

The End of Privilege

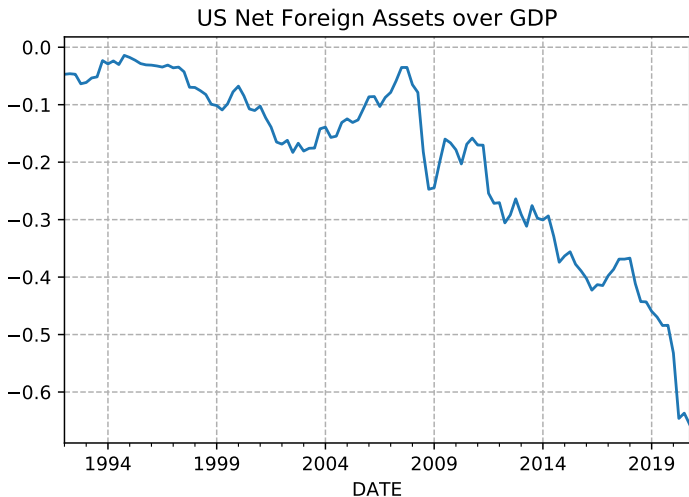
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The views expressed herein are those of the authors and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

Unprecedented Decline in US NFA in Last Decade



Part 1: What's Going On?

- **Original view emphasized current account**
 - NFA dynamics reflect national saving
 - e.g. US savings low in 1980s \Rightarrow current account deficits \Rightarrow deterioration in US NFA
 - But recently modest CA deficits + rapidly deteriorating NFA
- **Newer view recognizes returns matter**
 - US earns higher returns on foreign assets than it pays on liabilities \Rightarrow run CA deficits without blowing up the NFA
 - US seemed to enjoy this privilege for a long time
 - Literature emphasized US foreign assets high return risky assets, liabilities low return Treasuries (Gourinchas & Rey 2007, Mendoza, Quadrini & Rios-Rull 2009)
 - **But if US enjoys excess returns, why are NFA tanking?**

Our Reassessment

- US privilege is over!
- In last decade foreigners earned much higher returns on US assets than Americans earned on asset holdings abroad
- Differential relative returns mostly about **whose equity markets do better**, not about equity vs. bond positions
- **US equity surged over past decade, foreign equities did not**

Part 2: Welfare Implications?

- What are the welfare implications of strong US asset price growth and resulting deterioration in NFA position?
- Need a **theory for the boom in US asset valuations**
- Turn to data and recent macro-finance literature for guidance
 - Farhi and Gourio (2018) open economy implications
- Our story: **rising markups & after-tax profits for US firms**
 - Under that interpretation, potentially large welfare costs associated with decline in US NFA
 - **Rising markups equivalent to a value-added tax to fund reparations to ROW**
- Other stories
 - Changing discount rates (P/E ratios)
 - Growing unmeasured capital

Part 1: The End of Privilege

Accounting for NFA Dynamics

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

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

Statistical discrepancy results from two ways to measure net lending abroad:
current or financial account

- Iterating yields

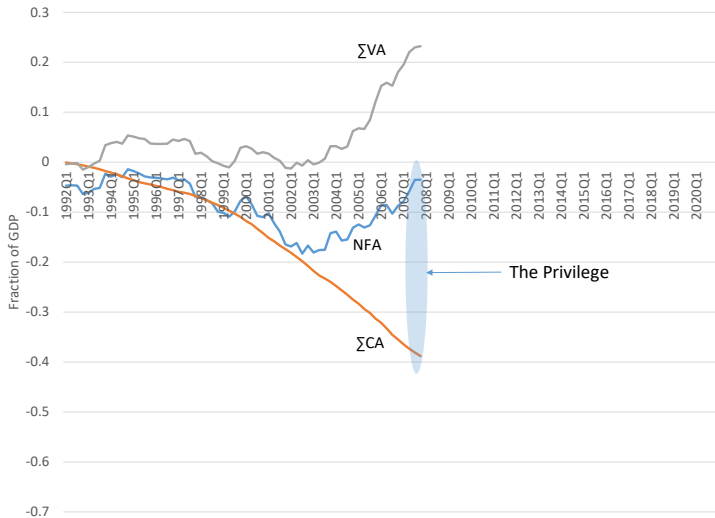
$$NFA_t - NFA_0 = \underbrace{\sum_{j=0}^t CA_j}_{\text{Cumulated CA}} + \underbrace{\sum_{j=0}^t VA_j}_{\text{Cumulated Valuations}} + \underbrace{\sum_{j=0}^t SD_j}_{\text{Cumulated SD}}$$

The Privilege

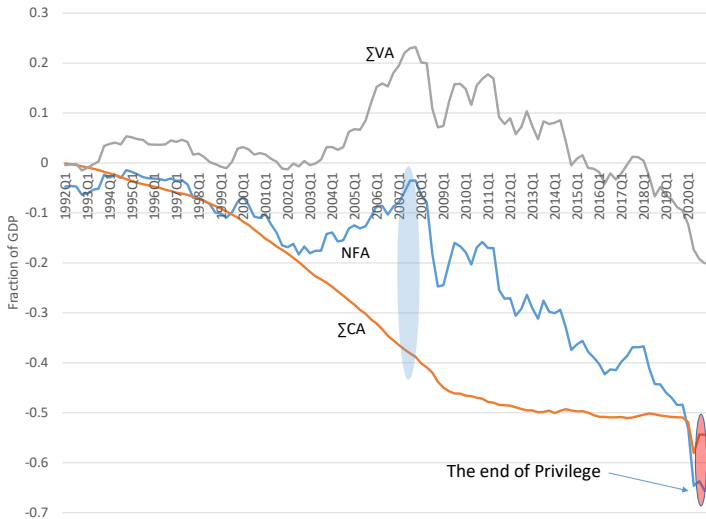
- Gourinchas and Rey (2007) emphasized importance of $\sum_{j=0}^t VA_j \gg 0$ in favor of the US (privilege)
- US can run current account deficits that are partly repaid by valuation changes

Current Account

The Privilege



The End of Privilege



Decomposing the Changes in the US NFA Position

	ΔNFA	$\sum CA$	$\sum VA$	$\sum SD$
1992-2007	0%	-39%	+23%	+16%
2010-2020	-44%	-8%	-32%	-4%

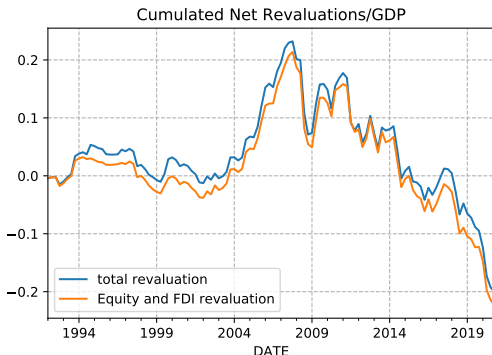
- 1992-2007: large deterioration of CA, offset by positive valuation
- 2010-2020: small deterioration of CA, **amplified** by negative valuation
- What's going on?

Digging into Valuation Effects

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

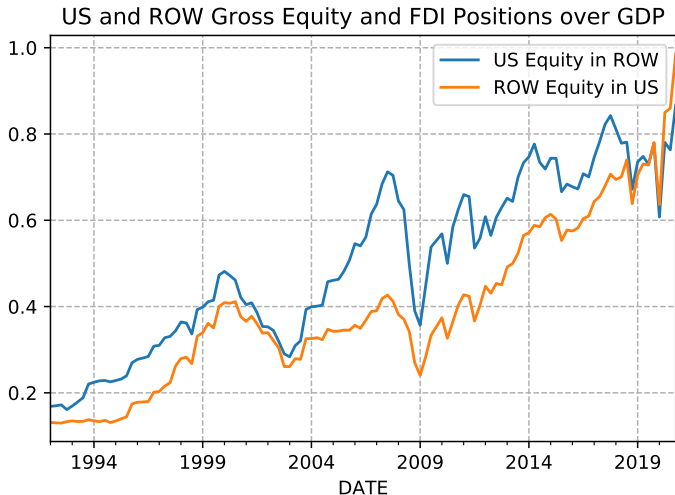
- For valuation effects to matter need:
 1. Large gross asset positions, $USFA_t$, $USFL_t$
 2. Big differences between $g_P^{t,t+1}$ and $g_{P^*}^{t,t+1}$
- Valuation effects almost entirely driven by equity
 - Portfolio and FDI
- Gross equity positions are **large**
- Gross equity positions are **roughly balanced**
- **US equity surged over past decade, foreign equities did not**

Valuation Effects Only in Equity & FDI



- Large international variation in prices of outstanding equity portfolios, little variation in valuation of bonds (see also Maggiori et al., 2020)

Gross Equity Positions Large and Roughly Balanced

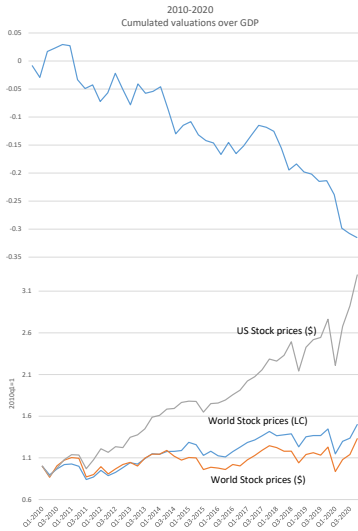
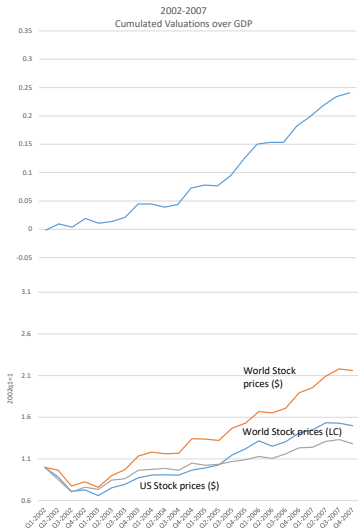


What drives equity valuations?

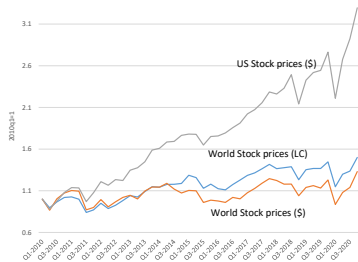
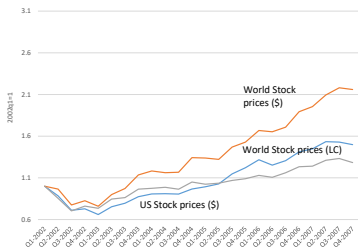
Two key candidate drivers

- Exchange rates
- Stock prices

Two valuation episodes



Two valuation episodes



- 2002-2007: Equity valuations favor US, mostly driven by USD depreciation
- 2010-2020: Equity valuations against US, mostly driven by US stocks outperforming foreign stocks

BEA Gross Equity Revaluations

NFA Dynamics Summary

- US NFA position fell from **-20% of GDP in 2010 to -65% in 2020**
- Current account deficits accounted for only around 10pp of this decline
- **Dominant driver (35pp) was equity revaluation effects**
- In turn reflecting strong performance of US stock market, coupled with large international gross equity / FDI positions

Part 2: What does this mean for Americans?

Interpretations of Rising US Asset Values

1. Rising US markups and profitability

- 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"*
- Consistent with de Loecker, Eeckhout, Unger (2020), Akcigit et al. (2021), Philippon (2019) evidence on rising market power
- Consistent with Karabarbounis, Neimann (2014, 2018) evidence on decline in labor share, rise in factorless income
- Consistent with Gutierrez and Philippon (2017) evidence on weak investment growth, notwithstanding low interest rates

2. Changing Discount Factors (rising PE ratio)

3. Rising Investment in Unmeasured Capital

Our Approach

- Build a simple quantitative macro finance model that can incorporate these factors
- Extend it to an international setting
- Use evidence on all standard valuation metrics to identify roles of alternative drivers of rising asset values
- What combination of changes in markups, interest rates, and growth rates best accounts for observed changes in:
(i) P/Y , (ii) P/K , (iii) P/D & (iv) P/E ?
- What are the corresponding implications for the NFA position and for US welfare?

Model

- Start with a simple tractable model
- Model US as small open economy, fixed world interest rate r^*
- Firms compete monopolistically:
 - equity prices reflect both value of physical capital and claims to future monopoly profits
- Fixed domestic-versus-foreign equity portfolios
- Free international trade in a risk-free bond
- Consider unanticipated permanent shock to markup due to productivity differential between leader and competitor firms
- also changes in discount factor and growth rates

Firms

- Final output is CES composite of intermediate varieties

$$Y_{corp} = \left(\int_0^1 Y_i^{\frac{\epsilon-1}{\epsilon}} di \right)^{\frac{\epsilon}{\epsilon-1}}$$

- $Y = Y_{corp} + Y_{noncorp}$ used for consumption and investment
- Y_{corp} is 57% of total output: can be owned by ROW
- Each variety i can be produced by
 - single **leader firm** with productivity z_H
 - competitive fringe of **followers** with productivity z_L

$$Y_i = zK_i^\alpha (ZL_i)^{1-\alpha}$$

- Firms rent capital at rate R and labor at rate W
- Growth in labor productivity Z at rate g

Firms

- Leader firms produce all output in equilibrium
- Gross markups are given by

$$\mu = \min \left\{ \frac{\varepsilon}{\varepsilon - 1}, \frac{z_H}{z_L} \right\}$$

- Assume parameters s.t. $\mu = \frac{z_H}{z_L}$: leaders engage in **limit pricing**:
 - produce just enough to drive p_i down to followers' unit cost, discourage entry
- Other firms make investment decisions and rent out capital

$$\max_{\{K_{t+1}\}} E \sum_{t=0}^{\infty} \frac{1}{(1+r^*)^t} [R_t K_t + (1-\delta)K_t - K_{t+1}]$$

US Households

- Preferences

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

where

$$u(C, L) = \frac{\left(C - Z \frac{L^{1+\sigma}}{1+\sigma} \right)^{1-\gamma}}{1 - \gamma}$$

- GHH preferences make labor supply independent of consumption

Portfolios

- US Households hold fixed fractions λ and λ^* of domestic and foreign firms
- Trade risk free bonds internationally that pay r^*

$$C_t + B_{t+1} = W_t L_t + B_t + r^* B_t + \lambda D_t + \lambda^* D_t^*$$

where

$$D_t = R_t K_t + (1 - \delta) K_t - K_{t+1} + \Pi_t$$

- Equity valued at the discounted present value of dividends at world discount rate r^*

Equilibrium Factor Shares, Earnings, and Dividends

- Firm FOCs plus symmetry across varieties gives factor income shares

$$\frac{R_t K_t}{Y_{corp,t}} = \frac{\alpha}{\mu}$$
$$\frac{W_t L_t}{Y_{corp,t}} = \frac{1 - \alpha}{\mu}$$

- Rest of output is monopoly profits (factorless income)

$$\Pi_t = \frac{\mu - 1}{\mu} Y_{corp,t}$$

- Optimal investment + FOC for labor supply

$$R_t = r^* + \delta$$
$$W_t = Z_t L_t^\sigma$$

- Dividends and Earnings

$$D_t = Y_{corp,t} - W_t L_t - I_t$$
$$E_t = Y_{corp,t} - W_t L_t - \delta K_t$$

Asset Values

- Firm value is discounted present value of dividends

$$P_t = \sum_{j=1}^{\infty} \frac{D_{t+j}}{(1+r^*)^j}$$

- Equals capital stock plus discounted value of monopoly profits

$$P_t = K_{t+1} + \sum_{j=1}^{\infty} \frac{\Pi_{t+j}}{(1+r^*)^j}$$

Asset Values on a Balanced Growth Path

1. Buffett Ratio: $\frac{P}{Y} = \frac{K'}{Y} + \frac{1}{r^* - g} \frac{\mu - 1}{\mu}$

2. Capital-Output Ratio: $\frac{K}{Y_{corp}} = \frac{1}{r^* + \delta} \frac{\alpha}{\mu}$

- Tobin's Q implied by these two ratios

3. Earnings-Price Ratio: $\frac{E'}{P} = r^* + g \left(\frac{K'}{P} - 1 \right)$

4. Dividend-Price Ratio: $\frac{D'}{P} = r^* - g$

5. Labor Share: $\frac{WL}{Y_{corp}} = \frac{1 - \alpha}{\mu}$

- Dividend-output ratio implied by these ratios
- Five parameters and five moments

$$g, r^*, \mu, \alpha, \delta$$

What happened to these five valuation and macro ratios from 2010 to 2020?

- Corporate asset values increased by 150% of GDP [graph](#)
- Little change in K/Y ratio
- Large rise in P/E' ratio [graph](#)
- Little change in D'/P ratio [graph](#)
- Big increase in payouts over output [graph](#)

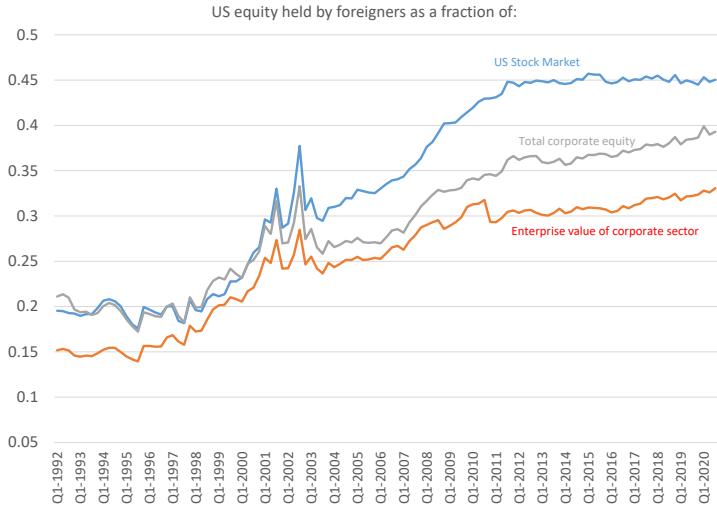
What Drove The Change in Asset Valuations?

- Choose r^* , g and μ to match asset valuations pre and post 2009

	Parameters			Moments	
	pre 2009	post 2009		pre 2009	post 2009
g	3.4%	1.75%	PE Ratio	17.5	27
r^*	6.4%	4.75%	D/P Ratio	3%	3%
μ	1.0155	1.102	Buffett Ratio	1.5	3
α	0.34		Capital/Output	1.20	1.21
δ	0.10		Labor Share	0.65	0.60

- Require a large increase in μ to match Buffett Ratio
- Need parallel drop in r^* and g by 1.65% to match DP and PE ratios
- Implications for NFA and welfare depend on ROW share of US Equity

Foreign Share of US Equity



Calibration of Portfolios and Labor Supply

- Pre-shock US has balanced equity position, negative net debt:

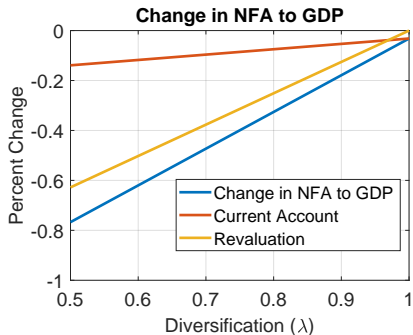
$$\begin{aligned}\frac{B_0}{Y_0} &= -0.2 \\ (1 - \lambda)P_0 &= \lambda^*P_0^*\end{aligned}$$

- $\lambda = 0.7$ based on equity + FDI diversification measure
- Assume ρ s.t. household wants consumption growth at rate g

$$1 = \frac{(1 + r^*)}{(1 + \rho)}(1 + g)^{-\gamma}$$

- \Rightarrow Shock changes level of consumption, not growth rate
- Set labor supply elasticity $\sigma = 2$
- Assume capital can be instantly reallocated following the shock
 \Rightarrow transition is immediate

Impact of Markup Shock on NFA



- K goes up slightly (lower r^* outweighs higher μ), K^* goes up more
- US households borrow to offset reduced dividends
- ROW equity in US revalued by $(1 - \lambda)\Delta P/GDP$
- Data: NFA fell from -20% to -65% GDP between 2010 & 2020

Welfare Effects of Markup Shock

- What are the welfare effects, how do they depend on λ ?
- Let ω be permanent percent increase in argument of utility given μ that leaves domestic households indifferent between μ and $\mu' = \eta$

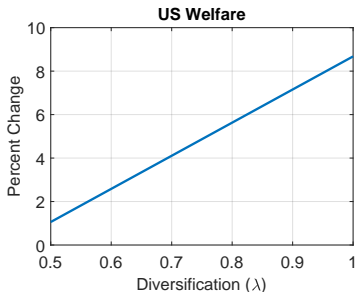
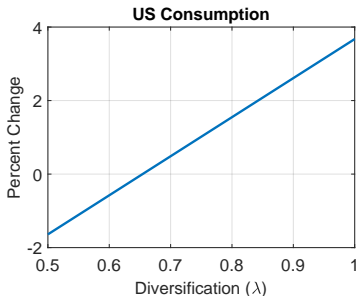
$$\omega = \frac{\left(\frac{(1-\alpha)}{\eta} + \lambda \frac{\eta^{-1}}{\eta} - \frac{1}{1+\sigma} \frac{1}{\eta} (1-\alpha) \right) - \left(\frac{(1-\alpha)}{\mu} + \lambda \frac{\mu^{-1}}{\mu} - \frac{1}{1+\sigma} \frac{1}{\mu} (1-\alpha) \right) \frac{Y'}{Y}}{1 - (\delta + g) \frac{\alpha}{\mu} \frac{1}{r+\delta} + (r - g) \frac{B_0}{Y_0} - \frac{1}{1+\sigma} \frac{1}{\mu} (1-\alpha)}$$

- Denominator is flow utility in baseline steady state
- Terms in the numerator:

1. decline in labor earnings: $\frac{(1-\alpha)}{\mu} Y \rightarrow \frac{(1-\alpha)}{\mu'} Y'$
2. rise in domestic profit income: $\lambda \frac{\mu^{-1}}{\mu} Y \rightarrow \lambda \frac{\mu'^{-1}}{\mu'} Y'$
3. rise in value of leisure: $-\frac{1}{1+\sigma} \frac{(1-\alpha)}{\mu} Y \rightarrow -\frac{1}{1+\sigma} \frac{(1-\alpha)}{\mu'} Y'$

- (Changes to r^* and g introduce couple of extra terms: income from renting capital and bonds changes)

Consumption and Welfare Impact



- When $\lambda = 1$ gain from rise in markups due to rise in leading firm productivity is **8.7%** of consumption
- When $\lambda = 0.7$ gain is cut in half to **4.1%** of consumption!

Unmeasured Investment and Asset Values?

- Production required measured and unmeasured capital

$$Y = K_U^{(1-\nu)} (K_M^\alpha L^{1-\alpha})^\nu$$

$$Y_M = Y - I_U$$

- Asset Valuation

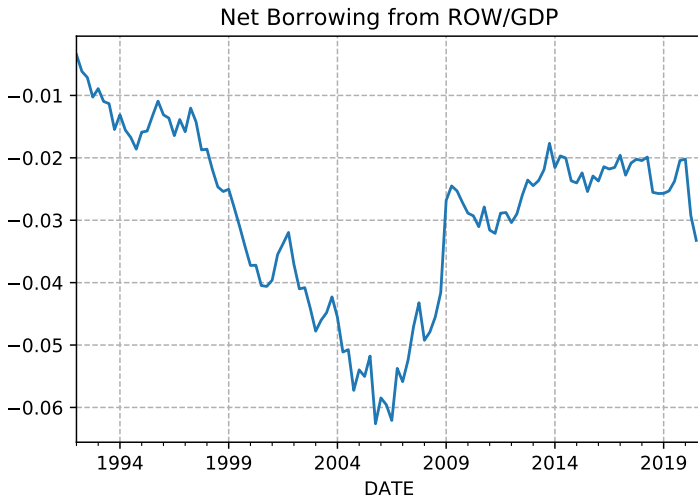
$$P = K'_U + K'_M$$

- Increase in Asset Values driven by shock to share of unmeasured capital?
- Isomorphic to markup increase in closed economy
- But to raise P/Y by a lot requires a huge increase in total investment
- Implies massive current account deficits
- Foreign ownership of US firms does not matter for welfare since increase in asset values requires investment

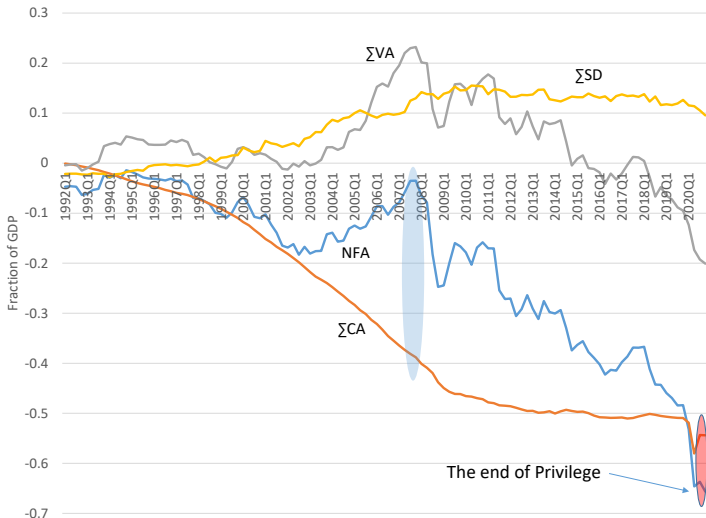
Wrapping Up

- Dynamics of US NFA driven by US vs. ROW equity values
- Explore alternative drivers of US vs. ROW asset values
 - Can international evidence – current account dynamics etc. – help discriminate between alternative theories?
 - How do alternative drivers of asset values change the welfare implications?
- Unanticipated Shocks to Markups much worse welfare implications with foreign ownership of US firms
- Including shocks to discount and growth rates does not change these welfare implications
- Shocks to investment opportunities do not have these welfare implications
 - but imply huge current account deficits to fund unmeasured investment

US Current Account

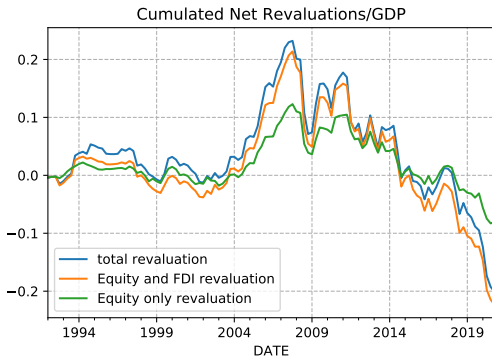


Statistical Discrepancy



- Statistical Discrepancy plays almost no role in NFA dynamics over past 10 years [back](#)

Valuations in FDI and Portfolio



- Large valuations changes both in FDI and portfolio investments

back

Asset Values

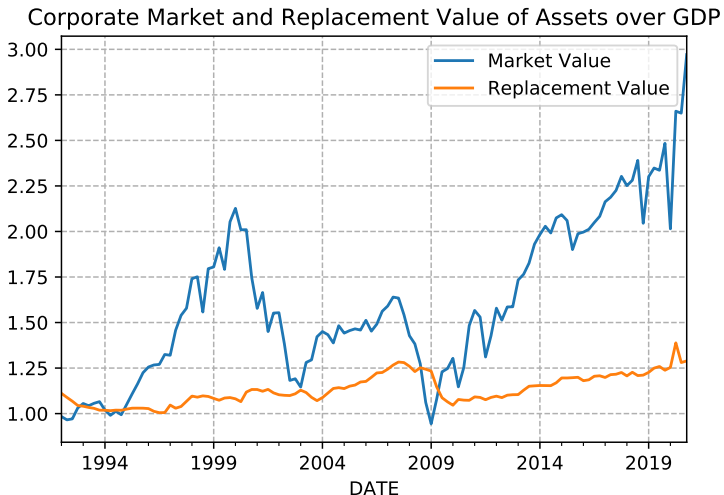
- Flow of Funds reports **market value and replacement cost** of non-financial assets in US
- **Tobin's Q** = market value / replacement cost
- Focus on **corporate sector**: this is what foreigners can buy

Corporate Sector Balance Sheet

Assets	Liabilities
Market value of non-financial assets = Enterprise value	Market value of equity
Financial assets	Financial liabilities (debt, bank loans etc)

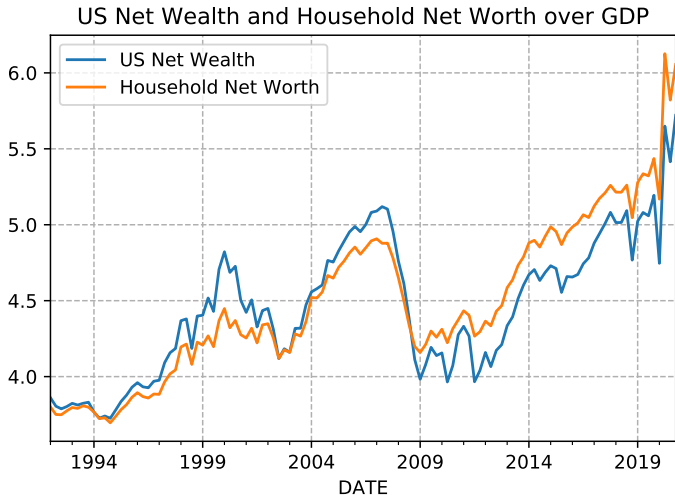
- **Dividends = Output - Wages - Investment - Corp. Taxes - IBT**

Market Valuations of US Corporations Have Boomed

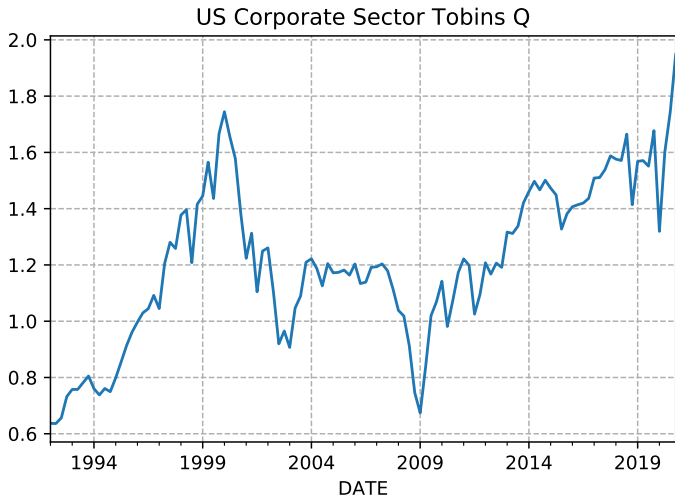


Americans Are Richer Than Ever

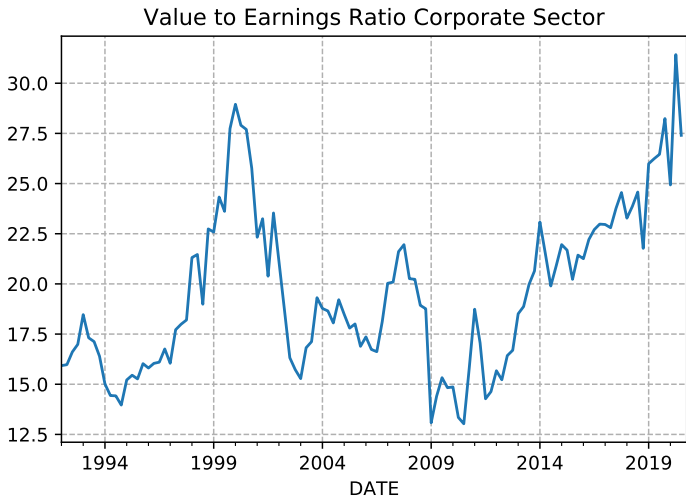
Why Aren't We Happy?



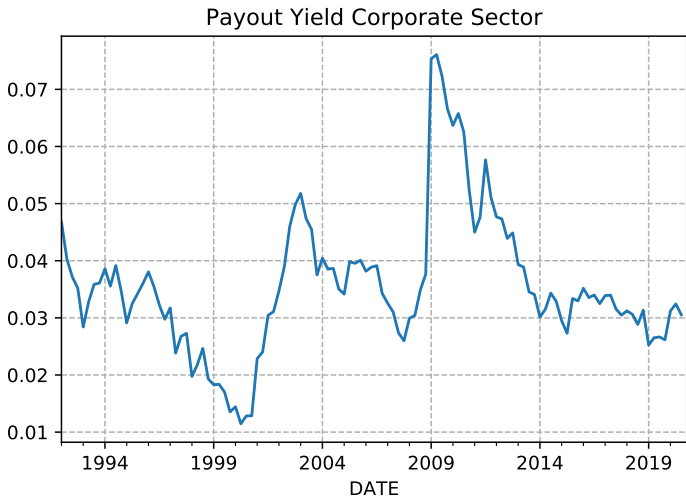
Corporate Sector Tobin's Q has risen



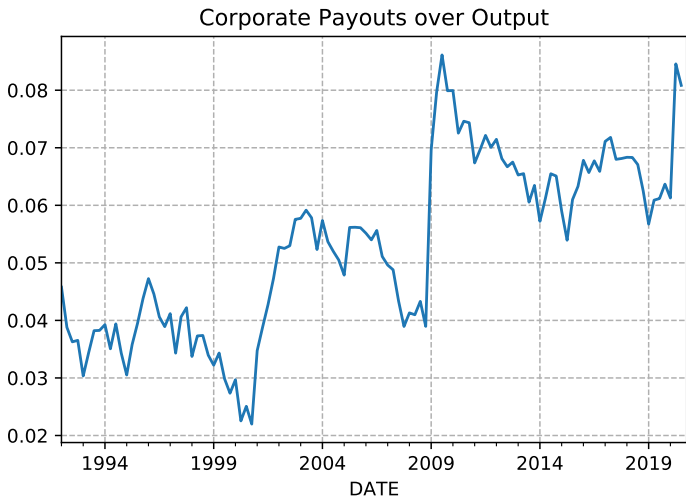
Price-Earnings Ratio Corporate Sector



Dividend-Price Ratio Corporate Sector



Falling labor share, corporate taxes, and weak investment implies bigger payouts



BEA Measured Gross Equity Revaluations

