



OREGON PUBLIC EMPLOYEES RETIREMENT FUND

ASSET/LIABILITY DISCUSSION: PHASE TWO-ASSETS ONLY REVIEW

APRIL 28, 2010

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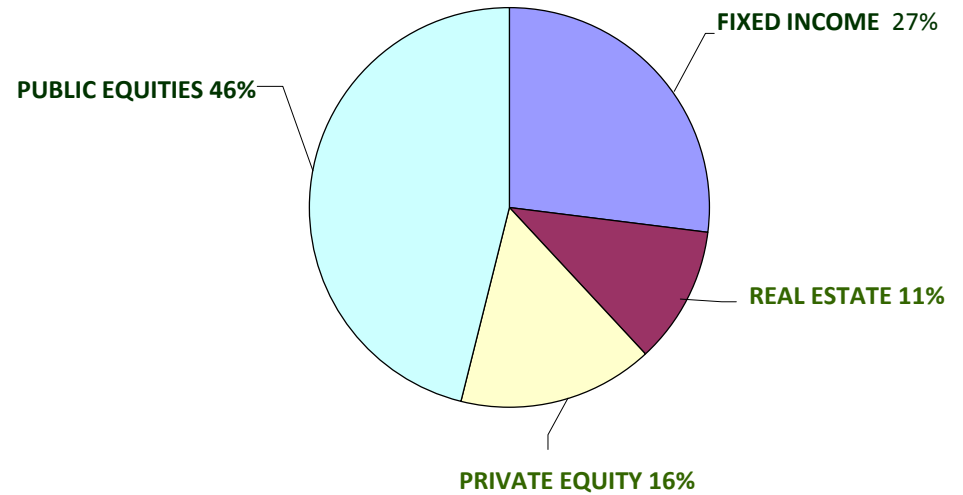
Asset Allocation

Manager Search

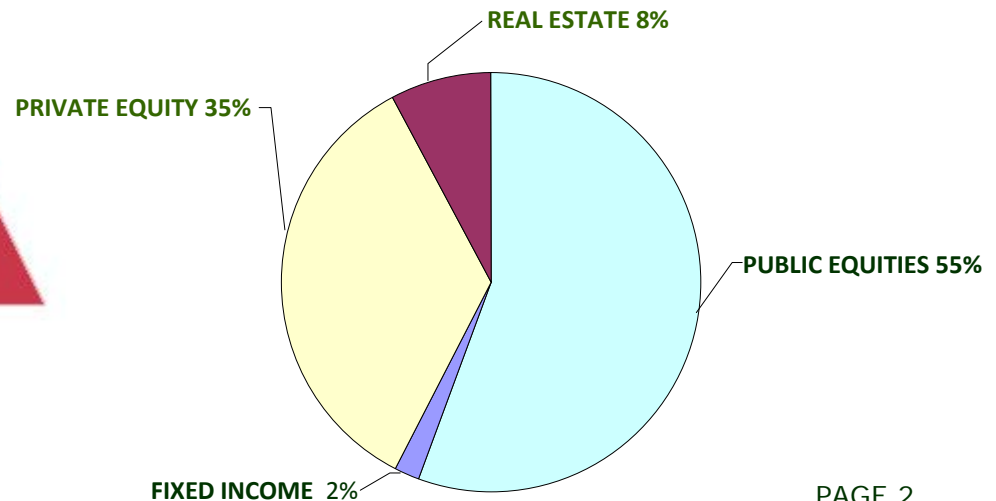
Manager Structure

Asset Allocation

Plan's Strategic Policy



Portfolio Risk Allocation – Current Policy



Scenarios

- Current policy benchmark target optimization
- Current policy benchmark target adding TIPs
- Range of policy benchmark targets using custom benchmarks to reflect actual implementation risk adding TIPs and Opportunity Portfolio
- Current policy targets adjusting returns and risks based upon various economic environments

Long Term Benchmark Policy Class Assumptions (March 2010)

	RANGE	EXP. RETURN	EXP. RISK	CURRENT TARGET	1 in 20 Years Poor Return
PUBLIC EQUITY	41-51%	9.0%	17.1%	46%	-15.5%
FIXED INCOME	22-32%	4.3%	4.6%	27%	-2.9%
PRIVATE EQUITY	12-20%	11.0%	35.0%	16%	-31.8%
REAL ESTATE	8-14%	6.5%	15.0%	11%	-16.2%
CASH	0-3%	3.0%	1.3%	0%	-
TOTAL		8.6%	14.2%	100%	-

OPERF Historical Asset Class Performance

	1 Year	3 Year	5 year	7 Year	10 Year
DOMESTIC EQUITIES	32.9	-5.6	0.7	6.5	0.4
RUSSELL 3000	28.3	-5.4	0.8	6.2	-0.2
ALPHA	4.6	-0.2	-0.1	0.3	0.6
INTERNATIONAL EQUITIES	41.1	-2.4	0.7	13.3	3.6
MSCI, ACWI,EX-US, IMI	43.6	-3.0	6.3	12.9	3.1
ALPHA	-2.5	0.6	0.7	0.4	0.5
PRIVATE EQUITY	-4.4	3.2	12.9	12.7	8.5
RUSSELL 3000+300 (lag)	-1.0	-1.0	5.4	10.8	5.6
ALPHA	-3.4	4.2	7.5	1.9	2.9
REAL ESTATE	-9.4	-4.8	7.8	10.9	10.9
NCREIF	-22.1	-1.3	6.2	7.3	7.8
ALPHA	12.7	3.5	1.6	3.6	3.1

Current Policy “Benchmark” Expectations

Asset Class	Expected Return	Expected Risk
Public Equity	9.0%	17.1%
Fixed Income	4.2%	4.6%
Private Equity	11.0%	35.0%
Real Estate	6.5%	15.0%

Current Policy Benchmarks-Current Asset Class Optimization

	Current Policy	Mix 1-1	Mix 1-2	Mix 1-3	Mix 1-4	Mix 1-5
Public Equity	46.0%	24.8%	32.8%	41.1%	49.7%	58.8%
Fixed Income	27.0%	50.1%	42.2%	33.9%	25.3%	16.2%
Private Equity	16.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Real Estate	11.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Equity	73.0%	49.9%	57.8%	66.1%	74.7%	83.8%
Expected Return	8.54%	7.50%	7.86%	8.22%	8.59%	8.95%
Std Deviation	14.1%	11.0%	11.9%	13.0%	14.2%	15.5%
Sharpe Ratio	0.39	0.41	0.41	0.40	0.39	0.38
% of Portfolio Risk						
Public Equity	55.6%	38.2%	46.8%	53.9%	59.8%	64.8%
Fixed Income	2.1%	7.6%	5.0%	3.1%	1.9%	0.9%
Private Equity	34.7%	45.0%	39.9%	35.4%	31.5%	28.2%
Real Estate	7.6%	9.3%	8.4%	7.5%	6.8%	6.1%

Current Policy Benchmarks, Add TIPS*

	Current Policy	Mix 2-1	Mix 2-2	Mix 2-3	Mix 2-4	Mix 2-5
Public Equity	46.0%	25.5%	33.5%	41.8%	50.3%	59.3%
Fixed Income	27.0%	22.4%	17.3%	12.1%	7.8%	1.7%
Private Equity	16.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Real Estate	11.0%	10.0%	10.0%	10.0%	10.0%	10.0%
TIPS	0.0%	27.0%	24.3%	21.1%	16.8%	13.9%
Equity	73.0%	50.6%	58.5%	66.8%	75.3%	84.3%
Expected Return	8.54%	7.50%	7.86%	8.23%	8.59%	8.96%
Exp. Std. Dev	14.1%	10.9%	11.9%	13.0%	14.2%	15.5%
Sharpe Ratio	0.39	0.41	0.41	0.40	0.39	0.38
% of Portfolio Risk						
Public Equity	55.6%	39.7%	48.2%	55.0%	60.6%	65.4%
Fixed Income	2.1%	2.8%	1.7%	0.9%	0.5%	0.1%
Private Equity	34.7%	45.4%	40.0%	35.4%	31.5%	28.1%
Real Estate	7.6%	9.7%	8.6%	7.7%	6.9%	6.2%
TIPS	0.0%	2.4%	1.5%	0.9%	0.5%	0.3%

*Expected Return 4% Risk 5%

Current Asset Class “Implementation Assumptions”

Asset Class	Expected Return	Expected Risk
Public Equity	9.0%	17.2%
Fixed Income	4.6%	4.3%
Private Equity	11.0%	35.0%
Real Estate	8.0%	20.0%
TIPS	4.0%	5.0%
Opp Port	8.0%	14.0%

Current Asset Class Implementation, Add TIPS and Opportunity Portfolio

	Current Policy	Mix 3-1	Mix 3-2	Mix 3-3	Mix 3-4	Mix 3-5	Current Mix*
Public Equity	46.0%	13.2%	22.5%	29.3%	38.7%	50.3%	42.9%
Fixed Income	27.0%	41.7%	34.5%	32.6%	25.7%	14.7%	25.7%
Private Equity	16.0%	15.0%	15.0%	15.0%	15.0%	15.0%	19.8%
Real Estate	11.0%	10.0%	10.7%	13.8%	15.0%	15.0%	9.4%
TIPS	0.0%	15.1%	12.4%	4.3%	0.5%	0.0%	0.0%
Opp Port	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	2.2%
Equity	73.0%	43.2%	53.1%	63.1%	73.7%	85.3%	74.3%
Expected Return	8.84%	7.50%	7.93%	8.36%	8.79%	9.23%	9.03%
Std Deviation	14.6%	10.3%	11.4%	12.6%	14.0%	15.5%	15.3%
Sharpe Ratio	0.40	0.44	0.43	0.42	0.41	0.40	0.39
% of Portfolio Risk							
Public Equity	53.7%	21.6%	33.6%	39.3%	46.9%	55.0%	47.3%
Fixed Income	3.3%	10.1%	6.8%	5.4%	3.6%	1.7%	2.9%
Private Equity	32.8%	47.8%	41.3%	35.7%	31.2%	27.3%	40.8%
Real Estate	10.3%	14.9%	13.9%	16.2%	15.6%	13.5%	8.1%
TIPS	0.0%	1.4%	0.8%	0.2%	0.0%	0.0%	0.0%
Opp Port	0.0%	4.1%	3.6%	3.2%	2.8%	2.5%	1.0%

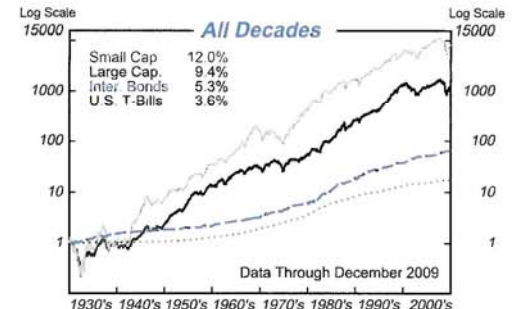
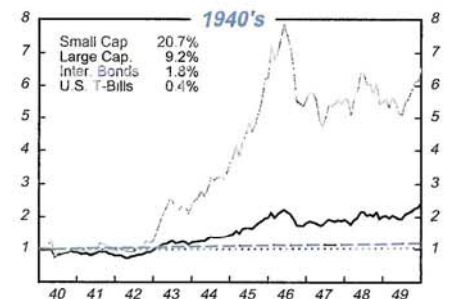
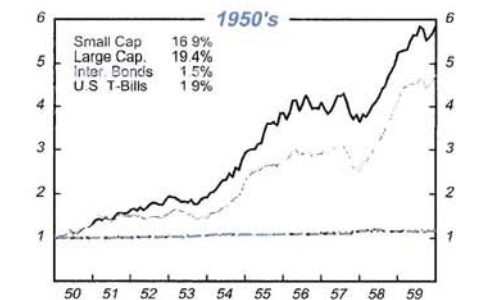
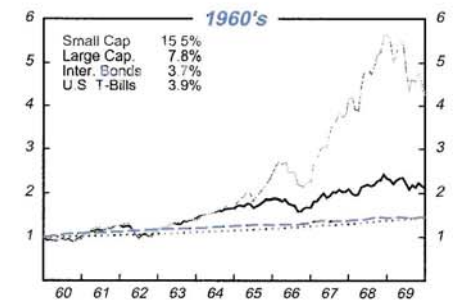
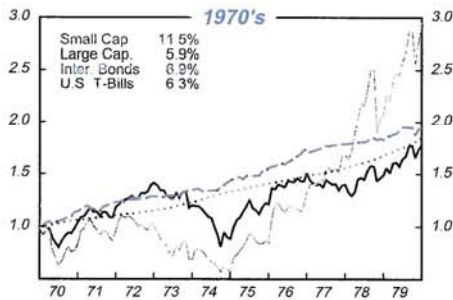
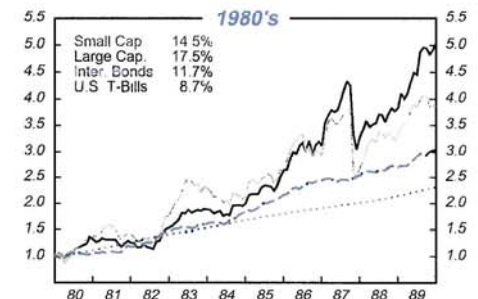
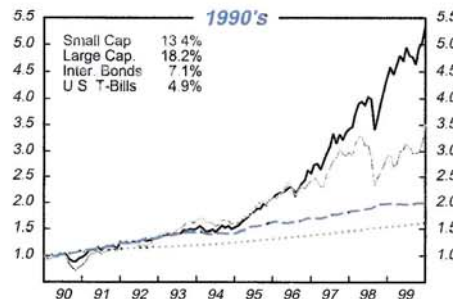
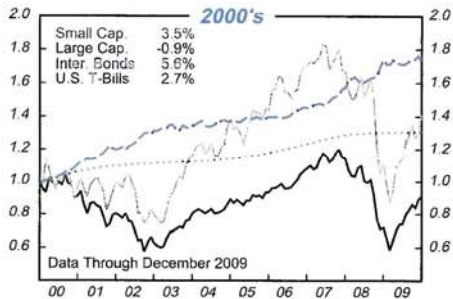
*Actual mix as of 3/31/10

Scenario Analysis Assumptions

- Inflation – Similar to late 1970's and early 1980's market returns
- Deflation- Hypothetical (no “extended” deflation experienced in the US recently)
- Low Return – Market conditions remain similar to now for extended period
- Recession – Similar to 1970's recession market returns

Eight Decades of Wealth Indices

Total Return



Small Capitalization Stocks — Large Capitalization Stocks - - - Intermediate Government Bonds U.S. Treasury Bills

Data is expressed as a Compound Annual Rate.

The graphs assume \$1 00 is invested December 31st of the year prior to the beginning of the decade.

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The information presented herein was compiled from sources believed to be reliable. It is intended for illustrative purposes only, and is furnished without responsibility for completeness or accuracy. Past performance does not guarantee future results.

Scenario Analysis Returns

ASSET	BASE	INFLATION	DEFLATION	LOW RETURN	RECESSION
US LRG CAP	8.5%	6.5%	4.5%	7.0%	-5.7%
US SML CAP	9.0%	6.5%	4.5%	7.5%	-5.7%
US FIXED	4.0%	5.3%	6.0%	4.0%	6.0%
INTL STOCK	8.5%	9.2%	4.5%	7.0%	-5.7%
EM STOCK	9.2%	9.2%	4.5%	7.5%	-5.7%
INTL FIXED	4.1%	8.0%	6.0%	4.0%	6.0%
REAL EST	6.5%	13.0%	2.0%	6.0%	5.0%
PRIV EQTY	11.0%	8.5%	4.5%	8.0%	-10.0%
HIGH YIELD	6.4%	5.9%	5.2%	5.5%	1.0%
EM DEBT	5.7%	8.0%	6.0%	5.0%	6.0%
TIPS	4.0%	11.0%	1.0%	3.5%	3.5%
BANK LOAN	5.0%	10.0%	2.5%	3.0%	3.0%
OPP PORT	8.0%	8.0%	5.1%	6.5%	-1.7%
CASH	3.0%	9.0%	0.5%	1.0%	1.0%
INFLATION	2.4%	9.0%	0.0%	2.4%	1.9%

Current Asset Class Implementation-Scenario Analysis

	Current Policy	Mix 3-1	Mix 3-2	Mix 3-3	Mix 3-4	Mix 3-5	Current Mix*
Public Equity	46.0%	13.2%	22.5%	29.3%	38.7%	50.3%	42.9%
Fixed Income	27.0%	41.7%	34.5%	32.6%	25.7%	14.7%	25.7%
Private Equity	16.0%	15.0%	15.0%	15.0%	15.0%	15.0%	19.8%
Real Estate	11.0%	10.0%	10.7%	13.8%	15.0%	15.0%	9.4%
TIPS	0.0%	15.1%	12.4%	4.3%	0.5%	0.0%	0.0%
Opp Port	0.0%	5.0%	5.0%	5.0%	5.0%	5.0%	2.2%
Equity	73.0%	43.2%	53.1%	63.1%	73.7%	85.3%	74.3%
Scenario Return							
Inflation	9.32	9.46	9.56	9.54	9.60	9.70	9.32
Deflation	5.43	4.98	5.09	5.28	5.34	5.26	5.52
Low Return	7.28	6.22	6.57	6.89	7.22	7.55	7.41
Recession	-0.96	1.92	1.06	0.53	-0.34	-1.47	-1.26

*Actual mix as of 3/31/10

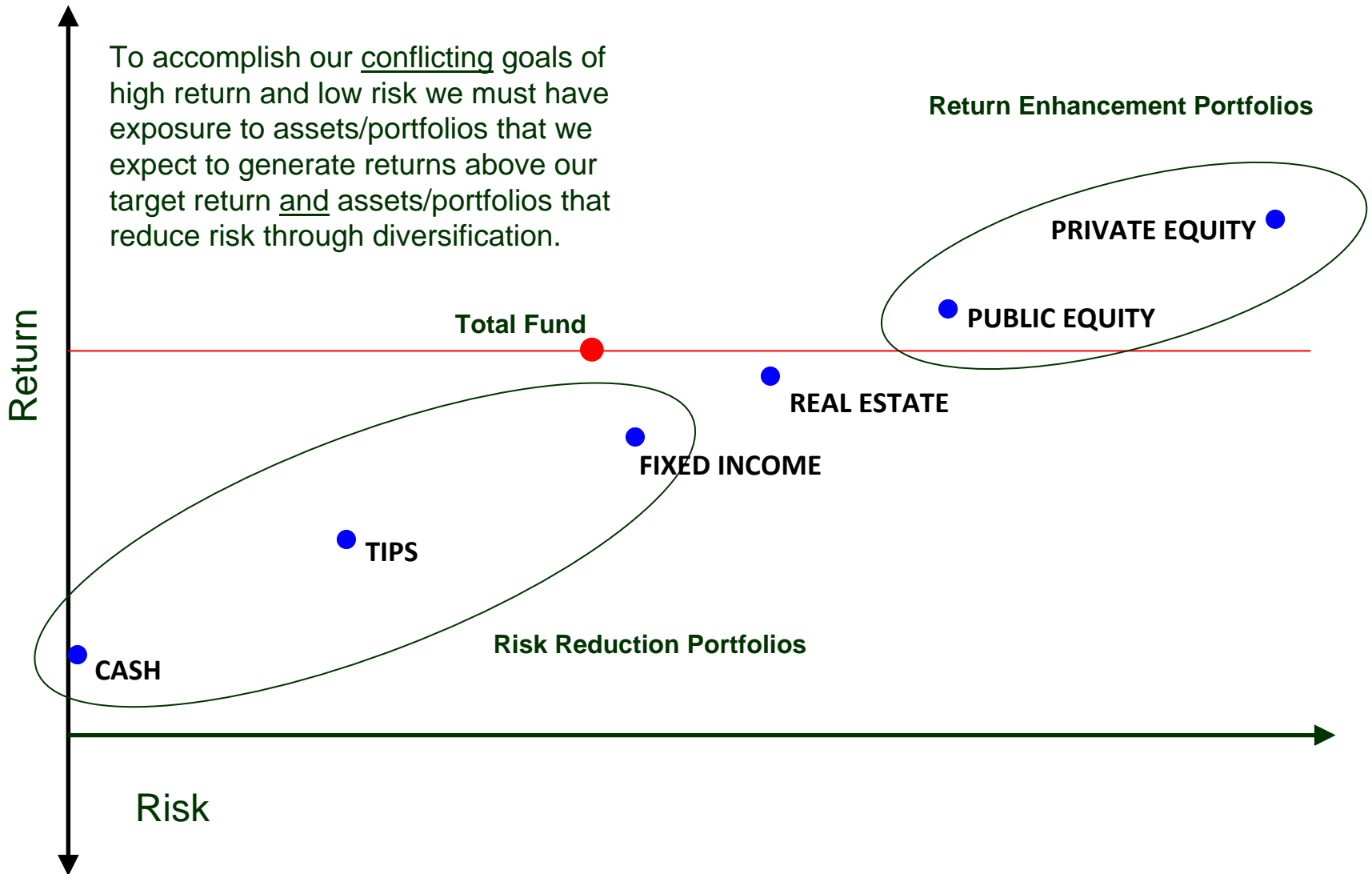
Next Steps – Phase Three

- Believe we have all the liability data
- Integrate assets with liability
- Incorporate OIC preferences from today's meeting
- Present results May 2010 meeting

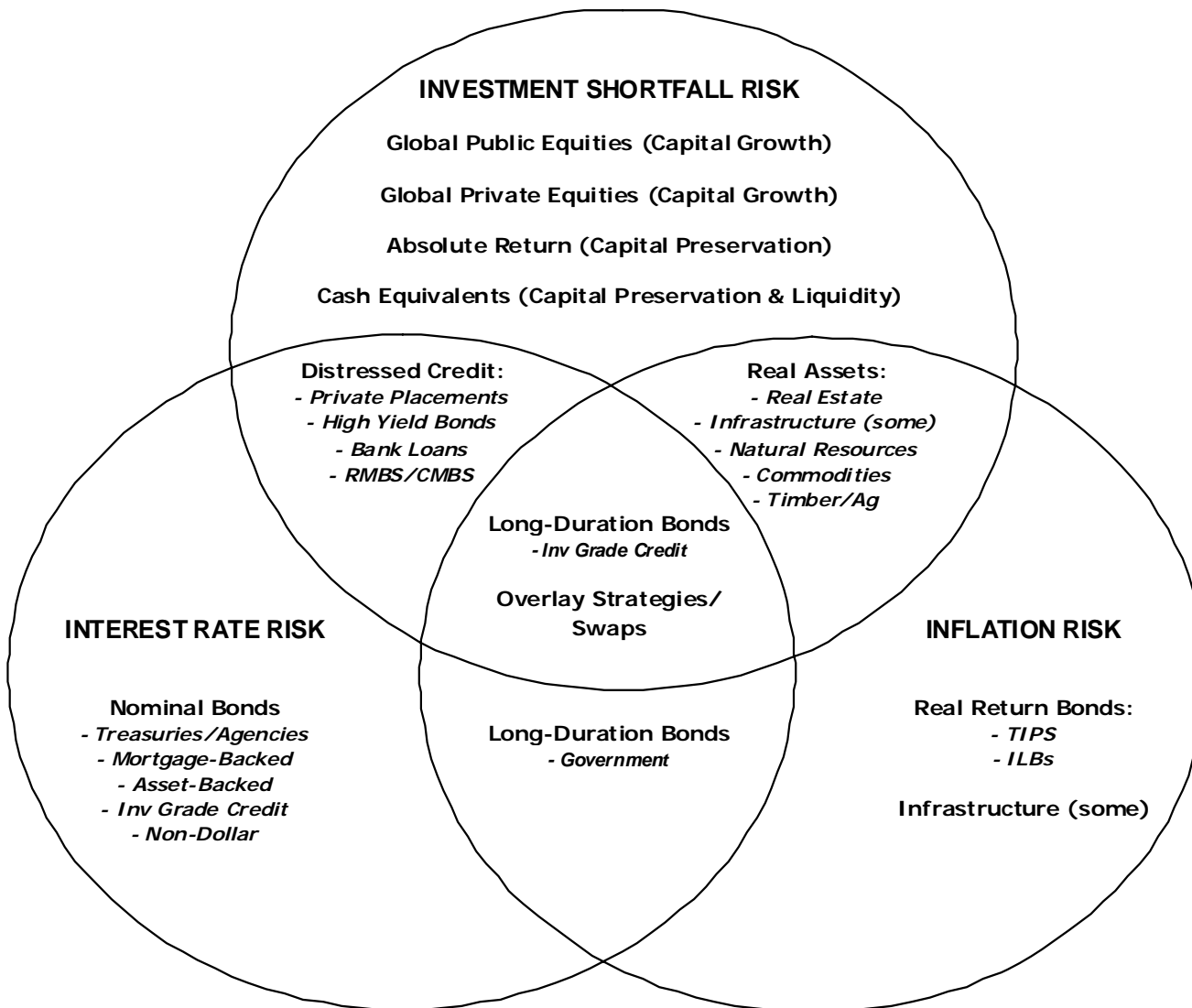


APPENDIX

Asset Allocation Example



Asset Allocation: Role in Hedging Risks



Defining Risk

- The basic definition of investment risk is variability of return. The alternative policies, or “asset mixes,” examined here are built to minimize this variability given an expected level of return over a long period of time. These mixes we call efficient. The method used to build them is an improved version of standard mean-variance optimization. The probabilities of continuously compounded returns to each asset class are assumed to approximate a bell shaped curve, or normal distribution. In other words, returns are random, and returns near the expected average are more likely than extreme returns. The likelihood of extreme returns is expressed as standard deviation. The probability of a particular asset-class return depends on the returns provided by every other asset class; this interdependence is expressed as correlation. Thus asset-class return expectations are commonly presented as three sets of numbers: mean returns, standard deviations, and correlations.

SIS Capital Markets Expectation Methodology

Fixed Income	Yield to Worst on Aggregate Index (compare to historic bond risk premium); adjusted for OPERF's duration target and unique sector allocations
Inflation	Consensus of economists' forecasts, TIPS
US Large Cap	CAPM, 3% to 6% equity premium, macroeconomic DDM
Cash	Inflation + 1% to 2% premium
US Small Cap	CAPM, (beta of ~1.2)
Private Equity	CAPM, (beta of ~1.6); adjusted for OPERF
International Equity	Weighted sum of local market premium + local risk free rate; composition is World ex-US
Emerging Mkt Equity	Weighted sum of local market premium + local risk free rate; composition is Emerging Markets
Real Estate	Historical behavior of equity REITs; current appraisal cap rates; CAPM; adjusted for OPERF's leverage policy
Absolute Return	Expected net premium to LIBOR (2-4%); 0.30 Sharpe Ratio
High Yield FI	Historical ratio: spread of High Yield over US Fixed Income divided by spread of Large Cap over US Fixed Income
TIPs*	Current real yield on Barclay's US TIPS Index plus SIS inflation expectation

* See Appendix for Glossary of Terms

SIS Capital Market Assumptions

- Strategic Purpose - Horizon = 2 to 3 Market Cycles
- Based on Capital Asset Pricing Model (CAPM*) — Investor Must Be Compensated for Taking Higher Risk
- Economic Growth Forecasts
- Stay Within Long-Term Real Return Corridors, Combined with Mean Reversion*
- Qualitative Overlay — Expectations Must Produce Reasonable Portfolios and a “Stable Frontier”
- Data Sources/Return
 - Complete Monthly Return History
 - Blue Chip Economic Forecast (Inflation, GDP Growth Estimates)
 - Wall Street Forecasts
 - Global Manager Forecasts
 - CAPM (For “Difficult” Asset Classes)
- Correlations* — Most Stable (90-Month Half-Life, 1985 to Present)
- Risks — Fairly Stable (Two Factor Model*; Historical 1976 to present, Half-Life 1985 to Present)

* See Appendix for Glossary of Terms

SIS Capital Market Expectations (10/30/2009)

Asset	US Lrg Cap	US Sml Cap	US Fixed	Intl Stock	EM Stock	Intl Bond	Real Est	Priv Eqty	Opp Port	High Yield	EM Debt	Bank Loan	TIPS	Commod	Cash	Inflation
US Lrg Cap	1.00															
US Sml Cap	0.82	1.00														
US Fixed	0.13	0.05	1.00													
Intl Stock	0.78	0.72	0.04	1.00												
EM Stock	0.58	0.66	-0.04	0.70	1.00											
Intl Bond	0.09	0.00	0.44	0.24	0.10	1.00										
Real Est	0.54	0.62	0.12	0.53	0.42	0.01	1.00									
Priv Eqty	0.62	0.63	-0.06	0.51	0.51	-0.03	0.32	1.00								
Opp Port	0.52	0.48	0.41	0.55	0.47	0.49	0.35	0.16	1.00							
High Yield	0.69	0.73	0.33	0.64	0.53	0.35	0.65	0.34	0.57	1.00						
EM Debt	0.44	0.55	0.22	0.35	0.41	0.21	0.48	0.32	0.64	0.53	1.00					
Bank Loan	0.42	0.49	0.40	0.51	0.30	0.28	0.57	0.10	0.66	0.63	0.41	1.00				
TIPS	0.03	0.03	0.46	0.05	0.06	0.35	0.21	-0.13	0.19	0.23	0.25	0.14	1.00			
Commod	0.23	0.26	-0.05	0.23	0.32	0.12	0.29	0.24	0.17	0.18	0.37	0.00	0.50	1.00		
Cash	0.27	0.11	0.42	0.19	0.07	-0.05	0.08	0.16	0.27	0.11	0.10	0.03	0.19	0.11	1.00	
Inflation	0.12	0.09	-0.01	0.11	0.15	0.04	0.16	0.05	0.08	0.04	0.12	-0.06	0.33	0.54	0.38	1.00

Professional Biographies

- **MICHAEL R. BEASLEY**. *Managing Director*. Co-founded Strategic Investment Solutions, Inc. (SIS) with Barry Dennis in 1994. Former EVP and Head of Consulting of Callan Associates, which he joined in 1986 and left in 1993. Founded Callan's Atlanta Office in 1986 and concurrently managed its New York Office in 1988. Served as Chairman of Callan's Manager Search Committee for two years. Brings 30 years of consulting and institutional investment experience to SIS. Prior experience includes 13 years with Merrill Lynch's Capital Markets Group in Jacksonville and Atlanta. Former Editorial Board member of the *Journal of Pension Plan Investing*. Frequent speaker on institutional investment issues. Graduate of the New Mexico Military Institute and an officer of the U.S. Army for five years that included a combat tour of duty in Vietnam.
- **JOHN P. MEIER, CFA**. *Managing Director and Head of Quantitative Services*. Highly experienced specialist in strategic planning, capital markets analysis, and quantitative investment strategies. A leading authority in the fields of performance benchmarking and portfolio performance attribution, whose ideas have been published in *Pensions and Investments*, *Futures*, *Risk* and *Quantitative International Investing*. Senior Product Manager at BARRA from 1988 to 1994, responsible for equity risk and valuation models and services. B.S. in Chem. Eng. From Michigan State, MBA in Finance from UC Berkeley.
- **MARC GESELL, CFA**. *Vice President*. Quantitative analysis, statistical research, and systems development specialist responsible for strategic planning. Seven years experience in software R&D, asset allocation modeling, and investment analysis. Most recently AVP and portfolio manager for First Interstate Bank (now Wells Fargo), responsible for managing \$200 million in private client portfolios. Helped establish clients' strategic plans, investment objectives, asset allocation mixes, and portfolio structure. B.S. in Computational Mathematics, Arizona State University, MBA in Finance, San Francisco State University, Chartered Financial Analyst. Former Officer, United State Army.
- **LOUIS KINGSLAND, JR.** *Adviser and Chair, Investment Policy Committee*. Developed first commercially available asset allocation and liability simulation model and asset mix optimizer, both still widely used today. Most recently EVP of Mellon Capital Management. Graduate, Air Force Academy. MA in Engineering, CalTech. Served as Deputy Mission Director of The Viking Space Project, and received a Distinguished Service Medal from NASA.

Definitions

STRATEGIC ASSET ALLOCATION

The discipline used to determine which assets and what proportion among those assets meet an investor's cash flow requirements, planning horizon, and attitude toward risk.

EXPECTED RATE OF RETURN

The expected value or mean of a probability distribution of returns. In our case, the expected return is the compounded annual return which is the same as the geometric mean. After tax expected return nets out the expected income and capital gains taxes paid by the trust.

STANDARD DEVIATION

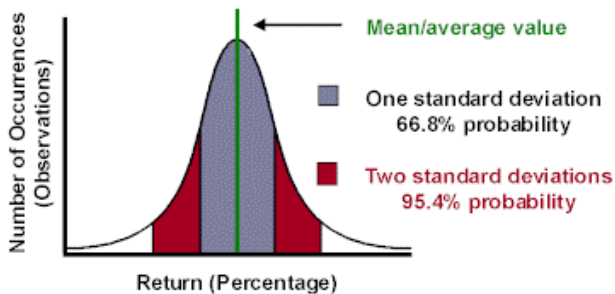
A statistical measure of the degree to which an individual value in a probability distribution tends to vary from the mean of the distribution. The square root of the **variance**. When returns are normally distributed, an individual return will fall within one standard deviation of the mean about two-thirds of the time. For example, if a portfolio had an expected return of 5% and an expected risk (standard deviation) of 13, then:

One Standard Deviation 68% of the time, returns can be expected to fall between -8.0% and +18%

Two Standard Deviations 95% of the time, returns can be expected to fall between -21% and +31%

Standard deviation is a useful historical measure of the variability of return earned by an investment portfolio. In performance measurement, it is generally assumed that a larger degree of dispersion implies that greater risk was taken to achieve the return.

Risk Measurement
Probability of Dispersion
Above or Below the Mean/Average



Definitions

CORRELATION COEFFICIENT

Correlation Coefficient
Shows Strength & Direction of Correlation



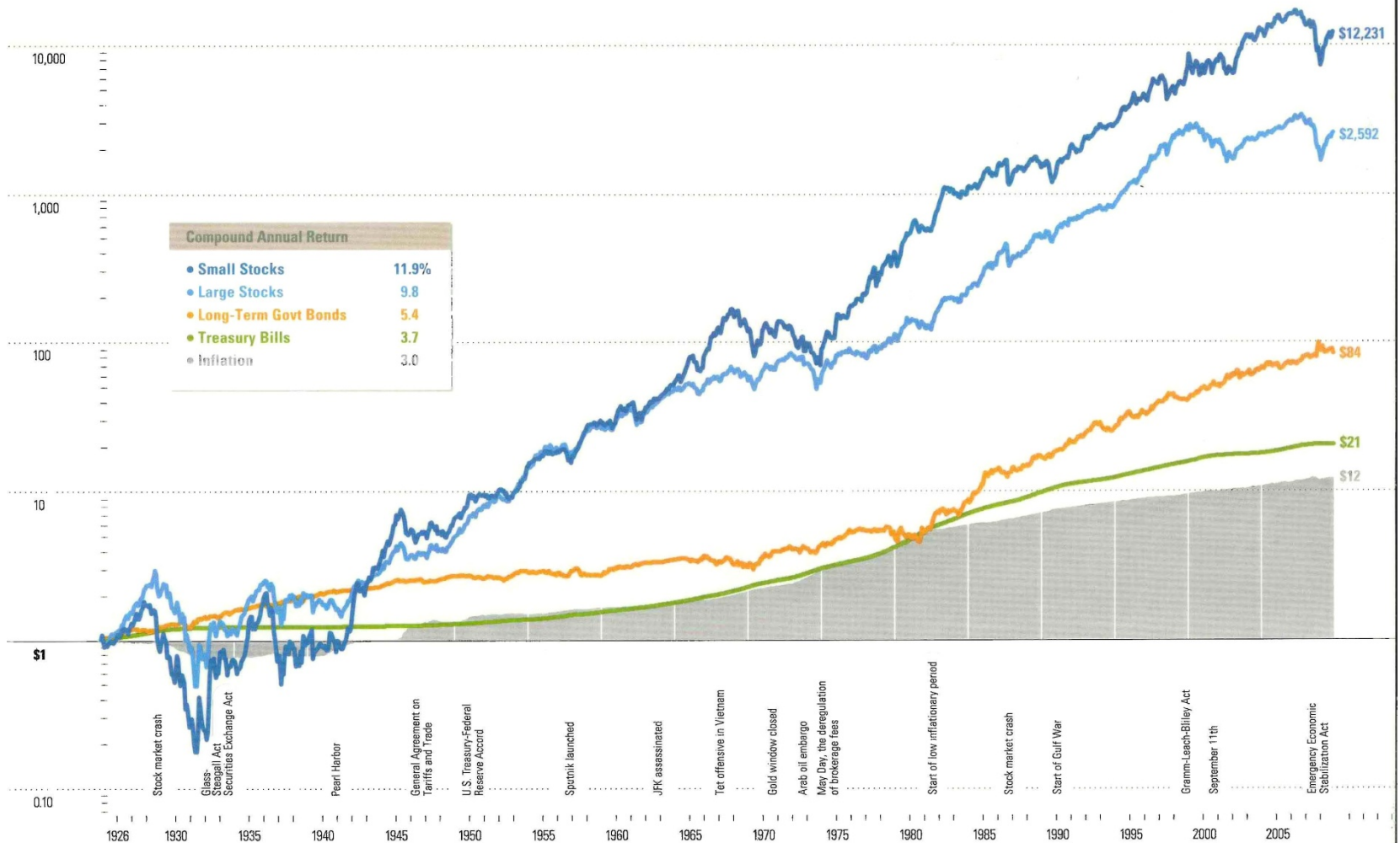
Correlation coefficient (r) is a measure of the degree of **correlation** between two quantities or variables, such as the rates of return on stocks and on bonds. A negative coefficient of correlation indicates an inverse or negative relationship, whereas a positive value indicates a direct or positive relationship. The range of values is from -1 to +1 inclusive. A zero (0) value indicates that no correlation exists. Correlation coefficients are useful in **asset class** identification and portfolio **diversification**.

Glossary of Terms

- **Asset Allocation** – (1) The way investments are distributed and weighted among different asset classes. (2) The distribution of investments among categories of assets, such as equities, fixed income, cash equivalents, and real estate.
- **CAPM** – Capital Asset Pricing Model. A system of equations that describes the way prices of individual assets are determined in efficient markets, that is, in markets where information is freely available and reflected instantaneously in asset prices. According to this model, prices are determined in such a way that risk premiums are proportional to systematic risk, measured by the beta coefficient, which cannot be eliminated by diversification. CAPM provides an explicit expression of the expected returns for all assets. Basically, the model holds that if investors are risk averse, high-risk stocks must have higher expected returns than low-risk stocks. CAPM maintains that the expected return of a security or a portfolio is equal to the rate on a risk-free investment plus a risk premium.
- **Correlation** – A relationship between two quantities, such that when one changes, the other does. A measure (ranging in value from 1.00 to -1.00) of the association between a dependent variable (fund, portfolio) and one or more independent variables (index). Correlation is a measure, not necessarily of causality, but rather of the strength of a relationship. A correlation coefficient of 1.00 implies that the variables move perfectly in lockstep; a correlation coefficient of -1.00 implies that they move inversely in lockstep; and a coefficient of 0.00 implies that the variables as calibrated are uncorrelated.
- **Efficient Frontier** – A set of optimal portfolios, one for each level of expected return, with minimum risk.
- **Expected Return** -- Estimate of the return of an investment or portfolio from a probability distribution curve of all possible rates of return; statistically, it is the mean (ether geometric mean or arithmetic mean) of the distribution or the "most likely" outcome.
- **Factor Model** – Regression-based mathematical calculation used to determine the extent to which macroeconomic factors or other explanatory variables affect the value or price movement of a specific security or portfolio.

Ibbotson® SBBI®

Stocks, Bonds, Bills, and Inflation 1926–2009



Past performance is no guarantee of future results. Hypothetical value of \$1 invested at the beginning of 1926. Assumes reinvestment of income and no transaction costs or taxes. This data is for illustrative purposes only and not indicative of any investment. An investment cannot be made directly in an index.

