

# 2013 ALM Workshop: Review of Asset Class Roles and Risk Factors Framework

## Investment Committee Workshop

May 13, 2013

# *Asset Class Roles and Benchmarks*

## Summary of Key Changes to Roles and Benchmarks from 2010 ALM

- Roles
  - Add Absolute Return Strategies to reflect its recently approved strategic role
  - Refine and standardize role language across programs
- Benchmarks
  - Introduce Minimum Volatility Index as another Global Equity benchmark option in addition to its existing CalPERS Custom FTSE All World benchmark
  - Replace the existing Global Fixed Income international benchmark with Barclays International Fixed Income Index GDP weighed ex-U.S.
  - Replace the existing non-U.S. inflation linked benchmark with Barclays Universal Government Inflation Linked Bond Index ex-U.S.

## 2013 ALM Asset Roles & Benchmarks - Private Equity

### Role

- Private equity allocations are a means of enhancing equity returns through a value-added approach to investment management of a diverse set of portfolio companies and to capture the illiquidity premium. The major driver for returns is appreciation, with negligible cash yield.
  - *High Growth Risks*
  - *Illiquid*

### Benchmark

- (2/3 FTSE U.S. Total Market Index (TMI) + 1/3 FTSE All World ex-U.S. TMI) + 3% lagged one quarter

## 2013 ALM Asset Roles & Benchmarks - Absolute Return Strategies

### Role

- The role of ARS is to act as an economic diversifier to equity risk and provide capital protection in bearish markets.
  - *Moderate Returns*
  - *Low Growth Risks*
  - *Moderate Liquidity*

### Benchmark

- 1-Yr T-bill plus 5% with a beta to Global Equity at 0.2 or lower

## 2013 ALM Asset Roles & Benchmarks - Real Estate

### Role

- The role of Real Estate is to have ownership risk in real property with stable cash yield and act as an economic diversifier to equity risk. Capital appreciation is an added, but lower source of return. Real Estate is also a partial inflation hedge.
  - *Cash Yield*
  - *Growth Risks*
  - *Inflation Protection*
  - *Illiquid*

### Benchmark

- NCREIF ODCE<sup>1</sup>

## 2013 ALM Asset Roles & Benchmarks - Infrastructure

### Role

- The role of Infrastructure is to have ownership risk in essential infrastructure assets and provide predictable returns with moderate long-term inflation protection. Infrastructure also acts as an economic diversifier to equity risk.
  - *Cash Yield*
  - *Moderate Growth Risks*
  - *Moderate Inflation Protection*
  - *Illiquid*

### Benchmark

- $\text{CPI}^1 + 4\%$  lagged one quarter

## 2013 ALM Asset Roles & Benchmarks - Forestland

### Role

- The role of Forestland is to have ownership risk in forestland properties, enhance long-term inflation protection and provide moderate cash yield.
  - *Moderate Cash Yield*
  - *Moderate Growth Risks*
  - *Inflation Protection*
  - *Illiquid*

### Benchmark

- NCREIF<sup>1</sup> Timberland

## 2013 ALM Asset Roles & Benchmarks - Global Fixed Income

### Role

- The role of Global Fixed Income is to serve as an economic diversifier to equity risk and be a reliable source of income.
  - *Cash Yield*
  - *Low Growth Risks*
  - *Liquid*

### Benchmark

- 90% Barclays Long Liabilities + 10% Barclays International Fixed Income Index GDP Weighted ex-U.S.

## 2013 ALM Asset Roles & Benchmarks - Inflation Assets

### Role

- The role of Inflation Assets is to provide liquid and strong protection against inflation.
  - *Inflation Protection*
  - *Moderate Growth Risks*
  - *Low Cash Yield*
  - *Liquid*

### Benchmark

- Broaden the non-U.S. component in the 75% Global ILB Custom Index<sup>1</sup> from currently five countries to sixteen countries in the Barclays Universal Government Inflation Linked Bond Index ex-U.S.<sup>2</sup> + 25% Standard & Poor's GSCI Total Return Index

<sup>1</sup> One-third of the Global ILB Custom Index is non-U.S.

<sup>2</sup> Excludes certain countries due to ratings (Argentina) and tax, regulatory or other capital control reasons (Brazil and South Korea)

## 2013 ALM Asset Roles & Benchmarks - Liquidity

### Role

- The role of Liquidity is to exhibit safety and capital preservation properties as well as to provide an effective risk protection during financial crisis
  - *Liquid*

### Benchmark

- 75% Barclays Treasury 2-10 year + 25% 1-mo T-bill

## 2013 ALM Asset Roles & Benchmarks - Global Equity

### Role

- The role of equities is total return oriented and to capture the equity risk premium (ERP), defined as the excess return over risk-free Government Bonds, by means of ownership risk in companies and exposure to corporate earnings growth. The major driver is appreciation, with some cash yield.
  - *High Growth Risks*
  - *Liquid*

### Benchmark

- Include Minimum Volatility (Min Vol) as one of the Global Equity benchmarks along with the current cap weighted CalPERS Custom FTSE All World Total Market Index (TMI) benchmark in the optimization process

# *Risk Factors Framework*

# Factors and Nutrients: Basic Building Blocks

In 2010, the asset allocation approach was similar to deciding how much of each type of soup we wanted ...



*Clam Chowder*



*Tomato Basil Soup*

# Factors and Nutrients: Basic Building Blocks



*Clam Chowder*  
(Public Equity)



*Tomato Basil Soup*  
(Fixed Income)

... now in 2013, the approach is to focus on the nutritional content of each soup (i.e., decompose the soup into its nutritional components)...

<b>Nutrition Facts</b>			
Serving Size: 227 g			
Amount Per Serving:			
Calories: 220		Calories from Fat: 90	
% Daily Value			
Total Fat	10 g		15%
Total Carbohydrate	23 g		8%
Protein	9 g		
Vitamin A	6%	Vitamin C	0%
Calcium	15%	Iron	4%

<b>Nutrition Facts</b>			
Serving Size: 243 g			
Amount Per Serving:			
Calories: 49		Calories from Fat: 0	
% Daily Value			
Total Fat	0 g		0%
Total Carbohydrate	10 g		3%
Protein	2 g		
Vitamin A	10%	Vitamin C	120%
Calcium	2%	Iron	2%

**Basic Nutrients:**

1. Fats
2. Carbohydrates
3. Proteins
4. Vitamins
5. Minerals

# Factors and Nutrients: Basic Building Blocks

... if we now think of these nutrients as the factors that explain asset class returns ...

...the question becomes:

## Public Equity

<b>Factor Exposure</b>	
Serving Size: 1 Asset Class	
Amount Per Serving:	
Total Risk: Y%	
% Contribution to Total Risk	
Factor 1	X%
Factor 2	X%
Factor 3	X%
Factor 4	X%
Factor 5	X%

## Fixed Income

<b>Factor Exposure</b>	
Serving Size: 1 Asset Class	
Amount Per Serving:	
Total Risk: Y%	
% Contribution to Total Risk	
Factor 1	X%
Factor 2	X%
Factor 3	X%
Factor 4	X%
Factor 5	X%

Basic Factors:

1. Factor 1
2. Factor 2
3. Factor 3
4. Factor 4
5. Factor 5

# Factors and Nutrients: Basic Building Blocks

How do we construct a portfolio to get our desired levels of each nutrient?

# *Appendix*

# Role and Key Characteristics of Benchmarks

- The role of a Benchmark is to represent:
  - 1) A theoretical portfolio that is most appropriate, judged from the perspective of potential returns and risk, in the long term
  - 2) An underlying framework and guide for our investment activities, which is reflective of the Investment Committee's preference
  - 3) A measuring stick for our investment performance
- Key characteristics of an optimal benchmark include <sup>1</sup>:
  - *Unambiguous* – clearly defines the names and weights of all assets included
  - *Investable* – should be possible to simply hold the benchmark
  - *Measurable* – performance can be calculated frequently
  - *Pre-specified* – specified in advance before investment period
  - *Appropriate* – representative of investment style

<sup>1</sup> Source: CAIA Association

## Why consider Min Vol Strategy in ALM Process?

- Equities constitute most of the Total Fund risk, resulting in:
  - Occasional large drawdowns <sup>1</sup>
  - A mismatch in correlation to growth rate of liabilities
- The above suggests allocation to equity risk should be lowered, however less equity implies lower returns (and higher contributions)
- Min Vol strategy may efficiently reduce risk of equity allocation
  - Buying insurance against downturns is very costly when needed
  - Min Vol has historically been an efficient way to reduce drawdowns during equity market downturns

## Disadvantages of a Min Vol Strategy

- Underperformance in strong bull markets
  - Bull markets could be multi year resulting in long lag period
- More concentrated portfolios than cap-weighted index by security holdings
- Significant tracking error to cap weighted index
- Higher turnover and transaction costs than cap weighted index
- Possibility that widespread adoption of Min Vol Strategy eliminates its historical efficiency

## MSCI ACWI Min Vol – Potential Historical Total Fund Impact

- Had MSCI ACWI Min Vol<sup>1</sup> historically been included as part of the GE benchmark, it could have improved return and volatility, and resulted in a higher risk-adjusted return over the past 10 years.
- It could also have reduced historical maximum drawdown

10 Year thru Mar2013 Historical Values (Geometric)*		With Current Benchmarks	With MSCI ACWI Min Vol as 10% of GE Benchmark	Difference	With MSCI ACWI Min Vol as 100% of GE Benchmark	Difference
Total Fund**	Annualized Gross Return	9.53%	9.63%	0.09%	10.41%	0.87%
	Volatility	9.15%	8.86%	-0.28%	6.74%	-2.40%
	Sharpe Ratio***	1.01	1.05	0.04	1.50	0.49
	Maximum Drawdown	-34.3%	-33.4%	0.9%	-24.8%	9.6%
	Tracking Error				3.70%	
Global Equity**	Annualized Gross Return	10.14%	10.40%	0.25%	12.40%	2.26%
	Volatility	16.84%	16.21%	-0.63%	11.25%	-5.59%
	Sharpe Ratio***	0.59	0.62	0.04	1.08	0.49
	Maximum Drawdown	-54.5%	-53.1%	1.4%	-39.0%	15.4%
	Tracking Error				7.56%	

\* Source: CalPERS Asset Allocation, assumes reinvestment of dividends

\*\* Using the FTSE All World Total Return Index as a proxy for current Global Equity portfolio

\*\*\* Assume 0.28% 3-month LIBOR as of 3/28/2013

## MSCI ACWI Min Vol – Forecasted Total Fund Risk Impact

- BarraOne risk estimates are lower for both the Total Fund and Global Equity by including MSCI ACWI Min Vol as part of the GE benchmark

Total Risk	With Current GE Benchmark	With MSCI ACWI Min Vol as 10% of GE Benchmark	With MSCI ACWI Min Vol as 100% of GE Benchmark
Total Fund Policy Benchmark	12.36%	12.04%	9.23%
GE Benchmark	18.01%	17.34%	11.69%

## Risk and Return of Min Vol Indices

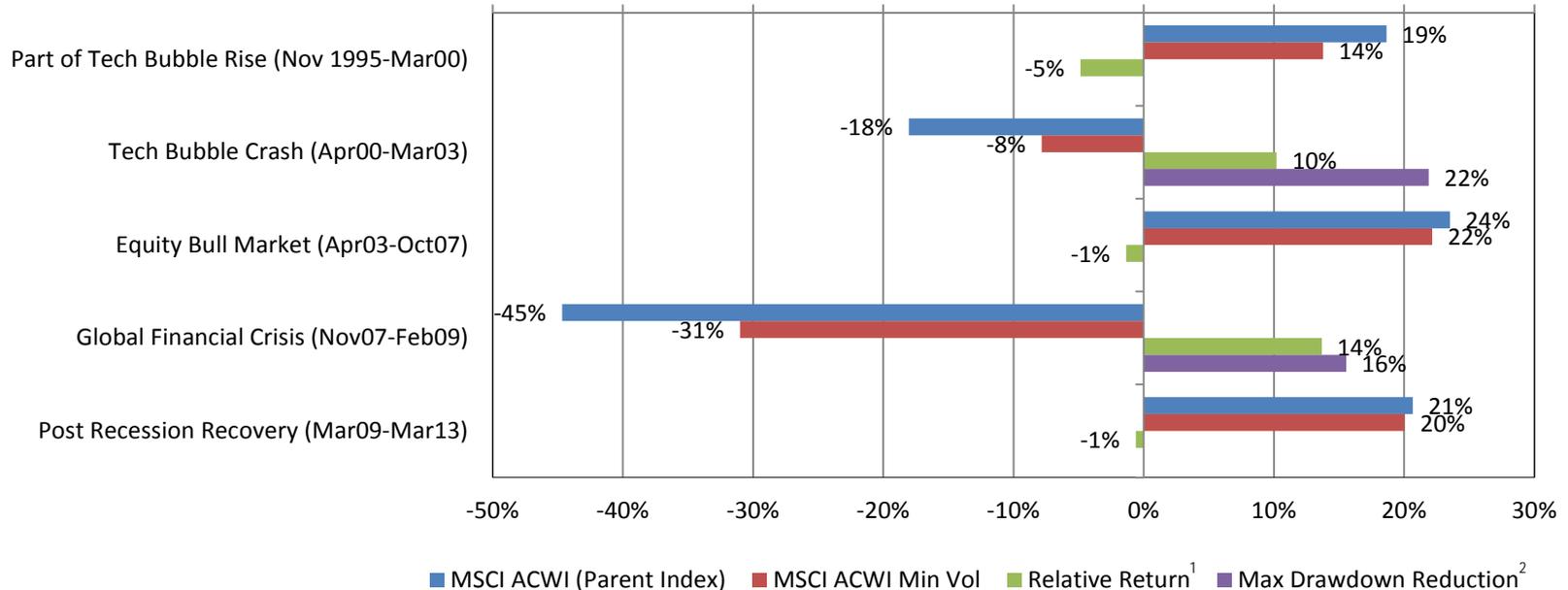
- The MSCI ACWI Min Vol Index has lower beta and substantially lower risk than its market cap weighted parent index, MSCI ACWI.
- However, the MSCI ACWI Min Vol Index incurs a sizable tracking error.

Nov 1995 – Mar 2013	Annualized Gross Return	Risk	Risk Reduction	Return / Risk	Tracking Error	Beta Exposure
MSCI ACWI	6.5%	16.4%		0.40		1.00
MSCI ACWI Min Vol	8.9%	11.3%	31%	0.79	7.26%	0.64

# Relative Performance by Major Market Events

- The MSCI ACWI Min Vol Index offers strong protection in down markets but may lag performance in the bull and recovery markets

**MSCI ACWI Min Vol vs. MSCI ACWI**  
**Annualized Gross Return and Drawdown Reduction**  
**Nov 1995 - Mar 2013**



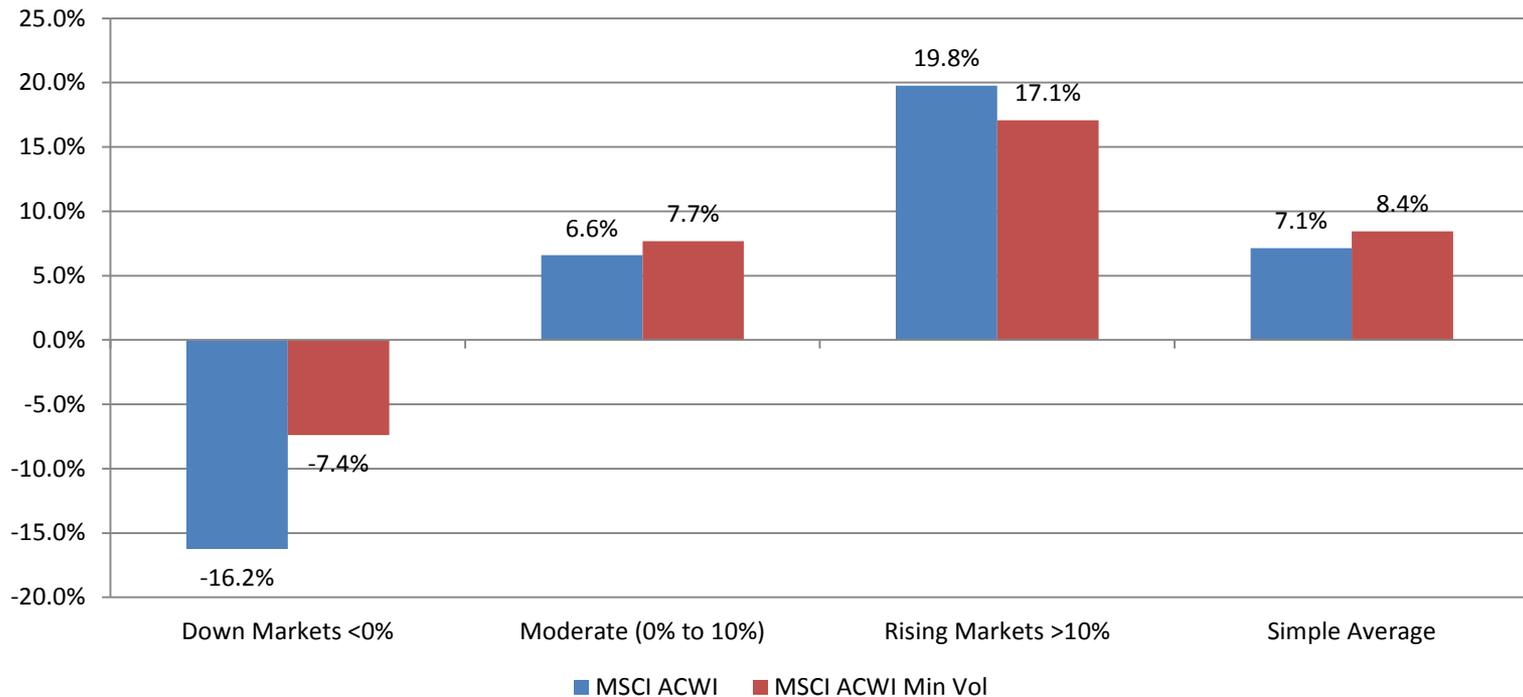
Source: CalPERS Asset Allocation using MSCI ACWI data as well as simulated data from MSCI ACWI Min Vol from Nov 1995 – Oct 2001

<sup>1</sup> Relative Return is the return difference between MSCI ACWI Min Vol and MSCI ACWI  
<sup>2</sup> Maximum Drawdown Reduction is the comparison in the decline of net asset value from historical peak to trough between MSCI ACWI Min Vol and MSCI ACWI

# Min Vol Index Downside Protection

- The MSCI ACWI Min Vol Index has provided better downside protection with some tradeoff in up markets

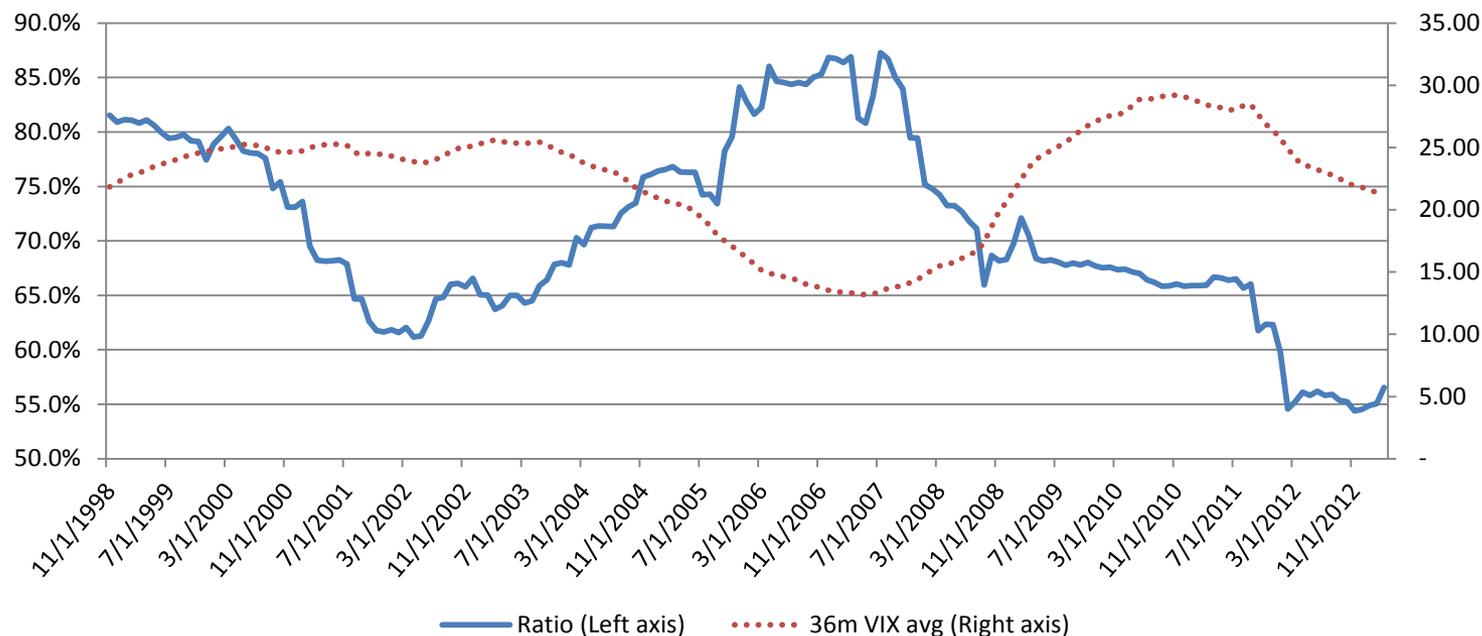
**Rolling 12-Month Annualized Gross Returns  
Nov 1995 - Mar 2013**



# Historical Realized Volatility of MSCI ACWI Min Vol Index

- The most significant risk reduction was achieved when the market experienced higher volatility as indicated by a higher VIX Index<sup>1</sup>

**Ratio of Volatility of MSCI ACWI Min Vol Index/  
Volatility of MSCI ACWI Index<sup>2</sup>**



Source: CalPERS Asset Allocation using MSCI ACWI data as well as simulated data from MSCI ACWI Min Vol from Nov 1995 – Oct 2001

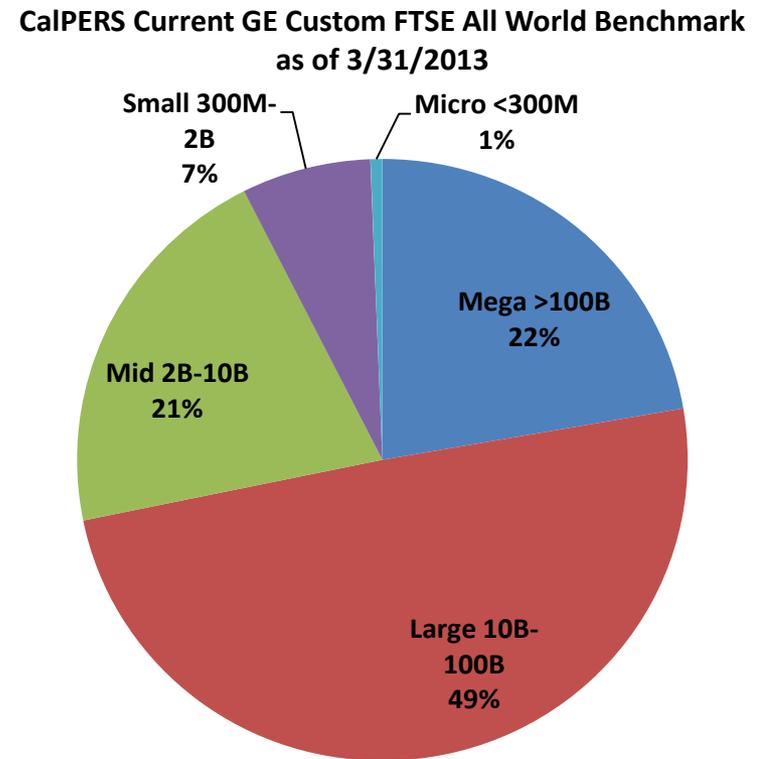
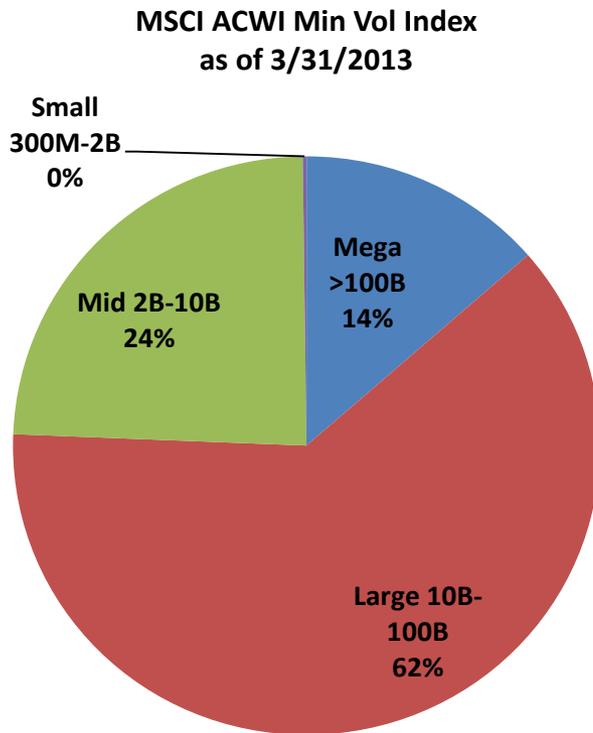
# MSCI ACWI Min Vol – Fundamental Characteristics<sup>1</sup>

- 1/6 of the Current GE Benchmark size
- Much higher concentration in companies
- Higher dividend yield
- Higher valuation
- Higher profitability
- Lower leverage

	As of 3/31/2013		3-Year Historical Average	
	MSCI ACWI Min Vol	CalPERS Current GE Benchmark	MSCI ACWI Min Vol	CalPERS Current GE Benchmark
Market Cap (in millions)	8,110,619	49,694,684	7,282,570	42,314,594
# of Securities	280	9,502	273	9,345
Monthly Trading Volume (in millions)	124	226	207	230
Dividend Yield	2.97	2.50	3.15	2.61
Price / Earnings	17.52	15.57	15.28	13.54
Price / Sales	1.72	1.08	1.55	0.91
Price / Book Value	2.47	1.82	2.20	1.19
Price / Cash Flow	9.91	8.06	8.31	6.67
Enterprise Value / EBITDA <sup>2</sup>	10.57	11.09	10.65	10.53
Return on Asset	8.34	7.00	8.93	7.10
Return on Equity	18.97	15.84	20.58	16.03
Operating Margin	21.03	17.77	21.09	17.29
EBITDA Margin	18.14	15.21	18.04	14.71
Gross Debt / EBITDA	2.11	2.45	2.17	2.47

# MSCI ACWI Min Vol – Market Cap Distribution

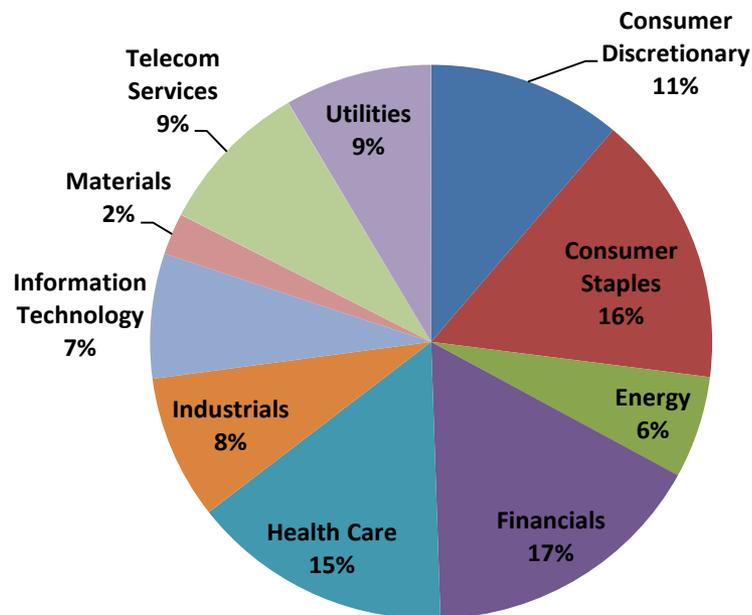
- The MSCI ACWI Min Vol Index has less exposure to small-cap companies thus higher liquidity



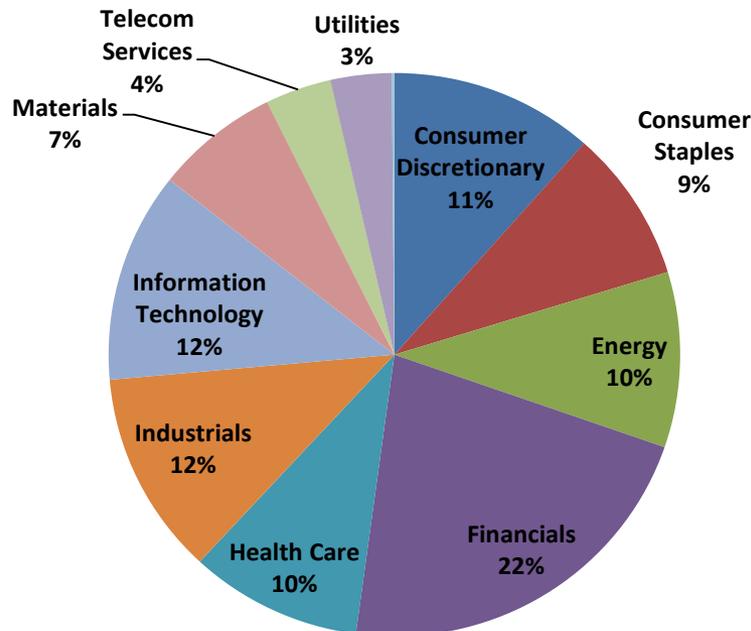
# MSCI ACWI Min Vol – Sector Distribution

- The MSCI ACWI Min Vol Index has more exposure to Consumer Staples, Telecomm, Health Care and Utilities
- And less exposure to Financials, IT, Materials, Energy and Industrials

**MSCI ACWI Min Vol Index  
as of 3/31/2013**



**CalPERS Current GE Custom FTSE All World Benchmark  
as of 3/31/2013**



Source: FactSet