Whole Lotta Shakin’ Goin’ On
A Seismologist’s Guide to the 2016 (Investment) Universe

The Board of Pensions Balanced Investment Portfolio Returned 8.95%

Big Maybelle recorded Whole Lotta Shakin’ Goin’ On on OKeh Records in 1955 with Quincy Jones, the producer. In 1957, sixty years ago, it was recorded by rockabilly singer Jerry Lee Lewis on Sun Records.

2016 was a year of seismic change on multiple fronts with a whole lotta shakin’ goin’ on. We experienced volatile global equity and fixed income markets; the vote on BREXIT for the United Kingdom to leave the European Union; the continued re-emergence of Russia as a global power; the U.S. presidential election; continued ISIS activity in the Middle East; the destruction of Syria; a campaign to raise the U.S. minimum wage; research on and implementation of artificial intelligence, with an initial foray into more and better factory robots, driverless cars and drones.

Perhaps we can put 2016 in context by reviewing the past and drawing upon the words of a statesman, a novelist and a singer.

Alexander Hamilton on U.S. Presidential Elections

The Federalist Papers is a collection of 85 articles and essays written in 1788 under the pseudonym Publius by Alexander Hamilton, James Madison, and John Jay to promote the ratification of the United States Constitution.

Federalist Paper 68 is believed to have been written by Hamilton. It describes the method of selecting a president. Hamilton viewed the electoral system as superior to direct popular election. Corruption of an electoral process could most likely arise from the desire of “foreign powers to gain an improper ascendant in our councils”.

Hamilton expressed confidence that “It will not be too strong to say, that there will be a constant probability of seeing the station filled by characters pre-eminent for ability and virtue”.

Kurt Vonnegut on AI (Artificial Intelligence) and Robotics

Vonnegut wrote Player Piano in 1952. He forecast decades in advance of our now daily reality that the computer revolution conquered man and people have been replaced by machines. “If it weren’t for the people always getting tangled up in the machinery. If it weren’t for them, the world would be an engineer’s paradise”.

Edwin Starr on War

In 1970, during the Vietnam War, Edwin Starr recorded the song War.

War, I despise ’cause it means destruction of innocent lives
War, means tears to thousands of mothers how
When their sons go off to fight and lose their lives
I said, war, good god, now, what is it good for? 
Absolutely, nothing 
Say it again, war, what is it good for? 
Absolutely, nothing, listen to me 
War, it ain't nothing but a heart breaker 
War, friend only to the undertaker, war

Civil wars, ethnic cleansing and wars of territorial aggression too numerous to mention have been with us in the past 47 years. Nothing has changed.

Before we begin a detailed review of actual 2016 investment performance of the Board of Pensions Balanced Investment Portfolio, we need to review what we thought would occur in 2016 with the actual results.

2016 Investment Outlook versus 2016 Actual Results

Good investment performance is as simple as getting more things right than wrong in asset allocation and manager selection. 2016 was a year when we were right and partly right in our major asset allocation decisions. While individual managers underperformed, we were fortunate to not be absolutely wrong in any of our major asset allocation decisions.

- **Our 2016 Outlook:** Global investors in equity and debt markets will face challenges in 2016. There are few clearly attractive undervalued asset classes as we enter 2016, so once again it should be a year for managers gifted in security selection. We believe we have retained those managers as we have noted in our list of relationships we can be proud of.
  
  2016 Actual: **Partly right.** Our U.S. equity component lagged the passive benchmark due to disappointing performance from our large capitalization core and growth managers. The international equity component exceeded the benchmark due to excellent performance from our developed market and emerging market equity managers.

- **Our 2016 Outlook:** While we believe stocks are likely to outperform bonds in 2016, it is unclear which regions are most likely to outperform. While the U.S. economy is clearly the strongest in the developed world, U.S. stocks are also expensive relative to peers, and the Federal Reserve is closer to tightening interest rates than other global central banks.
  
  2016 Actual: **Partly right.** U.S. stocks outperformed developed market stocks and core fixed income. Emerging market stocks and bonds outperformed U.S. stocks.

- **Our 2016 Outlook:** International developed markets will face challenges in 2016. We believe our managers will select the best companies, but at this time we do not plan to increase the allocation to developed markets.
  
  2016 Actual: **Right.** We were correct in not increasing the allocation to international developed markets as they underperformed emerging markets and the U.S.

- **Our 2016 Outlook:** We still expect longer duration fixed income assets to be less attractive in 2016 as the Federal Reserve increases rates in 2016. Spreads on high yield and investment grade corporate bonds have widened, potentially increasing opportunities in 2016.
  
  2016 Actual: **Right.** High yield bonds returned 18%. The 10-year Treasury returned 1%.

- **Our 2016 Outlook:** Emerging market stocks and bonds should provide superior long-term investment performance.
  
  2016 Actual: **Right.** We increased emerging market exposures in February 2016.

- **Our 2016 Outlook:** We do not expect inflation will be a problem in 2016. However, based upon 2014 conditions in the commodities markets and the 50% decrease in the price of
crude oil in the second half of 2014, an additional allocation was made to commodities in early 2015.  
2016 Actual: Right. The commodity portfolios returned 22.6% and 14.2%, respectively.

**Introduction**

The Board of Pensions Balanced Investment Portfolio returns net of fees and the asset allocation on December 31, 2016 were as follows:

<table>
<thead>
<tr>
<th>Asset Allocation</th>
<th>2016 Return</th>
<th>$ Millions</th>
<th>Percent</th>
<th>Long-Term Strategic Asset Allocation Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Equity</td>
<td>12.3%</td>
<td>$3,194</td>
<td>37.2%</td>
<td>30-50%</td>
</tr>
<tr>
<td>International Equity</td>
<td>6.0%</td>
<td>1,683</td>
<td>19.6%</td>
<td>10-25</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>6.6%</td>
<td>2,484</td>
<td>28.9%</td>
<td>25-45</td>
</tr>
<tr>
<td>Private Partnerships</td>
<td>9.4%</td>
<td>758</td>
<td>8.8%</td>
<td>1-20</td>
</tr>
<tr>
<td>Marketable Diversifying Investments</td>
<td>9.1%</td>
<td>467</td>
<td>5.4%</td>
<td>1-20</td>
</tr>
<tr>
<td>Total</td>
<td>8.9%</td>
<td>$8,586</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

The Board of Pensions Balanced Investment Portfolio began 2016 with total assets of $8.199 billion. With an investment return of 8.9% in 2016, the market value of the Portfolio increased to $8.586 billion by December 31, 2016 after paying out $336 million in net benefits payments to Plan members and their surviving spouses.

Performance of the Board of Pensions Balanced Investment Portfolio is compared to the 6.0% long-term investment return assumption for the Pension Plan. The return of each component of the Balanced Investment Portfolio is compared to the relevant asset class benchmark. Both the international equity and fixed income components of the Balanced Investment Portfolio exceeded their benchmark returns. The U.S. equity component lagged the benchmark return.

**The Absolute Return Benchmark: The Long-Term Investment Return Assumption**

The 2012-2013 Asset/Liability Task Force recommended and the Board of Directors approved 7 percent as the actuarial interest assumption for the Pension Plan and the expected long-term return of the Balanced Investment Portfolio. The 7 percent rate is also used to discount Pension Plan liabilities in the Stage 2 calculation of the Experience Apportionment.

The Investment Committee reviews the long-term investment return assumption on a regular basis. At the October 2015 meeting, the committee requested a review of capital market assumptions. Global capital market conditions and expected long-term asset class assumptions projected for 2016 and the next decade are significantly different from the assumptions used in the 2012-2013 Asset/Liability Study. In a global economic environment of low interest rates and 1-2% increases in GDP, lower long-term investment returns are forecast for virtually all asset classes.

In October 2016, a comprehensive review of future long-term capital market assumptions and their impact on the Balanced Investment Portfolio was presented in a joint meeting of the Investment and Pension Committees. As global economic and market conditions and historically low global interest rates have dampened expectations for long-term investment returns for almost all asset classes, the Investment Committee recommended, and the Board of Directors approved, a reduction in the expected long-term investment return assumption for the portfolio, from 7 percent to 6 percent.
By moving to a more conservative assumption for financial planning, the Board has taken a step to ensure the long-term solvency of the Pension Plan, whose assets make up 90 percent of the portfolio. The Board believed that it would not be acting in the best interest of plan members if it continued to rely on a long-term investment assumption of 7 percent when all indicators are that the Balanced Investment Portfolio could not achieve that return in today’s market environment without restructuring the portfolio into asset classes that have higher risk and less liquidity than the current long-term asset allocation.

**The Relative Benchmark: The Asset Mix Policy Benchmark of Investable Market Indices**

The relative benchmark, or asset mix policy benchmark, is used to compare the performance of the Board of Pensions Balanced Investment Portfolio to that of investable market indices. The asset mix policy benchmark is the return the Portfolio would have achieved by investing in each asset class using a passively managed index fund at the midpoint of the long-term strategic allocation range for each asset class. Alternatives are not included in the benchmark since there are no investable market indices for alternative investments.

**The Value of Long-Term Outperformance: The Board of Pensions Balanced Investment Performance Versus Asset Mix Policy Benchmark Performance**

As seen on the graph that follows, the actual investment performance of the Balanced Investment Portfolio compared to that of the asset mix policy benchmark provided an additional $842 million in portfolio value since December 1990. The green line is the return of the Balanced Investment Portfolio. The red line is the return of the passive asset mix policy benchmark. The graph shows the sharp recovery in portfolio value from the cumulative market decline of 2000-2002 and the depths of the financial crisis of 2008. Balanced Investment Portfolio outperformance has come from strong long-term performance from active investment managers and asset allocation decisions by the Investment Team and the Investment Committee.

**The Value of Long-Term Outperformance**

Since 1990, active management of the Balanced Investment Portfolio has provided an additional $842 million in assets.

Benchmark Performance represents Asset Mix Policy Benchmark, adjusted for Balanced Investment Portfolio cash flows. Columns represent cumulative dollar impact of relative performance, shown on right hand scale.

The Balanced Investment Portfolio had $2.1 billion in assets in 1988, paid out $5.1 billion in benefits to plan members and surviving spouses from 1988 through 2016, and closed the year with assets of $8.6 billion on December 31, 2016.

Benefits paid have exceeded dues received since 1988. This is not a problem and is part of the plan design. In 1988, when the Balanced Investment Portfolio was valued at $2.1 billion, the cash payment from the portfolio, in addition to 1988 dues received, was $15 million. Cash from the Balanced Investment Portfolio for benefit payments totaled $132 million for the five years from 1987 to 1991.

In 2016 additional cash for benefit payments totaled $336 million. Cash payments for benefits were $1.52 billion for the five years from 2012 to 2016.

An Overview of Economic and Market Events That Impacted 2016 Investment Performance

The major themes for 2015 were global slowdown, with a particular focus on China; continued decline in oil prices; strength of the U.S. dollar and a stable recovery in the U.S. We closed 2015 with a (1.1%) investment return.

The major themes for 2016 were global slowdown; volatile oil prices; strength of the U.S. dollar; a stable recovery in the U.S.; and with an improving U.S. economy, a focus on GDP growth and worker equality. We closed 2016 with an 8.9% investment return.

With the exception of the Presidential Election, what was different in 2016 and how do the themes play out in 2017 and beyond?

Drivers of U.S. GDP Growth: Impact – 4% GDP Unlikely

President Trump made growth a key plank in his platform. What are the chances we will attain a 4% growth in GDP? The graph that follows shows the drivers of U.S. GDP growth by decade for the past 60 years. The only decade with a 4.0% growth in real GDP was 1956-1965. Labor productivity or the growth in real output per worker contributed 2.7% with a 1.3% growth in workers. We hit 3.4% GDP growth in 1976-1985 and 1996-2005 but with different component
contribution. We had higher productivity, 2.1% in 1996-2005, but a higher growth in workers, 2.2% in 1976-1985 as baby boomers and a rising percentage of women entered the work force. The most recent decade had the lowest growth in real output per worker at 0.9%, combined with a 0.5% growth in workers. A target of 4% GDP growth will be a high hurdle.


A key component of GDP growth is growth in workers. The graph that follows projects that from 2015-2024, the growth in U.S. workers will be at the lowest level in decades as baby boomers retire from the workforce.
Signs of Healthy U.S. Labor Markets: Impact – Back to Pre-Crisis Levels

During the Global Financial Crisis of 2008 and the years it took to return to stable labor market conditions, the firing rate hit 1.9%, the peak from 2001 through 2016. With jobs in scarce supply, the voluntary quit rate declined from 2.5% in 2001 to 1.3% in 2009. As workers begin to look for new jobs the quit rate increased to 1.6%. The firing rate is now below 1.1% as in some areas it has become difficult to find qualified employees.

Fewer Active Workers: Impact – Reduction in Social Security Benefits without Increased Debt

In 1967 the ratio of active workers to pensioners on Social Security was 6.3X. In 2016 the ratio is 3.6X. Federal debt was 32% of GDP in 1967, but increased to 79% debt to GDP in 2016.
A declining ratio of active workers to retired will mean reduced Social Security benefits or a significant increase in Federal debt.

**Growth through Capital Expenditures and Mergers and Acquisitions: Potential Impact of Tax Repatriation**

U.S. corporation capital expenditures peaked at $2.3 trillion in 2007, falling to $1.5 trillion in 2009. M&A activity also peaked in 2007 at $2.0 trillion, then fell to $0.5 trillion in 2009. M&A activity remained relatively flat in 2016 at about $1.6 trillion. Tax repatriation from overseas could spur corporate capital expenditures.
Wage and Pricing Pressure for U.S. Small Businesses: Impact – Margin pressures will force increased automation in many industries

The need to raise wages and the ability to pass on that increased cost of doing business in prices has generally not been in sync. In 1989 about 28% of small businesses raised wages and the same percent also raised prices. In 2001, 30% of businesses increased wages while only 12% increased prices, a gap of 18%. The gap was 20% in 2009 when virtually no businesses increased wages and many reduced product pricing to remain in business. The rally for increased wages, including a $15 an hour minimum wage is again putting pressure on small businesses, with 23% increasing wages and barely 1% raising product prices, a gap of 22% that will continue to widen.

U.S. in a Globally Competitive Market Place: Impact – Tariffs may be required to reduce more competitive global trade

The U.S. has always prided itself on the ability to start a new business with a minimal amount of red tape. New data from the World Bank reflects a change in the U.S. ranking compared to the World as well as the 34 nations in the Organization for Economic Cooperation and Development (OECD). This is a trend to explore as trading relationships and partnerships are being evaluated.
U.S. Inflation Outlook: Impact – Inflation not a near term issue

Headline CPI, which includes food and energy, peaked in the 1980s at almost 15%. It dropped into negative territory in 2009-2010 and again in 2015. It was 2.1% in December 2016, well below the 50 year average of 4.1%. Core CPI is less volatile since it excludes food and energy. While it has not dipped into recessionary territory in the last 50 years, the current rate is 2.2% compared to the 50 year average of 4.1%.

Source: BLS FactSet, J.P. Morgan Asset Management
Contributions to EPS Growth in Europe vs. U.S.: Impact - U.S. tax rates too high but all other factors favor the U.S.

The Global Financial Crisis left European banks and corporations in significantly worse shape than counterparts in the U.S., with zombie banks still surfacing in Europe more than eight years after the crisis. The U.S. leads in virtually all measures, with strong operating margins and sales growth. One of the reasons developed international markets continue to underperform the U.S. Russell 3000 Index is the difference in cumulative earnings per share growth since 2007 of 78% for the U.S. and (27%) for Europe.

![Europe vs. US: profitability components](image)

Breakeven Interest Rates on 10-Year Inflation: Impact – U.K bonds more attractive than U.S.

As shown on the graph below, the breakeven interest rates on 10-year inflation bonds converged at 2.5% in 2012 for U.K. and U.S. bonds. By 2015, the U.K rate had increased to 3.5% and the U.S. declined to 2.0%. While rates have been lower in Germany, rates ticked up in 2016 in three countries to 3.0% for the U.K., 2.0% for the U.S. and 1.0% for Germany.
Erosion of the Political Center: Impact – Polarization of Views and Increased Nationalism

The demise of “Middle Earth” or that part of the electorate that is not stridently left or right in their views has been documented in U.S. politics for more than a decade. The same phenomenon is occurring in other developed world countries, reflecting an increase in nationalism due to the increased pressure of immigrants, decline in the well being of the middle class and use of national resources for programs people do not support. The rise of populism fuels a hunker down, bunker mentality and can lead to the destruction of global trade policies.
Global Increase in Trade Protectionism: Impact – A reduction in global trade impacts all countries

The U.S. Tariff Act of 1930 or the Smoot-Hawley Tariff Act, was an act to provide revenue, to regulate commerce with foreign countries, to encourage the industries of the U.S., and to protect American labor. The act raised U.S. tariffs on over 20,000 imported goods. Threats of retaliation began long before the bill was enacted into law. In May 1930 Canada retaliated by imposing new tariffs on products that accounted for 30% of U.S. exports to Canada. In 2017, with increased globalization of trade in both developed and emerging markets, the rise in trade protectionism will negatively impact all countries.
Corporate Debt Levels in China: Impact- A development to be monitored for investment implications

Given the large number of Chinese companies that are SOEs or State Owned Entities, it is important to monitor the level of non-financial corporate debt as these are the public market companies that offer shares to investors. In 1994, corporate debt was 84% of GDP. It increased to 120% in 2004, declined to 100% in 2008, then began the climb to the current level of 170% of GDP.

Oil in a Downward Spiral Supply/Demand Imbalance: Impact – As alternative sources of energy gain in market share, oil prices may never return to $100 a barrel

Projecting the price of oil from one year to the next has never been for the faint-hearted. Prices fell from $40 in September 1990 to $11 in November 1998, a 73% decline over eight years. Following a steady climb to $140 in June 2008, prices declined 70% in seven months to $42. After bottoming at $42 in January of 2009, prices increased by 150%, to $105 a barrel in June 2014. Just six months later, on December 31, 2014, the price was $53, a 50% decrease. In 2015 it closed the year at $37 a barrel. Price volatility has made it challenging to project the economic viability of oil exploration and production projects as well as alternative energy, such as wind and solar projects. As long as Saudi Arabia and Russia are willing to continue to supply the same level of oil at current prices, the supply/demand imbalance will worsen and alternative energy projects will not be competitive. Oil prices in 2016 ranged from $34 to $54 a barrel, a 59% increase from low to high.
U.S. Dollar Strength: Impact – A strong dollar increases the price of U.S. exports

The U.S. dollar continued to appreciate against virtually all developed market currencies in 2016, with cumulative appreciation since January 1, 2016 of more than 5% against a basket of developed market currencies. Many emerging market currencies including the Brazilian real and Russian ruble appreciated against the U.S. dollar in 2016, with a basket of emerging market currencies in line with the value of the dollar at year-end 2016.

Source: Bloomberg; West Texas Intermediate, first month futures contract. Data reflects month end prices.

The dollar appreciated against developed market currencies, but fell against emerging markets after Donald Trump’s victory in the U.S. presidential election.

Sources: Bloomberg, Federal Reserve
U.S. Markets in 2016 – A January Melt Down, An Election Surprise and Plenty of Volatility In Between

This overview of economic and market events that impacted 2016 investment performance will conclude with a timeline to help us remember just how our U.S. stock and bond markets were impacted by domestic and international events.

In the graph that follows, the red line (right axis) is the value of the Standard & Poor's 500 Index. The green line (left axis) is the interest rate on a 10-year U.S. Treasury bond. The interest rate on a 10-year U.S. Treasury was 2.27% on December 31, 2015. It closed on December 31, 2016 at 2.45%, an increase of 18 basis points in a very volatile year.

Bond investors were pleasantly surprised when the 10-year Treasury declined from 2.27% to 1.36% in June 2016, a decline of 91 basis points. They were less excited to have the 1.36% yield increase by 109 basis points to close the year at 2.45%.

The S&P 500 began the year at 2044 and quickly slumped to 1829 by mid-February, a decline of (10.5%). Investors who put cash to work at the low point of the year for the S&P 500 Index had a gain of 22.4%, significantly better than the 9.5% return for the full year. However, those who got cold feet and exited the market on November 4, the Friday prior to the Trump election, missed the market sprint of 7.4% through the end of 2016.

While the U.S. election impacted investment performance in 2016, the U.S. market was also impacted by internal factors, to include anticipated Federal Reserve rate increases as well as perceived economic weakness. External factors included the BREXIT, the vote in the United Kingdom to leave the European Union; the continuing war in Syria; lack of success in securing peace in the Middle East; the success of ISIS in retaining territory; attacks on civilians and tourists in Turkey, France, Germany and the U.S.; immigrants seeking asylum in Europe, and a slowdown of growth in China.

2016 U.S. Timeline

Sources: Bloomberg, Federal Reserve
Review of the Board of Pensions Balanced Investment Portfolio

We begin the detailed review of the Board of Pensions Balanced Investment Portfolio with an overview of global markets in 2016 and a comparison of the 2016 Balanced Investment Portfolio return of 8.9% to the returns available from public market indices.

As shown on the graph that follows, the best strategy for those with nerves of steel in 2016 would have been to invest only in U.S. Treasury bonds from January through July, with a return of 15%, sell and invest the proceeds in commodities, with return of 12% from July 29 to December 31, 2016. Investors should have avoided developed international markets, with a 1% return for the year and committed to high yield bonds, the best performing asset class with a return of 18%. Despite market volatility, U.S. stocks returned 12%, the same return as emerging market stocks.

As a diversified portfolio, the Board of Pensions Balanced Investment Portfolio return of 8.9% is made up of the returns provided by multiple asset classes. The 2016 Investment Review will provide a detailed commentary, analysis and performance review of all components of the Balanced Investment Portfolio, to include U.S. equity, international equity, fixed income, private partnerships and marketable diversifying strategies.

As shown on the graph that follows, it was a good year for virtually all asset classes. We could have increased our return by investing in more small company stocks, the Russell 2000 Index, and held fewer developed market stocks, the EAFE (Europe, Australia and the Far East) Index.
What is the Structure of the Board of Pensions Balanced Investment Portfolio?

The Board of Pensions Balanced Investment Portfolio uses external investment management firms for the day-to-day investment of $8.6 billion in assets. The Portfolio is unitized on a monthly basis and is the investment portfolio for the Pension Plan as well as other plans and programs administered by the Board of Pensions. The U.S. equity component of the Portfolio has ten active investment managers and two index funds. The international equity component has nine active managers, including three managers focused solely on emerging markets, and two index funds. The fixed income component has seven active managers, including dedicated assignments to managers for high yield or below investment grade securities, global bonds, emerging markets debt and short duration securities. Private partnership investments include commitments to 66 funds, or limited partnerships, investing in distressed debt, private equity, venture capital and real estate. Marketable diversifying strategies include real, absolute return and inflation protection strategies.

Portfolio diversification is a function of the long-term expected return for each asset class, but also must include risk assessments based on investment styles, liquidity and the potential firm risk for each investment manager retained by the Investment Committee. No managers were excused in 2016 and no new managers were retained. Six commitments were approved to limited partnerships in energy, real estate, private equity and distressed debt.

Each year separate account managers for the Balanced Investment Portfolio are provided lists of those companies on the current Prohibited Securities lists. The lists have historically included companies on the General Assembly Divestment List for involvement in military and tobacco, as well as those global companies whose primary businesses are in the alcohol and gaming industries. The military list includes those corporations that manufacture hand guns and assault weapons.

In recent years the General Assembly of the Presbyterian Church (U.S.A.) voted to add to the General Assembly Divestment List, companies that operate for-profit prisons and three U.S. companies whose products and services were deemed to detract from the peace process in Israel and Palestine. The Board of Pensions policy does not force the sale of companies newly
added to the lists. Instead the policy prohibits the future purchase of the securities and enables managers to retain securities until managers sell them in accounts with the same investment objective and strategy.

### BOARD OF PENSIONS BALANCED INVESTMENT PORTFOLIO

**PERIODS ENDED DECEMBER 31, 2016**

<table>
<thead>
<tr>
<th>Annualized Rate of Return (%)</th>
<th>1 Year</th>
<th>2 Years</th>
<th>3 Years</th>
<th>5 Years</th>
<th>10 Years</th>
<th>15 Years</th>
<th>20 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BOP U.S. EQUITY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Russell 3000 Index</td>
<td>12.3</td>
<td>6.3</td>
<td>8.1</td>
<td>15.0</td>
<td>7.6</td>
<td>7.9</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>BOP INTERNATIONAL EQUITY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSCI All Country World Index ex US (gross)</td>
<td>6.0</td>
<td>1.4</td>
<td>-0.1</td>
<td>7.0</td>
<td>2.7</td>
<td>6.8</td>
<td>6.1</td>
</tr>
<tr>
<td><strong>BOP FIXED INCOME</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Bloomberg Barclays Gov/Credit Index</td>
<td>3.0</td>
<td>2.5</td>
<td>2.8</td>
<td>3.5</td>
<td>4.8</td>
<td>5.2</td>
<td>5.6</td>
</tr>
<tr>
<td><strong>BOP PRIVATE PARTNERSHIPS</strong></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>9.4</td>
<td>6.1</td>
<td>8.9</td>
<td>10.1</td>
<td>9.3</td>
<td>12.8</td>
<td>--</td>
</tr>
<tr>
<td><strong>BOP MARKETABLE DIVERSIFYING STRATEGIES</strong></td>
<td>9.1</td>
<td>-0.1</td>
<td>-0.1</td>
<td>1.7</td>
<td>0.9</td>
<td>7.1</td>
<td>--</td>
</tr>
</tbody>
</table>

**BOP BALANCED PORTFOLIO**

| 8.9 | 3.8 | 4.4 | 8.7 | 5.4 | 6.8 | 7.2 |

**BOP RELATIVE BENCHMARK**

| Asset Mix Policy Benchmark* | 8.1 | 3.8 | 5.0 | 8.8 | 5.5 | 6.5 | 6.8 |

**LONG-TERM INVESTMENT RETURN**

| Pension Plan Actuarial Assumption | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |

Notes:

Returns are net of management fees.

*Effective 1/1/2005, the Asset Mix Policy Benchmark is calculated using each asset class midpoint multiplied by its index. The policy benchmark is:

- U.S. Equity = 47.5% * Russell 3000 Index (Includes allocation of 7.5% to alternative investments)
- International Equity = 17.5% * MSCI All Country World Index ex US (ACWI)
- Fixed Income = 35% * Barclays Capital Gov/Credit Bond Index
- Alternative Investments = 0
Review of the Board of Pensions Balanced Investment Portfolio Performance

Performance of the Board of Pensions Balanced Investment Portfolio is measured against both a relative benchmark and the 6.0% long-term investment return assumption for the Pension Plan.

The Relative Benchmark: The Asset Mix Policy Benchmark of Investable Market Indices

The relative benchmark, or asset mix policy benchmark, is used to compare the performance of the Board of Pensions Balanced Investment Portfolio to that of investable market indices. The asset mix policy benchmark is the return the Portfolio would have achieved by investing in each asset class using a passively managed index fund at the midpoint of the long-term strategic allocation range for each asset class. Alternatives are not included in the benchmark since there are no investable market indices for private partnership investments.

Years such as 2016 with above benchmark performance reflect the contribution, both positive and negative, of active investment management strategies and asset allocation decisions, including allocations to high yield bonds, emerging market stocks and bonds, distressed debt, private equity and other non-benchmark investments.

The graph for the Balanced Investment Portfolio that follows shows returns compared to the asset mix policy benchmark. Columns above the line are those years when the difference between the actual return and the asset mix policy benchmark is positive. Columns below the line are years when the actual return was lower than the policy benchmark. The green bar for 2016 is the 8.9% actual return less the 8.0% asset mix policy benchmark return, or positive increase of 0.8%. While it is difficult to consistently add value over a passively managed index portfolio, the Balanced Investment Portfolio has been able to do so in 19 out of the last 30 years, or 63% of the time, as well as over the fifteen and twenty year periods ended December 31, 2016.
The Long-Term Investment Return: The 6.0% Pension Plan Actuarial Assumption

In calculating the health and solvency of the pension plan, the actuary uses certain assumptions about plan demographics and financial metrics. These assumptions are reevaluated regularly to ensure that they are reasonable and current. One of the critical assumptions is the investment return of pension plan assets.

To measure the health of the pension plan, the actuary assumes that the return on the Balanced Investment Portfolio will, over the long-term, meet or exceed 6.0%. It is important to remember that this is a long-term goal and will not be met in every calendar year. For the long-term health and stability of the pension plan, it is imperative that the actual return on assets meet or exceed the plan investment return assumption.

The 8.9% return in 2016 exceeded the 6.0% long-term assumption. The Balanced Investment Portfolio returns exceeded the 6.0% assumption for the five, fifteen and twenty years ended December 31, 2016.

Performance Attribution

Performance attribution compares actual investment performance with Asset Mix Policy Benchmark performance. The Asset Mix Policy Benchmark does not include alternative investments since there are no investable market indices for alternative investments. The table that follows shows the average allocation in 2016 for each asset class compared to the allocation used in the Asset Mix Policy Benchmark.

<table>
<thead>
<tr>
<th>2016 AVERAGE ASSET ALLOCATION vs. ASSET MIX POLICY BENCHMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asset Allocation</strong></td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>U.S. Equity</td>
</tr>
<tr>
<td>International Equity</td>
</tr>
<tr>
<td>Fixed Income</td>
</tr>
<tr>
<td>Private Partnerships</td>
</tr>
<tr>
<td>Marketable Diversifying Strategies</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2016 PERFORMANCE ATTRIBUTION BOARD OF PENSIONS BALANCED INVESTMENT PORTFOLIO vs. ASSET MIX POLICY BENCHMARK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asset Mix Policy Benchmark Return</strong> 8.10%</td>
</tr>
<tr>
<td>U.S. Equity</td>
</tr>
<tr>
<td>International Equity</td>
</tr>
<tr>
<td>Fixed Income</td>
</tr>
<tr>
<td>Private Partnerships</td>
</tr>
<tr>
<td>Marketable Diversifying Strategies</td>
</tr>
<tr>
<td>Asset Allocation/Cash Flow Timing</td>
</tr>
<tr>
<td><strong>Net Impact on Portfolio Performance</strong></td>
</tr>
<tr>
<td><strong>Board of Pensions Balanced Investment Portfolio Return</strong></td>
</tr>
</tbody>
</table>

21
When reviewing the performance of the Board of Pensions Balanced Investment Portfolio return of 8.9% in 2016 compared to the 8.1% return of the Asset Mix Policy Benchmark, asset allocation differences between the actual portfolio and the benchmark should be noted. The most significant difference is the asset mix policy benchmark does not contain an allocation to alternative investments, an average allocation of 13.8% in the actual portfolio. As noted above, this is because there are no index funds to replicate private limited partnership investments.

The actual commitments to private partnerships and marketable diversifying strategies were made over the last fifteen years by reducing the allocations to both U.S. equity and fixed income. The U.S. equity allocation is currently 10.6% below the benchmark while the fixed income allocation is 5.4% below. Part of the long-term reduction in U.S. equity was reallocated to international equity.

**2016 Performance Attribution: Detractors and Contributors**

**+0.91% Fixed Income**
The fixed income component added to performance due to strong performance by out of benchmark strategies such as high yield and non-U.S. bonds.

**+0.17% International Equity**
International equity managers outperformed the benchmark of the ACWI ex U.S. Index. Active developed market managers and emerging markets managers added to component results.

**+0.07% Private Partnerships**
While not in the asset mix portfolio benchmark, the 9.4% return from illiquid partnerships exceeded the returns of the international equity and fixed income components of the Balanced Investment Portfolio.

**+0.02% Marketable Diversifying Strategies**
While not in the asset mix portfolio benchmark, the 9.1% return from the marketable diversifying strategies component of the portfolio exceeded the 7.1% return of the benchmark of the Consumer Price Index plus 5% annually and the exceeded the returns of the international equity and fixed income components of the Balanced Investment Portfolio.

**(0.06%) U.S. Equity**
U.S. equity managers lagged the benchmark of the Russell 3000 Index. Active managers added value in all styles except large core and large growth.

**(0.31%) Asset Allocation**
The U.S. equity component was the best performing component in the Balanced Investment Portfolio. The (0.31%) is the impact of the actual U.S. equity allocation of 36.9% compared to the asset mix policy benchmark allocation to U.S. equity of 47.5%.
Asset Allocation

The Balanced Investment Portfolio is invested for the long term. The strong performance in 2016 was based on asset allocation decisions and manager selections made in the past 24 months or longer. While it appears as if the asset allocation was static from one year to the next, $336 million was raised during 2016 to provide benefits to plan members. The Investment Team meets on a monthly basis to review upcoming capital commitments and cash flow requirements for benefits. Asset allocation shifts between year end 2015 and 2016 reflect market movement but also rebalancing from asset classes and managers with the greatest outperformance in 2016 to those with the best expected returns in 2017 and beyond.

COMPARATIVE ASSET ALLOCATION
BOARD OF PENSIONS BALANCED INVESTMENT PORTFOLIO

<table>
<thead>
<tr>
<th></th>
<th>December 31, 2016</th>
<th>December 31, 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$Millions</td>
<td>Percent</td>
</tr>
<tr>
<td>Equity</td>
<td>4,877</td>
<td>56.8</td>
</tr>
<tr>
<td>U.S. Equity</td>
<td>3,194</td>
<td>37.2</td>
</tr>
<tr>
<td>International Equity</td>
<td>1,683</td>
<td>19.6</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>2,484</td>
<td>28.9</td>
</tr>
<tr>
<td>Alternative Investments</td>
<td>1,225</td>
<td>14.3</td>
</tr>
<tr>
<td>Private Partnerships</td>
<td>758</td>
<td>8.8</td>
</tr>
<tr>
<td>Marketable</td>
<td>467</td>
<td>5.4</td>
</tr>
<tr>
<td>Diversifying Strategies</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8,586</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

U.S. Equity Component of the Balanced Investment Portfolio
37.2% of the Balanced Investment Portfolio on December 31, 2016

The U.S. equity component of the Board of Pensions Balanced Investment Portfolio had a return of 12.3% in 2016, lagging the 12.7% return of the benchmark Russell 3000 Index. The U.S. equity component exceeded the return of the Russell 3000 Index for the five, ten, fifteen and twenty years ended December 31, 2016.

An allocation to smaller company stocks in 2016 improved total equity performance. The Russell 2000 Index of small company stocks returned 21.3%, exceeding the 12.1% return of the Russell 1000 Index of large company stocks.

The U.S. equity component at the close of 2016 had an allocation of 74% to managers investing in large company stocks, 17% to managers investing in the stocks of small and mid-sized companies and 9% to a manager who can invest in the stock of companies of any market capitalization.

The large capitalization component of the portfolio returned 10.6%, lagging the 12.0% return of the S&P 500 and the 12.1% return of the Russell 1000 Index. Both of the two core managers lagged the return of the benchmark S&P 500 Index. One of the three value managers exceeded the 17.3% return of the Russell 1000 Value Index. Both of the two growth stock managers lagged the 7.1% return of the benchmark Russell 1000 Growth Index. The all
capitalization manager returned 14.8%, exceeding the 12.7% return of the benchmark Russell 3000 Index.

The small and mid capitalization component of the Portfolio returned 19.6%. The active small capitalization growth manager outperformed the benchmark Russell 2000 Growth Index. The active small capitalization core manager returned 29.9%, exceeding the 21.3% return of the Russell 2000 Index.

### U.S. Equity Index Returns
**Year to Date December 31, 2016**

<table>
<thead>
<tr>
<th>Index</th>
<th>% Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 3000 Value</td>
<td>12.7</td>
</tr>
<tr>
<td>Russell 1000 Value</td>
<td>17.3</td>
</tr>
<tr>
<td>Russell 2000 Value</td>
<td>31.7</td>
</tr>
<tr>
<td>Board of Pensions U.S. Equity</td>
<td>12.3</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>12.0</td>
</tr>
<tr>
<td>Russell 2000 Growth</td>
<td>11.3</td>
</tr>
<tr>
<td>S&amp;P US REIT</td>
<td>8.5</td>
</tr>
<tr>
<td>Russell 1000 Growth</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Source: BNY Mellon

### U.S. Equity Market Historical Performance

The Russell 3000 Index includes stocks of large and small companies and is a broader measure of the U.S. equity market than the S&P 500. However, the Russell 3000 originated in 1979, so it does not have the extensive history that is valuable for long-term investment perspective. For purposes of the following graph, U.S. equity market returns are represented by the S&P 500 Index beginning in 1970 and the Russell 3000 Index in 1979.

The Russell 3000 Index had a 12.7% return in 2016. The 12.7% return is above both the 7.1% average return of the last ten years, as reflected in the 10-year trend line, and the long-term 47-year average return of 10.2% since 1970. The U.S. equity market had negative returns in nine out of those 47 years and in four of the last 16 years.
Market Capitalization and Style

Investors know that the size of the companies they invest in, or company market capitalization, can significantly impact portfolio success. Market capitalization, the price per share of the company stock, times the number of shares outstanding, can vary as the share price of a company increases or decreases over time. As shown on the table below, large company stocks in the Russell 1000 Index returned 7.1% annually for the ten years ended December 31, 2016, the same return as the return of small company stocks in the Russell 2000 Index for the same time period.

Investment styles also affect performance. Stocks in the Russell 1000 Growth Index returned 8.3% annually for the ten years ended December 31, 2016, exceeding the 5.7% return of the Russell 1000 Value Index. Small growth stocks also outperformed small value stocks over the ten year period. However, value outperformed growth for the long-term, as measured over the twenty years ended December 31, 2016. Large value had a 1.4% advantage over large growth. Small value had an even larger advantage over small growth, with an extra 3.4% annually credited to value investors.

### LARGE/SMALL AND VALUE/GROWTH PERFORMANCE FOR PERIODS ENDED DECEMBER 31, 2016

<table>
<thead>
<tr>
<th></th>
<th>Short Term 1 Year</th>
<th>Medium Term 10 years (annualized)</th>
<th>Long Term 20 years (annualized)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 1000 (Large)</td>
<td>12.1%</td>
<td>7.1%</td>
<td>7.9%</td>
</tr>
<tr>
<td>Russell 2000 (Small)</td>
<td>21.3</td>
<td>7.1</td>
<td>8.2</td>
</tr>
<tr>
<td>Russell 1000 Value</td>
<td>17.3</td>
<td>5.7</td>
<td>8.3</td>
</tr>
<tr>
<td>Russell 1000 Growth</td>
<td>7.1</td>
<td>8.3</td>
<td>6.9</td>
</tr>
<tr>
<td>Russell 2000 Value</td>
<td>31.7</td>
<td>6.3</td>
<td>9.7</td>
</tr>
<tr>
<td>Russell 2000 Growth</td>
<td>11.3</td>
<td>7.8</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Source: Russell Investments
As shown in the table that follows, getting both style and market capitalization right was important in 2016. Getting style right was more important for investors in 2016 than size. Value exceeded growth in large, mid and small capitalization companies. In small capitalization stocks, value outperformed growth by 20.4 percentage points. Overall, stocks of small companies in the Russell 2000 Index exceeded the return of large companies in the Russell 1000 Index by 9.2%.

### 2016 U.S. STOCK MARKET PERFORMANCE BY MARKET CAPITALIZATION AND STYLE

<table>
<thead>
<tr>
<th>Index</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russell 3000 – Total Market</td>
<td>12.7%</td>
</tr>
<tr>
<td>Russell 1000 Index (Large Capitalization)</td>
<td>12.1</td>
</tr>
<tr>
<td>Russell Mid Cap Index (Mid Capitalization)</td>
<td>13.8</td>
</tr>
<tr>
<td>Russell 2000 Index (Small Capitalization)</td>
<td>21.3</td>
</tr>
<tr>
<td>Russell 1000 Growth Index</td>
<td>7.1</td>
</tr>
<tr>
<td>Russell 1000 Value Index</td>
<td>17.3</td>
</tr>
<tr>
<td>Russell Midcap Growth Index</td>
<td>7.3</td>
</tr>
<tr>
<td>Russell Midcap Value Index</td>
<td>20.0</td>
</tr>
<tr>
<td>Russell 2000 Growth Index</td>
<td>11.3</td>
</tr>
<tr>
<td>Russell 2000 Value Index</td>
<td>31.7</td>
</tr>
</tbody>
</table>

Source: Russell Investments

### Sector Performance

As noted above, the broad U.S. stock market, as represented by the Russell 3000 Index, had a return of 12.7% in 2016. All sectors with the exception of health care had positive returns in 2016. Performance ranged from 26.9% for stocks in the energy sector to (3.3)% for stocks in the health care sector.

2016 saw reversals of winners and losers. Energy, which was the worst sector in 2015, with a return of (23.2)% was the best performing sector, +26.9%, in 2016. The best sectors in 2015, health care, consumer durables and consumer staples, were the worst performing sectors in 2016.
The Balanced Investment Portfolio had broad sector diversification in 2016. The top ten stocks held on December 31, 2016 were Alphabet (Google), Microsoft, JP Morgan, Wells Fargo, Texas Instruments, Biogen, Southwest Airlines, Amgen, Eli Lilly, and Charles Schwab. These stocks were not the top ten holdings of the Balanced Investment Portfolio for the entire year. Eight of the companies were in the top ten holdings on December 31, 2015. These top ten U.S. stock holdings were 14.8% of the U.S. equity component of the portfolio and include companies in the health care, industrials, information technology and financials sectors.

**Structure of the U.S. Equity Component of the Balanced Investment Portfolio**

**Stock Selection in the U.S. Equity Component**

Active portfolio managers select individual stocks based upon valuations and expectations for future growth. Many of the best managers call themselves “benchmark agnostic”, meaning they don’t select stocks or sectors based upon the weighting in a benchmark. It is important to remember that the composition of most indices is backward looking, since it reflects the performance of prior periods. The weighting of an individual stock and its sector in most indices is based upon its market capitalization, so strong past performance leads to a higher weighting in the index. When you buy an index fund, you are buying more of the recent winners, and fewer of the recent losers. Since active managers try to anticipate the next winners, the stocks and sectors in their portfolios can differ significantly from an index.

**Sector Allocation in the U.S. Equity Component**

When the stocks selected by our U.S. equity managers are aggregated by sector, the U.S. equity component has over and underweights in certain sectors. Employing active portfolio managers who select companies with the greatest potential for stock price appreciation should result in a portfolio that does not look like an index fund. Since these are decisions made at the level of individual companies and not sectors, the U.S. equity component has over and underweights when compared to the sector weights of the Russell 3000 Index.
U.S. equity managers’ favorable outlook for health care, information technology and consumer discretionary stocks resulted in an overweight in these three sectors, two of the three worst performing sectors in the Russell 3000 Index. While sector overweights to health care and consumer discretionary hurt performance, a neutral weight to financials, the second best performing sector, helped performance. The portfolio was underweight energy, the best performing sector in 2016. Real estate stocks were added as a sector of the Russell 3000 in mid-2016. Managers were underweight real estate securities.

**U.S. Equity Component**

**Sector Weights vs. Russell 3000 Index**

December 31, 2016

![Bar chart showing sector weights vs. Russell 3000 Index for December 31, 2016.](source: BNY Mellon)

**International Equity Component of the Balanced Investment Portfolio**

19.6% of the Balanced Investment Portfolio on December 31, 2016

The international equity component of the Board of Pensions Balanced Investment Portfolio had a return of 6.0% in 2016, exceeding the 5% gross return of the benchmark MSCI All Country World Index ex U.S., or ACWI ex U.S\(^1\). The index is designed to measure the equity market performance of both developed and emerging markets, including the country indices of 23 developed and 21 emerging market countries. The international equity component of the Balanced Investment Portfolio exceeded the return of the ACWI ex U.S. Index for the one, two, three, five, ten, fifteen and twenty years ended December 31, 2016.

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\(^1\) The International Equity component of the Balanced Investment Portfolio is benchmarked against the ACWI ex U.S. benchmark *gross* of taxes on dividends, because it has a longer history; it returned 5.0% in 2016. Several charts in this review show the benchmark *net* of taxes on dividends, which returned 4.5% in 2016.
Emerging markets stocks in Latin America as represented in the MSCI EM Latin America Index, were the best performers, with a 31.0% return. Brazilian stocks and currency rebounded in 2016 with a return of 66.2% to U.S. dollar investors. Investors in Europe saw a (0.4%) return. The BREXIT vote for the U.K. to withdraw from the EU resulted in (0.1%) return due to the decline in value of the pound to the dollar.

In a reverse of 2015, emerging markets provided a return of 11.2%, exceeding the 1.0% return from developed market companies. In a volatile year, the returns for the countries known as the BRICS had a significant divergence in performance. Countries whose currencies appreciated against the dollar had better performance than countries whose currencies were flat or declined against the dollar. With stronger local currencies Brazil had a return of 66.2%; Russia, 54.6% and South Africa 17.9%. Flat or currency that declined against the dollar resulted in a 0.9% return for China and (1.4%) for India. Developed market returns ranged from 24.6% for investors in Canada to (24.9%) for investors in Israel.

Since managers in the international equity component of the Balanced Investment Portfolio build portfolios on a stock by stock basis, superior stock selection was the primary reason for better than benchmark performance. However, in 2016, sector, country allocation and currency were also important for performance.

Five out of six developed market international equity managers in the international equity component of the Balanced Investment Portfolio outperformed their respective benchmarks in 2016. Four of the five managers that outperformed had allocations of 23-30% in Japan, significantly higher than the MSCI All Country World Index ex U.S. weight of 17.3% on December 31, 2016. Japanese stocks returned (0.7%) to local investors and with minimal change in the dollar/yen relationship in 2016, returned 2.4% to U.S. dollar based investors in Japanese stocks.

Four out of six developed market international equity managers had above benchmark performance in 2016. Allocations to Europe generally detracted from performance. Stocks in Italy declined by 10.5% due to uncertainty of the financial stability of the banking system. Despite a stronger yen, investors in Japan had a 2.4% return.
Only one of the six developed markets managers hedged currency in 2016. The portfolio returned 10.7%, exceeding the hedged benchmark of 6.1%.

The international equity component total allocation to emerging market stocks was 22.0%, slightly lower than the 22.7% allocation to emerging market stocks in the ACWI ex U.S. Index. Emerging market stocks are selected for the international equity component of the portfolio by the six core managers and two dedicated emerging markets managers. Four of the core international equity managers found compelling investment opportunities in emerging markets, which improved performance in 2016 since emerging market equities outperformed developed markets. Both emerging markets managers outperformed the benchmark, with one manager returning 12.9% and the other, 20.1%. Outperformance was primarily due to good stock selection that led to overweights in Russia and South Africa and an underweight to companies in China.

**International Equity Market Historical Performance**

We have created a graph of historical long-term international equity returns showing developed international equity markets, as represented by the MSCI Europe, Australasia and the Far East (EAFE) Index from 1970 through 2000 and developed and emerging markets represented by the MSCI All Country World Index ex U.S. beginning in 2001, the inception date of the ACWI ex U.S. Index. As shown in the graph that follows, the 2016 net return of 4.5% is above the 10-year trend line return of 1.0% and the long-term 47-year average return of 4.1% for the blended indices since 1970. Following the pattern of the U.S. equity market, international equity had negative returns in 14 out of 47 years and in seven of the last 17 years.

As shown in the graph that follows, U.S. stocks outperformed international stocks in 2016. However, the pattern of U.S. versus international outperformance is not predictable, with long periods of over and underperformance for developed market international stocks versus U.S. stocks. Stocks in the S&P 500 Index had a ten year compound annual return of 6.9%, significantly outperforming the return of 0.7% from international stocks in the developed market EAFE Index.
Developed Market Performance

International equity performance in 2016 depended on both stock and country selection while, as shown in the graph that follows, currency had a significant impact. A strong dollar contributed to lackluster returns for U.S. dollar investors in virtually all developed markets except Japan, as the value of the U.S. dollar weakened against the yen. A strong dollar makes imported goods and vacations abroad less expensive for Americans, but it hurts our export industries and reduces returns since international stocks are worth less in strong U.S. dollars than in local currencies.

As shown on the graph that follows, investors in the twelve EMU countries that use the euro as their currency had a return of 4.3% compared to the 1.3% return to the U.S. investor. However, the 1.3% return from an index of stocks based on the twelve countries and translated back to U.S. dollars masks the variability of returns U.S. investors would have received from the indices of each country, from a 11.3% return in Austria to (10.5%) in Italy.

Countries that have natural resource exports as a significant component of GDP provided positive returns to U.S. investors due to the rebound in commodity sales and prices. U.S. investors had a return of 11.4% in Australia and a 24.6% return from investments in Canada. The impact of the BREXIT vote in the U.K. and the decline of the pound against the dollar resulted in a (0.1%) return for U.S. investors despite a return of 19.2% to U.K. investors.
International Sector Performance

Despite the linkages of a global economy, it cannot be assumed that the best performing sector in one region will also be the best sector in another. However, as shown in the graph that follows, sector performance was similar to that in the U.S. in 2016. Energy companies returned 31.3% in 2016, making the sector the best performer in the MSCI All Country World Index ex U.S. In a reversal of 2015 investment performance, health care stocks returned (13.1%), the worst performing sector.

MSCI ACWI ex U.S. Index Sector Returns and Weights 2016

<table>
<thead>
<tr>
<th>Sector</th>
<th>% Return</th>
<th>Weights (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>31.3</td>
<td>7.3</td>
</tr>
<tr>
<td>Materials</td>
<td>27.6</td>
<td>8.0</td>
</tr>
<tr>
<td>Information Technology</td>
<td>10.7</td>
<td>9.2</td>
</tr>
<tr>
<td>Industrials</td>
<td>6.3</td>
<td>11.7</td>
</tr>
<tr>
<td>Financials</td>
<td>6.2</td>
<td>23.4</td>
</tr>
<tr>
<td>MSCI ACWI ex US</td>
<td>4.5</td>
<td>---</td>
</tr>
<tr>
<td>Consumer Discretionary</td>
<td>-0.6</td>
<td>11.5</td>
</tr>
<tr>
<td>Consumer Staples</td>
<td>-1.9</td>
<td>9.8</td>
</tr>
<tr>
<td>Utilities</td>
<td>-3.3</td>
<td>3.2</td>
</tr>
<tr>
<td>Telecommunication Services</td>
<td>-4.1</td>
<td>4.7</td>
</tr>
<tr>
<td>Health Care</td>
<td>-13.1</td>
<td>8.1</td>
</tr>
<tr>
<td>Real Estate*</td>
<td></td>
<td>3.3</td>
</tr>
</tbody>
</table>

Source: MSCI (net dividends)

* Real Estate entered the index mid-year and did not produce a return for the full 2016
As investors review portfolio performance in 2016, it is important to appreciate the difference in composition between the Russell 3000 Index of U.S. companies and the ACWI ex U.S. of international companies. Active portfolio management results in different sector allocations than the index and provides portfolio diversification that is different from that of the Russell 3000 Index of U.S. companies. Financials are the largest sector in the ACWI ex U.S., with a 23.4% weighting, yet financials represented only 15.5% of the Russell 3000 Index. Information technology, the largest sector in the Russell 3000 Index, had a weight of 19.9% on December 31, 2016. With fewer and smaller technology companies based in non-U.S. markets, information technology had only a 9.2% weighting in the ACWI ex U.S. Index.

**Sector Allocation in the International Equity Component**

When the stocks selected by our international equity managers are aggregated by sector, the international equity component has over and underweights in certain sectors. If we explore the structure and composition of the international equity component of the Board of Pensions Balanced Investment Portfolio compared to the sectors of the ACWI ex U.S. Index, as shown in the graph that follows, we can see that the portfolio’s international equity component, based upon sector allocations, does not look like the ACWI ex U.S. Index. Employing active portfolio managers who select companies with the greatest potential for stock price appreciation should, and did, result in a portfolio that does not look like an index fund. Since these are decisions made at the level of individual companies and not sectors, the resulting portfolio has over and underweights when compared to the sector weights of the ACWI ex U.S. Index. The overweight to health care, the worst performing sector, detracted from performance, as did an underweight to energy companies, the best performing sector.

**International Equity Component**

**Sector Weights vs. MSCI ACWI ex U.S. Index**

**December 31, 2016**

[Graph showing sector weights]

Source: BNY Mellon

Active stock selection also results in country allocations that differ from the ACWI ex U.S. Index. The international equity component had an underweight in EM Latin America, the best performing regional index in 2016. An underweight to Canada detracted from performance as did an overweight in EM Europe and the Middle East and Africa. An underweight to countries in the European Monetary Union helped performance.
Emerging Markets Performance

In 2016, the MSCI Emerging Markets Index returned 11.6%. In many years, currency in emerging markets has had limited impact on investment performance, but in periods of rising inflation and central bank management of reserves and interest rates, the relationship of a country’s currency to the U.S. dollar can add to or detract from performance for U.S. dollar-based investors.

With the impeachment of President Dilma Rousseff, Brazil experienced greater political stability in 2016, the stock market returned 36.8% to local investors. As the Brazilian real appreciated against the dollar, U.S. investors had a return of 66.2%. The Russian economy experienced more stable oil prices and an appreciating ruble. Russian stocks returned 34.1%, which became 54.8% to U.S. dollar-based investors.

Political turmoil in Turkey contributed to the appreciation of the U.S. dollar against the value of the Turkish lira, lowering the return of 10.3% that local investors experienced to a (8.5%) return for U.S. dollar denominated investors like the Board of Pensions.
As shown on the graph that follows, emerging markets outperformed developed markets in 2016, with a return of 11.6% compared to the 1.0% return from EAFE developed markets. Emerging markets in the MSCI Emerging Markets Index had a ten year compound annual return of 2.2%, outperforming the return of 0.7% return from stocks in the developed market EAFE Index.
Fixed Income Component of the Balanced Investment Portfolio
28.9% of the Balanced Investment Portfolio on December 31, 2016

The fixed income component of the Balanced Investment Portfolio is the most structurally complex part of the portfolio. To provide superior investment returns, the portfolio structure must successfully anticipate the direction of U.S. interest rates, spreads of investment grade, high yield and emerging market bonds, as well as credit quality and the impact of currencies.

In 2016 the fixed income component of the Portfolio had a return of 6.6% compared to the benchmark return of 3.0% provided by the Barclays U.S. Government/Credit Index. The fixed income component exceeded the return of the Barclays Government/Credit Index for the one, two, five, ten, fifteen and twenty years ended December 31, 2016.

As shown on the graph that follows, 2016 fixed income index performance ranged from the 17.6% return on high yield bond index to the 0.3% return on 3 month Treasury bills. Emerging market bonds returned 10.2% on both the JPM Emerging Markets Bond Global Diversified Index and the JPM GBI-EM Global Diversified Unhedged Bond Index. The JPM Emerging Markets Bond - Global Diversified Index is emerging market debt but is based in U.S. dollars while the JPM GBI-EM Global Diversified Unhedged Bond Index is emerging market debt denominated in local currencies.
At the start of 2016, the consensus forecast was that U.S. interest rates would begin to increase in 2016, with increases in June, September and December anticipated, subject to employment and economic conditions. Few anticipated the continued decline in oil prices or the strength of the U.S. dollar against virtually all currencies.

As U.S. interest rates declined in the first half of 2016, our internally managed portfolio of Treasury Inflation Protection Securities (TIPS), with a duration of about 17 years, provided a return of 8.0%. Our short duration portfolio, with a duration of less than 2 years, returned 1.4%. Both portfolios exceeded their respective benchmarks.

A shorter than benchmark duration for core fixed income portfolios was important for success in 2016. While a complicated calculation, duration is often discussed as a number of years. Actually, it measures the sensitivity of the price of a fixed income investment to a change in interest rates. In a period of rising interest rates and falling bond prices, portfolios benefit from having a short duration. In periods of declining interest rates and rising bond prices, a longer duration portfolio would have the best return.

Core fixed income manager performance was impacted by shorter than index duration as well as the allocation to, and superior selection of, corporate bonds. All three core fixed income managers met or exceeded the exceeded the 3.0% return of the Bloomberg Barclays Government/Credit Index.

The 6.6% return of the fixed income component included the returns from core fixed income managers, TIPS and the short duration manager as well as a 15.0% return from our global high yield portfolio. The dollar denominated emerging market debt portfolio returned 13.1%; the local currency emerging market debt investment returned 15.5%. Both strategies exceeded the benchmark returns of 10.2%. The global sovereign bond portfolio return of 3.9% exceeded the 1.6% return of the Citigroup World Government Bond Index.

With the expectation of increasing U.S. interest rates in 2014-2015, the unconstrained strategy was approved and initially implemented in late 2013. This strategy provided a 5.9% return in 2016, as U.S. interest rates finally increased.
The cash and the short duration portfolios comprised 16.1% of the fixed income component on December 31, 2016, a slight decrease from the 16.3% allocation on December 31, 2015. A strategic short duration fixed income allocation of approximately 125% of annual benefits payments was approved by the Investment Committee in July 2008. The short duration strategy detracted from the performance of the fixed income component of the Balanced Investment Portfolio in 2016. Excluding cash and the short duration portfolio, the fixed income component had a return of 7.5% in 2016.

Fixed Income Market Historical Performance

The chart that follows provides the historical performance of the U.S. fixed income market, as represented by the returns of the Barclays Government/Credit Index. Investors in fixed income can experience negative returns during periods of rising interest rates or when spreads widen on corporate bonds and other types of credit based instruments. However, if we compare annual performance in a graph similar to those of long-term performance for U.S. and international stocks, fixed income has had far fewer and less severe years of negative performance. Over the last 10 years, as shown on the 10-year trend line in the graph, the Bloomberg Barclays Government/Credit Index had a return of 4.4%, below the 44-year average return of 7.3%. Fixed income markets as represented by Barclays Government/Credit Index had negative returns in 1994, 1999, and 2013 or only three out of 44 years.

Fixed Income Returns in Historical Perspective

Fixed Income Investment Performance

Fixed income performance depends on multiple factors but usually the most important ones are the level and direction of interest rates, portfolio duration, credit quality and investor appetite for risk, as reflected in the spread over U.S. Treasuries for corporate bonds.
Interest Rates

The Federal Reserve’s target for the federal funds rate was 4.25% at the start of 2008. This is the interest rate at which private depository institutions, primarily banks, lend balances at the Federal Reserve on an overnight basis to other depository institutions. On December 16, 2008, after six reductions in the first ten months of 2008, the Federal Open Market Committee made the unprecedented move of setting the funds target rate in the range of zero to 0.25%. No change in the fed funds target rate was made until the rate was increased to 0.25% in December 2015 and 0.50% in December 2016.

As shown on the yield curve graph that follows, interest rates on all U.S. Treasury maturities increased very slightly in 2016, with the largest increase in basis points at the short end of the yield curve. The yield on the 3-month Treasury bill was 0.16% on December 31, 2015 and increased 34 basis points to 0.50% on December 31, 2016. The yield on the 2-year note increased from 1.05% to 1.19% over the same period, while the 10-year Treasury yield increased by 18 basis points, from 2.27% on December 31, 2015 to 2.45% on December 31, 2016.

U.S. Treasury Yield Curve

![U.S. Treasury Yield Curve Graph](image)

Source: Treasury.gov

Investors and savers have become numb to brutally low interest rates in the U.S. We have experienced historically low interest rates since the global financial crisis of 2008, so it is important to step back and review where yields have been over the longer time periods. In July 1954 the yield on a 10-year U.S. Treasury bond was 2.30%. Yields had an uneven but steady progression to higher levels, culminating in the 15.32% yield on a 10-year Treasury in September 1981. While yields experienced modest increases and decreases on an annual basis, over the next 30+ years, interest rates generally declined, providing investors in long bonds more than 30 years of superior returns.

As shown on the graph that follows, the U.S. experienced interest rates persistently below 4% on the 10-year Treasury from the late 1920s through the 1950s. Low rates can persist for a long time.
The graph that follows shows the impact of a 1% plus or minus change in U.S. interest rates on U.S. Treasury securities with maturities ranging from short, the 2 year, to very long, the 30 year Treasury.

The impact of rising or falling interest rates will have a smaller impact on a bond with a 2 year maturity than one with a 30 year maturity. If investors believe that interest rates will decline by 1%, an investment in a 30 year Treasury will have a 23% change in price while the 2 year Treasury will increase in value by only 2.0%. Conversely, investors who believe interest rates will increase by 1% could avoid the (17.7%) price decline of the 30 year Treasury by investing in a 2 year Treasury, with a (1.9%) decrease in value, or investing a portfolio of securities with less than 2 year maturities, such as a money market fund.
Credit Quality and Spreads

Credit ratings are given to bonds based on Standard & Poor’s and Moody’s analyses of the ability of the issuer to pay interest and repay principal on schedule to bondholders. As reflected in the graph below, U.S. Treasury bonds provided investors with safety and liquidity and a 1.0% return in 2016. Investors in corporate bonds hope to give up some safety and liquidity to obtain a higher return. Investors in AAA corporate bonds had a slightly better performance than the U.S. Treasuries, with a return of 1.4%. However, buyers of low quality bonds were highly rewarded in 2016, as those investors with the greatest appetite for risk achieved a return of 16.1% from B-rated bonds and 30.9% from CCC-rated high yield or junk bonds.

2016 Corporate Rating Returns

<table>
<thead>
<tr>
<th>Rating</th>
<th>Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Treasury</td>
<td>1.0</td>
</tr>
<tr>
<td>U.S. Agency</td>
<td>2.3</td>
</tr>
<tr>
<td>AAA</td>
<td>1.4</td>
</tr>
<tr>
<td>AA</td>
<td>3.1</td>
</tr>
<tr>
<td>A</td>
<td>4.7</td>
</tr>
<tr>
<td>BBB</td>
<td>7.9</td>
</tr>
<tr>
<td>BB</td>
<td>13.6</td>
</tr>
<tr>
<td>B</td>
<td>16.1</td>
</tr>
<tr>
<td>CCC</td>
<td>30.9</td>
</tr>
</tbody>
</table>

Sources: Dodge & Cox, Oaktree

The U.S. Treasury bond is typically considered the highest quality long-term fixed income investment with the greatest liquidity and no default risk. As such, it is the benchmark security used by investors to price all other long term bonds. The spread for investment grade corporate bonds is a risk premium, or additional yield that investors require for any bond that is not a U.S. Treasury bond.

The graph that follows provides a historical overview of the relationship of the yield on high yield bonds and U.S. Treasuries. The yield spread is the additional cushion of safety required by investors to purchase high yield bonds instead of comparable maturity U.S. Treasury bonds. High yield spread movements mirrored the pattern of investment grade corporate bonds to Treasuries in 2008, with spreads tripling in the second half of 2008, to close the year at a historic high of 1519 basis points.
In 2012, high yield spreads continued to fall as income-seeking investors were willing to accept less liquidity and to assume the additional credit risk of high yield bonds. Spreads also narrowed in 2013 and through the first half of 2014, declining from a spread of approximately 430 basis points at the start of the year to just below 400 basis points in June 2014. In 2014 about 20% of the high yield bond index was comprised of energy and energy-related companies. With the collapse in oil prices in the second half of 2014, spreads on high yield bonds widened to almost 575 basis points by December 31, 2014, just above the 28-year average spread of 548 basis points.

As shown in an earlier graph, oil prices were volatile, but declined overall in 2015. As a result, high yield bond spreads widened significantly, to almost 760 basis points, nearly one standard deviation above the mean, by December 31, 2015. This trend continued into the first six weeks of 2016, but spreads narrowed during the rest of the year to close 2016 at 420 basis points, below the long-term average of 548 basis points.

The graph below illustrates the divergence between the approximately 20% of the High Yield Bond Index that was in energy, metals and mining (EMM), with a spread of almost 1500 basis points on December 31, 2015 and the 80% non-energy constituents, with a spread of nearly 575 basis points.

The EMM spread divergence peaked in early 2016 with a spread in excess of 1800 basis points required to sell bonds of companies in the energy and metals and mining sectors, while bonds of companies in non-energy sectors required approximately 600 basis point spread to the U.S. Treasuries. Risk seeking investors purchased CCC-rated energy bonds at distressed prices and achieved returns in excess of 30% as spreads fell from more than 1800 basis points to 496 basis points on December 31, 2016.
Default Rates

The default rate for U.S. dollar-denominated bonds is the par value of defaulted securities as a percentage of the par value of outstanding issues. Overall, the incidence of corporate defaults has declined from 2009 through 2015. This lulled many investors into forgetting the possible implications of a default on their corporate bonds, or that defaults could even occur.

Default rates for high yield corporate bonds peaked at 12.8% in 2002, when the investment grade corporate bonds of WorldCom, Enron and other highly leveraged companies fell to below investment grade and defaulted in a matter of days.

A record number of mergers and acquisitions in 2006 and 2007 required high levels of debt financing. Some acquisition debt was provided at extremely favorable rates and terms to companies potentially at risk for future financial distress. Due to the weak underwriting standards in the 2004 to 2006 period, many distressed debt investors believed that default rates in 2009 and 2010 would exceed the 12.8% experienced in 2002. While the 2009 rate was 10.1%, default rates since then have declined, and remained at, historically low levels as banks and other lenders have provided corporations with extra time to work through potential breaches in loan covenants, extended maturities and refinanced debt to avoid foreclosures and bankruptcies. As a result, investors remained enthusiastic buyers of high yield debt refinancings during a low interest rate environment.

In 2014, as shown in the graph that follows, default rates increased from 0.7% at the end of 2013 to 2.9% at the close of 2014 and 2.8% at the end of 2015. The projected default rate rose
again in 2016 to 3.3% as the collapse of oil prices put pressure on the profitability and cash flow of small and mid-sized energy companies.

**Historical Default Rates**
1972 through 2016

![Graph showing historical default rates from 1972 to 2016.]

<table>
<thead>
<tr>
<th>Year</th>
<th>Default Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972</td>
<td>1.1%</td>
</tr>
<tr>
<td>1974</td>
<td>10.3%</td>
</tr>
<tr>
<td>1976</td>
<td>12.8%</td>
</tr>
<tr>
<td>1978</td>
<td>10.3%</td>
</tr>
<tr>
<td>2016</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

Annual Average: 3.15%

Sources: Oaktree, NYU Salomon Center, Citigroup, JP Morgan as of 12/31/16

**Private Partnerships Component of the Balanced Investment Portfolio**

*8.8% of the Balanced Investment Portfolio on December 31, 2016*

Private Partnerships are used in the Balanced Investment Portfolio to supplement the traditional asset classes of stocks and bonds. Private partnerships provide access not available in the public markets to investment opportunities with potentially superior long-term returns and to managers with long-term records of creating value for their investors.

In 2016 six new commitments were approved for limited partnerships in distressed debt, energy, small company private equity and real estate. Five of the commitments were to firms with which the Board of Pensions had successful prior investments. One new relationship was added for real estate.

When reviewing performance, some of the differences can be attributed to the one quarter lag in performance reporting making it important to remember that private limited partnerships are long-term investments with a minimum of a ten year horizon. With strong performance from U.S. equity and high yield bonds, U.S. private equity and distressed debt failed to achieve their public market benchmarks. However the return for the private partnership component exceeded the return of the Balanced Investment Portfolio for the one, two, three, five and ten years ended December 31, 2016.
PRIVATE PARTNERSHIPS INVESTMENT PERFORMANCE HIGHLIGHTS

PERIODS ENDED DECEMBER 31, 2016

<table>
<thead>
<tr>
<th></th>
<th>Annualized Rate of Return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 Year</td>
</tr>
<tr>
<td><strong>BOP PRIVATE PARTNERSHIPS</strong></td>
<td></td>
</tr>
<tr>
<td>US PRIVATE EQUITY-NATURAL RESOURCES</td>
<td>10.3</td>
</tr>
<tr>
<td>Russell 3000 +300 bps *</td>
<td>15.8</td>
</tr>
<tr>
<td>INTERNATIONAL PRIVATE EQUITY</td>
<td>7.1</td>
</tr>
<tr>
<td>MSCI ACWI ex US +300 bps *</td>
<td>7.9</td>
</tr>
<tr>
<td>DISTRESSED DEBT</td>
<td>9.3</td>
</tr>
<tr>
<td>CG High Yield Cash Pay +300 bps*</td>
<td>20.8</td>
</tr>
<tr>
<td>VENTURE CAPITAL</td>
<td>7.3</td>
</tr>
<tr>
<td>Russell 2000 +300 bps *</td>
<td>24.6</td>
</tr>
<tr>
<td><strong>BOP TOTAL PRIVATE PARTNERSHIPS</strong></td>
<td>9.4</td>
</tr>
<tr>
<td>BOP Balanced Investment Portfolio</td>
<td>8.9</td>
</tr>
</tbody>
</table>

* The Index +300 basis points is calculated monthly and linked to provide an annualized number that will be different than the sum of the annual return of the Index +300 basis points.

Study of Private Partnership Benchmarks

From the time of the Board of Pensions first private partnership commitment in 1997, the single performance benchmark was the Russell 3000 Index plus an additional 500 basis points to compensate for additional risk and illiquidity in limited partnership investments. Returns from these investments had a low correlation to public market returns prior to 2008 but correlations experienced a significant increase after accounting changes instituted in 2008 required that limited partnership assets be marked to market each quarter. In 2013, the Investment Team initiated a study of the relationship between the returns of different types of limited partnership investments and related public market equity and fixed income indices over periods before and after the accounting change. The Investment Team completed a research paper using extensive statistical analyses to evaluate whether the benchmark for limited partnerships of the Russell 3000 plus 500 basis points was still appropriate or whether more appropriate benchmarks existed for each type of partnership investment. The Investment Team recommended and the Investment Committee approved using more closely related public market indices for each sub-set of limited partnership investments. The use of public market indices, plus a liquidity and risk premium of 300 basis points, provides more appropriate performance benchmarks for different types of limited partnerships.

Assets in private partnerships are diversified among different types of investments, including distressed debt, real estate, venture capital and three different types of private equity: U.S., international and natural resources/energy. Some of these categories blur in practice: for instance, some general partners invest for control of portfolio companies through either debt or equity securities depending in part on valuation of the respective securities at the time of
Investments in private partnerships are diversified by fund type, by fund manager and also diversified over time, since fund returns are strongly affected by cyclical factors which do not become apparent until long after investors have finalized their commitments to a specific fund. Spreading the investment periods of private partnerships over time potentially avoids concentration in periods which ultimately provide substandard returns.

**Private Partnerships by Vintage (Investment) Year**

The chart that follows shows private partnership commitments in the Balanced Investment Portfolio by vintage year, the year the general partner began investing capital committed to the partnership. Vintage year may differ from the year the Board of Pensions made the legal commitment to the partnership; the general partner may not begin investing funds immediately after a fund’s close because it is still investing a prior fund or because of disruptions in the investment market place. Commitments to illiquid partnerships are shown by vintage year as a percentage of the total commitments to illiquid partnerships in the Balanced Investment Portfolio and, within each vintage year, by type of partnership.
Private Partnerships
Commitments by Vintage Year
as of December 31, 2016

Private Partnership Capital Calls and Cash Distributions

When the Board of Pensions makes a legal commitment to invest in a private partnership the cash for investment will be called over a period of years. As investments are sold, the general partner will make cash distributions to the Balanced Investment Portfolio. The private partnerships in the Balanced Investment Portfolio have returned more cash than they called in recent years, although cash generation from these partnerships is highly unpredictable. Private partnership cash flows for the last five years are shown in the chart that follows.

Private Partnerships
YTD Cash Flows - Last Five Years

- International PE
- U.S. PE
- Venture Capital
- Distressed Debt
- Natural Resources/Energy
- Real Estate
While the market value of private market investments was $757 million or 8.8% of the Balanced Investment Portfolio on December 31, 2016, the Board tracks the amount of committed but uncalled capital for each limited partnership. This is the cash that can be called for existing private partnerships. When $410 million in committed but uncalled capital is added to the actual market value, the prospective allocation to private partnership is $1,242 million or 14.5% of the Balanced Investment Portfolio. As the Investment Team manages the portfolio, the amount of committed but uncalled capital is evaluated on a regular basis to maintain portfolio liquidity for capital calls.

**Private Partnerships**

Current Market Value + Unfunded Commitments
$1,242 Million = 14.5% of Balanced Portfolio MV*

- Distressed Debt 17.9%
- Natural Resources/Energy 26.1%
- Real Estate 10.2%
- International Private Equity 12.8%
- U.S. Private Equity 28.9%
- Venture Capital 4.1%

Total assets $8,586 million  *excludes $76 million unfunded commitments unlikely to be called

**Marketable Diversifying Strategies Component of the Balanced Investment Portfolio**

5.4% of the Balanced Investment Portfolio on December 31, 2016

The marketable diversifying strategies component of the Balanced Investment Portfolio currently includes real and absolute return investments in commingled fund as well as real estate securities. Real and absolute return investments offer returns which are potentially uncorrelated to public market securities. Real return investments include real estate and commodities. Absolute return strategies include risk parity portfolios. Other types of marketable strategies have been included in the Balanced Investment Portfolio previously and may be included in the future.

The investments in real return strategies were initiated in 2005 to provide protection during periods of increasing U.S. inflation. Inflation has not been a problem and these assets provided negative investment performance. In 2016, commodities provided strong performance. The two inflation and real return portfolios returned 22.6% and 14.2%, exceeding the 7.1% return of the benchmark of the CPI + 5%. Inflation and real return strategies lagged the benchmark in all time periods ended December 31, 2016 that were longer than one year.
The Balanced Investment Portfolio is invested in three absolute return strategies. One is a global macro strategy that returned 2.0% in 2016. Two risk parity strategies meet expectations. One returned 11.2% and one returned 9.9%. In 2016 the three absolute return strategies returned 6.6% underperforming the 7.1% return of the benchmark of CPI + 5%.

The real estate securities portfolio returned 12.0%.

The total marketable diversifying strategies component returned 9.1% in 2016.

**MARKETABLE DIVERSIFYING STRATEGIES INVESTMENT PERFORMANCE HIGHLIGHTS**

**PERIODS ENDED DECEMBER 31, 2016**

<table>
<thead>
<tr>
<th>Annualized Rate of Return (%)</th>
<th>1 Year</th>
<th>2 Years</th>
<th>3 Years</th>
<th>5 Years</th>
<th>10 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOP MARKETABLE DIVERSIFYING</td>
<td>9.1</td>
<td>-0.1</td>
<td>-0.1</td>
<td>1.7</td>
<td>0.9</td>
</tr>
<tr>
<td>STRATEGIES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consumer Price Index +5% Annually</td>
<td>7.1</td>
<td>6.4</td>
<td>6.2</td>
<td>6.4</td>
<td>6.8</td>
</tr>
<tr>
<td>BOP Balanced Investment Portfolio</td>
<td>8.9</td>
<td>3.8</td>
<td>4.4</td>
<td>8.7</td>
<td>5.4</td>
</tr>
</tbody>
</table>

The graph that follows reflects the diversification of the marketable diversifying strategies component of the Balanced Investment Portfolio on December 31, 2016.

** Marketable Diversifying Strategies**

$467 Million = 5.4% of Balanced Portfolio MV

- Absolute Return: 63.9%
- Real Estate: 10.3%
- Real Return: 25.8%

Total assets $8,586 million
Portfolio Accounting

The total return on the Balanced Investment Portfolio is measured using the actual market value of assets held on January 1, 2016, and the actual market value of assets held on December 31, 2016. The beginning asset value is increased by interest income and dividends and decreased by fees and benefits paid during the year. In 2016, the portfolio paid out $336 million in benefits in excess of dues received. The portfolio had net realized gains of $252 million on securities sold in 2016 and unrealized gains of $349 million due to appreciation in the market value of securities still held in the portfolio on December 31, 2016.

MARKET VALUE RECONCILIATION
BOARD OF PENSIONS
BALANCED INVESTMENT PORTFOLIO

<table>
<thead>
<tr>
<th></th>
<th>$Millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Value on January 1, 2016</td>
<td>$8,199</td>
</tr>
<tr>
<td>Net Income</td>
<td>141</td>
</tr>
<tr>
<td>Net Realized Gain</td>
<td>252</td>
</tr>
<tr>
<td>Net Unrealized Gain/(Loss)</td>
<td>349</td>
</tr>
<tr>
<td>Cash Flows into Portfolio</td>
<td>4</td>
</tr>
<tr>
<td>Benefit Payments/Transfers</td>
<td>(336)</td>
</tr>
<tr>
<td>Investment and Custody Fees</td>
<td>(23)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Value on December 31, 2016</td>
<td>$8,586</td>
</tr>
</tbody>
</table>

Plan and Program Participation

The assets of the Board of Pensions Balanced Investment Portfolio are unitized so that each participating plan and program owns units in the portfolio rather than individual securities. This reduces the investment and custodial fees for all plans and programs. The valuation of units is done monthly by BNY Mellon, custodian for all assets, using an accounting process similar to that used to develop the net asset value of a mutual fund. Plans, with the exception of the Benefit Supplement Fund, Medical Plan Long-Term Reserve and Medical Plan Contingency Reserve, own only units of the portfolio and have the same asset allocation and investment performance as the Balanced Investment Portfolio, dependent upon the time the plan or program adopted a 100% allocation to the portfolio.

The Benefit Supplement Fund and both Medical Reserve accounts own units of both the Board of Pensions Balanced Investment Portfolio and the Board of Pensions Fixed Income Portfolio. The Fixed Income Portfolio, valued at $60 million on December 31, 2016, can be used by plans and programs with differing investment horizons, enabling us to customize their long-term asset allocation.
The table that follows shows the market values of plans and programs participating in the Board of Pensions Balanced Investment Portfolio and the Board of Pensions Fixed Income Portfolio at BNY Mellon.

**PLAN AND PROGRAM PARTICIPATION**  
December 31, 2016

<table>
<thead>
<tr>
<th>PLAN AND PROGRAM PARTICIPATION</th>
<th>$Millions</th>
<th>% of BOP Balanced Investment Portfolio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pension Plan</td>
<td>$7,650</td>
<td>89.09%</td>
</tr>
<tr>
<td>Death and Disability Plan</td>
<td>753</td>
<td>8.76</td>
</tr>
<tr>
<td>Supplemental Death Benefits Plan</td>
<td>37</td>
<td>0.43</td>
</tr>
<tr>
<td>Post-Employment/Post-Retirement (PEPRM)</td>
<td>8</td>
<td>0.10</td>
</tr>
<tr>
<td>Medical Plan Contingency Reserve</td>
<td>41</td>
<td>0.48</td>
</tr>
<tr>
<td>Endowment Fund</td>
<td>20</td>
<td>0.24</td>
</tr>
<tr>
<td>Benefit Supplement Fund</td>
<td>20</td>
<td>0.23</td>
</tr>
<tr>
<td>Retirement Housing Fund</td>
<td>8</td>
<td>0.10</td>
</tr>
<tr>
<td>General Assistance Fund</td>
<td>34</td>
<td>0.40</td>
</tr>
<tr>
<td>Chaplains Deposit Fund</td>
<td>4</td>
<td>0.04</td>
</tr>
<tr>
<td>Restricted Gifts Fund</td>
<td>9</td>
<td>0.10</td>
</tr>
<tr>
<td>SR Plan</td>
<td>2</td>
<td>0.03</td>
</tr>
</tbody>
</table>

**Board of Pensions Balanced Investment Portfolio**  
$8,586 100.00%

**Board of Pensions Fixed Income Portfolio**  
60

**Cash Management Portfolio Plan Assets**  
67

- Pension Plan 33
- Medical Active ABP 22
- Medical Dental 2
- Medical Supplement 10

**Total Investments at BNY Mellon**  
$8,713

The Assistance Fund, Medical Plan Long-Term Reserve and Medical Plan Contingency Reserve own units of the Board of Pensions Balanced Investment Portfolio and the Board of Pensions Fixed Income Portfolio. “Other” includes the GAC Special Cuban Fund and the SR Plan, which each have total assets of less than $4 million.

Cash Management Portfolio Plan Assets of $93 million were transferred in December 2015 from Wells Capital Management/U.S. Bank Custodian. Assets are held at the Plan level and invested in the Standish Short Term Investment Fund.

Note: Due to rounding, percentages may not total 100%. 
Partnerships We Can Be Proud Of

The Board uses multiple investment managers for each asset class in the Board of Pensions Balanced Investment Portfolio. The Investment Team and the Investment Committee evaluate, retain and monitor managers for specific assignments within the total portfolio. The managers are responsible for the selection of individual securities or companies for their portfolios.

Custodian: The Bank of New York Mellon Corporation, Pittsburgh, PA

U.S. Equity
Adage Capital Management, Boston, MA
Barrow, Hanley, Mewhinney and Strauss, Inc., Dallas, TX
BlackRock Institutional Trust Company, San Francisco, CA
Brown Investment Advisory, Baltimore, MD
Dodge & Cox, San Francisco, CA
Jennison Associates, New York, NY
PRIMECAP Management Company, Pasadena, CA
Royce & Associates LLC, New York, NY
T. Rowe Price Associates, Inc., Baltimore, MD
Wasatch Advisors, Salt Lake City, UT

International Equity
Baillie Gifford, Edinburgh, UK
Capital International, Los Angeles, CA
Franklin Templeton Institutional, Fort Lauderdale, FL
Genesis Investment Management, London, UK
Lazard Asset Management, New York, NY
Marathon Asset Management LLP, London, UK
Silchester International Investors Limited, London, UK
Tweedy, Browne Company LLC, New York, NY
Walter Scott & Partners Limited, Edinburgh, UK

Fixed Income
Colchester Global Investors, London, UK
Dodge & Cox, San Francisco, CA
GMO, Boston, MA
Oaktree Capital Management LP, Los Angeles, CA
Pacific Investment Management Company, Newport Beach, CA
Reams Asset Management Company, Inc., Columbus, IN
Standish, Pittsburgh, PA

Alternative Investments in Illiquid Limited Partnerships: Private Equity, Distressed Debt, Venture Capital, Natural Resources/Energy
Actis Capital Management, London, UK
Capital International, Los Angeles, CA
The Carlyle Group, Washington, DC
Cerberus Capital Management LP, New York, NY
Commonfund Capital, Inc., Wilton, CT
Davidson Kempner, New York, NY
HIG Realty Partners, New York, NY
KKR, New York, NY
Lime Rock Resources, Houston, TX
Madison Dearborn Partners LLC, Chicago, IL
Merit Energy Partners, Dallas, TX
Oaktree Capital Management LP, Los Angeles, CA
Pacific Investment Management Company, Newport Beach, CA
Riverstone Holdings LLC, New York, NY
Silver Lake Partners, Menlo Park, CA
Templeton Asset Management Ltd., Fort Lauderdale, FL
Värde Partners, Inc., Minneapolis, MN
Warburg Pincus LLC, New York, NY
Whippoorwill Associates, Incorporated, White Plains, NY
Wind Point Partners, Chicago, IL
Yorktown Partners LLC, New York, NY

Alternative Investments in Liquid Partnerships: Absolute Return, Real Return and Total Return
AQR Capital Management, LLC, Greenwich, CT
Bridgewater Associates, Inc., Westport, CT
Parametric, Seattle, WA
Security Capital, Chicago, IL
Wellington Management Company LLC, Boston, MA
Conclusion - We held on in 2016 and we are ready for the challenges of 2017.

Global markets rocked us in 2015. We positioned ourselves and our portfolios for success in 2016, with an overarching theme of Holding On. Investors faced a 2016 global economy and global markets with a “whole lotta shakin’ goin’ on”. We held on and were rewarded with strong investment performance in all asset classes in 2016.

We expect seismic events to shake the global economy and markets in 2017. While difficult to prepare for real seismic events such as earthquakes, tsunamis as well as diverse seismic events such as volcanic, tectonic, oceanic atmospheric, and other explosions, seismologists find ways to mitigate risk to those in their potential wake.

Our job as investors is to know that financial tsunamis and investment earthquakes will occur and we must be prepared and vigil.

While investment performance is of paramount importance, we have several missions, and risk management is an integral part of our stewardship, if not our primary responsibility. It is difficult, if not impossible, to protect the Balanced Investment Portfolio from unexpected global risks that might have a probability of 0.3% or less, but such risks, known as tail risks by statisticians, are very real. Investors should recognize that in an interconnected global economy, we should expect systemic global shocks. We need to be mindful of what could be unusual, high risk events and their potentially devastating impact on investment portfolios. We need to raise questions with our managers that may appear to be out of the box and unrelated. We must always remember that the possible, improbable and “impossible” are with us every day as part of a normal distribution of events. As always, the hard part is to know where we are on the risk curve today and where we could be tomorrow.

While it is true that we are not in charge of much about life, we must think about where we expect markets to be in 2017 and beyond so as to best position the Balanced Investment Portfolio for the long-term benefit of our Plan members.

- In October 2016 the Board of Directors approved a reduction in the expected long-term investment return assumption for the Balanced Investment Portfolio from 7 percent to 6 percent. Virtually all long-term asset class assumptions for the next decade plus have made a parallel downward shift. We believe we have a well diversified portfolio and will not change the long-term asset allocation to potentially increase risk and decrease liquidity.

- Global investors in equity and debt markets will face challenges in 2017. As we enter 2017, there are few clearly attractive undervalued asset classes. Once again it should be a year for managers gifted in security selection. We believe we have retained those managers as we have noted in our list of relationships we can be proud of.

- We believe stocks are likely to outperform bonds in 2017, yet it is unclear which regions are most likely to outperform. The U.S. economy is clearly the strongest in the developed world yet U.S. stocks are also expensive relative to peers, and the Federal Reserve has begun a course of increasing interest rates while other global central banks may continue to ease.

- In the U.S., a new administration is hurling depth charges that could blow up global trade pacts, healthcare in the U.S. and destroy long-term alliances with friends and neighbors. On the positive side the administration could reduce tax rates to repatriate monies now held offshore to avoid U.S. tax rates and could launch a major program rebuilding roads, bridges and other parts of our aging infrastructure.
• International developed markets will face challenges in 2017. The potentially negative impact of new regulations on European banks has been deferred, but there will be increased regulatory and market issues in the telecommunications and technology sectors and many governments will continue to grapple with large debt levels. The U.K will wrestle with the impact of BREXIT, the decision to leave the EU. We believe our managers will select the best companies, but at this time do not plan to increase the allocation to international developed markets.

• After being totally wrong since 2014, we still expect longer duration fixed income assets to be less attractive in 2017 as the Federal Reserve continues to increase rates. Spreads on high yield and investment grade corporate bonds narrowed in 2016 but we still see opportunities for high yield in 2017. Selective investment in distressed debt should continue to provide attractive opportunities, especially in distressed energy.

• Emerging market stocks and bonds should provide superior long-term investment performance. We feel comfortable with the current allocations in 2017.

• We do not expect inflation will be a problem in 2017. Based upon 2014 conditions in the commodities markets and the 50% decrease in the price of crude oil in the second half of 2014, an additional allocation was made to commodities in early 2015. The Investment Committee and the Investment Team will continue to evaluate inflation and real return strategies that could benefit the Balanced Investment Portfolio in periods of inflation.

• We will continue to use short-term market outperformance or volatility in individual asset classes to raise cash to pay benefits. In 2017, benefits payments will require cash in excess of dues of more than $336 million.

• We are long-term investors. We have a long-term strategic asset allocation based on our liabilities, or the future benefits for our Plan members. We will not increase portfolio risk by using short-term trading strategies to improve investment performance.

• We are socially responsible investors and partner with the denomination’s Committee on Mission Responsibility Through Investment (MRTI) to assist in the mission of the denomination on issues of corporate governance, global social issues and the environment.

• We will faithfully pursue the goals of our assigned mission, recognizing the multiple needs of those we serve in the Presbyterian Church (U.S.A.).

February 2, 2017

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The 2016 Investment Review was prepared by the Investment Team of the Board of Pensions of the Presbyterian Church (U.S.A.)

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Notes for the 2016 Investment Review:

**Big Maybelle**, Mary Louise Smith, was known as America’s Queen Mother of Soul. She recorded a version of “Whole Lotta Shakin’ Goin’ On” two years before Jerry Lee Lewis’s louder and more raucous version was on the airwaves.

**Jerry Lee Lewis** was an American singer-songwriter, musician, and pianist, often known by his nickname, The Killer. He has been described as "rock & roll's first great wild man. A pioneer of rock and roll and rockabilly music, Lewis made his first recordings in 1956 at Sun Records in Memphis. "Crazy Arms" sold 300,000 copies in the South, but it was his 1957 hit "Whole Lotta Shakin' Going On" that propelled Lewis to fame. Lewis is the last surviving member of Sun Records’ Million Dollar Quartet and the Class of ’55 album, which also included Johnny Cash, Carl Perkins, Roy Orbison and Elvis Presley.

**Seismology**, from Ancient Greek meaning “earthquake” is the study of earthquakes, tsunamis as well as diverse seismic events such as volcanic, tectonic, oceanic atmospheric, and other explosions. A seismologist does research in the field of seismology.

**Alexander Hamilton**, January 11, 1755 or 1757 – July 12, 1804) was an American statesman and one of the Founding Fathers of the United States. He was an influential interpreter and promoter of the U.S. Constitution, as well as the founder of the nation’s financial system, the Federalist Party, the United States Coast Guard, and *The New York Post* newspaper. As the first Secretary of the Treasury, Hamilton was the main author of the economic policies of the George Washington administration. He took the lead in the funding of the states’ debts by the Federal government, as well as the establishment of a national bank, a system of tariffs, and friendly trade relations with Britain. He died following a duel with Aaron Burr. More than 210 years later he lives in the musical Hamilton, now on Broadway and other cities.

**Kurt Vonnegut Jr.** was an American writer. Vonnegut published his first novel, *Player Piano*, in 1952. In a career spanning over 50 years, Vonnegut published 14 novels, three short story collections, five plays, and five works of non-fiction. He is most famous for his darkly satirical, best-selling novel *Slaughterhouse-Five* (1969). Captured by the Germans during the Battle of the Bulge, he was a prisoner of war in Dresden and survived the Allied bombing of the city by taking refuge in a meat locker of the slaughterhouse where he was imprisoned.

**Edwin Starr** was an American soul singer. Besides the hit single "War", Starr's songs "25 Miles" and "Stop the War Now" were also major successes in the 1960s. Starr's career shifted to the United Kingdom in the 1970s, where he continued to produce music, living there until his death in 2003.

For Long-Term Investors: A time line of S&P 500 Performance Since 1900

![Graph of S&P Composite Index](image-url)