Is the Stock Market Overvalued?

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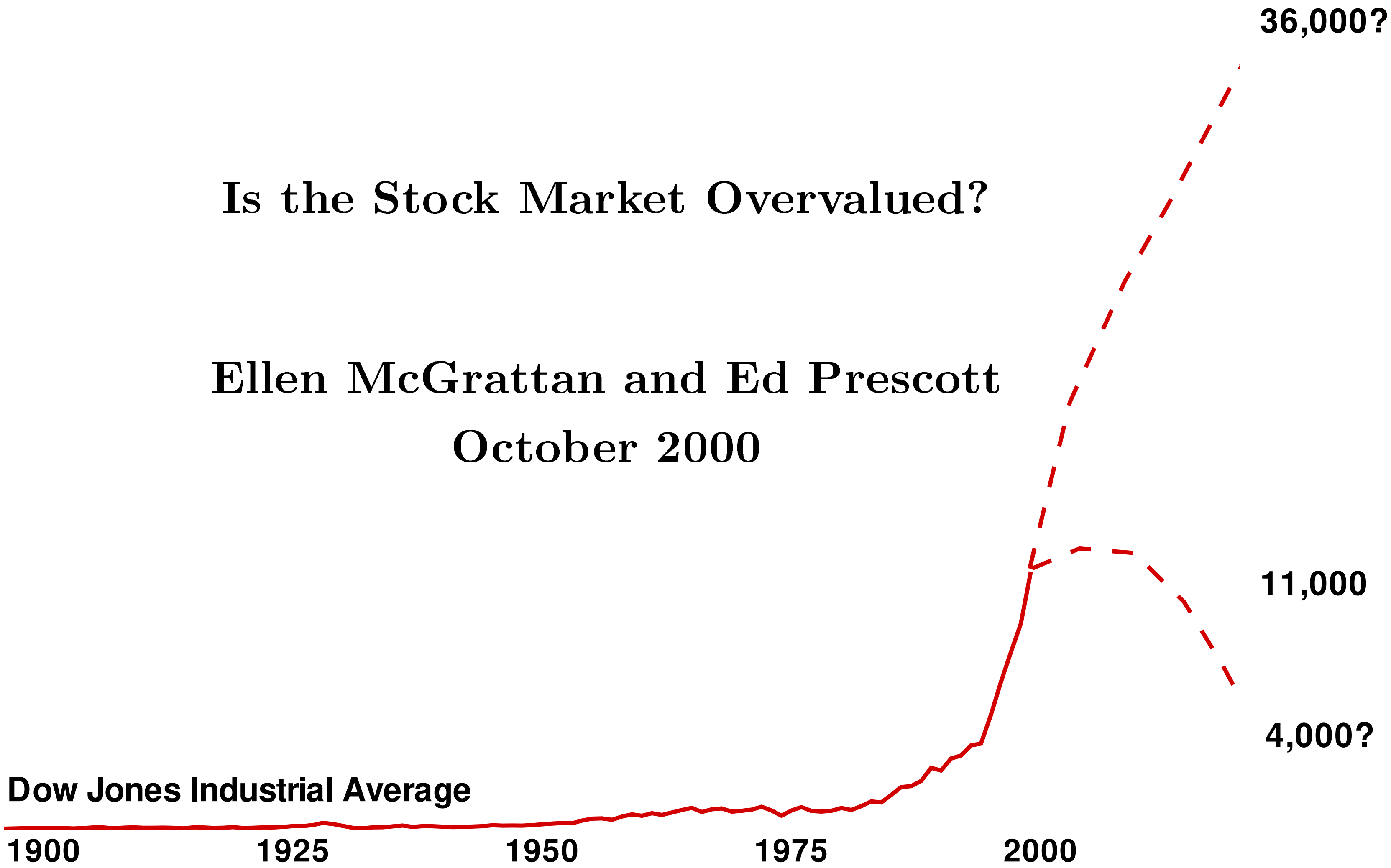
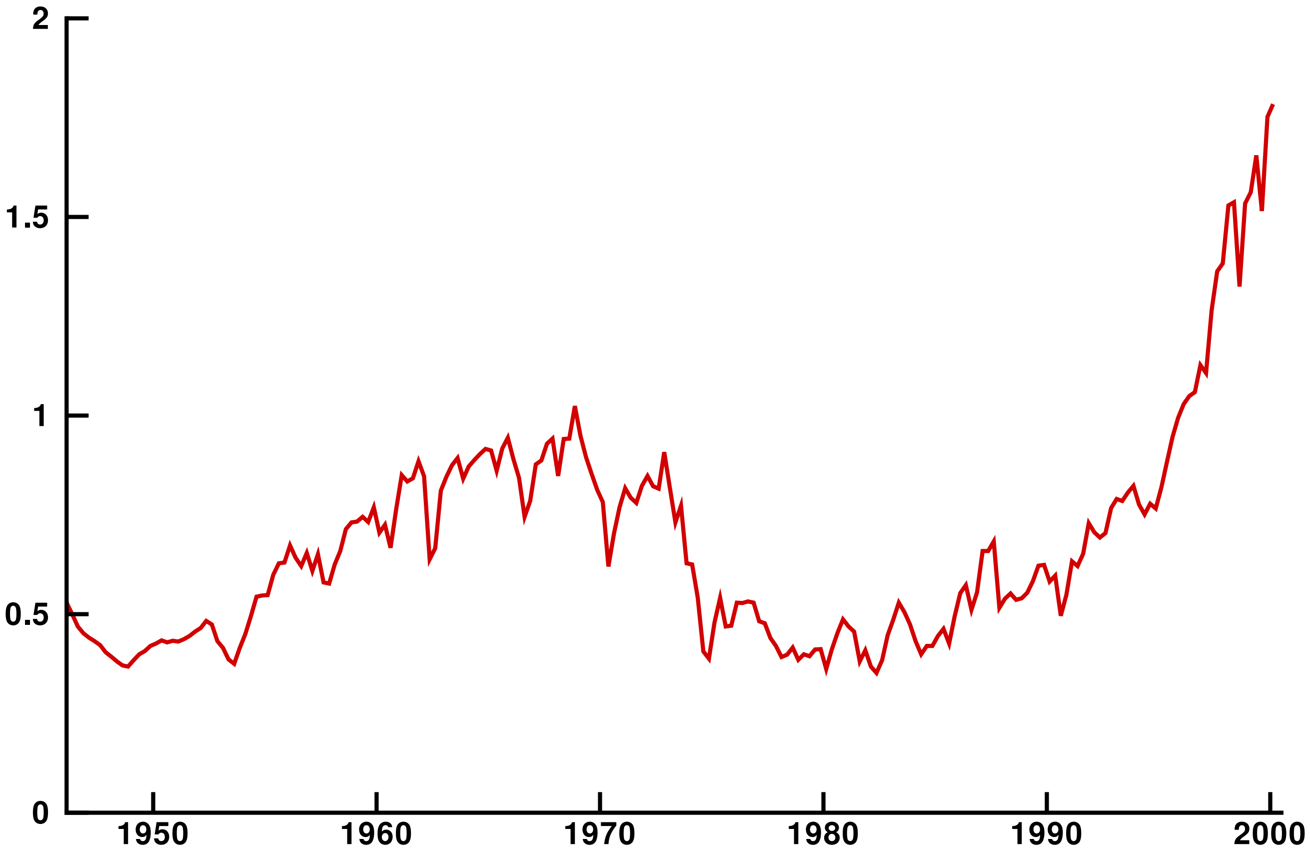


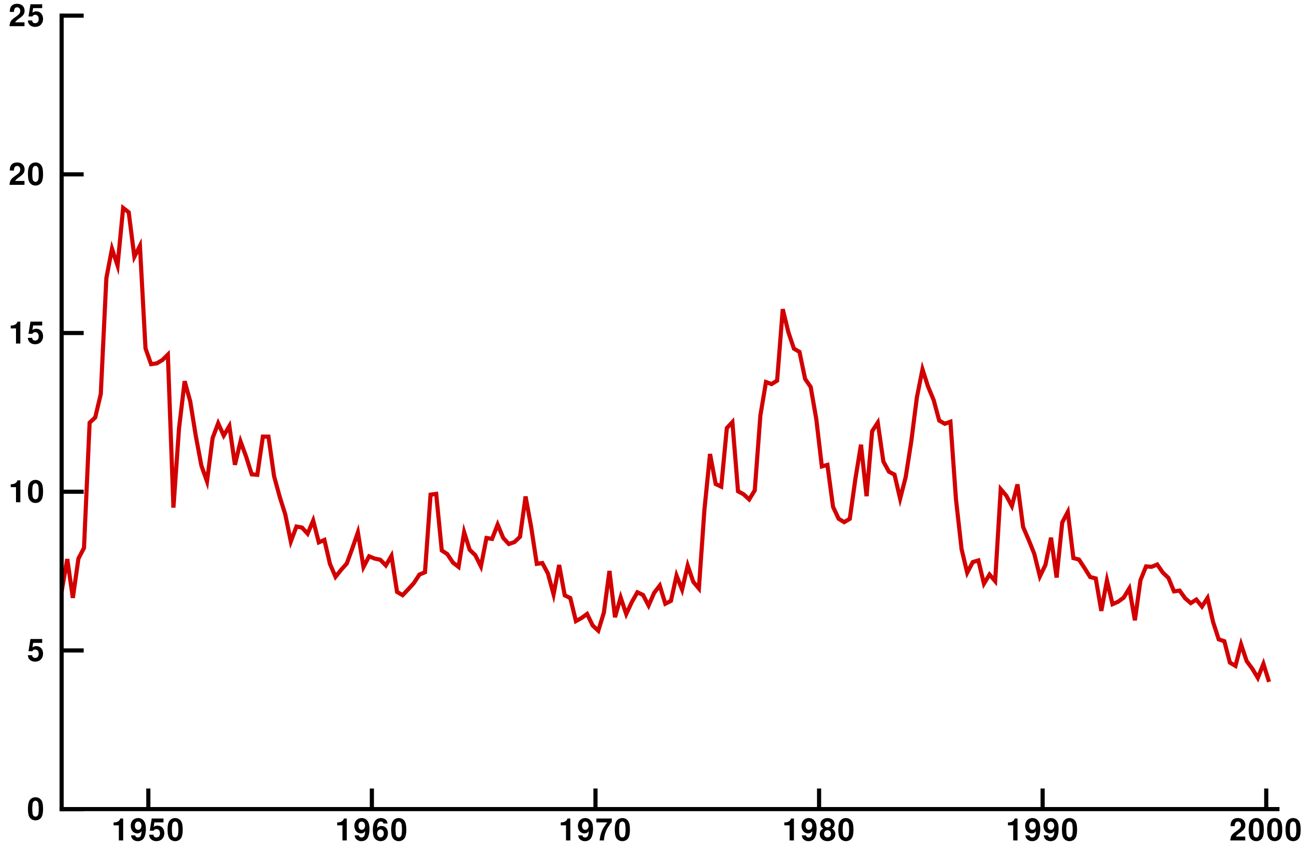
Stock Market Value to GNP

- Doubled since 1994
- Previous peak in 1968



Earnings-Price Ratio

- **E/P like return**
- **At historical low at 4% $\approx$ TIPS rate**



Historical Overview

- **Return on equity high and debt low**
- **Mehra and I found not due to premium for bearing risk**

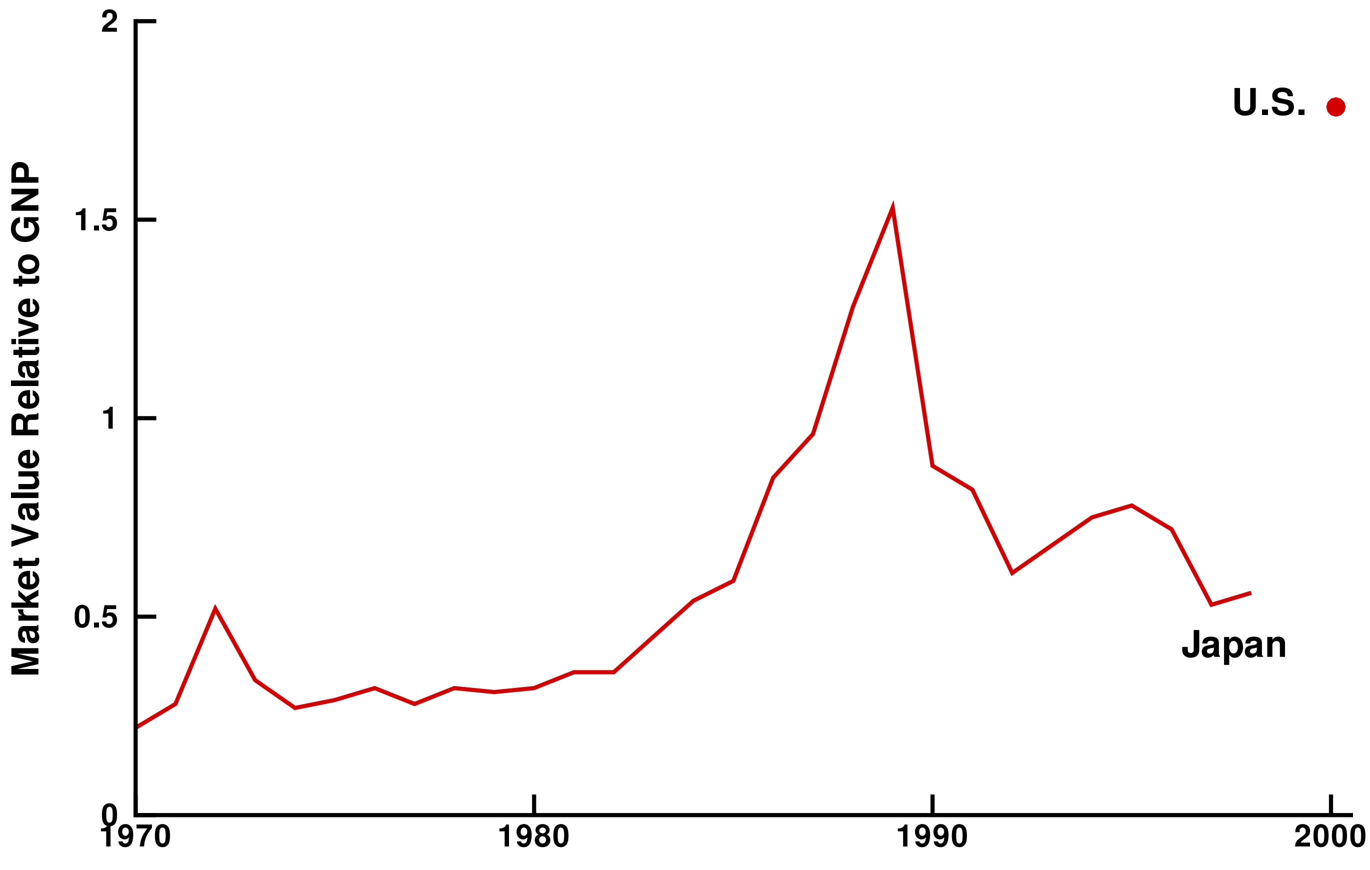
  $\Rightarrow$ **The Equity Premium Puzzle (1985)**
- **Attempts to resolve puzzle failed (Kocherlakota, 1998)**

In 1980s and 1990s

- Market value increased
- Will it go higher? (Glassman and Hassett)
- Has it gone too far at 1.8 GNPs? (Shiller)
- Will there be a crash
  - with big capital losses?
  - with bad macroeconomic outcomes?

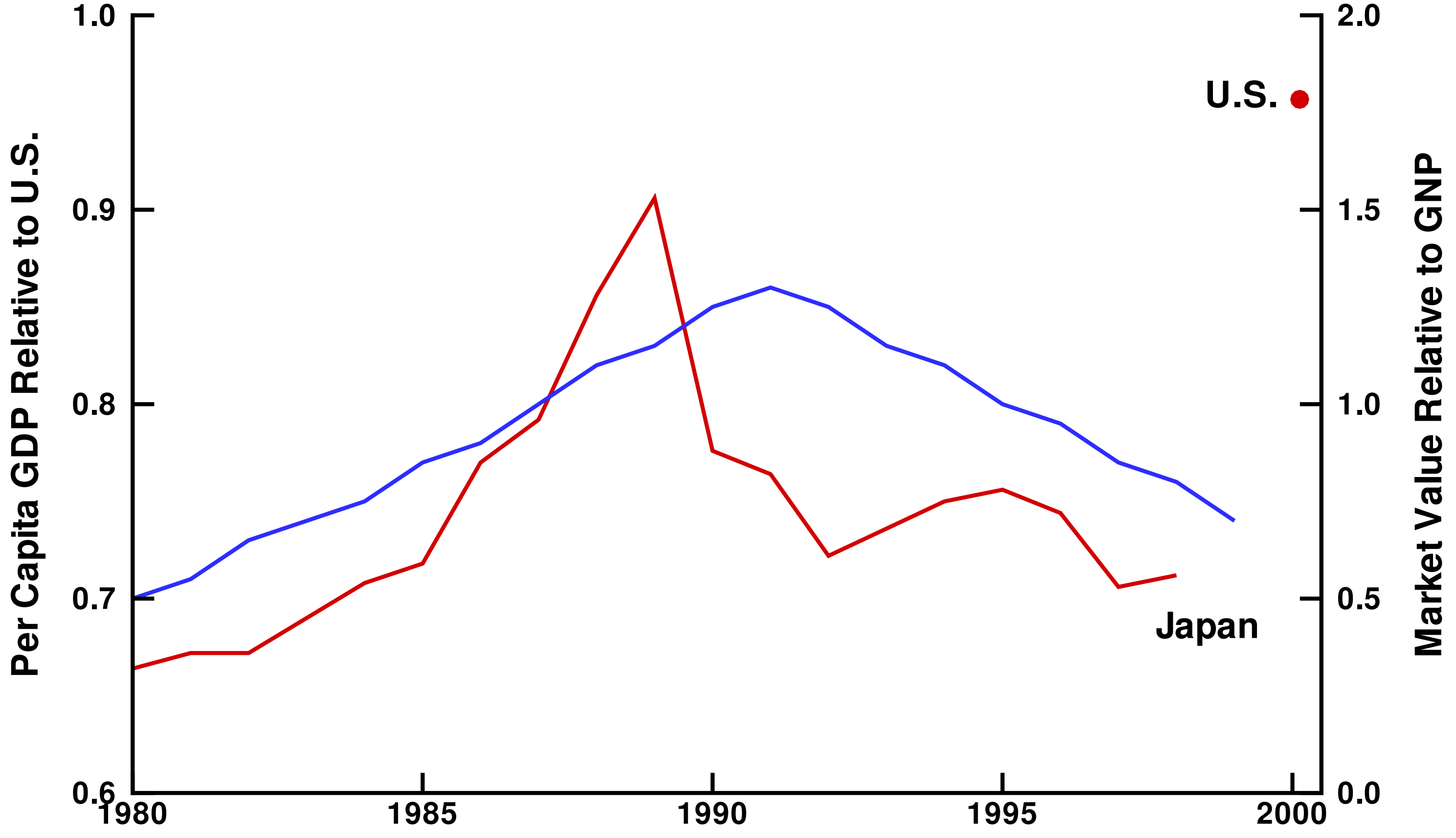
It happened in Japan

... there were big capital losses



It happened in Japan

... and there were bad macroeconomic outcomes



Our Findings

- **Is 1.8 GNPs too high? No.**
- **Is earnings-price ratio of 4% too low? No.**
- **Do we expect a market crash? If above 1.8 GNPs.**
- **Should investors switch from stocks to bonds? Possibly.**

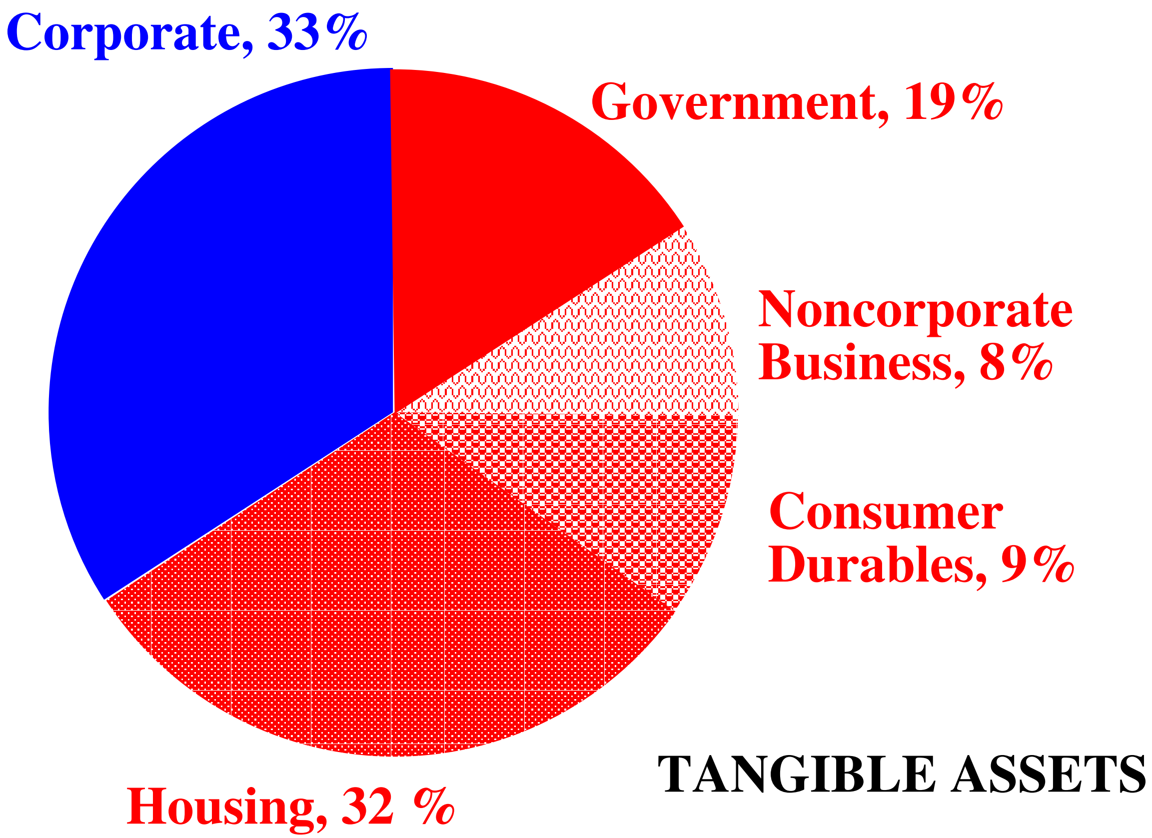
Two Approaches

- **Finance:**
  - **Data: CRSP**
  - **Theory:** $V_0 = E\left[\frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3}{(1+r)^3} + \ldots\right]$

- **Macro:**
  - **Data: NIPA and *Flow of Funds***
  - **Theory: growth theory with** $V = K$

Key Facts Motivating Theory We Use

- Corporate sector has 1/3 of tangible assets



Key Facts Motivating Theory We Use

- **Foreign subsidiary capital is large**
  - **Foreign subsidiary profits about 1.2% GNP**

- **Intangible capital is large**
  - **Examples:**

    R&D investment ($\approx$ 3% GNP)

    On-the-job training

Key Facts Motivating Theory We Use

- **Frictions are *now* small**
  - **Lower effective tax rate on dividends**
  - **Cheaper to diversify**
  - **Stock portfolio cheaper than CD or securities**
  - **Better access to information**

- **Corporate sector is close to 100% equity financed**

Theory

- **Now that frictions are small ...**
  - **Value of stocks = Value of corporate capital stock**
  - **Return on stocks $\approx$ Return on capital stock**
  - **Equity premium is small**
  - **Earnings-price ratio $\approx$ Return on stocks**

Value of Corporate Capital, 1990-1999

Structures	0.47 GNPs
Equipment	0.36
Inventories	0.16
Land	0.06
U.S. capital abroad	0.38
Unmeasured intangible capital	0.41
Total	1.84 GNPs

Current Value of Stocks	1.80 GNPs

Value of stock market is reasonable.

Estimate of Intangible Capital

- **Interest rate from *noncorporate* sector:**

$$i \;=\; \frac{\text{noncorporate profits}}{\text{noncorporate capital stock}}$$

$$\Rightarrow \; i = \mathbf{4.1\%} \;\approx\; \text{TIPS rate}$$

- **Equate interest rates in two sectors:**

$$i = (1-\tau)\,(\text{NIPA profits} + X_I - i\,K_I)\,/K_T$$

3% growth $\Rightarrow \; X_I = .03\,K_I \Rightarrow \; K_I = \mathbf{.64}$

An Accounting Issue

- **Imputed net interest paid by banks is big, 5.7% GNP**
- **U.S. system imputes this interest to lender**
- **U.N. system imputes this interest to borrower**
- **Our system:**
  - **All pay or receive market interest rate**
  - **Difference is purchase of financial services**
- **Lowers after-tax return on capital by 1%**

Asset Returns: Prediction of Theory

- **Steps taken:**
  - **Calibrate model to U.S. 1990-1999**
  - **Allow uncertainty in**

    technology

    tax rates

    corporate capital shares
  - **Simulate model – compute average returns**

Asset Returns: Prediction of Theory

- **Findings:**
  - **Average returns on equity (r^e) and debt (r^f) $\approx$ 4.1%**
  - **Equity premium $<$ 0.1%**

$\Rightarrow$ **earnings-price ratio of 4% not too low**

Our Findings

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- **Is earnings-price ratio of 4% too low? No.**
- **Do we expect a market crash? If above 1.8 GNPs.**
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Our Investment Strategy

- Diversify
- Consider holding some inflation-protected bonds
- Sell if market value gets much above 1.8 GNPs
- Buy if market crashes