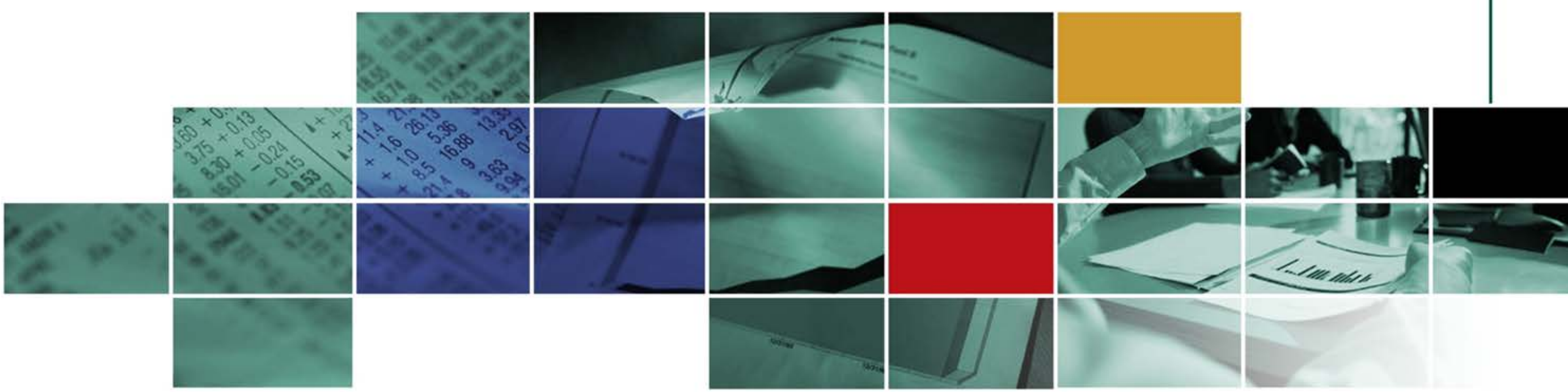
RVKuhns & ASSOCIATES, INC.

Staying Ahead of the Investment Curve

Texas Municipal Retirement System

November 2013



Dedicated RVK Consulting Team

Texas Municipal Retirement System

Marcia Beard – Principal, Senior Consultant
Jeremy Miller – Director of Capital Markets Research, Senior Consultant
Nick Woodward, CFA – Consultant
Spencer Hunter – Associate Consultant
Lindsay Helseth – Investment Associate
Kenny King – Senior Investment Analyst
Jim Voytko – President, Senior Consultant

The RVK consulting team approach enables TMRS to leverage the diverse capabilities of our entire firm.

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How to Prepare for an Unknown Future

- **Balance volatility risk against actuarial risk**
  - It does no good to reduce actuarial benchmark risk at the price of uncomfortably high volatility risk
- **Reduce risk across the board via broad diversification; allocations to traditional and alternative asset classes**
  - Still the #1 risk mitigator
- **Be sensitive to valuation and adjust the strategic allocation accordingly**
  - Review asset allocation each time RVK changes capital markets assumptions in any material way or the valuation of any major asset class shift dramatically – or both (since we hope a valuation change would trigger an assumption change in most instances)
- **Be sensitive to valuation by considering managers with some tactical latitude**
  - This doesn't mean total fund tactical asset allocation, but can mean allocations to Global Fixed Income managers, Liquid Alternatives, Global Tactical Asset Allocation managers, and Absolute Return Strategies, etc.

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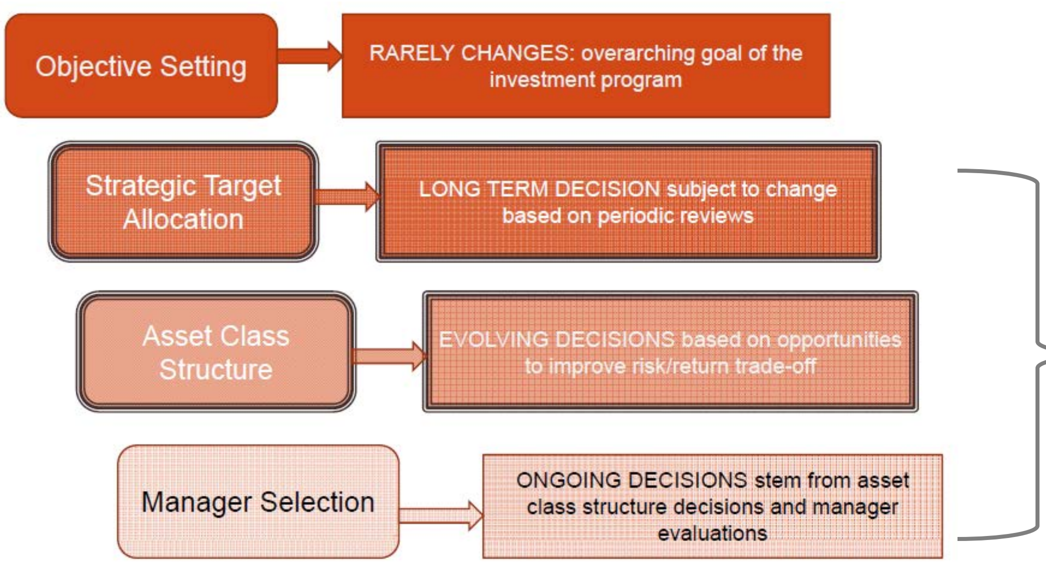
TMRS Asset Allocation Philosophy

- **Current policy assists to ensure that the risk tolerance remains appropriate**
  - *The Strategic Target Allocation will be* <u>*reviewed at least annually*</u> *to ensure that the long-term return objective and risk tolerance continues to be appropriate considering significant economic and market changes or changes in the Board's long-term goals*
  - *A formal asset allocation study will be conducted at least every three years to verify or amend the targets*
  - *A formal pension financial (asset-liability) study will be conducted at least every five years*

- **TMRS Asset Management Decision Flow Process:**



Each step in the process allows for various forms of diversification; multiple asset classes, different size/style mixes, and unique manager philosophies/processes can all aid in achieving long-term goals.

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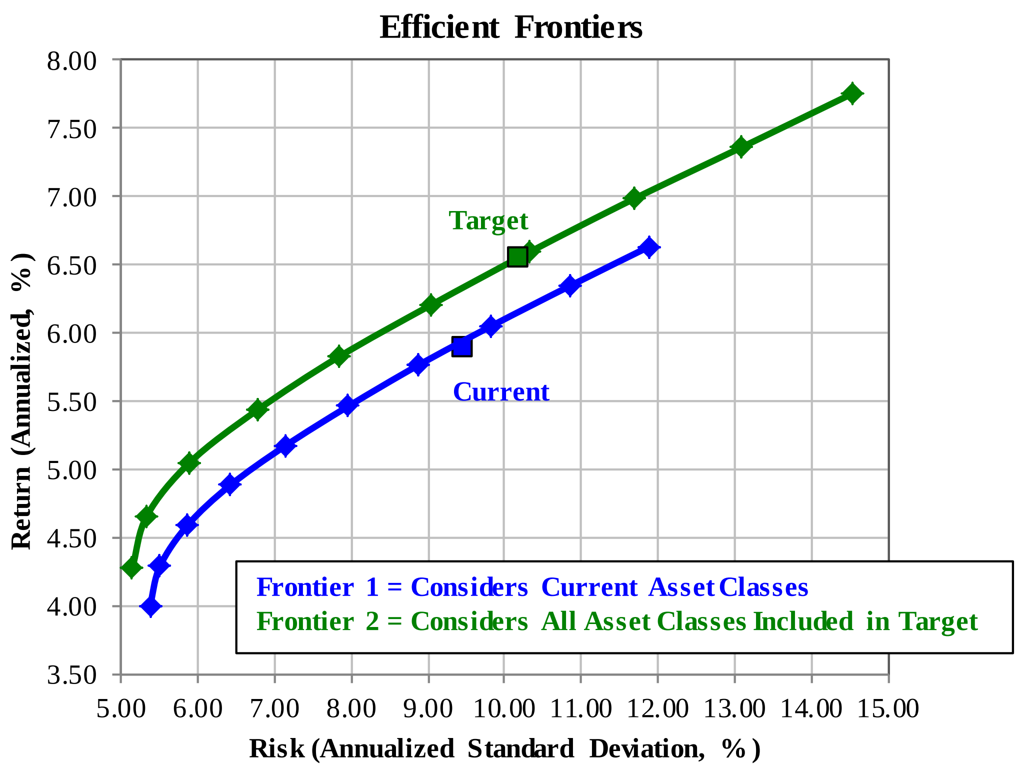
Review of Target Allocation

- **Many steps along the way, with a slow and methodical pace**

	Min	Max	Current (9/30/2013)	Target
50/50 Equity	0	60	47	35
Int. Duration Fixed Income	0	100	46	30
Non-Core Fixed Income	0	10	0	10
Custom Real Return	0	5	0	5
Global Linkers	0	0	4	0
Custom Real Estate	0	10	3	10
ARS	0	5	0	5
Private Equity	0	5	0	5
Total			100	100
Capital Appreciation			47	50
Capital Preservation			46	30
Alpha			0	5
Inflation			7	15
Expected Return			5.89	6.55
Risk (Standard Deviation)			9.46	10.17
Return (Compound)			5.47	6.07
Return/Risk Ratio			0.62	0.64
RVK Expected Eq Beta (LC US Eq = 1)			0.49	0.50
RVK Liquidity Metric (T-Bills = 100)			85	69



Modern Portfolio Theory

- **Investing in the combination of asset classes that tend to move in different directions at the same time provides a smoother return profile over time allows for better compounding**
  - Asset classes with historically low correlations to equities performed well during the tech bubble in the early 2000s

- **However, it is not a perfect solution - especially in periods of high correlation - but it is the best method for risk reduction**
  - Asset classes exhibited high level of correlation in 2008 as all (except Treasurys) moved downward in unison regardless of historical relationships

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Why Diversify?

Annual Asset Class Returns

Best ↑ / ↓ Worst

CYTD	2012	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997
21.30	17.04	14.96	18.24	43.60	5.24	16.59	26.51	24.06	21.93	42.34	10.25	8.44	14.15	72.38	24.14	31.78
10.57	16.42	9.90	16.93	28.34	-10.70	16.13	21.65	20.15	19.52	31.06	4.57	6.61	13.19	37.72	15.29	17.65
9.64	13.29	7.84	15.26	16.58	-20.02	14.84	15.72	17.68	12.00	19.82	3.12	4.64	12.40	24.69	14.73	13.94
7.15	11.53	2.64	12.73	15.04	-20.47	9.91	15.27	8.79	11.95	18.69	-2.61	-2.08	11.63	20.90	12.49	13.49
5.10	9.79	1.03	12.08	9.72	-21.54	9.15	13.08	6.75	11.01	11.93	-12.94	-11.46	0.82	14.97	11.97	9.65
4.93	4.80	-5.55	6.54	5.93	-37.31	6.97	9.85	6.12	6.79	8.28	-13.31	-19.83	-7.46	12.05	8.69	8.39
-1.89	4.21	-14.31	4.77	-30.40	-45.99	5.14	4.33	2.43	4.34	4.10	-21.54	-20.12	-19.44	-0.82	3.75	-3.30

US Stocks	International Stocks	US Bonds	Real Estate	Hedge Funds	Private Equity	Diversified Portfolio

- **Asset class returns are not easily predicted; a well-diversified portfolio can help mitigate risks and provide attractive long-term returns**

"Diversified Portfolio" consists of 17.5% US Stocks, 17.5% International Stocks, 30% US Bonds, 10% Non-Core Fixed Income, 5% Real Return Strategies, 10% Real Estate, 5% Hedge Funds, and 5% Private Equity.

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Why Diversify?

Trailing Returns

	1 Year	3 Years	5 Years	7 Years	10 Years	15 Years
US Stocks	21.61	16.77	10.58	6.08	8.11	6.01
International Stocks	16.91	6.11	6.82	3.28	9.07	6.78
US Bonds	-1.68	2.86	5.41	5.12	4.59	5.27
Real Estate	11.97	13.17	-0.24	2.43	6.08	6.91
Hedge Funds	6.51	2.48	1.51	1.37	3.13	5.80
Private Equity	12.13	13.07	9.27	9.05	12.68	11.65
Diversified Portfolio	**9.12**	**8.57**	**7.51**	**5.66**	**7.39**	**7.01**

As of September 30, 2013.

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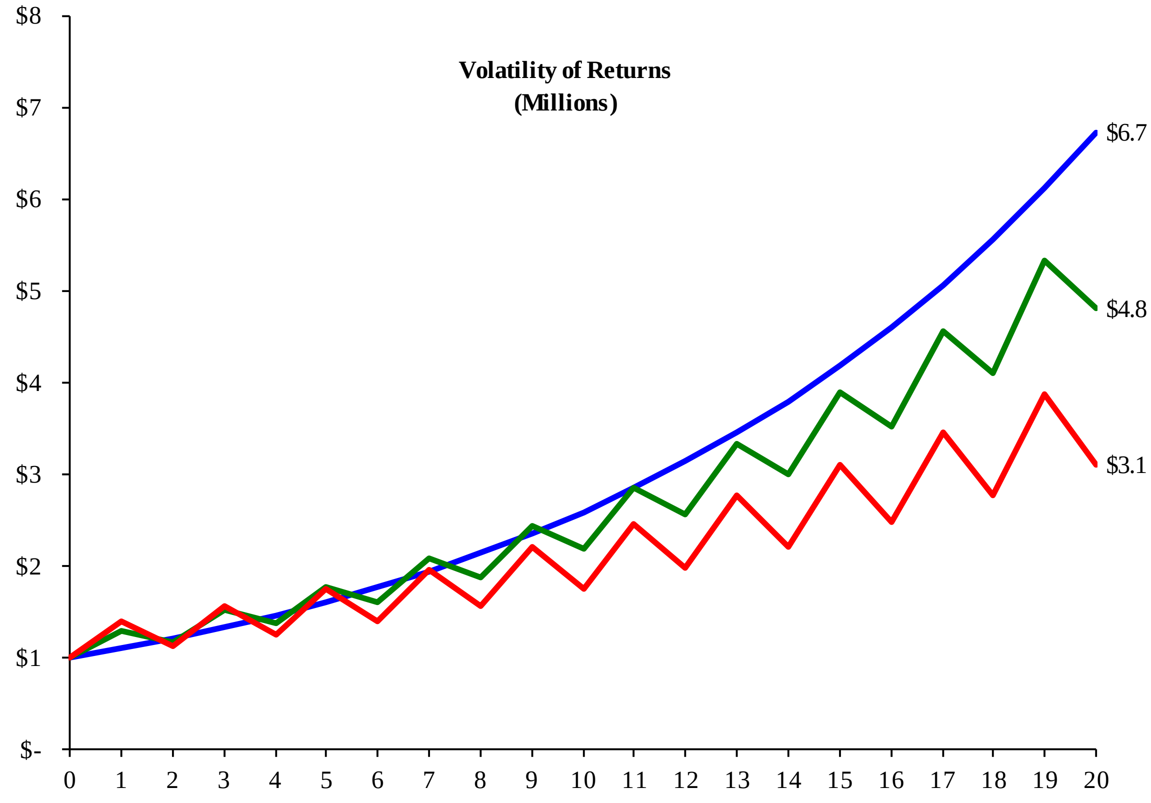
Why Diversify?

Years	1	2	3
1	10%	30%	40%
2	10%	-10%	-20%
3	10%	30%	40%
4	10%	-10%	-20%
5	10%	30%	40%
6	10%	-10%	-20%
7	10%	30%	40%
8	10%	-10%	-20%
9	10%	30%	40%
10	10%	-10%	-20%
11	10%	30%	40%
12	10%	-10%	-20%
13	10%	30%	40%
14	10%	-10%	-20%
15	10%	30%	40%
16	10%	-10%	-20%
17	10%	30%	40%
18	10%	-10%	-20%
19	10%	30%	40%
20	10%	-10%	-20%
Average	**10%**	**10%**	**10%**
Standard Deviation	**0%**	**21%**	**31%**



- All portfolios start with $1 million.
- After 20 years, the difference of 31% standard deviation is $3.6 million.

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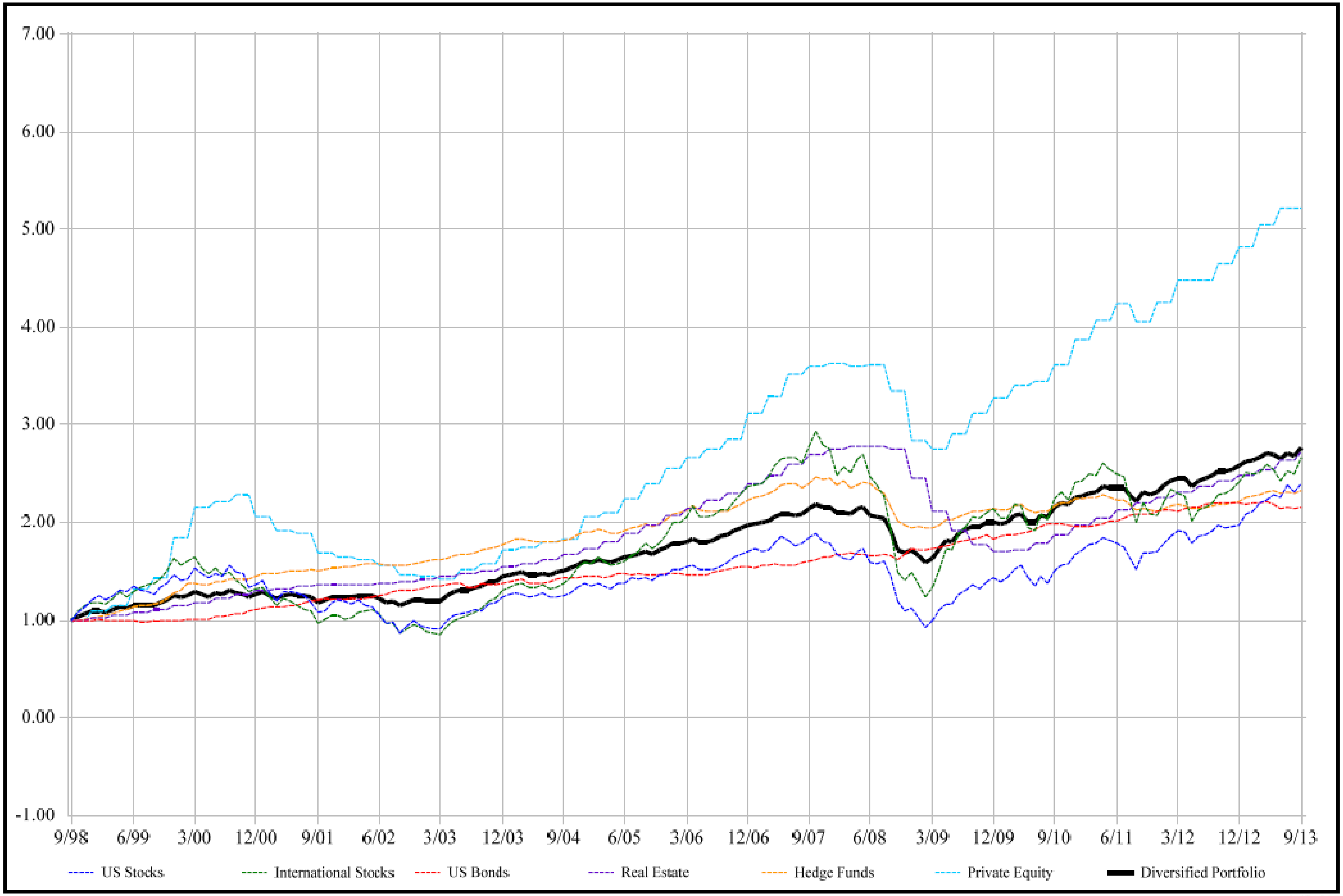
Why Diversify?

15 Year Growth of a Dollar



As of September 30, 2013.

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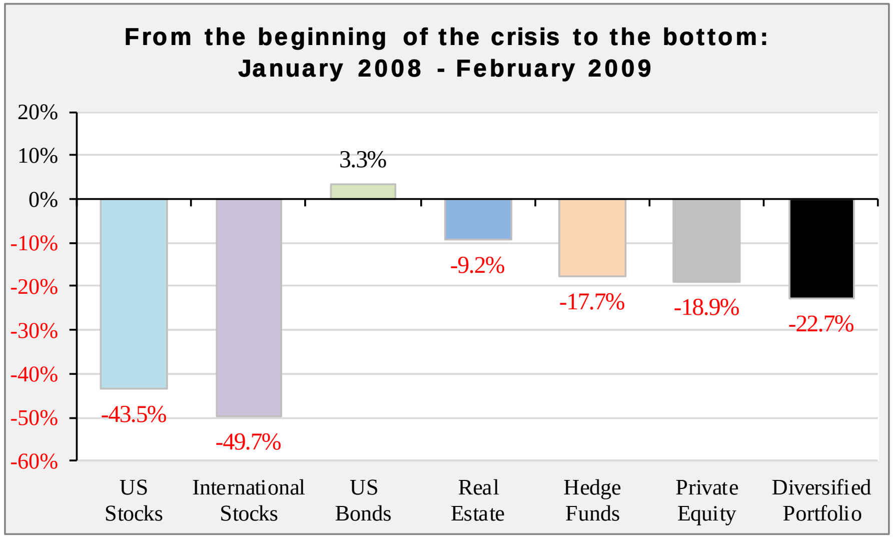
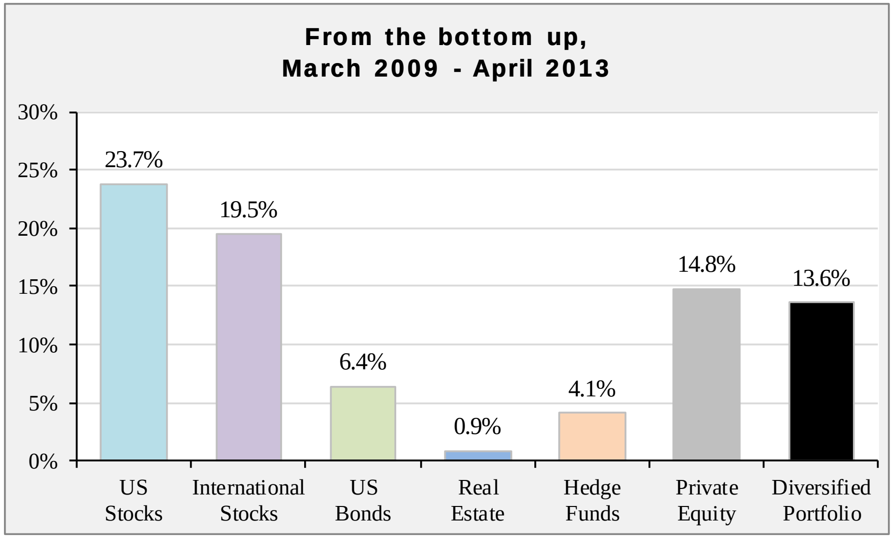
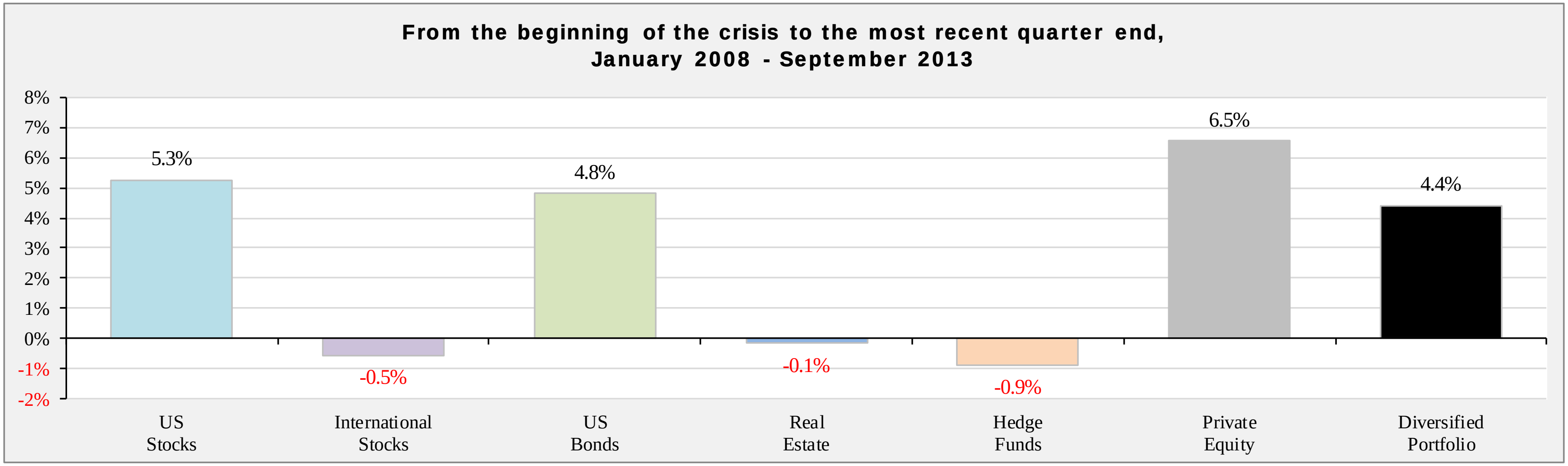
Asset Classes in Various Recent Market Environments







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TMRS and its Diversification

Market Environment vs. Asset Class		
	Strong Economy	**Weak Economy**
Strong Inflation	*Inflation* Real Assets TMRS target allocation includes 10.0% Real Estate investments including 5.0% core, 2.5% value add and 2.5% opportunistic.	*Inflation* Linkers TMRS target allocation includes 5.0% Global Inflation Linked investments.
Weak Inflation	*Capital Appreciation* Stocks TMRS target allocation includes 35.0% Global Equity investments including 17.5% domestic and 17.5% international; 10% Non-Core Fixed Income investments; and 5.0% Private Equity investments.	*Capital Preservation* Bonds TMRS target allocation includes 30.0% Core Fixed Income investments.

The 5% Absolute Return target allocation is not included in the table.

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How is TMRS Positioned?

- **TMRS was invested in 100% bonds due to plan design…**
  - Lacked diversification and potentially insufficient return given long-term market dynamics

- **…but, a different way to structure the portfolio was considered**
  - Broad diversification and a long-term perspective can lead to higher returns without undue risk

- **Timeline:**
  - ***Adopted Interim Target with 12% equity allocation in December 2007***
  - ***Adopted current Strategic Target Allocation in June 2009***
    - *Legislation in 2009 allowed for diversification and management to total return objectives*
    - *Plan objectives, risk tolerance, and viable structures guided the analysis*
  - ***TMRS has continued to methodically move towards the Strategic Target (revisions adopted in Aug 2012)***
    - *Interest rate risk was reduced and the portfolio has become more diversified*
    - *Continued need for implementation changes along the way*

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Why Add Alternative Asset Classes

- **Real Estate**
  - Real estate-oriented investments have generated attractive long-term returns with low correlations to traditional asset classes and can provide an inflationary hedge
- **Absolute Return**
  - Absolute Return Strategies can have a significant impact on the expected risk/return profile of a portfolio, even with a relatively small allocation
    - Attractive correlations and risk adjusted returns over the long-term
    - Important piece of the total fund allocation (alpha)
    - Management fees and costs to be considered in selecting an implementation approach
      - Generally fees in this asset class are coming down
- **Private Equity**
  - Unique cash flow structure requiring paced cash funding and distributions
    - Investments are long-term, typically 10 years or more, with limited ability to liquidate before the termination of a partnership
    - Capital is called "as needed," slowly over a period of years, and distributions occur irregularly as investments are sold
  - Additional costs, fees, and staffing needs to be considered
- **Non-Core Fixed Income**
  - US Treasury Yields near historical lows, creating a need to look elsewhere for yield and protection
  - Sector risks are increasing
  - Forward looking return outlook has been declining

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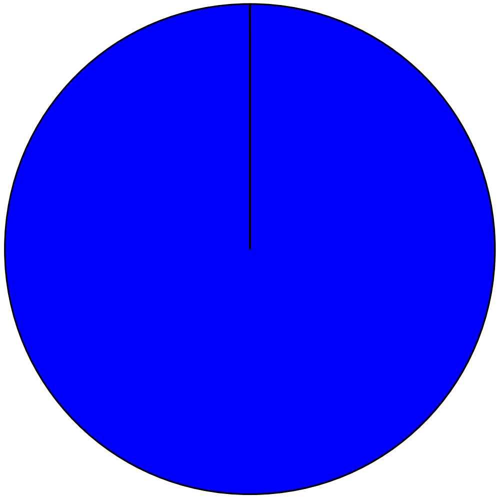
TMRS - Then and Now

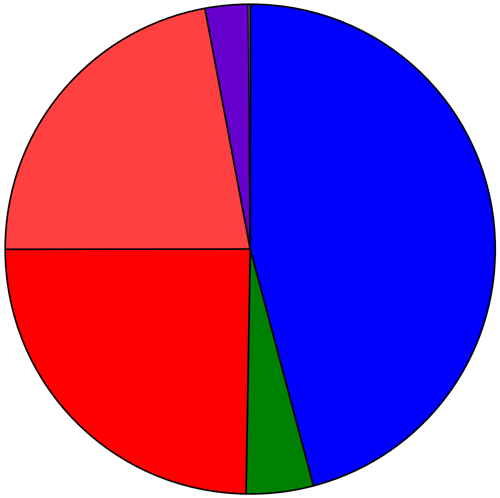
Allocation as of September 30, 2007 (RVK Start Date)

Core Fixed Income	100.0%
Non-Core Fixed Income	0.0%
Real Return	0.0%
Domestic Equity	0.0%
International Equity	0.0%
Real Estate	0.0%
Absolute Return	0.0%
Private Equity	0.0%
Unallocated Cash	0.0%
Total Fund	100.0%



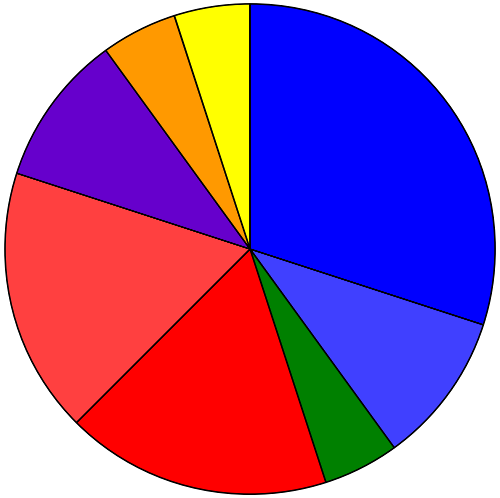
Allocation as of September 30, 2013

Core Fixed Income	45.9%
Non-Core Fixed Income	0.0%
Real Return	4.4%
Domestic Equity	24.7%
International Equity	22.1%
Real Estate	2.8%
Absolute Return	0.0%
Private Equity	0.0%
Unallocated Cash	0.1%
Total Fund	100.0%



Final Target Allocation

Core Fixed Income	30.0%
Non-Core Fixed Income	10.0%
Real Return	5.0%
Domestic Equity	17.5%
International Equity	17.5%
Real Estate	10.0%
Absolute Return	5.0%
Private Equity	5.0%
Unallocated Cash	0.0%
Total Fund	100.0%



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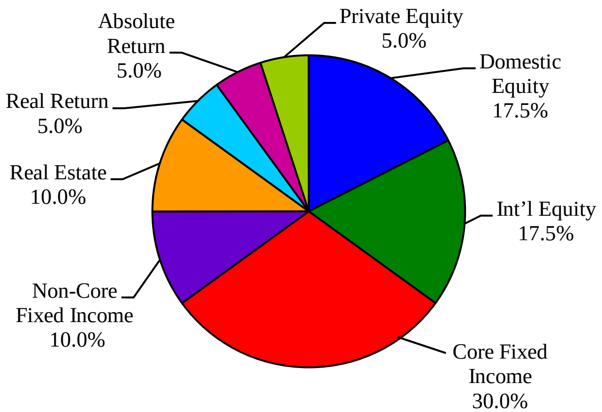
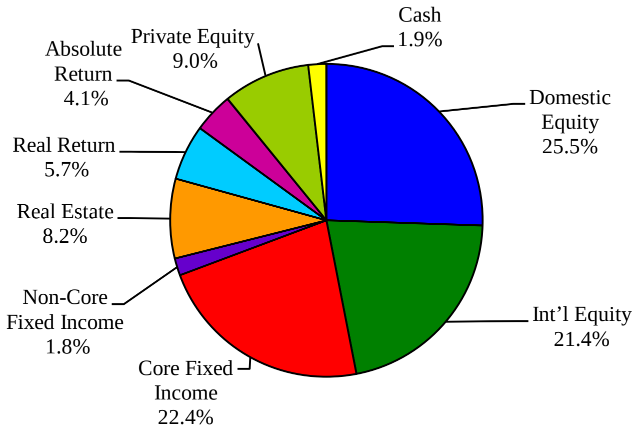
Peer Comparison - Asset Allocation

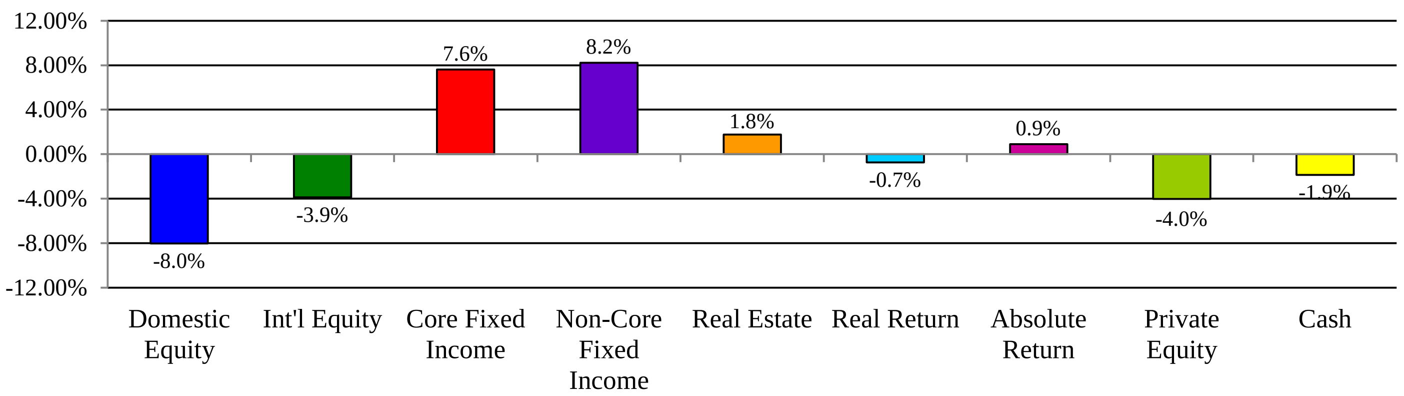
- **The long-term portfolio will be diversified, and similar to peers, yet unique to TMRS' risk tolerance and return objectives**

TMRS Strategic Target



Average Public Fund (Over $20 Billion) As of June 30, 2013





RVK June 30, 2013 Public Fund Survey. Average Public Fund is based on current allocations as of 06/30/13.

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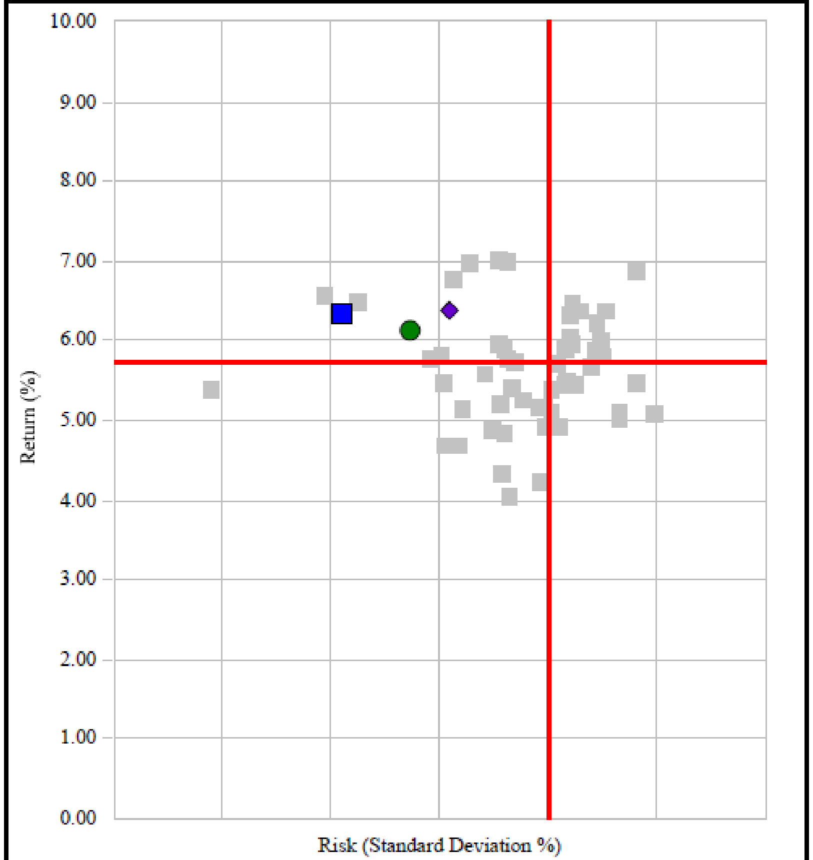
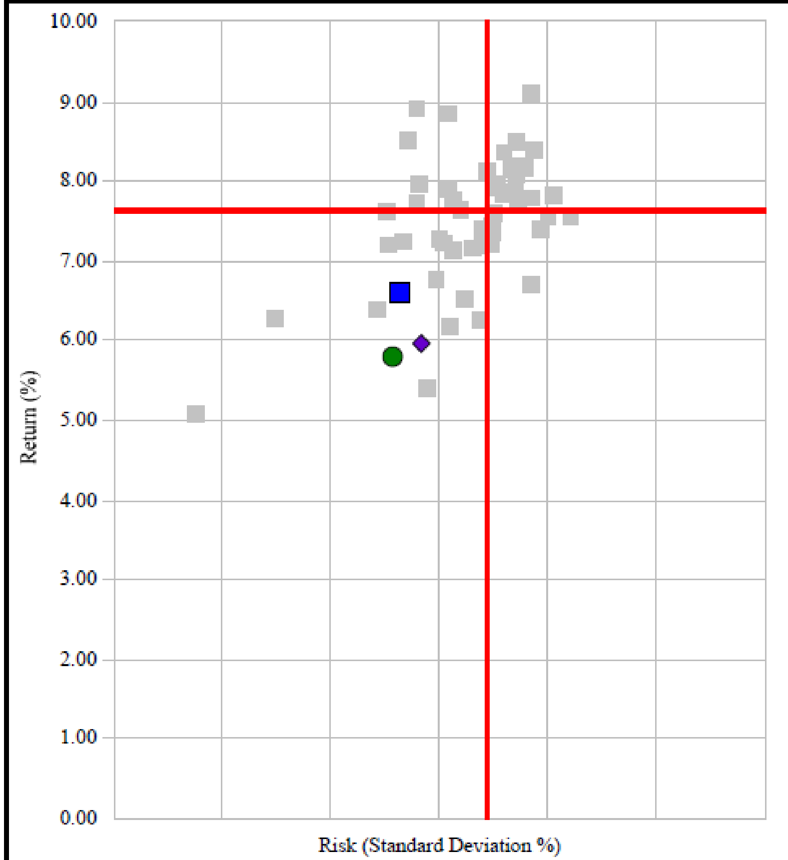
Peer Comparison - Risk / Return

Plan Sponsor Scattergram - 7 Years



	Return	Standard Deviation
Total Fund Composite	6.35	7.23
Actual Allocation Benchmark	6.12	8.48
Policy Index	6.37	9.18
Median	5.71	11.04

Plan Sponsor Scattergram - 10 Years



	Return	Standard Deviation
Total Fund Composite	6.60	8.29
Actual Allocation Benchmark	5.80	8.16
Policy Index	5.97	8.67
Median	7.63	9.91

As of September 30, 2013.
Performance shown is gross of fees. Peer group contains "All Public Plans > $1B".

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Next Steps

- **Continue progress toward diversification in a methodical manner**
  - Continue to diversify equity allocation by adding complementary active strategies in 2013-14
  - Consideration for further fixed income diversification
    - Completed search process for non-core fixed income mandates (Bank Loans/CLO) in September 2013
  - Continue to build real estate allocation by conducting additional manager/fund searches in 2013-14
  - Consideration for absolute return implementation
    - Search currently under way for fund-of-one provider
  - Continue to explore real return investment strategies and implementation options
  - Private Equity education in 2014
    - Leave 5% overweight to equities in passive core equity index funds as a placeholder for private equity allocation pending implementation of the 5% private equity allocation