MULTI-FACTOR MODELS: FACTOR THEORY

WHAT WILL YOU LEARN?

▸ Factor theory
▸ Factors

REMEMBER FROM CAPM

▸The only risk that investors should be compensated for bearing is the risk that cannot be diversified away.

▸Only exposure to systematic risk should be rewarded with a premium.

▸What if the systematic elements of risk are too complicated to be captured by a single market beta?

MULTI-FACTOR MODELS

▸CAPM defines 'bad times' as low returns on the market portfolio.

  ▸Under CAPM, risk premium for an asset can be viewed as compensation covarying with 'bad times'.

▸In multi-factor models, 'bad times' can have more definitions than just low returns on the market portfolio.
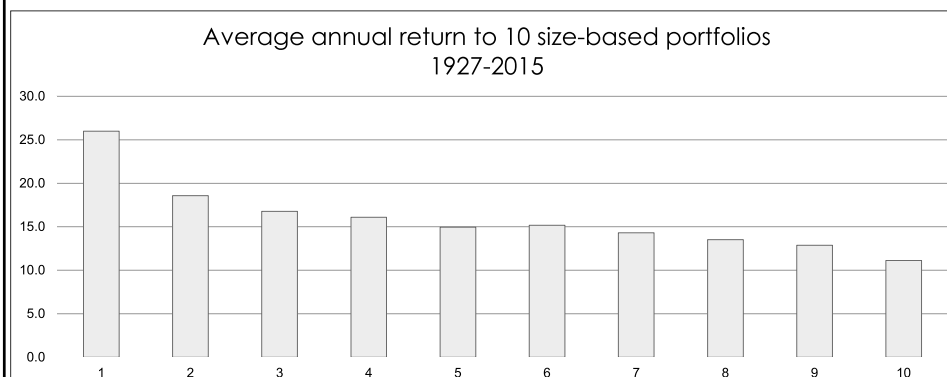
THE FAMA-FRENCH THREE-FACTOR MODEL

WHAT WILL YOU LEARN?

▸ What is the Fama-French three-factor model?

FAMA-FRENCH THREE-FACTOR MODEL

▸The Fama-French model explains asset returns with three factors:

   ▸Market factor

   ▸Size factor

   ▸Value factor

WHAT IS THE SIZE EFFECT?

Average annual return to 10 size-based portfolios
1927-2015

WHAT IS THE VALUE EFFECT?

Average annual return to 10 Book-to-market based portfolios
1927-2015

THE FAMA-FRENCH THREE-FACTOR MODEL

SIZE FACTOR: SMB

▸ SMB refers to the differential return of <u>s</u>mall stocks <u>m</u>inus <u>b</u>ig stocks.

▸ The SMB factor is constructed to capture the outperformance of small-cap stocks relative to large-cap stocks.

VALUE FACTOR: HML

▸ HML refers to return differential of <u>h</u>igh book-to-market stocks <u>m</u>inus <u>l</u>ow book-to-market stocks.

▸ Book-to-market ratio is defined as book value divided by market capitalization.

▸ The value effect refers to the fact value stocks outperform growth stocks, on average.

SIZE AND VALUE: ARE THESE RISK FACTORS?

▸ Fama and French argue that smaller firms are riskier because they may have greater difficulty surviving recessionary periods.

▸ Fama and French also argue that stocks with low market prices relative to their book values may be in "financial distress".

SUMMARY

▸ Fama-French three-factor model explains returns with three factors – market factor, a size factor, and a value factor.

▸ Not everyone agrees these are risk factors.

MULTI-FACTOR MODELS

▸What are bad times?

- ▸When you have lost your job?
- ▸Economic recessions
- ▸Financial crises
- ▸High inflation
- ▸High uncertainty or volatility periods

MULTI-FACTOR MODELS

▸The same intuition as CAPM then applies to multi-factor models:

▸Assets that covary more with bad times are unattractive to investors because they have low payoffs during bad times.

▸These assets therefore require a premium as compensation.

FACTORS

▸ A factor is a systematic variable that affects the returns of all assets.

▸ Factors cannot be diversified away.

EXAMPLES OF FACTORS

▸ Macro factors such as growth, inflation, volatility

▸ Dynamic factors such as value-growth, momentum

SUMMARY

▸Multi-factor models help capture what defines bad times in multiple ways.

▸Assets earn risk premiums because of their exposure to underlying factor risks.

▸Factors are systematic variables that cannot be diversified away.