Speculative Asset Prices

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Prices as Expected Present Values – Constant Discount Rate Case

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

- Where $P_t$ is real stock price index, $P_t^*$ is the perfect-foresight or ex-post rational price, and $D_{t+k}$ is the real dividend per share accruing to the index at future date $t + k$

- $E_t$ is the mathematical expectations operator conditional on information at time $t$.

- $r$ is the rate of discount, constant through time, embodying notion that returns are unforecastable
Real Stock Prices 1871-2013
Actual (Blue) and Ex-Post Rational (Red)
Based on Shiller (Am. Econ Rev. 1981)
Real S&P Composite Dividends Per Share 1871-2013
Alternative Present Value Models

• \( P_t = E_t(P_t^r) = \sum_{k=1}^{\infty} \prod_{j=1}^{k} \frac{1}{(1+r_{t+j}+\varphi)} D_{t+k} \)

Where \( r_t \) is the one-period interest rate

• \( P_t = E_t(P_t^C) = E_t \sum_{k=1}^{\infty} \prod_{j=1}^{k} M_{t+j} D_{t+k} \)  (3)

• where \( M_t = \) marginal rate of substitution in consumption between \( t \) and \( t+1 \), which is, assuming constant relative risk aversion \( A \), \( \rho(C_t/C_{t+1})^A \) and \( C_t \) is real per capita consumption at time \( t \). LeRoy (1973) . Lucas
Alternative Present Values
1871-2013

- **P* Discounted with Actual Future Interest Rates**
- **Actual Stock Price (P)**
- **Consumption-Discounted Dividends, (P*, A=4)**
- **Perfect Foresight Price P* endpoint based on last ten years dividend growth**
Variance Bounds Tests, Tests of “Excess Volatility” etc.


Linearized Present Value Model

\[ e_{t+1} - E_t e_{t+1} = (E_{t+1} - E_t) \{ \sum_{j=0}^{\infty} \rho^j \Delta d_{t+1+j} - \sum_{j=0}^{\infty} \rho^j r_{t+1+j} - \sum_{j=1}^{\infty} \rho^j e_{t+1+j} \} \]

• Where \( e_t \) = log one-period excess return of stocks over risk free rate, \( d_t \) = log dividend, \( r_t \) = log one-period real interest rate. (Campbell and Shiller 1987, 1988, 1989, Campbell 1991, Campbell and Ammer 1993, Campbell & Viceira 2002)

• Campbell and Ammer (1993) conclude with US aggregate stock market 1952-1987 data that future excess returns innovation has standard deviation
Beauty Contests

• Keynes (1936) likened stock market to a beauty contest, contestants trying to predict who others will find prettiest

Breakdown of Individual Stock Market Volatility into that Due to Information about Dividends and Due to Expected Future Returns

- Tuomo Vuolteenaho (2002) for individual stocks in US
- Concludes using CRSP-Compustat monthly data 1954-1996 that the variance of expected return news is approximately one half of the variance of news about future dividends.
Jeeman Jung and Robert Shiller
PDV of Dividend Changes for next 25 years/ Price
Against D/P Ratio, 1926-76
49 firms, 2499 observations
Repeat-Sales Home Price Indices

- Infers a home price index only from changes in prices of individual homes, despite infrequent sales
S&P/Case Shiller Index and CME Group Futures Price (John Dolan)
Case-Shiller Repeat Sales Home Price Indices Relative to Personal Income Los Angeles 1987-2013
The Behavioral Finance Revolution
After 1990

• Sociology: Collective consciousness Durkheim (1893), collective memory Halbwachs (1925)
• Social psychology: Groupthink, Janis (1971)
• Selective attention: William James 1890, (“rational inattention” Sims 2003)
• News media, Internet, amplify social epidemics Shiller, Irrational Exuberance (2000, 2005)
• Even population biology, epidemiology, and neuroeconomics are coming into play
And Yet Fundamentally Important Uses of Long-Term Prices

- Price discovery is somewhat meaningful, at least for assets with volatile fundamentals
- Markets for long-term prices are useful and should be expanded: markets for broader asset classes, such as real estate, longevity, and markets that capitalize flows such as GDP, energy prices, occupational income indices
- Better future use of computer technology
- Shiller, *Finance and the Good Society* 2012