The Waiting Game
Credit and long-term investment

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It is generally accepted that in the long run, credit spreads are more than large enough to cover downgrades and defaults. While some of the excess spread is intended to give protection for some future greater-than-anticipated losses, much of it can be thought of as compensation for market price volatility. However, what if the market price is not a major concern? For any investor holding fixed income for the long term, this may well be the case – at least to some extent. But defining “the long term” is not easy. In particular, it is not clear how long an investor needs to hold a credit asset for it to have a good chance of capturing this excess spread.

This question is key for all long-term investors, but it might be particularly pertinent for pension funds, especially if they are thinking of securing their liabilities with an insurance company. In fact, it essentially defines “the long term” for these investors. Such schemes often have liabilities in excess of their assets, and are looking at ways of clearing the deficit. Additional contributions offer one way of closing the gap, but so do additional investment returns.

If there was some way of showing that, at a particular spread, credit risk was likely to pay off over the time to buyout, then it would be easier to justify a move into high risk bonds. This is what we seek to demonstrate in this paper – that there is a clear relationship between the holding period, the spread at entry, and the likelihood of beating an equivalent Treasury portfolio. Specifically, higher spreads and longer holding periods both improve an investor’s chances of success, and these chances can be quantified. This is important for all long-term investors, not just pension funds.

Of course, many investors, even long term ones, will need to mark their assets to market. The importance of mark-to-market valuation will determine the extent to which an alternative, long term income-based view can be taken. However, for those investors that can look to the long term, this analysis shows the advantages of moving down the credit spectrum.

It is also important to note that this analysis is not intended to recommend a portfolio-wide strategy; rather, it is intended to help investors to think differently about higher yielding credit asset classes.

Introduction
The attraction of credit

In recent years, the fall in high quality government bond yields, demonstrated in Exhibit 1, has led many pension plans to look further down the credit spectrum. Investment grade corporate debt has long been a staple for funds, with high yield corporate bonds and emerging market debt (EMD) being increasingly used to raise income to the levels needed to pay members’ pensions.

These moves are sensible. It is true that spikes in credit spreads have led to significant volatility in the market value of credit assets, as shown in Exhibits 2 and 3. However, even with the high market price volatility seen in the lowest-rated bond asset classes, the volatility of the income produced is much less pronounced, as shown in Exhibit 4.

EXHIBIT 1: DATASTREAM 10-YEAR GOVERNMENT BOND YIELDS, JANUARY 1980 TO DECEMBER 2013

Source: DataStream.

Of course, there have been periods when the spikes in spreads have been followed by a significant level of defaults. This has been especially true for high yield bonds in both developed and emerging markets, and Exhibit 5 shows the impact of such episodes in the early 1990s and 2000s.

But how long is long term? And for a given term, what sort of spread can be considered “sufficiently high”?

EXHIBIT 2: YIELD TO WORST ON VARIOUS FIXED INCOME ASSET CLASSES, DECEMBER 2003 TO DECEMBER 2013

Source: J.P. Morgan DataQuery, Barclays Live, J.P. Morgan Asset Management analysis; For illustration purposes only.

\[\text{Yield to worst}\]

\[\text{HY EM hard corporate bonds}\]
\[\text{HY EM hard sovereign bonds}\]
\[\text{U.S. HY bonds}\]
\[\text{IG EM hard corporate bonds}\]
\[\text{IG EM hard sovereign bonds}\]
\[\text{IG corporate bonds}\]
\[\text{U.S. Treasury bonds}\]

The methodology used to derive these income flows is discussed in Appendix 1.
EXHIBIT 3: CUMULATIVE TOTAL RETURNS FOR FIXED INCOME ASSET CLASSES, DECEMBER 2003 TO DECEMBER 2013

Source: J.P. Morgan DataQuery, Barclays Live, J.P. Morgan Asset Management analysis; For illustration purposes only.

EXHIBIT 4: ANNUALISED INCOME PER USD 100 OF INITIAL INVESTMENT, DECEMBER 2003 TO DECEMBER 2013

Source: J.P. Morgan DataQuery, Barclays Live, J.P. Morgan Asset Management analysis. Note: income has been smoothed on a rolling three-month basis to reduce seasonal effects; For illustration purposes only.

EXHIBIT 5: ANNUALISED INCOME PER USD 100 OF INITIAL INVESTMENT, DECEMBER 1989 TO DECEMBER 2013

Source: Barclays Live, J.P. Morgan Asset Management analysis. Note: income has been smoothed on a rolling three-month basis to reduce seasonal effects; For illustration purposes only.
Quantifying the advantage of higher spreads

It appears from the analysis above that an investor able to consider only the income received would be unambiguously better off taking more credit risk. However, investors don’t have the luxury of an infinite holding period. It is therefore worth asking: how long would it take for a credit investor to be better off than an investor in U.S. Treasuries? This itself raises a further question: what does “better off” mean?

One way of answering this is to regard a Treasury portfolio as a kind of income-producing benchmark. Taking a portfolio of Treasuries as defined by the Barclays U.S. Treasury Index, consider that the coupons derived from the portfolio represent a series of liabilities that need to be met. Then, after some period of time, the remaining liabilities are “capitalised” in the value of the remaining portfolio. This could be thought of as being analogous to a set of pension liabilities, where there is an intention to buy those liabilities out at some point in the future (the price being driven by the residual value of the portfolio), but that until that time pension payments must be made (the Treasury coupons).

Given this benchmark, we can then consider how much money we need to invest in another asset class, such that it “beats” the Treasury portfolio over a given period. In this sense, the alternative credit portfolio wins if:

• The income produced by that portfolio is greater than the coupons produced by the Treasury portfolio (in other words, it covers the liability cash flows); and
• The value of the alternative credit portfolio at the end of the period is greater than the residual value of the Treasury portfolio.

In other words, not only should the investment be sufficient to cover the liability cash flows but the value of assets at the end of the investment period should also exceed the value of liabilities.

This approach does need to be refined slightly. The income for the alternative portfolio may well be significantly higher than that from the Treasury portfolio for most periods, only to fall behind if it has a single bad month. To regard the strategy therefore as having failed in these circumstances seems harsh. One way to deal with this is to assume that if the coupon from the alternative portfolio is higher than that from the Treasury portfolio in any period, the excess income is invested in a Treasury “buffer fund”. This fund can be used to supplement the income from the alternative portfolio in poor months, and to supplement the end value of the alternative portfolio when compared with the residual Treasury portfolio at the end of the holding period.

Under these criteria, one would expect credit products to perform better over a longer holding period. For shorter time horizons, the main factor determining whether the Treasury or the credit portfolio “wins” is whether the spread at exit is larger or smaller than the spread at entry; however, for longer periods, it is more likely that the additional income from the alternative credit portfolio will have resulted in a significant buffer fund having been accumulated.

Using the approach described above, we have carried out monthly analysis for both high yield and investment grade corporate bonds, starting every month from 31 December 1986 and with final returns for the month ending 31 December 2013, and with holding periods from one to 20 years.
For each month, and for each holding period, we have calculated the investment required for each credit asset class to “beat” an investment of USD 100 in Treasuries. The results are shown in Exhibits 6 and 7. These give the distribution of required initial amounts on the vertical axis, and the time for which the investment is held on the horizontal axis. The orange lines show the observed average investment and percentiles, whilst the blue bands show the smoothed results.

However, this analysis is “unconditional”, as it ignores a crucial piece of information: the spread at entry, or the difference between the yield on the credit and the yield on Treasuries. It is reasonable to expect that the higher the spread, the shorter the holding period needed for a credit portfolio to beat Treasuries. We demonstrate this in Exhibits 8 and 9.

Each point in this chart represents a particular month of investment, with the different colours representing holding periods. The vertical axis shows the credit assets purchased in any given month and held for the period indicated by the colour of the point that would be needed to beat an investment of USD 100 in Treasuries. The horizontal axis shows the spread (in percentage points) of the credit asset class over Treasuries.

Consider, for example, the circled observation in Exhibit 8. The spread of investment grade corporate bonds over Treasuries in this month was 3.04% (304 basis points). In this month, an investment of USD 80.00 in investment grade corporate bonds would have been sufficient not just to produce a higher monthly coupon than Treasuries every month for the next five years, but at the end of those five years the value of the investment grade corporate bond portfolio would have been greater than the value of the Treasury portfolio (assuming excess investment grade corporate bond coupons were reinvested in Treasuries).

These charts give some reassuring information. First, for each holding period, the pattern formed by the points slopes downwards. In other words, the higher the spread over Treasuries at entry, the lower the initial investment typically required to outperform Treasuries. Second, the patterns shift downwards as the holding period increases (as shown by a change in the colour of the points). This means that for a given spread over Treasuries, the longer the corporate bonds are held, the smaller is the investment likely to be needed for the credit portfolio to outtake Treasuries.

Finally, the longer the holding period, the more tightly grouped the points become. This is because for longer holding periods, the initial investment required is driven to an increasing extent by the amount needed to produce sufficient income, and is driven less by the amount required to combat a rise in spreads and the effect this has on the value of the portfolio. In practical terms, it means that as the holding period increases, the results become increasingly certain.

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2 The spread used is the option adjusted spread. This can be defined as the additional yield over Treasuries which if used to discount the cash flows on a bond gives the market value of that bond, allowing for any optionality.
However, Exhibits 8 and 9 also allow us to do something more than comment on the impact of holding periods and spreads - they let us quantify the impact of these factors. In fact, we can use information from these charts to answer some interesting questions:

- Given current spreads, how long do I need to hold a credit portfolio for it to outperform Treasuries with a particular degree of certainty?
- If I know my time horizon, at what spread should I consider investing in credit to have a particular probability of beating Treasuries?
- If I hold a credit portfolio and my time horizon is fixed, how likely am I to outperform Treasuries?
- For all of these scenarios, what is the likely level of outperformance relative to Treasuries?

The methodology used to derive these results is somewhat involved, so it is included in Appendix 1. However, some interesting statistics are summarised in Table 1. This gives the spread required for a credit portfolio (investment grade or high yield) to beat a Treasury portfolio for holding periods as far out as 10 years. The table can also be used to examine trade-offs in terms of holding period and confidence level for a given spread - or this information can be calculated directly from the information in Appendix 2.

The relevance to long-term investors here is clear - if the time horizon is long enough, and the spread is large enough, there are significant advantages to investing in lower-rated asset classes.

### Table 1: Spread (%) Required for Payback Over Periods to 10 Years with Various Degrees of Likelihood

<table>
<thead>
<tr>
<th>Holding period</th>
<th>IG corporate bonds</th>
<th></th>
<th></th>
<th>HY corporate bonds</th>
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<tr>
<td></td>
<td>75%</td>
<td>90%</td>
<td>95%</td>
<td>75%</td>
<td>90%</td>
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<tr>
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</tr>
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<td>5.80</td>
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</table>

Source: Barclays Live, J.P. Morgan Asset Management analysis, using monthly data from December 1986 to December 2013. For illustration purposes only.
The reason that U.S. investment grade and high yield corporate bonds were chosen was that they provide the longest data history of the various bond indices available. However, it is clearly of interest to extend this analysis to other fixed income asset classes where possible, including not only the various EMD asset classes, but also credit denominated in other currencies.

One way of doing this is to determine the parameters for calculating the required amounts and to compare those with the parameters for U.S. investment grade and high yield corporate debt, both for the full data period and for shorter periods that are available for each individual bond asset class. The investment grade asset classes we look at, together with the periods from which good data is available, are:

- GBP investment grade corporate debt (January 1999);
- EUR investment grade corporate debt (January 1999);
- Hard currency (USD) investment grade Sovereign EMD (March 1994); and
- Hard currency (USD) investment grade Corporate EMD (March 2002).

Even going back to 1999 - as we are able to do with the developed market bonds - gives significantly less data than is available for the U.S. Using this data, USD investment grade bonds appear more attractive than their GBP and EUR equivalents. In other words, for a given spread, the holding period needed for U.S. investment grade corporate bonds to outperform U.S. Treasuries with a particular degree of confidence is shorter than for GBP or EUR bonds. When the country-specific spreads are used GBP investment grade corporate bonds - which, at the end of December 2013, had a spread over Gilts some 18 basis points higher than the spread of U.S. investment grade corporate bonds over Treasuries - are less disadvantaged. While the difference is volatile, as there is less data available, the required holding period appears to fall from around four to around two years more than the USD asset class. In contrast, the spreads of EUR bonds over their respective Treasuries were only 5 basis points (bps) higher than those for U.S. investment grade corporate bonds, suggesting a holding period of around five years longer.

For hard currency investment grade EM sovereign debt, there is a slightly longer history, giving us slightly more confidence in these results. However, the results are almost too good to be true - they suggest that an investor would need to hold hard currency investment grade EM sovereign debt for some seven years fewer than if they invested in U.S. investment grade bonds. Investment grade EM corporate debt is only slightly less attractive. The (admittedly shorter) data history suggests that to beat U.S. Treasuries with a particular degree of confidence, this asset class would need to be held for around three years less than a U.S. investment grade corporate bond portfolio.

One reason for the extremely optimistic assessments in relation to EMD - and a possible reason for caution - is that the spreads of both sovereign and corporate investment grade EM credit have narrowed relative to U.S. investment grade credit, as shown in Exhibit 10. This gives the spread over the relevant government bond yield for a range of asset classes. The fact that bond spreads were so high meant investors were able to lock in higher cash flows for a given level of investment. EM investment grade bonds were similarly helped. However, both GBP and EUR investment grade spreads were much lower than their U.S. equivalents.
meaning that in the past the income available was suppressed. In short, the results for all of these asset classes are driven to a large extent by the spreads that were available relative to U.S. investment grade corporate bonds during the period of analysis.

**Exhibit 10: Option Adjusted Spreads for Various Investment Grade Credit Asset Classes**

![Graph](image1)

Source: Barclays Live, J.P. Morgan DataQuery, J.P. Morgan Asset Management analysis. For illustration purposes only.

Similar analysis can be carried out for high yield debt. The asset classes for which information is available are:

- GBP investment grade corporate debt (January 1999);
- EUR investment grade corporate debt (January 1999);
- Hard currency (USD) high yield sovereign EMD (March 1998); and
- Hard currency (USD) high yield corporate EMD (March 2002).

The information from GBP and EUR high yield corporate bonds must be treated with caution. GBP high yield debt is a relatively small asset class, and results have been dominated by the performance of financial issuers. The debt of a number of UK banks was downgraded to sub-investment grade during the financial crisis, and the subsequent survival of these institutions resulted in phenomenal returns on the downgraded bonds. For example, GBP 100 invested in the index at the end of 2008 would have been worth GBP 447 in December 2013. The results for EUR debt are also idiosyncratic. The nature of this index has changed enormously over the last fifteen years. Whereas it used to be an index dominated by telecommunication issuers, it is now far more diverse. Corporate emerging market high yield debt is subject to similar complications, whilst the concerns of sovereign EM high yield issuers are likely to have differed from those of corporates. The movement of spreads for these asset classes is shown in Exhibit 11.

Despite this, the results appear remarkably consistent. GBP high yield is advantaged by only a couple of years; sovereign EM high yield appears to need around a year less than this to provide the same level of certainty of beating U.S. Treasuries as U.S. high yield corporate debt; and the remaining two asset classes show similar performance to U.S. high yield corporate debt.

**Exhibit 11: Option Adjusted Spreads for Various High Yield Credit Asset Classes**

![Graph](image2)

Source: Barclays Live, J.P. Morgan DataQuery, J.P. Morgan Asset Management analysis. For illustration purposes only.

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3 Barclays Live Sterling High Yield Bond Index, Total Returns, J.P. Morgan Asset Management calculations
Conclusion

Fixed income investments present income investors with a broad variety of opportunities across the credit spectrum. In this paper it is shown that the level of income produced by an investment is closely related to the level of credit risk, but that credit risk is not the only reason for higher yields.

Indeed, the longer the time horizon an investor has, the greater the likelihood that investing in credit will pay off. This is the case whether an investor’s base currency is USD, GBP or EUR. However, it is also clear that not all investors can ignore the mark-to-market consequences of taking credit risk, and market price volatility does still need to be considered, to a greater or lesser extent.

It is also important to recognise that this analysis is based purely on historical index-level data, which includes a prolonged period of falling rates. However, there have been a range of spread environments during the period considered, and it is the spread that drives the results. Having said this, the results for any given portfolio of bonds could differ substantially from this index-level analysis.

But whilst fixed income investors need to be conscious of the increased market risk credit investments entail – indeed, such risk may well be a driver of their increased yield – such investments provide an opportunity for income during the current low interest rate environment.

Appendix 1 – Income calculation methodology

Each income stream represents the stream of coupons that an investor would receive from a holding in a particular portfolio. For data from one of the Barclays indices, or from the J.P. Morgan DataQuery Local Currency EM indices, the income is calculated by starting with a notional investment and applying the income yield to this amount. This gives the monthly income amount. The principal is then rolled forward to the next period by applying the capital return. This gives the revised value of the notional investment for the next period, to which the income yield is applied to give the cash income in the next period. This process continues over the period of analysis. This is done on a monthly basis.

The process can perhaps best be seen with an example. Consider a ten-year bond paying a coupon of 5% per annum. At issue, the yield will be 5%, and if EUR 100 is invested, an income of EUR 5 will be received. If, over the first year, the principal return is −50%, the value of the bond will fall to EUR 50. However, the income yield will rise to 10% per annum, meaning that the income amount received will remain at EUR 5.

For J.P. Morgan DataQuery hard currency EM indices, different data is available. We proxy the price index by deducting the dirty current yield – that is, the income both paid out and accrued in the period – from the return derived from the total return index on a daily basis. This gives a constructed price index, which is used to generate a series of principal values as above. The income each day is then calculated by multiplying the dirty current yield by this constructed price index. The monthly amount of income is then calculated by aggregating the daily cash income amounts over each calendar month. Hedged total return information is available, so no additional adjustments are needed in this regard.
Appendix 2 – Technical specifications

In this appendix, we explain the way in which the information from Exhibits 8 and 9 is used to provide the summary information in Table 1. To carry out this analysis, three parameters are needed from the results for each holding period:

• The slope parameter of the observations for each holding period (how much the expected amount required falls for each percentage point increase in spread);
• The constant parameter of each holding period (the expected amount that would be required if the spread were zero); and
• The standard error of the fit (how much uncertainty there is in the above estimates).

These parameters can be used as follows. Consider U.S. investment grade corporate debt. For some term, \( t \), the expected amount needed to beat Treasuries over that term is given by \( \mu = c + as \), where:

• \( c = 104.59 - 0.4813t \);
• \( a = -4.4292 + 0.1773t \); and
• \( s \) is the spread, in percentage points

The standard error for this estimated amount is \( \sigma = 5.3508 - 0.8344\sqrt{t} \). This allows us to calculate the percentiles around the mean amount as \( \mu + \sigma \Phi \), where \( \Phi \) is the cumulative standard normal distribution.

This means that we can calculate, for a given spread, how long we would expect to have to hold a U.S. investment grade corporate debt portfolio to beat an equal investment in Treasuries with a particular degree of confidence. For example, the spread as at the end of December 2013 was 1.14%. At this level, there is:

• A 75% chance that investment grade corporate bonds will outperform Treasuries over a six year time horizon (and the expected level of outperformance would be 4.0%);
• A 90% chance that investment grade corporate bonds will outperform Treasuries over an 11 year time horizon (and the expected level of outperformance would be 9.3%); and
• A 95% chance that investment grade corporate bonds will outperform Treasuries over a 13 year time horizon (and the expected level of outperformance would be 11.4%).

It is possible to carry out the same calculations for U.S. high yield corporate debt. Here

• \( c = 118.55 - 0.7591t \);
• \( a = -3.8358 + 0.0608t \); and
• \( \sigma = 15.7757 - 2.7314\sqrt{t} \).

The constant here starts off significantly higher than for investment grade corporate bonds, but falls more quickly with time. This means that ignoring the spread, the amount needed to beat Treasuries at shorter terms is higher for high yield than for investment grade, as would be expected given that high
yield spreads are more volatile. However, as high yield spreads are also higher, the buffer built up means the amount required falls over time more quickly. The impact of the spread is similar for both, but the high yield standard error is again much higher for shorter terms, falling more quickly as the term increases.

The high yield spread as at the end of December 2013 was 3.82%. At this level, there is:

- A 75% chance that investment grade corporate bonds will outperform Treasuries over a 15 year time horizon (and the expected level of outperformance would be 31.6%);
- A 90% chance that investment grade corporate bonds will outperform Treasuries over an 18 year time horizon (and the expected level of outperformance would be 38.4%); and
- A 95% chance that investment grade corporate bonds will outperform Treasuries over a 20 year time horizon (and the expected level of outperformance would be 43.0%).
Paul Sweeting, managing director, is European head of J.P. Morgan Asset Management’s Strategy Group, based in London. An employee since 2011, he is responsible for providing institutional clients with tailored advice, analysis and education about various aspects of asset allocation, risk management and investment strategies. Paul published a book called “Financial Enterprise Risk Management” in 2011. Before joining the firm, he held a full-time post at the University of Kent as professor of Actuarial Science, a role he continues to hold on a part-time basis. Prior to this, he worked at Munich Reinsurance and at Fidelity Investments, where he was director of Research at their Retirement Institute. Paul holds a Bachelor’s degree in Economics from the University of Bristol, a Master’s degree in Actuarial Science from Cass Business School and a Doctoral degree in Finance, also from the University of Bristol. He is a fellow of the Institute of Actuaries, of the Royal Statistical Society and of the Chartered Institute for Securities and Investment, and a CFA charterholder.