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MAXIMIZING INCOME AT TARGETED RISK LEVELS FOR RETIREES:

***NEW PORTFOLIO MANAGEMENT APPROACHES FROM
WILSHIRE ASSOCIATES***

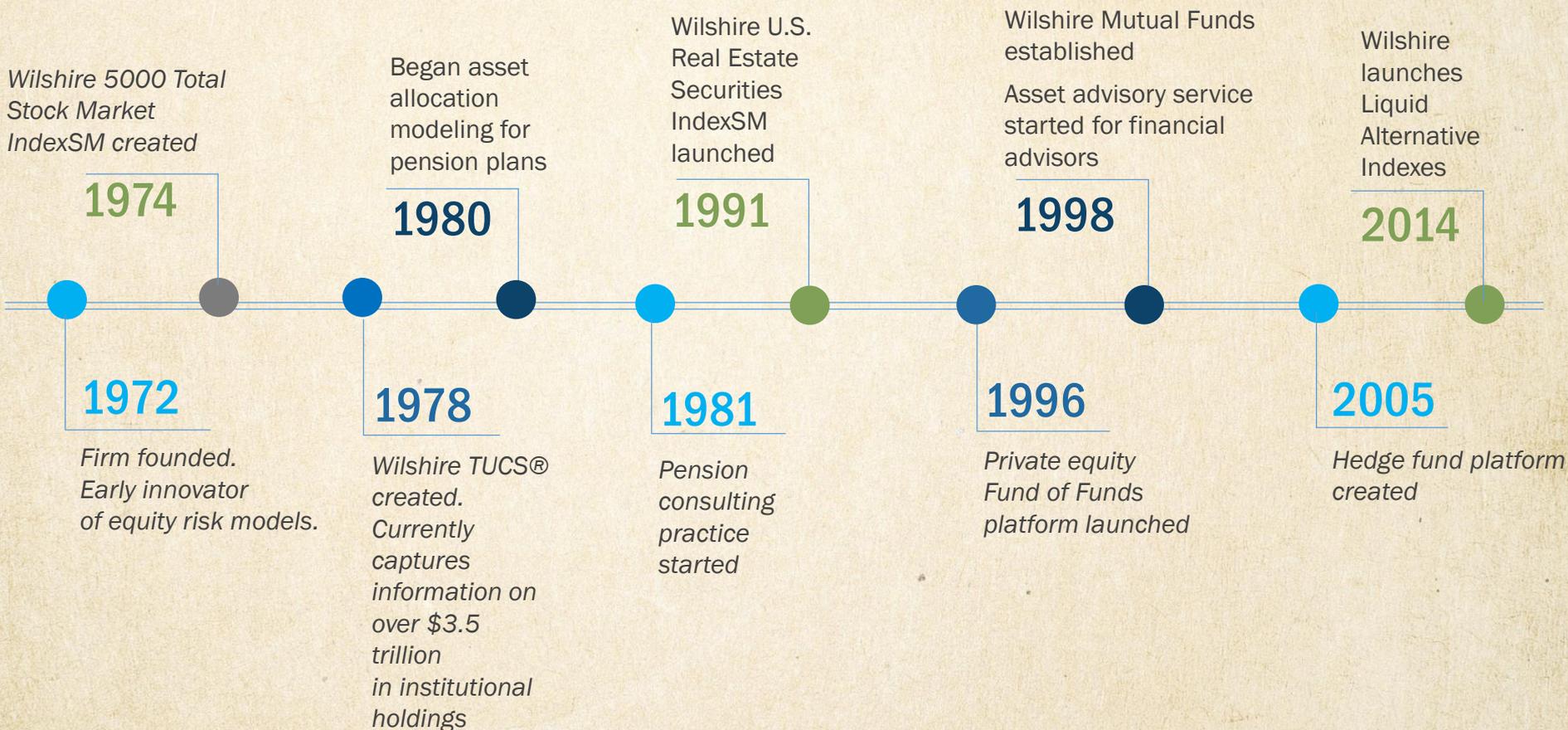
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WILSHIRE ASSOCIATES

Maximizing Income at Targeted Risk Levels for Retirees:

New Portfolio Management Approaches From Wilshire Associates

Institutional Heritage



Institutional Heritage



32 CFA Charterholders

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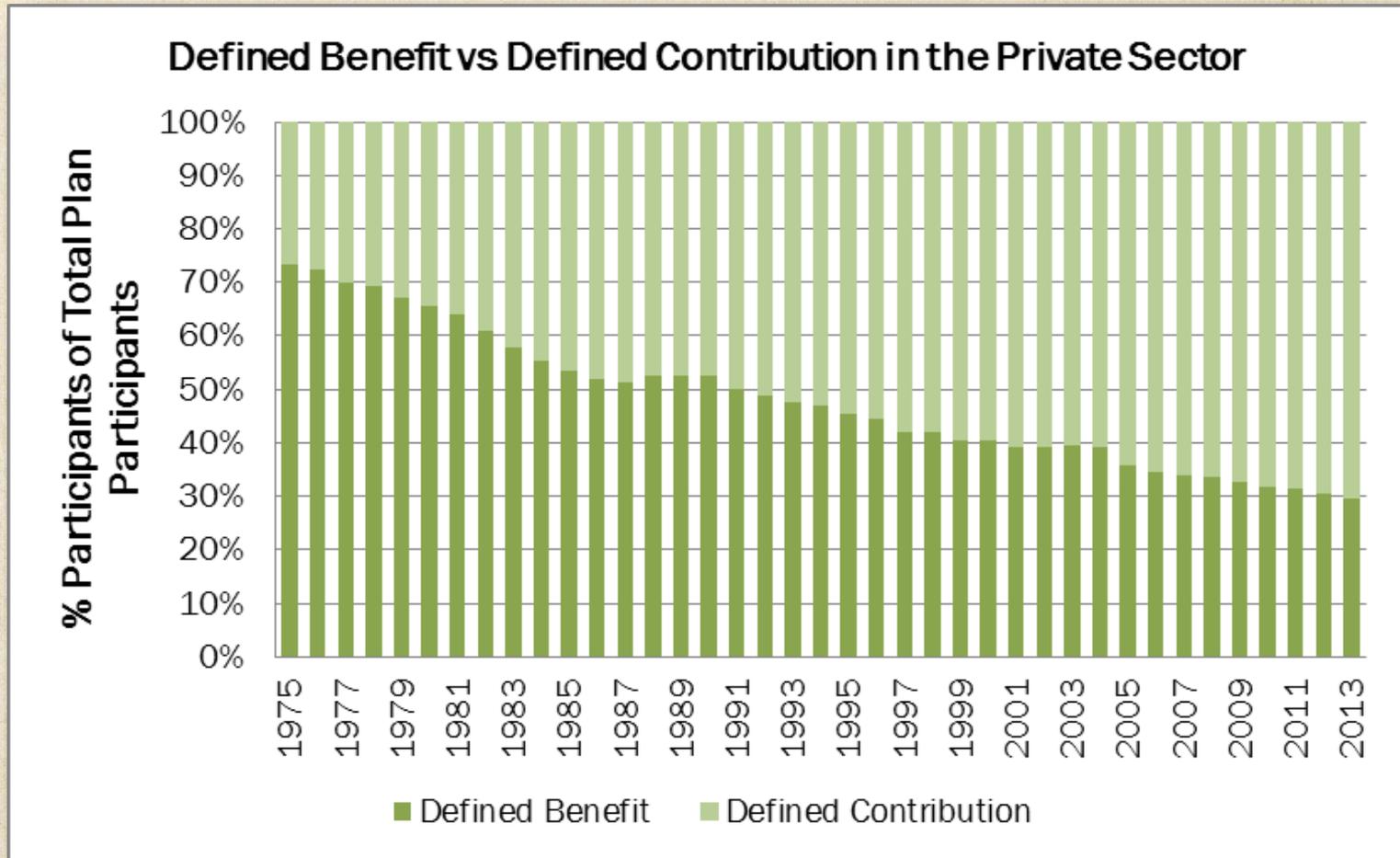
40+
years
of experience

Over
\$990 billion
(as of September 30, 2016)
in institutional consulting
assets advised

Advises on over
\$157 billion
(as of September 30, 2016)
in assets for
financial intermediaries

Approximately
300 associates
worldwide, 70+
of whom contribute to
manager research

Challenges Facing Retirees



The Main Task for Retirees: Generating a Steady Income Stream

Figure 2: Effect of Volatility on Portfolio Balance with Systematic Withdrawal Plans

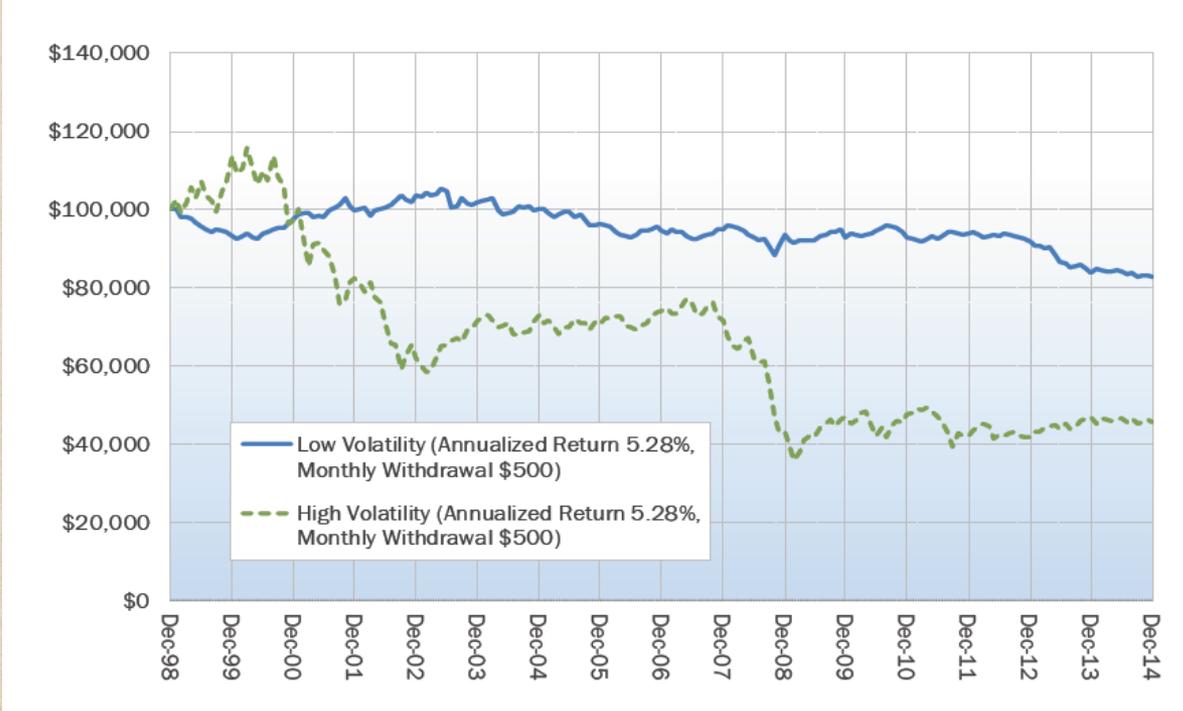


Table 1: Systematic Withdrawal Plans and Depletion Risk in Diversified Retirement Portfolios

Initial Withdrawal Rate	3%	4%	5%	6%	7%	8%	9%	10%
Depletion Risk	0%	4%	17%	39%	62%	79%	89%	96%

Source: Wilshire Associates

The Main Task for Retirees: Generating a Steady Income Stream

Table 3: Total 40 Year Return Decompositions of Traditional and Extended Portfolio Assets⁷

Asset	Proxy	Price Return		Dividend/Yield Return		Total Return	
		Ann. Return	Ann. Volatility	Ann. Return	Ann. Volatility	Ann. Return	Ann. Volatility
Traditional Portfolio							
Cash and Equivalents	<i>3-Month U.S. Treasury Bill</i>	0.00	0.00	4.18	0.87	4.18	0.87
Inflation-Protected Bonds	<i>Barclays U.S. TIPS</i>	1.43	5.82	4.13	0.55	5.59	5.76
Investment Quality Bonds	<i>Barclays U.S. Aggregate IG Bonds</i>	0.75	5.42	6.92	0.86	7.72	5.43
U.S. Common Equities							
Large-Cap Value Stocks	<i>Wilshire U.S. Large-Cap Value</i>	6.20	13.25	3.01	1.05	9.39	13.27
Large-Cap Growth Stocks	<i>Wilshire U.S. Large-Cap Growth</i>	7.40	17.02	1.10	0.47	8.57	17.03
Small-Cap Value Stocks	<i>Wilshire U.S. Small-Cap Value</i>	9.54	16.76	2.31	0.27	12.06	16.77
Small-Cap Growth Stocks	<i>Wilshire U.S. Small-Cap Growth</i>	8.38	22.14	0.64	0.25	9.07	22.15
Extended Portfolio							
High-Yield Bonds	<i>BAML High Yield Master II</i>	-0.99	8.14	9.47	0.47	8.39	8.19
Global Bonds	<i>Barclays Global Treasury ex-U.S.</i>	0.67	3.03	5.20	8.11	5.89	8.82
Non-U.S. Common Stocks							
Developed Markets	<i>MSCI EAFE</i>	7.05	17.01	2.21	0.39	9.41	17.01
Emerging Markets	<i>MSCI Emerging Markets</i>	6.39	22.91	2.35	0.37	8.88	22.93
U.S. Preferred Stocks	<i>BAML Preferred Stock</i>	-1.66	17.63	7.30	0.85	5.54	17.66
Commodities	<i>S&P GSCI</i>	4.81	19.30	0.00	0.00	4.81	19.30
Listed Real Estate							
U.S. Equity REITs	<i>FTSE NAREIT All Equity REITs</i>	6.02	16.94	7.30	2.26	13.75	16.99
U.S. Mortgage REITs	<i>FTSE NAREIT Mortgage REITs</i>	-4.81	18.40	12.35	2.75	7.03	18.49

Source: Wilshire Associates

Impact of IOMVO Vs. Standard MVO

Table 6: Allocations of Standard and Income Oriented Portfolios

Asset	Optimization Approach	
	Standard	Income Oriented
Cash & Equivalents	0.00	0.00
Investment Quality Bonds	32.24	35.39
Inflation-Protected Bonds	6.07	0.00
Large-Cap Value Stocks	16.777	2.64
Large-Cap Growth Stocks	12.05	0.00
Small-Cap Value Stocks	6.05	0.00
Small-Cap Growth Stocks	0.59	0.00
High Yield Bonds	7.98	12.50
Global Bonds	7.47	12.50
Developed non-U.S. Markets Stocks	4.11	23.47
Emerging Markets Stocks	4.91	1.01
Commodities	0.61	0
Preferred Stock	1.15	12.50
Equity REITs	NA	NA
Mortgage REITS	NA	NA
Portfolio Performance		
Annual Total Return	5.37	5.12
Annual Income Return	2.37	3.25
Expected Volatility	8.00	8.00
Satisfies Income Target?	No	Yes

Wilshire 2016, based on historical total returns, 1975-2015

The Role of Real Estate in Income-Oriented Portfolios

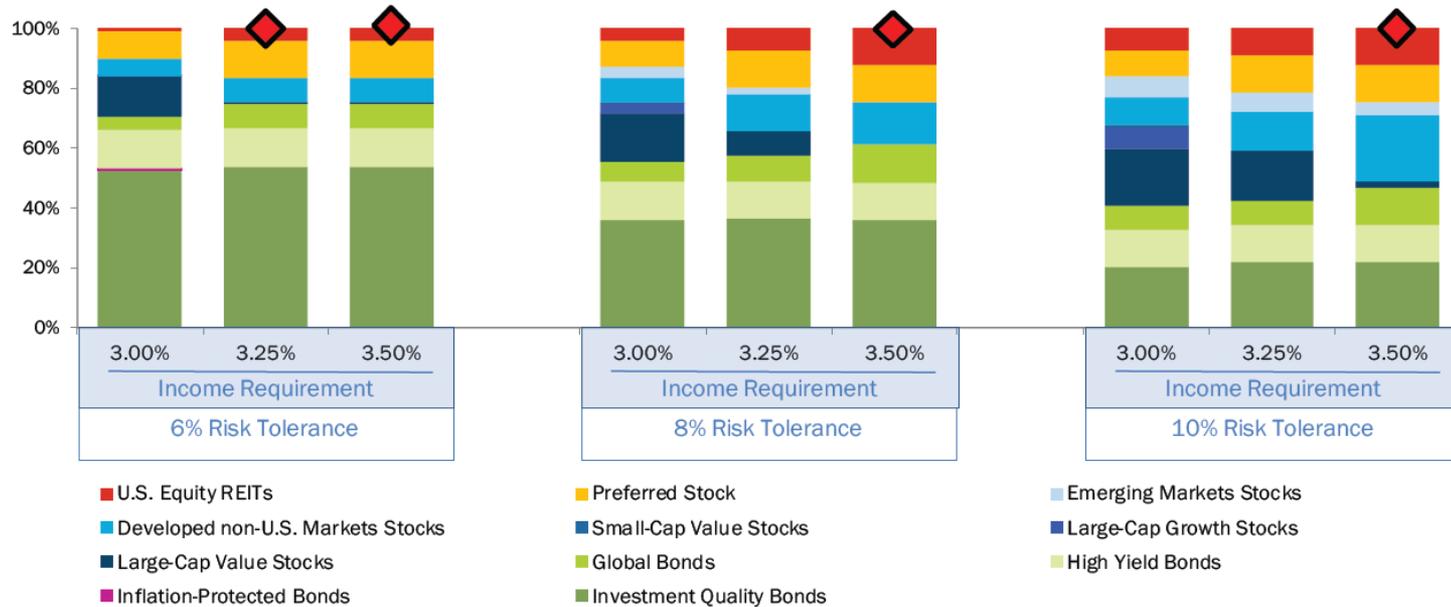
Table 7: Allocations of Income Oriented Portfolios with and without Real Estate

Asset	No REITs	Including Equity REITs	Including Equity and Mortgage REITs
Cash and Equivalents	0.00	0.00	0.00
Investment Quality Bonds	35.39	36.21	35.36
Inflation-Protected Bonds	0.00	0.00	0.00
Large-Cap Value Stocks	2.64	7.96	14.57
Large-Cap Growth Stocks	0.00	0.00	0.53
Small-Cap Value Stocks	0.00	0.00	0.00
Small-Cap Growth Stocks	0.00	0.00	0.00
High Yield Bonds	12.50	12.50	12.50
Global Bonds	12.50	8.91	6.06
Developed non-US Markets Stocks	23.47	12.41	9.23
Emerging Markets Stocks	1.01	1.87	3.24
Commodities	0	0	0
Preferred Stock	12.50	12.50	10.23
U.S. Equity REITs	0.00	7.63	3.27
U.S. Mortgage REITS	0.00	0.00	5.00
Portfolio Performance			
Annual Total Return	5.12	5.21	5.27
Annual Income Return	3.25	3.25	3.25
Expected Volatility	8.00	8.00	8.00
Satisfies Income Target?	Yes	Yes	Yes

Source: Wilshire Associates

The Role of Real Estate in Income-Oriented Portfolios

Figure 6: Optimal Portfolios: Income Oriented Optimizations across Risk Tolerances and Income Targets Including Equity REITs

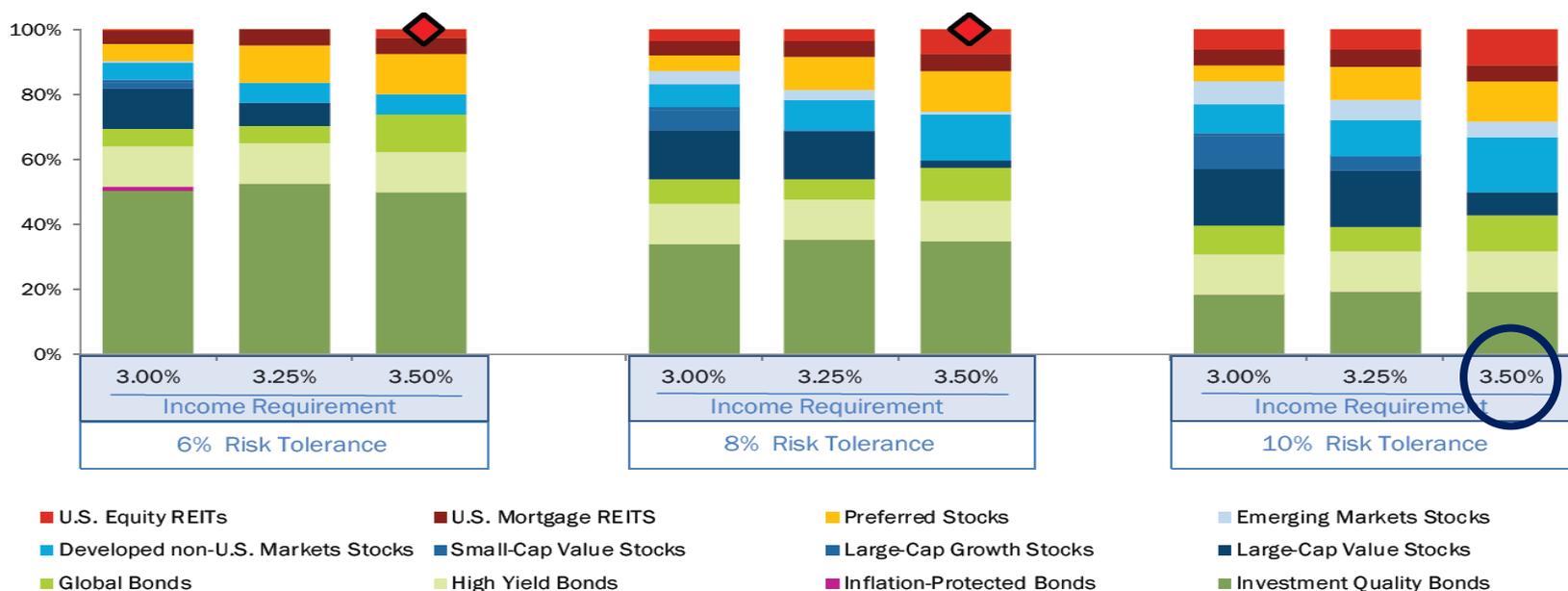


The red diamonds indicate that the income target is not achievable given the opportunity set and risk tolerance settings. The maximum achievable income returns are 3.20%, 3.35%, and 3.40% for 6%, 8%, and 10% risk tolerance levels respectively.

Source: Wilshire Associates

The Role of Real Estate in Income-Oriented Portfolios

Figure 7: Optimal Portfolios: Income Oriented Optimizations Across Risk Tolerances and Income Targets Including Equity and Mortgage REITs



The red diamonds indicate that the income target is not achievable given the opportunity set and risk tolerance settings. The maximum achievable income returns are 3.38% and 3.48% for 6% and 10% risk tolerance levels respectively.

Source: Wilshire Associates

Summary

1. Retirees face challenges as defined contribution plans gain popularity, requiring more investment direction on by the individual investor/participant.
2. Income oriented portfolios have historically provided less annual total return but with a greater income return, which for many retirees may be an appropriate trade-off.
3. Inclusion of the extended portfolio in the investment opportunity set plays a crucial role in building income-oriented portfolios because of added diversification and income generation capabilities.
4. REITs have historically delivered high and stable dividends, competitive total returns, and inflation protection, making these assets a desirable for income-oriented investment portfolios.
5. Addition of REITs improved the historical performance of income-oriented portfolios, and an allocation to REITs may be helpful in achieving income and volatility goals.

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Building a Better Retirement Portfolio

January 26, 2017



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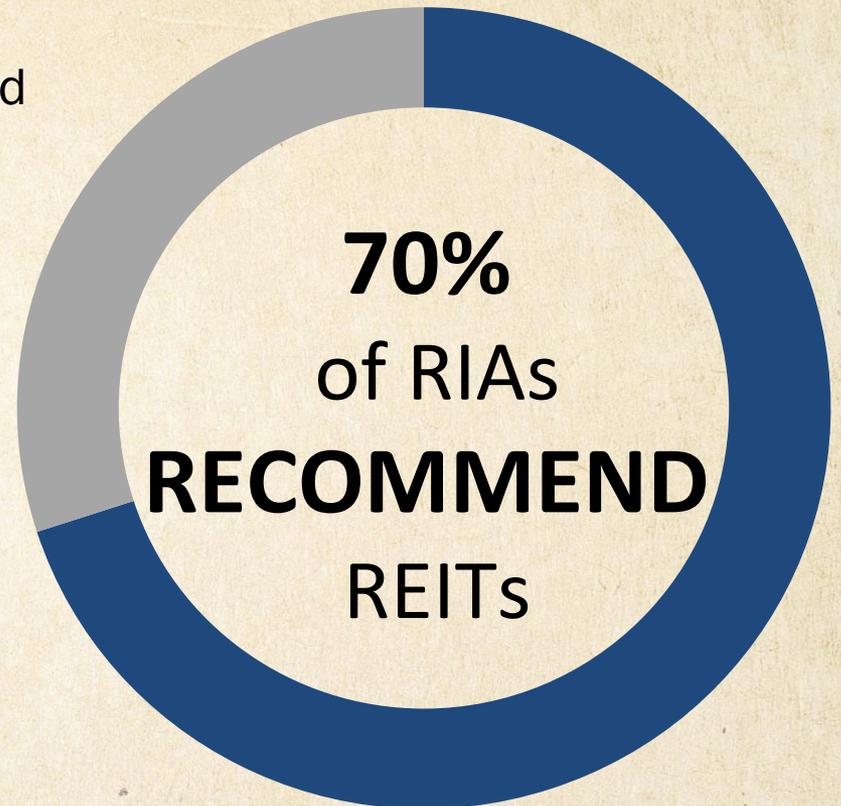
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REIT Investment Attributes

REITs are a key component of an optimized portfolio because of their unique blend of investment attributes.

REITs combine:

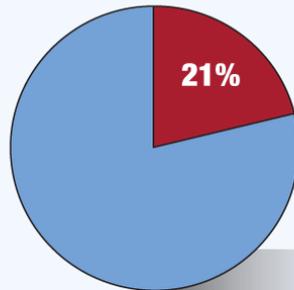
- Capital Appreciation
- Long-Term Portfolio Diversification
- Income Generation



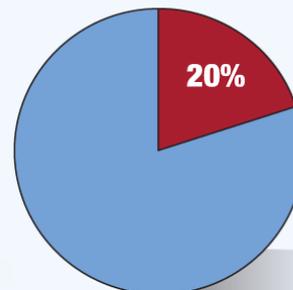
Portfolio Allocations to Global Real Estate

Different Researchers, Methodologies And Time Periods

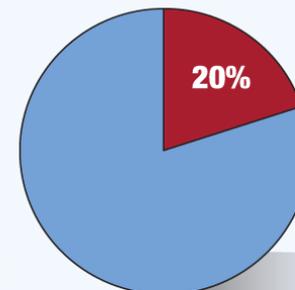
**Morningstar Analysis
Mean Variance Optimization
1990-2007**



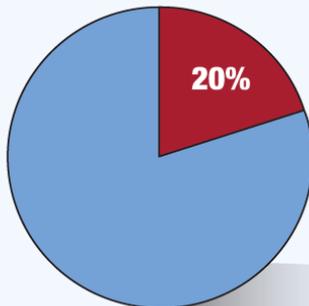
**Morningstar Analysis
Mean Variance Optimization
1990-2010**



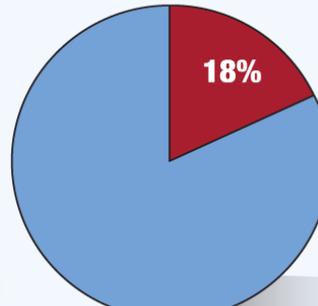
**Morningstar Analysis
Fat Tail Optimization
1990-2009**



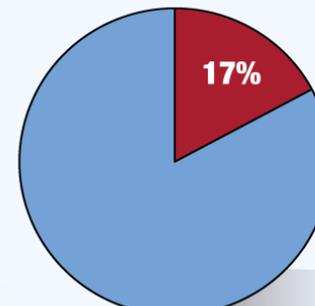
**Morningstar Analysis
Liability Relative Investing
1990-2009**



**Wilshire Analysis
Surplus Optimization
1990-2012**



**Wilshire Analysis
Surplus Optimization
1990-2015**



Listed REITs and Property Companies Contribute Solid Portfolio Performance

	FTSE NAREIT U.S. Equity REITs TR	FTSE EPRA/NAREIT Developed TR	Russell 3000 TR	MSCI EAFE TR	Barclays Capital U.S. Aggregate Bond Index	Barclays Capital Global Aggregate Bond Index
1-Year	8.63	4.99	12.74	1.00	2.65	2.09
3-Year	12.66	6.78	8.43	-1.60	3.03	-0.19
5-Year	11.98	10.33	14.67	6.53	2.23	0.21
10-Year	5.07	2.23	7.07	0.75	4.34	3.29
15-Year	10.79	9.84	7.11	5.28	4.58	4.79
20-Year	9.67	7.36	7.86	4.17	5.29	4.40
25-Year	11.13	8.76	9.29	4.95	5.63	5.14
30-Year	10.33	N/A	10.14	5.57	6.34	N/A
35-Year	11.96	N/A	11.33	8.53	7.98	N/A
40-Year	12.85	N/A	N/A	9.25	7.36	N/A
45-Year	11.93	N/A	N/A	8.70	N/A	N/A

Note: Monthly data as of December 2016

Sources: NAREIT® analysis of data from IDC accessed through FactSet.

REIT Returns Have Little in Common with any Non-REIT Stocks

Correlation coefficients based on monthly data, January 1991 – December 2016

FTSE NAREIT Equity REIT

Russell 1000 Growth
(Large-Cap Growth)
45.6%

Russell 1000
(Large-Cap)
56.2%

Russell 1000 Value
(Large-Cap Value)
62.7%

Russell Midcap/Growth
(Mid-Cap Growth)
47.5%

Russell 3000
(Total Stock Market)
57.7%

Russell Midcap/Value
(Mid-Cap Value)
72.2%

Russell 2000 Growth
(Small-Cap Growth)
50.9%

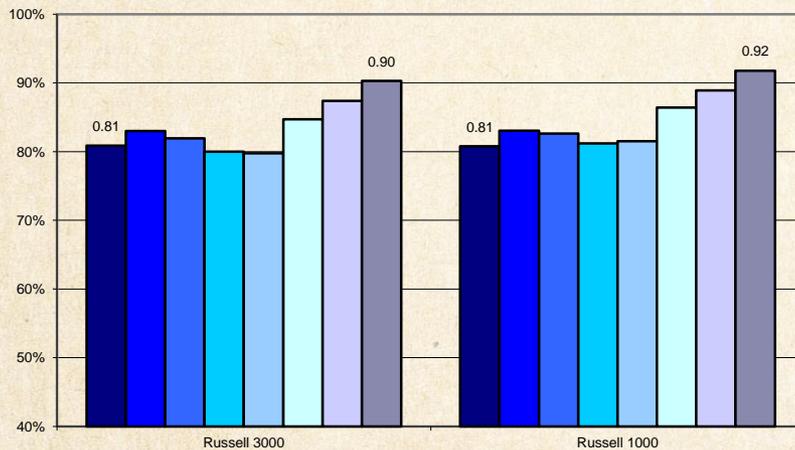
S&P Financials Sector
60.9%

Russell 2000 Value
(Small-Cap Value)
72.1%

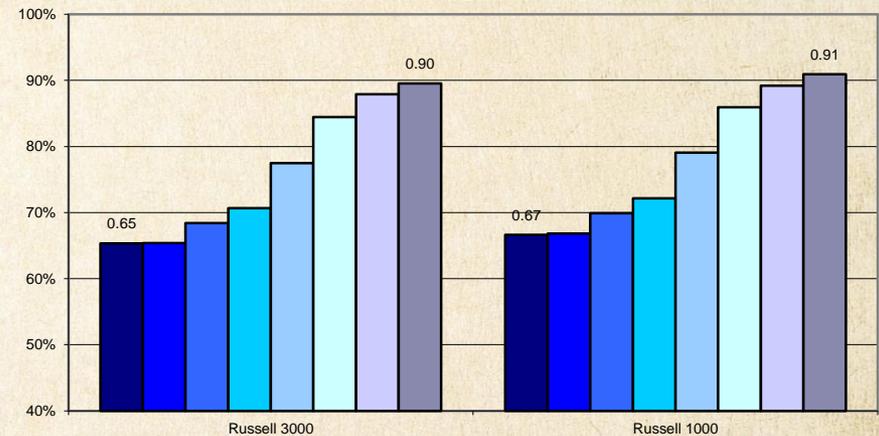


Correlation of Most Stock Market Sectors with Broad Stock Market Returns Increases with Longer Investment Horizons

Info Tech



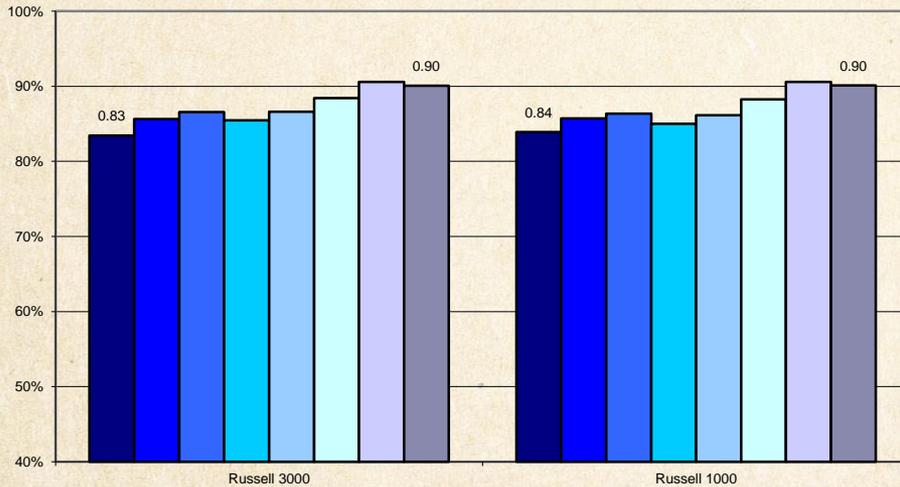
Health Care



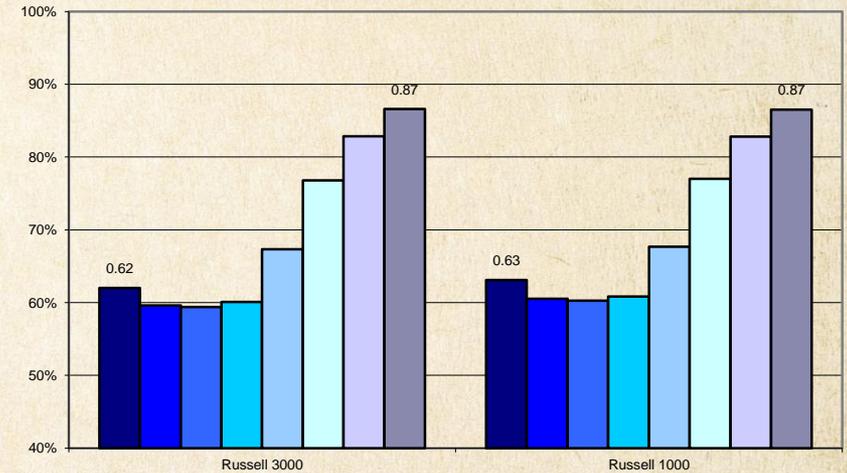
■ 1 month ■ 3 months ■ 6 months ■ 12 months ■ 24 months ■ 36 months ■ 48 months ■ 60 months

Correlation of Most Stock Market Sectors with Broad Stock Market Returns Increases with Longer Investment Horizons

Financials



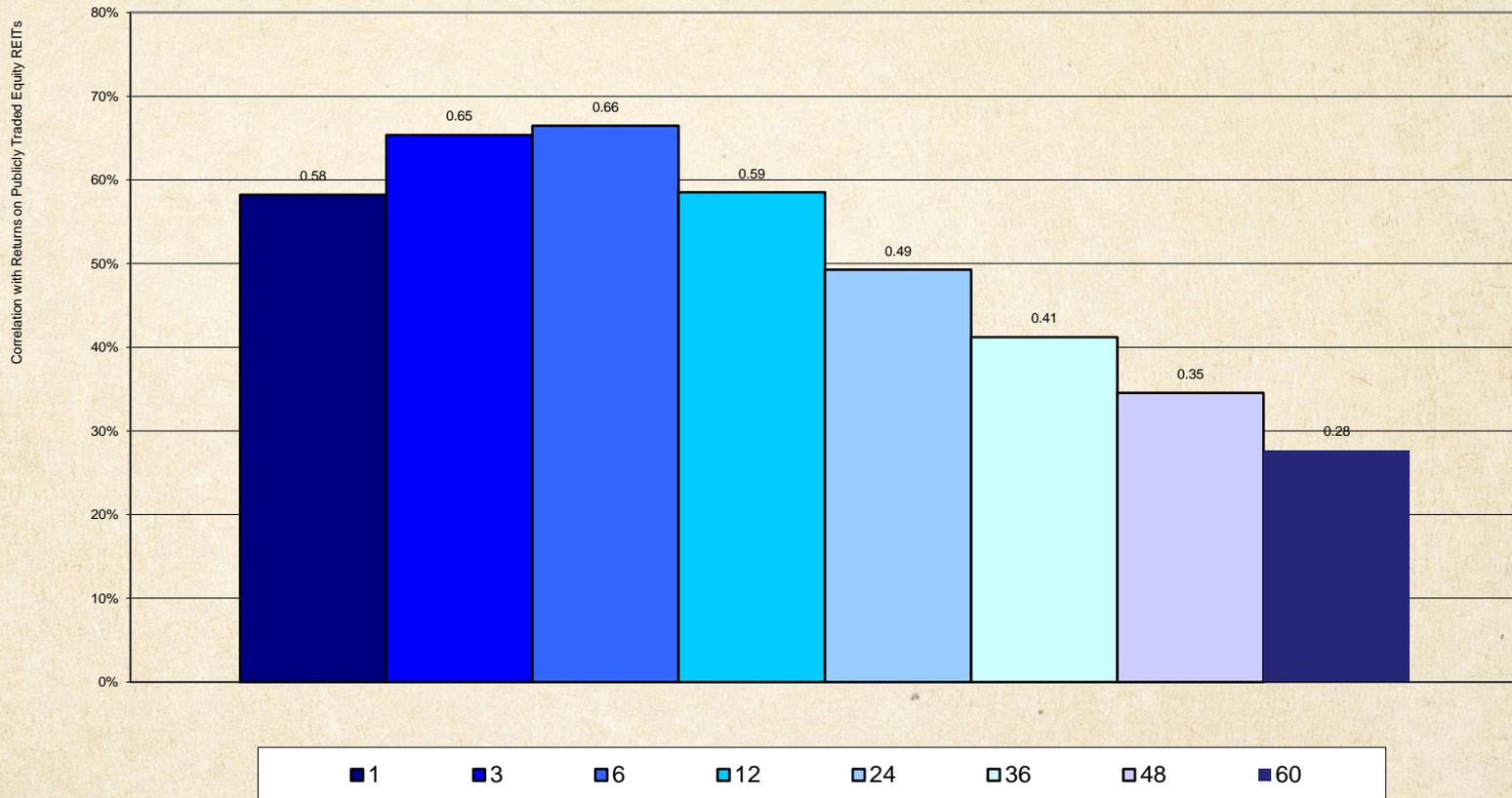
Consumer Staples



■ 1 month ■ 3 months ■ 6 months ■ 12 months ■ 24 months ■ 36 months ■ 48 months ■ 60 months

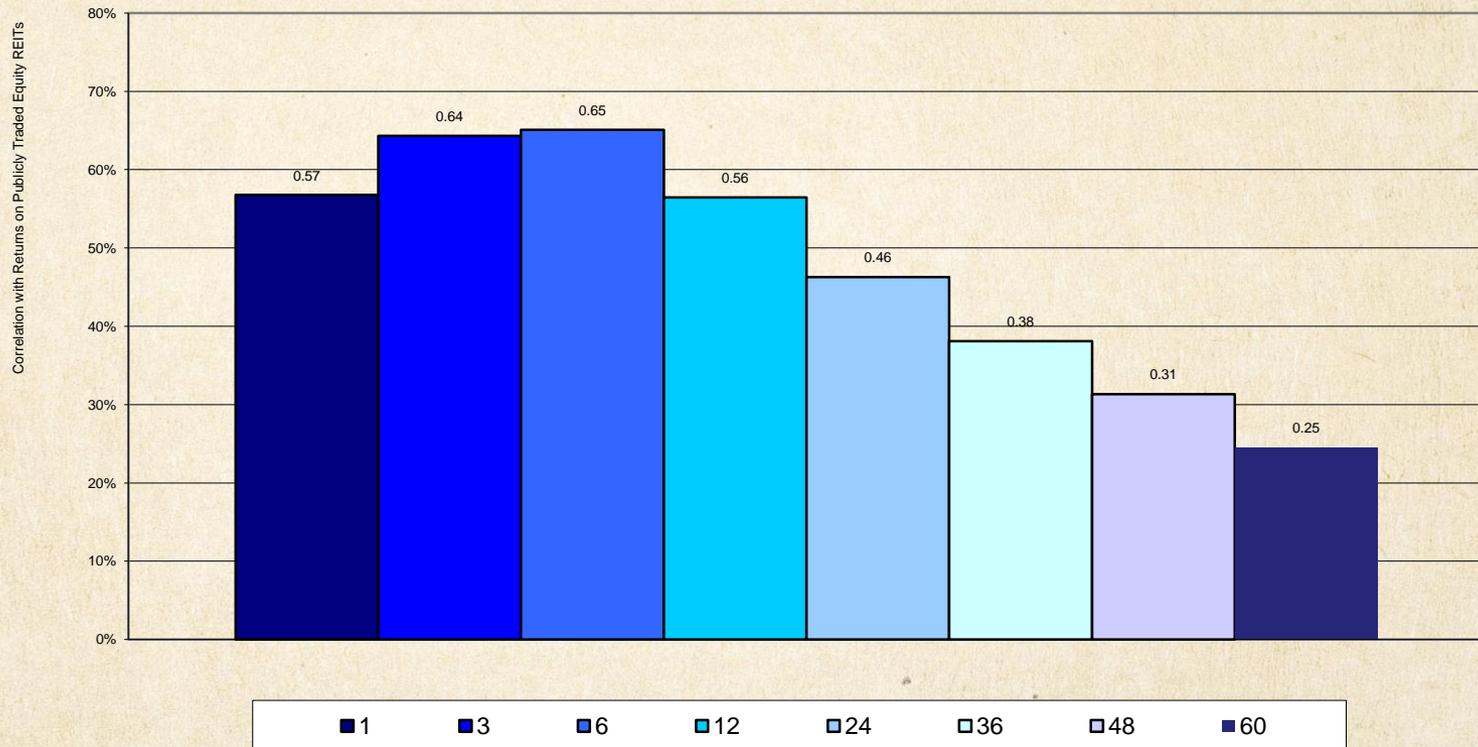
REIT-Stock Correlations *Decline* as Investment Horizon Lengthens

Correlations Between REITs and Russell 3000 US Total Market Index



REIT-Stock Correlations *Decline* as Investment Horizon Lengthens

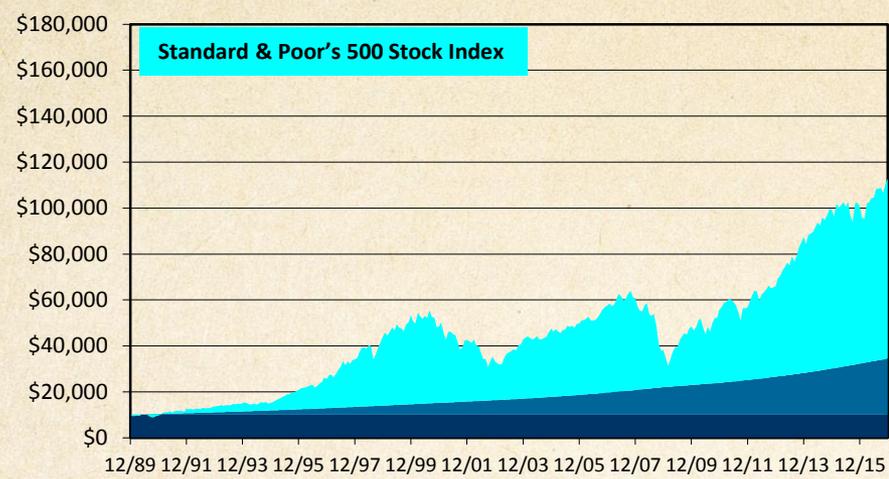
Correlations Between REITs and Russell 1000 Large-Cap Stock Index



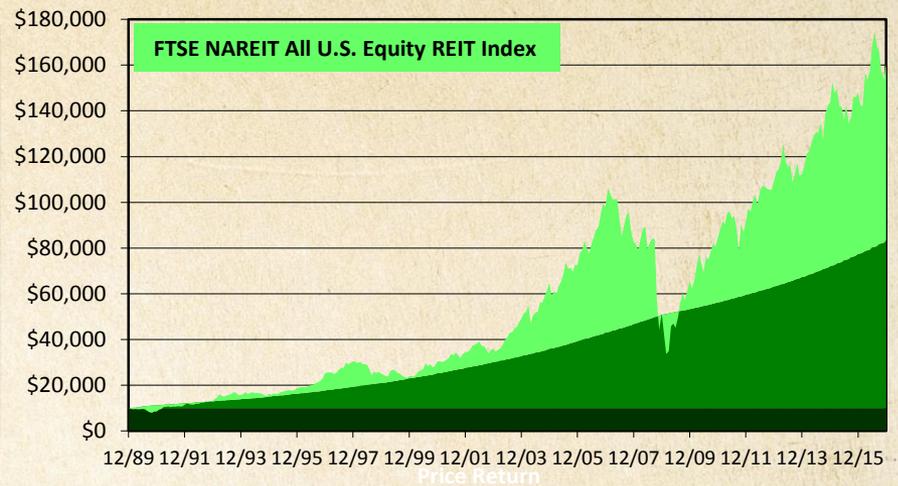
Source: NAREIT® analysis of monthly returns data for January 1990 through December 2016 from Interactive Data Pricing and Reference Data accessed through FactSet.

Dividends are an Important Component of Total Returns

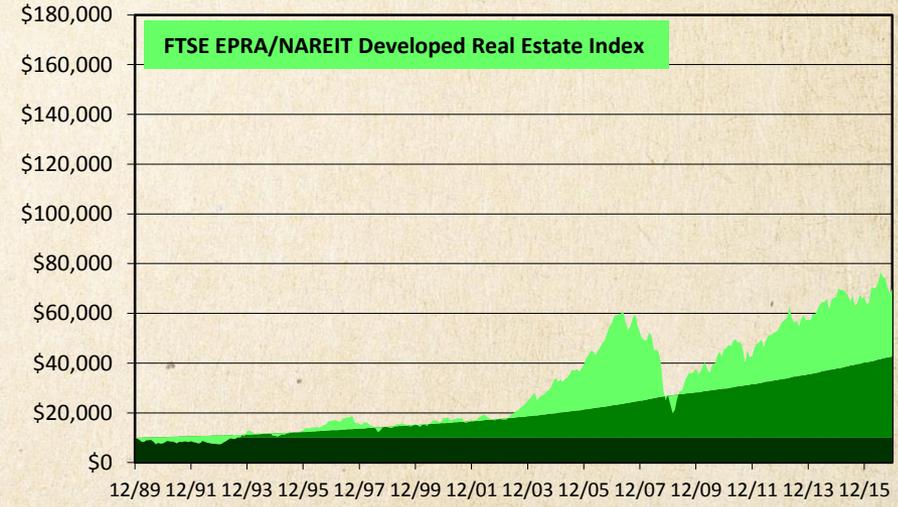
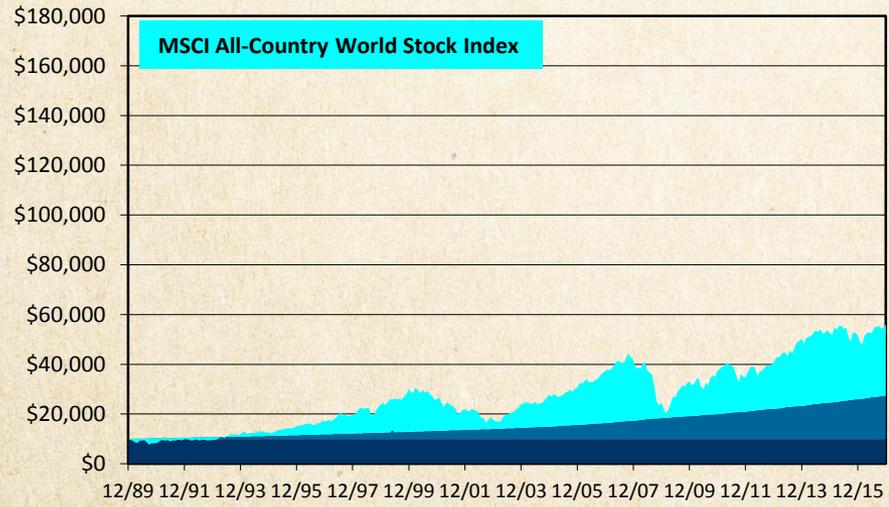
Dividend and Capital Gains, January 1990 – December 2016



■ Initial Investment ■ Cumulative Dividends with Reinvestment
■ Cumulative Capital Gains with Reinvestment



■ Initial Investment ■ Cumulative Dividends with Reinvestment
■ Cumulative Capital Gains with Reinvestment



Note: Based on monthly total returns and price appreciation returns, January 1990 – December 2016
Sources: NAREIT® analysis of data from IDP accessed through FactSet.



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