FACTS 1 EQUITY PREMIUM AND RISK

	STOCKS REAL	BONDS REAL	STOCK-BOND	GDP	CONS-UMPTION	NDS
E:	8.6	1.3	7.4	3.2	3.3	2.4
σ:	17.6	2.6	18.1	2.6	2.1	2.0
CORR:	0.99	-0.03	1.00	0.32	0.39	0.43

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BIG EQUITY PREMIUM $E(R^{STOCK} - R^{BOND}) \geq 7\%$ RISK?

BIG VOLATILITY OF STOCK RETURNS $\sigma(R^{STOCK} - R^{BAND}) \simeq 18\%$ RIGHT MEASURE?

STOCKS CORRELATED WITH ECONOMY

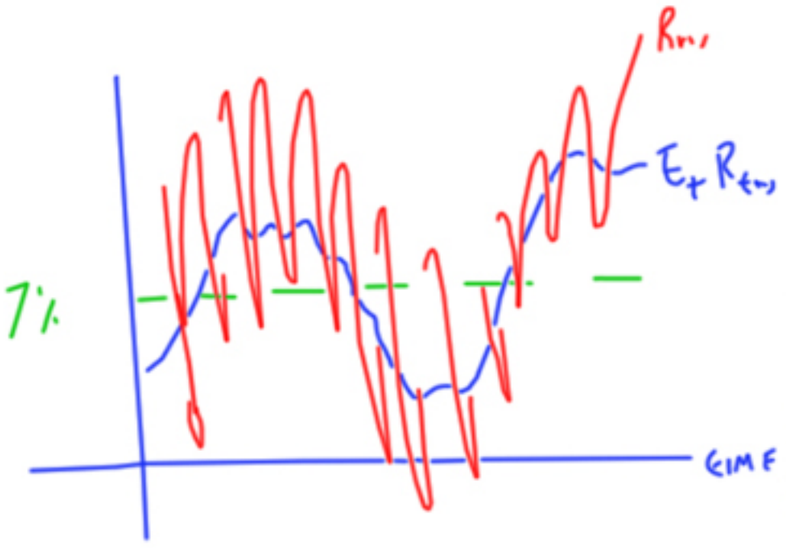
WHY SO RISKY?

FACTS 2 : TIME VARYING RISK PREMIUM

$$R_{t+n} = a + b X_t + \varepsilon_{t+1}$$

$$E_t R_{t+1} = a + b X_t$$

$b \sim 0 \rightarrow E_t R_{t+1} = \text{CONST.}$



$\frac{P_t}{D_t}$ FORECASTS RETURNS

$E_t(R_{t+1})$ IS BIG ; VARIES A LOT OVER TIME
BIG IN RECESSIONS

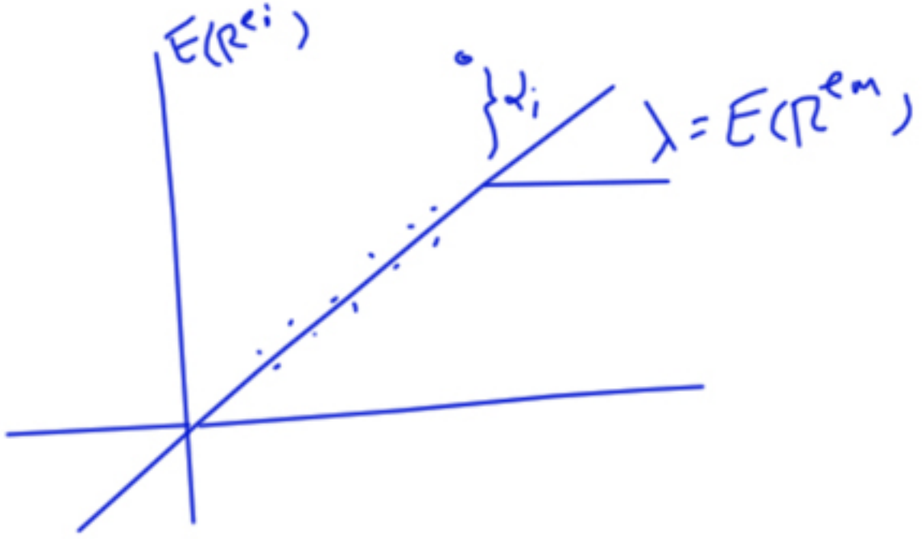
$\frac{P_t}{D_t}$ DOES NOT FORECAST D !

$P_t = E$ [DISCOUNTED DIV.]

FACTS 3: THE CROSS SECTION OF STOCK RETURNS

CAPM

$$E(R^{ei}) = [\alpha_i] + \beta_i E(R^{eM})$$



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$$E(R^{ei}) = [\alpha_i] + b_i E(rmrf) + h_i E(hml) + s_i E(smb)$$

WHY?

WHY $E(R^{eM})$; WHY E(hml)?

"MODEL OF RETURNS" – FACTORS

FACTS SUMMARY

RISK PREMIUM
EXPECTED RETURN

1) $E(R^e)$ IS BIG! 7% → BUY? RISK?

$\sigma(R^e)$ IS BIG, 18%.

R^e IS CORRELATED WITH ΔC, ΔY STOCKS FALL IN BAD TIMES

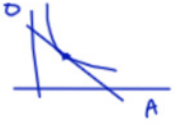
2) $E_t(R^e_{t+1})$ VARIES OVER TIME $\sigma[E_t(R^e_{t+1})] \simeq 6\%$!

→ BUY! TIME VARYING RISK PREMIUM?

3) $E_i(R^{e_i}_{t+1})$ VARIES ACROSS ASSETS ALOT:

FACTOR MODELS
WHY ARE "FACTORS PRICED" PREMIUM FOR VALUE-GROWTH

THEORY OVERVIEW. PREVIEW

- WHATS IT WORTH? TIME AND RISK
- dV/dx RISK MANAGEMENT
- 

  - INVESTMENT VS EQUILIBRIUM
  - WHAT DOES THE MARKET LOOK LIKE AFTER INVESTMENT?

GOAL $P_t = E_t\left(\beta \frac{U'(C_{t+1})}{U'(C_t)} X_{t+1}\right)$

$P = E(mx)$

ALL CLASSIC ISSUES OF FINANCE.

THEORY OVERVIEW: X AND U TO P = E(MX)

PAYOFF X

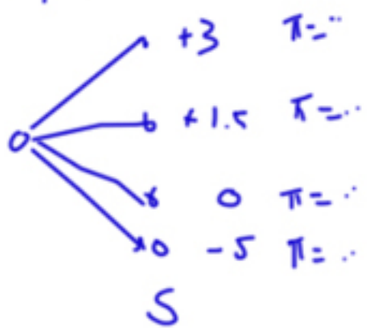
STOCK: $P_t \rightarrow X_{t+1} = P_{t+1} + d_{t+1}$

BOND: $P_t \rightarrow 1$

$1 \rightarrow R^f$

BET: $P_t = 0$ → +1 WIN, -1 LOSE

X_{t+1} IS RANDOM

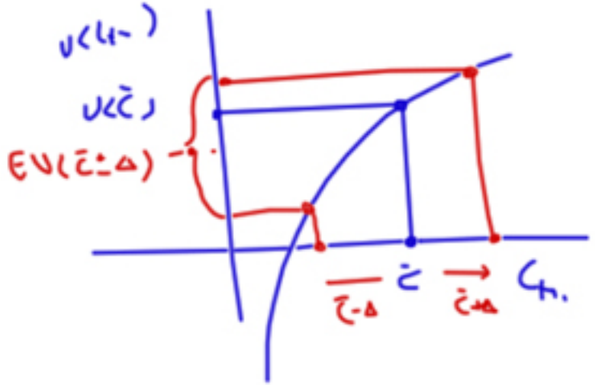


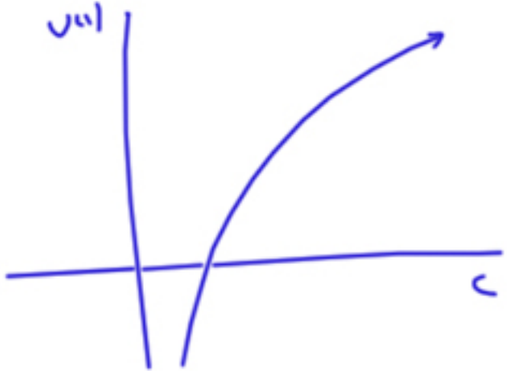
UTILITY

$X \rightarrow P$? VALUE TO WHO?

DISCOUNT FACTOR → TIME

$$U(C_t, C_{t+1}) = U(C_t) + \beta E_t[U(C_{t+1})]$$





$$V(C) = \frac{C^{1-\gamma}-1}{1-\gamma} \qquad U'(C) = C^{-\gamma}$$

$\gamma \to 1 \quad V(C) = \log(C)$

MAX $\{$ $U(C_t - \xi P_t) + \beta E_t U(C_{t+1} + \xi X_{t+1})$

$$P_t U'(C_t) = \beta E_t(U'(C_{t+1}) \cdot X_{t+1})$$

$$P_t = E_t\left[\beta \frac{U'(C_{t+1})}{U'(C_t)} X_{t+1}\right] = E_t\left[\beta\left(\frac{C_{t+1}}{C_t}\right)^{-\gamma} X_{t+1}\right]$$

$\frac{U'(C_{t+1})}{U'(C_t)} = M_{t+1}$

- AFTER INVESTMENT
- YOUR $\subseteq$ ADJUSTS
- MARGINAL

$P_t = E_t(X_{t+1})$?

$P_t = E_t\left(\frac{1}{R} X_{t+1}\right)$? $\quad R = 0.9$

$P_t = E_t(M_{t+1} X_{t+1})$

M_{t+1}: RANDOM, STOCHASTIC