New Mexico State Investment Council

Returns Expectations Analysis, Land Grant Permanent Fund

- *Investments Oversight Committee Meeting* • *July 27, 2011*

Background and Purpose

- The State Investment Council (SIC) is presently undertaking an asset study in the normal course of managing the Permanent Funds.

- The determination of a rate of return to target with the investment portfolios is an integral part of the study.

- SIC staff have produced analysis with regard to portfolio objectives, the level of investment return needed to meet those objectives, and, with SIC consultant RV Kuhns, have made forward-looking assumptions regarding potential investment returns and are in the process of constructing portfolio options for SIC consideration.

- The purpose of the analyses herein are to help in guiding the SIC to investment portfolios that are expected to meet the objectives of the permanent funds with reasonable investment risk.

Fund Objectives

The LGPF appears to have two explicit objectives and one implicit one:

1. Provide for the statutory distribution to the beneficiaries (explicit);
2. Protect the corpus from inflation (explicit);
3. Provide for some real growth of the corpus (implicit; to address general population growth, hedge against costs of the beneficiaries rising faster than inflation).

Questions to Answer

These analyses seek to answer three questions:

1. What level of return was necessary to achieve the fund's objectives in the past?
2. Using history as a guide, and making some assumptions regarding the future, what level of return might be necessary for the fund to achieve its objectives in the future?
3. Once we are comfortable with understanding the rate of return necessary to meet the objectives, what level of investment risk is necessary to achieve that return? Will we be able to construct a portfolio with acceptable risk that can be expected to generate the desired return in the financial markets as they exist?

Analysis Framework

Three analyses are prepared:

1. A historical analysis of the Land Grant Permanent Fund, looking back 20 years, and construction of a model to calculate a rate of return necessary to meet the objectives, using information such as below:
    1. Actual amount of distribution to the beneficiaries
    2. A measure of inflation (to calculate purchasing power protection)
    3. Estimating a real growth requirement
    4. Actual amount of contributions from the Land Office
    5. Actual earnings of the fund

2. Construction of a forward-looking financial model, using the factors above and making assumptions where necessary, to calculate a rate of return that would allow the fund to meet its on-going and future objectives.

3. A review of the financial markets, to determine the general level of available returns for a portfolio of similar investment risk characteristic of past permanent fund portfolios:
    1. Review of the level of risk historically taken by the LGPF investments
    2. Generating assumptions regarding the level of the risk-free rate of return in the next 10 years.
    3. Generating assumptions of the availability of risk premium.

Part One: Historical Review

Historical Required Return Model

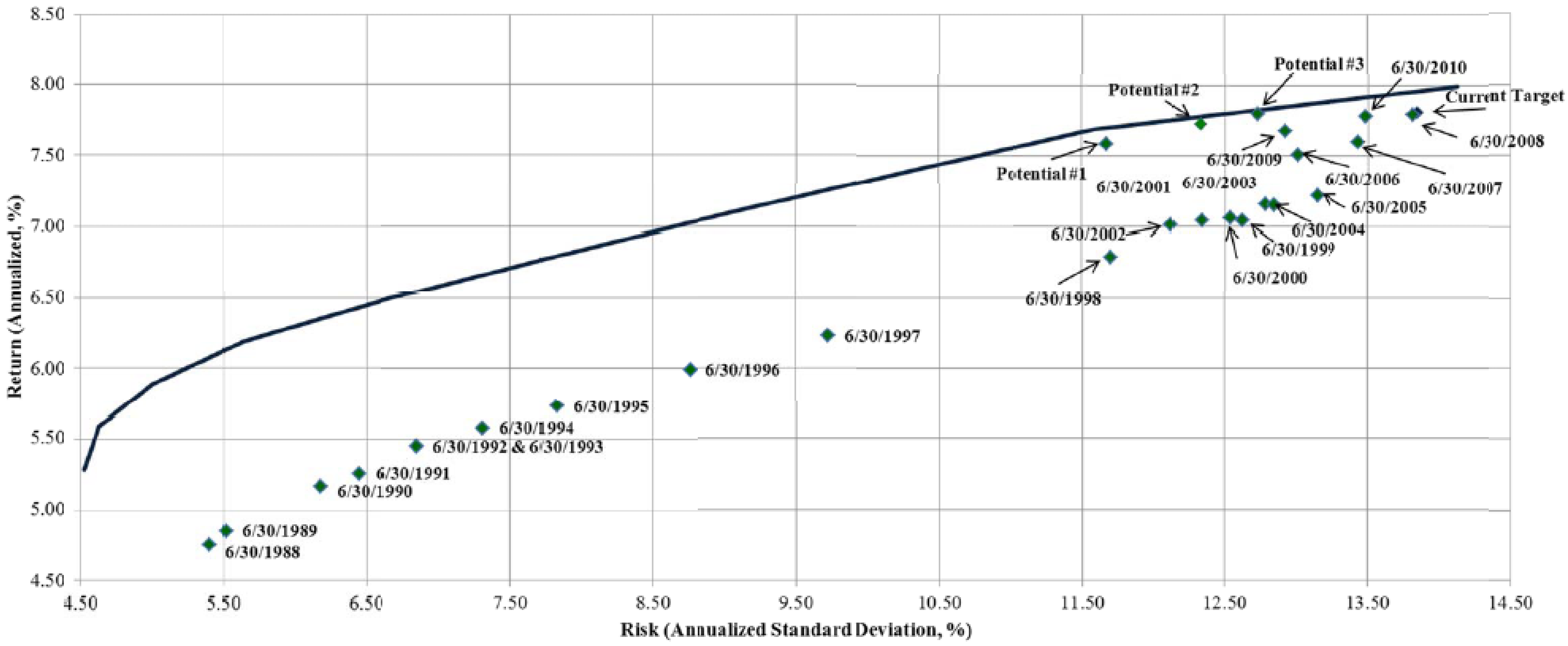
			Objectives:
Purchasing Power Prot	3	(1,3, or 5)	1. Provide the statutory distribution to the beneficiaries
Real Growth Rate	1.00%		2. Protect the corpus from inflation
Catch-up Years	7		3. Provide some real growth

Fiscal Years	(Objective #1) Beneficiary Distributions	1yr CPI	3yr CPI	5yr CPI	(Objective #2) Purchasing Power Protection	(Objective #3) % Real Growth		Gross Req'mnt	Prior Years Catch-up	Total Req'mnt	Return Req'mnt	Return Req'mnt (w/o catch-up)	Contrib from the Land Office	Investment Return	Total Sources	LGPF Balance
1991	259.4	4.70%	4.85%	4.43%	151.5	1.00%	31.3	442.2	-26.5	415.7	9.42%	10.27%	121.2	354.4	475.6	3,342.8
1992	262.0	3.09%	4.15%	4.32%	138.7	1.00%	33.4	434.1	-13.2	420.9	9.47%	9.86%	104.4	498.8	603.2	3,684.0
1993	261.5	3.00%	3.59%	4.12%	132.3	1.00%	36.8	430.6	3.0	433.6	8.43%	8.35%	122.9	455.7	578.6	4,001.1
1994	257.9	2.49%	2.86%	3.59%	114.4	1.00%	40.0	412.3	83.6	495.9	9.51%	7.42%	115.6	-9.9	105.7	3,848.9
1995	248.1	3.04%	2.84%	3.26%	109.4	1.00%	38.5	396.0	72.4	468.4	9.65%	7.76%	97.2	625.2	722.4	4,323.2
1996	246.0	2.75%	2.76%	2.87%	119.4	1.00%	43.2	408.7	80.9	489.6	9.01%	7.13%	100.2	495.0	595.2	4,672.4
1997	251.2	2.30%	2.70%	2.72%	126.0	1.00%	46.7	423.9	28.3	452.2	6.52%	5.91%	147.8	895.7	1,043.5	5,464.7
1998	255.4	1.68%	2.24%	2.45%	122.6	1.00%	54.6	432.7	-51.4	381.3	4.60%	5.54%	130.0	1,115.9	1,245.9	6,455.2
1999	260.5	1.96%	1.98%	2.35%	127.9	1.00%	64.6	453.0	-105.6	347.3	3.82%	5.46%	100.8	992.3	1,093.1	7,287.8
2000	265.7	3.73%	2.46%	2.48%	178.9	1.00%	72.9	517.5	-122.6	395.0	3.30%	4.98%	154.8	747.0	901.8	7,923.9
2001	283.1	3.25%	2.98%	2.58%	236.0	1.00%	79.2	598.3	38.5	636.8	4.40%	3.91%	288.2	-534.1	-245.9	7,394.9
2002	311.5	1.07%	2.68%	2.33%	197.8	1.00%	73.9	583.3	222.1	805.4	8.18%	5.18%	200.2	-590.7	-390.5	6,692.9
2003	332.8	2.11%	2.14%	2.42%	143.1	1.00%	66.9	542.9	283.2	826.1	9.05%	4.82%	220.4	227.7	448.1	6,808.2
2004	352.5	3.27%	2.14%	2.68%	146.0	1.00%	68.1	566.6	241.9	808.5	8.40%	4.85%	236.3	971.8	1,208.1	7,663.8
2005	422.2	2.53%	2.64%	2.44%	202.0	1.00%	76.6	700.8	255.7	956.5	8.29%	4.96%	320.9	705.7	1,026.6	8,268.1
2006	426.4	4.32%	3.37%	2.65%	278.6	1.00%	82.7	787.6	244.9	1,032.6	7.47%	4.51%	414.7	874.7	1,289.4	9,131.1
2007	438.9	2.69%	3.18%	2.98%	289.9	1.00%	91.3	820.1	136.8	957.0	6.11%	4.62%	398.6	1,617.2	2,015.8	10,708.0
2008	470.0	5.02%	4.00%	3.56%	428.7	1.00%	107.1	1,005.8	361.0	1,366.8	8.33%	4.96%	474.9	-568.3	-93.4	10,144.8
2009	521.5	-1.43%	2.06%	2.60%	208.8	1.00%	101.4	831.8	794.2	1,626.0	11.29%	3.46%	480.5	-2,159.9	-1,679.4	7,943.9
2010	525.5	1.05%	1.51%	2.30%	120.3	1.00%	79.4	725.2	763.1	1,488.3	14.58%	4.97%	330.3	1,138.2	1,468.5	8,886.9
2011E	535.9	3.16%	0.91%	2.08%	81.0	1.00%	88.9	705.8	562.0	1,267.8	10.46%	4.14%	338.1	1,239.0	1,577.1	11,000.0
											8.11%	**5.86%**				

LGPF: Portfolio Allocations Over Time

	Asset Class Allocations							Thematic Allocations			
	US Stocks	Non US Stocks	Private Equity	Bonds	Real Return	Core Real Estate	Hedge Funds	Capital Appreciation	Capital Preservation	Inflation	Market Neutral
1988	10.00%	0.00%	0.00%	90.00%	0.00%	0.00%	0.00%	10.00%	90.00%	0.00%	0.00%
1989	13.90%	0.00%	0.00%	86.10%	0.00%	0.00%	0.00%	13.90%	86.10%	0.00%	0.00%
1990	21.10%	0.00%	0.00%	78.90%	0.00%	0.00%	0.00%	21.10%	78.90%	0.00%	0.00%
1991	24.20%	0.00%	0.00%	75.80%	0.00%	0.00%	0.00%	24.20%	75.80%	0.00%	0.00%
1992	26.20%	0.00%	0.00%	73.80%	0.00%	0.00%	0.00%	26.20%	73.80%	0.00%	0.00%
1993	26.20%	0.00%	0.00%	73.80%	0.00%	0.00%	0.00%	26.20%	73.80%	0.00%	0.00%
1994	30.70%	0.00%	0.00%	69.30%	0.00%	0.00%	0.00%	30.70%	69.30%	0.00%	0.00%
1995	34.90%	0.00%	0.00%	65.10%	0.00%	0.00%	0.00%	34.90%	65.10%	0.00%	0.00%
1996	41.60%	0.00%	0.00%	58.40%	0.00%	0.00%	0.00%	41.60%	58.40%	0.00%	0.00%
1997	48.40%	0.00%	0.00%	51.60%	0.00%	0.00%	0.00%	48.40%	51.60%	0.00%	0.00%
1998	54.10%	0.00%	0.00%	45.90%	0.00%	0.00%	0.00%	54.10%	45.90%	0.00%	0.00%
1999	55.10%	7.70%	0.20%	37.00%	0.00%	0.00%	0.00%	63.00%	37.00%	0.00%	0.00%
2000	50.90%	12.40%	0.90%	35.80%	0.00%	0.00%	0.00%	64.20%	35.80%	0.00%	0.00%
2001	49.70%	15.40%	2.10%	32.80%	0.00%	0.00%	0.00%	67.20%	32.80%	0.00%	0.00%
2002	47.20%	13.90%	2.40%	36.50%	0.00%	0.00%	0.00%	63.50%	36.50%	0.00%	0.00%
2003	51.80%	14.70%	2.60%	30.90%	0.00%	0.00%	0.00%	69.10%	30.90%	0.00%	0.00%
2004	57.40%	13.90%	2.70%	26.00%	0.00%	0.00%	0.00%	74.00%	26.00%	0.00%	0.00%
2005	57.00%	8.40%	4.20%	30.40%	0.00%	0.00%	0.00%	69.60%	30.40%	0.00%	0.00%
2006	51.10%	9.10%	5.20%	23.40%	0.00%	1.10%	10.10%	65.95%	23.40%	0.55%	10.10%
2007	52.30%	11.60%	5.10%	19.90%	0.00%	1.60%	9.50%	69.80%	19.90%	0.80%	9.50%
2008	50.70%	11.60%	7.50%	16.40%	0.00%	3.40%	10.40%	71.50%	16.40%	1.70%	10.40%
2009	45.40%	8.10%	9.50%	20.00%	0.00%	3.90%	13.10%	64.95%	20.00%	1.95%	13.10%
2010	45.70%	11.80%	9.60%	19.50%	0.00%	3.70%	9.70%	68.95%	19.50%	1.85%	9.70%
2011	42.00%	14.50%	9.00%	25.40%	0.00%	3.10%	6.00%	67.05%	25.40%	1.55%	6.00%
2012E	34.00%	15.00%	10.00%	15.00%	8.00%	10.00%	8.00%	64.00%	15.00%	13.00%	8.00%

LGPF: Portfolio Expected Risk, Return and Efficiency Over Time



Some Conclusions from the Historical Review

- The existing return expectation for the Land Grant fund of 8.50% appears to be higher than was needed in the past for the fund to reach its objectives.

- A range of return between 6.00% and 8.00% should likely be the focus in determining the target return. This range of returns is very wide in the context of long-run, annually-compounded returns:
  - The difference in risk between a portfolio constructed to target a 6% return and one constructed to target an 8% return is significant.
  - The difference in the value of the fund over a long time horizon (20 years or more) is significant between achieving a 6% return per year and achieving an 8% return per year.
  - The balance between risk-taking and return-seeking must be carefully considered in light of the above.

- The fund's history of a high exposure to equity investments, an exposure believed to have been taken in order to make a realistic effort at making the return objective:
  - Has not generated the return expected over the past decade;
  - Has exposed the portfolio to volatility that might be better managed with more diversification;
  - Is not likely necessary in order to achieve the objectives of the fund.

- The portfolio's general reliance on publicly-traded asset markets reduced portfolio "efficiency" – the ability of the portfolio to generate the best return for the investment risks taken. Further diversification, as currently under consideration by the SIC, should improve portfolio performance.

Part Two: Forward-Looking Review

Forward-Looking Model

Future Assumptions:

Statutory Distribution:	5.50%
Inflation:	2.50%
Real Growth Req'mnt:	1.00%
Land Office Income:	$350 million annually initially, grows at the rate of inflation

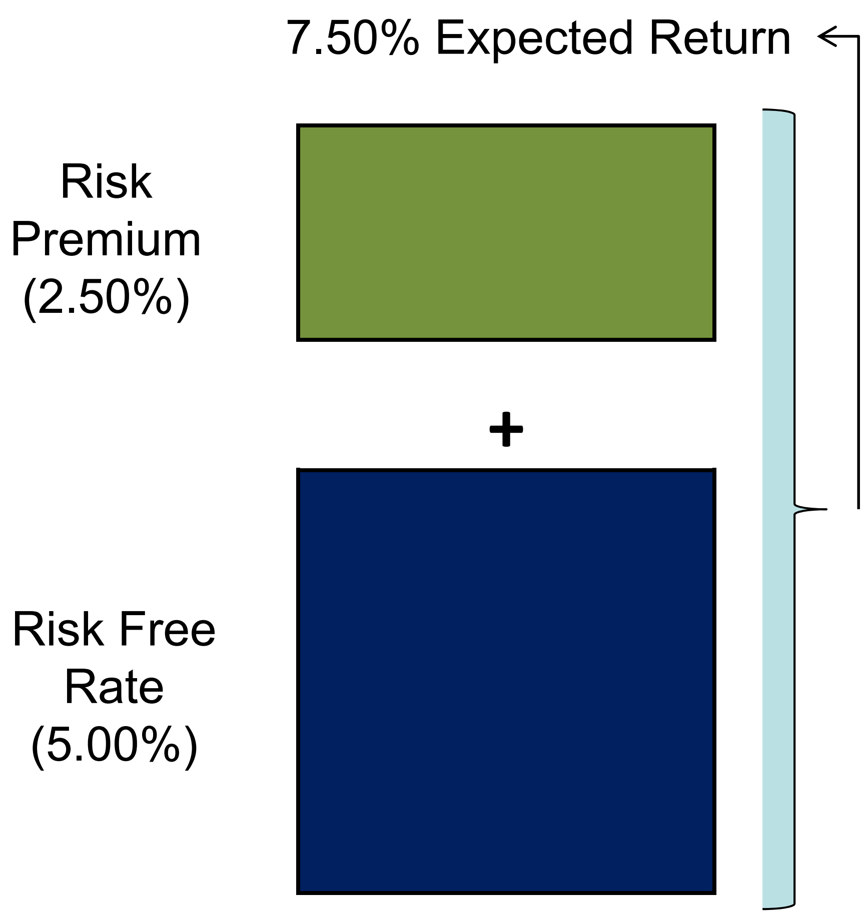
Fiscal Years	(Objective #1) Beneficiary Distributions	1yr CPI	3yr CPI	5yr CPI	(Objective #2) Purchasing Power Protection	(Objective #3) % Real Growth		Gross Req'mnt	Prior Years Catch-up	Total Req'mnt	Return Req'mnt	Return Req'mnt (w/o catch-up)	Income from the Land Office	Investment Return	Total Sources	LGPF Balance
2012	535.5	2.50%	2.50%	2.50%	275.0	1.00%	110.0	920.5	562.0	1,482.6	10.30%	5.19%	350.0		350.0	11,947
2013	549.1	2.50%	2.50%	2.50%	298.7	1.00%	119.5	967.3	562.0	1,529.3	9.80%	5.09%	358.8		358.8	12,927
2014	579.8	2.50%	2.50%	2.50%	323.2	1.00%	129.3	1,032.2	562.0	1,594.3	9.49%	5.14%	367.7		367.7	13,942
2015	645.7	2.50%	2.50%	2.50%	348.5	1.00%	139.4	1,133.7	562.0	1,695.7	9.46%	5.43%	376.9		376.9	14,992
2016	712.9	2.50%	2.50%	2.50%	374.8	1.00%	149.9	1,237.6	562.0	1,799.6	9.43%	5.68%	386.3		386.3	16,078
2017	768.7	2.50%	2.50%	2.50%	402.0	1.00%	160.8	1,331.5	562.0	1,893.5	9.31%	5.82%	396.0		396.0	17,203
2018	826.6	2.50%	2.50%	2.50%	430.1	1.00%	172.0	1,428.7	562.0	1,990.7	9.21%	5.95%	405.9		405.9	18,367
2019	886.4	2.50%	2.50%	2.50%	459.2	1.00%	183.7	1,529.3	0.0	1,529.3	6.06%	6.06%	416.0		416.0	19,010
2020	942.2	2.50%	2.50%	2.50%	475.3	1.00%	190.1	1,607.5	0.0	1,607.5	6.21%	6.21%	426.4		426.4	19,676
2021	993.7	2.50%	2.50%	2.50%	491.9	1.00%	196.8	1,682.3	0.0	1,682.3	6.33%	6.33%	437.1		437.1	20,364
2022	1,040.8	2.50%	2.50%	2.50%	509.1	1.00%	203.6	1,753.6	0.0	1,753.6	6.41%	6.41%	448.0		448.0	21,077
2023	1,083.4	2.50%	2.50%	2.50%	526.9	1.00%	210.8	1,821.1	0.0	1,821.1	6.46%	6.46%	459.2		459.2	21,815
2024	1,121.4	2.50%	2.50%	2.50%	545.4	1.00%	218.1	1,884.9	0.0	1,884.9	6.48%	6.48%	470.7		470.7	22,578
2025	1,160.6	2.50%	2.50%	2.50%	564.5	1.00%	225.8	1,950.8	0.0	1,950.8	6.50%	6.50%	482.5		482.5	23,368
2026	1,201.2	2.50%	2.50%	2.50%	584.2	1.00%	233.7	2,019.1	0.0	2,019.1	6.52%	6.52%	494.5		494.5	24,186
2027	1,243.3	2.50%	2.50%	2.50%	604.7	1.00%	241.9	2,089.8	0.0	2,089.8	6.54%	6.54%	506.9		506.9	25,033
2028	1,286.8	2.50%	2.50%	2.50%	625.8	1.00%	250.3	2,162.9	0.0	2,162.9	6.56%	6.56%	519.6		519.6	25,909
2029	1,331.8	2.50%	2.50%	2.50%	647.7	1.00%	259.1	2,238.6	0.0	2,238.6	6.58%	6.58%	532.6		532.6	26,816
2030	1,378.4	2.50%	2.50%	2.50%	670.4	1.00%	268.2	2,317.0	0.0	2,317.0	6.60%	6.60%	545.9		545.9	27,754
2031	1,426.7	2.50%	2.50%	2.50%	693.9	1.00%	277.5	2,398.1	0.0	2,398.1	6.62%	6.62%	559.5		559.5	28,726
											7.55%	**6.11%**				

Some Conclusions from the Forward-Looking Review

- Using the noted assumptions, the forward-looking model produces similar results to the historical model .
- Income from the Land Office is a critical component and bears greater analysis.
- Return from the investment portfolio becomes increasingly important over time to maintaining the corpus.

Part Three: Generating Investment Return Expectations

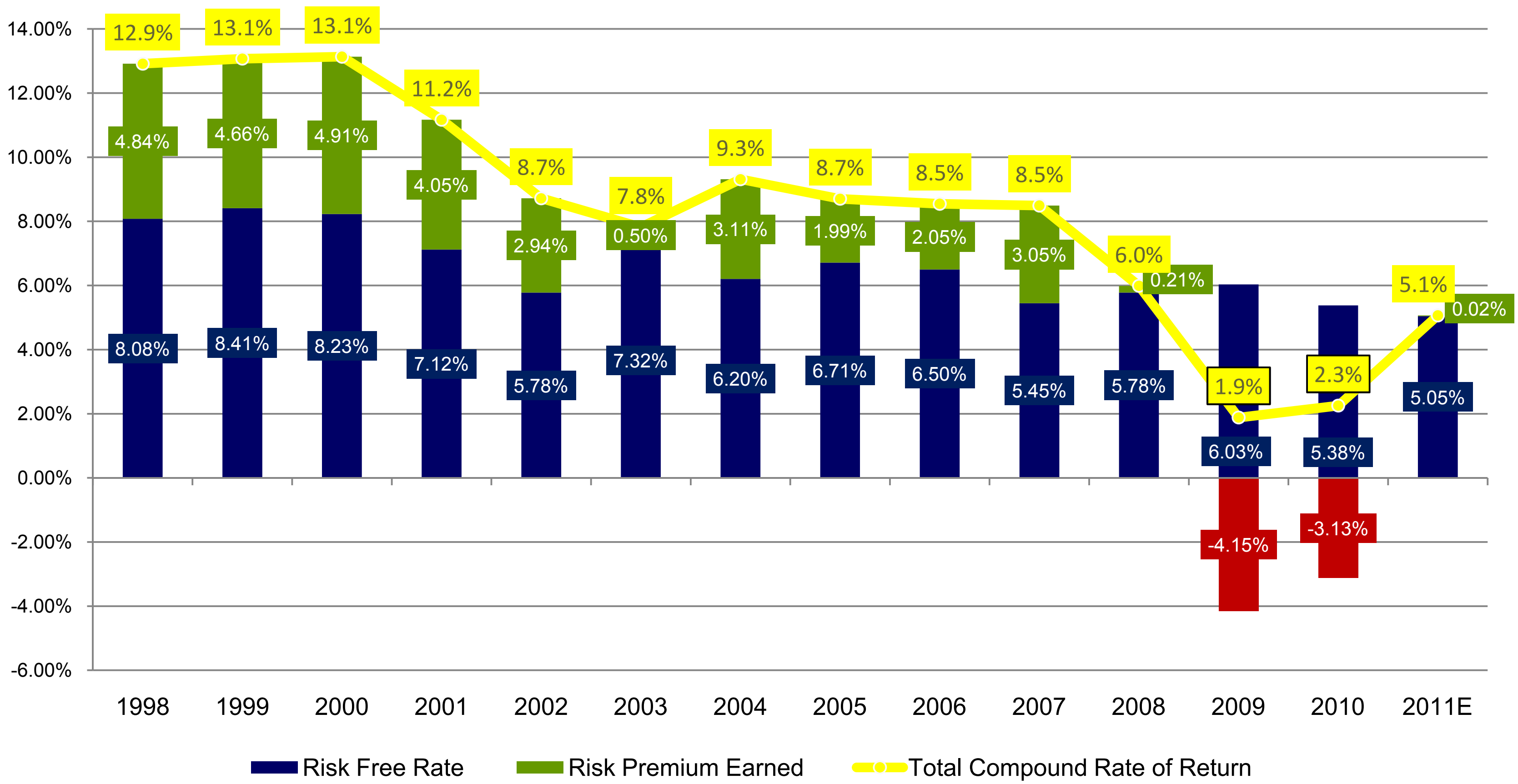
The Risk-Free Rate and Risk Premiums



Over longer time horizons (10 years or more), investment returns can be thought of as being a combination of a “risk-free” rate of return (generally the available rate of return from a US Treasury obligation), plus a “risk premium”, or additional return to be expected for owning assets of riskier nature than a US Treasury security (such as stocks, corporate bonds, real estate, private equity, etc.).

LGPF: Risk Free Rate and Risk Premiums Achieved Over Time

10 Year Rolling Periods, Fiscal Yearends, Compound Annual Returns

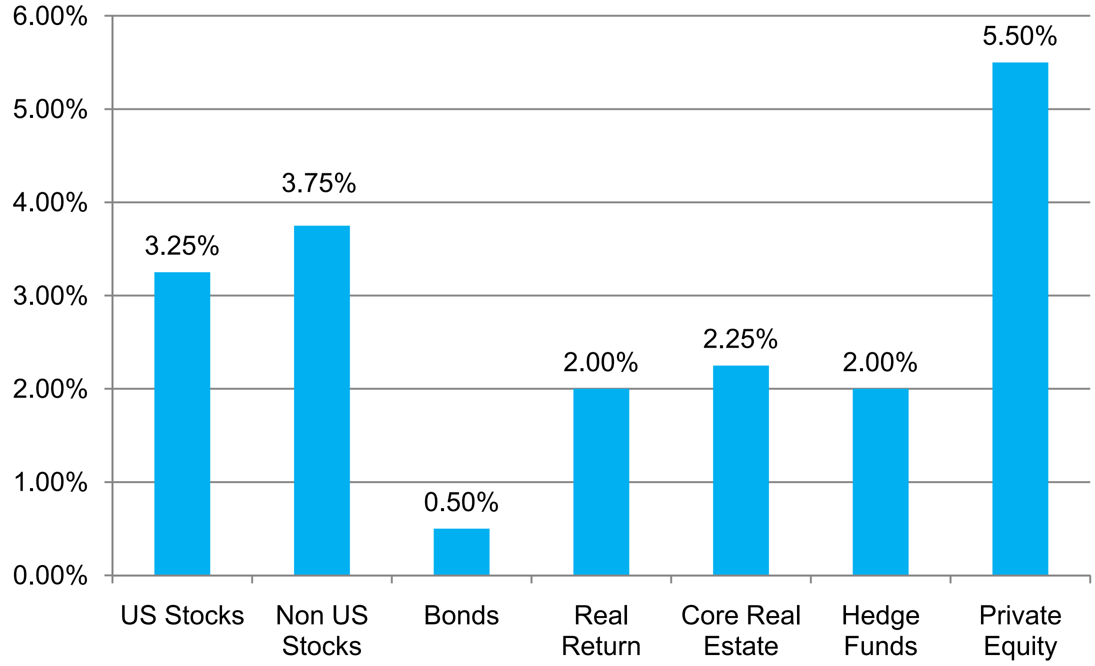


LGPF: Risk Premiums Achieved Over Time

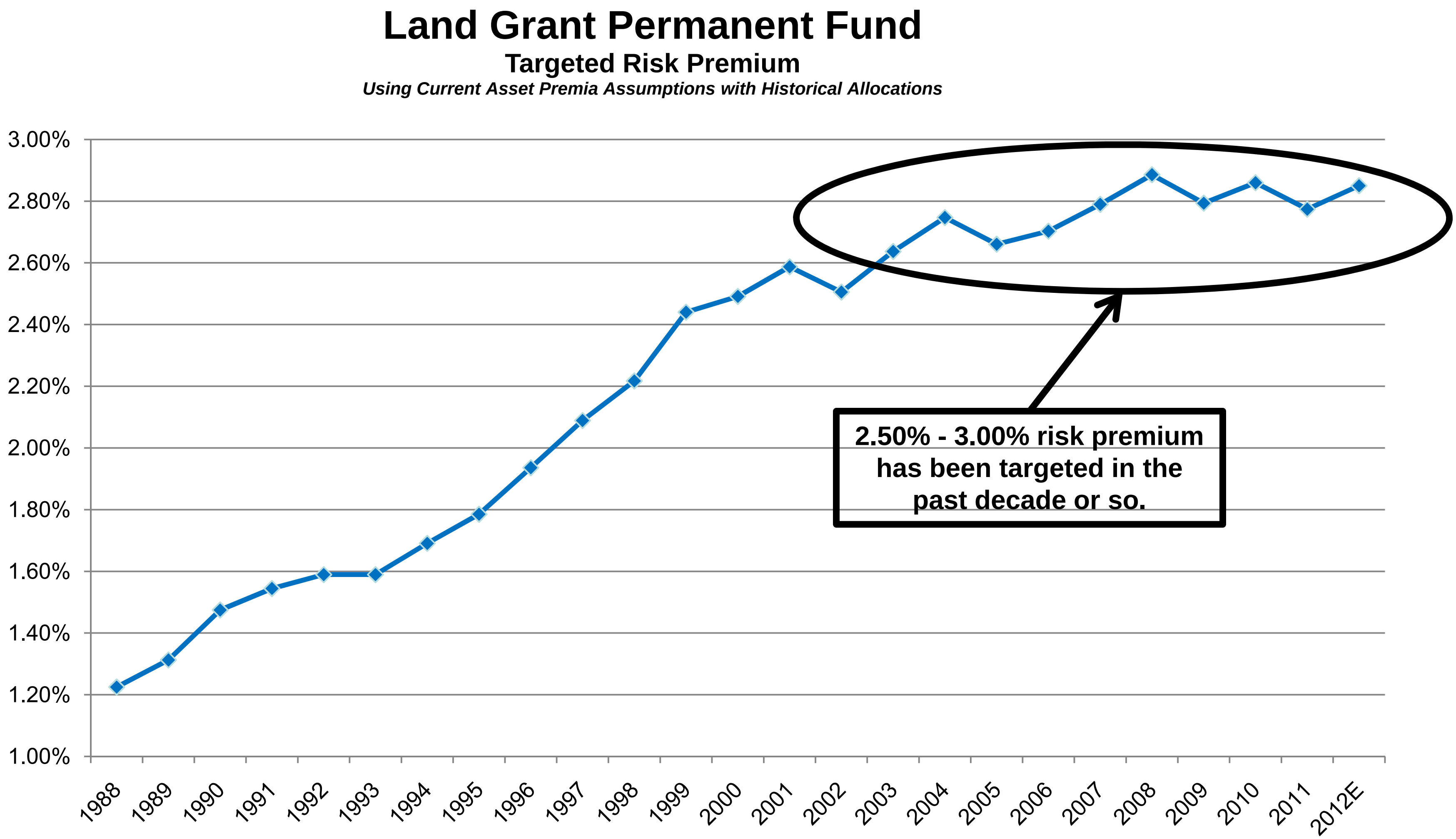
Annual Return (FY)		10yr Treas
1989	14.20%	8.08%
1990	9.70%	8.41%
1991	11.30%	8.23%
1992	15.10%	7.12%
1993	12.60%	5.78%
1994	-0.50%	7.32%
1995	16.00%	6.20%
1996	12.20%	6.71%
1997	18.50%	6.50%
1998	21.50%	5.45%
1999	15.80%	5.78%
2000	10.30%	6.03%
2001	-6.60%	5.38%
2002	-7.90%	5.05%
2003	3.60%	3.52%
2004	14.20%	4.58%
2005	9.70%	3.92%
2006	10.60%	5.14%
2007	17.90%	5.03%
2008	-3.80%	3.97%
2009	-22.00%	3.54%
2010	14.40%	3.29%
2011E	22.50%	3.16%

	Cmpd Ann'l ROR	Corresponding 10 Yr Treas (RFR)	LGPF Risk Prem
1989-1998	12.92%	8.08%	4.84%
1990-1999	13.07%	8.41%	4.66%
1991-2000	13.13%	8.23%	4.91%
1992-2001	11.17%	7.12%	4.05%
1993-2002	8.72%	5.78%	2.94%
1994-2003	7.82%	7.32%	0.50%
1995-2004	9.31%	6.20%	3.11%
1996-2005	8.70%	6.71%	1.99%
1997-2006	8.55%	6.50%	2.05%
1998-2007	8.49%	5.45%	3.05%
1999-2008	5.99%	5.78%	0.21%
2000-2009	1.88%	6.03%	-4.15%
2001-2010	2.25%	5.38%	-3.13%
2002-2011E	5.07%	5.05%	0.02%
		Average:	**1.79%**
1989-2011E	8.55%	8.08%	0.47%

Assumed/Expected Risk Premiums, by Asset Class



LGPF: Targeted Risk Premiums Over Time



Can the Markets Deliver?

Theoretically-Derived Return Availability

10 Yr Treasury Interest Rates		Risk Premiums										
	1.79%	1.50%	1.75%	2.00%	2.25%	2.50%	2.75%	3.00%	3.25%	3.50%	3.75%	4.00%
2.92%	4.57%											
4.00%	95%	5.50%	5.75%	6.00%	6.25%	6.50%	6.75%	7.00%	7.25%	7.50%	7.75%	8.00%
4.50%	51%	6.00%	6.25%	6.50%	6.75%	7.00%	7.25%	7.50%	7.75%	8.00%	8.25%	8.50%
5.00%	35%	6.50%	6.75%	7.00%	7.25%	7.50%	7.75%	8.00%	8.25%	8.50%	8.75%	9.00%
5.50%	29%	7.00%	7.25%	7.50%	7.75%	8.00%	8.25%	8.50%	8.75%	9.00%	9.25%	9.50%
6.00%	14%	7.50%	7.75%	8.00%	8.25%	8.50%	8.75%	9.00%	9.25%	9.50%	9.75%	10.00%
6.50%	7%	8.00%	8.25%	8.50%	8.75%	9.00%	9.25%	9.50%	9.75%	10.00%	10.25%	10.50%
7.00%	4%	8.50%	8.75%	9.00%	9.25%	9.50%	9.75%	10.00%	10.25%	10.50%	10.75%	11.00%
7.50%	2%	9.00%	9.25%	9.50%	9.75%	10.00%	10.25%	10.50%	10.75%	11.00%	11.25%	11.50%
8.00%	0%	9.50%	9.75%	10.00%	10.25%	10.50%	10.75%	11.00%	11.25%	11.50%	11.75%	12.00%

Can the Markets Deliver?

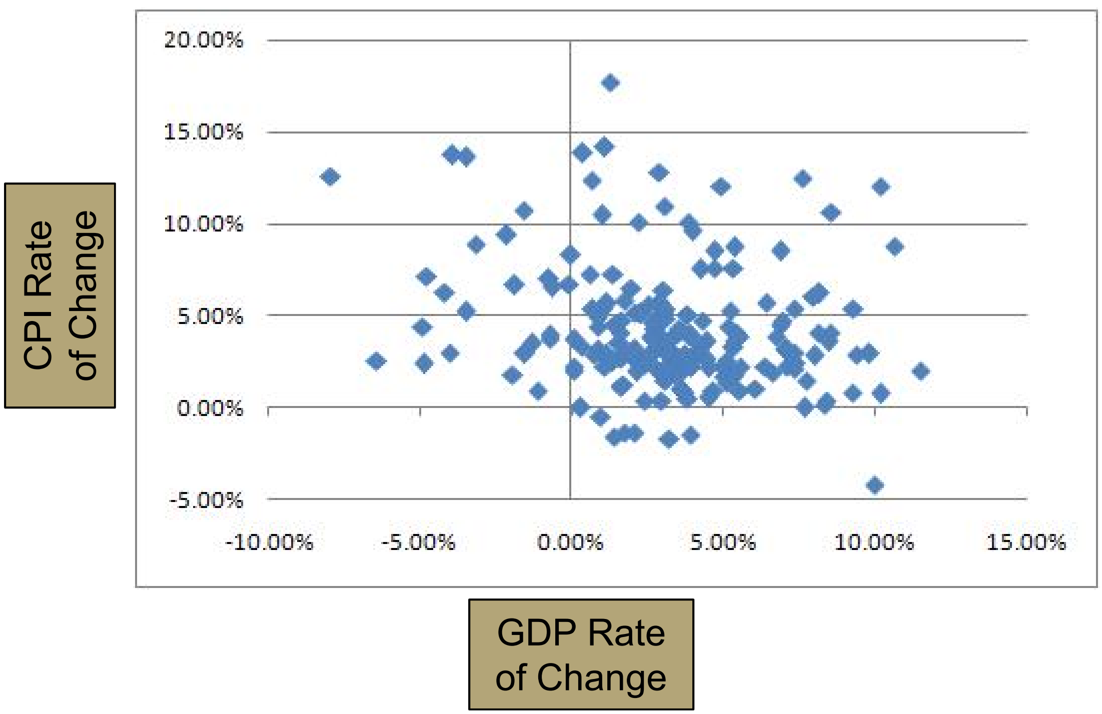
Economic Regimes since 1960

Since 1960

Number of Observations		
16	17	8
18	78	21
6	27	9

Pct of Total Observations		
8%	9%	4%
9%	39%	11%
3%	14%	5%

Pct Total Observations	
17%	
12%	72%

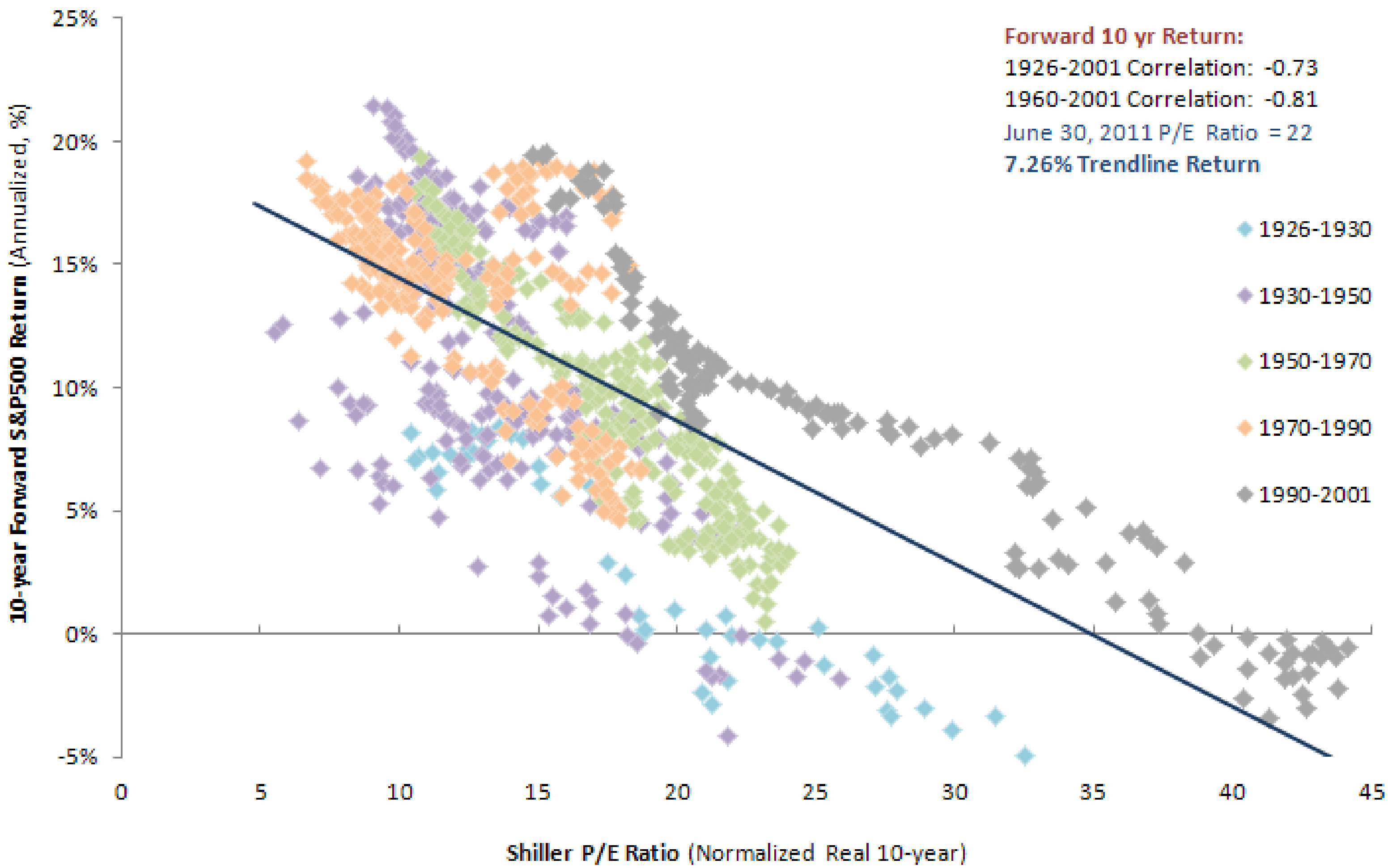


Using the annualized quarter-to-quarter change in both U.S. Gross Domestic Product and the Consumer Price Index, the table above shows how often the U.S. economy has been in each of the economic regimes since 1960.

Presently, SIC makes the assumption that, over the next ten years, interest rates will be on the rise and economic growth will underperform on average in the U.S. and other developed nations where the bulk of institutional portfolios are invested. This will lead to an investment environment that investors have not faced in decades, and one that may favor asset types that the SIC, as well as most other large, public, institutional investors, have not historically invested in in a material way.

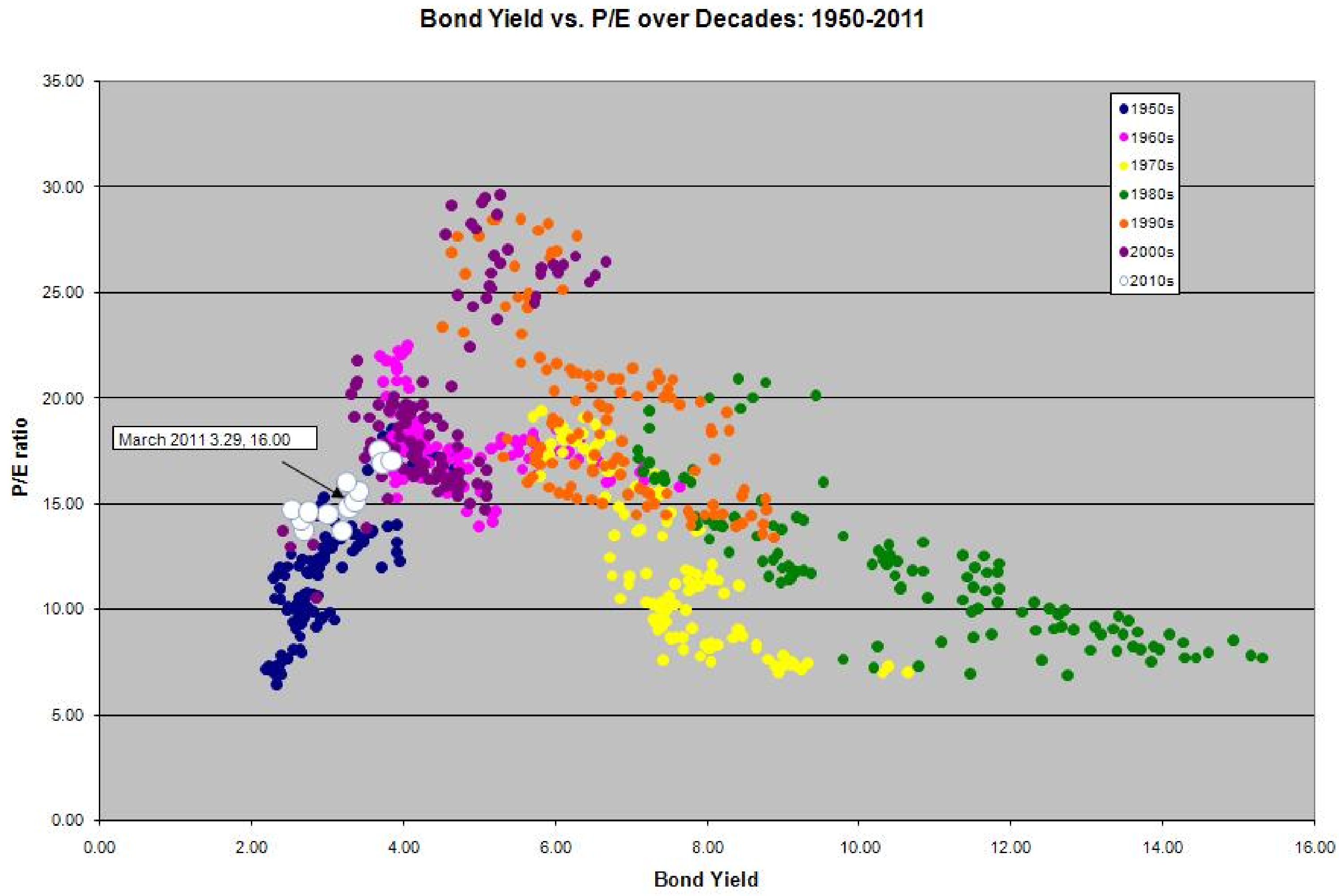
Can the Markets Deliver?

Equity Market Long-Run Returns versus Pricing



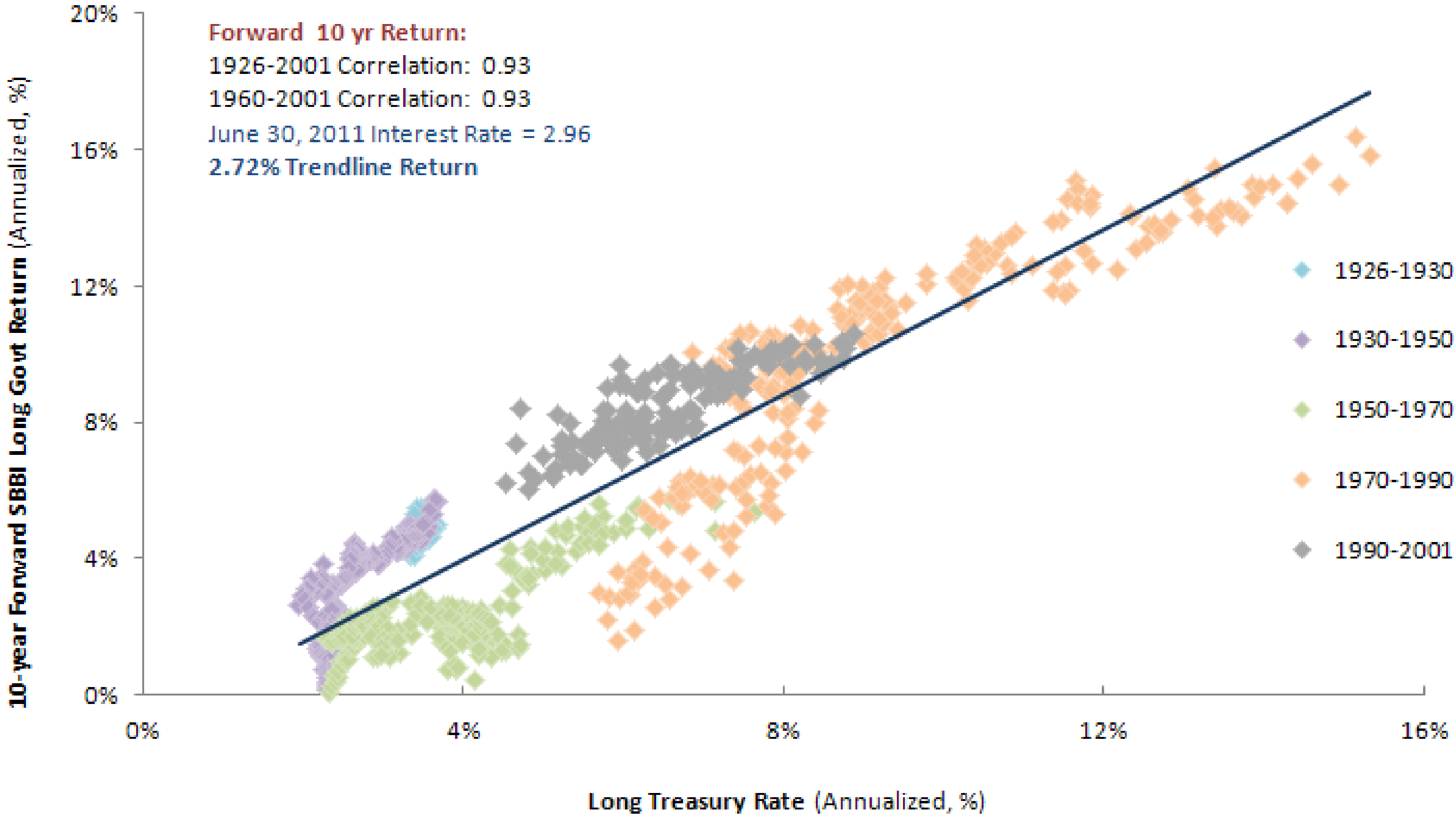
Can the Markets Deliver?

Investors Willingness to Pay for Earnings over Time



Can the Markets Deliver?

Bonds Purchased (or Owned) Today Will Almost Certainly Be Low-Returning Investments



Some Conclusions Regarding the Availability of Investment Return

- The current low rate of “risk-free” return structurally lowers total return available at every risk point.
- In consideration of the condition of the investment markets, the SIC reduced the target rate of return for the permanent funds from 8.50% to 7.50%. This still makes for a vigorous return target.
- Achieving the risk premium will be critical -- interest rates (and therefore the “risk-free rate”) are expected to rise going forward, but statistically, it will be difficult for rates to rise enough in the next ten year period to offset a major disappointment in risk premiums achieved.
- The SIC recognizes that the investment markets are changing, and that the portfolio must change with them to achieve the targeted rate of return with a reasonable amount of investment risk:
  - After a 30-year period of steadily declining interest rates in the U.S. (and globally), rates are expected to begin to climb back toward longer-term averages. Fixed income investments purchase (or owned) today will produce low rates of return in that type of environment.
  - Economic growth in the U.S. and other developed nations, where the bulk of SIC portfolios are invested, will likely underperform relative to the last three decades. To a degree, this will constrain growth in the equity markets.
  - Higher rates of inflation are expected to occur in the U.S. The U.S. dollar may show persistent weakness against a global basket of currencies. This affords opportunity in foreign-currency priced investments for those investing with U.S. dollars.
- Valuations: Publicly-traded equity (in which more than half of SIC portfolios are invested) seems priced such that valuation should not be the kind of hindrance to returns over the next ten years as it was over the last ten years. As noted above, fixed income valuations (low rates) will likely make for low-returning investments in this asset area.