ENDOWMENT & FOUNDATION SPENDING IN AN INTEGRATED ASSET/LIABILITY FRAMEWORK

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Introduction

The recent market environment has led Endowment and Foundation Trustees to re-evaluate the key aspects of their investment oversight. For most Trustees, the challenge is to balance the two competing financial objectives of an institution: meeting current spending needs while maintaining the long term "real" value of the assets.

Through the 1990s, these objectives did not appear to compete; asset values were growing and spending levels kept pace. During the 2008-2009 financial crisis, however, significant asset drawdowns became an unwelcome reminder that spending is equivalent to a liability, not an ever-growing entitlement.

For most investment committees, the 2008 market results highlighted the fact that the asset allocation decision must be closely linked to an institution's future liabilities, i.e. spending. These liabilities vary from institution to institution, but generally include future cash outlays for the operating budget, grant making, capital projects, and even less controllable items like the pace of capital calls from private equity or real estate managers. The critical tool that provides the necessary link between an institution's assets and future liabilities is the spending policy. NEPC believes that this linkage lends itself to an asset/liability management framework. To this end, NEPC has applied our existing asset/liability modeling tools and expertise - commonly used with Pension plans - to meet the unique needs of Endowments and Foundations.

Today, Endowments and Foundations are revisiting goals for their own assets and paying less attention to the returns sought by their peers. At NEPC, we emphasize a holistic approach to Fund management. We help Trustees answer the question of how to define an appropriate and sustainable spending policy so as not to erode assets long-term. The key elements of this approach include traditional asset allocation analysis that has been enhanced with risk budgeting, but then links the spending policy back to assets through scenario analysis, and a liquidity assessment.

In this paper, we will focus on ways to create an ideal spending policy. The key areas of focus will be:

KEY TOPICS

- **Defining an institution's liabilities (spending) and associated risks;**
- **Describing the various types of spending methodologies used by Endowments and Foundations; and**
- **Tying spending policy to asset allocation with modeling tools that analyze spending policies and their appropriateness for a given institution**

In the end, there is no "silver bullet" appropriate for all institutions. Each institution must link spending and asset allocation to their ultimate goals and objectives. We believe our Endowment and Foundation asset/liability approach provides a framework for taking an integrated approach to Fund management.

Defining Endowment/Foundation Liabilities

Many of the models NEPC uses when analyzing Pension plan assets versus liabilities can also be beneficial to Endowment and Foundation funds. A liability is simply a future outlay of money. For Pension plans this is simply the present value of future benefit payments, which tends to be relatively predictable. Unfortunately, for Endowments and Foundations this is often not the case. The success of capital campaigns, capital project costs and private equity and real estate capital calls all create uncertainty. While these liabilities are often unpredictable, the situation is further exacerbated by the uncertainty of annual pay-

outs, largely dictated by a spending policy. While it is not an easy task, the key is to understand and control these variables to the greatest extent possible.

Controlling the volatility of the assets helps to minimize some of the uncertainty, but that's not the entire story. We have talked at length in previous white papers about the importance of diversification and balancing risks within a portfolio. In fact, our clients, on average, have had far less volatility (and more return) than the median fund in the ICC Universe[1] for the trailing three-, five-, seven, and ten-year periods ended 12/31/2009[2]. Completely reducing asset volatility, however, is impossible – that is if you still want to earn a return above the risk free rate.

While asset volatility and unexpected liabilities are difficult to control, Trustees do have some flexibility and control when it comes to spending. There are two major spending methodologies and each has its pros and cons. There is no perfect spending policy, so Trustees must utilize the method that best fits their individual situation.

Understanding Your Liabilities

There are many ways to construct a spending policy, but the major methodologies that are primarily utilized are either asset value based or inflation-linked. Within these major categories, institutions employ policies that will have different rates of spending, various smoothing methods, methods that will blend methodologies, and methods that will help stabilize spending. For the purpose of this paper and to illustrate the challenges present in various spending policies, we will deal first with the pure applications of the two most commonly understood spending policies:

Exhibit 1: Major Spending Methodologies

Asset Based Policy	Inflation Based Policy
Three Year Moving Average: a constant rate applied to the three-year moving average. Many institutions employ this type of policy.	**Inflation-Linked Method**: Last year's spending dollars increased by inflation. Yale and Stanford use a variation of this policy.

To illustrate, let's consider an example Endowment that has a beginning market value of $300 million and uses a 5.0% spending rate.

This Endowment has the following asset allocation:

25% US Equity and 25% non US Equity

10% US Fixed Income and 10% Global Equity, including Emerging Debt

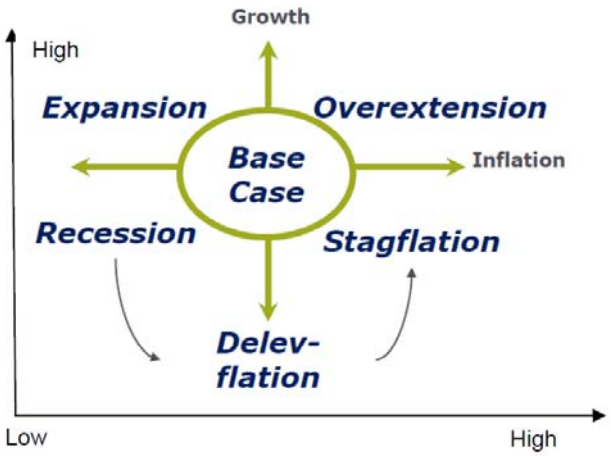
10% Real Assets, 10% Hedge Funds and 10% Private Equity

Using traditional mean-variance statistics (commonly referred to as expected portfolio return and risk) with NEPC's 2011 Base Case, 5-7 year assumptions for expected return, expected volatility, and expected correlation, the example Endowment has an expected return of 7.4% and a 11.7% expected standard deviation.

Furthermore, since this approach uses a Base Case scenario, NEPC introduces scenario analysis to test how this portfolio performs under extreme economic outcomes. We consider two major macroeconomic factors, growth and inflation, and model the impact of the extreme cases of these factors on the portfolio.

This results in six total scenarios including the base case and "Delev-flation", a potential outcome of the current financial crisis where there is low to negative inflation in the beginning years of the forecast followed by rapid inflation due to massive government stimulus and policy incentives. The scenario analysis includes both upside and downside economic scenarios, and stress tests the spectrum of low to high growth of the global economy and low to high inflation. Details for each scenario can be found in Appendix II.

Exhibit 2: Macroeconomic Environments

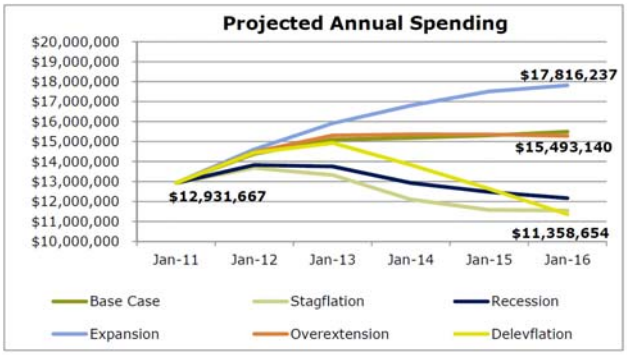


The following Exhibits show the impact of the various scenarios on the profiled spending policies for the example Endowment. For the asset based method, we extrapolate the expected asset value

1 The Independent Consultants Cooperative ("ICC") is made up of NEPC and fifteen other investment consulting firms in an alliance with State Street Corporation. By pooling our client data, we are able to build a universe of over 16,000 portfolios totaling over $1 trillion in assets. Past Performance is not a predictor of future value.
2 December 31, 2010 results were not available as of the publish date of this paper.

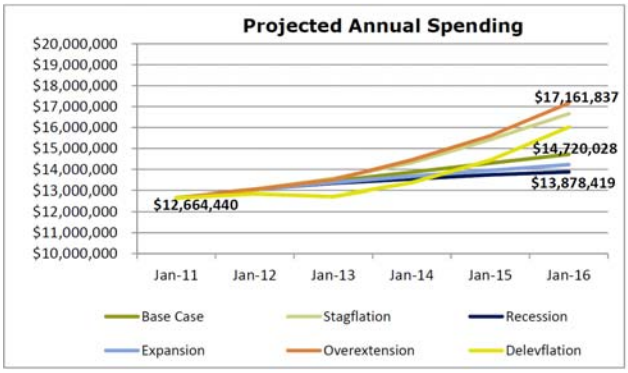
of the Endowment under each scenario and apply a 5.0% spending policy.

Exhibit 3: Three Year Moving Average



The inflation-linked method requires no assumption about asset value, but requires assumptions about inflation under each scenario.

Exhibit 4: Inflation-linked Method



As Exhibits 3 and 4 illustrate, the three year moving average has a higher dispersion of potential spending outcomes, ranging from $11.4 million to $17.8 million in 2016. This is because the spending policy is directly linked to the performance of the assets. In up-trending markets, spending will increase; in down trending markets, spending will decrease. Over the long-term, in upside economic environments where growth is moderate to high and exceeds expected inflation (Expansion, Overextension, and Base Case) the asset-based spending relative to an inflation-linked method will generally be higher. This is due to the fact that the inflation-linked method removes the growth of assets component from spending and increases spending at the rate of inflation. However, the reverse is true for the downside economic environments (Recession, Stagflation, and Delev-flation) where the inflation-linked method provides more stability to spending over time. The difference in spending between the inflation-linked method and the three year moving average in the downside scenarios is approximately $2.5 million.

By looking at the Exhibits 3 and 4, we can see that the inflation-linked method provides smoother projected spending because inflation is not expected to have the volatility that is implicit with the asset based method. However, in addition to lower potential spending in rising markets, a consequence of the inflation-linked method is a higher effective spending rate in declining markets, which over time will erode asset value. (See Exhibits 5 and 6) This is particularly noticeable under the Delev-flation and Stagflastion scenarios when inflation has increased significantly, causing spending to increase, while asset values are declining.

Exhibit 5: Three Year Moving Average

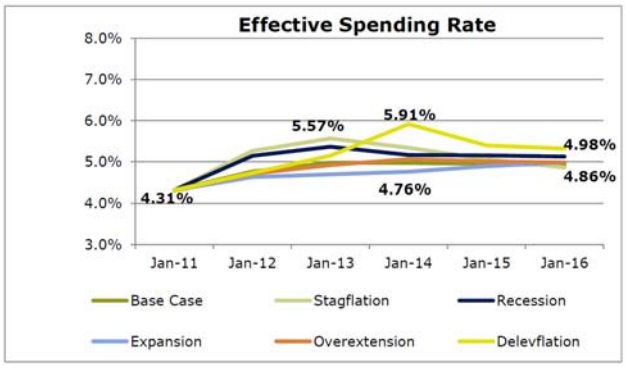
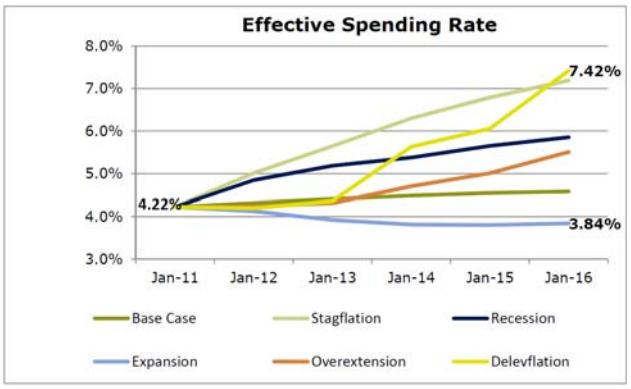


Exhibit 6: Inflation-linked Method



To link liabilities back to assets, the Projected Market Values in Exhibits 7 and 8 show the impact of the spending methodology on real asset values. Delineating spending from asset allocation in an environment where inflation is moderate to high means higher spending rates and therefore lower asset values. If you extrapolate the analysis more than five years, the result is significant erosion of assets over time, potentially impacting the Fund's ability to exist long term.

The benefit of inflation-linked spending in low to moderate inflation environments is that spending does not increase significantly year-over-year in rising markets and therefore market values are higher.

Exhibit 7: Three Year Moving Average

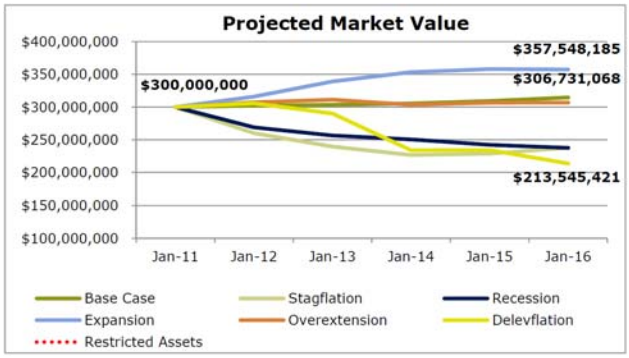
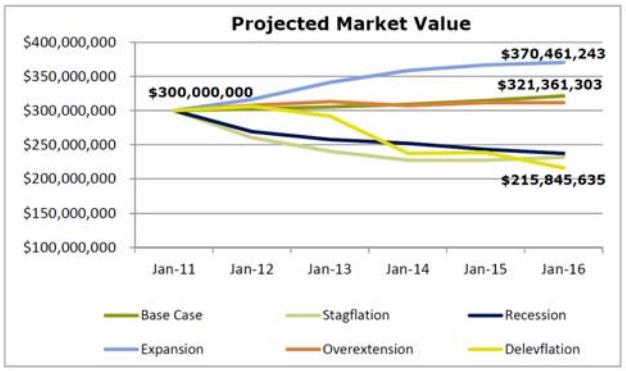


Exhibit 8: Inflation-linked Method



The takeaways from these charts are:

There is more variability in spending using the asset based spending policy because it relies on potential outcomes and changes in asset values, even if an institution uses a smoothing mechanism. Nonetheless, because spending is linked to asset values, there is potential for higher spending in up-trending markets.

Stability in year-over-year (YOY) changes in cash flow is better achieved using an inflation-linked spending policy, but at the cost of higher effective spending rates and therefore additional asset value erosion in declining markets.

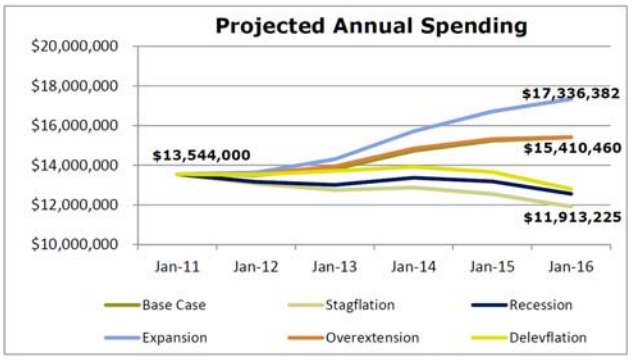
Institutions may apply various iterations of asset based or inflation-linked spending methods. We will quickly introduce four additional methods: Five Year Moving Average, Channel Method, and two Hybrid Methods. Additional details can be found in Appendix I. A summary of these potential policies is in Exhibit 9.

Exhibit 9: Alternative Spending Policies

Asset Based Policies	Hybrid Policies
Five Year Moving Average: A constant rate applied to the five-year moving average. Many institutions employ this type of policy. For this analysis 4.5% is applied	**80/20 Hybrid Method (80% Inflation, 20% Asset Based):** Weighted average of the prior spending adjusted for inflation plus spending based on the current market value ("Yale Rule")
Channel Method: A range-based policy that limits spending to an upper and lower target. For the charts, the **Three Year Moving Average of 4.5%** with limits at 4.25% and 4.75%	**40/60 Hybrid Method (40% Inflation, 60% Asset Based):** Weighted average of the prior spending adjusted for inflation plus spending based on the current market value (Stanford's Method)

An institution may use a longer smoothing period, like five years, to capture the benefit of an asset based spending policy in up-trending markets, but smooth volatility of change in spending from extreme market environments. The longer smoothing period removes some of the year-over-year volatility. To see the effects of this, compare Exhibit 10 to Exhibit 3.

Exhibit 10: Five Year Moving Average



The Channel Method attempts to limit volatility and maintain the asset based method by adding upper and lower channel limits to the effective spending rate. Over the long-term this also preserves capital. Exhibit 11 shows how the channels would be implemented in our scenario analysis. Exhibit 12 shows limits on the effective spending rates relative to Exhibit 13, which places no channels.

[2] Effective Spending Rate = actual dollars drawn for spending/current market value

Exhibit 11: Channel Method applied to Three Year Moving Average

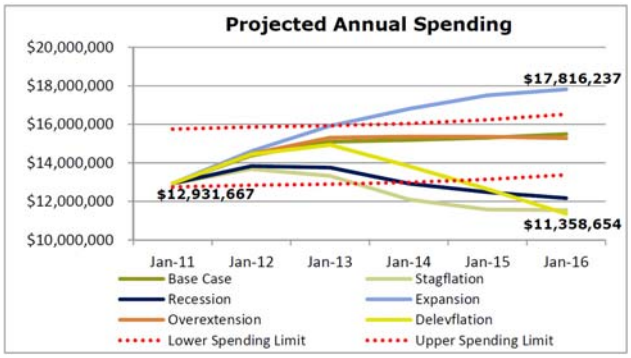


Exhibit 12: Channel Method Spending Rate Limits applied to Three Year Moving Average

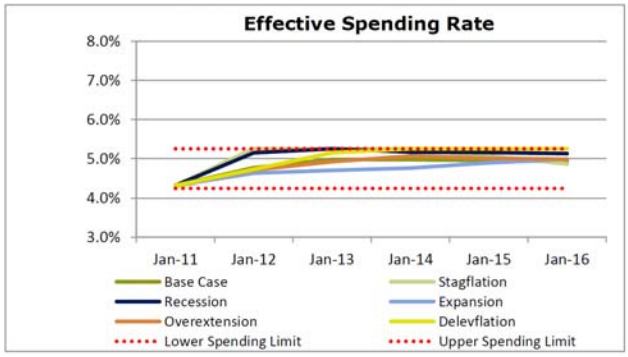
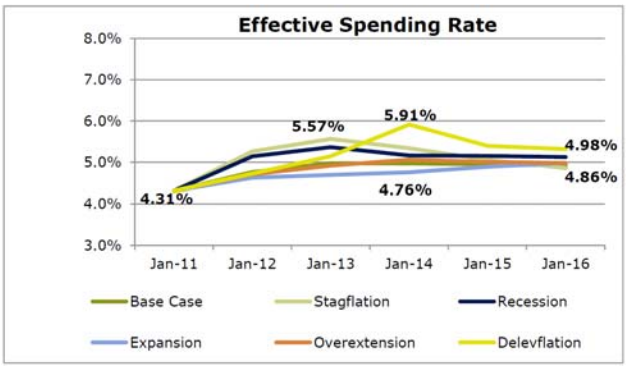


Exhibit 13: Unconstrained Spending Rates applied to Three Year Moving Average



Another iteration of spending is to blend an asset-based spending method with the inflation-linked method, known as the hybrid method. This approach gained popularity due to its usage at high profile universities such as Yale and Stanford. Exhibit 14 shows a policy that uses a weighted average of 80% of the potential spending rate applied to last year's inflation rate plus 20% of the potential spending rate linked to asset growth using one year trailing asset value. Exhibit 15 shows a policy that is 40% sensitive to inflation and 60% sensitive to asset growth, using the same application. Of note, the pattern of spending dollars and expected outcomes is clearly linked to the weights applied to inflation-linked and asset based methodologies.

Exhibit 14: 80/20 Rule

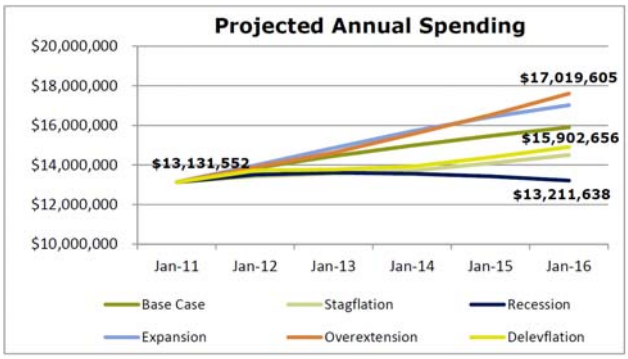
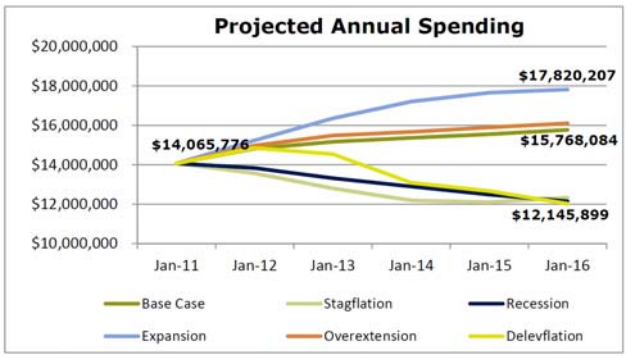


Exhibit 15: 40/60 Rule



In summary, there are a number of spending policies that are fairly well known, and even more iterations that could suit an institution. We recommend to clients that they review their spending policy in the context of their own goals and objectives.

Taking a Holistic Approach to Fund Management

Since the goal of any Endowment or Foundation is to spend to support its mission, it stands to reason that spending policy is a major decision. So, which spending policy is best? That answer requires stepping away from the single focus of the investment decisions, and considering the institution's overall goals and objectives. As previously mentioned, the liabilities of Endowments and Foundations include funding and operating budget, meeting liquidity requirements, grant making, capital projects, etc. These funding decisions are often made apart from the investment process. As such, the spending methodology should be linked to the biggest liability of the Fund, and that risk needs to be determined individually for each institution.

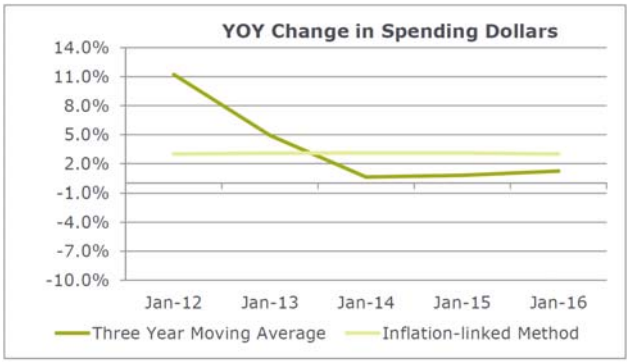
Still, there are common factors that institutions face. For instance, if an institution plans on large capital projects or bond issuance over the next

several years, liquidity planning is an important discussion. Regulatory concerns such as UPMIFA may also arise regarding spending on funds that may be underwater relative to their gift amount. In this case, it may be best to consider the issues under lower spending scenarios and a more defensive asset allocation. Commonly, institutions - and especially Foundations – face the issue that spending from assets funds significant portions of the operating budget. As a result, the year-over-year change in spending (spending volatility) becomes a concern.

Exhibits 16 and 17 show the impact of spending volatility, which represents the year-over-year change in percent of spending dollars. In this example, we compare the volatility present in the three year moving average relative to the inflation-linked method. In Exhibit 16, the spending volatility expected from the three year moving average (dark green line) is high, where spending dollars increase more than 11% in 2012 and another 5% the next year, as 2008 market values roll out of the smoothing mechanism. Spending volatility becomes an issue in budget forecasting; where many budget expenses are steady or increasing from year-to-year.

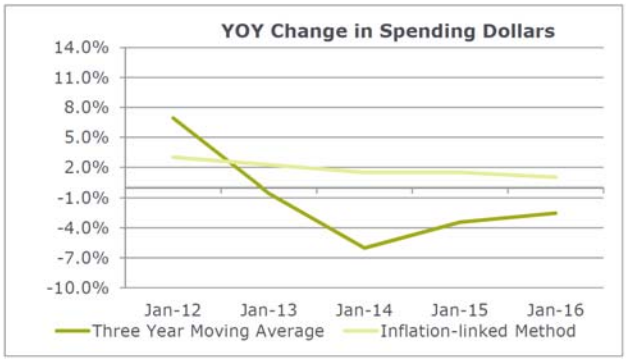
Perhaps the spending volatility expected from the inflation-linked method (light green line) seems more acceptable when thinking about linking the spending policy to budgeting. Again, considering the trade-offs between methods, lower spending volatility means giving up spending increases if assets appreciate.

Exhibit 16: Base Case Spending Volatility



Volatility becomes even more pronounced in a recession scenario (Exhibit 17), when asset values and therefore asset based spending drops.

Exhibit 17: Recession Spending Volatility



In the Recession case, spending dollars under the Three Year Moving Average drop below 2011 values by 2014. Exhibit 18 shows the change in dollars represented by Exhibits 16 and 17.

Establishing a spending policy necessitates taking a holistic approach, or considering the decision from different viewpoints and assessing the risks associated with the decision.

So, what are non-investment factors that may influence spending decisions?

The reliance on current spending for the operating budget. If an institution relies heavily on spending to fund operations, a spending policy that better stabilizes spending year-over-year may be appropriate for the budget. This can be accomplished with a lower volatility asset allocation or a spending policy that is delinked from asset values.

The short-term need for higher cash flows or liquidity, as in capital calls, funding for large projects, or even maintaining liquidity for bond issuance and ratings. This becomes a particular concern when an institution does not have inflows from capital campaigns, donations, etc. This issue must be considered throughout the asset/liability process to integrate asset allocation, spending policy and liquidity requirements.

Exhibit 18: Annual Change in Spending

Base Case	2011	2012	2013	2014	2015	2016
Three Year Moving Average						
Expected Spending in Dollars	$ 12,931,667	$ 14,382,955	$ 15,092,354	$ 15,185,014	$ 15,305,639	$ 15,493,140
% Change year-over-year		11.2%	4.9%	0.6%	0.8%	1.2%
Inflation-linked Method						
Expected Spending in Dollars	$ 12,664,440	$ 13,043,550	$ 13,445,385	$ 13,862,527	$ 14,292,896	$ 14,720,028
% Change year-over-year		3.0%	3.1%	3.1%	3.1%	3.0%
Recession	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Three Year Moving Average						
Expected Spending in Dollars	$ 12,931,667	$ 13,828,982	$ 13,752,904	$ 12,925,084	$ 12,481,519	$ 12,166,033
% Change year-over-year		6.9%	-0.6%	-6.0%	-3.4%	-2.5%
Inflation-linked Method						
Expected Spending in Dollars	$ 12,664,440	$ 13,044,373	$ 13,337,872	$ 13,537,940	$ 13,741,009	$ 13,878,419
% Change year-over-year		3.0%	2.3%	1.5%	1.5%	1.0%

Conclusion

Setting spending policy in the current market environment is a challenge. NEPC is currently forecasting subdued returns from stock and bond markets over the coming five-to-seven year period. As a result, we suggest that institutions can no longer rely on asset appreciation to fund spending needs. In a low-to-moderate return environment, spending policy becomes the balance between budget, fundraising, and investing for the future. The risk of these forces compromising the institution must be at least considered and potentially hedged.

What is the right spending policy for your institution? The answer to this question must be driven by considerations unique to your organization. Many of the risk factors an institution faces are unique to the organization, but still, Trustees face both internal and external factors that influence the decisions they must make relative to investments, spending and budget. We believe that a framework is necessary to review as much information as possible in a way that informs decisions. Taking the holistic approach, Trustees can make decisions about asset allocation, their ability to accept risks, and liquidity needs specific to the planning cycle for an institution.

To learn more about our firm and our Endowment & Foundation Practice Group, please refer to our website www.nepc.com.

Appendix I: Spending Policies

Investment income based spending policies spend from investment income generated from fixed income and/or dividend paying securities. This policy is structured so that asset allocation and spending are directly linked. With this policy, capital allocation starts with a fixed income target, and any return generating assets, like equities, are secondary allocations. As interest rates fall, this methodology becomes less attractive as investment income spending decreases. It should also be noted, that through the 1990's this approach meant that an Endowment or Foundation's investment returns would trail that of equity-centric peers, which may have caused many institutions to reevaluate asset allocation and as a result spending policy; in other words, outside forces drove internal decisions. Over time and as trust laws changed, this approach was often transitioned to include all investment gains.

Market value based spending policies apply a spending rate (in %) to a market value. The advantage of a defined spending formula and spending rate is that it makes spending simple. Investors can target a specific investment return goal and structure the Fund accordingly; unfortunately low interest rates and the necessity for spending dollars means higher equity allocations in portfolios to drive returns. The disadvantage of a market value based spending policy is that actual dollars spent fluctuate widely.

However, it is difficult both for a Trustees to budget for and for beneficiaries to rely on spending dollars if they vary greatly from year to year. 'Smoothing' can mitigate the fluctuations of the spending amount, but will not eliminate all the volatility due to the markets. Smoothing occurs when Funds take an average of the trailing 3 or 5 years (either on a quarterly or annual mark), and apply the spending rate to this average. The result of this calculation will still vary as markets rise or fall but it averages the ups and downs of the market value over time which will dampen the variability of the distributions.

Inflation-linked spending policies aim at balancing the goals of spending and capital preservation. These spending policies tie an inflation measure to actual spending dollars for a Fund. In its purest form, the policies would be applied by taking the last year's spending and increasing (or decreasing) it by an inflation measure like CPI or HEPI. This also accomplishes a link to spending with the needs and characteristics of a typical operating budget where expenses are grown every year based on inflation. The advantage of this policy is that spending is highly predictable over time and fluctuates very little.

Like the smoothing in the market value approach, this approach can be modified to reduce the impact on extreme inflation/deflation environments. The inflation sensitive method can be combined with the market value approach to derive a spending policy referred to as the **Hybrid Method.** The hybrid method uses a weighted average formula to combine market value spending rate policies with inflation-linked spending policies. This method allows an institution to set different weights for the two policies in order to meet their Fund's specific needs. The most popular expression of the hybrid method is the Yale Model, which weights 20% relative to their spending rate and market value and 80% to an inflation accelerator.

Finally, spending methodologies are designed with assumptions made about future expectations of the economic environments. As a result, any of the spending policies may break down if the assumptions no longer hold. In the case of income based spending policies, low interest rates lead to their demise. For market value spending policies, many institutions are reevaluating their assumptions about downside scenarios, and with inflation based models, they are questioning the probability of hyperinflation. To mitigate some of these issues long-term, some Funds modify the pure application of the spending policy with spending ceilings and floors.

The **Channel Method** or range based spending policies set an acceptable upper and lower limit of spending either based on actual dollars spent, effective spending rates, or market values. A range based spending policy will spend less in strong markets and a maximum in weaker markets, which in the end provides long-term capital preservation. The range based spending policy also limits spending volatility significantly, but it does not eliminate it. The natural extension of the channel method is a **Stabilization Fund**, where excess dollars from spending that would occur outside the upper channel are set aside to fund spending when it falls below the lower channel.

Appendix II: Scenario Analysis Definitions

Base Case: NEPC's 5-7 year asset class return assumptions

Expansion: Low inflation, high growth economic environment. Economy is growing at a strong, but seemingly sustainable level. Bond yields are stable, inflation is manageable, equities and other high volatility asset classes perform quite well in this environment. Historical Example – 2004-2006.

Overextension: Economy is growing at a rapid pace, inflation increases significantly – booming times but at the cost of future growth. Bond yields move higher as a result of inflation, high

yield does well with confidence in the economy. Equities, real estate, and commodities fuel rapid expansion. Historical Example – Vietnam War Era (1967-1971).

Stagflation: In stagflation two problems exist (1) the economy is not growing, and (2) inflation has skyrocketed. Fed has limited options to kick-start economy because easing only promotes further inflation. While equities are sagging and bonds are losing real value, real assets such as TIPS will perform well on a relative basis because they are linked to inflation. Historical Example – flat stock market and double digit inflation of the mid-1970s.

Recession: Economy stalls, there is a flight to quality as investors lose confidence. Equity markets fall; bond yields fall. Interest-sensitive securities (bonds, especially long duration bonds) will perform well in this environment. Historical Example – early 1990s.

Delev-flation: A potential outcome from current financial crisis. Low/negative inflation in beginning years of forecast followed by rapid inflation due to massive government stimulus and policy incentive. Stocks move sideways as outcomes remain unresolved but move materially lower over forecasted horizon. Nominal bonds lose value, inflation sensitive assets perform well.

Exhibit 3: Three Year Moving Average

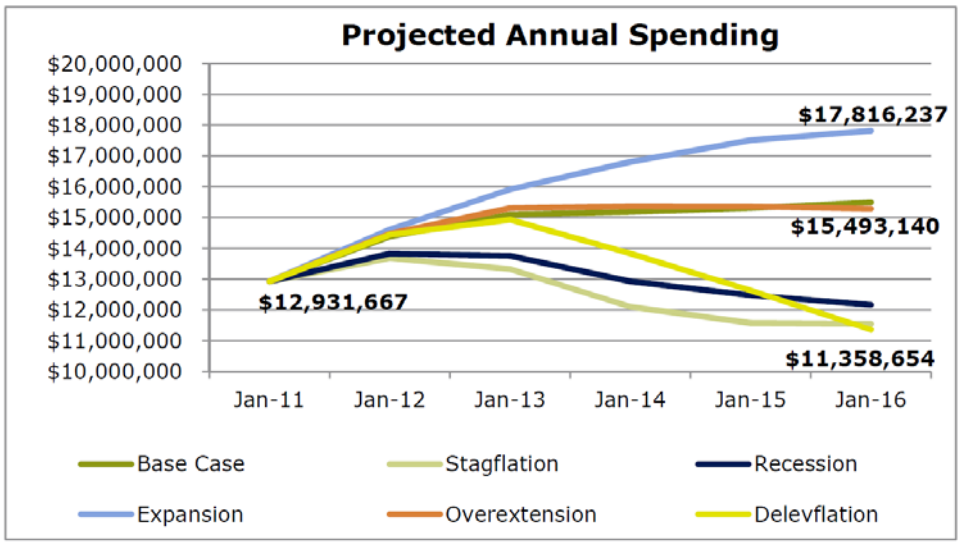
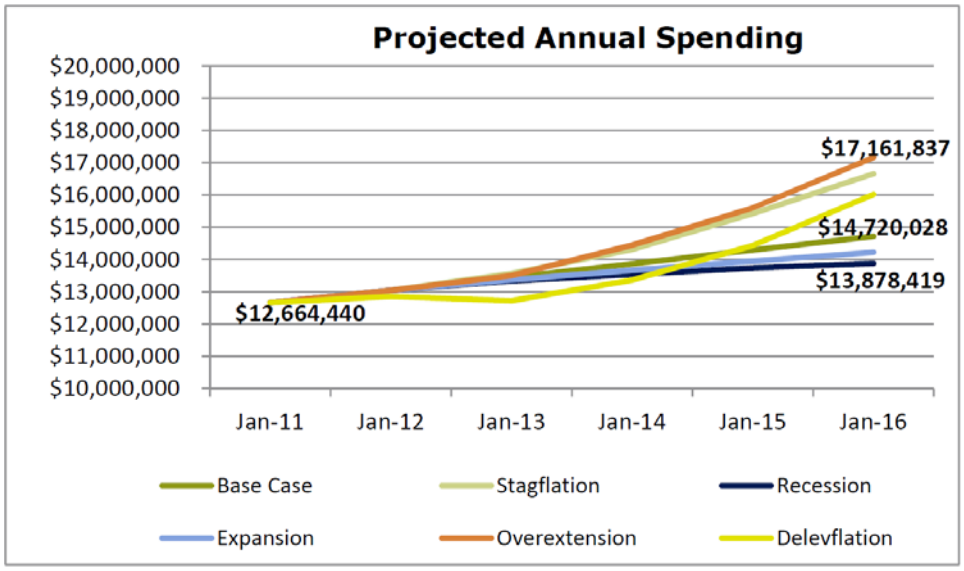


Exhibit 4: Inflation-linked Method



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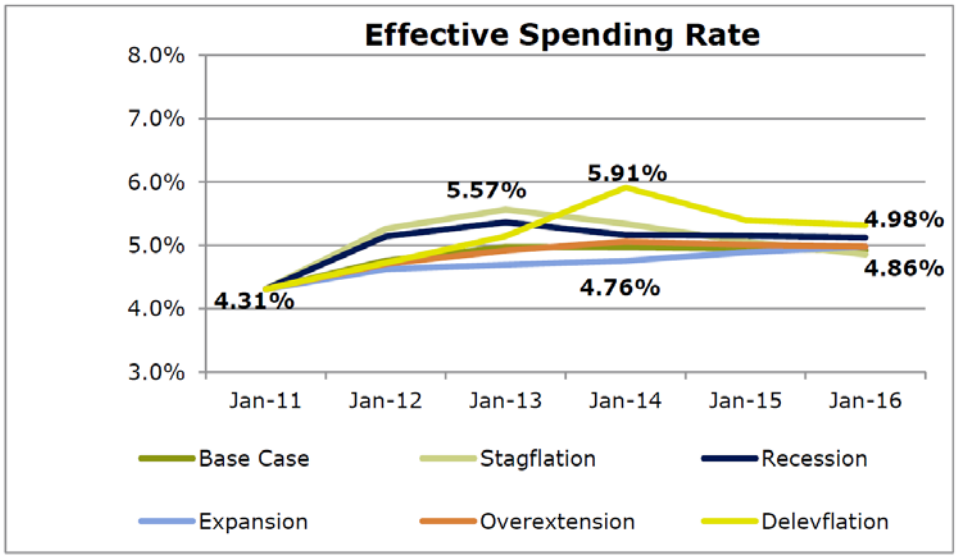

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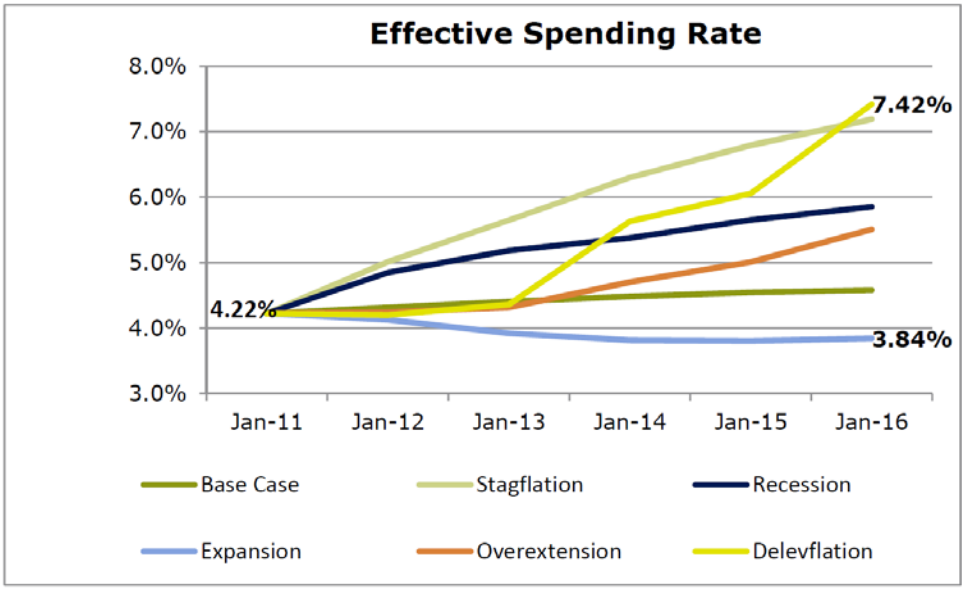

Exhibit 7: Three Year Moving Average

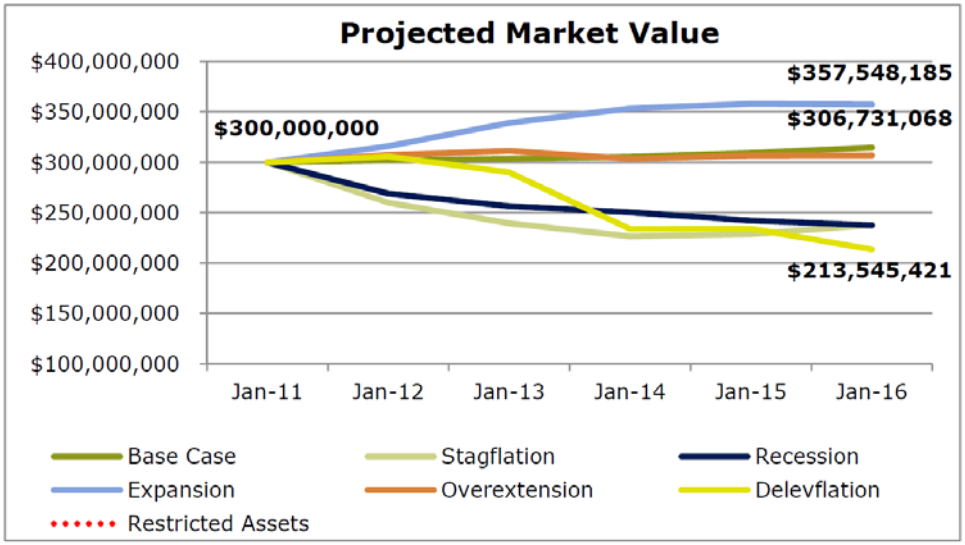

Exhibit 8: Inflation-linked Method

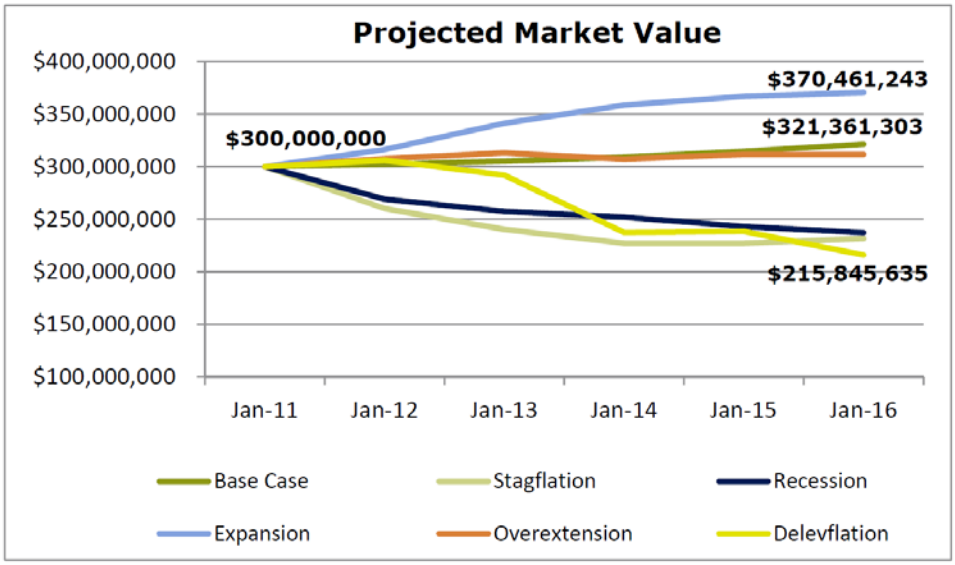

Exhibit 10: Five year Moving Average

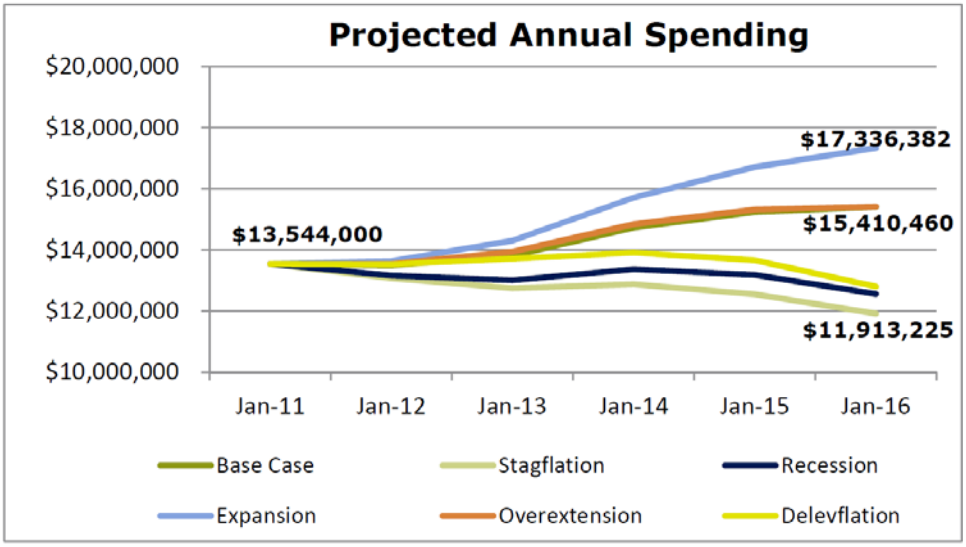

Exhibit 11: Channel Method applied to the Three Year Moving Average

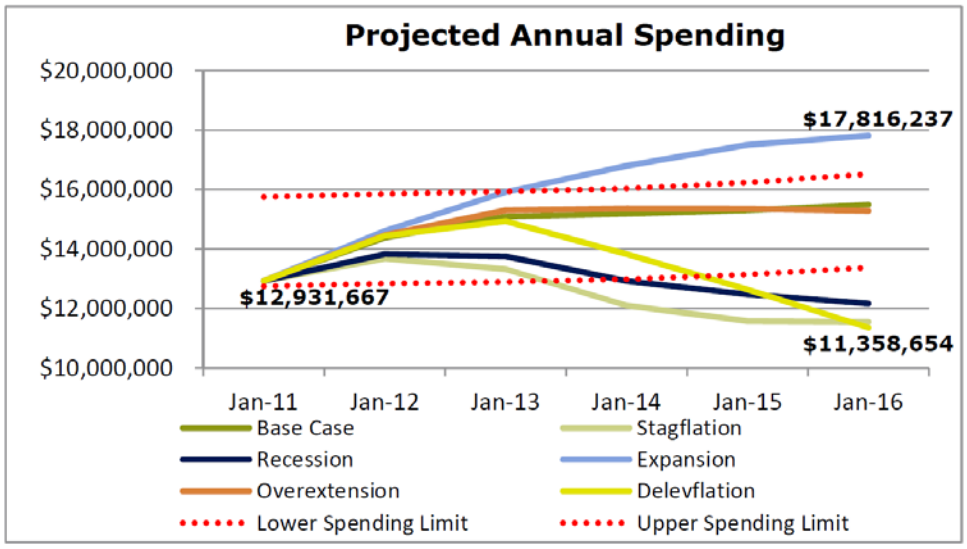

Exhibit 12: Channel Method Spending Rates applied to the Three Year Moving Average

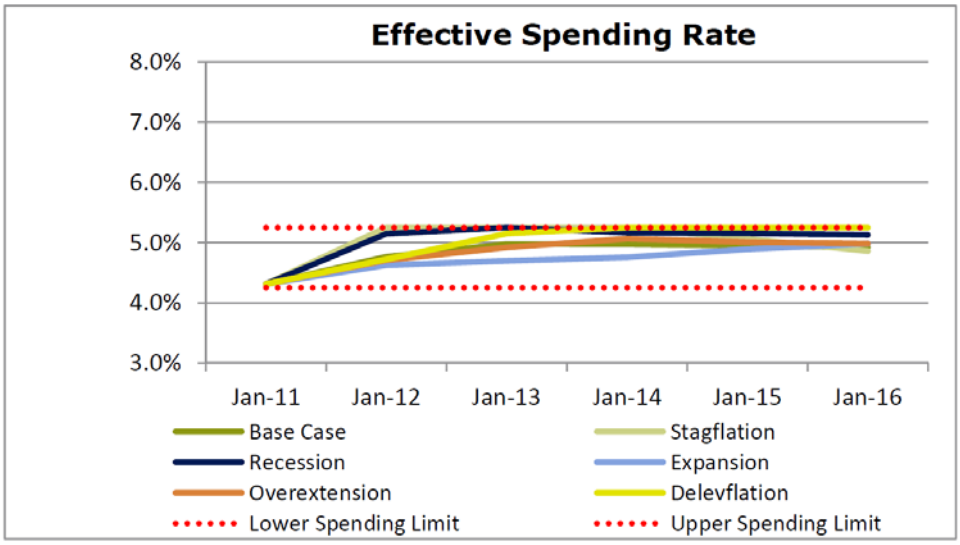

Exhibit 13: Unconstrained Spending Rates applied to the Three Year Moving Average

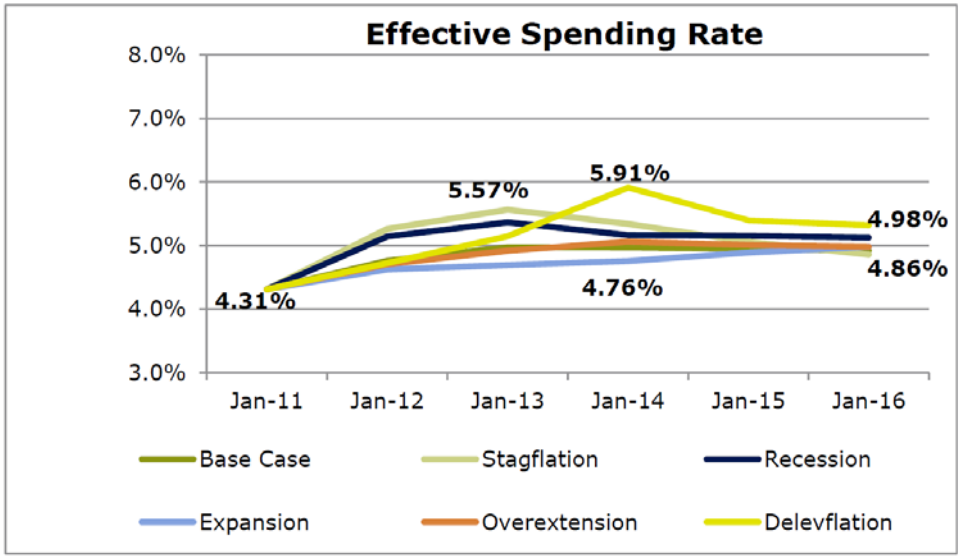

Exhibit 14: 80/20 Rule

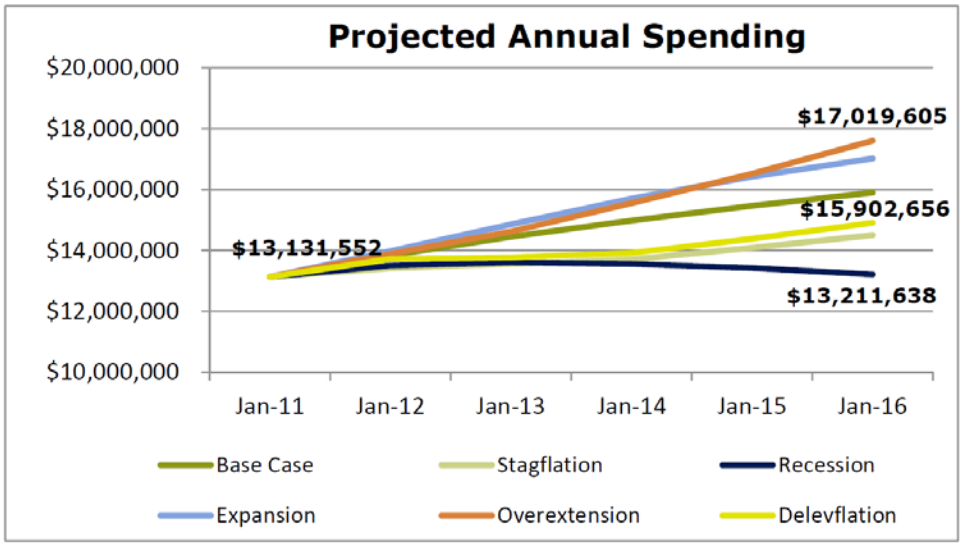

Exhibit 15: 40/60 Rule

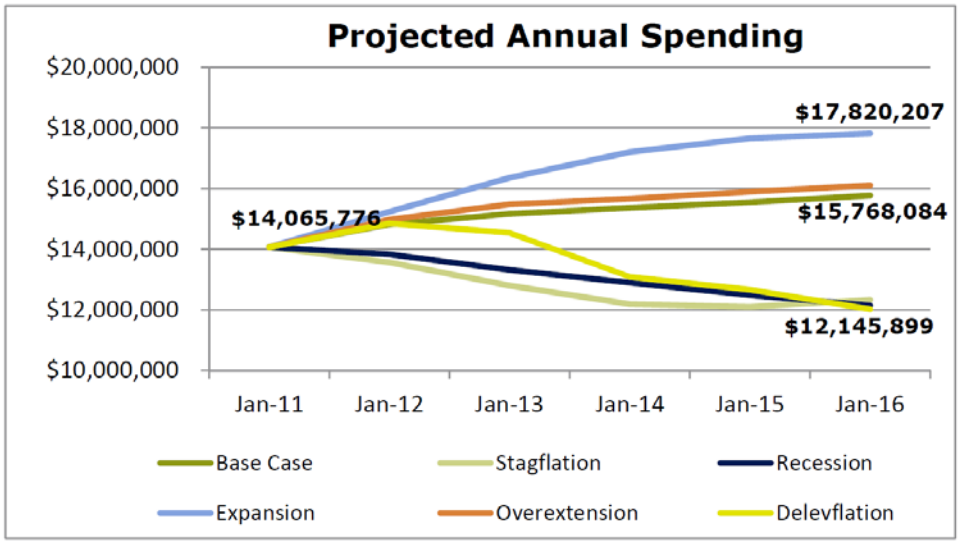

Exhibit 16: Base Case Spending Volatility

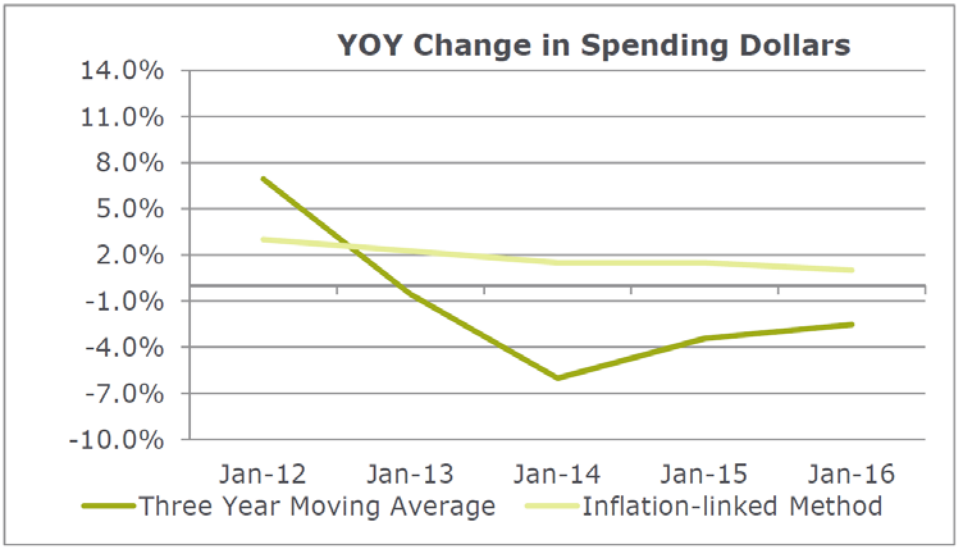

Exhibit 17: Recession Spending Volatility