

Long-Term Investment Pool & Similar Funds (LTIP)

Investment Review for Calendar 2014

Submitted February 2015

This cover page provides a summary overview of the Pennsylvania State University Long-Term Investment Pool (see next page for details) for Calendar Year 2014. The second page summarizes LTIP-related data that is discussed on the remaining pages, along with performance analysis.

Executive Overview

Long-Term Investment Pool (LTIP) Performance

Annualized *net* investment returns for the Penn State University LTIP (adjusted for the impact of gifts and spending, and after external investment management expenses) for periods ending December 31, 2014 are:

<u>Calendar 14</u>	<u>3 Years</u>	<u>5 Years</u>	<u>10 Years</u>
7.6%	11.9%	10.7%	7.9%

Long-Term Investment Pool Market Value (pg 3)

As of December 31, 2014, Penn State University's LTIP was valued at \$3.43 billion, which includes \$2.31 billion in endowment assets and \$1.12 billion in non-endowed funds. An additional \$108 million was held as Similar Funds (see page 2 for details). Endowment spending is reviewed on pages 2 and 3.

Review of Investment Markets (pg 4)

The graph below compares respective returns for the 12-months ending December 31, 2014 and December 31, 2013 for the S&P 500, MSCI All Country World (ACWI) ex-US, Dow Jones UBS Commodities, Barclays Aggregate Bonds, and publicly-traded Real Estate Investment Trusts (REITs) Indexes. As shown below, equity and commodity returns for calendar 2014 lagged 2013, while bonds and REITS outperformed their respective 2013 returns.

Investment Diversification and Asset Mix (pg 5)

At calendar year-end, 53% of LTIP assets were invested in public equities (domestic and foreign) and 15% in private equity and venture capital, in combination representing 68% of LTIP in growth-oriented assets. In addition, 14% was invested in fixed income/cash, 10% in real assets, and 8% in diversifying (hedge) strategies.

Comparative Fund Performance (pg 6)

Penn State's LTIP returned 7.6% net for the year ending December 31, 2014, outpacing the 5.9% return of the Passive Policy Portfolio, while LTIP's 3-yr and 5-yr relative performance notably better than the respective passive benchmark returns.

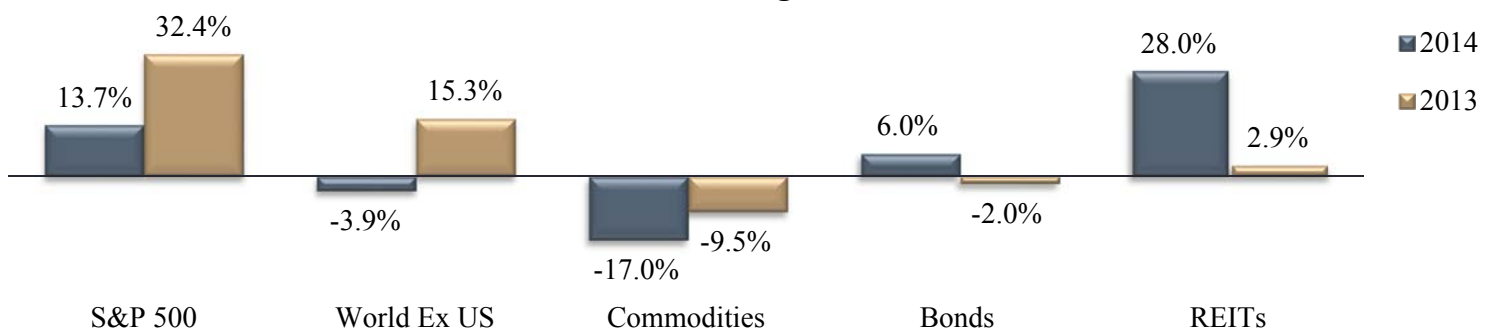
LTIP Liquidity (pg 7)

With nearly one-half of assets convertible to cash in a matter of days, the LTIP maintains adequate liquidity to satisfy anticipated cash requirements.

LTIP Performance and Spending (pg 8)

Penn State LTIP's average annual net returns of 7.9% and 9.0% for the last 10-year and 20-year periods, respectively, have allowed LTIP to earn inflation-adjusted returns in excess of spending, thereby achieving long-term intergenerational equity.

**Investment Market Returns
Calendar Years Ending December 31**



5-Year LTIP Facts and Figures

	Annual Periods Ending December 31				
	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>
<i>Investment Performance</i>					
Endowment ¹ (annualized net returns)	7.6%	14.2%	14.0%	3.9%	14.1%
<i>Market Values</i> (\$ millions)					
Endowment ¹	2,310.1	2,120.7	1,859.0	1,669.1	1,545.8
<u>Similar Funds</u> ²	<u>108.3</u>	<u>109.7</u>	<u>94.3</u>	<u>89.7</u>	<u>116.5</u>
Endowment and Similar Funds	2,418.4	2,230.4	1,859.3	1,798.1	1,458.0
Gifts & Other Additions (\$ mils)	120.1	87.3	52.6	139.1	71.4
Current Spending (\$ mils)	79.6	73.1	71.2	66.4	62.5
As described in footnote #3 below, funds earmarked for FAS 106 liabilities (post-retirement health care benefits for PSU retirees) were commingled into the University's Long-Term Investment Pool (LTIP) between September 2009 and January 2013. Prospectively, the reported market value, and related analysis, for LTIP will include all commingled funds, as shown below for December 31, 2014.					
<u>Non-Endowed Funds</u> ³	<u>1,121.3</u>	<u>1,081.0</u>	<u>717.3</u>	<u>134.8</u>	<u>135.7</u>
Total LTIP ⁴ & Similar Funds	3,539.31	3,311.4	2,670.6	1,893.6	1,798.0
1) Endowment — donor-restricted gifts					
2) Similar Funds — deferred gifts and donor-restricted funds in transit to Endowment					
3) Non-Endowed Funds earmarked for FAS 106 liability (employee post-retirement health care benefits)					
4) Commingled assets over which Penn State's Office of Investment Management (OIM) has investment responsibility, as approved by the Penn State Investment Council (PSIC), exclusive of Similar Funds					

Penn State Investment Council (PSIC) Meetings

August 22, 2014:

- Committing \$15M to: Round Hill Music Royalty Fund I, L.P.
- Investing \$20M in: Proprietary Capital Lynx Plus Fund
- Investing \$30M in: Sanderson International Value Equity Fund

October 31, 2014:

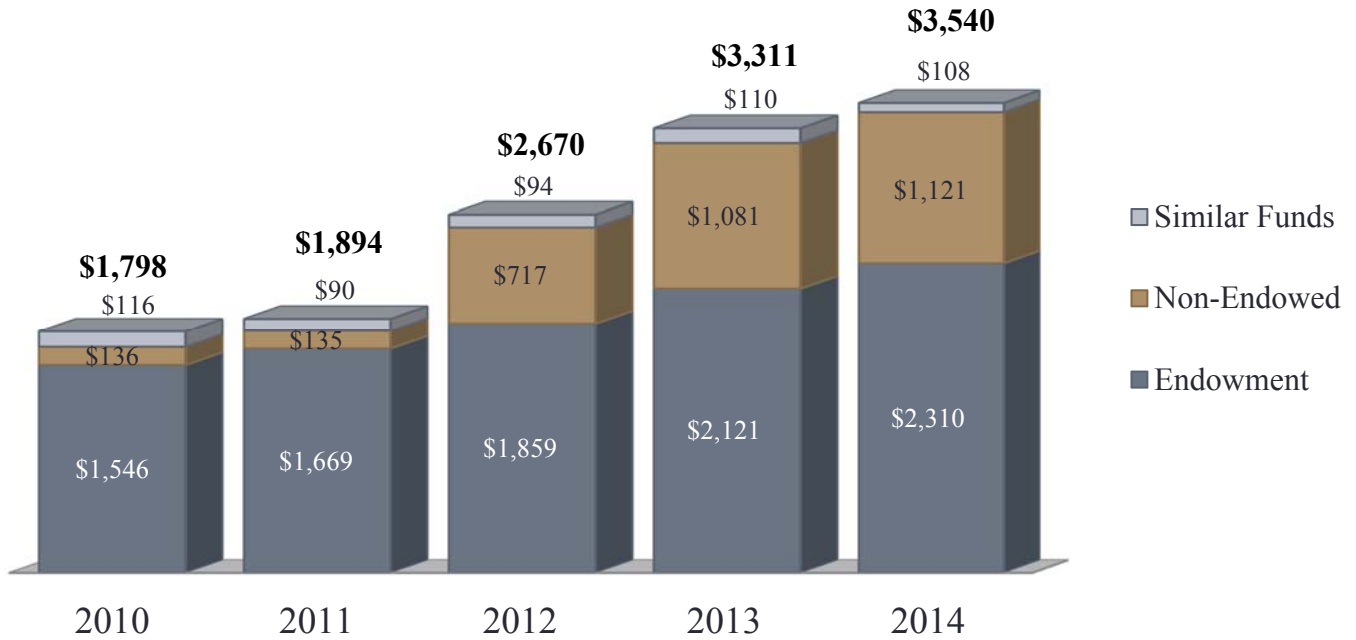
- Committing \$20M to: Siris Partners III, L.P.
- Committing \$20M to: OrbiMed Royalty Opportunities II, L.P.
- Committing \$15M to: Commonfund Capital Venture Partners XI, L.P.
- Investing \$25M in: Fuller & Thaler Small Cap Value
- Investing \$25M in: Snow Capital Small Cap Value Equity
- Investing \$50M in: Rice Hall James & Associates Small Cap Opportunities

Please note that commitments made to Limited Partnerships (LPs) are not immediately invested and are called (paid in) over several years until commitment is satisfied, except as noted.

Long-Term Investment Pool Market Value

As of December 31, 2014, Penn State’s Long-Term Investment Pool was valued at \$3.43 billion, including non-endowed funds in the amount of \$1.12 billion that have been commingled into the LTIP. Non-pooled assets — charitable remainder trusts, charitable gift annuities, and other life income funds in addition to donor restricted funds — accounted for an additional \$108 million, shown below as Similar Funds, for a total \$3.54 billion in assets.

Long-Term Investment Pool Market Value
Calendar Years Ending December 31
 (\$ millions)



Endowment Assets

Endowment assets increased by \$189 million during calendar 2014, from \$2.12 billion to \$2.31 billion. As seen in the table on page 2, endowed gifts added over the last 12 months totaled \$120 million, while endowment program support (spending) amounted to \$80 million. Current endowment spending has been approved by the Board of Trustees to remain at an annual rate of 4.5%.

Long-Term Investment Pool

As of December 31, the market value of the Long-Term Investment Pool (LTIP) totaled \$3.54 billion. In addition to Endowment assets of \$2.31 billion, LTIP includes \$1.12 billion in non-endowed assets that have been commingled for investment purposes, but are restricted to the on-going funding of the University’s FAS 106 liability.

The remainder of this report will focus on the Long-Term Investment Pool, including all commingled funds.

Review of Investment Markets in Calendar 2014

In the table below, representative financial market returns are listed for 1-, 3-, and 5-year periods covering four major asset categories: Global Equities (divided into US Equities and Non-US Equities), Fixed Income, Commodities, and Private Capital. The performance of investment markets that impact Penn State University's Long-Term Investment Pool (LTIP) is discussed below.

<i>Annualized Percentage Returns as of December 31, 2014</i>	<u>1 Year</u>	<u>3 Year</u>	<u>5 Year</u>
Global Equities U.S.			
S&P 500 Index (US Large Cap Equities)	13.7	20.4	15.5
Russell 3000 Index (Total US Equities)	12.6	20.5	15.6
Russell 2000 Index (US Small Cap Equities)	4.9	19.2	15.5
Global Equities Non-U.S.			
MSCI All Country Ex-U.S. Index (ACWI)	-3.9	9.0	4.4
MSCI Developed Non-U.S. Index (EAFE)	-4.9	11.1	5.3
MSCI Emerging Markets Index (EME)	-2.2	4.0	1.8
Fixed Income			
Barclays US Aggregate Bond Index	6.0	2.7	4.4
Barclays US Treasury TIPS Bond Index	3.6	0.4	4.1
JP Morgan Global Bond Index	-0.5	-1.0	1.7
Commodities			
Bloomberg Commodities Index	-17.0	-9.4	-5.5
Gold (SPDR GLD)	-2.2	-8.8	1.4
Private Capital (9/30/14)			
Venture Capital (Cambridge Associates)	20.9	14.5	14.5
Private Equity (Cambridge Associates)	16.2	16.4	16.3
Private Real Estate (NCREIF)	11.3	11.1	11.0

Market Notes:

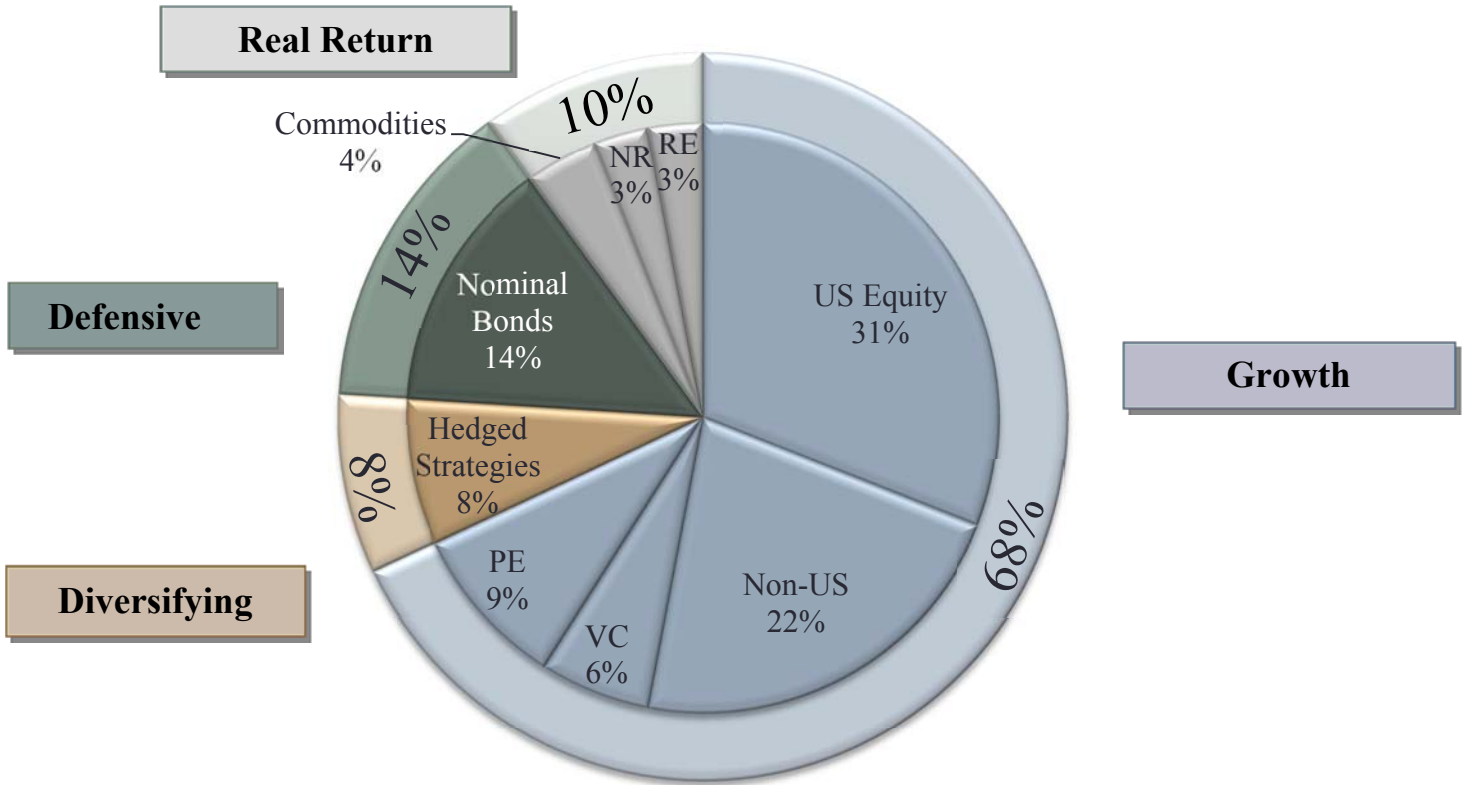
- **Global Equities:** Except for US Small Cap in 2014 (4.9%), US Equities have posted double-digit returns for each of the 1-, 3-, 5-years ending 12/31/14, and continued to outpace non-US Equities over all three periods. Non-US Equities were down 3.9% in 2014, with Developed Market and Emerging Market Equities retuning -4.9% and -2.2%, respectively.
- **Fixed Income:** US Fixed Income and US TIPS continued their pace of single digit gains while Global Bonds were slightly negative again in 2014.
- **Commodities:** The Bloomberg Commodities Index continued its negative trend, registering losses of -17.0%, -9.4%, and -5.5% for the trailing 1-, 3-, 5-years, while Gold outpaced commodities overall.
- **Private Capital:** Private Equity, Venture Capital, and Private Real Estate all continued their double-digit gains for each of the 1-, 3-, 5-years ending 9/30/2014.

Economic and Market Outlook

On the following two pages, LTIP's broad and detailed asset mix is discussed, followed by the composite investment returns for each of the four above asset categories compared to the corresponding LTIP returns.

Investment Diversification and Asset Mix

Asset allocation is a primary determinant of investment performance and risk control. LTIP's asset mix combines four strategic investment themes – growth (economic-sensitive), real (inflation-sensitive), diversifying (low sensitivity to economic/investment-market fluctuations), and defensive – to maximize potential returns, while tempering volatility. In the graph below, the four macro investment themes are shown in the outermost ring with their December 31, 2014 allocations of 68%, 8%, 14% and 10%, respectively; however, the percentages fluctuate over time depending on market trends and allocations approved by the Penn State Investment Council.



At a more granular level, LTIP's diversified portfolio includes a variety of traditional asset classes that comprise the four strategic themes, as shown by the slices within the inner pie (percentages are rounded):

- Growth (68%): 31% in publicly-traded US and 22% in publicly-traded non-US common stocks, as well as 6% in venture capital and 9% in private equity funds.
- Diversifying (8%): 5% in credit-related, 2% in equity-related strategies and 1% in various other hedged strategies.
- Defensive (14%): 10% in US government and investment grade corporate bonds, and 4% in global bonds.
- Real Return (10%): 3% in real estate, 3% in natural resources, and 4% in commodities.

The approximately 68% currently allocated to growth is intended to take advantage of capital growth and purchasing power protection offered by equity-type investments, while the 10% allocated to real return is to buffer inflation. The 14% invested in defensive (fixed income) and 8% in various hedged strategies are intended to provide stability and diversification during times of market turbulence and uncertain economic conditions.

LTIP Performance Compared to Passive Portfolio

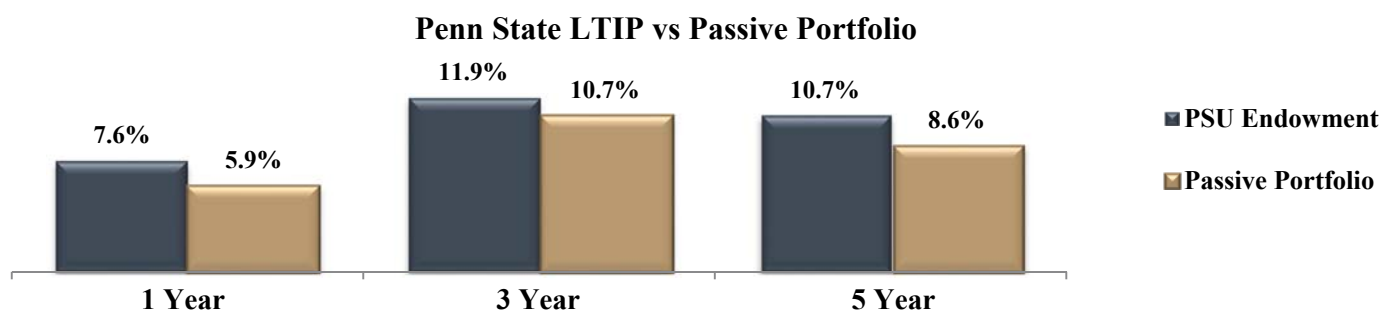
The Long-Term Investment Pool’s investment performance is measured against a hypothetical *Passive Portfolio*, comprised of four broad asset categories: Public Equities, Private Capital, Fixed Income and Commodities. This passive portfolio serves as a blended benchmark against which the performance of the actual, actively-managed, and more broadly-diversified LTIP portfolio is monitored. This analysis is distinct from the foregoing conceptual, strategic themes which do not lend themselves to benchmarks analysis.

These categories are very broadly defined: the equity and fixed income categories include hedge funds whose strategies are equity and/or credit oriented, respectively, while commodities include hedged and long-only strategies. The custom index for Private Capital includes representative private equity, venture capital, and private real estate partnership time-weighted returns.

In the table below, the respective static weightings of the four asset categories are associated with corresponding market benchmarks and their respective index returns to generate *Passive Portfolio* returns over 1-, 3-, and 5-year horizons:

<u>Asset Class</u>	<u>Benchmark</u>	<u>Weighting</u>	<u>Annualized Benchmark Returns</u>		
			<u>1 Year</u>	<u>3 Years</u>	<u>5 Years</u>
Public Equities	MSCI All Country World	55%	4.2	14.1	9.2
Total Private Capital	Custom Index	20	16.1	14.6	14.5
Fixed Income	Barclays Aggregate Bond Index	20	6.0	2.7	4.4
Commodities	Dow Jones UBS Commodities	<u>5</u>	<u>-17.0</u>	<u>-9.4</u>	<u>-5.5</u>
Total Passive Portfolio (net)		100%	5.9%	10.7%	8.6%

Note: The weightings used above are assumed to be constant over the entire 5-yr.

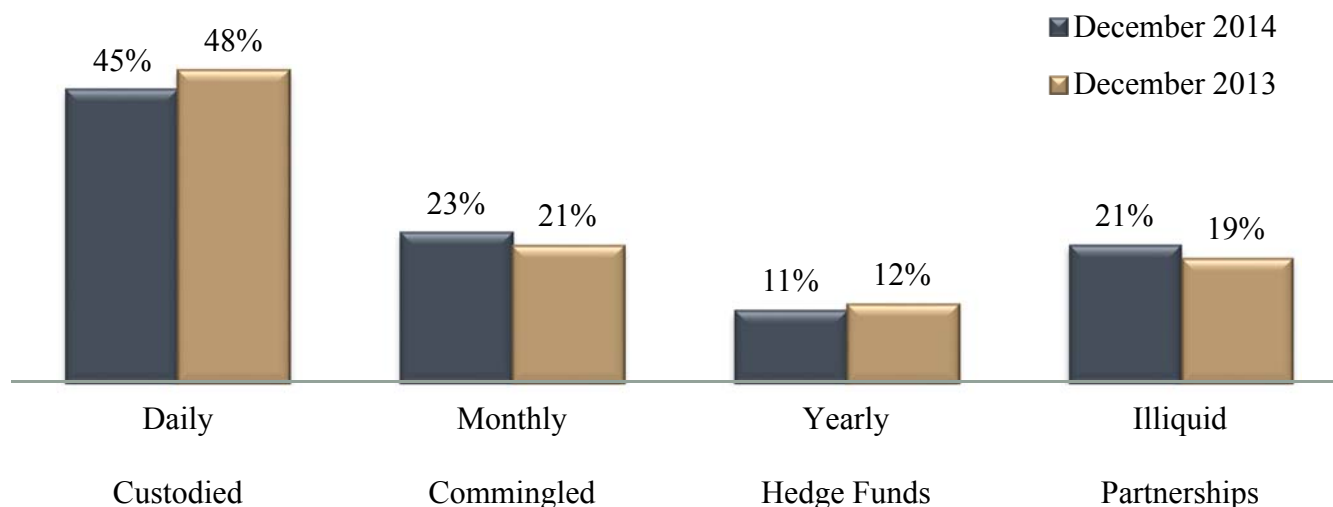


As shown above, Penn State’s LTIP returned 7.6% net for calendar 2014, surpassing the 5.9% return of the Passive Portfolio over the trailing 12 months. For the 3- and 5-year periods, the Long-Term Investment Pool’s annualized returns of 11.9% and 10.7% outpaced the Passive Portfolio’s returns of 10.7% and 8.6%, respectively. This indicates that, over the long term, LTIP was able to outperform passive indexes through selection of active investment managers and broad diversification of assets as shown on the previous page.

The Passive Portfolio provides a guidepost to help achieve long-term results that are consistent with the twin objectives of purchasing-power preservation, along with stable LTIP spending. LTIP’s performance varies from the *static* Passive Portfolio as a consequence of several factors, including, but not limited to, the timing of cash-flows, tactical shifts in asset mix, and individual investment manager performance and turnover.

Long-Term Investment Pool Liquidity

Financial crises are characterized, among other considerations, by lack of liquidity, as institutions are unable to meet current obligations due to lack of available cash. In the graph below, LTIP assets are classified according to how quickly they can be converted to cash. Securities listed on exchanges or traded over-the-counter, and held in custody as separately managed accounts, can be liquidated on a daily basis (typically 1- and 3-day settlement for bonds and stocks, respectively). Commingled portfolios, i.e., collectively-managed investment pools of publicly-traded securities, are eligible for purchase or sale at least once a month. Hedge fund partnerships are typically open for at least partial liquidation once a year, with a few having more and/or less frequent liquidity “windows.” Non-marketable partnerships are considered illiquid primarily because of the inability of limited partner investors to transact at will.



Observations from the blue (left) bars of each of the four pairs above for the period ending December 31, 2014:

- 45% percent of LTIP assets are invested in stocks and bonds that can be converted to cash in a matter of days. Of this, about 1% is held in money market accounts, along with approximately 5% in “securitized cash” (i.e., fully-collateralized S&P and Treasury futures), which can be readily converted to cash in order to satisfy day-to-day and/or unforeseen cash requirements.
- Commingled portfolios, primarily non-US public equities, comprise 23% of LTIP assets and can be converted to cash within 30 days or, in some cases, sooner. Commingled structures are used for non-US holdings in lieu of registering in individual countries where foreign companies are headquartered.
- 11% of LTIP assets are invested in various diversifying hedge fund partnerships and can be at least partially converted to cash annually or, in many cases, quarterly.
- 21% percent of LTIP assets are invested in more than 100 different partnership funds or other non-marketable investments that are considered illiquid because underlying holdings are typically not readily marketable or the timing of future realizations into cash distributions are uncertain.

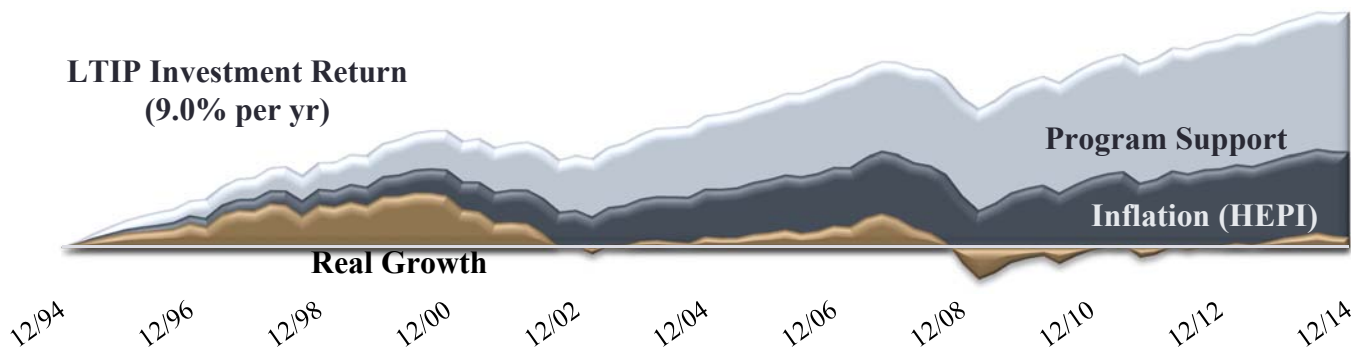
The foregoing indicates that LTIP maintains sufficient liquidity to satisfy anticipated cash requirements.

Liquidity Trends

As shown above, the liquidity profile of Penn State’s LTIP has shifted somewhat from the end of calendar 2013 (tan bars) to the end of calendar 2014 (blue bars). Daily liquidity decreased slightly from 48% to 45%, while monthly liquidity increased from 21% to 23%, as LTIP’s allocation shifted from separately-managed US equities to non-US commingled funds. Yearly liquidity dropped marginally from 12% to 11%, while illiquid non-marketable alternative assets increased from 19% to 21%. Over time, stepped up commitments to partnerships will gradually result in larger representation by non-marketable investments.

Long-Term LTIP Growth and Spending

In the chart below, the top line represents the cumulative net investment return of the Penn State Long-Term Investment Pool (LTIP) over the last 20 years, averaging 9.0% per year. The layers illustrate investment return apportioned to program support (spending, as previously discussed on pages 2 and 3) and inflation (as measured by the Higher Education Price Index [HEPI]), with the remaining residual representing net, real (inflation-adjusted) growth.



Cumulative 20-year Returns (Base 100 Index)

LTIP's primary investment goal is to earn a long-term rate of return sufficient to support *current* spending and to preserve *future* purchasing power. This two-pronged objective is illustrated by apportioning total nominal (i.e., before adjusting for inflation) investment return (topmost line above) into discrete layers, representing program support and inflation, along with a residual layer corresponding to net *real* growth. Because investment returns periodically fluctuate (illustrated by the jagged topography above), real growth, which nets out program support and inflation from total LTIP return, oscillates across the horizontal "intergenerational equity" line. While market fluctuations have caused the growth layer to swing positive and negative around the horizontal line, intergenerational equity has largely been achieved.

Two Very Different Decades of Market Performance

The variable nature of investment returns is characterized in the table below which bifurcates the last 20 years into two successive 10-year periods, whose respective investment returns differed widely. The 10 years ending December 2004 (second row) benefitted from an extended equity bull market during the 1990s, while the 10 years ending December 2014 (first row) suffered a large sell-off in equities, before rebounding over the last 5.8 years. The return disparity between decades is visibly reflected by comparing the 10-year average returns for the period ending December 31, 2014 versus the period ending December 31, 2004 for both the S&P 500 and Barclays Aggregate Bond Indexes below:

<u>10-Year Periods</u> <u>Ending December 31</u>	<u>Annual Nominal Returns</u>			<u>HEPI</u>	<u>Annual Real Returns</u>		
	<u>S&P 500</u>	<u>Bond Index</u>	<u>LTIP</u>		<u>S&P</u>	<u>Bonds</u>	<u>LTIP</u>
2004 to 2014	7.7%	4.7%	7.9%	2.8%	4.9%	1.9%	5.1%
1994 to 2004	12.1	7.7	10.2	3.5	8.5	4.2	6.6
Difference:	-4.4%p	-3.0%p	-2.3%p	-0.7%p	-3.6%p	-2.3%p	-1.5%p

As shown by the negative differentials in the third row above, market index returns for the most recent 10 years lagged those for the previous 10 years: S&P 500's 7.7% annualized nominal return for the 10 years ending December 31, 2014 trailed its 12.1% pace for the prior 10-year period by 4.4% (percentage points); meanwhile, Barclays Aggregate Bond Index returned 4.7% for the December 31, 2014 10-year period versus 7.7% for the prior 10-year period, a 3.0%p differential. LTIP's 7.9% annualized nominal net return for the 10 years ending December 31, 2014 *exceeded* the respective returns for both stocks and bonds. LTIP's prior 10-year return of 10.2% was between the corresponding stock and bond returns. LTIP's differential of -2.3%p indicates more consistent return relative to investment market returns.

On an inflation-adjusted basis relative to HEPI (boxed column in middle of above table), LTIP's net real return difference was -1.5%p compared to real differences of -3.6% for stocks and -2.3% for bonds (the third row of the right three columns above). Over the last decade, replacing public market investments with a variety of "alternative investments" has enabled LTIP to outperform both stocks and bonds for the 10 years ending December 2014. More importantly, LTIP's inflation-adjusted returns (5.1% and 6.0%) exceeded Penn State's annual spending rate (4.5%).