Tax Policy and Investment in a Global Economy

Online Appendix

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A Aggregate Investment After TCJA

This appendix reviews aggregate non-residential investment around the passage of TCJA.

Appendix Figure A.1 shows NIPA real private non-residential fixed investment, a trend forecast based on data through 2017:Q3, and confidence interval bands around the trend forecast. The left panel uses a univariate forecasting model with four lags. The right panel uses a VAR including four lags of the log of investment, the log of the price of investment relative to consumption, the log of the price of oil relative to consumption, the Gilchrist-Zakrajšek excess bond premium, and the Cleveland Fed *ex ante* 10 year real interest rate. According to both approaches, realized investment is above its pre-TCJA trend and around the 75th percentile of the forecast confidence interval. The magnitude implies excess investment of about 6p.p. in 2019:Q4 relative to the mean out-of-sample forecast.[1]

Appendix Table A.1 reports non-residential investment relative to pre-TCJA forecasts made by the Congressional Budget Office (CBO), the Federal Reserve Staff Tealbook forecast, and the median of the Survey of Professional Forecasters (SPF). The available forecast horizons differ across the sources.[2] Non-residential investment in 2019:Q4 exceeded both the CBO and Tealbook forecasts by about 6p.p., very consistent with the time-series approaches in Appendix Figure A.1. Non-residential investment in 2018:Q3 exceeded the median SPF forecast by 3.3p.p. Kopp et al. (2019) also find excess non-residential investment growth in 2018 of about 3.5p.p. relative to (unpublished) IMF staff forecasts and that higher-than-expected investment in 2018 and 2019 did not occur in other major advanced economies. We conclude that actual U.S. non-residential investment at the end of 2019 exceeded both time series and professional forecasts by about 6p.p. and that this out-performance was unique to the U.S.

This conclusion overturns some early evaluations of TCJA using aggregate data.[3] Three main differences explain why. First, the BEA has revised up the path of aggregate non-residential investment in the quarters following TCJA. For example, in February 2020 Furman (2020) reported annualized growth of real private non-residential investment over 2017Q4-2019Q4 of 2.8% and that this performance was more than 1p.p. lower than over the period 2015Q4-2017Q4. According to the current data release, real private non-residential investment over 2017Q4-2019Q4 instead grew 4.3% at an annualized rate.[4] The upward revision of 3.1p.p. to

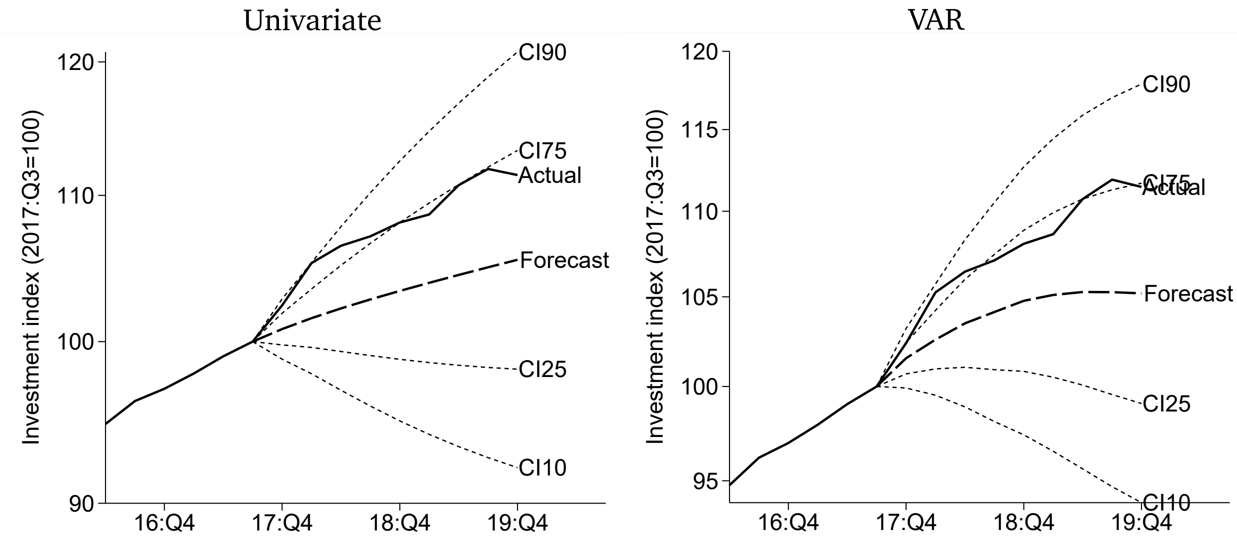
[1] Appendix Figure A.1 plots non-residential investment because this is the broadest measure of business investment, because the BEA corporate investment series combines investment of both C and S corporations and is only available at an annual frequency, and for comparability with the forecasts in Appendix Appendix Table A.1. The same exercises also imply out-performance of non-residential investment in equipment and structures only. Gravelle and Marples (2025) instead compare our results to the 6.1% growth of corporate investment in equipment and structures from 2017 to 2019. In addition to excluding the growth potentially due to TCJA that occurred in 2017 (see the last paragraph of this section), in our SOI data C-corporate investment growth exceeded S-corporate investment growth, suggesting higher growth of the C-corporate investment that is the main focus of our study.

[2] The CBO forecast is dated June 2017 while the Tealbook and SPF forecasts are dated July 2017. The CBO forecast assumes no change in tax policy. The Tealbook forecast assumes a fiscal expansion of 0.5% of GDP in 2018 through a cut to personal income taxes (p. 5). The SPF forecasts do not specify their assumption about fiscal policy.

[3] Indeed, relying on this earlier literature, in Chodorow-Reich, Zidar and Zwick (2024) some of us wrote that aggregate investment was not above trend post-TCJA. The analysis in this appendix supersedes what we wrote in Chodorow-Reich, Zidar and Zwick (2024).

[4] See `https://www.philadelphiafed.org/-/media/FRBP/Assets/Surveys-And-Data/real-time-data/data-files/xlsx/rinvbfQvQd.xlsx` for the full history of vintages of this data

Figure A.1: Private Non-residential Investment Statistical Forecasts



Notes: In each panel, the solid line labeled "Actual" shows the path of NIPA real private non-residential investment, I, from 2016:Q2-2019:Q4. The bold dashed line labeled "Trend" shows the trend obtained as the pseudo out-of-sample forecast $\hat{I}$ using actual investment through 2017:Q3. In the left panel, the trend is computed using the univariate regression $\log I_t = b_0 + \sum_{\ell=1}^{4} \log I_{t-\ell} + e_t$. That is, $\log \hat{I}_{17:Q4,0} = \left(1, \log I_{17:Q3}, \log I_{17:Q2}, \log I_{17:Q1}, \log I_{16:Q4}\right) \mathbf{b}$ gives the forecast for 2017:Q4, $\log \hat{I}_{17:Q4,1} = \left(1, \log \hat{I}_{17:Q4,0}, \log I_{17:Q3}, \log I_{17:Q2}, \log I_{17:Q1}\right) \mathbf{b}$ gives the forecast for 2018:Q1, and so on. The dotted lines show the confidence interval bounds for the quantiles indicated. In the right panel, the trend and confidence interval bounds are computed using a VAR in log investment, the log of the price of investment relative to consumption, the log of the price of oil relative to consumption, the Gilchrist-Zakrajšek excess bond premium, and the Cleveland Fed *ex ante* 10 year real interest rate. The sample for the regressions in both panels is 1983:Q1-2017:Q3.

Table A.1: Private Non-residential Investment Professional Forecasts

	Value
Actual change 2017:Q3-2019:Q4	11.4%
June 2017 CBO forecast 2017:Q3-2019:Q4	5.9%
June 2017 CBO forecast error 2017:Q3-2019:Q4	+5.5p.p.
July 2017 Tealbook forecast 2017:Q3-2019:Q4	5.4%
July 2017 Tealbook forecast error 2017:Q3-2019:Q4	+6.1p.p.
Actual change 2017:Q3-2018:Q3	7.1%
2017:Q3 SPF median forecast 2017:Q3-2018:Q3	3.8%
2017:Q3 SPF median forecast error 2017:Q3-2018:Q3	+3.3p.p.

cumulative growth over 2017Q4-2019Q4 accounts for half of the 6p.p. excess investment in 2019Q4 found above.

series.

Second, Gravelle and Marples (2019) and Gale and Haldeman (2021) both note the growth of investment after TCJA but also the difficulty of assigning causality to the TCJA in the presence of other factors such as higher oil prices in 2018 or overall demand. Kopp et al. (2019) directly dispute the claim that the oil sector drove overall business investment growth in 2018. Furthermore, transitory factors such as oil prices in 2018 cannot explain continued elevated investment in 2019. More broadly, we agree with the difficulty of drawing definitive conclusions from aggregate data alone. We instead make the weaker claim of higher post-TCJA aggregate investment of a magnitude consistent with the sharper conclusions coming from our analysis of firm-level data.

Third, some previous analyses such as Furman (2020) treat 2017Q4 as a pre-TCJA quarter. We think this is not appropriate. The expensing provisions applied immediately and in fact with additional force since investment in 2017Q4 could be immediately deducted at the pre-TCJA marginal tax rate. Importantly, aggregate investment did not simply spike and then fall in 2017Q4. Rather, while post-TCJA investment *growth* was strongest in 2017Q4 and 2018Q1, the *level* of investment remained above trend through 2019Q4. This feature is precisely the prediction of our (or any neoclassical) model—investment growth occurs immediately following passage and the level of investment remains above the pre-TCJA trend thereafter. It also explains our focus above on investment in 2019Q4 relative to pre-TCJA trend.

B Model Appendix

B.1 Derivation of Profit Function (3)

We temporarily introduce i subscripts for clarity. Firm i takes the factor prices P_t^L, P_t^M as given and faces a demand constraint $Q_{i,t} = P_{i,t}^{-\frac{\mathscr{M}}{\mathscr{M}-1}} \mathbb{Q}_t$, where $\mathbb{Q}_t \equiv \left(\int_i Q_{i,t}^{1/\mathscr{M}} di\right)^{\mathscr{M}}$ denotes aggregate output and we have normalized the aggregate price index to one. The firm solves the static optimization problem $\max_{L_i, M_i} P_{i,t} Q_{i,t} - P_t^L L_{i,t} - P_t^M M_{i,t}$. Let $Y_{i,t} = P_{i,t} Q_{i,t} = Q_{i,t}^{\frac{1}{\mathscr{M}}} \mathbb{Q}_t^{\frac{\mathscr{M}-1}{\mathscr{M}}} = \mathbb{Q}_t^{\frac{\mathscr{M}-1}{\mathscr{M}}} A_{i,t} \mathscr{K}_{i,t}^{\alpha_{\mathscr{K}}} L_{i,t}^{\alpha_L} M_{i,t}^{\alpha_M}$ denote firm revenue. The FOC are:

$$\text{FOC}\left(L_{i,t}\right): \qquad P_t^L = \frac{\alpha_L Y_{i,t}}{L_{i,t}},$$

$$\text{FOC}\left(M_{i,t}\right): \qquad P_t^M = \frac{\alpha_M Y_{i,t}}{M_{i,t}}.$$

By definition and substituting the FOC gives:

$$F\left(\mathscr{K}_{i,t}; Z_{i,t}\right) \equiv Y_{i,t} - P_t^L L_{i,t} - P_t^M M_{i,t} = \left(1 - \alpha_L - \alpha_M\right) Y_{i,t}. \tag{A.1}$$

Using

$$M_{i,t} = \left(\frac{\alpha_M}{P_t^M}\right)\left(\frac{\alpha_L}{P_t^L}\right)^{-1} L_{i,t}$$

and the FOC for $L_{i,t}$ we get an expression for revenue as a function of capital:

$$\begin{aligned}
\text{Def.:}\qquad & Y_{i,t} = \mathbb{Q}_t^{\frac{\mathscr{M}-1}{\mathscr{M}}} A_{i,t} \mathscr{K}_{i,t}^{\alpha_{\mathscr{K}}} L_{i,t}^{\alpha_L} M_{i,t}^{\alpha_M} \\
\text{Subst. prev. line:}\qquad & = \left(\frac{\alpha_M}{P_t^M}\right)^{\alpha_M} \left(\frac{\alpha_L}{P_t^L}\right)^{-\alpha_M} \mathbb{Q}_t^{\frac{\mathscr{M}-1}{\mathscr{M}}} A_{i,t} \mathscr{K}_{i,t}^{\alpha_{\mathscr{K}}} L_{i,t}^{\alpha_L+\alpha_M} \\
\text{Subst. FOC }(L)\text{:}\qquad & = \left(\frac{\alpha_M}{P_t^M}\right)^{\alpha_M} \left(\frac{\alpha_L}{P_t^L}\right)^{-\alpha_M} \mathbb{Q}_t^{\frac{\mathscr{M}-1}{\mathscr{M}}} A_{i,t} \mathscr{K}_{i,t}^{\alpha_{\mathscr{K}}} \left(\frac{\alpha_L}{P_t^L} Y_{i,t}\right)^{\alpha_L+\alpha_M} \\
& = \left(\frac{\alpha_M}{P_t^M}\right)^{\frac{\alpha_M}{1-(\alpha_L+\alpha_M)}} \left(\frac{\alpha_L}{P_t^L}\right)^{\frac{\alpha_L}{1-(\alpha_L+\alpha_M)}} \mathbb{Q}_t^{\frac{\mathscr{M}-1}{\mathscr{M}}} A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}} \mathscr{K}_{i,t}^{\frac{\alpha_{\mathscr{K}}}{1-(\alpha_L+\alpha_M)}}.
\end{aligned}$$

We then have:

$$F\left(\mathscr{K}_{i,t}; Z_{i,t}\right) = (1-\alpha_L-\alpha_M) Y_{i,t} = Z_{i,t} \mathscr{K}_{i,t}^{\alpha}, \tag{A.2}$$

$$\text{where: } Z_{i,t} \equiv (1-\alpha_L-\alpha_M)\left(\frac{\alpha_M}{P_t^M}\right)^{\frac{\alpha_M}{1-(\alpha_L+\alpha_M)}} \left(\frac{\alpha_L}{P_t^L}\right)^{\frac{\alpha_L}{1-(\alpha_L+\alpha_M)}} A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}} \mathbb{Q}_t^{\frac{\mathscr{M}-1}{\mathscr{M}(1-(\alpha_L+\alpha_M))}}, \tag{A.3}$$

$$\alpha \equiv \frac{\alpha_{\mathscr{K}}}{1-(\alpha_L+\alpha_M)}. \tag{A.4}$$

The firm takes $Z_{i,t}$ as exogenous when making its choice of capital. In general equilibrium, the factor prices and aggregate output evolve endogenously.

B.2 Derivations of Equations (11) to (18) Relating Capital to Tax Changes

This appendix derives the main result of Section 3 relating the cross steady-state change in capital to the changes in taxes.

We start by extending the model to allow for multiple types of domestic and international capital. Let $K_{s,t}$ and $K_{e,t}$ denote structures and equipment capital. We assume:

$$K_t = g\left(K_{s,t}, K_{e,t}\right)$$

and likewise for international capital. Each type of capital has its own price and depreciation schedule and obeys its own dynamic evolution equation. The firm maximizes the present value of dividends with a discount rate ρ, subject to initial conditions and the dynamic evolution equations for each type of domestic and international capital.

B.2.1 First Order Conditions and Steady State

We write the Hamiltonian:

$$\mathscr{H}\left(I_{s,t}, K_{s,t}, I_{e,t}, K_{e,t}, \bar{I}_{s,t}, \bar{K}_{s,t}, \bar{I}_{e,t}, \bar{K}_{e,t}\right) = D_t + \sum_{i \in \{s,e\}} \left(\lambda_{i,t}\left(I_{i,t} - \delta^i K_{i,t}\right) + \bar{\lambda}_{i,t}\left(\bar{I}_{i,t} - \bar{\delta}^i \bar{K}_{i,t}\right)\right).$$

Necessary conditions for $i \in \{s,e\}$:

$$I_{i,t}: \quad (1-\tau_t)\Phi_1\left(I_{i,t},K_{i,t}\right)+\left(1-\Gamma_{i,t}\right)P^K_{i,t}=\lambda_{i,t}, \tag{A.5}$$

$$\bar{I}_{i,t}: \quad (1-\bar{\tau}_t)\bar{\Phi}_1\left(\bar{I}_{i,t},\bar{K}^i_t\right)+\left(1-\bar{\Gamma}_{i,t}\right)P^{\bar{K}}_{i,t}=\bar{\lambda}_{i,t}, \tag{A.6}$$

$$K_{i,t}: \quad \frac{(1-\tau_t)\left(F_1\left(\partial K_t/\partial K_{i,t}\right)-\Phi_2\left(I_{i,t},K_{i,t}\right)\right)+(1-\bar{\tau}_t)\bar{F}_2\left(\partial K_t/\partial K_{i,t}\right)-\delta^i\lambda_{i,t}+\dot{\lambda}_{i,t}}{\lambda_{i,t}}=\rho, \tag{A.7}$$

$$\bar{K}_{i,t}: \quad \frac{(1-\bar{\tau}_t)\left(\bar{F}_1\left(\partial \bar{K}_t/\partial \bar{K}_{i,t}\right)-\bar{\Phi}_2\left(\bar{I}_{i,t},\bar{K}_{i,t}\right)\right)+(1-\tau_t)F_2\left(\partial \bar{K}_t/\partial \bar{K}_{i,t}\right)-\bar{\delta}^i\bar{\lambda}_{i,t}+\dot{\bar{\lambda}}_{i,t}}{\bar{\lambda}_{i,t}}=\rho. \tag{A.8}$$

Substituting the adjustment costs:

$$\text{FOC } (I_{i,t}): \quad \dot{K}_{i,t}/K_{i,t}=\left[\frac{1}{\phi}\left(\frac{\lambda_{i,t}-P^K_{i,t}\left(1-\Gamma_{i,t}\right)}{(1-\tau_t)}\right)\right]^{\frac{1}{\gamma}}, \tag{A.9}$$

$$\text{FOC}(K_{i,t}): \quad \dot{\lambda}_{i,t}=\left(\rho+\delta^i\right)\lambda_{i,t}-(1-\tau_t)\left(F_1\left(\partial K_t/\partial K_{i,t}\right)-\Phi_2\left(I_{i,t},K_{i,t}\right)\right)-(1-\bar{\tau}_t)\bar{F}_2\left(\partial K_t/\partial K_{i,t}\right). \tag{A.10}$$

The analogous equations hold for foreign capital.

In steady state, $\dot{K}_{i,t}=\dot{\lambda}_{i,t}=0$, giving:

$$\lambda^*_i=(1-\Gamma_i)P^K_i. \tag{A.11}$$

Let $R^*_i \equiv \left(\rho+\delta^i\right)\lambda^*_i$ and likewise for foreign. From equation (A.10) we have the system of equations for the steady state:

$$\left((1-\tau)F^*_1+(1-\bar{\tau})\bar{F}^*_2\right)\left(\partial K^*/\partial K^*_s\right)=R^*_s, \tag{A.12}$$
$$\left((1-\tau)F^*_1+(1-\bar{\tau})\bar{F}^*_2\right)\left(\partial K^*/\partial K^*_e\right)=R^*_e, \tag{A.13}$$
$$\left((1-\bar{\tau})\bar{F}^*_1+(1-\tau)F^*_2\right)\left(\partial \bar{K}^*/\partial \bar{K}^*_s\right)=\bar{R}^*_s, \tag{A.14}$$
$$\left((1-\bar{\tau})\bar{F}^*_1+(1-\tau)F^*_2\right)\left(\partial \bar{K}^*/\partial \bar{K}^*_e\right)=\bar{R}^*_e. \tag{A.15}$$

Recognizing that $F^*_1=F_1\left(K^*,\bar{K}^*;Z^*\right), F^*_2=F_2\left(K^*,\bar{K}^*;Z^*\right), \bar{F}^*_1=\bar{F}_1\left(\bar{K}^*,K^*;Z^*\right), \bar{F}^*_2=\bar{F}_2\left(\bar{K}^*,K^*;Z^*\right)$, this is a system of four non-linear equations in four unknowns $K^*_s, K^*_e, \bar{K}^*_s, \bar{K}^*_e$.

We assume that structures and equipment combine according to:

$$K=g\left(K_s,K_e\right)=\left(a_s^{\frac{1}{\nu}}K_s^{\frac{\nu-1}{\nu}}+a_e^{\frac{1}{\nu}}K_e^{\frac{\nu-1}{\nu}}\right)^{\frac{\nu}{\nu-1}} \tag{A.16}$$

and define $R^* \equiv \left(a_s\left(R^*_s\right)^{1-\nu}+a_e\left(R^*_e\right)^{1-\nu}\right)^{\frac{1}{1-\nu}}$, and likewise for international capital. Standard derivations with a constant elasticity of substitution give:

$$\frac{\partial K^*}{\partial K_i^*} = a_i^{\frac{1}{\nu}} \left(\frac{K_i^*}{K^*}\right)^{-\frac{1}{\nu}} = \left(\frac{R_i^*}{R^*}\right). \tag{A.17}$$

Equation (A.17) allows us to collapse the four steady state conditions into two, as in the main text:

$$(1-\tau)F_1^* + (1-\bar{\tau})\bar{F}_2^* = R^*, \tag{A.18}$$
$$(1-\bar{\tau})\bar{F}_1^* + (1-\tau)F_2^* = \bar{R}^*. \tag{A.19}$$

B.2.2 Equations (15) to (18)

Substituting functional forms:

$$R^* = \alpha\left[(1-\tau^*)aZ^*(\mathscr{K}^*)^{\alpha+1/\sigma-1} + (1-\bar{\tau}^*)(1-\bar{a})\bar{Z}^*\left(\bar{\mathscr{K}}^*\right)^{\alpha+1/\sigma-1}\right](K^*)^{-\frac{1}{\sigma}}, \tag{A.20}$$
$$\bar{R}^* = \alpha\left[(1-\bar{\tau}^*)\bar{a}\bar{Z}^*\left(\bar{\mathscr{K}}^*\right)^{\alpha+1/\sigma-1} + (1-\tau^*)(1-a)Z^*(\mathscr{K}^*)^{\alpha+1/\sigma-1}\right]\left(\bar{K}^*\right)^{-\frac{1}{\sigma}}, \tag{A.21}$$

where recall $\mathscr{K} = \left(aK^{\frac{\sigma-1}{\sigma}} + (1-a)\bar{K}^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}}$ and $\bar{\mathscr{K}} = \left(\bar{a}\bar{K}^{\frac{\sigma-1}{\sigma}} + (1-\bar{a})K^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}}$.

Let $\tilde{\alpha} \equiv \sigma\alpha + (1-\sigma) = 1-\sigma(1-\alpha) \subseteq [1-\sigma, 1]$ be the elasticity-adjusted returns to scale, i.e., $\alpha = 1 \Rightarrow \tilde{\alpha} = 1$ and $\alpha = 0 \Rightarrow \tilde{\alpha} = 1-\sigma$, with $\tilde{\alpha} = \alpha$ if $\sigma = 1$. Let $\mathbb{E}_w(x,y) \equiv wx + (1-w)y$ denote the weighted average of x and y.[5] Defining $\hat{\tau} = d\tau/(1-\tau)$ and $\hat{\Gamma} = d\Gamma/(1-\Gamma)$ and using equations (11) to (14), the log-linearization around the steady state gives:

$$\text{(A.20)}: \quad r + (1/\sigma)k = s_{F_1}\left(z - \hat{\tau} + \left(\frac{\tilde{\alpha}}{\sigma}\right)\left(s_1 k + (1-s_1)\bar{k}\right)\right) + \left(1-s_{F_1}\right)\left(\bar{z} - \hat{\bar{\tau}} + \left(\frac{\tilde{\alpha}}{\sigma}\right)\left(\bar{s}_1\bar{k} + (1-\bar{s}_1)k\right)\right),$$
$$\sigma r + k = -\sigma\mathbb{E}_{s_{F_1}}\left(\hat{\tau} - z, \hat{\bar{\tau}} - \bar{z}\right) + \tilde{\alpha}\left(\mathbb{E}_{s_{F_1}}(s_1, 1-\bar{s}_1)k + \left(1 - \mathbb{E}_{s_{F_1}}(s_1, 1-\bar{s}_1)\right)\bar{k}\right),$$
$$k = \frac{\left(1-\mathbb{E}_{s_{F_1}}(s_1, 1-\bar{s}_1)\right)\tilde{\alpha}\bar{k} - \sigma\left(r + \mathbb{E}_{s_{F_1}}\left(\hat{\tau} - z, \hat{\bar{\tau}} - \bar{z}\right)\right)}{1-\mathbb{E}_{s_{F_1}}(s_1, 1-\bar{s}_1)\tilde{\alpha}}, \tag{A.22}$$
$$\text{(A.21)}: \quad \bar{k} = \frac{\left(1-\mathbb{E}_{s_{\bar{F}_1}}(\bar{s}_1, 1-s_1)\right)\tilde{\alpha}k - \sigma\left(\bar{r} + \mathbb{E}_{s_{\bar{F}_1}}\left(\hat{\bar{\tau}} - \bar{z}, \hat{\tau} - z\right)\right)}{1-\mathbb{E}_{s_{\bar{F}_1}}(\bar{s}_1, 1-s_1)\tilde{\alpha}}. \tag{A.23}$$

[5] Note the following properties which we use in the derivation that follows:

$$\mathbb{E}_w(1-x, y) = 1 - \mathbb{E}_w(x, 1-y),$$
$$\mathbb{E}_w(x, 1-y) + \mathbb{E}_{\bar{w}}(y, 1-x) - 1 = (1-w-\bar{w})(1-x-y),$$
$$\mathbb{E}_{\bar{w}}(y, 1-x) = 1 - x - \bar{w}(1-x-y),$$
$$(1-\bar{w})(1-\mathbb{E}_w(x, 1-y)) - w\mathbb{E}_{\bar{w}}(y, 1-x) = (1-w-\bar{w})y.$$

Substituting equation (A.23) into equation (A.22):

$$\begin{aligned}
&\left(1-\mathbb{E}_{s_{F_1}}\left(s_1,1-\bar{s}_1\right)\tilde{\alpha}\right)k \\
&=\left(1-\mathbb{E}_{s_{F_1}}\left(s_1,1-\bar{s}_1\right)\right)\tilde{\alpha}\left(\frac{\left(1-\mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1,1-s_1\right)\right)\tilde{\alpha}k-\sigma\left(\bar{r}+\mathbb{E}_{s_{\bar{F}_1}}\left(\hat{\bar{\tau}}-\bar{z},\hat{\tau}-z\right)\right)}{1-\mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1,1-s_1\right)\tilde{\alpha}}\right) \\
&-\sigma\left(r+\mathbb{E}_{s_{F_1}}\left(\hat{\tau}-z,\hat{\bar{\tau}}-\bar{z}\right)\right).
\end{aligned}$$

Grouping terms and simplifying:

$$k=-\frac{\omega_{k,r}r+\left(1-\omega_{k,r}\right)\bar{r}+\omega_{k,\tau}\left(\hat{\tau}-z\right)+\left(1-\omega_{k,\tau}\right)\left(\hat{\bar{\tau}}-\bar{z}\right)}{1-\alpha}, \tag{A.24}$$

$$\begin{aligned}
\text{where: } \omega_{k,r} &\equiv \frac{1-\mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1,1-s_1\right)\tilde{\alpha}}{1-\left(\mathbb{E}_{s_{F_1}}\left(s_1,1-\bar{s}_1\right)+\mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1,1-s_1\right)-1\right)\tilde{\alpha}} \\
&=\frac{1-\left(\left(1-s_1\right)-s_{\bar{F}_1}\left(1-s_1-\bar{s}_1\right)\right)\tilde{\alpha}}{1-\left(1-s_{F_1}-s_{\bar{F}_1}\right)\left(1-s_1-\bar{s}_1\right)\tilde{\alpha}}, \\
\omega_{k,\tau} &\equiv \frac{\left(\left(1-\mathbb{E}_{s_{F_1}}\left(s_1,1-\bar{s}_1\right)\right)\tilde{\alpha}\right)\left(1-s_{\bar{F}_1}\right)+\left(1-\mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1,1-s_1\right)\tilde{\alpha}\right)s_{F_1}}{1-\left(\mathbb{E}_{s_{F_1}}\left(s_1,1-\bar{s}_1\right)+\mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1,1-s_1\right)-1\right)\tilde{\alpha}} \\
&=\frac{s_{F_1}+\left(1-s_{F_1}-s_{\bar{F}_1}\right)\bar{s}_1\tilde{\alpha}}{1-\left(1-s_{F_1}-s_{\bar{F}_1}\right)\left(1-s_1-\bar{s}_1\right)\tilde{\alpha}}, \\
r &= -\hat{\Gamma}+\frac{d\rho+d\delta}{\rho+\delta}+p^K, \\
\bar{r} &= -\hat{\bar{\Gamma}}+\frac{d\bar{\rho}+d\bar{\delta}}{\bar{\rho}+\bar{\delta}}+p^{\bar{K}}.
\end{aligned}$$

Equations (15) to (18) in the main text follow from substituting the expressions for r and $\bar{r}$ and re-grouping terms to isolate the tax variables. Note that with multiple types of capital $r=a_s r_s+a_e r_e$ is a weighted average of the change in user cost of different types of capital, with the weights given by steady state expenditure shares.

B.2.3 Derivation for General Production Function

To establish the property that the coefficients in equation (A.24) multiplying r and $\bar{r}$ sum to the same total as the coefficients multiplying $\hat{\tau}$ and $\hat{\bar{\tau}}$ for general differentiable production functions over K and $\bar{K}$, we write the log-linearization of the system of first order conditions (A.18) and (A.19) as:

$$\begin{pmatrix} c_{11} & c_{12} \\ c_{21} & c_{22} \end{pmatrix}\begin{pmatrix} k \\ \bar{k} \end{pmatrix}=\begin{pmatrix} r+\mathbb{E}_{s_{F_1}}\left(\hat{\tau},\hat{\bar{\tau}}\right) \\ \bar{r}+\mathbb{E}_{s_{\bar{F}_1}}\left(\hat{\bar{\tau}},\hat{\tau}\right) \end{pmatrix},$$

where:

$$c_{11}=\mathbb{E}_{s_{F_1}}\left(\frac{K^*F_{11}^*}{F_1^*},\frac{K^*\bar{F}_{22}^*}{\bar{F}_2^*}\right),c_{12}=\mathbb{E}_{s_{F_1}}\left(\frac{\bar{K}^*F_{12}^*}{F_1^*},\frac{\bar{K}^*\bar{F}_{21}^*}{\bar{F}_2^*}\right),$$
$$c_{21}=\mathbb{E}_{s_{\bar{F}_1}}\left(\frac{K^*\bar{F}_{12}^*}{\bar{F}_1^*},\frac{K^*F_{21}^*}{F_2^*}\right),c_{22}=\mathbb{E}_{s_{\bar{F}_1}}\left(\frac{\bar{K}^*\bar{F}_{11}^*}{\bar{F}_1^*},\frac{\bar{K}^*F_{22}^*}{F_2^*}\right).$$

Solving:

$$\begin{pmatrix}k\\ \bar{k}\end{pmatrix}=\frac{1}{c_{11}c_{22}-c_{12}c_{21}}\begin{pmatrix}c_{22} & -c_{12}\\ -c_{21} & c_{11}\end{pmatrix}\begin{pmatrix}r+\mathbb{E}_{s_{F_1}}\left(\hat{\tau},\hat{\bar{\tau}}\right)\\ \bar{r}+\mathbb{E}_{s_{\bar{F}_1}}\left(\hat{\bar{\tau}},\hat{\tau}\right)\end{pmatrix},$$
$$k=\frac{c_{22}r-c_{12}\bar{r}+\left(s_{F_1}c_{22}-\left(1-s_{\bar{F}_1}\right)c_{12}\right)\hat{\tau}+\left(\left(1-s_{F_1}\right)c_{22}-s_{\bar{F}_1}c_{12}\right)\hat{\bar{\tau}}}{c_{11}c_{22}-c_{12}c_{21}}. \tag{A.25}$$

Letting $\tilde{b}_1,\tilde{b}_2,\tilde{b}_3,\tilde{b}_4$ denote the coefficients multiplying $r,\bar{r},\hat{\tau},\hat{\bar{\tau}}$, respectively, inspection of equation (A.25) shows $\tilde{b}_1+\tilde{b}_2=\tilde{b}_3+\tilde{b}_4$.

B.2.4 Equations (11) to (14)

Let $\chi_K\equiv\bar{K}^*/K^*$ denote the steady state ratio of international to domestic capital, $\chi_{\mathcal{K}}\equiv\bar{\mathcal{K}}^*/\mathcal{K}^*$, and $\chi_\tau\equiv(1-\bar{\tau})/(1-\tau)$, $\chi_Z\equiv\bar{Z}^*/Z^*$, $\chi_R=\bar{R}^*/R^*$, $\chi_a=\bar{a}/a$. Then:

$$s_1=\frac{a}{a+(1-a)\chi_K^{\frac{\sigma-1}{\sigma}}}, \tag{A.26}$$
$$\bar{s}_1=\frac{\bar{a}\chi_K^{\frac{\sigma-1}{\sigma}}}{\bar{a}\chi_K^{\frac{\sigma-1}{\sigma}}+(1-\bar{a})}. \tag{A.27}$$

Moreover:

$$F_1^*=\alpha aZ^*(K^*)^{-\frac{1}{\sigma}}(\mathcal{K}^*)^{\alpha+1/\sigma-1},$$
$$\bar{F}_1^*=\alpha\bar{a}\bar{Z}^*\left(\bar{K}^*\right)^{-\frac{1}{\sigma}}\left(\bar{\mathcal{K}}^*\right)^{\alpha+1/\sigma-1}=\chi_Z\chi_K^{-\frac{1}{\sigma}}\chi_{\mathcal{K}}^{\alpha+1/\sigma-1}\chi_aF_1^*,$$
$$F_2^*=\alpha(1-a)Z^*\left(\bar{K}^*\right)^{-\frac{1}{\sigma}}(\mathcal{K}^*)^{\alpha+1/\sigma-1}=\left(\frac{1-a}{a}\right)\chi_K^{-\frac{1}{\sigma}}F_1^*,$$
$$\bar{F}_2^*=\alpha(1-\bar{a})\bar{Z}^*(K^*)^{-\frac{1}{\sigma}}\left(\bar{\mathcal{K}}^*\right)^{\alpha+1/\sigma-1}=\left(\frac{1-\bar{a}}{\bar{a}}\right)\chi_K^{\frac{1}{\sigma}}\bar{F}_1^*=\left(\frac{1-\bar{a}}{a}\right)\chi_Z\chi_{\mathcal{K}}^{\alpha+1/\sigma-1}F_1^*,$$

giving:

$$s_{F_1}=\frac{(1-\tau^*)F_1^*}{(1-\tau^*)F_1^*+(1-\bar{\tau}^*)\bar{F}_2^*}=\frac{a}{a+(1-\bar{a})\chi_\tau\chi_Z\chi_{\mathcal{K}}^{\alpha+1/\sigma-1}}, \tag{A.28}$$
$$1-s_{\bar{F}_1}=\frac{(1-\tau^*)F_2^*}{(1-\bar{\tau}^*)\bar{F}_1^*+(1-\tau^*)F_2^*}=\frac{\left(\frac{1-a}{a}\right)\chi_K^{-\frac{1}{\sigma}}}{\chi_\tau\chi_Z\chi_K^{-\frac{1}{\sigma}}\chi_{\mathcal{K}}^{\alpha+1/\sigma-1}\chi_a+\left(\frac{1-a}{a}\right)\chi_K^{-\frac{1}{\sigma}}}$$

$$= \frac{1-a}{(1-a)+\bar{a}\chi_\tau\chi_Z\chi_{\mathscr{K}}^{\alpha+1/\sigma-1}}. \tag{A.29}$$

Finally, multiplying equation (A.18) by χ_R , dividing the resulting expression and equation (A.19) by $(1-\tau)$, and equating, we have that $\chi_R\left(F_1^*+\chi_\tau\bar{F}_2^*\right)=\chi_\tau\bar{F}_1^*+F_2^*$. Substituting the derivatives and manipulating gives:

$$\chi_\tau\chi_Z\chi_{\mathscr{K}}^{\alpha+1/\sigma-1}=\frac{(1-a)\,\chi_K^{-\frac{1}{\sigma}}-a\chi_R}{(1-\bar{a})\,\chi_R-\bar{a}\chi_K^{-\frac{1}{\sigma}}}, \tag{A.30}$$

which shows that s_{F_1} and $s_{\bar{F}_1}$ are functions of a,χ_R,χ_K. Moreover, this expression implicitly defines χ_K as a function of a,σ,α,χ_Z, and χ_τ. Repeating equations (A.26) and (A.27) and substituting equation (A.30) into equations (A.28) and (A.29), the four share terms that enter into the elasticity formulae are:

$$s_1=\frac{a}{a+(1-a)\,\chi_K^{\frac{\sigma-1}{\sigma}}}, \tag{A.31}$$

$$\bar{s}_1=\frac{\bar{a}\chi_K^{\frac{\sigma-1}{\sigma}}}{\bar{a}\chi_K^{\frac{\sigma-1}{\sigma}}+(1-\bar{a})}, \tag{A.32}$$

$$s_{F_1}=\frac{a\left((1-\bar{a})\,\chi_R-\bar{a}\chi_K^{-\frac{1}{\sigma}}\right)}{(1-\bar{a}-a)\,\chi_K^{-\frac{1}{\sigma}}}, \tag{A.33}$$

$$1-s_{\bar{F}_1}=\frac{(1-a)\left((1-\bar{a})\,\chi_R-\bar{a}\chi_K^{-\frac{1}{\sigma}}\right)}{(1-\bar{a}-a)\,\chi_R}. \tag{A.34}$$

B.2.5 Foreign and total capital response

The expression for $\bar{k}$ follows from symmetry of the setup:

$$\bar{k}=\frac{\omega_{\bar{k},\bar{r}}\hat{\bar{\Gamma}}+\left(1-\omega_{\bar{k},\bar{r}}\right)\hat{\Gamma}-\omega_{\bar{k},\bar{\tau}}\hat{\bar{\tau}}-\left(1-\omega_{\bar{k},\bar{\tau}}\right)\hat{\tau}+\bar{\epsilon}}{1-\alpha}, \tag{A.35}$$

$$\text{where: } \omega_{\bar{k},\bar{r}}\equiv\frac{1-\left((1-\bar{s}_1)-s_{F_1}(1-s_1-\bar{s}_1)\right)\tilde{\alpha}}{1-\left(1-s_{F_1}-s_{\bar{F}_1}\right)(1-s_1-\bar{s}_1)\,\tilde{\alpha}}, \tag{A.36}$$

$$\omega_{\bar{k},\bar{\tau}}\equiv\frac{s_{\bar{F}_1}+\left(1-s_{F_1}-s_{\bar{F}_1}\right)s_1\tilde{\alpha}}{1-\left(1-s_{F_1}-s_{\bar{F}_1}\right)(1-s_1-\bar{s}_1)\,\tilde{\alpha}}, \tag{A.37}$$

$$\bar{\epsilon}\equiv\omega_{\bar{k},\bar{\tau}}\bar{z}+\left(1-\omega_{\bar{k},\bar{\tau}}\right)z-\omega_{\bar{k},\bar{r}}\left(\frac{d\bar{\rho}+d\bar{\delta}}{\bar{\rho}+\bar{\delta}}+p^{\bar{K}}\right)-\left(1-\omega_{\bar{k},\bar{r}}\right)\left(\frac{d\rho+d\delta}{\rho+\delta}+p^K\right). \tag{A.38}$$

Finally, let $s_K=K/\left(K+\bar{K}\right)$. The total capital response (scaled by the returns to scale) is:

$$(1-\alpha)\left(s_Kk+(1-s_K)\,\bar{k}\right)=s_K\left(\omega_{k,r}\hat{\Gamma}+\left(1-\omega_{k,r}\right)\hat{\bar{\Gamma}}-\omega_{k,\tau}\hat{\tau}-\left(1-\omega_{k,\tau}\right)\hat{\bar{\tau}}+\epsilon\right)$$

$$
\begin{aligned}
&+(1-s_K)\left(\omega_{\bar{k},\bar{r}}\hat{\bar{\Gamma}}+\left(1-\omega_{\bar{k},\bar{r}}\right)\hat{\Gamma}-\omega_{\bar{k},\bar{\tau}}\hat{\bar{\tau}}-\left(1-\omega_{\bar{k},\bar{\tau}}\right)\hat{\tau}+\bar{\epsilon}\right)\\
&=\omega^T_{k,r}\hat{\Gamma}+\left(1-\omega^T_{k,r}\right)\hat{\bar{\Gamma}}-\omega^T_{k,\tau}\hat{\tau}-\left(1-\omega^T_{k,\tau}\right)\hat{\bar{\tau}}+\epsilon^T, \qquad \text{(A.39)}
\end{aligned}
$$

$$
\text{with: } \omega^T_{k,r}\equiv s_K\omega_{k,r}+(1-s_K)\left(1-\omega_{\bar{k},\bar{r}}\right)=\omega_{k,r}-(1-s_K)\left(\frac{1-\tilde{\alpha}}{1-\left(1-s_{F_1}-s_{\bar{F}_1}\right)(1-s_1-\bar{s}_1)\tilde{\alpha}}\right), \tag{A.40}
$$

$$
\omega^T_{k,\tau}\equiv s_K\omega_{k,\tau}+(1-s_K)\left(1-\omega_{\bar{k},\bar{\tau}}\right)=\omega_{k,\tau}+(1-s_K)\left(\frac{\left(1-s_{F_1}-s_{\bar{F}_1}\right)(1-\tilde{\alpha})}{1-\left(1-s_{F_1}-s_{\bar{F}_1}\right)(1-s_1-\bar{s}_1)\tilde{\alpha}}\right). \tag{A.41}
$$

B.3 Derivation of Steady-state Relative Profits

This appendix derives the final moment condition relating relative profits to parameters. Let $\chi_F=\bar{F}\left(\bar{K}_t,K_t;\bar{Z}_t\right)/F\left(K_t,\bar{K}_t;Z_t\right)$ denote the ratio of foreign to domestic taxable income. Then:

$$
\begin{aligned}
\chi_F&=\chi_Z\chi^{\alpha}_{\mathscr{H}},\\
\text{where: } \chi_{\mathscr{H}}&=\left(\frac{\bar{a}\chi_K^{\frac{\sigma-1}{\sigma}}+(1-\bar{a})}{a+(1-a)\chi_K^{\frac{\sigma-1}{\sigma}}}\right)^{\frac{\sigma}{\sigma-1}}.
\end{aligned}
$$

Using this definition together with equation (A.30) gives the moment:

$$
\chi_\tau\chi_F=\left(\frac{(1-a)\chi_K^{-\frac{1}{\sigma}}-a\chi_R}{(1-\bar{a})\chi_R-\bar{a}\chi_K^{-\frac{1}{\sigma}}}\right)\chi_{\mathscr{H}}^{1-1/\sigma}=\left(\frac{(1-a)\chi_K^{-\frac{1}{\sigma}}-a\chi_R}{(1-\bar{a})\chi_R-\bar{a}\chi_K^{-\frac{1}{\sigma}}}\right)\left(\frac{\bar{a}\chi_K^{\frac{\sigma-1}{\sigma}}+(1-\bar{a})}{a+(1-a)\chi_K^{\frac{\sigma-1}{\sigma}}}\right).
$$

Under the interpretation that adjustment costs are paid in units of labor (so total paid labor is split between production labor L and capital installation labor), we can associate F and $\bar{F}$ with taxable income before credits and deductions.

B.4 Dynamic Accumulation of Intangible Capital Extension

This extension shows that a dynamic choice of intangible capital provides one possible microfoundation for complementarity between domestic and foreign capital.

We introduce intangible capital by augmenting the domestic and foreign production functions to include the factor $\mathscr{H}_t$:

$$
Q_t=\left(A_t\mathscr{H}_t^{\alpha_{\mathscr{H}}}\mathscr{K}_t^{\alpha_{\mathscr{K}}}L_t^{\alpha_L}M_t^{\alpha_M}\right)^{\mathscr{M}}, \tag{A.42}
$$

$$
\bar{Q}_t=\left(\bar{A}_t\mathscr{H}_t^{\alpha_{\mathscr{H}}}\bar{\mathscr{K}}_t^{\alpha_{\mathscr{K}}}\bar{L}_t^{\alpha_L}\bar{M}_t^{\alpha_M}\right)^{\mathscr{M}}. \tag{A.43}
$$

Importantly, the same quantity $\mathscr{H}_t$ enters into both the domestic and foreign production functions; the non-rivalry of $\mathscr{H}_t$ distinguishes it as intangible capital. The domestic concentrated earnings function becomes:

$$F\left(K_t,\bar{K}_t,\mathscr{H}_t;Z_t\right)=Z_t\mathscr{H}_t^{\alpha_{\mathscr{H}}\alpha/\alpha_{\mathscr{K}}}\mathscr{K}_t^{\alpha}, \tag{A.44}$$

and likewise for the foreign operation. We assume $\alpha_{\mathscr{H}}<\alpha_{\mathscr{K}}/\alpha=1-\alpha_L-\alpha_M$, so that there are not increasing returns to intangible capital in the earnings function. A natural benchmark is that intangible capital is tangible capital-augmenting, so that $\alpha_H=\alpha_{\mathscr{K}}$. Intangible capital obeys the law of motion $\dot{\mathscr{H}}_t=I_{\mathscr{H},t}-\delta^{\mathscr{H}}\mathscr{H}_t$, with adjustment costs $\Phi^{\mathscr{H}}\left(I_{\mathscr{H},t},\mathscr{H}_t\right)$. We assume for simplicity that all intangible investment (i.e. R&D) occurs domestically.[6]

The necessary conditions for tangible investment and capital remain unaltered in this setup. With convex adjustment costs, the new necessary conditions relating to the accumulation of intangible capital are:

$$\text{FOC }(I_{\mathscr{H},t}):\qquad \dot{\mathscr{H}}_t/\mathscr{H}_t=\left[\frac{1}{\phi^{\mathscr{H}}}\left(\frac{\lambda_{\mathscr{H},t}-P_t^{\mathscr{H}}\left(1-\Gamma_{\mathscr{H},t}\right)}{(1-\tau_t)}\right)\right]^{\frac{1}{\gamma}}, \tag{A.45}$$

$$\text{FOC}(\mathscr{H}_t):\qquad \dot{\lambda}_{\mathscr{H},t}=\left(\rho+\delta^{\mathscr{H}}\right)\lambda_t^{\mathscr{H}}-(1-\tau_t)\left(F_3-\Phi_2^{\mathscr{H}}\right)-(1-\bar{\tau}_t)\bar{F}_3. \tag{A.46}$$

Combining these equations, the steady state has the additional condition:

$$R^*_{\mathscr{H}}=(1-\tau)F_3^*+(1-\bar{\tau})\bar{F}_3 \tag{A.47}$$

$$=\frac{\alpha_{\mathscr{H}}\alpha}{\alpha_{\mathscr{K}}}\left[(1-\tau)F\left(K^*,\bar{K}^*,\mathscr{H}^*;Z^*\right)+(1-\bar{\tau})\bar{F}\left(\bar{K}^*,K^*,\mathscr{H}^*;\bar{Z}^*\right)\right](\mathscr{H}^*)^{-1}, \tag{A.48}$$

with $R^*_{\mathscr{H}}=\left(\rho+\delta^{\mathscr{H}}\right)P^{\mathscr{H}}(1-\Gamma_{\mathscr{H}})$ being the user cost of intangible capital.

As in the baseline model, we derive the long-run response of capital to changes in tax policy. As a preliminary step, define the revenue shares:

$$s_{RK}=\frac{R^*K^*}{(1-\tau)F\left(K^*,\bar{K}^*,\mathscr{H}^*;Z^*\right)+(1-\bar{\tau})\bar{F}\left(\bar{K}^*,K^*,\mathscr{H}^*;\bar{Z}^*\right)},$$

$$s_{\bar{R}\bar{K}}=\frac{\bar{R}^*\bar{K}^*}{(1-\tau)F\left(K^*,\bar{K}^*,\mathscr{H}^*;Z^*\right)+(1-\bar{\tau})\bar{F}\left(\bar{K}^*,K^*,\mathscr{H}^*;\bar{Z}^*\right)},$$

and note:

$$\frac{\alpha_{\mathscr{H}}\alpha}{\alpha_{\mathscr{K}}}=\frac{R^*_{\mathscr{H}}\mathscr{H}^*}{(1-\tau)F\left(K^*,\bar{K}^*,\mathscr{H}^*;Z^*\right)+(1-\bar{\tau})\bar{F}\left(\bar{K}^*,K^*,\mathscr{H}^*;\bar{Z}^*\right)}.$$

Let $\hbar=d\log\mathscr{H}$. It is straightforward to show that the numerators in the expressions for k and $\bar{k}$ in equations (A.22) and (A.23) gain the new term $-\alpha_{\mathscr{H}}\alpha\hbar/\alpha_{\mathscr{K}}$. In addition, linearizing equation (A.48) gives:

$$\alpha_{\mathscr{H}}\alpha\hbar/\alpha_{\mathscr{K}}=\zeta_{\mathscr{H}}\left(s_{RK}k+s_{\bar{R}\bar{K}}\bar{k}-r_{\mathscr{H}}\right), \tag{A.49}$$

[6] This assumption is inessential to the results characterizing how the presence of intangible capital affects the responses of domestic and foreign tangible capital to the main tax terms.

where: $$\zeta_{\mathscr{H}} = \frac{\alpha_{\mathscr{H}}\alpha/\alpha_{\mathscr{K}}}{1-\alpha_{\mathscr{H}}\alpha/\alpha_{\mathscr{K}}} = \frac{\alpha_{\mathscr{H}}}{1-\alpha_L-\alpha_M-\alpha_{\mathscr{H}}} \subseteq [0,\infty].$$

Substituting equation (A.49) into the augmented equations (A.22) and (A.23) and solving gives the result for the response of tangible capital in the presence of dynamic accumulation of intangible capital:

$$k = -\frac{\omega_{k,r}r + \left(1-\omega_{k,r}\right)\bar{r} + \omega_{k,\tau}\left(\hat{\tau}-z\right) + \left(1-\omega_{k,\tau}\right)\left(\hat{\bar{\tau}}-\bar{z}\right) + \zeta_{\mathscr{H}}r_{\mathscr{H}}}{1-\alpha-\zeta_{\mathscr{H}}\left(s_{RK}+s_{\bar{R}\bar{K}}\right)}, \tag{A.50}$$

$$\text{where: } \omega_{k,r} \equiv \frac{1-\zeta_{\mathscr{H}}\sigma s_{\bar{R}\bar{K}} - \mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1, 1-s_1\right)\tilde{\alpha}}{1-\left(\mathbb{E}_{s_{F_1}}\left(s_1,1-\bar{s}_1\right)+\mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1,1-s_1\right)-1\right)\tilde{\alpha}},$$

$$\omega_{k,\tau} \equiv \frac{s_{F_1} + \left(1-s_{F_1}-s_{\bar{F}_1}\right)\left(\zeta_{\mathscr{H}}\sigma s_{\bar{R}\bar{K}} + \bar{s}_1\tilde{\alpha}\right)}{1-\left(\mathbb{E}_{s_{F_1}}\left(s_1,1-\bar{s}_1\right)+\mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1,1-s_1\right)-1\right)\tilde{\alpha}}.$$

In particular, equation (A.50) shows that intangible capital introduces a force akin to complementarity between K and $\bar{K}$. Indeed, setting $a = \bar{a} = s_1 = \bar{s}_1 = s_{F_1} = s_{\bar{F}_1} = \mathbb{E}_{s_{F_1}}\left(s_1, 1-\bar{s}_1\right) = \mathbb{E}_{s_{\bar{F}_1}}\left(\bar{s}_1, 1-s_1\right) = 1$ so that foreign capital does not directly enter the domestic production function, we have:

$$\omega_{k,r}\left(a=\bar{a}=1\right) = \frac{1-\zeta_{\mathscr{H}}\sigma s_{\bar{R}\bar{K}}-\tilde{\alpha}}{1-\tilde{\alpha}} = \frac{1-\alpha-\zeta_{\mathscr{H}}s_{\bar{R}\bar{K}}}{1-\alpha} < 1. \tag{A.51}$$

The positive response of domestic capital to the foreign cost of capital occurs because the accumulation of foreign tangible capital induces more intangible investment, which also benefits domestic tangible capital. In addition to this force on $\omega_{k,r}$, the additional term in the denominator of the expression for k tends to increase the capital elasticities, because of the crowding in of intangible investment.

B.5 Intangible Capital Location Choice Extension

This extension augments our baseline environment to allow the firm to choose the location of intangible capital in order to shift profits into low tax jurisdictions. The firm has a stock of intangible capital of $\mathscr{H}_t$, divided into intangible capital booked domestically H_t and booked abroad $\bar{H}_t$. To focus on the location choice, we now take the overall stock $\mathscr{H}$ as exogenous. Intangible capital is non-rival and multiplicatively scales Z_t and $\bar{Z}_t$; since it is now exogenous, the precise elasticity of earnings to intangible capital does not matter.

The firm applies a transfer price P_t^H to the use of intangible capital located in a different jurisdiction. Let $\Delta_{H,t} = \bar{H}_t - H_t$ denote the stock located abroad in excess of the domestic stock. Hence the domestic branch receives net royalties $P_t^H\left(H_t - \bar{H}_t\right) = -P_t^H\Delta_{H,t}$ and the foreign branch receives net royalties $P_t^H\Delta_{H,t}$. The firm may pay a cost from too-aggressive transfer pricing, given by $\Psi^H\left(\Delta_{H,t}, K_t, \bar{K}_t\right)$. This cost represents the legal risk and compliance cost of locating intangible capital differently from the location of tangible capital. Total cash flows are thus augmented by transfer pricing profits net of costs $\left(\tau_t - \bar{\tau}_t\right)P_t^H\Delta_{H,t} - \Psi^H\left(\Delta_{H,t}, K_t, \bar{K}_t\right)$.

With this setup, equation (6) and its foreign counterpart remain unchanged. The necessary conditions for K and $\bar{K}$ and the new necessary condition for Δ_H become:

$$K_t: \qquad \dot{\lambda}_t = (\rho+\delta)\lambda_t - (1-\tau_t)(F_1 - \Phi_2) - (1-\bar{\tau}_t)\bar{F}_2 + \Psi_2^H\left(\Delta_{H,t}, K_t, \bar{K}_t\right), \tag{A.52}$$

$$\bar{K}_t: \qquad \dot{\bar{\lambda}}_t = (\rho+\delta)\bar{\lambda}_t - (1-\bar{\tau}_t)\left(\bar{F}_1 - \bar{\Phi}_2\right) - (1-\tau_t)F_2 + \Psi_3^H\left(\Delta_{H,t}, K_t, \bar{K}_t\right), \tag{A.53}$$

$$\Delta_{H,t}: \qquad \Psi_1^H = (\tau_t - \bar{\tau}_t)P_t^H. \tag{A.54}$$

The FOC ($\Delta_{H,t}$) says that at the margin increasing foreign intangible assets generates tax savings $(\tau_t - \bar{\tau}_t)P_t^H$ and increases the transfer pricing burden by Ψ_1^H.

Define the steady state user cost as $R^* = (\rho+\delta)(1-\Gamma^*)P^K + \Psi_2^H\left(\Delta_{H,t}, K_t, \bar{K}_t\right)$. The following linearized relationship still holds with the parameters $\omega_{k,r}, \omega_{k,\tau}$ defined as in equations (16) and (17):

$$k = \frac{-\omega_{k,r} r - \left(1-\omega_{k,r}\right)\bar{r} - \omega_{k,\tau}\hat{\tau} - \left(1-\omega_{k,\tau}\right)\hat{\bar{\tau}} + \epsilon}{1-\alpha}.$$

Immediately, if the decision to shift profits via the location of intangible capital does not depend on physical capital, $\Psi_2^H\left(\Delta_{H,t}, K_t, \bar{K}_t\right) = 0$, then nothing changes in the firm's physical capital decision.

To understand the implications for investment when the location choice depends on physical capital, we parameterize $\Psi^H\left(\Delta_{H,t}, K_t, \bar{K}_t\right) = \left(\psi_1^H/2\right)\left(\Delta_{H,t} - \psi_2^H\left(\bar{K}_t - K_t\right)\right)^2$. With this functional form, we have:

$$\Delta_{H,t} - \psi_2^H\left(\bar{K}_t - K_t\right) = \frac{(\tau_t - \bar{\tau}_t)P_t^H}{\psi_1^H}. \tag{A.55}$$

The difference between the allocation of intangible and tangible capital is increasing in the tax gap and decreasing in the cost shifter ψ_1^H. The parameter ψ_2^H specifies how the allocation of intangibles moves with tangible capital. The domestic user cost becomes: $R^* = (\rho+\delta)(1-\Gamma^*)P^K + \psi_2^H(\tau_t - \bar{\tau}_t)P_t^H > (\rho+\delta)(1-\Gamma^*)P^K$. The additional term arises because an additional unit of domestic capital requires an additional ψ_2^H of reallocation of intangibles, which costs $(\tau_t - \bar{\tau}_t)P_t^H$ of total profits. Thus, a reduction in τ reduces the user cost and stimulates investment above the usual effect, because the lost profits from reduced intangible-shifting that come with higher K are smaller when τ falls, so there is less disincentive to accumulate K. At the same time, the steady state user cost is larger, which implies a larger coefficient on $\hat{\Gamma}$. The foreign user cost becomes: $\bar{R}^* = \left(\bar{\rho}+\bar{\delta}\right)\left(1-\bar{\Gamma}^*\right)P^K - \psi_2^H(\tau_t - \bar{\tau}_t)P_t^H < \left(\bar{\rho}+\bar{\delta}\right)\left(1-\bar{\Gamma}^*\right)P^K$.

To see how these changes modify equation (15), define the share contributions of the intangible terms to the user cost:

$$s_H = \frac{\psi_2^H(\tau-\bar{\tau})p^H}{R^*} \subseteq [0,1], \qquad \bar{s}_H = \frac{\psi_2^H(\tau-\bar{\tau})p^H}{\bar{R}^*}.$$

Then:

$$r = -(1-s_H)\hat{\Gamma} + s_H\frac{d(\tau-\bar{\tau})}{\tau-\bar{\tau}}, \qquad \bar{r} = -(1+\bar{s}_H)\hat{\bar{\Gamma}} - \bar{s}_H\frac{d(\tau-\bar{\tau})}{\tau-\bar{\tau}}$$

and hence:

$$k=\frac{\omega_{k,r}\left(1-s_H\right)\hat{\Gamma}+\left(1-\omega_{k,r}\right)\left(1+\bar{s}_H\right)\hat{\bar{\Gamma}}-\omega_{k,\tau}\hat{\tau}-\left(1-\omega_{k,\tau}\right)\hat{\bar{\tau}}+\left(\left(1-\omega_{k,r}\right)\bar{s}_H-\omega_{k,r}s_H\right)\frac{d(\tau-\bar{\tau})}{\tau-\bar{\tau}}+\epsilon}{1-\alpha}. \tag{A.56}$$

B.6 Interest Deduction Extension

A firm with debt of B_t can deduct interest i_tB_t from its taxable earnings. We assume the firm also pays a cost (i.e., insurance) that is increasing in its (domestic) leverage and given by $\Psi^B\left(B_t,K_t\right)$. Cash flows are therefore augmented by $\tau_t i_t B_t-\Psi^B\left(B_t,K_t\right)$. The changes to the necessary conditions are:

$$K_t: \qquad \dot{\lambda}_t=\left(\rho+\delta\right)\lambda_t-\left(1-\tau_t\right)\left(F_1-\Phi_2\right)-\left(1-\bar{\tau}_t\right)\bar{F}_2+\Psi_2^B\left(B_t,K_t\right), \tag{A.57}$$

$$B_t: \qquad \tau_t i_t=\Psi_1^B. \tag{A.58}$$

Define the steady state user cost as $R^*=\left(\rho+\delta\right)\left(1-\Gamma^*\right)P^K+\Psi_2^B\left(B_t,K_t\right)$. The following linearized relationship still holds with the parameters $\omega_{k,r},\omega_{k,\tau}$ defined as in equations (16) and (17):

$$k=\frac{-\omega_{k,r}r-\left(1-\omega_{k,r}\right)\bar{r}-\omega_{k,\tau}\hat{\tau}-\left(1-\omega_{k,\tau}\right)\hat{\bar{\tau}}+\epsilon}{1-\alpha}.$$

Immediately, if the financial capital structure decision does not depend on physical capital, $\Psi_2^B\left(\Delta_{B,t},K_t\right)=0$, then nothing changes in the firm's physical capital decision.

To understand the implications for investment when the financial capital structure decision does depend on physical capital, we follow Barro and Furman (2018) and parameterize $\Psi^B\left(B_t,K_t\right)=\left(\psi^B\right)^{-\theta}\left(B_t/\left(P_t^K K_t\right)\right)^{1+\theta}P_t^K K_t/\left(1+\theta\right)$. With this functional form, the steady state domestic user cost becomes $R^*=\left(\rho+\delta\right)\left(1-\Gamma^*\right)P^K-\frac{\psi^B\theta P^K}{1+\theta}\left(\tau^* i^*\right)^{1+1/\theta}$. Defining $s_B\equiv\frac{\frac{\theta}{1+\theta}\tau_t i_t B_t/K_t}{R^*}$, we have:

$$k=\frac{\omega_{k,r}\left(1-s_B\right)\hat{\Gamma}+\left(1-\omega_{k,r}\right)\hat{\bar{\Gamma}}-\left(\omega_{k,\tau}-\omega_{k,r}s_B\left(\frac{1+\theta}{\theta}\right)\left(\frac{\tau}{1-\tau}\right)\right)\hat{\tau}-\left(1-\omega_{k,\tau}\right)\hat{\bar{\tau}}+\epsilon}{1-\alpha}. \tag{A.59}$$

B.7 Global Value Chain Interpretation

This extension derives expressions analogous to equation (3) for a firm maximizing composite global output of locally-produced inputs. The production and revenue functions are:

$$\begin{aligned}
\text{Domestic input: } Q_t &= A_t K_t^{\alpha_K} L_t^{\alpha_L},\\
\text{Foreign input: } \bar{Q}_t &= \bar{A}_t \bar{K}_t^{\alpha_K} \bar{L}_t^{\alpha_L},\\
\text{Final output: } Y_t &= \left(a_Y Q_t^{\frac{\sigma_Y-1}{\sigma_Y}}+\left(1-a_Y\right)\bar{Q}_t^{\frac{\sigma_Y-1}{\sigma_Y}}\right)^{\frac{\sigma_Y}{\sigma_Y-1}}.
\end{aligned}$$

The firm's static maximization problem is:

$$\max_{L,\bar{L}} Y_t - P_t^L L_t - P_t^{\bar{L}} \bar{L}_t.$$

The FOC are:

$$P_t^L = a_Y \alpha_L \frac{Q_t}{L_t}\left(\frac{Q_t}{Y_t}\right)^{-\frac{1}{\sigma_Y}},\ P_t^{\bar{L}} = (1-a_Y)\,\alpha_L \frac{\bar{Q}_t}{\bar{L}_t}\left(\frac{\bar{Q}_t}{Y_t}\right)^{-\frac{1}{\sigma_Y}}.$$

Substituting the FOC and solving gives:

$$\begin{aligned}
Q_t &= \left(Z_t^Q\right)^{\frac{\sigma_Y}{\sigma_Y-1}} K_t^{\frac{\alpha_K}{1-\alpha_L\left(\frac{\sigma_Y-1}{\sigma_Y}\right)}} Y_t^{\frac{\alpha_L}{\alpha_L+(1-\alpha_L)\sigma_Y}},\\
\bar{Q}_t &= \left(\bar{Z}_t^Q\right)^{\frac{\sigma_Y}{\sigma_Y-1}} \bar{K}_t^{\frac{\alpha_K}{1-\alpha_L\left(\frac{\sigma_Y-1}{\sigma_Y}\right)}} Y_t^{\frac{\alpha_L}{\alpha_L+(1-\alpha_L)\sigma_Y}},\\
\text{with: } Z_t^Q &\equiv \left(A_t\left(\frac{a_Y\alpha_L}{P_t^L}\right)^{\alpha_L}\right)^{\frac{\sigma_Y}{(1-\alpha_L)\sigma_Y-1}}\\
\bar{Z}_t^Q &\equiv \left(\bar{A}_t\left(\frac{a_Y\alpha_L}{P_t^{\bar{L}}}\right)^{\alpha_L}\right)^{\frac{\sigma_Y}{(1-\alpha_L)\sigma_Y-1}}.
\end{aligned}$$

Thus:

$$\begin{aligned}
Y_t &= \mathscr{K}_t^{\alpha},\\
\text{where: } \mathscr{K}_t &\equiv \left(a_t K_t^{\frac{\sigma-1}{\sigma}} + \bar{a}_t \bar{K}_t^{\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}},\\
a_t &\equiv a_Y Z_t^Q,\\
\bar{a}_t &\equiv (1-a_Y)\,\bar{Z}_t^Q,\\
\sigma &\equiv \frac{\alpha_L + (1-\alpha_L)\,\sigma_Y}{\alpha_L+\alpha_K+(1-\alpha_K-\alpha_L)\,\sigma_Y},\\
\alpha &\equiv \frac{\alpha_K}{1-\alpha_L}.
\end{aligned}$$

Domestic and foreign current costs are:

$$\begin{aligned}
P_t L_t &= \alpha_L s_t Y_t,\\
\bar{P}_t \bar{L}_t &= \alpha_L (1-s_t)\, Y_t,\\
\text{where: } s_t &= a_Y\left(\frac{Q_t}{Y_t}\right)^{\frac{\sigma_Y-1}{\sigma_Y}}.
\end{aligned}$$

If a share s_t of total revenues are assigned to the domestic jurisdiction for tax purposes, then total domestic and foreign taxable incomes are:

$$F\left(K_t,\bar{K}_t;A_t,\bar{A}_t\right) = s_t\,(1-\alpha_L)\,\mathscr{K}_t^{\alpha}, \tag{A.60}$$

$$\bar{F}\left(\bar{K}_t, K_t; \bar{A}_t, A_t\right) = (1-s_t)(1-\alpha_L)\mathcal{K}_t^{\alpha}. \tag{A.61}$$

Equations (A.60) and (A.61) take the same form as equation (3), with the additional restriction that $\mathcal{K} = \bar{\mathcal{K}}$ and with time-varying shares in the composite capital variable.

B.8 FDII and GILTI

Let $\tau^{s}, \bar{\tau}^{s}, \Gamma^{s}, \bar{\Gamma}^{s}$ denote the ex-FDII and ex-GILTI domestic and foreign marginal tax rates and present values of allowances ("s" for statutory), which we now distinguish from the GILTI and FDII-inclusive effective marginal tax rates and costs of capital.

The GILTI (Global Intangible Low Taxed Income) Internal Revenue Code (IRC) Section 951A tax applies to foreign income. The TCJA defines global deemed intangible income as after-tax foreign income in excess of $\theta_t^{\text{GILTI-T}} = 0.1$ of foreign tangible property ("T" for tangible), i.e., GILTI $= (1-\bar{\tau}^{s})\bar{F}\left(\bar{K}_t, K_t, \bar{Z}_t\right) - \bar{\Phi}\left(\bar{I}_t, \bar{K}_t\right) - \theta_t^{\text{GILTI-T}}\bar{K}_t$.[7] To account for GILTI being defined on an after-tax basis, firms must then "gross up" their GILTI, yielding a pre-deduction and credit tax base of $\bar{F}\left(\bar{K}_t, K_t, \bar{Z}_t\right) - \bar{\Phi}\left(\bar{I}_t, \bar{K}_t\right) - \theta_t^{\text{GILTI-T}}\bar{K}_t/(1-\bar{\tau}^{s})$.[8] The Section 250 deduction of $\theta_t^{\text{GILTI-D}} = 0.5$ ("D" for deduction) of the GILTI+Gross-up makes the effective U.S. tax rate 10.5% on this income. Firms can further apply foreign tax credits (FTCs) of $\theta_t^{\text{GILTI-C}} = 0.8$ ("C" for credit) of foreign taxes paid on this income. Thus, after-tax foreign profits for a GILTI-taxed firm are:

$$\begin{aligned}
&\overbrace{\left(1-\bar{\tau}_t^{s}\right)\left(\bar{F}\left(\bar{K}_t, K_t, \bar{Z}_t\right) - \Phi\left(\bar{I}_t, \bar{K}_t\right)\right)}^{\text{Profits net of foreign taxes}} \\
&-\underbrace{\left(\tau_t^{s}\left(1-\theta_t^{\text{GILTI-D}}\right) - \theta_t^{\text{GILTI-C}}\bar{\tau}_t^{s}\right)\left(\bar{F}\left(\bar{K}_t, K_t, \bar{Z}_t\right) - \Phi\left(\bar{I}_t, \bar{K}_t\right) - \theta_t^{\text{GILTI-T}}\bar{K}_t/\left(1-\bar{\tau}_t^{s}\right)\right)}_{\text{GILTI tax net of foreign tax credit}} \\
&= \left(1-\bar{\tau}_t\right)\left(\bar{F}\left(\bar{K}_t, K_t, \bar{Z}_t\right) - \Phi\left(\bar{I}_t, \bar{K}_t\right)\right) + \left(\bar{\tau}_t - \bar{\tau}_t^{s}\right)\theta_t^{\text{GILTI-T}}\bar{K}_t/\left(1-\bar{\tau}_t^{s}\right), \\
&\text{where: } \bar{\tau}_t \equiv \bar{\tau}_t^{s}\left(1-\theta_t^{\text{GILTI-C}}\right) + \tau_t^{s}\left(1-\theta_t^{\text{GILTI-D}}\right).
\end{aligned}$$

The GILTI tax is often described as a minimum tax because at $\bar{\tau}_t^{s} = 0$ it nonetheless implies $\bar{\tau}_t = \tau_t^{s}\left(1-\theta_t^{\text{GILTI-D}}\right)$. It ceases to apply when $\bar{\tau}_t^{s} \geq \tau_t^{s}\left(1-\theta_t^{\text{GILTI-D}}\right)/\theta_t^{\text{GILTI-C}} = 0.1312$.

The FDII (Foreign Derived Intangible Income) deduction applies to domestic income derived from foreign sources, i.e., exports. Let ξ denote the (fixed) share of a firm's domestic income attributable to exports. The TCJA defines DII (deemed intangible income) as domestic income in excess of $\theta_t^{\text{FDII-T}} = 0.1$ of domestic tangible property, i.e., DII $= F\left(K_t, \bar{K}_t, Z_t\right) - \Phi\left(I_t, K_t\right) - \theta_t^{\text{FDII-T}}K_t$, and FDII as the foreign part of DII, i.e., FDII $= \xi\left(F\left(K_t, \bar{K}_t, Z_t\right) - \Phi\left(I_t, K_t\right) - \theta_t^{\text{FDII-T}}K_t\right)$. A corporation can deduct $\theta_t^{\text{FDII-D}} = 0.375$ of FDII against domestic taxable income. Thus, after-

[7] For simplicity, the exposition here omits tangential factors such as the exclusion of certain categories of income from the GILTI base, allocable deductions, interest expenses in the calculation of the deemed tangible return, and interactions of multiple subsidiaries some of which may not have taxable income. The technical term for tangible property is Qualified Business Asset Investment (QBAI).

[8] The IRC Section 78 gross-up approach follows the treatment of foreign income under Subpart F. The division of $\bar{K}$ by $(1-\bar{\tau}^{s})$ occurs due to the interaction of the gross-up approach and the GILTI QBAI deduction and has been called "getting the math wrong" by Caballero (2020).

tax domestic profits for a firm with domestic income exceeding $\theta_t^{\text{FDII-T}} K_t$ are:

$$F\left(K_t, \bar{K}_t, Z_t\right) - \Phi\left(I_t, K_t\right) - \tau_t^{s}\left(F\left(K_t, \bar{K}_t, Z_t\right) - \Phi\left(I_t, K_t\right) - \underbrace{\theta_t^{\text{FDII-D}}\xi\left(F\left(K_t, \bar{K}_t, Z_t\right) - \Phi\left(I_t, K_t\right) - \theta_t^{\text{FDII-T}} K_t\right)}_{\text{FDII deduction}}\right)$$
$$= \left(1-\tau_t\right)\left(F\left(K_t, \bar{K}_t, Z_t\right) - \Phi\left(I_t, K_t\right)\right) - \tau_t^{s}\xi\theta_t^{\text{FDII-D}}\theta_t^{\text{FDII-T}} K_t,$$
where: $\tau_t = \tau_t^{s}\left(1-\theta_t^{\text{FDII-D}}\xi\right)$.

Putting FDII and GILTI together, the necessary conditions become:

$$I_t: \qquad \lambda_t = \left(1-\tau_t\right)\Phi_1\left(I_t, K_t\right) + \left(1-\Gamma_t^{s}\right) P_t^{K}, \tag{A.62}$$
$$\bar{I}_t: \qquad \bar{\lambda}_t = \left(1-\bar{\tau}_t\right)\bar{\Phi}_1\left(\bar{I}_t, \bar{K}_t\right) + \left(1-\bar{\Gamma}_t^{s}\right) P_t^{\bar{K}}, \tag{A.63}$$
$$K_t: \qquad \dot{\lambda}_t = R_t - \left(1-\tau_t\right)\left(F_1 - \Phi_2\left(I_t, K_t\right)\right) - \left(1-\bar{\tau}_t\right)\bar{F}_2, \tag{A.64}$$
$$\bar{K}_t: \qquad \dot{\bar{\lambda}}_t = \bar{R}_t - \left(1-\bar{\tau}_t\right)\left(\bar{F}_1 - \bar{\Phi}_2\left(\bar{I}_t, \bar{K}_t\right)\right) - \left(1-\tau_t\right)F_2, \tag{A.65}$$
$$\text{where:} \qquad R_t = \left(\rho+\delta\right)\lambda_t + \tau_t^{s}\xi\theta_t^{\text{FDII-D}}\theta_t^{\text{FDII-T}}, \tag{A.66}$$
$$\bar{R}_t = \left(\rho+\delta\right)\bar{\lambda}_t - \theta_t^{\text{GILTI-T}}\left(\bar{\tau}_t - \bar{\tau}_t^{s}\right)/\left(1-\bar{\tau}_t^{s}\right). \tag{A.67}$$

In particular, equations (A.62) to (A.65) characterize exactly the same dynamic system as equations (6) and (7) and their foreign counterparts, but with the redefined effective marginal tax rates and user costs. The user cost terms can be rewritten as:

$$R_t = \left(\rho+\delta\right)\left(\left(1-\tau_t\right)\Phi_1\left(I_t, K_t\right) + \left(1-\Gamma_t\right)P_t^{K}\right),\ \Gamma_t \equiv \Gamma_t^{s} - \frac{\tau_t^{s}\xi\theta_t^{\text{FDII-D}}\theta_t^{\text{FDII-T}}}{\left(\rho+\delta\right)P_t^{K}},$$
$$\bar{R}_t = \left(\rho+\delta\right)\left(\left(1-\bar{\tau}_t\right)\bar{\Phi}_1\left(\bar{I}_t, \bar{K}_t\right) + \left(1-\bar{\Gamma}_t\right)P_t^{\bar{K}}\right),\ \bar{\Gamma}_t \equiv \bar{\Gamma}_t^{s} + \frac{\left(\bar{\tau}_t - \bar{\tau}_t^{s}\right)\theta_t^{\text{GILTI-T}}}{\left(1-\bar{\tau}_t^{s}\right)\left(\rho+\delta\right)P_t^{\bar{K}}}.$$

In this sense, the investment incentives of GILTI go through the foreign marginal tax rate and cost of capital and the incentives of FDII go through the domestic marginal tax rate and cost of capital. The impacts on the costs of capital arise because both GILTI and FDII exempt profits up to 10% of tangible capital, which implies that marginal changes in the tangible capital stock directly affect taxes owed.

Our measurement of the GILTI incentives requires additional clarifications. First, IRC 904 limits FTCs to the foreign income share of tax owed calculated as if all global income were subject to U.S. tax. In making this calculation, firms must reallocate a part of certain U.S. expenses (such as overhead or interest expenses) to their foreign subsidiaries.[9] This expense reallocation can reduce allowable FTCs by enough that firms with foreign tax rates well above the purported 13.125% limit still owe GILTI tax. However, for such firms, their GILTI tax depends only on the reallocated expenses; denoting the reallocated expenses by X_t, the FTC limitation is:

$$\tau_t^{s}\left(1-\theta_t^{\text{GILTI-D}}\right)\left(\bar{F}\left(\bar{K}_t, K_t, \bar{Z}_t\right) - \Phi\left(\bar{I}_t, \bar{K}_t\right) - \theta_t^{\text{GILTI-T}}\bar{K}_t/\left(1-\bar{\tau}_t^{s}\right)\right) - \tau_t^{s} X_t,$$

[9] See IRS form 1118 Schedule A column 15 and Schedule B lines 7-11 (revision 2018).

and hence if this limit binds their GILTI tax is simply $\tau_t^s X_t$ and in particular does not depend on $\bar{K}_t$. We therefore code these firms as not subject to GILTI. Second, for the reasons discussed in the main text, our preferred implementation sets $\bar{\tau}_t^s = 0$ in determining the effect of GILTI on $\bar{R}_t$ in equation (A.67).

B.9 Labor Market Clearing Condition

This appendix provides the labor market clearing condition. As a preliminary step, using $\mathbb{Q}_t = \int_i Y_{i,t} di$ (recall the normalization of the aggregate price to one), write:

$$\mathbb{Q}_t = (1-\alpha_L-\alpha_M)^{-1}\int_i Z_{i,t}\mathcal{K}_{i,t}^{\alpha} di = \left(\left(\frac{\alpha_M}{P_t^M}\right)^{\frac{\alpha_M}{1-(\alpha_L+\alpha_M)}}\left(\frac{\alpha_L}{P_t^L}\right)^{\frac{\alpha_L}{1-(\alpha_L+\alpha_M)}}\int_i A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}}\mathcal{K}_{i,t}^{\alpha} di\right)^{\frac{\mathcal{M}(1-(\alpha_L+\alpha_M))}{1-\mathcal{M}(\alpha_L+\alpha_M)}}.$$

Then:

$$Z_{i,t} = (1-\alpha_L-\alpha_M)\left(\frac{\alpha_M}{P_t^M}\right)^{\frac{\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}}\left(\frac{\alpha_L}{P_t^L}\right)^{\frac{\mathcal{M}\alpha_L}{1-\mathcal{M}(\alpha_L+\alpha_M)}}\left(\int_i A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}}\mathcal{K}_{i,t}^{\alpha} di\right)^{\frac{\mathcal{M}-1}{1-\mathcal{M}(\alpha_L+\alpha_M)}} A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}}.$$

We assume an aggregate labor supply curve $L_t/L_t^* = \left(P_t^L\right)^{\nu_L}$. For firm i with capital $\{K_{i,t}, \bar{K}_{i,t}\}$, technology $\{A_{i,t}, \bar{A}_{i,t}\}$, and taking as given the wages $\{P_t^L, \bar{P}_t^L\}$, domestic labor demand is:

$$\begin{aligned}
L_{i,t} &= \frac{\alpha_L Y_{i,t}}{P_t^L} = \frac{\alpha_L Z_{i,t}\mathcal{K}_{i,t}^{\alpha}}{(1-\alpha_L-\alpha_M)P_t^L} \\
&= \frac{\alpha_L \mathcal{K}_{i,t}^{\alpha}}{P_t^L}\left(\frac{\alpha_M}{P_t^M}\right)^{\frac{\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}}\left(\frac{\alpha_L}{P_t^L}\right)^{\frac{\mathcal{M}\alpha_L}{1-\mathcal{M}(\alpha_L+\alpha_M)}}\left(\int_i A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}}\mathcal{K}_{i,t}^{\alpha} di\right)^{\frac{\mathcal{M}-1}{1-\mathcal{M}(\alpha_L+\alpha_M)}} A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}} \\
&= \left(\frac{\alpha_M}{P_t^M}\right)^{\frac{\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}}(\alpha_L)^{\frac{1-\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}}\left(\int_i A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}}\mathcal{K}_{i,t}^{\alpha} di\right)^{\frac{\mathcal{M}-1}{1-\mathcal{M}(\alpha_L+\alpha_M)}} A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}}\mathcal{K}_{i,t}^{\alpha}\left(P_t^L\right)^{-\frac{1-\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}}.
\end{aligned}$$

Denote the pre-determined part of firm labor demand:

$$X_{i,t}^L = \left(\frac{\alpha_M}{P_t^M}\right)^{\frac{\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}}(\alpha_L)^{\frac{1-\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}}\left(\int_i A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}}\mathcal{K}_{i,t}^{\alpha} di\right)^{\frac{\mathcal{M}-1}{1-\mathcal{M}(\alpha_L+\alpha_M)}} A_{i,t}^{\frac{1}{1-(\alpha_L+\alpha_M)}}\mathcal{K}_{i,t}^{\alpha}.$$

Labor market clearing requires $\int_i L_{i,t} di = \left(\int_i X_{i,t}^L di\right)\left(P_t^L\right)^{-\frac{1-\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}} = \left(P_t^L\right)^{\nu_L} L_t^*$:

$$P_t^L = \left(\frac{\left(\int_i X_{i,t}^L di\right)\left(P_t^L\right)^{-\frac{1-\mathcal{M}\alpha_M}{1-\mathcal{M}(\alpha_L+\alpha_M)}}}{L_t^*}\right)^{1/\nu_L} = \left(\frac{\int_i X_{i,t}^L di}{L_t^*}\right)^{\frac{1-\mathcal{M}(\alpha_L+\alpha_M)}{\nu_L(1-\mathcal{M}(\alpha_L+\alpha_M))+1-\mathcal{M}\alpha_M}}. \tag{A.68}$$

With balanced growth preferences ($\nu_L = 0$), no markup ($\mathcal{M} = 1$), and no materials ($\alpha_M = 0$), equation (A.68) simplifies in our baseline model to:

$$P_t^L = \left(\frac{\int_i X_{i,t}^L di}{L_t^*} \right)^{1-\alpha_L}. \tag{A.69}$$

We impose labor market clearing by guessing a path for P_t^L (starting at the steady state), obtaining $Z_{i,t}$ and hence $\mathscr{K}_{i,t}$ for each portfolio of firms, computing X^L, and then using equation (A.68) to update the guess for the path of P_t^L until convergence.

B.10 Transition Dynamics and Short Versus Long-Run Investment Response

This appendix shows that in the case of no foreign adjustment costs, $\bar{\phi} \to 0$, the short-run and long-run elasticities of investment to the four tax terms all scale by approximately the same factor, denoted χ_{SR}. Furthermore, χ_{SR} is a sufficient statistic for the role of domestic adjustment costs.

Linearized dynamic system. We show these results using a linear approximation of the transition dynamics with quadratic adjustment costs ($\gamma = 1$). Define:

$$h\left(\lambda; \tau, \Gamma, P^K, \phi\right) = \left[\frac{1}{\phi} \left(\frac{\lambda - P^K (1-\Gamma)}{(1-\tau)} \right) \right], \tag{A.70}$$

$$\text{with: } h(\lambda^*) = 0,$$

$$h'(\lambda^*) = \frac{1}{\phi (1-\tau^*)}. \tag{A.71}$$

The dynamic system then takes the form:

$$\text{FOC } (I_t): \quad \dot{K}_t / K_t = h\left(\lambda_t; \tau_t, \Gamma_t, P_t^K, \phi\right), \tag{A.72}$$

$$\text{FOC } (K_t): \quad \dot{\lambda}_t = (\rho + \delta) \lambda_t - (1-\tau_t)(F_1 + ((1/2) h(\lambda_t) + \delta) \phi h(\lambda_t)) - (1-\bar{\tau}_t) \bar{F}_2, \tag{A.73}$$

$$\text{FOC } (\bar{I}_t): \quad \dot{\bar{K}}_t / \bar{K}_t = h\left(\bar{\lambda}_t; \bar{\tau}_t, \bar{\Gamma}_t, P_t^{\bar{K}}, \bar{\phi}\right), \tag{A.74}$$

$$\text{FOC } (\bar{K}_t): \quad \dot{\bar{\lambda}}_t = (\rho + \delta) \bar{\lambda}_t - (1-\bar{\tau}_t)\left(\bar{F}_1 + \left((1/2) h\left(\bar{\lambda}_t\right) + \delta\right) \bar{\phi} h\left(\bar{\lambda}_t\right)\right) - (1-\tau_t) F_2. \tag{A.75}$$

We take a Taylor expansion in the neighborhood of the steady state. Let $k_{t,s} = (K_t - K_s)/K_s \approx \log(K_t/K_s)$ denote the percent deviation of K_t from K_s. In particular, $k_{t,*} = (K_t - K^*)/K^*$ is the deviation from the new steady state and $k_{*,0} = (K^* - K_0)/K_0$ is the long-run percent change, simply denoted by k elsewhere in the manuscript. Note that $\dot{k}_{t,*} = \dot{K}_t / K^*$. The linear system associated with the Taylor expansion is:[10]

$$\begin{pmatrix} \dot{k}_{t,*} \\ \dot{\lambda}_t \\ \dot{\bar{k}}_{t,*} \\ \dot{\bar{\lambda}}_t \end{pmatrix} = \mathbf{A} \begin{pmatrix} k_{t,*} \\ \lambda_t - \lambda^* \\ \bar{k}_{t,*} \\ \bar{\lambda}_t - \bar{\lambda}^* \end{pmatrix}, \tag{A.76}$$

with:

$$\mathbf{A} = \begin{pmatrix} 0 & h'(\lambda^*) & 0 & 0 \\ a_{21} & \rho & a_{23} & 0 \\ 0 & 0 & 0 & h'\left(\bar{\lambda}^*\right) \\ a_{41} & 0 & a_{43} & \rho \end{pmatrix},$$

$$a_{21} = -(1-\tau^*)K^* F_{11}\left(K^*, \bar{K}^*; Z^*\right) - (1-\bar{\tau}^*)K^* \bar{F}_{22}\left(\bar{K}^*, K^*; \bar{Z}^*\right) > 0,$$
$$a_{23} = -(1-\tau^*)\bar{K}^* F_{12}\left(K^*, \bar{K}^*; Z^*\right) - (1-\bar{\tau}^*)\bar{K}^* \bar{F}_{21}\left(\bar{K}^*, K^*; \bar{Z}^*\right),$$
$$a_{41} = -(1-\bar{\tau}^*)K^* \bar{F}_{12}\left(\bar{K}^*, K^*; \bar{Z}^*\right) - (1-\tau^*)K^* F_{21}\left(K^*, \bar{K}^*; Z^*\right) = a_{23}\chi_K^{-1},$$
$$a_{43} = -(1-\bar{\tau}^*)\bar{K}^* \bar{F}_{11}\left(\bar{K}^*, K^*; \bar{Z}^*\right) - (1-\tau^*)\bar{K}^* F_{22}\left(K^*, \bar{K}^*; Z^*\right) > 0.$$

The two stable eigenvalues of $\mathbf{A}$ are:

$$d_1 = \frac{\rho}{2} - \sqrt{\left(\frac{\rho}{2}\right)^2 + \frac{\left(h'(\lambda^*)a_{21} + h'\left(\bar{\lambda}^*\right)a_{43}\right) + \sqrt{\left(h'(\lambda^*)a_{21} + h'\left(\bar{\lambda}^*\right)a_{43}\right)^2 - 4h'(\lambda^*)h'\left(\bar{\lambda}^*\right)\left(a_{21}a_{43} - a_{23}a_{41}\right)}}{2}},$$
$$d_2 = \frac{\rho}{2} - \sqrt{\left(\frac{\rho}{2}\right)^2 + \frac{\left(h'(\lambda^*)a_{21} + h'\left(\bar{\lambda}^*\right)a_{43}\right) - \sqrt{\left(h'(\lambda^*)a_{21} + h'\left(\bar{\lambda}^*\right)a_{43}\right)^2 - 4h'(\lambda^*)h'\left(\bar{\lambda}^*\right)\left(a_{21}a_{43} - a_{23}a_{41}\right)}}{2}},$$

with the eigenvector associated with the n^{th} eigenvalue:

$$\mathbf{f}_n = \begin{pmatrix} 1 \\ \frac{d_n}{h'(\lambda^*)} \\ -\left(a_{43}h'\left(\bar{\lambda}^*\right) + (\rho - d_n)\,d_n\right)^{-1} a_{41}h'\left(\bar{\lambda}^*\right) \\ -\left(a_{43}h'\left(\bar{\lambda}^*\right) + (\rho - d_n)\,d_n\right)^{-1} a_{41}d_n \end{pmatrix}.$$

The linearized solution is:

$$k_{t,*} = \frac{c_1}{k_{0,*}}k_{0,*}e^{d_1 t} + \frac{c_2}{k_{0,*}}k_{0,*}e^{d_2 t} = \left(s_{k,d}e^{d_1 t} + \left(1 - s_{k,d}\right)e^{d_2 t}\right)k_{0,*}, \tag{A.77}$$
$$\bar{k}_{t,*} = \frac{c_1\mathbf{f}_1(3)}{\bar{k}_{0,*}}\bar{k}_{0,*}e^{d_1 t} + \frac{c_2\mathbf{f}_2(3)}{\bar{k}_{0,*}}\bar{k}_{0,*}e^{d_2 t} = \left(s_{\bar{k},d}e^{d_1 t} + \left(1 - s_{\bar{k},d}\right)e^{d_2 t}\right)\bar{k}_{0,*}, \tag{A.78}$$
$$\text{where: } s_{k,d} \equiv \frac{c_1}{k_{0,*}} = \frac{\mathbf{f}_2(3) - \chi_{k_{0,*}}}{\mathbf{f}_2(3) - \mathbf{f}_1(3)} = \left(\frac{a_{23}h'(\lambda^*)}{d_2d_3 - d_1d_4}\right)\left(\frac{a_{41}h'\left(\bar{\lambda}^*\right)}{a_{43}h'\left(\bar{\lambda}^*\right) + d_2d_3} + \chi_{k_0}\right),$$

[10] To ease notation, we omit general equilibrium terms relating to changes in Z. These do not change the conclusions of this section.

$$s_{\bar{k},d} \equiv \frac{c_1 \mathbf{f}_1(3)}{\bar{k}_{0,*}} = \frac{\mathbf{f}_1(3)\left(\mathbf{f}_2(3)\,\chi_{k_{0,*}}^{-1} - 1\right)}{\mathbf{f}_2(3) - \mathbf{f}_1(3)}.$$

Thus, the weighted average $s_{k,d}e^{d_1 t} + \left(1 - s_{k,d}\right)e^{d_2 t}$ determines the speed of convergence of domestic capital. Furthermore:

$$\dot{k}_{t,0} = \frac{\dot{K}_t}{K_0} = \left(\frac{K^*}{K_0}\right)\dot{k}_{t,*} = \left(\frac{K^*}{K_0}\right)\left(s_{k,d}d_1 e^{d_1 t} + \left(1 - s_{k,d}\right)d_2 e^{d_2 t}\right)k_{0,*} = -\left(s_{k,d}d_1 e^{d_1 t} + \left(1 - s_{k,d}\right)d_2 e^{d_2 t}\right)k_{*,0},$$

where as in equation (15):

$$k_{*,0} = \frac{\omega_{k,r}\hat{\Gamma} + \left(1 - \omega_{k,r}\right)\hat{\hat{\Gamma}} + \omega_{k,\tau}\hat{\tau} + \left(1 - \omega_{k,\tau}\right)\hat{\hat{\tau}}}{1 - \alpha}.$$

For example, the short-run response of net investment is:

$$\dot{k}_{0,0} = \dot{K}_0/K_0 = -\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)k_{*,0}. \tag{A.79}$$

Short-run versus long-run elasticities. We now relate the tax elasticities of short-run investment, $d\ln I_0$, to the long-run change, $k_{*,0}$. Using $d\ln I_0 = dI_0/I_0 = d\left(\dot{K}_0 + \delta\right)/I_0 = (1/\delta)\,d\dot{K}_0/K_0 = (1/\delta)\,d\dot{k}_{0,0}$, the short-run elasticities are given by the (scaled by $1/\delta$) partial derivatives of equation (A.79):

$$\frac{\partial \dot{k}_{0,0}}{\partial \hat{\Gamma}} = -\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)\frac{\partial k_{*,0}}{\partial \hat{\Gamma}} - k_{*,0}\frac{\partial\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)}{\partial \hat{\Gamma}}, \tag{A.80}$$

$$\frac{\partial \dot{k}_{0,0}}{\partial \hat{\hat{\Gamma}}} = -\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)\frac{\partial k_{*,0}}{\partial \hat{\hat{\Gamma}}} - k_{*,0}\frac{\partial\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)}{\partial \hat{\hat{\Gamma}}}, \tag{A.81}$$

$$\frac{\partial \dot{k}_{0,0}}{\partial \hat{\tau}} = -\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)\frac{\partial k_{*,0}}{\partial \hat{\tau}} - k_{*,0}\frac{\partial\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)}{\partial \hat{\tau}}, \tag{A.82}$$

$$\frac{\partial \dot{k}_{0,0}}{\partial \hat{\hat{\tau}}} = -\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)\frac{\partial k_{*,0}}{\partial \hat{\hat{\tau}}} - k_{*,0}\frac{\partial\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)}{\partial \hat{\hat{\tau}}}. \tag{A.83}$$

In each of equations (A.80) to (A.83), the left hand side is the (scaled by $1/\delta$) short-run investment elasticity and the first term on the right hand side is the long-run elasticity multiplied by a common scalar $-\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)$. However, the second term in each equation differs because the derivatives of $\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)$ with respect to different tax policies are not all the same. Specifically, $\left(s_{k,d}d_1 + \left(1 - s_{k,d}\right)d_2\right)$ is a function of the new steady state and hence the derivatives depend on the long-run elasticities, which vary across tax policies.

Equations (A.80) to (A.83) simplify in the case of no foreign adjustment costs, $\bar{\phi} \to 0$, since

$\lim_{\bar{\phi}\to 0} s_{k,d} d_1 + \left(1-s_{k,d}\right) d_2 = d_2$.[11] Applying this limit, for each $x \in \left\{\hat{\Gamma}, \hat{\bar{\Gamma}}, \hat{\tau}, \hat{\bar{\tau}}\right\}$ we obtain:

$$\lim_{\bar{\phi}\to 0} \frac{\partial \dot{k}_{0,0}}{\partial x} = -d_2 \frac{\partial k_{*,0}}{\partial x} - k_{*,0} \frac{\partial d_2}{\partial x}, \tag{A.84}$$
$$\text{where: } \lim_{\bar{\phi}\to 0} d_2 = \frac{\rho}{2} - \sqrt{\left(\frac{\rho}{2}\right)^2 + \frac{1}{\phi\,(1-\tau)}\left(\frac{a_{21}a_{43} - a_{23}a_{41}}{a_{43}}\right)} < 0.$$

The first term in equation (A.84) is a common scalar $-d_2$. The second term still varies across tax variables but only involves derivatives of d_2 and hence third derivatives of the production function around the new steady state (since $a_{21}, a_{23}, a_{41}, a_{43}$ involve second derivatives of F and $\bar{F}$). Since these third derivatives are small relative to the first term, all short-run elasticities scale to the long-run elasticities by approximately the same value, given by d_2. Intuitively, the difference between the ratio of short-run to long-run elasticities to e.g. Γ and $\bar{\Gamma}$ arises primarily because both ratios depend on the magnitude of domestic adjustment costs but the short-run elasticity to $\bar{\Gamma}$ also depends on the foreign adjustment cost. When $\bar{\phi} \to 0$, the only remaining difference occurs because foreign capital does not quite jump immediately to its long-run value due to the feedback from growing domestic capital to foreign capital. This feedback effect is small. In our calibration, the ratio of the short-to-long run investment elasticity varies by less than 5% across the tax variables.

The common scaling property is exact for domestic-only firms:[12]

$$\frac{\partial \dot{k}_{0,0}(\text{domestic only})}{\partial x} = -\left(d_2 + k_{*,0}\frac{\partial d_2}{\partial k_{*,0}}\right)\frac{\partial k_{*,0}}{\partial x}, \tag{A.85}$$
$$d_2(\text{domestic only}) = \frac{\rho}{2} - \sqrt{\left(\frac{\rho}{2}\right)^2 + \frac{a_{21}}{\phi\,(1-\tau)}} = \frac{\rho}{2} - \sqrt{\left(\frac{\rho}{2}\right)^2 - \frac{K^* F_{KK}}{\phi}}.$$

Because the long-run elasticities are equal for domestic-only firms, $\partial k_{*,0}/\partial \hat{\Gamma} = -\partial k_{*,0}/\partial \hat{\tau}$, the term $-\left(d_2 + k_{*,0}\frac{\partial d_2}{\partial k_{*,0}}\right)$ is the common short-to-long-run ratio. Furthermore, since $k_{*,0}\frac{\partial d_2}{\partial k_{*,0}} \approx 0$, the ratio is simply approximately $-d_2$. By the same logic, allowing for adjustment costs to labor would not break common scaling because they would not affect the long-run elasticities of capital to the tax variables.

Ratio χ_{SR}. The average deviation of investment over period 0 to T relative to date 0 is:

$$\int_0^T \left(\frac{\dot{K}_t + \delta\,(K_t - K_0)}{T\delta K_0}\right) dt = \frac{1}{\delta T}\int_0^T \left(\delta k_{t,0} - \left(s_{k,d} d_1 e^{d_1 t} + \left(1-s_{k,d}\right) d_2 e^{d_2 t}\right) k_{*,0}\right) dt$$
$$\approx \frac{1}{\delta T}\int_0^T \left(\delta\left(k_{t,*} + k_{*,0}\right) - \left(s_{k,d} d_1 e^{d_1 t} + \left(1-s_{k,d}\right) d_2 e^{d_2 t}\right) k_{*,0}\right) dt$$

[11] Because $\lim_{\bar{\phi}\to 0} d_1 \to -\sqrt{h'\left(\bar{\lambda}^*\right) a_{43}} \to -\infty$, proving this limit requires application of L'Hopital's rule.

[12] Equation (A.85) applies the chain rule to equation (A.84) since for domestic-only firms d_2 does not directly depend on tax variables. The expression for d_2 in the domestic-only case uses $a_{23} = a_{41} = a_{43} = 0$ for domestic-only firms and the definition of a_{21}.

$$\approx k_{*,0} - \frac{k_{*,0}}{\delta T}\int_0^T \left(\delta\left(s_{k,d}e^{d_1 t} + \left(1-s_{k,d}\right)e^{d_2 t}\right) + \left(s_{k,d}d_1 e^{d_1 t} + \left(1-s_{k,d}\right)d_2 e^{d_2 t}\right)\right)dt$$
$$= k_{*,0}\left(1 - s_{k,d}\left(1+\frac{\delta}{d_1}\right)\left(\frac{e^{d_1 T}-1}{\delta T}\right) - \left(1-s_{k,d}\right)\left(1+\frac{\delta}{d_2}\right)\left(\frac{e^{d_2 T}-1}{\delta T}\right)\right).$$

The long run deviation of investment is:

$$\frac{\delta\left(K^* - K_0\right)}{\delta K_0} = k_{*,0}.$$

Thus, the ratio is:

$$\chi_{SR} = 1 - s_{k,d}\left(1+\frac{\delta}{d_1}\right)\left(\frac{e^{d_1 T}-1}{\delta T}\right) - \left(1-s_{k,d}\right)\left(1+\frac{\delta}{d_2}\right)\left(\frac{e^{d_2 T}-1}{\delta T}\right).$$

In particular, as $\bar{\phi} \to 0$, $\chi_{SR} \to 1 - \left(1+\frac{\delta}{d_2}\right)\left(\frac{e^{d_2 T}-1}{\delta T}\right)$. Inverting this expression gives the domestic adjustment cost as a function of χ_{SR}.

B.11 Adjustment Cost Moments

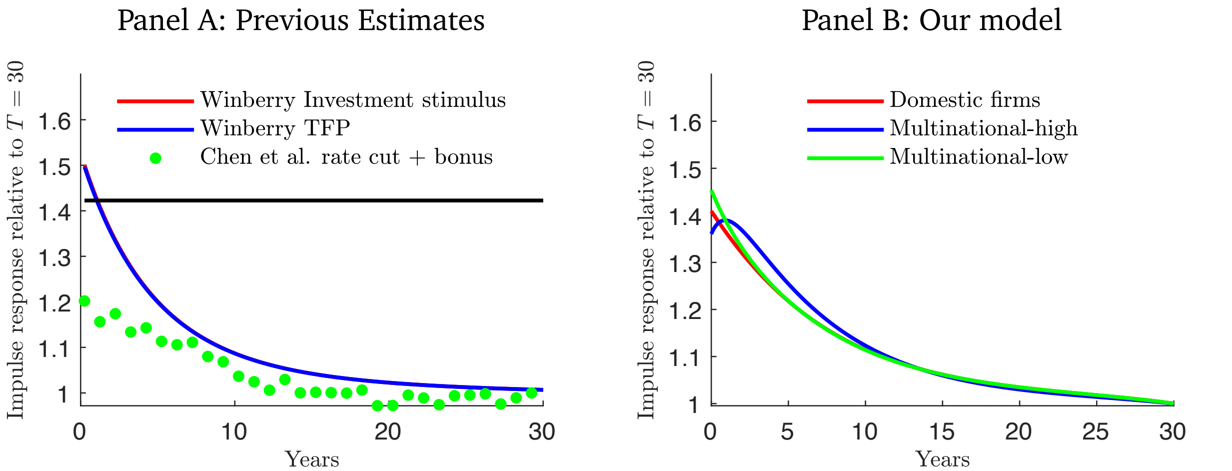
This appendix describes our analysis of the Winberry (2021) calibration. Winberry (2021) estimates a model of fixed and convex adjustment costs to match interest rate dynamics and, crucially, three targets of the firm-level investment distribution based on the SOI sample over 1998-2010, drawn from Zwick and Mahon (2017): the average investment rate, the standard deviation of investment rates, and the fraction of firm-years with an investment rate above 20%.

Using the Winberry (2021) replication code, Panel A of Appendix Figure B.1 reports first-order impulse responses of log investment to a TFP shock and to an investment stimulus shock scaled relative to a value of 1 after 30 years. Because our empirical exercise obtains firm-level investment responses to a permanent tax change, we plot these impulse responses holding the aggregate wage and interest rate fixed and setting the quarterly persistence of each shock to 0.9999. The impulse responses to a TFP and investment stimulus shock have exactly the same shape, indicating that the common scaling property derived above for a model with only convex adjustment costs carries over to models with fixed costs of adjustment as well.[13] The dashed horizontal lines shows the ratio of average log investment over the first 8 quarters (our empirical sample period) to investment after 30 years. The green dots in Panel A report the corresponding impulse response on the Chen et al. (2023) model.

Panel B reports the partial equilibrium impulse responses in our model. By construction, they initialize around the level of 1.4 found in our analysis of Winberry (small differences arise because we obtain values of ϕ using the first-order solution). The shape similarities across the domestic and multinational firms reflect the common scaling property. The small hump

[13] Of course, with fixed costs of adjustment the shape of the impulse response function is in general not invariant to the magnitude of the shock. This scale dependence disappears in the first order approximations shown in Appendix Figure B.1 and will generally be small when idiosyncratic shocks are dominant in determining when firms adjust.

Figure B.1: Impulse Responses of Firm-Level Investment



Notes: Panel A shows the partial equilibrium impulse response of log investment scaled to equal 1 after 30 years, separately for the Winberry (2021) model for investment stimulus or TFP changes and for the Chen et al. (2023) model for a combination of a rate cut and bonus depreciation. The horizontal black line shows the average response in Winberry over the first two years. Panel B reports the same impulse responses in our model.

in the multinational-high illustrates the limit of the common scaling property — as domestic capital rises, the additional response of foreign capital due to complementarity breaks common scaling, but this departure is quantitatively small.

B.12 Interpretation of a Levels Regression

This appendix considers the common regression specification of the investment-capital ratio on the level of the "tax term" in the context of our model. For simplicity, we restrict attention to domestic-only firms.

A common regression specification is:

$$\frac{I_{j,t}}{K_{j,t}} = c_1 TT_{j,t} + \alpha_j + \nu_t + e_{j,t},$$

where $TT_{j,t} = \left(1-\Gamma_{j,t}\right)/\left(1-\tau_{j,t}\right)$ denotes the "tax term." It simplifies matters to take first differences and consider the specification around a tax change at date 0:

$$\frac{I_{j,0^+}}{K_{j,0}} - \frac{I_{j,0}}{K_{j,0}} = c_0 + c_1\left(TT_j^* - TT_{j,0}\right) + \Delta e_{j,t}, \tag{A.86}$$

where $X_{j,0^+}$ denotes the value of a variable just after the tax change and TT_j^* the new tax term. We now provide an expression for c_1.

In the case of domestic-only firms, the system of (A.76) becomes:

$$\begin{pmatrix} \dot{k}_{t,*} \\ \dot{\lambda}_t \end{pmatrix} = \mathbf{A}\begin{pmatrix} k_{t,*} \\ \lambda_t - \lambda^* \end{pmatrix}, \tag{A.87}$$

with:

$$\mathbf{A} = \begin{pmatrix} 0 & h'(\lambda^*) \\ a_{21} & \rho \end{pmatrix},$$
$$a_{21} = -(1-\tau^*) K^* F_{11}(K^*; Z^*) > 0.$$

The solution is:

$$k_{t,*} = k_{0,*} e^{d_1 t}, \tag{A.88}$$
$$\lambda_t - \lambda^* = k_{0,*} d_1 \phi (1-\tau^*) e^{d_1 t}, \tag{A.89}$$

where $d_1 = \frac{\rho}{2} - \sqrt{\left(\frac{\rho}{2}\right)^2 - \phi^{-1} K^* F_{11}(K^*; Z^*)}$ is the stable eigenvalue. Furthermore, the steady state of the (domestic-only version of the) system equations (6) and (7) gives $k_{0,*} = \left(\frac{1}{1-\alpha}\right) \log(TT^*/TT_0)$, $\lambda_0 = 1 - \Gamma_0$, $\lambda^* = 1 - \Gamma^*$.

We now obtain an expression for c_1. Using equation (A.89) and the steady-state conditions gives an expression for the impact change in after-tax λ:

$$\frac{\lambda_{0^+}}{1-\tau^*} - \frac{\lambda_0}{1-\tau_0} = (TT^* - TT_0) + \left(\frac{d_1 \phi}{1-\alpha}\right) \log(TT^*/TT_0). \tag{A.90}$$

FOC (6) relates equation (A.86) to the model:

$$\frac{I_{0^+}}{K_0} - \frac{I_0}{K_0} = \frac{1}{\phi}\left(\frac{\lambda_{0^+}}{1-\tau^*} - \frac{\lambda_0}{1-\tau_0} - (TT^* - TT_0)\right). \tag{A.91}$$

Combining equations (A.86), (A.90) and (A.91), we find:

$$\begin{aligned} c_1 &= \frac{Cov\left(\frac{I_{0^+}}{K_0} - \frac{I_0}{K_0}, TT^* - TT_0\right)}{Var(TT^* - TT_0)} \\ &= \frac{Cov\left(\frac{1}{\phi}\left((TT^* - TT_0) + \left(\frac{d_1\phi}{1-\alpha}\right)\log(TT^*/TT_0) - (TT^* - TT_0)\right), TT^* - TT_0\right)}{Var(TT^* - TT_0)} \\ &= \left(\frac{d_1}{1-\alpha}\right) \frac{Cov(\log(TT^*/TT_0), TT^* - TT_0)}{Var(TT^* - TT_0)} \\ &\approx \left(\frac{d_1}{1-\alpha}\right) \times \frac{1}{TT_0}. \end{aligned} \tag{A.92}$$

The final expression in equation (A.92) contains a much more complicated mapping of parameters and policy variables into the regression coefficient than our preferred specification (see e.g. Auerbach and Hassett, 1992, for an example of this approach). Moreover, because around a tax reform firm-level heterogeneity in TT_0 likely is correlated with $TT^* - TT_0$, a cross-sectional regression need not even produce an appropriate weighted-average of $\left(\frac{d_1}{1-\alpha}\right) \times \frac{1}{TT_0}$.

A variant of equation (A.86) involves including Tobin's Q (scaled by $1-\tau$) as a separate regressor as in Desai and Goolsbee (2004). On the one hand, with quadratic adjustment costs, inspection of equation (6) shows that the regression coefficients on both $(\lambda_{j,0^+} - \lambda_{j,0}) / (1 - \tau_{j,0})$

and $\left(TT_j^* - TT_{j,0}\right)$ equal $1/\phi$, the inverse of the adjustment cost scalar. However, if the change in λ is measured with any error (e.g., because marginal Q is not observed), this approach does not consistently estimate coefficients with any clear structural interpretation.

C Data Definitions and Variable Construction

C.1 Variable Definitions in U.S. Treasury Tax Data

For firm- and industry-level variables, we use the following lines from the following tax forms: 1120, 1118, 1125-A, 3800, 4562, and 5471.

- Investment
  - Sum of Form 4562, Page 1, part I lines 7 and 8, part II line 14, part III lines 19a(c)-19i(c) and 20a(c)-20c(c), and part IV line 12.
- Capital
  - Capital is depreciable assets less accumulated depreciation.
  - Line 10a(c) less line 10b(c) on Form 1120, Page 5, Schedule L.
- Foreign Capital
  - Line 8a column b less line 8b column b on Form 5471, Schedule F.
- Export share ξ
  - Section 250 (FDII) deduction reported on 1120 schedule C divided by 0.375× taxable income (1120 line 30) less 0.1× capital (1120 schedule L line 10a less 10b).
- Liquid Assets
  - Liquid assets are cash, government obligations, and tax-exempt securities.
  - Sum of lines 1(d), 4(d), and 5(d) on Form 1120, Page 5, Schedule L.
- Revenue
  - Line 1c on Form 1120, Page 1.
- Profits
  - Line 11 less line 27 on Form 1120, Page 1.
- Sales
  - Line 11 on Form 1120, Page 1 plus line 8 on Form 1125-A.
- Earnings before interest, taxes, and depreciation (EBITD)

  - We calculate EBITD as the sum of profits, interest paid, and net depreciation.
  - Sum of lines 11, 18, 20, less line 27 on Form 1120, Page 1.
- Labor Compensation
  - Labor compensation is compensation of officers, salaries and wages, pension, profit-sharing, and other plans, employee benefit programs, and cost of labor.
  - Sum of lines 12, 13, 23, 24 on Form 1120, Page 1, and line 3 on Form 1125-A.
- Taxable Income
  - Line 30 on Form 1120, Page 1.
- Net Foreign Income
  - Line 5a on Form 1120M-3, Page 1, part I.
- Net Foreign Loss
  - Line 5b on Form 1120M-3, Page 1, part I.
- Profits Margin
  - Profits divided by sales.
  - Line 11 less line 27 from Form 1120, Page 1; all divided by the sum of line 11 on Form 1120, Page 1, and line 8 on Form 1125-A.
- EBITD Margin
  - EBITD divided by sales.
  - Sum of lines 11, 18, 20, less line 27 on Form 1120, Page 1.; all divided by the sum of line 11 on Form 1120, Page 1, and line 8 on Form 1125-A.
- Dividends
  - Line 19(a) on Form 1120, Page 2, Schedule C.
- Company age
  - Difference between year of tax record and line C on Form 1120, Page 1.
- Industry
  - SOI Industry Code determined by SOI from principal business activity code (line 2a on Form 1120, Page 3, Schedule K), prior year data, and references.
- Marginal Effective Tax Rate (METR)
  - Authors' calculations.

- GILTI Tax
  - GILTI calculations rely on fields on Form 1118 identified with the separate category code "951A." We identify firms as GILTI payers if the GILTI inclusion less 50% deduction times 21% is greater than the separate foreign tax credit. However, we do not assign GILTI tax rates to firms paying GILTI due to credit limitations. These are GILTI payers with foreign taxes before credit limitation greater than the credit limitation.
  - GILTI inclusion less 50% deduction is Schedule A, 3(a) plus 3(b) less 14(c).
  - The separate foreign tax credit is Schedule B, line 12.
  - Foreign taxes before credit limitation is Schedule B, line 6.
  - The credit limitation is Schedule B, line 11.
- Form 5471 Tax Rate
  - The average of total amount of income, war profits, and excess profits taxes paid or accrued in USD divided by the amount of total foreign income minus the total of foreign deductions, and the total amount of income, war profits, and excess profits taxes paid or accrued in USD divided by the amount of current earnings and profits in USD.
  - Average of Schedule E, line 8 divided by Schedule C, line 18, column 2 and Schedule E, line 8 divided by Schedule H, line 5d; all on Form 5471.
- Alternative Minimum Tax
  - Line 14 on Form 4626.
- Average Tax Rate
  - Equal to the total tax settlement less net section 965 tax liability paid, divided by the sum of taxable income, labor compensation, and net depreciation.
  - Line 11 less line 12 on Form 1120, Page 3, Schedule J; all divided by the sum of lines 12, 13, 20 23, 24, 30 on Form 1120, Page 1, and line 3 on Form 1125-A.
- Net Operating Loss Carryforwards
  - Schedule K, line 12 on Form 1120.
- General Business Credits
  - Schedule J, line 5c for credits used.
  - Sum of Form 3800, Part 1, line 6; Part II, line 25; and Part II, line 36 for credits available.
- Foreign Tax Credits
  - Schedule J, line 5a for credits used.

- Domestic Production Activities Deduction
  - Line 25 on Form 1120 prior to TCJA, disallowed post-TCJA.

C.2 Economic Depreciation Controls

We use data from the Bureau of Economic Analysis (BEA) on "Implied Rates of Depreciation for Private Nonresidential Fixed Assets" and the "Net Stock of Private Nonresidential Fixed Assets" to obtain an industry-by-year level measure of economic depreciation. In our analysis, industry is defined at the 3-digit NAICS level. The construction for a given year is as follows:

- The BEA provides data on implied depreciation rates at the BEA Code (a form of industry code)-by-asset code level.
- For each BEA Code, we compute an economic depreciation rate equal to the weighted average of the implied rates for asset codes EQ00 (Equipment) and ST00 (Structures).
  - The weights are given by the BEA Code-specific values of $\frac{\text{Net Stock in EQ00}}{(\text{Net Stock in EQ00}) + (\text{Net Stock in ST00})}$ and $\frac{\text{Net Stock in ST00}}{(\text{Net Stock in EQ00}) + (\text{Net Stock in ST00})}$, respectively.
- We then crosswalk the BEA Codes to 3-Digit NAICS Codes using a crosswalk provided by the BEA.
  - Certain 3-digit NAICS codes are associated with more than one BEA Code. In that case, we compute a weighted average of the BEA Code-specific economic depreciation rates.
  - The weights are given by BEA Code-specific total net stock in equipment and structures (the denominator which appears in the weights defined above).

C.3 Definitions of Control Variables for Robustness Table

- 3-digit NAICS code
  - First 3 digits of the NAICS code of the firm. Used to control for industry fixed effects.
- 4-digit NAICS code
  - First 4 digits of the NAICS code of the firm. Used to control for industry fixed effects.
- Trade Shock Controls from Flaaen and Pierce (2019)
  - Cumulative new tariff rate import share of consumption.
  - Cumulative new tariff rate export share of output.
  - Cumulative new tariff share of costs.
- Pre-period Capital
  - Capital as defined above, but before 2018. Used as a control for firm size.

- Pre-period Investment
  - Investment as defined above, but before 2018. Used to control for lagged investment.
- Intangible Capital
  - Defined as research expenses divided by the sum of research expenses and investment. Divided into deciles for use a control for intangible capital.
  - Research expenses are defined as the sum of lines 9 and 28 on Form 6765: qualified expenses for credit and qualified expenses for alternative simplified credit, respectively.
- Toll Tax Paid
  - Flag for positive toll tax. Used as a control.
  - Flag for positive value in line 12 on Form 1120, Page 3, Schedule J.

C.4 Additional Discussion of METR and GILTI Calculations

To estimate marginal effective tax rates (METRs) we simulate future income, deductions, and credits using firm-specific parameters. These parameters are estimated using a panel of tax return data from 2004 to 2016 for firms that appear in the SOI corporate sample in base years 2015 and 2016.[14] In years where the firm does not appear in the corporate sample, we supplement with information from the population of Form 1120 filings.

For each firm, we calculate the standard deviation of year-over-year change in profits, or net income. We then simulate income trajectories 20 years into the future where year-over-year changes in income are drawn from a normal distribution with mean zero and the firm's calculated standard deviation. Firms begin the simulation with the observed stock of net operating loss (NOL) carryforwards in the base year. Firms carry forward losses and deduct them against income in future years. We do not model NOL carrybacks for computational tractability and because most firms choose not to amend prior tax returns to carry back losses (Zwick, 2021).

In evaluating out-of-sample prediction, we initially found that some firms are assigned a probability of switching between profit and loss that is too low. Further, we observe that losses are less persistent than gains, an asymmetry not captured by our standard deviation measure. To better match observed income dynamics, we make two adjustments to the simulated change in income. First, the standard deviation used to simulate changes in income is restricted to a minimum of half of the absolute value of base year net income. This ensures each firm has a non-trivial chance of switching between profit and loss. Second, in years immediately following losses, we assign change in income from a distribution where the standard deviation is doubled. This better matches the observed asymmetrical income volatility following profit or loss.

We calculate historical take-up of credits and deductions in two parts. We first calculate a binary take-up rate as the share of years in which the firm claimed the credit or deduction

[14] In robustness analysis, we construct "endogenous" METRs using 2018 and 2019 as base years and instrument these with the METRs derived from pre-TCJA values.

conditional on having positive tax liability after carryforwards but before credits. For General Business Credits (GBCs) and the Domestic Production Activity Deduction (DPAD), claiming rates are approximately zero for firms with no regular tax liability before credits.

In the second step, we calculate firm-specific credit or deduction amounts conditional on claiming. For DPAD, we scale claimed amounts by income after carryforwards, then take logs. We then calculate the firm-level mean and standard deviation of log values. For GBCs we assign the log mean and standard deviation of credits available as opposed to credits claimed because the repeal of corporate AMT relaxes some of the limitations on use of GBCs following TCJA.

For GBCs and DPAD, we assign each simulated firm-year a binary indicator for claiming the credit or deduction set to 1 with probability equal to the firm-specific take-up rate. We also assign a conditional credit or deduction amount drawn from a lognormal distribution with firm-specific mean and standard deviation. To estimate post-TCJA METRs, simulated DPAD is added to income with a probability equal to the firm's DPAD take-up rate.

Appendix Figure C.1 compares simulated and realized values of income, DPAD, and GBCs for 2016. Simulations use data through 2015 to predict outcomes one year in the future. We calculate the probability of outcomes (e.g., claiming GBCs) as the share of simulated or realized observations in which the outcome occurs. A 45-degree line is overlaid to compare our simulation with perfect prediction. For income, DPAD, and GBCs, predicted probabilities and levels are highly predictive of realized values. Firms claim GBCs and DPAD at slightly higher rates than our simulations would predict, but across bins, the average discrepancy is less than 5%. In general, log income, DPAD, and GBCs closely match predicted values, though they become more noisy for log values less than 2 (approximately $7,000).

Each simulated trajectory of income, deductions, and credits is compared with a trajectory in which base year income is increased by one percent of revenue. Pre-TCJA and Post-TCJA tax schedules and net operating loss rules are applied to both the baseline simulation and the simulation receiving an income shock. In the Pre-TCJA calculation, firms claim DPAD against the income shock with a probability equal to their previous DPAD takeup rate. The deduction amount is the minimum of 9%, or the income shock multiplied by the simulated value of DPAD scaled by income. METRs are estimated as the increase in the net present value of tax divided by the income shock. The net present value is calculated with a discount rate of 6%. We run this simulation 50 times for base years 2015 and 2016, then take the average value as our METR.

Our simulation does not include foreign tax credits (FTCs) as we are interested in the METR for domestic income. Firms generally face two limitations on the use of FTCs. First, FTCs are non-refundable so they cannot reduce tax liabilty below zero. Second, firms can only offset the foreign share of US tax, where the foreign share is calculated as the ratio of foreign income to the sum of foreign and domestic income.[15] On the margin, firms with negative domestic income and positive foreign income are unconstrained by this second limitation because the foreign share is greater than 1. For these firms, any additional tax can be offset by FTCs to the extent the firm has paid qualifying foreign taxes. To account for this problem, we replace taxable income in the base year with domestic income when domestic income is negative.

To model the corporate AMT in the pre-TCJA period, we estimate a linear probability model

[15] We calculate domestic income as net income minus all foreign dividends reported on Schedule C. Foreign income is the sum of all foreign dividends reported on Schedule C.

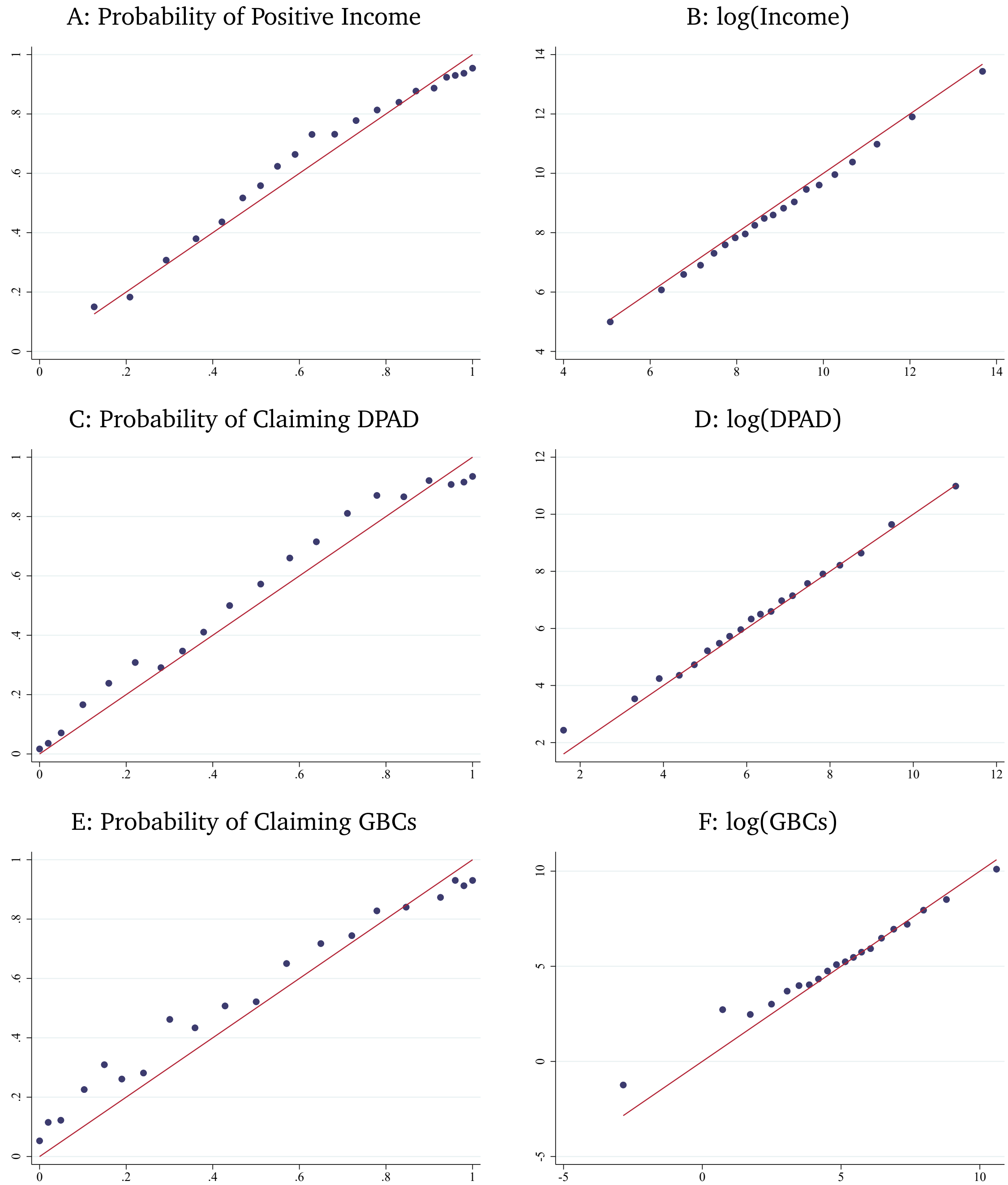
for whether a firm pays AMT in 2017 based on separate indicators for paying the AMT in 2015 or 2016. The final METR is a weighted average of the corporate AMT rate (20%) and the simulated METR with the weight being the predicted probability of paying the AMT. For firms with predicted probability of paying the AMT less than 5%, we set the weight on the AMT rate to zero.

C.5 Decomposing Variation in Tax Shocks

This section describes three ways to decompose the tax shocks to understand the importance of different sources for variation in firm-level tax shocks. We constructed measures of our main tax variables that isolate variation from different sources: base year income differences, net operating losses, tax credits (e.g., general business tax credits), and base provisions (e.g., the domestic production activities deduction and the AMT). We then formed measures of net-of-tax rate changes based on each of these sources and saw how well these measures relate to our baseline tax rate term. One version used the full tax shock excluding variation from that specific type of provision (Appendix Figure C.2) and another only used variation from that specific type of provision (Appendix Figure C.3). We then regress our main tax shock on these different measures and report how the R-squared changes when we only use these provision-specific tax-shocks (Appendix Figure C.4). We also do a variance decomposition exercise that reports what share of the variance in the explainable variation in our main tax shock comes from each provision.

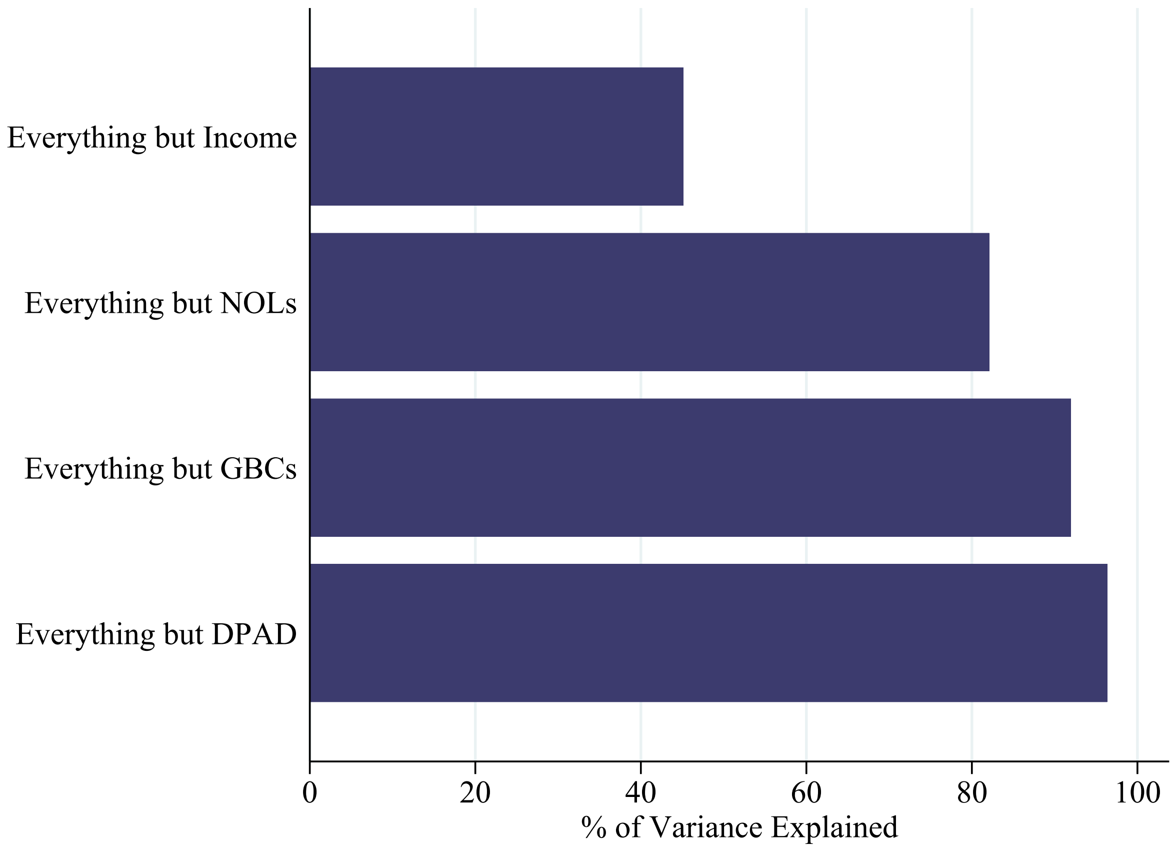
We find that each of these sources generate firm-level variation, but that base year income is the most important source of variation in the firm-level tax rate. Net operating losses and the AMT also account for material amounts of variation, whereas DPAD and business credits contribute a positive but smaller amount.

Figure C.1: Comparison of Predicted and Realized 2016 Income, Deductions, and Credits



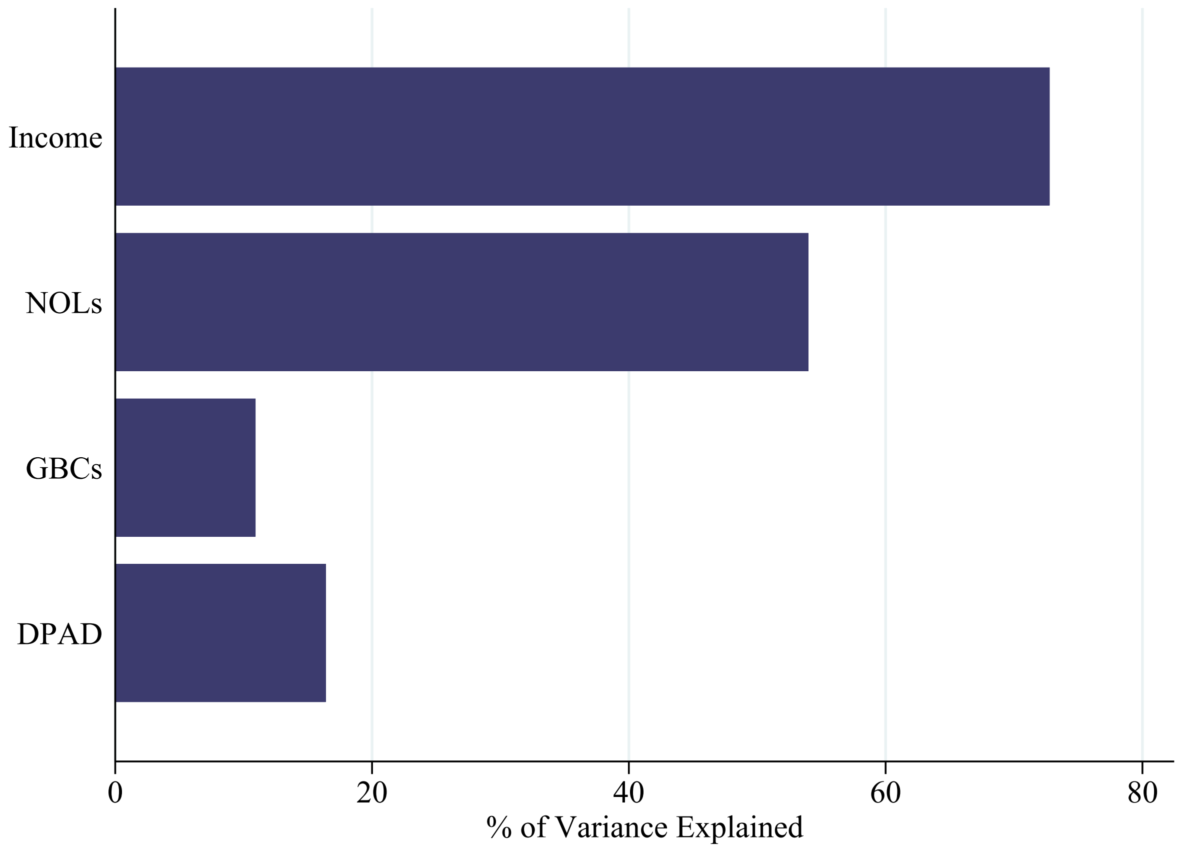
Notes: Each panel compares predicted and realized 2016 values for firms in our sample. Firm-level predictions are mean values across 50 simulations using data from 2004 to 2015 to predict one year into the future. We calculate the probability of outcomes (e.g. claiming GBCs) as the share of simulated or realized observations in which the outcome occurs. Mean predicted and realized values are calculated within 20 bins sorted by predicted values. Panel A compares the simulated probability of reporting positive income (net income minus special deductions) with the realized share of firms with positive income. Panel B compares predicted and realized log income. Panel C compares the simulated probability of claiming the domestic production activity deduction (DPAD) with the realized share of firms claiming DPAD. Panel D compares predicted and realized log DPAD deductions. Panel E compares the simulated probability of claiming General Business Credits (GBCs) with the realized share of firms claiming GBCs. Panel F compares predicted and realized log GBCs.

Figure C.2: Proportion of Explained Variance in $\hat{\tau}$ by Excluded Provision



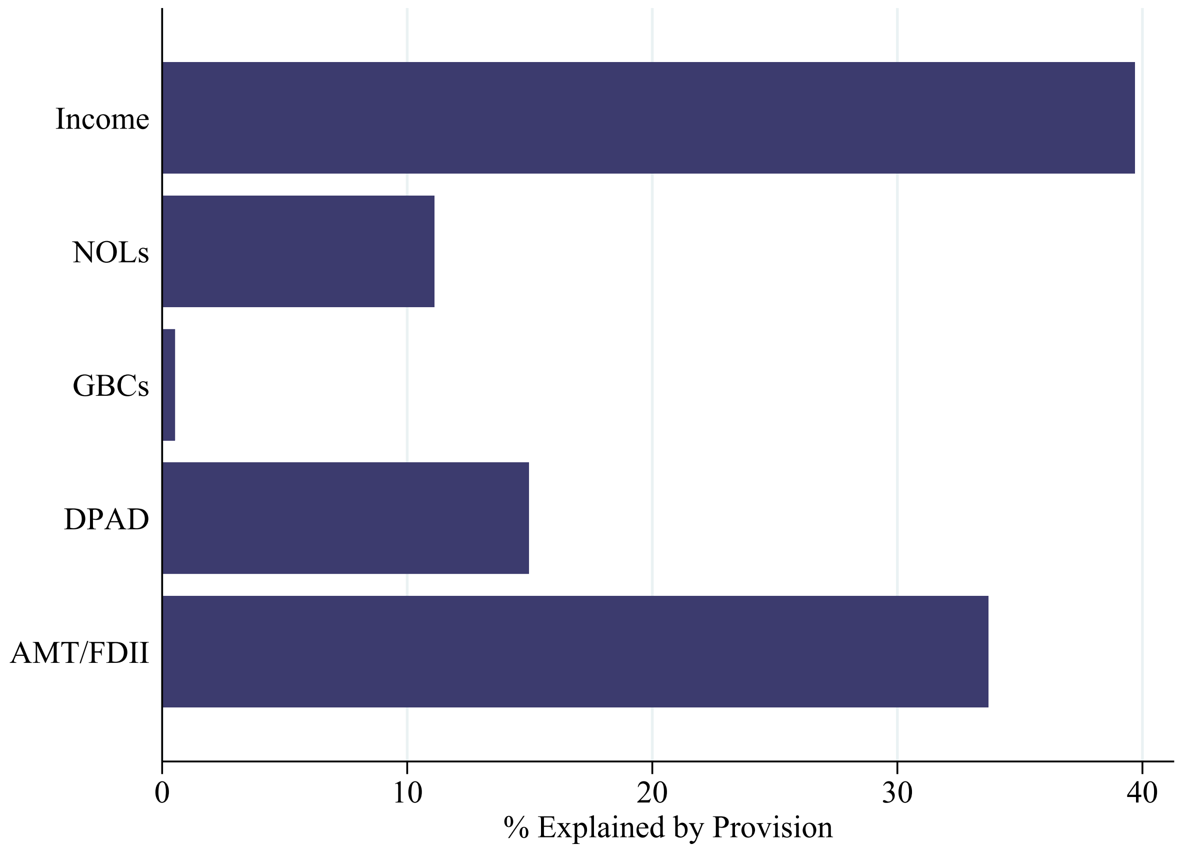
Notes: This figure plots the R^2 values, multiplied by 100 for ease of interpretation, from four regressions with $\hat{\tau}$ on the left hand side. On the right hand side of each regression is $\hat{\tau}$ after removing all variation due to one of four provisions: the reduction of the corporate income tax rate (Income); the changes to how net operating losses are treated (NOLs); changes to general business credits (GBCs); and the repeal of the Domestic Production Activities Deduction (DPAD).

Figure C.3: Proportion of Explained Variance in $\hat{\tau}$ by Provision



Notes: This figure plots the R^2 values, multiplied by 100 for ease of interpretation, from four regressions with $\hat{\tau}$ on the left hand side. On the right hand side of each regression is $\hat{\tau}$ with only the variance from one of four provisions: the reduction of the corporate income tax rate (Income); the changes to how net operating losses are treated (NOLs); changes to general business credits (GBCs); and the repeal of the Domestic Production Activities Deduction (DPAD).

Figure C.4: Decomposition of Variation in $\hat{\tau}$ by Provision



Notes: This figure decomposes the share of variance in $\hat{\tau}$ which is explained by five key provisions: the reduction of the corporate income tax rate (Income); the changes to how net operating losses are treated (NOLs); changes to general business credits (GBCs); the repeal of the Domestic Production Activities Deduction (DPAD); and the repeal of the corporate alternative minimum tax as well as the new deduction for foreign derived intangible income (AMT/FDII). Jointly, these five provisions explain 84.3% of the variation in $\hat{\tau}$. Each bar represents what share of that explained variance is due to the respective provision. Specifically, we run the regression $\hat{\tau} = \beta_0 + \sum_{j=1}^{5} \beta_j \hat{\tau}^j + \varepsilon$, where $\hat{\tau}^j$ is a measure of $\hat{\tau}$ which only includes variation due to the j'th provision. Then each bar is equal to $\frac{\mathbb{V}(\hat{\tau}^j \beta_j)}{\sum_{i=1}^{5} \mathbb{V}(\hat{\tau}^i \beta_i)}$.

D Additional Results

D.1 Foreign Capital Response

Using tax data for foreign subsidiaries of U.S. multinationals from Form 5471, Appendix Table G.1 turns to another key outcome, the response of foreign tangible capital. Through the lens of our theory, the short-run elasticity of foreign capital to $\bar{\Gamma}$ must be positive for complementarity to rationalize the positive $\bar{\Gamma}$ coefficients in Table 3. Panel A reports our baseline specification in the pooled multinational firm sample but with the log change in foreign capital as the dependent variable. The $\bar{\Gamma}$ coefficient of 0.57 is statistically significant and implies an increase in foreign capital of roughly 8% for firms subject to GILTI. For comparison, perturbing post-TCJA $\bar{\Gamma}$ around its mean value and calculating the two-year average log deviation of foreign capital $\bar{K}$ in the model yields a short-run elasticity of around 1.3. Panel B reports the location of foreign capital before and after TCJA. The foreign capital stock of U.S. multinationals grew in all regions, but grew fastest in the G7, BRIC, and other countries. The share of foreign tangible capital in tax havens fell, especially in the small island havens that had relatively low capital before TCJA. This geographic pattern suggests that the reported accumulation reflects actual foreign investment and not simply accounting gimmicks in response to GILTI and hence could plausibly complement domestic capital.

D.2 Robustness

Appendix Tables G.2 and G.3 collect robustness tests designed to support a causal interpretation of the baseline regressions.

The first row of Appendix Table G.2 repeats the baseline coefficients. The next several rows add different covariates. Row 2 addresses the particular concern of the "trade war" in 2017 by including three trade war exposure measures within manufacturing industries from Flaaen and Pierce (2019): import protection, rising input costs, and foreign retaliation measures. Row 3 includes a control in the multinational sample for whether firms paid the "toll tax" on previously unrepatriated foreign earnings under Section 965. This indicator combines reported toll tax payments from tax returns with supplemental measures hand- and GPT-collected from financial statements.[16] Row 4 adds a control for the intangible intensity of a firm's domestic operations, measured as the mean ratio of R&D expenditure relative to the sum of R&D expenditure and investment. We include this control via indicators by decile of intangible intensity. Row 5 controls for size bins defined over pre-TCJA capital. Each of these controls leaves the tax term coefficients essentially unchanged. Row 6 adds a control for lagged investment growth, which slightly increases the magnitudes of the domestic tax terms in absolute value. Rows 7 and 8 show that the estimates are similar to the baseline with NAICS 3 or 4 digit fixed effects. These industry controls flexibly remove the influence of industry-by-time shocks, thus absorbing many possible confounding factors.

The remaining rows perturb the specification or sample. Row 9 weights the regression by lagged log capital. The tax elasticities remain quite similar. Row 10 drops industries with high

[16] Using BEA data, Albertus, Glover and Levine (Forthcoming) find no evidence of differential investment responses to the TCJA for firms with large amounts of unrepatriated cash, who would be subject to large toll tax payments.

investment through partnerships that our investment measure may miss, with small changes in the coefficients. Row 11 drops firms that have at least 50% of their foreign income in tax havens.[17] The results are similar to the baseline, suggesting firms likely to be active profit-shifters are not driving the results.

Row 12 reports coefficients from a simulated instrumental variables (IV) regression. In our baseline regression, $\hat{\tau}$ comes from applying pre and post-TCJA tax law to the projected income path starting from a firm's 2015 and 2016 tax returns to generate METRs for 2015 and 2016 with and without TCJA. The row 12 specification instead uses this measure as an excluded instrument, with the endogenous variable the difference between the average METR in 2015 and 2016, obtained by applying pre-TCJA tax law to the firm's 2015 and 2016 tax returns and simulated income paths, and in 2018 and 2019, obtained by applying post-TCJA tax law to the firm's 2018 and 2019 tax returns and simulated income paths. Differences between the excluded instrument and endogenous variable arise because of changes in firms' taxable income statuses or deductions and credits between these years. In practice these inputs are highly persistent and the simulated IV yields very similar coefficients.[18]

Row 13 includes the level of economic depreciation and its interaction (after demeaning in the sample) with each of the tax policy terms.[19] These interaction terms address the possibility that the policy change correlates with economic depreciation, which also affects the short-run response of investment to the policy change. In practice, the main effects of the policy terms do not change much when including these interactions, suggesting limited correlated between treatment effects and the policy changes or limited heterogeneity in the treatment effects.

Row 14 instruments for the METRs using versions of those tax terms that exclude all variation to the base income, which Figure C.4 shows is an important source of tax shock heterogeneity. The instrument isolates variation across firms that is driven by tax policy changes.

D.3 Alternative Assumptions on Foreign Tax Shocks

Our baseline specification assumes firm expectations of the foreign effective tax rate approximately matches their post-reform rate. This assumption simplifies our analysis by abstracting from potential heterogeneity in the effective foreign tax shock. Here we consider the robustness of our main results to alternative assumptions.

The literature presents mixed conclusions about the effect of the TCJA on foreign marginal effective rates. Dharmapala (2018) argues that, despite the move in the direction of territorial taxation, the reform nevertheless *may have increased* tax rates if firms expected a tax holiday on repatriations in the future. For example, if firms expected a holiday approximating the 2004 American Jobs Creation Act (AJCA), which offered a 5.25 percent tax rate for repatriated earn-

[17]For this categorization, we consider both income in dot havens like Bermuda and the Cayman Islands and non-dot havens like Ireland and the Netherlands. Within the sample of multinational firms, these firms account for 7% of the sample of firms and 30% of foreign and domestic capital.

[18]The simulated IV also addresses the possible role of measurement-error-induced attenuation coming from constructing the METRs using firm-level income simulations.

[19]We measure economic depreciation using the Bureau of Economic Analysis "Implied Rates of Depreciation for Private Nonresidential Fixed Assets." We aggregate the rates (which are measured at the industry-asset-year level) to the 3-digit NAICS-by-year level using additional data from the BEA on the net stock of equipment and structures in each industry-year pair. More information on this process can be found in Appendix Section C.2.

ings, the TCJA could have increased the foreign tax rate relative to this baseline. Alternatively, if firms expected a holiday rate closer to the 15.5 percent rate that applied to liquid assets, then the TCJA would have reduced the foreign tax rate going forward. Consistent with this view, Dyreng et al. (2023) finds that the effective tax rate on foreign income fell a few percentage points for listed US firms, and fell more for firms doing less profit shifting prior to the reform. Conversations with practitioners and experts suggest a range of experiences that depend on each firm's situation.

Our baseline approach—assuming a change on average equal to what transpired—can be seen as a middle ground given the uncertainty in the nature of the foreign tax shock. Here, we consider three alternative approaches that relax this assumption. First, we assume firms expected an AJCA-like holiday rate of 5.25 percent. We also incorporate the 85% limit on the use of foreign tax credits that accompanies the preferential rate. For firms paying very low effective foreign tax rates, this assumption implies an increase in foreign effective rates of a few percentage points. The second approach assumes firms are subject to a TCJA-like holiday rate of 15.5 percent, equal to the rate the reform applied to repatriations of liquid assets. This assumption implies a decrease in tax rates for firms that previously had low effective foreign tax rates. The third approach assumes firms are subject to a blended holiday rate that averages the 15.5 percent rate on liquid assets and the 8 percent rate on illiquid assets. We use firm-specific average net PPE relative to total assets reported on all Form 5471s to determine the illiquid share. This approach implies a modest decrease in effective foreign tax rates for most firms, with larger decreases for firms with more liquid assets abroad. In all cases, we derive firm-specific effective foreign tax rates paid abroad from Form 5471 following Dowd, Landefeld and Moore (2017).

Appendix Tables G.4-G.6 present summary statistics for the alternative assumptions on foreign tax shocks. The average effective foreign tax rate for all multinationals prior to TCJA is between 25 and 26 percent, which includes both taxes paid abroad and the additional expected US tax on foreign source income. In the first scenario, some firms experience a small tax decrease of 2 percentage points and others experience a substantial tax increase up to 7 percentage points. In the other two scenarios, some firms experience modest decreases of 2 to 4 percentage points, but very few firms experience increases. Note that firms paying substantial tax abroad prior to the reform experience no change in taxes, such that the median change in effective foreign tax rates is zero across all three scenarios. The non-AJCA scenarios deliver changes more in line with the empirical literature estimating effective taxes on foreign source income (Dyreng et al., 2023).

Appendix Tables G.7 and G.8 present augmented regressions that incorporate these alternative assumptions in regressions with domestic investment growth and foreign capital grwoth as the left-hand-side variables, respectively. We highlight three findings. First, adding these alternative assumptions does not change the coefficient on the domestic tax shocks or $\hat{\hat{\Gamma}}$. Second, the coefficient on $\hat{\hat{\tau}}$ is statistically insignificant in the case of domestic investment, though the magnitude is consistent with the coefficient on $\hat{\hat{\Gamma}}$. As noted above, the reform only had small effects on foreign tax rates, so there is limited power to identify effects separately. Finally, the coefficient on $\hat{\hat{\tau}}$ is larger and statistically significant in the case of foreign capital growth in the blended rate scenario. It is also notable that the coefficient has the correct sign only in the TCJA holiday rate scenarios, which supports the notion that most firms experienced the reform as a modest decrease in foreign tax rates.

A growing empirical literature, contemporaneous with our work and surveyed in Dharmapala (2024), presents related findings to ours. Using different methods to identify firms subject to GILTI, this literature finds that firms likely to be subject to GILTI increased foreign investment and both foreign and domestic M&A activity (Atwood et al., 2023; Beyer et al., 2023*b*). Crawford and Markarian (2024) compare US to Canadian multinationals and find higher global investment for US firms, especially capital-intensive and financially constrained firms. They find substantial declines in effective tax rates for multinational firms using accounting data. We document similar patterns in our companion paper Chodorow-Reich et al. (2025), which uses a synthetic matching approach to compare the trajectories of global investment and other outcomes for public US firms relative to similar foreign multinationals.

D.4 Other Outcomes

Appendix Tables G.9 and G.10 show results for other firm outcomes: the investment to capital ratio, log domestic capital accumulation, log investment by subcomponent, log tax payments, log labor compensation, log salaries and wages, log officer compensation, and log R&D. The investment-to-capital ratio increases strongly with the tax term change $\hat{\Gamma} - \hat{\tau}$ in the domestic sample. Both equipment and structures investment increase by a comparable magnitude, indicating that the total tangible investment response in the main specifications comes from a combination of both types of investment. The effects on domestic capital mirror those on investment. Various measures of labor compensation increase in the domestic sample, though the labor compensation effects in the multinational sample are less precise.[20] As expected, tax payments decline with the policy change. We also find some evidence of R&D expenditure effects but leave a full investigation of intangibles to future work.

E Mergers and Acquisitions

E.1 Related Literature

While Lyon (2020) finds that the value of U.S. acquisitions of foreign firms increased by 50% and that the acquisition of U.S. assets by foreign firms declined by 25% immediately following the passage of the TCJA, Amberger and Robinson (2023) and Dunker, Overesch and Pflitsch (2022) find that U.S. acquisitions of foreign firms decreased. Using a difference-in-differences design to compare U.S. and non-U.S. firms, Amberger and Robinson (2023) find that the probability of a U.S. firm acquiring a foreign firm decreased by 3.5-4.5 percentage points, while there was no change in the foreign mergers and acquisitions behavior of non-U.S. firms. Dunker, Overesch and Pflitsch (2022) similarly find that U.S. firms acquire firms in low-tax countries and tax havens significantly less often following the passage of the TCJA. They find that these changes are mainly driven by GILTI-affected firms and that there is no evidence of changes in mergers and acquisitions activity for firms that are unaffected.

[20] The magnitudes for these other outcomes (e.g., capital, labor) may reflect M&A activity, which makes it difficult to compare them to our main investment results. Appendix E presents some analysis of M&A patterns for U.S. multinationals following prior work.

E.2 Construction of Mergers and Acquisitions Sample

Following Dunker, Overesch and Pflitsch (2022), we construct a sample of mergers and acquisitions using the Refinitiv SDC Mergers and Acquisitions data. Starting with a sample of all cross-border mergers and acquisitions from 2010 to 2019 with non-missing deal values and non-U.S. targets, we remove deals that are declared as internal restructurings or where the acquirer does not hold a majority stake in the target. We then merge with Compustat data, only keeping deals where the acquirer is not missing financial data and dropping deals with firms in the financial or utility industries. Finally, we drop deals where the target country has fewer than 10 deals observed or where the target country switched between the low-tax and high-tax group during the sample period. A complete waterfall table comparing our sample to the sample in Dunker, Overesch and Pflitsch (2022) can be found in Appendix Table E.1. We follow them in defining GILTI-affected firms for this section.

We also use the same raw Refinitiv SDC Mergers and Acquisitions data to build a sample of U.S. mergers and acquisitions following Lyon (2020). We restrict the samples to deals where either the acquiring or target firm is based in the U.S. and at least 20% of the target firm is acquired. We also drop transactions with missing deal values or unknown locations for the target or acquirer. This results in a dataset with a total deal value of \$14.4T, which closely matches the \$14.2T in M&A deal value from Lyon (2020).

E.3 Mergers and Acquisitions Results

Appendix Figure E.1 plots the average annual M&A deal value by U.S. acquirers before and after the passage of the TCJA. Panels A and B replicate panels B and E in Figure 1 of Dunker, Overesch and Pflitsch (2022), where deals are divided by their target country. Low-tax target countries are defined as those below the 25^{th} percentile of the sample distribution. Like Dunker, Overesch and Pflitsch (2022), we find that there is an increase in the annual value of U.S. M&As after the TCJA was passed, and that this is driven by GILTI-affected firms acquiring firms in high-tax foreign countries. The GILTI-affected firms spend less on M&As in low-tax countries in the post-period.

We also used our replication of the Lyon (2020) sample to investigate the claims made in Lyon (2020) and Goodspeed and Hassett (2022). Panels C and D in Appendix Figure E.1 show that the dollar-value of U.S. acquisitions increased by 34% after 2017 and that foreign acquisitions of U.S. firms decreased by 31%. Lyon (2020) instead finds that the dollar-value of U.S. acquisitions increased by 50% and that foreign acquisitions decreased by 25%.[21]

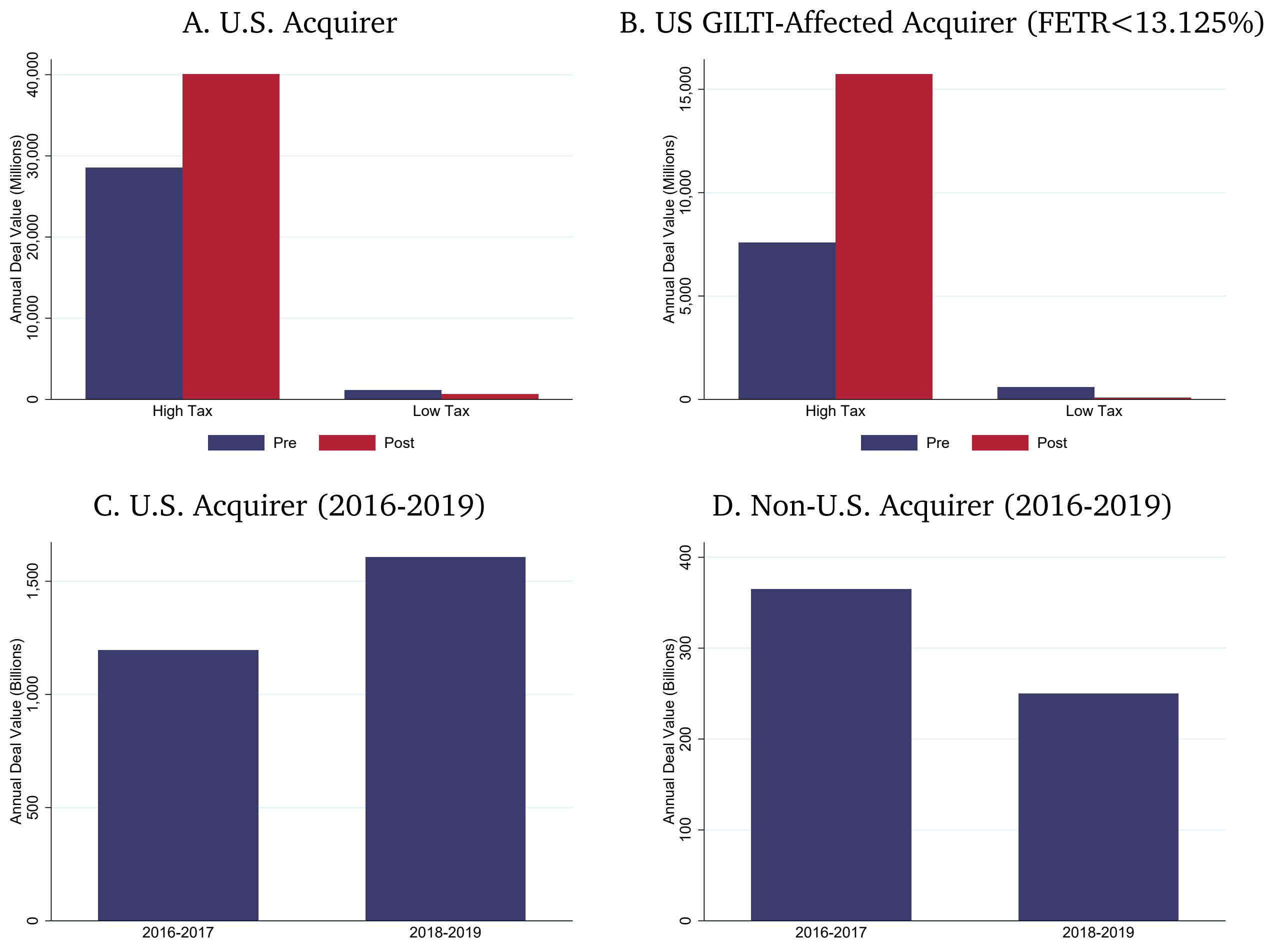
[21] Note that our sample is different from that of Lyon (2020). While we were able to closely replicate the initial dataset, which had \$14.2 trillion in domestic and cross-border M&A transactions by U.S. firms from 2010 to 2019 (roughly 1% less than the total deal value we found), Lyon (2020) then reclassified \$8.5T in redomiciliations of U.S. firms as acquisitions by foreign firms instead of acquisitions by U.S. firms. We are unable to account for these inversions in our dataset.

Table E.1: Mergers and Acquisitions Waterfall

Description	Dunker et al. (2023)	Our Sample
All cross-border M&A deals with non-missing deal value of U.S. and non-U.S. acquirers announced between 2010 and 2019 (Source: SDC Platinum). Deals with U.S. targets are excluded.	45,861	34,416
Less: M&A deals in which the acquirer does not or will not hold a majority stake in the target and deals that are declared as internal restructurings.	(11,006)	(9,098)
Less: M&A deals of acquirers not included in Compustat.	(16,918)	(17,048)
Less: M&A deals of firms from the financial and utility industries	(3,808)	(952)
Less: M&A deals with missing financial data. Also requiring at least 10 deals per target country and eliminating target countries that switch between a low-tax and high-tax group during the sample period.	(4,048)	(2,575)
Final Sample	**10,081**	**4,743**

Notes: The financial data that are required include the Compustat variables: CH (Cash); AT (Assets); PPENT (Property, Plant, and Equipment); INTAN (Intangible Assets); DLTT (Long-Term Debt); PI (Pretax Income); SALE (Sales/Turnover); ACT (Current Assets); and LCT (Current Liabilities) in year t-1 and SALE in year t-2.

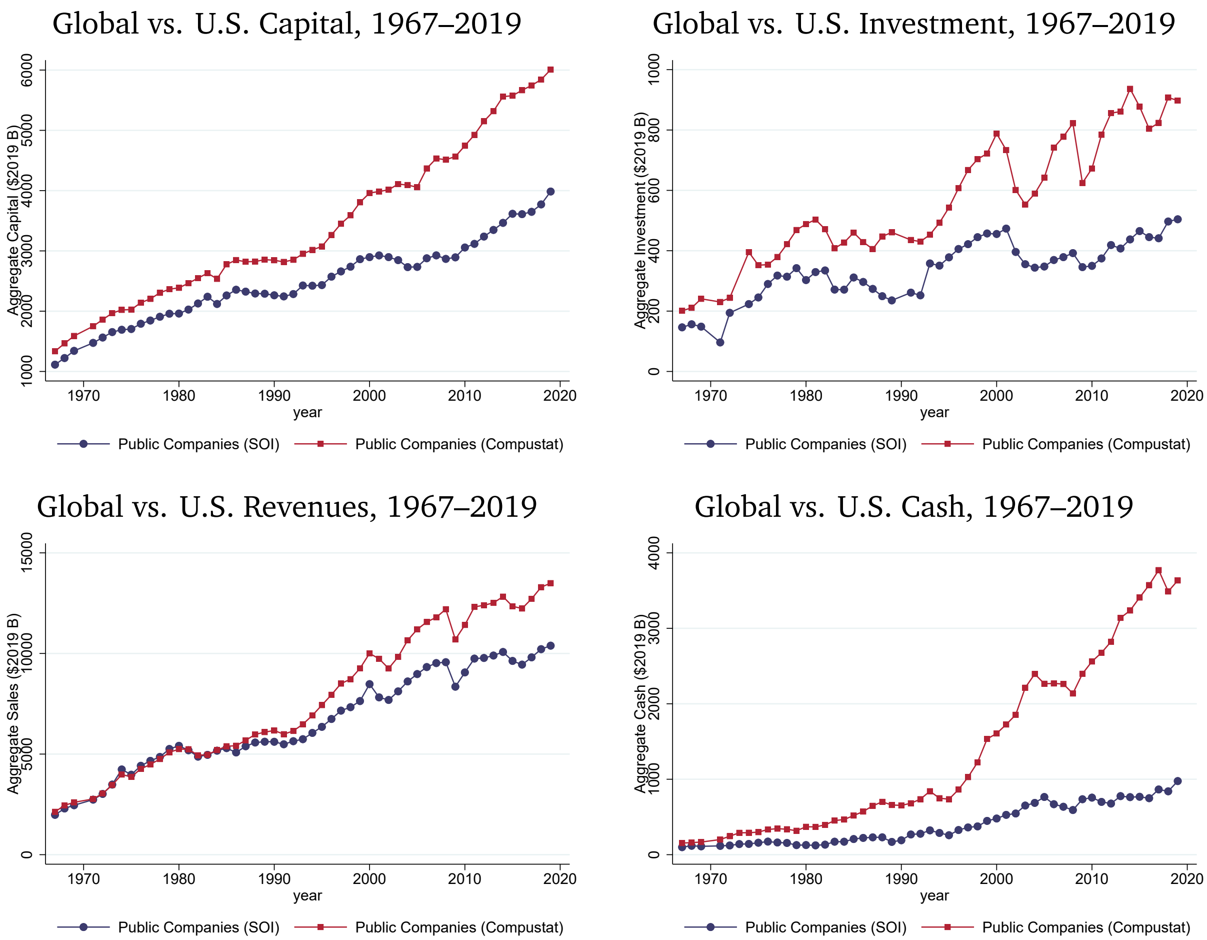
Figure E.1: Annual Aggregate Cross-Border Merger and Acquisition Deal Value Before and After the TCJA



Notes: Panels A and B use the dataset from Refinitiv following the sample restrictions from Dunker, Overesch and Pflitsch (2022), and panels C and D use the Refinitiv data with a separate set of restrictions that follow Lyon (2020). The definition of GILTI-affected in panel B follows Dunker, Overesch and Pflitsch (2022) in using a foreign effective tax rate (FETR) threshold of 13.125%, which is the threshold at which GILTI ceases to bind.

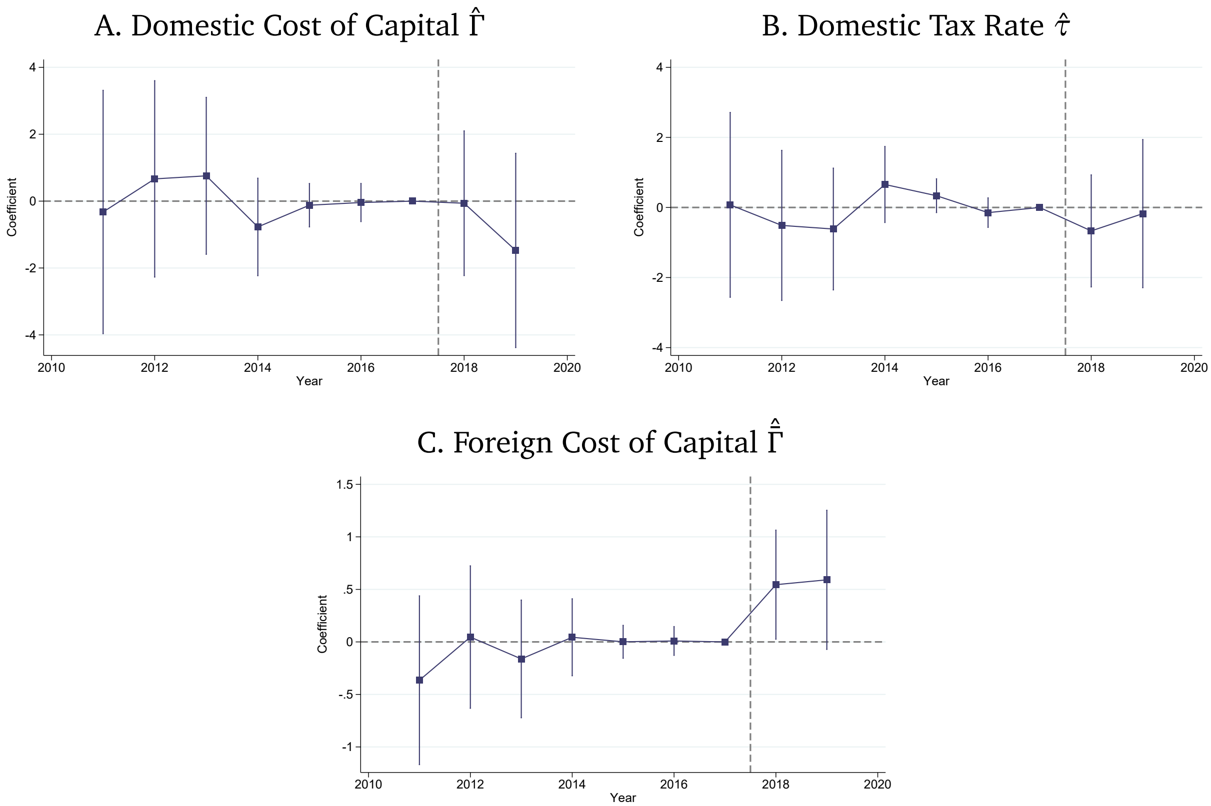
F Appendix Figures

Figure F.1: Activity by U.S. Firms is Increasingly Global (Unscaled)



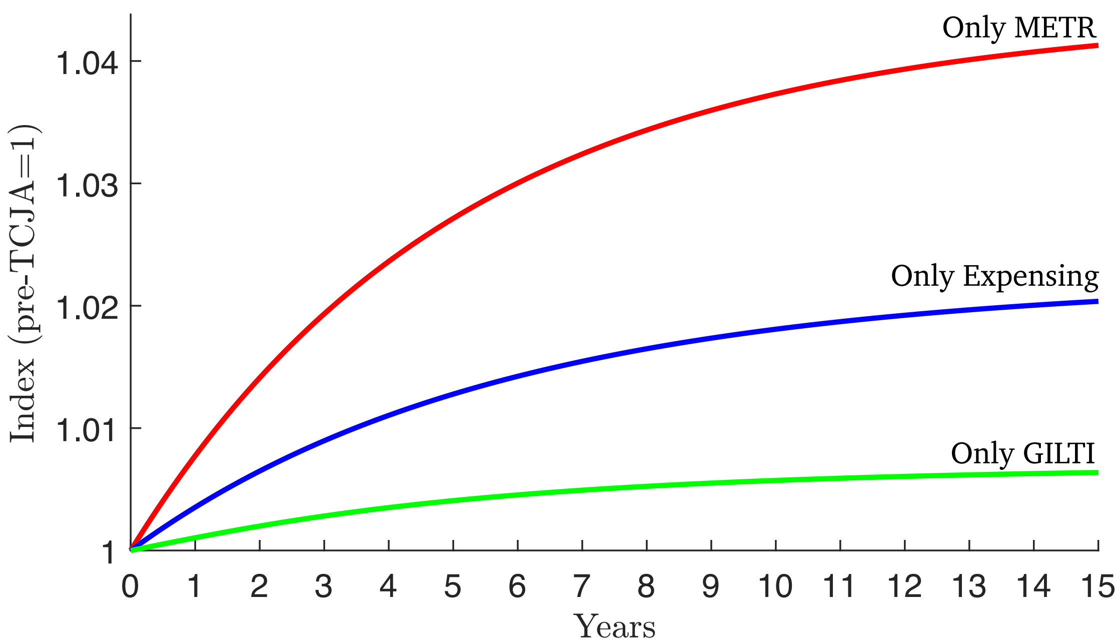
Notes: These figures present the unscaled versions of the figures in Figure 1. They use Compustat–SOI datasets to plot aggregates for domestic variables versus global variables for firms we are able to merge each year. We use the following Compustat variables for global measures: PPENT for capital, CAPX for investment, SALE for revenues, and CHE+IVAO for cash. Pre-1993 SOI investment only includes investment-tax credit-(ITC)-eligible basis, understating the divergence in the figure. The last year of Compustat PPENT excludes capitalized operating leases per a change in accounting rules using data from Compustat Snapshot. We thank Yueran Ma for guidance on this correction.

Figure F.2: Year-by-Year Foreign Capital Effects by Tax Term Component for Multinationals



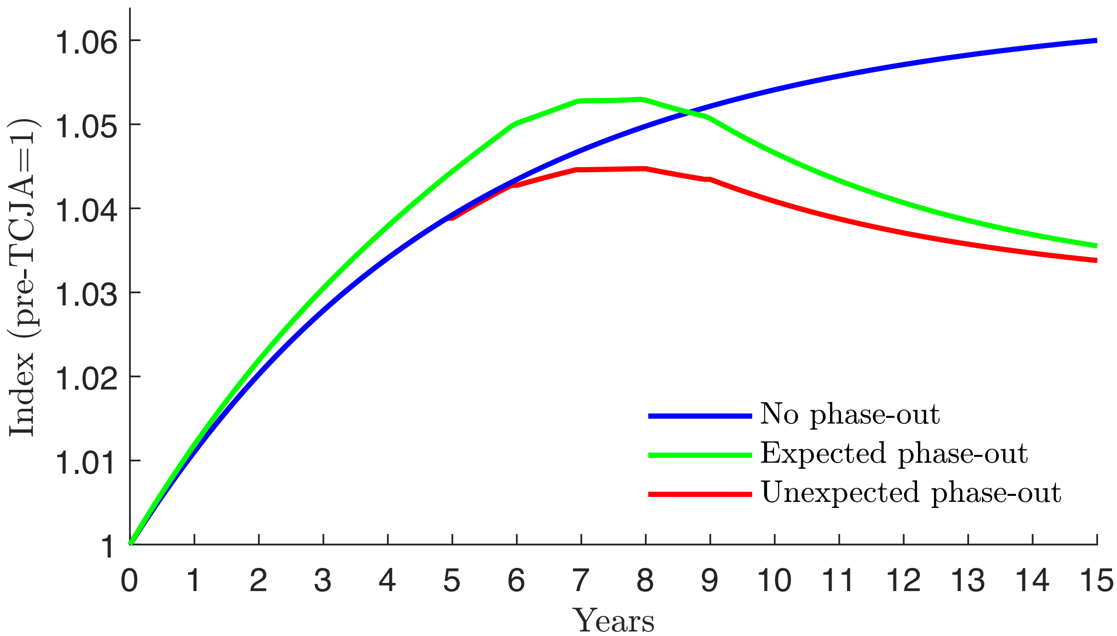
Notes: These figures plot the tax-term coefficients between 2011-2019 from an analogous regression to the one specified in equation (19), but with $d\,\log(\text{Foreign Capital})$ on the left hand side, using our firm-level corporate tax data. The coefficients in each year come from separate regressions with the dependent variable the log change in foreign capital between 2017 and the year shown and the right hand side variables fixed at their pre-to-post TCJA change. All three panels report coefficients for the pooled multinational firm sample. The solid vertical lines depict 95% confidence intervals.

Figure F.3: Model-Implied Capital by TCJA Provision



Notes: The figure shows the model-implied paths of domestic corporate capital applying only the TCJA changes to the METR τ (red line), to expensing (blue line), or GILTI (green line).

Figure F.4: Role of Expensing Phase-out



Notes: The figure shows the model-implied paths of domestic corporate capital under the baseline assumption of no phase-out or expected phase-out of the expensing provisions (blue line), when firms fully anticipate phase-out of expensing as written into the TCJA law (green line), or when firms are surprised each year that bonus depreciation ratchets down (red line).

G Appendix Tables

Table G.1: Foreign Capital Growth

Panel A: Regression Estimates

Regressor:	$\hat{\Gamma}$	$\hat{\hat{\Gamma}}$	$\hat{\tau}$	N
d log(Foreign Capital)	-0.22	0.57^{*}	-0.80	2099
	(1.23)	(0.29)	(0.90)	

Panel B: Changes in Foreign Capital by Region

Region:	Pre-Period $\bar{K}$ (\$B)	Post-Period $\bar{K}$ (\$B)	Share Pre (%)	Share Post (%)	Change in Share (p.p.)	Capital Growth (%)
Total	589.1	704.1				19.5
G7	154.6	179.2	26.2	25.5	-0.8	15.9
OECD (excluding G7)	106.7	131.3	18.1	18.7	0.5	23.1
BRIC	65.9	82.6	11.2	11.7	0.5	25.3
Developing (Non-BRIC)	24.4	30.8	4.1	4.4	0.2	26.1
Tax Haven Non-Islands	121.5	143.5	20.6	20.4	-0.2	18.1
Tax Haven Islands	73.8	79.4	12.5	11.3	-1.2	7.6
Other	42.2	57.3	7.2	8.1	1.0	35.7

Notes: Standard errors appear in parentheses. Panel A presents the results of regressing d log(Foreign Capital) on our tax terms. The sample consists of all U.S. multinational firms. We winsorize d log(Foreign Capital) at the 5% level. Standard errors appear in parentheses. Panel B summarizes how foreign capital (by region) changed after the TCJA. Foreign capital (Columns 1-2) is in billions of USD. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table G.2: Robustness of Baseline Regression Estimates for High Foreign Capital Multinationals

Sample:	Domestic		Multinational-High Firms			
Regressor	$\hat{\Gamma}-\hat{\tau}$	N	$\hat{\Gamma}$	$\hat{\hat{\Gamma}}$	$\hat{\tau}$	N
Specification:						
1. Baseline	4.27***	6973	4.76*	0.90*	−4.23**	1112
	(0.51)		(1.88)	(0.40)	(1.35)	
2. Trade Controls	4.37***	6973	4.79*	0.87*	−4.29**	1112
	(0.52)		(1.90)	(0.40)	(1.36)	
3. Toll Tax Control			4.67*	0.82*	−4.14**	1112
			(1.89)	(0.42)	(1.35)	
4. Intangible Capital	4.32***	6973	4.80*	0.80*	−4.41**	1112
	(0.52)		(1.90)	(0.40)	(1.36)	
5. Size Controls	4.27***	6973	4.74*	0.90*	−4.22**	1112
	(0.51)		(1.88)	(0.40)	(1.35)	
6. Lagged Investment	4.54***	6927	5.37**	0.99**	−5.01***	1110
	(0.46)		(1.71)	(0.36)	(1.23)	
7. Industry FE (NAICS 3D)	4.08***	6973	3.52	0.73	−3.33*	1112
	(0.51)		(1.93)	(0.42)	(1.41)	
8. Industry FE (NAICS 4D)	4.19***	6973	4.16*	0.75	−3.66*	1112
	(0.52)		(2.11)	(0.45)	(1.55)	
9. Weighted	3.87***	6973	5.41**	1.10**	−4.44***	1112
	(0.57)		(1.80)	(0.38)	(1.28)	
10. Drop Industries	4.29***	6765	4.73*	0.86*	−4.23**	1104
	(0.52)		(1.91)	(0.40)	(1.37)	
11. Drop Profit Shifters			5.13*	0.67	−4.64**	878
			(2.13)	(0.46)	(1.52)	
12. Simulated IV	4.14***	6908	4.42*	0.78*	−4.02**	1107
	(0.49)		(1.73)	(0.39)	(1.31)	
13. Depreciation Controls	4.31***	6973	5.08**	0.98*	−4.39**	1109
	(0.57)		(1.91)	(0.40)	(1.37)	
14. Exclude Income IV	3.49***	6973	7.66***	1.29**	−5.24**	1112
	(0.57)		(2.29)	(0.46)	(1.64)	

Notes: This table presents the results for regressions of $d\log(\text{Investment})$ on our tax terms for domestic firms and high foreign capital U.S. multinationals under different robustness specifications. Appendix Table G.3 presents the low foreign capital multinational results. Row 1 presents our baseline results. Row 2 includes controls for trade shocks. Row 3 controls for firms paying the toll tax. Row 4 controls for intangible capital. Row 5 controls for pre-period capital, while row 6 controls for lagged investment growth. Rows 7 and 8 include 3-digit and 4-digit NAICS fixed effects. Row 9 weighs by the log of the mean capital from 2015-2016. Row 10 drops industries with high baseline investment from partnerships (2-digit NAICS 22 and 3-digit NAICS 486 and 531, which represent utilities, pipeline transportation, and real estate). Row 11 drops firms with $\geq 50\%$ of their foreign income in tax havens. Row 12 presents a simulated IV using post-TCJA tax rates. Row 13 controls for economic depreciation rate δ (which is assigned at the 3-digit NAICS level) and the interaction between each tax policy change and demeaned δ. Row 14 instruments for our tax terms using versions of those tax terms which exclude all variation due to a firm's base year income. * $p < .05$, ** $p < .01$, *** $p < .001$

Table G.3: Robustness of Baseline Regression Estimates for Low Foreign Capital Multinationals

Sample:	Domestic		Multinational-Low Firms			
Regressor	$\hat{\Gamma}-\hat{\tau}$	N	$\hat{\Gamma}$	$\hat{\hat{\Gamma}}$	$\hat{\tau}$	N
Specification:						
1. Baseline	4.27***	6973	4.10*	−0.26	−4.95***	1146
	(0.51)		(1.79)	(0.38)	(1.32)	
2. Trade Controls	4.37***	6973	4.04*	−0.25	−4.91***	1146
	(0.52)		(1.79)	(0.38)	(1.32)	
3. Toll Tax Control			3.92*	−0.36	−4.74***	1146
			(1.78)	(0.38)	(1.32)	
4. Intangible Capital	4.32***	6973	4.09*	−0.23	−5.02***	1146
	(0.52)		(1.80)	(0.38)	(1.34)	
5. Size Controls	4.27***	6973	4.06*	−0.28	−4.93***	1146
	(0.51)		(1.79)	(0.38)	(1.32)	
6. Lagged Investment	4.54***	6927	3.93*	−0.09	−5.18***	1143
	(0.46)		(1.64)	(0.36)	(1.21)	
7. Industry FE (NAICS 3D)	4.08***	6973	3.78*	−0.04	−4.74***	1146
	(0.51)		(1.73)	(0.42)	(1.31)	
8. Industry FE (NAICS 4D)	4.19***	6973	3.49	0.14	−4.28**	1146
	(0.52)		(1.84)	(0.45)	(1.39)	
9. Weighted	3.87***	6973	2.07	−0.35	−3.18*	1146
	(0.57)		(1.82)	(0.37)	(1.37)	
10. Drop Industries	4.29***	6765	3.89*	−0.28	−4.92***	1134
	(0.52)		(1.79)	(0.38)	(1.32)	
11. Drop Profit Shifters			4.93**	−0.44	−5.49***	1032
			(1.88)	(0.40)	(1.39)	
12. Simulated IV	4.14***	6908	4.09*	−0.19	−4.63***	1140
	(0.49)		(1.68)	(0.38)	(1.30)	
13. Depreciation Controls	4.31***	6973	3.68	−0.39	−4.55***	1144
	(0.57)		(1.89)	(0.39)	(1.38)	
14. Exclude Income IV	3.49***	6973	6.00**	0.21	−4.46**	1146
	(0.57)		(1.94)	(0.39)	(1.43)	

Notes: This table presents the results for regressions of $d\log(\text{Investment})$ on our tax terms for domestic firms and low foreign capital U.S. multinationals under different robustness specifications. Appendix Table G.2 presents the high foreign capital multinational results. Row 1 presents our baseline results. Row 2 includes controls for trade shocks. Row 3 controls for firms paying the toll tax. Row 4 controls for intangible capital. Row 5 controls for pre-period capital, while row 6 controls for lagged investment growth. Rows 7 and 8 include 3-digit and 4-digit NAICS fixed effects. Row 9 weighs by the log of the mean capital from 2015-2016. Row 10 drops industries with high baseline investment from partnerships (2-digit NAICS 22 and 3-digit NAICS 486 and 531, which represent utilities, pipeline transportation, and real estate). Row 11 drops firms with ≥ 50% of their foreign income in tax havens. Row 12 presents a simulated IV using post-TCJA tax rates. Row 13 controls for economic depreciation rate δ (which is assigned at the 3-digit NAICS level) and the interaction between each tax policy change and demeaned δ. Row 14 instruments for our tax terms using versions of those tax terms which exclude all variation due to a firm's base year income. * $p < .05$, ** $p < .01$, *** $p < .001$

Table G.4: $\bar{\tau}$ Statistics under Different Repatriation Expectations for All Multinationals

$\mathbb{E}$[Repatriation]	Variable	Mean	Std. Dev.	Median	P10	P90
AJCA Rate:						
	Pre-TCJA $\bar{\tau}$	0.25	0.14	0.25	0.05	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.12	0.23	0.12	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	0.00	0.03	0.00	-0.02	0.07
	$\hat{\bar{\tau}}$	0.00	0.03	-0.01	-0.03	0.07
TCJA Liquid Rate:						
	Pre-TCJA $\bar{\tau}$	0.26	0.12	0.23	0.16	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.12	0.23	0.12	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	-0.01	0.01	0.00	-0.04	0.00
	$\hat{\bar{\tau}}$	-0.01	0.02	0.00	-0.04	0.00
TCJA Blended Rate:						
	Pre-TCJA $\bar{\tau}$	0.26	0.12	0.23	0.14	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.12	0.23	0.12	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	0.00	0.01	0.00	-0.02	0.00
	$\hat{\bar{\tau}}$	-0.01	0.01	0.00	-0.03	0.00

Notes: This table provides summary statistics for all multinationals under three different assumptions of repatriation expectations. This subsample is composed of 2235 firms. "AJCA Rate" refers to the assumption that firms expected the TCJA would implement a repatriation holiday similar to the repatriation holiday in the American Job Creation Act of 2004. "TCJA Liquid" Rate refers to the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA liquid rate. "TCJA Blended Rate" refers to the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA blended rate. For disclosure reasons, we do not report true medians (or other percentiles). Instead, we report the average of observations in neighboring percentile bins.

Table G.5: $\bar{\tau}$ Statistics under Different Repatriation Expectations for Multinational-High

$\mathbb{E}$[Repatriation]	Variable	Mean	Std. Dev.	Median	P10	P90
AJCA Rate:						
	Pre-TCJA $\bar{\tau}$	0.25	0.13	0.25	0.08	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.12	0.24	0.13	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	0.00	0.03	-0.01	-0.03	0.05
	$\hat{\bar{\tau}}$	0.00	0.03	-0.01	-0.03	0.06
TCJA Liquid Rate:						
	Pre-TCJA $\bar{\tau}$	0.26	0.11	0.24	0.16	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.12	0.24	0.13	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	-0.01	0.01	0.00	-0.03	0.00
	$\hat{\bar{\tau}}$	-0.01	0.01	0.00	-0.03	0.00
TCJA Blended Rate:						
	Pre-TCJA $\bar{\tau}$	0.26	0.12	0.24	0.14	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.12	0.24	0.13	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	0.00	0.01	0.00	-0.01	0.00
	$\hat{\bar{\tau}}$	0.00	0.01	0.00	-0.02	0.00

Notes: This table provides summary statistics for multinationals with high foreign-to-domestic capital under three different assumptions of repatriation expectations. This subsample is composed of 1103 firms. “AJCA Rate” refers to the assumption that firms expected the TCJA would implement a repatriation holiday similar to the repatriation holiday in the American Job Creation Act of 2004. “TCJA Liquid” Rate refers to the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA liquid rate. “TCJA Blended Rate” refers to the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA blended rate. For disclosure reasons, we do not report true medians (or other percentiles). Instead, we report the average of observations in neighboring percentile bins.

Table G.6: $\bar{\tau}$ Statistics under Different Repatriation Expectations for Multinational-Low

$\mathbb{E}$[Repatriation]	Variable	Mean	Std. Dev.	Median	P10	P90
AJCA Rate:						
	Pre-TCJA $\bar{\tau}$	0.24	0.14	0.25	0.05	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.13	0.23	0.12	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	0.01	0.03	0.00	-0.02	0.07
	$\hat{\bar{\tau}}$	0.01	0.04	0.00	-0.03	0.07
TCJA Liquid Rate:						
	Pre-TCJA $\bar{\tau}$	0.26	0.12	0.23	0.16	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.13	0.23	0.12	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	-0.01	0.01	0.00	-0.04	0.00
	$\hat{\bar{\tau}}$	-0.01	0.02	0.00	-0.04	0.00
TCJA Blended Rate:						
	Pre-TCJA $\bar{\tau}$	0.26	0.12	0.23	0.14	0.43
	Post-TCJA $\bar{\tau}$	0.25	0.13	0.23	0.12	0.43
	Post $\bar{\tau}$ - Pre $\bar{\tau}$	-0.01	0.01	0.00	-0.03	0.00
	$\hat{\bar{\tau}}$	-0.01	0.01	0.00	-0.03	0.00

Notes: This table provides summary statistics for multinationals with low foreign-to-domestic capital under three different assumptions of repatriation expectations. This subsample is composed of 1132 firms. "AJCA Rate" refers to the assumption that firms expected the TCJA would implement a repatriation holiday similar to the repatriation holiday in the American Job Creation Act of 2004. "TCJA Liquid" Rate refers to the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA liquid rate. "TCJA Blended Rate" refers to the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA blended rate. For disclosure reasons, we do not report true medians (or other percentiles). Instead, we report the average of observations in neighboring percentile bins.

Table G.7: The Effect of Tax Term Shocks on Investment Growth under Different Repatriation Expectations

Dep. Var.:	$d\log(\text{Investment})$								
$\mathbb{E}$[Repatriation]:	AJCA Rate			TCJA Liquid Rate			TCJA Blended Rate		
Sample:	Pooled	Multi-High	Multi-Low	Pooled	Multi-High	Multi-Low	Pooled	Multi-High	Multi-Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\hat{\Gamma}$	4.13**	4.57*	3.80*	4.14**	4.57*	3.81*	4.15**	4.58*	3.82*
	(1.30)	(1.88)	(1.78)	(1.30)	(1.88)	(1.78)	(1.30)	(1.88)	(1.78)
$\hat{\hat{\Gamma}}$	0.25	0.94*	−0.37	0.27	0.96*	−0.35	0.29	0.95*	−0.30
	(0.28)	(0.41)	(0.39)	(0.28)	(0.40)	(0.39)	(0.27)	(0.40)	(0.38)
$\hat{\tau}$	−4.37***	−4.09**	−4.70***	−4.39***	−4.10**	−4.70***	−4.41***	−4.11**	−4.75***
	(0.94)	(1.35)	(1.32)	(0.94)	(1.35)	(1.32)	(0.94)	(1.35)	(1.32)
$\hat{\hat{\tau}}$	−0.45	−0.14	−0.72	0.49	−0.42	1.31	−0.35	−1.04	0.29
	(0.62)	(0.97)	(0.82)	(1.36)	(2.14)	(1.77)	(1.69)	(2.97)	(2.08)
Observations	2,235	1,103	1,132	2,235	1,103	1,132	2,235	1,103	1,132

Notes: This table presents the results for regressions of $d\log(\text{Investment})$ on our tax terms across different samples and specifications of $\hat{\hat{\tau}}$. We winsorize $d\log(\text{Investment})$ at the 5% level. Columns 1-3 report the results when $\hat{\hat{\tau}}$ is estimated under the assumption that firms expected the TCJA would implement a repatriation holiday similar to the repatriation holiday in the American Job Creation Act of 2004. Columns 4-6 report the results when $\hat{\hat{\tau}}$ is estimated under the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA liquid rate. Columns 7-9 report the results when $\hat{\hat{\tau}}$ is estimated under the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA blended rate. Column 1 reports the results for a pooled group of all firms while columns 2 and 3 report the results for firms with high and low foreign capital separately, where high foreign capital firms have a ratio of foreign to domestic capital above 15%. The remaining columns are defined analogously at the sample level. * $p < .05$, ** $p < .01$, *** $p < .001$

Table G.8: The Effect of Tax Term Shocks on Foreign Capital Growth under Different Repatriation Expectations

Dep. Var.:	d log(Foreign Capital)								
$\mathbb{E}$[Repatriation]:	AJCA Rate			TCJA Liquid Rate			TCJA Blended Rate		
Sample:	Pooled	Multi-High	Multi-Low	Pooled	Multi-High	Multi-Low	Pooled	Multi-High	Multi-Low
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\hat{\Gamma}$	−0.17	−0.47	0.43	−0.16	−0.47	0.44	−0.13	−0.47	0.49
	(1.24)	(1.46)	(1.85)	(1.24)	(1.47)	(1.85)	(1.23)	(1.46)	(1.85)
$\hat{\hat{\Gamma}}$	0.65*	0.56	1.11*	0.66*	0.55	1.16*	0.70*	0.53	1.27**
	(0.29)	(0.31)	(0.48)	(0.29)	(0.31)	(0.48)	(0.29)	(0.31)	(0.47)
$\hat{\tau}$	−0.82	−0.95	−0.86	−0.83	−0.95	−0.91	−0.90	−0.97	−1.01
	(0.91)	(1.03)	(1.42)	(0.91)	(1.03)	(1.42)	(0.91)	(1.03)	(1.42)
$\hat{\hat{\tau}}$	0.30	0.46	−0.49	−1.12	−1.00	−0.18	−4.92**	−2.95	−4.29
	(0.67)	(0.81)	(1.00)	(1.48)	(1.77)	(2.20)	(1.88)	(2.40)	(2.65)
Observations	2,077	1,050	1,027	2,077	1,050	1,027	2,077	1,050	1,027

Notes: This table presents the results for regressions of d log(Foreign Capital) on our tax terms across different samples and specifications of $\hat{\hat{\tau}}$. We winsorize d log(Foreign Capital) at the 5% level. Columns 1-3 report the results when $\hat{\hat{\tau}}$ is estimated under the assumption that firms expected the TCJA would implement a repatriation holiday similar to the repatriation holiday in the American Job Creation Act of 2004. Columns 4-6 report the results when $\hat{\hat{\tau}}$ is estimated under the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA liquid rate. Columns 7-9 report the results when $\hat{\hat{\tau}}$ is estimated under the assumption that firms expected the TCJA would implement a one-time holiday at the TCJA blended rate. Column 1 reports the results for a pooled group of all firms while columns 2 and 3 report the results for firms with high and low foreign capital separately, where high foreign capital firms have a ratio of foreign to domestic capital above 15%. The remaining columns are defined analogously at the sample level. * $p < .05$, ** $p < .01$, *** $p < .001$

Table G.9: The Effect of Tax Shocks on Other Outcomes (Domestic and Multinational-High)

Sample:	Domestic Firms		Multinational-High Firms			
Regressor:	$\hat{\Gamma} - \hat{\tau}$	N	$\hat{\Gamma}$	$\hat{\hat{\Gamma}}$	$\hat{\tau}$	N
Outcome:						
$d\,\frac{\text{Investment}}{\text{Capital}}$	0.52***	6894	0.56	0.13	−0.51	1106
	(0.09)		(0.44)	(0.10)	(0.31)	
d log(Domestic Capital)	1.60***	6885	−0.04	0.40*	−0.66	1089
	(0.18)		(0.89)	(0.19)	(0.63)	
d log(Equipment)	4.46***	6942	4.83**	0.83*	−4.08**	1108
	(0.46)		(1.75)	(0.38)	(1.26)	
d log(R&D)	1.53*	1318	2.52	0.54	−2.62*	738
	(0.68)		(1.59)	(0.30)	(1.14)	
d log(Structures)	3.97**	3560	−3.02	0.80	0.35	732
	(1.30)		(4.71)	(1.05)	(3.38)	
d log(Tax Revenue)	−2.79***	4118	2.94	1.95*	5.94**	658
	(0.63)		(2.79)	(0.76)	(2.13)	
d log(Labor Comp.)	0.78***	5972	−0.22	0.20	−0.05	975
	(0.12)		(0.56)	(0.14)	(0.42)	
d log(Salaries & Wages)	0.92***	5839	0.30	0.15	−0.53	971
	(0.14)		(0.68)	(0.17)	(0.50)	
d log(Officer Comp.)	0.48*	5008	−2.61*	−0.50	1.88*	886
	(0.22)		(1.13)	(0.26)	(0.83)	

Notes: This table contains coefficients (and observations counts) from regressions after restricting the sample to domestic firms (columns 1-2), and U.S. multinationals with high foreign capital (columns 3-6). Outcome variables appear as row names. All outcomes are winsorized at the 5% level. Standard errors appear in parentheses. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table G.10: The Effect of Tax Shocks on Other Outcomes (Multinational-Low)

Regressor:	$\hat{\Gamma}$	$\hat{\hat{\Gamma}}$	$\hat{\tau}$	N
Outcome:				
$d\,\frac{\text{Investment}}{\text{Capital}}$	0.53	−0.08	−0.85*	1136
	(0.46)	(0.10)	(0.34)	
$d\log$(Domestic Capital)	1.37	0.08	−2.52***	1122
	(0.77)	(0.19)	(0.59)	
$d\log$(Equipment)	3.60*	−0.31	−4.44***	1144
	(1.65)	(0.37)	(1.22)	
$d\log$(R&D)	0.97	0.01	−1.37	659
	(1.52)	(0.34)	(1.11)	
$d\log$(Structures)	−1.17	0.79	−3.12	742
	(4.65)	(0.95)	(3.29)	
$d\log$(Tax Revenue)	1.57	0.93	4.05*	677
	(2.21)	(0.65)	(2.03)	
$d\log$(Labor Comp.)	0.22	−0.10	−0.60	1011
	(0.45)	(0.12)	(0.33)	
$d\log$(Salaries & Wages)	0.28	−0.05	−0.60	1008
	(0.52)	(0.15)	(0.38)	
$d\log$(Officer Comp.)	0.62	0.26	−0.17	924
	(0.91)	(0.23)	(0.67)	

Notes: This table contains coefficients and observation counts from regressions after restricting the sample to U.S. multinationals with low foreign capital. Outcome variables appear as row names. All outcomes are winsorized at the 5% level. Standard errors appear in parentheses. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

Table G.11: Tax Change Portfolios

	Share	K_0/ firm	$100 \times \Gamma$		$100 \times \bar{\Gamma}$		$100 \times \tau$		$100 \times \bar{\tau}$		N
			Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Group:											
Domestic 1	18.7	101	13.7	8.8			16.3	9.4			3048
Domestic 2	1.4	53	21.5	14.5			33.6	21.7			439
Domestic 3	1.4	51	24.2	16.1			26.8	16.9			439
Domestic 4	13.9	75	28.4	18.6			32.9	20.3			3047
Multinat. high 1	3.9	181	14.7	8.7	17.7	17.7	17.4	9.8	28.0	28.0	356
Multinat. high 2	3.2	320	15.0	8.7	17.7	29.4	17.2	9.1	7.0	7.0	165
Multinat. high 3	0.5	442	23.9	15.7	17.7	29.4	31.3	18.8	7.0	7.0	17
Multinat. high 4	0.2	203	25.5	16.4	17.7	29.4	27.7	16.6	7.0	7.0	18
Multinat. high 5	0.1	134	26.3	18.2	17.7	17.7	32.5	21.6	27.6	27.6	17
Multinat. high 6	1.8	183	27.1	16.5	17.7	17.7	34.2	20.0	18.8	18.8	165
Multinat. high 7	0.0	24	27.2	18.3	17.7	17.7	29.7	19.1	27.3	27.3	16
Multinat. high 8	7.9	368	27.3	15.9	17.7	29.4	32.2	17.2	7.0	7.0	356
Multinat. low 1	4.5	187	13.9	8.9	17.7	17.7	16.4	9.8	22.7	22.7	400
Multinat. low 2	2.1	277	19.5	14.1	17.7	29.4	22.4	14.6	7.0	7.0	125
Multinat. low 3	0.2	283	21.9	12.9	17.7	29.4	24.3	12.8	7.0	7.0	10
Multinat. low 4	0.4	391	23.2	15.2	17.7	29.4	34.4	21.9	7.0	7.0	16
Multinat. low 5	0.5	282	24.7	16.6	17.7	17.7	33.4	21.8	36.4	36.4	29
Multinat. low 6	0.3	158	26.9	17.6	17.7	17.7	28.6	18.0	30.4	30.4	35
Multinat. low 7	4.9	319	28.1	18.2	17.7	29.4	33.0	20.1	7.0	7.0	255
Multinat. low 8	4.0	243	29.4	19.0	17.7	17.7	33.2	20.6	21.4	21.4	271
Non C-corp.	30.0	87	23.0	23.0			31.0	31.0			

Notes: Share is the share of domestic capital at firms in the group, in percent. K_0/ firm is average domestic capital per firm in billions of dollars. Pre and post refer to 2015-2016 and 2018-2019 averages.

Table G.12: 30 Year Revenue Effects

	Percent of no-TCJA corporate revenue			
	METR only	Exp. only	GILTI only	Total
1. Mechanical corporate	−39.0	−3.5	0.0	−41.6
2. Dynamic and personal	3.6	−0.1	2.0	5.7
3. Total	−35.3	−3.6	2.0	−35.9
4 (memo): Year 30 K (%)	4.4	2.2	0.7	6.4
5 (memo): (3)/(4)	−8.1	−1.6	3.0	−5.6

Notes: The table shows the present value of total corporate and personal income tax changes for changes to the METR only, to expensing only, to GILTI only, and for all tax changes simultaneously, expressed as a share of no-TCJA steady state corporate revenue. Row 1 shows the corporate revenue effects of changes in $\Gamma, \bar{\Gamma}, \tau, \bar{\tau}$ holding K and $\bar{K}$ fixed at their no-TCJA level. Row 2 shows the revenue effects of changes in K and $\bar{K}$ evaluated at the TCJA tax rates and of payout taxes. Rows 3 shows overall revenue effects in the 30 year window. Row 4 shows the percent increase in domestic capital after 30 years.

Table G.13: 10 Year Revenue Effects

	Percent of no-TCJA corporate revenue		
	Baseline	Unexp. phaseout	Exp. phaseout
1. Mechanical corporate	−41.6	−39.9	−39.9
2. Dynamic and personal	3.4	3.7	4.2
3. Total	−38.2	−36.3	−35.7
4 (memo): Year 10 K (%)	5.4	4.1	4.7
5 (memo): (3)/(4)	−7.1	−8.8	−7.6

Notes: The table shows the present value of total corporate and personal income tax changes over 10 years for our baseline with permanent full expensing, unexpected phaseout of expensing, and anticipated phaseout of expensing, expressed as a share of no-TCJA steady state corporate revenue. Row 1 shows the corporate revenue effects of changes in $\Gamma, \bar{\Gamma}, \tau, \bar{\tau}$ holding K and $\bar{K}$ fixed at their no-TCJA level. Row 2 shows the revenue effects of changes in K and $\bar{K}$ evaluated at the TCJA tax rates and of payout taxes. Row 3 shows the overall revenue effects. Row 4 shows the percent increase in domestic capital after 10 years.

Table G.14: Tax Term Change Statistics

	Means		Standard Deviations	
Variable	Pre	Post	Pre	Post
Γ	0.217	0.136	0.080	0.053
$\bar{\Gamma}$	0.177	0.191	0.000	0.039
τ	0.259	0.155	0.090	0.057
$\frac{1-\Gamma}{1-\tau}$	1.061	1.024	0.058	0.031

Notes: This table provides the means and standard deviations in our analysis sample of the three tax variables, as well as the tax term before and after the TCJA.

Table G.15: Tax Changes by Industry, Full Sample

Industry (NAICS)	Code	Γ			τ			Tax Term $(1-\Gamma)/(1-\tau)$			N
		Pre	Post	% Change	Pre	Post	% Change	Pre	Post	% Change	
Agriculture, Forestry, Fishing and Hunting	11	0.22	0.15	-33.4%	0.25	0.16	-36.2%	1.05	1.02	-2.7%	223
Mining, Oil, and Gas	21	0.18	0.12	-36.1%	0.20	0.12	-39.7%	1.03	1.01	-2.1%	317
Utilities	22	0.16	0.11	-33.7%	0.20	0.12	-40.5%	1.06	1.02	-3.8%	184
Construction	23	0.23	0.15	-34.8%	0.27	0.17	-36.9%	1.05	1.02	-2.9%	536
Manufacturing	31	0.23	0.15	-35.3%	0.28	0.17	-39.2%	1.06	1.02	-3.9%	577
Manufacturing	32	0.22	0.14	-36.2%	0.25	0.15	-40.1%	1.05	1.01	-3.2%	1338
Manufacturing	33	0.21	0.13	-38.0%	0.25	0.14	-41.6%	1.05	1.01	-3.1%	2556
Wholesale Trade	42	0.25	0.15	-38.0%	0.29	0.18	-40.2%	1.07	1.03	-3.8%	1714
Retail Trade	44	0.24	0.15	-37.1%	0.30	0.18	-39.1%	1.08	1.03	-4.1%	639
Retail Trade	45	0.22	0.14	-37.5%	0.26	0.16	-40.1%	1.06	1.02	-3.5%	157
Transport and Warehousing	48	0.23	0.14	-36.9%	0.26	0.15	-40.4%	1.04	1.01	-2.9%	392
Transport and Warehousing	49	0.22	0.15	-35.3%	0.28	0.17	-38.0%	1.07	1.03	-3.9%	51
Information	51	0.20	0.13	-37.9%	0.23	0.13	-41.8%	1.04	1.01	-2.7%	921
Real Estate	53	0.19	0.12	-37.4%	0.23	0.14	-40.0%	1.06	1.02	-3.1%	310
Professional, Scientific, and Technical Services	54	0.21	0.13	-38.8%	0.24	0.14	-41.6%	1.04	1.01	-2.7%	767
Management of Companies	55	0.22	0.14	-37.7%	0.31	0.19	-38.3%	1.12	1.06	-5.4%	978
Admin., Support, and Waste Mgmt.	56	0.23	0.14	-39.3%	0.26	0.15	-42.1%	1.05	1.02	-3.2%	280
Educational Services	61	0.21	0.13	-38.0%	0.26	0.16	-40.3%	1.07	1.03	-3.9%	78
Health Care	62	0.17	0.11	-37.7%	0.21	0.13	-39.8%	1.06	1.02	-2.9%	276
Arts, Entertainment, and Recreation	71	0.16	0.10	-35.7%	0.21	0.13	-38.7%	1.07	1.03	-3.8%	167
Accommodation and Food	72	0.18	0.11	-39.7%	0.24	0.14	-42.3%	1.09	1.04	-4.6%	322
Other Services (except Public Admin.)	81	0.19	0.12	-38.3%	0.24	0.14	-40.0%	1.07	1.03	-3.5%	126

Notes: This table summarizes tax change statistics by industry for the full sample in our analysis. For each industry (as reported in columns 1-2), columns 3-5 summarize the average value of Γ before and after the TCJA, as well as the percent change. Columns 6-8 and 9-11 report the same for τ and the tax term (respectively). Column 12 summarizes the number of firms in that industry in the full sample.

Table G.16: Tax Changes by Industry, Domestic Sample

Industry (NAICS)	Code	Γ			τ			Tax Term $(1-\Gamma)/(1-\tau)$			N
		Pre	Post	% Change	Pre	Post	% Change	Pre	Post	% Change	
Agriculture, Forestry, Fishing and Hunting	11	0.22	0.14	-33.3%	0.25	0.16	-35.9%	1.05	1.02	-2.6%	212
Mining, Oil, and Gas	21	0.18	0.12	-35.6%	0.20	0.12	-39.0%	1.03	1.01	-2.0%	260
Utilities	22	0.16	0.11	-33.3%	0.21	0.12	-40.1%	1.06	1.02	-3.8%	172
Construction	23	0.24	0.15	-34.6%	0.27	0.17	-36.7%	1.05	1.02	-2.9%	502
Manufacturing	31	0.23	0.15	-34.1%	0.27	0.17	-37.5%	1.06	1.02	-3.5%	454
Manufacturing	32	0.21	0.14	-34.8%	0.25	0.15	-38.0%	1.05	1.02	-2.8%	939
Manufacturing	33	0.21	0.14	-35.7%	0.25	0.15	-38.4%	1.05	1.02	-2.7%	1597
Wholesale Trade	42	0.25	0.15	-37.5%	0.29	0.18	-39.4%	1.07	1.03	-3.6%	1391
Retail Trade	44	0.24	0.15	-37.0%	0.29	0.18	-38.8%	1.08	1.03	-4.0%	575
Retail Trade	45	0.22	0.14	-36.9%	0.26	0.16	-39.3%	1.06	1.02	-3.2%	119
Transport and Warehousing	48	0.23	0.15	-36.2%	0.26	0.16	-39.6%	1.04	1.01	-2.9%	340
Transport and Warehousing	49	0.22	0.15	-34.9%	0.28	0.17	-37.6%	1.08	1.03	-3.9%	46
Information	51	0.22	0.14	-35.8%	0.25	0.15	-39.6%	1.04	1.01	-2.9%	581
Real Estate	53	0.19	0.12	-36.8%	0.23	0.14	-39.2%	1.06	1.02	-3.1%	266
Professional, Scientific, and Technical Services	54	0.21	0.13	-37.7%	0.24	0.14	-39.9%	1.04	1.02	-2.5%	516
Management of Companies	55	0.22	0.14	-37.7%	0.31	0.19	-38.3%	1.12	1.06	-5.4%	975
Admin., Support, and Waste Mgmt.	56	0.22	0.14	-37.5%	0.25	0.15	-39.6%	1.05	1.02	-2.8%	204
Educational Services	61	0.21	0.13	-37.8%	0.26	0.16	-39.8%	1.08	1.03	-3.9%	66
Health Care	62	0.17	0.11	-37.5%	0.21	0.13	-39.5%	1.05	1.02	-2.8%	259
Arts, Entertainment, and Recreation	71	0.16	0.10	-35.5%	0.21	0.13	-38.5%	1.07	1.03	-3.7%	155
Accommodation and Food	72	0.17	0.11	-38.8%	0.23	0.14	-41.2%	1.08	1.04	-4.3%	287
Other Services (except Public Admin.)	81	0.19	0.12	-38.0%	0.24	0.14	-39.3%	1.07	1.03	-3.4%	113

Notes: This table summarizes tax change statistics by industry for the domestic sample in our analysis. For each industry (as reported in columns 1-2), columns 3-5 summarize the average value of Γ before and after the TCJA, as well as the percent change. Columns 6-8 and 9-11 report the same for τ and the tax term (respectively). Column 12 summarizes the number of firms in that industry in the domestic sample.

Table G.17: Tax Changes by Industry, Foreign Sample

Industry (NAICS)	Code	Γ			τ			Tax Term $(1-\Gamma)/(1-\tau)$			N
		Pre	Post	% Change	Pre	Post	% Change	Pre	Post	% Change	
Agriculture, Forestry, Fishing and Hunting	11	0.26	0.17	-34.4%	0.30	0.18	-40.5%	1.06	1.01	-4.4%	11
Mining, Oil, and Gas	21	0.17	0.11	-37.8%	0.20	0.12	-42.0%	1.03	1.01	-2.4%	57
Utilities	22	0.14	0.09	-37.9%	0.18	0.10	-44.9%	1.04	1.01	-3.2%	12
Construction	23	0.22	0.14	-37.2%	0.25	0.15	-41.1%	1.04	1.01	-3.1%	34
Manufacturing	31	0.25	0.15	-38.8%	0.30	0.17	-44.1%	1.07	1.02	-5.1%	123
Manufacturing	32	0.22	0.13	-39.0%	0.26	0.14	-43.9%	1.05	1.01	-3.9%	399
Manufacturing	33	0.21	0.12	-41.2%	0.24	0.13	-46.0%	1.05	1.01	-3.7%	959
Wholesale Trade	42	0.24	0.15	-40.0%	0.29	0.16	-43.4%	1.07	1.02	-4.3%	323
Retail Trade	44	0.24	0.15	-38.0%	0.30	0.18	-42.0%	1.10	1.03	-5.7%	64
Retail Trade	45	0.21	0.12	-39.5%	0.26	0.15	-42.8%	1.07	1.03	-4.3%	38
Transport and Warehousing	48	0.22	0.13	-40.4%	0.25	0.14	-44.1%	1.04	1.01	-3.1%	52
Information	51	0.17	0.10	-42.0%	0.19	0.10	-46.4%	1.03	1.01	-2.4%	340
Real Estate	53	0.20	0.12	-39.8%	0.24	0.13	-43.7%	1.05	1.01	-3.3%	44
Professional, Scientific, and Technical Services	54	0.22	0.13	-40.8%	0.25	0.14	-44.5%	1.04	1.01	-3.1%	251
Admin., Support, and Waste Mgmt.	56	0.25	0.14	-42.1%	0.28	0.15	-46.5%	1.05	1.01	-3.8%	76
Educational Services	61	0.23	0.14	-39.2%	0.28	0.16	-42.9%	1.07	1.02	-4.2%	12
Health Care	62	0.24	0.14	-39.8%	0.29	0.17	-42.8%	1.08	1.03	-4.6%	17
Arts, Entertainment, and Recreation	71	0.20	0.13	-37.9%	0.27	0.16	-41.3%	1.09	1.04	-5.0%	12
Accommodation and Food	72	0.21	0.12	-45.1%	0.28	0.14	-49.1%	1.10	1.03	-6.4%	35
Other Services (except Public Admin.)	81	0.23	0.14	-40.9%	0.28	0.15	-45.6%	1.07	1.02	-4.8%	13

Notes: This table summarizes tax change statistics by industry for the foreign sample in our analysis. For each industry (as reported in columns 1-2), columns 3-5 summarize the average value of Γ before and after the TCJA, as well as the percent change. Columns 6-8 and 9-11 report the same for τ and the tax term (respectively). Column 12 summarizes the number of firms in that industry in the foreign sample.