Expert View

To: ACM

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Subject: Memorandum the Brattle Group on the effect of QE on the WACC

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Introduction

The Weighted Average Cost of Capital (WACC) plays a crucial role in regulated industries. The calculation of the WACC is based on the Capital Asset Pricing Model (CAPM). The cost of capital is equal to Risk Free Rate (RFR) of interest plus a risk premium for the correlation of the asset's return to aggregate non-diversifiable risk. The RFR is therefore a critical input for the calculation of the WACC.

In a Memorandum to the ACM dated 3 April 2020 the Brattle Group has argued that ACM should apply a surcharge to the Risk Free Rate (RFR) to account for the effect of ECB's Quantitative Easing (QE). QE has been routinely applied by most central banks (CB) since the 2008 financial crisis. The ECB does so since 2015. These programs have twisted yield curve, reducing long interest rate while keeping the interest rate for bonds with zero duration constant at approximately minus 1%. The interest rates for German and Dutch 10 year bonds have turned negative in the course of 2020. Markets expect interest rate to remain low for the years to come. The Brattle Group has put forward two arguments why the ACM should correct the RFR for the impact of this policy (see p 4.)

1. The country specific risk is not properly accounted for in the RFR. Two factors play a role in the reasoning of the Brattle Group: sovereign default risk and the country specific political risk of operating a business in a regulated industry. These risks are not priced adequately by financial markets due to ECB policy interventions.
2. The Brattle Group questions whether investors really consider negative risk free rates. The group argues that a negative real RFR is hard to square with rational behaviour of investors.

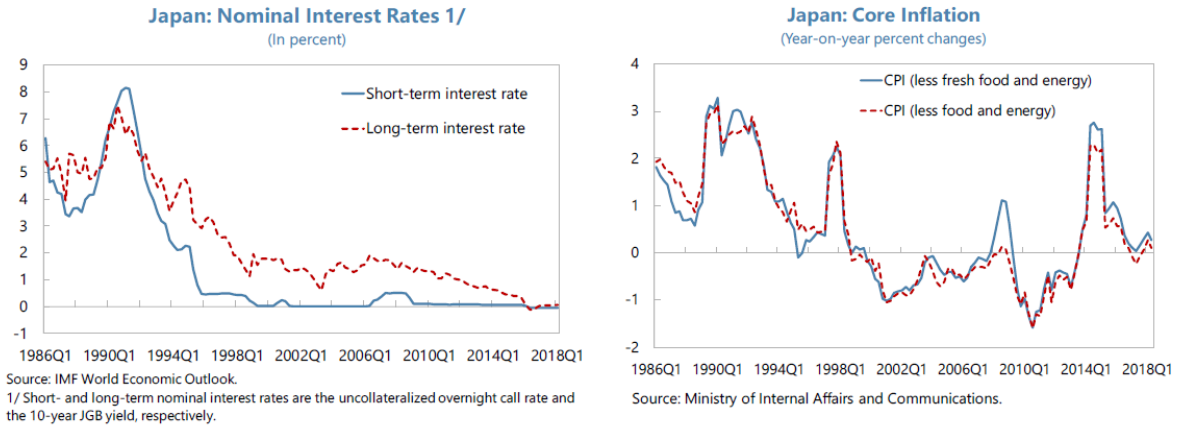
ACM has asked me for an expert view on this Memorandum. As a general conclusion, I see no reason why the RFR applied for the calculation of WACC should be adjusted for the effect of QE policies, in particular not for Germany and the Netherlands. The remainder of this report will substantiate this view. As a background for the discussion, Section 2 gives a short overview of role of QE policies in a world with excess saving and low real interest rates. Next, Section 3 and 4 discuss both arguments of the Brattle Group for adjusting the RFR.

The secular decline in real interest rates

Real interest rates and inflation are in secular decline since the mid-eighties of the previous century. Since by definition the nominal interest rate is the real interest rate plus inflation, this applies a fortiori to the nominal interest rate. The phenomenon has been first observed in Japan, see Figure 1. In a seminal paper, Krugman (1998) analysed its implications. Standard monetary policy is governed by the Taylor rule. This rule demands CBs to raise the short term interest rate more than one-for-one

for every increase of expected inflation rate above its target, which is 2 % in case of the ECB. A lower interest rate increases current consumption demand and therefore pushes up inflation, since entrepreneurs use excess demand to increase their prices. The reverse holds for a higher interest rate.

Figure 1



In the current situation, there is special problem. Nominal rates can never go much below minus 1%, since then agents will start storing their value in cash rather than in bank accounts, a phenomenon referred to as the Zero Lower Bound (ZLB) (though the actual lower bound is not 0% but minus 1%, due to the additional cost of storing money physically in the form of banknotes rather than on a bank account). Hence, real interest rates can never fall below minus 3% (the lower bound of the nominal rate of minus 1% minus the inflation target of 2%). Currently, both the Bank of Japan and the ECB operate at the ZLB, which leaves both CBs without ammunition to balance the capital market in case of excess supply on the capital market, or equivalently, a decline of inflation below its 2%-target. QE addresses this problem by targeting not the short but the long term interest rate. Before the ZLB became binding, monetary policy interventions shifted the entire yield curve up and down in parallel. Since the moment the ZLB has become binding, monetary policy rotates the yield curve around the ZLB of minus 1% for bonds with zero duration rather than shifting it up or down, see Teulings and Baldwin (2012) for an overview. The QE policy is implemented by the ECB buying long term bonds on the second hand capital market, thereby driving up their prices, or equivalently, reducing the long term interest rate. By doing this, the ECB takes the risk of an increase in interest rates on its balance sheet, thereby signalling that it expects the interest rates to remain low in the near future.

The most likely explanation for the downward trend in the RFR is demography, see Lu and Teulings (2016) for an overview of the discussion. The last cohorts born before the sudden drop in fertility rates several decades ago (it happened in 1970 in Germany; in other countries it happen at slightly different points in time) are substantially larger then both preceding and subsequent cohorts. These cohorts have large saving accounts to fund their future pensions, held either privately or by their pension-funds. This large supply of capital depresses the market return on capital and hence the RFR. Since the demographic structure of Japan leads that of the Eurozone by 15 years, what happened to Japan in the past 15 years is a tell-tale for what is awaiting the Eurozone during the next 15 years. A low RFR is there to stay. This squares well with market expectations and with ECB policies, which flatten the yield curve and hence reduce the risk premium for an insurance policy protecting the investor against an unexpected increase in interest rates.

This argument points to a major source of confusion in the public policy debate, related to the concept of the *natural rate of interest*. This concept has been interpreted as if there were some magic constant to which the real interest rate should converge in the long run. Instead, economists often use a concept related to the natural rate of interest, the FERIR: the Full Employment Real Rate of Interest. At full employment, there should be neither inflationary nor deflationary pressures. The inflation is stable for that interest rate, in line with the logic supporting the Taylor rule. Contrary to a popular suggestion, there is nothing in economic theory to suggest that this FERIR – or the related concept of natural rate of interest – should have some particular value. Instead, the natural rate of interest varies over time, being determined by supply and demand on the capital market.

We conclude that the fall of the real interest rate is driven by market forces. If anything, the ECB, or for that matter, CBs throughout the world are hampered to implement a market clearing RFR by the ZLB. Relative to the situation without QE, ECB policies have reduced the long term interest rate. However, relative to goal underlying the Taylor rule – keeping inflation at its 2% target – the ECB has failed to reduce the interest rate by sufficient amount, since the ZLB constrains their policy options. Hence, CBs find it hard to live up to their promise to keep inflation at its 2%-target these days.

Does the current RFR price country specific risk adequately?

The Brattle Group argues that for the calculation of the WACC the RFR should be adjusted since country risk is not adequately priced. Taking literally, this argument is problematic for three reasons.

First, by its definition, the RFR does not compensate for any risk. Hence, there should be no premium for any risk factor in the RFR.

Second, assume that a regulator would nevertheless like to include a risk premium for sovereign default risk in the RFR used for the calculation of the WACC. In a monetary union, there might a reason for doing so. In a standard situation where the areas of the monetary and fiscal authorities coincide, sovereign defaults are usually avoided by a devaluation of the currency. Since sovereign bonds are risk free relative to the value of the currency, the RFR in terms of the domestic currency automatically reflects the risk premium on a devaluation of the currency. In a monetary union, this argument runs into trouble, since the rates for sovereign bonds differ between member states. These interest rate differentials reflect differences in the liquidity of the market for that country and/or country specific default risks. Since liquidity premiums are small for most countries, interest rate differentials mainly reflect country specific default risks. Since the option of devaluation is not available as a safety valve, default is a more realistic outcome. This raises the problem which country's interest rate should be used as the RFR. Should regulators in member states with higher interest rates on their sovereign debt view this surcharge as a reflection of a higher RFR or should they view this as part of the risk premium?

QE policies that have been conducted by most CBs have reduced interest rates across the globe. This effect should obviously not be offset by adjustments in the RFR used for the calculation of the WACC since these policies have been motivated by a fall in the FERIR due to shifts supply and demand of capital. Hence, they reflect a real shift in the cost of capital that should therefore affect the WACC.

However, QE has had the additional effect in the Eurozone of compressing interest rate differentials between member states. QE provides implicit insurance against sovereign default risk for countries with a higher risk profile such as Italy. This effect shifts risks away from bonds of these higher risk countries, thereby reducing their RFR, towards low risk countries, thereby increasing their RFR

relative to a situation where there were no default risk differentials between member-states.[1] This implicit insurance is valued by financial markets, as is testified by the recent strong response of the interest spreads to ECB announcements. These responses are clearly the result of ECB policy choices. However, this is a real change in the risk profile of these bonds and should therefore not been offset by adjustments in the WACC.

Third, to the extent that QE has compressed interest rate differentials between member states of the Eurozone by reducing the risk of default in high risk countries as argued before, it has reduced the rates in countries with above average rates like Italy, but it has increased the rates in countries with below average rates like Germany and the Netherlands. If one presumes that the RFR should be corrected for this effect (which runs against the second argument), then the RFR for Germany and the Netherlands should be reduced rather than increased.

Is a negative RFR consistent with rational behaviour?

The Brattle Group argues that negative RFR's are inconsistent with rational behaviour. This is incorrect. Standard economic theory using the rationality assumption provides no a priori reason why the RFR should be positive, see the argument in Section 2. The RFR is the interest rate that clears the market for risk free claims on future consumption. For example, when there is a large demand for precautionary saving, the RFR might become negative. The current situation where large cohorts born before the fall in fertility around 1970 are saving massively for their retirement is another example. In both situations, the demand for stores of value for future consumption is larger than the supply. The large supply of capital implies that return to capital on the marginal investment project should be lower than before. This is just the law diminishing returns. The lower interest rate renders projects profitable that would otherwise be unfeasible.

The Brattle Group invokes the Ramsey/Euler equation, which relates the interest rate to the slope of the expected consumption profile, see Lucas (1977): a negative interest rate should coincide with a declining consumption profile. The strength of this relation depends on the elasticity of intertemporal substitution. The value of this elasticity is subject to substantial controversy in the economic literature. Direct measurement of the elasticity tends to find low values, e.g. Hall (1988), while the dynamics of equity prices can be most easily explained by assuming high value, e.g. Schorfheid et al. (2018). It is therefore hard to draw strong conclusions from the slope of the consumption profile. However, there is free market for assets paying the RFR, with players on both the long and the short side of the market. Whether one wants to borrow or lend risk free, the RFR is the price one has to pay. Most banks do charge negative rates to commercial customers and to consumers with deposits above a threshold.[2] There is therefore no reason to view the RFR as a non-rational phenomenon.

[1] The net effect of QE on the interest rate of Germany and the Netherlands remains negative since the overall reduction outweighs the compression brought about by the implicit insurance against sovereign default for countries with a higher risk profile.

[2] The Brattle Group invokes the proverbial mattress to argue that a negative RFR is irrational. This is exactly the ZLB problem discussed before. This bound is not exactly zero but roughly minus 1% since there are cost involved for owners to store their money physically in banknotes, such as saves and burglary insurance policy.

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