Blue
PAPER

Active Management Opportunities in European Fixed Income

IN BRIEF

November 2012

The Shift in Risk
The rise in volatilities, changes in correlations, the reduction in safe assets and negative real rates are challenging investors in the European Fixed Income market.

New active management opportunities
Active Managers can benefit from new opportunities arising from the debt crisis and from the development of liquid derivative instruments.

Portfolio construction and risk budgeting
Risk Budgeting enables the optimal mix of portfolio strategies based on a quantitative assessment of their contribution to overall portfolio risk.

PIONEER Investments®

Tanguy Le Saout
Head of European Fixed Income

Ali Chabaane
Head of Portfolio Construction

Executive Summary

- The fixed income investment market has seen immense change in recent years. Record low interest rates, economic uncertainty, the euro-debt crisis and global deleveraging continue to heavily influence this asset class.
- The number of those assets traditionally classified as "safe" has declined, while the yields offered by the few remaining "safe" government assets have become negative in real terms. Moreover, increasing volatility in the fixed income investment universe in general has resulted in less correlation among different market sectors. Faced with these challenges, investors have been forced to rethink the fundamental concept of 'risk free' assets and in turn, review their fixed income allocation in the search for yield.
- An active management approach could be the answer to these challenges. This approach aims to deliver excess returns "alpha" by taking risk within a managed framework and draws not only on a portfolio manager's skills, but also on the opportunity set available in the marketplace.
- In recent years, the opportunities available within the European Fixed Income market have increased due to dislocations created by the debt crisis. Additionally, the development of liquid derivative instruments has resulted in fewer constraints for implementing strategies, allowing more efficient use of investment strategies. These developments could benefit active managers working in the European Fixed Income sector.
- Portfolio Construction and Risk Budgeting are key to further enhancing active management results. This approach not only provides a solid framework for maximising a portfolio's risk-adjusted returns, but is also an important tool for monitoring strategies' results, analysing success rates and thereby contributing to portfolio managers' skill set.
- At Pioneer Investments, we are continuously developing our active management capabilities. Our European Fixed Income Investment team is organised by specialisation, while our proprietary risk budgeting system, supported by our dedicated Portfolio Construction team, works to generate alpha whilst maintaining a strong focus on drawdown prevention.

Contributors

This Blue Paper represents the views of Pioneer Investments' European Fixed Income and Portfolio Construction teams, and has been edited by Claudia Bertino and Laura Fiorot of the Global Financial Communication Team.

Tanguy Le Saout is Head of European Fixed Income, where he oversees all European Fixed Income portfolio management as well as European credit research. He is also the Lead Portfolio Manager of several fixed income portfolios.

Ali Chabaane is the Head of Portfolio Construction. He leads a group which is part of the investment division and is in charge of ensuring portfolios are constructed in order to maximise their risk-adjusted return potential.

Edited by
Claudia Bertino
Laura Fiorot
Financial Communication

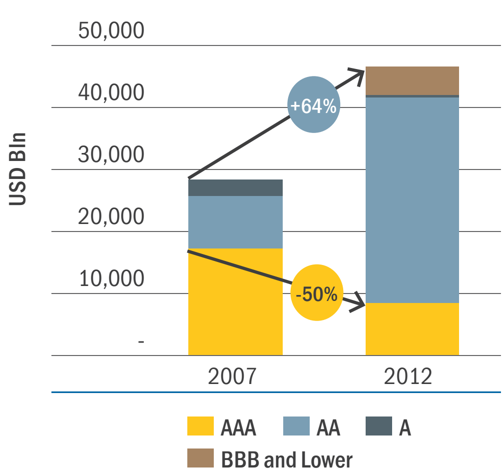
The Shift in Risk

The amount of AAA-rated government bond issues has halved in the last five years

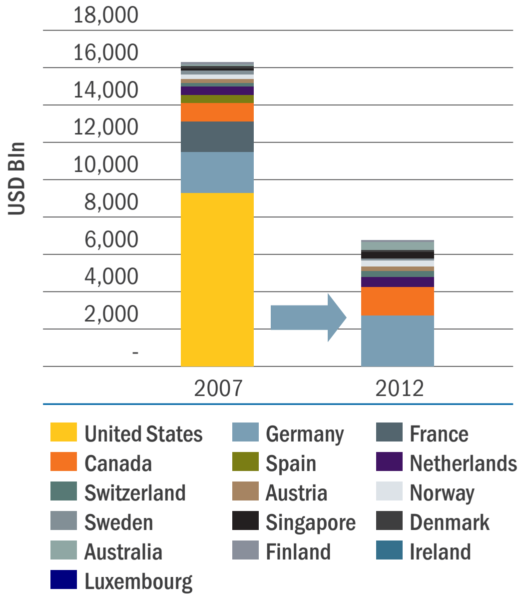
Historically, government bonds issued by advanced economies have been considered "safe" investments. However, the global financial crisis and the euro sovereign-debt crisis have altered this perception.

For example, from 2007 to 2012, the overall amount of outstanding debt issued by advanced economies has increased at an annual rate[1] of 12%. If we consider the AAA credit rating (by Standard & Poor's) as a measure of safety for sovereign bonds, we observe that over the same period the overall amount of "safe" government bonds has halved.

Outstanding Sovereign Debt of Advanced Economies by S&P Rating



Shrinking Levels of AAA-rated Sovereign Bonds



Source: Pioneer Investments estimates based on IMF data on Nominal GDP and Gross Debt as % of GDP from the IMF World Economic Outlook, April 2012. Standard & Poor's Ratings as at 29 June 2012, IMF debt value forecast for 2012.

Key Points - The Shift in Risk

→ The reduction in the number of "safe" assets over the past five years, stemming from a more cautious and selective approach to government bond risk assessment, has resulted in a decoupling of "safe" assets from all other sovereign bonds.

→ Due to central banks' expansionary monetary policies and the surge in investors' risk aversion, the few remaining "safe" bonds available are, in most cases, offering negative real yields.

→ We believe that the investment landscape has become more challenging. The yields available in the past can no longer be achieved solely through "safe" investments, therefore the search for yield has become investors' priority.

[1] Source: Pioneer Investments calculation based on IMF World Economic Outlook, April 2012.

The reduction in the amount of "safe" assets is common not only in the government sector, but also in the broader Global Fixed Income market. For example, in the private sector the amount of securitised issuance in the US has decreased from more than US$3 trillion in 2007 to around US$750 billion in 2010[2] and the number of AAA-rated issues included in the Merrill Lynch AAA Global Fixed Income Markets Index declined from a total of 5.331 securities at the end of 2007 to 3.586 securities in June 2012.

Throughout the crisis, investors have become aware (even before the various rating downgrades of sovereigns) that assets which were previously considered as "safe" may change their risk profile over time.

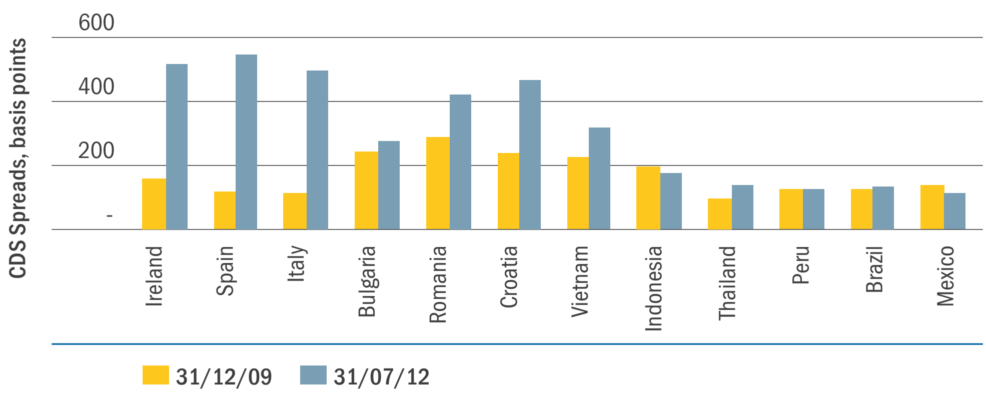
Assets previously considered "safe" have changed their risk profile over time

Looking at the implied probability of default for AAA-rated sovereign debt over the next five years[3], it was just 0.1% in 2007, while it increased to 1.3% in 2011. For AA-rated bonds the increase is even more significant with the probability of default rising from 0.1% (the same as the AAA) in 2007 to 2.4% in 2011 (almost twice the AAA probability), signalling that financial markets have become more cautious and selective since the crisis.

With the shift in the risk, the distinction between the issues of developed and emerging countries is outdated

The change in advanced economies' risk profile is evident when comparing the CDS spreads (the premium paid to buy a protection against a default) of some Euro countries with those of certain Emerging countries. Deteriorating public finances in the Euro area over the last decade, combined with the better fiscal discipline of Emerging economies following the crisis of the late nineties, has led to higher CDS levels in the Eurozone peripheral countries compared to some Emerging market countries, despite their higher credit rating. It is worth remembering that the CDS spread is not only a function of the issuer's risk of default, but also depends on supply and demand dynamics. That is why, in periods of high risk aversion, investors' demand for hedging could lead to extreme values for CDS spreads, even if the issuer's fundamentals are favourable.

The Changing Sovereign Risk Landscape
Change in CDS 5-Year Rate Dec 2009 – July 2012

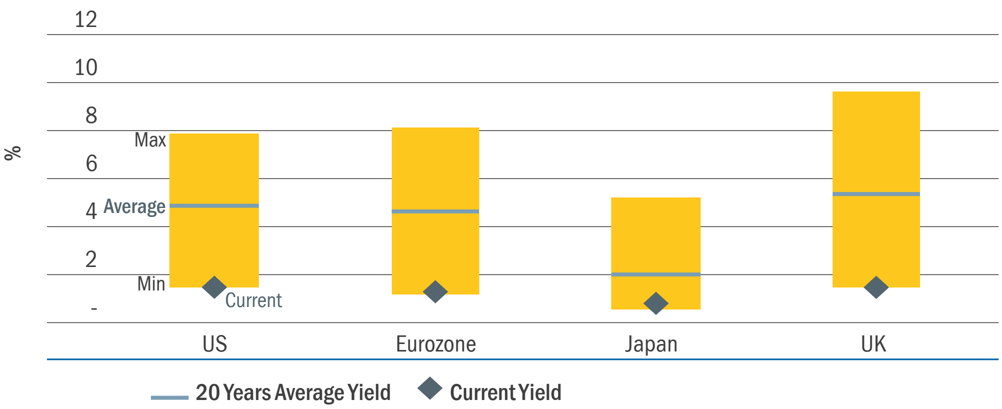


Source: Bloomberg. Data at 31 July 2012.

[2] Source: International Monetary Fund, April 2012.
[2] Source: International Monetary Fund, April 2012.

Another effect of the financial crisis is that the yields offered by the few remaining "safe" government bonds (Japanese, US, UK and German bonds) have decreased dramatically over the last five years. This decline has occurred against a backdrop of expansionary monetary policy by major central banks to support the economic recovery and avoid a credit crunch.

Current 10-Year Core Government Bond Yields vs. 20-Year Average



Source: Bloomberg. Data as at 31 July 2012.

With risk free assets offering negative real return, the search for yield is becoming a mantra for investors

Real rates in the US, UK, Germany and Japan are, in most cases, negative. In the US, UK and Japan, this is mainly due to the Quantitative Easing policies carried out by their respective Central Banks which aim to artificially lower rate curves. However, in Germany the negative real rates are due to the strong demand for safety, driven by the surge in risk aversion during the euro-debt crisis.

As a result, investing in the government bonds of these particular countries now results in a loss of capital in real terms - the yields offered by these bonds are at their historical low and, in most cases, are also below inflation.

We believe that the market has become more challenging for fixed income investors as the returns that were once available through "safe" assets can no longer be realised today. As a result, the search for yield is becoming the key priority for investors.

The European Fixed Income Investment Challenge

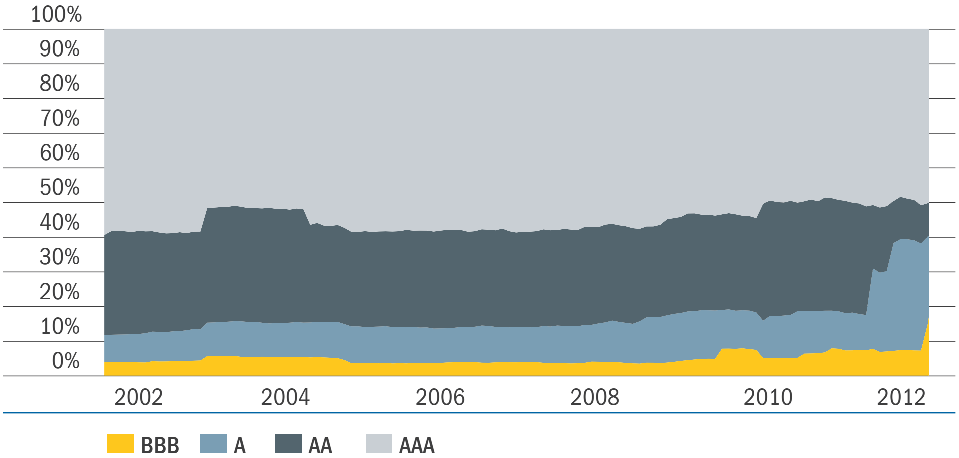
Lower quality of the European Fixed Income universe

The decreasing number of "safe" assets available has had a significant impact on the European Fixed Income investment universe over the last decade.
If we consider, for instance, the Barclays Euro Aggregate Bond Index (a Euro investment-grade index commonly used as a benchmark by asset managers), its composition by credit rating has changed, especially as a result of the euro-debt crisis.

In June 2002, the AAA and AA-rated instruments accounted for roughly 60% and 29% of the Index's weight respectively, while they now account for less than 50% and 10% respectively. Conversely, A-rated bonds, which accounted for 8% of the Index in 2002, now represent more than 25%. At the same time, the BBB-rated instruments increased from 4% to 15% of the Index's overall composition.

As a result, investors who maintained a stable allocation to this Index over time have seen the average credit quality of their portfolio decline.

Barclays Euro Aggregate Bond Index Composition by Rating



Source: Factset, data as at 29 June 2012.

Key Points - The Investment Challenge

→ In the last decade, the allocation of the Barclays Euro Aggregate Bond Index has moved away from the AAA instruments towards lower-rated bonds.

→ The volatility of the different fixed income sectors has increased while the sectors themselves are less correlated. Hence, for investors in this Index, the apparent stability of the index risk masks a different and unexpected underlying risk profile. Conversely, the different behaviours of each market segment have generated a new opportunity set.

→ We do not believe in a passive approach to this index. With the continuous evolution of the Euro Fixed Income market, an active management approach combined with a strong risk management framework could prove rewarding for investors in search for yield.

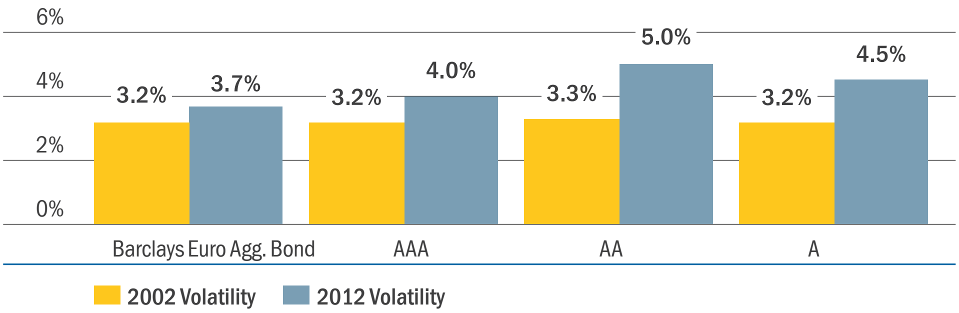
What impact has this change had in terms of the overall index risk?
We analysed the 3-year annualised volatility of the ML EU Broad Market AAA Index (AAA), the ML EU Broad Market AA Index (AA) and the ML EU Broad Market A Index (A) and their relative correlations for 2002 and 2012.

Fixed income markets are more volatile than expected

The three indices experienced an increase in volatility in 2012 compared to 2002. This increase is evident in the AA and A segments, which had the same level of volatility in 2002 as the AAA segment, while they now have a higher volatility. The AA segment now shows the highest 3-year volatility rate, which in turn has led to a strong reduction in the size of the segment due to various rating downgrades.

Another interesting point to note is that the current volatility of the Barclays Euro Aggregate Bond Index is the lowest among the four indices, due to the diversification[4] benefits of a broad allocation across the different rating segments.

Volatility Comparison 2012 vs. 2002



Source: Bloomberg. 3-Year Rolling Annualised Volatility, calculated on weekly data. Data as at 30 June 2012 vs. data as at 30 June 2002.

But not everything is bad: while correlations are breaking down, diversification is playing a beneficial role

Correlations among the three rating segments have also changed dramatically over the same 10-year period. While in June 2002, the average correlation among the three indices was 0.98, ten years later it was 0.50.

June 2002

	AAA	AA	A
AAA	1.00	1.00	0.98
AA		1.00	0.98
A			1.00

June 2012

	AAA	AA	A
AAA	1.00	0.51	0.45
AA		1.00	0.55
A			1.00

Source: Bloomberg. 3-Year Correlations, calculated on weekly data. Data as at 30 June 2012 vs. data as at 30 June 2002.

In 2002, the three indices were almost perfect substitutes of each other in terms of risk, as they had the same volatility and a correlation close to 1 (i.e. perfectly correlated). This indicates that at that time there was little additional value in selecting bonds among the three rating segments, as they all had the same risk characteristics.

[4] Diversification does not guarantee a profit or protect against a loss.

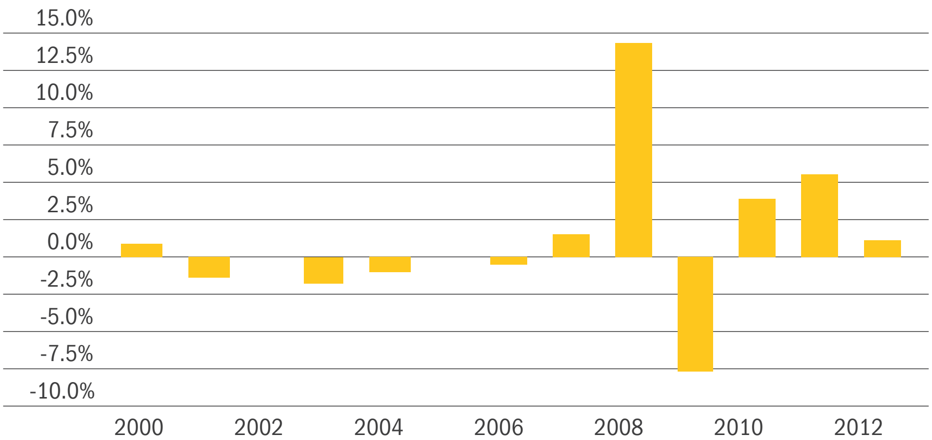
Today, the situation is very different. Correlations have broken down, thereby allowing for greater diversification benefits. This explains why the 3-year annualised volatility rate of the Barclays Euro Aggregate Bond Index saw a slight increase from 3.2% in June 2002 to 3.7% in June 2012.

Hence for an investor, the apparent stability of some risk measures of the Index masks a different underlying risk profile and, probably, different expected behaviour when compared to the past.

This is quite evident when looking at, for example, the difference between the performance of the AAA and A segments, the two largest in the European Fixed Income universe. From 2000–2007 the difference in performance of these segments was quite small, but starting from 2008 this difference has become much larger.

All the changes taking place in the European Fixed Income universe may prove rewarding for active managers with a strong risk management discipline

Difference Between the ML EU Broad Market AAA and the ML EU Broad Market A Indices



Source: Bloomberg. Calendar year performance. Data as at 29 June 2012.

This divergent behaviour could provide greater opportunities for relative value investment choices typical of the active management approach.

We believe that the changes currently taking place in the European Fixed Income universe may be beneficial for investors searching for additional yield as new active management opportunities arise. However, this search should also encompass a strong risk management framework, especially as the risk profile of the different asset classes is continuously evolving and financial markets, in general, are subject to more frequent bouts of volatility.

Generating "alpha" is about delivering excess returns by taking risk within a managed framework

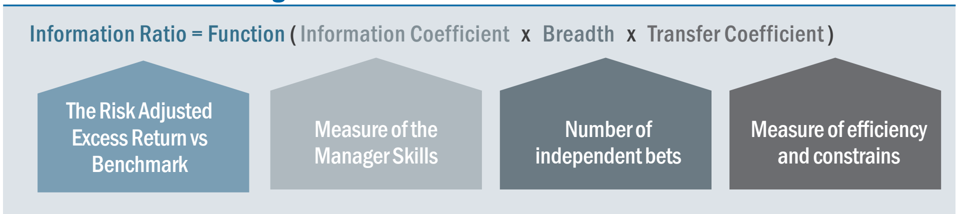
Active Management to Address Challenges and Exploit Opportunities

We believe that an active management approach can satisfy investors' appetite for additional yield, whilst maintaining a strong risk management discipline.
This approach provides exposure to the market ("beta exposure"), while at the same time seeks to outperform the benchmark, thus generating positive "alpha" (the risk-adjusted difference between the portfolio manager's and the benchmark's performance).

Generating "alpha" is about delivering excess returns by taking risk within a managed framework. But what elements are needed to achieve this?
According to the "Law of Active Management"[5], the ability to generate alpha, as measured by the Information Ratio, is a function of three elements:

1. Information Coefficient - the level of skill of the portfolio manager
2. Breadth -the breadth of opportunities
3. Transfer Coefficient - the limitations (costs, liquidity, ability to take long or short positions, etc) that the manager may face in implementing his/her insights.

The Law of Active Management



Source: The Law of Active Management. Grinold and Kahn 1999, and Clarke, de Silva and Thorely 2002.

The good news for investors, as we intend to demonstrate, is that the 'Breadth' and 'Transfer Coefficient' components have recently been increasing, thereby providing more opportunities to generate alpha.

Key Points – Why Active Management?

→ Generating "alpha" is about delivering excess returns by taking risk within a managed framework. The ability to generate "alpha" depends mainly on a portfolio manager's level of skill, the breadth of opportunities and any potential limitations in implementing his/her insights.

→ The opportunity set for generating alpha has further increased amid recent crises.
For example, we have seen dislocation in the credit market and divergences in the euro government bond sector, while the development of derivative markets is providing new tools for more efficient implementation of fixed income strategies.

→ In a world with increasing investment opportunities and derivatives market developments leading to an broader range of strategies available for investment managers, an active management approach can be an important source of value for investors.

[5] Grinold and Kahn 1999, and Clarke, de Silva and Thorely 2002.

There are several opportunities available in the European Fixed Income market for an active management approach

The Breadth Component

The breadth of the opportunity set available for a European Fixed Income investor has always been quite wide. In fact, returns from different European Fixed Income sectors over the last 10 years illustrate the importance of actively selecting and changing the sources of performance over time.

During this period, no single sector has been able to consistently deliver results above inflation every year. In 2008, for example, the Core Government Bond Index was the best performer, while in 2009 its return was well below that of the Peripheral and the Corporate Bond sector indices.

European Fixed Income Sector Returns vs. Inflation

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	YTD 2012
Fin. Sub. 10.71%	Corp. HY 28.59%	Corp. HY 14.56%	Corp. HY 5.96%	Corp. HY 11.10%	Inflation 3.10%	Core 11.31%	Corp. HY 74.88%	Corp. HY 14.26%	Core 6.67%	Corp. HY 14.01%
Peripheral 9.98%	Fin. Sub. 7.94%	Fin. Sub. 8.89%	Peripheral 5.65%	Inflation 1.90%	Core 1.93%	Corp. IG 6.21%	Fin. Sub. 17.65%	Core 5.50%	Corp. IG 3.31%	Fin. Sub. 13.74%
Core 9.64%	Corp. IG 4.49%	Peripheral 8.11%	Core 5.24%	Fin. Sub. 0.30%	Peripheral 1.81%	Peripheral 5.84%	Corp. IG 7.02%	Fin. Sub. 3.65%	Inflation 2.70%	Core 6.75%
Corp. IG 9.47%	Peripheral 6.31%	Corp. IG 7.47%	Fin. Sub. 5.17%	Corp. IG 0.18%	Corp. IG 1.57%	Inflation 1.60%	Peripheral 6.31%	Inflation 2.20%	Corp. HY -2.48%	Corp. IG 6.19%
Inflation 2.30%	Core 3.98%	Core 7.41%	Corp. IG 4.88%	Core -0.40%	Fin. Sub. -0.48%	Fin. Sub. -5.85%	Core 3.11%	Corp. IG 2.13%	Fin. Sub. -6.19%	Peripheral 4.16%
Corp. HY -4.97%	Inflation 2.00%	Inflation 2.40%	Inflation 2.20%	Peripheral -0.58%	Corp. HY -2.26%	Corp. HY -34.22%	Inflation 0.90%	Peripheral -5.04%	Peripheral -6.75%	Inflation 1.40%

Source: Bloomberg. Data as at 31 July 2012. Inflation = Eurozone CPI; Core = Merrill Lynch Euro Government Bond ex Greece, Ireland, Italy, Portugal and Spain Index; Peripheral = Merrill Lynch Greece, Ireland, Italy, Portugal and Spain Govt Bond Index; Corp. IG = Merrill Lynch EMU Large Cap Investment Grade Index; Fin.Sub. = Merrill Lynch Euro Financial Subordinated & Lower Tier 2; Corp. HY = Merrill Lynch Euro Corporate High Yield Bond Index in Local Currency.

New opportunities arising from the Euro-debt crisis

The opportunity set for generating alpha has further increased amid the crises of recent years, as illustrated in the examples below:

→ **Credit vs. government allocation:** in both positive and in subdued growth phases, credit market exposure can outperform government bonds. A dedicated research team can add further value by selecting corporate issues with the best risk-return potential. In fact, analysts can evaluate the credit profile of different issuers and sectors to identify mispriced bonds where their fundamental credit quality is different than that implied by market prices and in turn, exploit these spreads by applying selected strategies. Although credit opportunities are always available in the marketplace, periods of dislocation such as the post Lehman Brothers crisis can represent the most rewarding times for these strategies.

→ **Country allocation:** diversification by country has recently become a valuable source of alpha amid the euro-debt crisis, which highlighted the credit risk characteristics of sovereign debt. Before the crisis, the euro government bonds of major European countries were highly correlated. However, since 2008 the yields offered by core countries' government bonds (e.g. Germany and France) and those offered by the peripheral countries such as Italy and Spain, have started to diverge.

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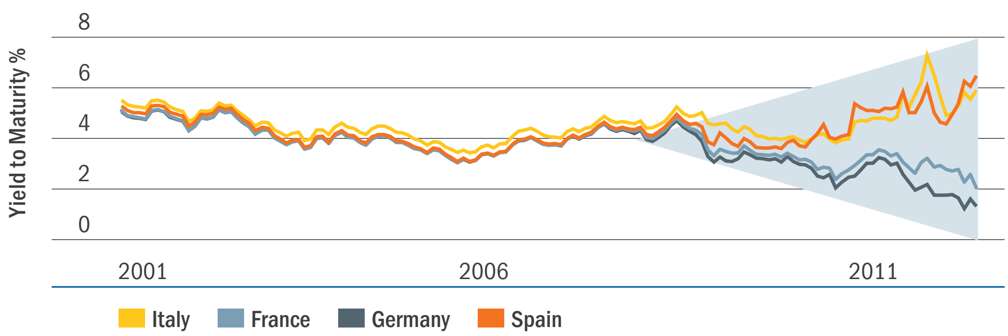
This has resulted in compelling opportunities for strategies exploiting the spread difference between these countries. One example of this is the strong move that the 2-year Italian government bond yield experienced between November 2011 and March 2012 when it fell from a peak of 7.5% down to 1.7%. During the same period, the 2-year yield on German bonds only ranged from 0.1% to 0.5%.

Divergences in European Government Bonds Yields



Source: Bloomberg, JPMorgan Indexes. Data as at 31 July 2012.

→ **Interest Rates, Duration and Yield Curve:** overall changes in the market environment can result in changes to interest rates which in turn also impacts the shape of the yield curve. Macroeconomic models and analysis of a country's macroeconomic development can provide insights to future changes of the level and shape of the yield curve. An active manager has the chance to add value by anticipating possible interest rates moves by central banks (key active players in the Euro-debt crisis) or by forecasting inflation and economic developments which may affect the overall yield curve.
To exploit the opportunities arising from movements in the shape of the curve, the portfolio manager can, for example, apply investment strategies that include buying and selling bonds with different maturities.

→ **Currency:** active currency management relies on a portfolio manager's ability to exploit differences in the relative values of the world's major currencies. To do this, specialists combine fundamental analysis and quantitative models to identify the currencies which are over or under valued. Forecasting currency movements is highly dependent on understanding the major drivers of the FX markets such as macroeconomic indicators, central banks' actions and investment flows. During the Euro crisis, euro currency dynamics have been highly dependent on risk aversion and on central banks' actions, thereby creating compelling opportunities in currency trades.

Derivative instruments provide an opportunity to implement investment strategies in an efficient way

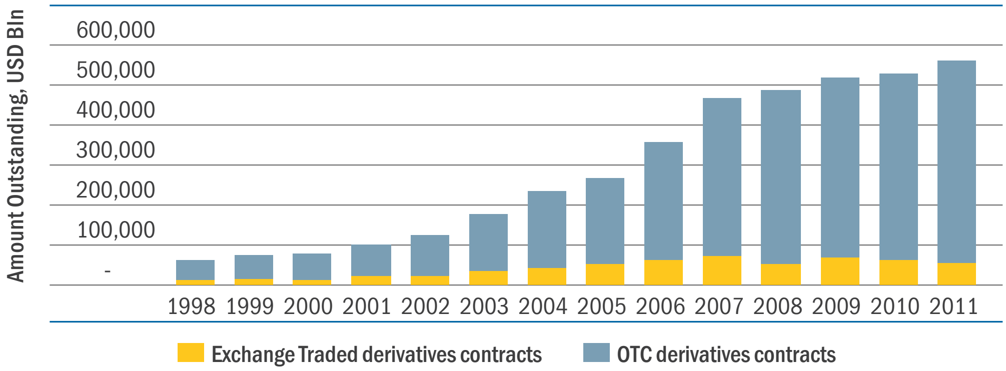
The Transfer Coefficient

With such a wide variety of markets, maturities, currencies and strategies available, it is essential that portfolio managers are able to apply these strategies efficiently. In this respect, we believe that the development of derivative instruments available in the Fixed Income market represents an important improvement and is the key trend behind the increase in the Transfer Coefficient in the "Law of Active Management".

While the term "derivatives" is often associated with negative connotations, not every derivative instrument deserves such a negative association, especially if used effectively. In fact, derivative instruments may present a number of benefits to investment managers, and ultimately to investors: reducing transaction costs and allowing hedging positions on specific risks. Through credit derivatives, for instance, it is possible to isolate credit risk and transfer this to other counterparties. Therefore, derivatives instruments can offer additional opportunities for generating alpha that cash bonds cannot provide.

Over the last decade, the Fixed Income derivatives market has evolved significantly. Investment managers can now draw from a vast set of underlying instruments for which derivative contracts are available: interest rates, currencies, credit risk and inflation. These contracts may be used not only to hedge against a specific factor risk, but also to gain synthetic exposure to a security or to a diversified index in a very liquid market. The operational management of derivative contracts has also improved: counterparty risks are now neutralised, there has been a standardisation of the process and the industry is moving towards OTC derivatives clearing.

Growth of Interest Rate Derivatives Markets



Source: BIS Quarterly Review, as at 30 June 2012.

In a world where the opportunity set is increasing and the development of the derivatives market has enlarged the range of strategies available to portfolio managers, an active management approach can become an important source of value for investors.

However, to be successful, the active management approach first of all requires a skilled portfolio manager. Evaluating any portfolio managers' skill involves analysing how good he/she is with his positions and how well these positions bets are implemented in a portfolio.

In this new world of opportunities, it is the portfolio manager's expertise that becomes the most important variable. In our opinion, a skilled manager is a risk taker who is able to successfully identify sources of alpha, coordinate the input of specialists, aims to ensure that the overall level of portfolio risk is adequate and finally, that the discipline is respected.

The ability to clearly identify the alpha sources is essential to exploit the opportunities arising from different markets and segments

Portfolio Construction and Risk Budgeting at Work

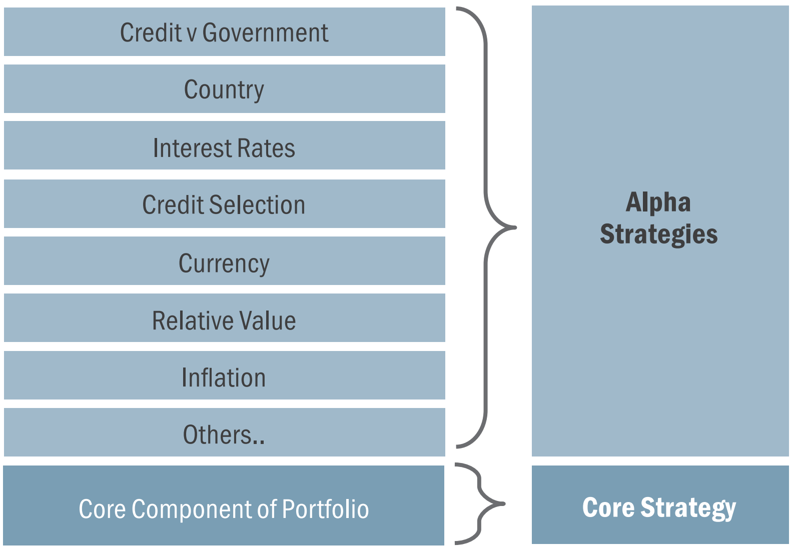
At Pioneer Investments, we are dedicated to developing and monitoring our active management skills. Our investment culture focuses on developing techniques that optimise risk-adjusted returns. By preventing and managing drawdowns, we maximise our success ratio, thereby providing value for investors.

We believe that the ability to clearly identify alpha sources is essential when investing in the European Fixed Income market. By separating the “alpha” strategies from the “beta” exposure, the portfolio manager can evaluate the risk-return profile of each strategy and actively allocate risk to the most beneficial strategies.

Specialisation in specific markets and sectors can boost a portfolio manager’s skillset. Consequently, Pioneer Investments’ European Fixed Income Investment team is organised according to areas of expertise.

Our European Fixed Income team leverage the skills of experienced investment specialists with specific areas of expertise

The Investment Approach: Separating Active Strategies



Source: Pioneer Investments.

Key Points - Portfolio Construction and Risk Budgeting

→ The ability to clearly identify alpha sources is essential when investing in the European Fixed Income market.

→ Our European Fixed Income Investment team is organised according to areas of expertise.

→ Our proprietary risk budgeting system, which is supported by a dedicated Portfolio Construction team, is an integral part of the investment process. Our system supports the combination of different strategies into a single portfolio and effectively monitors the risk contribution of each strategy to a portfolio’s overall risk/return profile.

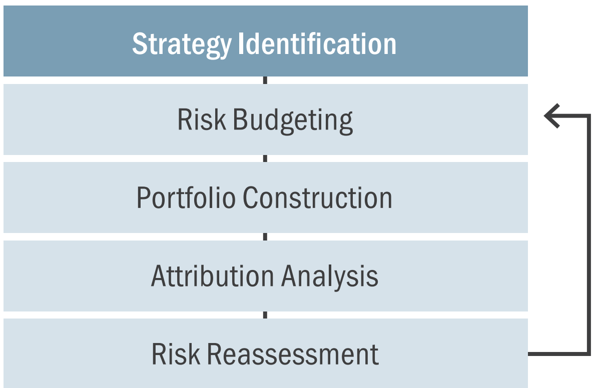
Portfolio managers retain overall responsibility for the portfolios they manage, but the entire European Fixed Income team contributes to the investment ideas process. Our team of investment specialists (the risk takers) are highly experienced in their chosen fields and can provide the best insights for each alpha strategy in the portfolio.

The Portfolio Construction and Risk Budgeting Process aims at setting and allocating active risks within a managed framework

Portfolio Construction and Risk Budgeting play a fundamental role when combining different strategies and investments segments, changing the investment point of view from an asset allocation perspective to a risk allocation perspective. The investment decisions, in terms of risk allocation, are mainly driven by the expected returns that each strategy can provide in relation to their contribution to portfolio risk.
This allows us to effectively allocate the portfolio risk and monitor the diversification contribution of each strategy.

To support the combination of different strategies in a single portfolio and to effectively monitor the risk contribution of each strategy, we have developed a proprietary risk budgeting system supported by a dedicated team: the Portfolio Construction team. Our proprietary system can be customised by the Portfolio Managers - once an investment strategy is selected, it is mapped into the system and the process begins.

Pioneer Investments' Portfolio Construction and Risk Budgeting Process



Source: Pioneer Investments.

Risk Budgeting is about deconstructing the portfolio's risk into its constituent parts to determine ex-ante the level of risk needed to achieve the desired performance. Risk is reassessed and adjusted (through the aid of attribution analysis) on an ongoing basis in order to meet performance targets.

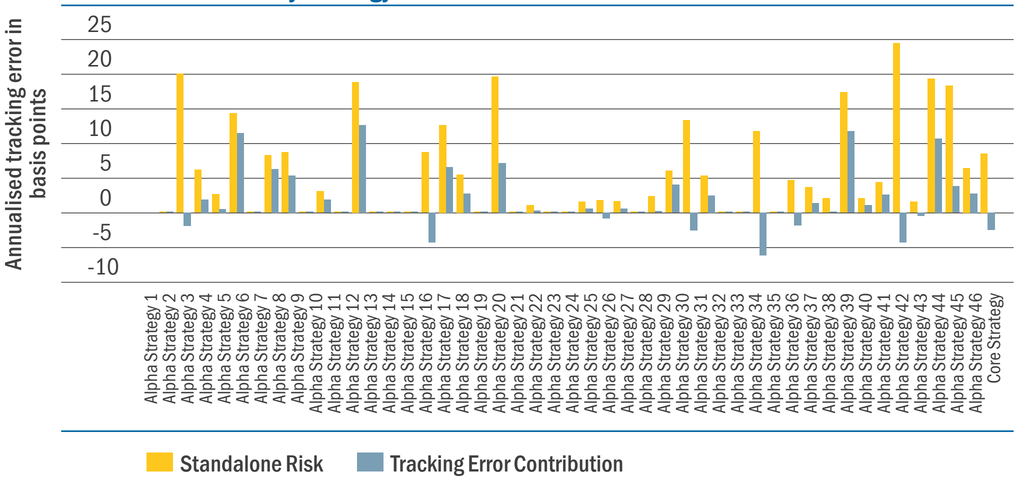
Our Risk Budgeting system can be customised by individual portfolio managers. Throughout the process, the risk and performance evolution of the different strategies are closely monitored by the portfolio managers who, in turn, run each strategy taking into consideration the set target returns.
Limits are set on a case-by-case basis, driven by volatility and expected returns.

Portfolio Construction focuses on assessing the risk and return of each strategy implemented: the team has access to the daily performance attribution by risk factor, volatility and correlation parameters. This allows the Portfolio Construction team to build optimal portfolios across chosen strategies where each strategy reflects a single view on a market segment (which is different from optimising solely at the security or asset class level).

The Portfolio Construction team works in close partnership with portfolio managers to identify active sources of risk, allocating it to those strategies with the highest expected returns and diversification benefits. To do this, the Portfolio Construction team analyses the contribution in terms of risk provided by each strategy. The aim is to limit the impact that a single strategy can have by selecting a diversified range of strategies based on a quantitative assessment of their contribution to the overall portfolio risk.

Risk Budgeting allows the optimal mix of portfolio strategies based on a quantitative assessment of their contribution to overall portfolio risk

Risk Contribution by Strategy



Source: Pioneer Investments. For illustrative purposes only.

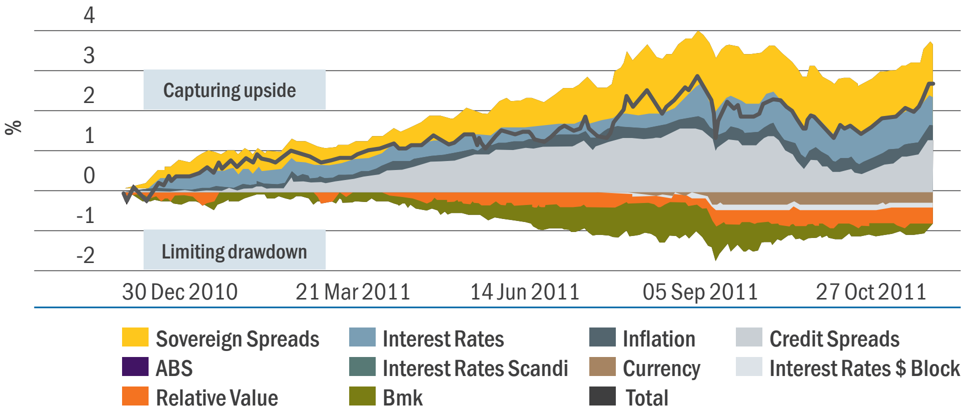
The Portfolio Construction team analyses the portfolio to determine any "Unwanted Risk", seeking to avoid any adverse outcomes. Strategies are subjected to factor risk analysis to assess whether they contain unwanted risk.
The assessment is conducted through:

- → Analysis of the correlation between strategies
- → Ex-ante assessment of the expected correlation between strategies
- → Analysis of the contribution of every single strategy to portfolio performance
- → Assessment of the quality of diversification through qualitative analysis of scenarios adversely affecting the strategies/fund performance.

Attribution analysis allows the ongoing assessment of actual performance versus the expected. Analysing the performance of each strategy is essential for limiting overall portfolio drawdown and increasing the potential to capture the upside.

Risk Budgeting is a powerful tool for limiting and managing drawdown

Performance Attribution by Strategy



Source: Pioneer Investments. For illustrative purposes only.

Combining risk and performance attribution analysis is essential for **reassessing risk**. If the performance achieved given a certain risk budget is not in line with the portfolio manager's expectations, he/she can decide to adjust the strategy or review the risk budget to increase the chances of success.

Risk Budgeting should be viewed as a process that guides portfolio construction. This discipline is important in order to make decisions on individual investment strategies based on a clear understanding of their contribution to the portfolio's risk-return profile.

This tool can therefore help to develop and measure our active management skills. Active management success depends on the ability to be right more often than not in investment decisions, but most importantly on realising higher returns from winners than from losers. Our Risk Budgeting system provides statistics on the percentage of 'winning' and 'losing' strategies through the Win/Loss ratio (the Ratio between the Average Profit of Winner Strategies/Average Loss of Losing Strategies). This ratio helps the portfolio manager to monitor the behavioural component in the active risk taking activity.

We strongly believe that combining specialised investment skills with a strong risk management discipline allows active managers to better exploit market opportunities in this challenging environment. That is why we are committed to developing an investment culture which promotes techniques that maximise active management results, while at the same time paying significant attention to drawdown management.

The Risk Budgeting system has been one of our most important developments in recent years. Created in 2005 to support the European Government Bond desk, the tool has since been further enhanced. Based on the success of the system in the European Government Bond sector, we invested further in order to extend this approach to the European and Emerging Markets Fixed Income, Multi-Asset and European Equity Investment desks.

Important Information

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