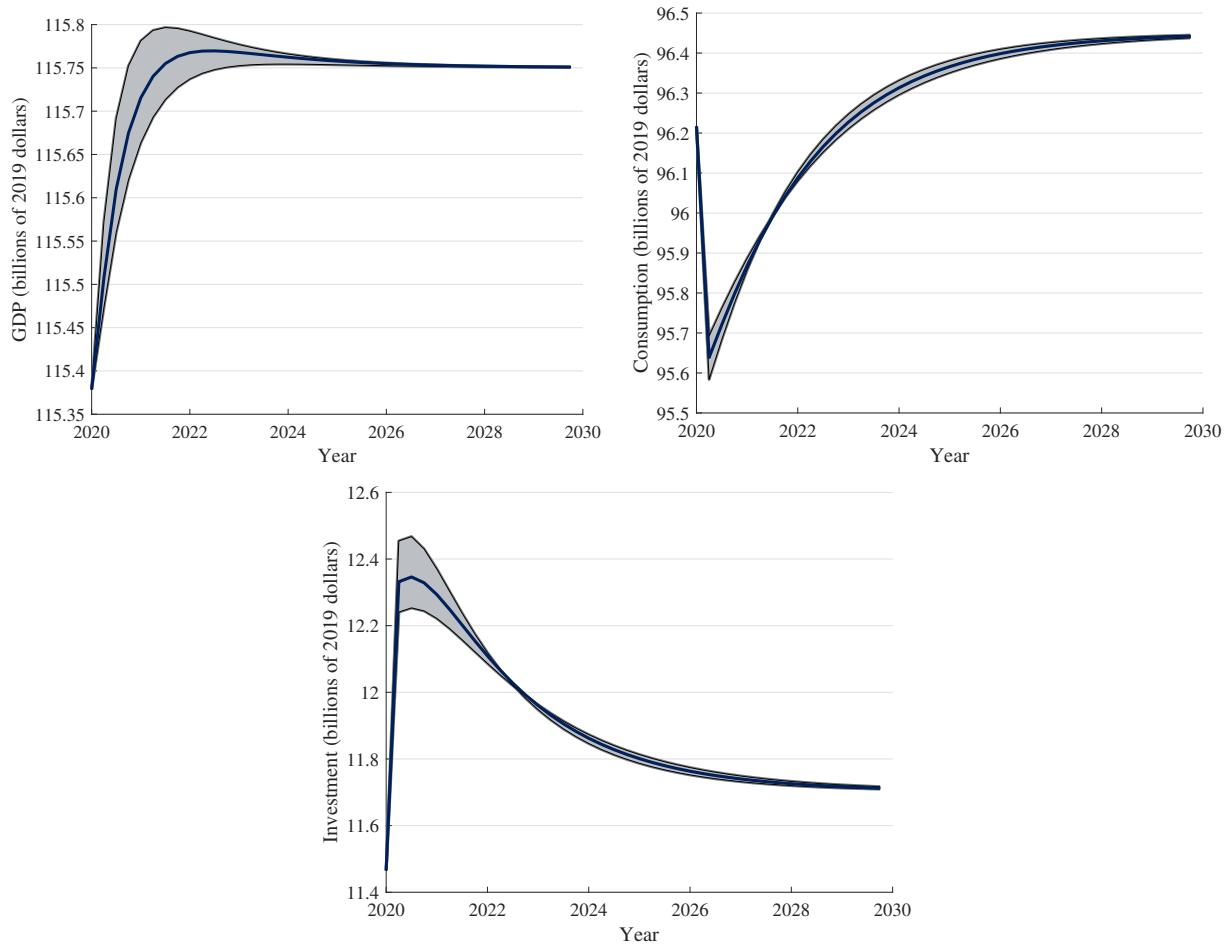
FIGURE 2: SHORT-RUN TRANSITION

5 Discussion and Conclusion

Our objective in this paper is to examine the implications of the Tax Freedom Act from the perspective of economic efficiency. The legislation is designed to move Mississippi away from an income-based tax system and toward a consumption-based tax system. As a result, our main objective in this paper is to quantify the benefits of increased economic efficiency associated with tax reform and verify that these benefits do not come at the cost of lost tax revenue. We indeed find that the proposal is close to revenue-neutral. The elimination of the individual income tax's inefficiencies would increase real GDP by $371 million per year.

The increased efficiency from eliminating the income tax is the result of how income taxes penalize savings. Taxing income from savings reduces the after-tax rate of return on savings. Due to the nature of compounding, those who are saving for long durations effectively face higher tax rates. This not only distorts behavior away from saving but also reduces the duration of savings. The elimination of the individual income tax removes this distortion and therefore encourages savings and investment.

Nonetheless, there is a reason to believe that our results might understate the magnitude of the benefits. The reason for this possible understatement is that there are two important factors that we did not incorporate into our model that might be relevant. First, we assume in our model that changes in tax policy only influence the *level* of economic activity and not the *growth rate*. Due to the nature of compounding, any increase in the growth rate, however modest, would dramatically increase the benefits of the tax change. Second, we do not include migration in our model. The elimination of the income tax is potentially important for migration since some workers might be more willing to relocate to states that lack an individual income tax. This could also be more likely if some amount of remote work continues in the aftermath of the pandemic. It is also possible that firms might choose to locate in (or relocate to) Mississippi if they think that the lack of an income tax might help them attract employees. Given that we neglect these mechanisms in our model, our estimates of the tax reform's economic benefits are likely a lower bound.

References

Auerbach, Alan J. 2006. "The Choice Between Income and Consumption Taxes: A Primer." NBER Working Paper No. 12307.

Reeves, Tate. 2020. *FY 22 Executive Budget Recommendation*. https://mcusercontent.com/08cb3e52aa1308600f84d49ea/files/526c69c0-c141-46ce-b22e-2856c7a1b861/FY2022_Governor_Tate_Reeves_EBR.pdf

Appendix

A Steady State

$$h^{\eta} c = \frac{1 - \tau_y}{1 + \tau_c} \alpha \frac{y}{h}$$

$$1 = \beta \left[(1 - \tau_y)(1 - \tau_f)(1 - \alpha)\frac{y}{K} + 1 - \delta \right]$$

$$y = AK^{1-\alpha} h^{\alpha}$$

$$y = (1 + \tau_c)c + \delta K + \left[\tau_f(1 - \alpha) + \tau_y \left(1 - \tau_f(1 - \alpha) \right) \right] y$$

This system includes four endogenous variables, $\{c, h, K, y\}$, five structural parameters, $\{\eta, \alpha, \beta, \delta, A\}$, and three policy parameters, $\{\tau_c, \tau_f, \tau_y\}$. There are a total of twelve unknowns and four steady state equations. This leaves eight steady state calibration targets:

1. total net corporate, individual, and consumption tax revenues to adjusted GDP in 2019

$$\frac{g}{y} = 6.670\%$$

   From FRED, sum *MSSLGRTAX*, *MSINCTAX*, and *MSCORPINCTX* and divide by adjusted GDP

   - adjusted GDP: *MSNGSP* minus *MSTOTLTAX* plus total model tax
   - total model tax: the sum of *MSSLGRTAX*, *MSINCTAX*, and *MSCORPINCTX*

2. individual income tax revenues as a share of tax revenues in 2019,

$$\frac{\tau_y \left(\alpha + (1 - \tau_f)(1 - \alpha) \right) y}{g} = 25.577\%$$

   From FRED, divide *MSINCTAX* by total model tax

3. net corporate income tax revenues as a share of tax revenues in 2019,

$$\frac{\tau_f(1 - \alpha)y}{g} = 6.429\%$$

   From FRED, divide *MSCORPINCTX* by total model tax

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4. consumption share of adjusted GDP in 2019

$$\frac{c}{y} = 83.392\%$$

From FRED, divide *MSPCE* by adjusted GDP

5. inverse Frisch elasticity, $\eta = 1$

6. output equals $115,379

7. an annual net after-tax return of capital ownership of 5% and quarterly data frequency

$$\beta = 1.05^{-1/4}$$

8. capital depreciation of 10% annually

$$\delta = 1.10^{-1/4} - 1$$

B Replication Code for Data Retrieval using Stata 16

```
clear
cls
set more off
ssc install freduse
ssc install bgshade
ssc install xtscc
#delimit ;

set fredkey e1da24f0aa456cf4aecbede0d5362847;

local macro // State Government Tax Collections, Total Taxes in Mississippi
MSTOTLTAX
// State Government Tax Collections, Total Sales and Gross Receipts in Mississippi
MSSLGRTAX
// State Government Tax Collections, Individual Income Taxes in Mississippi
MSINCTAX
// State Government Tax Collections, Corporation Net Income Taxes in Mississippi
MSCORPINCTX
// Total Gross Domestic Product for Mississippi
MSNGSP
// Personal Consumption Expenditures: Total for Mississippi
MSPCE
// Total Personal Income in Mississippi
MSOTOT
// Resident Population in Mississippi
MSPOP;

import fred `macro', aggregate(annual,avg) clear;

g shareSales = 100*MSSLGRTAX/MSTOTLTAX; label var shareSales "Sales Tax";
g shareIncome = 100*MSINCTAX/MSTOTLTAX; label var shareIncome "Individual Income Tax";
g shareCorpIncome = 100*MSCORPINCTX/MSTOTLTAX; label var shareCorpIncome "Net Corporate Income Tax";

g year = year(daten);
g quarter = quarter(daten);
g date = yq(year,quarter);
tsset date, quarterly; label var date "Year"; format date %tqCCYY;

bgshade date if date>=yq(1980,1), shaders(quarter)
twoway( (line shareSales date if date>=yq(1980,1), lwidth(medthick) lcolor("0 32 91"))
(line shareIncome date if date>=yq(1980,1), lwidth(medthick) lpattern(dash) lcolor("204 9 47"))
(line shareCorpIncome date if date>=yq(1980,1), lwidth(medthick) lpattern(shortdash) lcolor("0 107 166"))
, legend(cols(3) size(*0.8)) graphregion(color(white)) bgcolor(white) ytitle("Percent"));

g shareSalesAdj = 100*MSSLGRTAX/(MSSLGRTAX+MSINCTAX+MSCORPINCTX);
label var shareSalesAdj "Sales Tax";
g shareIncomeAdj = 100*MSINCTAX/(MSSLGRTAX+MSINCTAX+MSCORPINCTX);
label var shareIncomeAdj "Individual Income Tax";
g shareCorpIncomeAdj = 100*MSCORPINCTX/(MSSLGRTAX+MSINCTAX+MSCORPINCTX);
label var shareCorpIncomeAdj "Net Corporate Income Tax";

bgshade date if date>=yq(1980,1), shaders(quarter)
twoway( (line shareSalesAdj date if date>=yq(1980,1), lwidth(medthick) lcolor("0 32 91"))
(line shareIncomeAdj date if date>=yq(1980,1), lwidth(medthick) lpattern(dash) lcolor("204 9 47"))
(line shareCorpIncomeAdj date if date>=yq(1980,1), lwidth(medthick) lpattern(shortdash) lcolor("0 107 166"))
, legend(cols(3) size(*0.75)) graphregion(color(white)) bgcolor(white) ytitle("Percent"));

replace MSNGSP = MSNGSP - MSTOTLTAX/1000 + (MSSLGRTAX + MSINCTAX + MSCORPINCTX)/1000;

g taxShareGDP = (MSSLGRTAX + MSINCTAX + MSCORPINCTX)/1000/MSNGSP;
g taxShareTax = (MSSLGRTAX + MSINCTAX + MSCORPINCTX)/MSTOTLTAX;
g taxRate = MSINCTAX/MSOTOT/1000;
g consShareGDP = MSPCE/MSNGSP;
g perCapGDP = MSNGSP/MSPOP*1000;
sum taxShareGDP taxShareTax taxRate consShareGDP shareSalesAdj shareIncomeAdj shareCorpIncomeAdj;
```

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C   REPLICATION CODE FOR TABLES 2 AND 3 USING MATLAB

```matlab
clc; clear all; close all;

%% targets
incTaxShareTot = 25.57723/100;      % individual income tax share of taxes
corpIncTaxShareTot = 6.429257/100;  % corporate income tax share of taxes
salesTaxShareTot = 1 - incTaxShareTot - corpIncTaxShareTot;
cons2Gdp = .8339211;                % consumption share of GDP
totTax2Gdp = .0667042;              % total taxes considered to GDP
inv2Gdp = 1 - cons2Gdp - totTax2Gdp;
eta = 1;                            % inverse Frisch elasticity
% y = 104889.681/4;                   % 2019 GDP per tax filing
y = 2978227*38740.71923/4;             % 2019 GDP per resident

% picked parameters
beta = 1.05^(-0.25);    % discount rate, annualized capital return 5%
delta = 1.1^(0.25)-1;   % depreciation

% implied parameters
% c K y chi
tauY = incTaxShareTot*totTax2Gdp/(1-corpIncTaxShareTot*totTax2Gdp);
tauC = salesTaxShareTot*totTax2Gdp/cons2Gdp;
Ky = (1-cons2Gdp-totTax2Gdp)/delta;
K = Ky*y;
alpha = 1-corpIncTaxShareTot*totTax2Gdp-Ky*((1-beta*(1-delta))/beta/(1-tauY));
tauF = corpIncTaxShareTot*totTax2Gdp/(1-alpha);
h = ((1-tauY)/(1+tauC)*alpha/cons2Gdp)^(1/(1+eta));
A = y/(K^(1-alpha))/(h^alpha);
c = cons2Gdp*y;
i = delta*K;
g = y - c - i;

w = alpha*y/h;
r = (1-tauF)*(1-alpha)*y/K;
labInc = w*h;
totInc = w*h+r*K;
consTaxSh = tauC*c/g;
incTaxSh = tauY*(w*h+r*K)/g;
corpIncTaxSh = 1-consTaxSh-incTaxSh;

baseline = [4*y 4*c 4*i 4*g 4*K 4*labInc 4*totInc consTaxSh incTaxSh corpIncTaxSh]';

%% no income taxes
tauY = 0;
Ky = (beta*(1-tauY)*(1-tauF)*(1-alpha))/(1-beta*(1-delta));
cy = (1-delta*Ky-(tauF*(1-alpha)+tauY*(1-tauF*(1-alpha))))/(1+tauC);
h = ((1-tauY)/(1+tauC)*alpha/cy)^(1/(1+eta));
K = (Ky*A)^(1/alpha)*h;
y = A*K^(1-alpha)*h^alpha;
c = cy*y;
i = delta*K;
g = y - c - i;
```

```
w = alpha*y/h;
r = (1-tauF)*(1-alpha)*y/K;
labInc = w*h;
totInc = w*h+r*K;

consTaxSh = tauC*c/g;
incTaxSh = tauY*(w*h+r*K)/g;
corpIncTaxSh = 1-consTaxSh-incTaxSh;

cut_income = [4*y 4*c 4*i 4*g 4*K 4*labInc 4*totInc consTaxSh incTaxSh corpIncTaxSh]';

%% raise consumption
tauY = 0;
tauC = 9.57/7.07*tauC;
Ky = (beta*(1-tauY)*(1-tauF)*(1-alpha))/(1-beta*(1-delta));
cy = (1-delta*Ky-(tauF*(1-alpha)+tauY*(1-tauF*(1-alpha))))/(1+tauC);
h = ((1-tauY)/(1+tauC)*alpha/cy)^(1/(1+eta));
K = (A*Ky)^(1/alpha)*h;
y = A*K^(1-alpha)*h^alpha;
c = cy*y;
i = delta*K;
g = y - c - i;

w = alpha*y/h;
r = (1-tauF)*(1-alpha)*y/K;
labInc = w*h;
totInc = w*h+r*K;

consTaxSh = tauC*c/g;
incTaxSh = tauY*(w*h+r*K)/g;
corpIncTaxSh = 1-consTaxSh-incTaxSh;

raise_consumption = [4*y 4*c 4*i 4*g 4*K 4*labInc 4*totInc consTaxSh incTaxSh corpIncTaxSh]';

output = [baseline cut_income raise_consumption]/1000/1000;
pct_change = 100*(output(1:7,2:end)./output(1:7,1)-1);

% Real GDP growth per capita
growth = 0.0058;

output2 = 1/(1-beta^4-growth)*(output(1:2,2:end)-output(1:2,1));
printmat(output,'Long Run Effects',...
'y c i g K labInc totInc consTaxSh incTaxSh corpTaxSh',...
'baseline tauY=0 tauC=0.0736')
printmat(pct_change,'Percentage Change for Long Run Effects',...
'y c i g K labInc totInc',...
'tauY=0 tauC=0.0736')
printmat(1000*1000*output2/2978227,'Lifetime Effects in Dollars per Resident',...
'y c',...
'tauY=0 tauC=0.0736')
printmat(1000*1000*output2/1100000,'Lifetime Effects in Dollars per Filer',...
'y c',...
'tauY=0 tauC=0.0736')
```
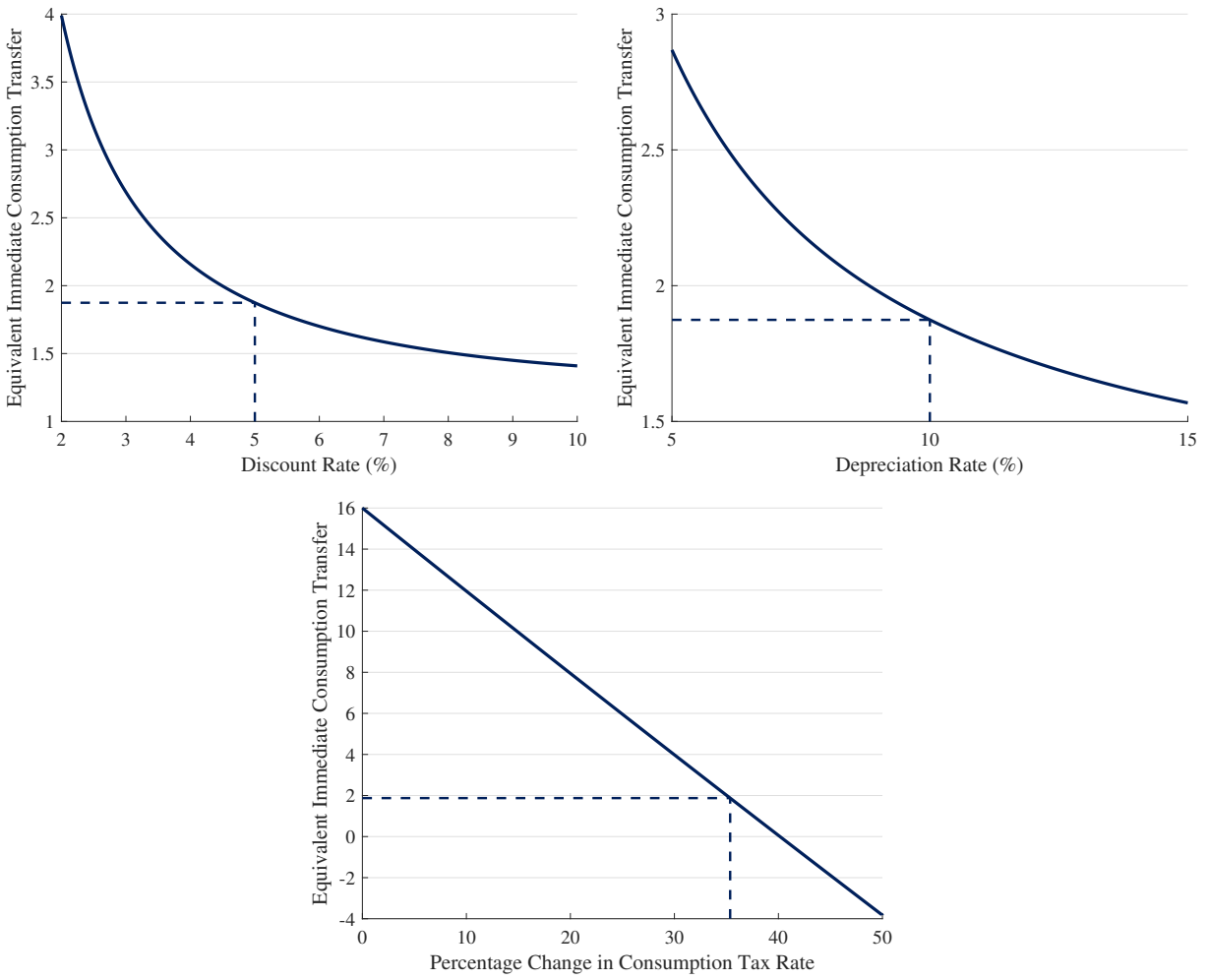
D Sensitivity Analysis of Long-Run Results

Figure D.1: Sensitivity Analysis of Long-Run Effects