

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

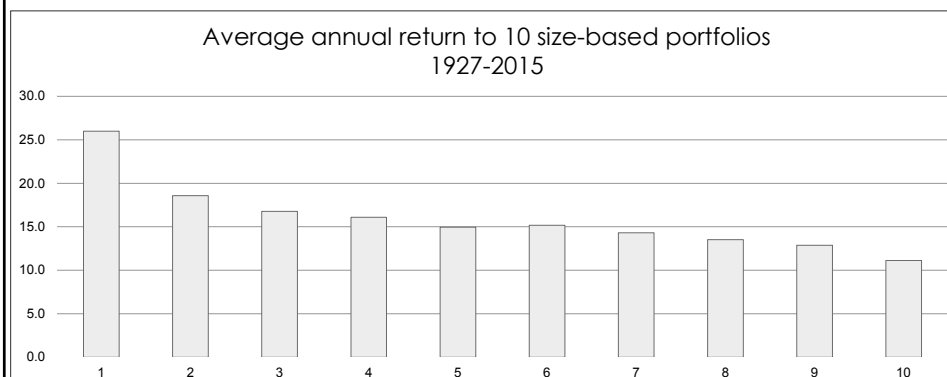
WHAT WILL YOU LEARN?

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

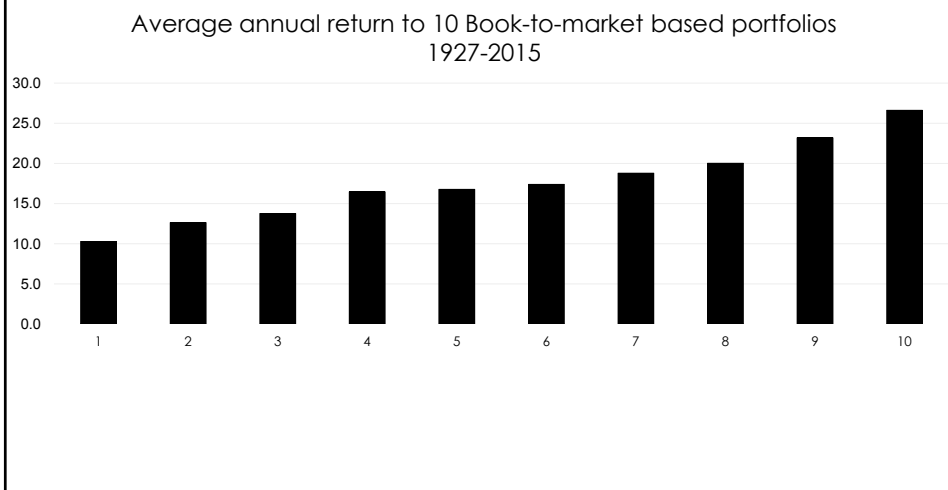
FAMA-FRENCH THREE-FACTOR MODEL

- ▶ The Fama-French model explains asset returns with three factors:
 - ▶ Market factor
 - ▶ Size factor
 - ▶ Value factor

WHAT IS THE SIZE EFFECT?



WHAT IS THE VALUE EFFECT?



THE FAMA-FRENCH THREE-FACTOR MODEL

SIZE FACTOR: SMB

- ▶ SMB refers to the differential return of small stocks minus big 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 high book-to-market stocks minus low 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.