Online Appendix to "Trade Protection, Stock-Market Returns, and Welfare" (For Online Publication)

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Introduction

This online appendix contains supplementary theoretical and empirical results. Section A presents the proofs of the propositions in the theory section and model extensions. Section B generalizes of our framework that allows for growth. Section C turns to data and measurement issues. We present the sources for each event in Section C.1. Section C.2 provides a list of all the variables and the data sources used. Sections C.3 and C.3 provide more details on the data sources and construction of the China-exposure variables, and Section C.4 presents details on the construction of the factor share variables. Section C.5 presents sample statistics.

Next, we provide additional details for the welfare calculations. Section D describes how we reweight our sample of publicly listed firms using the size distribution of U.S. firms. Section E provides details of the procedure to estimate the changes in discount rates. Finally, we provide additional robustness tables in Section F.

A Proofs

A.1 Proof of Proposition 1

Proposition. *1 If the elasticity of substitution between labor and the specific factor for all firms is constant, the log change in wages equals the employment-share weighted average of the log changes in cash flow, i.e.,*

$$\hat{w}_t = \sum_f \frac{L_f}{L} \hat{r}_{ft},$$

and the log change in employment in each firm equals $\hat{L}_{ft} = \sigma \left(\hat{r}_{ft} - \sum_{f'} \frac{L_{f'}}{L} \hat{r}_{f't} \right)$.

Proof. Totally differentiating equations (2) and (3) yields:

$$\hat{y}_{ft} = -\hat{a}_{Vft}, \tag{A1}$$

and

$$\sum_f \frac{L_f}{L} \left(\hat{a}_{Lft} - \hat{a}_{Vft} \right) = \hat{L}, \tag{A2}$$

where we have used the fact that in the baseline equilibrium $L_{ft} = L_f$. Substituting equation (4) into equation (A2) yields

$$-\sum_f \frac{L_f}{L} \sigma \left(\hat{w}_t - \hat{r}_{ft} \right) = \hat{L}, \tag{A3}$$

or

$$\hat{w}_t = \sum_f \frac{L_f}{L} \hat{r}_{ft} - \frac{\hat{L}}{\sigma} \tag{A4}$$

If the supply of labor is fixed, we have $\hat{L} = 0$, which establishes that

$$\hat{w}_t = \sum_f \frac{L_f}{L} \hat{r}_{ft}. \tag{A5}$$

Substituting equation (A1) into equation (4) yields

$$-\hat{y}_{ft} - \hat{a}_{Lft} = \sigma\left(\hat{w}_t - \hat{r}_{ft}\right) \tag{A6}$$

or

$$\hat{L}_{ft} = \sigma\left(\hat{r}_{ft} - \hat{w}_t\right) = \sigma\left(\hat{r}_{ft} - \sum_{f'} \frac{L_{f'}}{L}\hat{r}_{f't}\right). \tag{A7}$$

□

A.1.1 Extension of Proposition 1 to Model Endogenous Aggregate Employment Rates

Starting with equation (A4), we now can add an upward-sloping labor-supply curve by defining the log change in employment relative to some base level L as

$$\hat{L}_t = \hat{L}_t^s = \tilde{\sigma}\hat{w}_t,$$

where $\tilde{\sigma} > 0$ denotes the slope of the labor-supply curve. Substituting the expression for $\hat{L}_t^s$ into equation (A4) gives us

$$\hat{w}_t = \sum_f \frac{L_f}{L}\hat{r}_{ft} - \frac{\tilde{\sigma}\hat{w}_t}{\sigma}$$

$$\hat{w}_t = \sum_f \frac{L_f}{L}\hat{r}_{ft} - \frac{\tilde{\sigma}}{\sigma}\sum_f \frac{L_f}{L}\hat{r}_{ft}$$

$$\hat{w}_t = \left(1 - \frac{\tilde{\sigma}}{\sigma}\right)\sum_f \frac{L_f}{L}\hat{r}_{ft},$$

which proves that wages will rise with changes in cash flow as long as $\tilde{\sigma} < \sigma$, i.e., the labor-supply response cannot be too large. Substituting this expression into equation (A7) gives us

$$\hat{L}_{ft} = \sigma\left(\hat{r}_{ft} - \hat{w}_t\right) = \sigma\left(\hat{r}_{ft} - \left(1 - \frac{\tilde{\sigma}}{\sigma}\right)\sum_f \frac{L_f}{L}\hat{r}_{ft}\right).$$

This expression continues to show that the relative employment of a firm increases when it has higher returns to its specific factor. Thus, the relationship between log change in firm employment and returns to its specific factor in Proposition 1 is robust to allowing for an upward sloping labor supply curve.

A.2 Proof of Proposition 2

Proposition. 2 *The log change in the ERP for a firm ($\hat{p}^e_{ft}$) can be expressed as a linear function of the log changes in cash flows*

$$\hat{p}^e_{ft} = \theta_{Vf}\hat{r}_{ft} + \theta_{Lf}\sum_{f'} \frac{L_{f'}}{L}\hat{r}_{f't}$$

and is equivalent to the log change in its revenue total factor productivity:

$$\widehat{TFPR}_{ft} \equiv \hat{p}_{ft} + \widehat{TFP}_{ft} = \hat{p}^e_{ft},$$

where $\widehat{TFP}_{ft} \equiv \hat{y}_{ft} - \theta_{Lf}\hat{L}_{ft} - \theta_{Vf}\hat{V}_{ft}$. *The log changes in revenue for a firm can also be expressed as linear functions of the log changes in cash flows:*

$$\hat{p}_{ft} + \hat{y}_{ft} = (\theta_{Lft}\sigma + \theta_{Vf})\,\hat{r}_{ft} + \theta_{Lft}\,(1-\sigma)\sum_{f''}\frac{L_{f''}}{L}\hat{r}_{f''t}.$$

Proof. In order to prove the first sentence in the proposition, we first totally differentiate the unit-cost equation to obtain

$$\omega_{Lft}\hat{a}_{Lft} + \omega_{Vft}\hat{a}_{Vft} + \sum_i \omega_{ift}\hat{a}_{ift} = 0.$$

Using this result after totally differentiating equation (1) and dividing both sides by p_{ft}, we obtain

$$\omega_{Lft}\hat{w}_t + \omega_{Vft}\hat{r}_{ft} + \sum_i \omega_{ift}\hat{q}_{it} = \hat{p}_{ft}. \tag{A8}$$

If we divide both sides by $(1 - \sum_i \omega_{ift})$ and rearrange, we obtain:

$$\hat{p}^e_{ft} \equiv \frac{\hat{p}_{ft} - \sum_i \omega_{ift}\hat{q}_{it}}{1 - \sum_i \omega_{ift}} = \theta_{Vft}\hat{r}_{ft} + \theta_{Lft}\hat{w}_t, \tag{A9}$$

where θ_{Lft} and θ_{Vft} are the shares of labor and the specific factor in value added in time t. Remembering that $\sum_i \omega_{ift}$, θ_{Vft}, and θ_{Lft} are not time-varying and using Proposition 1 to rewrite equation (A9) gives us the first line of the proposition:

$$\hat{p}^e_{ft} = \theta_{Vf}\hat{r}_{ft} + \theta_{Lf}\sum_{f'}\frac{L_{f'}}{L}\hat{r}_{f't}.$$

In order to show the equivalence between the log changes in a firm's ERP and revenue productivity, we first multiply both sides of equation (1) by firm output (y_f) to obtain

$$p_{ft}y_{ft} = L_{ft}w_t + V_f r_{ft} + \sum_i m_{ift}q_{it},$$

where m_{ift} is the amount of intermediates of type i used in production. Since we have assumed that the share of *total* expenditures on intermediate inputs in sales doesn't change across periods (i.e., $\sum_i \omega_{ift} = \sum_i \omega_{if}$), we can rewrite this equation as

$$p_{ft}y_{ft}\left(1 - \sum_i \omega_{if}\right) = L_{ft}w_t + V_f r_{ft},$$

where the left-hand side is value added. Totally differentiating this expression and recalling that $\sum_i \omega_{ift}$ is fixed yields

$$(dp_{ft}y_{ft} + p_{ft}dy_{ft})\left(1 - \sum_i \omega_{if}\right) = L_{ft}dw_t + V_{ft}dr_{ft} + w_t dL_{ft} + r_{ft}dV_{ft}.$$

Dividing through by $p_{ft}y_{ft}\left(1-\sum_i \omega_{if}\right)$ produces

$$\hat{p}_{ft}+\hat{y}_{ft}=\theta_{Lf}\hat{w}+\theta_{Lf}\hat{L}_{ft}+\theta_{Vf}\hat{r}_{ft}+\theta_{Vf}\hat{V}_{ft}. \tag{A10}$$

We can then subtract off $\theta_{Lf}\hat{L}_{ft}+\theta_{Vf}\hat{V}_{ft}$ from both sides of this equation to show that the log change in a firm's revenue productivity is equal to the log change in its ERP:

$$\widehat{\text{TFPR}}_{ft}\equiv\hat{p}_{ft}+\hat{y}_{ft}-\theta_{Lf}\hat{L}_{ft}-\theta_{Vf}\hat{V}_{ft}=\theta_{Vf}\hat{r}_{ft}+\theta_{Lf}\hat{w}_t=\hat{p}^e_{ft}.$$

To express the log change of a firm's revenue as a function of log change in cash flows, we use Proposition 1, the fact that $\hat{V}_{ft}=0$ in equation (A10), and the result that each firm in the baseline specification hires the same number of workers in each period to arrive at

$$\hat{p}_{ft}+\hat{y}_{ft}=\left(\theta_{Lf}\sigma+\theta_{Vf}\right)\hat{r}_{ft}+\theta_{Lf}\left(1-\sigma\right)\sum_{f'}\frac{L_{f'}}{L}\hat{r}_{f't}. \tag{A11}$$

□

A.3 Proof of Proposition 3

Proposition. *3 The vectors of log changes in firm output prices ($\hat{\boldsymbol{p}}_t$), output ($\hat{\boldsymbol{y}}_t$), and TFP $\left(\widehat{TFP}_t\right)$ can be expressed as linear functions of the vectors of log changes in cash flows ($\hat{\boldsymbol{r}}_t$) and imported intermediate input prices $\left(\hat{\boldsymbol{q}}^*_t\right)$:*

$$\begin{aligned}\hat{\boldsymbol{p}}_t&=\mathbf{A_1}\hat{\boldsymbol{r}}_t+\mathbf{A_2}\hat{\boldsymbol{q}}^*_t\\ \hat{\boldsymbol{y}}_t&=\mathbf{A_3}\hat{\boldsymbol{r}}_t-\mathbf{A_2}\hat{\boldsymbol{q}}^*_t\\ \widehat{TFP}_t&=\mathbf{A_4}\hat{\boldsymbol{r}}_t-\mathbf{A_2}\hat{\boldsymbol{q}}^*_t,\end{aligned}$$

where the elements of matrices $\mathbf{A_1},\mathbf{A_2},\mathbf{A_3}$, and $\mathbf{A_4}$ only depend on the baseline factor shares in revenue and value added (ω_f,θ_f), shares of total employment (L_f/L), and the elasticity of substitution between labor and the specific factor (σ).

Proof. We begin by noting that for domestic firms, one firm's input price is another firm's output price. Without loss of generality, we can order firms so that the first F firms are domestic and the remaining F^* firms are foreign. For domestic firms, we have $\hat{q}_{it}=\hat{p}_{it}$. Equation (A8) can be rearranged as

$$\omega_{Vf}\hat{r}_{ft}+\omega_{Lf}\sum_f\frac{L_f}{L}\hat{r}_{ft}+\sum_{i=F+1}^{F+F^*}\omega_{ift}\hat{q}_{it}=\hat{p}_{ft}-\sum_{i=1}^{F}\omega_{ift}\hat{p}_{it},$$

where we have used Proposition 1 to substitute out $\hat{w}_t$.

We can write this more compactly in matrix form as $\boldsymbol{\omega_1}\hat{\boldsymbol{r}}_t+\boldsymbol{\omega_2}\hat{\boldsymbol{q}}^*_t=\boldsymbol{\omega_3}\hat{\boldsymbol{p}}_t$, where $\hat{\boldsymbol{r}}_t$ and $\hat{\boldsymbol{p}}_t$ are $F\times 1$ vectors of log changes in the shadow prices of the specific factors and prices; $\hat{\boldsymbol{q}}^*_t$ a $F^*\times 1$ vector whose elements are the $\hat{q}_{it}$ of the foreign firms; $\boldsymbol{\omega_1}$ is a $F\times F$ matrix defined as

$$\boldsymbol{\omega_1}\equiv\begin{bmatrix}\omega_{V1}+\frac{\omega_{L1}L_1}{L} & \frac{\omega_{L1}L_2}{L} & \cdots & \frac{\omega_{L1}L_F}{L}\\ \frac{\omega_{L2}L_1}{L} & \omega_{V2}+\frac{\omega_{L2}L_2}{L} & & \vdots\\ \vdots & & \ddots & \vdots\\ \frac{\omega_{LF}L_1}{L} & \cdots & \cdots & \omega_{VF}+\frac{\omega_{LF}L_F}{L}\end{bmatrix};$$

$\boldsymbol{\omega_2}$ is a $F \times F^*$ matrix defined as

$$\boldsymbol{\omega_2} \equiv \begin{bmatrix} \omega_{F+1,1} & \omega_{F+2,1} & \cdots & \omega_{F+F^*,1} \\ \omega_{F+1,2} & \omega_{F+2,2} & & \vdots \\ \vdots & & \ddots & \vdots \\ \omega_{F+1,1} & \cdots & \cdots & \omega_{F+F^*,F} \end{bmatrix};$$

and $\boldsymbol{\omega_3}$ is a $F \times F$ matrix defined as

$$\boldsymbol{\omega_3} \equiv \begin{bmatrix} 1-\omega_{11} & -\omega_{12} & \cdots & -\omega_{1F} \\ -\omega_{21} & 1-\omega_{22} & & \vdots \\ \vdots & & \ddots & \vdots \\ -\omega_{F1} & \cdots & \cdots & 1-\omega_{FF} \end{bmatrix}.$$

Thus, we have $\hat{\boldsymbol{p}}_t = \mathbf{A_1}\hat{\boldsymbol{r}}_t + \mathbf{A_2}\hat{\boldsymbol{q}}_t^*$, where $\mathbf{A_1} \equiv \boldsymbol{\omega_3^{-1}\omega_1}$ and $\mathbf{A_2} \equiv \boldsymbol{\omega_3^{-1}\omega_2}$.

Next, we rearrange equation (A11) to express the log change in output as

$$\hat{y}_{ft} = \left(\theta_{Lf}\sigma + \theta_{Vf}\right)\hat{r}_{ft} + \theta_{Lf}\left(1-\sigma\right)\sum_{f'}\frac{L_{f'}}{L}\hat{r}_{f't} - \hat{p}_{ft}.$$

We express this in matrix form as $\hat{\boldsymbol{y}}_t = \mathbf{\Theta_1}\hat{\boldsymbol{r}}_t - \hat{\boldsymbol{p}}_t = \mathbf{A_3}\hat{\boldsymbol{r}}_t - \mathbf{A_2}\hat{\boldsymbol{q}}_t^*$, where

$$\mathbf{\Theta_1} \equiv \begin{bmatrix} \theta_{L1}\sigma + \theta_{V1} + \frac{\theta_{L1}(1-\sigma)L_1}{L} & \frac{\theta_{L1}(1-\sigma)L_2}{L} & \cdots & \frac{\theta_{L1}(1-\sigma)L_F}{L} \\ \frac{\theta_{L2}(1-\sigma)L_1}{L} & \theta_{L2}\sigma + \theta_{V2} + \frac{\theta_{L2}(1-\sigma)L_2}{L} & & \vdots \\ \vdots & & \ddots & \vdots \\ \frac{\theta_{LF}(1-\sigma)L_1}{L} & \cdots & \cdots & \theta_{LF}\sigma + \theta_{VF} + \frac{\theta_{LF}(1-\sigma)L_F}{L} \end{bmatrix}$$

and $\mathbf{A_3} = \mathbf{\Theta_1} - \mathbf{A_1}$.

Finally, we use the first result in Proposition 2 to derive the following expression for the vector of log changes in TFP:

$$\widehat{\text{TFP}}_t = \hat{\boldsymbol{p}}_t^e - \hat{\boldsymbol{p}}_t = \mathbf{A_4}\hat{\boldsymbol{r}}_t - \mathbf{A_2}\hat{\boldsymbol{q}}_t^*,$$

where $\mathbf{A_4} \equiv \mathbf{\Theta_2} - \mathbf{A_1}$ and

$$\mathbf{\Theta_2} \equiv \begin{bmatrix} \theta_{V1} + \frac{\theta_{L1}L_1}{L} & \frac{\theta_{L1}L_2}{L} & \cdots & \frac{\theta_{L1}L_F}{L} \\ \frac{\theta_{L2}L_1}{L} & \theta_{V2} + \frac{\theta_{L2}L_2}{L} & & \vdots \\ \vdots & & \ddots & \vdots \\ \frac{\theta_{LF}L_1}{L} & \cdots & \cdots & \theta_{VF} + \frac{\theta_{LF}L_F}{L} \end{bmatrix}.$$

$\square$

A.4 Proof of Proposition 4

We start with a lemma that relates the consumption-metric welfare effect to the weighted average of deviations in consumption, where weights are given by the household's stochastic discount factor.

Lemma 1. *The consumption-equivalent welfare effect of the deviation path* $(\hat{C}_t)_{t=0}^{\infty}$ *is*

$$\mathcal{C} = \frac{\sum_{t=0}^{\infty} \mathrm{E}_0\left[M_{0\to t} C_t \hat{C}_t\right]}{\sum_{t=0}^{\infty} \mathrm{E}_0\left[M_{0\to t} C_t\right]},$$

where $M_{0\to t}$ *denotes the household's Stochastic Discount Factor (SDF).*

Proof. Denote $\mathcal{W}_0$ the welfare of the household at time t. Totally differentiating with respect to the deviation path for consumption $(\hat{C}_t)_{t=0}^{\infty}$ gives:

$$d\mathcal{W}_0 = \mathrm{E}_0\left[\sum_{t=0}^{\infty} \frac{\partial \mathcal{W}_0}{\partial C_t} C_t \hat{C}_t\right].$$

where $\partial\mathcal{W}_0/\partial C_t$, a stochastic derivative, corresponds to the effect of increasing consumption in states realized at time t for welfare at time 0.

The consumption-metric welfare effect $\mathcal{C}$ is defined as the constant log deviation of consumption that yields the same welfare change; that is

$$\mathrm{E}_0\left[\sum_{t=0}^{\infty} \frac{\partial \mathcal{W}_0}{\partial C_t} C_t \mathcal{C}\right] = \mathrm{E}_0\left[\sum_{t=0}^{\infty} \frac{\partial \mathcal{W}_0}{\partial C_t} C_t \hat{C}_t\right].$$

Solving for $\mathcal{C}$ gives:

$$\mathcal{C} = \frac{\mathrm{E}_0\left[\sum_{t=0}^{\infty} \frac{\partial \mathcal{W}_0}{\partial C_t} C_t \hat{C}_t\right]}{\mathrm{E}_0\left[\sum_{t=0}^{\infty} \frac{\partial \mathcal{W}_0}{\partial C_t} C_t\right]}.$$

To conclude, notice that, for any available asset i with return $R_{i,0\to t}$ between 0 and t, an optimizing agent must be indifferent between consuming a bit more today and investing a bit more in asset i between 0 and t, which implies

$$\frac{\partial \mathcal{W}_0}{\partial C_0} = \mathrm{E}_t\left[\frac{\partial \mathcal{W}_0}{\partial C_t} R_{i,0\to t}\right].$$

Hence, $\frac{\partial\mathcal{W}_0/\partial C_t}{\partial\mathcal{W}_0/\partial C_0}$ corresponds to the household's SDF, $M_{0\to t}$, and dividing the numerator and denominator of our expression for $\mathcal{C}$ proves the lemma. □

Proposition. 4 *The consumption-equivalent welfare effect of the deviation path* $(\hat{C}_t)_{t=0}^{\infty}$ *is*

$$\mathcal{C} = (1-\rho)\sum_{t=0}^{\infty} \rho^t \mathrm{E}_0\left[\frac{C_t^{1-\gamma}}{\mathrm{E}_0\left[C_t^{1-\gamma}\right]}\hat{C}_t\right],$$

where $\rho \equiv 1 - C_t/W_t$ *denotes the consumption-to-wealth ratio, which is constant in the baseline economy.*

Proof. Denote $M_{t\to t+k}$ the household SDF between t and $t+k$ and $W_t = \mathrm{E}_t[\sum_{k=0}^{\infty} M_{t\to t+k} C_{t+k}]$ the present value of consumption (or, equivalently, total wealth). As shown, for instance, in Martin (2013), a household with Epstein-Zin preferences has an SDF of the form:

$$M_{t\to t+k} = \left(\beta^k \left(\frac{C_{t+k}}{C_t}\right)^{-1/\psi}\right)^{\theta} \left(R^{-1}_{W,t\to t+k}\right)^{1-\theta}, \tag{A12}$$

where $\theta \equiv (1-\gamma)/(1-1/\psi)$ and $R_{W,t+1} \equiv \frac{W_{t+1}}{W_t - C_t}$ denotes the return on the wealth portfolio between t and $t+1$ and $R_{W,t\to t+k} = R_{W,t+1} \dots R_{W,t+k}$ denotes the cumulative return on the wealth portfolio between t and $t+k$. In the special case where $\psi = 1/\gamma$ (separable preferences), equation (A12) gives the familiar expression $M_{t\to t+k} = \beta^k \left(C_{t+k}/C_t\right)^{-\gamma}$.

This expression for the SDF can be simplified when log consumption is i.i.d (which is the case on the baseline path). Indeed, in this case, we can guess (and verify later) that the consumption-to-wealth ratio is constant over time, in which case the return on the wealth portfolio simplifies to:

$$\begin{aligned} R_{W,t+1} &= \frac{W_{t+1}}{W_t - C_t} \\ &= \frac{W_t}{W_t - C_t} \times \frac{W_{t+1}}{W_t} \\ &= \frac{1}{\rho}\frac{C_{t+1}}{C_t}, \end{aligned}$$

where the last line uses the definition of $\rho \equiv 1 - C_t/W_t$. Combining with (A12) allows us to simplify the expression for the SDF along the baseline path:

$$\begin{aligned} M_{t\to t+k} &= \left(\beta^k \left(\frac{C_{t+k}}{C_t}\right)^{-1/\psi}\right)^{\theta} \left(\rho^k \frac{C_t}{C_{t+k}}\right)^{1-\theta} \\ &= \beta^{\theta k} \rho^{(1-\theta)k} \left(\frac{C_{t+k}}{C_t}\right)^{-\gamma}, \end{aligned} \tag{A13}$$

where the second line uses the fact that $\theta(1-1/\psi) = (1-\gamma)$. We now verify that the consumption-to-wealth ratio is indeed constant along the baseline path. Using the definition of total wealth, we get

$$
\begin{aligned}
W_t &= \mathrm{E}_t\left[\sum_{k=0}^{\infty} M_{t\to t+k} C_{t+k}\right] \\
&= C_t \sum_{k=0}^{\infty} \beta^{\theta k} \rho^{(1-\theta)k} \mathrm{E}_t\left[\left(\frac{C_{t+k}}{C_t}\right)^{1-\gamma}\right] \\
&= C_t \sum_{k=0}^{\infty} \beta^{\theta k} \rho^{(1-\theta)k} \mathrm{E}_t\left[\left(\frac{C_{t+k}}{C_{t+k-1}}\right)^{1-\gamma} \left(\frac{C_{t+k-1}}{C_{t+k-2}}\right)^{1-\gamma} \dots \left(\frac{C_{t+1}}{C_t}\right)^{1-\gamma}\right] \\
&= C_t \sum_{k=0}^{\infty} \beta^{\theta k} \rho^{(1-\theta)k} \mathrm{E}_t\left[\left(\frac{C_{t+k}}{C_{t+k-1}}\right)^{1-\gamma}\right] \mathrm{E}_t\left[\left(\frac{C_{t+k-1}}{C_{t+k-2}}\right)^{1-\gamma}\right] \dots \mathrm{E}_t\left[\left(\frac{C_{t+1}}{C_t}\right)^{1-\gamma}\right] \\
&= C_t \sum_{k=0}^{\infty} \beta^{\theta k} \rho^{(1-\theta)k} \mathrm{E}_0\left[\left(\frac{C_1}{C_0}\right)^{1-\gamma}\right]^k \\
&= C_t \sum_{k=0}^{\infty} \left(\beta^{\theta} \rho^{1-\theta} \mathrm{E}_0\left[\left(\frac{C_1}{C_0}\right)^{1-\gamma}\right]\right)^k \\
&= C_t \frac{1}{1 - \beta^{\theta} \rho^{1-\theta} \mathrm{E}_0\left[\left(\frac{C_1}{C_0}\right)^{1-\gamma}\right]},
\end{aligned}
$$

where the fourth and fifth lines use the fact that consumption growth is independently and identically distributed across periods along the baseline path and the last line uses the formula for the infinite sum of a geometric sequence. Hence, we have proven that the wealth-to-consumption ratio W_t/C_t is constant along the baseline path.

Finally, we can combine this equation with the definition of $\rho = 1 - C_t/W_t$ to solve for ρ in terms of the household preferences and of the distribution of consumption growth:

$$
\begin{aligned}
\rho &= \beta^{\theta} \rho^{(1-\theta)} \mathrm{E}_0\left[\left(\frac{C_1}{C_0}\right)^{1-\gamma}\right] \\
\implies \rho &= \beta \mathrm{E}_0\left[\left(\frac{C_1}{C_0}\right)^{1-\gamma}\right]^{\frac{1}{\theta}}.
\end{aligned}
$$

Plugging this into (A13) gives a simplified expression for the SDF along the baseline path:

$$
\begin{aligned}
M_{0\to t} &= \beta^t \left(\frac{C_t}{C_0}\right)^{-\gamma} \mathrm{E}_0\left[\left(\frac{C_t}{C_0}\right)^{1-\gamma}\right]^{1/\theta - 1} \\
&= \rho^t \frac{\left(\frac{C_t}{C_0}\right)^{-\gamma}}{\mathrm{E}_0\left[\left(\frac{C_t}{C_0}\right)^{1-\gamma}\right]}.
\end{aligned}
$$

Combining this formula for the SDF with the expression for the welfare effect $\mathcal{C}$ obtained in Lemma 1 gives:

$$\begin{aligned}
\mathcal{C} &= \frac{\sum_{t=0}^{\infty} \mathrm{E}_0 \left[\rho^t \frac{\left(\frac{C_t}{C_0}\right)^{1-\gamma}}{\mathrm{E}_t \left[\left(\frac{C_t}{C_0}\right)^{1-\gamma} \right]} \hat{C}_t \right]}{\sum_{t=0}^{\infty} \mathrm{E}_0 \left[\rho^t \frac{\left(\frac{C_t}{C_0}\right)^{1-\gamma}}{\mathrm{E}_0 \left[\left(\frac{C_t}{C_0}\right)^{1-\gamma} \right]} \right]} \\
&= (1-\rho) \sum_{t=0}^{\infty} \rho^t \mathrm{E}_0 \left[\frac{\left(\frac{C_t}{C_0}\right)^{1-\gamma}}{\mathrm{E}_0 \left[\left(\frac{C_t}{C_0}\right)^{1-\gamma} \right]} \hat{C}_t \right],
\end{aligned}$$

where the second line obtains after simplifying the denominator in the first line to $\sum_{t=0}^{\infty} \rho^t = 1/(1-\rho)$. □

A.5 Proof of Corollary 1

Corollary. *1 The consumption-equivalent welfare effect of the deviation path* $(\hat{C}_t)_{t=0}^{\infty}$ *due to higher-order terms is:*

$$\begin{aligned}
\mathcal{C}^{\textit{higher-order}} =& \frac{1-\gamma}{2}(1-\rho) \sum_{t=1}^{\infty} \rho^t d \left(\mathrm{Var}_0 \ln C_t] \right) \\
&+ \frac{(1-\gamma)^2}{3!}(1-\rho) \sum_{t=1}^{\infty} \rho^t d \left(\textit{Skewness}_0[\ln C_t] \cdot \mathrm{Var}_0[\ln C_t]^{3/2} \right) \\
&+ \frac{(1-\gamma)^3}{4!}(1-\rho) \sum_{t=1}^{\infty} \rho^t d \left(\textit{Excess Kurtosis}_0[\ln C_t] \cdot \mathrm{Var}_0[\ln C_t]^2 \right) \\
&+ \ldots
\end{aligned}$$

Proof. First, note that one can rewrite the expression for welfare given in Proposition 4 as:

$$\mathcal{C} = (1-\rho) \sum_{t=0}^{\infty} \rho^t \frac{d \ln \mathrm{E}_0 \left[C_t^{1-\gamma} \right]}{1-\gamma}.$$

The *cumulant-generating function* (CGF) of a random variable g is defined as the function $\theta \to \ln \mathrm{E} \left[e^{\theta g} \right]$. It is well known that the CGF can be expanded as a power series in θ:

$$\ln \mathrm{E} \left[e^{\theta g} \right] = \sum_{l=1}^{\infty} \frac{\theta^l}{l!} \kappa_l,$$

where κ_l corresponds to the the l-th *cumulant* of the variable g. In particular, the first cumulant corresponds to the mean of g and the second cumulant corresponds to its variance. Applying this definition with $g = \ln C_t$ and $\theta = 1-\gamma$ gives:

$$\ln \mathrm{E}_0 \left[C_t^{1-\gamma} \right] = \sum_{l=1}^{\infty} \frac{(1-\gamma)^l}{l!} \kappa_{l,0\to t},$$

where $\kappa_{l,0\to t}$ denotes the l-th cumulant of log consumption at time t from the point of view of time 0. Combining the last two equations gives:

$$\begin{aligned}
\mathcal{C} &= (1-\rho)\sum_{t=0}^{\infty}\rho^t\frac{1}{1-\gamma}\sum_{l=1}^{\infty}\frac{(1-\gamma)^l}{l!}d\kappa_{l,0\to t}\\
&= (1-\rho)\sum_{t=0}^{\infty}\rho^t d\kappa_{1,0\to t} + (1-\rho)\sum_{t=0}^{\infty}\rho^t\frac{1}{1-\gamma}\sum_{l=2}^{\infty}\frac{(1-\gamma)^l}{l!}d\kappa_{l,0\to t}\\
&= \underbrace{(1-\rho)\sum_{t=0}^{\infty}\rho^t \mathrm{E}_0\left[\hat{C}_t\right]}_{\text{deviations in expected log consumption}} + \underbrace{(1-\rho)\sum_{t=1}^{\infty}\rho^k\sum_{l\geq 2}\frac{(1-\gamma)^{l-1}}{l!}d\kappa_{l,0\to t}}_{\text{deviations in higher-order moments}},
\end{aligned}$$

where the last line uses the fact that the deviation of the average log consumption (its first cumulant) can be written as the average deviation of log consumption. Finally, one can obtain the equation in the main text by expressing the second, third, and fourth cumulants using the definition of variance, skewness, and excess kurtosis. □

A.6 Proof of Proposition 5

Proposition. 5 *Around a baseline path in which the cash-flow-to-firm-value ratio, $r_{ft}V_f/\Pi_{ft}$ is equal to the constant consumption-to-wealth ratio, C_t/W_t, we have:*

$$\hat{\Pi}_{f0} = (1-\rho)\sum_{t=0}^{\infty}\rho^k \mathrm{E}_0\left[\hat{r}_{ft}\right] - \sum_{t=1}^{\infty}\rho^t\mathrm{E}_0\left[\hat{R}_{ft}\right]$$

Proof. Differentiating the present value relationship (11) gives

$$\begin{aligned}
\hat{\Pi}_{f0} &= \frac{1}{\Pi_{f0}}\mathrm{E}_0\left[\sum_{t=0}^{\infty}\frac{r_{ft}V_f}{R_{f1}\dots R_{ft}}\left(\hat{r}_{ft}-\sum_{s=1}^{t}\hat{R}_{fs}\right)\right]\\
&= \frac{1}{\Pi_{f0}}\mathrm{E}_0\left[\sum_{t=0}^{\infty}\frac{r_{ft}V_f}{R_{f1}\dots R_{ft}}\hat{r}_{ft}\right] - \frac{1}{\Pi_{f0}}\sum_{t=1}^{\infty}\mathrm{E}_0\left[\left(\sum_{s=t}^{\infty}\frac{r_{fs}V_f}{R_{f1}\dots R_{fs}}\right)\hat{R}_{ft}\right]\\
&= \frac{1}{\Pi_{f0}}\mathrm{E}_0\left[\sum_{t=0}^{\infty}\frac{r_{ft}V_f}{R_{f1}\dots R_{ft}}\hat{r}_{ft}\right] - \frac{1}{\Pi_{f0}}\sum_{t=1}^{\infty}\mathrm{E}_0\left[\frac{1}{R_{f1}\dots R_{ft}}\mathrm{E}_t\left[\sum_{s=t}^{\infty}\frac{r_{fs}V_f}{R_{ft+1}\dots R_{fs}}\right]\hat{R}_{ft}\right]\\
&= \sum_{t=0}^{\infty}\mathrm{E}_0\left[\frac{r_{ft}V_f}{\Pi_{ft}}\frac{\Pi_{ft}/\Pi_{f0}}{R_{f1}\dots R_{ft}}\hat{r}_{ft}\right] - \sum_{t=1}^{\infty}\mathrm{E}_0\left[\frac{\Pi_{ft}/\Pi_{f0}}{R_{f1}\dots R_{ft}}\hat{R}_{ft}\right]
\end{aligned}$$

where the second line uses the fact that $\Pi_{ft} = \mathrm{E}_t\left[\sum_{s=t}^{\infty}\frac{r_{fs}V_f}{R_{ft+1}\dots R_{fs}}\right]$, following (11). We then use the assumption that on the baseline path $r_{ft}V_f/\Pi_{ft}$ is constant and equal to C_t/W_t (if not, all of our equalities should be understood as being at the first-order around this baseline path, as in Campbell and Shiller (1988)).[1] In particular, using the definition of ρ above, we can write $(\Pi_{ft} - r_{ft}V_f)/\Pi_{ft} = \rho$, which implies:

$$R_{ft+1} = \frac{\Pi_{ft+1}}{\Pi_{ft} - r_{ft}V_f} = \frac{1}{\rho}\frac{\Pi_{ft+1}}{\Pi_{ft}}$$

[1]The underlying assumption is that, on the baseline path, consumption growth is i.i.d. and the cash flow of each firm grows at the same rate as aggregate consumption.

Plugging this into the previous equation gives:

$$\hat{\Pi}_{f0} = (1-\rho)\sum_{t=0}^{\infty}\rho^t \mathrm{E}_0\left[\hat{r}_{ft}\right] - \sum_{t=1}^{\infty}\rho^t \mathrm{E}_0\left[\hat{R}_{ft}\right]$$

□

B Model Extensions

B.1 Adding Growth

The baseline model that we analyze does not allow for growth, but we can easily change it to a model in which productivity rises by ϕ each period. We demonstrate that the only effect of increasing productivity in this setup is to cause output, wages, and payments to the specific factor to rise by ϕ each period. We do this by showing that if output grows at a rate ϕ and prices do not change, then all factor and product markets will clear, and firms will continue to earn zero profits. We then show that if output grows at a rate ϕ, firms have no incentive to change prices, which means that we have identified an equilibrium. We model growth in our setup by assuming that firm output in each period is given by

$$y_{ft} = h\left(\phi^t V_f, \phi^t L_{ft}, m_{ift}\right),$$

where $\phi \geq 1$ is a parameter that determines TFP growth. Since labor and the specific factor are paid the value of their marginal product, we can write the wage and rental rate equations as

$$w_t = \phi^t h_L p_{ft} \quad \text{and} \quad r_{ft} = \phi^t h_V p_{ft}.$$

Thus, if firms do not change their employment levels and prices do not change, we will have $\Delta \ln w_t = \Delta \ln r_{ft} = \phi$. This result implies that real incomes will rise by ϕ, which means that if demand is homothetic and prices do not change, output will rise by ϕ. We also know from Proposition 1 that each firm will continue to employ the same number of workers as in period 0 if wages and rental rates rise by the same amount.

The new factor market clearing conditions in each time period will be

$$\sum_f \frac{a_{Lf0}}{\phi^t}\left(\phi^t y_{f0}\right) = L, \text{ and}$$

$$\frac{a_{Vf0}}{\phi^t}\left(\phi^t y_{f0}\right) = V_f.$$

An important implication of these equations is that if markets clear in period 0, they will also clear in period t.

Finally, we show that an equilibrium featuring no changes in prices from those in period 0 will also satisfy the zero-profit condition. In order to do this, we first show that the unit-input requirement for materials doesn't change because separability of the production function means that

$$a_{ift} = \frac{m_{ift}}{y_{ft}} = \frac{a_{if0} y_{ft}}{y_{ft}} = a_{if0}.$$

One implication of this result is that intermediate input use grows at the same rate as output growth, i.e., $\Delta \ln m_{ift} = \Delta \ln y_{ft} = \phi$. If output in period t is given by $\phi^t y_{ft}$ and prices do not change, then the zero-profit condition (equation 1) can be written as

$$a_{Lft}w_t + a_{Vft}r_{ft} + \sum_i a_{ift}q_{it} = p_{ft}$$

$$\frac{a_{Lf0}}{\phi^t}\left(\phi^t w_0\right) + \frac{a_{Vf0}}{\phi^t}\left(\phi^t r_{f0}\right) + \sum_i a_{if0}q_{it} = p_{ft}$$

$$a_{Lf0}w_0 + a_{Vf0}r_{f0} + \sum_i a_{if0}q_{it} = p_{ft}.$$

Since we know that these equations hold in period 0, we know that if $q_{it} = q_{i0}$, then $p_{ft} = p_{f0.}$ Intermediate input prices will not change if labor and specific factor productivity growth affects all firms equally because intermediate input usage, consumer demand, and supply will all grow at a rate of ϕ.

C Data and Measurement

C.1 Event Dates

The following table presents the event dates (i.e., the date of the first news report of each increase in tariffs), the date that new tariffs were implemented, the country imposing the tariffs, and the news link of each event. The earliest event date was identified via Factiva and Google Search.

Table C.1: Details on Event Dates

Event Date	Implementation Date	Country	News Link
23jan2018*	07feb2018	US	Washington Post
01mar2018*	23mar2018	US	Reuters
22mar2018	23mar2018	US	NYT
23mar2018	02apr2018	China	CNBC
29may2018	07jun2018	US	NPR
15jun2018	07jun2018	China	NPR
19jun2018	24sep2018	US	WSJ
02aug2018	24sep2018	China	Reuters
06may2019**	05oct2019	US	DW
13may2019	01jun2019	China	CNBC
01aug2019	01aug2019	US	CNBC
23aug2019	01aug2019	China	CNBC

Note: Event dates with the first news release on a weekday after trading hours (4:00 PM EST) are flagged by an asterisk (*). Event dates with the first news release on a weekend are flagged by two asterisks (**). In these instances, the trading day for the event is the first trading day after the news release.

C.2 Summary of Data Sources

Table C.2: Summary of Data Sources

Variable	Construction
Book Leverage	*Source: CRSP-Compustat Annual Merged Dataset (2017)* Book leverage is total debt including current [**dt**] *divided by* assets (total) [**at**], **dt**/**at**.
Cash Flow to Asset Ratio	*Source: CRSP-Compustat Annual Merged Dataset (2017)* The Cash Flow-to-Asset Ratio is operating income after depreciation [**oiadp**] *plus* interest and related expense (total) [**xintq**] *all divided by* assets (total) [**at**]; (**oiadp** + **xintq**)/**at**.
China Revenue Share	*Source: FactSet Geographic Revenue Exposure (2017)* These data report revenue shares from major markets (including China) for 3,134 firms (identified by PERMNO). If we cannot match a firm to this dataset, we try to match using tickers. If we cannot match a firm using either PEMRNO or the ticker to one in the Datamyne dataset, we assume that its China revenue share is zero. More details are provided in Section C.3.
China Importer/ Exporter	*Source: Datamyne dataset of the value and quantity of exports to and imports from China (via sea) by U.S. firms in 2017, Supply chain data from Capital IQ* We combine the Datamyne dataset with supply chain data to determine whether each firm imported from or exported to China (via sea) in 2017 either directly or through a subsidiary/supplier. Refer to Section C.3 for details on variable construction.

Variable	Construction
Economic Surprise Variables (ES_t)	*Source: Daniel Lewis based on Lewis et al. (2019)* The difference between a macroeconomic data release value and the Bloomberg median of economists' forecast on the previous day. The 65 series we use to construct our economic surprise variables are ISM manufacturing, ISM non-manufacturing, ISM prices, construction spending, durable goods new orders, factory orders, initial jobless claims, ADP payroll employment, non-farm payrolls, unemployment rate, total job openings, consumer credit, non-farm productivity, unit labor costs, retail sales, retail sales less auto, federal budget balance, trade balance, import price index, building permits, housing starts, industrial production, capacity utilization, business inventories, Michigan consumer sentiment, PPI core, PPI, CPI core, CPI, Empire State manufacturing index, Philadelphia Fed BOS, GDP (advance estimate), GDP (second estimate), GDP price index, personal income, personal spending, PCE price index, core PCE price index, wholesale inventories, new home sales, CB consumer confidence, leading economic index, employment cost index, Wards total vehicle sales, continuing claims retail sales ex auto and gas, NAHB housing market index, change in manufacturing payrolls, MNI Chicago, PMI pending home sales, Richmond Fed manufacturing index, Dallas Fed manufacturing index, existing home sales, Chicago Fed national activity index, capital goods (non-defense ex air), NFIB small business optimal index, Cap goods ship. ex air, KC Fed manufacturing activity, Markit U.S. manufacturing purchasing managers index, Case-Shiller home price index, and Markit U.S. services purchasing managers index, federal funds shock, forward guidance shock, asset purchase shock, and the Federal Reserve information shock.
Equity-Premium Bound (EPB$_t$)	*Source: OptionMetrics, dataset with prices of actively traded option on the S&P 500 (ticker SPX)* We follow Martin (2017) method for constructing EPB_t.

Variable	Construction
Firm	*Source: CRSP-Compustat Annual Merged Dataset (2017)* A firm is defined by its Compustat Global Company Key or GVKEY. In our sample, the GVKEY codes map one-to-one to the unique identifier and permanent identifier to security or PERMNO in CRSP. As such, we are able to use PERMNO (**permno**) and GVKEY (**gvkey**) interchangeably across datasets.
Firm Employment L_f	*Source: CRSP-Compustat Annual Merged Dataset (2017)* The employment variable in Compustat [**emp**] includes the following items: all part-time and seasonal employees; and all employees of consolidated subsidiaries, both domestic and foreign. The employment variable excludes consultants, contract workers, and employees of unconsolidated subsidiaries.
Firm Returns ($\ln R_{ft}$)	*Source: CRSP U.S. Stock Database* We define log firm returns as the *log* of one *plus* net returns [**ret**]; $\ln(1 + \mathbf{ret})$.
Labor and Specific Factor Shares (θ_{Lf} and θ_{Vf})	*Source: Compustat and BEA Input-Output table* Firm cash flow as a share of revenue is calculated by dividing accounting cash flows with gross sales [**sale**] in 2017, obtained from Compustat. We use the BEA's 450-by-450 industry (6-digit NAICS) IO table in 2012 to construct labor and materials shares of revenue. In Section C.3, we describe how we combine all of these shares to construct the labor and specific factor shares of value added (θ_{Lf} and θ_{Vf}).

Variable	Construction
Ratio Between Market Value of Equity and Market Value of Assets κ_f	*Source: CRSP-Compustat Annual Merged Dataset (2017)* κ_f is defined as the ratio between the market value of equity and the market value of total assets (equity + debt). The market value of equity (or market capitalization) is defined below. The market value of assets is the sum of the market value of equity and the value of debt, constructed as total assets [**`at`**] *minus* stockholder equity [**`seq`**] *minus* cash and short-term investments [**`che`**]; **`at`** − **`seq`** − **`che`**. If cash and short-term investments is missing, we replace it with zero. Finally, we winsorize κ_f to be between 0.1 and 1.0.
Market Value of Equity	*Source: CRSP-Compustat Annual Merged Dataset (2017)* We use the 2017 Market Value of Equity of a firm is [**`mkval`**]. When this variable is unavailable we use the *product of* annual price close (fiscal) [**`prcc_f`**] *and* common shares outstanding [**`csho`**]; **`prcc_f`** × **`csho`**.
Profit	*Source: CRSP-Compustat Annual Merged Dataset (2017)* Profit is "operating income after depreciation" [**`oiadp`**] *minus* "interest and related expense (total)" [**`xint`**]; **`oiadp`** − **`xint`**.
Property, Plant, and Equipment (PPE) per worker	*Source: CRSP-Compustat Annual Merged Dataset (2017)* PPE per worker is property, plant, and equipment (gross total) [**`ppegt`**] *divided by* employees [**`emp`**]; **`ppegt`**/**`emp`**.

Variable	Construction
Treasury Yield (1- to 30-Month Maturity)	**1. Maturity: 3, 4, and 12 months** *Source: Board of Governors of the Federal Reserve System, {3-Month, 6-Month, 1-Year} Treasury Bill Secondary Market Rate, Discount Basis; retrieved from FRED, Federal Reserve Bank of St. Louis* We obtain the nominal yields with the following maturities from FRED: 3-Month [**DTB3**], 6-Month [**DTB6**], and 12-Month [**DTB1YR**]. **2. Maturity: all remaining maturities up to 30 months** *Source: daily US yield curve data up to 2019 dataset from Gürkaynak et al. (2007); dataset retrieved from Refet Gürkaynak's website* The US yield curve dataset was published alongside Gürkaynak et al. (2007) and is updated regularly. At the time of writing, the dataset reports nominal and real yields up until October 25, 2019, at different monthly maturities ranging from one to thirty months. Nominal yields in the paper refers to "Zero-Coupon Yield (Continuously Compounded)" [**SVNY**xx].
Real Yields (1- to 30-Month Maturity)	*Source: daily US TIPS curve data up to 2019 dataset from Gürkaynak et al. (2010); dataset retrieved from Refet Gürkaynak's website* The US yield curve dataset was published alongside Gürkaynak et al. (2010) and is updated regularly (data up to 10/25/2019). Real yields is "TIPS Yield Zero Coupon (Continuously Compounded)" [**TIPSY**xx].
Tobin's Q	*Source: CRSP-Compustat Annual Merged Dataset (2017)* Tobin's Q is market capitalization *plus* book value of total assets [**at**] *minus* book value of common equity [**ceq**], *all divided* by the book value of total assets [**at**].
U.S. Import Value	*Source: U.S. Census Bureau* We obtain 2017 U.S. import values for each good (HTS10) and exporting country from the U.S. Census Bureau.

Variable	Construction
U.S. Tariff Rates	*Source: U.S. Trade Representative (USTR), and U.S. International Trade Commission (USITC).* In the paper, the tariff rate in year y for an HS10 product and exporting country refers to the tariff rate in effect in December of year y. We use the December 2017 and 2019 tariff rates applied to each product (HTS10) and exporting country.
U.S. Firm-size Distribution (Goods and Services)	*Source: U.S. Census Bureau, "Number of Firms, Number of Establishments, Employment, and Annual Payroll by Small/Large Enterprise Employment Sizes for the United States and States, NAICS Sectors: 2017" dataset* The dataset reports reports the number of employees by sector (NAICS2) and employment bin.

C.3 Construction of China-Exposure Variables

We consider three ways in which firms were exposed to China: importing, exporting, and foreign sales (either through exporting or subsidiaries). It is important to capture indirect imports that are ultimately purchased by U.S. firms because many firms do not import directly from China but instead obtain Chinese inputs through their subsidiaries or the U.S. subsidiaries of foreign firms. In order to identify the supply chains, we use DUNS numbers from Dun & Bradstreet to merge importers from Datamyne with a list of firms and their subsidiaries from Capital IQ. We use a firm-name match to link firms, subsidiaries, and their suppliers that are reported in Datamyne, Compustat, Bloomberg, and FactSet and identify which firms are trading with China directly or indirectly through their network of suppliers. After matching firms with identical names in two or more datasets, we manually compared firms with similar names to identify whether they are matches. We define "China Revenue Share" to be the share of a firm's revenues in 2017 (either obtained through sales of subsidiaries or exports) that arise from sales in China, as reported in FactSet.

The Datamyne data used to identify U.S. firms that import from China or export to China have a number of limitations. First, the product level reported is more aggregated than that in the Harmonized Tariff System 8-digit level at which U.S. tariffs are set. While some of the Datamyne data are at the Harmonized System (HS) 6-digit level, much of it is at the far more aggregated HS2-digit level, making it impossible to know what share of a firm's trade was affected by tariffs. We, therefore, use a binary exposure measure. Our "China Import" dummy is one if the firm or its supply network imported from China in 2017 and zero otherwise. We also construct a "China Export" dummy analogously for exports. Second, the Datamyne data only cover seaborne trade. The U.S. Census data reveal that in 2017, 62 percent of all imports from China and 58 percent of exports to China were conducted by sea. So although we capture over half of the value of U.S.-China trade, the China import and export dummies are likely to miss some U.S. firms that trade with China. On the export side, any exporters that are not reflected in the export dummy are included in the China revenue share variable.

China Revenue Share The China revenue share variable is from FactSet. There are two potential issues we note. First, firms sometimes report geographic revenue shares for more aggregated geographies than countries (e.g., Asia/Pacific). In these cases, FactSet imputes the undisclosed revenue share for a country using that country's GDP weight within a more aggregate geographic unit for which the data are disclosed (e.g., China's GDP share within Asia/Pacific region). FactSet provides a confidence factor that ranges from 0.5 to 1, with 1 indicating no imputation. Fortunately, within our sample of firms, the mean confidence factor for the China revenue share is 0.996 with a range of 0.98 to 1, and our China revenue share variable comes mostly from direct disclosures.

C.4 Construction of Factor-Share Variables

In order to construct the labor and specific factor share variables (θ_{Lf} and θ_{Vf}), we set $r_f V_f / (p_f y_f)$ equal to the firm's operating income after depreciation less interest expenses, divided by sales as reported in Compustat in 2017 and kept firms for which this value was positive.[2] Because Compustat does not separately report the compensation of employees and materials cost by firm, we need to use industry-level data in order to infer $wL_f / (p_f y_f)$ and $\sum_i \omega_{if}$. To do this, we set LSHARE_f and MSHARE_f equal to the compensation of employees divided by output and intermediate-input expenses divided by output in the NAICS 6-digit industry containing the firm, as reported in the 2012 450×450 Bureau of Economic Analysis Input-Output table (the most recently available disaggregated IO table). Since we are using data from two different sources to compute the shares, they may not sum to 1. Therefore, in order to preserve this property, we set $wL_f / (p_f y_f) = \Theta_f \text{LSHARE}_f$ and $\sum_i \omega_{if} = \Theta_f \text{MSHARE}_f$, where

$$\Theta_f = \frac{\left(1 - \frac{r_f V_f}{p_f y_f}\right)}{\text{LSHARE}_f + \text{MSHARE}_f}.$$

Once we constructed these variables we used equation (7) to construct θ_{Lf} and θ_{Vf}.

[2]Operating income after depreciation equals firm revenue less cost of goods sold, sales, general and administrative expenses, and depreciation. Labor costs appear in the cost of goods sold and the market and administration expenses lines. We also tried an alternative measure of $r_f V_f$ in which we did not subtract interest expenses, but it only had small effects on the results.

C.5 Sample Statistics

Table C.4: Descriptive Statistics

	N	Mean	SD	p25	p50	p75
Ratio of Equity to Total Assets κ	3,463	0.65	0.30	0.43	0.71	0.94
China Importer Dummy	2,437	0.31	0.46	0.00	0.00	1.00
China Exporter Dummy	2,437	0.04	0.20	0.00	0.00	0.00
China Revenue Share	2,437	0.03	0.07	0.00	0.00	0.02

Note: The China Importer and China Exporter dummies equal 1 for firms that import or export to China. China Revenue Share is the share of a firm's revenues that come from China.

D Details on Reweighting the Compustat-CRSP Sample

We now detail how we reweight the sample of firms in our Compustat-CRSP sample to approximate the distribution of firms in the U.S. across sectors and employment size. We first describe the method used in our baseline results, which uses a non-parametric approach. We then describe an alternative method, used as a robustness exercise, that uses a more parametric approach with a finer employment grid.

D.1 Baseline Method

We start by dividing the set of firms in our sample into 18 industries (defined by their first 2-digit NAICS code) and four employment bins (0-500, 501-5,000, 5,001-20,000, 20,001+). For the 2-digit NAICS industries 11 (agriculture), 61 (education), 62 (health care), and 81 (other services), we only use two employment bins, below or above 20000, to ensure that there are enough firms within each bin.

We compute the average deviation in firm value in sector s and employment bin b for event j as:

$$\hat{\Pi}^{j}_{sb0} \equiv \sum_{f' \in \Omega_{sbj}} \frac{L_f}{\sum_{f' \in \Omega_{sbj}} L_{f'}} \Pi^{j}_{f0}.$$

where Ω_{sbj} denotes the set of firms in industry sector s and employment bin b with a non-missing return on event j and Π_{fj} denotes the change in firm value over the day in which event j happens. We then compute the overall deviation in firm value in sector s and employment bin b as the sum of the average deviation on all tariff-announcement days j in our sample

$$\hat{\Pi}_{sb0} \equiv \sum_{j=1}^{J} \hat{\Pi}^{j}_{sb0}.$$

The average deviation in firm value in sector s is given by

$$\hat{\Pi}_{s0} \equiv \sum_{b \in \Omega^B_s} \frac{L_{sb}}{\sum_{b' \in \Omega^B_s} L_{sb'}} \hat{\Pi}_{sb0},$$

where Ω_s^B is the set of employment bins b in sector s and L_{sb} denotes the overall employment in bin b and sector s in the U.S. economy, provided by the Statistics of U.S. Businesses (SUSB, U.S. Census Bureau). As a final step, we compute the overall deviation in firm value for the whole economy as

$$\hat{\Pi}_0 \equiv \sum_{s \in \Omega^S} \frac{VA_s}{C} \hat{\Pi}_{s0},$$

where Ω^S denotes the set of sectors, VA_s is the value added of sector s and C is personal consumption expenditures, all obtained from the BEA.

D.2 Alternative Method

Under this alternative methodology, we divide the set of firms in our sample into 18 industries (defined by their first 2-digit NAICS code) and a finer grid of ten employment bins (defined by nine employment thresholds 500, 750, 1000, 1500, 2000, 2500, 5000, 10000, and 20000). With this finer employment grid, some {sector s, employment bin b, announcement j} cells have zero or very few firms. To handle this issue, we first regress, within each event and sector, the deviation in firm value on log employment and log employment squared. We then use the predicted values from this regression to construct the average deviation in firm value for each {sector s, employment bin b, announcement j} cell. The final step is similar to the previous method: we obtain the overall deviation in firm value in the economy by taking an employment-weighted average within each sector, and then a value-added weighted average across sectors.

E Details on Estimating Changes in Discount Rates

E.1 Stylized Facts

In Table 1, we reported stock-market returns event-by-event. In the same spirit. Appendix Table E.1 reports the change in nominal yields, real yields, and in the equity-premium bound event-by-event. This shows that our results are not driven by some outlier event: almost all announcements tend to decrease real yields and increase the equity-premium bound.

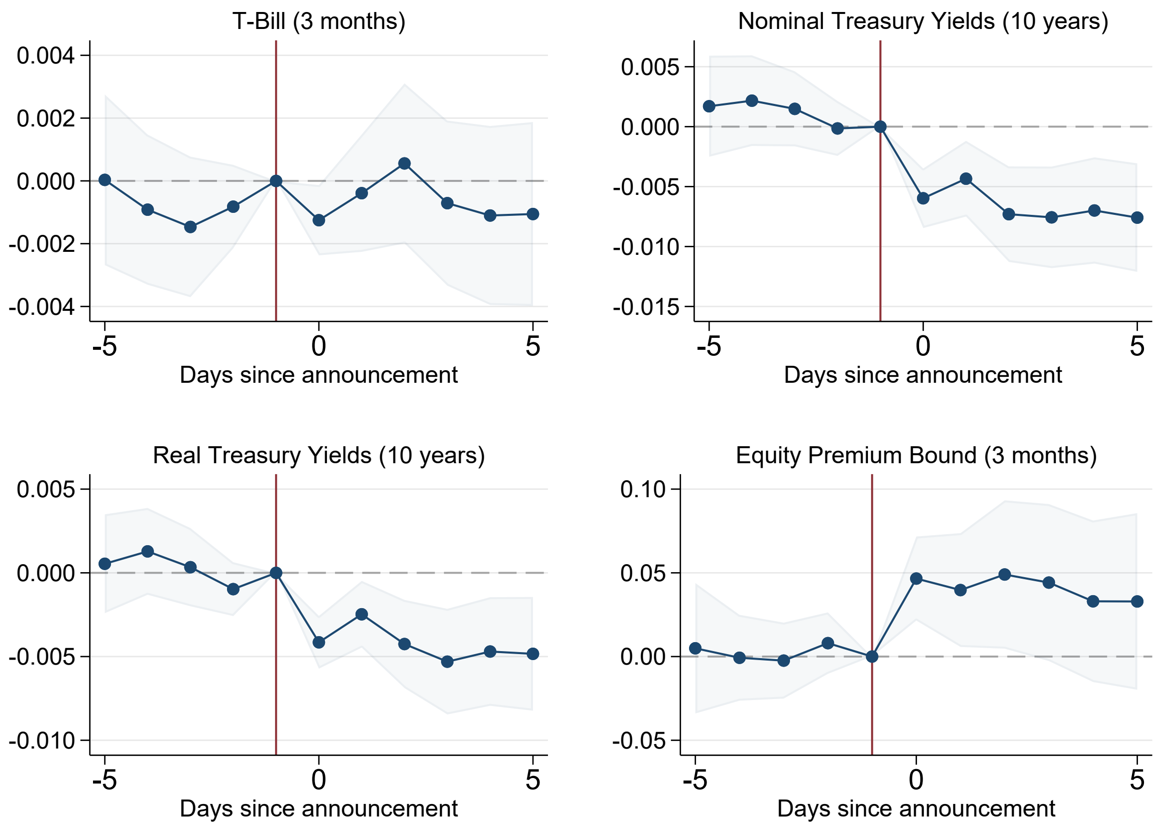
Table E.1: Change in Discount Rates on Tariff-Announcement Days

Event Date	Δ T-Bill (3m) (x100)	Δ Nominal Yields (10y) (x100)	Δ Real Yields (10y) (x100)	Δ EPB (12m) (x100)
23jan2018	-0.01	-0.03	-0.03	0.02
01mar2018	-0.03	-0.06	-0.04	0.23
22mar2018	-0.02	-0.07	-0.05	0.35
23mar2018	0.02	-0.00	0.00	0.29
15jun2018	0.00	-0.01	-0.02	0.07
19jun2018	0.00	-0.03	-0.03	0.10
02aug2018	-0.01	-0.02	-0.01	-0.04
06may2019	0.01	-0.03	-0.03	0.11
13may2019	-0.02	-0.07	-0.04	0.29
01aug2019	-0.01	-0.13	-0.05	0.12
23aug2019	-0.03	-0.09	-0.08	0.45
Cumulative	-0.10	-0.54	-0.36	1.98

Note: The table reports the daily change in each variable on each announcement day. We obtain the daily yield-to-maturity on 3-month T-Bill from FRED, the daily nominal and real yield-to-maturity on 10-year Treasuries from Gürkaynak et al. (2007), and the daily equity-premium bound from OptionMetrics, using the methodology of Martin (2017).

In Figure 1, we reported the dynamic effect of announcements on stock-market returns over a five-day window. In the same spirit, Appendix Figure E.1 reports the dynamic effect of announcements on the change in nominal yields, real yields, and the equity-premium bound over a five-day window. This figure shows that the change in these variables is concentrated on the days of the announcements, which supports the notion that a one-day window is long enough to capture the overall effect of announcements.

Figure E.1: The Dynamics of Discount Rates around Tariff Announcements



Note: This figure plots the cumulative change in each variable from the day before the announcement. Formally, we estimate the following regression on all trading days between 2017 and 2019: $\Delta Y_t = \alpha + \sum_{s=-4}^{5} \beta_s D_{s,t} + \sum_{d=1}^{D} \gamma_d \times ES_{d,t} + \epsilon_t$, where $D_{s,t} = 1$ if day t is s days after an announcement ; $D_{s,t} = 0$ otherwise and $ES_{d,t}$denotes the surprise in macroeconomic releases. We then plot the cumulative change in Y_t from the eve of the announcement to the horizon s as $11 \sum_{k=s+1}^{-1} \hat{\beta}_k$ if $s < -1$ and $11 \sum_{k=0}^{s} \hat{\beta}_k$ if $s > -1$. Shaded areas correspond to the 95 percent confidence interval computed using robust standard errors.

E.2 VAR

We now describe more precisely how we construct the set of variables used in the VAR discussed in (18). The log risk-free rate $\ln R_{\text{risk-free,t}}$, corresponds to the annualized yield of 3-month T-Bills (`DTB3` in FRED) minus the growth of the CPI price index (`CPIAUCSL` in FRED) in the previous year. The excess market return $\ln R_{EM,t}$ corresponds to the log return of CRSP value-weighted stock market minus the risk-free rate implied by the yield of 3-month T-Bills. The term spread TS is the annualized yield-to-maturity of ten-year treasuries (`SVENY10` in Gürkaynak et al. (2007)) minus the annualized yield of 3-month T-Bills. The equity-premium bound corresponds to the annualized equity premium for the 3-month horizon constructed using the methodology of Martin (2017), using data from OptionMetrics. The value spread, VS, is the log difference in log book-to-market value between the top 10 percent and the bottom 10 percent of firms ranked by book to market equity, constructed using data from Fama-French library. The credit spread, CS, is the difference between the yield of BAA bonds, from Moody's Seasoned Baa Corporate Bond Yield, and the log risk-free rate. The log price-dividend ratio, $\ln PD$, is the logarithm of a smoothed average price-dividend ratio, constructed as the dividends distributed by the value-weighted CRSP portfolio in the past year divided by its current price. In some robustness tests, we also add the return of the small-minus-big portfolio SMB (i.e., a portfolio of long small firms and short big firms) and the return of the high-minus-low portfolio HML (i.e., a portfolio of long high book-to-market equity and short low book-to-market equity) from Fama-French data library.

Table E.2: Effect of Tariff Announcements on VAR variables (One-Day Window)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$\log R_{\text{risk-free}}$	$\log R_{EM}$	TS	EPB	VS	CS	$\log PD$	SMB	HML
Event	-0.000**	-0.125***	-0.005***	0.046***	0.092***	-0.001***	-0.127***	0.016	-0.041**
	(0.000)	(0.040)	(0.001)	(0.013)	(0.030)	(0.000)	(0.039)	(0.015)	(0.017)
N	753	754	753	753	753	753	753	754	754

Note: The table reports the sum of β_j in the regression (21). The sample includes all trading days from 2017 to 2019. Robust standard errors in parentheses.

Table E.3: Effect of Tariff Announcements on VAR variables (Three-Day Window)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	$\log R_{\text{risk-free}}$	$\log R_{EM}$	TS	EPB	VS	CS	$\log PD$	SMB	HML
Event	-0.000	-0.112*	-0.003	0.039	0.051	-0.000	-0.130**	0.027	-0.023
	(0.000)	(0.066)	(0.002)	(0.024)	(0.048)	(0.000)	(0.066)	(0.031)	(0.029)
N	753	754	753	753	753	753	753	754	754

Note: The table reports the sum of β_j in the regression (21), using three-day windows around announcement. The sample includes all trading days from 2017 to 2019. Robust standard errors in parentheses.

Table E.4: Robustness Exercises for Changes in Future Discount Rates

Specification	Deviations in Discount Rates $\rho\boldsymbol{B}(I-\rho\boldsymbol{B})^{-1}d\boldsymbol{x}_0$			
	Risk-free Rate	Excess Returns	SMB	HML
	$\sum \rho^t \mathrm{E}_0\left[\hat{R}_{\text{risk-free},t}\right]$	$\sum \rho^t \mathrm{E}_0\left[\hat{R}_{EM,t}\right]$	$\sum \rho^t \mathrm{E}_0\left[\hat{R}_{SMB,t}\right]$	$\sum \rho^t \mathrm{E}_0\left[\hat{R}_{HML,t}\right]$
Baseline	-0.021	0.089		
Without TS	-0.017	0.090		
Without EPB	-0.013	0.083		
Without VS	0.003	0.076		
Without CS	-0.008	0.084		
Without $\log PD$	-0.023	0.047		
FF 3-Factor Model	-0.009	0.074	0.026	0.006
3-Days Window	-0.005	0.088		

Note: The table reports $\rho\boldsymbol{B}(I-\rho\boldsymbol{B})^{-1}d\boldsymbol{x}_0$, where $\boldsymbol{x}_0$ is reported in Table E.2 (using a one-day window) and Table E.3 (using a three-day window).

F Additional Tables

Table F.1: Effect of Tariff Announcements on the Components of Cash Flow and Stock Returns

	Deviation in ...					
	Discount-Rate	Asset-Value	logR	Discount-Rate	Asset-Value	logR
	(1)	(2)	(3)	(4)	(5)	(6)
China Importer	0.38***	-2.35***	-2.59***	0.26***	-0.70***	-0.30
	(0.10)	(0.28)	(0.35)	(0.07)	(0.22)	(0.28)
China Exporter	-0.47***	-0.70	-2.01***	-0.31***	0.34	-0.36
	(0.17)	(0.49)	(0.72)	(0.11)	(0.38)	(0.60)
China Revenue Share	6.57***	-12.09***	-10.22***	4.40***	-9.36***	-7.43***
	(1.14)	(2.22)	(2.23)	(0.77)	(2.00)	(2.01)
N	26,807	26,807	26,807	26,807	26,807	26,807
Events	U.S.	U.S.	U.S.	China	China	China

Note: All dependent variables are multiplied by 100. A firm f's deviation discount rate on trading day t corresponds to the term $\sum_{t=1}^{\infty} \rho^t \mathrm{E}_0[\hat{R}_{ft}]$ in the theory section. A firm's asset value on a trading day t is market value plus debt. The deviation in a firm f's cash flow on the day t, denoted by $\hat{r}_{ft}$, is the sum of its deviation in the discount rate and deviation in asset value. This table uses a one-day window around each event, enforces a balanced panel of firms, and drops firms in the financial sector. China Importer is a dummy that equals one if the firm or any of its subsidiaries or suppliers import from China. China Exporter is a dummy that equals one if the firm or subsidiaries export to China. China Revenue Share is the share of the firm's revenue from China, reported in percentage points. Columns 1-3 presents the sum of the coefficients across each of the U.S. event days; and columns 4-6 are the sum of the coefficients across each of the China event dates. Standard errors are in parenthesis. Asterisks correspond to the following levels of significance: $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

Table F.2: Relationship between Changes in Returns and Future Observables (with Controls Reported)

	(1) $\ln(\text{Profit}_{ft})$	(2) $\ln(\text{L}_{ft})$	(3) $\ln(\text{Sales}_{ft})$	(4) $\ln(\text{Sales/L})_{ft}$
Post × ln R_f	0.23***	0.07***	0.12***	0.04**
	(0.04)	(0.01)	(0.02)	(0.02)
Post × PPE per Worker$_f$	-0.00	-0.00	-0.00	0.00
	(0.02)	(0.01)	(0.01)	(0.01)
Post × $\ln$(Mkt. Val. of Equity$_f$)	0.02	-0.01	0.03***	0.03***
	(0.02)	(0.01)	(0.01)	(0.01)
Post × $\frac{\text{Cash Flows}}{\text{Assets}}_f$	-0.39***	0.02***	-0.08***	-0.09***
	(0.03)	(0.01)	(0.01)	(0.01)
Post × Book Leverage$_f$	0.05***	-0.03***	-0.02**	0.01
	(0.02)	(0.01)	(0.01)	(0.01)
Post × Tobin's Q$_f$	0.08***	0.07***	0.08***	0.00
	(0.02)	(0.01)	(0.01)	(0.01)
Firm FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
R^2	0.915	0.976	0.962	0.873
Observations	11940	17032	16760	16736

Note: Data is at the firm-annual level for the period 2013 to 2021, from Compustat and CRSP. Profit is defined as operating income after depreciation less interest and related expenses. We follow Greenland et al. (2024)'s specification in defining $\ln R_f$ as the log of one plus the average return on 5 days surrounding the tariff-announcement dates across all event dates in 2017-2019; however, instead of using abnormal returns, we just simply use the actual return. In this table, $\ln R_f$ is then multiplied by 100. The Post dummy takes a value of one in 2019, 2020, and 2021. All columns include the following control variables at the start of the sample (i.e., 2013) interacted with the Post dummy as covariates: Property, Plant, and Equipment (PPE) per worker, market capitalization, cash-flow-to-asset ratio, book leverage and Tobin's Q. The controls are winsorized at the 1 percent level and then demeaned and divided by their standard deviation. See Appendix C.2 for details on variable constructions. Standard errors are in parenthesis. $^{***}p < 0.01,^{**} p < 0.05,^{*} p < 0.1$.