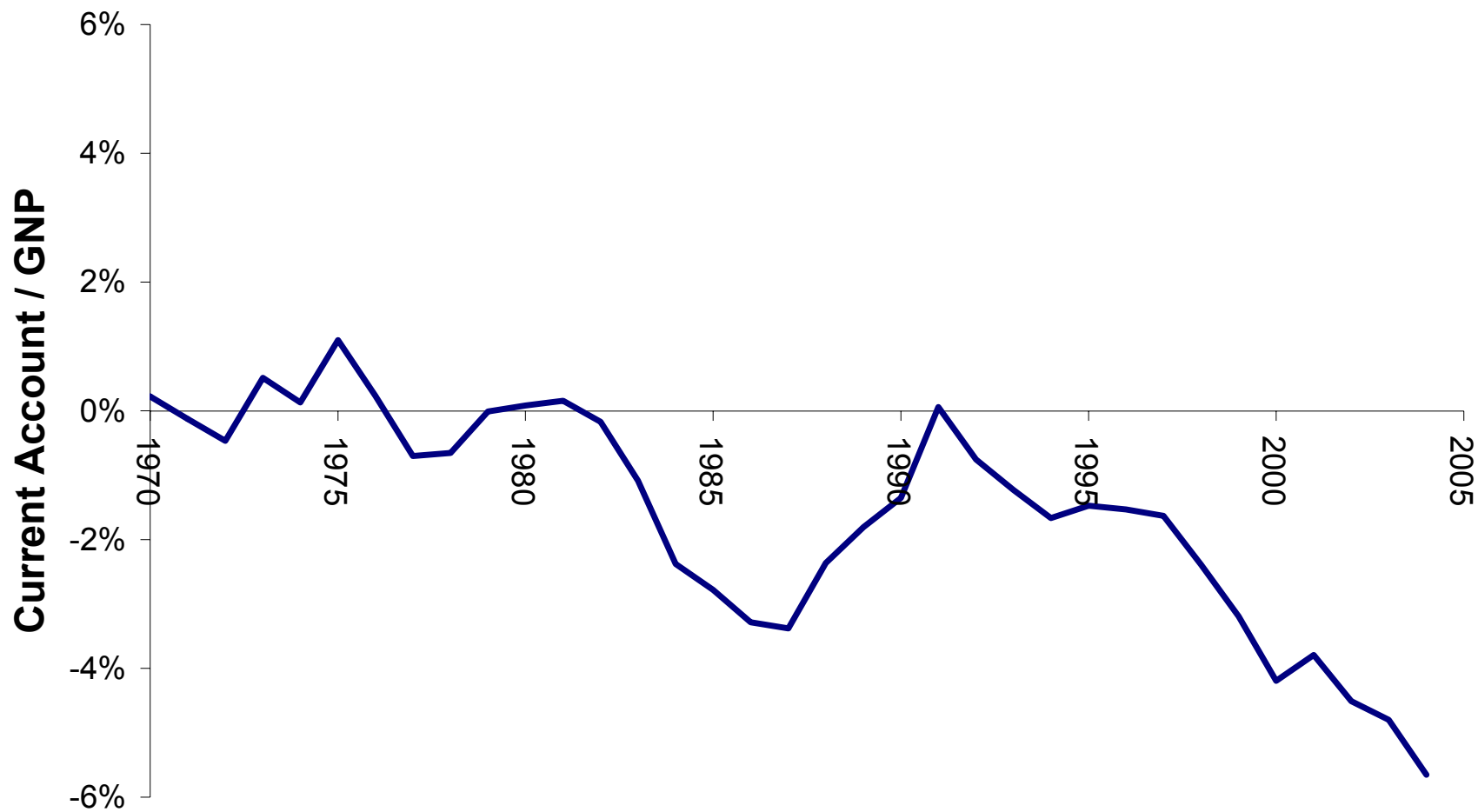


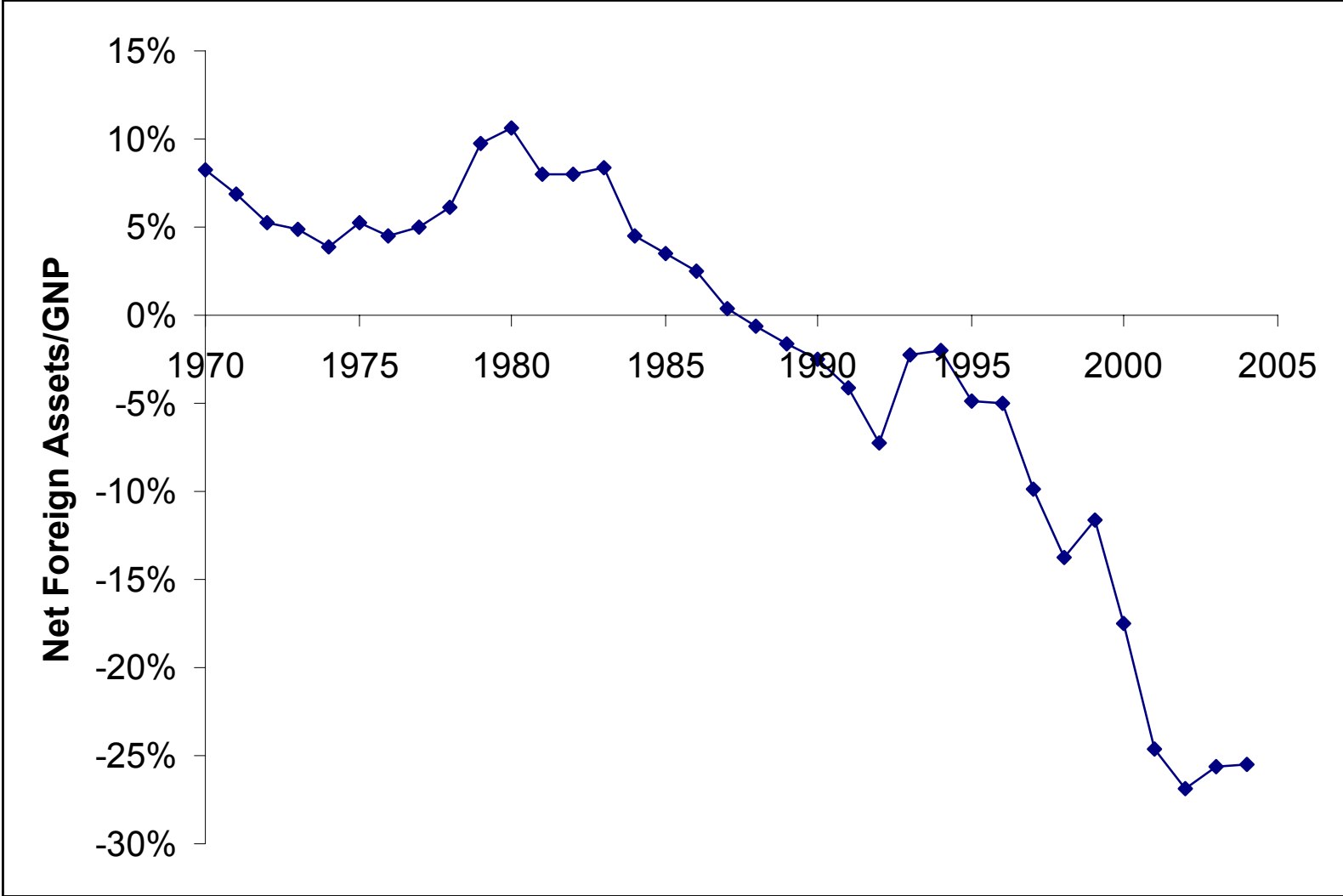
Key Facts

- Large current account deficits since mid-1990s
- Large and persistent decline in US net foreign assets
- Began as equity-driven decline (“dot-com” bubble”)
- Has transformed into debt-driven decline (“Bush” deficits)

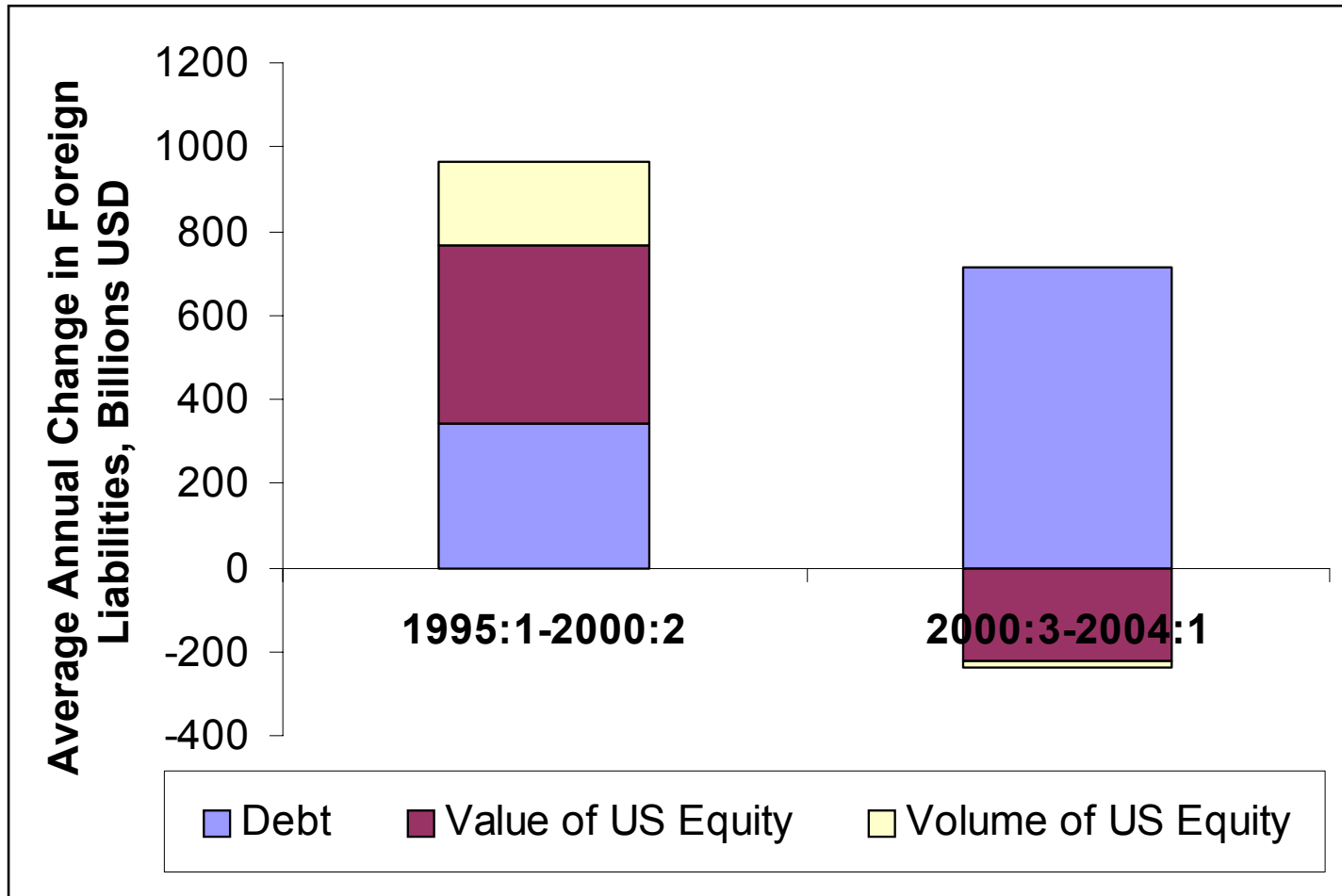
US Current Account Balance



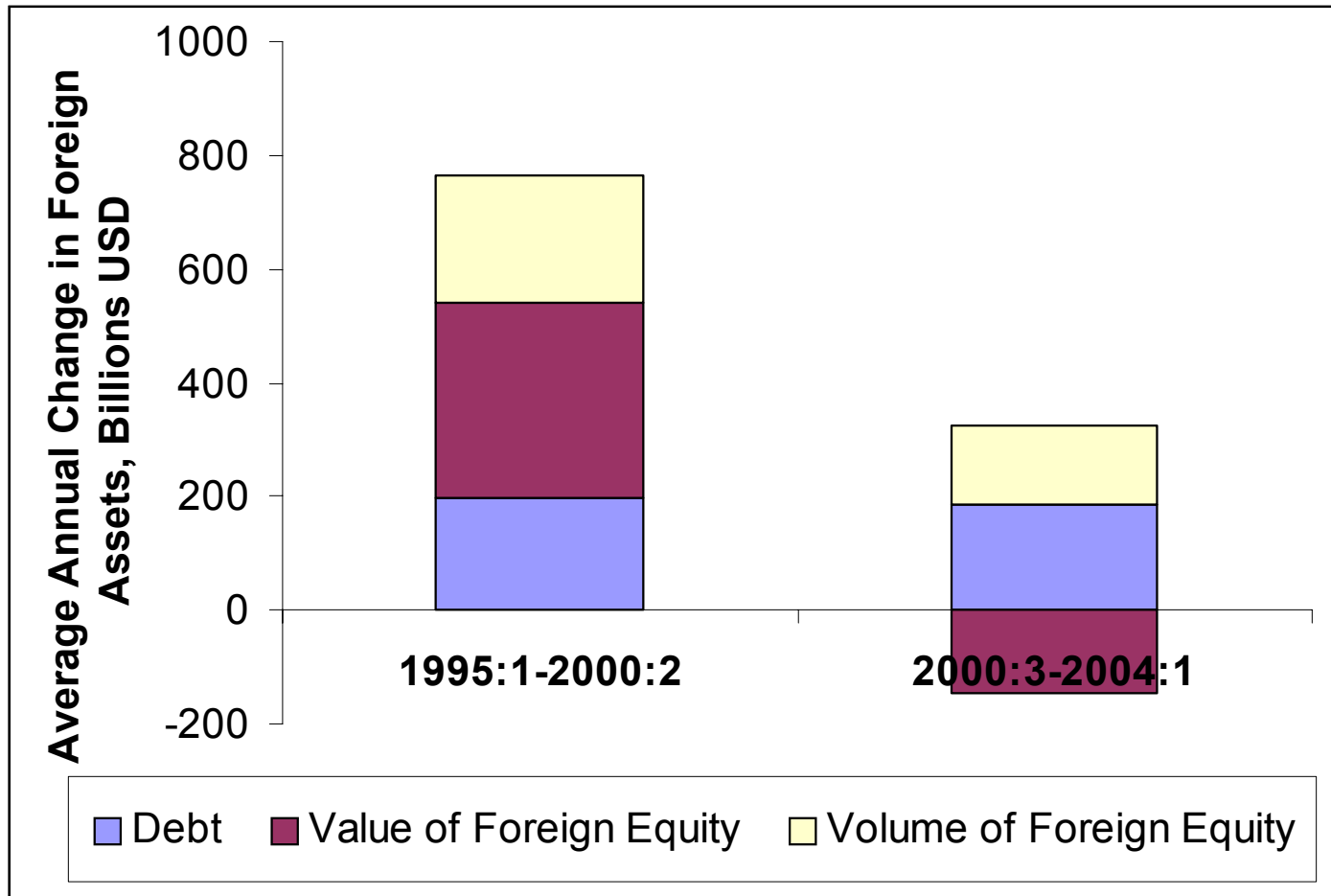
US Net Foreign Assets



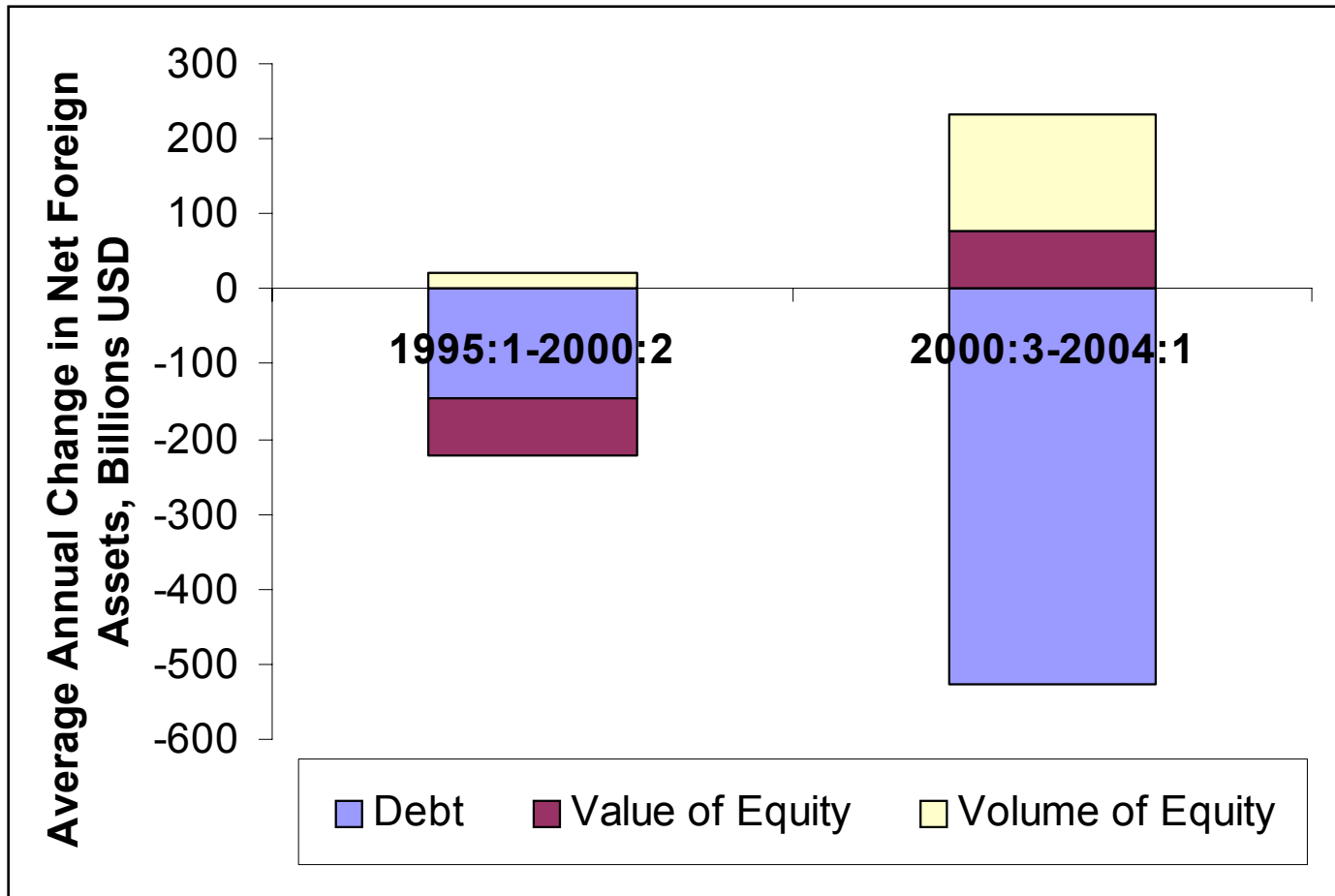
Change in US Foreign Liabilities



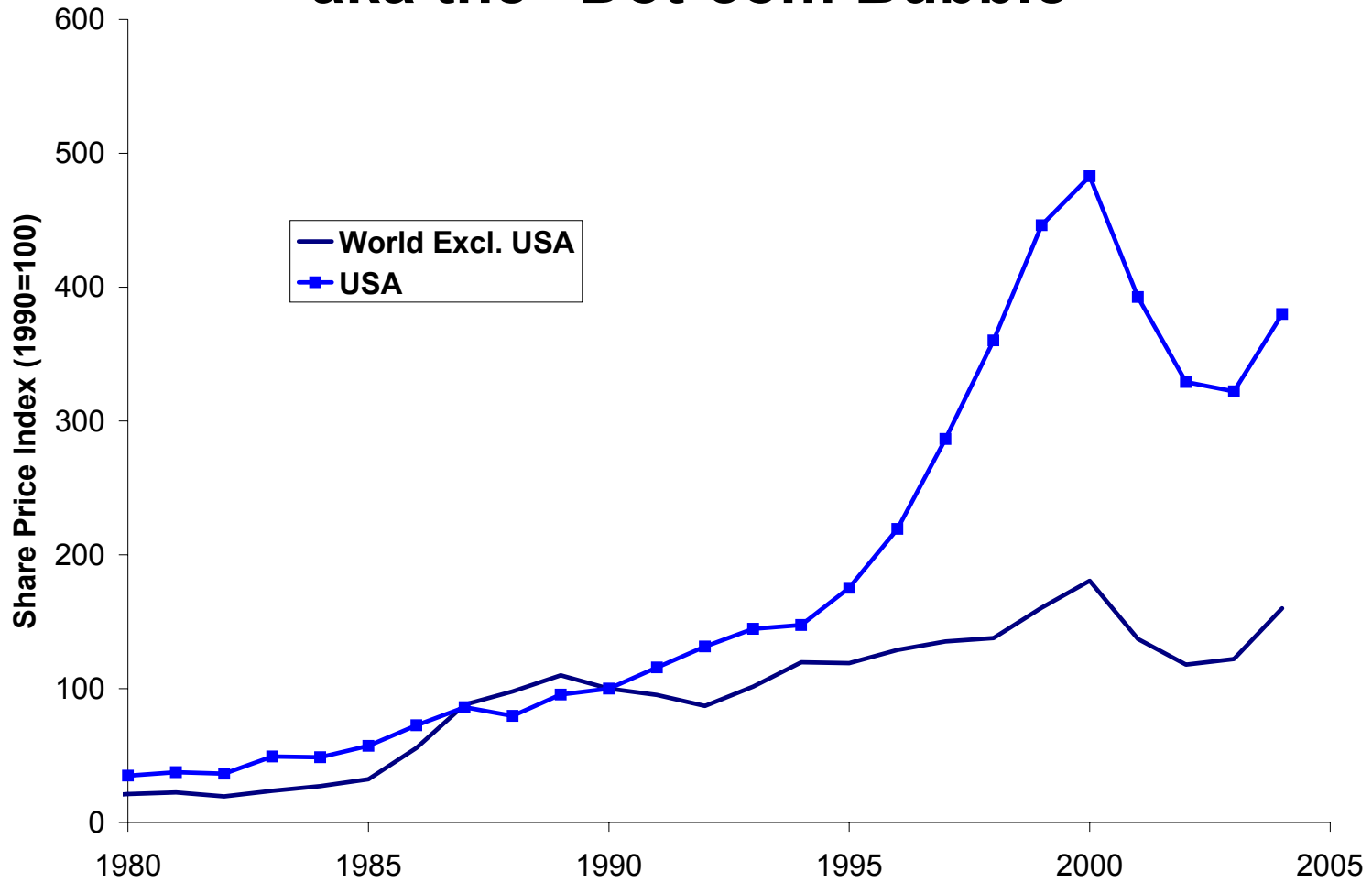
Change in US Foreign Assets



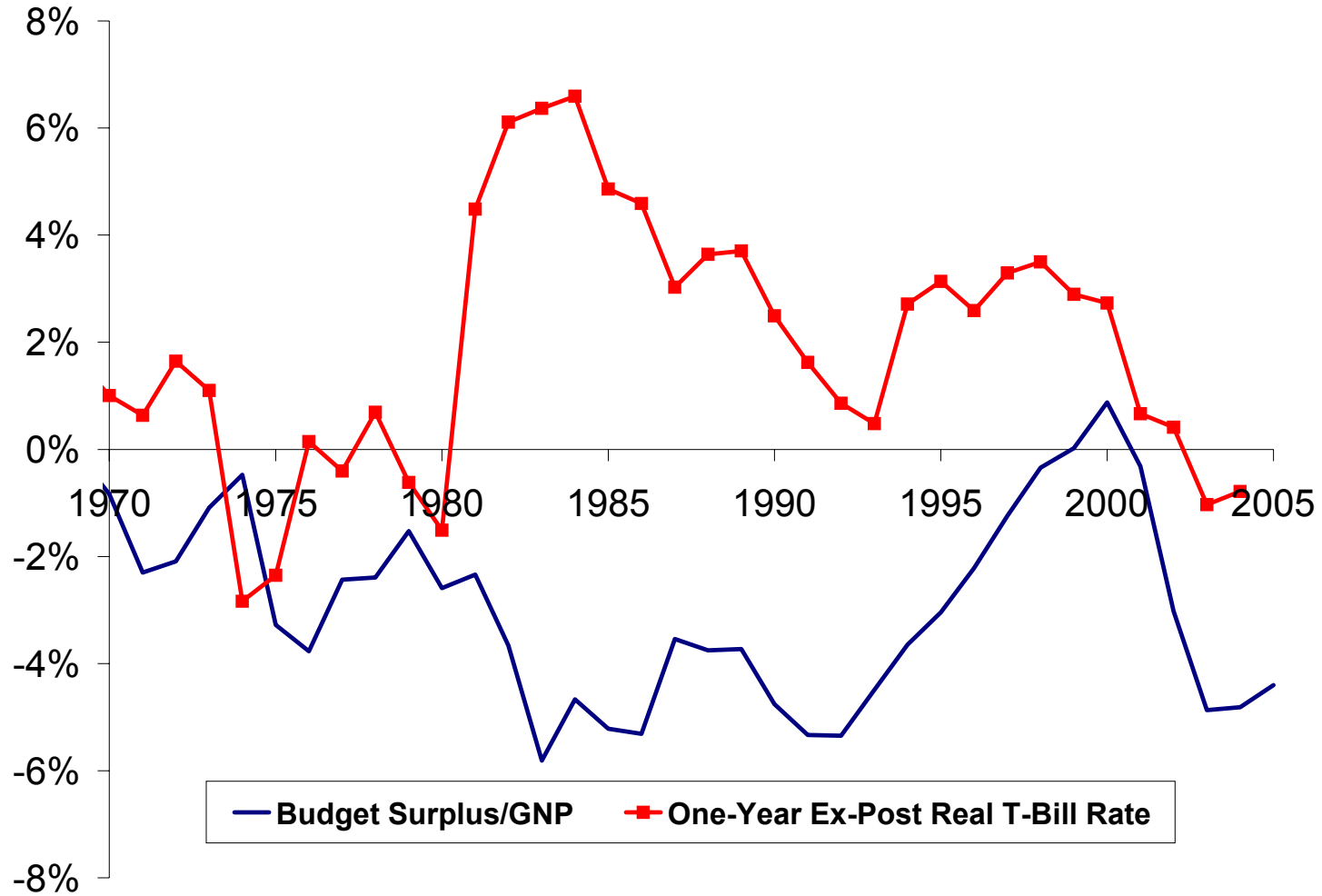
Change in US Net Foreign Assets



Stock Market Boom of the 1990s, aka the “Dot-com Bubble”



Budget Deficits and Interest Rates



The Conventional Wisdom

- high US productivity in 1990s, reversal in 2000s
- exogenous shift to large budget deficits
- something must give....

- Problems with the conventional wisdom
 - how to explain movements in stock market (neither cost nor quantity of capital increased 4-fold in 1990s)
 - decline in real interest rates during massive fiscal expansion (“glut of savings”)

Alternative Views

- financial frictions → “pockets” of inefficiency
 - bubbles and/or public debt usefully displace inefficient investments
 - stock market bubble in 1990s eliminates inefficient investments
1. Benevolent View
 - expansion of public debt a welfare-improving response to exogenous collapse of bubble
 2. Cynical View
 - opportunistic expansion of public debt bursts bubble and allows government to expropriate owners of bubble at home and abroad

Basic Model with Debt and Capital

- Two regions, US and ROW
- OLG of size one that maximize $E_t C_{t+1}$
- Endowment income when young is γ^t in US and ROW

Investment Options:

1. Government debt which yields interest rate r_t ;
2. Build self-financed firm and get expected return π ;
3. Buy stocks from publicly traded firm and get $\pi - \alpha$.

Assumptions

- Entrepreneurs choose 1 or 2, shareholders choose 1 or 3
- Economy is productive ($\pi > \gamma$), and financial frictions are small ($\pi - \alpha > \gamma$)

Basic Model, Cont'd

- Consumption and welfare

$$E_t C_{i,t+1} = \begin{cases} \max\{\pi, r_{t+1}\} + E_t T_{i,t+1} & \text{if } i \in E \\ \max\{\pi - \alpha, r_{t+1}\} + E_t T_{i,t+1} & \text{if } i \notin E \end{cases}$$

- Debt accumulation

$$D_{t+1} = \frac{r_{t+1}}{\gamma} \cdot D_t + \sum_{i \in \mathcal{U}^*} T_{i,t+1} \quad r_{t+1} = \begin{cases} \pi - \alpha & \text{if } D_t < 1 - \varepsilon \\ [\pi - \alpha, \pi] & \text{if } D_t = 1 - \varepsilon \\ \pi & \text{if } D_t > 1 - \varepsilon \end{cases}$$

- World capital stock: $K_t = 1 - D_t$
- US net foreign assets: $NFA_t = (0.5 - \delta_t) \cdot D_t + (0.5 - \kappa_t) \cdot K_t$

Conventional Wisdom

- Second half of 1990s: An increase in the share of good investment projects located in the US (expansion of IT sector, instability in emerging markets). That is, an increase in κ_t or ε_t
 - unravels with collapse of stock market
- First half of the 2000s: A large US fiscal expansion (more spending, less taxes). That is, an increase in δ_t .
 - expansion is unsustainable and will require adjustment

Sustainability and Welfare

- Deficits cannot continue forever
 - interest rate exceeds growth rate, and increases with level of debt
 - debt crowds out shareholders, eventually entrepreneurs
 - world savings are fixed, so reversal is required
- Fiscal expansion raises welfare of current US generations at expense of future generations
- High interest rates are a positive spillover to ROW

Problems with Conventional View

- How to explain 3-fold increase in stock market value?
 - stock market value = price x quantity of capital
 - reproducible capital \rightarrow price \leq cost
 - adjustment costs are small (Hall (2004))
 - where is large increase, then fall, in quantity?
 - non-reproducibe capital? (Hall (2001))
- Why does interest rate fall during huge fiscal expansion?
 - did π fall or α increase?
 - “glut of savings” (Asia, Oil?)
- “Dot-com” collapse followed by “Bush” deficits just a coincidence?

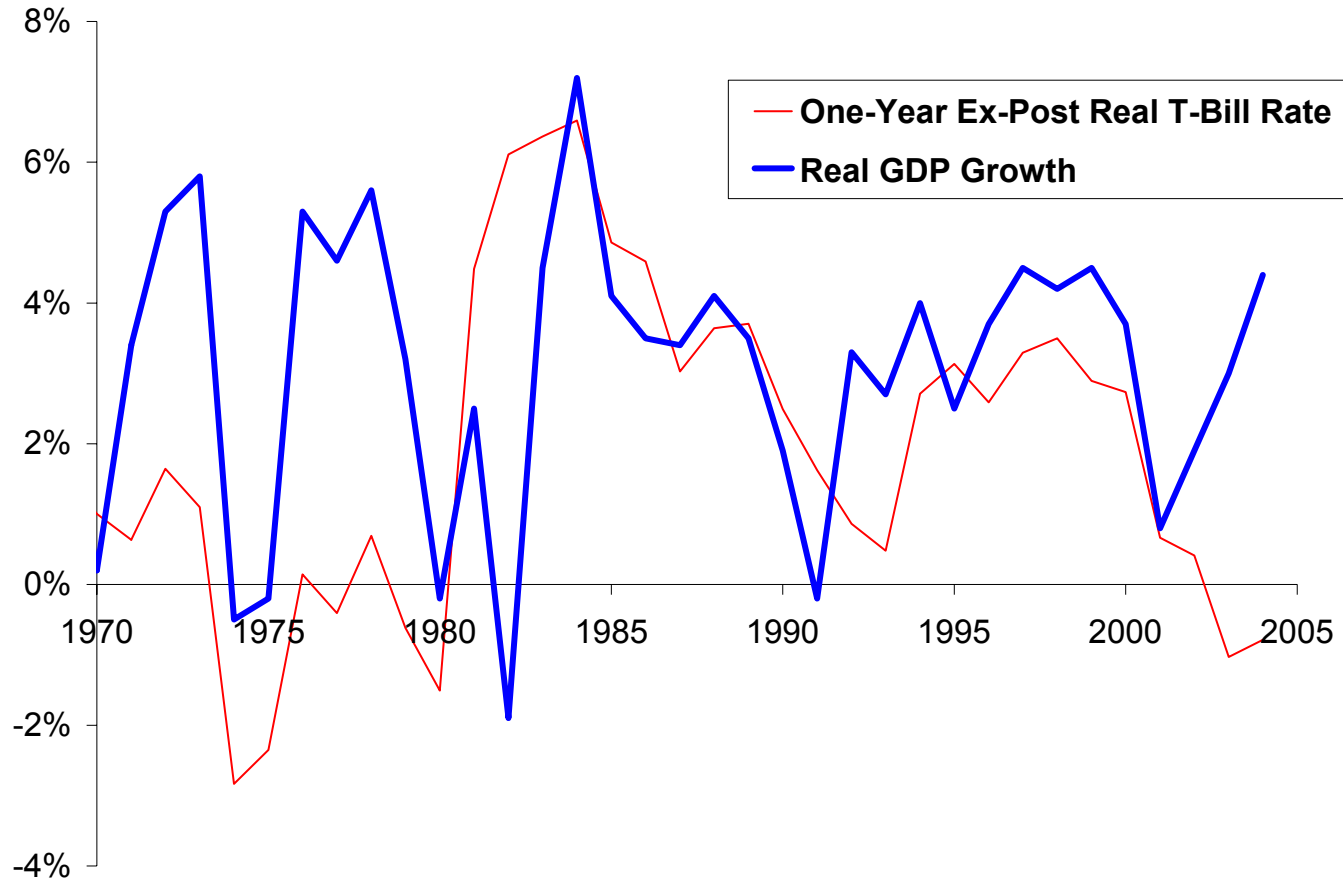
Financial Frictions and Asset Bubbles

- Can “bubbly” firms survive in stock market? Must satisfy:

$$\gamma \cdot \frac{E_t B_{t+1}}{B_t} \geq r_{t+1} \quad \text{if } B_t > 0 \quad \text{and } B_t \leq 1$$

- Bubbles cannot occur if $r_{t+1} > \gamma$
- But empirically interest rate is often below growth rate (financial frictions?)

Interest Rates and Growth Rates



Model with Debt, Capital, and Bubbles

- Stock market may contain bubbly firms
- Creation of bubbly firms is random, returns to creating bubble are pure rents
- Consumption and welfare:

$$E_t C_{i,t+1} = \begin{cases} \max \left\{ \pi, r_{t+1}, \gamma \cdot \frac{E_t \{B_{t+1} - N_{t+1}\}}{B_t} \right\} + E_t T_{i,t+1} + E_t N_{i,t+1} & \text{if } i \in E \\ \max \left\{ \pi - \alpha, r_{t+1}, \gamma \cdot \frac{E_t \{B_{t+1} - N_{t+1}\}}{B_t} \right\} + E_t T_{i,t+1} + E_t N_{i,t+1} & \text{if } i \notin E \end{cases}$$

Model, Cont'd

- Debt accumulation:

$$D_{t+1} = \frac{r_{t+1}}{\gamma} \cdot D_t + \sum_{i \in I \cup I^*} T_{i,t+1} \quad r_{t+1} = \begin{cases} \pi - \alpha & \text{if } D_t < 1 - \varepsilon - B_t \\ [\pi - \alpha, \pi] & \text{if } D_t = 1 - \varepsilon - B_t \\ \pi & \text{if } D_t > 1 - \varepsilon - B_t \end{cases}$$

- Bubble dynamics:

$$\frac{E_t \{B_{t+1} - N_{t+1}\}}{B_t} = \frac{r_{t+1}}{\gamma}$$

- World capital stock: $K_t = 1 - D_t - B_t$

- US net foreign assets:

$$NFA_t = (0.5 - \delta_t) \cdot D_t + (0.5 - \beta_t) \cdot B_t + (0.5 - \kappa_t) \cdot (1 - D_t - B_t)$$

Dynamic Inefficiency

- Young shareholders are a “pocket” of inefficiency
 - Return to investment: $(\pi - \alpha) \cdot (1 - \varepsilon)$
 - Cost of investment: $\gamma \cdot (1 - \varepsilon)$
 - “social contract”: young shareholders give endowment to old shareholders
 - all generations better off
 - old generation that starts “social contract” gets windfall
- How to implement this “social contract”?
 - “give” endowment to old by buying debt and/or bubbles
 - “receive” endowment of young by selling them when old

The “Benevolent” View

- Bubble driven by investor sentiment drives out inefficient investments (transition probability is λ):

$$B_t = \begin{cases} 0 & \text{if } S_t = L \\ 1 - \varepsilon - D_t & \text{if } S_t = H \end{cases}$$

- Benevolent government supplies debt only when needed to correct market failures

$$\sum_{i \in I} T_{i,t} = \begin{cases} T & \text{if } S_t = L \\ 0 & \text{if } S_t = H \end{cases} \quad T = \frac{\gamma - \pi + \alpha}{\gamma} \cdot (1 - \varepsilon)$$

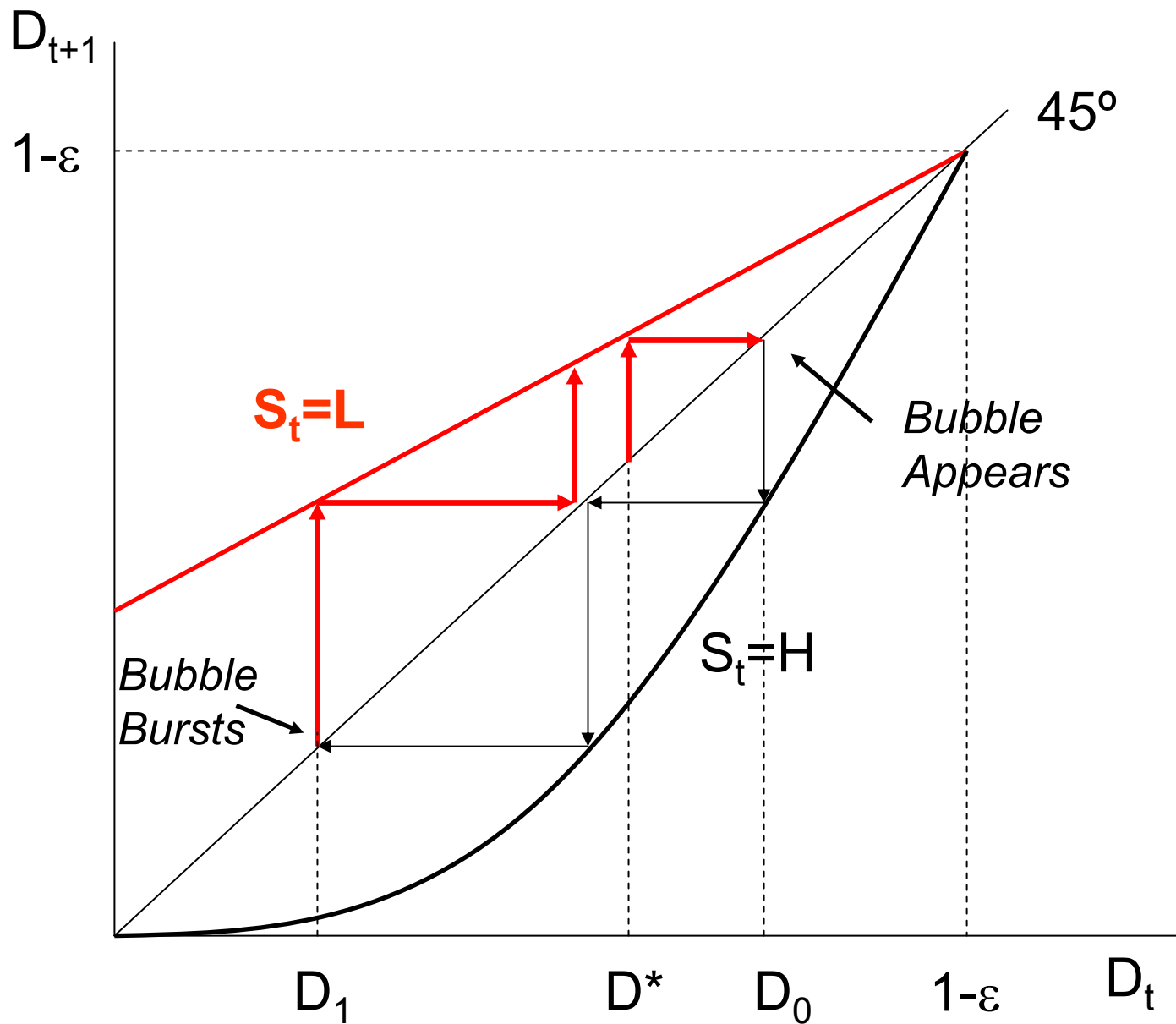
- Debt eventually crowds out shareholders (ROW has no debt and balanced budgets)

Benevolent View, Cont'd

- Start in “pessimistic” state: low interest rate, debt rises
- Bubble appears mostly in US; interest rate jumps (bubble and debt compete for same pool of savings); debt falls

$$r_{t+1} = \begin{cases} \pi - \alpha & \text{if } S_t = L \\ \frac{\gamma \cdot (1 - \varepsilon) \cdot (1 - \lambda)}{1 - \varepsilon - \lambda \cdot D_t} & \text{if } S_t = H \end{cases}$$

- Stock market booms (rents from bubble creation)
- Bubble collapses exogenously; debt rises again

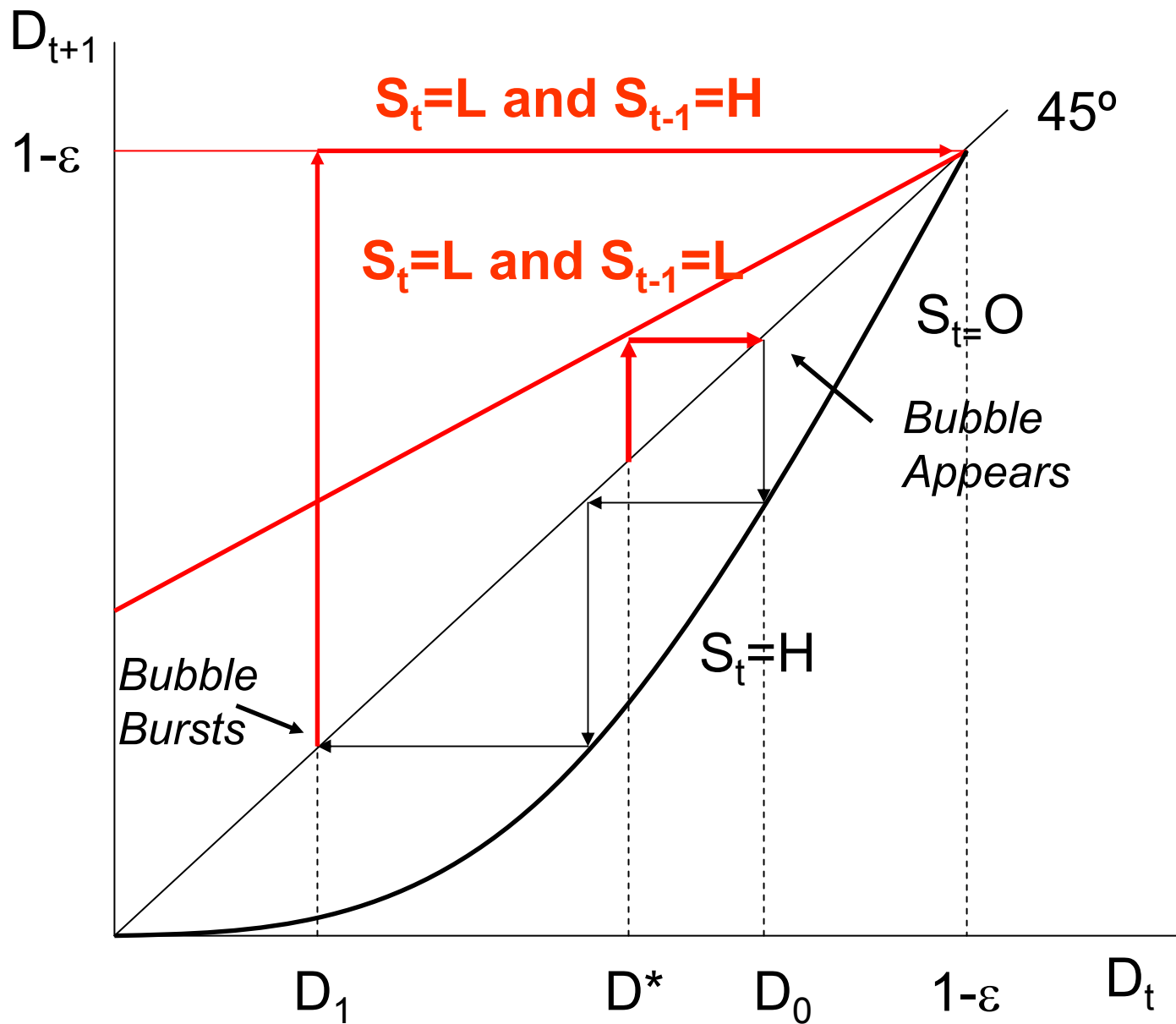


Sustainability and Welfare

- Current generation of old get windfall from supplying bubble (mostly in US), and all future generations benefit from higher interest rates
- Collapse of bubble hurts current generation of shareholders (who “pay” for breaking of social contract), all future generations hurt by lower interest rates
- Fiscal expansion offsets loss for US residents only, benefits all generations (unlike conventional view)
- Fiscal expansion is sustainable since $r_{t+1} < \gamma$, so that budget deficits and $NFA < 0$ can persist forever

Is the Benevolent View Right?

- Current US budget deficits are “too large”, debt stabilizes at above world savings!
- Modified benevolent view: supply enough debt to replace bubble quickly, then stabilize debt with small deficits
- Current generations earn most of “fee” (deficits) for providing useful asset to eliminate inefficient investment
- Empirically relevant?
 - Stock market decline 2000-03 = \$3 trillion
 - Projected debt expansion 2000-12 = \$2.6 trillion



The “Cynical” View

- “Opportunistic” government tries to appropriate value of bubble by crowding it out with debt (transition probability is ϕ)

$$\sum_{i \in I} T_{it} = \begin{cases} (1 - \varepsilon - D_t) & \text{if } D_t < 1 - \varepsilon \\ \frac{\gamma - \pi + \alpha}{\gamma} \cdot (1 - \varepsilon) & \text{if } D_t = 1 - \varepsilon \end{cases}$$

- Bubble can exist only in “optimistic” state with “altruistic” government

$$B_t = \begin{cases} 0 & \text{if } S_t = L \text{ or } G_t = O \\ 1 - \varepsilon - D_t & \text{if } S_t = H \text{ and } G_t = A \end{cases}$$

- Timing?

Benevolent and Cynical View

- Two views are observationally equivalent!
- Bubble appears under “altruistic” government that eliminates deficit
- Bubble bursts, deficits appear, and the interest rate falls:

$$r_{t+1} = \begin{cases} \pi - \alpha & \text{if } S_t = L \text{ or } G_t = O \\ \frac{\gamma \cdot (1 - \varepsilon) \cdot (1 - \eta)}{1 - \varepsilon - \eta \cdot D_t} & \text{if } S_t = H \text{ and } G_t = A \end{cases}$$

- Key difference is that change in type of government causes bubble to burst, engineers “beggar-thy-neighbour” transfer from ROW