



UNIVERSITY OF CALIFORNIA

Office of the Treasurer

601

GEP Asset Allocation Review and Recommendation

*Committee on Investments /
Investment Advisory Committee
May 2006*



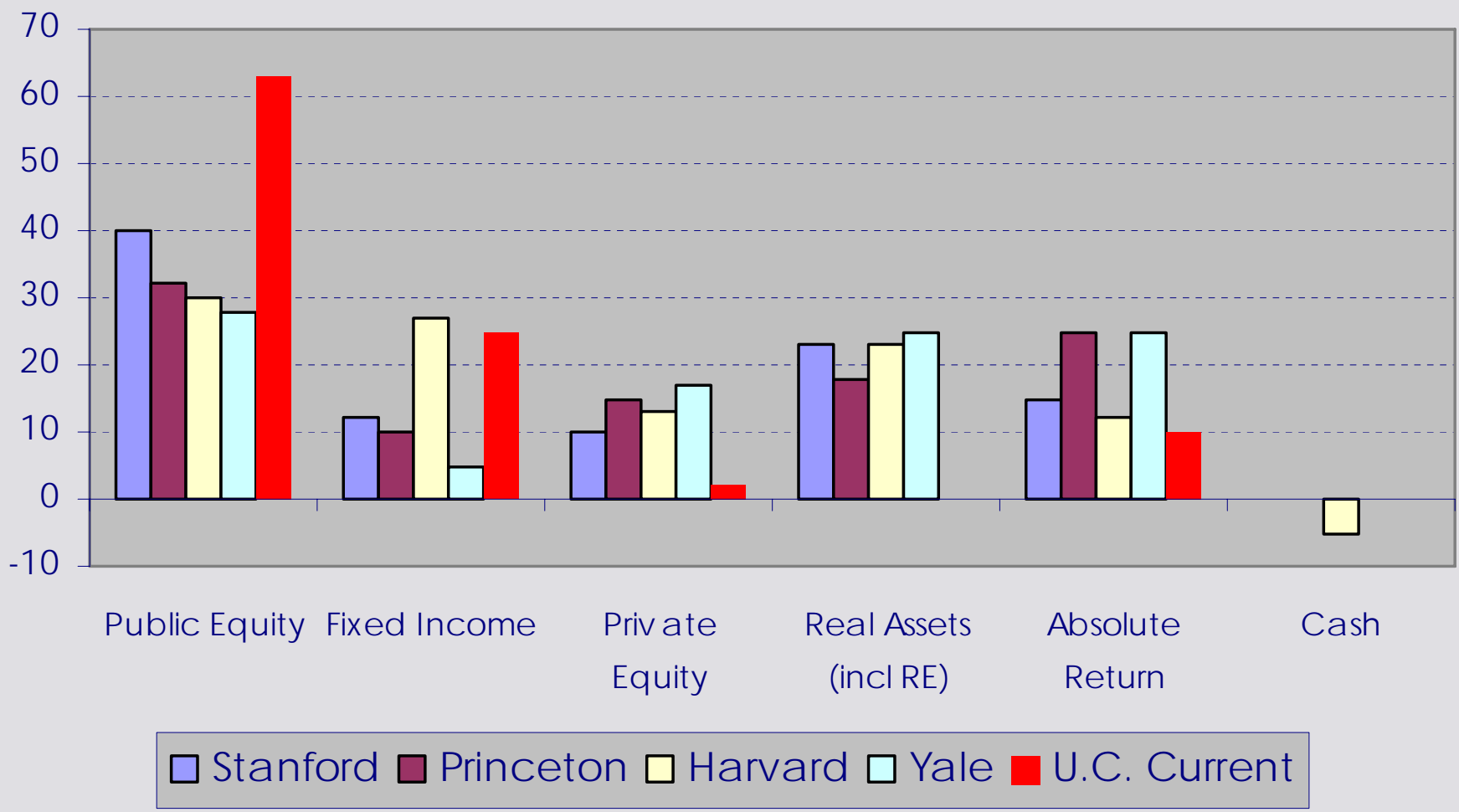
AGENDA

- ◆ Review background and previous actions
- ◆ Review endowment asset allocation **process**
- ◆ Outline capital market **assumptions**
- ◆ Discuss endowment **decision variables**
- ◆ **Recommend** asset allocation policy given risk target
- ◆ **Approve** Policy changes, effective July 1, 2006



UC GEP vs. PEERS

Asset Allocation - UC and Big 4





◆ Endowment changes, March-July 2005:

■ US Equity	- \$786 million	-16% of total GEP
■ Fixed Income	- \$358 million	-7%
■ Non US Equity	+ \$554 million	+11%
■ Emg Mkt Eq	+ \$172 million	+3.5%
■ Abs. Return	+ \$168 million	+3.5%
■ TIPS	+ \$250 million	+5%

- ◆ **Fiduciaries select level of investment risk:**
 - Investment objectives, horizon, and liquidity constraints
 - Own risk tolerance as fiduciaries
- ◆ **Treasurer/Consultants propose asset allocation policy:**
 - Consistent with fiduciaries' chosen risk level



- ◆ Review spending and liquidity requirements of Fund
- ◆ Determine what asset classes are appropriate for Fund
- ◆ Obtain consensus expectations for major asset class return and volatility for next 3-5 years



ASSET ALLOCATION PROCESS

- ◆ Generate a set of efficient asset mixes for a range of risk levels, given any policy or liquidity constraints
- ◆ Model the endowment cash flows over an appropriate horizon, assuming variable (random) investment returns and inflation levels
- ◆ Determine what decision factors are important for the endowment (how to distinguish investment success/failure)



◆ Factors contributing to endowment growth

- Expected Nominal Return
- Less Inflation
- Less Payout
- Less Student growth
- Plus Contributions
- = Net Growth

◆ Values expressed in **real dollars per student**



- ◆ What level of investment performance will satisfy University's goal for the endowment?
- ◆ Solution: model endowment growth (and spending growth) under different levels of risk and return



DECISION FACTORS

Given different asset mixes:

1. How much can the endowment **value*** **grow** over ten years, on **average**
2. How much can the endowment **value*** decline after ten years, in the 10% of **worst cases**
3. How much can **spending*** **grow** over ten years, on **average**
4. How much can **spending*** decline after ten years, in the 10% of **worst cases**

*per student, in real (2006) \$, over 10 year investment horizon

EQUITY RISK PREMIUM (ERP)

- ◆ Most important input in the asset allocation process is the **expectation for equities to outperform bonds** over the long term
 - *Compensation for risk*
 - *Called “equity risk premium” or ERP*
- ◆ Typically defined as Expected Equity Return less Expected 10 yr Gov't Bond Return
 - *Best expectation for latter is current bond yield*
- ◆ Institutions first estimate ERP for a full market cycle (trend)
- ◆ Then determine short-term factors causing differences from trend



EQUITY RISK PREMIUM (ERP)

- ◆ Current estimates:
- ◆ Estimated Equity Return: 7.5% - 9.5%
- ◆ 10 Year Gov't Bond Yield: 4.5% - 5.5%
- ◆ Equity Risk Premium: 3.0% - 4.0%

- ◆ Treasurer/Consultant point estimate is 8% for Equity return and 3% for ERP



EXPECTED EQUITY RETURNS

◆ Estimated Nominal Equity Return

■ Inflation 2.5%-3.0%

■ + Cash Yield

◆ Dividends 1.5%-2.0%

◆ Buybacks 0.5%-0.75%

■ + Real earnings growth

◆ GDP Growth

– Labor Supply 1.0%-1.25%

– Productivity 2.0%-2.5%

◆ Large Cap Premium 0%

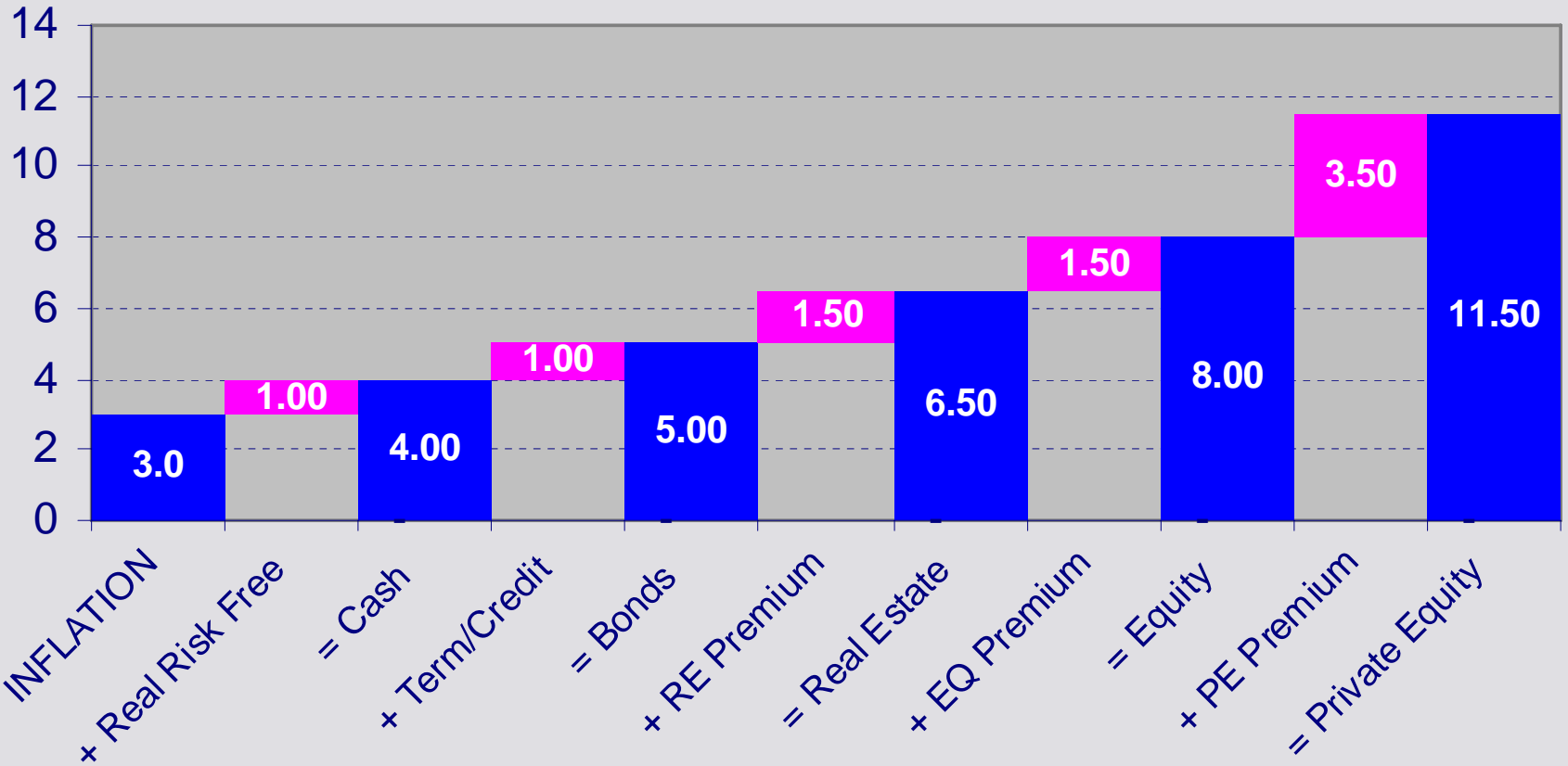
■ +/- Change in valuation (P/E) 0%

◆ Estimated Equity Return = 7.5%-9.5%



CAPITAL MARKET EXPECTATIONS

Return = Premium for Risk



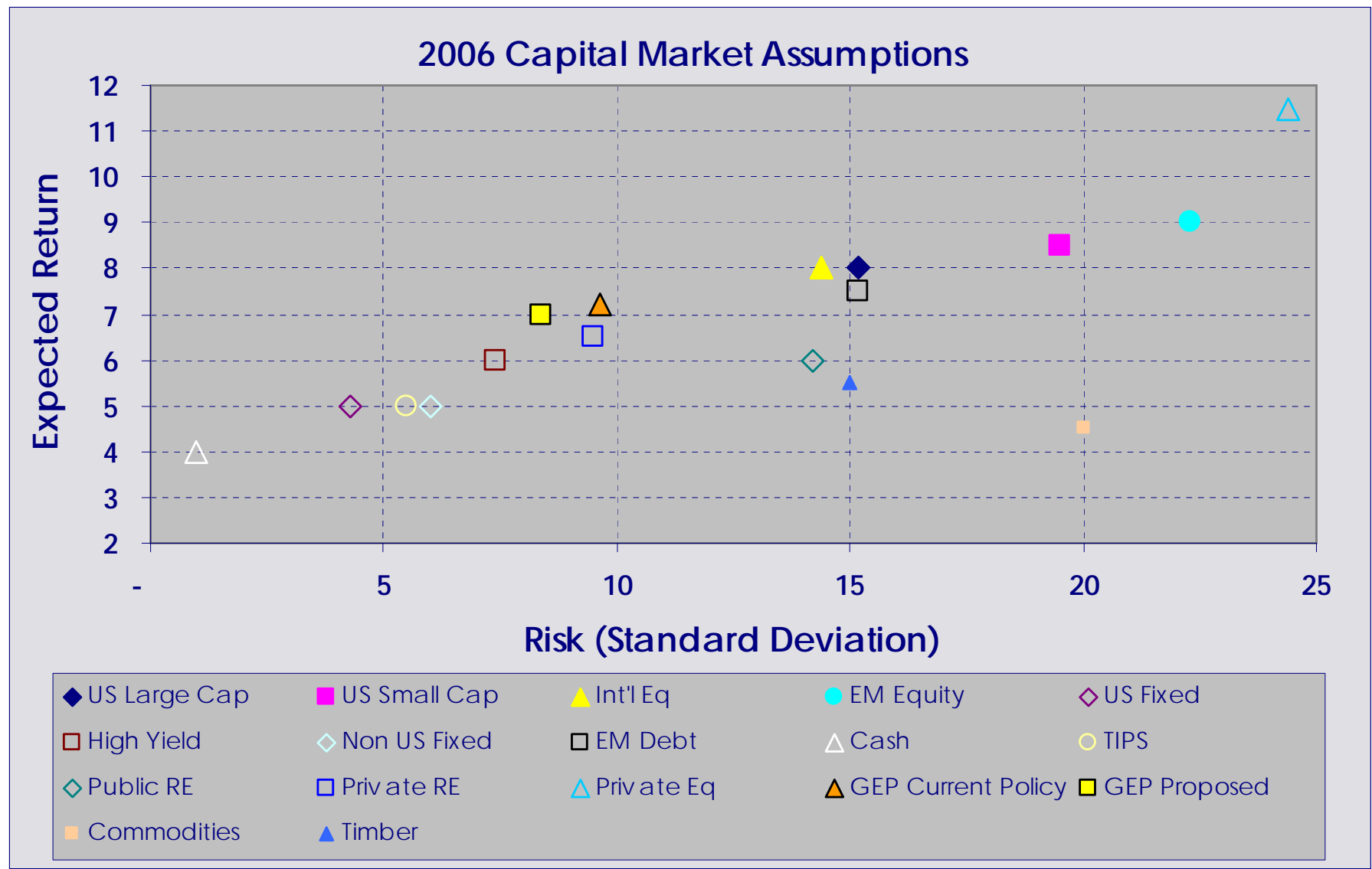


CAPITAL MARKET EXPECTATIONS

Capital Market Assumptions, 2006	Expected Returns	Expected Risk	Risk Premium	Over
US Large Cap	8.0	15.20	3.0	US Bonds
US Small Cap	8.5	19.50	0.5	US Eq
Int'l Eq	8.0	14.40	-	US Eq
EM Equity	9.0	22.30	1.0	US Eq
US Fixed	5.0	4.30	1.0	Cash
High Yield	6.0	7.40	1.0	US Bonds
Non US Fixed	5.0	6.00	-	US Bonds
EM Debt	7.5	15.20	2.5	US Bonds
Public RE	6.0	14.20	0.5	US Bonds
Private RE	6.5	9.50	1.5	US Bonds
Private Eq	11.5	24.40	3.5	US Eq
Abs Return	6.0	6.00	2.0	Cash
Commodities	4.5	20.00	0.5	Cash
Cash	4.0	1.00	0.5	Infl
TIPS	5.0	5.50	-	US Bonds
Timber	5.5	15.00	1.5	Cash

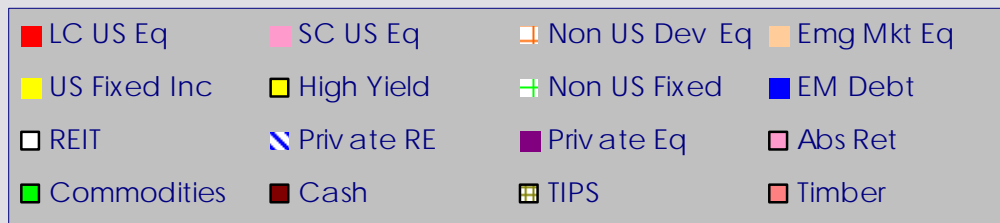
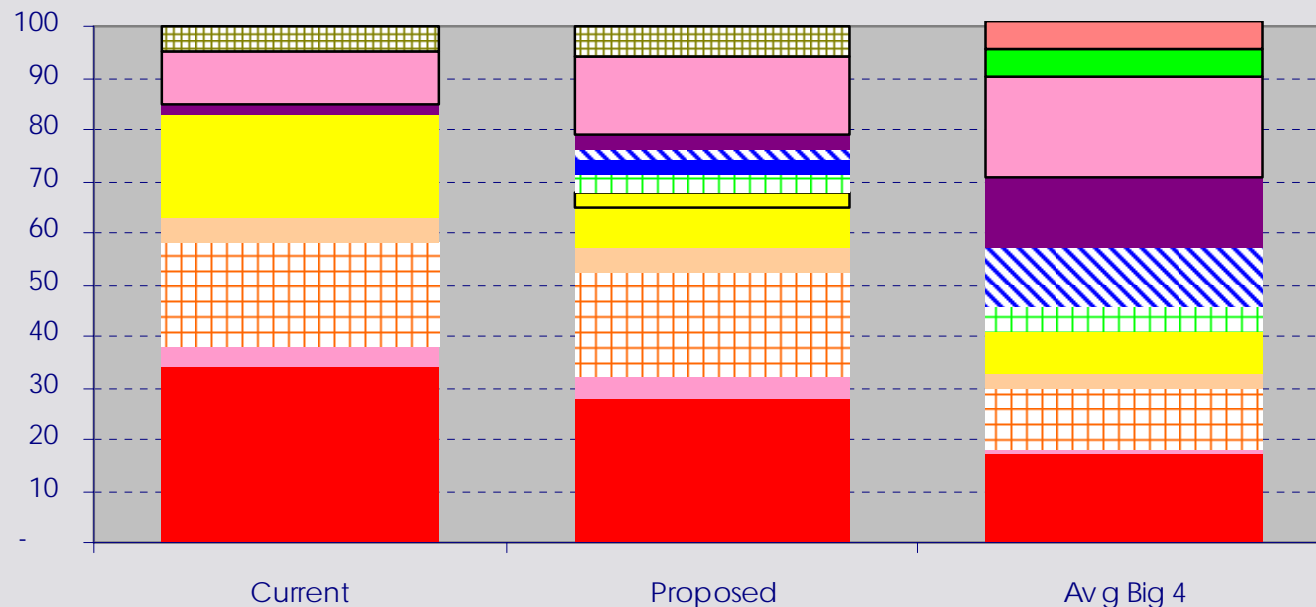
Expected Returns are arithmetic; realized (compound) returns will be lower due to volatility

CAPITAL MARKET EXPECTATIONS



RECOMMENDED PORTFOLIO

Current, Proposed, and Efficient Asset Mixes



Expected Return	7.19	7.26	7.27
Compound Return	6.73	6.81	6.93
Standard Deviation	9.62	9.45	8.24
Sharpe Ratio	0.33	0.34	0.40

	Current	Proposed	Avg Big 4
LC US Eq	34.0	28.0	17.1
SC US Eq	4.0	4.0	1.1
Non US Dev Eq	20.0	20.0	11.4
Emg Mkt Eq	5.0	5.0	2.9
US Fixed Inc	20.0	8.0	8.3
High Yield	-	3.0	-
Non US Fixed	-	3.0	5.2
EM Debt	-	3.0	-
REIT	-	-	-
Private RE	-	2.0	11.1
Private Eq	2.0	3.0	13.8
Abs Ret	10.0	15.0	19.3
Commodities	-	-	5.6
Cash	-	-	(0.8)
TIPS	5.0	6.0	-
Timber	-	-	5.1
	100.0	100.0	100.0
Expected Return	7.19	7.26	7.27
Compound Return	6.73	6.81	6.93
Standard Deviation	9.62	9.45	8.24
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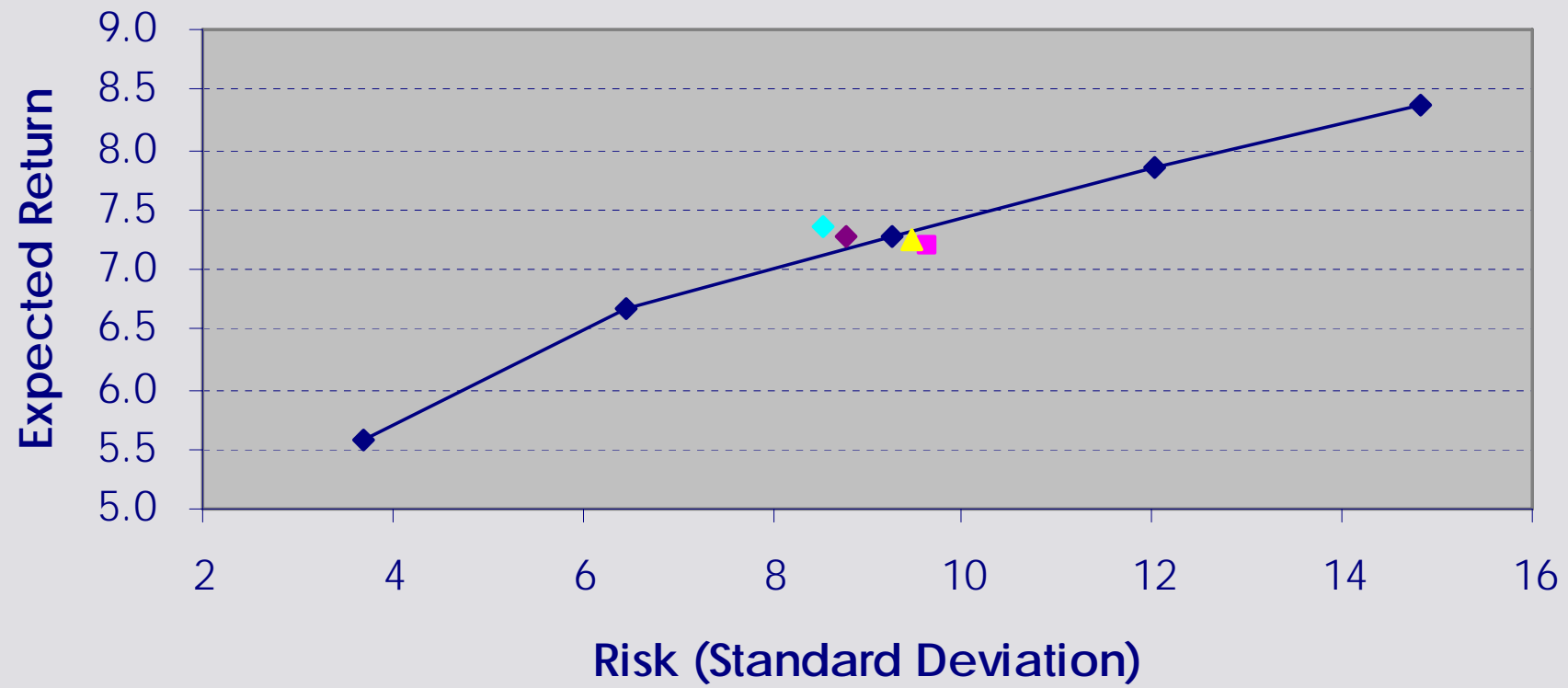
RECOMMENDED POLICY / RANGES

Asset Class	GEP Eff. Policy @ August 2005	GEP Proposed Policy 2006	Change	Lower Range [-15%]	Upper Range [+15%]	Long Term Goal
US Equity	38	32	(6)	NOTE: Currently, ranges around three broad categories are +/- 10%. We recommend increasing to +/- 15% in order to allow flexibility to Treasurer and Campus Foundations in allocating assets		20
Int'l Dev. Equity	20	20	-			20
Emg Mkt Equity	5	5	-			5
US Fixed Income	20	8	(12)			5
US High Yield	-	3	3			2.5
Int'l Fixed Income	-	3	3			2.5
Emg Mkt Debt	-	3	3			2.5
TIPS	5	6	1			2.5
Private Real Estate	-	2	2			7.5
Private Equity	2	3	1			7.5
Absolute Return	10	15	5			20
Other Alternatives	-	-	-			5
TOTAL	100	100	-			100
Equity	63	57	(6)	42	72	45
Bonds	25	23	(2)	8	38	15
Alternatives	12	20	8	5	35	40



EFFICIENT ASSET MIXES

Efficient Frontier and Asset Mixes March 2006





RECOMMENDED BENCHMARK

Asset Class	Percent	Benchmark
US Equity	32	Russell 3000 Tobacco Free
Int'l Dev. Equity	20	MSCI World ex US Tobacco Free
Emg Mkt Equity	5	MSCI Emerging Market Index
US Fixed Income	8	Lehman Aggregate
US High Yield	3	Merrill Lynch High Yield Cash Pay
Int'l Fixed Income	3	Citigroup World Gov't Bond ex US Index
Emg Mkt Debt	3	JP Morgan EMBI Plus
TIPS	6	Lehman US TIPS Index
Private Real Estate	2	NCREIF Property Index (lag 3 month)
Private Equity	3	Actual Portfolio Return
Absolute Return	15	One Month T Bills + 4.5%
TOTAL	100	



EFFECTIVE DATE

- ◆ Recommended policy and benchmark effective July 1, 2006
- ◆ Transition benchmark will be approved by the Regents' investment consultant



NEXT STEPS

- ◆ Approve revision to GEP Policy
 - *Target asset weights*
 - *Ranges around broad asset classes*
 - *Benchmarks*
- ◆ At August COI meeting, recommend adding other “real asset” classes (besides real estate)
- ◆ Additional staffing to execute strategy