Diversification
and
Discussion of Risk

Conference of the County Investment Academy
San Antonio
June 2019

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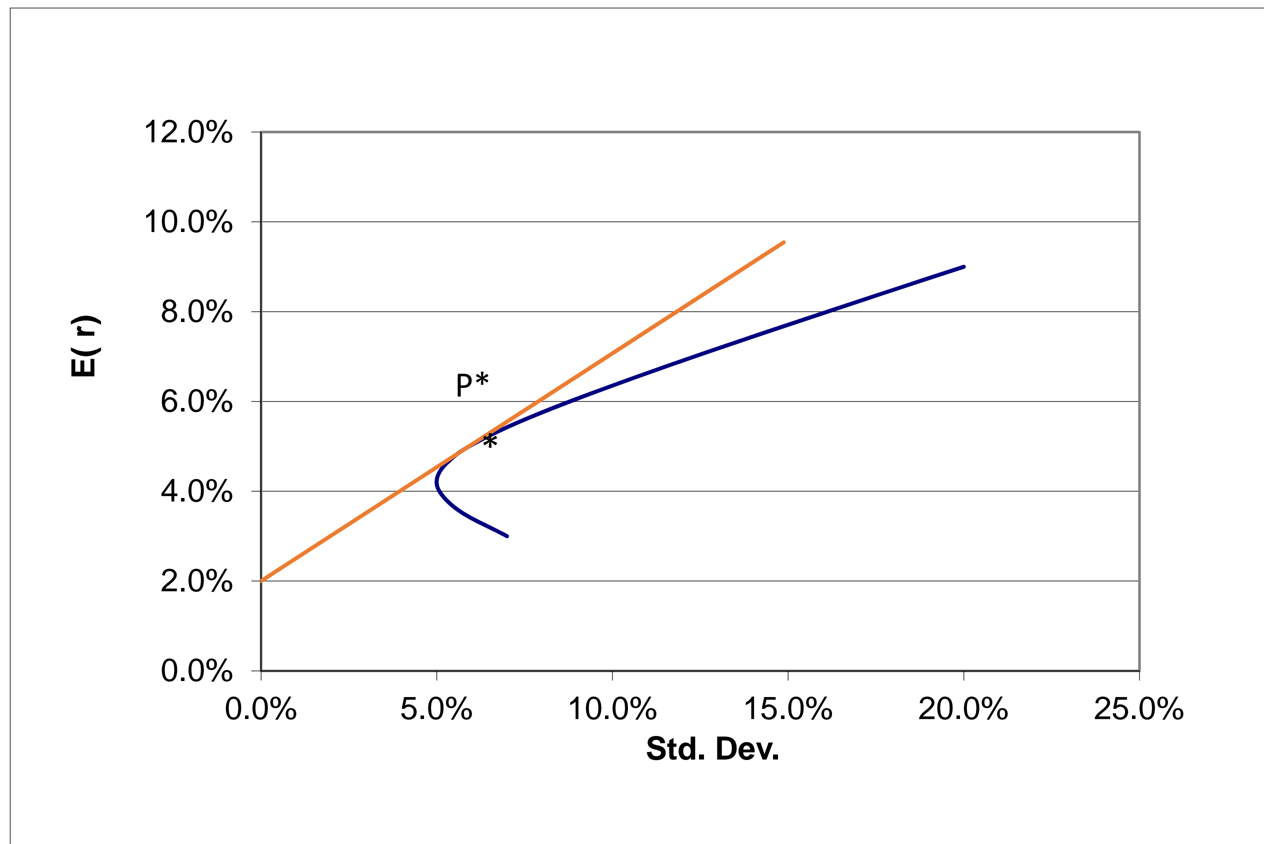
TEXAS STATE UNIVERSITY

PFIA 2256.008c
Requires Training in:

- Investment Diversification

Capital Market Theory



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Capital Market Theory

- Points along the upper half of the curve represent the best risk/return diversified portfolios of risky assets
- The straight line represents portfolios obtained by investing in the “optimal risky portfolio” (P*) and either lending or leveraging at the “risk-free” rate.
- Points on the line below the curve represent “lending” and points above represent “leveraging” (note increased “risk” as measured by standard deviation of returns!)

So in theory…..

Key result?

An undiversified portfolio yields inferior return for the level of risk!

The same, or higher, return could be attained at a lower level of risk with a diversified portfolio.

If you are not diversified, you are taking more risk than you can expect to be compensated for!

Diversification and Correlation of Returns

Correlation, which measures the degree of "co-movement", ranges from -1 to +1. When the correlation between returns is less than 1 there are diversification benefits—the risk of portfolio is less than the average of the risks of the individual assets.

Which pair of stock returns is more correlated?

Chevron, Exxon

Chevron, Delta Airlines

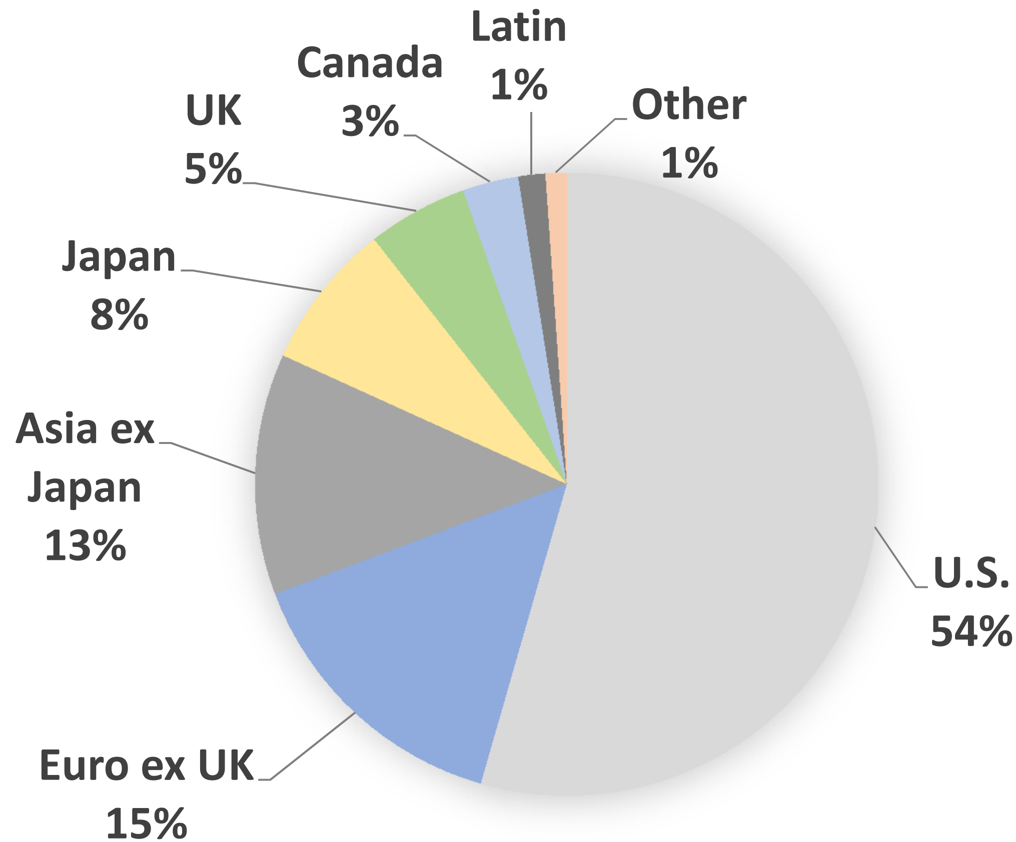
International Diversification

Correlations vs S&P 500:

Country	Correlation
China	0.62
Korea	0.53
Japan	0.73
Germany	0.74
UK	0.73
Brazil	0.29
Chile	0.38

Monthly returns vs corresponding MSCI indexes (US dollar returns) 5 years ended April 2019
Source: FactSet

Global Market Capitalization



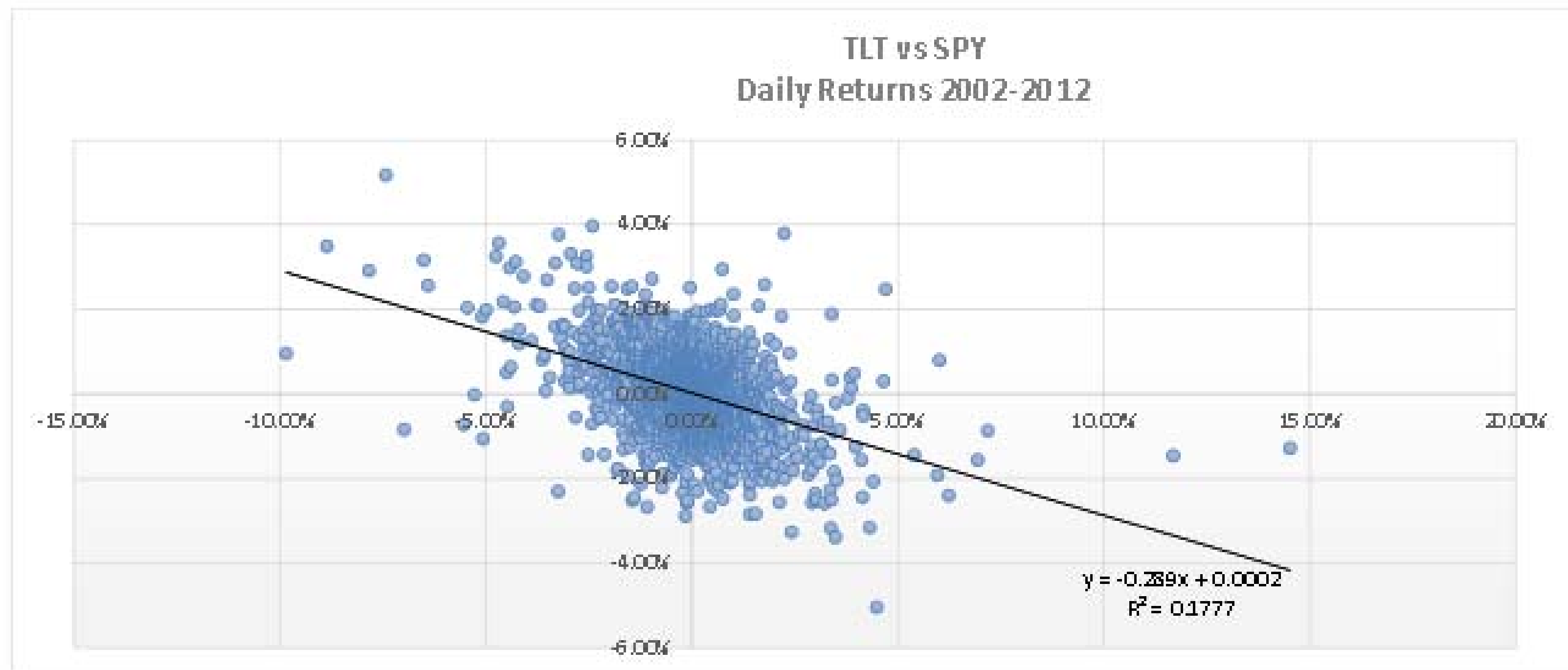
Diversification Across Asset Classes

Treasuries versus Stocks

Inflation vs Deflation

Rising vs falling risk premium (changes in market sentiment)

S&P 500 vs Long-term Treasuries



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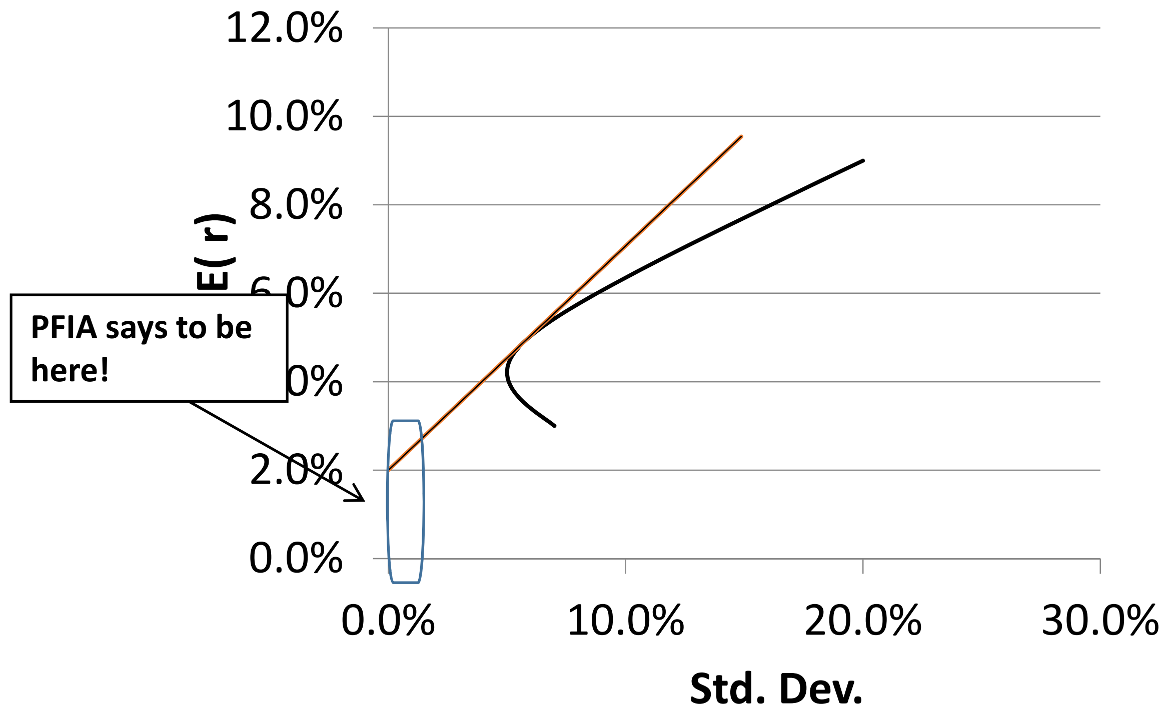

PFIA says to be here!
12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%
E(r)
0.0%
10.0%
20.0%
30.0%
Std. Dev.

- The PFIA requires that you invest in very safe assets, generally very short-term assets
- Be SLY—Safety, liquidity, yield
- Nevertheless, some principles of diversification apply

Sources of Risk

Security Risk or Credit risk

Call/Prepayment Risk

Market risk

Liquidity risk

Reinvestment risk

Strategy Risk

Security Risk

Credit Risk

- Default Risk: Risk of delay and/or lack of payment
- Spread Risk: Risk of change in credit spread due to change in default risk or market sentiment
- Must diversify across large number of issuers to minimize impact of credit risk

Sec. 2256.006. STANDARD OF CARE.

(b) In determining whether an investment officer has exercised prudence with respect to an investment decision, the determination shall be made taking into consideration:

(1) the investment of all funds, or funds under the entity's control, over which the officer had responsibility rather than a consideration as to the prudence of a single investment; and

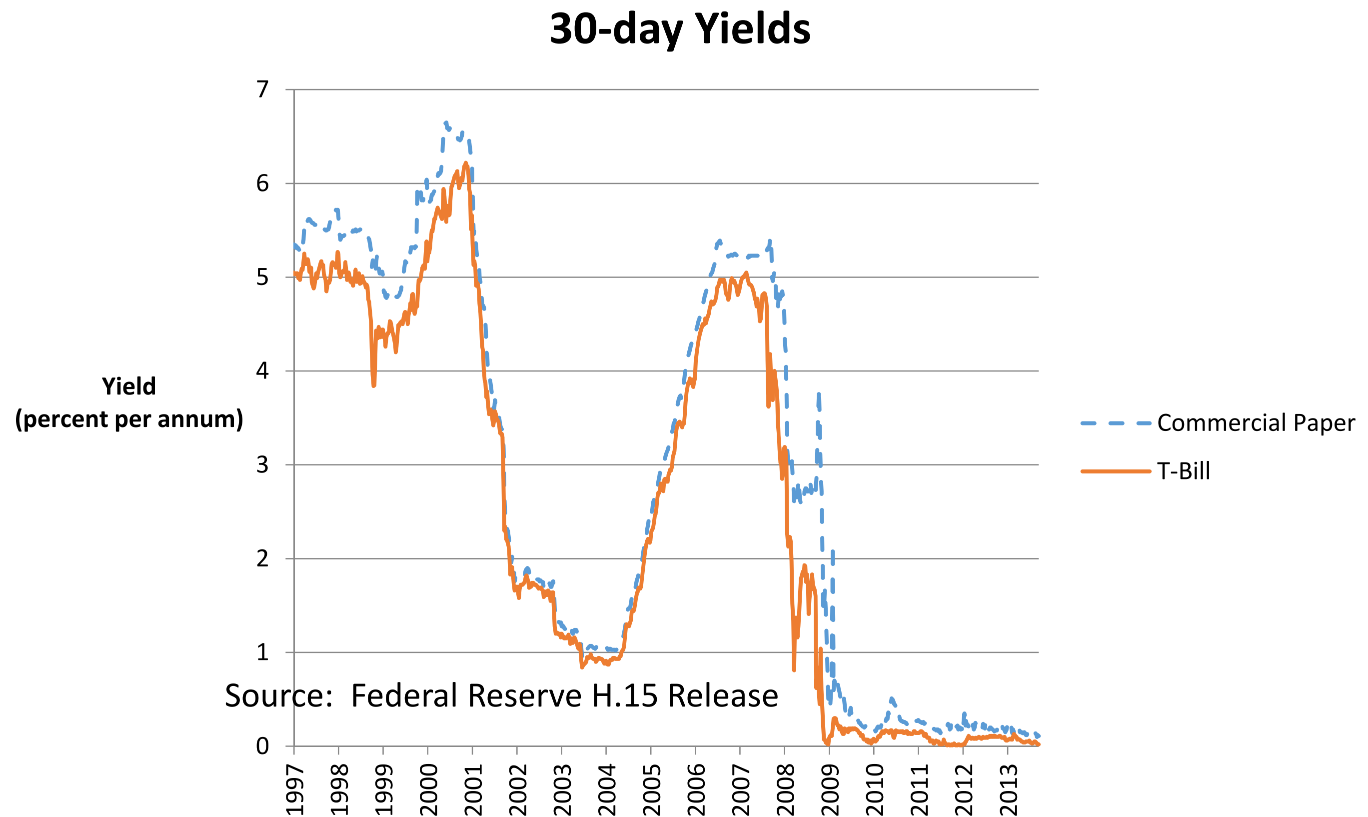
- (2) whether the investment decision was consistent with the written investment policy of the entity.

In other words…..

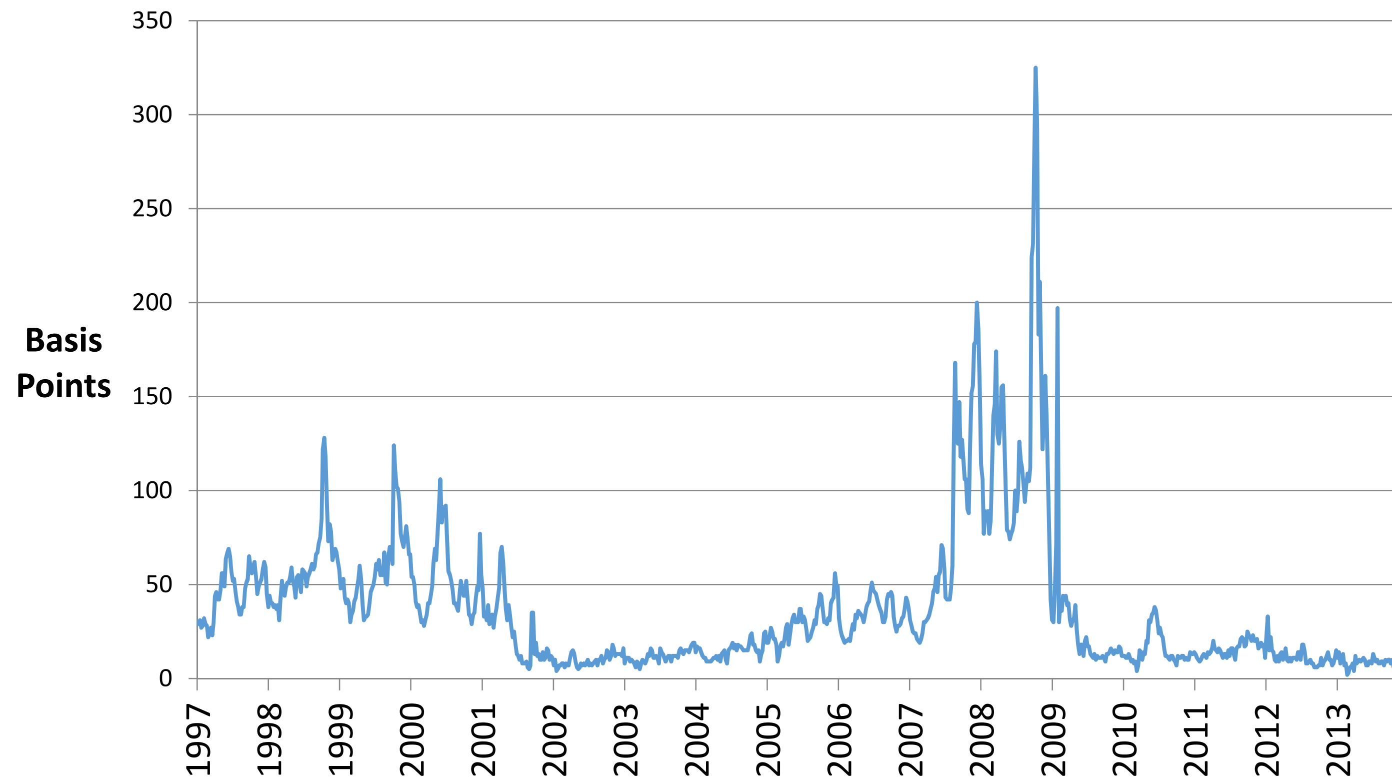
- Prudence will be judged in a <u>portfolio</u> context. An investment that seems imprudent on a stand-alone basis can be justified in a portfolio context.

- Corollary: An investment that turns out poorly had better be only a small part of your portfolio!

Commercial Paper vs T-Bills



Commercial Paper Spread



Source: Federal Reserve H.15 Release

Market Risk

Primarily due to interest rate risk.

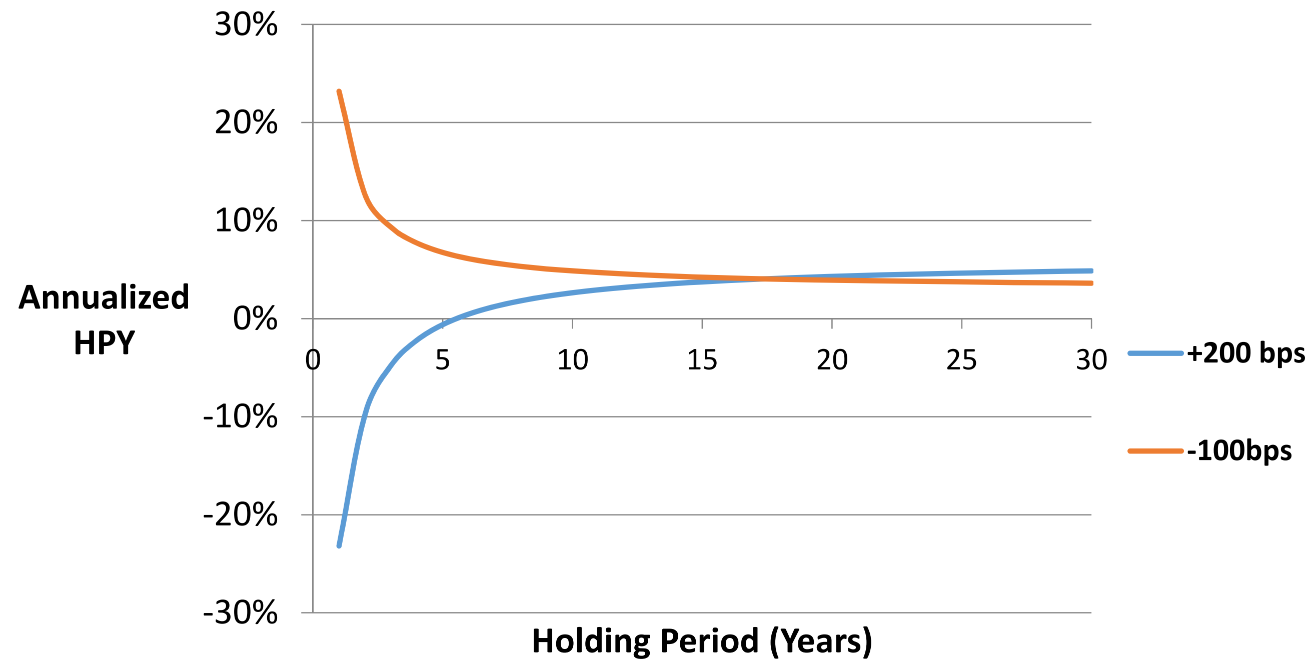
The two dimensions of interest rate risk:

Price Risk or Market Risk—due to rising interest rates

Reinvestment Risk—exposed to falling interest rates

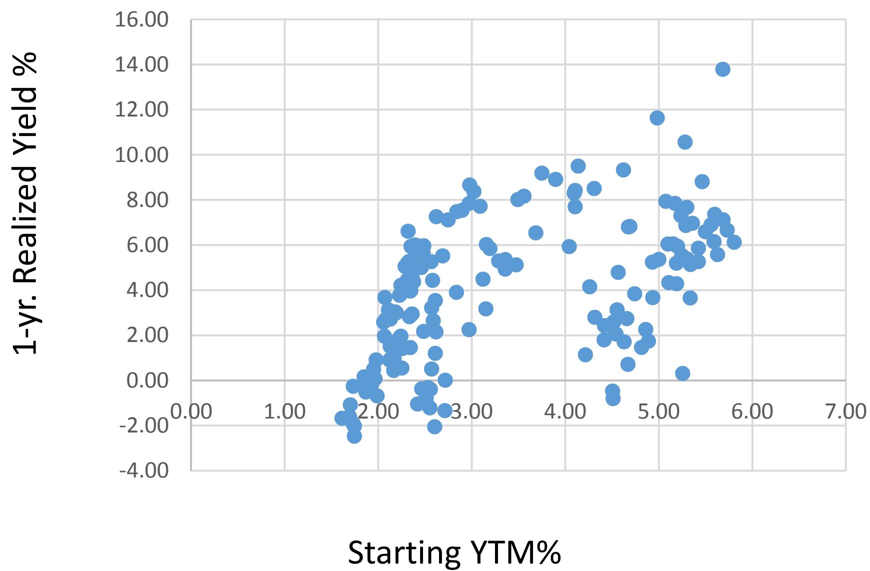
Strategy can help manage exposure to these countervailing risks.

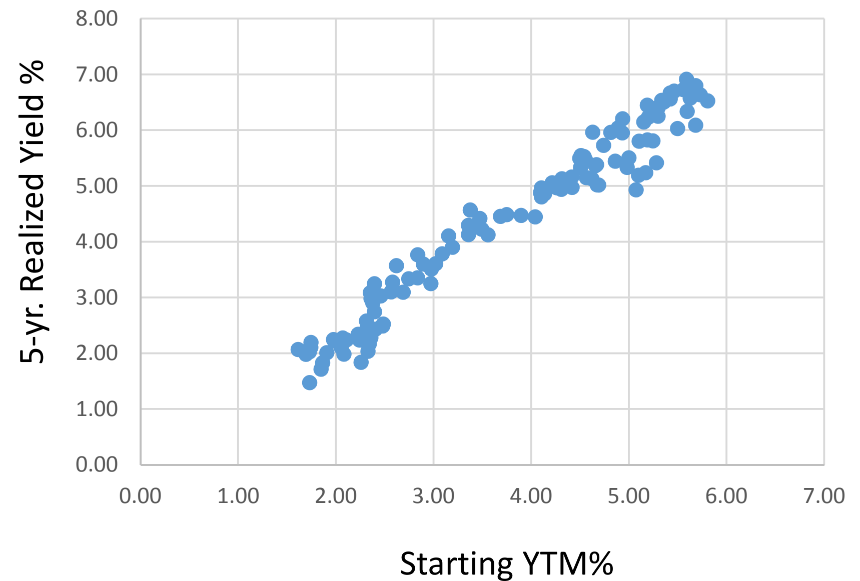
Illustration of Interest Rate Risk



Holding period yields computed assuming +200/-100 basis point change in yield for the life of the bond.

Duration Matching Works!





Bloomberg Barclay's U.S. Aggregate Bond Index starting yield versus realized annualized yield over monthly rolling one-year and five-year horizons April 2004-April 2019.
Source: FactSet

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Strategy Risk

- Short investment horizons are subject to “price risk”. (Extension strategy causes market or price risk)
- Long investment horizons are subject to “reinvestment risk”. (Rollover Strategy causes reinvestment risk)
- Matching Strategy—Match maturities to cash flow needs
- Which risk causes more trouble?

--Price Risk! (see Orange County 1994)