THE Brattle GROUP

# MEMORANDUM

**TO:** Dutch Authority for Consumers and Markets (ACM)

**FROM:** Dan Harris, Lucrezio Figurelli (The Brattle Group)

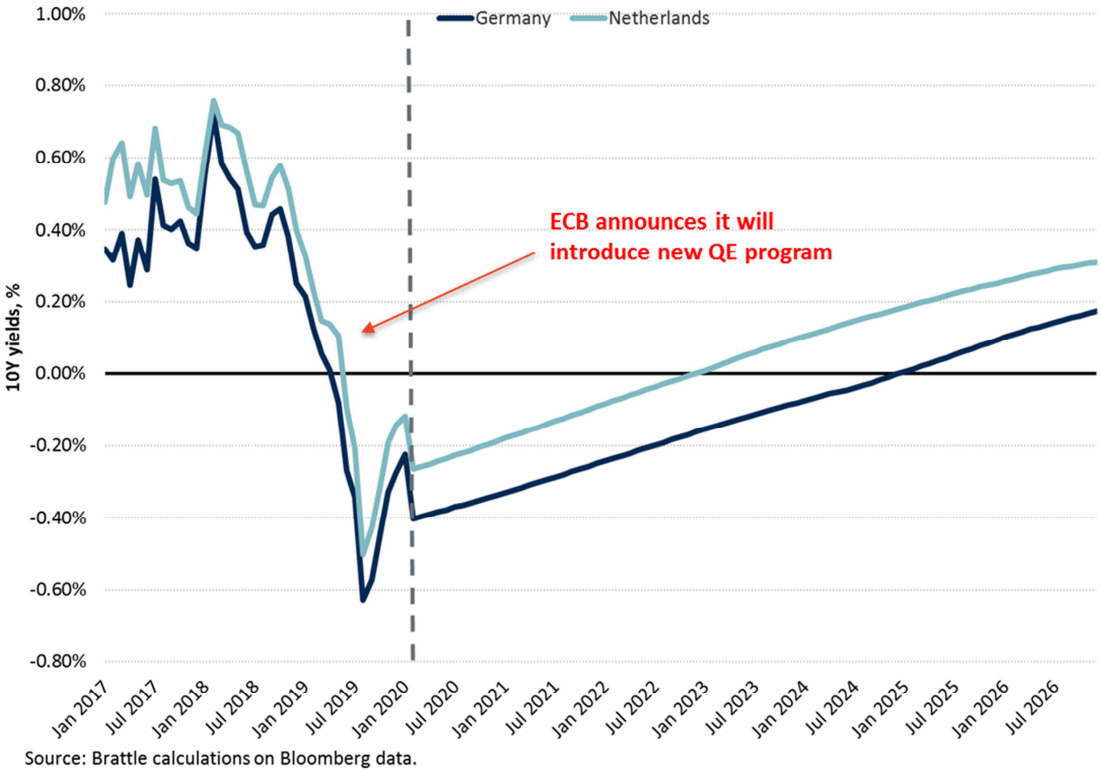
**SUBJ:** Accounting for Quantitative Easing (QE)

**DATE:** 3 April 2020

## I. Introduction

The ACM's methodology for calculating the Weighted Average Cost of Capital (WACC), and specifically the method for calculating the cost of equity, bases the risk free rate (RFR) on Dutch and German government bond yields. Over the past five years, the monetary policies implemented by the European Central Bank (ECB), and in particular the ECB's Quantitative Easing (QE) programs, have depressed these and other government bond yields to historical lows. Since 2015, the QE programs have increased the prices of government bonds directly involved, and reduced the yields. As Figure 1 illustrates, the renewal of the ECB's QE policy announced in the in the spring of 2019 has had a particularly dramatic effect on bond yields. As of January 2020, the yields on Dutch and German government bond yields were negative. Forward curves indicate that they are expected to remain negative for the next few years. The RFR calculated as of 12 January 2020 based on the three-year average of Dutch and German government bonds calculated was 0.27%. Going forward, the value of the RFR will continue to decline, and could eventually turn negative in the near future.

Figure 1: Dutch and German Government Bonds, Historical and Forward Rates




Source: Brattle calculations on Bloomberg data.

The key question QE presents for the ACM and other regulators is: does the fall in government bond yields, which QE has caused, reflect the fall in the return that equity investors require?[1] If it does, there is no need to adjust bond yields for the effect of QE. If it does not, then using current bond yields could underestimate the true cost of equity. Regulators would need to make an upward adjustment to the observed yields.

## II. QE Has Clearly Depressed Bond Yields

The ECB's QE policies have clearly and measurably depressed government bond yields - the purpose of the QE program is after all to lower borrowing costs to stimulate the economy. A number of studies have measured the effect. In particular, a recent ECB study[2] has measured

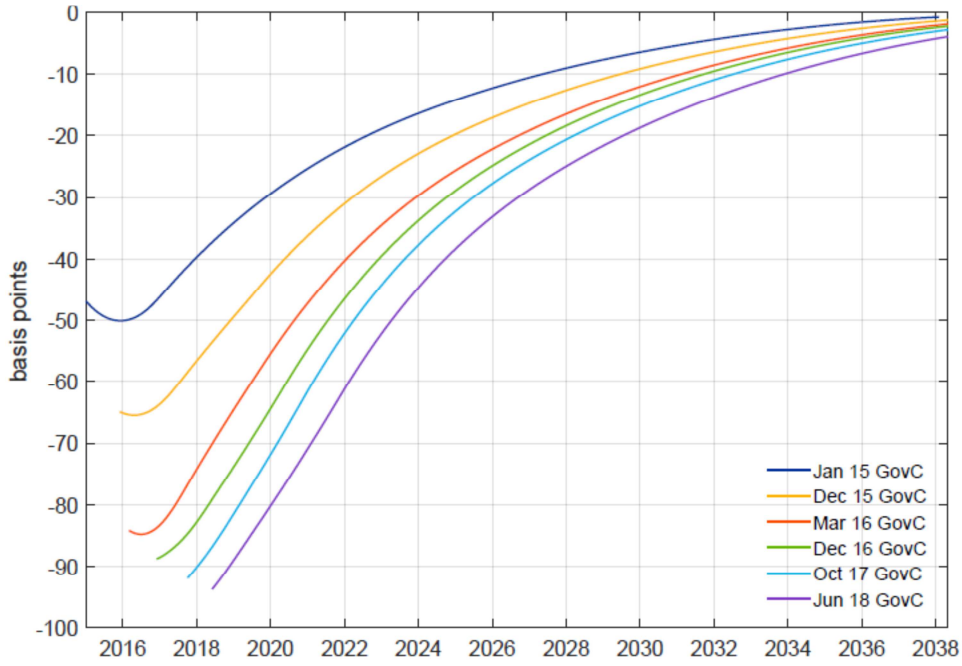
[1] In this annex, we discuss only the cost of equity. No adjustment should be made to the methodology applied in calculating the cost of debt. This is because unlike for the cost of equity, where the expected return of investors is not directly observable, the cost of debt can be measured directly based on the historical and current yields of comparable debt.

[2] Fabian Eser, Wolfgang Lemke, Ken Nyholm, Sören Radde, Andreea Liliana Vladu, "Tracing the impact of the ECB's asset purchase programme on the yield curve", ECB Working Paper No 2293, July 2019 (https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2293~41f7613883.en.pdf).

the impact of the QE programs implemented between 2015 and 2018 on the yield curve of government bonds at different maturities. The study measured both the impact of the different QE programs at announcement and the impact over time, incorporating in the analysis expectation about future bond purchases by the ECB, and the tapering out of past QE policies. Overall, the study found that the impact of the QE programs implemented up to and including June 2018 had decreased the yield of 10-year government bonds by about 95 basis points.[3] The current effect on bond yields is likely to be larger, because the study does not account for the new QE program formally announced in September 2019.

In Figure 2, below, we reproduce Figure 1 of the cited ECB study, showing the impact of the various QE programs at announcement and over time.[4]

**Figure 2: Impact of the QE Programs on the yeild of 10-Year Government Bonds**




## III. Should Regulators Adjust for the Effect of QE?

Having established that the impact of QE on government bond yields can be measured, the relevant question to consider is whether the expected return of equity investors – which is what the CAPM is trying to estimate – has reduced as much as government bond yields indicate. The case for no adjustment would say that, since the risk-free rate has decreased,

3 *Ibid.*
4 *Ibid.*

then – based on the CAPM framework – the equity cost of capital must also have decreased. That is, since equity investors demand a return above a reference risk-free rate, then if the reference rate decreases, then the return the investors require also decreases.

There are broadly two responses to the 'no adjustment' argument. *First*, there is political or country risk. In prior Brattle reports, including a 2016 study prepared for the EC,[5] we argued that estimating the RFR on depressed bond yields would understate the expected return of investors because political and country risk had not decreased.

The RFR under the CAPM model measures the rate of return of a hypothetical risk-free asset. Long-term government bond yields have been used as the risk-free assets in the regulatory practice. Long-term government bonds, however, are not risk free, because they are subject to the risk of default of the country. Nonetheless, they also capture the diversifiable political and country risk of operating a regulated business in a given country. Although diversifiable risk is properly accounted for in the expected cash flows, this may be complicated in practice, and a reasonable regulatory practice has been to account for political and country risk by using local government bonds. Arguably, QE has not reduced country and political risk. Hence, accepting the depressed bond yields as the RFR will underestimate the compensation required for political and country risk.

*Second*, there is the issue of whether an investor would really consider a negative risk-free rate. The overall impact of the various QE programs on government bond yields has increased over time, and government bond yields in several countries, including Germany and the Netherlands, are now persistently negative in both real and nominal terms.

From a theoretical standpoint, it is hard to rationalize an investment in an asset that will give you a negative *real* return, which will not even compensate for time value of money. Nonetheless, a recent study commissioned by the UK regulators argues that "*a negative (real) RFR is relatively rare; but it is not irrational and it is consistent with a standard decision-making model.*"[6] In particular, the study argues that a negative real RFR is possible if consumption is expected to decline steadily. However, we are aware of no evidence,

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5 Dan Harris, Richard Caldwell, Francesco Lo Passo, and Lucia Bazzucchi, "Review of Approaches to Estimate a Reasonable Rate of Return for Investments in Telecoms Networks in Regulatory Proceedings and Options for EU Harmonization", prepared for DG Connect, July 2016.

6 Stephen Wright, Phil Burns, Robin Mason, Derry Pickford, Aon Hewitt, "Estimating the cost of capital for implementation of price controls by UK Regulators: An update on Mason, Miles and Wright (2003)" (2018).

suggesting a steady decline in consumption is expected. Rather, the negative RFR we observe today are the result of the QE programs and of the shortage of "risk-free borrowers".[7]

Furthermore, the claim made in the UK study only applies to a *real* rate. Negative *nominal* rates do not seem consistent with rational economic decision-making. After all, holding cash in a currently account - or under the proverbial mattress – pays a nominal interest rate of zero. It is hard to see why an investor would invest in an asset with a negative *nominal* return, when she could simply hold cash.

In a recent market survey on the RFR and the market risk premium, Fernandez et al. (2020)[8] find that many respondents from European countries use a RFR that is higher than the yield of 10-year government bonds. The survey, for example, reports an average 2020 RFR of 1.6% for the Netherlands.[9] This is over 130 basis points higher than the RFR estimated based on ACM methodology as of 12 January 2020 (0.27%). Hence, it seems that at least the average investor does not regard a negative bond yield as the RFR against which they measure the premium they need for an investment in risk equity.

It is difficult to definitely answer the question of whether using current government bond yields will underestimate the equity cost of capital, because we cannot observe the equity cost of capital directly. However, the issues discussed above suggest that calculating the RFR based on QE-depressed bond yields may result in an underestimate of the expected return of investors. We conclude that an adjustment to the RFR calculated based on government bond yields is necessary to properly measure the required return of equity investors.

## IV. Possible Regulatory Responses

Even before the sharp fall in yields seen in 2019, several regulators already made adjustments to their methodologies for estimating the RFR. In 2015, for example, the regulatory Authority for electricity, gas and water in Italy (AEEGSI) changed the methodology for the calculation

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7 Extremely low and even negative rates should attract more and more consumers to borrow and anticipate consumption. However, not all consumers are "risk-free borrowers". For example, young consumers cannot borrow at the RFR to buy a house if they are not creditworthy.

8 Pablo Fernandez, Eduardo de Apellániz, Javier F. Acín, "Survey: Market Risk Premium and Risk-Free Rate used for 81 countries in 2020", March 2020 (available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3560869).

9 *Ibid.*

of the WACC rate in order to mitigate the effect of market's volatility and to account for the impact the new monetary policies by the ECB. Specifically, AEEGSI decided to apply a 0.5% floor to the real RFR and added a country risk premium of 1%, resulting in an uplift to the RFR of more than 100 basis points.[10] Similarly, in 2018, the Spanish telecoms regulator (CNMC) applied a 100 basis points uplift to the RFR to account for the impact of QE.[11] Given the further, substantial decline in government bond yields over the course of 2019 (see Figure 1), it likely that more regulators will consider further QE adjustments to the RFR.

Accordingly, there are broadly two possibilities. First, set a minimum or floor value for the RFR. The advantage of this approach is that it is simple, and adjusts automatically in the sense that if the bond yields increase, the floor will no longer apply. The disadvantage is that the regulator must decide on what a reasonable floor is. The second option is to make an adjustment to compensate for some or all of the depressing effects of QE. The advantage of this approach is that, as discussed above, the effect has been studied and is now relatively simple to quantify. This disadvantage is that the regulator would need to review the adjustment over time, as the effects of the QE programs gradually unwind.

[10] Aeegsi, Directive n.583/2015/R/com, December 2015.

[11] CNMC, Decision WACC/DTSA/018/18.