Investments & Pension Oversight Committee

Friday, August 3rd, 2012

Investment Performance, Evaluation and Projections

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Returns – What is important?

- Returns are calculated on a total return basis and include not only income and dividends, but also realized or unrealized gains and losses.
- Multiple year period returns are significant. The average time in the system for an ERB retiree is about 40 years.
- Returns for a single year or less are not significant as chance plays a large role in the outcome.
- Return numbers by themselves tell only part of the story. Risk also plays a role, particularly in the long run.

Returns – Evaluation

- Most importantly – Did we achieve our actuarial target in the long run?
- Unfortunately, the information we would most like to have is the most uncertain: future returns.
- “We cannot direct the wind, but we can adjust the sails.” We can only earn what the market **potentially** allows us to earn. We can attempt to make the most of that potential in the long run.
- Thus, we want to answer the question how did ERB do given the potential returns available in the markets.

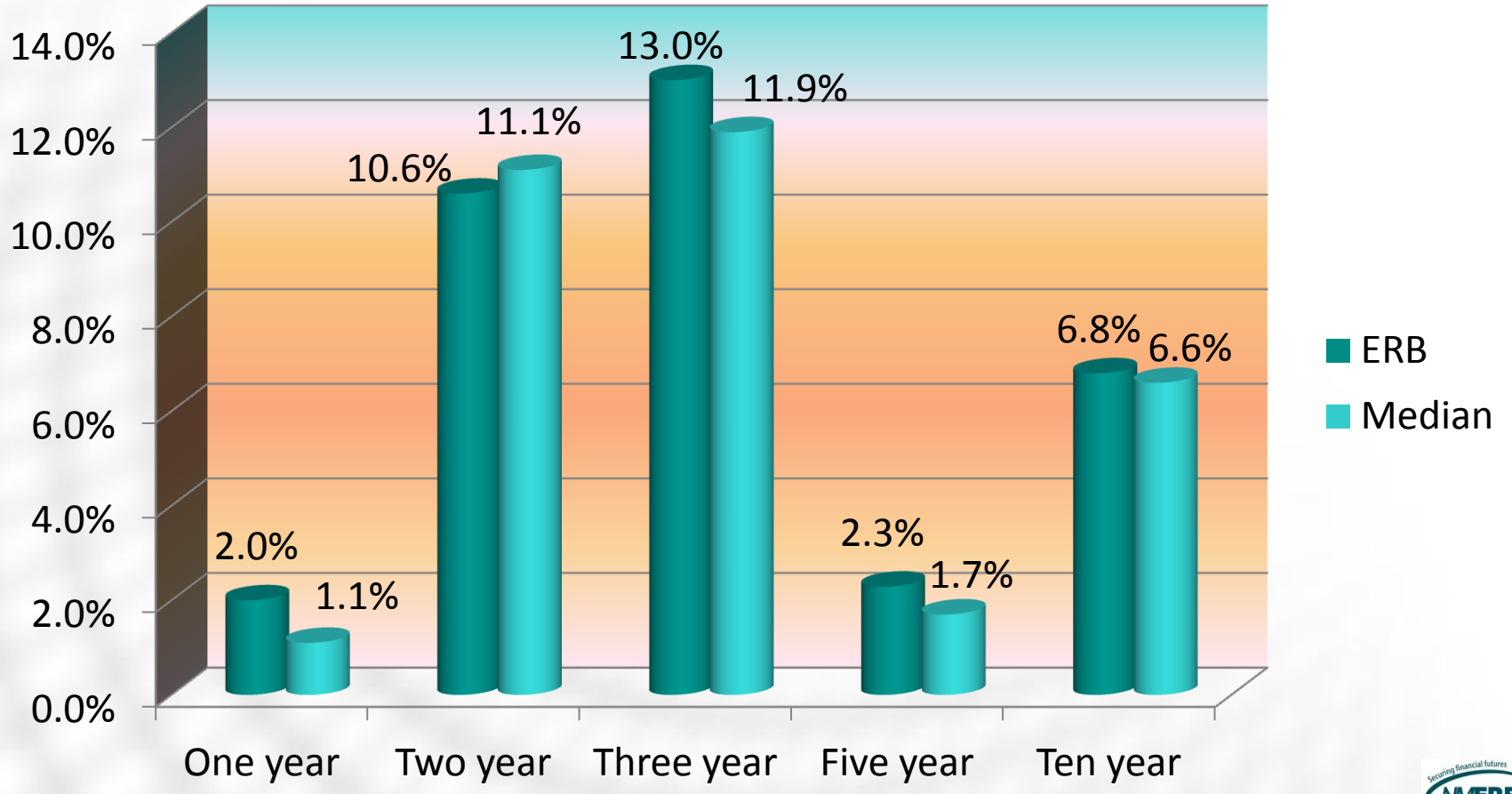
Peer Comparisons

- Given an uncertain future, a prudent investor must diversify their portfolio.
- Thus, evaluating portfolio performance versus a single market, such as the S&P 500, is not a complete solution.
- Comparing ERB's return to a like set of investors is a better comparison. This is called a "universe" or "peer group" comparison.

ERB's Peer Group

- The peer group for ERB is public pension funds in the US with more than $1 billion in assets. This group is comprised of 63 funds.
- This excludes smaller public funds, as they may allocate assets in a different manner for a number of reasons.
- ERB's rank in this group for the year ending June 30, 2012 was in the top 25%. ERB's return of 2.0% was well above the median fund return of 1.1%.

Peer Comparison June 30, 2012



Long Term Returns – June 30, 2012

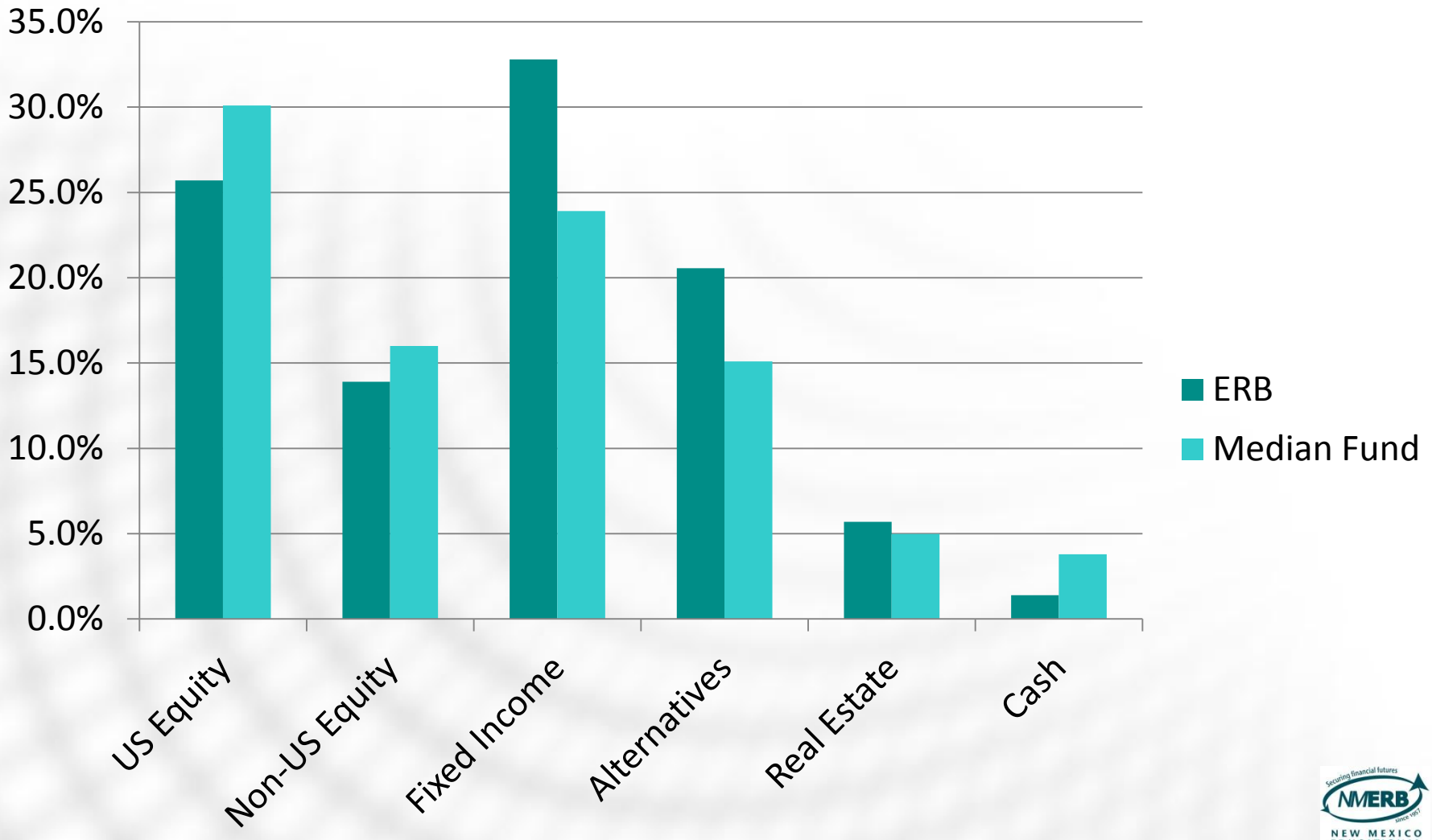
	1 year	3 years	5 years	10 years
ERB	2.0%	13.0%	2.3%	6.8%
Median	1.1%	11.9%	1.7%	6.6%
Difference	0.9%	1.1%	0.6%	0.2%
Rank	25%	10%	36%	39%

	15 years	20 years	25 years	29 years
ERB	5.9%	8.1%	8.7%	9.3%
Median	N/A	N/A	N/A	N/A

What is it worth?

- In 2005, a change in statute allowed broader investment authority to ERB under the prudent investor rule.
- New asset allocation plan October of 2007. A major shift in investment philosophy.
- Implementation of the new plan began in 2008, required hiring additional staff, consultants and managers.
- No significant impact recorded on returns until 2009.
- Over the last three years, ERB ranks in the top 10% of the fund universe. The median public fund returned 11.9% vs. ERB's return of 13.0%. This difference of 1.1% per year is worth more than $300 million in investment earnings over the three year period.

Asset Allocation – June 30, 2012



Asset Allocation - Table

	ERB	Median Fund
US Equity	25.7%	30.1%
Non-US Equity	13.9%	16.0%
Fixed Income	32.8%	23.9%
Alternatives	20.6%	15.1%
Real Estate	5.3%	5.0%
Cash	1.4%	3.8%

Asset Class Returns March 31, 2012

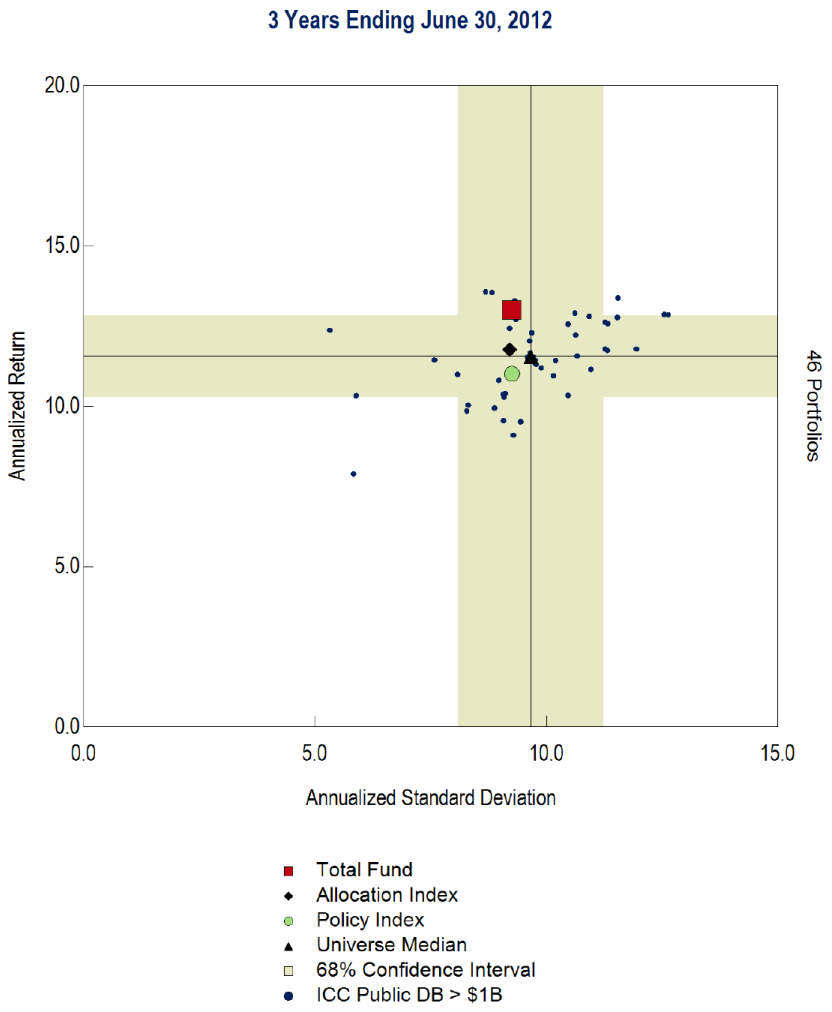
	1 yr	2yr	3 yr	5 yr	10 yr
US Equity	4.1%	16.9%	16.0%	-0.1%	5.7%
Non-US Equity	-17.9%	2.4%	7.4%	-3.9%	6.8%
Core Bonds	8.4%	7.3%	10.0%	7.5%	5.8%
Opportunistic Credit	2.7%	8.6%	14.4%		
Absolute Return	-2.8%	1.5%	5.6%	-1.3%	
Real Estate	11.7%	21.9%	27.9%	1.9%	
Private Equity	12.1%	15.5%	18.4%	-1.6%	
Real Assets	-6.1%	5.1%	4.8%		
GTAA	12.8%	17.6%			

Risk-Adjusted Returns

- Return calculations are industry standard (Total return, time-weighted).
- Risk measures are more varied.
- Most common measure observed is standard deviation of historical return streams.
- Question remains – What is the best way to compare funds with different variability of results?
- Most common answer - Return per unit of volatility

$$\text{Sharpe Ratio} = \frac{\text{return} - \text{risk free rate}}{\text{standard deviation}}$$

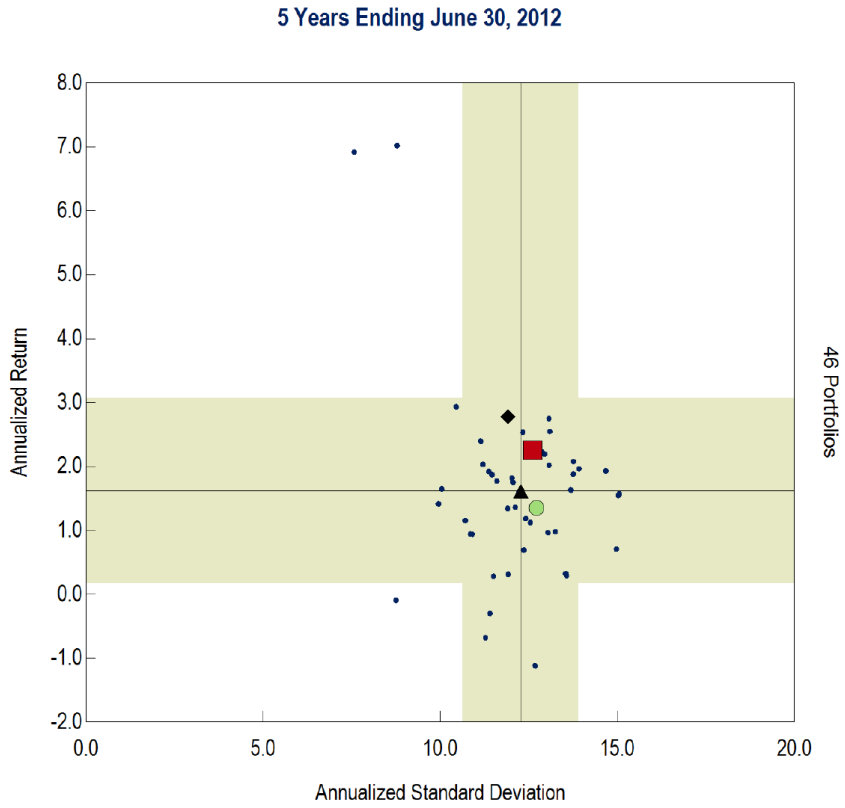
Risk Adjusted Returns – 3 Years Ending June 30, 2012



3 Years Ending June 30, 2012

	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Sharpe Ratio	Rank	Sortino Ratio	Rank
Total Fund	13.0%	9	9.2%	35	1.4	12	2.4	14
Allocation Index	11.8%	44	9.2%	34	1.3	22	2.2	17
Policy Index	11.0%	69	9.3%	35	1.2	40	2.1	22
S&P 500	16.4%	1	16.1%	99	1.0	89	1.8	65
Barclays Aggregate	6.9%	99	2.7%	1	2.5	1	3.7	2
ICC Public DB > $1B Median	11.6%	--	9.7%	--	1.1	--	1.9	--

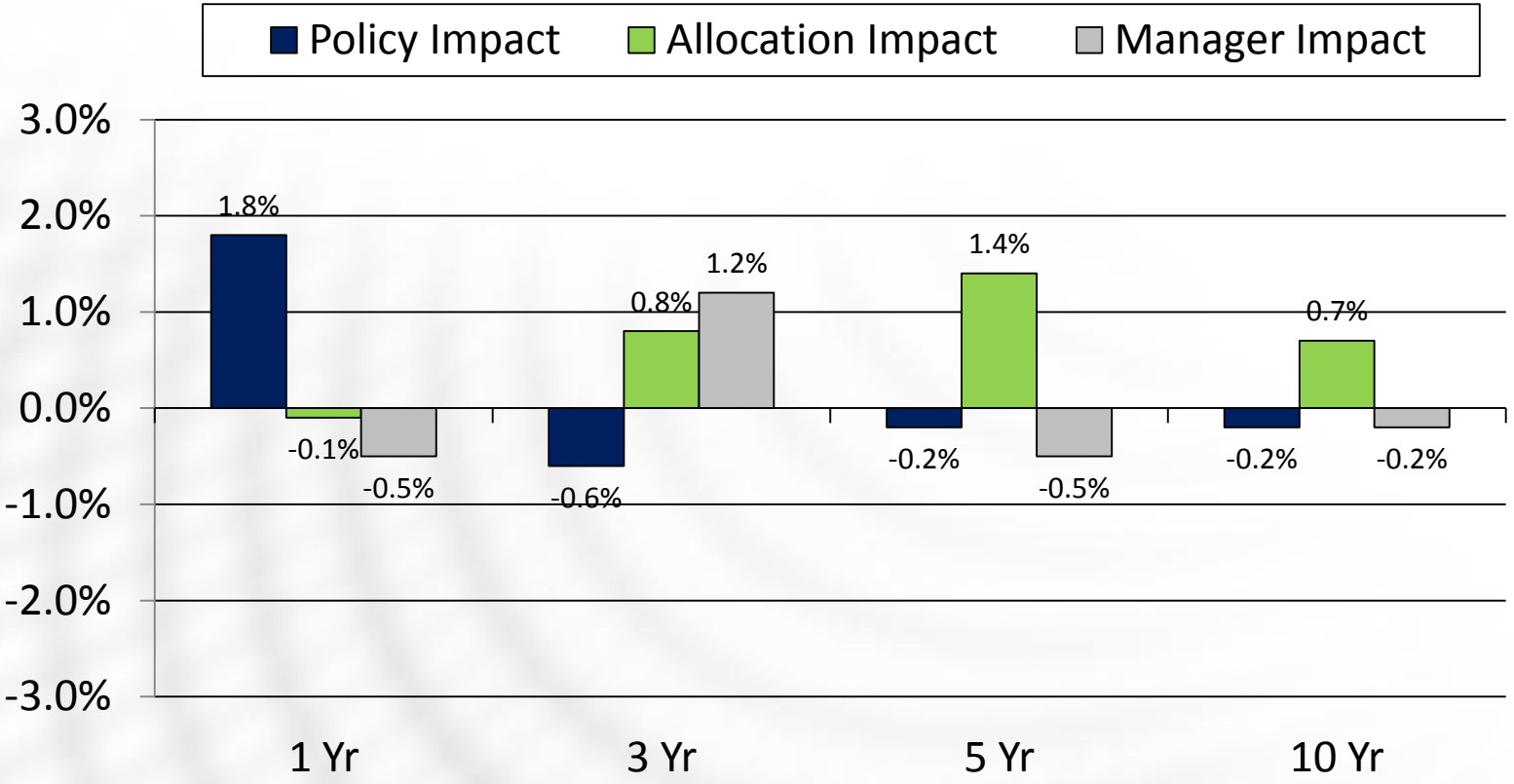
Risk Adjusted Returns – 5 Years Ending June 30, 2012



5 Years Ending June 30, 2012

	Anlzd Ret	Rank	Anlzd Std Dev	Rank	Sharpe Ratio	Rank	Sortino Ratio	Rank
Total Fund	2.3%	16	12.6%	59	0.1	16	0.2	19
Allocation Index	2.8%	7	11.9%	40	0.2	6	0.3	6
Policy Index	1.4%	62	12.7%	61	0.0	63	0.1	66
S&P 500	0.2%	92	19.2%	99	0.0	85	0.0	92
Barclays Aggregate	6.8%	3	3.6%	1	1.7	1	3.0	1
ICC Public DB > $1B Median	1.6%	--	12.3%	--	0.1	--	0.2	--

Attribution Analysis - June 30, 2012



Policy Impact: *The policy index is calculated by multiplying the target asset class weights times the return of the respective passive benchmark (re-balanced monthly). The policy impact, which is the difference between the policy index and the median fund's performance, measures the effectiveness of Plan Structure.*

Allocation Impact: *The allocation index is calculated by multiplying the actual asset class weights times the return of the respective passive benchmark. When the policy index is subtracted from the allocation index, the result measures the impact of deviating from the target weights.*

Manager Impact: *The Composite is calculated by multiplying the actual asset class weights times the actual manager return. The allocation index is then subtracted from the Composite. The result, manager impact, measures the contribution of active management.*

Developing Asset Allocation Targets

- Utilize forward-looking process of projected asset class returns and uncertainty.
- Integrate asset and liabilities to understand interplay between investment results, contributions and benefits.
- Risk budgeting/Risk-factor Analysis
- Scenario Analysis
- Liquidity Analysis

Projected Return - Process

1. Begin with a projection of expected future returns for each asset class. Current, expected and historical market factors are taken into account in formulating projections.
2. Project future volatility of each asset class.
3. Project future correlation of asset classes with each other.
4. Mathematically combine the three factors to arrive at projected returns for the next 5-7 years.

Projected Returns

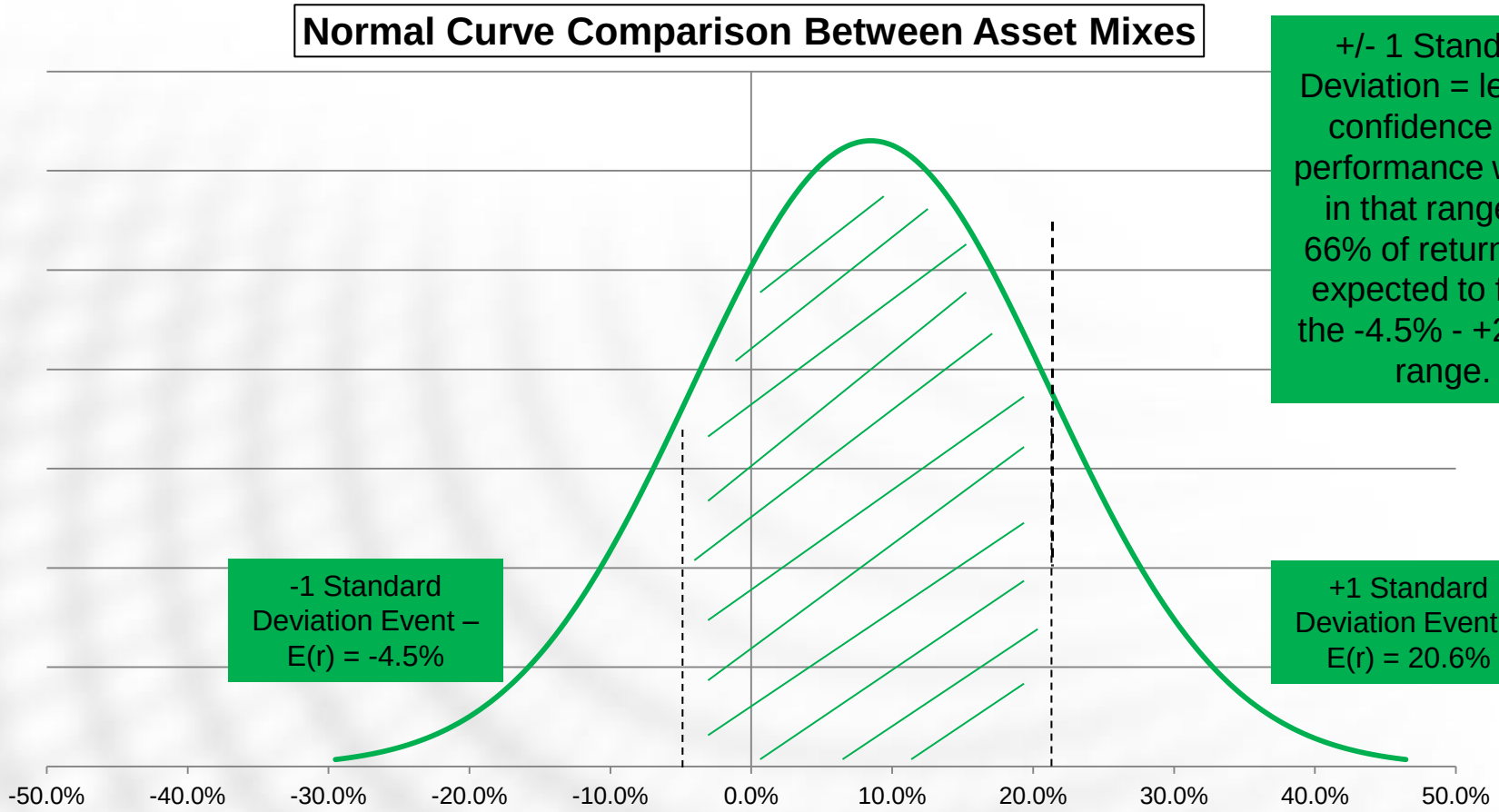
	Actual Allocation (3/31/2012)	NEPC Recommendation	Long Term Policy Target (9/30/2005)
Cash	1%	1%	0%
Large Cap Equities	25%	20%	40%
Small/Mid Cap Equities	3%	2%	6%
Int'l Equities	5%	5%	18%
Emerging Int'l Equities	10%	10%	2%
Total Equity	**42%**	**37%**	**66%**
Core Bonds	15%	7%	20%
High Yield Bonds	0%	0%	
Opportunistic Credit	14%	20%	5%
Global Bonds	0%	0%	
Emerging Market Debt	2%	2%	0%
TIPS	0%	0%	4%
Total Fixed Income	**32%**	**29%**	**29%**
Private Equity	6%	8%	0%
Real Estate	5%	5%	5%
Absolute Return	7%	3%	0%
Inflation-Linked Assets	1%	7%	0%
Global Asset Allocation	3%	5%	0%
Risk Parity	4%	5%	0%
Total Alternatives	**25%**	**33%**	**5%**
Expected Return (compound) (5-7 Years)	7.8%	8.5%	6.8%
Expected Risk (volatility) (5-7 Years)	11.8%	12.7%	12.8%
Sharpe Ratio (5-7 Years)	0.55	0.57	0.43
Sortino Ratio (0% Minimum Acceptable Return)	0.85	0.87	0.65
Probability of < 0% over 1 year	25.5%	25.2%	29.8%
Probability of < 0% over 5 Years	7.1%	6.8%	11.8%
Probability of < 7.75% over 5 Years	50.0%	45.0%	56.8%
Expected Return (compound) (30 Years)	8.2%	8.6%	7.6%

Notes

Expected return and risk based on 2012 NEPC Capital Market Assumptions

Totals may not add to 100% due to rounding

Probability Distribution

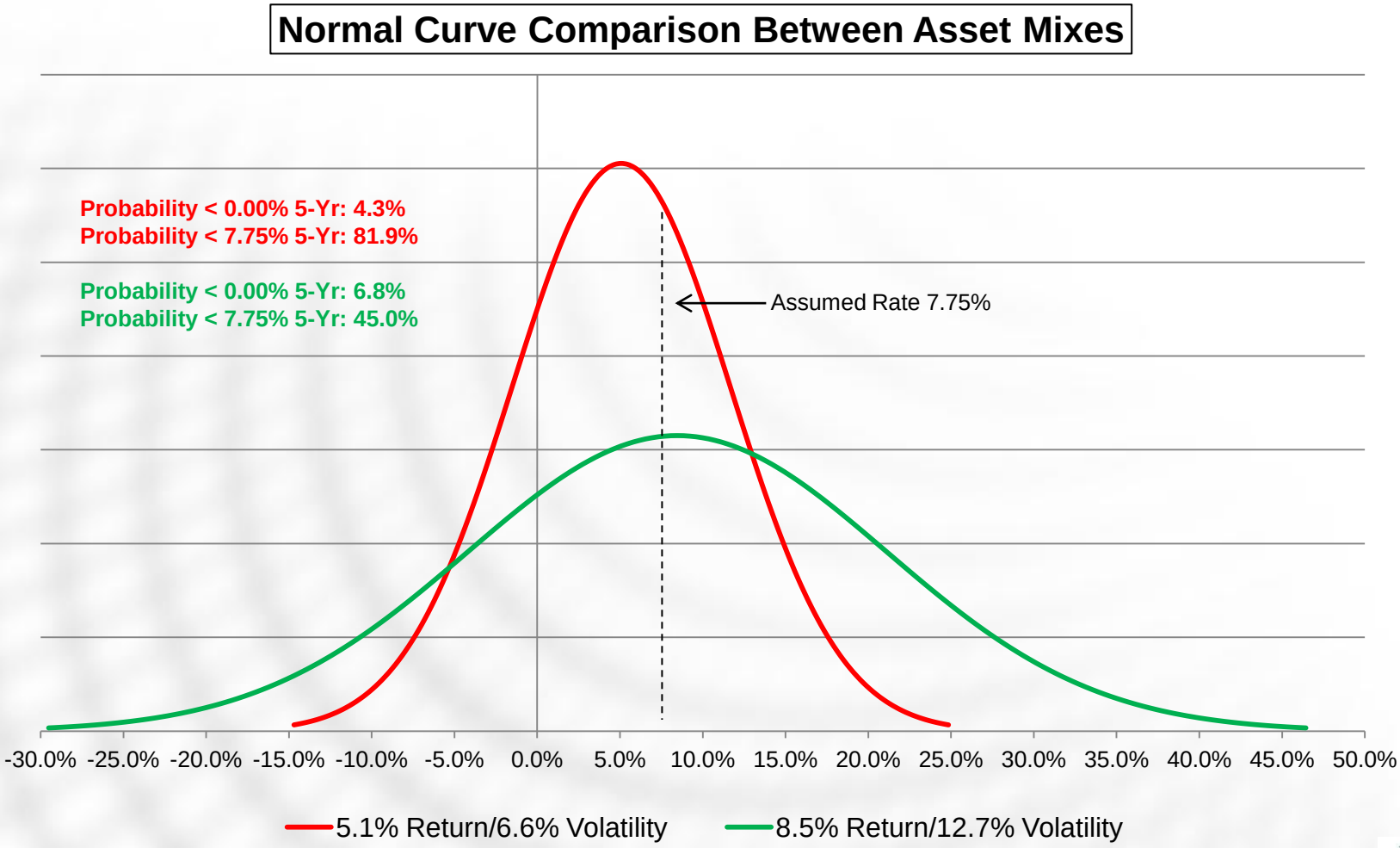


+/- 1 Standard Deviation = level of confidence that performance will fall in that range; or 66% of returns are expected to fall in the -4.5% - +20.6% range.

-1 Standard Deviation Event – E(r) = -4.5%

+1 Standard Deviation Event – E(r) = 20.6%

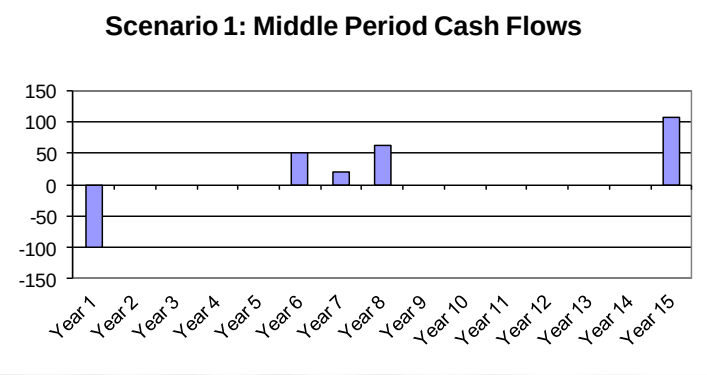
Probability Distribution



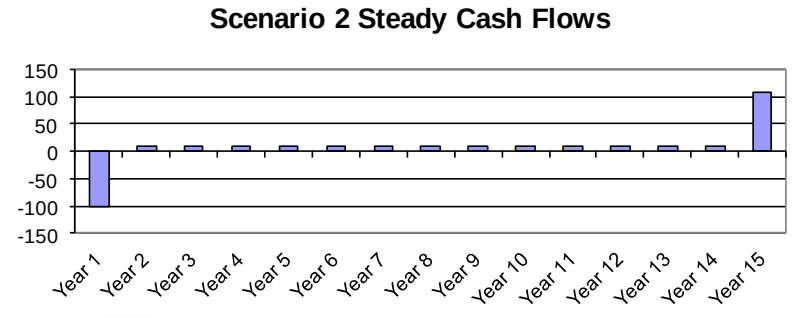
Appendix - Time Weighted vs. Dollar Weighted returns

- The *Internal Rate of Return (IRR)* is the return that reconciles the beginning dollar amount of an investment plus cash flows with the ending value. It represents the rate of return on the average dollar invested.
  - It is the discount rate that equates the present value of the future cash flows to the amount invested.
    - Cash Outflows – initial investment and additional investments
    - Cash Inflows – profits taken during the investment period; as well as the ending value of the investment period
- The *Time Weighted Return (TWR)* is the return produced by linking the returns for each sub-period, giving equal weight to each time period. It focuses on the return on the first dollar invested and is used primarily to compare manager results without distortion from differences in cash flows.
  - It is independent of the amount invested because the manager normally does not control cash inflows and outflows.
  - Most appropriate for investments in public stock and bond managers, as well as Total Fund calculations.
  - Less appropriate for measuring private equity or partnership investments, especially over shorter time periods.
- You cannot directly compare IRRs to TWRs

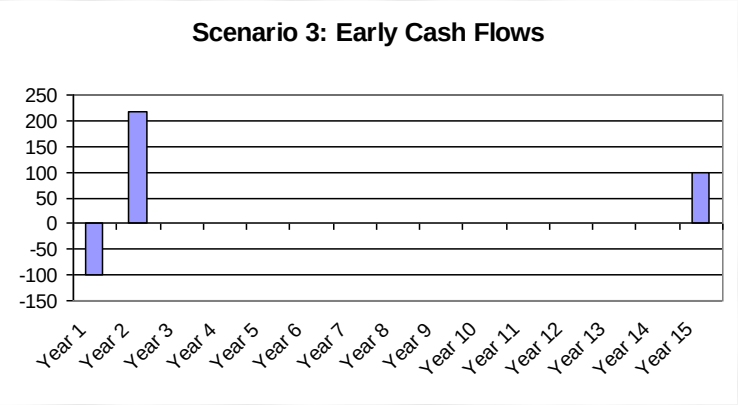
TWR vs. DRW-Examples



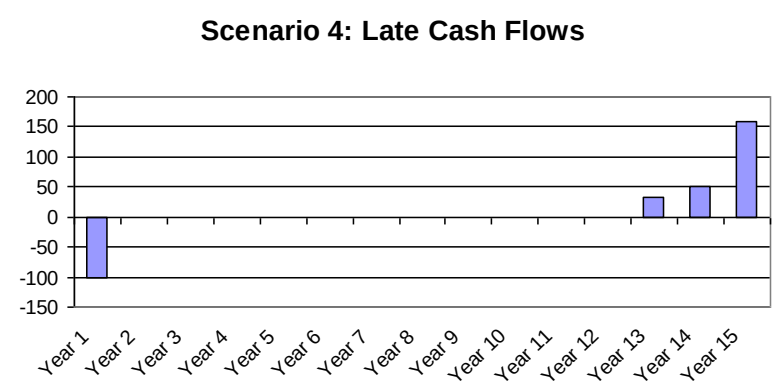
Time Weighted 8% **IRR 8%**



Time Weighted 10% **IRR 8%**



Time Weighted 16% **IRR 8%**



Time Weighted 7% **IRR 8%**