



How to generate income in a low interest rate environment?

Nov 2017

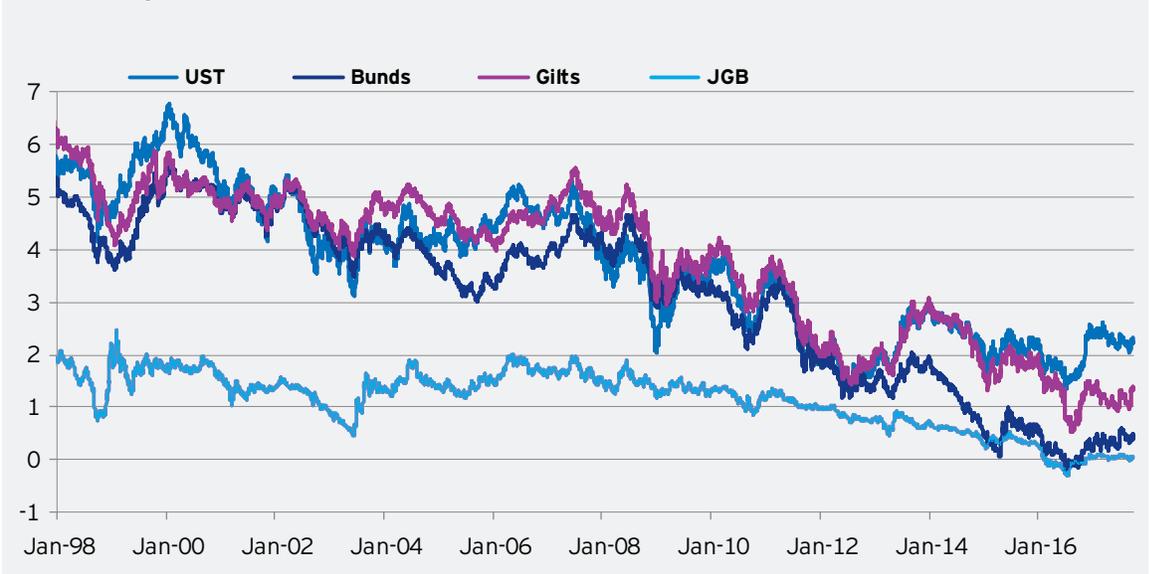
Since mid-2013, global market volatility has become more pronounced and frequent, while interest rates have remained low. Given the increasing level of market volatility, it is appropriate to ask “how to generate income and manage the risk in a low interest rate environment” ?

- Historically investors could rely on a steady stream of coupon payments from fixed income and fairly safe bond investments to generate sustainable income return.
- However as the G7 central banks have lowered interest rates and maintained an accommodative policy, the risk-free has continued to decline (the average G7 cash rate is negative) and traditional strategies can only slightly enhance yield from the rock bottom of the return spectrum.

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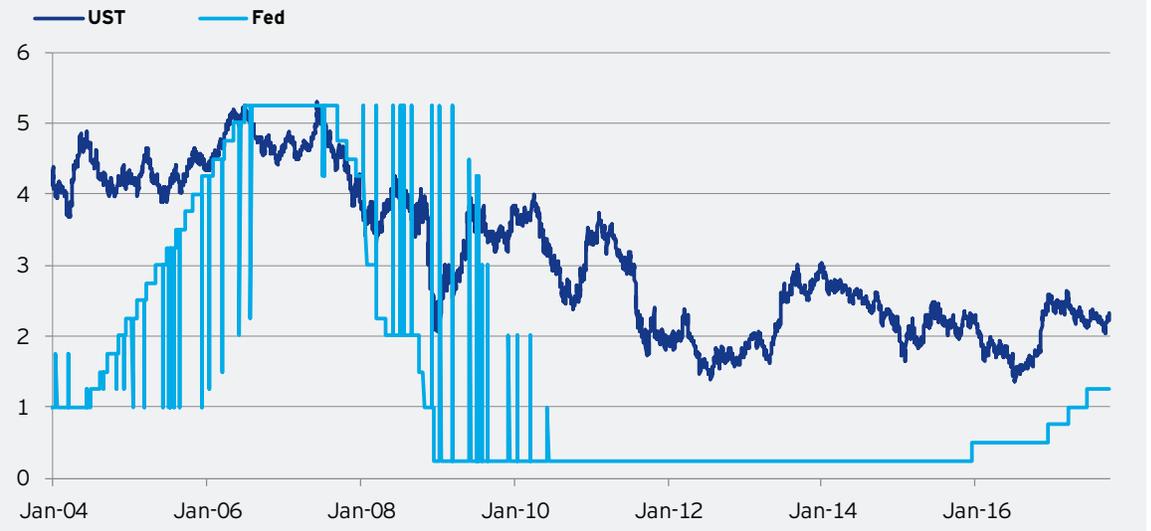
US Treasury, Bunds, Gilts, JGB



Source: Bloomberg L.P., data as of 29 September, 2017

- Quantitative Easing (QE) from the US has already reversed, and the Fed will maintain a tightening bias.
- Therefore, it is necessary to address the risk of rising interest rates and the potential impact of capital losses from fixed income investments.

10s US Treasury yield vs Fed policy



Source: Bloomberg L.P., data as of 29 September, 2017

- The so-called “Bernanke put” starting from mid-2013 and the spill-over effect from interest rate policy has led to significant fluctuations in volatility across major asset classes, including, S&P and US Treasury 10-year yield.

Asset class volatility since the Bernanke put



Source: Bloomberg L.P., data as of 29 September, 2017

- As a result, return volatility of major asset classes can easily consume most or potentially all of the income return from a single asset class.

Return components from fixed income investment since QE 2



Source: Bloomberg L.P., data as of 29 September, 2017

- Given the direction of US interest rates, the tightening bias from the Fed could ultimately translate to a stronger US dollar and indirectly put pressure on local returns from various markets.
- So it is important to not just generate income, but also to manage risk in order to protect returns.
- Some non-traditional sources of yield include emerging-market debt, US high-yield debt, high-dividend-paying stocks, real assets, commodities, etc. These assets can easily generate a higher income risk-free rate.
- But they also are subject to singular asset bias and more importantly, interest rate risk. Therefore, it is critical to have a diversified portfolio of different assets to generate income and control the risk.

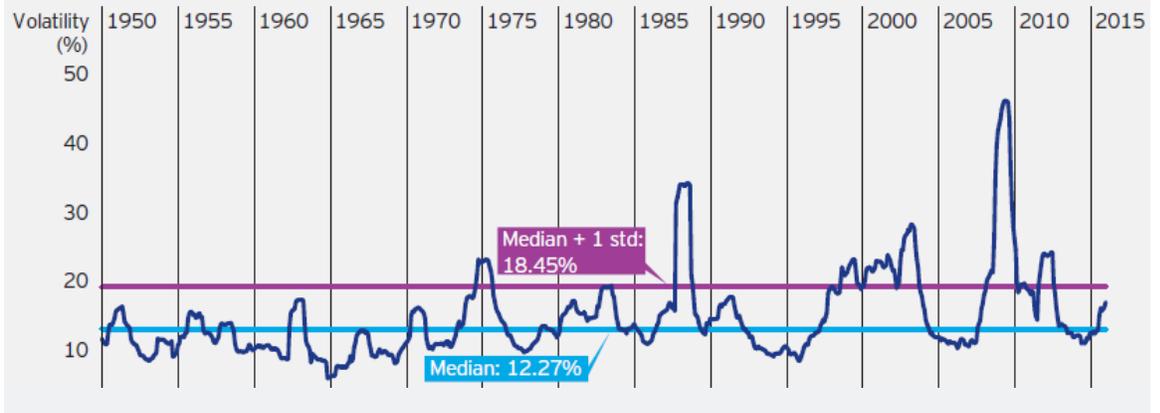
Volatility is dynamic¹

Historically, volatility has always factored into investment decisions, for example, by allocating to a balanced portfolio of stocks and bonds to diversify risk. However the global financial crisis forced investors to re-examine their understanding of volatility as well as their approach to accounting for it in their portfolios.

As volatility becomes more pronounced and more frequent, we believe the risk level investors actually experience over the short term is unlikely to equal the risk tolerance level they expect to achieve over the long term. Volatility, as measured by the standard deviation of rolling one-year S&P 500 Index returns, has averaged 12% since 1950 and severe market swings, defined as volatility that exceeds one standard deviation above average volatility (18.4%), have occurred roughly once every six to seven years.

¹ Extract from "Seeking better investment outcomes by managing volatility" - The Invesco White Paper Series

Post-war S&P 500 Index annualized rolling one-year volatility

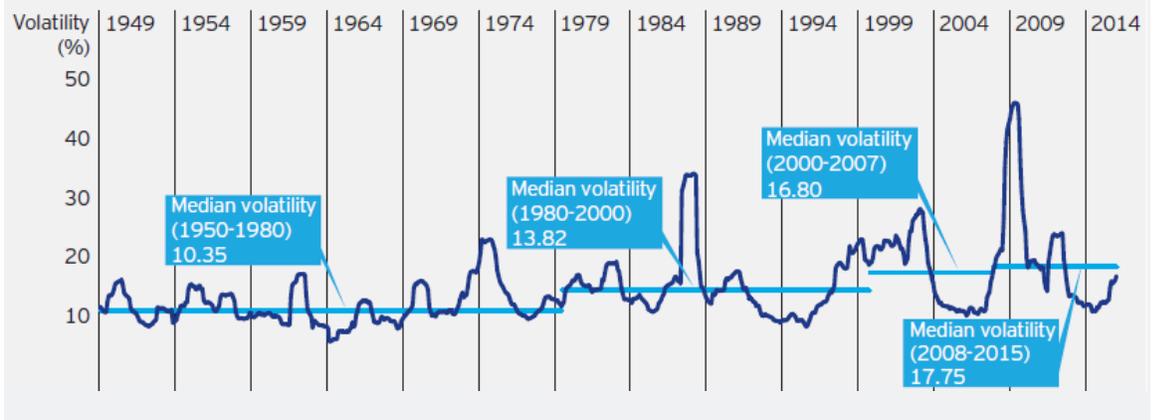


Source: Bloomberg L.P., and Invesco, data as of 31 December, 2015. Data is represented by S&P 500 Index.

On the surface, this average level of volatility and frequency of high volatility events might be acceptable to most investors. However, underpinning investment decisions with the assumption that volatility is constant over time could undermine long-term financial goals, as the magnitude and frequency of volatility have increased over time.

Looking across the returns of the S&P 500 Index in the post-war period, we see that median volatility has increased from 10.3% between 1950 and 1980 to 13.8% in the subsequent 20 years. Median volatility increased again to 16.8% in the period between 2000 and 2007. In the years since the financial crisis, volatility averaged 17.7%. Thus, the average accumulator who began saving for retirement in the 1980s and 1990s would have incorporated incorrect assumptions regarding volatility - ones that were too low - in planning for retirement with the potential to undermine financial goals.

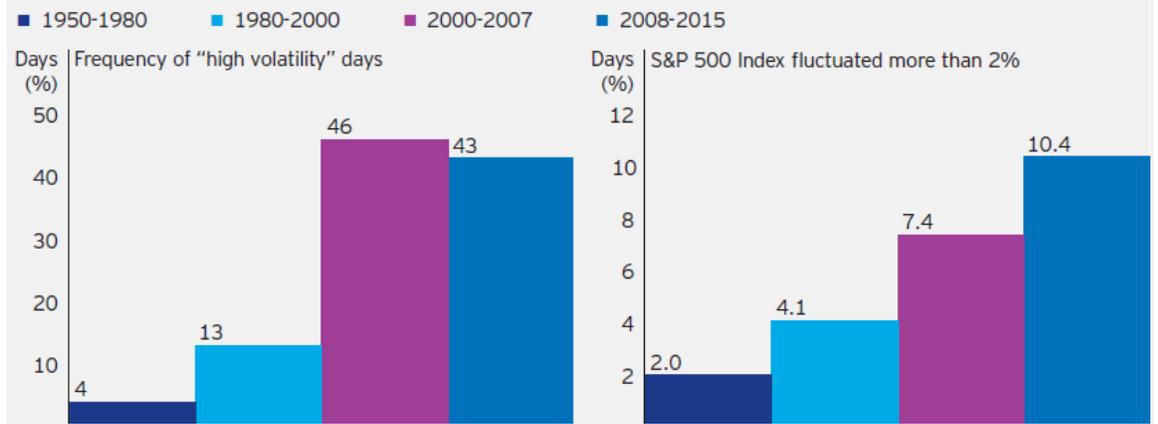
Magnitude of volatility has increased over time



Source Bloomberg L.P., and Invesco, data as of 31 December, 2015. Data is represented by S&P 500 Index.

In addition to magnitude, the frequency of high volatility episodes has increased over the past 65 years. For example, the frequency of high volatility events (i.e. volatility higher than one standard deviation above the mean) has increased from 4% in the period between 1950 and 1980 to more than 40% in the period since 2000. Another reflection of volatility involves short-term -daily -movements in market returns. The number of days during which the S&P 500 Index fluctuated more than 2% (up or down) has increased from 2% in the period between 1950 and 1980 to more than 10% in the period between 2008 and 2015.

Frequency of volatility has increased over time



Source: Bloomberg L.P. data as of 31 December, 2015. Data is represented by S&P 500 Index.

Traditionally, many investors have targeted a level of volatility based on their tolerance for losses, and they have sought to manage volatility in their portfolios through a static allocation to assets they believed would move independently of each other - like a traditional balanced portfolio comprising 60% stocks and 40% bonds - thereby smoothing out portfolio returns. However, experience since 2000 shows that investing in a 60/40 portfolio does not always provide the diversification benefits investors seek moreover, it does not account for the changing dynamics of stronger and more frequent volatility over time.

Volatility is here to stay

- China's growth recession remains the biggest risk to the global economy in the medium term.
- Depreciation of Reminbi (Yuan) has triggered a lot of concern, not just for Chinese capital flow but also for overall emerging market (EM) capital flow in the long run.
- A stronger US dollar coincides with weaker demand and commodity pricing has raised concerns about overall growth in EM countries.
- Europe as a whole is still recovering while Brexit is now a minor concern, but Greece and Spain still display the worst effect to the bloc.
- US economic growth has remained steady but external weakness originating from EM to Europe persists.
- Since the global financial crisis, central banks have provided stimulus in the form of accommodative monetary policy which has helped support and stabilize the financial markets but at the same time has compressed yields.
- As a result of long-term accommodative policy, interest rates have stayed too low but global growth remains sluggish.
- Given the above, macroeconomic issues may re-emerge that could easily create more volatility across assets, countries and region.

Key principles for an income portfolio in a low interest rate environment

There are three main principles for an income portfolio in a low interest rate environment:

1. Diversifiability of assets

- Ability to diversify away from singular asset risk and across to other asset classes.
- Ability to reduce exposure to systematic risk inherited from certain asset classes to minimize overall portfolio risk.

2. Adaptability of investment style and asset mix

- Flexibility to change the investment style and asset mix at different points in time should allow underlying investments to follow the economic cycle more closely.
- Adopting a dynamic rather than static mix of assets across the spectrum should allow investors to lock in income and even capital returns.

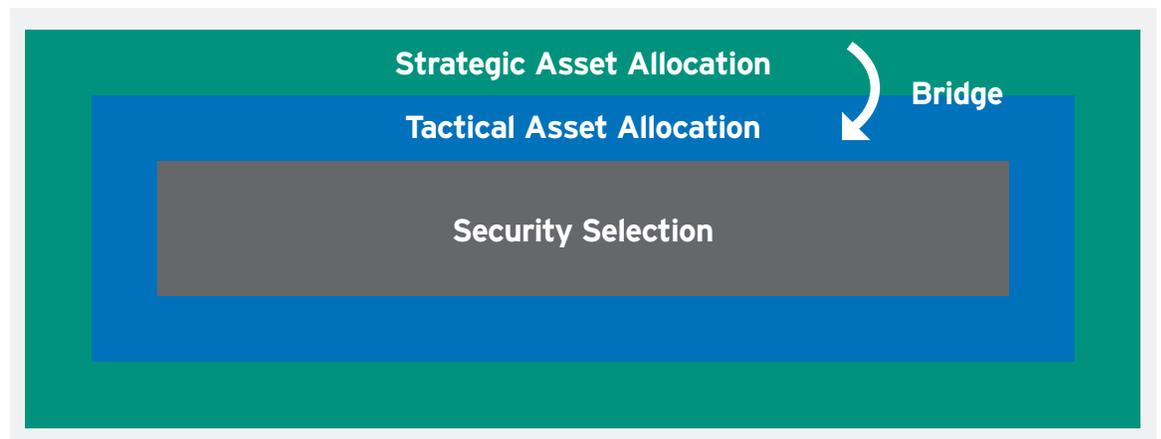
3. Capacity to hedge various type of risks

- The market, interest rates and to a lesser extent in the current environment, inflation can pose a significant risk to the income component of the returns.
- Having the capability and flexibility to use different hedging instruments is vital to the overall stability of the portfolio returns in the long run.
- Likewise, idiosyncratic risk from company exposure can also be stripped out by using hedging tools to maintain a certain level of income return for the portfolio.

Portfolio management techniques

Multi-asset strategy with targeted risk control is a managed volatility strategy. It is most suitable for income portfolios in low interest rate environments and it also incorporates all of the above-mentioned principles.

With multi-asset strategy, the asset allocation process plays a slightly more important role than security selection when making day-to-day investment decisions and managing the portfolio.



For illustrative purposes only.

Strategic Asset Allocation (SAA)

Strategic Asset Allocation or SAA is also known as policy allocation. It is the setup of a long-term target allocation in major asset classes such as equities, fixed income, and cash based on a portfolio's risk-return objective, such as risk tolerance and time horizon. In the long run, SAA is the most crucial determinant of the total return of a diversified portfolio since it incorporates the equilibrium assumptions around return distribution of different asset classes.

Tactical Asset Allocation (TAA)

Tactical Asset Allocation or TAA is a bridging process attempt that uses active portfolio management techniques together with a top-down macroeconomic perspective to generate additional returns (α) on the portfolio. Conversely, the active portfolio management technique can also help to decrease portfolio risk by changing the asset mix at different points in time based on temporary imbalances in equilibrium assumptions of different asset classes.

Intuitively, the alpha generated from TAA is similar to the traditional alpha generated from idiosyncratic or non-systematic risk i.e. company risk. But fundamentally, TAA attempts to add value relative to SAA by timing and capturing the temporary dislocation of asset prices from their respective equilibrium level in the short term, for example overweighting asset classes that are expected to outperform and underweighting those asset classes that are expected to underperform in the short run.

The mechanism behind the TAA process is based on a set of financial and economic variables which produce "flags" that can be used to predict performance in the short to medium term i.e. from a period of one month to a maximum of 12 months for different asset classes. Concurrently, the process also assigns a short-term weighting based on prescribed risk perimeters to the designated asset class in order to gain exposure and achieve the portfolio objective.

Return Attribution

Systematic risk		Non-systematic risk
β	SAA - Return from systematic risk	
α	TAA - Return from timing of risk factors	Traditional α - Return from security selection

For illustrative purposes only.

Alpha generation

The availability of an investable opportunity set between the TAA process and traditional security selection process will make a difference to the end result - alpha (α). Since there are only a limited number of asset classes available for the TAA process and, in contrast, an unlimited number of substitutes for security selection-from new companies, issuances, IPOs etc. Hypothetically it is always easier to generate alpha from the security selection process than the TAA process.

Nonetheless, there are also some benefits from the TAA process:

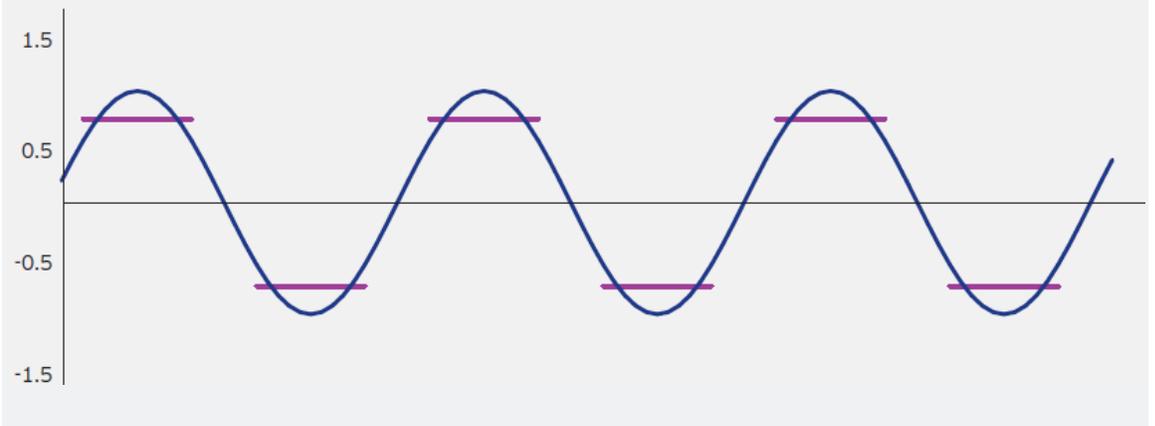
- Major asset classes tend to behave independently or have a lower correlation with each other. This is completely different from security selection within the same asset class or universe, and this is particularly useful for portfolio diversification.
- Focus on low cost and liquid instruments for implementation. Since, the TAA process is rather short term in nature. It is both efficient and transparent to use instruments like ETFs, future contracts, etc. to gain exposure. Cost savings can be substantial as the turnover rate for the TAA process is generally higher than for security selection.

Volatility control

Managed volatility strategies like the multi-asset strategy with target risk control generally manages the volatility under a specific ceiling level by using the TAA process to shift the risk across various asset classes as market conditions change. Essentially, the strategy tries to remove the edge from the volatility of the portfolio - this is referred to as "take the edge off".

With downside protection and volatility control, managed volatility strategies aim to achieve lower volatility and reduced downside risk in falling markets while still delivering a higher risk-adjusted return, although the strategies tend to lag in a highly volatile and sideways market.

Volatility management - taking the edge off



For illustrative purposes only.

Conclusion: Low rates and low visibility

A low interest rate environment has become the 'new normal' for the overall market, so it is still technically correct to maintain exposure to assets which offer meaningfully positive carry. But after the cautious optimism of the summer, the political uncertainty together with subdued growth and a rate hike bias in the US, volatility has remained high while visibility has remained low. So it is rational to focus on strategy with more emphasis on "risk", such as the *Multi-asset strategy with targeted risk control*.

Invesco's approach to managed volatility

The Invesco Global Investment Solutions Development and Implementation team has extensive experience in designing and implementing managed volatility strategies that can either be applied to existing portfolios or can serve as stand-alone products, with the aim of mitigating portfolio volatility by dynamically adjusting asset allocations in response to shifts in the market environment.

The team uses a GARCH-based algorithm to forecast portfolio volatility, and proprietary optimization software that seeks to create a portfolio that will meet the overall target level of risk with the smallest futures position possible. The team's unique approach to managing volatility is predicated on the following tenets:

- **Stability over noise:** While modeling has evolved toward capturing faster-moving signals, which we believe offers less stability from day to day, we have adopted an approach that incorporates a more stable signal. This affords us greater confidence in our simulations and more fluid transition from research to implementation.
- **Conservative modeling:** Our extensive experience in research and implementation has led to the development of models that seek to incorporate more realistic simulations of risk by reflecting lags and frictions, rather than best-case scenario.
- **Focus on risk reduction:** We focus our research and fit our simulations on results that seek to reliably control risk rather than produce the greatest total return.
- **Liquidity and hedging:** Because managed volatility strategies often require trading into a choppy volatile and less liquid market, it's important to select instruments with ample excess liquidity, and to implement alternatives for hedging in the event that our primary instruments is not tradable at a given time.
- **Responsive rebalancing:** Using proprietary models, we hedge and rebalance the portfolio in response to volatility spikes as they occur, seeking to reduce trading costs and improve our hedging ability relative to competitors.

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