Class 1

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Asset Pricing
International Risk Sharing/Business Cycles
New Keynesian Open Economy Model/Obstfeld-Rogoff
Labour Markets
Assessment: 4 paper reviews
Today: Cochrane, “Financial Markets and the Real Economy.”

Macro-Finance: Relate asset returns to macro fundamentals. (Different to usual approach.) Summers example re portfolio models like CAPM.

Objective is to rationalize asset returns without relying on "bubbles" etc.

Recall the gross return on an asset is:

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

Two components: dividend and capital gain

Standard theory predicts that all price movements compensate for something.

Asset returns/variation reveal preferences too. Low P/D ratios in recessions.

Two components to expected return: risk-free rate and risk premium (reward for waiting/reward for risk.)

In practice most asset pricing theory is primarily concerned with rationalizing risk premia.

Risk premia abound in markets; e.g., failure of UIP.

Empirically, most variation in asset prices stems from variation in risk premia (and not expected cash flows.) Implications for investment (Tobin's Q etc)

$$P_t = E_t \sum_{t=0}^{t=\infty} \frac{D_t}{1 + r_f + \rho_t}$$

Shiller

Central Idea: Rationalize risk premia by insurance/hedging property of assets. Riskless part comes from permanent income hypothesis.
Central idea in asset pricing: If asset pays off well in bad times, equilibrium expected returns will be low (and vice versa).
Think of insurance.

Objective

Relate asset returns to macro variables, ultimately *consumption.* Not intermediate objectives.

What we mean by "bad times" are times when consumption—the ultimate determinant of welfare—is low: "consumption-based asset pricing."

Formally, assets whose returns have a high $Cov(r, MU)$ are desirable and should pay relatively low returns. (MU means marginal utility or "hunger.")

Theory

$$u(C_t) + Eu(C_{t+1})$$

$$y_t = C_t + \gamma p_t$$

$$C_{t+1} = y_{t+1} + \gamma x_{t+1}$$

Making subsitutions

$$u(y_t - \gamma p_t) + Eu(y_{t+1} + \gamma x_{t+1})$$

Maximizing w.r.t γ gives

$$p_t u'(C_t) = E\beta u'(C_{t+1}) x_{t+1}$$

$$p_t = E_t \beta \frac{u'(c_{t+1})}{u'(c_t)} x_{t+1}$$

$$p_t = E_t m_{t+1} x_{t+1}$$

m_t is the *stochastic discount factor* or *pricing kernel*.
Letting $x_t = p_{t+1} + d_{t+1}$

$$p_t = E_t m_{t+1}(p_{t+1} + d_{t+1})$$

$$1 = E_t m_{t+1} R_{t+1}$$

where $R_{t+1} = \frac{p_{t+1}+d_{t+1}}{p_t}$

Using

$$p_t = E_t m_{t+1}(p_{t+1} + d_{t+1})$$

we can solve forward to get p_t in terms of all future dividends, but discounted by stochastic discount factors.

Theory

For stock market with return of r_{t+1} we have

$$u'(C_t) = \beta E\left((1 + r_{t+1})u'(C_{t+1})\right) \quad (1)$$

For risk-free asset, we have

$$u'(C_t) = \beta E\left((1 + r_f)u'(C_{t+1})\right) \quad (2)$$

Equating both expressions gives

$$Er_{t+1} = r_f - \frac{Cov(u'(C_{t+1}), r_{t+1})}{E_t(u'(C_{t+1}))} \quad (3)$$

Covariance of MU with return is key. Main idea: a high covariance leads to low equilibrium returns.
Level of utility doesn't matter, but marginal utility does.
Issue of separability is important: does marginal utility depend on other variables, and if so does this increase the covariance?

$$Er_{t+1} = r_f - \frac{Cov(u'(C_{t+1}), r_{t+1})}{E_t(u'(C_{t+1}))} \tag{4}$$

Time Variation in returns relates to time varying covariances (i.e., time-varying risk.)

CAPM is essentially a special case of this model, where we assume that marginal utility varies inversely with the market portfolio.

Cross-Sectional Variation: do some stocks covary more with marginal utility? Such stocks should command higher returns. (Ideally, we can we use this approach to rationalize models such as the Fama-French three factor model.)

Puzzles

$$u(C) = \frac{c^{1-\theta}}{1-\theta}$$

Risk neutrality when $\theta = 0$: no risk premia
Separability
IES and risk aversion
Substituting this utility function into (2) and manipulating gives

$$r_f = \rho + \theta g_c - \frac{1}{2}\theta(\theta+1)\sigma_{g_c}^2. \tag{5}$$

r_f deterministic
Substituting this utility function into (4) gives the equity premium

$$\mathbb{E}\left(r - r_f\right) = \theta\sigma_{r,g_c} = \theta\sigma_r\sigma_{g_c}\rho_{r,g_c}. \tag{6}$$

Conditional/Unconditional
Volatility; portfolio

Empirical failures

$$\mathbb{E}(r_t - r_f) = \theta Cov(r, g_c) \tag{7}$$

$$\Rightarrow 6 = \theta(.24) \Rightarrow \theta \approx 25?$$

$$r_f = \rho + \theta g_c - \frac{1}{2}\theta(\theta + 1)\sigma_{g_c}^2. \tag{8}$$

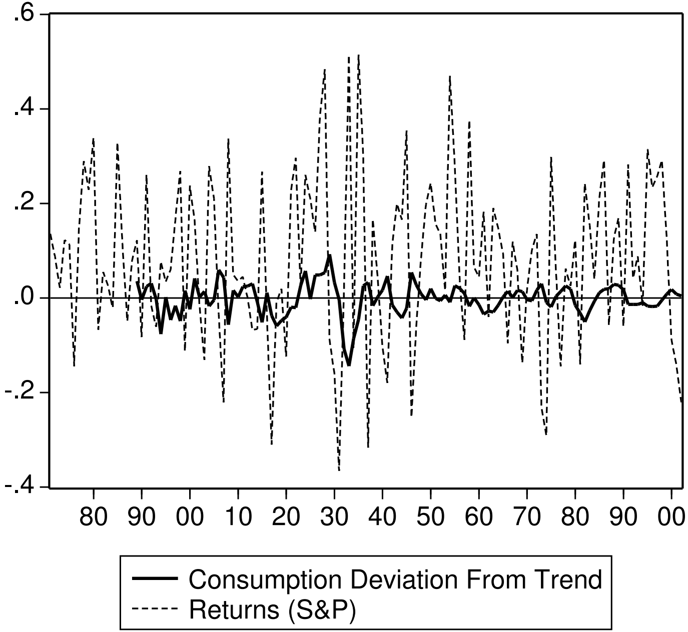
$$\Rightarrow r_f = 23?$$

Hanson-Jagannathan Bounds

Intuition

With consumption growth over time, people should be borrowing more, leading a higher risk-free rate. Standard model counterfactually predicts a huge risk-free rate. In fact, risk-free rate is only about $1 - 2\%$.

Equities pay off well in booms and badly in recessions. So far so good. But consumption only rises a little in booms and falls only a little in recessions. Therefore, model cant rationalize the *magnitude* of the equity premium. Why is international diversification so low (i.e., home bias) if so risk averse?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Consumption Deviation From Trend
Returns (S&P)

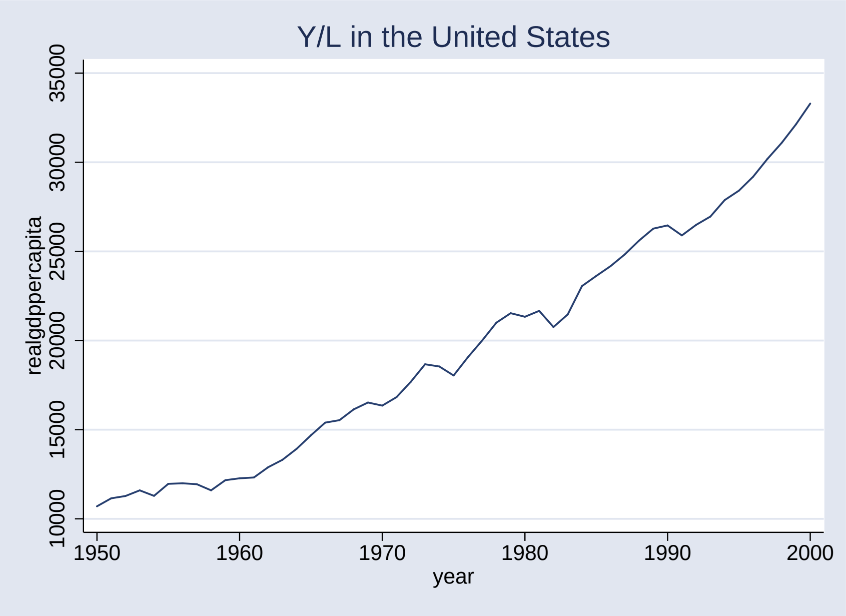

Figure: The Source of the Risk-free rate Puzzle

Has spawned enormous research effort.

Could risk aversion be that high after all?

Not just finance - savings, cost of business cycles etc.

Market Imperfections (Can't borrow etc)

International Risk Sharing.

Time series and Cross Section (Time varying covariances; lots of different Sharpe ratios, not differnt correlations)

Empirical Research looking for risk factors.

What is Needed?

Increase consumption risk over business cycle

Increase incentives to save

Proposed Solutions

Nonseparabilities; e.g., labor and consumption complements. (Need greater variation of SDF)

Data issues/distribution (could variances be bigger, tails be fatter?)

Behavioural

By contrast behavioural finance attempts to rationalize asset returns (at least partly) by pyschological phenomena. For instance, with “loss aversion” the consumers not only experiences the usual disutility from losing, but there’s an extra “kick” from the very fact a loss has occurred.

In this case, neoclassical economics would argue that, when large amounts of money are at stake, people will readily overcome psychological biases such as loss aversion. They don’t deny them outright, but question their *quantitative* importance.)

Habit Persistence

$$u(C_t) = \frac{(C_t - X_t)^{1-\theta}}{1-\theta}$$

$$RA = -\frac{C_t u''}{u'} = \frac{\theta}{S}$$

where

$$S_t = \frac{C_t - X_t}{C_t}$$

Time-varying risk aversion (leading to time varying risk premia, as in the data.)
If expected returns rise in a recession (due to higher risk aversion), prices fall *to generate* those higher returns. So can explain price volatility.
Has large implications for monetary economics too
Tension: IES and savings
Verdelhan and UIP

Proposed Solutions

Habit Persistence (External/Internal)

Data Issues ("Asset Pricing with Garbage.") But surely too small.

Sample selection (data)

Distributions/Rare Disasters/ don't know long run variance

Commitments

Lags

IES/risk averson (Epstein/Zin)

Incomplete markets (example)

Heterogeneity/Participation

Liquidity premium (Sharpe ratios)

Loss aversion

Prospect Theory

Wealth in utility

Durables/nondurables

Limited participatioin and risk aversionn

Frictions like transaction costs $(1+\tau)u'(c_t) = E\beta(1+r)u'(c_{t+1})$

Monetary Economics
An example: term/risk premia low in last decade on nominal bonds.

One explanation. Recall Phillips curve. Low GDP, low inflation. But with low inflation, expected bond returns fall and bond prices rise. If you are holding a bond, you make capital gain.

So nominal bonds acted as hedge; when GDP is low, you get a capital gain if you hold them. Theory thus predicts that equilibrium returns on nominal bonds are low. (In background, demand for them drives up price, which ultimately lowers returns.)