# For Education Hurgertain Markets

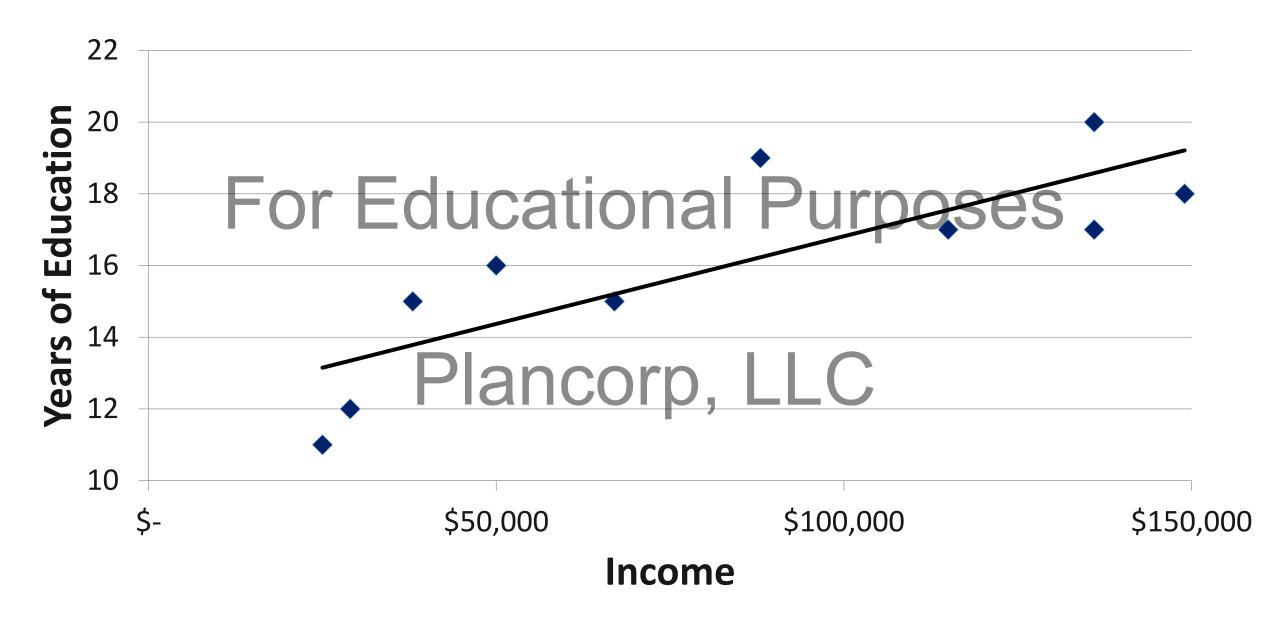
Plancorp, LLC

July 21, 2018



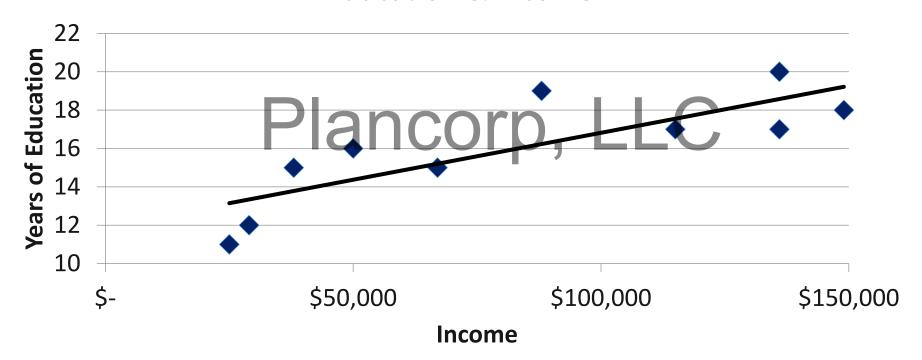


#### Correlation: Education and Income

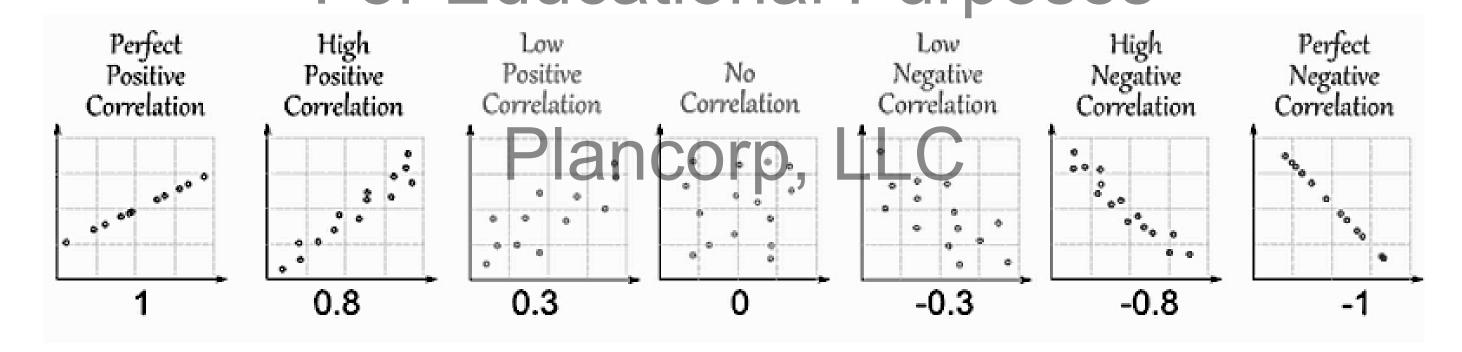


- 1. Correlation is the relationship between two or more variables.
- 2. Correlation ranges between 1.0 and -1.0.
- 3. The lower the correlation, the greater the diversification benefit

**Education & Income** 



- 1. Correlation is the relationship between two or more variables.
- 2. Correlation ranges between 1.0 and -1.0.
- 3. The lower the correlation, the greater the diversification benefit FOR Educational Purposes

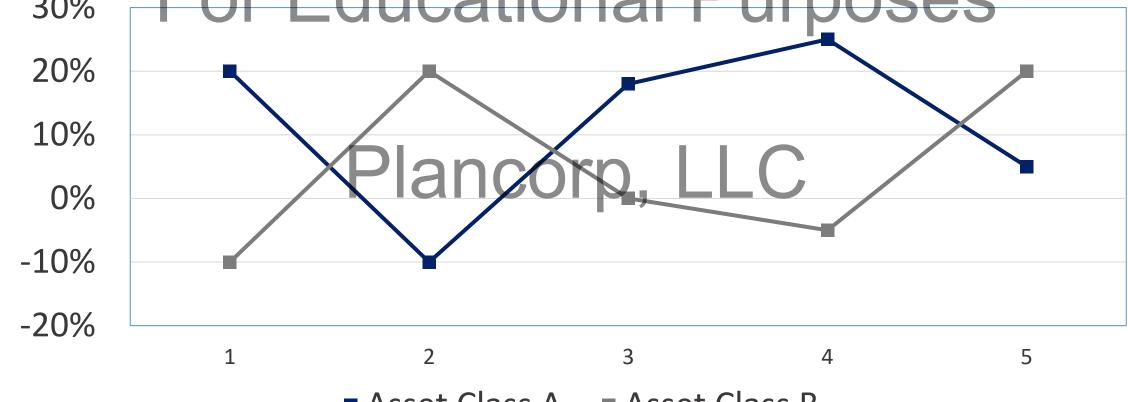


- 1. Correlation is the relationship between two or more variables.
- 2. Correlation ranges between 1.0 and -1.0.

3. The lower the correlation, the greater the diversification benefit 30% 20% 10% 0% -10% -20% 2 1 Asset Class A

- 1. Correlation is the relationship between two or more variables.
- 2. Correlation ranges between 1.0 and -1.0.

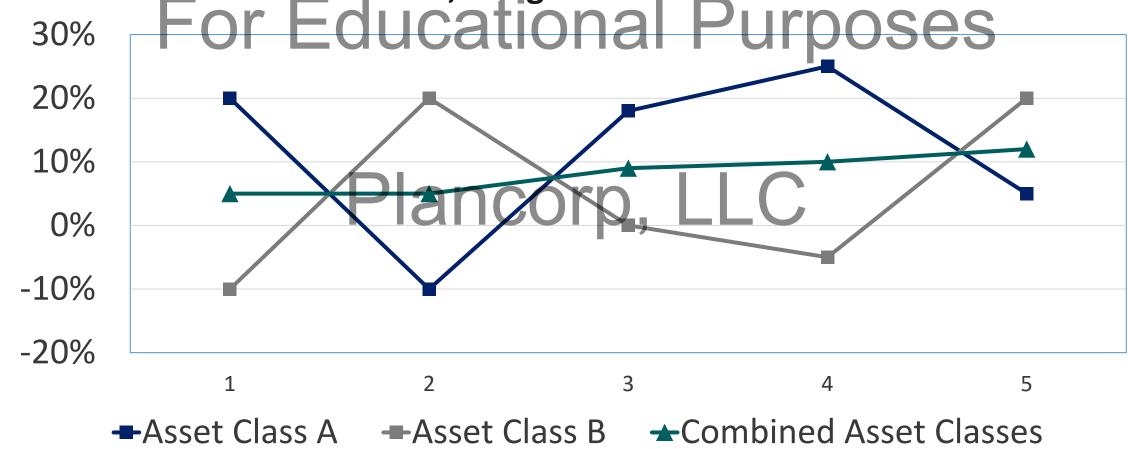
3. The lower the correlation, the greater the diversification benefit 30% FOR Educational Purposes



Asset Class A — Asset Class B

- 1. Correlation is the relationship between two or more variables.
- 2. Correlation ranges between 1.0 and -1.0.

3. The lower the correlation, the greater the diversification benefit



	Low Volatil	ity Portfolio	High Volatil	ity Portfolio
Year	Growth of \$100,000	Annual Return	Growth of \$100,000	Annual Return
1	\$110,000	10.0%	\$134,000	34.0%
2	\$115,500	5.0%	\$121,940	-9.0%
3	\$131,670	14.0%	\$153,644	26.0%
4	F\$143,520U	cational F	u\$129,664S	-16.0%
5	\$162,178	13.0%	\$169,070	31.0%
6	\$165,421	anc <b>29%</b> , L	<b>\$167,380</b>	-1.0%
7	\$185,272	12.0%	\$197,508	18.0%
8	\$214,916	16.0%	\$173,807	-12.0%
9	\$227,811	6.0%	\$210,306	21.0%
10	\$257,426	13.0%	\$227,313	8.0%

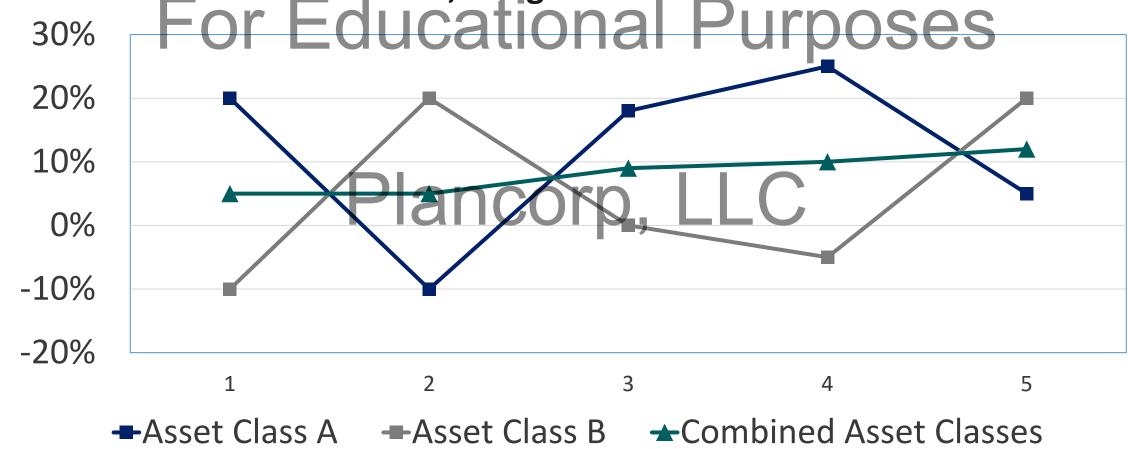
	Low Volatility Portfolio		High Volatili	ty Portfolio
Year	Growth of \$100,000	Annual Return	Growth of \$100,000	Annual Return
1	\$110,000	10.0%	\$134,000	34.0%
2	\$115,500	5.0%	\$121,940	-9.0%
3	\$131,670	14.0%	\$153,644	26.0%
4	\$143,520	9.0%	\$129,061	-16.0%
5	\$162,178	13.0%	\$169,070	31.0%
6	C\$165,421	cauq <sub>0</sub> %ar F	\$167,380 <b>C</b> S	-1.0%
7	\$185,272	12.0%	\$197,508	18.0%
8	\$214,916	16.0%	\$173,807	-12.0%
9	\$227,811	anc6.0%	\$210,306	21.0%
10	\$257,426	13.0%	\$227,313	8.0%
Average	Return	10.0%		10.0%

	Low Volatility Portfolio		High Volatility Portfolio	
Year	Growth of \$100,000	Annual Return	Growth of \$100,000	Annual Return
1	\$110,000	10.0%	\$134,000	34.0%
2	\$115,500	5.0%	\$121,940	-9.0%
3	\$131,670	14.0%	\$153,644	26.0%
4	\$143,520	9.0%	\$129,061	-16.0%
5	\$162,178	13.0%	\$169,070	31.0%
6	<b>O</b> \$165,421 <b>O U</b>	cauq <sub>0</sub> %ar F	\$167,380 <b>CS</b>	-1.0%
7	\$185,272	12.0%	\$197,508	18.0%
8	\$214,916	16.0%	\$173,807	-12.0%
9	\$227,811	anc 6.0%	\$210,306	21.0%
10	\$257,426	13.0%	\$227,313	8.0%
Average	Return	10.0%		10.0%
Standard	Deviation	4.5%		18.6%

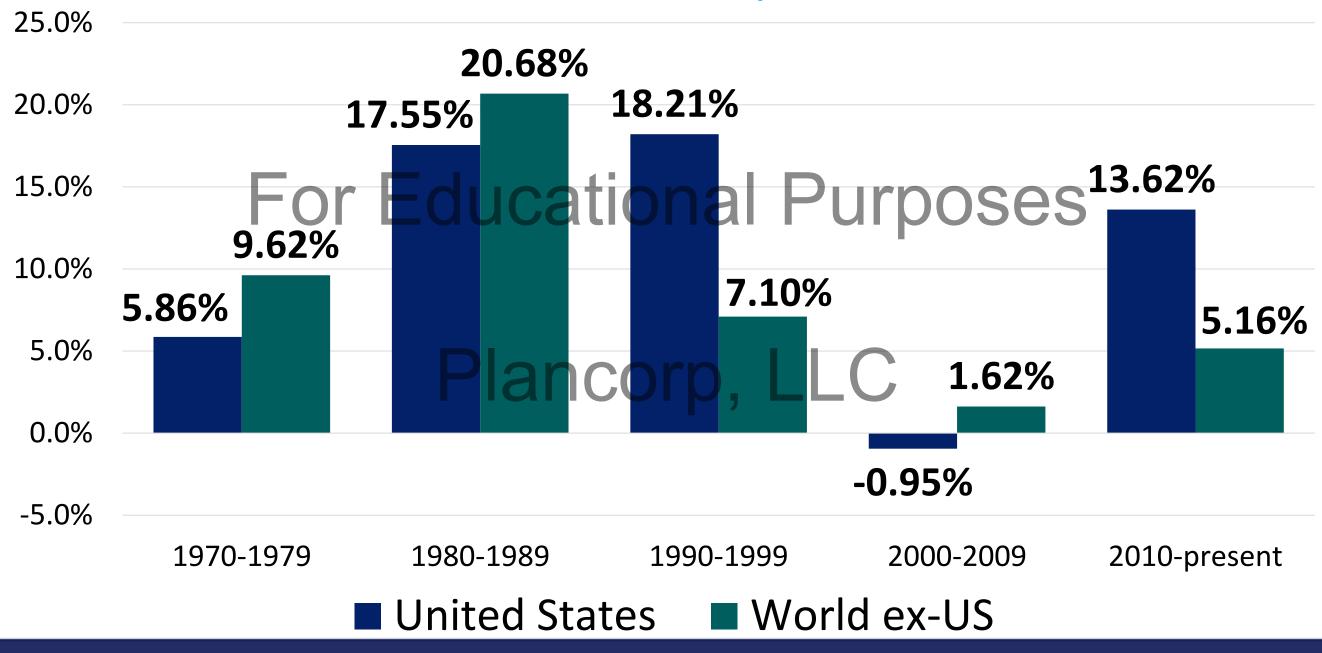
	Low Volatility Portfolio		High Volatility Portfolio	
Year	Growth of \$100,000	Annual Return	Growth of \$100,000	Annual Return
1	\$110,000	10.0%	\$134,000	34.0%
2	\$115,500	5.0%	\$121,940	-9.0%
3	\$131,670	14.0%	\$153,644	26.0%
4	\$143,520	9.0%	\$129,061	-16.0%
5	\$162,178	13.0%	\$169,070	31.0%
6	C\$165,421	cauq.mai F	\$167,380 <b>CS</b>	-1.0%
7	\$185,272	12.0%	\$197,508	18.0%
8	\$214,916	16.0%	\$173,807	-12.0%
9	\$227,811	anc 6.0%	\$210,306	21.0%
10	\$257,426	13.0%	\$227,313	8.0%
Average	e Return	10.0%		10.0%
Standard	Deviation	4.5%		18.6%
Compour	nd Return	9.9%		8.5%

- 1. Correlation is the relationship between two or more variables.
- 2. Correlation ranges between 1.0 and -1.0.

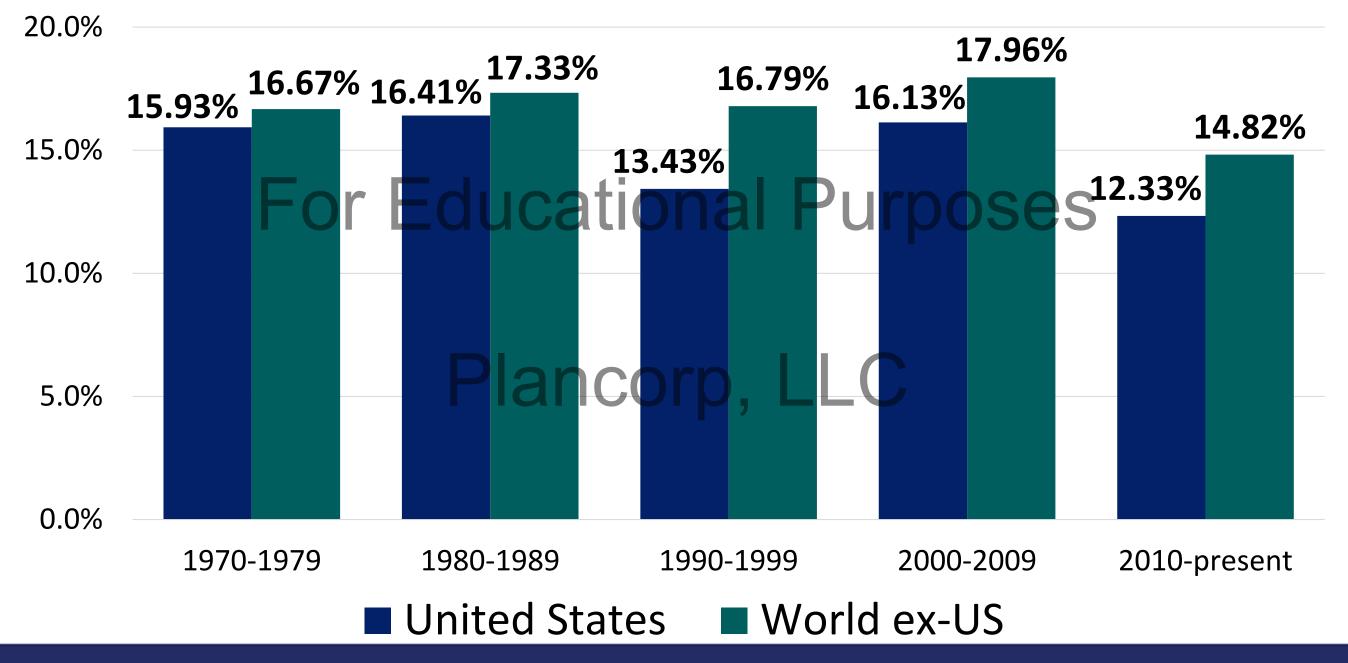
3. The lower the correlation, the greater the diversification benefit



#### US vs. World: Annualized Return by Decade



#### US vs. World: Annualized Standard Deviation



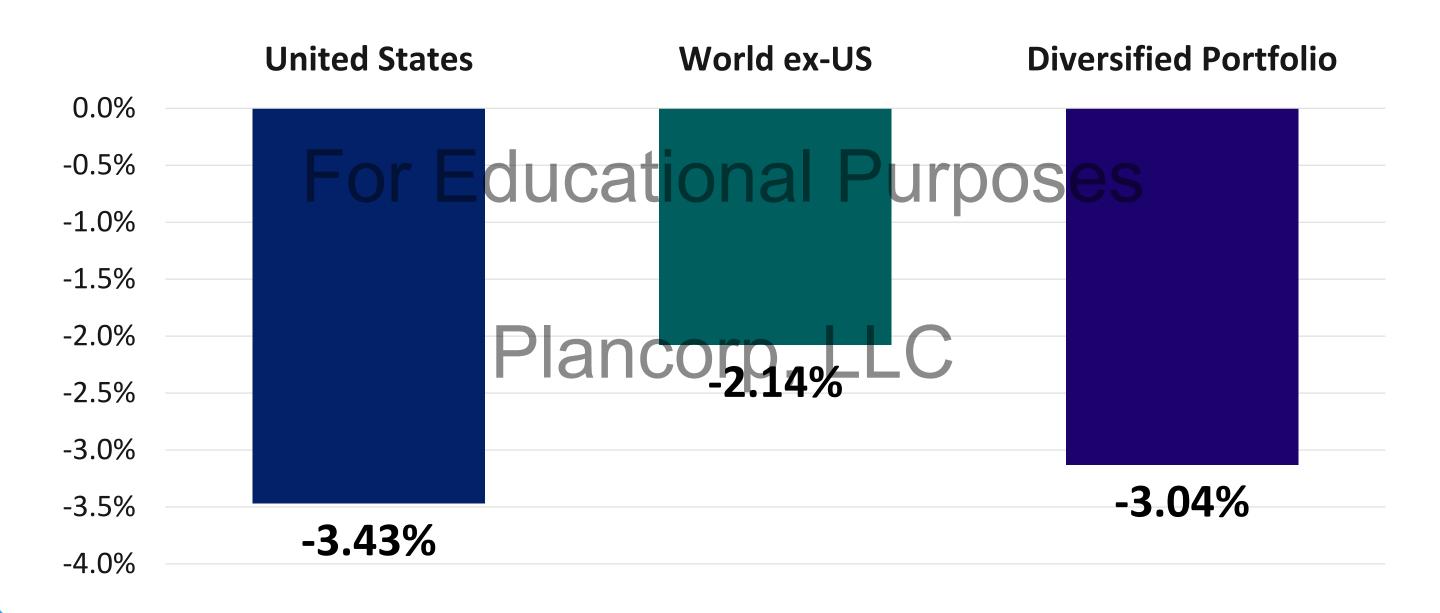
	United States	nal Purpos	Diversified Portfolio
Annualized Return	10.63%	nai i uipos	000
Standard Deviation	Planco	rp, LLC	

	United States	World ex-US	Diversified Portfolio
Annualized Return	10.63%	nai i uipos	000
Standard Deviation	15.50%CO	rp, LLC	

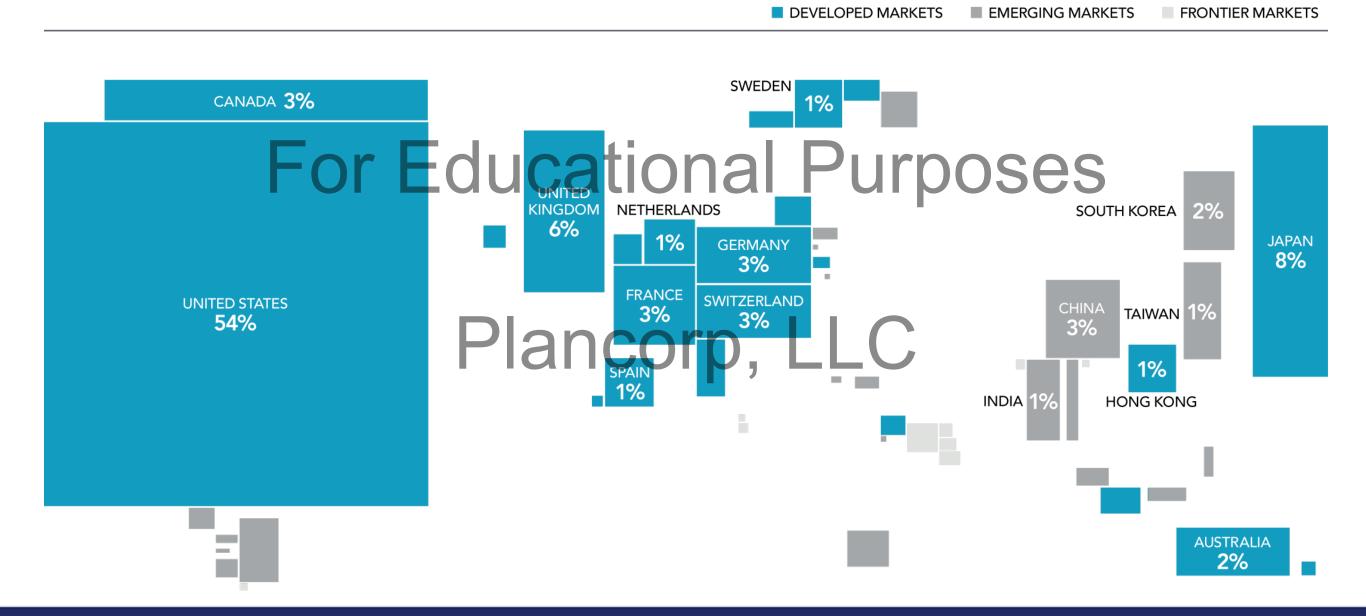
Fo	United States	World ex-US	Diversified Portfolio
Annualized Return	10.63%	9.03%	000
Standard Deviation	15.50%CO	rp,16.84%	

F	United States	World ex-US	Diversified Portfolio
Annualized Return	10.63%	9.03%	10.35%
Standard Deviation	15.50%CO	rp,16.84%	14.67%

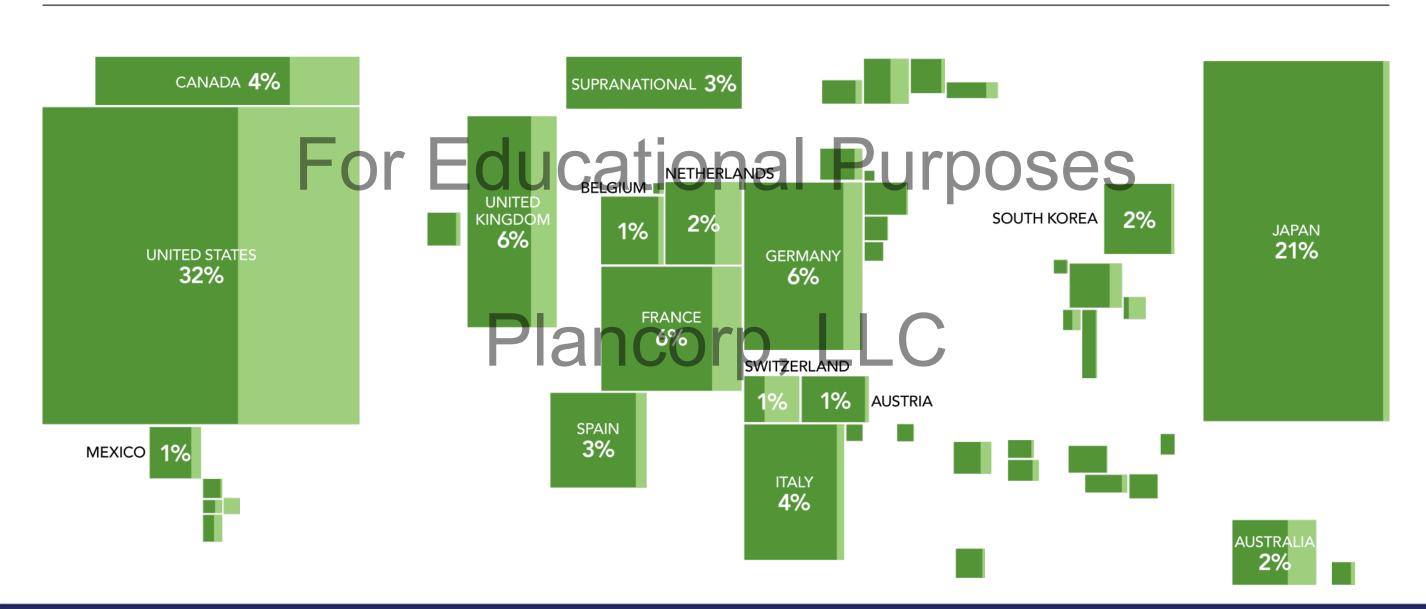
	United States	World ex-US	Diversified Portfolio
Annualized Return	10.63%	9.03%	10.35%
Standard Deviation	15.50%CO	rp,16.84%	14.67%
Sharpe Ratio	0.56	0.42	0.57



#### Global Diversification vs Home Bias



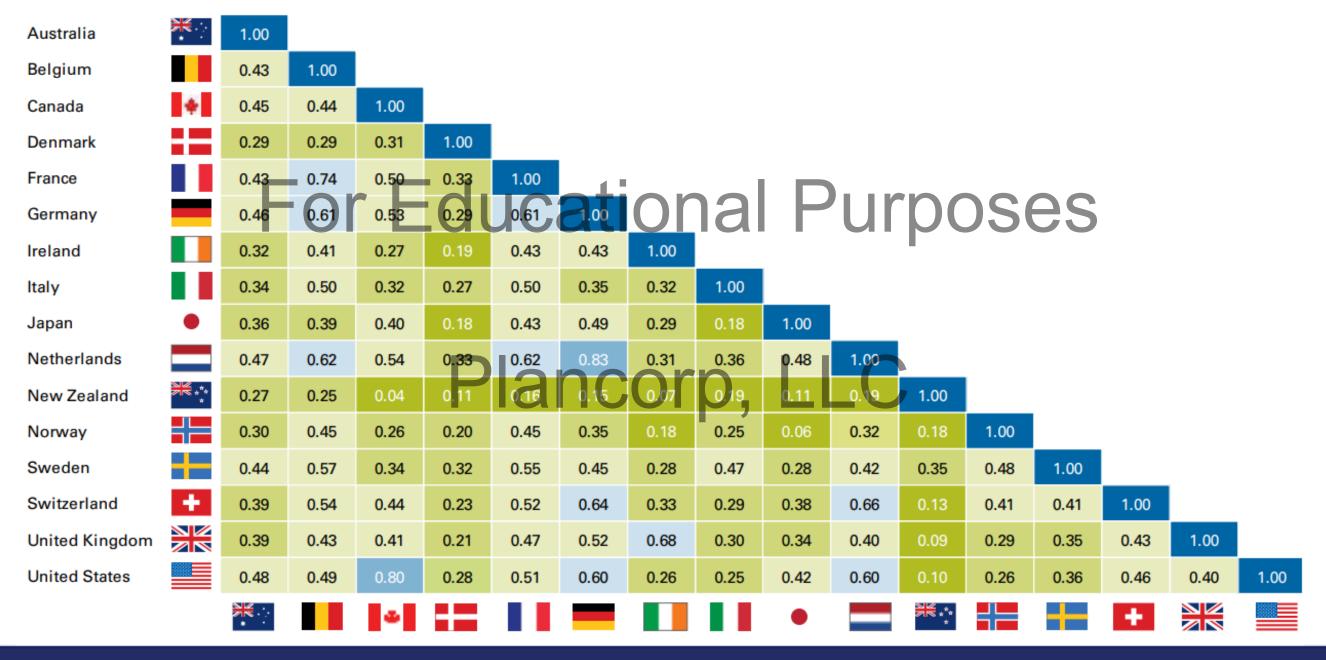
## A World of Opportunity in Fixed Income



GOVERNMENT

CORPORATE

#### Interest Rate Diversification of a Global Bond Allocation



## Global Bonds Reduce Volatility

US Bonds vs Global Bonds (1990-2017)

For Fo	US Bonds Jucational Pur	Global Bonds
Annualized Return	6.03%	6.03%
Standard Deviation	Plangorn, LLC	2.99%
Reduction in Vol	20.40%	

## FortEducational Burposes

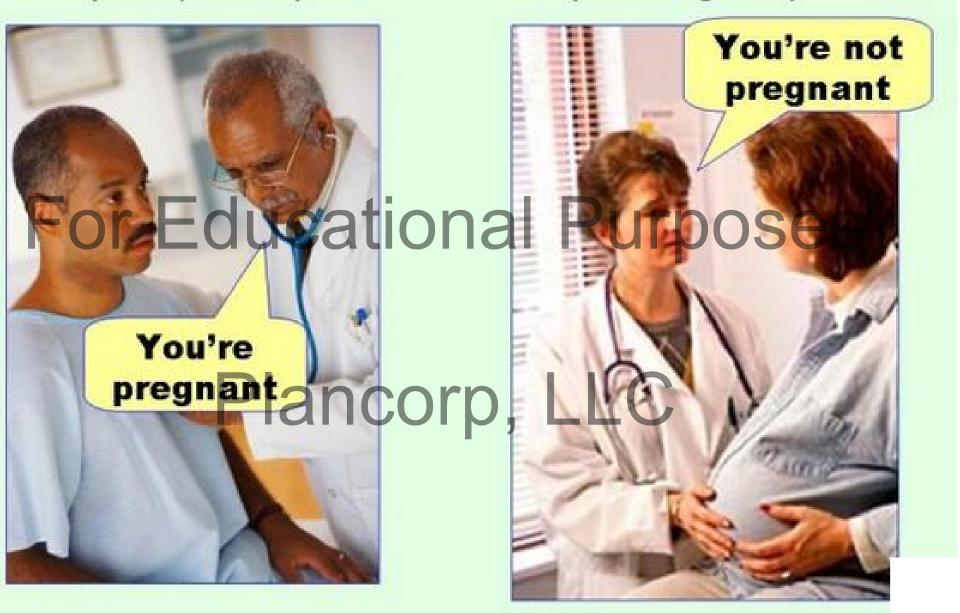
Plancorp, LLC

#### Type I error

(false positive)

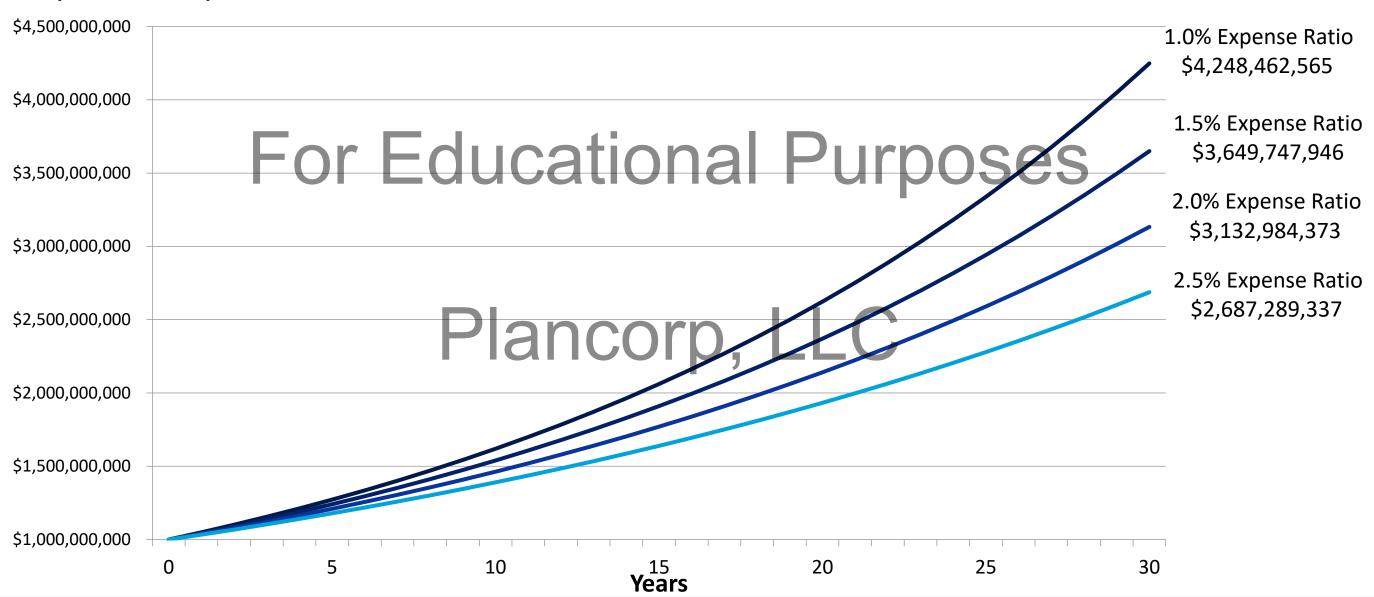
#### Type II error

(false negative)



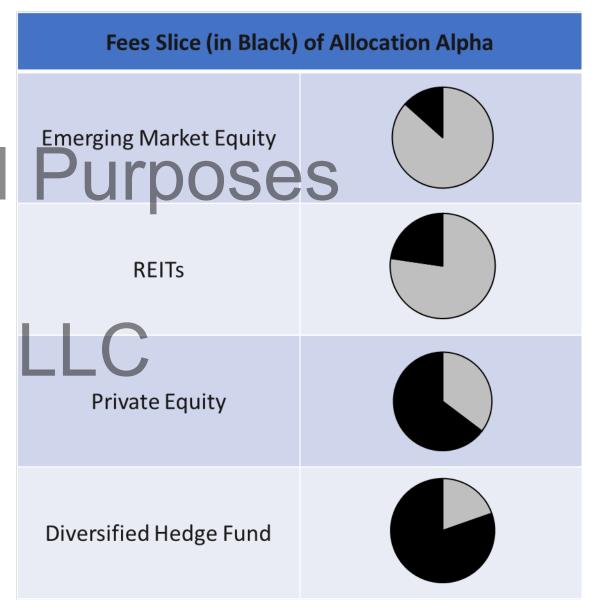
#### Fees Matter

Impact of Expense Ratio on 6% Annualized Return Over 30 Years

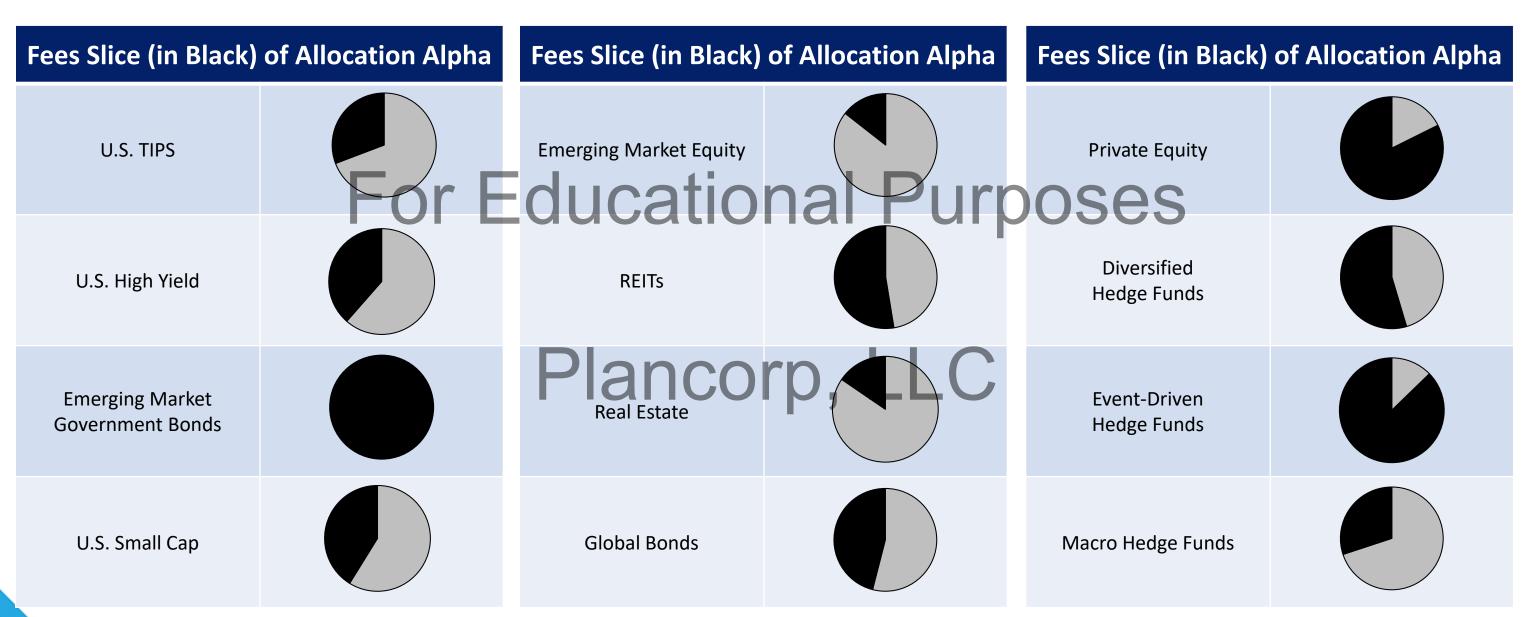


#### Share of Allocation Benefits Absorbed By Costs

- Fees eat up a significant portion of the diversification benefit.
- Fees consuming more than 50% of the benefit name make it difficult to justify inclusion in a portfolio.
- Only 22 of the 45 major asset classes have a positive allocation alpha and fees that are below 50% of the alpha.

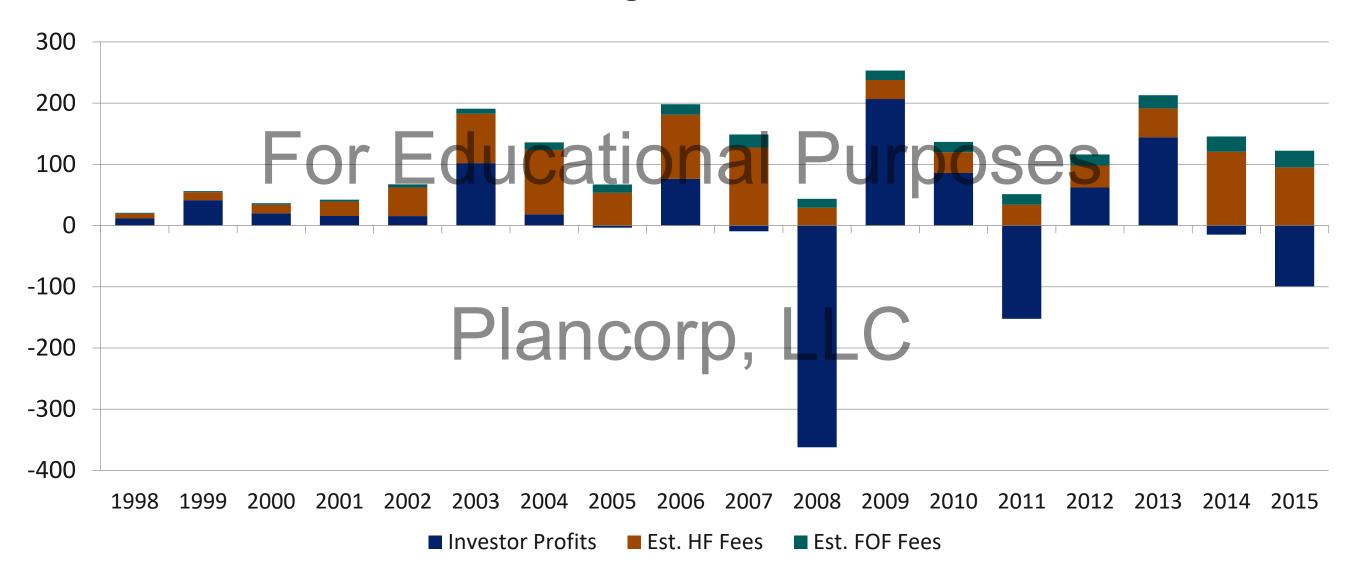


## Share of Allocation Benefits Absorbed By Costs



#### Hedge Funds: What Are They Good For?

Investors' Real Profits vs Estimated Hedge Fund and Fund-of-Fund Fees in Billions of \$



#### Creator of "The Endowment Model" on Alternatives...

"Talking heads prattle about the attractions of alternative asset classes. Wall Street pushes vehicles that allow investors to access inefficient markets. Investors require unusual self-confidence to ignore the widely hyped non-core investments and to embrace the quietly effective core investments."

- David Swenson, Unconventional Success

#### The State of Endowment Investing

- NACUBO-Commonfund Study of Endowments (NCSE)
- 805 US Endowments
- Average Size = \$649.9 million
- Average Allocation Confirmatives 3% ational Purposes

Plancorp, LLC

Institutions & Benchmarks	1 Year	3 Years	5 Years	10 Years
Average	-1.9%	5.2%	5.4%	5.0%
Top 25%	-0.7%	6.1%	6.2%	5.6%
US Stocks F	or Educ	ational F	ournesses	7.4%
International Stocks	-9.8% Pla	1.9% ncorp, L	LC <sup>1.2%</sup>	1.6%
Bonds	6.0%	4.1%	3.8%	5.1%
Blended 60/40	1.5%	6.6%	6.6%	5.4%

## The State of Endowment Investing

Institutions & Benchmarks	1 Year	3 Years	5 Years	10 Years
Average	-1.9%	ational F 5.2%	7urposes 5.4%	5.0%
Top 25%	-0. <b>7%</b>	ncorp, L	LC6.2%	5.6%
Blended 60/40	1.5%	6.6%	6.6%	5.4%

#### Who Should Be Using The Endowment Model?

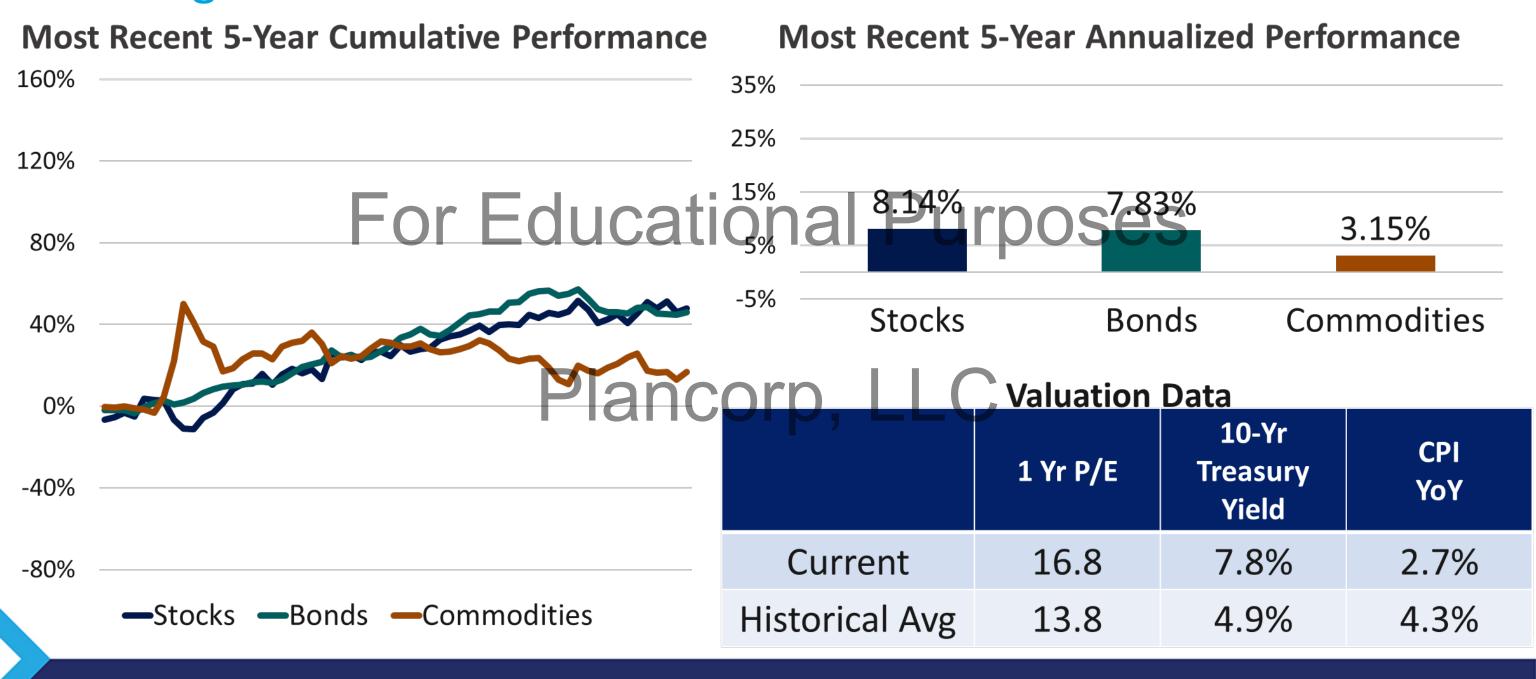
"If I didn't have a team like I have here scouring the world doing 800 meetings a year, looking for the best talent, I would index most of it...I would argue there might only be 50 or 60 investors in the world who really can do this model well.

- Scott Malpass, CIO Notre Dame University

## For Educational Bythoses

Plancorp, LLC

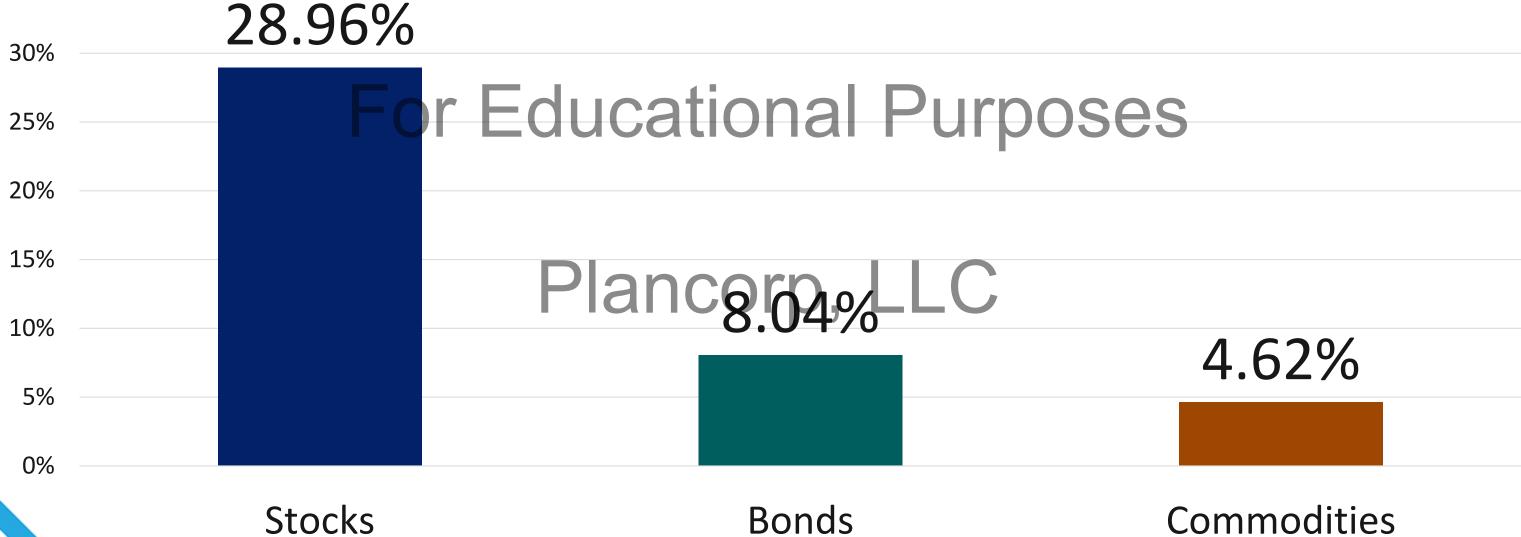
# Round 1: Equity Valuations Are a Bit Rich, Inflation Subdued, and Yields High



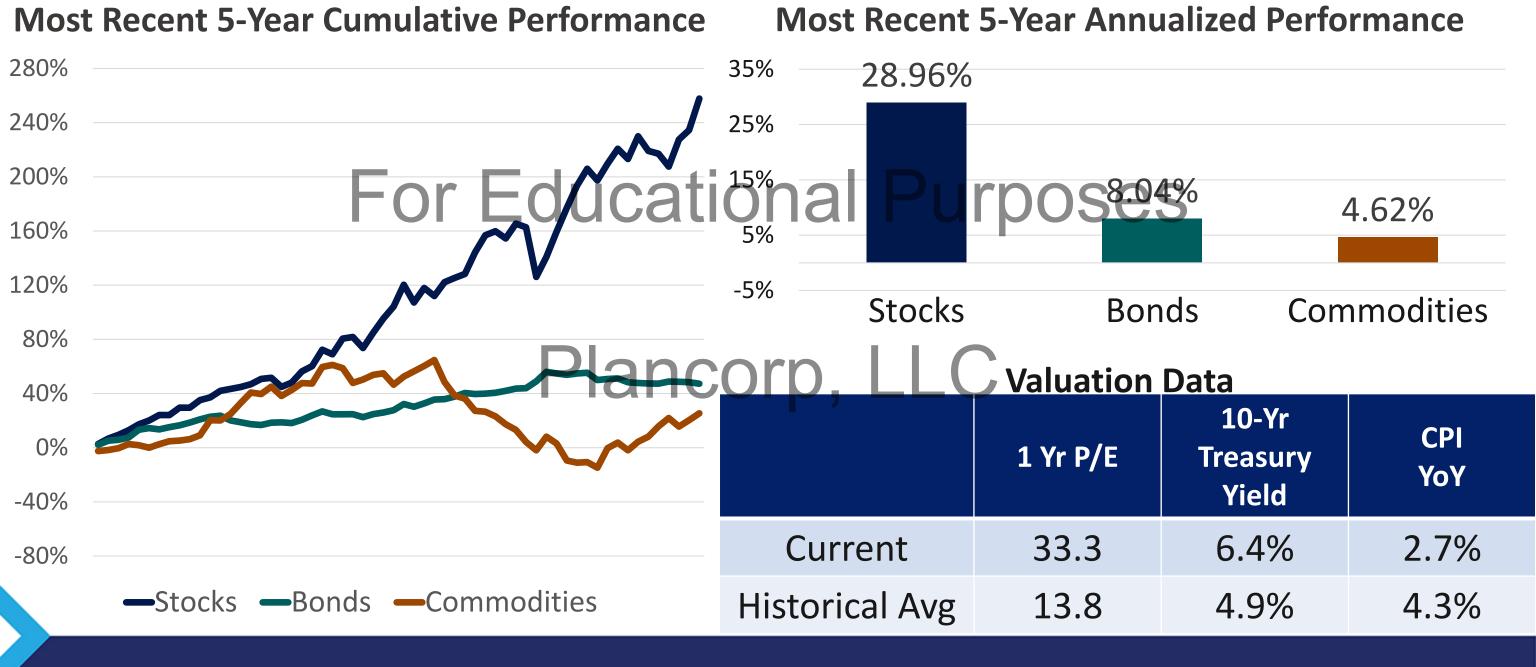
#### Round 1: Results

35%



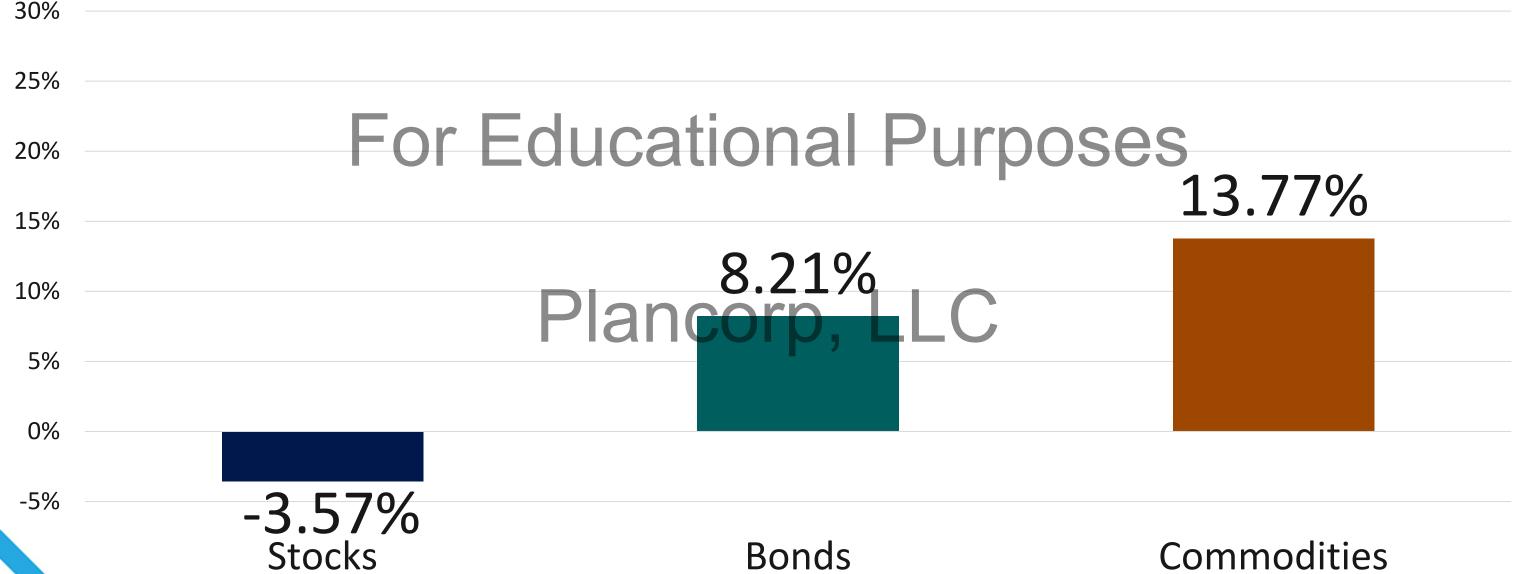


#### Round 2: Equities Expensive, Bonds Flat-Lining, and Inflation Modest

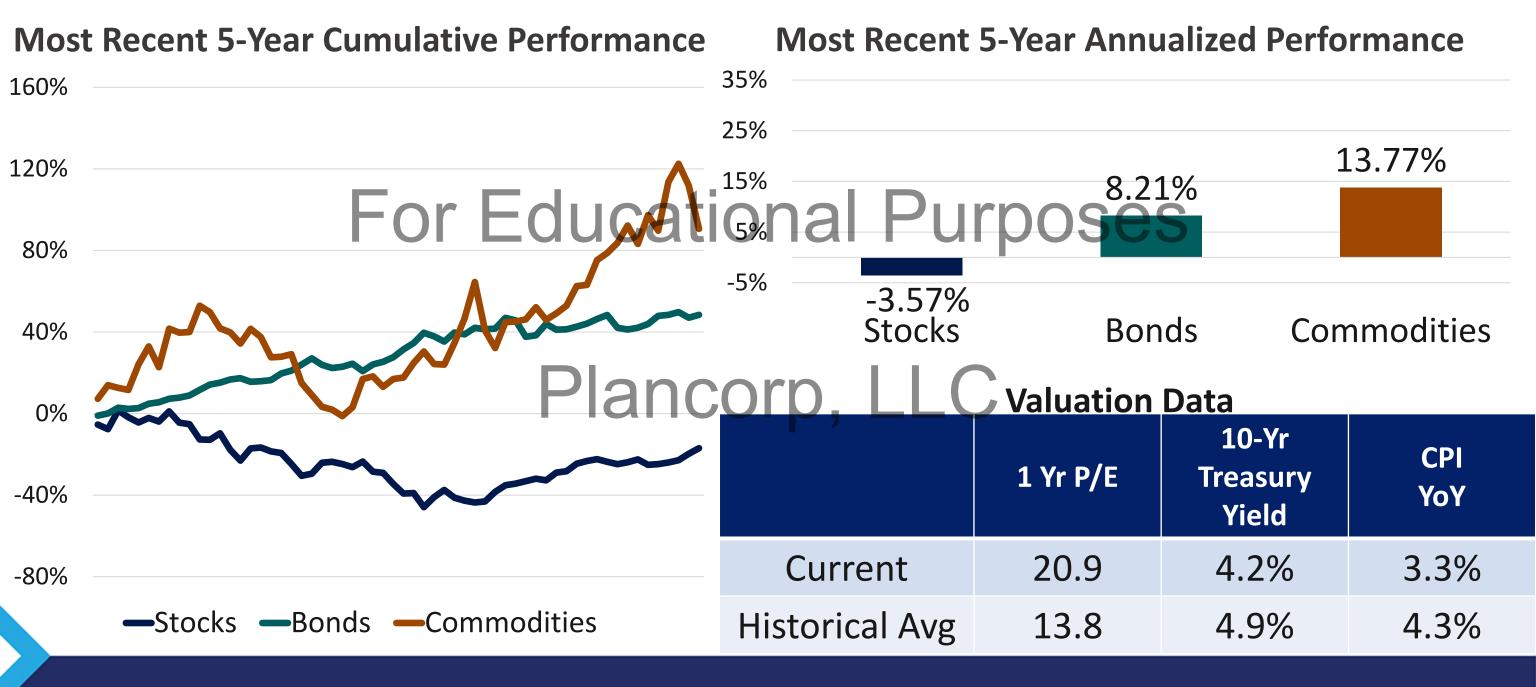


#### Round 2: Results



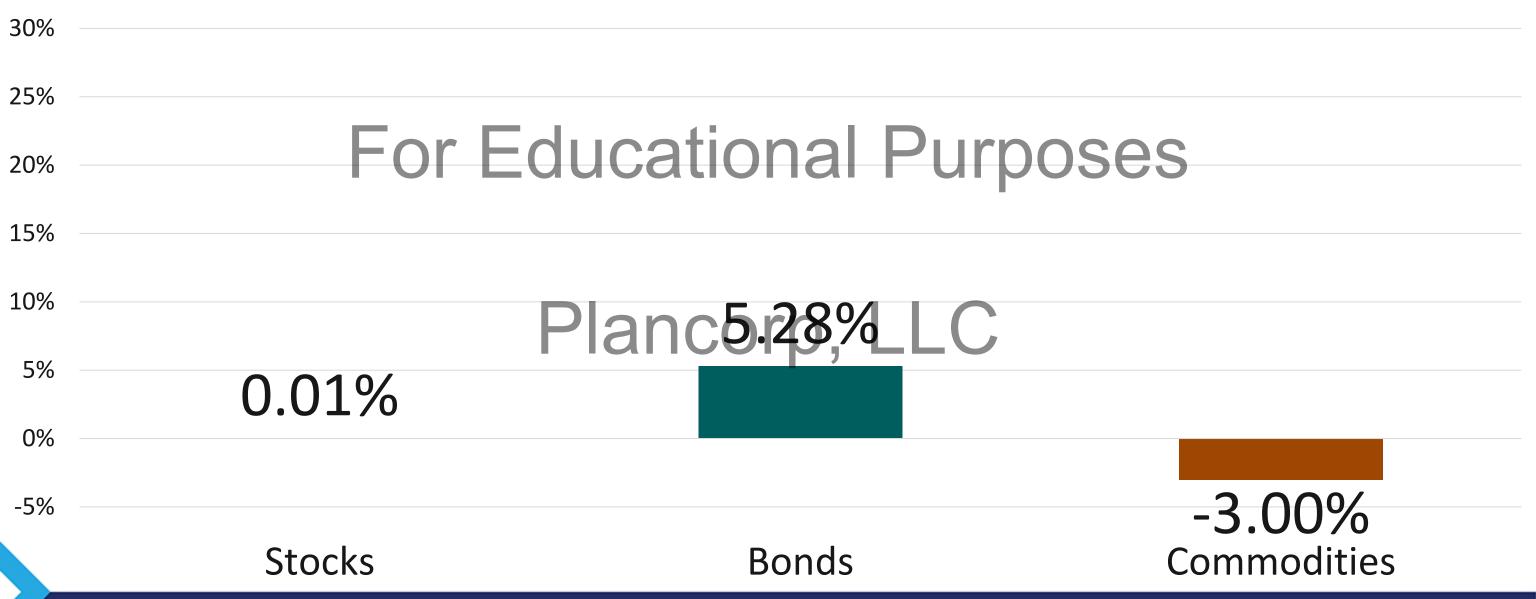


#### Round 3: Stocks Less Expensive This Time, Bond Yields Below Average



#### Round 3: Results



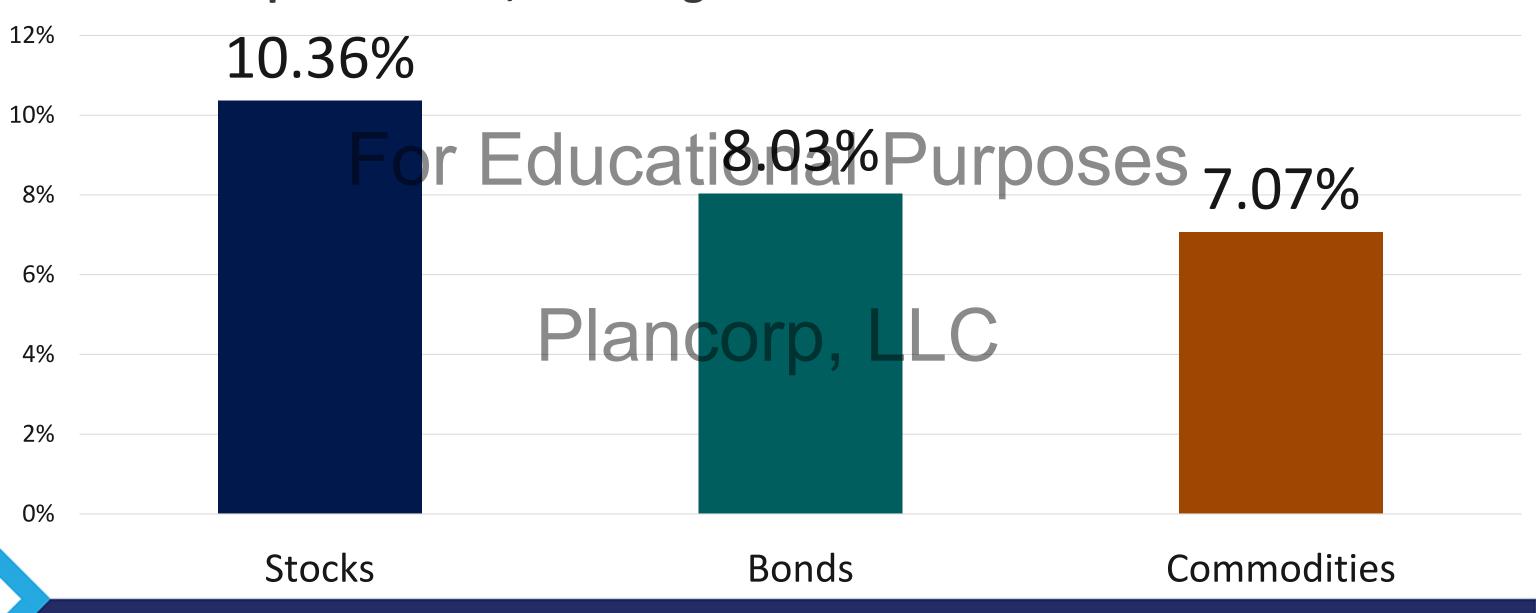


#### **BONUS ROUND:**

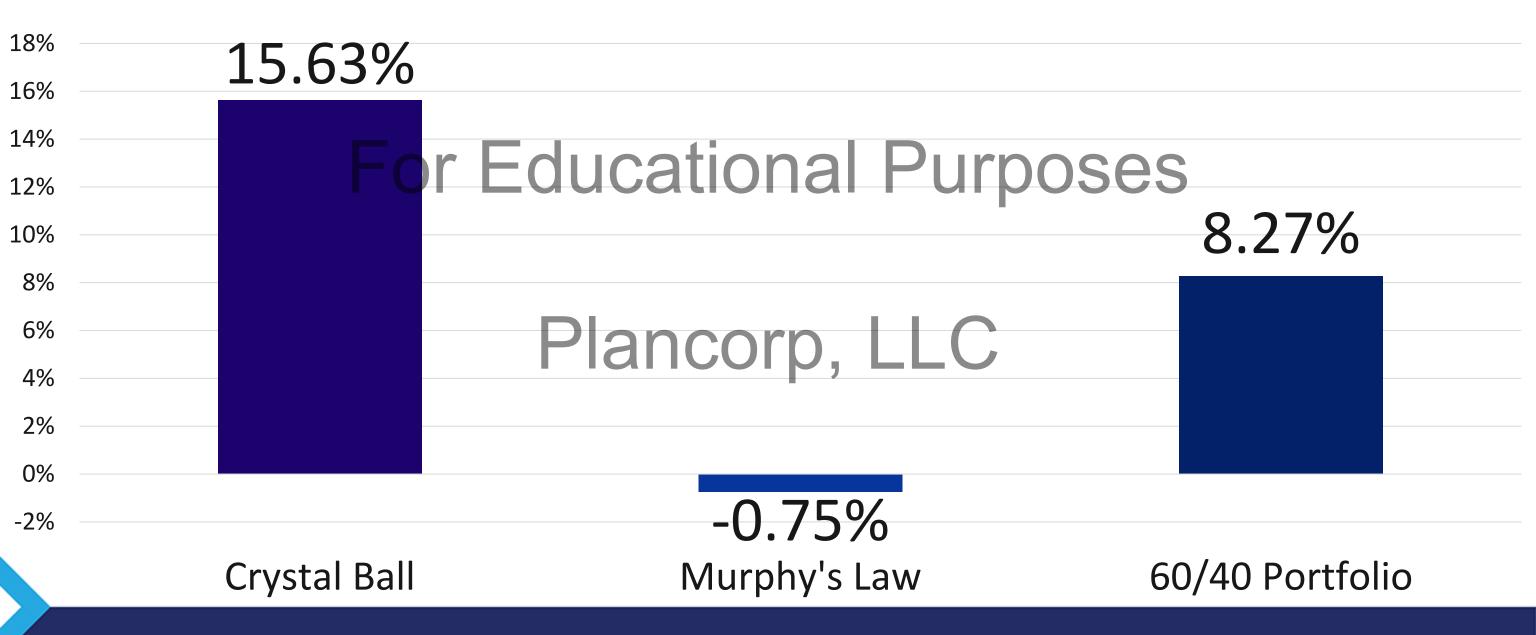
# For Educational Purposes How Many Companies are in the S&P 500? Plancorp, LLC

#### Full Period: Asset Class Results

#### Lots of Up and Down, But Longer Period Has Been Good to Investors



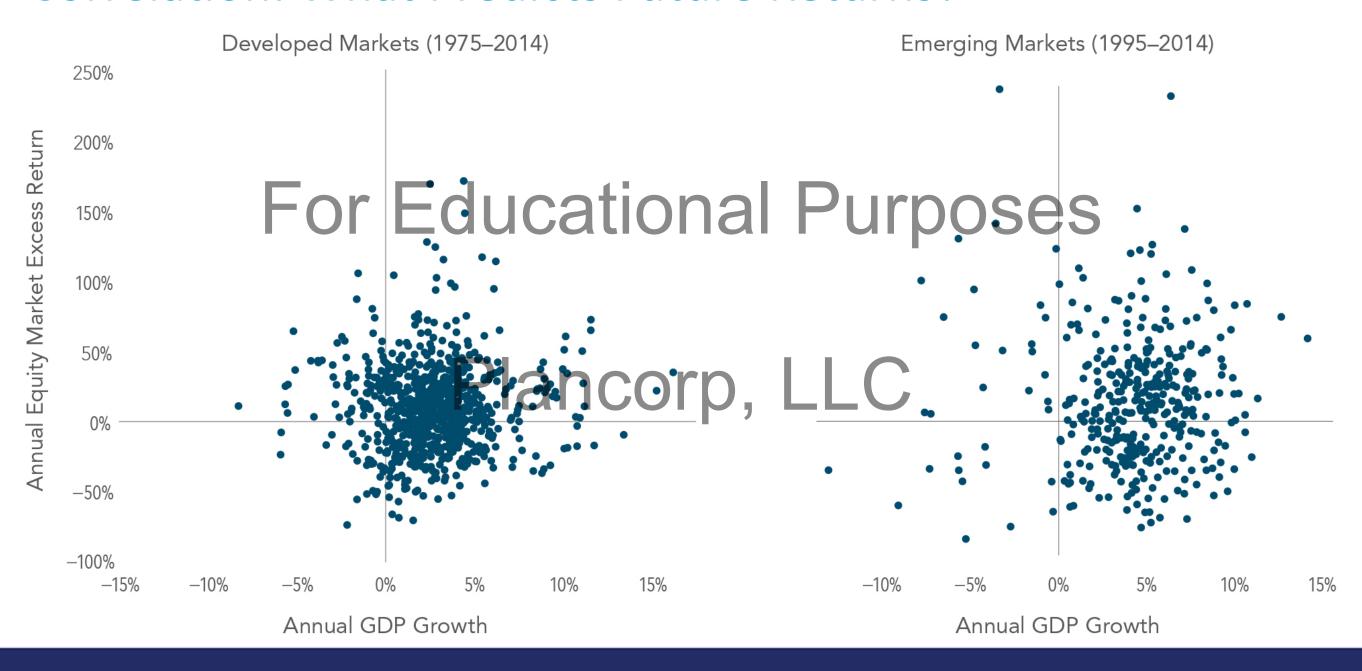
#### Full Period: Asset Class Results



### WastEducational Patibases

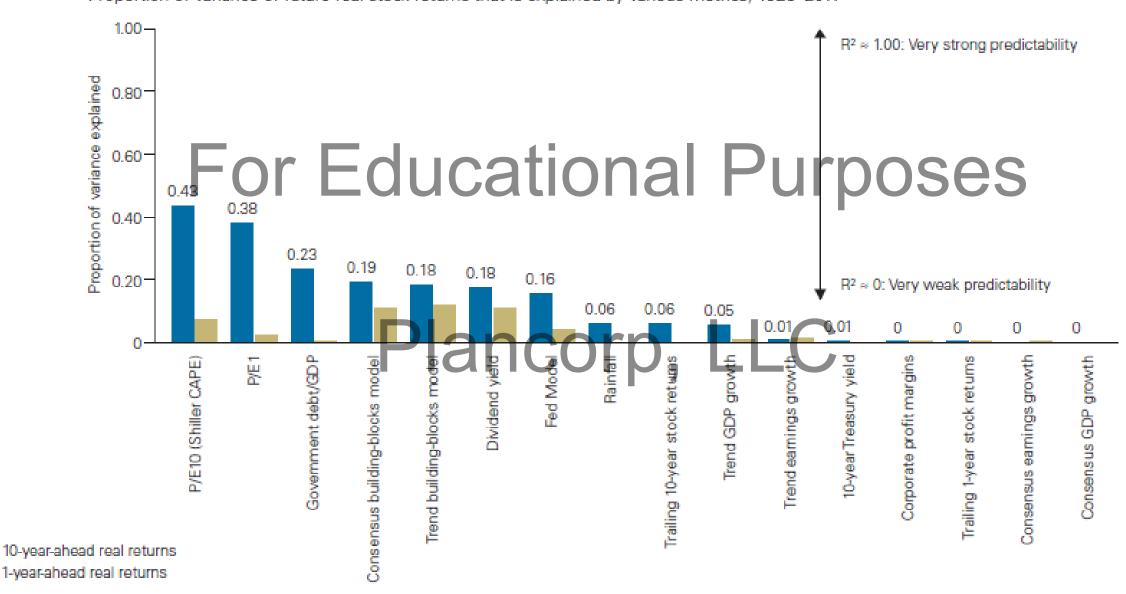
Plancorp, LLC

#### Correlation: What Predicts Future Returns?

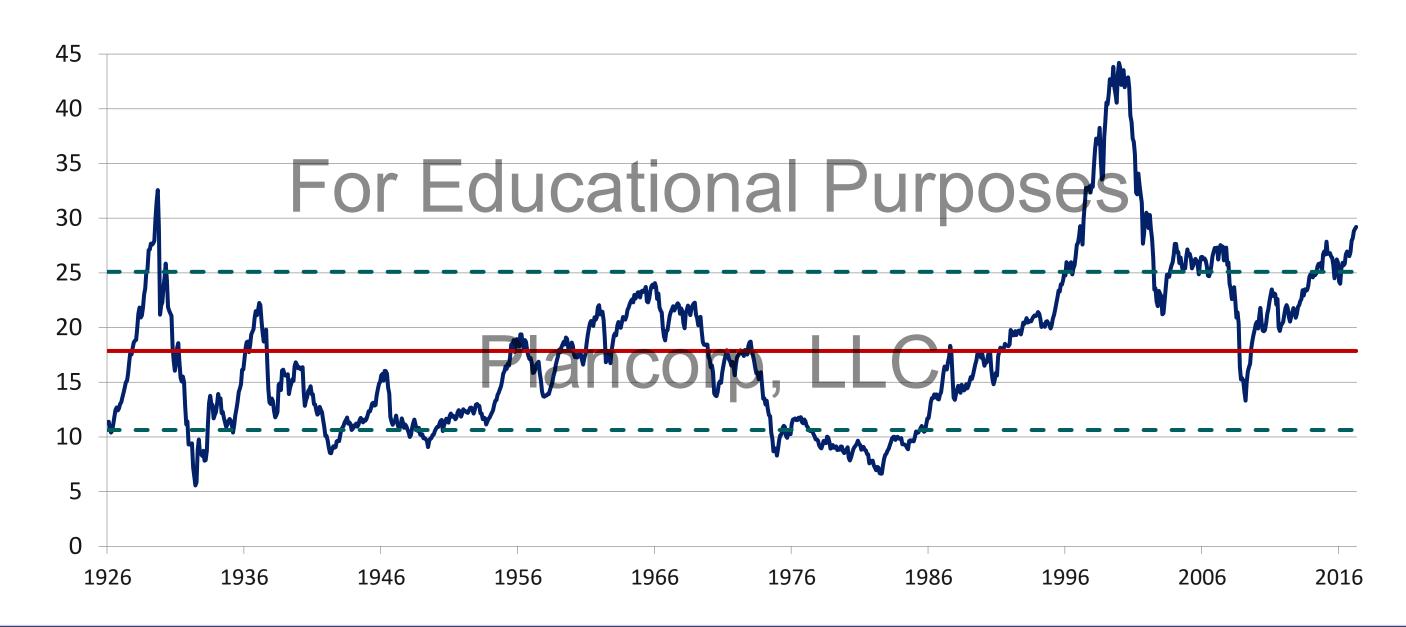


#### **Correlation: What Predicts Future Returns?**

Proportion of variance of future real stock returns that is explained by various metrics, 1926-2011

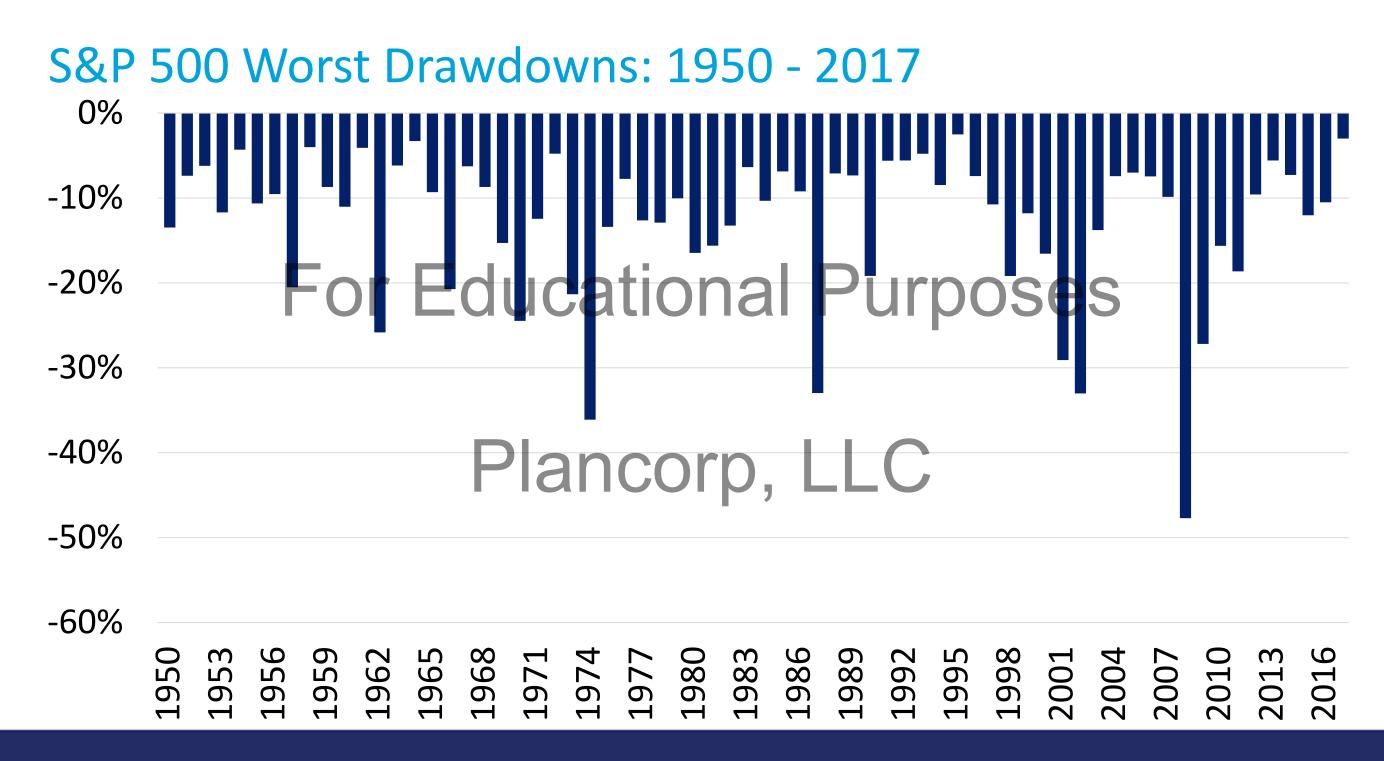


#### Valuation Relative to Historical Average

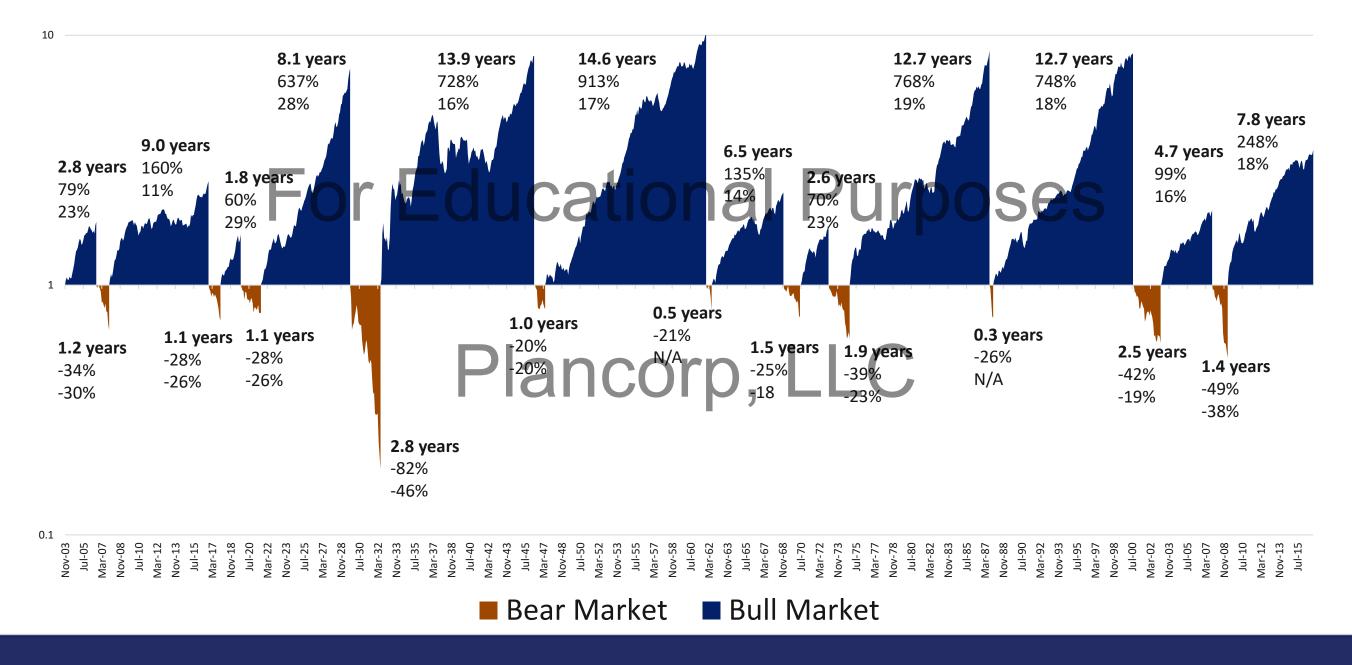


#### Valuation and Returns

S&P 500 Returns Following CAPE Over 25 (1926-2017)				
F	For1 Year LCa	atisovears P	U <b>5 Years</b> e S	3 10 Years
Average	5.39%	0.38%	0.71%	4.02%
High	52.14% ar	1C29.69%	18.67%	9.28%
Low	-38.09	-42.35%	-17.36%	-4.95%



#### US Bull and Bear Markets: 1903 - 2016



### ForhEdskationaleRurposes

Plancorp, LLC

#### Many of the Greatest Advancements in Finance Have Come From Academia

1952 Diversification and Portfolio Risk

HARRY MARKOWITZ Nobel Prize in Economics, 1990

1966 Efficient Markets

Hypothesis

Economics, 2013

1984

Term Structure of Interest Rates

2012

**Profitability** 

ROBERT NOVY-MARX EUGENE FAMA

1964 Single-Factor **Asset Pricing** Risk/Return Model

WILLIAM SHARPE Nobel Prize in Economics, 1990

ROLF BANZ

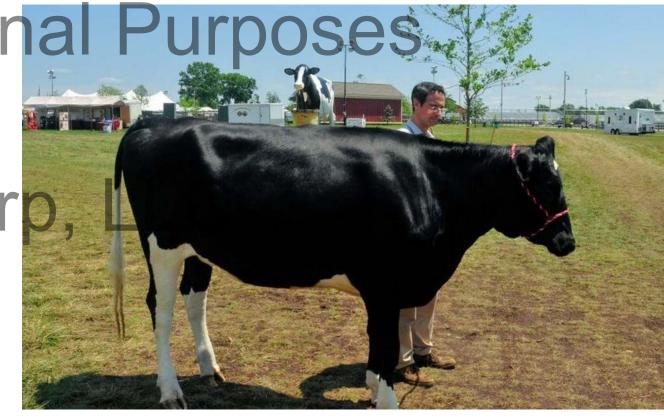
1992-1993

Value Effect and Multifactor Asset Pricing Model

**EUGENE FAMA** KENNETH FRENCH

#### How Much Does This Cow Weigh?

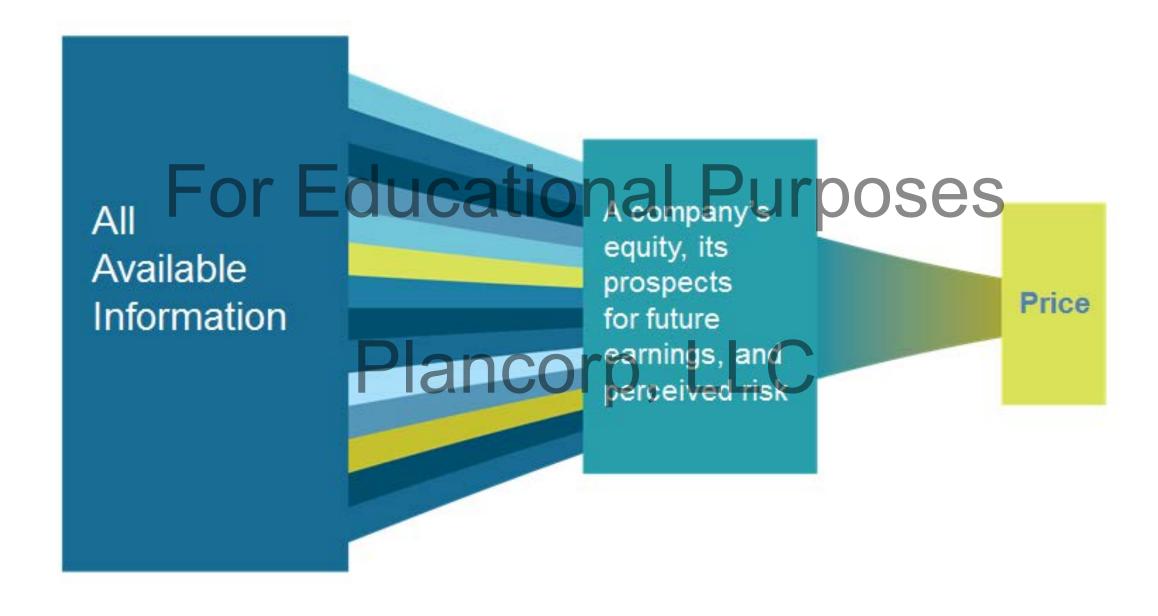




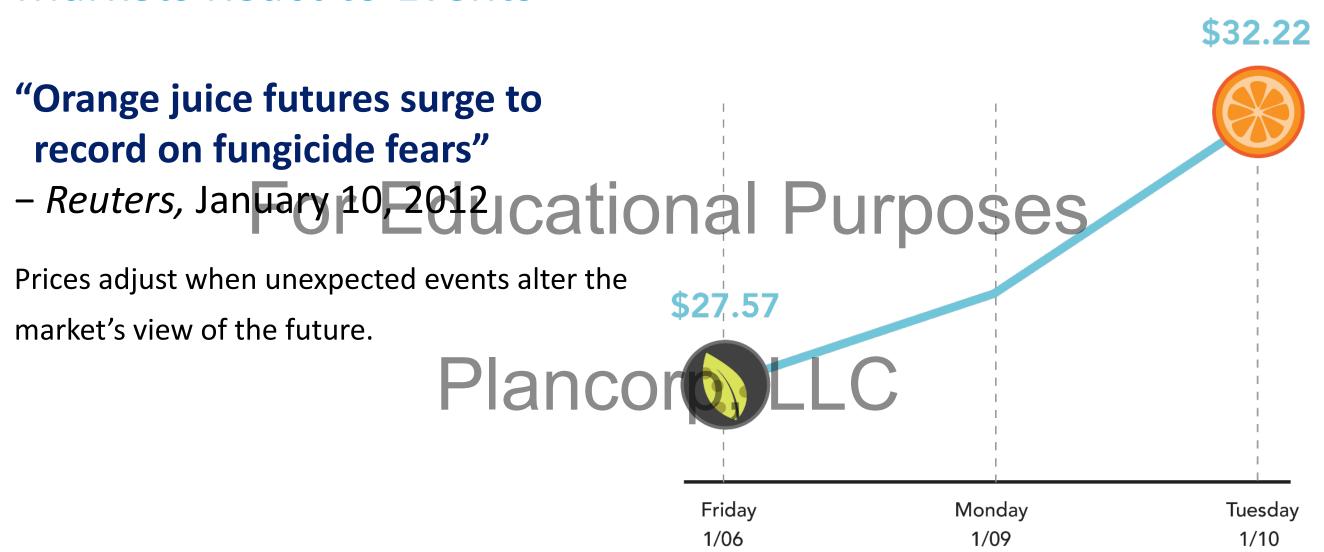
#### Markets Integrate Combined Knowledge of All Participants



#### What Affects a Stock's Current Price?



#### Markets React to Events

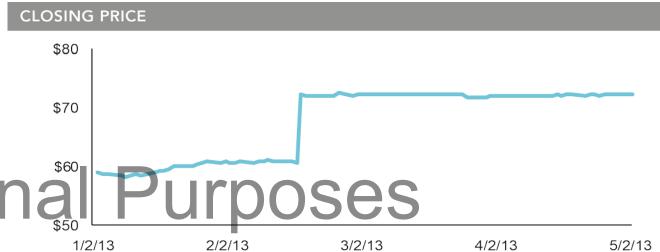


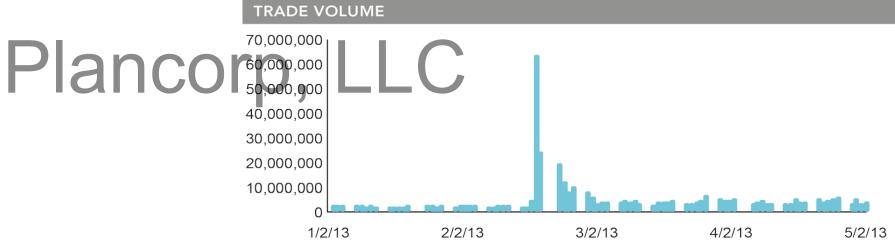
#### Markets React to Events

"Heinz agrees to buyout by Berkshire Hathaway, 3G"

- USA Today, February 14, 2013 ation a

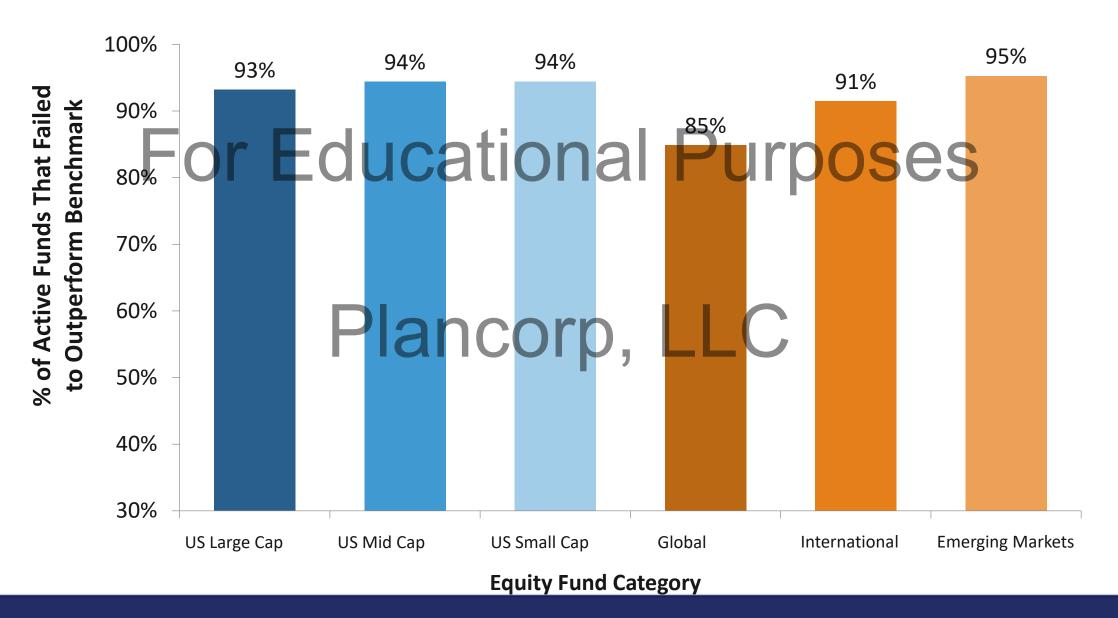
News travels quickly, and prices can adjust in an instant.





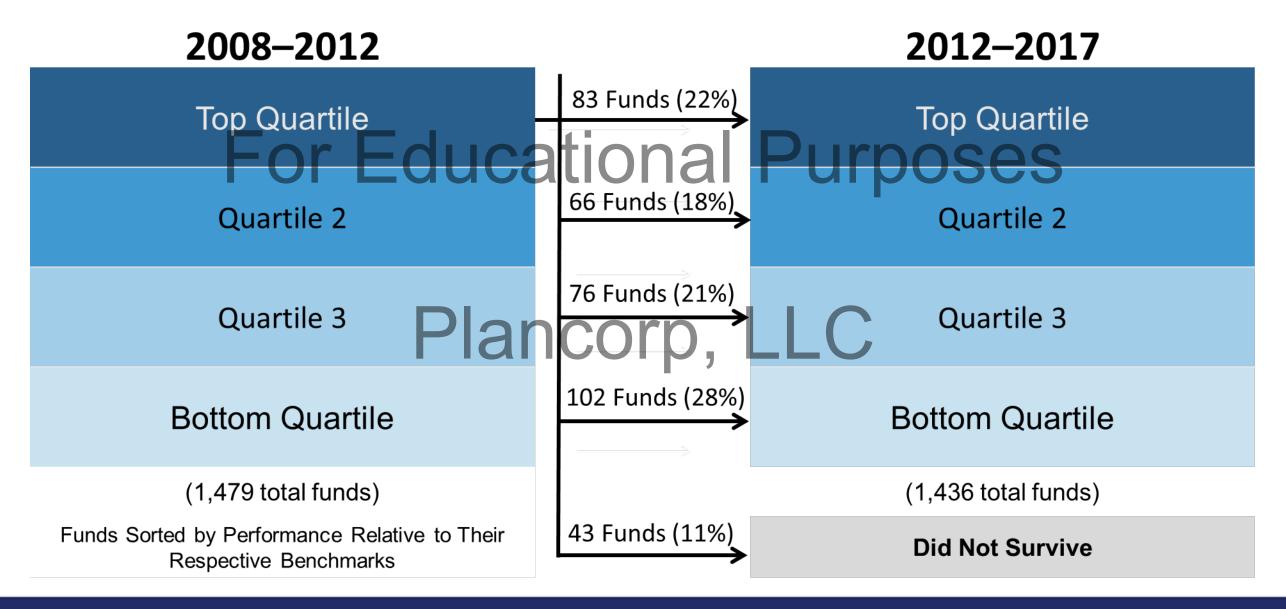
#### The Failure of Active Management

Active Public Equity Funds That Failed to Beat the Index (15 Years as of 6/30/17)



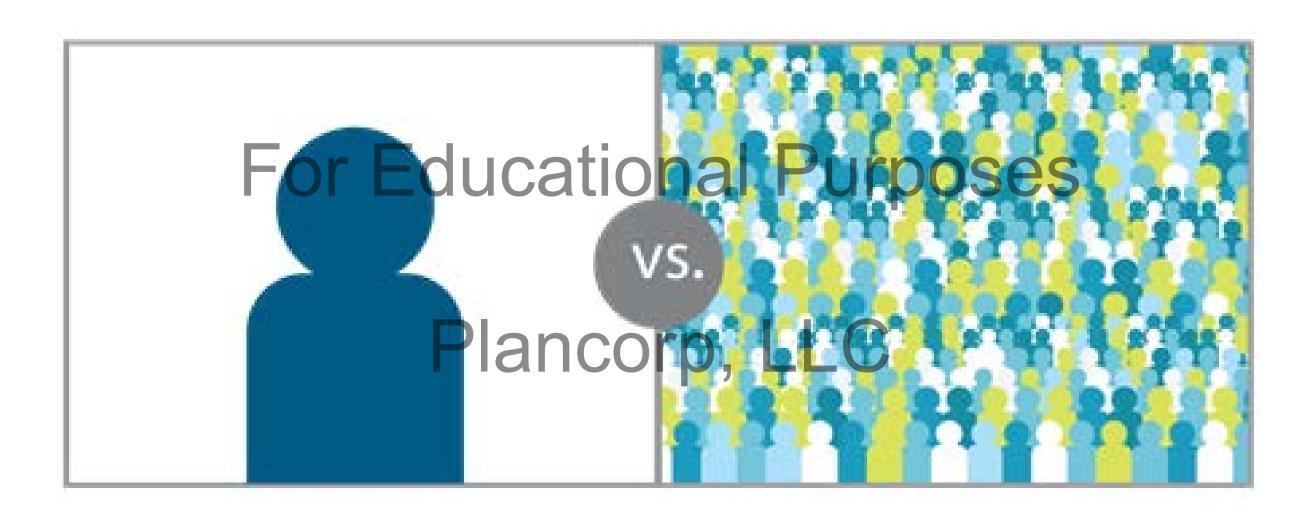
#### The Failure of Active Management

Subsequent Performance of Top 25% of US Equity Funds (as of 6/30/2017)



Source: Standard & Persistence Scorecard, June 2017. The left column represents all US equity funds in the CRSP Mutual Fund Database with a complete return history for 2008–2012. The funds are sorted by performance relative to their benchmarks. Funds in the top quartile are then tracked and directed to their subsequent performance quartiles in the following 5-year period (2012–2017), or to the "Did Not Survive" category. Quartiles in the following period reflect all funds with a complete return history. Percentages may not total 100% due to rounding. Source: CRSP Survivor-Bias-Free US Mutual Fund Database.

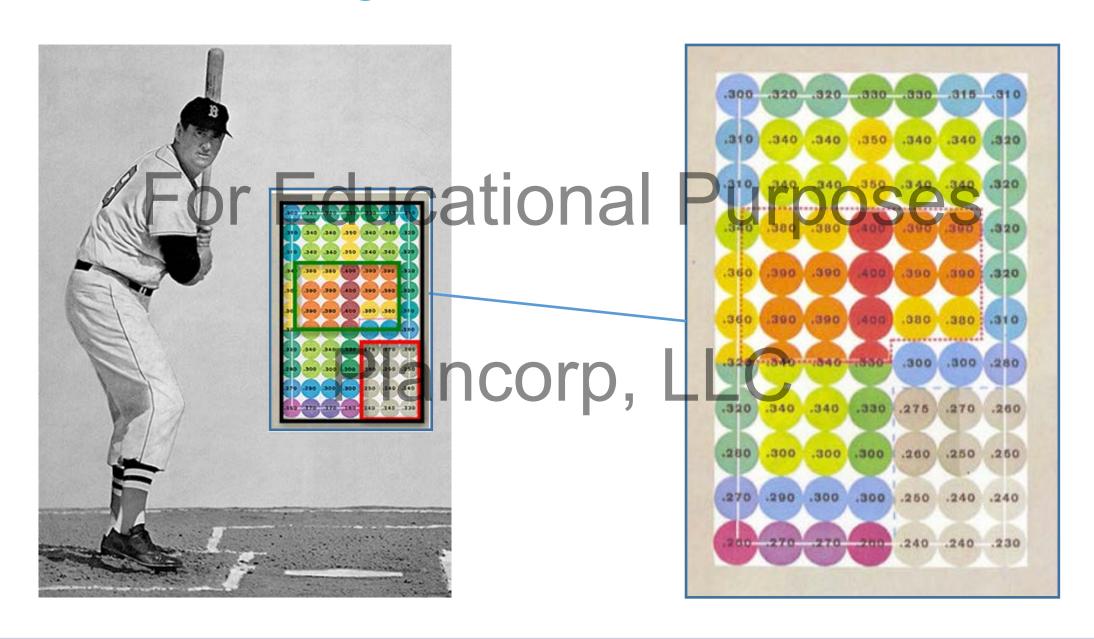
#### Rather Than Compete With the Market...

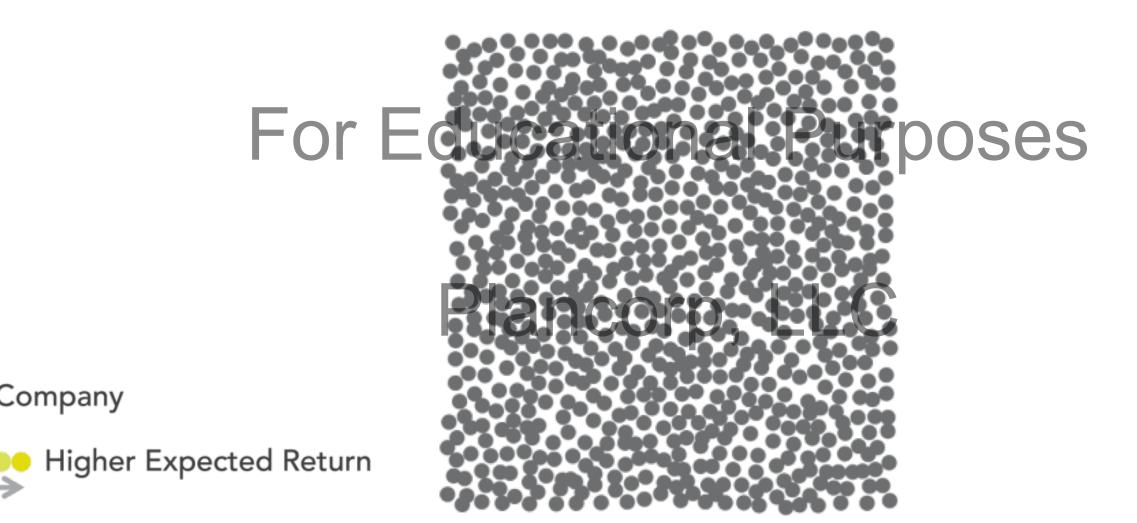


#### Rather Than Compete With the Market...



#### The Science of Hitting

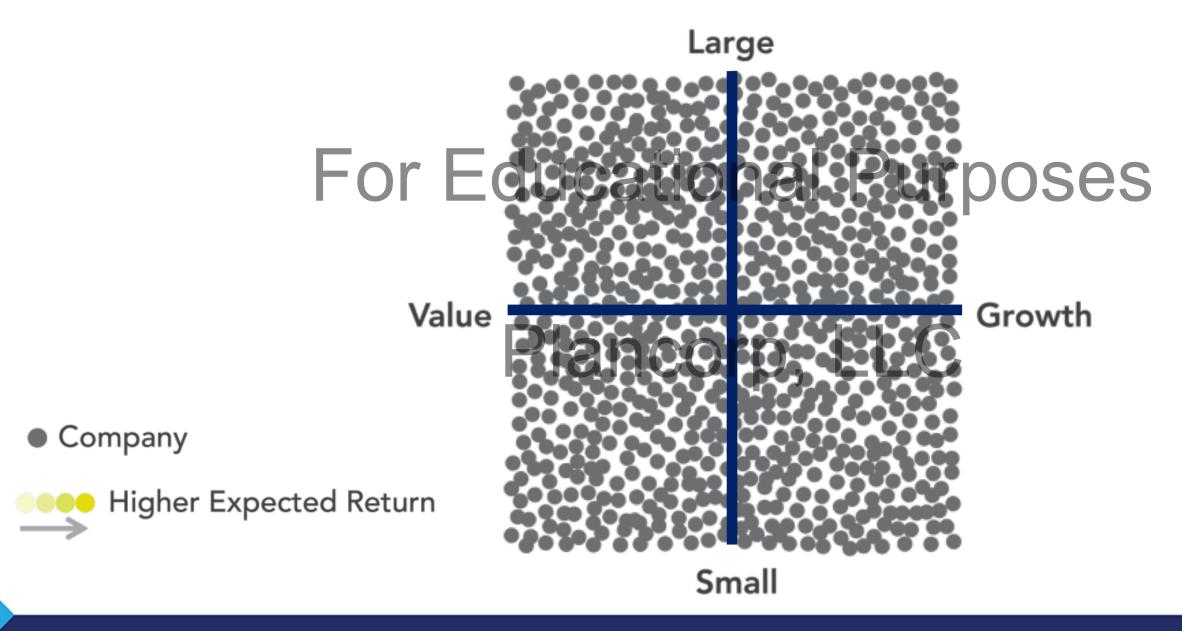




1. Beta: A quantitative measure of the co-movement of a given stock, mutual fund, or portfolio with the overall market.

Company

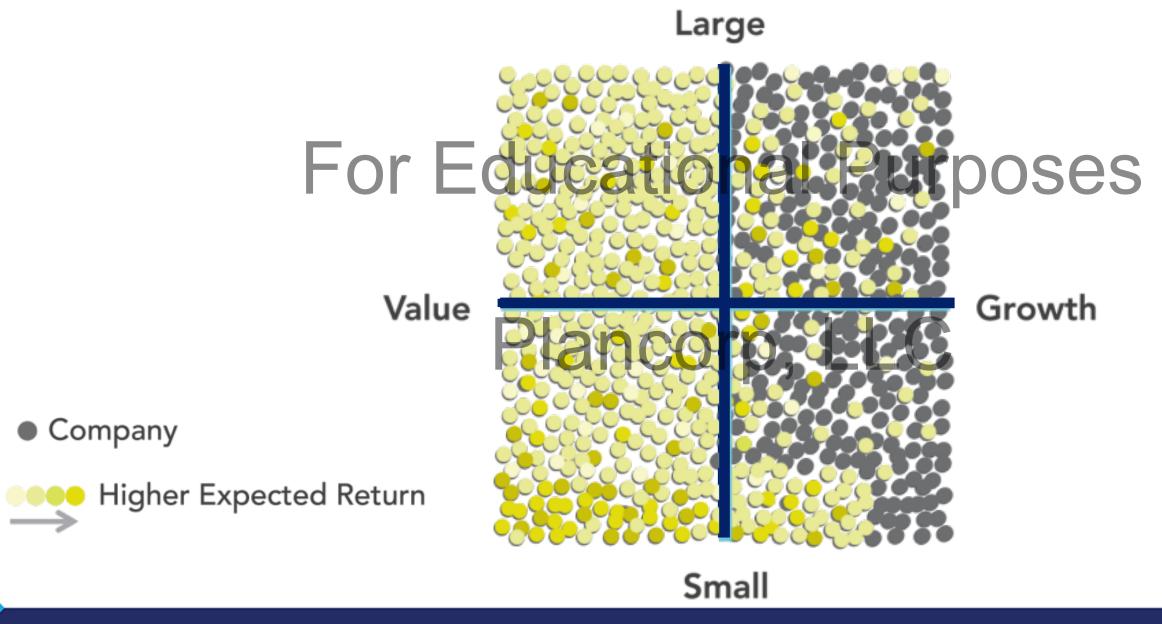
- 2. Price-to-Book Ratio: A company's capitalization divided by its book value. It compares the market's valuation of a company to the value of that company as indicated on its financial statements.
- 3. Direct Profitability: A measure of a company's current profits. We define this as operating income before depreciation and amortization minus interest expense, scaled by book equity.



<sup>1.</sup> Beta: A quantitative measure of the co-movement of a given stock, mutual fund, or portfolio with the overall market.

<sup>2.</sup> Price-to-Book Ratio: A company's capitalization divided by its book value. It compares the market's valuation of a company to the value of that company as indicated on its financial statements.

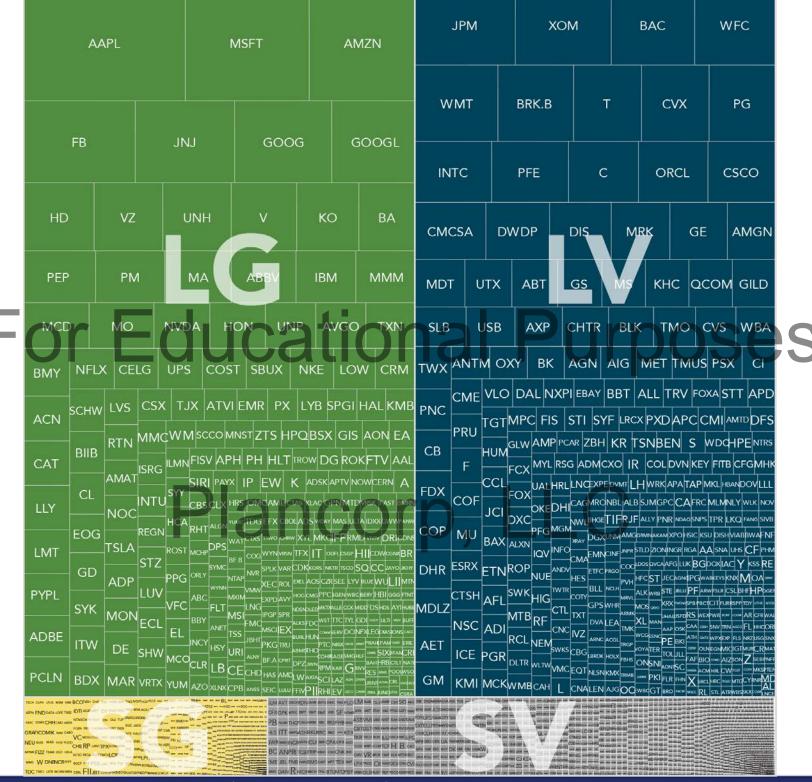
<sup>3.</sup> Direct Profitability: A measure of a company's current profits. We define this as operating income before depreciation and amortization minus interest expense, scaled by book equity.



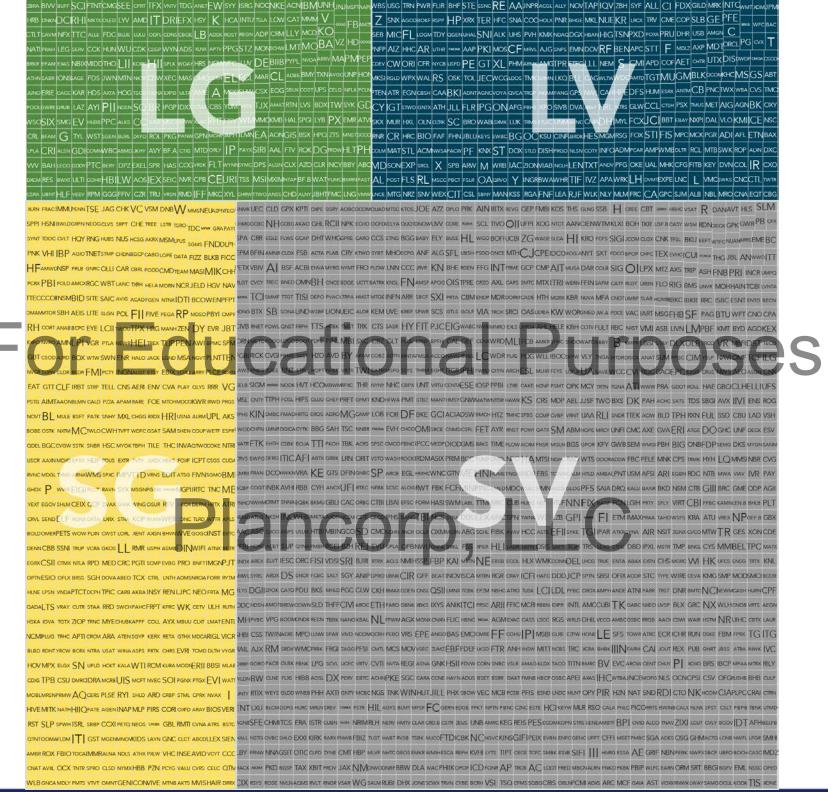
<sup>1.</sup> Beta: A quantitative measure of the co-movement of a given stock, mutual fund, or portfolio with the overall market.

<sup>2.</sup> Price-to-Book Ratio: A company's capitalization divided by its book value. It compares the market's valuation of a company to the value of that company as indicated on its financial statements.

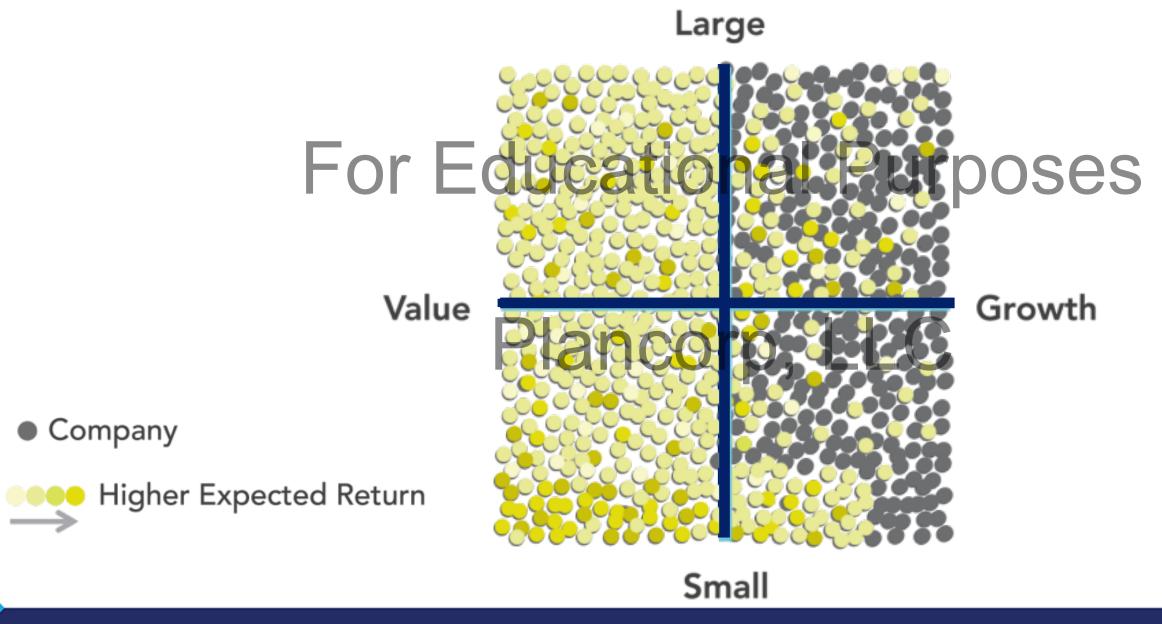
<sup>3.</sup> Direct Profitability: A measure of a company's current profits. We define this as operating income before depreciation and amortization minus interest expense, scaled by book equity.



Source: Dimensional Fund Advisors. For Illustrative purposes only. Illustration includes constituents of the Russell 3000 Index as of December 31, 2017, on a market-cap weighted basis segmented into Large Value, Large Growth, Small Value, and Small Growth. Large cap is defined as the top 90% of market cap (small cap is the bottom 10%), while value is defined as the 50% of market cap of the lowest relative price stocks). For educational and informational purposes only and does not constitute a recommendation of any security. The determinations of Large Value, Large Growth, Small Value, and Small Growth do not represent any determinations Dimensional may make in assessing any of the securities shown. Source: Frank Russell Company is the source and owner of the trademarks, service marks, and copyrights related to the Russell Indexes.



Source: Dimensional Fund Advisors. For Illustrative purposes only. Illustrations includes the constituents of the Russell 3000 Index as of December 31, 2017 on an equal-weighted basis segmented into Large Value, Large Growth, Small Value, and Small Growth. Large cap is defined as the top 90% of market cap (small cap is the bottom 10%), while value is defined as the 50% of market cap of the lowest relative price stocks). For educational and informational purposes only and does not consist of a recommendation of any security. The determinations of Large Value, Large Growth, Small Value, and Small Growth do not represent any determinations Dimensional may make in assessing any of the securities shown. Source: Frank Russell Company is the source and owner of the trademarks, service marks, and copyrights related to the Russell Indexes.



<sup>1.</sup> Beta: A quantitative measure of the co-movement of a given stock, mutual fund, or portfolio with the overall market.

<sup>2.</sup> Price-to-Book Ratio: A company's capitalization divided by its book value. It compares the market's valuation of a company to the value of that company as indicated on its financial statements.

<sup>3.</sup> Direct Profitability: A measure of a company's current profits. We define this as operating income before depreciation and amortization minus interest expense, scaled by book equity.

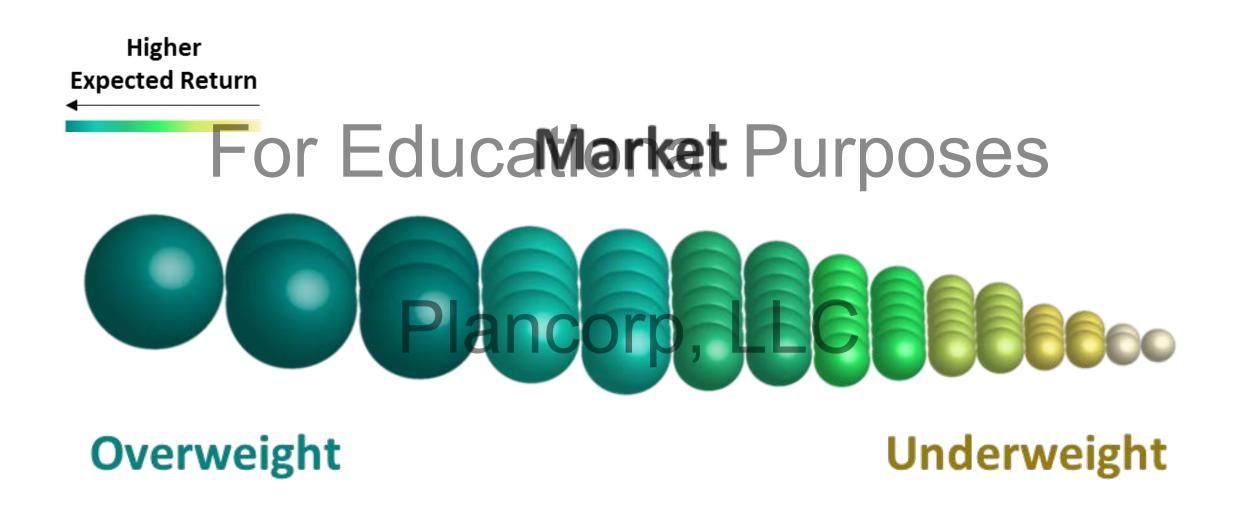
#### Viewing the Market in a Different Dimension

# For EducaMarket Purposes

### Portfolios Can Be Structured Using Expected Returns

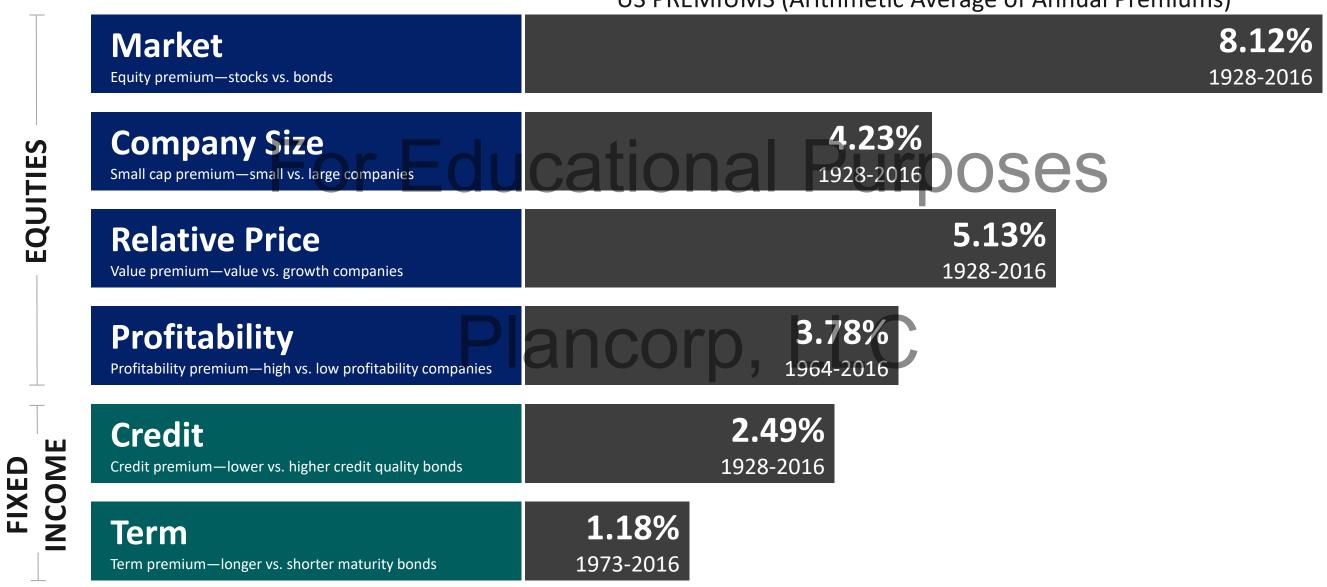


### Portfolios Can Be Structured Using Expected Returns



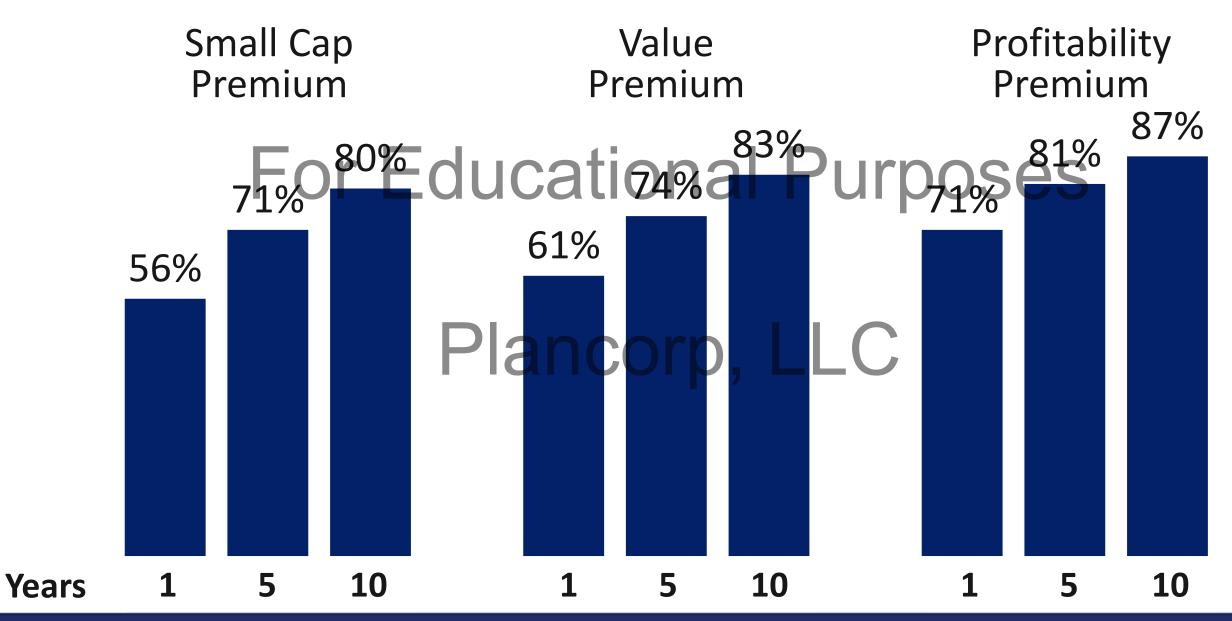
### Dimensions of Expected Returns





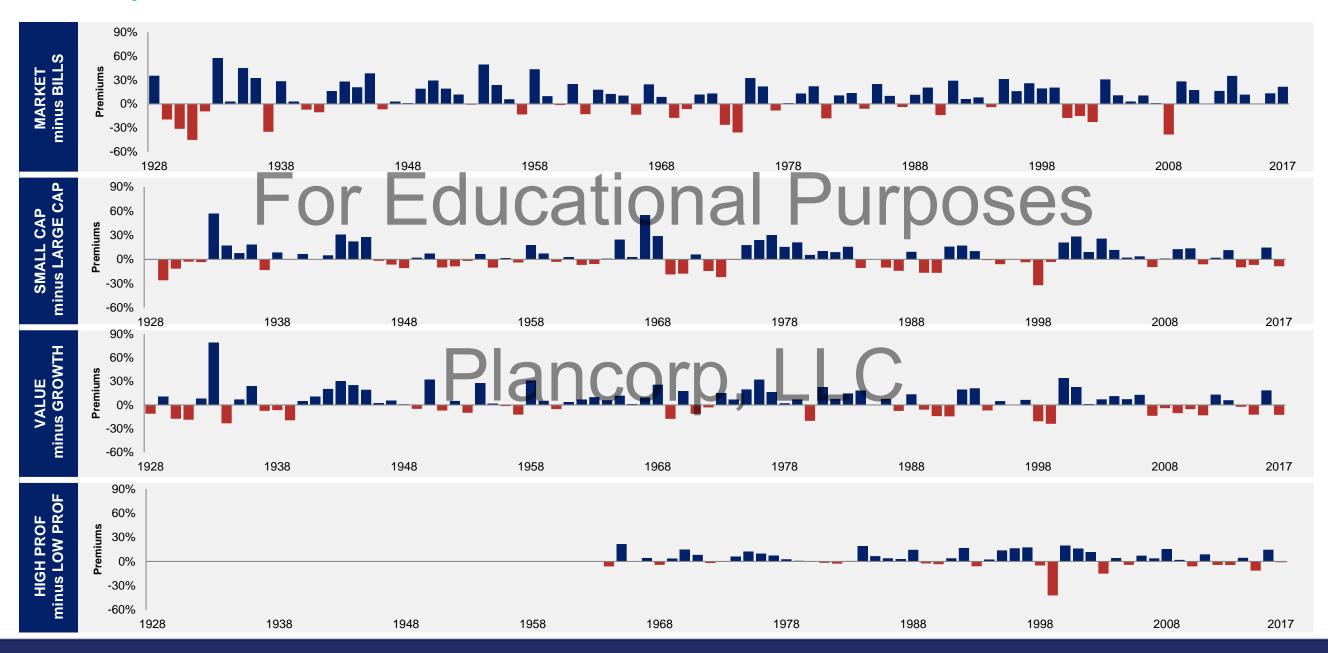
Size premium is the arithmetic average of the annual Dimensional US Small Cap Index returns minus the annual S&P 500 Index returns. Relative price premium is the arithmetic average of the annual Fama/French US Value Index returns minus the annual Fama/French US Growth Index returns US LT Govt TR USD, both provided by Ibbotson Associates via Morningstar Direct. Credit premium is calculated as the average annual return of Bloomberg Barclays U.S. Intermediate Credit A Index returns and Bloomberg Barclays U.S. Intermediate Credit Baa Index minus the average annual return of Bloomberg Barclays U.S. Government Bond Index Intermediate returns. Credit premium data provided by Bloomberg. Index descriptions available upon request. Eugene Fama and Ken French are members of the Board of Directors for and provide consulting services to Dimensional Fund Advisors LP.

# Estimated Probability of a Positive Premium

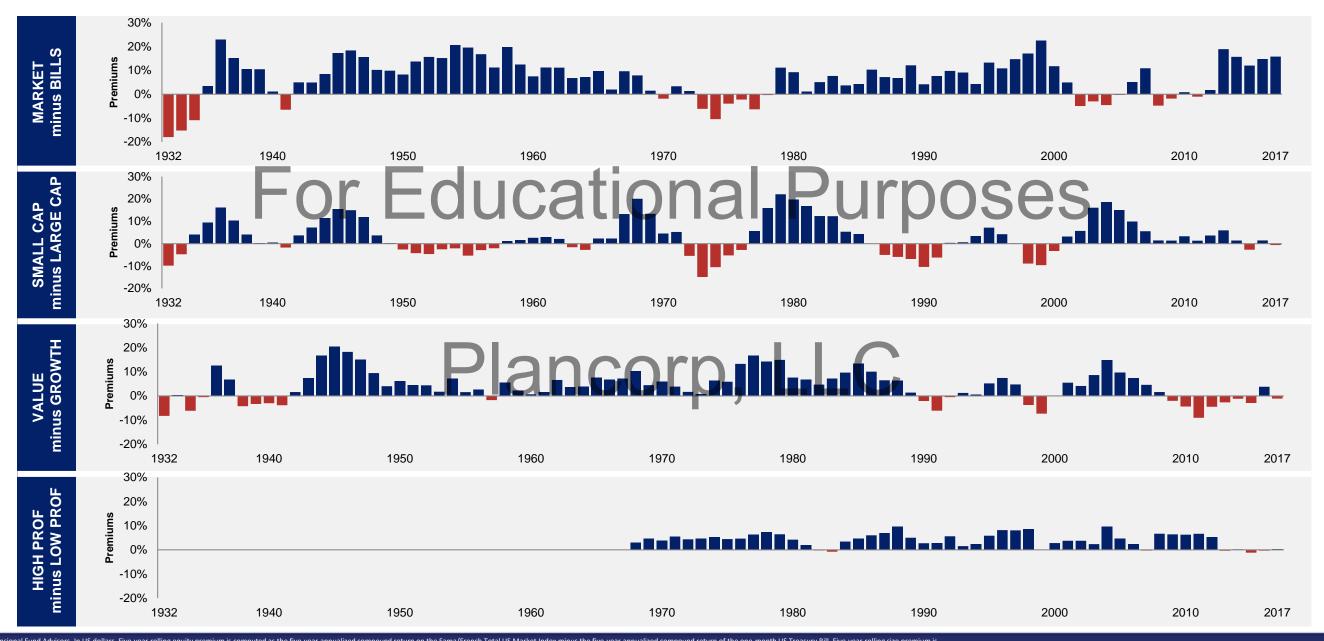


Source: Dimensional Fund Advisors. Probability of a positive premium computed using one million simulations that bootstrap returns from historical annual premiums from 1928 (1964 for profitability) to 2015. Size premium: Dimensional US Small Cap Index minus the S&P 500 Index. Relative prime premium: Fama/French US Value Index minus the Fama/French US Growth Index. Profitability premium: Dimensional US High Profitability Index minus the Dimensional US Low Profitability Index. The S&P data is provided by Standard & Poor's Index Services Group. See "Index Descriptions" in the appendix for descriptions of Dimensional and Fama/French index data.

### Yearly Observations of Premiums: U.S. Markets

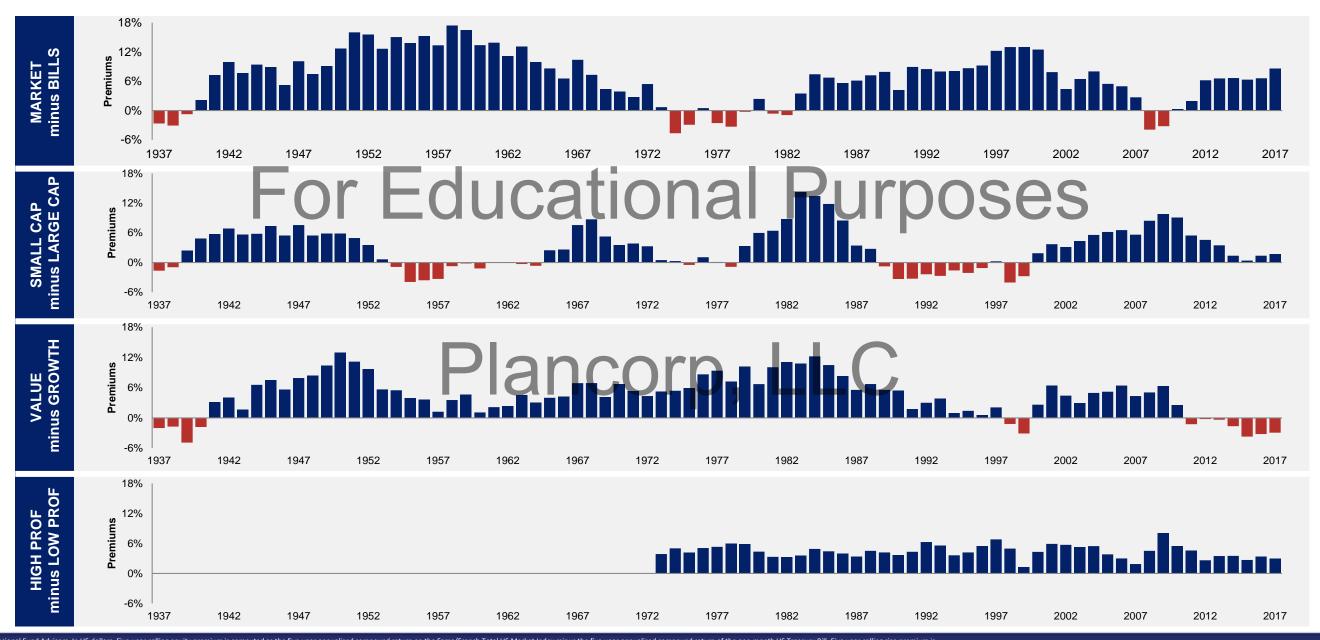


# Five-Year Observations of Premiums: U.S. Markets



Research Index minus the five-year annualized compound return on the Fama/French US Growth Research Index minus the five-year annualized compound return on the S&P 500 Index. Five-year rolling relative price premium is computed as the five-year annualized compound return on the Fama/French US Growth Research Index. The five-year rolling profitability premium is computed as the five-year annualized compound return on the Fama/French US Growth Research Index. The five-year rolling profitability premium is computed as the five-year annualized compound return on the Dimensional US High Profitability Index minus the five-year annualized compound return on the Dimensional US High Profitability index minus the five-year annualized compound return on the Dimensional US High Profitability index minus the five-year annualized compound return on the Dimensional US High Profitability index minus the five-year annualized compound return on the Dimensional US High Profitability index minus the five-year annualized compound return on the Dimensional US High Profitability index minus the five-year annualized compound return on the Dimensional US High Profitability Index minus the five-year annualized compound return on the Dimensional US High Profitability Index minus the five-year annualized compound return on the Dimensional US High Profitability Index minus the five-year annualized compound return on the Dimensional US High Profitability Index minus the five-year annualized compound return on the Dimensional US High Profitability Index minus the five-year annualized compound return on the Dimensional US High Profitability Index minus the five-year annualized compound return on the Dimensional US High Profitability Index Minus the five-year annualized compound return on the Dimensional US High Profitability Index Minus the five-year annualized compound return on the Dimensional US High Profitability Index Minus the five-year annualized compound return on the Dimensional US High Profitability Index Minus the five-year annuali

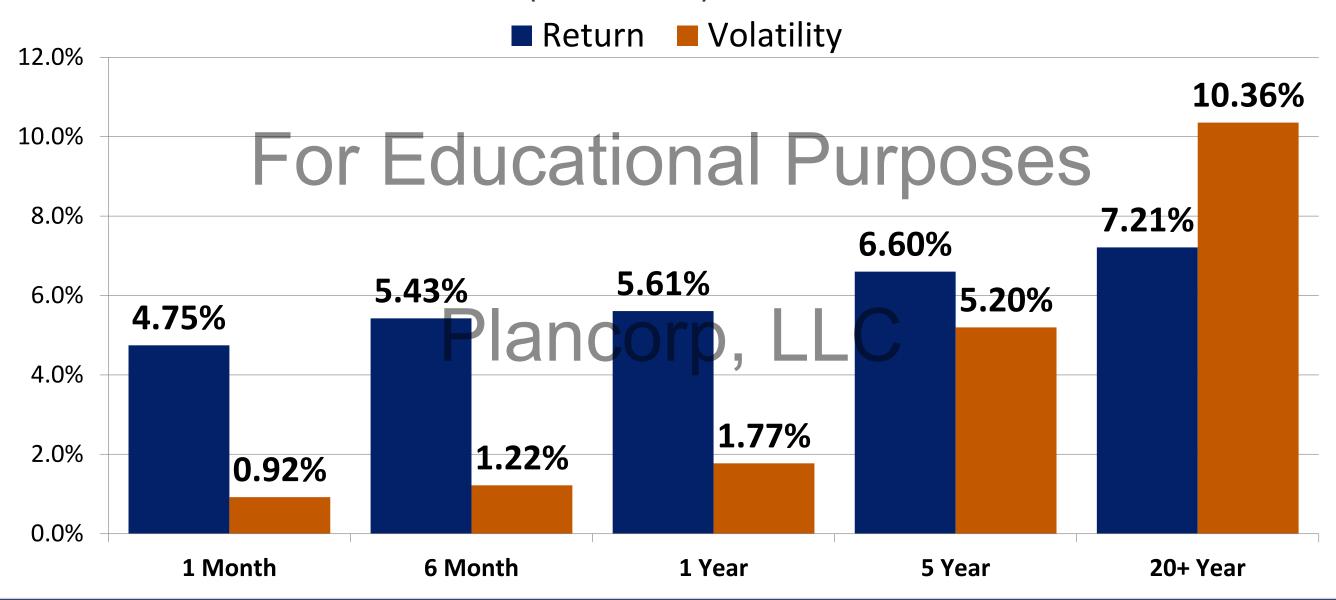
#### Ten-Year Observations of Premiums: U.S. Markets



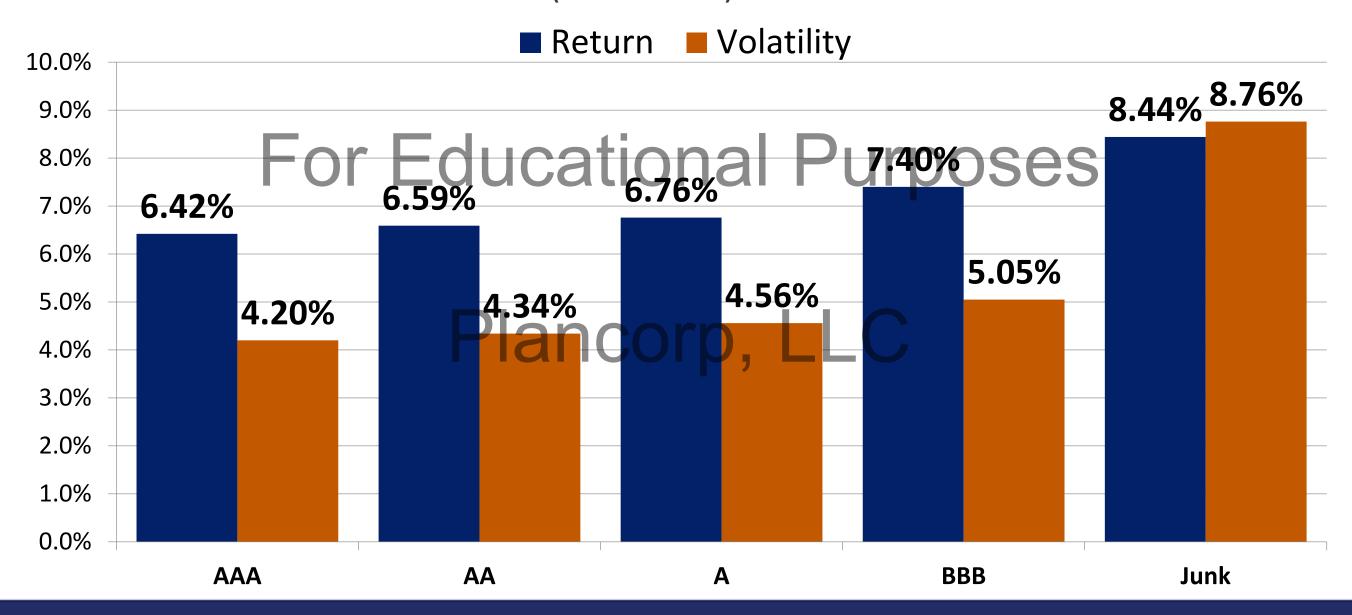
Source: Dimensional Fund Advisors. In U.S. dollars. Five-year rolling equity premium is computed as the five-year annualized compound return on the planeshord of the one-month of the one-month

# Forfixducational Paugoses

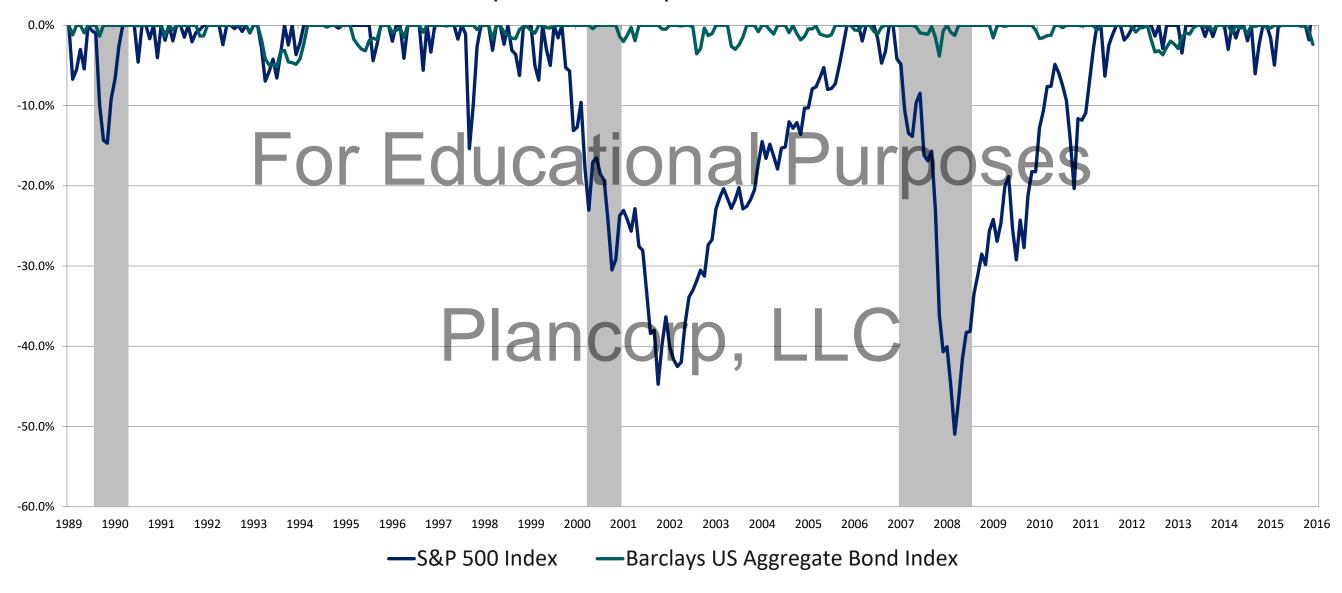
Fixed Income Term Risk & Return (1964-2017)



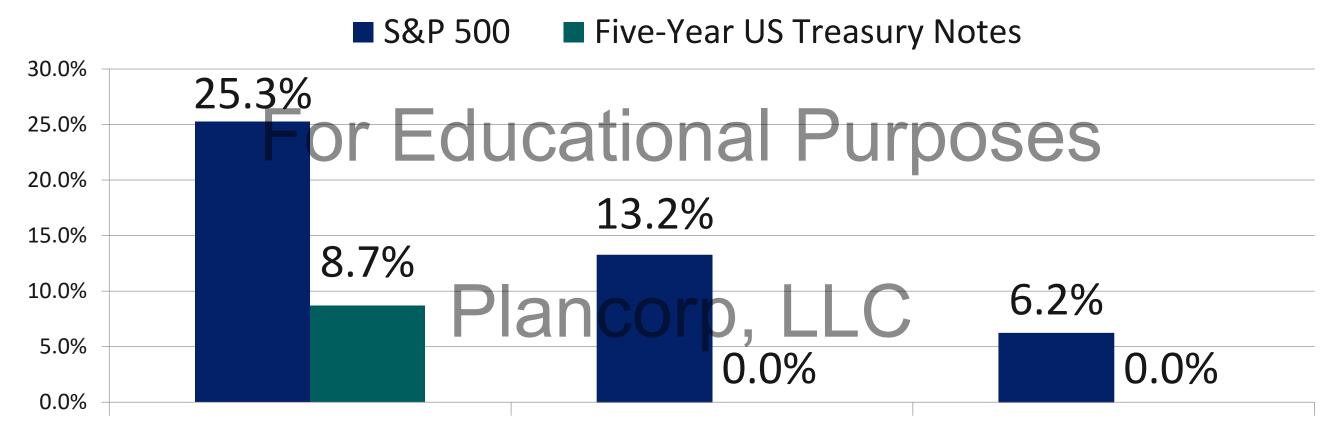
Fixed Income Credit Risk & Return (1988-2017)



US Stock and Bond Downturns (1990-2017)



Percentage of 12-Month Periods With Negative Returns (1926-2017)

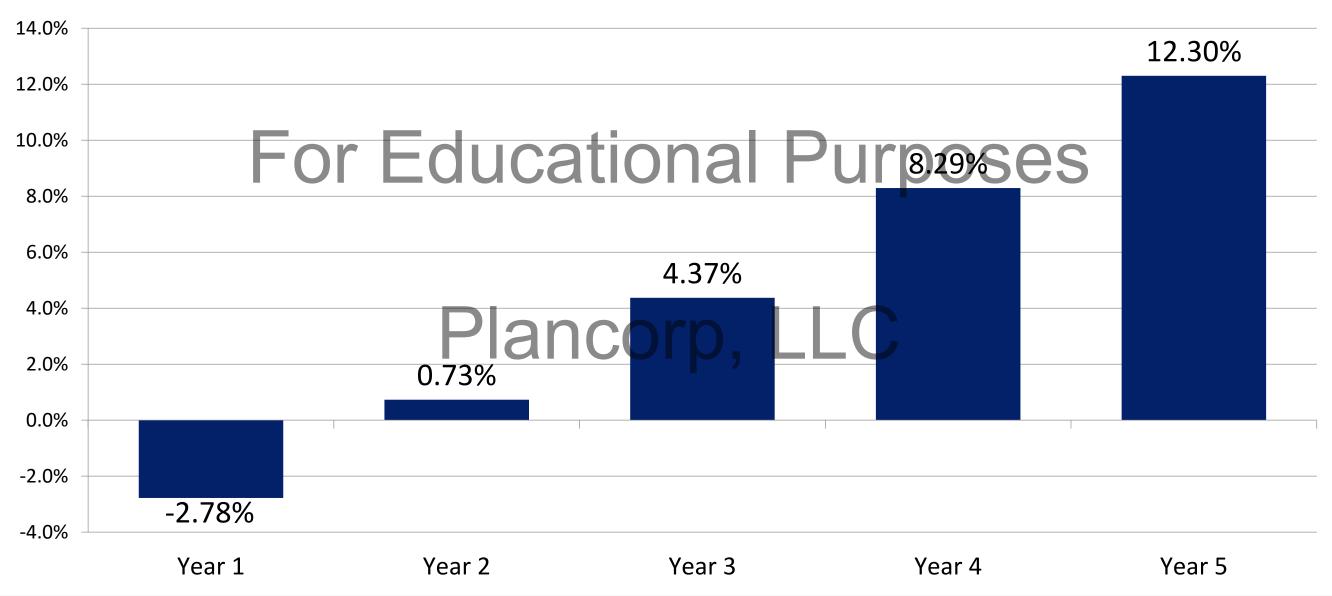


With Negative Returns With Returns Worse Than -10%

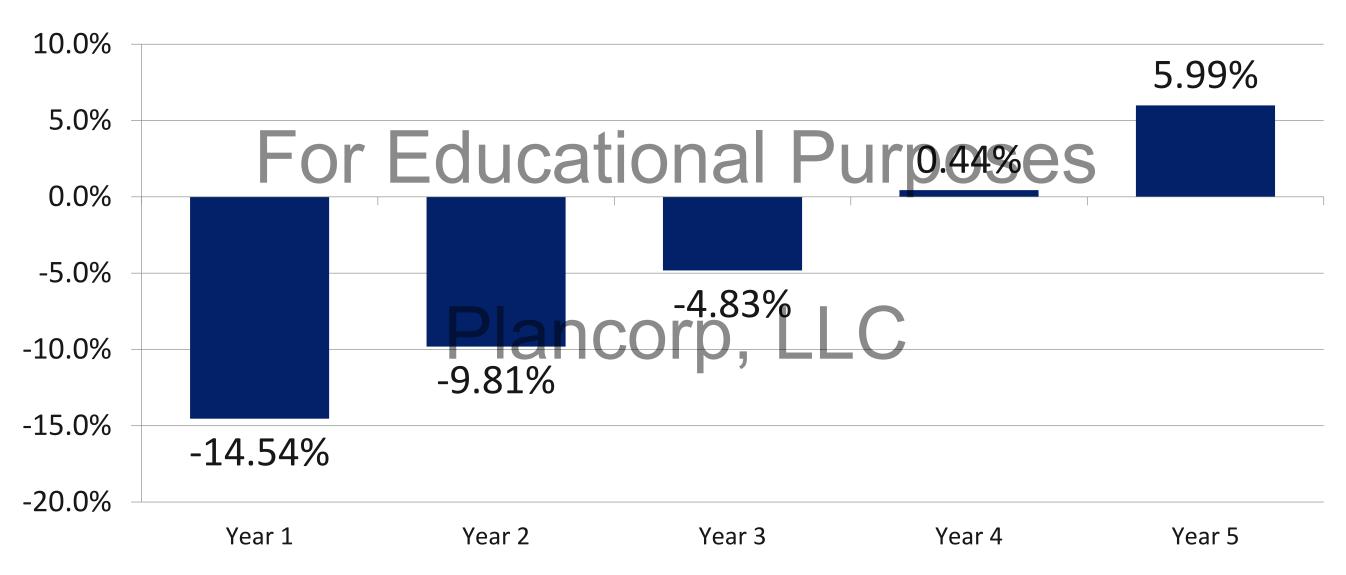
With Returns Worse
Than -20%

### Rising Rates Are Good For Long-Term Investors

Cumulative Bond Returns Following One Percentage Point Increase in Interest Rates



Cumulative Bond Returns Following Three Percentage Point Increase in Interest Rates



# Bond Funds are Superior to Individual Bond Portfolios

Most individual bonds are part of a bond portfolio that never matures as investors usually reinvest the proceeds of maturing bonds into new bonds. In other words, a portfolio of individual bonds is actually a form of a bond fund with four distinct disadvantages:

Higher cost

Cash drag

- For Educational Purposes
- Lack of diversification
- No global exposure

# The Importance of Simplification

"Simple can be harder than complex: You have to work hard to get your thinking clean to make it simple. But it's worth it in the end because once you get there, you can move mountains." - Steve Jobs

"The business schools reward difficult complex behavior more than simple behavior, but simple behavior is more effective." - Warren Buffett

"The five ascending levels of intelligence: smart, intelligent, brilliant, genius, simple." - Albert Einstein

"It is remarkable how much long-term advantage people like us have gotten by trying to be consistently not stupid, instead of trying to be very intelligent." Charlie Munger

# HENCER Westinnair Purposes?

### Take Back Your Advantage

- Minimize trading and reduce the number of decisions you make.
- Keep costs low. Don't pay more than 0.30% for a diversified portfolio and be mindful of taxes.
- Develop a thoughtful asset allocation that matches your risk tolerance and stick to it for multiple decades.
- Define asset classes more broadly and hold fewer funds across fewer accounts.
- Don't worry about having the most interesting investments.
- Set financial planning goals and evaluate those more frequently than your portfolio.

# Receive My Newsletter By Texting

For Edynatics and Parposes

# For Educational Purposes

#### **Disclosures**

For educational purposes; should not be used as investment advice.

Indices are not available for direct investment. Their performance does not reflect the expenses associated with the management of an actual portfolio. Past performance is no guarantee of future results.

PAST PERFORMANCE IS NO GUARANTEE OF FUTURE RESULTS. Investing involves risk. It should not be assumed that recommendations made in the future will be profitable or will equal the performance shown. Investment returns and principal value of an investment will fluctuate and losses may occur. Diversification does not ensure a profit or guarantee against a loss.