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EUROZONE MYC – EXPLANATION AND FAQS

This paper is addressed to users of the Eurozone Mercer Yield Curve ("Eurozone MYC") and their auditors. It explains the methodology used to derive the Eurozone MYC which applied in recent years including refinement to the way we determine the transition point (see explanation below) which was introduced from 30 November 2016.

Background

Accounting standards require the discount rate used when calculating pension benefit obligations to be based on the yields on high quality corporate bonds. They do not specify how this should be done, which means the choice of bonds and the methodology for determining the rate is the responsibility of company directors, subject to the review of their auditor.

The Eurozone MYC has been developed to help company directors choose a best estimate of high quality corporate bond yields within the guidelines set out by IAS19 and US GAAP. It is intended to take account of as much relevant market information as seems reasonable, in the context of a process which needs to be efficient, and to produce consistent and stable results, given volatile markets and sparse information on longer term yields.

The four main areas where choices have been made in developing the Eurozone MYC are to:

- Determine ***which bonds are used***;
- ***Fit a curve*** to the bonds;
- ***Determine the transition point*** at which there ceases to be sufficient corporate bond information; and
- ***Extend the curve*** beyond the transition point.

This paper considers each of these steps and provides answers to frequently asked questions.

Which Bonds are Used

The MYC is based on euro-denominated corporate bonds rated AA by Moody's Investor Service or S&P Global Ratings. In addition, we require them to be bonds which:

- Have data available from our data provider (Thomson Reuters Datastream)
- Have predictable cashflows (i.e. not callable bonds, make-whole bonds, puttable bonds, bonds with floating coupon rates or certain sinkable bonds)
- Have at least €50 million in outstanding issue
- Have at least 6 months to maturity and, where they have maturity greater than 50 years, satisfy additional checks to ensure it is reasonable to assume they are actively traded
- Are not collateralised (collateralised bonds are asset-backed securities rather than loans taken by companies for business purposes so we do not view them as 'corporate' bonds)
- Are not government-related (government-related bonds are issued by a company where a government is the majority stakeholder so we do not view them as 'corporate' bonds)

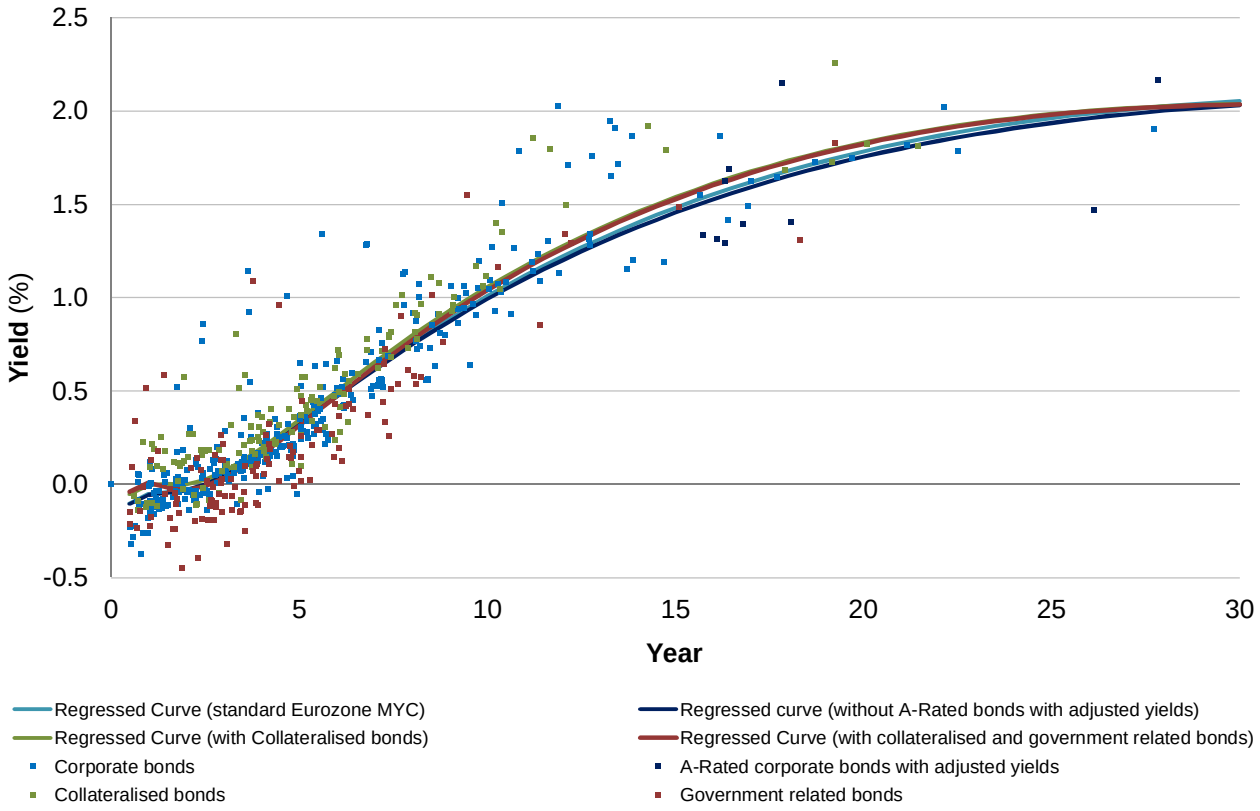
In addition, we include additional data from euro-denominated corporate bonds which satisfy the criteria shown above, have terms of 15 years or more, but are rated A. Before incorporating these bonds in our analysis, their yields get adjusted by a calculated A-AA spread so they can be treated as proxies for AA-rated bonds. We call these bonds synthetic AA bonds.

This is consistent with US GAAP, which allows for a discount rate derived from any portfolio of investment instruments provided they seek to match the return on highly-rated bonds. Similarly, the IFRS Interpretations Committee has suggested this approach, stating that:

> *"[I]f an entity concludes that the market for corporate bonds rated "AAA" and "AA" is not sufficiently deep, the entity could expand the bonds' population to include corporate bonds with a lower rating. In this case, the entity should adjust the market yields on corporate bonds with a lower rating, in order to remove the market premium for the additional credit risk."*

There are currently no long-dated euro-denominated corporate bonds which satisfy our criteria and are AAA-rated.

The chart below shows the bonds which satisfy these requirements at 30 December 2016, and how the yield curve we have fitted would vary if we chose different sub-sets of bonds used. As you can see, the curves do not change materially.



Source: Corporate bond data provided by Thomson Reuters Datastream

Fit a Curve

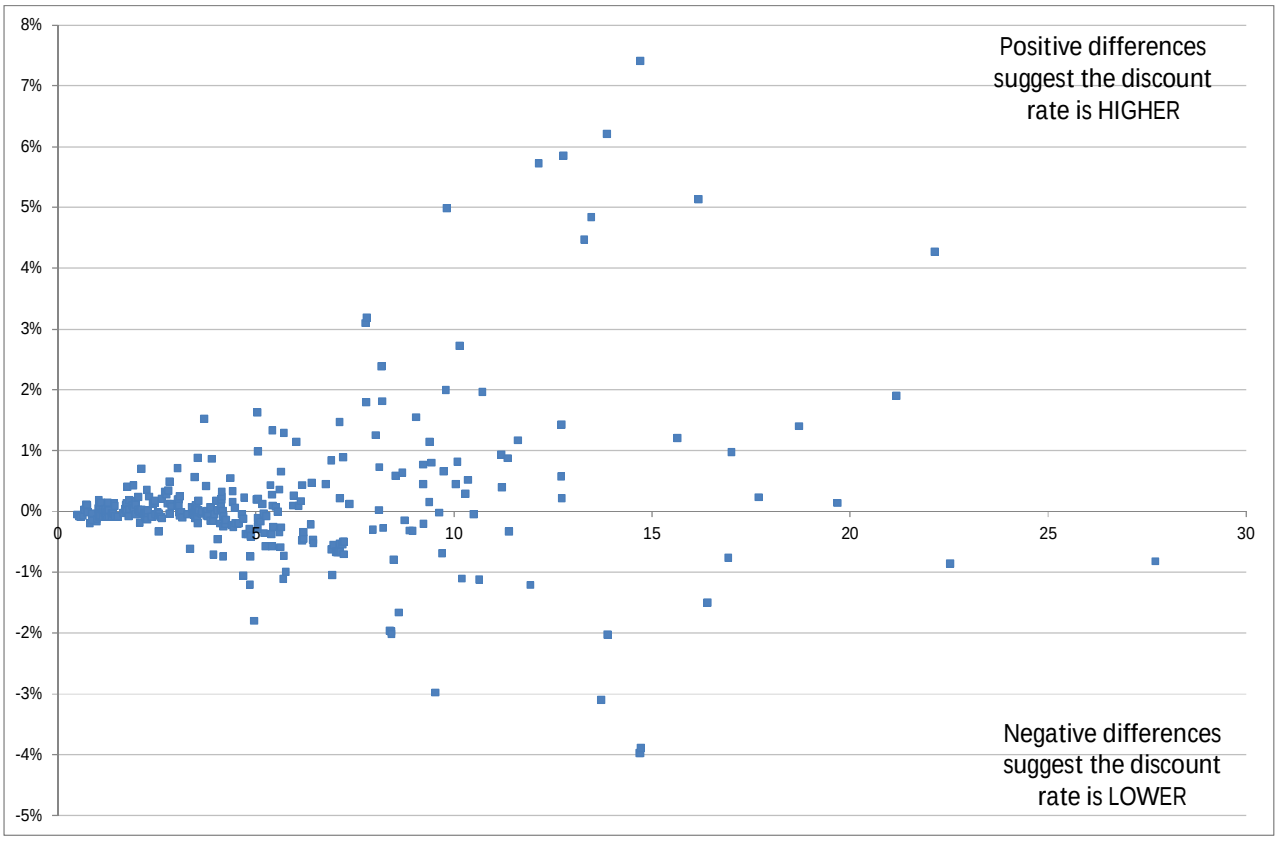
We fit the yield curve using the following steps:

- Choose the fourth degree polynomial based on the logarithm of time to maturity which minimises the square of differences between itself and the data points.
- Determine that bonds where the yield to maturity is more than two standard errors from the curve are outliers.
- Choose a new fourth degree polynomial based on the logarithm of time to maturity which minimises the square of differences between itself and the data points excluding outliers.
- Convert the regressed maturity yield into a spot rate curve using the technique known as bootstrapping, which assumes that the price of a coupon bond for a given maturity equals the present value of the underlying bond cash flows using zero-coupon spot rates.

The appropriateness of this method can be checked in the following way:

- calculating theoretical bond prices using the yield curve
- comparing them with actual bond prices

If the curve has been fitted well, then the differences between the theoretical and actual bond prices should be evenly spread around zero. The chart below shows these differences at 30 December 2016. As you can see, the values are broadly evenly spread around zero. There appears to be a slight bias to the positive side which suggests the Eurozone MYC could be higher, however we do not believe that this is significant.



Determine the Transition Point

Pension liabilities may have a sufficiently long duration that there is no deep market in AA-rated bonds with matching maturity terms. In such circumstances, IAS19 and US GAAP say that the curve should be extrapolated for longer maturities. As a result in markets where there is no deep market in AA rated bonds with longer terms, we generally determine a point ('the transition point') at which we choose to extrapolate the MYC.

Prior to 30 November 2016 we determined the transition point as the average term of the five longest-dated bonds in our universe, capped at 30 years. However, in the Eurozone, market movements left yields of the five longest bonds relatively more dispersed in 2016 than in previous years, which prompted us to look further into the effects on our curve.

As a result, we refined our model so that the transition point was the average term of the five longest bond yields included in the curve (that is, excluding outliers). To address our objective that the MYC produces results that are "middle of the road" relative to alternative possible constructions, we also decided to exclude synthetic AA bonds from the transition point calculation. The impact of the refinement is as follows:

Duration	31 December 2015		30 December 2016	
	Before	After	Before	After
5 years	1.20%	1.20%	0.72%	0.72%
10 years	2.06%	2.06%	1.42%	1.41%
15 years	2.42%	2.42%	1.74%	1.72%
20 years	2.64%	2.64%	1.93%	1.90%
25 years	2.78%	2.78%	2.06%	2.02%

This refinement was applied in curves produced from 30 November 2016. Since it had no effect as at 31 December 2015 and minimal impact as at 30 December 2016, we do not expect it will require any material additional disclosures.

Extend the Curve

Having determined a suitable transition point, it is necessary to determine how to extend the curve beyond that point. We have chosen to extrapolate the curve in line with the yield on government bonds, by holding the spread constant.

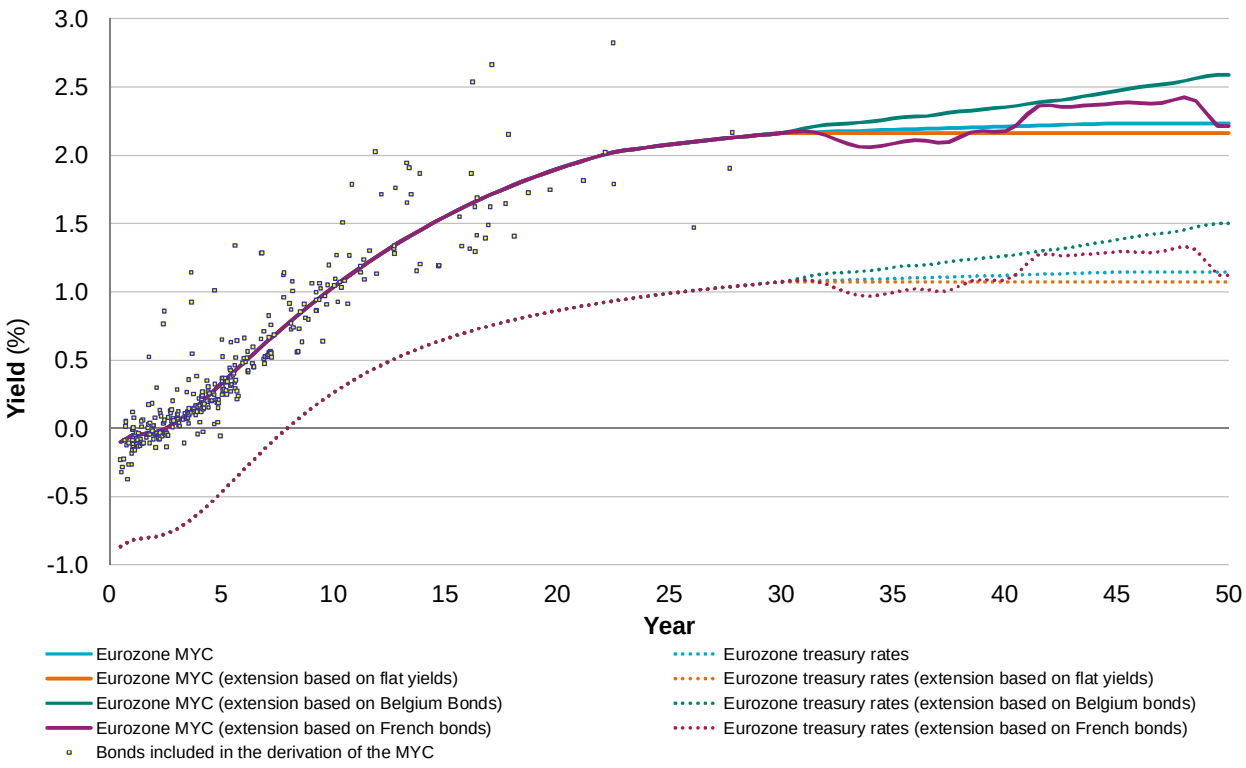
In the Eurozone, although several governments have issued bonds with terms up to around 50 years, when the European Central Bank (ECB) produces its treasury curve, it stops at 30 years because after this point there is less bond information.

One approach in this instance would be to use the ECB curve up to 30 years, and assume the curve remains flat thereafter. However, as described above, accounting standards require financial assumptions to be based on market data for the relevant period. While market data for government bonds with terms between 30 and 50 years is limited, there is enough data that we do not feel it is reasonable to disregard it.

We therefore examined the bond data available. When we adapted Mercer's central approach to the Eurozone, Austrian government bonds were the longest-dated bonds with sufficient data available and showed a smooth progression of increases. We therefore decided to extend the treasury curve using the Austrian government bond data.

We have chosen to continue this approach for year by year consistency although, from a theoretical perspective, it would be preferable to base our treasury curve extension on all available government bond information. This may change in the future, as we review our approach from time to time to ensure it remains fit for purpose.

The chart below shows that as at 30 December 2016, the yields for the other government bonds which have been issued increase more steeply than the Austrian government bonds.



Note: All Eurozone MYC curves shown reflect the updated transition point calculation
Source: Corporate bond data provided by Thomson Reuters Datastream, Eurozone treasury data provided by ECB

Frequently Asked Questions

Why are the bond yields from other data sources different from those in the MYC?

We obtain bond yields from Thomson Reuters Datastream based on bid pricing data. Different data providers obtain bond pricing data from different markets and may use different pricing approaches (e.g. using mid data). These differences may result in different price quotations (and therefore different yields) however our experience has been that these differences in yields tend to be very small.

We use bid pricing data because this gives the yield information for the widest range of bonds, and is consistent with the fair value definition in the accounting standards.

Why is a given bond not included in the construction of the MYC?

The full criteria for bond inclusion is discussed in the section ***What Bonds are Used***. When we have been asked this question in the past, the reason has usually been that either data for the bond was unavailable from Thomson Reuters Datastream, that the bond had options which affected its yield, or that the bond had been classified as being collateralised or government-related.

As shown in the section ***What Bonds are Used***, including bonds which have been classified as being collateralised or government-related does not materially affect the shape of the curve.

Can you change the curve so it includes bond X / uses a methodology Y?

Mercer uses the methodology underpinning the MYC in all countries where there is a deep market in corporate bonds, although there are some country specific features reflecting different characteristics of local markets. Making wholesale changes to the Eurozone MYC is not something which we can undertake lightly. As well as ensuring we have global consistency for our multi-national clients, it is important for accounting that the approach used for setting assumptions is consistent from year to year, so changes should only be made where they are justified.

However, we recognise that different approaches are also likely to be acceptable to auditors and we are prepared to construct different curves for clients with adjustments to the bonds used or the methodology, where requested to do so under our engagement with the client.

Why are you using data from synthetic AA bonds in the Eurozone MYC?

While there is no doubt that a deep market in Eurozone AA-rated corporate bonds exists at up to terms of around 15 years, the number of bonds reduces significantly after this point. The IFRS Interpretations Committee has suggested an approach to deal with this which we adopted:

> *"[I]f an entity concludes that the market for corporate bonds rated "AAA" and "AA" is not sufficiently deep, the entity could expand the bonds' population to include corporate bonds with a lower rating. In this case, the entity should adjust the market yields on corporate bonds with a lower rating, in order to remove the market premium for the additional credit risk."*

As shown in the section ***What Bonds are Used***, including information from A-rated bonds does not materially affect the shape of the curve – however it does improve the stability of the curve.

We believe that this approach is also valid under US GAAP, based on ASC 715-30-35-43 which requires the discount rate to:

> *"…reflect rates at which the defined benefit obligation could be effectively settled….[I]n the estimation of those rates employers may look to rates of return on high-quality fixed-income investments that are currently available and expected to be available during the benefits' period to maturity."*

Our understanding is that, for US GAAP, a discount rate derived from a portfolio of any investment instruments may be used, provided they seek to match the return on highly rated bonds, as this continues to "reflect rates at which the defined benefit obligation could be effectively settled". As we adjust the yields on the A-rated bonds to reflect the reduced return on AA-rated bonds, we consider the dataset of bonds including the derived yields to represent a proxy for the "fixed-income debt securities that receive one of the two highest ratings" the SEC has suggested in ASC 715-20-S99.

Does adding synthetic AA bonds add bias?

We do not believe that our approach (adding synthetic AA bonds) adds bias to the curve. This is partly because the adjustment we make to the yields should remove any bias. Also, if there were long-dated euro-denominated corporate bonds which satisfy our criteria, but were rated AAA, we would include them in our curve.

What is the impact of excluding synthetic AA bonds?

Excluding these bonds does not generally have a material impact on the curve. The table below shows the impact at 31 December 2015 (post transition point update) and 30 December 2016:

Duration	31 December 2015		30 December 2016	
	Eurozone MYC	Excluding A	Eurozone MYC	Excluding A
5 years	1.20%	1.20%	0.72%	0.71%
10 years	2.06%	2.04%	1.41%	1.39%
15 years	2.42%	2.42%	1.72%	1.70%
20 years	2.64%	2.62%	1.90%	1.88%
25 years	2.78%	2.76%	2.02%	1.99%