0.1 Twin stocks

- Shell and Royal Dutch — claims on the same company

- There is a difference between prices

- The difference is driven by the difference in aggregate movements in London vs Dutch stock markets

- Sharpe ratio (expected return/standard deviation) of this arbitrage is not great
0.2 Are noise traders eliminated from the market?

- DSSW setup \( E (R_{NT} - R_A) = \\
  E \left [ \left ( \lambda_t^{NT} - \lambda_t^A \right ) \left ( r + p_{t+1} - p_t (1 + r) \right ) \right ] = \rho^* - \frac{(1+r)^2(\rho^*^2 + \sigma^*^2)}{2\gamma \mu \sigma^2_\rho} \)

- Might be both positive and negative

- If \( \gamma \) is large enough, then \( E (R_{NT} - R_A) > 0 \) and noise traders prevail

- This is because noise traders are more optimistic and take more risk

- But by construction \( EU^A > EU^{NT} \)
• Stock returns look like a random walk [see slides]

• Evidence from stock splits — supports efficient market hypothesis [see slides]

• Event study methodology [see slides]

• Jensen: “The Efficient Market Hypothesis is the best established fact in all of social sciences”

• de Bondt and Thaler JoF 1985 [see slides]
• Value vs growth [see slides]: a recent attempt at explanation by consumption covariance — growth stocks have low covariance with consumption because most of risk is idiosyncratic; conversely GM has high covariance (Parker, Julliard, Barsal)

• Initial Public Offerings [see slides]
0.3 Campbell-Cochrane “By force of habit” JPE 1999

- Explains low equity premium in booms and high in recessions

- \( U = \sum \delta^t \frac{(C_t - X_t)^{1-\gamma}}{1-\gamma} \) where \( X_t \) is your habit

- Denote \( S_t = \frac{C_t - X_t}{C_t} \) surplus/consumption ratio, \( s_t = \ln S_t < 0 \).

- \( U^t_c = (C_t - X_t)^{-\gamma} \) and \( \frac{-CU^t_{cc}}{U^t_c} = \gamma \frac{C_t}{C_t - X_t} = \frac{\gamma}{S_t} > \gamma \).
• “Catching up with the Joneses economy” — what makes me happy is not my consumption compared to my past consumption (internal habit) but my consumption compared to past consumption in the economy (external habit).

• This is too simplify the problem: noone’s current consumption impacts his or her future habit

• Representative consumer economy. Aggregate $s^a = \ln S^a < 0$, $S^a_t = \frac{C^a_t - X^a_t}{C^a_t}$

• Postulates

$$s^a_{t+1} = (1 - \phi) \bar{s} + \phi s^a_t + \lambda (s^a_t) \left( \ln C^a_{t+1} - \ln C^a_t - g \right)$$

where $g$ is mean growth rate and $\phi \in (0, 1)$ determines mean reversion.
• Lucas economy \( \Delta \ln C^a_{t+1} = g + \nu_{t+1} \)

• Euler equation

\[
1 = E \left( \frac{M_{t+1}}{1 + r} R_{t+1} \right)
\]

with

\[
M_{t+1} = \delta \frac{U_c \left( C^a_{t+1}, X^a_{t+1} \right)}{U_c \left( C^a_t, X^a_t \right)} = \delta \frac{(C^a_{t+1} - X^a_{t+1})^{-\gamma}}{(C^a_t - X^a_t)^{-\gamma}}
\]

\[
= \delta \left( \frac{S^a_{t+1}}{S^a_t} \right)^{-\gamma} \left( \frac{C^a_{t+1}}{C^a_t} \right)^{-\gamma} = \delta e^{-\gamma((1-\phi)(\bar{s}-s_t)+g(1+\lambda(s^a_t)))\nu_{t+1}}
\]
• They postulate $1 + r = E[M_{t+1}]$ is constant

$$1 + r = \delta e^{-\gamma((1-\phi)(\bar{s}-s_t)+g^2(1+\lambda(s_t^{\alpha}))^2\sigma_v^2)}$$

• Hence

$$\lambda(s_t) = \frac{1}{\bar{s}}\sqrt{1 + 2(\bar{s} - s_t) - 1}$$
To price stocks, use

\[ R_{t+1} = \frac{P_{t+1} + D_{t+1}}{P_t} \]

to write the Euler equation as

\[ 1 = \frac{1}{1 + r} E \left[ M_{t+1} \frac{P_{t+1} + D_{t+1}}{P_t} \right] \]

Thus

\[ \frac{P_t}{D_t} = \frac{1}{1 + r} E \left[ M_{t+1} \frac{D_{t+1}}{D_t} \left( 1 + \frac{P_{t+1}}{P_t} s_{t+1} \right) \right] \]

Postulate, \( \frac{P_t}{D_t} = f(s_t), \ln \frac{D_{t+1}}{D_t} = g_D + w_{t+1} \) and solve for \( f(s_t) \).