Online Appendix for

"Inequality Aversion, Populism, and the Backlash Against Globalization"

ĽUBOŠ PÁSTOR and PIETRO VERONESI

December 4, 2020

This Online Appendix presents the proofs of all propositions in Pástor and Veronesi (2019), additional theoretical results, multiple extensions of the baseline model, details of data construction, and additional empirical evidence.

Overview

This Appendix is organized as follows:

- **Section A1. Theory: Additional Results**
- **Section A2. Theory: Proofs**
  - The proofs of all theoretical results in the paper
- **Section A3. Theory: Model Extensions**
  - Extension: Time-Varying Output Shares
  - Extension: Time-Varying Population Shares
  - Extension: Lower Output in Autarky
  - Extension: Higher Output Volatility in Autarky
  - Extension: Lower Output in Autarky with Leverage
- **Section A4. Theory and Data: Inequality**
  - Capital Income Inequality
  - Description of Inequality Data
- **Section A5. Data: Cross-Country Election Analysis**
- **Section A6. Data: International Social Survey Programme (ISSP)**
- **Section A7. Evidence: Which Countries Are Populist?**
  - Political party positions
  - Robustness to alternative specifications

A1. Theory: Additional Results

The outline of this section is as follows:

- Section A1.1. plots the distribution of initial endowments across agents with different risk aversion, as promised in Section 3.3 in the paper.
- Section A1.2. analyzes the impact of income taxes on the equilibrium, adding to Section 5.3 in the paper.
- Section A1.3. addresses the adjustment of portfolio holdings for leverage and taxes, adding to Section 7.1 in the paper.
- Section A1.4. discusses the distribution of consumption volatility across agents, adding to Section 7.2 in the paper.
- Section A1.5. presents additional theoretical results on country imbalances under globalization, adding to Section 7.3 in the paper.
- Section A1.6. analyzes the role of dispersion in risk-bearing capacity, adding to Section 7.6 in the paper.

Throughout this Appendix, we take the finance interpretation of contracts between agents. The results under the labor interpretation are analogous. The finance interpretation can be formally mapped into the labor interpretation while retaining the same mathematics. Agents' financial wealth, which is invested in stocks and bonds, maps into human capital, which is "invested" in a job whose risk exposure is the same as that of the stock-bond portfolio. Under the finance interpretation, agents receive dividends from their stock holdings and interest payments from their bond holdings. Under the labor interpretations, agents receive wages from their job. The wage of a given agent at a given time in a given state is the agent's optimal consumption at that time in that state, as computed below. For any wage pattern, there exists a job that generates it. Each agent chooses a job that generates the wage pattern matching the agent's optimal consumption.

A1.1. Initial Endowments

Given the parameter values presented in Section 3.3 of the paper, the distribution of initial endowments is essentially uniform across agents with different risk aversions:

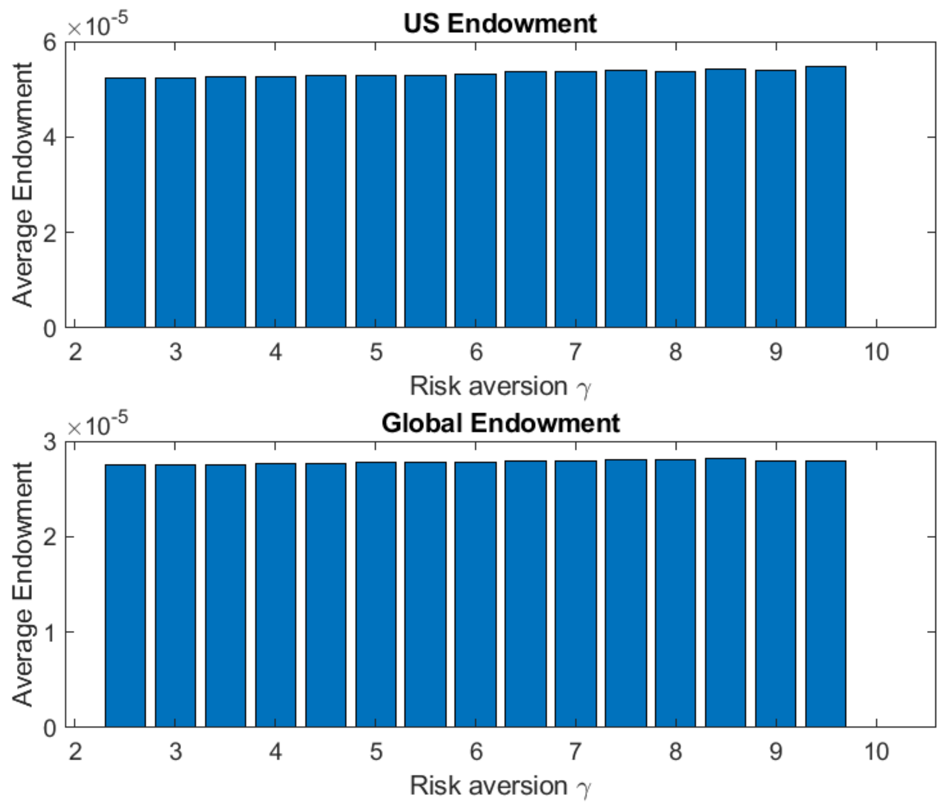


Figure A1. The Distribution of Initial Endowments. This figure plots the distribution of initial endowments across agents with different risk aversion. The parameter values are in Section 3.3 of the paper.

A1.2. Redistribution: Income tax

In this subsection, we supply the details for the results on income taxation, which are summarized in Section 5.3 in the paper. Section A1.2.1. addresses a flat tax, whereas Section A1.2.2. allows for agent-specific tax rates (e.g., progressive income taxation).

We analyze the impact of income taxation on equilibrium consumption and the state price density. Recall that the only income in our model is financial income derived from agents' holdings of stocks and bonds. Agents' stock holdings generate income in the form of dividends and capital gains, whereas agents' bond holdings earn interest. We sidestep some realistic complications, such as the asymmetric impact of gains and losses and whether taxes are paid on "paper" profits or profits realized at the time of the asset's sale. To focus on the key implications of income taxation, we consider a setting in which agent i's after-tax income from holding N_{it} shares in the global stock market portfolio is simply equal to $(1 - \tau_{P,i,t})N_{it}(dP_t + D_t dt)$, where $\tau_{P,i,t}$ is an agent-specific tax rate on the stock return earned at time t. Similarly, the after-tax income from a bond position B_{it} is $(1 - \tau_{r,i,t})B_{it}r_t$, where $\tau_{r,i,t}$ is the tax rate on the bond return earned at time t. We assume that the income tax revenue is immediately and equally redistributed to all agents within the same country, so that each country's government runs a balanced budget.

A1.2.1. Flat Tax

We first consider a flat income tax schedule, under which all agents face equal, though possibly time-varying, income tax rates: $\tau_{P,i,t} = \tau_{P,t}$ and $\tau_{r,i,t} = \tau_{r,t}$ for all agents i. We assume that both rates are bounded above: $0 \leq \tau_{P,t} \leq \overline{\tau}_P < 1$ and $0 \leq \tau_{r,t} \leq \overline{\tau}_r < 1$. The dynamic budget constraint of agent i in country k is then given by

$$dW_{it} = N_{it}\left(1-\tau_{P,t}\right)\left(dP_t + D_t dt\right) + B_{it}\left(1-\tau_{r,t}\right) r_t dt + ds_t^k - C_{it} dt \ ,$$

where ds_t^k is the redistribution to agent i from the collected income tax revenue, so that

$$\begin{aligned} ds_t^k &= \frac{1}{m^k}\int_{j\in I^k}\left[N_{jt}\tau_{P,t}\left(dP_t + D_t dt\right) + B_{jt}\tau_{r,t} r_t dt\right] dj \\ &= \overline{N}_t^k \tau_{P,t}\left(dP_t + D_t dt\right) + \overline{B}_t^k \tau_{r,t} r_t dt \end{aligned}$$

where

$$\begin{aligned} \overline{N}_t^k &= \frac{\int_{j\in I^k} N_{jt} dj}{m^k} \\ \overline{B}_t^k &= \frac{\int_{j\in I^k} B_{jt} dj}{m^k} \end{aligned}$$

and $m^k = \int_{j\in I^k} dj$ is the mass of agents in country k (so that $m^{US} = m$ and $m^{RoW} = 1-m$). Note that the redistribution amount ds_t^k is stochastic because higher stock returns imply higher tax revenue. Negative stock returns imply that agents receive tax rebates, which the government raises by levying ds_t^k. This is a simplification; of course, additional lump-sum taxes may generate net positive redistribution on average.

Proposition A1. *The equilibrium with a flat income tax is identical to the one with no taxes, except that the optimal stock and bond allocations are equal to*

$$N_{it} = \frac{V_{it}\sigma_{Vi} - \frac{\tau_{P,t}}{m^k}\int_{j\in I^k} V_{jt}\sigma_{Vj} dj}{\sigma_P P_t (1-\tau_{P,t})} \tag{A1}$$

$$B_{it} = V_{it} - \frac{\tau_{r,t}}{m^k}\int_{j\in I^k} V_{jt} dj - \frac{V_{it}\sigma_{Vi} - \frac{\tau_{r,t}}{m^k}\int_{j\in I^k} V_j \sigma_{Vj} dj}{\sigma_P (1-\tau_{P,t})} \tag{A2}$$

where $V_{it} = E_t\left[\int_t^T \frac{\pi_s^*}{\pi_t^*} C_{is} ds\right]$ and σ_{Vi} is the diffusion of dV_{it}/V_{it}. The values of π_s^* and C_{is} in the expression for V_{it} are equilibrium values of the state price density and consumption, respectively, whose expressions are given in the proof.

This proposition shows that with a flat income tax, the equilibrium consumption and state price density are the same as in the no-tax case analyzed in the paper, except that the optimal asset allocation is adjusted to reflect agents' natural exposure to stock and bond returns due to redistribution. Note that if $\tau_P = 0$, then the position in stocks is the same as in the no-tax case. The result stems from the fact that stochastic redistribution makes agents exposed to stock return shocks. To hedge this exposure, agents adjust their portfolio positions. Similarly, if $\tau_r = 0$, the position in bonds becomes the standard $B_{it} = V_{it}\left(1 - \sigma_{Vi}/\sigma_P(1-\tau_{P,t})\right)$, which can be positive or negative. With taxes on bond returns, agents are naturally long bonds, so they adjust their bond positions downward to obtain their desired exposure.

The proof of Proposition A1 is in Section A2. of this Appendix, along with all other proofs.

A1.2.2. Agent-Specific Income Tax Rates

Agent-specific income tax rates generate market segmentation. Agents i and j facing different tax rates earn different after-tax returns on the same securities. Therefore, even though each agent has access to the same stock and the same bond, agents i and j effectively perceive them as two different assets, albeit with perfectly correlated returns. This implies that each agent effectively faces his own state price density, which we denote by π_{it}. While the equilibrium is difficult to compute, we can obtain some necessary conditions that highlight the impact of agent-specific tax rates on agents' consumption. Throughout, we make the simplifying assumption that the tax rates on stock returns are the same as the tax rates on bond returns:

$$\tau_{P,i,t} = \tau_{r,i,t} = \tau_{i,t}\ . \tag{A3}$$

Proposition A2. *In any equilibrium with agent-specific tax rates, the market price ν_t of risk is common to all agents. Each agent's consumption satisfies*

$$C_{it} = e^{\frac{g_t - \log(\xi_i)}{\gamma_i} - \frac{1}{\gamma_i}\int_0^t \tau_{i,s} r_s ds}\ , \tag{A4}$$

where ξ_i is the Lagrange multiplier from the static budget constraint, $g_t = -\phi t - \log(\pi_t)$, and π_t is the common component of all state price densities $\pi_{it} = e^{\int_0^t \tau_{i,s} r_s ds}\pi_t$ such that

$$\pi_t = e^{-\int_0^t (r_s + \frac{1}{2}\nu_s^2)ds - \int_0^t \nu_s dZ_s}\ .$$

Proposition A2 shows that in any equilibrium under the assumption (A3), each agent's consumption depends on the agent's tax rate and risk aversion. Each agent's consumption decreases with the agent's tax rate, to the extent that depends on the agent's risk aversion. Since agents facing higher tax rates consume less, the tax schedule affects the equilibrium distribution of consumption across agents. We thus see that a progressive tax schedule, one that imposes higher income tax rates on higher-income agents, could in principle address the consumption externality.

The proof of Proposition A2 is in Section A2. of this Appendix, along with all other proofs.

A1.3. Portfolio Holdings

As noted in Section 7.1 in the paper, there are two difficulties in mapping model-implied holdings to the data. First, equity is unlevered in the model but levered in the data because firms themselves issue debt; therefore, an adjustment for firm leverage is necessary. Second, our model omits governments, which issue debt and repay it by levying taxes on agents. Because they owe taxes, agents are effectively levered. Model-implied holdings must therefore be adjusted for both taxation and firm leverage. The following proposition shows how we make both types of adjustments. The proof of the proposition is in Section A2. of this Appendix.

Proposition A3. *Let θ denote the unadjusted fraction of wealth invested in stocks. The fraction of wealth invested in stocks that is adjusted for firm leverage and taxation is given by*

$$\theta^{Adj} = \theta \frac{1-x}{1+\alpha} \tag{A5}$$

where x is average firm leverage and $\alpha \equiv \frac{T/W}{r}$, where T/W is the average across agents of the fraction of wealth agents pay in taxes and r is the interest rate.

We choose $x = 20\%$, motivated by the evidence of Graham, Leary, and Roberts (2015) that average firm leverage in the data is 20.1% (see their Table 1).

We calibrate α as follows. From the Survey of Consumer Finances, we compute the ratios of median income to median net worth across the three high net worth groups (50% to 75%), (75% to 90%) and (90% to 100%). From Splinter (2019), we obtain the tax to income ratios across income percentiles. Assuming that the population's rank by net worth is roughly the same as that by income, the T/W ratios for the three net worth groups are 0.065, 0.042, and 0.028, respectively. These T/W ratios are all at least 0.028; moreover, the definition of net worth in the data does not account for the implicit short position in bonds due to future taxes. For both reasons, it seems reasonable to assume 0.028 as a lower bound for T/W. Combining $T/W \geq 0.028$ with a real interest rate of $r = 1.4\%$, we obtain $\alpha = \frac{T/W}{r} \geq 2$. Another way to obtain the same approximate restriction $\alpha \geq 2$ is to take the average of the three T/W ratios above, which is equal to 0.045, and pair it with $r = 2.25\%$. Either way, the adjustment ratio from equation (A5) is

$$\frac{1-x}{1+\alpha} \leq \frac{0.8}{3} = 0.27$$

That is, to map model-implied holdings to the data, we need to multiply θ by a factor of 0.27 or less. To make the adjustment conservative, we use the smallest possible adjustment, 0.27.

A1.4. Consumption Volatility

Figure A2 shows the model-implied distribution of consumption volatility across agents with different levels of wealth. The main finding is that richer agents have more volatile consumption. This finding follows from the fact that richer agents have larger portfolio positions in equity, whose returns are more volatile than bond returns. Specifically, consumption volatility of agent i is equal to $g'(\delta_t)\sigma_\delta/\gamma_i$. Low-$\gamma_i$ agents have more volatile consumption, and they also tend to be richer.

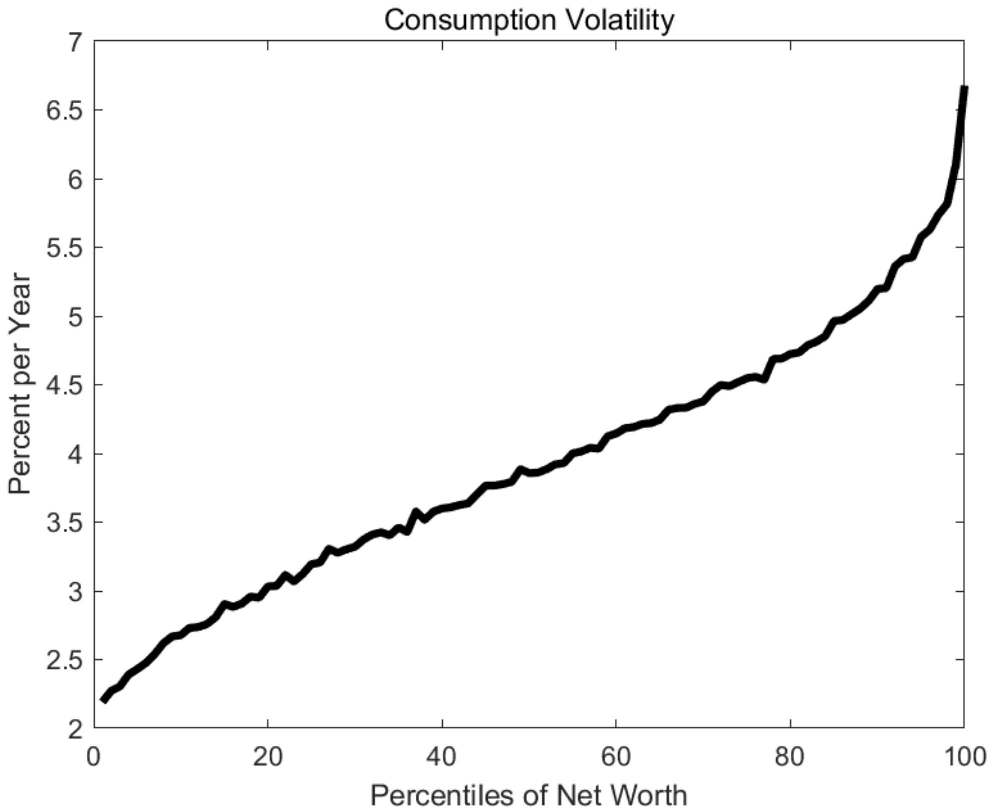


Figure A2. The Distribution of Consumption Volatility. This figure plots the model-implied distribution of U.S. agents' consumption volatility as a function of agents' net worth, expressed in percentiles. The figure conditions on $\delta_t = 1$, and the remaining parameter values are in Section 3.3 of the paper.

A1.5. Imbalances under Globalization

In this subsection, we present some additional theoretical results that are mentioned in Section 7.3 in the paper. We then relate the countries' trade balances to their current account balances.

First, we establish some notation. The wealth of agent i at time t is

$$W_{it} = \mathrm{E}_t \left[\int_t^T \frac{\pi_s}{\pi_t} C_{is} \, ds \right] , \tag{A6}$$

so the aggregate wealth of all agents in country $k \in \{US, RoW\}$ is

$$W_t^k = \int_{i \in \mathcal{I}^k} W_{it} \, di \; . \tag{A7}$$

We let P_t^k denote the market price of country k's stock, which is a claim on the stream of dividends produced by the country's tree, and $P_t = P_t^{US} + P_t^{RoW}$ denote the value of the global stock market portfolio. Under globalization, all agents have positions in this stock portfolio and in risk-free bonds. We let N_{it} and B_{it} denote agent i's holdings of stocks and bonds, respectively, and also define $N_t^k = \int_{i \in \mathcal{I}^k} N_{it}\, di$ and $B_t^k = \int_{i \in \mathcal{I}^k} B_{it}\, di$. In terms of the state variable δ_t, we have $W_t^k = W^k(\delta_t)$ and $P_t = P(\delta_t)$. For each country, we then have

$$W^k(\delta_t) = N_t^k\, P(\delta_t) + B_t^k \; , \tag{A8}$$

which shows that a country's wealth is equal to the value of its stock-bond portfolio.

Corollary A1. *U.S. agents are net borrowers whereas RoW agents are net lenders.*

That is, $B_t^{US} < 0$ and $B_t^{RoW} > 0$. From Corollary A1 and equation (A8), we see that U.S. agents have a levered position in the stock market (i.e., $N_t^{US}\, P(\delta_t) > W^{US}(\delta_t)$), unlike RoW agents (for whom $N_t^{RoW}\, P(\delta_t) < W^{RoW}(\delta_t)$). As a result, U.S. agents benefit more from economic growth (i.e., from growing δ_t) than do RoW agents.

Corollary A2. *When output is large enough, U.S. agents' total wealth exceeds the U.S. stock market capitalization. The opposite is true for RoW:*

$$\frac{W_t^{US}}{P_t^{US}} \;>\; 1 \;>\; \frac{W_t^{RoW}}{P_t^{RoW}} \; . \tag{A9}$$

Since U.S. agents hold levered portfolios, their wealth exceeds the value of their own tree, increasingly so as output continues to grow. The U.S. is therefore "rich" relative to RoW under globalization.

The proofs of Corollaries A1 and A2 are in Section A2. of this Appendix, along with all other proofs. While Corollary A1 appears to hold generally, we are able to prove it only in the special case when agents perceive zero probability of a move to autarky at time τ and the distribution of γ_i satisfies the following condition:

$$\gamma_i < \gamma_j \quad \forall i, j : \left\{ i \in \mathcal{I}^{US},\; j \in \mathcal{I}^{RoW} \right\} \; , \tag{A10}$$

so that U.S. agents are uniformly less risk-averse than RoW agents. In contrast, Corollary A2 holds more generally under condition (3) from the paper, as do our remaining results. The proof of Corollary A2 does not rely on Corollary A1; instead, it follows directly from Proposition 2.

Next, we relate the current account balances of both countries to the countries' trade balances. Proposition 2 in the paper shows that when δ_t is sufficiently large, the U.S. runs a trade deficit, as it consumes more than it produces: $C_t^{US} > D_t^{US}$. While trade balance is an important component of a country's current account, this account also includes other components resulting from an asymmetry in the countries' asset holdings.

The countries' asset holdings are asymmetric because U.S. agents have lower γ_i's than RoW agents, on average. Lower-γ_i agents optimally choose more volatile consumption paths (to see this, recall that the consumption volatility of agent i is $g'(\delta_t)\sigma_\delta/\gamma_i$). To support these consumption paths, lower-γ_i agents hold riskier portfolios. As a result, the aggregate portfolio of U.S. agents is riskier than that of RoW agents.

This result is illustrated in Figure A3, which plots the model-implied aggregate positions in stocks and bonds for both countries. The aggregate U.S. portfolio is about 110% in stocks and -10%

in bonds, whereas the RoW portfolio is about 97% in stocks and 3% in bonds. That is, U.S. agents are net borrowers whereas RoW agents are net lenders. This result is not parameter-dependent; we prove it earlier in Corollary A1. The result also seems to hold in the data. Gourinchas and Rey (2014), for example, show that the U.S. as a whole is net long risky assets and net short safe assets. This evidence provides support for the model.

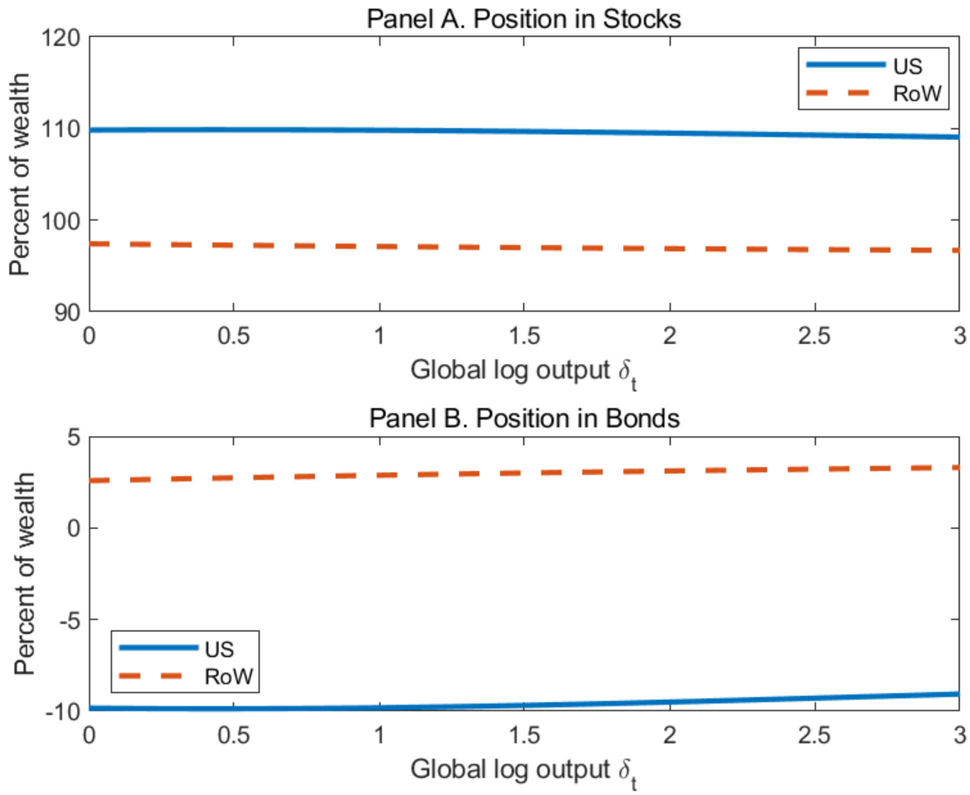


Figure A3. Country-Level Asset Positions. This figure plots the model-implied asset positions of both countries, expressed as a fraction of the given country's wealth, against δ_t. Panel A (B) plots the countries' positions in stocks (bonds). For a given country, the positions in Panels A and B add up to 100%. Within a given panel, the positions do not balance each other because the wealth levels differ across countries. The figure corresponds to the globalization setting from Section 4 in the paper. The parameter values are in Section 3.3 of the paper.

Armed with this understanding of the countries' portfolio positions, we derive their current account balances. Total wealth of U.S. agents, W_t^{US}, can be decomposed into their aggregate holdings of U.S. stocks, RoW stocks, and risk-free bonds:

$$W_t^{US} = N_t^{US,US} P_t^{US} + N_t^{US,RoW} P_t^{RoW} + B_t^{US}$$

where $N_t^{US,k}$ is the fraction of country k's tree owned by U.S. agents, for $k \in \{US, RoW\}$. (As defined earlier, P_t^k is the market value of country k's tree and B_t^{US} is the amount of risk-free bonds held by U.S. agents.) The split between U.S. stocks and RoW stocks is indeterminate in the model. Therefore, for simplicity, we assume that U.S. agents own all of the U.S. tree, $N^{US,US} = 1$, in addition to their holdings of the RoW tree and bonds. Substituting $N_t^{US,US} = 1$ into the previous equation, we see that the amount invested in RoW stocks by U.S. agents is

$$N_t^{US,RoW} P_t^{RoW} = W_t^{US} - P_t^{US} - B_t^{US}$$

This amount is positive when δ_t is large enough. (To see that, recall from Corollary A1 that $-B_t^{US} = B_t^{RoW} > 0$ and from Corollary A2 that $W_t^{US} > P_t^{US}$ when δ_t is large enough.) It follows that the return U.S. agents earn on their holdings of RoW stocks is

$$\begin{aligned} N_t^{US,RoW}(dP_t^{RoW} + D_t^{RoW} dt) &= N_t^{US,RoW} P_t^{RoW} \left(\frac{dP_t^{RoW}}{P_t^{RoW}} + \frac{D_t^{RoW}}{P_t^{RoW}} dt \right) \\ &= \left(W_t^{US} - P_t^{US} - B_t^{US} \right) \left(\frac{dP_t^{RoW}}{P_t^{RoW}} + \frac{D_t^{RoW}}{P_t^{RoW}} dt \right) \end{aligned}$$

The expected return U.S. agents earn on their holdings of RoW stocks therefore is

$$\left(W_t^{US} - P_t^{US} - B_t^{US} \right) E \left[\frac{dP_t^{RoW}}{P_t^{RoW}} + \frac{D_t^{RoW}}{P_t^{RoW}} dt \right] = \left(W_{it}^{US} - P_t^{US} - B_t^{US} \right) (r_t + \mu_\delta^{RoW}) dt$$

where μ_δ^{RoW} is the risk premium on RoW stocks:

$$\mu_\delta^{RoW} = -\text{Cov} \left(\frac{dP^{RoW}}{P_t^{RoW}}, \frac{d\pi_t}{\pi_t} \right) = \sigma_\delta^{RoW} \sigma_\pi$$

In addition, RoW agents earn the return of $r_t B_t^{RoW} dt$ on their lending to U.S. agents. Putting things together, the expected dynamics of the current account balance are

$$E[dCA] = \left(D_t^{US} - C_t^{US} \right) dt + \left(W_{it}^{US} - P_t^{US} - B_t^{US} \right) (r_t + \mu_\delta^{RoW}) dt - r_t B_t^{RoW} dt \qquad \text{(A11)}$$

The first term is the U.S. trade balance, or the amount produced minus the amount consumed by U.S. agents. The second term is the return to U.S. agents from their holdings of RoW stocks. The last term is the interest paid by the U.S. to RoW for RoW's holdings of U.S. bonds. Recall that this relation holds under the assumptions that δ_t is sufficiently large for Corollary A2 to hold and that U.S. agents hold all of the U.S. tree and some of the RoW tree.

Figure A4 shows the U.S. current account balance, as a percentage of the U.S. GDP, for our parameter values. Interestingly, the U.S. current account balance is positive, unlike its trade balance. Even though the U.S. runs a trade deficit (see Figure 8 in the paper), this deficit is more than offset by the net return U.S. agents earn on their foreign holdings. This net return is positive. Although U.S. agents pay interest on the bonds they have sold to RoW agents, they earn higher returns on their holdings of RoW risky assets, which carry a risk premium and of which they are increasingly large owners. In fact, these returns are so high that they outweigh the negative trade balance, leading to a current account surplus for the U.S.

The comparison of Figure A4 and Figure 8 in the paper reveals a large wedge between the trade balance and the current account balance. On the positive side, this wedge seems to go in the right direction given the evidence mentioned earlier that the U.S. as a whole is net long risky assets and net short safe assets (e.g., Gourinchas and Rey, 2014). On the negative side, the magnitude of this wedge is too large; in reality, the wedge is small enough that the trade and current account balances are fairly similar for most countries. The reason behind this large magnitude is that, given the model's simplicity, capital assets and their returns play a larger role in the model than they do in the data.

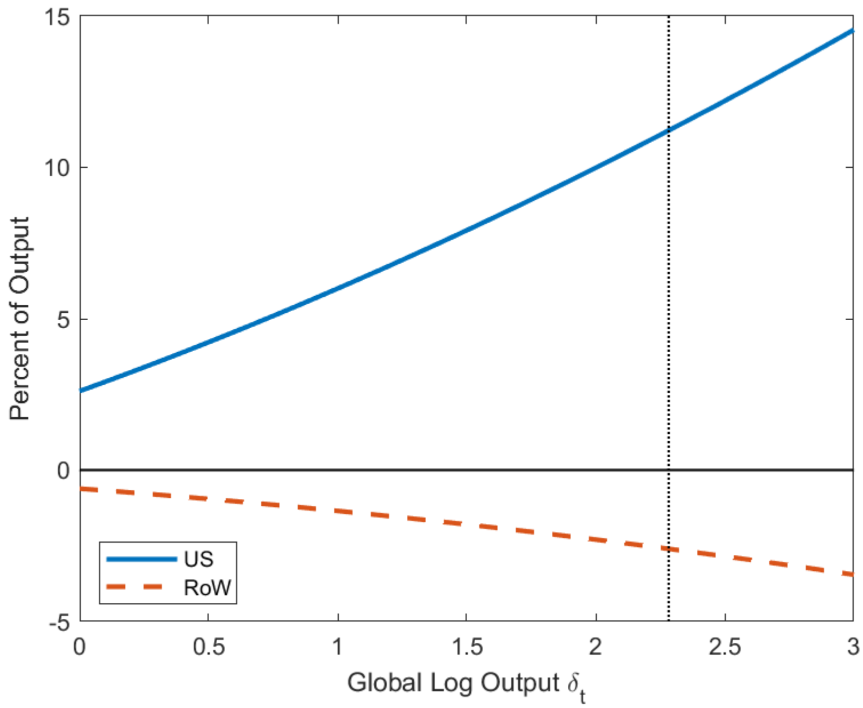


Figure A4. Current Account Balance. This figure plots the model-implied current account balances of both countries, expressed as a fraction of their outputs, against δ_t. The parameter values are in Section 3.3 of the paper. The vertical line denotes $\overline{\delta}$ from Proposition 5.

A1.6. Dispersion in Risk Bearing Capacity

This section discusses the role of the dispersion in risk bearing capacity (or, equivalently, the dispersion in risk aversion, γ_i) within countries in generating our results. The main conclusion of this section is that our main results do not depend on this dispersion. In addition, we offer some insights into the relations between the dispersion in γ_i and inequality.

The first important point is that regardless of how disperse γ_i is across agents, the model's predictions hold as long as condition (3) in the paper is satisfied. This condition, recall, is

$$\lim_{x\to 0}\frac{\mathrm{E}^{\mathcal{I}^{RoW}}\left[e^{x/\gamma_j}|j\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^{\mathcal{I}^{US}}\left[e^{x/\gamma_i}|i\in\mathcal{I}^{US}\right]}=0 \tag{A12}$$

Whether this condition holds depends on the right tails of the distributions of risk tolerance $\rho_i = 1/\gamma_i$ in the two countries. It does not directly depend on the dispersion of risk tolerance. The dispersion could potentially affect whether condition (A12) is satisfied, but as long as the condition is satisfied, the dispersion per se does not matter and our results go through.

To investigate the role of the dispersion in risk-bearing capacity, we hold the distribution of γ_i constant within the U.S. but vary the distribution within RoW. Recall from Table 2 in the paper that in our baseline specification, the distributions of γ_i in both countries have about the same dispersions. In the following two subsections, we hold the US distribution of γ_i the same as in Table 2, but we make the distribution for RoW either substantially less disperse (Section A1.6.1.) or substantially more disperse (Section A1.6.2.).

A1.6.1. Case 1: Lower Dispersion in RoW

Figure A5 illustrates the case in which the dispersion of risk aversion in RoW is lower than in the U.S. Panel A plots the distribution of γ_i for the U.S.; as noted earlier, this distribution is the same as in the paper (Table 2). Panel B plots the distribution of γ_i in RoW; this distribution is substantially less disperse compared to Table 2. Despite the change in the RoW distribution, we continue to assume that RoW agents are more risk-averse than U.S. agents: the average (median) risk aversion in RoW is 6.11 (6.00) whereas it is only 5.2 (4.9) in the U.S.

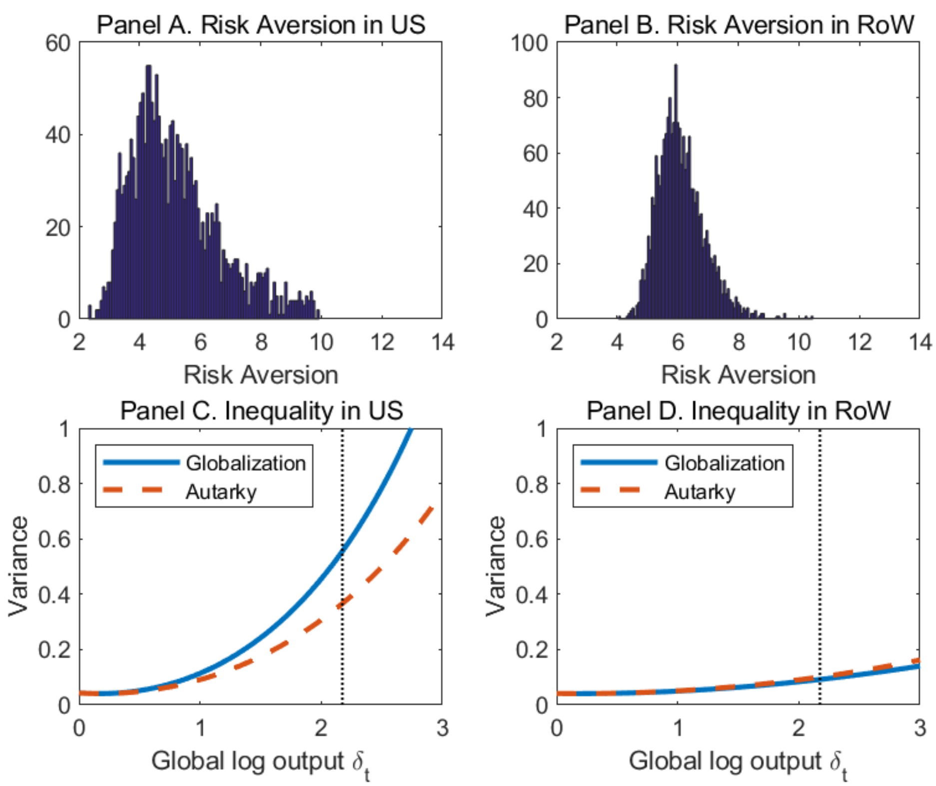


Figure A5. Inequality with Low Dispersion of RoW Risk Aversion. This figure shows the impact on the U.S. and RoW inequality when risk aversion in RoW has low dispersion. For both the U.S. and RoW, ρ_i has a truncated normal distribution. For the U.S., it is the same as in the text: $\rho_i | i \in \mathcal{I}^{US} \sim TruncN(0.2, 0.06, 0.1, 0.5)$. For RoW, it is $\rho_i | i \in \mathcal{I}^{RoW} \sim TruncN(0.1667, 0.02, 0.033, 0.33)$.

First, note that condition (A12) holds also in this case, so that our main results continue to hold as well. In particular, U.S. agents elect the populist when $\delta_\tau > \overline{\delta}$. The value $\overline{\delta}$ from Proposition 5 is marked by the vertical lines in Panels C and D of Figure A5.

Second, the lower dispersion in γ_i in RoW implies fewer risk-sharing opportunities among RoW agents, compared to the baseline case considered in the paper. As a result, the portfolio positions of RoW agents are more similar than in the baseline case and there is less RoW inequality, as shown in Panel D of Figure A5 (compare with Panel B of Figure 5 in the paper). In the limit, if all RoW agents had the same risk aversion, they would hold the same portfolios, and their consumption paths would be the same, apart from small differences in their initial endowments.

The flipside of less risk sharing within RoW is more risk sharing between countries. As a result, the portfolio positions of U.S. agents are more disperse than in the baseline case and there is more U.S. inequality under globalization, as shown in Panel C of Figure A5 (compare with Panel A of Figure 5 in the paper).

A1.6.2. Case 2: Higher Dispersion in RoW

Figure A6 shows the other case, in which the dispersion of risk aversion in RoW is higher than in the U.S. Panel A plots this distribution for the U.S., which is the same as in Panel A of Figure A5 as well as in the paper. Panel B plots the distribution of γ_i in RoW; this distribution is much more disperse compared to that in the paper. As before, we continue to assume that RoW agents are more risk-averse than U.S. agents: the average γ_i in RoW is now 7.5, the median is 5.6, and both values are higher for RoW than for the U.S. We set the minimum risk aversion for RoW equal to 3, above the minimum risk aversion in the U.S., which is equal to 2. Therefore, condition (A12) is satisified, and our results follow, as before. U.S. agents still want to move to autarky when $\delta_\tau > \overline{\delta}$, where $\overline{\delta}$ is plotted by vertical lines in Panels C and D of Figure A6.

The higher dispersion in γ_i in RoW implies more risk-sharing opportunities among RoW agents, compared to the baseline case considered in the paper. As a result, the portfolio positions of RoW agents are more disperse than in the baseline case and there is more RoW inequality, as shown in Panel D of Figure A6 (compare with Panel B of Figure 5 in the paper, as well as with Panel D in Figure A5). In fact, inequality in RoW exceeds U.S. inequality.

Better risk sharing within RoW implies less risk sharing between countries. As a result, the portfolio positions of U.S. agents are less disperse than in the baseline case and there is less U.S. inequality, as shown in Panel C of Figure A6 (compare with Panel A of Figure 5 in the paper, as well as with Panel C in Figure A5).

As a result of the lower U.S. inequality, the threshold $\overline{\delta}$ is now a bit higher than in Figure A5 (2.47 versus 2.17). Facing less inequality for a given value of δ_t, it now takes a larger value of δ_t for U.S. inequality to be large enough to induce U.S. agents to vote for autarky. Finally, even though RoW inequality is even larger than U.S. inequality in this case, RoW agents do not vote for autarky because they face an infinite cost of expropriation, as explained in the paper.

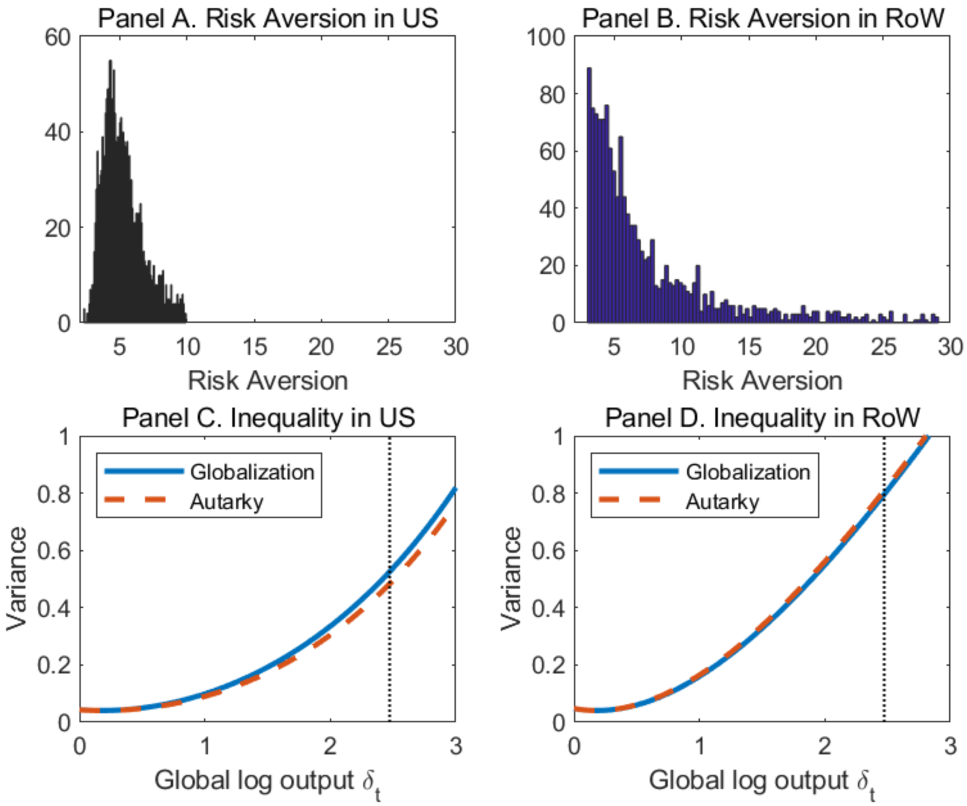


Figure A6. Inequality with High Dispersion of RoW Risk Aversion. This figure shows the impact on the U.S. and RoW inequality when risk aversion in RoW has high dispersion. For both the U.S. and RoW, ρ_i has a truncated normal distribution. For the U.S., it is the same as in the text: $\rho_i | i \in \mathcal{I}^{US} \sim TruncN(0.2, 0.06, 0.1, 0.5)$. For RoW, it is $\rho_i | i \in \mathcal{I}^{RoW} \sim TruncN(0.1667, 0.06, 0.033, 0.33)$.

A2. Theory: Proofs

Each country k's stock price P_t^k and riskless bond price B_t^k follow the processes

$$\begin{aligned}\frac{dP_t^k + D_t^k dt}{P_t^k} &= \mu_{P,t}^k dt + \sigma_{P,t}^k dZ_t + q^k dA_t \\ \frac{dB_t^k}{B_t^k} &= r_t^k dt + q^k dA_t\end{aligned}$$

where all parameter values are endogenously determined in equilibrium, q^k is an F_τ-measurable random variable, also determined in equilibrium, and

$$A_t = \begin{cases} 0 & \text{if} \quad t < \tau \\ 1 & \text{if} \quad t \geq \tau \end{cases}$$

The jump component dA_t arises in equilibrium due to the shift to autarky at time τ under the conditions obtained below. (In equilibrium, $q^k = 0$ if the mainstream candidate is elected, but $q^k \neq 0$ if the populist is elected and the move to autarky takes place.) Even with the move to autarky, markets are dynamically complete because the jumps in prices at time τ are perfectly predictable just before time τ and their magnitude is known. The state price density for country k follows the process

$$\frac{d\pi_t^k}{\pi_t^k} = -r_t^k dt - \sigma_{\pi,t}^k dZ_t - q^k dA_t$$

where all quantities are again determined in equilibrium. The stock and bond prices of each country jump by the same percentage amount as the state price density so that $\pi_t^k P_t^k$ and $\pi_t^k B_t^k$ are continuous at time τ: For instance, $\pi_\tau^k P_\tau^k = \left(\pi_{\tau-}^k e^{-q^k}\right)\left(P_{\tau-}^k e^{q^k}\right) = \pi_{\tau-}^k P_{\tau-}^k$. Under this condition, standard replication arguments prove market completeness (see Karatzas and Shreve, 2010).

Proof of equation (16): Market clearing requires

$$D_t = \int_{\cup_k \mathcal{I}^k} C_{it} di$$

Under globalization, $\pi_t^{US} = \pi_t^{RoW} = \pi_t$ and thus $g_t^{US} = g_t^{RoW} = g_t$. Optimal consumption is

$$C_{it} = e^{\psi_i + \rho_i (g_t - y)}$$

Substituting and invoking the law of large numbers gives

$$D_t = \mathrm{E}^i\left[e^{\psi_i + \rho_i(g_t - y)} | i \in \mathcal{I}\right] = \mathrm{E}^i\left[e^{\psi_i} | i \in \mathcal{I}\right] \mathrm{E}^i\left[e^{\rho_i(g_t - y)} | i \in \mathcal{I}\right]$$

where the second equality stems from the independence of ψ_i from ρ_i. Taking logs, we obtain

$$\delta_t = \log\left(\mathrm{E}^i\left[e^{\psi_i} | i \in \mathcal{I}\right]\right) + \log\left(\mathrm{E}^i\left[e^{\rho_i(g_t - y)} | i \in \mathcal{I}\right]\right) \tag{A13}$$

Denote the solution as

$$g_t = g(\delta_t)$$

Thus, the state price density is

$$\pi_t = e^{-\phi t - g(\delta_t)}$$

The normalization $\pi_0 = 1$ implies $g_0 = g(\delta_0) = 0$. Normalizing $D_0 = 1$ without loss of generality, we obtain the restriction

$$\mathrm{E}^i\left[e^{\psi_i}|i \in \mathcal{I}\right] = \frac{1}{\mathrm{E}^i\left[e^{-y\rho_i}|i \in \mathcal{I}\right]} \tag{A14}$$

which yields the equilibrium condition for g_t given in equation (15) in the paper:

$$\delta_t = \log\left(\frac{\mathrm{E}^i\left[e^{\rho_i(g_t - y)}|i \in \mathcal{I}\right]}{\mathrm{E}^i\left[e^{-y\rho_i}|i \in \mathcal{I}\right]}\right) \tag{A15}$$

Q.E.D.

Lemma 1. $g(\delta_t)$ is globally increasing and concave: $g'(\delta_t) > 0$ and $g"(\delta_t) < 0$ with $g(\delta_t) \to \infty$ when $\delta_t \to \infty$.

Proof: See Veronesi (2018). Q.E.D.

Proof of Proposition 1: We first derive the expression for V_t^k stated in the proposition. Recall the notation

$$\overline{C}_t^k = \mathrm{E}^i\left[C_{it}|i \in \mathcal{I}^k\right]$$

Therefore

$$\begin{aligned}
V_t^k &= \mathrm{Var}\left(\frac{C_{it}}{\overline{C}_t^k}|i \in \mathcal{I}^k\right) = \mathrm{E}^i\left[\left(\frac{C_{it}}{\overline{C}_t^k}\right)^2 |i \in \mathcal{I}^k\right] - \mathrm{E}^i\left[\frac{C_{it}}{\overline{C}_t^k}|i \in \mathcal{I}^k\right]^2 \\
&= \frac{\mathrm{E}^i\left[(C_{it})^2|i \in \mathcal{I}^k\right]}{\left(\overline{C}_t^k\right)^2} - \left(\frac{\mathrm{E}^i\left[C_{it}|i \in \mathcal{I}^k\right]}{\overline{C}_t^k}\right)^2 \\
&= \frac{\mathrm{E}^i\left[(C_{it})^2|i \in \mathcal{I}^k\right]}{\mathrm{E}^i\left[C_{it}|i \in \mathcal{I}^k\right]^2} - 1
\end{aligned}$$

Substituting for the optimal consumption, we obtain

$$V_t^k = \frac{\mathrm{E}\left[e^{2\psi_i}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[e^{\psi_i}|i \in \mathcal{I}^k\right]^2} \frac{\mathrm{E}\left[e^{2\rho_i(g(\delta_t) - y)}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[e^{\rho_i(g(\delta_t) - y)}|i \in \mathcal{I}^k\right]^2} - 1$$

We next show that $\partial V / \partial \delta_t > 0$. Because $g_t = g(\delta)$ is uniformly increasing in δ (from Lemma 1), it suffices to show that $\partial V / \partial g > 0$. Let us take the first derivative with respect to g_t

$$
\begin{aligned}
\frac{\partial V_t^k}{\partial g_t} &= \frac{\mathrm{E}\left[e^{2\psi_i}\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\left\{\frac{\mathrm{E}\left[2\rho_i e^{2\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]^2} - \frac{\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]2\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]\mathrm{E}\left[\rho_i e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}{\left\{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]^2\right\}^2}\right\} \\
&= 2\frac{\mathrm{E}\left[e^{2\psi_i}\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\left\{\frac{\mathrm{E}\left[\rho_i e^{2\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]^2} - \frac{\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]^2}\frac{\mathrm{E}\left[\rho_i e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}\right\} \\
&= 2\left(1+V_t^k\right)\left\{\frac{\mathrm{E}\left[\rho_i e^{2\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}{\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]} - \frac{\mathrm{E}\left[\rho_i e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}_k\right]}\right\} \\
&= 2\left(1+V_t^k\right)\left\{\widetilde{\mathrm{E}}\left[\rho|\delta_t\right] - \mathrm{E}^*\left[\rho|\delta_t\right]\right\}
\end{aligned}
$$

where the expectations $\mathrm{E}^*[\rho|\delta_t]$ and $\widetilde{\mathrm{E}}[\rho|\delta_t]$ use the densities $f^*(\rho|\delta_t)$ and $\widetilde{f}(\rho|\delta_t)$, respectively:

$$
\begin{aligned}
f^*(\rho|\delta_t) &= \frac{e^{\rho(g_t-y)}f(\rho)}{\int e^{\rho(g_t-y)}f(\rho)\,d\rho} \\
\widetilde{f}(\rho|\delta_t) &= \frac{e^{2\rho(g_t-y)}f(\rho)}{\int e^{2\rho(g_t-y)}f(\rho)\,d\rho} \\
&= \frac{e^{\rho(g_t-y)}e^{\rho(g_t-y)}f(\rho)}{\int e^{\rho(g_t-y)}e^{\rho(g_t-y)}f(\rho)\,d\rho} \\
&= \frac{e^{\rho(g_t-y)}f^*(\rho|\delta_t)}{\int e^{\rho(g_t-y)}f^*(\rho|\delta_t)\,d\rho}
\end{aligned}
$$

For $g_t > y$ we have $e^{\rho(g_t-y)}$ is increasing in ρ. Therefore, $\widetilde{f}(\rho|\delta_t)$ gives more weight to high ρ. Thus, the average ρ computed using $\widetilde{f}(\rho|\delta_t)$ must be higher than the one computed using $f^*(\rho|\delta_t)$. That is, $\widetilde{\mathrm{E}}[\rho|\delta_t] - \mathrm{E}^*[\rho|\delta_t] > 0$. It follows that $\partial V(g)/\partial g > 0$.

We next show that V_t^k is unbounded. We exploit our assumption that the distribution $f(\rho)$ on $\rho \in [\rho_L, \rho_H]$ is non-degenerate. To do so, we define a set of economies with n groups of agents with risk tolerances $\{\rho_L, \rho_2, ..., \rho_{n-1}, \rho_H\}$ and each group with distributions $f_{(n)} = \left\{f_{(n),L}, f_{(n),2}...f_{(n),n-1}, f_{(n),H}\right\}$ with $f_{(n),i} > 0$ and $\sum_{i=1}^n f_{(n),i} = 1$. Define

$$
V_{(n),t}^k = \frac{\mathrm{E}\left[e^{2\psi}\right]}{\mathrm{E}\left[e^{\psi}\right]^2}\frac{\mathrm{E}\left[e^{2\rho_i(g-y)}\right]}{\mathrm{E}\left[e^{\rho_i(g-y)}\right]^2} = \frac{\mathrm{E}\left[e^{2\psi}\right]}{\mathrm{E}\left[e^{\psi}\right]^2}\frac{\sum_{i=1}^n f_{(n),i}e^{2\rho_i(g-y)}}{\left[\sum_{i=1}^n f_{(n),i}e^{\rho_i(g-y)}\right]^2}
$$

We can factor out $e^{2\rho_H g}$ from the sum in the numerator and $e^{\rho_H g}$ from the sum in the denominator to obtain

$$
V_{(n),t}^k = \frac{\mathrm{E}\left[e^{2\psi}\right]}{\mathrm{E}\left[e^{\psi}\right]^2}\frac{e^{2\rho_H(g-y)}\sum_{i=1}^n f_{(n),i}e^{2(\rho_i-\rho_H)(g-y)}}{\left[e^{\rho_H(g-y)}\sum_{i=1}^n f_{(n),i}e^{(\rho_i-\rho_H)(g-y)}\right]^2} = \frac{\mathrm{E}\left[e^{2\psi}\right]}{\mathrm{E}\left[e^{\psi}\right]^2}\frac{\sum_{i=1}^n f_{(n),i}e^{2(\rho_i-\rho_H)(g-y)}}{\left[\sum_{i=1}^n f_{(n),i}e^{(\rho_i-\rho_H)(g-y)}\right]^2}
$$

As δ increases to infinity, so does $g = g(\delta)$, and thus for each term i in the sum $e^{2(\rho_i-\rho_H)(g-y)} \to 0$ and $e^{(\rho_i-\rho_H)(g-y)} \to 0$, except for the last one $i = H$ which is always equal to 1. Thus, for every n

we have

$$V^k_{(n),t} \to \frac{\text{E}\left[e^{2\psi}\right]}{\text{E}\left[e^{\psi}\right]^2}\frac{1}{f_{(n),H}}$$

As $n \to \infty$, the assumption of a non-degenerate distribution implies that the density of each risk-aversion group declines to zero, $f_{(n),H} \to 0$, and thus $V^k_{(n),t} \to \infty$. Q.E.D.

Proof of Corollary 1.

For any random variable X, skewness is given by

$$Skew\left(X\right) = \text{E}\left[\left(\frac{X - \text{E}\left[X\right]}{\text{Std}\left(X\right)}\right)^3\right] = \frac{\text{E}\left[X^3\right] - 3\text{E}\left[X\right]\text{Var}\left(X\right) - \text{E}\left[X\right]^3}{\text{Var}\left(X\right)^{\frac{3}{2}}}$$

In our case,

$$X = \frac{C_{it}}{\overline{C}^k_t}$$

Therefore $\text{E}\left[X\right] = 1$ and $\text{Var}\left(X\right)$ is our inequality measure. Thus

$$Skew\left(\frac{C_{it}}{\overline{C}^k_t}|i \in \mathcal{I}^k\right) = \frac{\text{E}\left[\left(\frac{C_{it}}{\overline{C}^k_t}\right)^3|i \in \mathcal{I}^k\right] - 3\text{Var}\left(\frac{C_{it}}{\overline{C}^k_t}|i \in \mathcal{I}^k\right) - 1}{\text{Var}\left(\frac{C_{it}}{\overline{C}^k_t}|i \in \mathcal{I}^k\right)^{\frac{3}{2}}}$$

Optimal consumption $C_i = e^{\psi_i + \rho_i(g_t - y)}$ implies

$$\text{Var}\left(\frac{C_i}{\overline{C}^k}|i \in \mathcal{I}^k\right) = \text{E}\left(\left(\frac{C_i}{\overline{C}^k}\right)^2|i \in \mathcal{I}^k\right) - \text{E}\left(\frac{C_i}{\overline{C}^k}|i \in \mathcal{I}^k\right)^2 = \frac{\text{E}\left[\left(e^{\psi_i + \rho_i(g_t - y)}\right)^2|i \in \mathcal{I}^k\right]}{\text{E}\left[e^{\psi_i + \rho_i(g_t - y)}|i \in \mathcal{I}^k\right]^2} - 1$$

and

$$\text{E}\left[\left(\frac{C_i}{\overline{C}^k}\right)^3|i \in \mathcal{I}^k\right] = \frac{\text{E}\left[\left(e^{\psi_i + \rho_i(g_t - y)}\right)^3|i \in \mathcal{I}^k\right]}{\text{E}\left[e^{\psi_i + \rho_i(g_t - y)}|i \in \mathcal{I}^k\right]^3}$$

Therefore

$$\begin{aligned} Skew\left(\frac{C_i}{\overline{C}^k}|i \in \mathcal{I}^k\right) &= \frac{\frac{\text{E}\left[e^{3\psi_i}|i\in\mathcal{I}^k\right]}{\text{E}\left[e^{\psi_i}|i\in\mathcal{I}^k\right]^3}\frac{\text{E}\left[e^{3\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]}{\text{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]^3} - 3\left(\frac{\text{E}\left[e^{2\psi_i}\right]}{\text{E}\left[e^{\psi_i}\right]^2}\frac{\text{E}\left[e^{2\rho_i(g_t-y)}\right]}{\text{E}\left[e^{\rho_i(g_t-y)}\right]^2} - 1\right) - 1}{\left(\frac{\text{E}\left[\left(e^{2\psi_i}\right)\right]}{\text{E}\left[e^{\psi_i}\right]^2}\frac{\text{E}\left[\left(e^{2\rho_i(g_t-y)}\right)\right]}{\text{E}\left[e^{\rho_i(g_t-y)}\right]^2} - 1\right)^{\frac{3}{2}}} \\ &= \frac{\frac{\text{E}\left[e^{3\psi_i}|i\in\mathcal{I}^k\right]}{\text{E}\left[e^{\psi_i}|i\in\mathcal{I}^k\right]^3}\widehat{S} - 3\frac{\text{E}\left[e^{2\psi_i}\right]}{\text{E}\left[e^{\psi_i}\right]^2}\widehat{V} + 2}{\left(\frac{\text{E}\left[\left(e^{2\psi_i}\right)\right]}{\text{E}\left[e^{\psi_i}\right]^2}\widehat{V} - 1\right)^{\frac{3}{2}}} \end{aligned}$$

where we denote for simplicity

$$\widehat{S} = \frac{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]^3} \text{ and } \widehat{V} = \frac{\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]^2}$$

The first order limiting term is

$$\begin{aligned} K &= \frac{\widehat{S}}{\widehat{V}^{\frac{3}{2}}} = \frac{\frac{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]^3}}{\left(\frac{\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]^2}\right)^{\frac{3}{2}}} = \frac{\frac{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]^3}}{\frac{\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]^{\frac{3}{2}}}{\mathrm{E}\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^k\right]^3}} \\ &= \frac{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}}} \end{aligned}$$

Using the discretization and limiting argument used in the proof of Proposition 1,

$$\begin{aligned} K &= \frac{\sum e^{3\rho_i(g_t-y)}f_i}{\left(\sum e^{2\rho_i(g_t-y)}f_i\right)^{\frac{3}{2}}} = \frac{e^{3\rho_H(g-y)}\sum e^{3(\rho_i-\rho_H)(g_t-y)}f_i}{e^{3\rho_H(g-y)}\left(\sum e^{2(\rho_i-\rho_H)(g_t-y)}f_i\right)^{\frac{3}{2}}} \\ &= \frac{\sum e^{3(\rho_i-\rho_H)(g_t-y)}f_i}{\left(\sum e^{2(\rho_i-\rho_H)(g_t-y)}f_i\right)^{\frac{3}{2}}} \to \frac{f_H}{f_H^{\frac{3}{2}}} = \frac{1}{f_H^{\frac{1}{2}}} \end{aligned}$$

which converges to infinity as $f_H \to 0$.

Therefore, we can write

$$\begin{aligned} Skew\left(\frac{C_{it}}{\overline{C}^k}|i \in \mathcal{I}^k\right) &= \frac{\frac{\mathrm{E}\left[e^{3\psi_i}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\psi_i}|i\in\mathcal{I}^k\right]^3}\widehat{S} - 3\frac{\mathrm{E}\left[e^{2\psi_i}\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\widehat{V} + 2}{\left(\frac{\mathrm{E}\left[\left(e^{2\psi_i}\right)\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\widehat{V} - 1\right)^{\frac{3}{2}}} \\ &= \frac{\frac{1}{\widehat{V}^{\frac{3}{2}}}\left(\frac{\mathrm{E}\left[e^{3\psi_i}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\psi_i}|i\in\mathcal{I}^k\right]^3}\widehat{S} - 3\frac{\mathrm{E}\left[e^{2\psi_i}\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\widehat{V} + 2\right)}{\frac{1}{\widehat{V}^{\frac{3}{2}}}\left(\frac{\mathrm{E}\left[\left(e^{2\psi_i}\right)\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\widehat{V} - 1\right)^{\frac{3}{2}}} \\ &= \frac{\left(\frac{\mathrm{E}\left[e^{3\psi_i}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\psi_i}|i\in\mathcal{I}^k\right]^3}K - 3\frac{\mathrm{E}\left[e^{2\psi_i}\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\frac{\widehat{V}}{\widehat{V}^{\frac{3}{2}}} + \frac{2}{\widehat{V}^{\frac{3}{2}}}\right)}{\left(\frac{\mathrm{E}\left[\left(e^{2\psi_i}\right)\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2} - \frac{1}{\widehat{V}}\right)^{\frac{3}{2}}} \\ &= \frac{\left(\frac{\mathrm{E}\left[e^{3\psi_i}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\psi_i}|i\in\mathcal{I}^k\right]^3}K - 3\frac{\mathrm{E}\left[e^{2\psi_i}\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\frac{1}{\widehat{V}^{\frac{1}{2}}} + \frac{2}{\widehat{V}^{\frac{3}{2}}}\right)}{\left(\frac{\mathrm{E}\left[\left(e^{2\psi_i}\right)\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2} - \frac{1}{\widehat{V}}\right)^{\frac{3}{2}}} \end{aligned}$$

As $g \to \infty$,

$$Skew\left(\frac{C_{it}}{\overline{C}^k}|i \in \mathcal{I}^k\right) \to \frac{\left(\frac{\mathrm{E}\left[e^{3\psi_i}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\psi_i}|i\in\mathcal{I}^k\right]^3}(\infty) - 3\frac{\mathrm{E}\left[e^{2\psi_i}\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}0 + 0\right)}{\left(\frac{\mathrm{E}\left[\left(e^{2\psi_i}\right)\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2} - 0\right)^{\frac{3}{2}}} = \infty$$

Finally, note that

$$\begin{aligned}
\frac{\partial K}{\partial g} &= \frac{\mathrm{E}\left[3\rho_i e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}}}{\left[\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}}\right]^2} \\
&\quad - \frac{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\frac{3}{2}\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}-1}\left(\mathrm{E}\left[2\rho_i e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)}{\left[\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}}\right]^2} \\
&= \frac{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}}}\left(\frac{\mathrm{E}\left[3\rho_i e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]} - \frac{3\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}-1}\mathrm{E}\left[\rho_i e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}}}\right) \\
&= 3\frac{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)^{\frac{3}{2}}}\left(\frac{\mathrm{E}\left[\rho_i e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[e^{3\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]} - \frac{\mathrm{E}\left[\rho_i e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]}{\left(\mathrm{E}\left[e^{2\rho_i(g_t-y)}|i \in \mathcal{I}^k\right]\right)}\right) \\
&= 3K\left(\widetilde{\widetilde{\mathrm{E}}}\left[\rho_i|i \in \mathcal{I}^k\right] - \widetilde{\mathrm{E}}\left[\rho_i|i \in \mathcal{I}^k\right]\right) \\
&> 0
\end{aligned}$$

where $\widetilde{\mathrm{E}}\left[\rho_i|i \in \mathcal{I}^k\right]$ and $\widetilde{\widetilde{\mathrm{E}}}\left[\rho_i|i \in \mathcal{I}^k\right]$ use the following distributions, respectively:

$$\begin{aligned}
\widetilde{f}(\rho|\delta_t) &= \frac{e^{2\rho(g_t-y)}f(\rho)}{\int e^{2\rho(g_t-y)}f(\rho)\,d\rho} \\
\widetilde{\widetilde{f}}(\rho|\delta_t) &= \frac{e^{3\rho(g_t-y)}f(\rho)}{\int e^{3\rho(g_t-y)}f(\rho)\,d\rho} \\
&= \frac{e^{\rho(g_t-y)}e^{2\rho(g_t-y)}f(\rho)}{\int e^{\rho(g_t-y)}e^{2\rho(g_t-y)}f(\rho)\,d\rho} \\
&= \frac{e^{\rho(g_t-y)}\widetilde{f}(\rho|\delta_t)}{\int e^{\rho(g_t-y)}\widetilde{f}(\rho|\delta_t)\,d\rho}
\end{aligned}$$

This implies that $\widetilde{\widetilde{f}}(\rho|\delta_t)$ gives more weight to high ρ for $g_t > y$ and thus $\widetilde{\widetilde{\mathrm{E}}}\left[\rho_i|i \in \mathcal{I}^k\right] > \widetilde{\mathrm{E}}\left[\rho_i|i \in \mathcal{I}^k\right]$, which explains the inequality.

Therefore, for g large enough,

$$Skew\left(\frac{C_{it}}{\overline{C}^k}|i \in \mathcal{I}^k\right) = \frac{\left(\frac{\mathrm{E}\left[e^{3\psi_i}|i\in\mathcal{I}^k\right]}{\mathrm{E}\left[e^{\psi_i}|i\in\mathcal{I}^k\right]^3}K - 3\frac{\mathrm{E}\left[e^{2\psi_i}\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2}\frac{1}{V^{\frac{1}{2}}} + \frac{3}{V^{\frac{3}{2}}}\right)}{\left(\frac{\mathrm{E}\left[\left(e^{2\psi_i}\right)\right]}{\mathrm{E}\left[e^{\psi_i}\right]^2} - \frac{1}{V}\right)^{\frac{3}{2}}} \to \frac{\mathrm{E}\left[e^{3\psi_i}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[\left(e^{2\psi_i}\right)\right]^{\frac{3}{2}}}K$$

and given $\partial K/\partial g > 0$ we have that

$$\frac{\partial Skew}{\partial g} > 0$$

for δ large enough. Q.E.D.

Proof of Corollary 2.

The consumption share of U.S. agent i is given by

$$s_t^i = \frac{C_{it}}{\overline{C}_t^{US}} = \frac{e^{\psi_i}}{E^I\left[e^{\psi_i}|i \in I^{US}\right]} \frac{e^{\rho_i\left(g_t^{US}-y\right)}}{E^I\left[e^{\rho_i\left(g_t^{US}-y\right)}|i \in I^{US}\right]} .$$

Recall that $g_t^{US}(\delta_t)$ is monotonically increasing in δ_t. Therefore, to determine the conditions under which s_t^i is increasing in δ_t, we only need to consider the sign of

$$\frac{ds_t^i}{dg_t^{US}} = \frac{\rho_i e^{\rho_i\left(g_t^{US}-y\right)} E^I\left[e^{\rho_i\left(g_t^{US}-y\right)}|i \in I^{US}\right] - e^{\rho_i\left(g_t^{US}-y\right)} E^I\left[\rho_i e^{\rho_i\left(g_t^{US}-y\right)}|i \in I^{US}\right]}{\left(E^I\left[e^{\rho_i\left(g_t^{US}-y\right)}|i \in I^{US}\right]\right)^2} .$$

Therefore,

$$\frac{ds_t^i}{dg_t^{US}} \geq 0$$

iff

$$\rho_i > \frac{E^I\left[\rho_i e^{\rho_i\left(g_t^{US}-y\right)}|i \in I^{US}\right]}{E^I\left[e^{\rho_i\left(g_t^{US}-y\right)}|i \in I^{US}\right]}$$

iff

$$\rho_i > \overline{\rho}\left(\delta_t\right) = E^*\left[\rho_i|g^{US}\left(\delta_t\right)\right] , \tag{A16}$$

where $E^*\left[.|g^{US}\left(\delta_t\right)\right]$ uses the distribution

$$f^*\left(\rho_i|g^{US}\left(\delta_t\right), i \in I^{US}\right) = \frac{f\left(\rho_i|i \in I^{US}\right) e^{\rho_i\left(g^{US}(\delta_t)-y\right)}}{\int f\left(\rho_i|i \in I^{US}\right) e^{\rho_i\left(g^{US}(\delta_t)-y\right)} d\rho_i} .$$

The weights $e^{\rho_i\left(g^{US}(\delta_t)-y\right)}$ are increasing in ρ_i when $g^{US}\left(\delta_t\right) - y > 0$, which is true when output δ_t is large enough. Moreover, as g_t^{US} increases further, the distribution $f^*\left(\rho_i|g^{US}\left(\delta_t\right), i \in I^{US}\right)$ assigns increasingly large weights to larger values of ρ_i. That in turn implies that $E^*\left[\rho_i|g^{US}\left(\delta_t\right)\right]$ increases as δ_t increases. That is, the fraction of agents who satisfy condition (A16) shrinks as δ_t increases. Q.E.D.

Proof of Proposition 2. We prove the more general statement in Section A3.1. with stochastic F_t. The case $F_t = F = m$, which is presented in the paper, is a special case. First, note that

$$\int_{i \in \mathcal{I}^{US}} C_{it} di > D_t^{US}$$

if and only if

$$s_t^{US} = \frac{\int_{i \in \mathcal{I}^{US}} C_{it} di}{D_t} > \frac{D_t^{US}}{D_t} = F_t$$

Aggregate consumption in the U.S. is

$$\int_{i \in \mathcal{I}^{US}} C_{it} di = m \frac{\mathrm{E}^i \left[e^{\rho_i (g(\delta_t) - y)} | i \in \mathcal{I}^{US} \right]}{\mathrm{E}^i \left[e^{-\rho y} | i \in \mathcal{I} \right]}$$

Because by market clearing

$$\begin{aligned} D_t &= \int_{i \in \mathcal{I}} C_{it} di = \int_{i \in \mathcal{I}^{US}} C_{it} di + \int_{i \in \mathcal{I}^{RoW}} C_{it} di \\ &= m \frac{\mathrm{E} \left[e^{\rho_i (g-y)} | i \in \mathcal{I}^{US} \right]}{\mathrm{E}^i \left[e^{-\rho y} | i \in \mathcal{I} \right]} + (1-m) \frac{\mathrm{E} \left[e^{\rho_i (g-y)} | j \in \mathcal{I}^{RoW} \right]}{\mathrm{E}^i \left[e^{-\rho y} | i \in \mathcal{I} \right]} \end{aligned}$$

we obtain

$$\begin{aligned} s^{US}(g) &= \frac{\int_{i \in \mathcal{I}^{US}} C_{it} di}{D_t} = \frac{m \, \mathrm{E} \left[e^{\rho_i (g-y)} | i \in \mathcal{I}^{US} \right]}{m \, \mathrm{E} \left[e^{\rho_i (g-y)} | i \in \mathcal{I}^{US} \right] + (1-m) \, \mathrm{E} \left[e^{\rho_i (g-y)} | j \in \mathcal{I}^{RoW} \right]} \\ &= \frac{1}{1 + \frac{(1-m)}{m} \frac{\mathrm{E}\left[e^{\rho_i (g-y)} | j \in \mathcal{I}^{RoW} \right]}{\mathrm{E}\left[e^{\rho_i (g-y)} | i \in \mathcal{I}^{US} \right]}} \\ &= F(\delta) \end{aligned}$$

where $F(\delta)$ is in equation (A29). Equation (3) in the paper is

$$R(x) = \frac{\mathrm{E} \left[e^{\rho_j x} | j \in \mathcal{I}^{RoW} \right]}{\mathrm{E} \left[e^{\rho_i x} | i \in \mathcal{I}^{US} \right]} \to 0 \text{ as } x \to \infty$$

Clearly

$$s^{US}(g) = \frac{1}{1 + \frac{1-m}{m} R(g-y)}$$

and we know from Lemma 1 that $g(\delta_t) \to \infty$ as $\delta_t \to \infty$. It follows that $s^{US}(g) \to 1$ as $\delta_t \to \infty$. Therefore, if $F_t < F(\delta_t) = s^{US}(g)$, the result follows.

The case $F = m$ is a special case that just requires

$$R(g(\delta_t) - y) = \frac{\mathrm{E} \left[e^{\rho_i (g(\delta_t) - y)} | j \in \mathcal{I}^{RoW} \right]}{\mathrm{E} \left[e^{\rho_i (g(\delta_t) - y)} | i \in \mathcal{I}^{US} \right]} < 1$$

Indeed, if $R(g(\delta_t) - y) = 1$ then $s^{US}(g) = m$ and thus $R(g(\delta_t) - y) < 1$ implies $s(g) > m = F$. Letting $\underline{\delta}$ denote the threshold such that $R(g(\delta_t) - y) < 1$ for all $\delta_t > \underline{\delta}$ (such $\underline{\delta}$ exists from equation (3)), the result follows.

Q.E.D.

Proof of Corollary A1. We can prove Corollary A1 under the following sufficient conditions:

1. Let $\gamma_i < \gamma_j$ (i.e., $\rho_i > \rho_j$) for all $i \in \mathcal{I}^{US}$ and $j \in \mathcal{I}^{RoW}$
2. The probability of a switch to autarky is negligible

Then the proof follows from Veronesi (2018), who considers a single-country setting. From Cox and Huang (1986), the positions in stocks and bonds are, respectively,

$$\begin{aligned} N_{it} &= \frac{\sigma_{Wi} W_{it}}{\sigma_{P_t} P_t} \\ B_{it} &= W_{it} \left(1 - \frac{\sigma_{Wi}}{\sigma_{P_t}}\right) \end{aligned}$$

where σ_{Wi} is the volatility of the stochastic process driving agent i's wealth W_{it} and σ_{P_t} is the volatility of the stock price process. In a one-country model (where the single country can represent the global economy in our model), Veronesi (2018) shows that for all ρ_i and $\rho_j \leq 1$

$$\sigma_{W,i} > \sigma_{W,j} \text{ if and only if } \rho_i > \rho_j$$

The wealth volatilities of U.S. and RoW agents are the wealth-weighted averages of the individual agents' volatilities. Denoting the wealth weights by $\omega_i^k = W_i / \int_{i \in \mathcal{I}^k} W_i di$, the wealth-weighted averages are

$$\begin{aligned} \sigma_{W,US} &= \int_{i \in \mathcal{I}^{US}} \omega_i^{US} \sigma_{W,i} di \\ \sigma_{W,RoW} &= \int_{i \in \mathcal{I}^{RoW}} \omega_i^{RoW} \sigma_{W,i} di \end{aligned}$$

Under the condition $\rho_i > \rho_j$ for $i \in \mathcal{I}^{US}$ and $i \in \mathcal{I}^{RoW}$ we thus have

$$\sigma_{W,US} > \sigma_{W,RoW}$$

The final step is to note that by market clearing we must have

$$P_t = W_t^{US} + W_t^{RoW}$$

and thus the global market volatility is

$$\sigma_P = \frac{W_t^{US}}{W_t^{US} + W_t^{RoW}} \sigma_{W,US} + \frac{W_t^{RoW}}{W_t^{US} + W_t^{RoW}} \sigma_{W,RoW}$$

which implies

$$\sigma_{W,RoW} < \sigma_P < \sigma_{W,US}$$

Thus, $B_t^{US} < 0$ and $B_t^{RoW} > 0$, i.e. U.S. borrows and RoW lends.

Q.E.D.

The conditions used in this corollary are only sufficient and do not appear to be tight. Unfortunately, a generalization appears difficult.

Proof of Corollary A2. We have

$$\frac{W_t^{US}}{P_t} = \frac{W_t^{US}}{W_t^{US} + W_t^{RoW}}$$

where

$$W_t^k = \mathrm{E}_t\left[\int_t^T \frac{\pi_s^k}{\pi_t^k} C_s^k ds\right]$$

and

$$C_s^k = \int_{i \in \mathcal{I}^k} C_{is} di$$

Denote by $\underline{\delta}$ the threshold in Proposition 2 such that $C_s^{US} > D_s^{US}$ for $\delta_s > \underline{\delta}$. Given our assumptions, for every $s > t$ we have $\delta_s|_{\delta_t} \sim N\left(\delta_t + \mu_\delta (s-t), \sigma_\delta^2 (s-t)\right)$. Thus, denoting by $\Phi(x; a, b)$ the cdf of a normal distribution with mean a and variance b, the probability

$$\Pr\left(\delta_s < \underline{\delta} | \delta_t\right) = \Phi\left(\underline{\delta}; \delta_t + \mu_\delta (s-t), \sigma_\delta^2 (s-t)\right) \to 0 \quad \text{as} \quad \delta_t \to \infty.$$

Thus, when δ_t is large enough, then we know that under globalization, $C_s^{US} > D_s^{US}$, while under autarky, $C_s^{US} = D_s^{US}$. In complete markets, the wealth of U.S. and RoW is given by

$$\begin{aligned} W_t^{US} &= \mathrm{E}_t\left[\int_t^T \frac{\pi_s^{US}}{\pi_t^{US}} \left(\int_{i \in \mathcal{I}^{US}} C_{is} di\right) ds\right] = \mathrm{E}_t\left[\int_t^T \frac{\pi_s^{US}}{\pi_t^{US}} \left(C_s^{US}\right) ds\right] \\ W_t^{RoW} &= \mathrm{E}_t\left[\int_t^T \frac{\pi_s^{RoW}}{\pi_t^{RoW}} \left(\int_{i \in \mathcal{I}^{RoW}} C_{is} di\right) ds\right] = \mathrm{E}_t\left[\int_t^T \frac{\pi_s^{RoW}}{\pi_t^{RoW}} \left(C_s^{RoW}\right) ds\right] \end{aligned}$$

When δ_t is sufficiently large, $C_s^{US} \geq D_s^{US}$ for every s with probability (close to) one, and by the same token $C_s^{RoW} \leq D_s^{RoW}$, with strict inequalities under globalization when $\delta_s > \underline{\delta}$. It follows that for δ_t sufficiently large and $t < \tau$:

$$\begin{aligned} W_t^{US} &= \mathrm{E}_t\left[\int_t^T \frac{\pi_s^{US}}{\pi_t^{US}} \left(C_s^{US}\right) ds\right] > \mathrm{E}_t\left[\int_t^T \frac{\pi_s^{US}}{\pi_t^{US}} D_s^{US} ds\right] = P_t^{US} \\ W_t^{RoW} &= \mathrm{E}_t\left[\int_t^T \frac{\pi_s^{RoW}}{\pi_t^{RoW}} \left(C_s^{RoW}\right) ds\right] < \mathrm{E}_t\left[\int_t^T \frac{\pi_s^{RoW}}{\pi_t^{RoW}} D_s^{RoW} ds\right] = P_t^{RoW} \end{aligned}$$

But market clearing also implies that

$$W_t^{US} + W_t^{RoW} = P_t^{US} + P_t^{RoW}$$

It follows

$$\frac{W_t^{US}}{P_t^{US}} > 1 > \frac{W_t^{RoW}}{P_t^{RoW}}$$

Q.E.D.

Lemma 2. (a) For every δ_t,

$$g^{US}(\delta_t) < g(\delta_t) < g^{RoW}(\delta_t)$$

if and only if $F_t = D_t^{US}/D_t$ satisfies

$$F_t < F(\delta_t) = \left(1 + \frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i \in \mathcal{I}^{RoW}\right] m^{RoW}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i \in \mathcal{I}^{US}\right] m^{US}}\right)^{-1} \tag{A17}$$

(b) There exists $\underline{\delta}$ such that $F_t < F(\delta_t)$ is always satisfied for $\delta_t > \underline{\delta}$.

(c) In particular, condition (A17) holds when F_t is constant and equal to m, i.e. $F_t = m$ for every t.

(d) If F_t is constant and equal to m, $F = m$, then $g(\delta) = y$ implies $g^{US}(\delta) = y$ and $g^{RoW}(\delta) = y$. That is, the three functions $g(\delta_t)$, $g^{US}(\delta_t)$ and $g^{RoW}(\delta_t)$ intersect at $\delta^* = g^{-1}(y)$.

Proof of Lemma 2.

(a) We first consider the general case with generic F_t and then the special case of $F_t = F = m$. The equilibrium consumption under autarky is the same as under globalization, except that the state price density is

$$\pi_i^k = e^{-\phi t - g^k(\delta_t)}$$

where we retain the aggregate δ_t as the only state variable. In particular

$$C_{it} = e^{\psi_i + \rho_i\left(g^k(\delta_t) - y\right)}$$

where ψ_i and y are determined at time 0 (i.e., they do not change as we move to autarky; complete markets). The equilibrium condition for each country is

$$\begin{aligned}
D_t^k &= \int_{\mathcal{I}^k} C_{it} di = \int_{\mathcal{I}^k} e^{\psi_i + \rho_i\left(g_t^k - y\right)} di = \mathrm{E}^i\left[e^{\psi_i + \rho_i\left(g_t^k - y\right)}|i \in \mathcal{I}^k\right] m_k \\
&= \mathrm{E}^i\left[e^{\psi_i + \rho_i\left(g_t^k - y\right)}|i \in \mathcal{I}^k\right] m_k \\
&= \mathrm{E}^i\left[e^{\psi_i}|i \in \mathcal{I}^k\right] \mathrm{E}^i\left[e^{\rho_i\left(g_t^k - y\right)}|i \in \mathcal{I}^k\right] m_k \\
&= \mathrm{E}^i\left[e^{\psi_i}|i \in \mathcal{I}\right] \mathrm{E}^i\left[e^{\rho_i\left(g_t^k - y\right)}|i \in \mathcal{I}^k\right] m_k \\
&= \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^k - y\right)}|i \in \mathcal{I}^k\right] m_k}{\mathrm{E}^i\left[e^{-\rho_i y}|i \in \mathcal{I}\right]}
\end{aligned}$$

where we used the fact that

$$\mathrm{E}^i\left[e^{\psi_i}|i \in \mathcal{I}^k\right] = \mathrm{E}^i\left[e^{\psi_i}|i \in \mathcal{I}\right] = \frac{1}{\mathrm{E}^i\left[e^{-\rho_i y}|i \in \mathcal{I}\right]}$$

as the distribution of ψ_i does not depend on the country. Because

$$D_t^k = F_t^k D_t$$

we have

$$e^{\delta_t}\frac{F_t^k}{m^k}=\frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^k-y\right)}|i\in\mathcal{I}^k\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i\in\mathcal{I}\right]} \tag{A18}$$

Recall that market clearing under globalization had

$$e^{\delta_t}=\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i\in\mathcal{I}\right]}$$

which gives the condition

$$\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i\in\mathcal{I}\right]}\frac{F_t^k}{m^k}=\frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^k-y\right)}|i\in\mathcal{I}^k\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i\in\mathcal{I}\right]}$$

(i) Let $k=US$ for simplicity and rewrite

$$\left(\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}+\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}\right)\frac{F_t^{US}}{m^{US}}=\mathrm{E}^i\left[e^{\rho_i\left(g_t^{US}-y\right)}|i\in\mathcal{I}^{US}\right]$$

Divide throughout by $\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]$:

$$\left(m^{US}+\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]}m^{RoW}\right)\frac{F_t^{US}}{m^{US}}=\frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^{US}-y\right)}|i\in\mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]} \tag{A19}$$

The right hand side uses the same distribution of ρ_i in both the numerator and the denominator. In addition, $\rho_i>0$. Therefore,

$$g_t^{US}<g_t$$

if and only if

$$\left(m^{US}+\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_j(g_t-y)}|j\in\mathcal{I}^{US}\right]}m^{RoW}\right)\frac{F_t^{US}}{m^{US}}<1$$

that is, if and only if

$$F_t^{US}<F\left(\delta_t\right)=\frac{1}{1+\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}}$$

which is the statement in the Lemma.

(ii) We now show that the same threshold applies for the case $k=RoW$. In this case, from

$$\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i\in\mathcal{I}\right]}\frac{F_t^{RoW}}{m^{RoW}}=\frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^{RoW}-y\right)}|i\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i\in\mathcal{I}\right]}$$

rewrite

$$\left(\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}+\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}\right)\frac{F_t^{RoW}}{m^{RoW}}=\mathrm{E}^i\left[e^{\rho_i\left(g_t^{RoW}-y\right)}|i\in\mathcal{I}^{RoW}\right]$$

Divide throughout by $\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]$:

$$\left(\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]}m^{US}+m^{RoW}\right)\frac{F_t^{RoW}}{m^{RoW}}=\frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^{RoW}-y\right)}|i\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]}$$

The right hand side uses the same distribution over ρ_i in both numerator and denominator. Thus,

$$g_{RoW,t}>g_t$$

if and only if

$$\left(\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]}m^{US}+m^{RoW}\right)\frac{F_t^{RoW}}{m^{RoW}}>1$$

iff

$$F_t^{RoW}>F^{RoW}\left(\delta_t\right)=\frac{1}{1+\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}}}$$

Turning this around,

$$1-F_t^{US}>F^{RoW}\left(\delta_t\right)=\frac{1}{1+\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}}}$$

iff

$$1-\frac{1}{1+\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}}}>F_t^{US}$$

iff

$$\frac{\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}}}{1+\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}}}>F_t^{US}$$

iff

$$\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}+\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}>F_t^{US}$$

iff

$$\frac{1}{1+\frac{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{RoW}\right]m^{RoW}}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)}|i\in\mathcal{I}^{US}\right]m^{US}}}=F\left(\delta_t\right)>F_t^{US}$$

which the same condition as before.

(b) Note that from the equilibrium condition, we also have $g(\delta_t) \to \infty$ as $\delta_t \to \infty$. Thus, from equation (3), as $g(\delta_t) \to \infty$ we have $\frac{\mathrm{E}^i\left[e^{\rho_i(g_t - y)}|i \in \mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_j(g_t - y)}|j \in \mathcal{I}^{US}\right]} \to 0$. Thus, in the limit,

$$F(\delta_t) \to 1$$

Hence, for every F_t^{US} there is δ_t sufficiently large such that $F_t^{US} < F(\delta_t)$ and hence $g_t^{US} < g_t$. Vice versa, for every δ_t, there is $F_t^{US} < F(\delta_t)$ such that $g_t^{US} < g_t$.

(c) In the case $F_t = m$ for all t, the condition required is simply

$$R(g(\delta_t) - y) = \frac{\mathrm{E}^i\left[e^{\rho_i(g_t - y)}|i \in \mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t - y)}|i \in \mathcal{I}^{US}\right]} < 1$$

which in turn implies

$$F(\delta_t) > m = F^{US}$$

(d) In the case $F_t = m$ for all t, condition (A18) is

$$\begin{aligned} e^{\delta_t} &= \frac{\mathrm{E}^i\left[e^{\rho_i(g_t - y)}|i \in \mathcal{I}\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i \in \mathcal{I}\right]} \\ e^{\delta_t} &= \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^{US} - y\right)}|i \in \mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i \in \mathcal{I}\right]} \\ e^{\delta_t} &= \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^{RoW} - y\right)}|i \in \mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{-\rho_i y}|i \in \mathcal{I}\right]} \end{aligned}$$

If $\delta_t = \underline{\delta} = -\log\left(\mathrm{E}^i\left[e^{-\rho_i y}|i \in \mathcal{I}\right]\right)$, then the equations become

$$\begin{aligned} 1 &= \mathrm{E}^i\left[e^{\rho_i(g(\underline{\delta}) - y)}|i \in \mathcal{I}\right] \\ 1 &= \mathrm{E}^i\left[e^{\rho_i\left(g^{US}(\underline{\delta}) - y\right)}|i \in \mathcal{I}^{US}\right] \\ 1 &= \mathrm{E}^i\left[e^{\rho_i\left(g^{RoW}(\underline{\delta}) - y\right)}|i \in \mathcal{I}^{RoW}\right] \end{aligned}$$

The function $G(x) = \mathrm{E}^i\left[e^{\rho_i x}|i \in \mathcal{I}^k\right]$ is monotonically increasing in x (as $G'(x) = \mathrm{E}^i\left[\rho_i e^{\rho_i x}|i \in \mathcal{I}^k\right] > 0$). Thus, the unique solutions are

$$g(\underline{\delta}) - y = g^{US}(\underline{\delta}) - y = g^{RoW}(\underline{\delta}) - y = 0$$

That is, the equations all intersect at the same $\underline{\delta}$. Q.E.D.

Lemma 2 implies that for every δ_t, either

$$g^{US}(\delta_t) < g(\delta_t) < g^{RoW}(\delta_t)$$

or

$$g^{US}\left(\delta_t\right) > g\left(\delta_t\right) > g^{RoW}\left(\delta_t\right)$$

That is, the global $g\left(\delta_t\right)$ is always between the U.S. and RoW.

Proof of Proposition 3. We have already shown in Lemma 2 that for every δ_t we either have

$$g_{US}\left(\delta\right) < g\left(\delta\right) < g_{RoW}\left(\delta\right)$$

or

$$g_{US}\left(\delta\right) > g\left(\delta\right) > g_{RoW}\left(\delta\right)$$

Moreover, under the additional constraint that $F = m$, all these functions intersect at y.

Consider now inequality under autarky. The formula is the same as before:

$$V_t^k = \frac{\mathrm{E}\left[e^{2\psi_i}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[e^{\psi_i}|i \in \mathcal{I}^k\right]^2} \frac{\mathrm{E}\left[e^{2\rho_i\left(g^k(\delta_t)-y\right)}|i \in \mathcal{I}^k\right]}{\mathrm{E}\left[e^{\rho_i\left(g^k(\delta_t)-y\right)}|i \in \mathcal{I}^k\right]^2}$$

We already know that

$$\frac{\partial V^k}{\partial g} > 0$$

holds if and only if $g^k\left(\delta\right) - y > 0$. Because all functions intersect at y when $F_t = m$ for all t, we only have two possible cases:

1. $0 < g_{US}\left(\delta\right) - y < g\left(\delta\right) - y$. Then $V_t^{US}\left(x\right)$ is increasing and thus $V_t^{US}\left[g^{US}\right] < V_t^{US}\left[g\right]$
2. $0 > g_{US}\left(\delta\right) - y > g\left(\delta\right) - y$. Then $V_t^{US}\left(x\right)$ is decreasing and hence $V_t^{US}\left[g^{US}\right] < V_t^{US}\left[g\right]$

which proves the claim for the U.S. The proof for RoW is analogous.

Q.E.D.

Proof of Proposition 4. Consider the intertemporal utility of agent i in US at time τ:

$$\begin{aligned}
\mathrm{E}_\tau\left[\int_\tau^T U_i\left(C_{it}, V_t^{US}, t\right) ds|G\right] &= \mathrm{E}_\tau\left[\int_\tau^T e^{-\phi(t-\tau)}\left(\frac{C_{it}^{1-\gamma_i}}{1-\gamma_i} - \eta_i V^{US}\left[g\left(\delta_t\right) - y\right]\right) dt\right] \\
&= \mathrm{E}_\tau\left[\int_\tau^T e^{-\phi(t-\tau)}\left(\frac{e^{(1-\gamma_i)\psi_i + (1-\gamma_i)\rho_i(g(\delta_t)-y)}}{1-\gamma_i} - \eta_i V^{US}\left[g\left(\delta_t\right) - y\right]\right) dt\right]
\end{aligned}$$

where we now highlight that the function V_t^{US} depends on $V^{US}\left[g\left(\delta_t\right) - y\right]$. Similarly

$$\mathrm{E}_\tau\left[\int_\tau^T U_i\left(C_{it}, V_t^{US}, t\right) ds|A\right] = \mathrm{E}_\tau\left[\int_\tau^T e^{-\phi(t-\tau)}\left(\frac{e^{(1-\gamma_i)\psi_i + (1-\gamma_i)\rho_i\left(g^{US}(\delta_t)-y\right)}}{1-\gamma_i} - \eta_i V^{US}\left[g^{US}\left(\delta_t\right) - y\right]\right) dt\right]$$

Define

$$u[x] = \frac{e^{(1-\gamma_i)\psi_i + (1-\gamma_i)\rho_i x}}{1-\gamma_i} - \eta_i V^{US}[x]$$

We note that

$$u'(x) < 0$$

if and only if

$$e^{(1-\gamma_i)\psi_i + (\rho_i - 1)x}\rho_i < \eta_i \frac{dV^{US}[x]}{dx}$$

For $\eta_i = 0$ this condition is never satisfied. For $\eta_i > 0$, rewrite

$$\frac{e^{(1-\gamma_i)\psi_i + (\rho_i - 1)x}\rho_i}{\eta_i} < \frac{dV^{US}[x]}{dx}$$

The right hand side does depend on x, but it is bounded below, as $V^{US}[x]$ converges to infinity. It follows that as $x \to \infty$, for all i the left hand side converges to 0 and thus for every i (with $\eta_i > 0$) eventually $u'(x) < 0$ for all $x > x^i$. It follows that for $g(\delta_t) - y$ sufficiently high, a jump to $g^{US}(\delta_t) - y < g(\delta_t) - y$ will always increase the utility function. This is especially true for those agents with high η_i and low ρ_i. If this is true for all δ_t sufficiently high, it must be true for the expectation of future values:

$$\begin{aligned}
\mathrm{E}_\tau\left[\int_\tau^T U_i\left(C_{it}, V_t^{US}, t\right) ds | A\right] &= \mathrm{E}_\tau\left[\int_\tau^T e^{-\phi(t-\tau)}\left(u\left[g^{US}(\delta_t) - y\right]\right) dt\right] \\
&> \mathrm{E}_\tau\left[\int_\tau^T e^{-\phi(t-\tau)}\left(u\left[g(\delta_t) - y\right]\right) dt\right] = \mathrm{E}_\tau\left[\int_\tau^T U_i\left(C_{it}, V_t^{US}, t\right) ds | G\right]
\end{aligned}$$

Q.E.D.

Proof of Corollary 3. From the proof of Proposition 4, if $\eta_i = 0$ then $u'(x) < 0$ is never true. Q.E.D.

Proof of Proposition 5. From the proof of Proposition 4, for every i there exists $\overline{\delta}^i$ such that for $\delta_t > \delta^i$ agent i votes for the populist. Given a mass of agents with η_i above zero, rank agents i in ordering i^* according to increasing thresholds $\overline{\delta}^i$, i.e. $i^* > j^*$ if and only if $\overline{\delta}^{i^*} > \overline{\delta}^{j^*}$ and choose $\overline{\delta} = \min\left(\overline{\delta}^{i^*} : \int_{i^*} di^* = 0.5\right)$. Q.E.D.

Proof of Proposition 6. The proof is implicit in the Proof of Proposition 4. To repeat, recall that $u'[x] < 0$ if and only if

$$\frac{e^{\left(1-\frac{1}{\rho_i}\right)\psi_i + (\rho_i - 1)x}\rho_i}{\eta_i} < \frac{dV^{US}[x]}{dx} \tag{A20}$$

Clearly, the left hand side is decreasing in η_i . Moreover, the log left hand side of this expression

$$\log(LHS(\rho)) = \left(1 - \frac{1}{\rho_i}\right)\psi_i + (\rho_i - 1)x + \log(\rho_i) - \log(\eta_i)$$

has

$$\frac{d\log\left(LHS\left(\rho\right)\right)}{d\rho}=\frac{\psi_i}{\rho_i^2}+x+\frac{1}{\rho_i}>0$$

for $x>-\frac{1}{\rho_i}\left(\frac{\psi_i}{\rho_i}+1\right)$, which is always true for $\psi_i>-\rho_i$. Therefore, for x large enough, the LHS of (A20) is increasing in ρ_i making it less likely to be satisfied. I.e. agents with low risk tolerance (high risk aversion) are more likely to have (A20) satisfied and hence to vote for a populist. Q.E.D.

Proof of Proposition 7. Immediate from complete markets, under standard regularity conditions on $\mathrm{T}_i\left(\delta_t\right)$ that ensure the existence of the expectation. Q.E.D.

Proof of Corollary 4. It follows from Proposition 7 and Proposition 5. Q.E.D.

Proof of Equation (31) in the paper : Under equation (3)

$$\begin{aligned}\left(g^{US}\left(\delta_t\right)\right)' &< \left(g^{RoW}\left(\delta_t\right)\right)'\\ \left(g\left(\delta_t\right)\right)' &< \left(g^{RoW}\left(\delta_t\right)\right)'\end{aligned}$$

The equations determining $g^{US}\left(\delta_s\right)$ and $g^{RoW}\left(\delta_s\right)$ are

$$\left(m^{US}+R\left(g_t-y\right)m^{RoW}\right)\frac{F_t^{US}}{m^{US}}=\frac{\mathrm{E}^i\left[e^{\rho_i\left(g_{US,t}-y\right)}|i\in\mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i\left(g_t-y\right)}|i\in\mathcal{I}^{US}\right]}$$

and

$$\left(\frac{1}{R\left(g_t-y\right)}m^{US}+m^{RoW}\right)\frac{F_t^{RoW}}{m^{RoW}}=\frac{\mathrm{E}^i\left[e^{\rho_i\left(g_{RoW,t}-y\right)}|i\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i\left(g_t-y\right)}|i\in\mathcal{I}^{RoW}\right]}$$

where

$$\begin{aligned}R\left(x\right) &= \frac{\mathrm{E}^i\left[e^{\rho_i x}|i\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i x}|i\in\mathcal{I}^{US}\right]}\\ \frac{1}{R\left(x\right)} &= \frac{1}{\frac{\mathrm{E}^i\left[e^{\rho_i x}|i\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i x}|i\in\mathcal{I}^{US}\right]}}=\frac{\mathrm{E}^i\left[e^{\rho_i x}|i\in\mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i x}|i\in\mathcal{I}^{RoW}\right]}\end{aligned}$$

As $g_t-y\rightarrow\infty$, then

$$\begin{aligned}\frac{\mathrm{E}^i\left[e^{\rho_i\left(g_{US,t}-y\right)}|i\in\mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i\left(g_t-y\right)}|i\in\mathcal{I}^{US}\right]} &\rightarrow F_t\\ \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_{RoW,t}-y\right)}|i\in\mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i\left(g_t-y\right)}|i\in\mathcal{I}^{RoW}\right]} &\rightarrow \infty\end{aligned}$$

This implies that $g_{RoW}(\delta_t)$ must increase unboundedly compared to both $g(\delta_t)$ and $g^{US}(\delta_t)$ and thus both $g^{RoW}(\delta_t) - g(\delta_t)$ and $g^{RoW}(\delta_t) - g^{US}(\delta_t)$ must increases unboundedly. It follows that for δ_t sufficiently large,

$$\begin{aligned}
\left(g^{RoW}(\delta_t)\right)' &> (g(\delta_t))' \\
\left(g^{RoW}(\delta_t)\right)' &> \left(g^{US}(\delta_t)\right)'
\end{aligned}$$

The final case

$$(g(\delta_t))' > \left(g^{US}(\delta_t)\right)'$$

is unfortunately too hard to prove under the general condition in equation (3). But we can prove it under the more restrictive condition in equation (A10). In this case, in autarky we have (for $t \geq \tau$ recall $F_t = F_\tau$)

$$\begin{aligned}
D_t^k &= m^k \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^k - y\right)} | i \in \mathcal{I}^k\right]}{\mathrm{E}^i\left[e^{-\rho_i y} | i \in \mathcal{I}\right]} \\
e^{\delta_t} F_\tau^k &= m^k \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_t^k - y\right)} | i \in \mathcal{I}^k\right]}{\mathrm{E}^i\left[e^{-\rho_i y} | i \in \mathcal{I}\right]}
\end{aligned}$$

or

$$\delta_t + \log\left(\frac{F_\tau^k}{m^k}\right) = \log\left(\mathrm{E}^i\left[e^{\rho\left(g_t^k - y\right)} | i \in \mathcal{I}^k\right]\right) - \log\left(\mathrm{E}^i\left[e^{-\rho_i y} | i \in \mathcal{I}\right]\right)$$

Thus, the total differential is

$$1 = g_k'(\delta_t) \frac{\mathrm{E}^i\left[\rho e^{\rho\left(g_t^k - y\right)} | i \in \mathcal{I}^k\right]}{\mathrm{E}^i\left[e^{\rho\left(g_t^k - y\right)} | i \in \mathcal{I}^k\right]}$$

or

$$g_k' = \frac{1}{\mathrm{E}_k^*[\rho]}$$

where

$$\mathrm{E}_k^*[\rho] = \frac{\mathrm{E}^i\left[\rho e^{\rho\left(g_t^k - y\right)} | i \in \mathcal{I}^k\right]}{\mathrm{E}^i\left[e^{\rho\left(g_t^k - y\right)} | i \in \mathcal{I}^k\right]}$$

is the weighted average risk tolerance, where the weights are given by $\left(\frac{e^{\rho\left(g_t^k - y\right)}}{\mathrm{E}^i\left[e^{\rho\left(g_t^k - y\right)} | i \in \mathcal{I}^k\right]}\right)$.

Under equation (A10), namely, $\rho_i > \rho_j$ for $i \in \mathcal{I}^{US}$, $j \in \mathcal{I}^{RoW}$, we clearly have

$$\mathrm{E}_{US}^*[\rho] > \mathrm{E}^*[\rho] > \mathrm{E}_{RoW}^*[\rho]$$

which implies the claim. Q.E.D.

Proof of Proposition 8. Follows instantly from the two equations immediately preceding it in the paper.

Proof of Proposition 9. Note that $\frac{P_t^{US}}{P_t^{RoW}+P_t^{US}}$ increases if and only if $\frac{P_t^{US}}{P_t^{RoW}}$ increases. Consider the ratio

$$\frac{P_t^{US}}{P_t^{RoW}} = \frac{\mathrm{E}_t\left[\int_t^T \frac{\pi_s^{US}}{\pi_t} D_s^{US} ds\right]}{\mathrm{E}_t\left[\int_t^T \frac{\pi_s^{RoW}}{\pi_t} D_s^{RoW} ds\right]} = \frac{F}{1-F}\frac{\mathrm{E}_t\left[\int_t^T \pi_s^{US} D_s ds\right]}{\mathrm{E}_t\left[\int_t^T \pi_s^{RoW} D_s ds\right]}$$

where $\pi_s^{US} = \pi_s^{RoW} = \pi_s$ if $s < \tau$ or $s > \tau$ and $\delta_\tau > \overline{\delta}$.

We know that for δ_s sufficiently large $g^{US}(\delta_s) \leq g^{RoW}(\delta_s)$ and therefore $\pi_s^{US} = e^{-\phi s - g^{US}(\delta_s)} \geq \pi_s^{RoW} = e^{-\phi s - g^{RoW}(\delta_s)}$. It follows that

$$\frac{P_t^{US}}{P_t^{RoW}} > \frac{F}{1-F}$$

Finally, the equations determining $g^{US}(\delta_s)$ and $g^{RoW}(\delta_s)$ are

$$\left(m^{US} + R(g_t - y)\, m^{RoW}\right)\frac{F_t^{US}}{m^{US}} = \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_{US,t}-y\right)} | i \in \mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)} | i \in \mathcal{I}^{US}\right]}$$

and

$$\left(\frac{1}{R(g_t - y)} m^{US} + m^{RoW}\right)\frac{F_t^{RoW}}{m^{RoW}} = \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_{RoW,t}-y\right)} | i \in \mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)} | i \in \mathcal{I}^{RoW}\right]}$$

where

$$\begin{aligned} R(x) &= \frac{\mathrm{E}^i\left[e^{\rho_i x} | i \in \mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i x} | i \in \mathcal{I}^{US}\right]} \\ \frac{1}{R(x)} &= \frac{1}{\frac{\mathrm{E}^i\left[e^{\rho_i x} | i \in \mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i x} | i \in \mathcal{I}^{US}\right]}} = \frac{\mathrm{E}^i\left[e^{\rho_i x} | i \in \mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i x} | i \in \mathcal{I}^{RoW}\right]} \end{aligned}$$

As $g_t - y \to \infty$, then

$$\begin{aligned} \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_{US,t}-y\right)} | i \in \mathcal{I}^{US}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)} | i \in \mathcal{I}^{US}\right]} &\to F_t \\ \frac{\mathrm{E}^i\left[e^{\rho_i\left(g_{RoW,t}-y\right)} | i \in \mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{\rho_i(g_t-y)} | i \in \mathcal{I}^{RoW}\right]} &\to \infty \end{aligned}$$

This implies that $g_{RoW}(\delta_t)$ must increase unboundedly compared to $g^{US}(\delta_t)$ and thus $g^{US}(\delta_t) - g^{RoW}(\delta_t)$ also increases unboundedly. It follows that $\frac{P_t^{US}}{P_t^{RoW}}$ increases as well as δ_t increases. Q.E.D.

Proof of Proposition 10. The values at time $t < \tau$ of a US bond and an RoW bond, both maturing at time $t + m > \tau$, are given by

$$\begin{aligned} B_t^{US}(m) &= \mathrm{E}\left[\frac{\pi_{t+m}^{US}}{\pi_t^{US}}\right] = e^{g(\delta_t)}\mathrm{E}_t\left[e^{-g_{US}(\delta_{t+m})}\right] \\ &= \int_{-\infty}^{\bar{\delta}} e^{-(g(\delta_{t+m})-g(\delta_t))}\phi\left(\delta_{t+m}, \delta_t + \mu m, \sigma^2 m\right) d\delta_{t+m} \\ &\quad + \int_{\bar{\delta}}^{\infty} e^{-(g^{US}(\delta_{t+m})-g(\delta_t))}\phi\left(\delta_{t+m}, \delta_t + \mu m, \sigma^2 m\right) d\delta_{t+m} \\ B_t^{RoW}(m) &= \mathrm{E}\left[\frac{\pi_{t+m}^{RoW}}{\pi_t^{RoW}}\right] = e^{g(\delta_t)}\mathrm{E}_t\left[e^{-g_{RoW}(\delta_{t+m})}\right] \\ &= \int_{-\infty}^{\bar{\delta}} e^{-(g(\delta_{t+m})-g(\delta_t))}\phi\left(\delta_{t+m}, \delta_t + \mu m, \sigma^2 m\right) d\delta_{t+m} \\ &\quad + \int_{\bar{\delta}}^{\infty} e^{-(g^{RoW}(\delta_{t+m})-g(\delta_t))}\phi\left(\delta_{t+m}, \delta_t + \mu m, \sigma^2 m\right) d\delta_{t+m} \end{aligned}$$

where $\phi(x, a, b)$ is the normal density with mean a and variance b. Recall that $g^{US}(\delta_T) - g(\delta_t) < g(\delta_T) - g(\delta_t) < g^{RoW}(\delta_T) - g(\delta_t)$. Therefore, as δ_t increases (and thus the probability mass of $\delta_{t+m} > \bar{\delta}$ also increases), $B_t^{US}(m)$ increases in value while $B_t^{RoW}(m)$ decreases in value. In other words, as δ_t increases, the US bond yield decreases and the RoW yield increases, Q.E.D.

Proof of Corollary 5. Recall that the volatility of consumption for agent $i \in \mathcal{I}^{US}$ is equal to $\rho^i g'(\delta)\sigma_\delta$ under globalization, and to $\rho^i (g^{US})'(\delta)\sigma_\delta$ under autarky. The claim follows from the inequalities in equation (31) in the paper. A similar argument holds for agents $j \in \mathcal{I}^{RoW}$. Q.E.D.

PROOFS OF THE RESULTS FOR INCOME TAXES (see Section A1.2. of this Appendix)

Proof of Proposition A1. First, consider an equivalent expression for the budget constraint using after-tax returns:

$$dW_{it} = N_{it}\left(dP_t^* + D_t^* dt\right) + B_{it} r_t^* dt + ds_t^k - C_{it} dt \ ,$$

where we define

$$\begin{aligned} dP_t^* + D_t^* dt &\equiv \left(1 - \tau_{P,t}\right)\left(dP_t + D_t dt\right) \\ r_t^* &\equiv \left(1 - \tau_{r,t}\right) r_t \end{aligned}$$

and rewrite

$$ds_t^k = \overline{N}_t^k \frac{\tau_{P,t}}{\left(1 - \tau_{P,t}\right)}\left(dP_t^* + D_t^* dt\right) + \overline{B}_t^k \frac{\tau_{r,t}}{\left(1 - \tau_{r,t}\right)} r_t^* dt \ .$$

We can then define the stochastic discount factor using after-tax returns:

$$\frac{d\pi_t^*}{\pi_t^*} = -r_t^* dt - \sigma_\pi^* dZ_t \ ,$$

where

$$\sigma_\pi^* = \frac{\mu_P(1 - \tau_{P,t}) - r_t(1 - \tau_{r,t})}{\sigma_P(1 - \tau_{P,t})} \ .$$

For notational convenience, we denote after-tax expected dollar return and volatility by

$$\begin{aligned} \mu_P^{\$} &= E_t\left[dP_t^* + D_t^* dt\right] = \left(1 - \tau_{P,t}\right)\mu_P P_t \\ \sigma_P^{\$} &= \sqrt{E\left[\left(dP_t^* + D_t^* dt\right)^2\right]} = \left(1 - \tau_{P,t}\right)\sigma_P P_t \ . \end{aligned}$$

We now show that agent i's wealth at time t is equal to

$$W_{it} = E_t\left[\int_t^T \frac{\pi_s^*}{\pi_t^*} C_{is} ds\right] \ ,$$

for any consumption path C_{is} satisfying the budget constraint. That is, there exists a replicating strategy that delivers consumption C_{is} as its outcome. From the budget equation, we have

$$\begin{aligned} dW_{it} &= N_{it}\left(dP_t^* + D_t^* dt\right) + B_{it} r_t^* dt + \overline{N}_t^k \frac{\tau_{P,t}}{\left(1 - \tau_{P,t}\right)}\left(dP_t^* + D_t^* dt\right) + \overline{B}_t^k \frac{\tau_{r,t}}{\left(1 - \tau_{r,t}\right)} r_t^* dt - C_{it} \\ &= \left[N_{it} + \overline{N}_t^k \frac{\tau_{P,t}}{\left(1 - \tau_{P,t}\right)}\right]\mu_P^{\$} dt \\ &\quad + \left[N_{it} + \overline{N}_t^k \frac{\tau_{P,t}}{\left(1 - \tau_{P,t}\right)}\right]\sigma_P^{\$} dZ_t + \left[B_{it} + \overline{B}_t^k \frac{\tau_{r,t}}{\left(1 - \tau_{r,t}\right)}\right] r_t^* dt - C_{it} \ . \end{aligned}$$

Define V_{it} as

$$V_{it} = E_t\left[\int_t^T \frac{\pi_s^*}{\pi_t^*} C_{is} ds\right] = \frac{1}{\pi_t^*}\left\{E_t\left[\int_0^T \pi_s^* C_{is} ds\right] - \int_0^t \pi_s^* C_{is} ds\right\} \ .$$

It follows from the martingale representation theorem that there exists a process $\widetilde{\eta}_{it}$ for which

$$\begin{aligned} dV_{it} &= (\pi_t^*)^{-1}\left\{\widetilde{\eta}_{it}dZ_t - \pi_t^* C_{it}dt\right\} - (\pi_t^*)^{-2}d\pi_t^*\left\{E_t\left[\int_0^T \pi_s^* C_{is}ds\right] - \int_0^t \pi_s^* C_{is}ds\right\} \\ &\quad +(\pi_t^*)^{-3}d\pi_t^2\left\{E_t\left[\int_0^T \pi_s^* C_{is}ds\right] - \int_0^t \pi_s^* C_{is}ds\right\} + (\pi_t^*)^{-2}\pi_t^*\sigma_\pi^*\widetilde{\eta}_{it}dt \end{aligned}$$

That is,

$$dV_{it} = (\pi_t^*)^{-1}\left\{\widetilde{\eta}_{it}dZ_t - \pi_t^* C_{it}dt\right\} - \frac{d\pi_t^*}{\pi_t^*}V_{it} + (\sigma_\pi^*)^2 V_{it} + (\pi_t^*)^{-1}\sigma_\pi^*\widetilde{\eta}_{it}dt$$

or

$$dV_{it} = \eta_{it}V_{it}dZ_t - C_{it}dt + r_t^* V_{it}dt + V_{it}\sigma_\pi^* dZ_t + (\sigma_\pi^*)^2 V_t dt + \sigma_\pi^*\eta_t V_t dt$$

where

$$\eta_{it} = \widetilde{\eta}_{it}\frac{1}{\pi_t^* V_{it}}$$

or

$$dV_{it} = -C_{it}dt + r_t^* V_{it}dt + V_{it}\left(\sigma_\pi^* + \eta_{it}\right)dZ_t + V_{it}\left(\sigma_\pi^* + \eta_{it}\right)\sigma_\pi^* dt$$

For given values of $\overline{N}_t^k$ and $\overline{B}_t^k$, we choose N_{it} and B_{it} so that

$$\left[N_{it} + \overline{N}_t^k\frac{\tau_{P,t}}{(1-\tau_{P,t})}\right]\sigma_P^{\$} = V_{it}\left(\sigma_\pi^* + \eta_{it}\right) \tag{A21}$$

$$\left[N_{it} + \overline{N}_t^k\frac{\tau_{P,t}}{(1-\tau_{P,t})}\right]\mu_P^{\$} + \left[B_{it} + \overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})}\right]r_t^* = V_{it}\left[r_t^* + \left(\sigma_\pi^* + \eta_{it}\right)\sigma_\pi^*\right] \tag{A22}$$

From equation (A21),

$$N_{it} + \overline{N}_t^k\frac{\tau_{P,t}}{(1-\tau_{P,t})} = \frac{V_{it}\left(\sigma_\pi^* + \eta_{it}\right)}{\sigma_P^{\$}}$$

Substituting this expression into equation (A22), we obtain

$$\frac{V_{it}\left(\sigma_\pi^* + \eta_{it}\right)}{\sigma_P^{\$}}\mu_P^{\$} + \left[B_{it} + \overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})}\right]r_t^* = V_{it}\left[r_t^* + \left(\sigma_\pi^* + \eta_{it}\right)\sigma_\pi^*\right]\ ,$$

which we can rewrite as

$$\left[B_{it} + \overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})}\right]r_t^* = V_{it}\left[r_t^* + \left(\sigma_\pi^* + \eta_{it}\right)\sigma_\pi^*\right] - \frac{V_{it}\left(\sigma_\pi^* + \eta_{it}\right)}{\sigma_P^{\$}}\mu_P^{\$}$$

From the equilibrium condition of the SDF, the after-tax equity premium must be equal to the negative covariance of the SDF with the after-tax stock return, which immediately implies

$$\mu_P^{\$} = r_t^* P_t + \sigma_\pi^*\sigma_P^{\$}$$

and therefore

$$\left[B_{it} + \overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})}\right]r_t^* = V_{it}\left[r_t^* + \left(\sigma_\pi^* + \eta_{it}\right)\sigma_\pi^*\right] - \frac{V_{it}\left(\sigma_\pi^* + \eta_{it}\right)}{\sigma_P^{\$}}\left[r_t^* P_t + \sigma_\pi^*\sigma_P^{\$}\right]$$

or

$$\left[B_{it}+\overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})}\right]r_t^* = V_{it}r_t^* + V_{it}\left(\sigma_\pi^*+\eta_{it}\right)\sigma_\pi^* - \frac{V_{it}\left(\sigma_\pi^*+\eta_{it}\right)}{\sigma_P^\$}r_t^*P_t - \frac{V_{it}\left(\sigma_\pi^*+\eta_{it}\right)}{\sigma_P^\$}\sigma_\pi^*\sigma_P^\$$$

or

$$\begin{aligned}
\left[B_{it}+\overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})}\right]r_t^* &= V_{it}r_t^* - \frac{V_{it}\left(\sigma_\pi^*+\eta_{it}\right)}{\sigma_P^\$}r_t^*P_t \\
B_{it}+\overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})} &= V_{it} - \frac{V_{it}\left(\sigma_\pi^*+\eta_{it}\right)}{\sigma_P(1-\tau_{P,t})} \\
B_{it}+\overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})} &= V_{it}\left(1-\frac{\sigma_{V_i}}{\sigma_P(1-\tau_{P,t})}\right) ,
\end{aligned}$$

where $\sigma_{Vi}\equiv\sigma_\pi^*+\eta_{it}$. Therefore, the following positions in stocks and bonds are budget-feasible, and they replicate the consumption flow of agent i:

$$N_{it} = \frac{V_{it}\sigma_{Vi}}{\sigma_P P_t(1-\tau_{P,t})} - \overline{N}_t^k\frac{\tau_{P,t}}{(1-\tau_{P,t})} \tag{A23}$$

$$B_{it} = V_{it}\left[1-\frac{\sigma_{Vi}}{\sigma_P(1-\tau_{P,t})}\right] - \overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})} \tag{A24}$$

We now solve for $\overline{N}_t^k$ and $\overline{B}_t^k$, which are defined earlier as

$$\overline{N}_t^k = \frac{\int_{j\in I^k}N_{jt}dj}{m^k} \quad \text{and} \quad \overline{B}_t^k = \frac{\int_{j\in I^k}B_{jt}dj}{m^k} .$$

Computing averages of both sides of N_{it} and B_{it} in equations (A23) and (A24), we obtain

$$\begin{aligned}
\overline{N}_t^k &= \frac{\frac{1}{m^k}\int_{i\in I^k}V_{it}\sigma_{Vi}di}{\sigma_P P_t(1-\tau_{P,t})} - \overline{N}_t^k\frac{\tau_{P,t}}{(1-\tau_{P,t})} \\
\overline{B}_t^k &= \frac{1}{m^k}\int_{i\in I^k}V_{it}di - \frac{\frac{1}{m^k}\int_{i\in I^k}V_i\sigma_{Vi}di}{\sigma_P(1-\tau_{P,t})} - \overline{B}_t^k\frac{\tau_{r,t}}{(1-\tau_{r,t})} .
\end{aligned}$$

Solving for $\overline{N}_t^k$ and $\overline{B}_t^k$, we find

$$\begin{aligned}
\overline{N}_t^k &= \frac{\frac{1}{m^k}\int_{i\in I^k}V_{it}\sigma_{Vi}di}{\sigma_P P_t} \\
\overline{B}_t^k &= (1-\tau_{r,t})\left[\frac{1}{m^k}\int_{i\in I^k}V_{it}di - \frac{\frac{1}{m^k}\int_{i\in I^k}V_i\sigma_{Vi}di}{\sigma_P(1-\tau_{P,t})}\right] .
\end{aligned}$$

Therefore, the positions in stocks and bonds are

$$\begin{aligned}
N_{it} &= \frac{V_{it}\sigma_{Vi} - \frac{\tau_{P,t}}{m^k}\int_{j\in I^k}V_{jt}\sigma_{Vj}dj}{\sigma_P P_t(1-\tau_{P,t})} \\
B_{it} &= V_{it} - \frac{\tau_{r,t}}{m^k}\int_{j\in I^k}V_{jt}dj - \frac{V_{it}\sigma_{Vi} - \frac{\tau_{r,t}}{m^k}\int_{j\in I^k}V_j\sigma_{Vj}dj}{\sigma_P(1-\tau_{P,t})} .
\end{aligned}$$

Finally, from equation (A21) and the definition of $\sigma_{Vi} = \sigma_\pi^* + \eta_{it}$, we have that for every i,

$$\left[N_{it} + \overline{N}_t^k \frac{\tau_{P,t}}{(1-\tau_{P,t})}\right] \sigma_P^\$ = V_{it}\sigma_{Vi} \ .$$

Next, we integrate across i on both sides of this equation. Noting that $\int N_{it} di = m^{US}\overline{N}^{US} + m^{RoW}\overline{N}^{RoW}$, we obtain

$$\left[\int N_{it} di + \int N_t di \frac{\tau_{P,t}}{(1-\tau_{P,t})}\right] \sigma_P^\$ = \int V_{it}\sigma_{Vi} di \ .$$

Imposing market clearing $\int N_{it} di = 1$, we obtain the restriction

$$\left[1 + \frac{\tau_{P,t}}{(1-\tau_{P,t})}\right] \sigma_P^\$ = \int V_{it}\sigma_{Vi} di$$

or

$$\frac{1}{(1-\tau_{P,t})}\sigma_P P_t (1-\tau_{P,t}) = \int V_{it}\sigma_{Vi} di$$

or

$$\sigma_P P_t = \int V_{it}\sigma_{Vi} di \ . \tag{A25}$$

Similarly, from equation (A22), we have

$$B_{it} + \overline{B}_t^k \frac{\tau_{r,t}}{(1-\tau_{r,t})} = V_{it}\left[1 - \frac{\sigma_{Vi}}{\sigma_P(1-\tau_{P,t})}\right] \ .$$

Taking the integral on both sides and recognizing that $\int B_{it} di = m^{US}\overline{B}_t^{US} + m^{RoW}\overline{B}_t^{RoW}$, we obtain

$$\int B_{it} di + \int B_{it} di \frac{\tau_{r,t}}{(1-\tau_{r,t})} = \int V_{it} di - \frac{\int V_i \sigma_{Vi} di}{\sigma_P(1-\tau_{P,t})}$$

and from market clearing $\int B_{it} di = 0$ we obtain the restriction

$$0 = \int V_{it} di - \frac{\int V_i \sigma_{Vi} di}{\sigma_P(1-\tau_{P,t})} \ . \tag{A26}$$

Equations (A25) and (A26) imply that market clearing holds (by construction, given that we used market clearing to obtain these restrictions):

$$\begin{aligned}
\int N_{it} di &= \frac{\int V_{it}\sigma_{Vi} di - \tau_{P,t}\int V_{jt}\sigma_{Vj} dj}{\sigma_P P(1-\tau_{P,t})} = \frac{\sigma_P P_t - \tau_{P,t}\sigma_P P_t}{\sigma_P P_t\,(1-\tau_{P,t})} = 1 \\
\int B_{it} di &= \int V_{it} di - \tau_{r,t}\int V_{jt} dj - \frac{\int V_{it}\sigma_{Vi} di - \tau_{r,t}\int V_j \sigma_{Vj} dj}{\sigma_P(1-\tau_{P,t})} \\
&= \int V_{it} di\,(1-\tau_{r,t}) - \frac{\int V_{it}\sigma_{Vi} di\,(1-\tau_r)}{\sigma_P(1-\tau_{P,t})} \\
&= \left(\int V_{it} di - \frac{\int V_{it}\sigma_{Vi} di}{\sigma_P(1-\tau_{P,t})}\right)(1-\tau_r) \\
&= 0 \ .
\end{aligned}$$

Finally, agent i's wealth at time 0 is given by

$$W_{i0} = E_0 \left[\int_0^T \pi_t^* C_{it} dt \right] = w_{i0} + s_0^k \, ,$$

where w_{i0} is the financial endowment at time 0. The Lagrangean is thus

$$L = E \left[\int_0^T e^{-\phi t} \left(\frac{C_{it}^{1-\gamma_i}}{1-\gamma_i} - \eta_i V_t^k \right) dt \right] - \xi_i \left(E \left[\int_0^T \pi_t^* C_{it} dt \right] - \left(w_{i0} + s_0^k \right) \right)$$

obtaining the first-order conditions

$$e^{-\phi t} C_{it}^{-\gamma_i} = \xi_i \pi_t^*$$

and hence

$$C_{it} = e^{-\rho_i \log(\xi_i) + \rho_i g^*(\delta_t)}$$

where

$$g^*(\delta_t) = -\phi t - \log(\pi_t^*) \ .$$

Substituting the consumption, we obtain the initial wealth restriction that determines the Lagrange multipliers

$$e^{-\rho_i \log(\xi_i)} E_0 \left[\int_0^T e^{-\phi t - g^*(\delta_t) + \rho_i g^*(\delta_t)} dt \right] = w_{i0} + s_0^k$$

Finally, market clearing pins down $g^*(\delta_t)$ as the solution to the following equation:

$$D_t = \int C_{it} di = \int e^{-\rho_i \log(\xi_i) + \rho_i g^*(\delta_t)} di = E^{\mathcal{I}} \left[e^{-\rho_i \log(\xi_i) + \rho_i g^*(\delta_t)} \right] \ .$$

This is the same market-clearing condition as in the no-tax case examined in the paper. It follows that the state price density in the economy with taxes is the same as its counterpart in the economy without taxes, except for the Pareto weights ξ_i, which depend on the initial distribution $w_{i0} + s_0^k$. It follows that consumption paths are also the same in both economies. Q.E.D.

Proof of Proposition A2. The dynamic budget constraint is

$$dW_{it} = N_{it} \left(1 - \tau_{P,i,t}\right) \left(dP_t + D_t dt\right) + B_{it} \left(1 - \tau_{r,i,t}\right) r_t dt + ds_t^k - C_{it} dt \ ,$$

where

$$ds_t^k = \frac{1}{m^k} \int \left[N_{jt} \tau_{Pjt} \left(dP_t + D_t dt\right) + B_{jt} \tau_{r,j,t} r_t dt \right] dj \ .$$

This is equivalent to agent i having access to stock and bond investments with returns

$$\begin{aligned} dP_{it} + D_{it} dt &= \left(1 - \tau_{P,i,t}\right) \left(dP_t + D_t dt\right) \\ r_{it} &= \left(1 - \tau_{r,i,t}\right) r_t \end{aligned}$$

and being endowed with a security that pays the stochastic flow ds_t^k over time. We denote by s_t^k the value of such a security. The budget constraint is

$$dW_{it} = N_{it} \left(dP_{it} + D_{it} dt\right) + B_{it} r_{it} dt + ds_t^k - C_{it} dt \ .$$

Define the state price density for agent i as

$$\frac{d\pi_{it}}{\pi_{it}} = -r_{it}dt - v_{it}dZ_t \ ,$$

where the market price of risk is

$$v_{it} = \frac{\mu_{it} - r_{it}}{\sigma_{it}} = \frac{\mu_P \left(1 - \tau_{P,it}\right) - r_t \left(1 - \tau_{rit}\right)}{\sigma_P \left(1 - \tau_{P,it}\right)} \ .$$

From equation (A3), all agents have the same market price of risk:

$$v_{it} = v_t = \frac{\mu_P - r_t}{\sigma_P} \ .$$

Standard results imply that the dynamic budget constraint for agent i can be equivalently written in its static form as

$$w_{i0} + s_0^k = E_0 \left[\int_0^T \pi_{is} C_{is} ds \right] \ ,$$

where we use the agent-specific state price density π_{it}. The first order conditions from the Lagrangean are

$$\begin{aligned} e^{-\phi t} C_{it}^{-\gamma_i} &= \xi_i \pi_{it} = \xi_i e^{-\int^t (1-\tau_{is}) r_s ds - \int^t v_s^2/2 ds - \int^t v_s dZ_s} \\ &= \xi_i e^{-\int^t (1-\tau_{is}) r_s ds + \int^t r_s ds - \int^t r_s ds - \int^t v_s^2/2 ds - \int^t v_s dZ_s} \\ &= \xi_i e^{\int^t \tau_{is} r_s ds} \pi_t \ , \end{aligned}$$

where

$$\pi_t = e^{-\int^t r_s ds - \int^t v_s^2/2 ds - \int^t v_s dZ_s}$$

is the common part of the state price density. Therefore, optimal consumption can be written as

$$C_{it} = e^{\frac{g(\delta_t) - \log(\xi_i)}{\gamma_i} - \frac{1}{\gamma_i} \int^t \tau_{is} r_s ds} \ ,$$

where

$$g_t = -\phi t - \log\left(\pi_t\right) \ .$$

Q.E.D.

Proof of Proposition A3.

We consider a general setting without distinguishing the U.S. from RoW because the problem is not country-specific. We first consider implicit leverage through taxation and then firm leverage.

First, consider taxation. Government issues debt to finance its activities, which are necessary for production. (It is as if the "tree" in a Lucas tree model needed also government infrastructure as an input.) All risk-free overnight debt purchased by traders is issued by the government. The government thus acts as an intermediary, which issues overnight debt that pays a risk-free interest rate r_t and levies taxes τ_t to make interest rate payments.

Recall the dynamic budget constraint when there are no taxes and no government bonds:

$$dW_{it} = N_{it}\left(dP_t + D_t dt\right) + B_{it} r_t dt - C_{it} dt$$

Optimal portfolio allocations to stocks and bonds are then easily derived:

$$N_{it} = \frac{W_{it}\sigma_{Wi,t}}{P_t \sigma_{Pt}};\ B_{it} = W_{it}\left(1 - \frac{\sigma_{Wi,t}}{\sigma_{Pt}}\right)$$

We must have some agents with $B_{it} > 0$ and others with $B_{it} < 0$ so that in equilibrium $\int B_{it} di = 0$. Therefore, many agents invest more than 100% of their net worth, $W_{it} = N_{it} P_t + B_t$, in stocks:

$$\frac{N_{it} P_t}{W_{it}} = \frac{\sigma_{Wi,t}}{\sigma_{Pt}} > 1$$

This implication, which is rarely observed in the data, is due to the simplicity of the model. By adding taxes and leverage to the model, we reduce the amounts agents invest in stocks.

We now use tilde, "$\widetilde{\ }$", to denote variables in the new setting with taxation (but no firm leverage yet). The budget constraint of agent i is

$$d\widetilde{W}_{it} = \widetilde{N}_{it}\left(dP_t + D_t dt\right) + \left(\widetilde{B}_{it} - \widetilde{L}_{it}\right) r_t dt - \widetilde{T}_{it} dt - C_{it} dt$$

where $\widetilde{B}_{it} \geq 0$ is the dollar amount invested in government issued bonds and $\widetilde{L}_{it} \geq 0$ is the dollar amount borrowed, if any (see below). Bonds are issued by the government and they need to be repaid period by period. The government re-issues the necessary amount every period and uses taxes to pay interest. Note that because $\widetilde{T}_{it} > 0$, each agent is naturally "levered" in that s/he must pay some money period by period to pay for the bonds issued by the government.

The government runs a balanced budget, so that taxes must be sufficient to pay bond interest. Given that the government here acts as a pass-through, we have

$$\int \widetilde{B}_{it} di \times r_t = \int \widetilde{T}_{it} di$$

For any tax rate $\widetilde{T}_{it}$ and $\widetilde{B}_{it}$, define B_{it} such that

$$B_{it} r_t dt = \left(\widetilde{B}_{it} - \widetilde{L}_{it}\right) r_t dt - \widetilde{T}_{it} dt$$

That is, as long as $r_t \neq 0$,

$$B_{it} = \left(\widetilde{B}_{it} - \widetilde{L}_{it}\right) - \frac{\widetilde{T}_{it}}{r_t}$$

If we substitute this B_{it} into the budget equation, we obtain a dynamic budget equation identical to one obtained when there are no taxes. Therefore, in equilibrium, the optimal amount of debt B_{it} is the same as above:

$$B_{it} = W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}}\right)$$

Combining the last two equations, for an agent who is already naturally levered because of taxation, the investment in bonds plus the loan is

$$\widetilde{B}_{it} - \widetilde{L}_{it} = W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}}\right) + \frac{\widetilde{T}_{it}}{r_t}$$

In other words, even if according to the original optimal plan the amount of bond investment $B_{it} = W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}}\right) < 0$ (i.e., agent i is levered), the actual bond investment under taxation ($\widetilde{B}_{it}$) may be positive as the agent is implicitly levered given the obligation to pay taxes. Assuming that taxes are sufficiently high so that

$$W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}}\right) + \frac{\widetilde{T}_{it}}{r_t} > 0$$

then $\widetilde{L}_{it} = 0$ and agent i invests $\widetilde{B}_{it} > 0$ in government bonds.

Let tax_t denote the average ratio of taxes paid to total wealth, T_{it}/W_{it}, across agents i. Taxes paid by agent i are then

$$T_{it} = tax_t W_{it}$$

so that

$$\begin{aligned} \widetilde{B}_{it} &= W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}}\right) + \frac{tax_t}{r_t} W_{it} \\ &= W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}} + \frac{tax_t}{r_t}\right) \end{aligned}$$

Define $\alpha \equiv tax_t/r_t$, then

$$\widetilde{B}_{it} = W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}} + \alpha\right)$$

We see that if α is sufficiently high, the implied investment in bonds is positive for all i. The idea is that we are all short government bonds because we pay taxes to maintain government infrastructure, without which production would be impossible. We are also long government bonds through our investment portfolios. The net outcome is derived above. Note that once we define B_{it} as above, the budget equation with taxes is the same as without taxes, which implies that the stock position is the same:

$$\widetilde{N}_{it} = N_{it} = \frac{W_{it}\sigma_W}{P_t \sigma_P}$$

Note that (with $L_{it} = 0$ now):

$$\begin{aligned} d\widetilde{W}_{it} &= \widetilde{N}_{it}\left(dP_t + D_t dt\right) + \widetilde{B}_{it} r_t dt - \widetilde{T}_{it} dt - C_{it} dt \\ &= N_{it}\left(dP_t + D_t dt\right) + \widetilde{B}_{it} r_t dt - tax_t W_{it} dt - C_{it} dt \\ &= N_{it}\left(dP_t + D_t dt\right) + W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}} + \alpha\right) r_t dt - \alpha r_t W_{it} dt - C_{it} dt \end{aligned}$$

$$\begin{aligned}
&= N_{it}\left(dP_t + D_t dt\right) + W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}}\right) r_t dt - C_{it} dt \\
&= N_{it}\left(dP_t + D_t dt\right) + W_{it} B_{it} r_t dt - C_{it} dt \\
&= dW_{it}
\end{aligned}$$

which is the same process as before without taxes. Therefore, starting from the same initial conditions, $W_{it} = \widetilde{W}_{it}$.

In all this, what is the net worth of an agent computed using the variables above? Because borrowing is implicit through taxes and not counted in net worth, net worth as regularly computed in the data amounts to

$$\widetilde{NW}_{it} = N_{it} P_t + \widetilde{B}_{it}$$

rather than the prior value

$$W_{it} = N_{it} P_t + B_{it}$$

Recall that $\widetilde{B}_{it} = B_{it} + \frac{\widetilde{T}_{it}}{r_t}$. That is, $W_{it} = N_{it} P_t + B_{it} = N_{it} P_t + \widetilde{B}_{it} - \widetilde{T}_{it}/r = \widetilde{NW} - T_{it}/r_t$. Therefore, the investment in stocks as percent of net worth is

$$\theta^{Adj} = \frac{N_{it} P_t}{\widetilde{NW}_{it}} = \frac{N_{it} P_t}{N_{it} P_t + \widetilde{B}_{it}} < 1$$

if $\widetilde{B}_{it} > 0$. Agents' stock investments thus no longer exceed their net worth.

Government budget constraint holds by assumption. Given T_{it}, we have

$$\begin{aligned}
\int \widetilde{B}_{it} di &= \int W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}}\right) di + \frac{\int T_{it} di}{r_t} \\
&= \int W_{it} di - \frac{\int W_{it}\sigma_{Wit} di}{\sigma_{Pt}} + \frac{\int T_{it} di}{r_t} \\
&= P_t - \frac{P_t \sigma_{P_t}}{\sigma_{Pt}} + \frac{\int T_{it} di}{r_t} \\
&= \frac{\int T_{it} di}{r_t}
\end{aligned}$$

Thus the budget constraint holds, by construction:

$$\int \widetilde{B}_{it} di \times r_t = \int T_{it} di$$

Second, we allow firms to issue bonds. We denote firm equity by

$$S_t = P_t - X_t$$

where X_t is the amount of bonds issued by the firm. An equity holder receives the dividend minus the interest paid to bond holders. We assume all debt is risk free (or fully secured) and overnight. Therefore, the agent's budget constraint becomes:

$$d\widetilde{W}_{it} = \widetilde{N}_{it}\left(dS_t + \left(D_t - X_t r_t\right) dt\right) + \widetilde{X}_{it} r_t dt + \widetilde{B}_{it} r_t dt - \widetilde{T}_{it} dt - C_{it} dt$$

where $\widetilde{X}_{it}$ are the holdings of corporate debt of agent i, where

$$\int X_{it}di = X_t$$

By setting $\widetilde{X}_{it} = \widetilde{N}_{it}X_t$, the budget constraint is the same as before. In other words, an investor in the firm buys $\widetilde{N}_{it}$ shares and the corresponding fraction of debt, so that between the two, the investor receives the same total payout as before (receive less dividend due to interest paid, but get the interest back from holding the bond). In fact,

$$\begin{aligned} d\widetilde{W}_{it} &= \widetilde{N}_{it}\left(dS_t + \left(D_t - X_t r_t\right)dt\right) + \widetilde{X}_{it}r_t dt + \widetilde{B}_{it}r_t dt - \widetilde{T}_{it}dt - C_{it}dt \\ &= \widetilde{N}_{it}\left(dS_t + D_t dt\right) - \widetilde{N}_{it}X_t r_t dt + \widetilde{X}_{it}r_t dt + \widetilde{B}_{it}r_t dt - \widetilde{T}_{it}dt - C_{it}dt \\ &= \widetilde{N}_{it}\left(dP_t + D_t dt\right) + B_{it}r_t dt - C_{it}dt \end{aligned}$$

and we use the fact that the dollar change in stock price equal the change in value of assets

$$dS_t = dP_t$$

This comes from the balance sheet equation

$$P_t = S_t + X_t$$

Between today and tomorrow X_t is fixed (as X_t is maturing), so, $dP_t = dS_t$. The firm pays $(D_t - X_t r_t)\,dt$ to its equity holders and $X_t r_t dt$ to its debt holders.

Now, the position in stocks divided by net worth is

$$\begin{aligned} \theta^{Adj} &= \frac{\widetilde{N}_{it}S_t}{\widetilde{N}_{it}S_t + \widetilde{X}_{it} + \widetilde{B}_{it}} = \frac{\widetilde{N}_{it}S_t}{\widetilde{N}_{it}P_t - \widetilde{N}X_t + \widetilde{N}_{it}X_t + \widetilde{B}_{it}} \\ &= \frac{\widetilde{N}_{it}P_t\left(1-x\right)}{\widetilde{N}_{it}P_t + \widetilde{B}_{it}} \end{aligned}$$

where

$$x = \frac{X_t}{P_t}$$

is target firm leverage.

To summarize, we make two adjustments: The first is $(1-x)$ and the second is $\widetilde{B} = B_{it} + \frac{\widetilde{T}_{it}}{r_t} > B_{it}$. Both adjustments decrease the investment in stocks implied by the model.

Developing the second adjustment further, under the assumptions that lead to $\widetilde{B}_{it} = W_{it}\left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}} + \alpha\right)$ and given $\widetilde{N}_{it}P_t = W_{it}\frac{\sigma_{Wit}}{\sigma_P}$, the fraction of wealth invested in stock is

$$\theta^{Adj} = \frac{\widetilde{N}_{it}S_t}{\widetilde{N}_{it}S_t + \widetilde{X}_{it} + \widetilde{B}_{it}} = \frac{\sigma_{Wit}}{\sigma_P}\frac{(1-x)}{1+\alpha} = \theta\frac{(1-x)}{1+\alpha}$$

where $\theta = N_{it}P_t/W_{it}$ is the fraction invested in stock in original model.

Q.E.D.

Also note that net worth is given by

$$\widetilde{NW}_{it} = \widetilde{N}_{it} P_t + \widetilde{B}_{it} = W_{it} \frac{\sigma_{Wit}}{\sigma_P} + W_{it} \left(1 - \frac{\sigma_{Wit}}{\sigma_{Pt}} + \alpha \right) = W_{it} \left(1 + \alpha \right) \ .$$

PROOFS OF THE RESULTS IN MODEL EXTENSIONS (see Section A3. of this Appendix)

The case with stochastic F_t has been covered in general statements.

Proof of Voting for Autarky under Higher Costs:

We need to show

$$\mathrm{E}_\tau \left[\int_\tau^T U_i \left(C_{it}, V_{k,t}, t \right) ds | A \right] > \mathrm{E}_\tau \left[\int_\tau^T U_i \left(C_{it}, V_{k,t}, t \right) ds | G \right]$$

where now we have different distributions depending whether we are under G or under A. Denote by δ_t^A the process under autarky. We have that for $h > 0$

$$\delta_{\tau+h}^A = \delta_\tau - j + \mu^A h + \sigma^A \sqrt{h} x$$

whereas in global economy we have

$$\delta_{\tau+h} = \delta_\tau + \mu h + \sigma \sqrt{h} x$$

Following Veronesi (2018), note that the expected utility is equivalent to the expectation over two independent random variables, a random time h distributed according to a truncated exponential density with parameter ϕ and a random normal variable x that determines $\delta_{t+h} = \delta_t + \mu_\delta h + \sigma_\delta \sqrt{h} x$.

Using the notation of Veronesi (2018), agent i votes for autarky if and only if

$$\mathrm{E}_\tau^{h,x} \left[u \left[g_{US} \left(\delta_{\tau+h}^A \right) \right] \right] - \mathrm{E}_\tau^{h,x} \left[u \left[g \left(\delta_{\tau+h} \right) \right] \right] > 0$$

where

$$u [g] = \frac{e^{(1-\gamma_i)\psi_i}}{1-\gamma_i} e^{(1-\gamma_i)\rho_i (g-y)} - \eta_i V [g]$$

Now, recall that h and x are the two stochastic quantities. If $\sigma^A = \sigma$, then given $\mu^A < \mu$ and $j > 0$ we have

$$\delta_{t+h}^A < \delta_{t+h}$$

for each possible realization of (h, x). Because g_{US} and g are increasing, this implies

$$g_{US} \left(\delta_{\tau+h}^A \right) < g_{US} \left(\delta_{\tau+h} \right) < g \left(\delta_{\tau+h} \right)$$

Therefore, if u is decreasing in g, we have the result that agent i under the jump j and the decrease μ^A will be even more likely to vote for autarky against the alternative that $j = 0$ and $\mu^A = \mu$.

The case with higher volatility instead relies on the near linearity of the utility function for large δ, which makes the expected utility insensitive to volatility for large δ_t. In particular, the utility function is

$$u[g] = \frac{e^{(1-\gamma_i)\psi_i}}{1-\gamma_i} e^{(1-\gamma_i)\rho_i(g-y)} - \eta V[g]$$

Note that

$$u'[g] = e^{(1-\gamma_i)\psi_i} \rho_i e^{(1-\gamma_i)\rho_i(g-y)} - \eta_i \frac{dV}{dg}$$

and

$$u''[g] = e^{(1-\gamma_i)\psi_i} \rho_i (\rho_i - 1) e^{(\rho_i-1)(g-y)} - \eta_i \frac{d^2V}{dg^2}$$

Both terms converge to zero as g diverges to infinity. That is, the function $u[g]$ becomes nearly linear in the limit. Therefore, in the limit, volatility of g (through higher δ volatility) has no impact, and the discrete shift in $g(\delta) \to g_{US}(\delta) < g(\delta)$ must dominate. Q.E.D.

Proof of Proposition A4.

The stock price under leverage is

$$\begin{aligned} P_t &= e^{g(\delta_t)} \mathrm{E}_t \left[\int_t^T e^{-\phi(s-t) - g(\delta_s) + q\delta_s} ds \right] \\ &= \frac{1 - e^{-\phi(T-t)}}{\phi} e^{g(\delta_t)} \, \mathrm{E}_t^{x,h} \left[e^{-g\left(\delta_t + \mu_\delta h + \sigma_\delta \sqrt{h} x\right) + q\left(\delta_t + \mu_\delta h + \sigma_\delta \sqrt{h} x\right)} \right] \end{aligned}$$

where $h \equiv s - t$. The expectation $\mathrm{E}_t^{x,h}[.]$ is computed with respect to two independent random variables: a random time h distributed according to a truncated exponential density with parameter ϕ and a random normal variable x that determines $\delta_{t+h} = \delta_t + \mu_\delta h + \sigma_\delta \sqrt{h} x$ (see Veronesi, 2018).

The first derivative of P_t with respect to μ_δ is then

$$\frac{\partial P_t}{\partial \mu_\delta} = e^{g(\delta_t)} \mathrm{E}_t^{x,h} \left[\left(q - g'(\delta_{t+h})\right) h e^{-g(\delta_{t+h}) + q\delta_{t+h}} \right]$$

The sign of this derivative therefore depends on the sign of $q - g'(\delta_{t+h})$. We know

$$g'(\delta_{t+h}) = \frac{1}{\mathrm{E}^*\left[\rho^i | \delta_{t+h}\right]}$$

where $\mathrm{E}^*[.|\delta_{t+h}]$ is the cross-sectional expectation of ρ^i that uses a consumption-weighted distribution (recall that $\rho^i = 1/\gamma_i$). Because $\rho^i < 1$ for all i, we have $\mathrm{E}^*[\rho^i|\delta_{t+h}] < 1$, which implies $g'(\delta_{t+h}) > 1$ for all h. It follows that if $q = 1$ (no leverage), then $q - g'(\delta_{t+h}) < 0$ for all h, and so $\partial P_t / \partial \mu_\delta < 0$. However, if q is sufficiently large, then $q - g'(\delta_{t+h}) > 0$ and so $\partial P_t / \partial \mu_\delta > 0$.

Recall that as δ_t increases, $g'(\delta_t)$ decreases (because $g''(\delta_t) < 0$). Given that $g'(\delta_t)$ is bounded below by one, it must converge to a fixed value as δ_t increases. Let $\underline{\gamma}$ denote the limit of $g'(\delta_t)$ as δ_t grows to infinity. This limit is equal to the infimum of γ_i across agents, $\underline{\gamma} \equiv \inf\{\gamma_i\}$, because when

δ_t converges to infinity, the consumption share of the agent with the largest ρ^i goes to one, so that $\mathrm{E}^* [\rho^i|\delta_{t+h}] \to \sup\{\rho^i\}$. We have $\underline{\gamma} \geq 1$ because $\gamma_i > 1$ for all i. Because $g'(\delta_t)$ decreases with δ_t and is bounded below by $\underline{\gamma}$, for any given $q > \underline{\gamma}$ there exists δ_t large enough so that $g'(\delta_t) < q$. Therefore, $q - g'(\delta_{t+h}) > 0$ and so $\partial P_t / \partial \mu_\delta > 0$, QED.

A3. Theory: Model Extensions

In this section, we discuss five extensions of the baseline model presented in the paper. In Section A3.1., we allow the countries' output shares to vary over time. In Section A3.2., we allow the countries' population shares to vary over time, effectively permitting migration across countries. In Section A3.3., we assume that a move to autarky reduces subsequent output. We consider two such scenarios: (i) a lower long-term growth rate of output, and (ii) a one-time destruction of capital. In Section A3.4., we assume that a move to autarky makes output more volatile. Finally, in Section A3.5., we assume that a move to autarky reduces the long-term growth rate of output and that stocks are levered claims on output.

In all five extensions, our main result about the fragility of globalization continues to hold. The extensions also produce additional insights into the conditions under which the populist candidate gets elected. For example, the first extension explains why the recent rise of China may have contributed to the rise of populism in the West. The second extension shows that immigration increases the likelihood of populist victory. The third extension shows that the prospect of a destruction of capital does not discourage agents from voting populist; on the contrary, it encourages them to do so. The last extension generates drops in stock prices when the probability of autarky increases.

A3.1. Extension: Time-Varying Output Shares

In the baseline model, each country's share of global output is constant and equal to the country's population share ($\frac{D_t^{US}}{D_t} = m$). We now generalize this setting by allowing the output shares to vary over time. Similar to Menzly, Santos and Veronesi (2004), we assume that

$$F_t = \frac{D_t^{US}}{D_t} \tag{A27}$$

is stochastic, following a diffusion process in the interval (0,1). For tractability, we assume that F_t stops fluctuating at time τ if agents elect the populist (i.e., $F_t = F_\tau$ for $t \geq \tau$ under autarky). We maintain all other assumptions of the baseline model.

In this more general setting, our main results continue to hold. More interesting, the outcome of the U.S. election depends on the value of F_τ. This value affects two necessary conditions for the populist to be elected. The first of these is $g^{US}(\delta_t) < g(\delta_t)$, which ensures that U.S. inequality declines upon the move to autarky. The second one is that the U.S. runs a trade deficit. Both conditions hold if and only if

$$F_t \; < \; F(\delta_t) \; , \tag{A28}$$

where

$$F(\delta_t) \;=\; \left(1 + \frac{\mathrm{E}^i\left[e^{(g(\delta_t)-y)/\gamma_i} \,|\, i \in \mathcal{I}^{RoW}\right]}{\mathrm{E}^i\left[e^{(g(\delta_t)-y)/\gamma_i} \,|\, i \in \mathcal{I}^{US}\right]} \, \frac{1-m}{m}\right)^{-1} . \tag{A29}$$

The function $F(\delta_t)$ monotonically increases from 0 to 1 as δ_t increases from $-\infty$ to $+\infty$. The threshold condition (A28) implies that for any given value of F_t, there exists δ_t sufficiently large—larger than $F^{-1}(F_t)$—so that the two conditions mentioned above hold. Also, for any given δ_t, there exists F_t sufficiently low—lower than $F(\delta_t)$—so that the same two conditions hold. The threshold condition (A28) can thus be triggered by either an increase in δ_t or a decrease in F_t.

Building on these results, we prove that our main result—Proposition 5—continues to hold with a modified threshold: there exists a value $\overline{\delta}(F_\tau)$ such that the U.S. elects the populist when $\delta_\tau > \overline{\delta}$. The backlash against globalization thus eventually happens also in this more general setting. Our main theoretical result is thus robust to allowing for time-varying output shares.

The threshold $\overline{\delta}(F_\tau)$ is increasing in F_τ when F_τ is large enough. Further increases in F_τ then make the condition (A28) binding, so that δ_τ must exceed a larger threshold $\overline{\delta}(F_\tau)$ for this condition to hold. As a result, the populist's victory becomes more likely when F_τ declines from a high level. Intuitively, when F_τ declines, a shift to autarky is more attractive to U.S. agents because it gives them less risk to share, resulting in less inequality. After moving to autarky, U.S. agents share only the risk associated with their own tree. This local risk is lower when F_τ declines, implying less extreme portfolio positions across U.S. agents and thus less inequality, making autarky more desirable.

This result—that a decrease in F_t makes the populist victory more likely when F_t is large enough—provides the basis for a novel potential explanation for why populism in the West appeared in 2016. The rise of populism has its roots in the 2008 financial crisis. The argument is *not* that the crisis made the U.S. poorer in absolute terms; after all, the 2009–2016 period was characterized by a long uninterrupted economic expansion, one of the longer expansions in the U.S. history. But the crisis made the U.S. poorer *relative* to RoW. The 2008 crisis is often perceived as global, but it was more of an "Atlantic" crisis, which impoverished the West but not China or certain other parts of the world. While U.S. output shrank, Chinese output continued to grow at a rapid pace approaching 10% per year. (Australia did not have a recession in 2008 either.) As a result, China—and RoW more generally—grew richer relative to the U.S. in the decade preceding 2016, implying a decrease in F_t. The lower U.S. output share implies more Chinese risk to share, making autarky more appealing to U.S. agents, as explained earlier.

A3.2. Extension: Time-Varying Population Shares

In the baseline model, the fraction of agents living in the U.S. is fixed at m. We now allow the U.S. population share m_t to vary over time. An increase in m_t can be interpreted, for example, as immigration from RoW into the U.S. While varying m_t, we hold constant the distributions of risk aversion in both countries, maintaining the interpretation of country-level differences in financial development. We also assume, similar to the previous section, that both m_t and F_t stop fluctuating at time τ if agents elect the populist.

Since the function $F(\delta_t)$ from equation (A29) depends on m_t, we relabel it as $F(\delta_t, m_t)$. Since $F(\delta_t, m_t)$ is an increasing function of m_t, the threshold condition (A28) is more likely to hold at time τ when m_τ is larger, holding δ_τ and F_τ constant. Recall that the condition (A28) is necessary for the populist to get elected. As a result, immigration from RoW to the U.S. makes it more likely that the populist gets elected. Intuitively, when m_t increases, autarky becomes more attractive to

U.S. agents because they have more other U.S. agents to share local risk with. This result is consistent with the important role of immigration observed in the recent populist backlash. However, immigration is also closely related to cultural reasons that are outside our model.

A3.3. Extension: Lower Output in Autarky

In the baseline model, a move to autarky does not affect the output process. In this section, we consider two possible changes in that process upon a shift to autarky:

1. A reduction in the growth rate of output, μ_δ ,
2. A downward jump in output: $D_\tau = JD_{\tau-}$, where $J < 1$.

Both changes capture the idea that a shift to autarky may be costly in terms of lost output. In the first change, growth slows down permanently when the gains from cross-border trade disappear. The second change is an abrupt one-time contraction at time τ resulting from the disruption of trade. Both changes have ambiguous effects on agents' utility—while they imply lower consumption, they also reduce inequality.

Adding either or both of these changes to our baseline model leads to the same basic conclusions. As long as the values of J and the drop in μ_δ are known, markets continue to be complete and our main results continue to hold. That includes the key Proposition 5, with a different threshold $\overline{\delta}$ compared to the baseline case. The backlash against globalization thus eventually takes place—when output is large enough, U.S. voters find it optimal to elect a populist even if the move to autarky is costly in terms of lost output.

This result sheds new light on the 2016 EU referendum in Britain. Before the referendum, many economists predicted that Brexit would lead to significant output losses for Britain. The British voters heard the message and yet voted in favor of Brexit. Interpreting this fact through the lens of our model, lower output was a price the British voters were willing to pay in order to reduce inequality. Along the same lines, the British voters may have accepted that Brexit would weaken the City of London. Since inequality is driven mostly by the highest incomes, a particularly effective way to reduce it is to drive the wealthy London bankers out of Britain.

A reduction in output reduces inequality because it hurts the rich (i.e., the low-γ_i agents) more than the poor. When output is large enough, the median voter welcomes a reduction in output because the resulting reduction in inequality outweighs the decline in consumption in utility terms. This is true even if there is no shift to autarky at time τ. Suppose we replace the move to autarky by a destruction of capital at time τ, so that the second change described above (a downward jump in output) happens in the absence of autarky. Agents then find it optimal to destroy some of the capital when inequality grows large enough, which in turn happens when output is large enough. Such destruction could also take the form of a war or a revolution (e.g., Scheidel, 2017). The implications of our model thus extend beyond the reversal of globalization.

A3.4. Extension: Higher Output Volatility in Autarky

Another potential cost of autarky is an increase in output volatility. After cross-border risk sharing stops, agents face the risk associated with local but not global output; they can no longer diversify country-specific risks. We do not model such risks, but in their presence, a shift to autarky would raise the output volatility faced by agents. To illustrate this fact, suppose the two countries' outputs follow processes with identical drifts and volatilities:

$$\frac{dD_t^k}{D_t^k} = \mu_\delta dt + \sigma_\delta dZ_t^k \,, \qquad k \in \{US, RoW\} \,, \tag{A30}$$

where dZ_t^{US} and dZ_t^{RoW} are Brownian motions with correlation $\rho < 1$. Global output, $D_t = D_t^{US} + D_t^{RoW}$, then follows the process

$$\frac{dD_t}{D_t} = \mu_\delta dt + \sigma_\delta \left(F_t \, dZ_t^{US} + (1 - F_t) \, dZ_t^{RoW} \right) \,, \tag{A31}$$

where $F_t = D_t^{US}/D_t$ as before. It follows that

$$\text{Var}\left(\frac{dD_t}{D_t}\right) = \sigma_\delta^2 \left[F_t^2 + (1 - F_t)^2 + 2F_t(1 - F_t)\rho \right] \leq \sigma_\delta^2 \,, \tag{A32}$$

so that global output is less volatile than local output. Therefore, in the presence of country-specific risks, a move to autarky would raise output volatility due to the loss of cross-country diversification benefits.

Motivated by this fact, we extend our model by allowing the volatility of the output process, σ_δ, to rise at time τ if a move to autarky occurs. We find that our main results continue to hold in that setting.

A3.5. Extension: Lower Output in Autarky with Leverage

In the baseline model, an increase in the probability of autarky lifts U.S. stock prices by lowering the discount rate. This prediction seems violated by anecdotal evidence that news of a potential trade war tends to reduce stock prices. (A good example are stock price reactions during the trade negotiations between the U.S. and China in the late 2010s.) We show in this section that it is possible to modify our baseline model so that it implies a drop in U.S. stock prices when the probability of autarky increases.

We modify the model in two dimensions. First, we allow the growth rate of output, μ_δ, to decline after a move to autarky, as in Section A3.3. (Recall that in the baseline model, a move to autarky does not affect μ_δ.) This assumption is motivated by the observation that trade wars are likely to have adverse consequences for output by negatively affecting firms' supply chains. Second, we assume stocks are levered claims on output. Following Abel (1999), we assume that levered log dividend is equal to $q\delta_t$ where $q \geq 1$ is the leverage factor ($q = 1$ in the baseline model). The price of a levered stock is then

$$P_t = e^{g(\delta_t)} \mathrm{E}_t \left[\int_t^T e^{-\phi(s-t) - g(\delta_s) + q\delta_s} ds \right]$$

We then have the following result:

Proposition A4. *Let $\underline{\gamma}$ denote the infimum of γ_i across agents: $\underline{\gamma} \equiv inf\{\gamma_i\}$, so that $\underline{\gamma} \geq 1$. Then for any $q > \underline{\gamma}$ and δ_t sufficiently large, $\partial P_t / \partial \mu_\delta > 0$.*

The proof of Proposition A4 is in Section A2. of this Appendix. In that proof, we also show that when $q = 1$, $\partial P_t / \partial \mu_\delta < 0$. That result follows from intertemporal smoothing. A reduction in μ_δ reduces future dividends, which increases agents' demand for saving, which in turn increases their demands for stocks and bonds; as a result, stock prices rise. Therefore, our first assumption alone—that μ_δ drops upon a move to autarky—does not deliver the result that stock prices fall when trade wars become more likely; quite the opposite. But adding the second assumption—levered dividends—does deliver the result if leverage is sufficiently strong, as shown in Proposition A4.

The intuition is that when $q > 1$, an increase in μ_δ has a larger effect on expected future cash flow. When q is large enough, this cash flow effect more than outweighs the consumption smoothing effect, leading to an increase in P_t. To see why a large value of δ_t is also necessary, note that as δ_t increases, wealth accrues disproportionately to agents with low values of γ_i, i.e., agents with high elasticity of intertemporal substitution. When δ_t is large enough, most wealth is in the hands of agents who are willing to substitute intertemporally, and so the consumption smoothing effect is weaker than the cash flow effect. To summarize, when q and δ_t are large enough, we obtain the desired relation $\partial P_t / \partial \mu_\delta > 0$; that is Proposition A4.

Proposition A4 implies that this model extension can generate a drop in stock prices when the probability of autarky increases. This drop is illustrated in Figure A7. Panel A plots stock prices in a setting without leverage ($q = 1$). U.S. stock prices then increase around the shift to autarky, as explained earlier. Panel B plots stock prices in a setting with leverage ($q = 7$). This value of q is relatively large, but for this parametric specification, we need a large value of q because the threshold $\overline{\delta}$ is relatively low. (To raise $\overline{\delta}$, we could reduce the values of η_i, which would then allow us to illustrate the same point with smaller values of q.) We see that stock prices in both countries fall upon a move to autarky because the cash flow effect associated with the drop in μ_δ outweighs the intertemporal smoothing effect.

Finally, Panel C of Figure A7 shows that bond yields in both countries drop around the time of the move to autarky. The reason is that a lower expected growth in autarky induces agents to buy bonds in advance, resulting in higher bond prices and thus lower yields. The effect is very strong, pushing the yields deep into the negative territory for these parameter values.

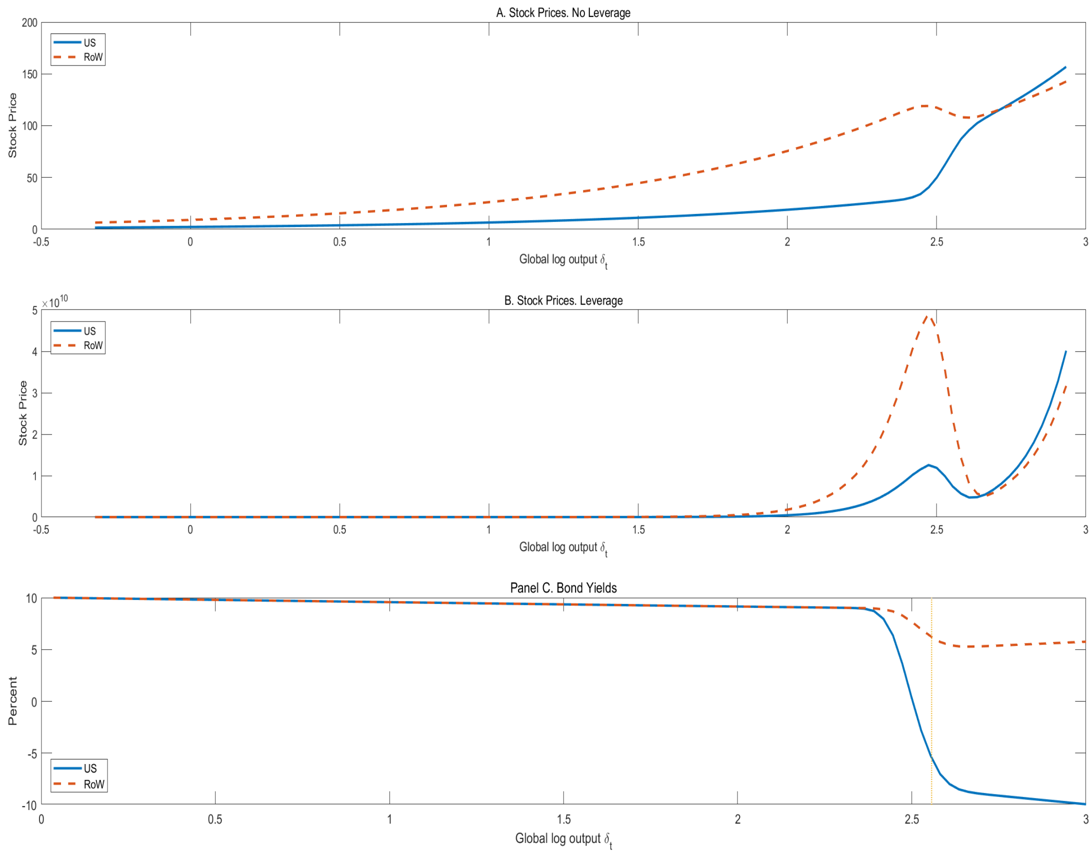


Figure A7. Stock Prices and Bond Yields with Drop in Output and Leverage. This figure plots model-implied asset prices in a setting with a drop in expected growth under autarky and stocks being levered claims on output. Panel A plots stock prices without leverage, that is, with $q = 1$. Panel B plots stock prices with leverage, namely, with $q = 7$. Panel C plots model-implied bond yields with $q = 7$. All quantities are plotted for both countries as a function of global log output.

A4. Theory and Data: Inequality

In this section, we expand on the discussion of inequality in Section 4.1 in the paper. We first present the counterpart of Figure 7 in the paper, replacing wealth inequality with capital income inequality. Then we describe all of our inequality data.

A4.1. Capital Income Inequality

This figure is the counterpart of Figure 7 in the paper, except for capital income inequality:

Figure A8. Top Capital Income Shares and Their Ratios: Data vs. Model. Panel A plots the annual time series of the top 1% capital income share in the U.S. Panel B plots the time series of top capital income share ratios, namely top 1% to top 10% (solid line) and top 0.1% to top 1% (dashed line), in the U.S. Both series are based on pre-tax capital income from the World Inequality Database. Panels C and D plot analogous quantities for equilibrium capital income shares generated under the expected path from our model.

A4.2. Description of Inequality Data

Below, we describe the data we use to measure income inequality, wealth inequality, and capital income inequality. All three series come from the World Inequality Database.

Income inequality—We use top income inequality shares for the U.S., based on post-tax national income (adults over age 20 and equal split adults, i.e., income divided equally among spouses). Post-tax income is equal to pre-tax income after subtracting all taxes and adding all forms of government spendingcash transfers, in-kind transfers, and collective consumption expenditures.

Wealth inequality—We use top wealth inequality shares for the U.S., based on net personal wealth. Net personal wealth is the total value of non-financial and financial assets (housing, land, deposits, bonds, equities, etc.) held by households, minus their debts. The wealth inequality measure is constructed by using the income capitalization methodology of Saez and Zucman (2016). The version we use incorporates the methodological improvements described in Saez and Zucman (2020). The wealth shares are based on adults over age 20 and an equal split. The series are available for the period 1962–2019.

Capital income inequality—We use top capital income inequality shares for the U.S., based on pre-tax capital income. Pre-tax capital income is the sum of all pretax personal income flows accruing to the individual owners of capital as a production factor, before taking into account the operation of the tax/transfer system, but after taking into account the operation of pension system. The central difference between personal factor income and pretax income is the treatment of pensions, which are counted on a contribution basis by factor income and on a distribution basis by pretax income. The capital income measure is constructed using the procedure described in Piketty, Saez and Zucman (2018). The capital income shares are based on adults over age 20 and an equal split. The series are available for the period 1962-2014. There are missing values for all variables in the years 1963 and 1965. For both years, we fill missing values by carrying forward the previous observation.

A5. Data: Cross-Country Election Analysis

In this section we fill in some details regarding the data used in our cross-country election-based analysis. The scoring used in the 2014 Chapel Hill Survey of Experts is as follows:

1. NATIONALISM: Position towards nationalism.
   0 = Strongly promotes cosmopolitan rather than nationalist conceptions of society
   10 = Strongly promotes nationalist rather than cosmopolitan conceptions of society

2. IMMIGRATE_POLICY: Position on immigration policy.
   0 = Strongly opposed tough policy
   10 = Strongly favors tough policy

3. ANTIELITE_SALIENCE: Salience of anti-establishment and anti-elite rhetoric.
   0 = Not Important at all
   10 = Extremely Important

We match the timing of the independent variables to the timing of the election. For an election in a given country-year, we measure inequality, trade balance, and financial development in the same country-year. If the same-year value is unavailable, we use the prior-year value. If financial development is unavailable for both years, we record it as missing. If inequality is unavailable for both years, we go farther back in time until we find a non-missing value. This approach is motivated by the high persistence of the inequality series. We do not have to go much farther back—our oldest Gini coefficient is from 2014, and our oldest top 10% share is from 2013.

A6. Data: International Social Survey Programme (ISSP)

This survey covers the following countries: Belgium, Switzerland, Czech Republic, Germany, Denmark, Estonia, Spain, Finland, France, Great Britain, Georgia, Croatia, Hungary, Ireland, Israel, India, Iceland, Japan, South Korea, Lithuania, Latvia, Mexico, Norway, Philippines, Portugal, Russian Federation, Sweden, Slovenia, Slovakia, Turkey, Taiwan, United States, and South Africa. We only use data for OECD countries as of 2013, which implies that we exclude Croatia, Georgia, Latvia, Lithuania, the Philippines, Russia, South Africa, and Taiwan.

National Identity insets are available in 2013, 2003, and 1995. We use the 2013 inset.

When we match the country-level protectionism scores to our data on inequality, financial development, and trade balance, we use the 2013 values of these variables to match the year of the ISSP survey. If the 2013 value of financial development is missing, we take the most recent value since 2010; if all values since 2010 are missing, we record financial development as missing. For inequality, we go as far back as necessary to find a non-missing observation. Our oldest top 10% share observation is from 2008; our oldest Gini coefficient is from 2012.

The question we focus on, "Country should limit the import of foreign products," is question 5a. Individual responses in the database are on the scale of 1 to 5, with 1 indicating "agree strongly" and 5 indicating "disagree strongly." We flip the original numerical ranking so that higher response values indicate a stronger anti-globalization attitude. That is, in our data, 5 indicates "agree strongly" and 1 indicates "disagree strongly."

The full list of questions asked in the national identity survey:

- **Q1a-d** Identification with [City/ County/ Country/ Continent]
- **Q2a-h** What is important to be (NATIONALITY)
- **Q3a-h** Attitudes towards own nation
- **Q4a-j** Proud of national and political achievements
- **Q5a-e** Views on national versus international issues, attitudes towards rights of foreigners
- **Q6a-e** Views on national versus international issues
- **Q7 a/b** Attitudes towards foreign cultural presence
- **Q8** Maintain traditions – adapt in society
- **Q9a-h** Attitudes towards foreigners and their rights
- **Q10** Number of immigrants increase to country
- **Q11** Statements about immigrants and [Country's] culture

- **Q12** How proud are you of being [Country Nationality]
- **Q13a-d** Impact of patriotic feelings on [country's unification/ intolerance/ ...]
- **Q14** Are you a citizen of [Country]
- **Q15** Parents citizens of [Country] at birth
- **Q16** Heard or read about [the European Union]
- **Q17 OPTIONAL** Benefits from being member of [the European Union]
- **Q18 OPTIONAL** [Country] should follow decisions of [the European Union]
- **Q19 OPTIONAL** EU should have more power than national government
- **Q20 OPTIONAL** EU Referendum to become new member
- **Q21 OPTIONAL** EU members: Referendum to remain member

We do not use EU-related questions because our sample contains also countries outside the EU such as Israel, Japan, Korea, Mexico, and Turkey.

A7. Evidence: Which Countries Are Populist?

This section presents additional information and empirical evidence that is mentioned but not shown in the paper.

A7.1. Political Party Positions.

Table A1 reports the positions of all political parties in our sample along four dimensions related to anti-global populism: nationalism, attitudes toward immigrants and ethnic minorities, and the salience of anti-elite rhetoric. Each number in the table is the party's score on the scale of 0 to 10, with higher values indicating a more populist stance. Each party's scores are averaged across all experts evaluating this party in the 2014 Chapel Hill Survey.

A7.2. Alternative Populism Definition: Anti-Ethnic-Minority Parties.

Figure A9 is the counterpart of the vote share figures in the paper, except that it defines populist parties as anti-ethnic-minority (as opposed to nationalist, anti-immigrant, or anti-elite). Analogous to the other three definitions of populist parties, we classify a party as populist if its average score for the position towards ethnic minorities is at least six. The scoring used by the experts in the survey is on the scale of 0 to 10 as follows:

0 = Strongly supports more rights for ethnic minorities

10 = Strongly opposes more rights for ethnic minorities

A7.3. Alternative Election Set: Excluding European Parliament Elections.

Figures A10 through A12 are the counterparts of the corresponding vote share figures in the paper, except that they do not use the results from European Parliament elections. In other words, they use the results from national elections only.

A7.4. Alternative Election Set: Excluding National Elections.

Figures A13 through A15 are the counterparts of the corresponding vote share figures in the paper, except that they do not use the results from national elections. In other words, they use the results from European Parliament elections only.

A7.5. Alternative Election Set: Excluding the U.S.

Figures A16 through A18 are the counterparts of the corresponding vote share figures in the paper, except that they exclude the results from the U.S. elections. Similarly, Figures A19 through A24 are the counterparts of the corresponding vote share figures in Sections A7.3. and A7.4. of this Appendix, except that they exclude the results from the U.S. elections.

A7.6. Alternative Measures of Financial Development.

Figures A25 through A27 are the counterparts of Panels D of the vote share figures in the paper, except that they replace stock market capitalization / GDP by three other measures of financial development. Figure A28 does the same for the survey figure in the paper. The three alternative measures are:

- Private credit / GDP
  - Private credit by deposit money banks and other financial institutions, divided by GDP
- Stock market trading volume / GDP
  - Also known as stock value traded, divided by GDP
- The sum of stock and bond market capitalizations / GDP
  - Calculated by adding the following three series:
    - Private Bond Market Capitalization / GDP
    - Public Bond Market Capitalization / GDP
    - Stock Market Capitalization / GDP

All measures of financial development are taken from the World Bank's Financial Development and Structure database. As of this writing, this database was most recently revised in June 2017 and contains cross-country data from 1960 to 2015. All variables are in percentage terms.

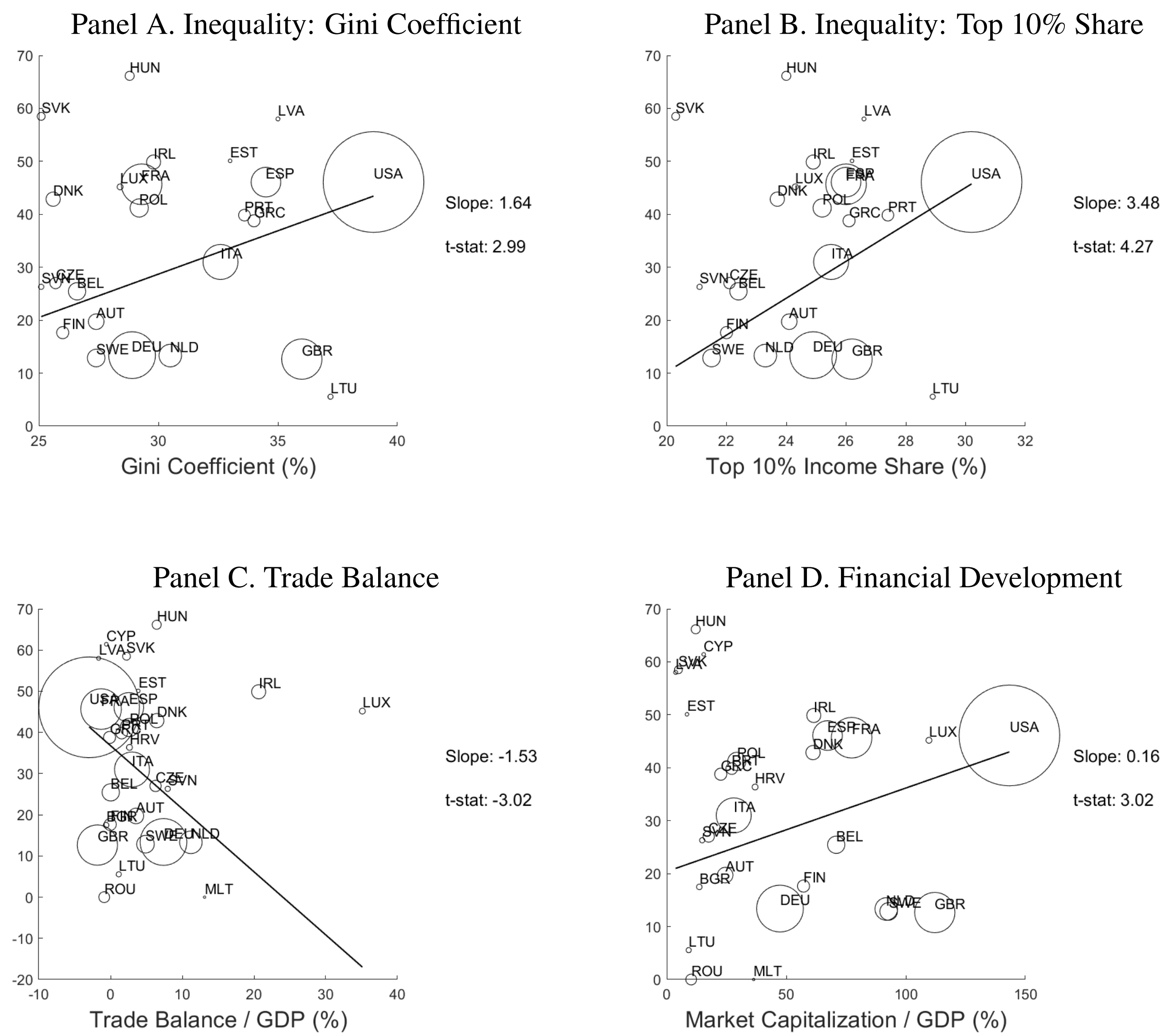


Figure A9. Vote Share of Anti-Ethnic-Minority Parties. This figure plots the election vote share of the parties we classify as anti-ethnic-minority, in percent. For each country, we use either the most recent national parliamentary election as of January 1, 2017 or the same country's May 2014 European Parliament election, whichever occurs later. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

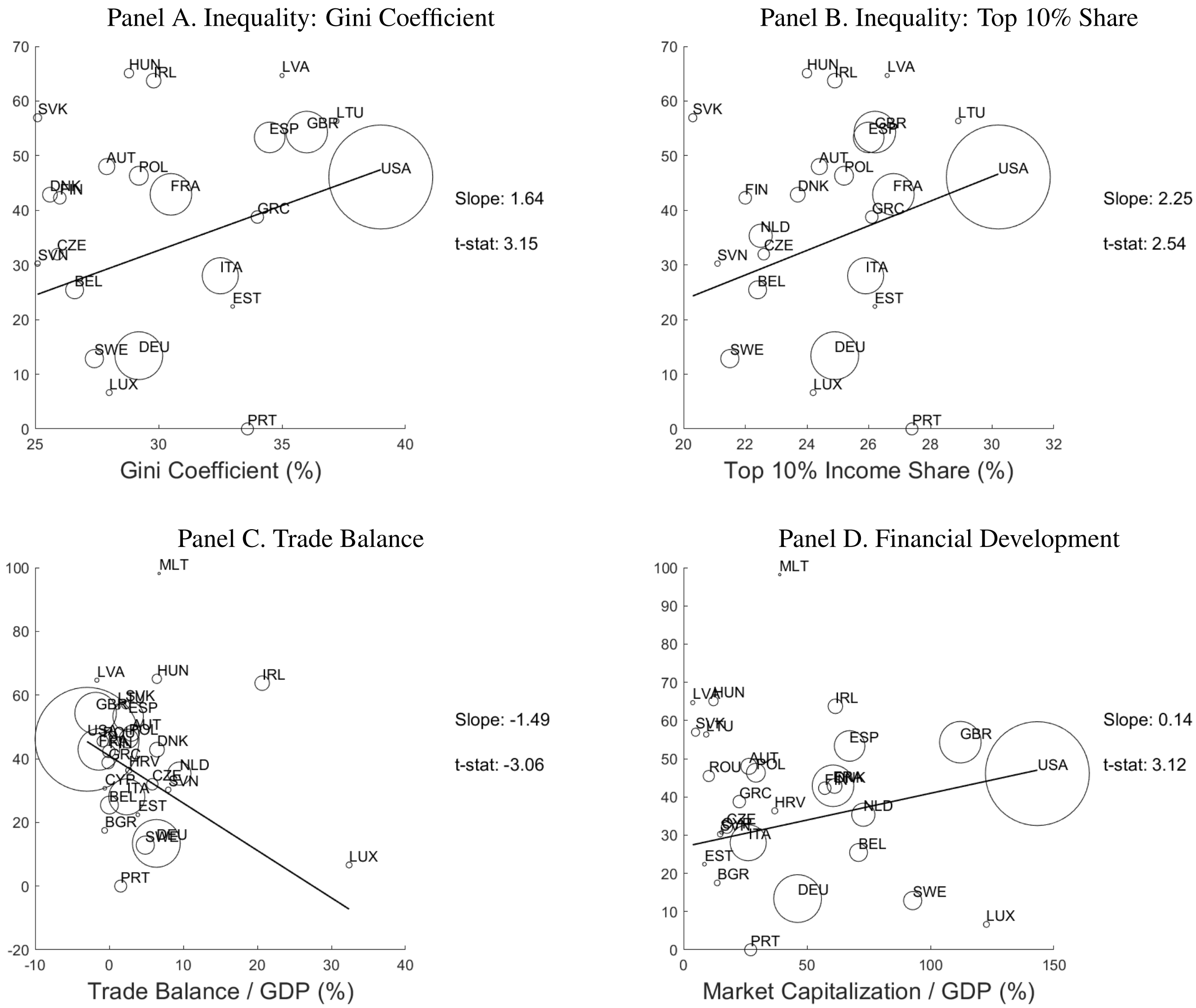


Figure A10. Vote Share of Nationalist Parties: National Elections Only. This figure plots the election vote share of the parties we classify as nationalist, in percent. For each country, we use the most recent national parliamentary election as of January 1, 2017. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

Figure A11. Vote Share of Anti-Immigrant Parties: National Elections Only. This figure plots the election vote share of the parties we classify as anti-immigrant, in percent. For each country, we use the most recent national parliamentary election as of January 1, 2017. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

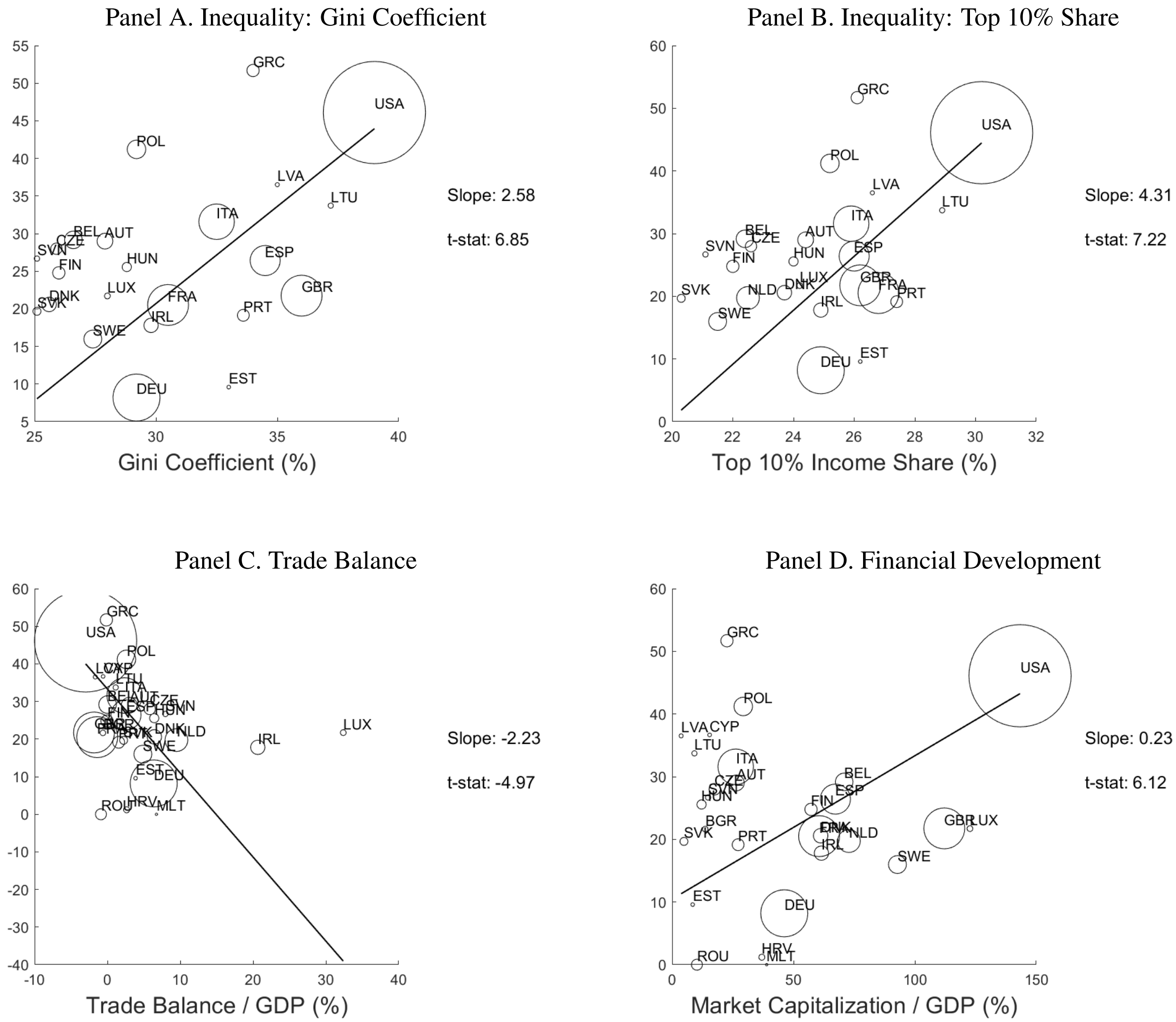


Figure A12. Vote Share of Anti-Elite Parties: National Elections Only. This figure plots the election vote share of the parties we classify as anti-elite, in percent. For each country, we use the most recent national parliamentary election as of January 1, 2017. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

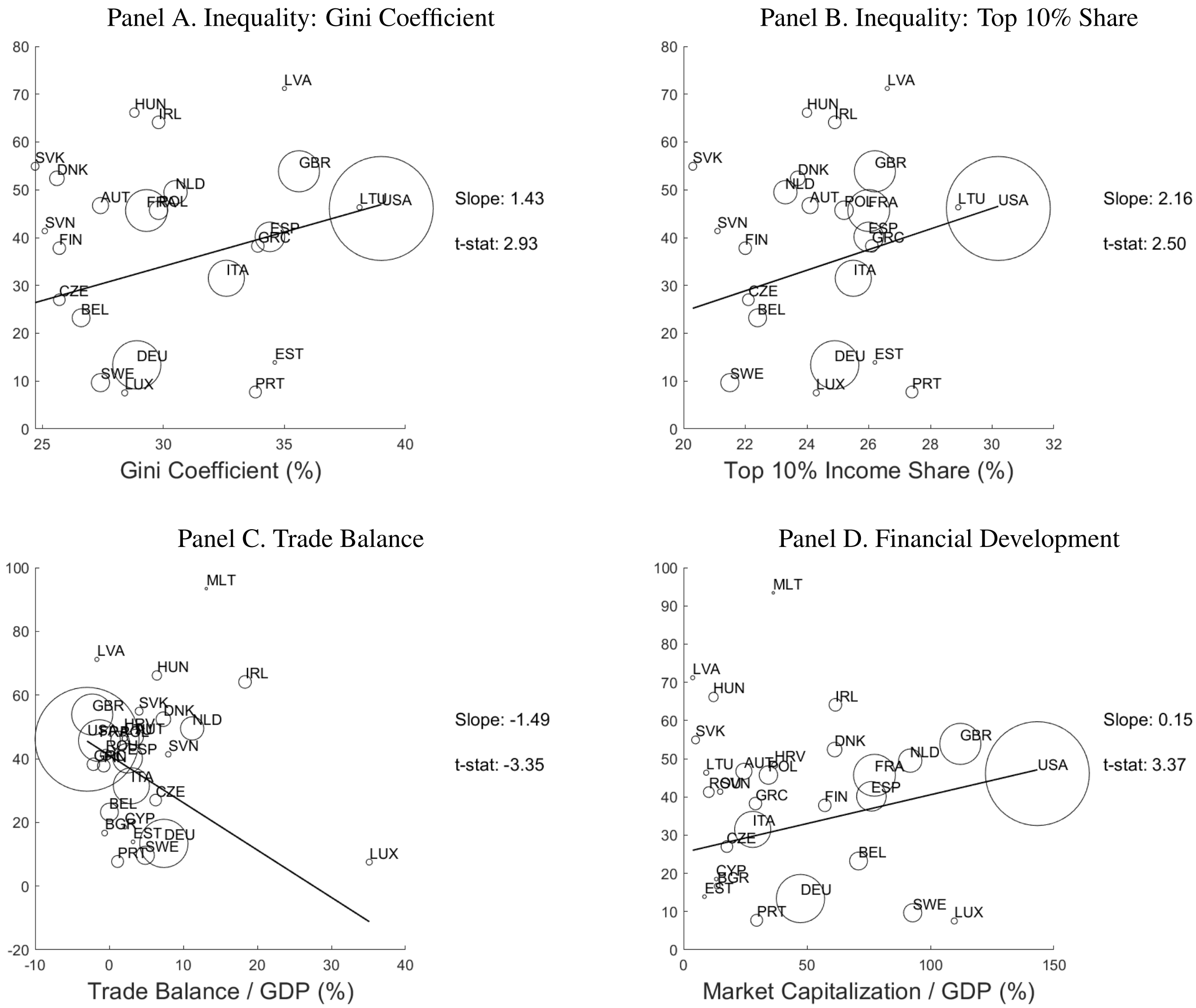


Figure A13. Vote Share of Nationalist Parties: European Parliament Elections Only. This figure plots the election vote share of the parties we classify as nationalist, in percent. For each European country, we use its May 2014 European Parliament election. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

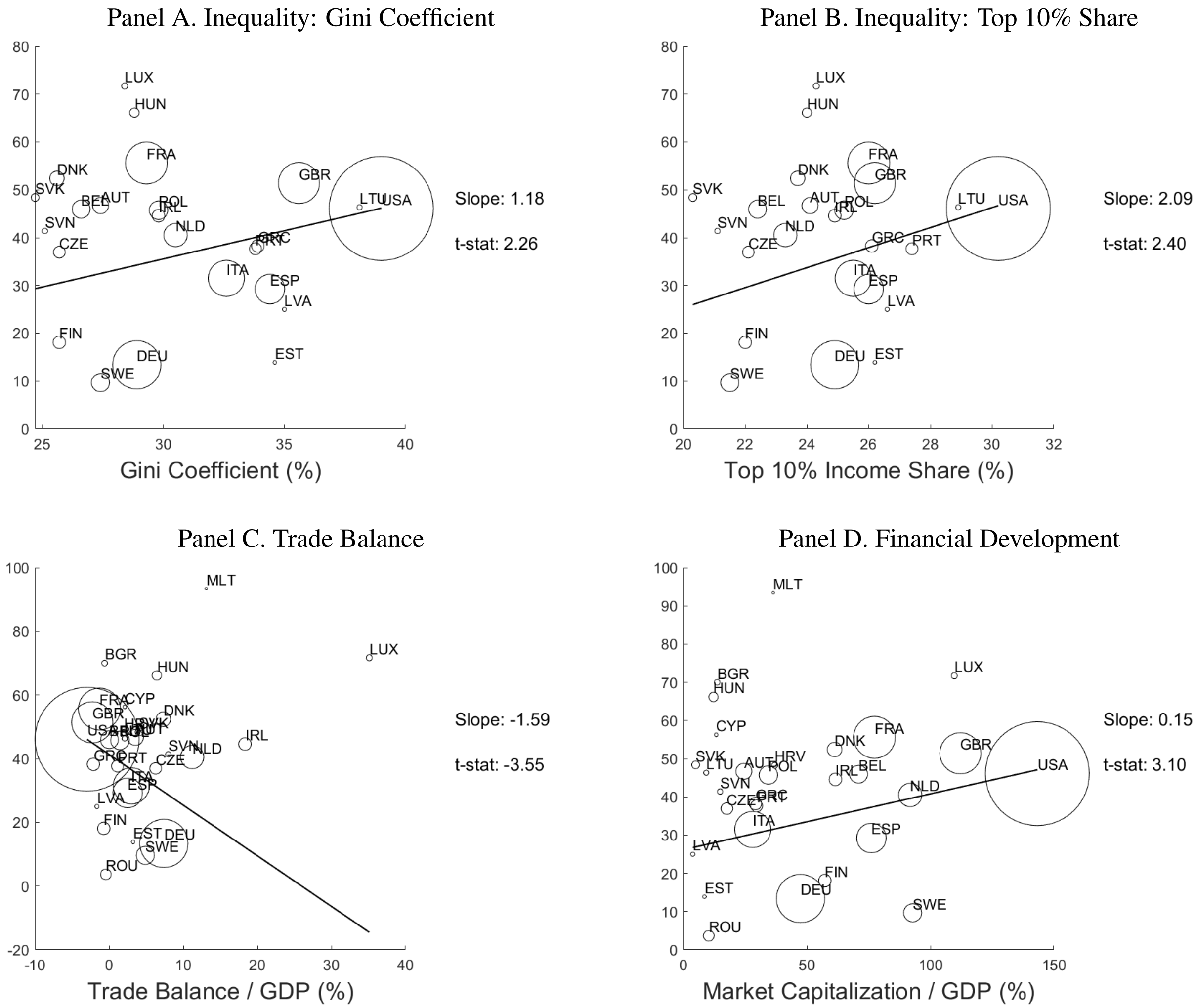


Figure A14. Vote Share of Anti-Immigrant Parties: European Parliament Elections Only. This figure plots the election vote share of the parties we classify as anti-immigrant, in percent. For each European country, we use its May 2014 European Parliament election. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

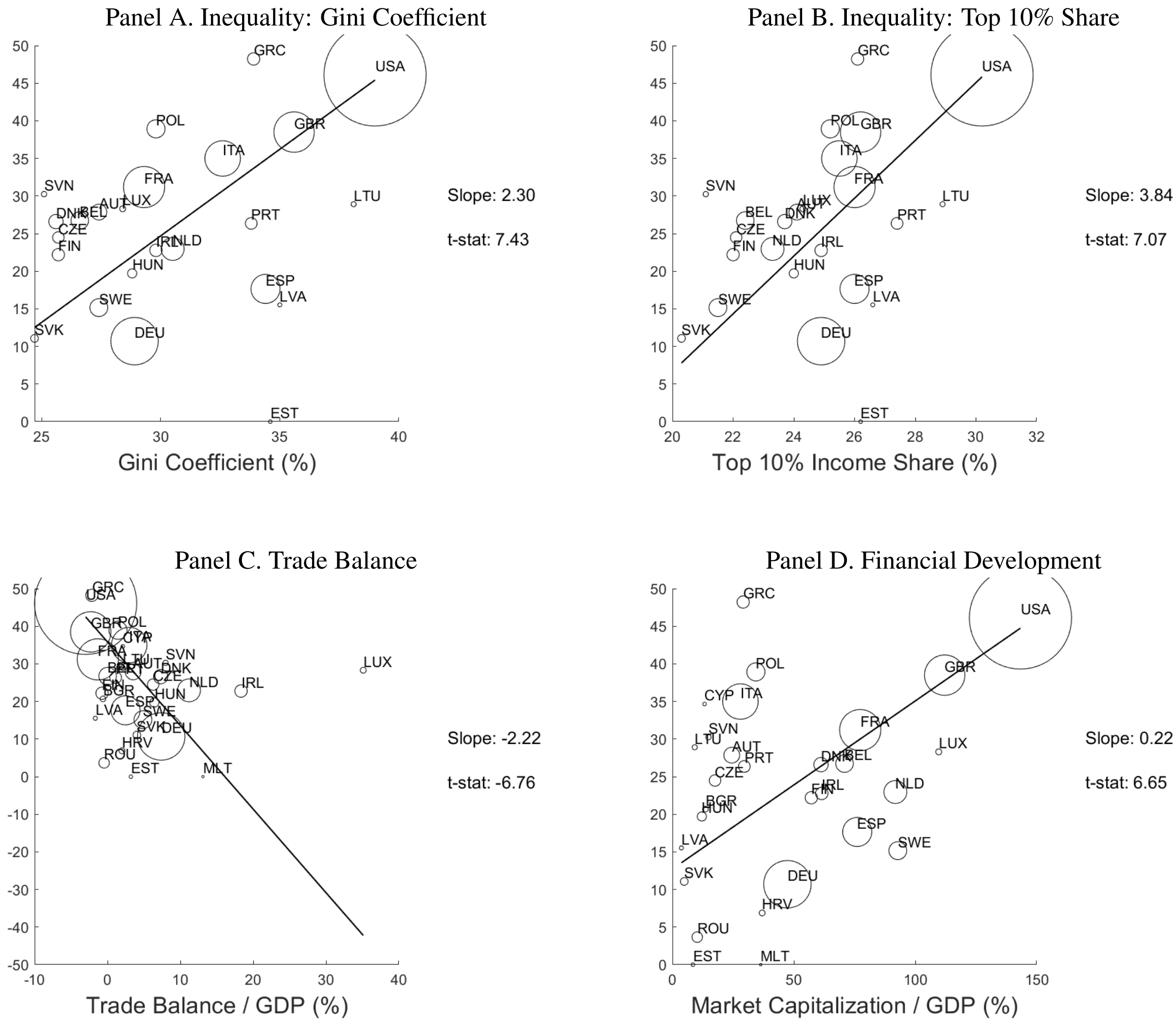


Figure A15. Vote Share of Anti-Elite Parties: European Parliament Elections Only. This figure plots the election vote share of the parties we classify as anti-elite, in percent. For each European country, we use its May 2014 European Parliament election. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

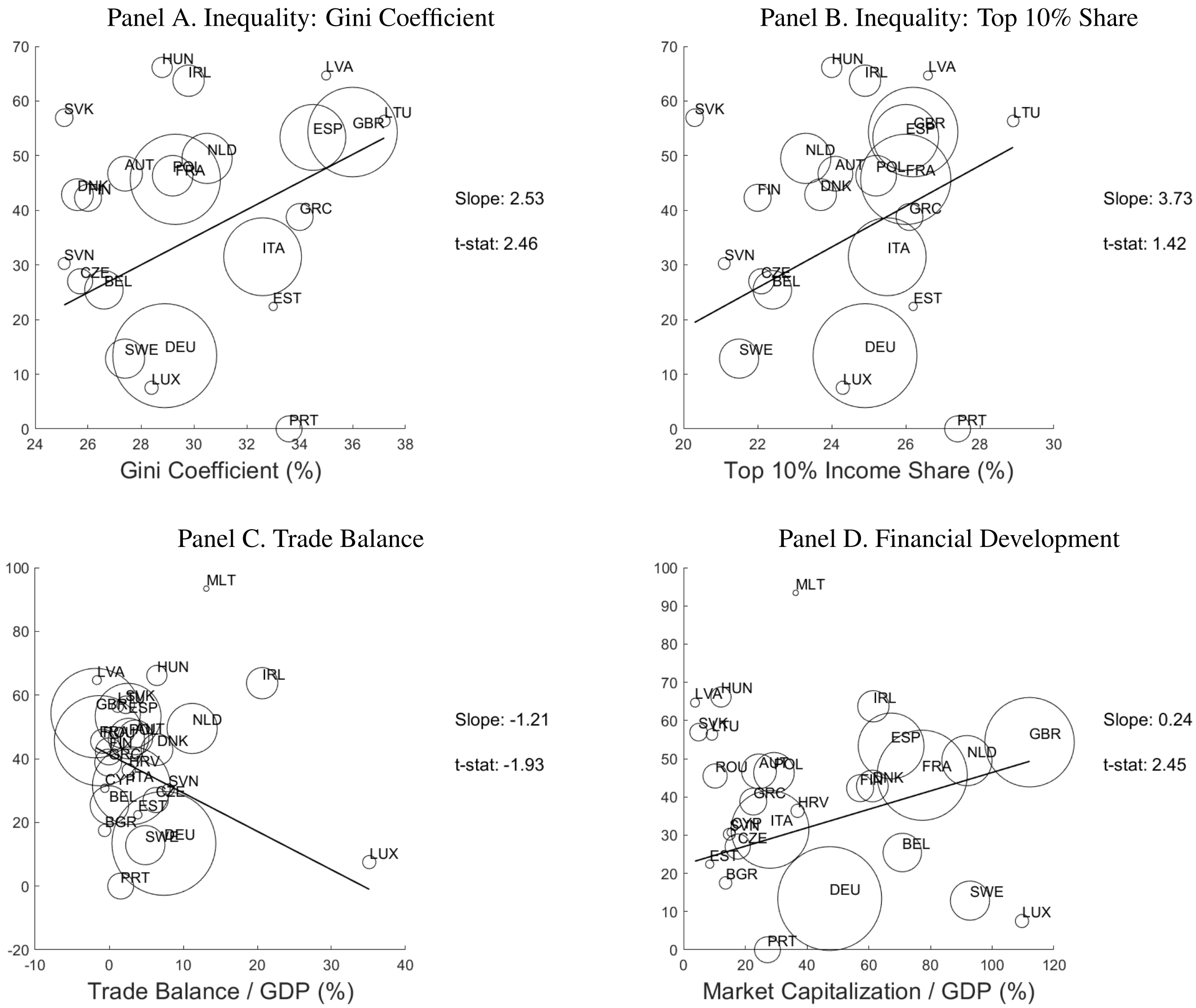


Figure A16. Vote Share of Nationalist Parties. Excluding the U.S. This figure plots the election vote share of the parties we classify as nationalist, in percent. For each country, we use either the most recent national parliamentary election as of January 1, 2017 or the same country's May 2014 European Parliament election, whichever occurs later. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

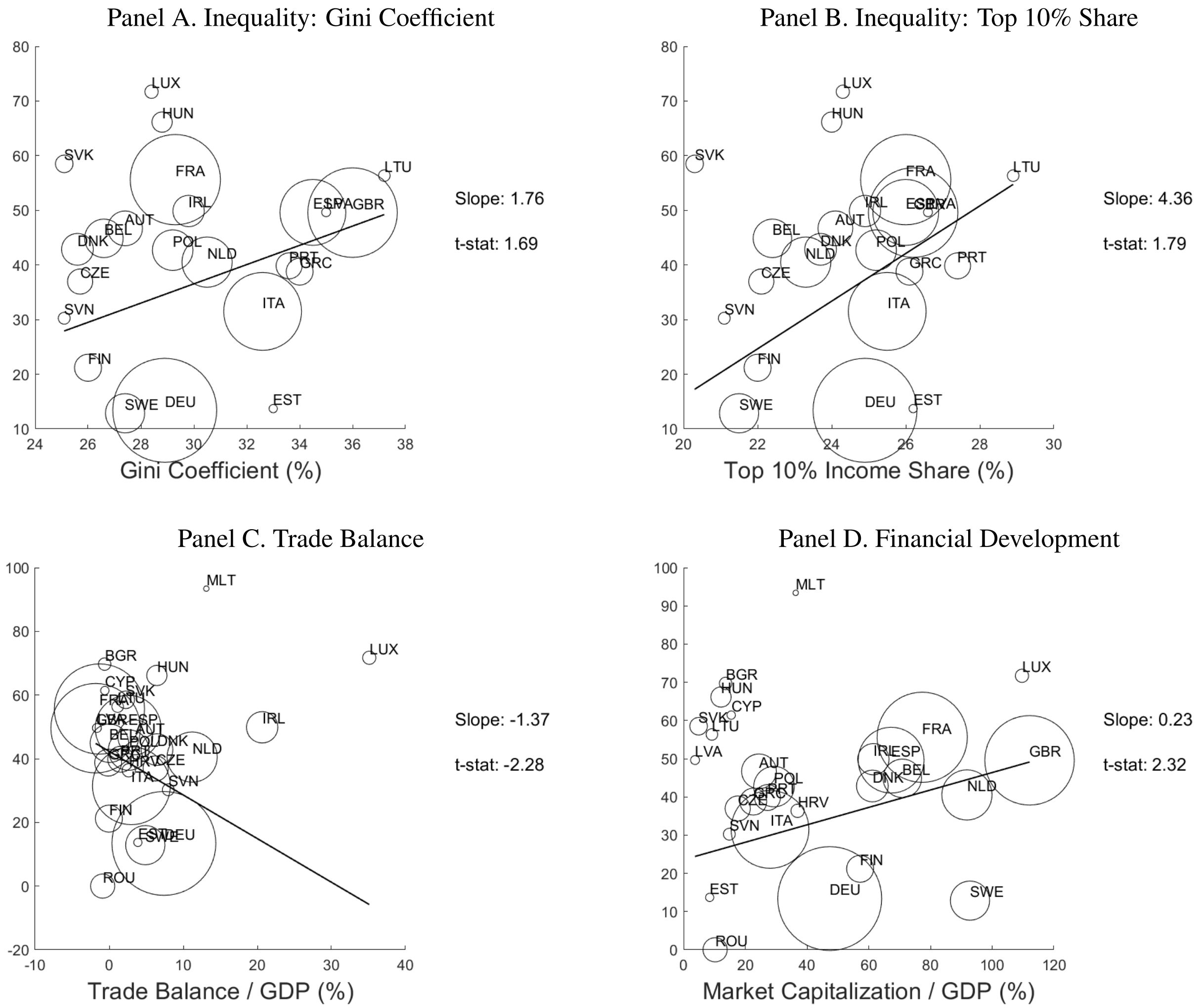


Figure A17. Vote Share of Anti-Immigrant Parties. Excluding the U.S. This figure plots the election vote share of the parties we classify as anti-immigrant, in percent. For each country, we use either the most recent national parliamentary election as of January 1, 2017 or the same country's May 2014 European Parliament election, whichever occurs later. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

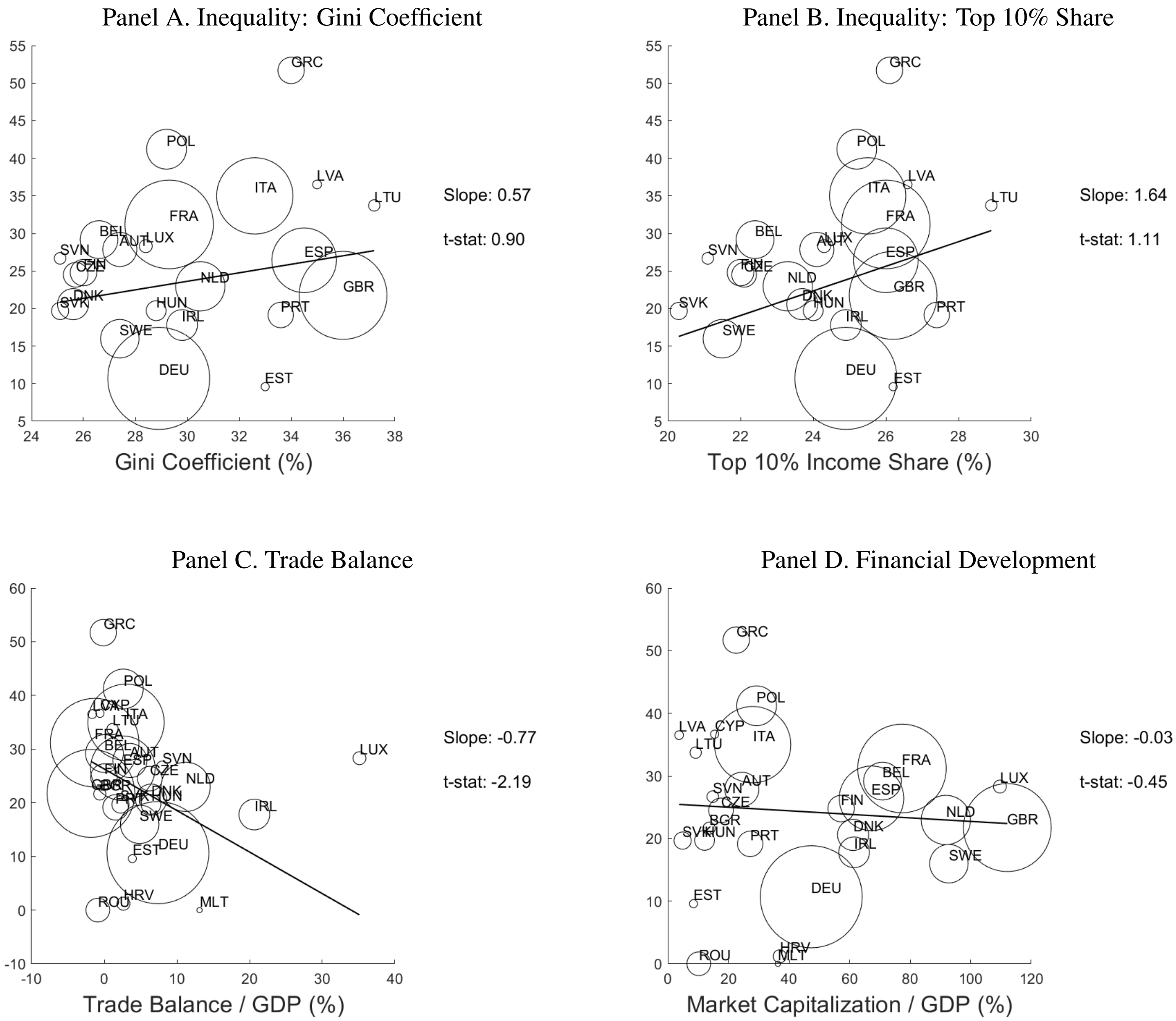


Figure A18. Vote Share of Anti-Elite Parties. Excluding the U.S. This figure plots the election vote share of the parties we classify as anti-elite, in percent. For each country, we use either the most recent national parliamentary election as of January 1, 2017 or the same country's May 2014 European Parliament election, whichever occurs later. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

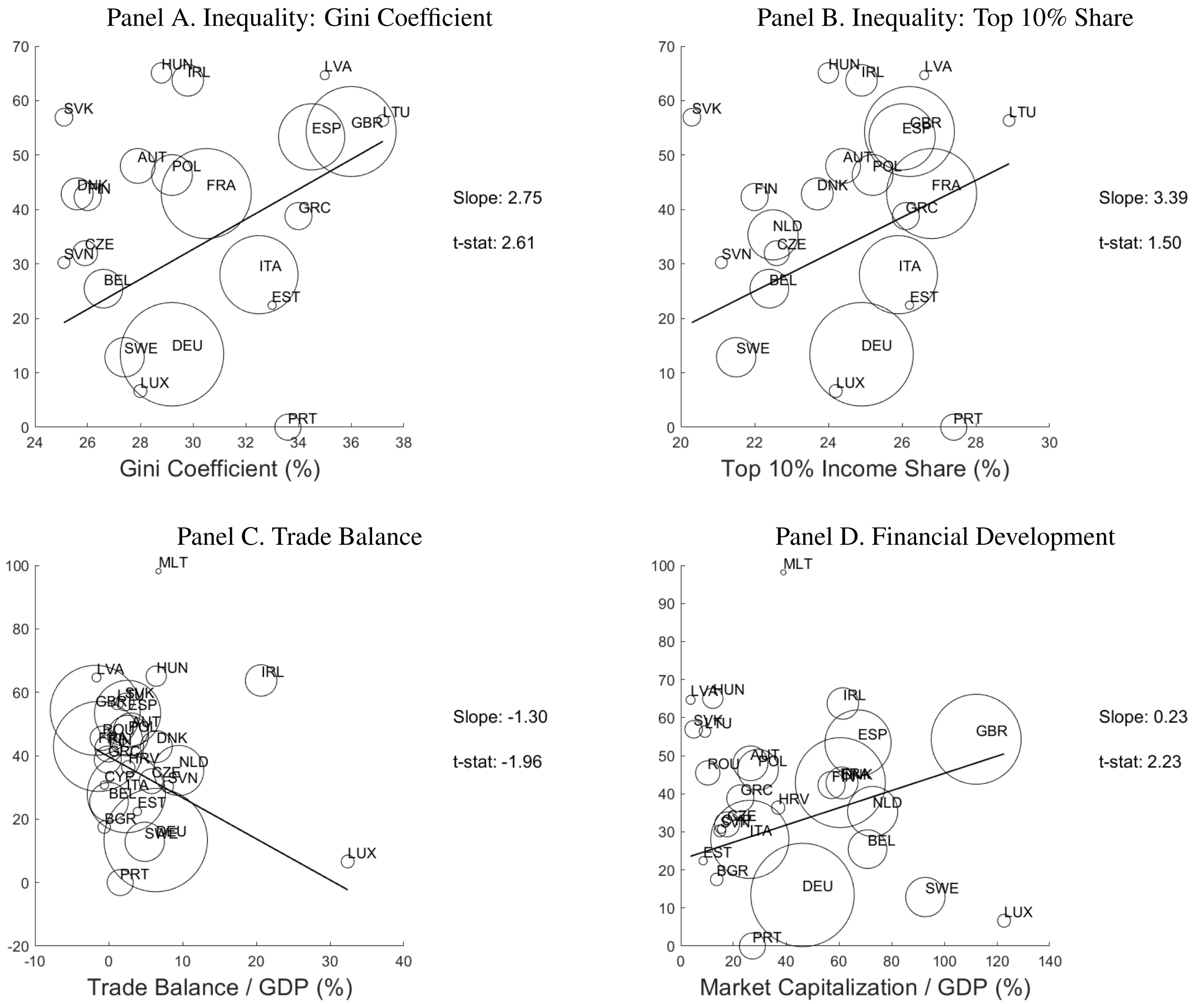


Figure A19. Vote Share of Nationalist Parties: National Elections Only. Excluding the U.S. This figure plots the election vote share of the parties we classify as nationalist, in percent. For each country, we use the most recent national parliamentary election as of January 1, 2017. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

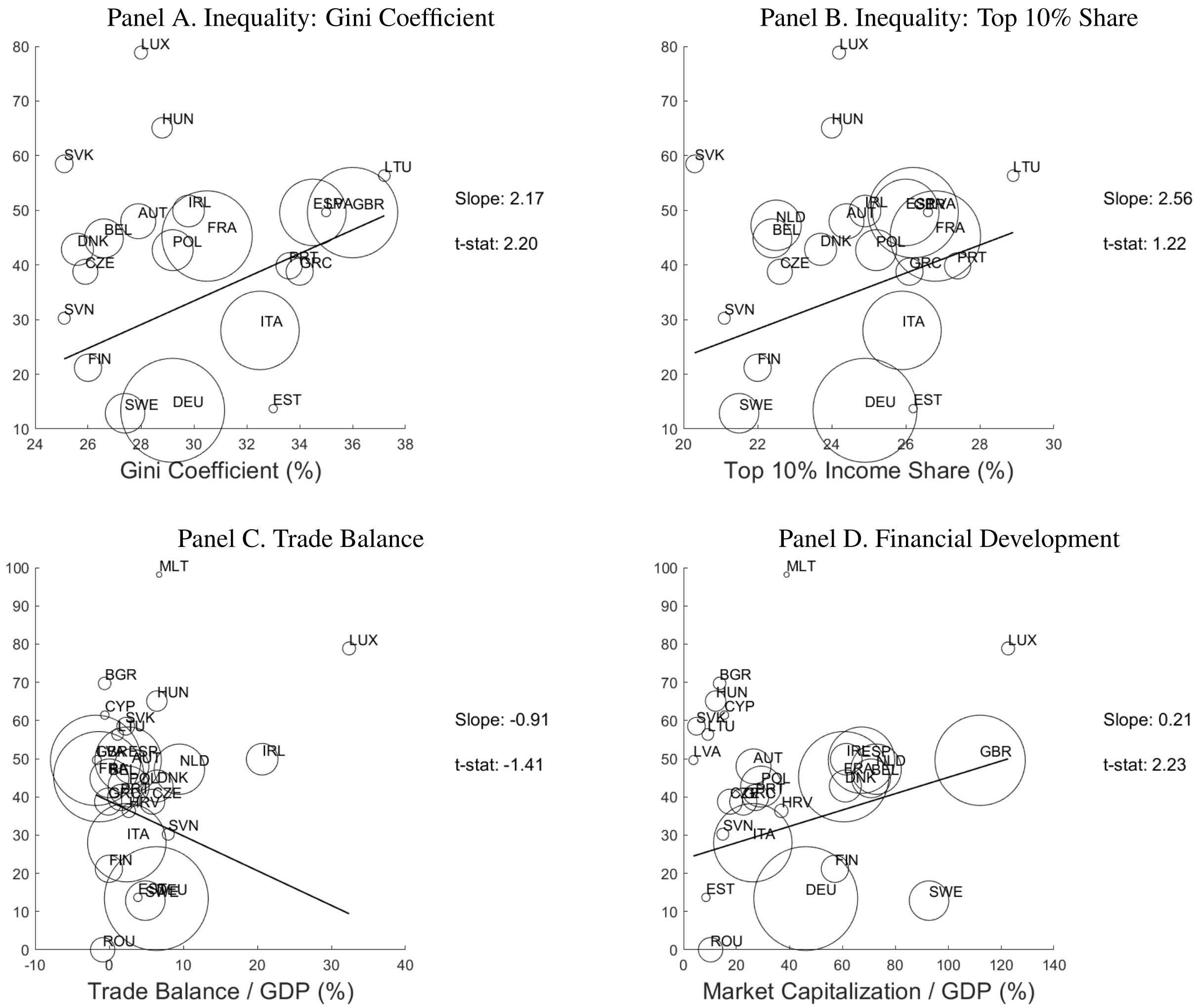


Figure A20. Vote Share of Anti-Immigrant Parties: National Elections Only. Excluding the U.S. This figure plots the election vote share of the parties we classify as anti-immigrant, in percent. For each country, we use the most recent national parliamentary election as of January 1, 2017. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

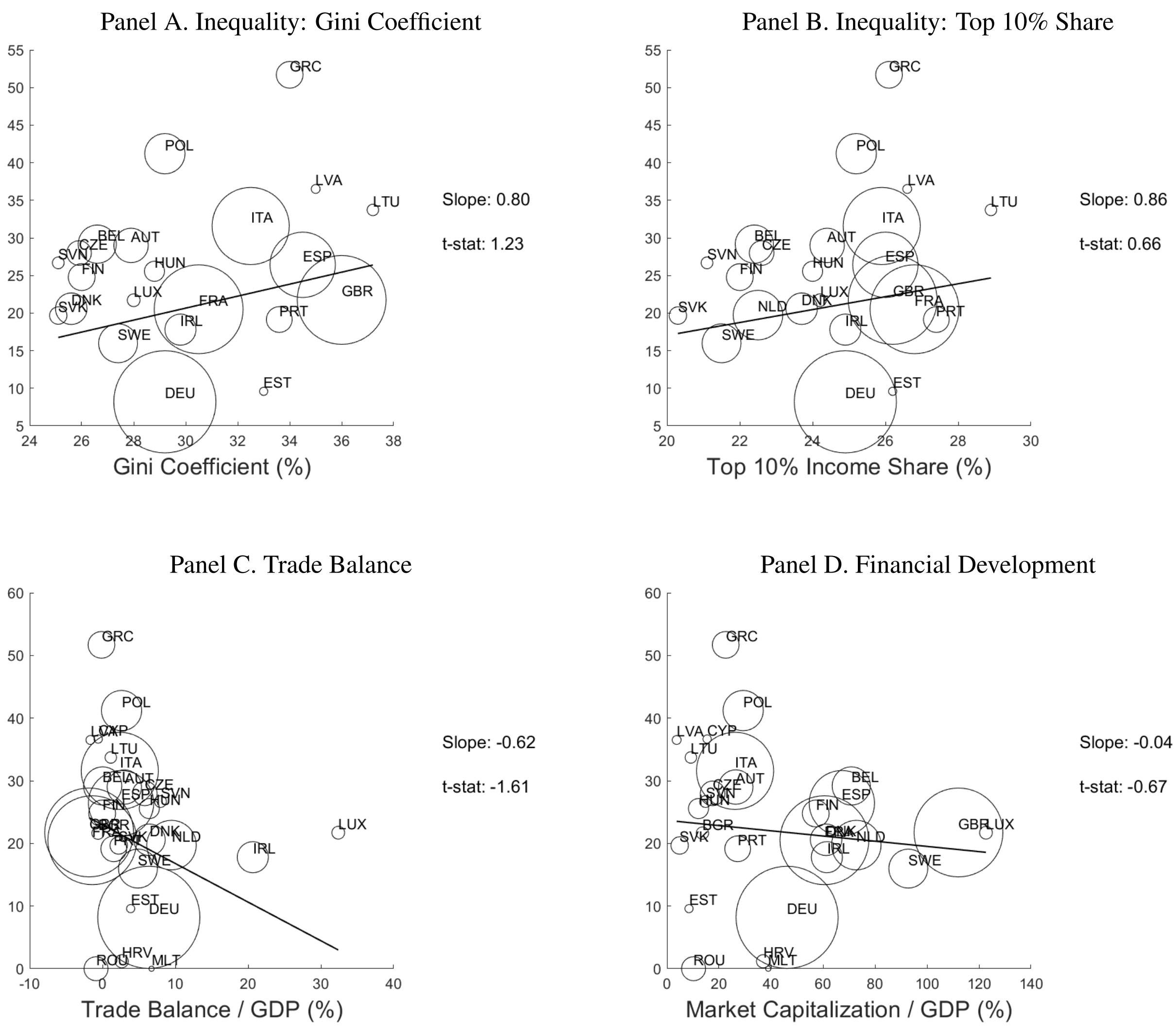


Figure A21. Vote Share of Anti-Elite Parties: National Elections Only. Excluding the U.S. This figure plots the election vote share of the parties we classify as anti-elite, in percent. For each country, we use the most recent national parliamentary election as of January 1, 2017. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

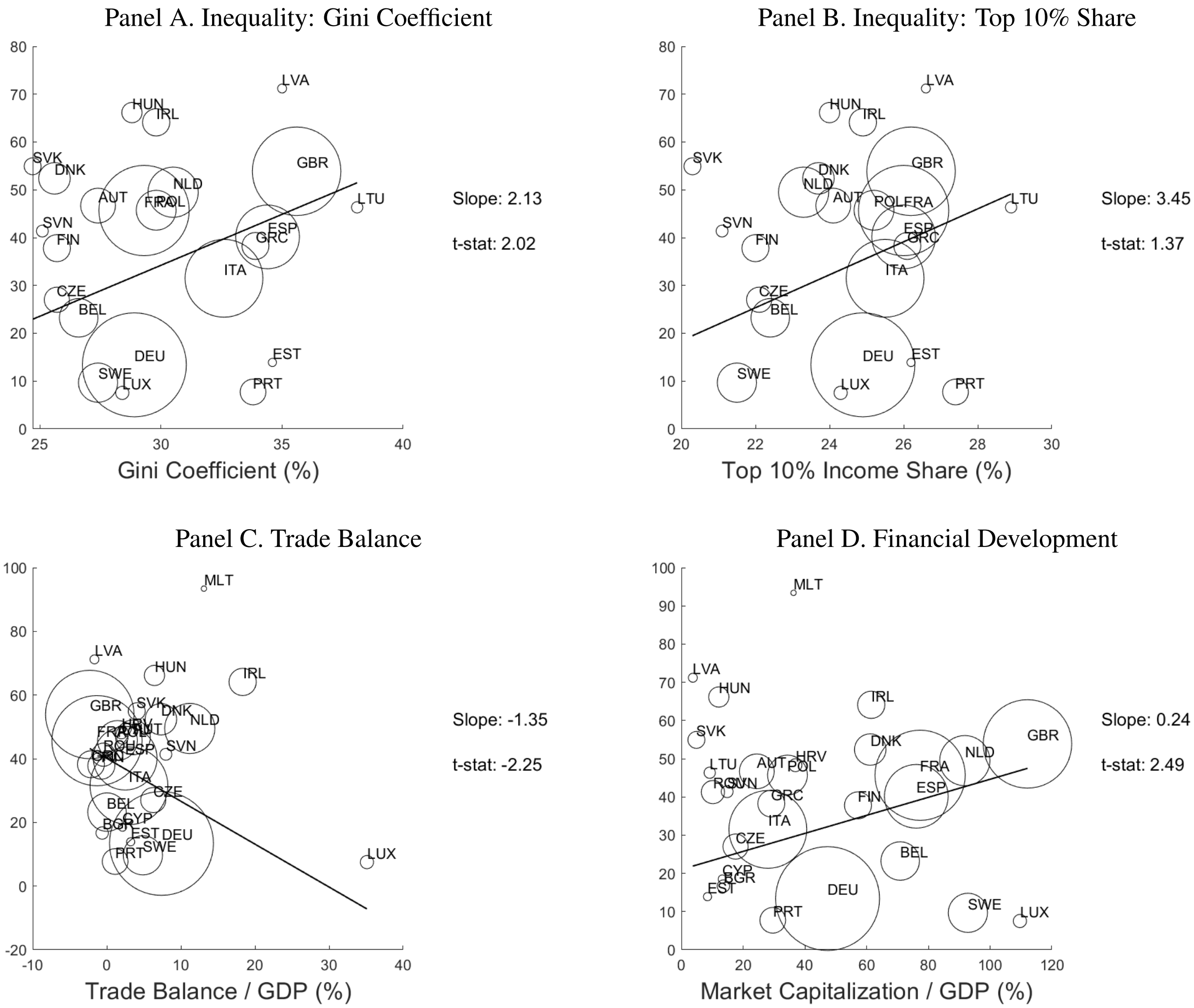


Figure A22. Vote Share of Nationalist Parties: European Parliament Elections Only. Excluding the U.S. This figure plots the election vote share of the parties we classify as nationalist, in percent. For each European country, we use its May 2014 European Parliament election. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

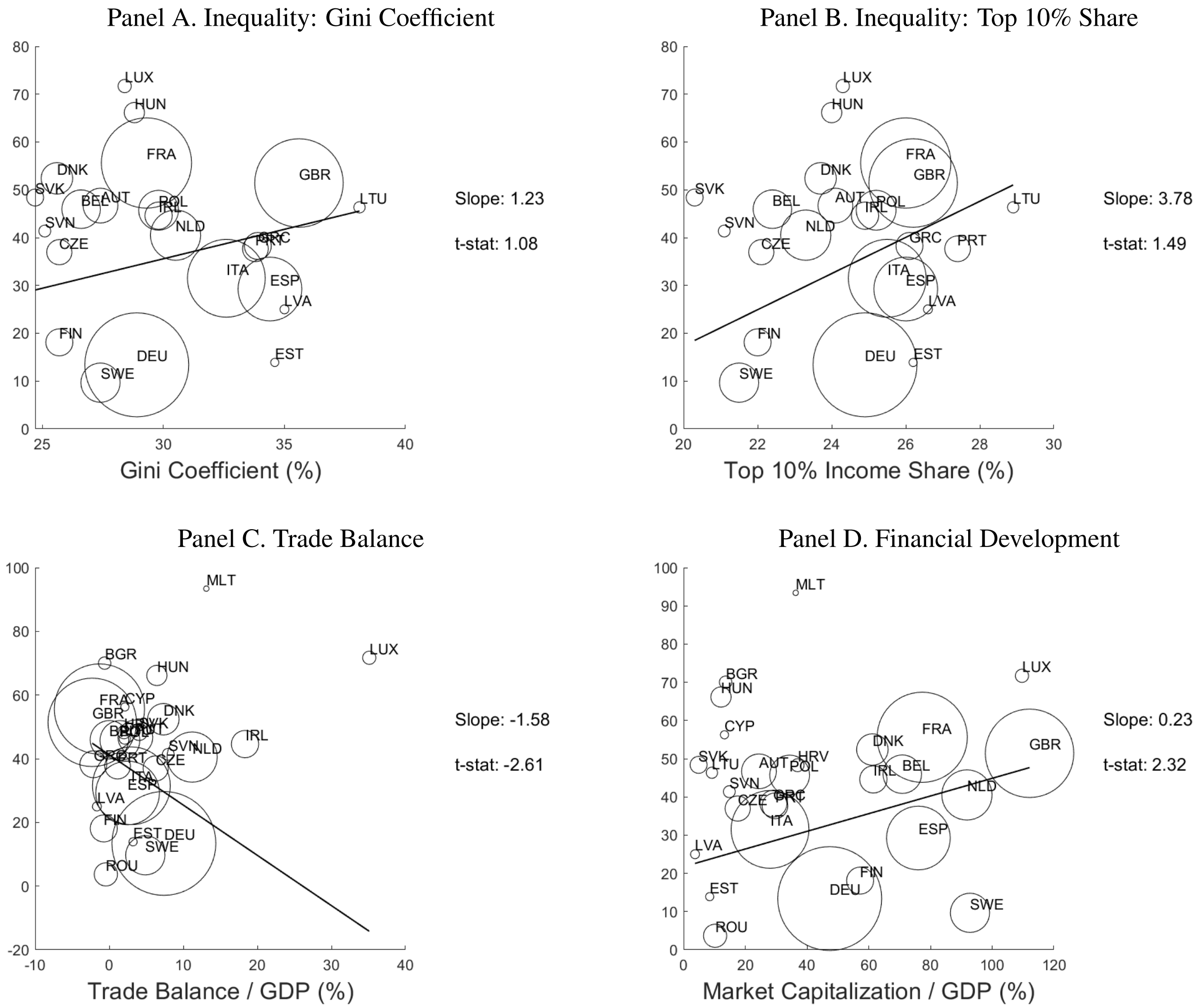


Figure A23. Vote Share of Anti-Immigrant Parties: European Parliament Elections Only. Excluding the U.S. This figure plots the election vote share of the parties we classify as anti-immigrant, in percent. For each European country, we use its May 2014 European Parliament election. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

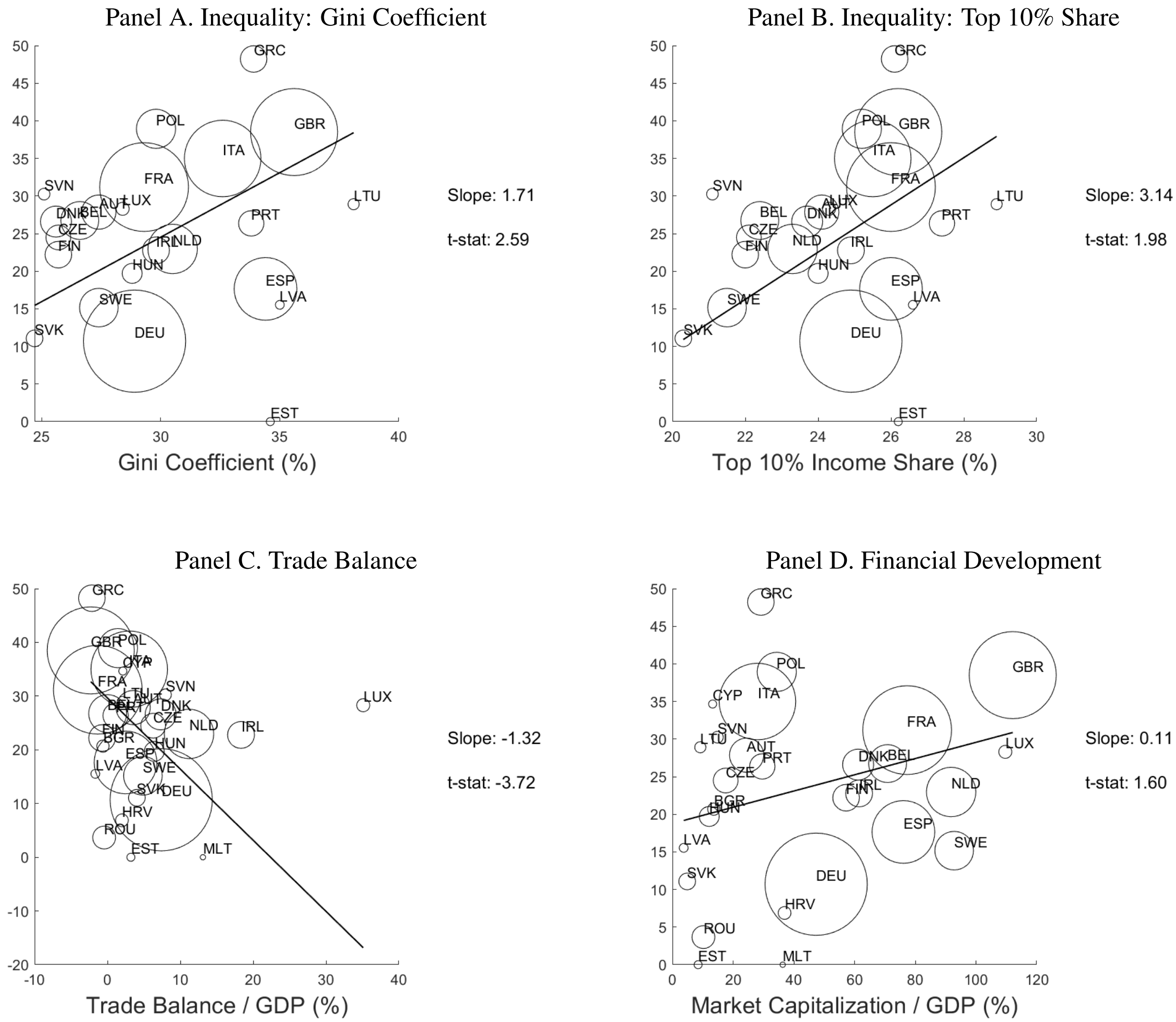


Figure A24. Vote Share of Anti-Elite Parties: European Parliament Elections Only. Excluding the U.S. This figure plots the election vote share of the parties we classify as anti-elite, in percent. For each European country, we use its May 2014 European Parliament election. The vote share is plotted against country-level measures of the Gini coefficient of disposable net income (Panel A), the share of income going to the top 10% of earners (Panel B), trade balance as a fraction of GDP (Panel C), and the ratio of stock market capitalization to GDP (Panel D). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression. The U.S. is excluded from the sample.

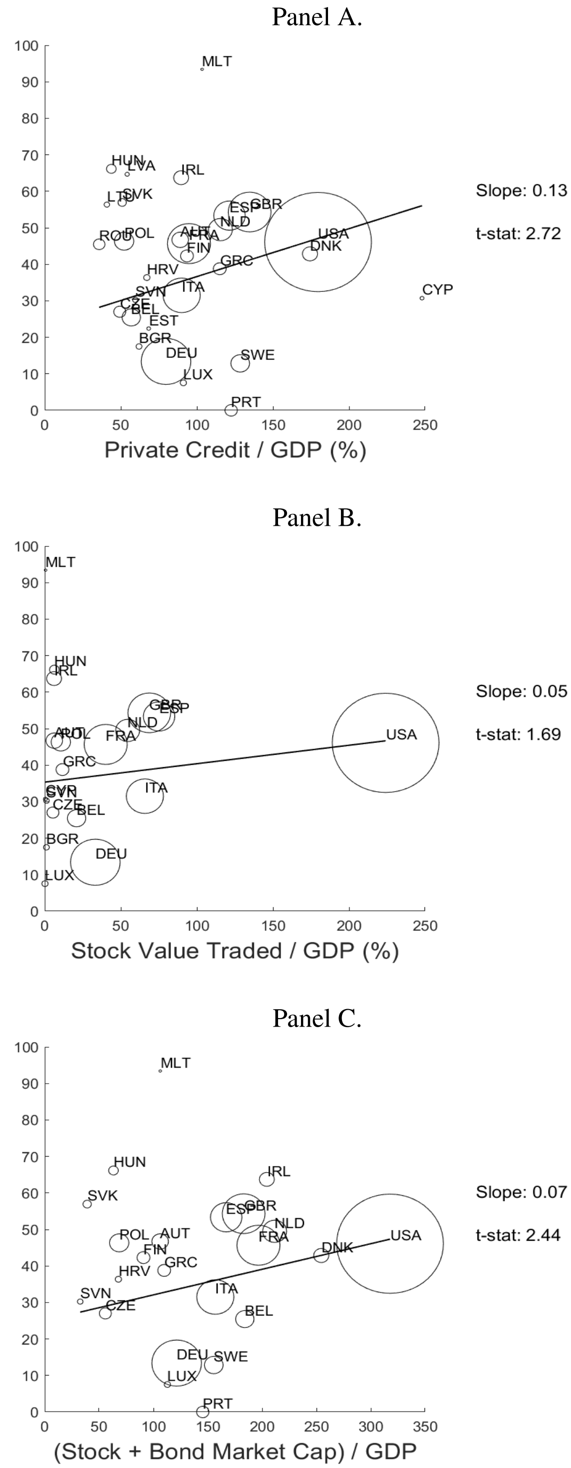
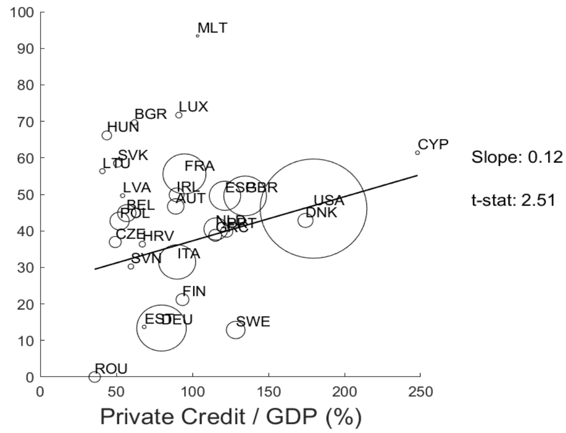
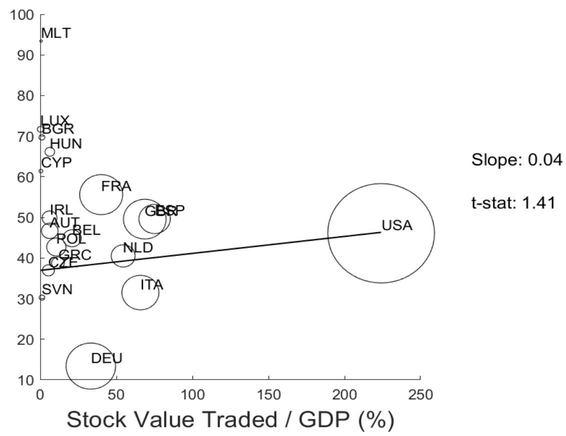


Figure A25. Vote Share of Nationalist Parties: Other Measures of Financial Development. This figure plots the election vote share of the parties we classify as nationalist, in percent. The vote share is plotted against three alternative country-level measures of financial development: private credit to GDP (Panel A), stock market trading volume to GDP (Panel B), and the sum of stock and bond market capitalizations to GDP (Panel C). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

Panel A.



Panel B.



Panel C.

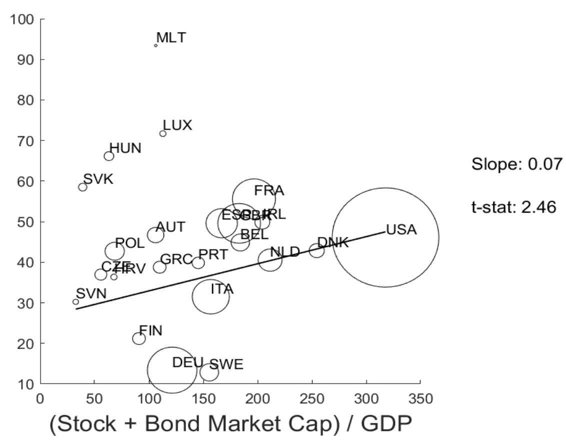


Figure A26. Vote Share of Anti-Immigrant Parties: Other Measures of Financial Development. This figure plots the election vote share of the parties we classify as anti-immigrant, in percent. The vote share is plotted against three alternative country-level measures of financial development: private credit to GDP (Panel A), stock market trading volume to GDP (Panel B), and the sum of stock and bond market capitalizations to GDP (Panel C). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

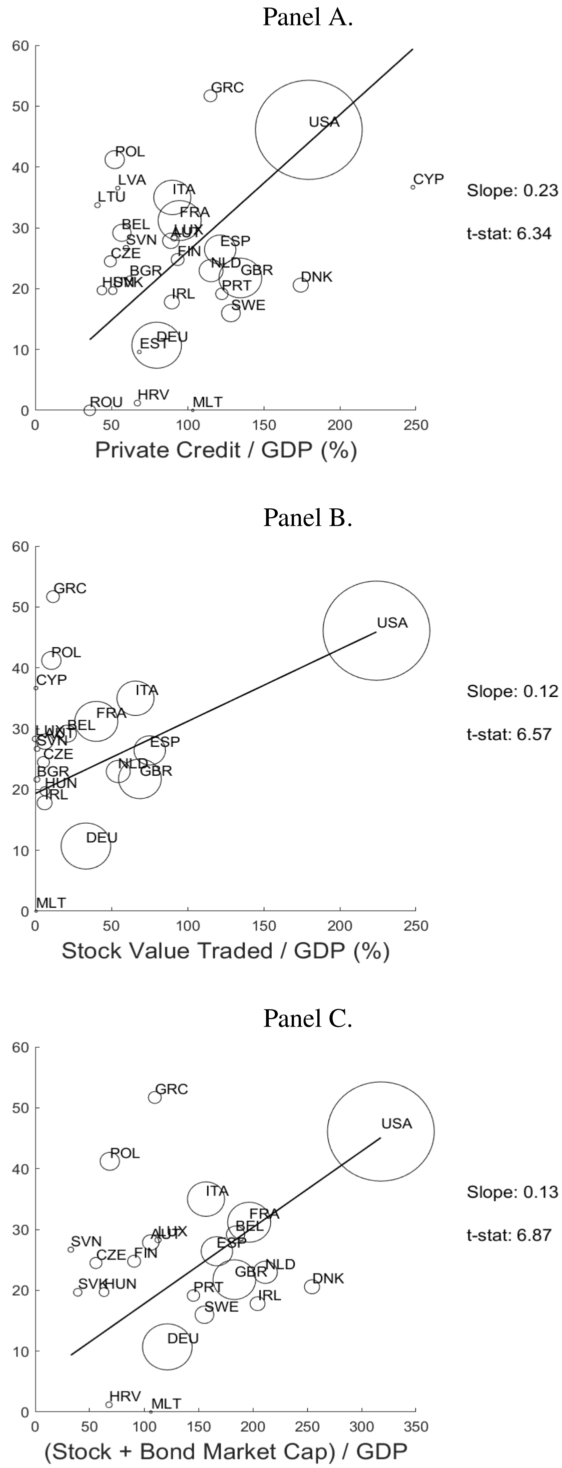


Figure A27. Vote Share of Anti-Elite Parties: Other Measures of Financial Development. This figure plots the election vote share of the parties we classify as anti-elite, in percent. The vote share is plotted against three alternative country-level measures of financial development: private credit to GDP (Panel A), stock market trading volume to GDP (Panel B), and the sum of stock and bond market capitalizations to GDP (Panel C). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

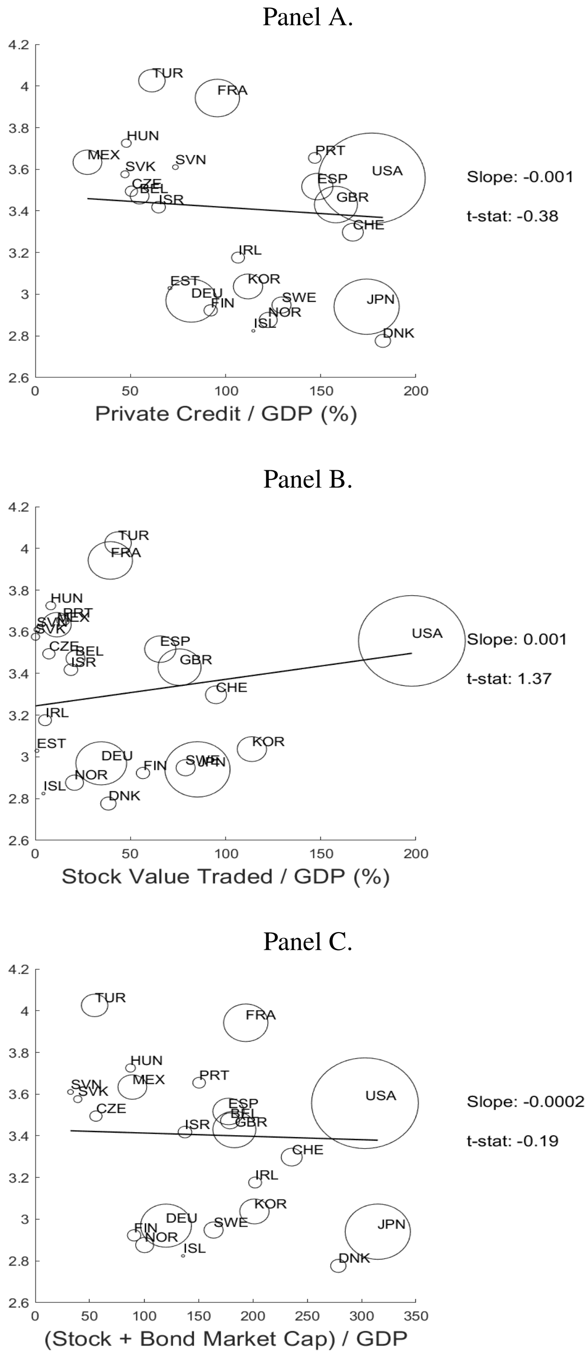


Figure A28. Support for Protectionism: Other Measures of Financial Development. This figure plots the extent to which the country's respondents in the 2013 ISSP survey agree with the statement "Country should limit the import of foreign products." The survey responses range from 1 to 5, with 5 indicating "agree strongly" and 1 "disagree strongly." The original scoring is in reverse but we flip it around so that a higher score indicates stronger support for protectionism. The country-level score is the average of all individual responses in the country. This score is plotted against three alternative country-level measures of financial development: private credit to GDP (Panel A), stock market trading volume to GDP (Panel B), and the sum of stock and bond market capitalizations to GDP (Panel C). The circle around each country's observation has an area proportional to the country's GDP. The slope and its t-statistic are from the GDP-weighted cross-country regression.

Table A1
Political Party Positions

This table reports the positions of all political parties in our sample along four dimensions related to anti-global populism: nationalism, attitudes toward immigrants and ethnic minorities, and the salience of anti-elite rhetoric. Each number in the table is the party's score on the scale of 0 to 10, with higher values indicating a more populist stance. Each party's scores are averaged across all experts evaluating this party in the 2014 Chapel Hill Survey.

Country	Party Abbreviation	Anti-Immigrant Score	Nationalist Score	Anti-Ethnic Minorities Score	Anti-Elite Score
Austria	fpo	9.89	9.4	8.8	8
Austria	gruene	1.67	1.6	1.4	4.8
Austria	neos	4	2.7	3	6.2
Austria	ovp	6.11	6.2	5.9	1.6
Austria	spo	4.44	4.1	4	2.3
Belgium	cvp	5.4	5.25	5.2	2
Belgium	ecolo	1.8	1	1.4	3
Belgium	fdf	4.4	4.5	4	4.6
Belgium	mr	6.2	3	5	1.6
Belgium	n-va	7.6	9	7	6.2
Belgium	pa-ptb	1.8	1	1.6	8.4
Belgium	pp	8.5	10	9	6.5
Belgium	ps	2.8	2.25	2	2.6
Belgium	psc-cdh	4.2	4.25	4.6	2
Belgium	pvv—vld	6.6	3	5.6	1.6
Belgium	sp	3.4	2.25	2.6	2.6
Belgium	vb	9.6	10	9.6	9
Bulgaria	abv	6.46	5.25	5.79	6.19
Bulgaria	ataka	9.38	9.82	9.87	9.47
Bulgaria	bbt	8.8	8	8.45	8.82
Bulgaria	dps	4.83	4.24	1.2	4.06
Bulgaria	gerb	6.27	5.06	4.73	4.94
Bulgaria	kzb—dl	6.2	5.12	4.93	4.06
Bulgaria	nfsb	9.13	8.81	8.93	8.38
Croatia	hdssb	7.5	8.56	8.44	6.78
Croatia	hdz	7.14	8.11	6.78	2.78
Croatia	ids	3	1.11	1.22	2.11
Croatia	sph	3.71	2.22	2.22	1.78
Cyprus	akel	3	3.5	2.5	6.5
Cyprus	diko	7	7.5	8	3.5
Cyprus	disy	6.5	4.5	6	3.5
Cyprus	edek	7	7.5	7	6.5
Cyprus	kinhma	8	8	8	4.5
Cyprus	kop	7	7	7	7.5
Czech Republic	ano	5.86	4.82	5	7.77
Czech Republic	cssd	4.33	5.08	4.69	1.5
Czech Republic	kdu-csl	7	5.08	5.75	2.46
Czech Republic	kscm	6.67	7.62	6.18	5.69
Czech Republic	ods	7.88	7.46	6.67	2.15
Czech Republic	sso	7.63	7.67	6.83	7
Czech Republic	sz	1.33	1.92	1.62	5.85
Czech Republic	top09	5	3.77	4.75	1.92
Czech Republic	usvit	9.4	9.23	9.62	9.46
Denmark	df	9.7	9.11	8	6.9

Country	Party Abbreviation	Anti-Immigrant Score	Nationalist Score	Anti-Ethnic Minorities Score	Anti-Elite Score
Denmark	en-o	1.6	2.6	1.38	5.9
Denmark	kf	7.1	7.1	6.38	2.5
Denmark	nla	4.1	4.56	5.13	3.13
Denmark	rv	2.6	2	3	1.1
Denmark	sd	5.5	4.8	5	2.8
Denmark	sf	2.8	3.2	3.13	2.9
Denmark	v	7.7	6.5	6.88	2.8
Estonia	eer	5.67	4.29	5	7.5
Estonia	ek	5	4.63	1.86	4.75
Estonia	ere	5.13	5.38	6.86	1
Estonia	ev	5.5	6.4	6.6	8.33
Estonia	irl	6.5	8.13	8.57	1.63
Estonia	sde—m	4.63	3.25	3.86	3.29
Finland	dl—vas	2.88	3.25	3.5	6.25
Finland	kd	6.14	7.13	5.71	2.25
Finland	kesk	5.63	6.75	5.5	3.75
Finland	kok	5.13	4.63	5	0.88
Finland	rkp-sfp	2.75	2.88	1.13	1.13
Finland	sp-p	9	9.25	9	9.13
Finland	ssdp	4.13	4.25	4.5	2.63
Finland	vihr	1.38	1.38	2.13	4.25
France	fn	9.8	8.82	9.91	9.55
France	pcf	3.6	4.64	3.3	6.64
France	ps	4.7	4.27	3.73	3.2
France	udf—md	6.33	5.5	5.44	5.3
France	ump—lr	7.6	7.36	7.36	3
France	v	2.1	1.55	1.4	5.36
Germany	afd	9.3	8.7	8.8	7.78
Germany	b90/gru	2.09	1.4	2.3	2
Germany	cdu	5.73	4.7	5.6	0.8
Germany	csu	7.45	6.6	7	2
Germany	fdp	3.6	3.4	4.13	0.9
Germany	li/pds	4	3.7	3.33	5.4
Germany	npd	9	9.89	10	9.11
Germany	pi	2.5	1.25	1.67	6.86
Germany	spd	3.91	3.3	3.5	1.3
Germany	tier	1	0	2	10
Greece	anel	9.11	9.22	9.11	9.22
Greece	kke	2.83	5.56	3.14	9.78
Greece	nd	8	7.44	8.22	2.33
Greece	pasok	4.33	3.67	4.33	2.78
Greece	syriza	2.22	3.11	2.11	8.56
Greece	tp	3.44	2.44	2.89	5.33
Greece	xa	10	10	10	10
Hungary	dk	2.8	1.64	3.29	4.5
Hungary	fi+kdnp	7.83	8.79	7.43	4.64
Hungary	jobbik	9.33	9.69	9	9.07
Hungary	lmp	3	3.62	2.85	7.43
Hungary	mszp	4.45	3.14	4.21	3.5
Ireland	ff	6	7.33	7.5	1.33
Ireland	fg	6.17	6.17	7.5	1.17
Ireland	green	4.17	3.17	2	5

Country	Party Abbreviation	Anti-Immigrant Score	Nationalist Score	Anti-Ethnic Minorities Score	Anti-Elite Score
Ireland	lab	5.17	4.67	3	1.5
Ireland	sf	5.2	8.17	3.5	8.2
Ireland	sp	5	3.5	0	8.8
Italy	fdl	8.75	9.4	8.75	6.25
Italy	fi-pdl	7.75	7.2	8.25	4
Italy	ln	9.5	9.6	9.75	8.8
Italy	m5s	4.25	3.8	5.67	10
Italy	ncd	7.5	6.6	7.5	2.2
Italy	pd	3.25	3.4	2.5	4.4
Italy	prc	1	2.25	1.33	9.33
Italy	svp	6	6.67	0.5	5
Latvia	lra	6.25	6.29	5.83	7.71
Latvia	na	8.71	9.75	8.78	5
Latvia	nsl	6.25	5	4.33	9
Latvia	s	4.71	3	1.44	7.38
Latvia	v	5.29	6.63	6.89	1.88
Latvia	zzs	6.29	7.38	6.89	5.5
Lithuania	dp	4.36	4.58	4.2	4.67
Lithuania	llra	6.17	6.75	1.25	6.27
Lithuania	lrls	3.73	3.33	3.18	1.5
Lithuania	lsdp	4.45	4.27	3.33	1.83
Lithuania	lvls	6.5	6.27	4.71	6.27
Lithuania	ts-lk	6.09	7.08	5.83	2
Lithuania	tt-ldp	6.45	7.75	6.17	7.5
Luxembourg	adr	6	4.5	4	5
Luxembourg	ar—adr	9.5	9	9.5	9
Luxembourg	csv	7.5	5.5	7	2.5
Luxembourg	dl	2	1	1.5	9
Luxembourg	dp	6.5	5.5	4.5	5
Luxembourg	greng	4.5	4	3	6.5
Malta	pl	8.5	6.75	5.75	3.33
Malta	pn	6.75	7	4.5	4.33
Netherlands	50+	5	6	5.5	5.8
Netherlands	cda	6.5	6.25	5.71	1.43
Netherlands	cu	3.75	6.29	4.71	2.14
Netherlands	d66	2.13	1.38	2.71	1.43
Netherlands	gl	1.13	1.38	1.86	1.71
Netherlands	pvda	4.13	4.25	3.71	1.29
Netherlands	pvdd	2.33	5	4.33	5
Netherlands	pvv	9.88	9.75	9.86	9.43
Netherlands	sp	4.38	6.25	4.5	6.57
Netherlands	vvd	7.5	5.88	5.86	1.71
Poland	pis	6.2	8.18	7.06	7.47
Poland	po	4	3.82	4	1.41
Poland	psl	6.38	6.41	5.56	2.41
Poland	razem	5.63	7.19	6.15	6.33
Poland	sld	3.33	3.06	3.19	2.82
Portugal	be	0.8	1.5	1.4	7.5
Portugal	cdu	2.5	4.83	3	7.5
Portugal	ps	4	4.17	4	2
Portugal	psd	6.8	5.83	6.2	0.5
Romania	pmp	4.6	4.92	4.86	4.38

Country	Party Abbreviation	Anti-Immigrant Score	Nationalist Score	Anti-Ethnic Minorities Score	Anti-Elite Score
Romania	pnl	4.14	4.94	4.56	2.86
Romania	psd	4.71	7.5	5.56	2.54
Romania	udmr	4.6	4.31	0.63	3.5
Slovakia	kdh	7.62	7.5	6.69	3.79
Slovakia	mh	5.36	3.79	1	3.5
Slovakia	mk	5	6	0.62	4
Slovakia	olano	7.36	7.08	6.5	8.5
Slovakia	s	6	5.5	6	5.75
Slovakia	sas	4.55	3.21	4.5	5.64
Slovakia	smer	6.46	6.79	7.31	3.71
Slovakia	sns	9.31	9.93	10	7
Slovenia	desus	4.5	4.75	4.75	4.5
Slovenia	lzj-ps	2.78	2.75	2.88	4.63
Slovenia	nsi	7.44	7.63	6.22	5.88
Slovenia	sds	7.8	8.11	7.22	6.63
Slovenia	sls	6.44	7	5.63	5
Slovenia	smc	3.5	3.71	3.89	4.71
Slovenia	zaab	2.78	3.38	3.25	4.25
Slovenia	zdle	1.22	1	0.67	6.75
Spain	ap-p	8.1	7.2	7.44	1.4
Spain	c-pc	6.25	5	6.17	6.33
Spain	cc	6.44	6.88	5.13	1.86
Spain	cdc	6.67	8.1	4.63	1.9
Spain	ehb	5.83	8.33	3.17	2.25
Spain	erc	3.67	8.3	2.38	4.22
Spain	p	1.4	6	2.67	10
Spain	pnv	6.44	8.4	4.25	1.9
Spain	psoe	3.6	4.3	4.11	3
Sweden	c	1.94	3	3.31	2.05
Sweden	fi	0.47	0.94	1.27	7.13
Sweden	fp	2.17	2.78	3.38	1.95
Sweden	kd	2.61	4.65	3.94	2.11
Sweden	m	2.61	3.89	3.88	1.74
Sweden	mp	0.56	1.17	1.63	3.58
Sweden	sap	2.33	3.33	3	1.95
Sweden	sd	9.78	9.78	9.81	8.89
Sweden	v	0.56	1.28	1.56	5.37
United Kingdom	con	8	7.33	5.14	2.17
United Kingdom	gp	2.14	1.17	1.17	7.67
United Kingdom	lab	5.43	4.17	2.71	4
United Kingdom	lib	4.29	3.17	2.14	3.17
United Kingdom	plaid	3	5.75	1	6.5
United Kingdom	snp	3.6	6.33	2	7.33
United Kingdom	ukip	10	9.83	8.43	9.29

REFERENCES

Abel, Andrew B., 1999, Risk premia and term premia in general equilibrium, *Journal of Monetary Economics* 43, 3–33.

Gourinchas, Pierre-Olivier, and Helene Rey, 2014, External adjustment, global imbalances, valuation effects, in *Handbook of International Economics* 4, 585–645. Elsevier.

Graham, John R., Mark T. Leary, and Michael R. Roberts, 2015, A century of capital structure: The leveraging of corporate America, *Journal of Financial Economics* 118, 658–683.

Guiso, Luigi, and Paolo Sodini, 2013, Household finance: An emerging field, in *Handbook of the Economics of Finance* 2, 1397–1532, Elsevier.

Karatzas, Ioannis, and Steven Shreve, 2010, *Methods of Mathematical Finance*, Springer, New York.

Pástor, Ľuboš, and Pietro Veronesi, 2019, Inequality aversion, populism, and the backlash against globalization, Working paper.

Splinter, David, 2019, U.S. Taxes are Progressive: Comment on "Progressive Wealth Taxation," Working paper.

Veronesi, Pietro, 2018, Heterogeneous households under uncertainty, Working paper.