Popularity Pricing and Premiums

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The Capital Asset Pricing Model
What Comes Next?

$$\text{Expected Return of Any Asset} = \text{Risk Free Rate} + \text{Asset Beta} \times \text{Market Risk Premium}$$

- The Sharpe-Lintner CAPM is an extremely powerful equilibrium model with only 3 inputs
- Key assumptions are risk aversion (one dimension) and homogeneous expectations
- Can we generalize assumptions to include other more realistic risk and non-risk preferences?

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CAPM: Risk & Return
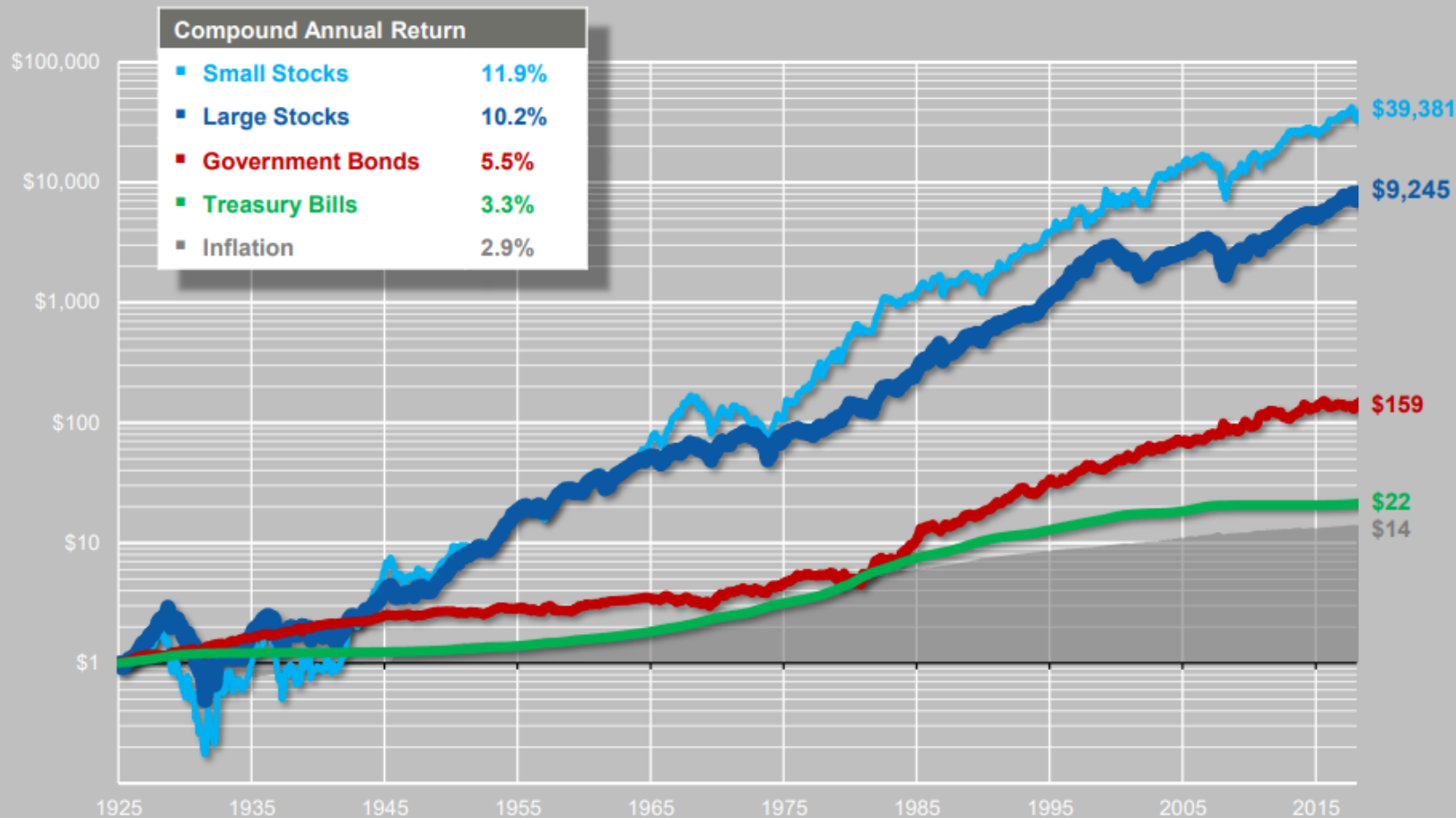
Risks

Valuation
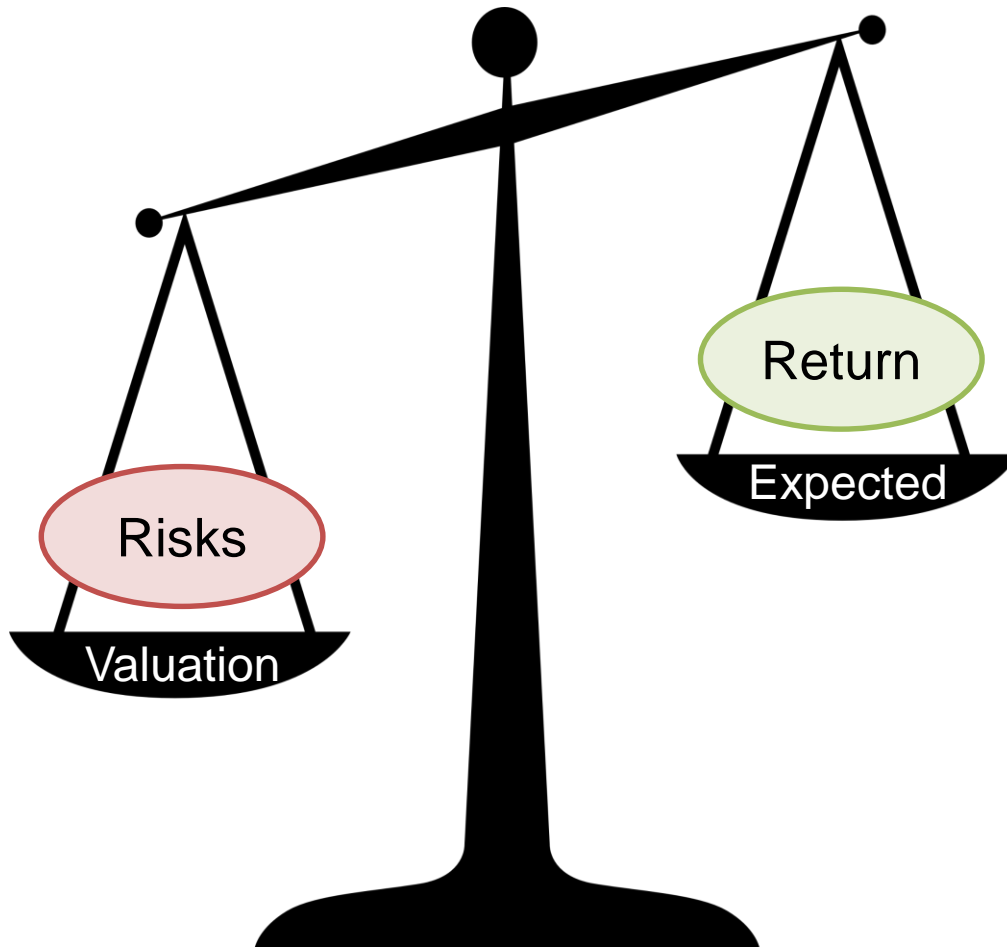
Return

Expected

The primary preference of the CAPM beyond expected returns is to take less market risk.

Many CAPM extensions assume various risks, but no other preferences.

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Stocks, Bonds, Bills, and Inflation 1926–2019

Compound Annual Return

Small Stocks	11.9%	
Large Stocks	10.2%	
Government Bonds	5.5%	
Treasury Bills	3.3%	
Inflation	2.9%	

$39,381
$9,245
$159
$22
$14

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Can We Generalize the CAPM and What Are its Limitations?
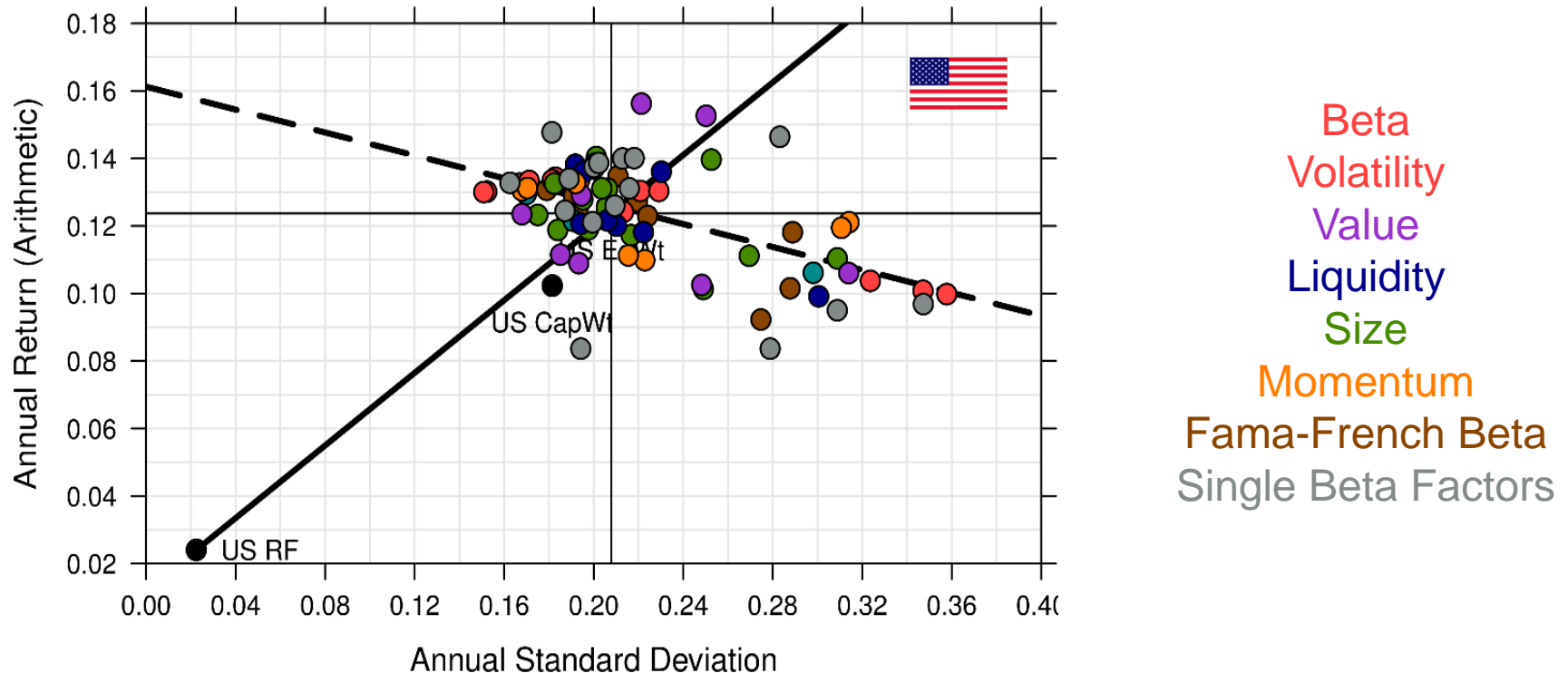
Includes only one type of risk

Does not include non-risk preferences

Not justified empirically

Risk & Return "within" Markets

Stock Returns Ranked Across 21 Metrics / 84 Quartiles
(1995 – 2015)

Source: "Risk and Return Within the Stock Market: What Works Best?" Working Paper, Roger G. Ibbotson and Daniel Y.-J. Kim, January 2016; International results: Zebra Capital Management, LLC

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Asset Classes from 19 Countries
Stocks, Bonds & Bills (1901-2017)

Local Currency Compound Annual Real Returns (%)

- **Risk seems to explain returns across stock, bond, and cash asset classes.**

- **Are risk and return aligned across countries as CAPM proposes?**

Source: Dimson, Marsh, and Staunton updated through 2017 with data from Morningstar Direct.

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Risk is an "incomplete" Explanation of Returns
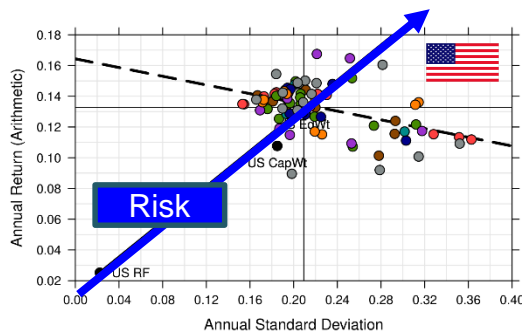
The univariate view of risk and return (CAPM) is an oversimplification.

- What's missing here?
  - Should be a broad, universal concept
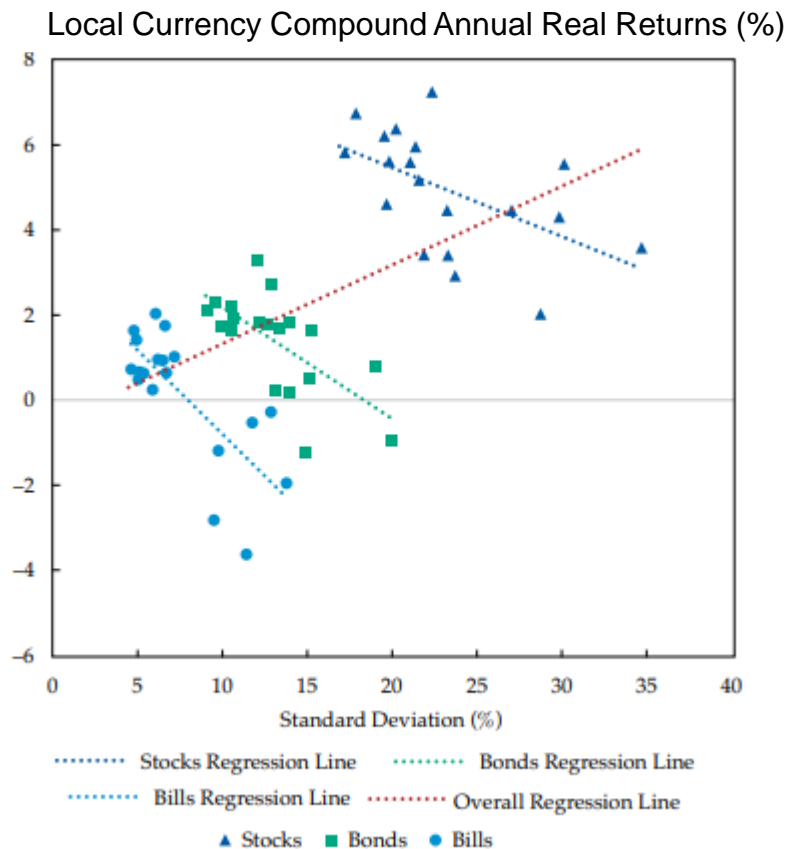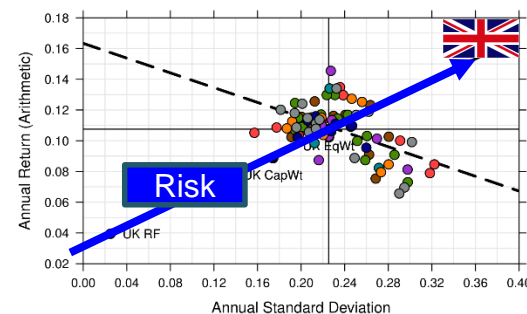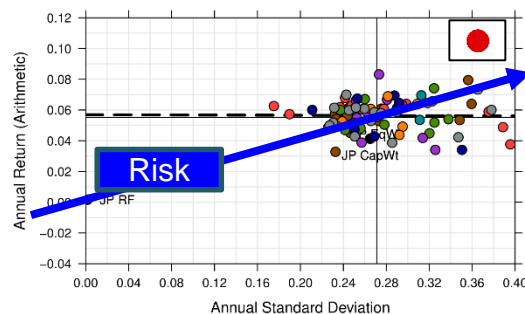 - Should affect pricing
  - Should include other preferences

Source: "Risk and Return Within the Stock Market: What Works Best?" Working Paper, Roger G. Ibbotson and Daniel Y.-J. Kim, January 2016; International results: Zebra Capital Management, LLC

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What is the PAPM?
Popularity Asset Pricing Model

Based on the idea of Popularity (Ibbotson & Idzorek 2014, Idzorek & Ibbotson 2017), the PAPM generalizes the CAPM to include:

- Multiple risk and non-risk preferences and premiums, e.g. risk, liquidity, brands, ESG

- Heterogeneous expectations and mispricing, e.g. extrapolation, differing information or skill, cognitive errors, and market inefficiency

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What is Popularity?

- Popularity is how much anything is liked, preferred, recognized, or demanded

- Assets with popular/unpopular characteristics
  - higher/lower valuations
  - lower/higher expected returns

- Popularity can explain premiums, anomalies, and mispricing
  - Diverse preferences & expectations
  - Can be classical or behavioral

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Illustrative Popularity Based Explanations

Premium/Anomaly/Characteristic/ The Dimension of Popularity	Explanations
Equity Premium	Stocks are riskier than safer assets. Risk is unpopular.
Liquidity	Investors prefer more liquidity to less.
Severe downside risk	Investors dislike large losses.
Size	Small-caps are riskier, less liquid, and have less capacity
Value	Value stocks are less glamorous and often out of favor.
Low volatility/beta	Active managers prefer high-beta stocks in hopes of outperforming benchmarks.
Environmental, Social, Governance (ESG)	Investors tend to seek out responsible investments.
Brand and reputation	Stocks with desirable attributes are sought out beyond their economic benefits.

CLASSICAL (rows: Equity Premium through Size)

BEHAVIORAL (rows: Value through Brand and reputation)

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Principles of Classical Finance

- Rationality
  - Investors maximize cashflows, expected return, and other characteristics such as liquidity and tax efficiency, while minimizing risk.

- Arbitrage or Equilibrium?
  - The law of one price: Arbitrage
  - Demand equals supply: Equilibrium

- Efficient Markets
  - Security prices reflect all relevant information regarding their value. All prices are "fair".

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Equilibrium (PAPM) vs Arbitrage (APT)

Can Popularity be arbitraged away…?

Popularity is based upon aggregate preferences,
and cannot be arbitraged away

PAPM in the Classical World:
Rational Preferences

- ## Assets are bundles of characteristics

  - Corporations supply expected cash flows in a securitized form

  - Investors demand or have preferences for characteristics
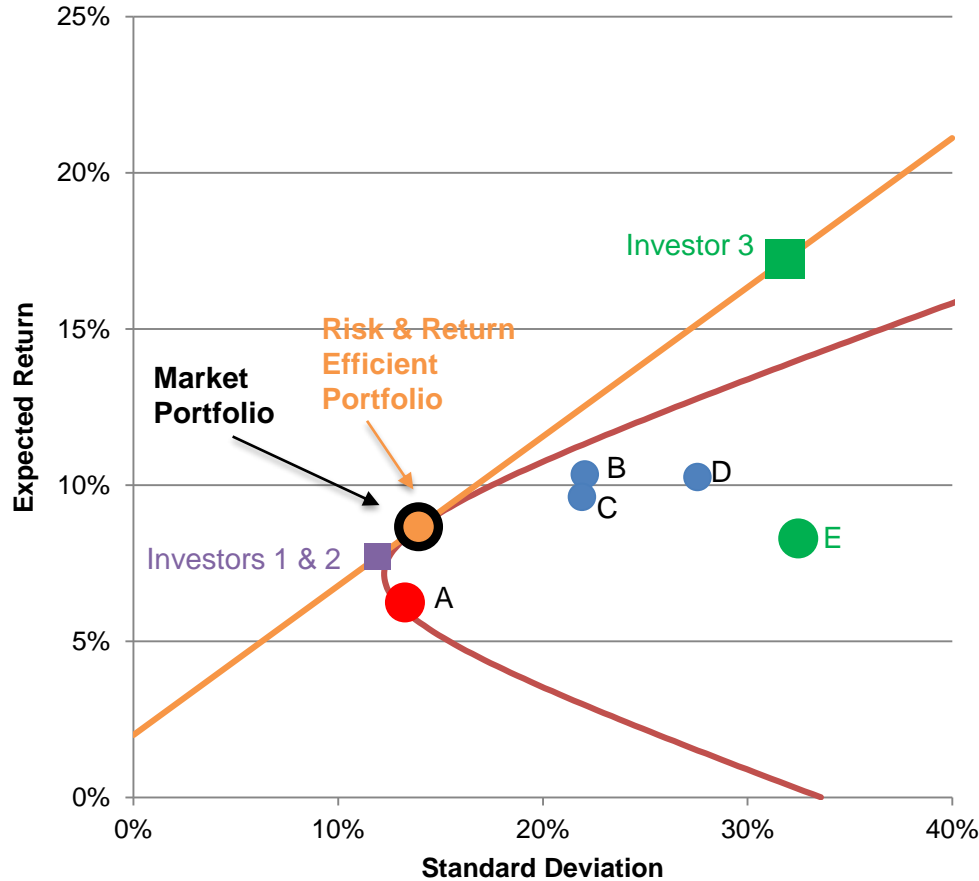
  - Prices equate supply and demand

Types of Risk

Less Liquidity

More Taxable

Valuation

Return

Expected

Unpopular Characteristics
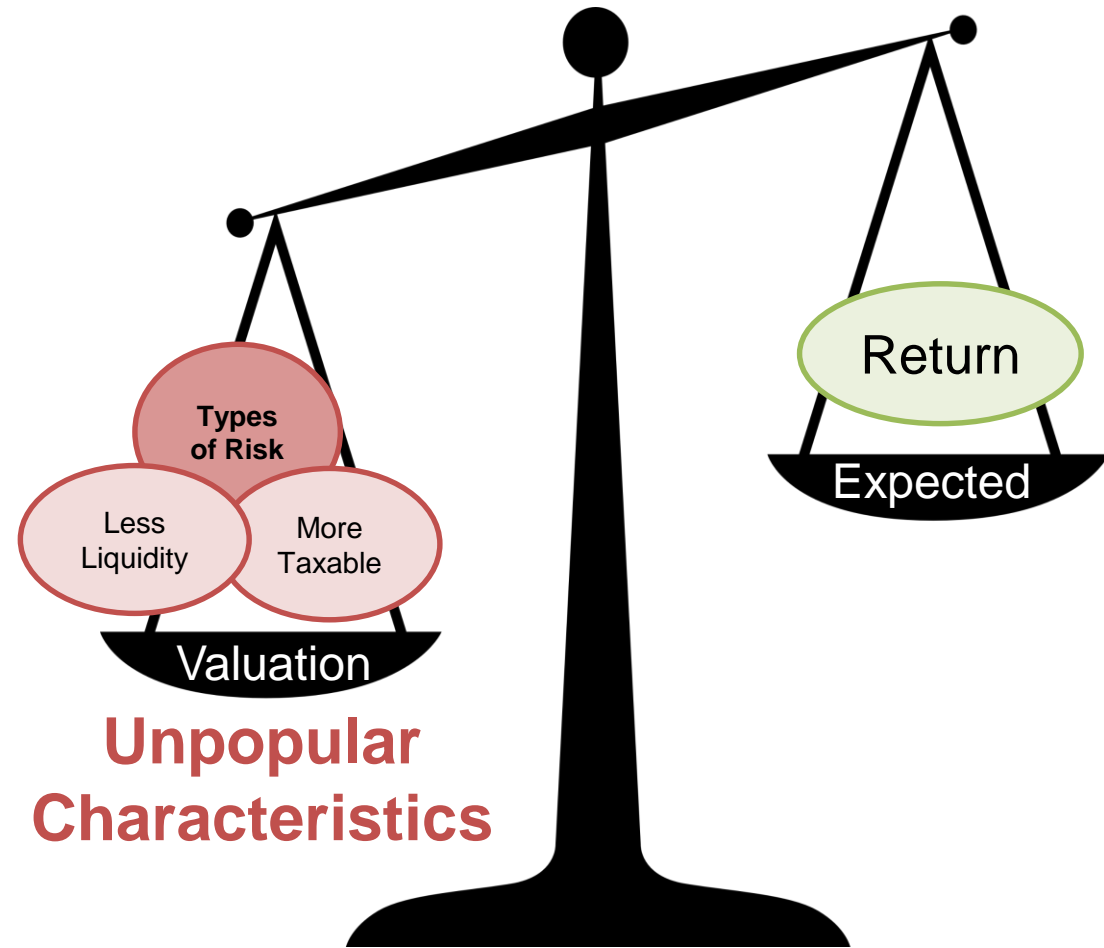
Ibbotson, Diermeier, & Siegel "The Demand for Capital Market Returns: A New Equilibrium Theory" *FAJ* 1984.

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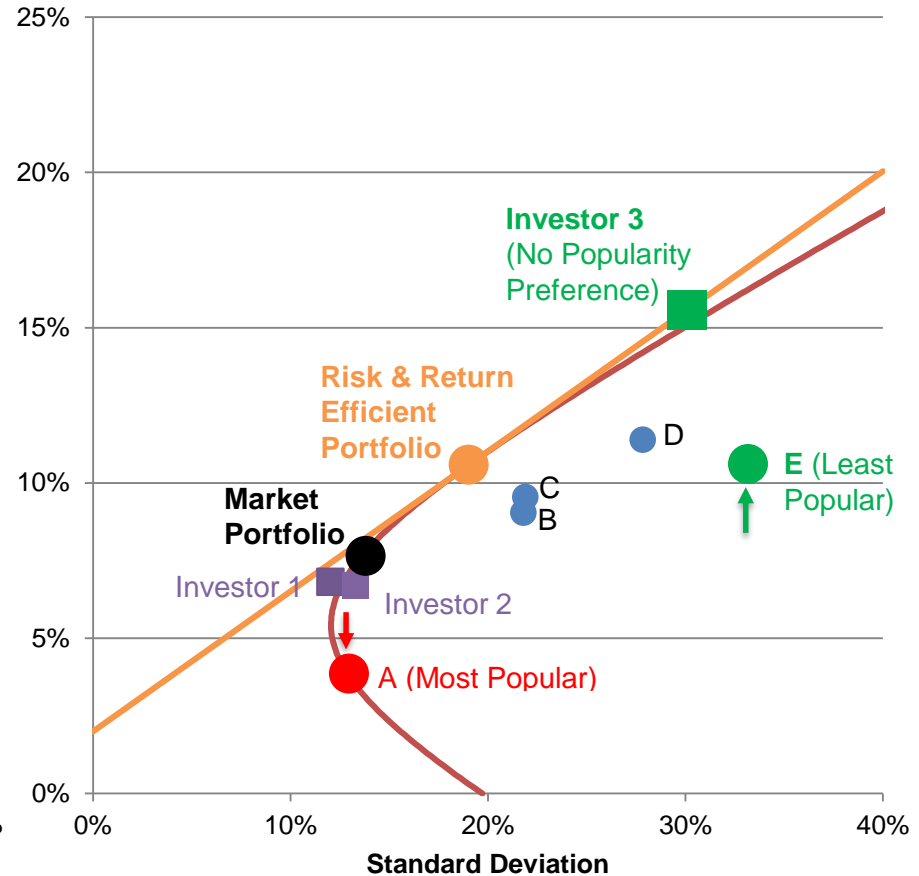# Contrasting the CAPM vs PAPM

Illustration with 3 Investors and 5 Securities (A, B, C, D, E)

CAPM vs PAPM

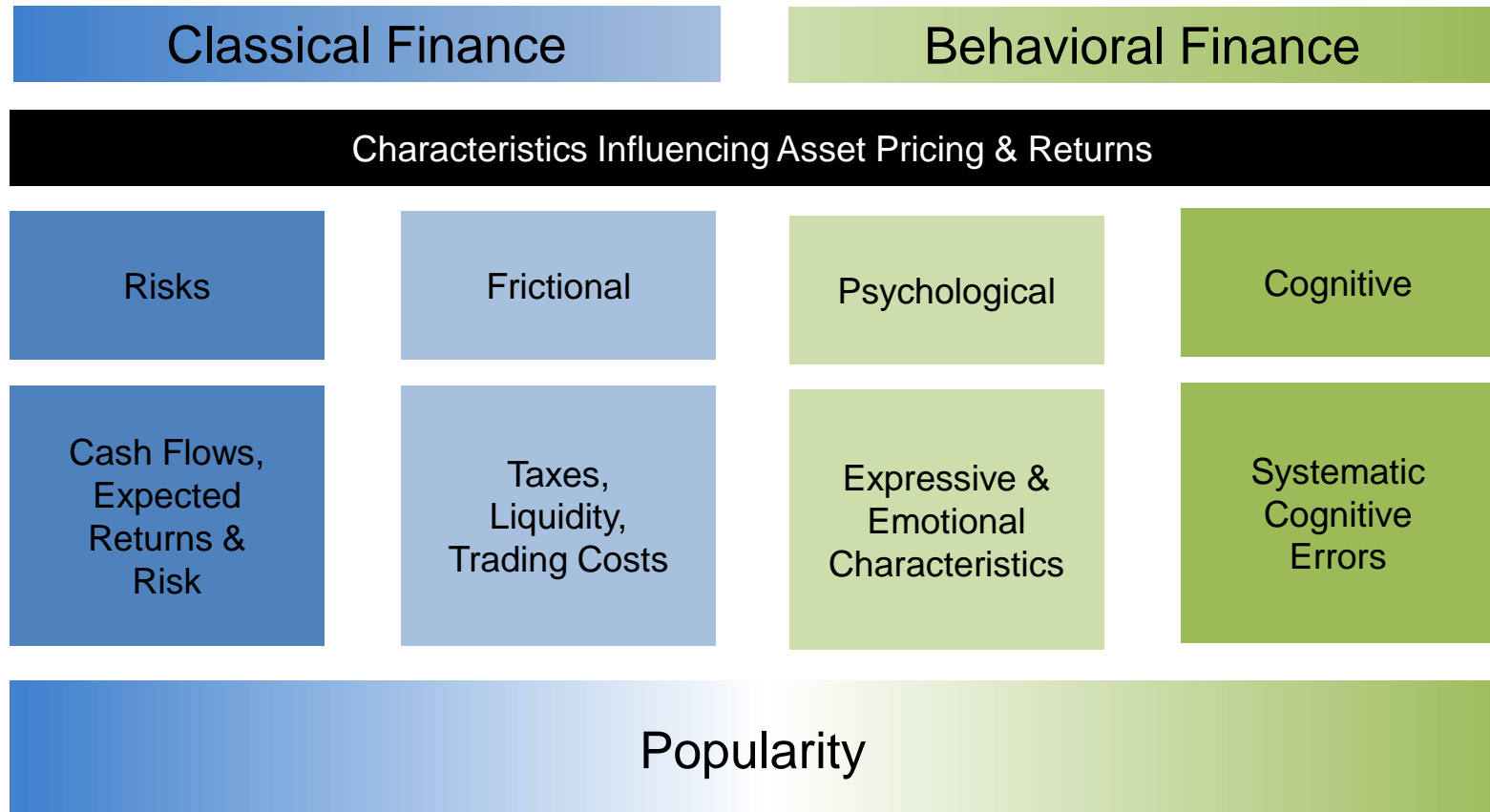|	CAPM	PAPM
Assumptions		
Expectations	Homogeneous	Can be Hetero or Homogeneous
Borrow/Lend	@Riskless Rate	@Riskless Rate
Adverse to	Risk	Multiple risk and non-risk characteristics
Taxes, Transaction costs, etc.	Ignored	Included as characteristics
Conclusions		
Market Portfolio	Max Sharpe Ratio	Not efficient
Investor Holdings	Market + Risk Free L/S	MVO portfolio
Security Expected Excess Returns	Proportional to systematic risk (Beta) and market risk premium	Linear function of beta and popularity loadings on security characteristic premiums

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Behavioral Finance (BF)

- BF contrasts with Classical Finance by questioning the basic assumption of rationality

- Behavioral "irrational" biases can impact asset pricing and mispricing

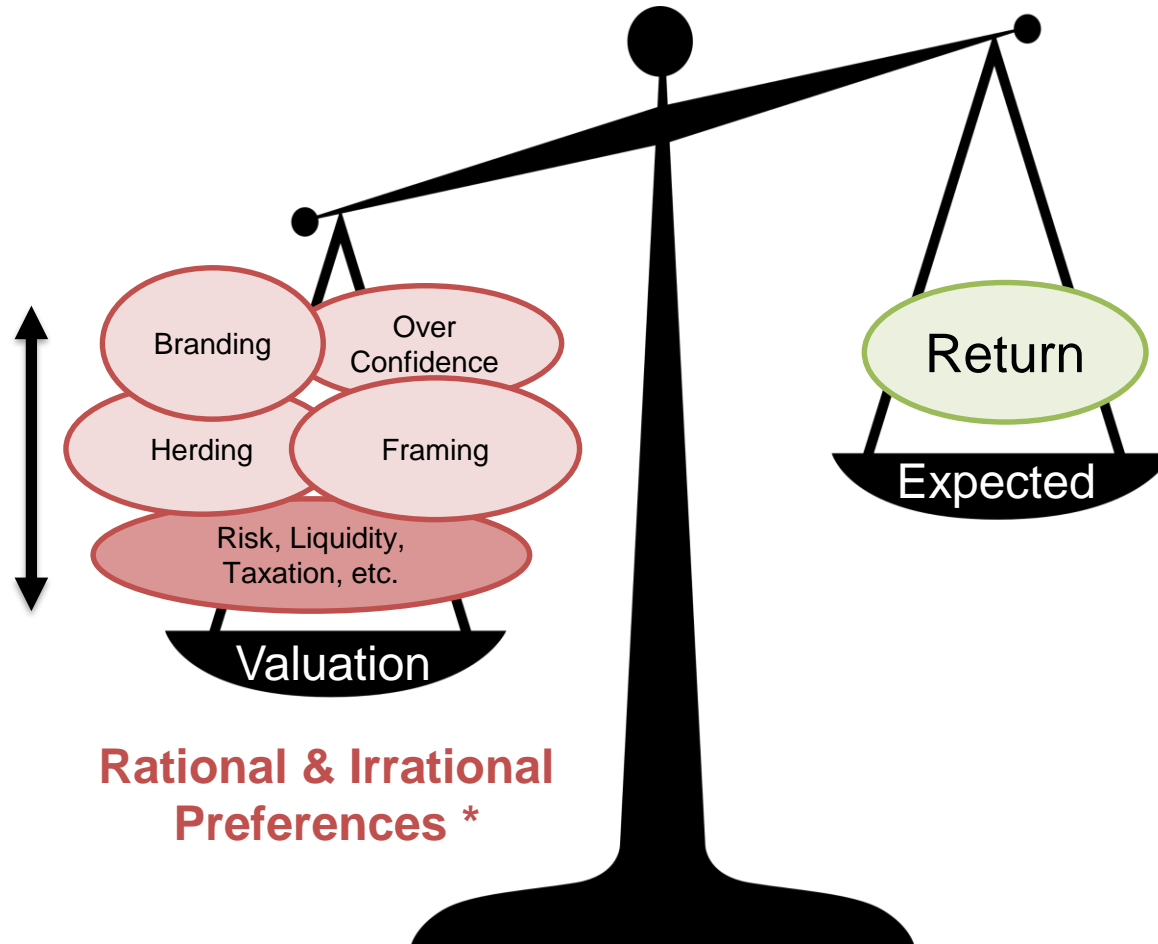- Distortions include loss aversion, over confidence, framing, anchoring, etc.

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Classical & Behavioral Finance

Classical Finance	Behavioral Finance

Characteristics Influencing Asset Pricing & Returns			
Risks	Frictional	Psychological	Cognitive
Cash Flows, Expected Returns & Risk	Taxes, Liquidity, Trading Costs	Expressive & Emotional Characteristics	Systematic Cognitive Errors

Popularity

Based upon the CFA Institute Monograph, Ibbotson, Idzorek, Kaplan, & Xiong 2018.

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Popularity Allows For
Rational & Irrational Preferences

Branding

Over Confidence

Herding

Framing

Risk, Liquidity, Taxation, etc.

Valuation

Return

Expected

Rational & Irrational Preferences *

* Preferences can be either positive or negative

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Asset Pricing Theory Popularity: Classical & Behavioral
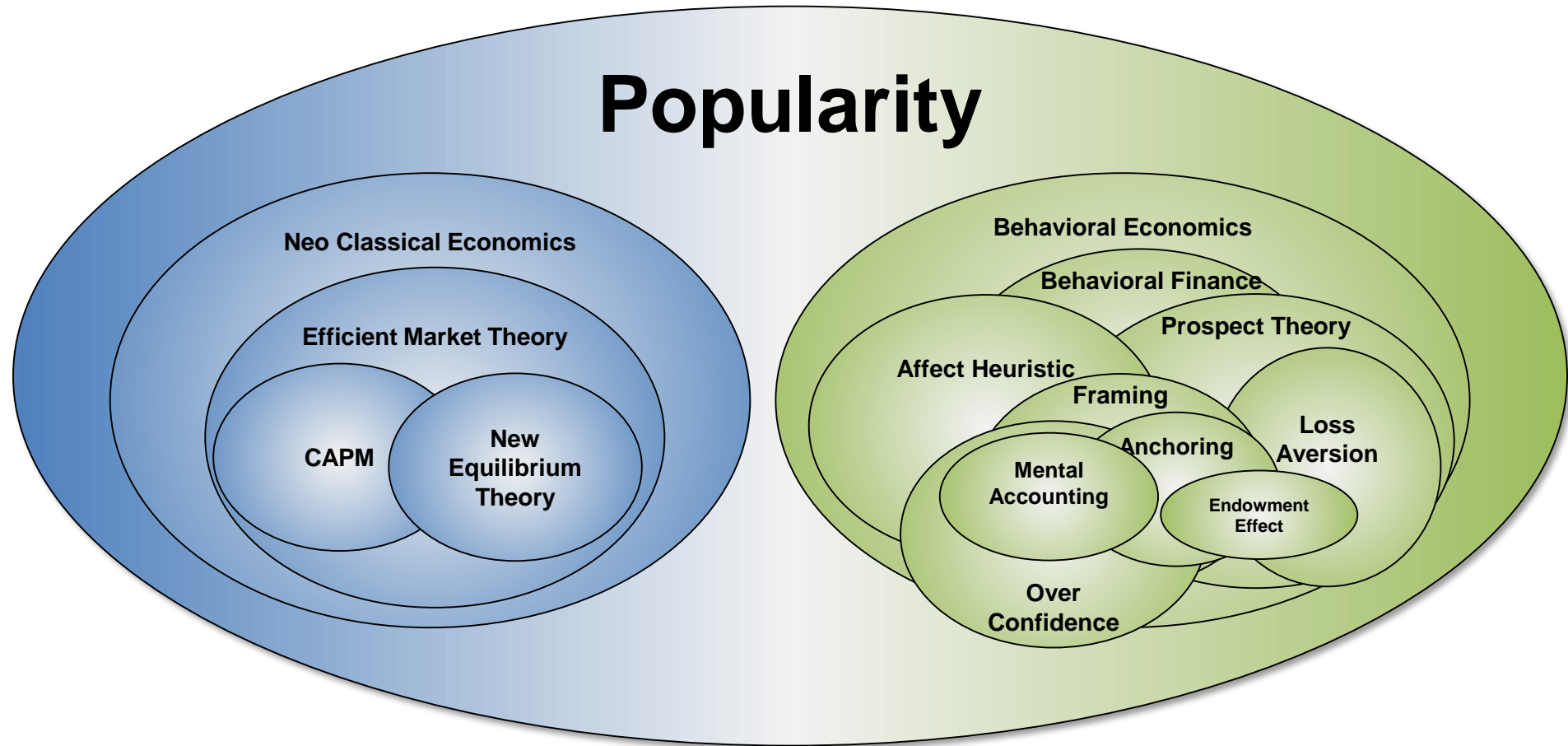
Source: Idzorek & Ibbotson, "Popularity and Asset Pricing", *Journal of Investing*, Spring 2017

How can we test Popularity?

- Popularity is *consistent* with the *premiums* found in Classical Finance as well as Behavioral premiums and *mispricings.*

- What are some *testable* predictions of Popularity that are different from traditional asset pricing models?
  - Branding
  - Reputation
  - Moats

- We run some *preliminary* tests.

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Evidence Supporting Popularity

Interbrand

Year: **2014** ▼

2014 Rank	2013 Rank	Brand	Region/Country	Sector	Brand Value
01	01	Apple	United States	Technology	118,863 $m
02	02	Google	United States	Technology	107,439 $m
03	03	Coca-Cola	United States	Beverages	81,563 $m
04	04	IBM	United States	Business Services	72,244 $m
05	05	Microsoft	United States	Technology	61,154 $m

- Quartiles are formed based upon the prior year rank with monthly quartile returns measured during the following calendar year.
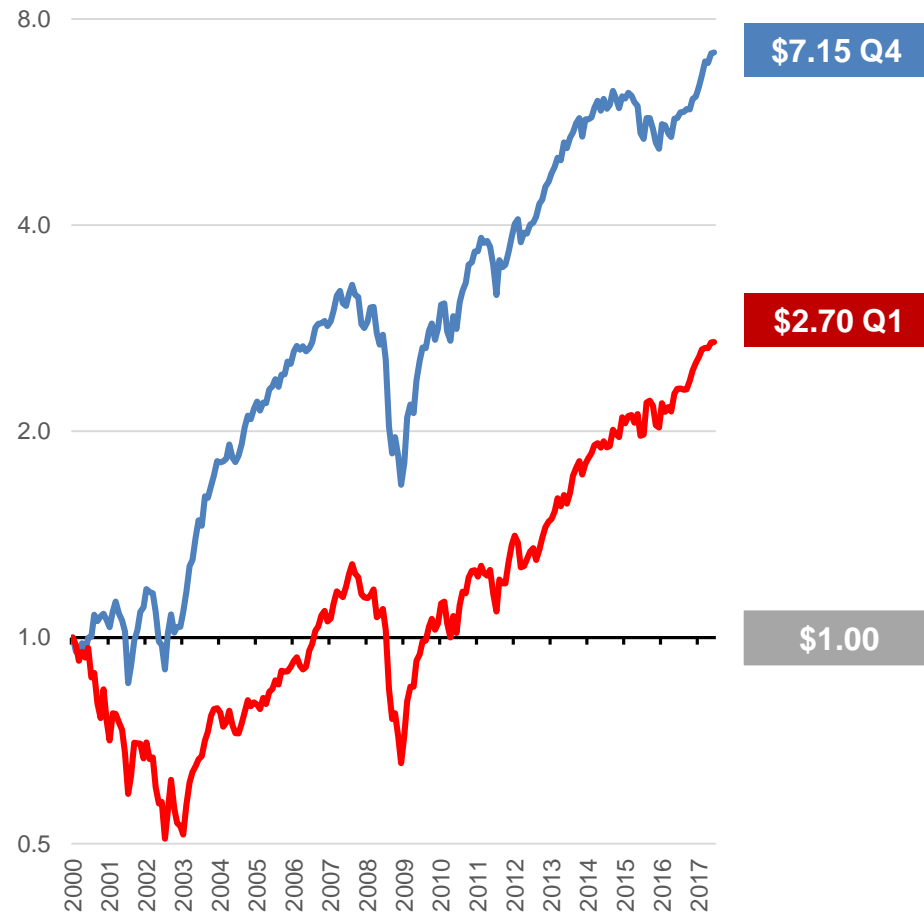
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High Brand Value = High Popularity
Mar 2000 – Aug 2017

	Q4 - Lowest Brand Value	Q1-Highest Brand Value
Geo. Mean	11.95%	5.87%
Std. Dev.	16.73%	16.90%
Sharpe	0.71	0.34

Historically, buying the unpopular quartile (Q4) outperformed.
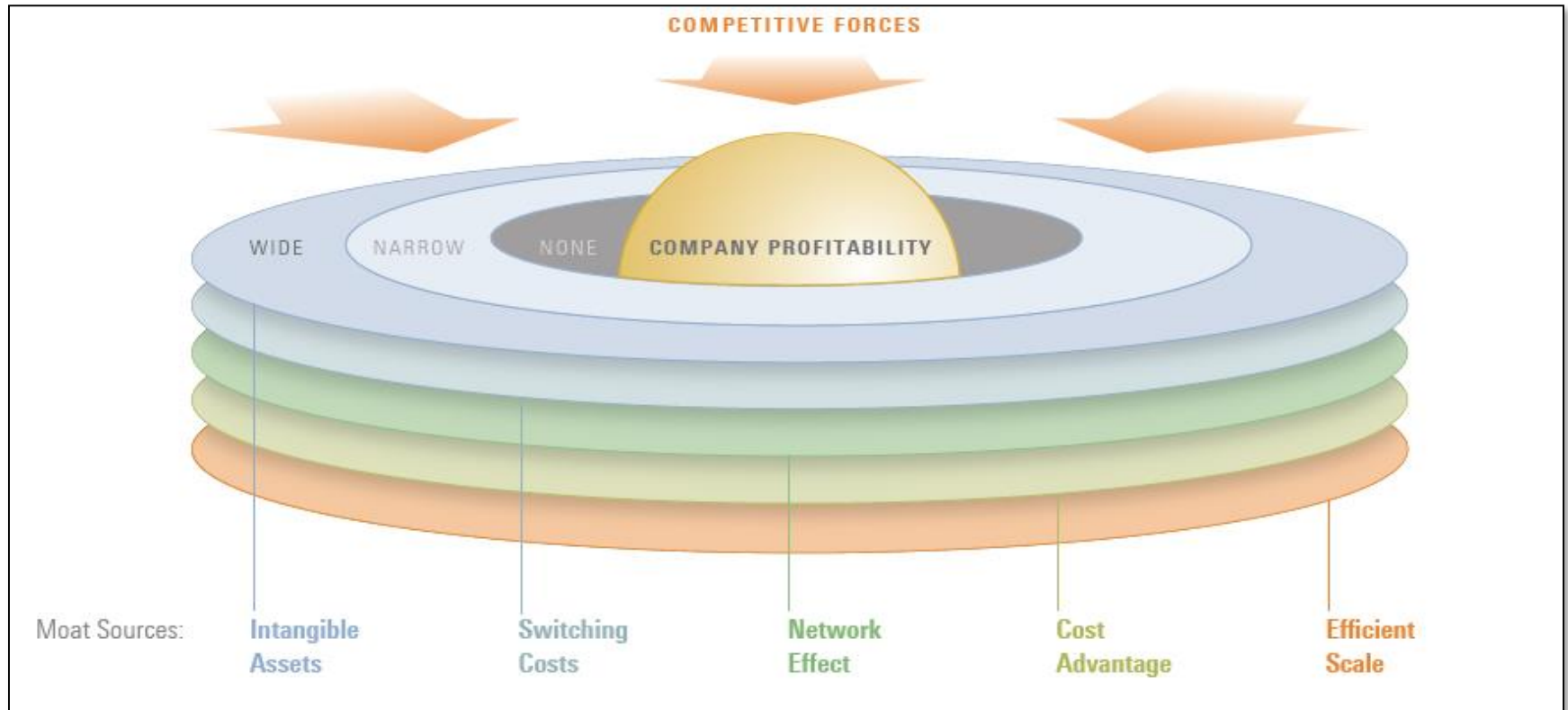

$7.15 Q4

$2.70 Q1

$1.00

The differences between the monthly returns (Q4 vs Q1) were statistically different at the 5% level.

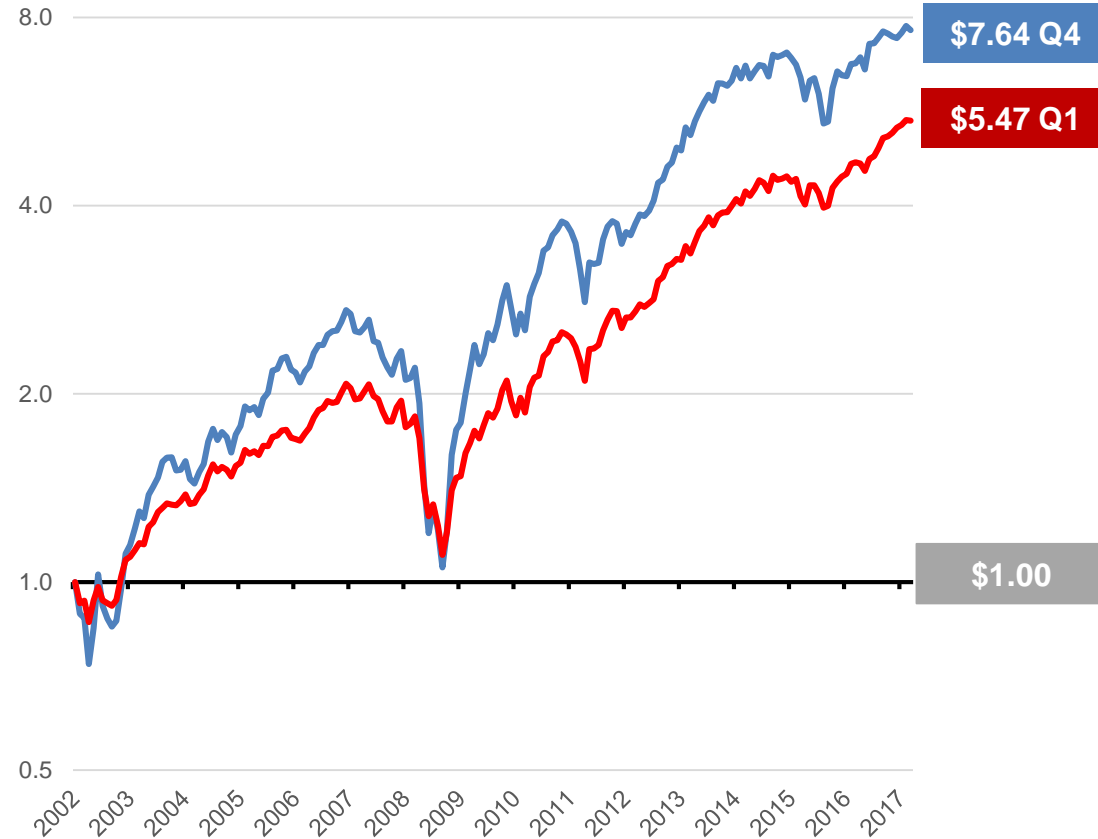# Competitive Sustainable Advantage
Morningstar Economic Moat

High Moat = High Popularity
July 2002 – Aug 2017

	Q4-Lowest Moat	Q1-Highest Moat
Geo. Mean	14.3%	11.9%
Std. Dev.	23.4%	14.6%
Sharpe	0.69	0.80

Historically, buying the unpopular quartile (Q4) outperformed.

$7.64 Q4

$5.47 Q1

$1.00

Other Valuation Tests of Popularity

Most tests are based on realized returns

- Realized returns include expected returns, changes in preferences, and changes in estimated growth
- Expected returns are difficult to detect since realized returns are noisy

Event studies measure changes in price

- Changes in popularity are easier to detect e.g. join index, splits, etc.

Conclusions
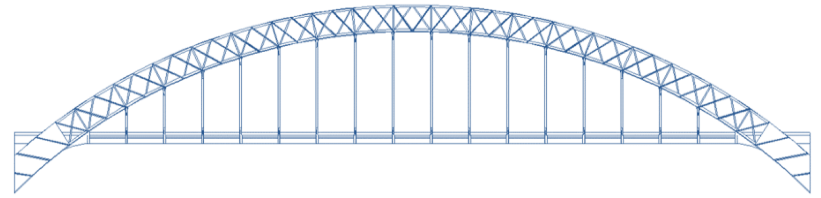
- **PAPM** is a generalization of **CAPM,** relaxing assumptions allowing for:
  - Multiple preferences for risk and non-risk characteristics
  - Classical and Behavioral
  - Premiums (long-term) and mispricing (short-term)

- Security expected prices and returns reflect the weighted average of investor expectations, weighted by investor wealth, risk aversion, and preferences.

- **Popularity** provides a bridge between Classical (rational) and Behavioral (irrational) Finance with the potential for inefficient capital markets.

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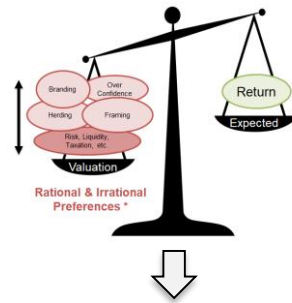
Implementation

Figure 3.3. Toward a Popularity-Based Asset Pricing Formula

	Rational								Irrational
	Risk-Free Rate	Market (MKT)	Size (SMB)	Value (HML)	Liquidity (LIQ)	Risk Anomalies (RISKA)	Environmental, Social, Governance (ESG)	Competitive Advantage, Brand, Reputation (CABR)	Momentum (MOM)
CAPM	$E[R_i] = R_f + B_{i1}E[R_{MKT} - R_f]$								
Fama–French 3-Factor	$E[R_i] = R_f + B_{i1}E[R_{MKT} - R_f] + B_{i2}SMB + B_{i3}HML$								
NET*	$E[R_i] = R_f + B_{i1}E[R_{MKT} - R_f] + B_{i2}SMB + B_{i3}HML + B_{i4}LIQ + B_{i5}RISKA$								
Popularity**	$E[R_i] = R_f + B_{i1}E[R_{MKT} - R_f] + B_{i2}SMB + B_{i3}HML + B_{i4}LIQ + B_{i5}RISKA + B_{i6}ESG + B_{i7}CABR + B_{i8}MOM$								