The End of Privilege: a reexamination of the Net Foreign Asset Position of the United States

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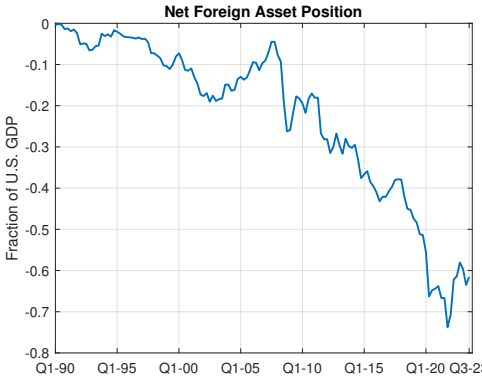
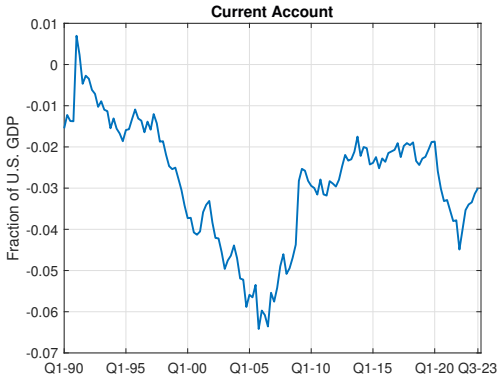
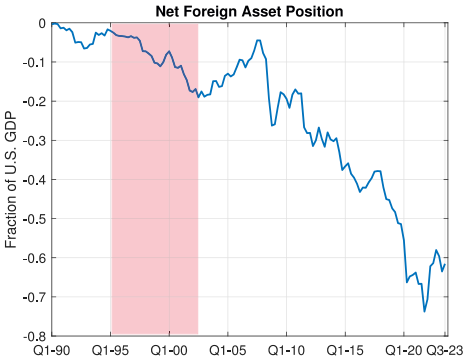
US NFA and CA

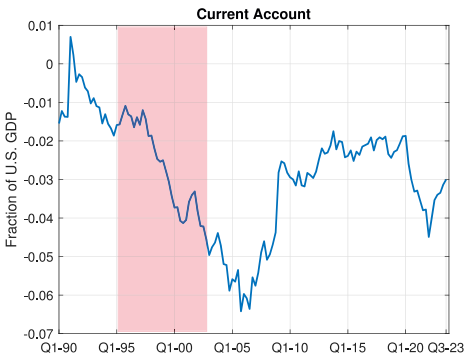




- NFA = *Net wealth of US residents* (hholds + institutions) = Mkt value of claims of US residents on foreigners - claims of foreigners on US residents: prime example of *global imbalance*
- CA = Net borrowing/lending of US residents v/s foreigners

Part 1: What drives the large and persistent NFA decline?





- Original theories of NFA emphasized current account
  - NFA dynamics reflect borrowing/lending (CA)

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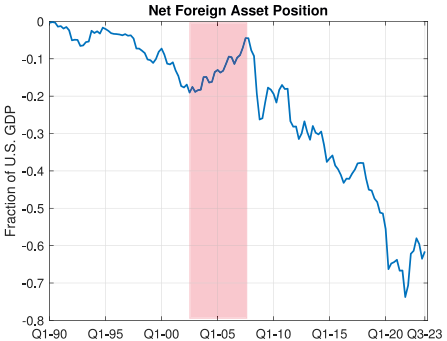

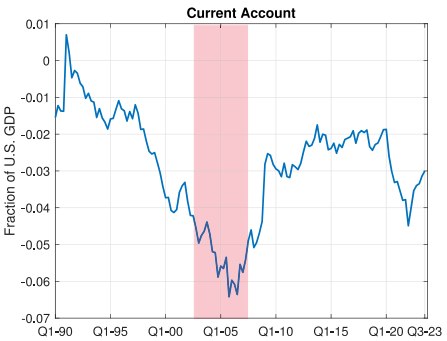

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  - NFA dynamics reflect borrowing/lending (CA)
  - but post 2002 CA and NFA disconnected..

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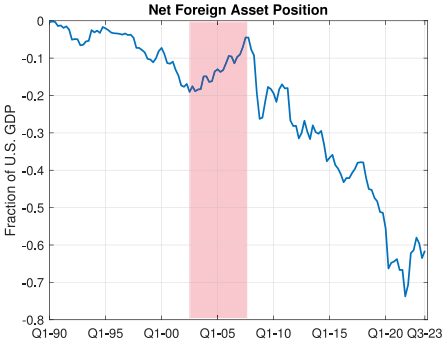

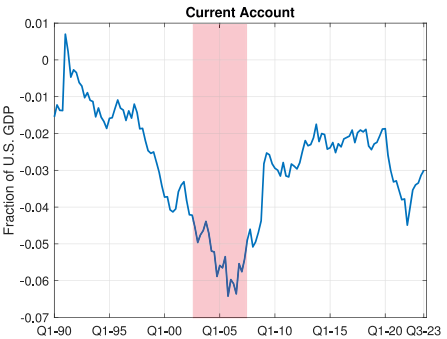

- Newer view recognizes valuations matter
  - Gourinchas & Rey (2007) emphasized that changes in relative prices of portfolios of foreign assets/liabilities can induce adjustment in NFA
  - US ran substantial CA deficits in the 2000s without blowing up its NFA (privilege)

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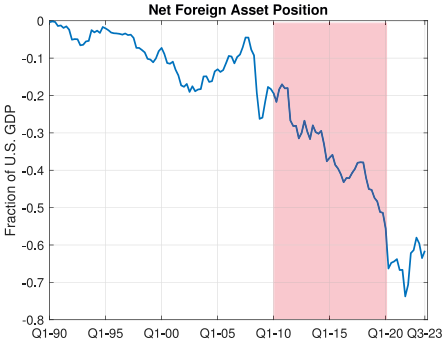

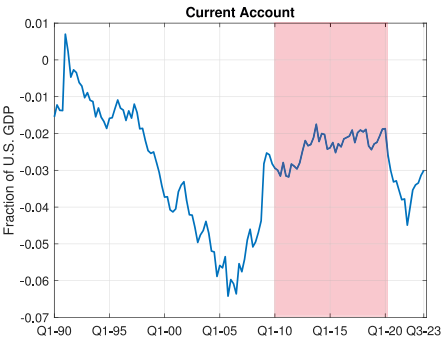

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  - US ran substantial CA deficits in the 2000s without blowing up its NFA (privilege)
  - but post GFC modest CA deficits + rapidly deteriorating NFA (end of privilege)

The end of privilege

- Post GFC: What Happened?
- Large and persistent boom in value of US corporations (relative to foreign), and large and persistent increase in equity gross positions
- The End of Privilege (ex-post)
  - Very large decline in US Net Wealth despite smaller US borrowing
  - International Income Puzzle and Ex-ante Privilege

Part 2: What does this mean for Americans?

- What drove the boom in value of US corporations?
  - Lower discount factor? Faster growth? Bigger profits?
- Explore open economy macro-finance model
  - Builds on Farhi & Gourio (2018), Greenwald, Lettau & Ludvigson (2019), Eggertsson, Robbins & Wold (2022), Crouzet & Eberly (2021) and others
  - Extend model to include implications for US current account and NFA
  - Estimate lots of time-varying structural parameters to replicate all flows, stocks, and asset values for the US corporate sector, plus the path for the US current account and NFA position

Part 2: Results

- "Reduced form" evidence on valuations
  - Large increase in free cash flow to owners of U.S. corporations (markups? taxes?)
  - Valuation multiple fairly stable
- Model driven results
  - Integrating CA in model identifies roles of discounting v/s payouts in asset valuation
  - Rising "output wedge" between revenue and cost key driver of boom in payouts and valuation
- Welfare implications for US residents
  - Nearly zero absent international equity diversification
  - Large and negative (ex-post) given observed equity diversification
  - Risk sharing implications?

Part 1: Accounting for NFA Dynamics

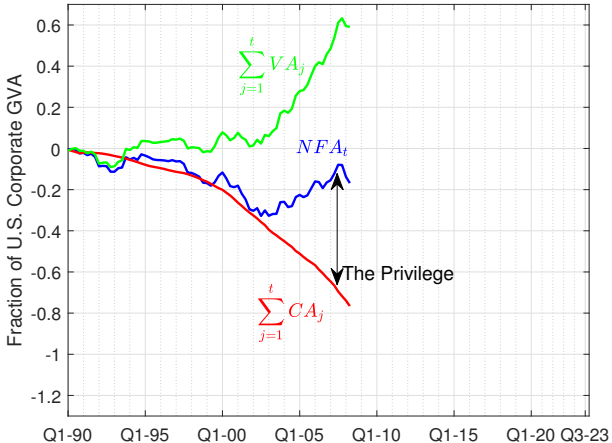
$$NFA_{t+1} - NFA_t = \underbrace{CA_t}_{\text{Net lending abroad}} + \underbrace{VA_t}_{\text{Valuation Effects}}$$

$$VA_t = USFA_t \times g_{P^*}^{t,t+1} - USFL_t \times g_P^{t,t+1}$$

- Iterating yields

$$NFA_t - NFA_0 = \underbrace{\sum_{j=0}^{t} CA_j}_{\text{Cumul. net lending}} + \underbrace{\sum_{j=0}^{t} VA_j}_{\text{Cumul. valuations}}$$

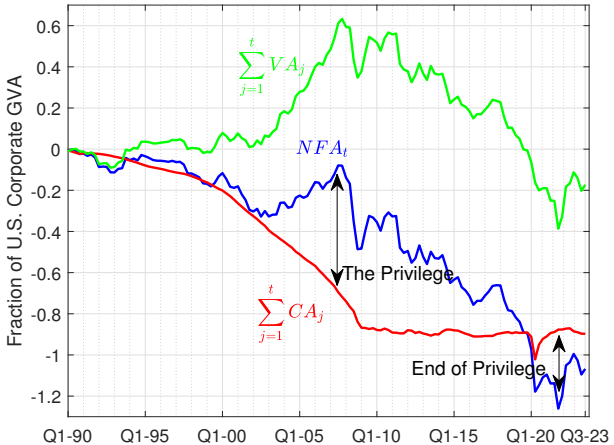
The Privilege



- Pre 2010: US run substantial CA deficits, yet NFA did not decline much due to positive valuation effects (Gourinchas and Rey, 2007)

Statistical Discrepancy

The Privilege and its end



- Post 2010: US $Cum(CA)/Y$ stabilizes, negative valuation effects drive decline in NFA

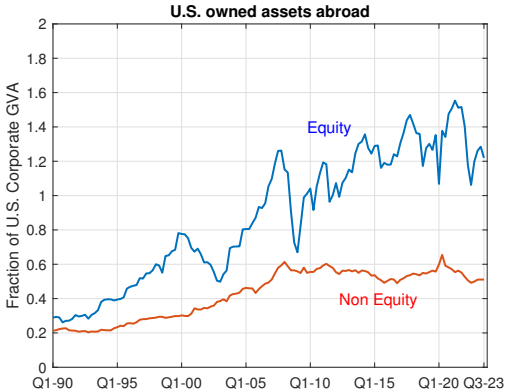
Statistical Discrepancy

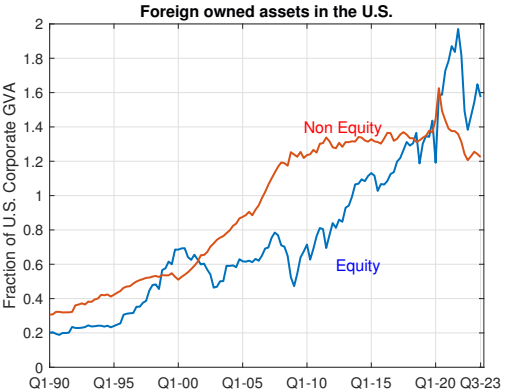
Digging into valuation effects

$$VA_t = USFA_t \times g_{P*}^{t,t+1} - USFL_t \times g_P^{t,t+1}$$

- To observe large valuations need:
  1. Large gross positions, $USFA_t$, $USFL_t$
  2. If gross positions are balanced: differences in asset price changes $g_P^{t,t+1}$ and $g_{P*}^{t,t+1}$
  3. If gross positions unbalanced: large asset price changes $g_P^{t,t+1}$ and $g_{P*}^{t,t+1}$

Large Gross Positions

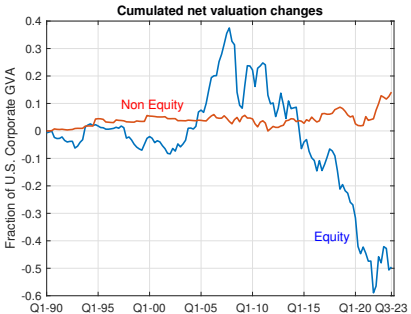




- In recent years both equity and non equity positions are large!
- In 2010 value of US equity owned by foreigners $\simeq 100\%$ of US Corporate GVA
- Equity (portfolio and FDI) is more balanced, non-equity more unbalanced

Issue with measuring gross positions

Net Cumulated Valuations Effects



- Large change in values of equity (both large positions and relative price changes)

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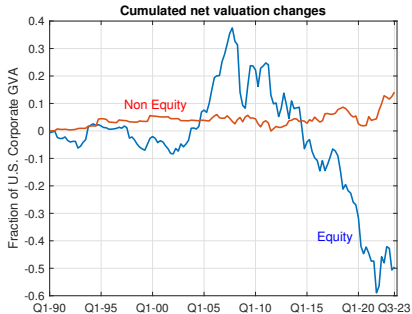
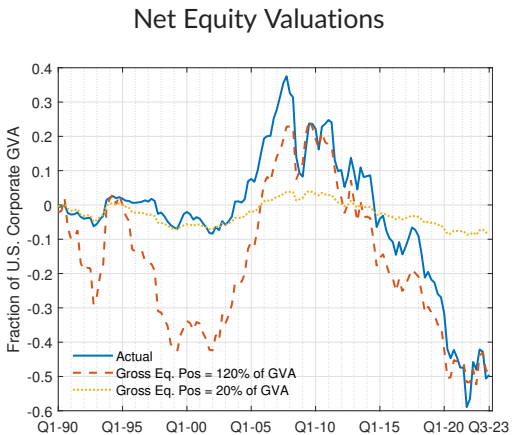


- Large change in values of equity (both large positions and relative price changes)
- Small change in values of non-equity (bonds, currency, etc) except in 2021-2022 (common fall in bond prices with unbalanced bond positions)
  - Small relative prices changes as bonds held by US abroad mostly $ denominated: Maggiori et al. (2020)

Portfolio and FDI equity

The importance of large gross positions

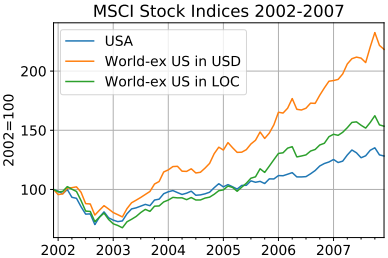


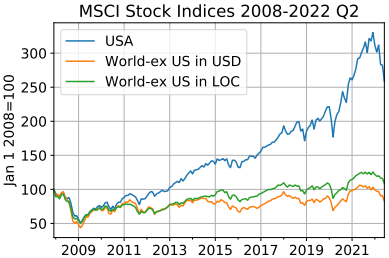
What drives the changes in relative price of equity

Two key candidate drivers

- Exchange rates
- Stock prices

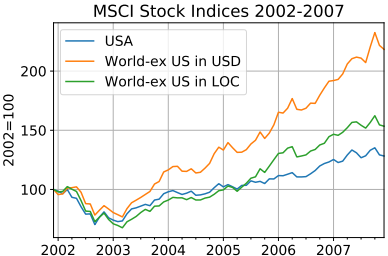
Two valuation episodes

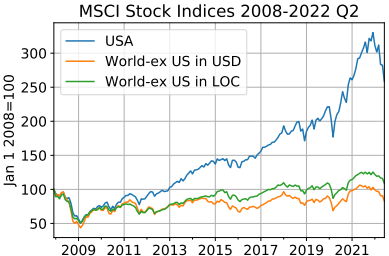




- 2002-2007: Equity valuations favor US, USD depreciation important
- 2008-2022Q2: Equity valuations against US, mostly driven by US stocks outperforming foreign stocks

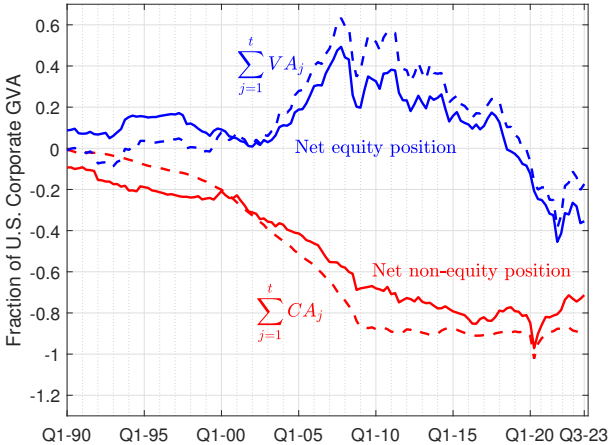
Two valuation episodes





- 2002-2007: Equity valuations favor US, USD depreciation important
- 2008-2022Q2: Equity valuations against US, mostly driven by US stocks outperforming foreign stocks
- Direct estimate of exchange rate effects on NFA/Y (using BEA data):
  - USD depreciation accounts for 40% of positive equity reval in 2002-2007
  - USD appreciation accounts for 20% of negative equity reval in 2010-2021

Equity v/s Non Equity Summary



- Current account mostly financed by non-equity flows
- Equity position mostly driven by changes in equity valuations

NFA Dynamics Summary

- US NFA position fell from -20% of GDP in 2010 to -62% in 2023
- Current account deficits accounted for only around 10pp of this decline
- Dominant driver (35pp) was equity revaluation effects
- In turn reflecting strong relative performance of US equities, coupled with large international gross equity positions

income puzzle and expected privilege

Part 2: What Drives Rising US Asset Values?

1. Rising profitability of US corporations
   - Farhi and Gourio (2018), Eggertson, Robbins, Wold (2021), Crouzet and Eberly (2021)
   - Greenwald, Lettau, Ludvigson (2020): *"the considerable gains to holding equity over the post-war period can be in large part attributed to an unpredictable sequence of factor share shocks that reallocated rewards to shareholders"*
   - De Loecker, Eeckhout, Unger (2020), Akcigit et al. (2021), Philippon (2019) evidence on rising market power
   - Barkai (2020), Karabarbounis, Neimann (2014, 2019) evidence on decline in labor share, rise in factorless income
   - Gutierrez and Philippon (2017) evidence on weak investment growth, notwithstanding low interest rates
2. Changing Discount Factors and Expected Growth Rates

Analytical Quantitative International Macro Finance Model

- Two countries, US and ROW
- Firms make profits $\Rightarrow$ equity values reflect value of capital plus expected future profits
- Households trade equity and bonds
- ROW preferences linear — pins down r^*_{t+1} for world
- Calibrate to match US corporate sector flows, stocks and valuations + ROW enterprise value and cash flow + US current account
- What drives valuations?
- How do changing valuations affect
  1. Current Account and NFA position?
  2. Welfare?

Production firms

- Final output is CES composite of intermediate varieties

$$Y_t = \left(\int_0^1 Y_{it}^{\frac{\varepsilon-1}{\varepsilon}} di \right)^{\frac{\varepsilon}{\varepsilon-1}}$$

- Each variety i can be produced by
  - single leader firm with productivity z_{Ht}
  - competitive fringe of followers with productivity z_{Lt}

$$Y_{it} = z_t K_{it}^{\alpha_t} (Z_t L_{it})^{1-\alpha_t}$$

- Firms rent capital at rate R_t and labor at rate W_t
- Time-varying share of capital in costs α_t
- Growth in labor productivity Z_t from t to $t+1$ at rate g_{t+1}
- Expected growth in labor productivity Z_{t+1} from $t+1$ at $\bar{g}_{t+1}$
- Tax rate τ_t on output

Production and capital firms

- Leader production firms produce all output in equilibrium
- Gross markups are given by $\mu_t = \min\left\{\frac{\varepsilon}{\varepsilon-1}, \quad \frac{z_{Ht}}{z_{Lt}}\right\}$
- Assume $\mu_t = \frac{z_{Ht}}{z_{Lt}}$, $\mu_t^* = \frac{z_{Ht}^*}{z_{Lt}^*}$: leaders engage in limit pricing:
  - produce enough to drive p_i down to followers' unit cost, discourage entry
  - Markup can increase if $z_H \uparrow$ or if $z_L \downarrow$
  - In first case markup correlated with productivity, in second case not
- Capital firms make investment decisions and rent out capital

$$\max_{\{K_{t+1}\}} \mathbb{E}_0 \sum_{t=0}^{\infty} \frac{1}{(1+r_{t+1}^*)^t} \left[R_t K_t + (1-\delta_t) Q_t K_t - Q_t K_{t+1}\right]$$

  - δ_t is depreciation rate
  - Q_t, Q_t^* is price of new capital

Households

- US preferences

$$E \sum_{t=0}^{\infty} \left(\frac{1}{1+\rho} \right)^t \log(C_t)$$

- ROW preferences: risk neutral, discount factor $\rho^*_{t+1} \Rightarrow r^*_{t+1} = \rho^*_{t+1}$

- US households hold shares λ_{t-1} and λ^*_{t-1} of domestic and foreign firms
- Trade risk free bonds internationally that pay r^*_t

$$C_t + B_{t+1} + (\lambda_t - \lambda_{t-1}) V_t + (\lambda^*_t - \lambda^*_{t-1}) V^*_t =$$
$$W_t L_t + (1 + r^*_t) B_t + \lambda_{t-1} D_t + \lambda^*_{t-1} D^*_t$$

- Set λ_t and λ^*_t to match observed equity holdings. ROW share of US Equity

Expectations (repeated surprises)

- For r_t^*, α_t, μ_t, μ_t^*, δ_t, τ_t:
  - assume perfect foresight at t regarding $t+1$ values (no risk)
  - agents expect no changes from $t+1$ onward
- Productivity growth:
  - perfect foresight for g_{t+1} between t and $t+1$
  - expect growth at rate $\bar{g}_{t+1}$ from $t+1$ onward
- Expect Q_t and Q_t^* constant from date t onward
- Important for analytical solution

Equilibrium Factor Shares, Earnings, and Dividends

- Firm FOCs plus symmetry across varieties gives factor income shares

$$\begin{aligned} \frac{R_t K_t}{Y_t} &= (1-\tau_t)\frac{\alpha_t}{\mu_t} \\ \frac{W_t L_t}{Y_t} &= (1-\tau_t)\frac{1-\alpha_t}{\mu_t} \end{aligned}$$

- Rest of output is monopoly profits (factorless income)

$$\frac{\Pi_t}{Y_t} = (1-\tau_t)\frac{\mu_t - 1}{\mu_t}$$

- Optimal investment (given $\mathbb{E}_t Q_{t+1} = Q_t$)

$$R_{t+1} K_{t+1} = (r^*_{t+1} + \delta_{t+1}) Q_t K_{t+1}$$

- Dividends and Earnings

$$\begin{aligned} D_t &= (1-\tau_t)Y_t - W_t L_t - I_t \\ E_t &= (1-\tau_t)Y_t - W_t L_t - \delta_t Q_t K_t \end{aligned}$$

Asset Values

- Firm value is discounted present value of dividends

$$V_t = \sum_{j=1}^{\infty} \frac{D_{t+j}}{(1 + r^*_{t+1})^j} = \frac{E(D_{t+1})}{r^*_{t+1} - \bar{g}_{t+1}}$$

- Equals capital stock plus discounted value of monopoly profits

$$V_t = Q_t K_{t+1} + \frac{\Pi_{t+1}}{(r^*_{t+1} - \bar{g}_{t+1})}$$

Measuring Valuations and Cashflow

- Measure enterprise value V of US corporate sector: total market value of corporate non-financial assets
- Match that to free cash flow D of US corporate sector: total income that can be paid to investors
- Use Flow of Funds to measure V; NIPA to measure D

Corporate Sector Balance Sheet

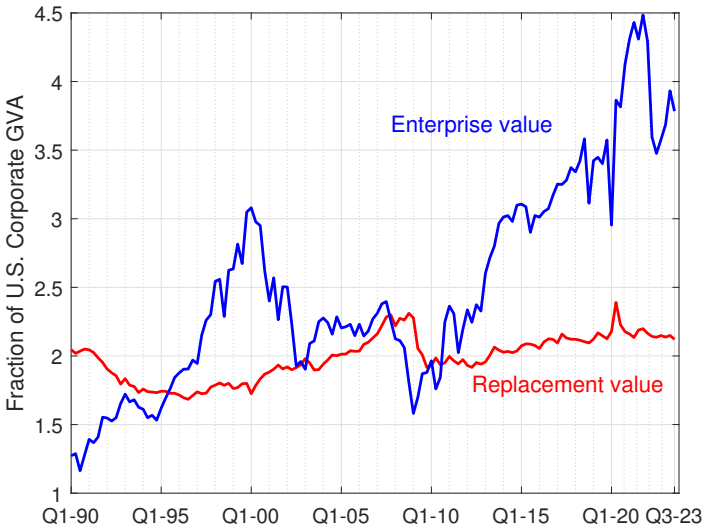
Assets	Liabilities
Enterprise value V	Market value of equity
Financial assets	Financial liabilities (debt, bank loans etc)

- D = GVA - Wages - Corp. Taxes - IBT - Investment
- E = GVA - Wages - Corp. Taxes - IBT - CFC

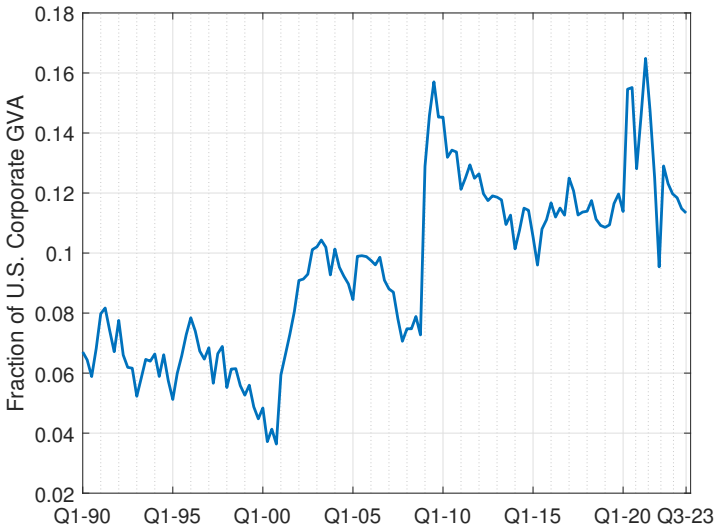
Advantages of Measurement Approach

- D_t straight from National Income accounts
  - Long time series
- V_t for same firms for which we measure D_t
  - Entire corporate sector, not just publicly traded firms
- D_t measure insensitive to what firms do with profits
  - pay dividends vs buy back shares vs pay off debt vs acquire financial assets

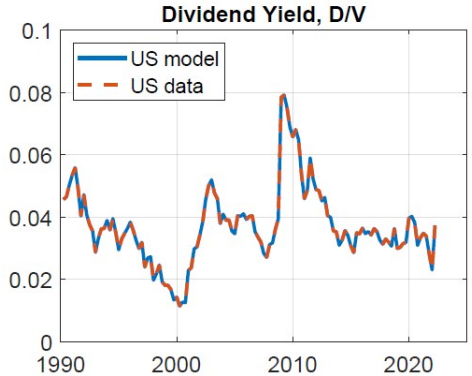
Enterprise Value and Capital: US Corporate Sector

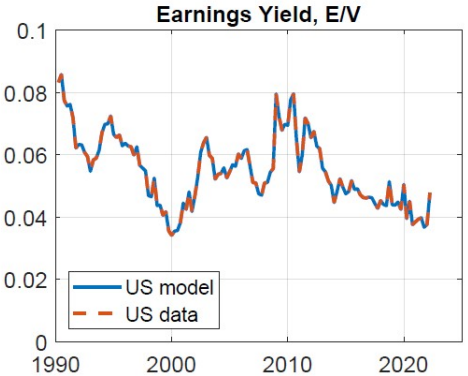


Free Cash Flow *D*, US Corporate Sector



Free Cash Flow and Earnings to Enterprise Value, US Corp. Sector





- No trend in dividend yield D_t/V_t
- Decline in earnings yield E_t/V_t

US Current Account

- Corporate savings equals investment, gov't savings equals zero
- Households have log utility over consumption, exogenous labor supply
- Consume fraction $(1-\beta)$ of total wealth
- $\Longrightarrow$ Household Savings and Current Account

$$CA_t = Income_t - \frac{\rho}{1+\rho} Wealth_t$$

$$Income_t = r_t^* B_t + \lambda_{t-1} D_t + \lambda_{t-1}^* D_t^* + W_t L_t$$

$$Wealth_t = Income_t + B_t + \lambda_{t-1} V_t + \lambda_{t-1}^* V_t^* + H_t$$

- H_t is discounted present value of labor income from $t+1$ on

What Drives the Current Account?

- Implies

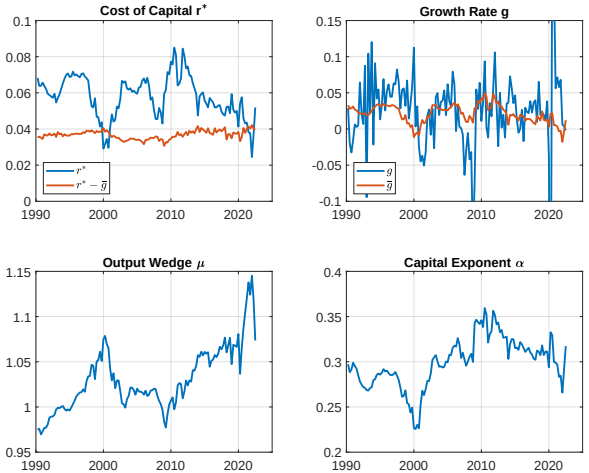
$$(1+\rho)CA_t = \underbrace{\lambda_{t-1}\left(\frac{D_t}{V_t}-\rho\right)V_t}_{\text{US Equity}} + \underbrace{\lambda^*_{t-1}\left(\frac{D^*_t}{V^*_t}-\rho\right)V^*_t}_{\text{ROW Equity}} +$$

$$\underbrace{(r^*_t-\rho)B_t}_{\text{Net Non-Equity}} + \underbrace{\left(\frac{W_tL_t}{H_t}-\rho\right)H_t}_{\text{Human Wealth}}$$

$$H_t = \frac{W_{t+1}L_{t+1}}{r^*_{t+1}-\bar{g}_{t+1}}$$

- Quantitatively: H_t most important determinant, human wealth important determinant of consumption/saving decisions
- Stable current account implies that $r^*_{t+1}-\bar{g}_{t+1}$ cannot move much

Baseline parameters estimates



- Key structural findings: stable $r^* - \bar{g}$, declining $\bar{g}$ and r^*, increasing output wedge μ

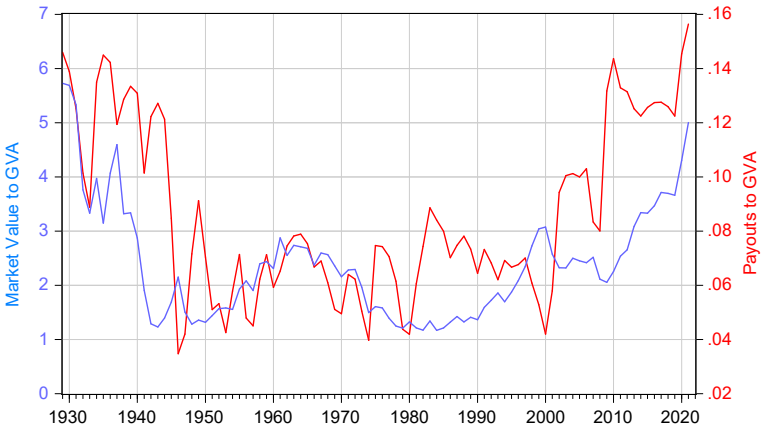
Identifying moments

- $\frac{D}{V} = r^* - \bar{g}, \quad V = QK + \frac{\Pi}{(r^* - \bar{g})} \quad \frac{V}{Y} = \frac{QK}{Y} + \frac{\Pi}{Y}\frac{1}{(r^* - \bar{g})}$
- Increasing $\frac{V}{Y}$ ratio, value of corporate sector
- Constant $\frac{QK}{Y}$ ratio, it is not capital
- Constant $\frac{D}{V}$ ratio, it is not lower $r^* - \bar{g}$ but higher profits
- Small current account movements, additional evidence against lower $r^* - \bar{g}$
- Declining $\frac{E}{V}$ ratio: identifies aggregate growth (given $\frac{K}{V}$)

$$\frac{E - D}{V} = \frac{X - \delta K}{V} = g\frac{K}{V}$$

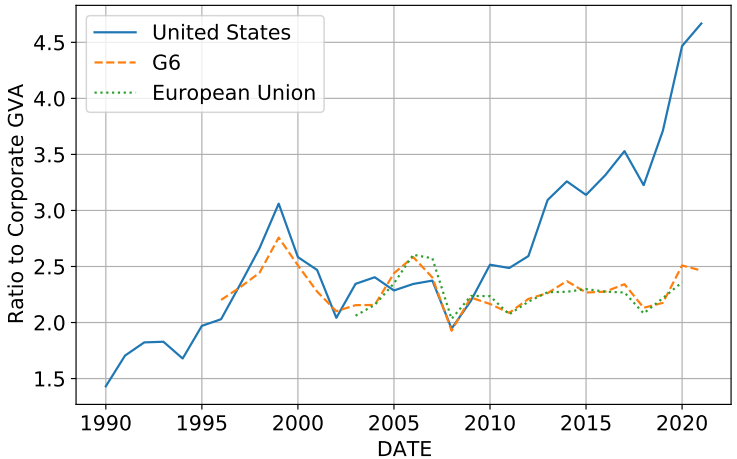
Additional moments

Free Cash Flow US Corporate Sector Back to 1929

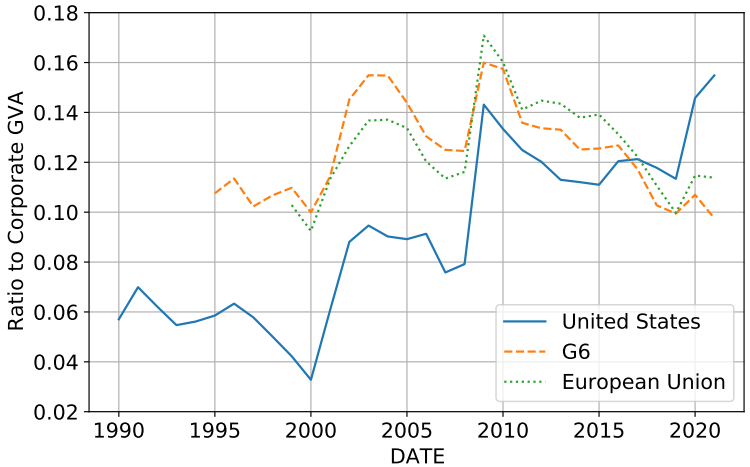


- Atkeson, Heathcote and Perri, 2024

Enterprise Value in ROW has not Risen

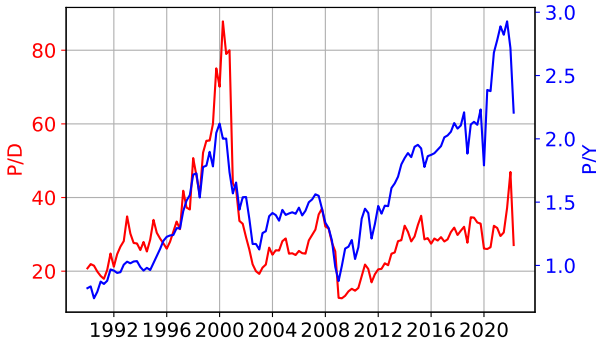


Free Cash Flow in ROW has not Risen



Alternative measure of D^* / V^* on US equity in ROW

Current equity boom looks different

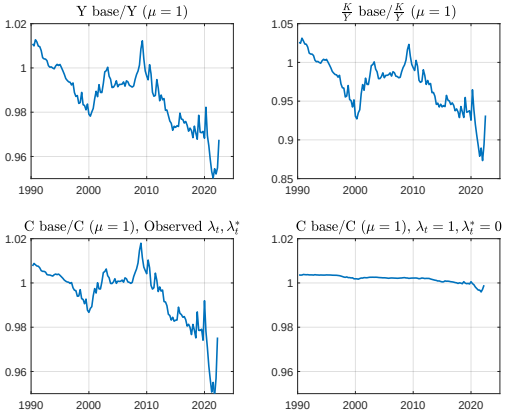


- dot-com boom: large increase in P/D ratio
- current boom: constant P/D ratio, justified by higher dividends

Counterfactuals for Welfare

- How did the rise in μ_t impact U.S. welfare?
- How does the welfare impact depend on equity diversification?
- Model with all the same parameters except $z_{Lt} \equiv z_{Ht}$ so $\mu_t \equiv 1$
  - Solve with λ_t and λ_t^* as in the data
  - Solve with $\lambda_t \equiv 1$ and $\lambda_t^* \equiv 0$ (no diversification)
- Solution for flows, stocks, and valuation of U.S. corporate sector independent of diversification
- Solution for U.S. consumption depends on diversification

Counterfactuals



- US output, investment, wages all decline when output wedge increase
- With diversification US consumption also decline
- Without diversification US consumption declines much less, wage loss compensated by higher dividends: welfare losses of higher output wedge (in RA set-up)

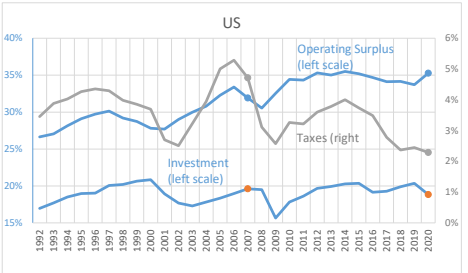
Mark-ups, diversification and ex-ante welfare (risk sharing)

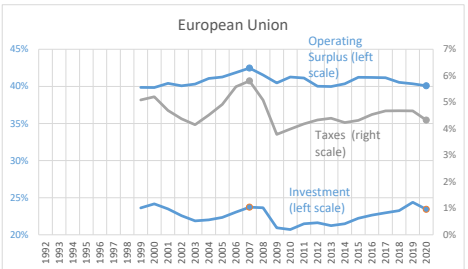
- Baxter and Jermann (1997), Heathcote and Perri (2013), Coeurdacier, Kollman, Martin (2007)
- Whether the transfer from US to ROW is good for risk sharing (desirable ex-ante) depends on why wedge $\mu_{t+1} = \frac{z_H}{z_L}$ moves
  - If followers become less productive ($z_L \downarrow$), shock bad for US as a whole, diversification worsens risk sharing
  - If initial $\mu_t = 1$, can show optimal portfolio (in response to z_L shocks) has no equity diversification
- If μ increases because z_H rises (Amazon), then diversification improves risk sharing
- US transfers resources abroad when it is relatively more productive

Conclusions

- Large cross border equity positions imply *relative* stock market performance big driver of NFA through direct valuation effects
- Integrated Model of Corporate Sector, CA, and NFA positions
- Quantitative model of flows and asset values in international economy
  - points to big increase in “output wedge” as key driver of asset boom
  - absent international diversification, small impact on U.S. welfare
  - with observed diversification, big impact on U.S. welfare
- Model of links between asset valuations and NFA

Decomposing the increase in payouts

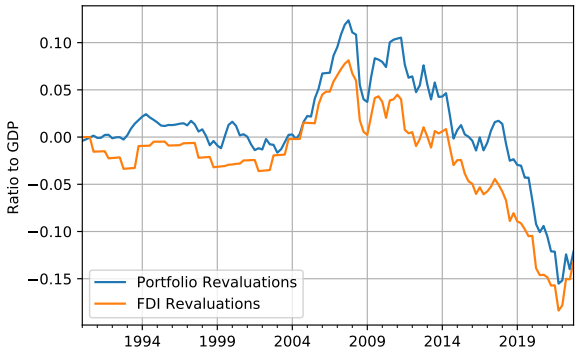




Other Issues

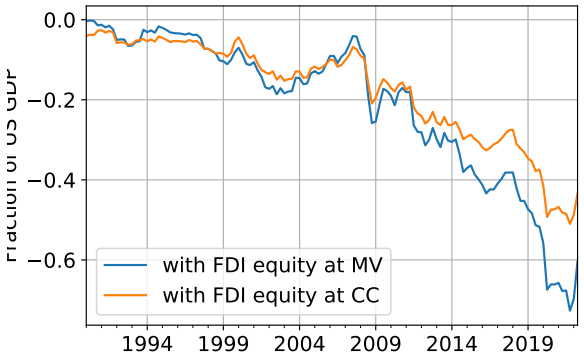
- Income Puzzle and Ex-Ante Privilege go
  - Curcuru, Thomas, and Warnock (2013) express skepticism on this point
  - Income puzzle mainly due to FDI accounting profits not actual payments
- Unmeasured Capital Corrado et. al. estimates
  - Corrado, Haskell, Jona-Lassino and Iommni 2022 JEP and linked data
  - Intangible investment and capital are large
  - But they show no trend from 1997 to 2021
  - So hard to account for the rise in free cash flow and valuations
  - Also hard to account for smooth growth in measured output if there were a big burst of investment in unmeasured intangibles

Cumulated Net Valuations in FDI and Portfolio Equity



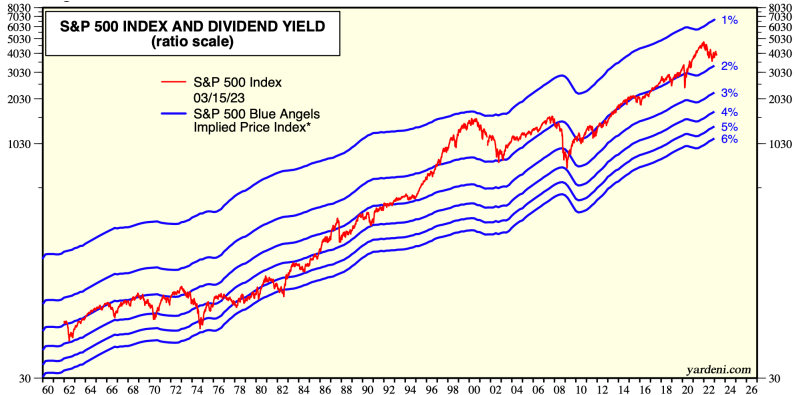
- Large valuations changes both in FDI and portfolio investments back

Impact of FDI equity valuations on NFA position



- FDI equity valuations add -20% to NFA position back

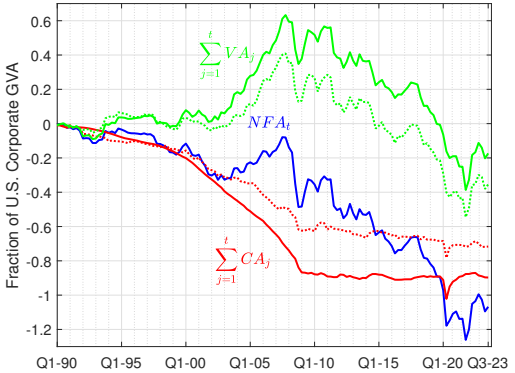
S&P500 Dividends and Yields



* Blue lines show hypothetical values of S&P 500 stock price index using actual S&P 500 dividend (4-quarter trailing sum) divided by dividend yields from 1% to 6%
Source: Standard & Poor's.

back

Alternative measures of net lending abroad

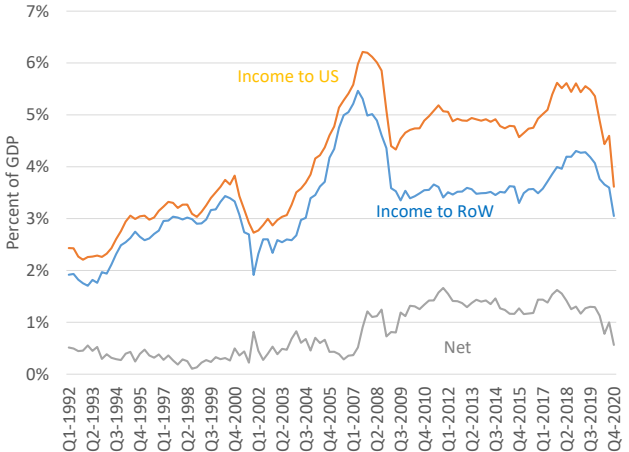


- Discrepancy between two ways of measuring net lending abroad: current or financial account
- Changes the decomposition between cumulated *CA* and cumulated *VA*
- Similar conclusions regarding end of privilege

back

International Income Puzzle and Ex-Ante Privilege

- NFA evolution contrasts with Net Factor Income from abroad: negative declining NFA, positive stable NFI

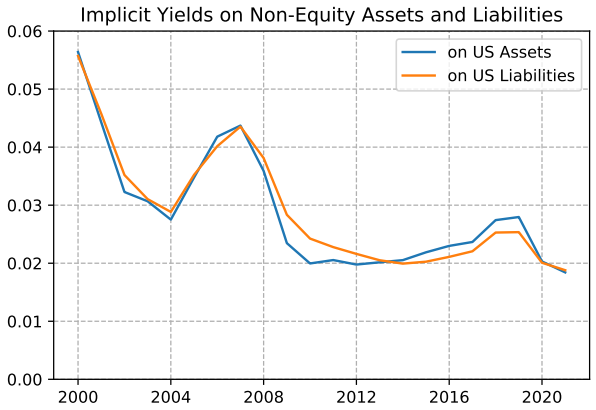


International Income Puzzle and Ex-Ante Privilege

- Are “Safe Assets” special?
  - Currency, Bank deposits, US Treasuries
  - average income yields on US non-equity external assets and liabilities are similar implicit interest rates
- Extraordinary “income yield” on US Direct Investment Equity Assets in ROW implicit DI yields
  - *Dark Matter?* (is value of DI equity in ROW understated)
  - *Profit Shifting?* (about 1/3 of DI equity income is in tax havens)
- Positive US Net Income despite negative Net Assets almost entirely due to DI equity asset income yield and small gap in dividend yields on portfolio equity assets and liabilities implicit PI yields

back to other issues

Implicit Income Yields on Non-Equity External Assets and Liabilities



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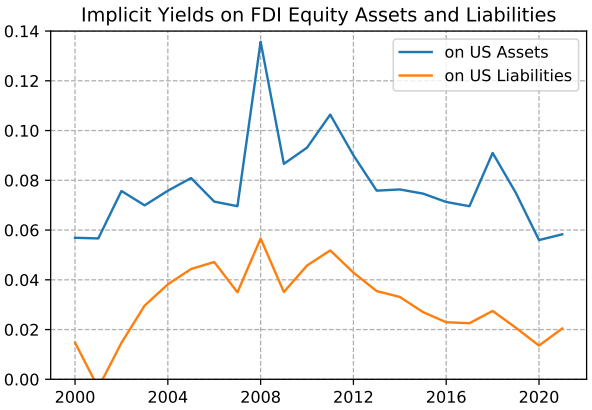
Implicit Income Yields on DI Equity External Assets and Liabilities



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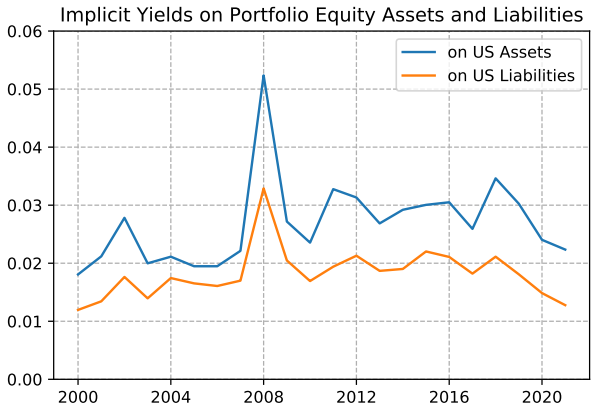
Implicit Income Yields on Portfolio Equity External Assets and Liab.



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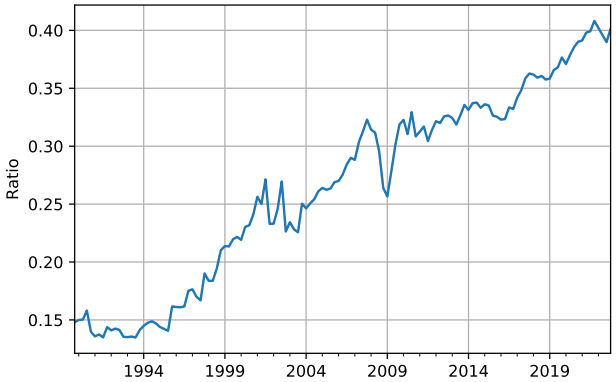
Overstatement of Gross Equity Positions

- Bertaut, Bressler, Curcuru 2020
- Corporate Inversions, e.g. Medtronics incorporates in Ireland
  - *BEA*: Foreign equity, *MSCI*: US equity
  - Medtronics owning assets (i.e. plants) in US adds to gross foreign holdings of US equity
  - US residents holdings of Medtronics adds to US gross holdings of foreign equity
- Offshore funds
  - *Cayman fund holdings of US equity* add to gross foreign holding of US equity
  - *Cayman fund Shares held by US residents* add to US gross holdings of foreign equity
- In both cases economically it is US holdings of US equity
- Overstates gross positions and Δ in net positions due to Δ in US equity values
- Using revised estimates of US gross positions: changes in US NFA still large

back

ROW Equity Share of US Corporate Enterprise Value



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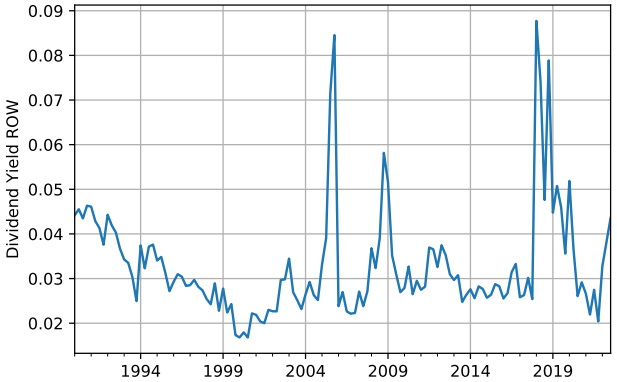
Dividend Yield (paid) on US Equity in ROW



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Expected and Unexpected Drivers of NFA

$$NFA_t - NFA_{t-1} = CA_{t-1} + \lambda^*_{t-1}\left(V^*_t - V^*_{t-1}\right) - (1-\lambda_{t-1})\left(V_t - V_{t-1}\right)$$

- What movements occur when parameters turn out as expected vs. deviations due to unexpected shocks?

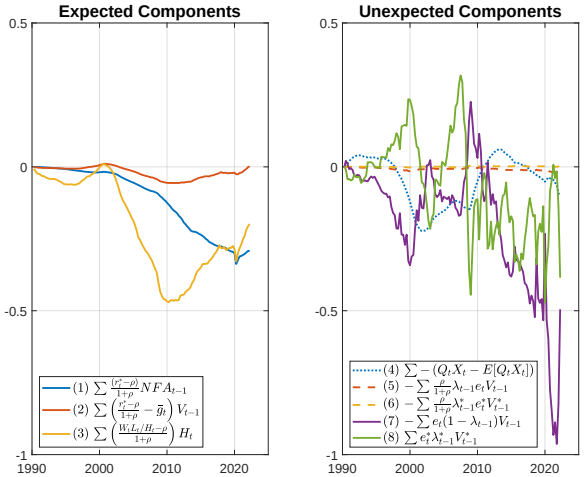
- Excess Returns

$$e_t = \frac{D_t + V_t}{V_{t-1}} - (1 + r^*_t), \qquad e^*_t = \frac{D^*_t + V^*_t}{V^*_{t-1}} - (1 + r^*_t)$$

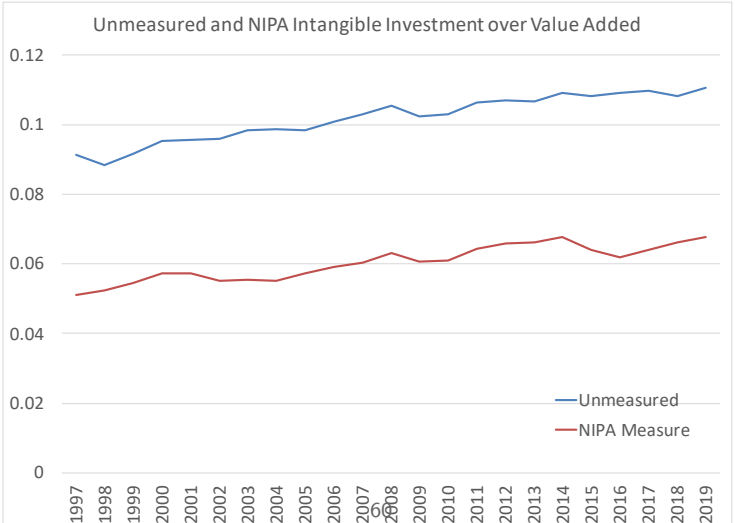
Expected and Unexpected Drivers of NFA

$$
\begin{aligned}
NFA_t - NFA_{t-1} \;=\; & \underbrace{\frac{r_t^* - \rho}{1+\rho} NFA_{t-1}}_{(1)} \\
& + \underbrace{\left(\frac{r_t^* - \rho}{1+\rho} - \bar{g}_t \right) V_{t-1}}_{(2)} + \underbrace{\left(\frac{\frac{W_t L_t}{H_t} - \rho}{1+\rho} \right) H_t}_{(3)} \\
& - \underbrace{(Q_t X_t - \mathbb{E}_{t-1}[Q_t X_t])}_{(4)} \\
& - \underbrace{\frac{\rho}{1+\rho} \lambda_{t-1} e_t V_{t-1}}_{(5)} - \underbrace{\frac{\rho}{1+\rho} \lambda_{t-1}^* e_t^* V_{t-1}^*}_{(6)} \\
& - \underbrace{e_t (1 - \lambda_{t-1}) V_{t-1}}_{(7)} + \underbrace{e_t^* \lambda_{t-1}^* V_{t-1}^*}_{(8)}
\end{aligned}
$$

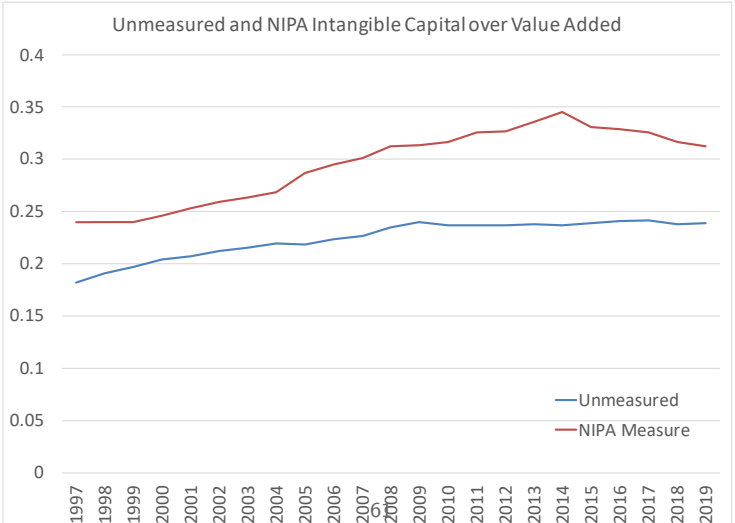
Expected and Unexpected Drivers of NFA



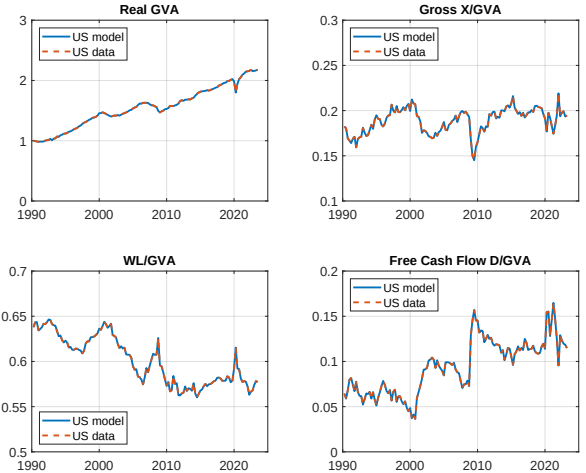
Corrado et. al. 2021 Unmeasured Investment



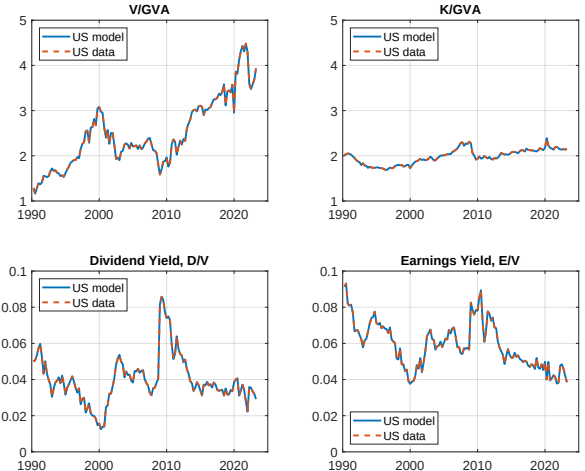
Corrado et. al. 2021 Unmeasured Capital



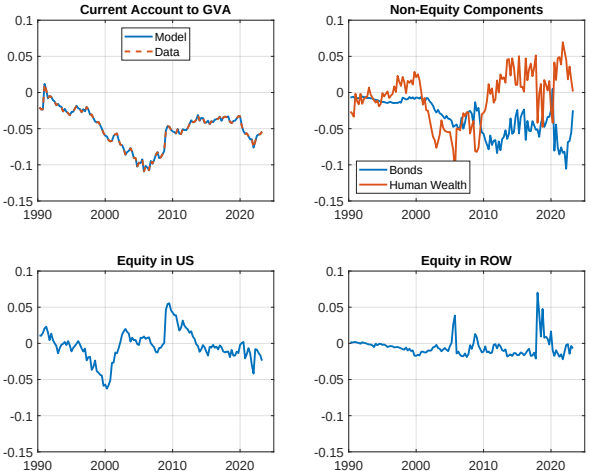
Baseline Results



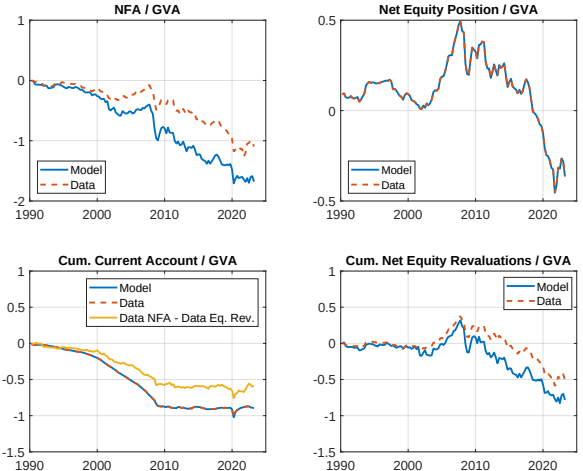
Baseline Results



Baseline Results



Baseline Results



US Equities and US Corporate Sector

- Looking into the strong performance of US Equities
- Assume US equities are claims to cash flow of US corporate sector

What Drives the Current Account?

$$(1+\rho)CA_t = \underbrace{\lambda_{t-1}\left(\frac{D_t}{V_t}-\rho\right)V_t}_{\text{US Equity}} + \underbrace{\lambda^*_{t-1}\left(\frac{D^*_t}{V^*_t}-\rho\right)V^*_t}_{\text{ROW Equity}} + \underbrace{(r^*_t-\rho)B_t}_{\text{Net Non-Equity}} + \underbrace{\left(\frac{W_tL_t}{H_t}-\rho\right)H_t}_{\text{Human Wealth}}$$

- On BGP, $CA_t = \bar{g}B_t$
- Fluctuations in D_t, D^*_t, W_tL_t due to cyclical fluctuations in current output and investment $\Rightarrow$
  - These effects dominant in standard international business cycle models
- Changes in V_t, V^*_t, H_t due to changes in profits and in r^*_{t+1} and $\bar{g}_{t+1}$
  - These effects small in standard international business cycle models
- Note: human wealth H_t is very big $\Rightarrow$ need $r^*_{t+1} - \bar{g}_{t+1}$ close to constant to avoid massive fluctuations in CA_t.

Sensitivity Analysis

- Closed Economy macro finance models do not use current account data
- Valuation multiple, the earnings yield, and Tobin's Q

$$r^*_{t+1} - \bar{g}_{t+1} = \frac{E_{t+1}}{V_t} - \bar{g}_{t+1}\frac{Q_t K_{t+1}}{V_t}$$

- Farhi and Gourio (2018), Crouzet and Eberly (2021) etc. make assumptions about $\bar{g}_{t+1}$ or $r^*_{t+1} - \bar{g}_{t+1}$ to "identify" r^*_{t+1}
- We try four alternative "identifying" assumptions
  - $r^*_{t+1} - \bar{g}_{t+1}$ constant
  - $\bar{g}_{t+1}$ given by HP trend
  - $\bar{g}_{t+1}$ given by SPF 10 year growth forecast
  - $r^*_{t+1} - \bar{g}_{t+1}$ equal realized D_{t+1}/V_t
- Similar r^*_{t+1} and μ_{t+1} across all five assumptions

Sensitivity Analysis