PAYING THE FULL WACC?

Impact of Brexit on the cost of capital

10 August 2016

Preliminary analysis

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1. INTRODUCTION

Regulators periodically set the maximum revenues which monopoly network companies are allowed to earn from customers. An important component of these revenue allowances is a fair return for equity investors; and revenues to cover the efficient cost of debt finance raised by the companies. Collectively, these allowances are known as the Weighted Average Cost of Capital (WACC).

As part of our wider series on the economic impact of Brexit, this paper seeks to evaluate the consequences of the UK referendum result for the cost of capital in regulated utilities in the UK. A forthcoming related bulletin will review the volume of EU funds (including EIB finance) channelled to the UK.

Although there are some differences in detailed methods, there is a broad consensus in respect of how to determine WACC for regulated infrastructure in the UK, amongst the relevant sector regulators (e.g. Ofgem, Ofwat, CAA and the Utility Regulator in Northern Ireland, as well as the CMA which decides on appeal cases in most of these sectors). In particular, there is reasonably well established precedent on how prevailing market data should be processed and should flow into decisions.

In the remainder of this paper we review the evidence that is emerging from capital markets on certain metrics relied on by UK regulators following the referendum. We then evaluate how this evidence may flow through into regulatory decisions, given existing UK practice and precedent. Lastly, we identify challenges for regulators and regulated companies, given what the emerging data may be telling us about the future suitability of existing methods.

We discuss the cost of equity and the cost of debt in turn, before drawing together conclusions on the challenges that may emerge for regulatory policy.

2. COST OF EQUITY

> A majority of business leaders think the vote for Brexit is bad for them, and as a result plans for investment and hiring are being put on hold or scaled back
>
> *Director General of the Institute of Directors*

The cost of equity represents the return that equity investors expect and require from investing in a business. It is reasonable to expect a higher return from a business with a higher level of risk.

The result of the referendum has brought significant uncertainty to the UK economy. There is material uncertainty over the trading arrangements that may eventually be established between the UK and the EU and elsewhere. Businesses must now decide how to act in the face of this uncertainty. Some businesses appear to be responding by putting some discretionary investment decisions on hold. A snap business reaction survey from the Institute of Directors found that over a third (36%) of IoD members say the outcome of the leave vote will cause them to cut investment in their business, and a quarter (24%) will put a freeze on recruitment.

It seems that many investors are interpreting this uncertainty over prospects for the UK economy as a new and material risk, and that this is causing them to raise their required rate of return. In other words, any investment hiatus could be interpreted as a signal that the required cost of equity for investors has increased following Brexit.

However, estimating the cost of equity in such uncertain times is by no means straightforward. Regulators need to identify the forward looking expected return an investor requires at the time of investing. But all we can observe in the data is outturn realised returns on equity shares traded in the market, calculated from share prices and dividend yields. The forward looking required return is entirely unobservable because it incorporates buying prices as well as expectations of future cashflows that the investor believes can be generated.

It is for this reason that the estimation of the cost of equity contains an element of uncertainty and, as a result, practitioners tend to employ various methods drawing evidence from a range of sources in order to build a reliable overall picture.

Among the regulators in the UK, it is relatively established that the estimation of the cost of equity is based on the capital asset pricing model (CAPM). This framework requires the estimation of three individual components:

- the return investors would demand on a “risk-free” investment, which is often proxied by the **yield on Government bonds**;

- the incremental return required for investing in more risky equities, known as the **equity risk premium (ERP)**; and
- an adjustment to reflect company-specific risks for investing in a regulated network business, known as the **beta**.

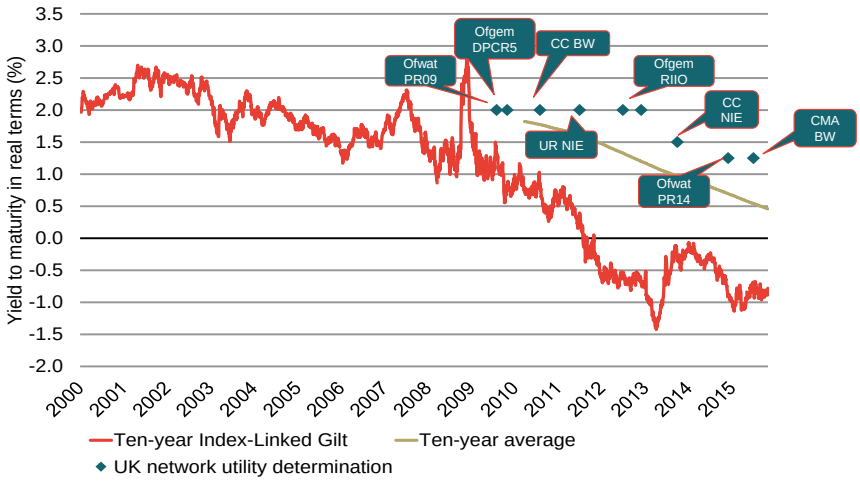
We examine these individually to see if there are any clear signs of a shift in the cost of equity.

Risk-free rate

The risk-free rate (RFR) represents the rate of return required by investors from risk-free assets. UK utility regulators have typically drawn evidence from the yield on UK government bonds (Gilts) to estimate the RFR. But regulators have not simply relied on market yields at the time their decision is made – usually, a longer-term methodology is preferred.

Exhibit 1 below shows the recent regulatory determinations in the UK compared to market evidence drawn from the yield on the ten-year inflation-linked Gilt.[1] The historical spot yield is shown, along with the trailing ten year average of that spot yield. We also show recent regulatory determinations in respect of RFR.

Exhibit 1. RFR – regulatory determinations versus market data



Source: Regulatory determinations

Note: BW – Bristol Water, NIE – Northern Ireland Electricity.

It can be seen that since the Global Financial Crisis (GFC) in 2008, regulatory determinations on the RFR have remained materially above the trailing ten-year average.

The Gilt yield is likely to be further affected by Brexit. Two factors may influence yields, namely:

[1] The majority of regulatory determinations on the WACC is in real terms, therefore the comparison of regulators' estimates of the RFR and an index-linked Gilt yield is appropriate.

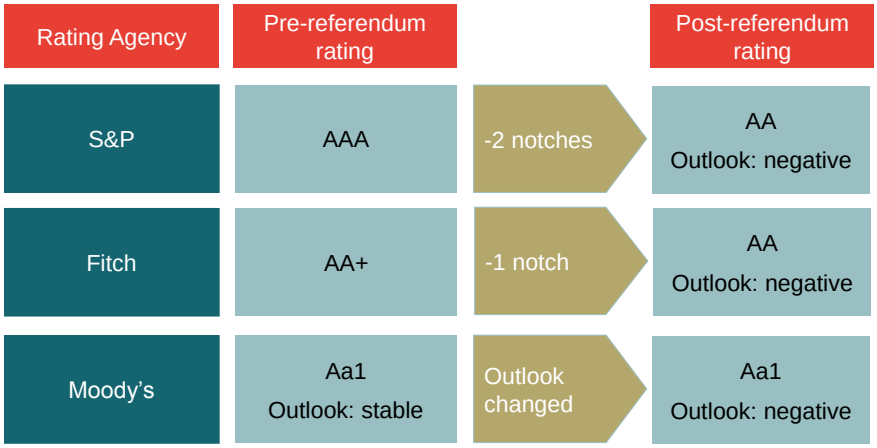
- Credit risk; and
- Capital market conditions – including central bank policy.

> The referendum result could lead to "a deterioration of the UK's economic performance, including its large financial services sector."
>
> *S&P Global Ratings*

Credit risk

Following the referendum result, two credit rating agencies downgraded UK Government debt and a third altered the UK outlook to 'negative' (Exhibit 2). This implies the UK government faces higher credit risk going forward.

Exhibit 2. Credit downgrade of UK gilt caused by Brexit



Source: Rating agency reports

Credit downgrades are usually associated with higher borrowing costs. However, other factors in the capital market may play a role which could offset the effect of increasing interest rates.

Capital market conditions

There are two phenomena that are often observed in capital markets at times of higher uncertainty:

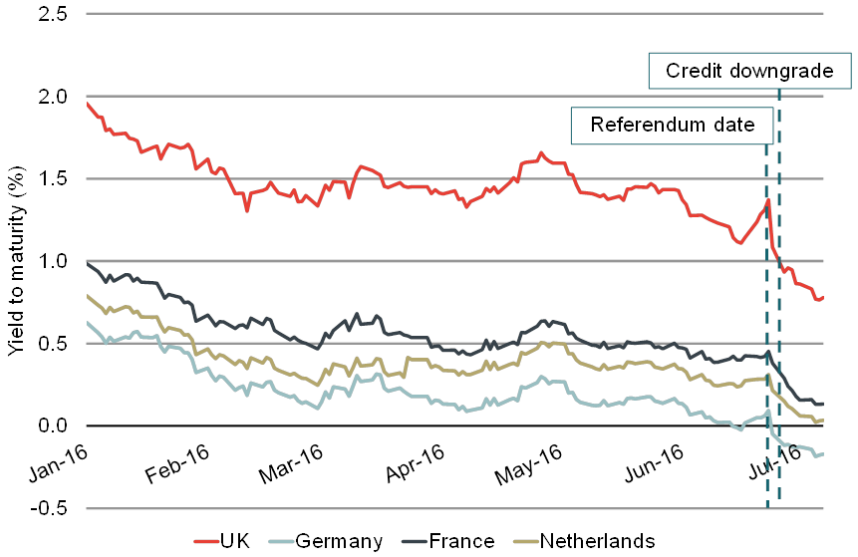
- **Flight to safety** – which refers to a large scale portfolio adjustment as investors move their money from more risky assets into less risky assets (for example from equity into fixed income; from speculative grade to investment grade; and from corporate to government bonds).
- **Quantitative easing** – which refers to the central bank's large scale buying of government bonds (and certain designated investment grade corporate bonds), in a bid to stimulate the economy by ensuring that effective lending rates are low. Furthermore, Bank of England has also decreased the base interest rate to 0.25% from 0.5%, last changed in 2009 following the credit crisis.

> As a backstop, and to support the functioning of markets, the Bank of England stands ready to provide more than £250bn of additional funds through its normal facilities.
>
> *Mark Carney, Bank of England governor*

Both of these market phenomena tend to reduce the yield on government bonds and therefore imply a reduction in the RFR.

Exhibit 3 illustrates recent development in the ten-year Gilt yield. The drop in yields at the time of the referendum result can be seen.

Exhibit 3. Yields on 10y safe-haven government bonds (nominal)



Source: Bloomberg

A similar, but smaller, drop in yields of government bonds in a few other countries can also be seen, for example in Germany, France and the Netherlands – which are also often considered safe havens.

Overall, these market phenomena may imply that the post-Brexit RFR is lower than expected before the Referendum. A crucial question is: how will this market development be taken into consideration by UK regulators in their upcoming price control reviews?

In the immediate future, regulators may maintain their overall methodology which has been based on a longer-term view of the RFR, as shown in Exhibit 1, leaving headroom above what the current market data would imply. Regulators may, however, choose to lower their RFR estimates if yields on sovereign bonds remain at current low levels for some time.

Equity risk premium

Like the overall cost of equity, the ERP is fundamentally a forward-looking concept. It is the incremental expected return investors require in future to invest in equities in general. Given higher uncertainty in the market, as described above, it is conceivable that the ERP can increase post-Brexit.

To estimate the ERP, practitioners could look at both forward-looking estimates and long-term historical averages. Most regulatory precedent in the UK puts more weight on the latter, since longer-term averages tend to be more stable over time and are less sensitive to the cut-off date of the estimation, compared to a forward-looking method which focuses on the latest developments in the market.

Furthermore, regulators in the UK pay particular attention to the total market return (TMR), which is the sum of the ERP and RFR. There is broad agreement among UK regulators that the TMR tends to be more stable over time than the two components, even though different regulators have come to different conclusions on the exact level of the TMR. Recent regulatory precedent points to a range for the TMR of 6.5% - 7.0% in real terms, with more recent decisions focusing on the lower end of that range.[2]

Historical average ERP

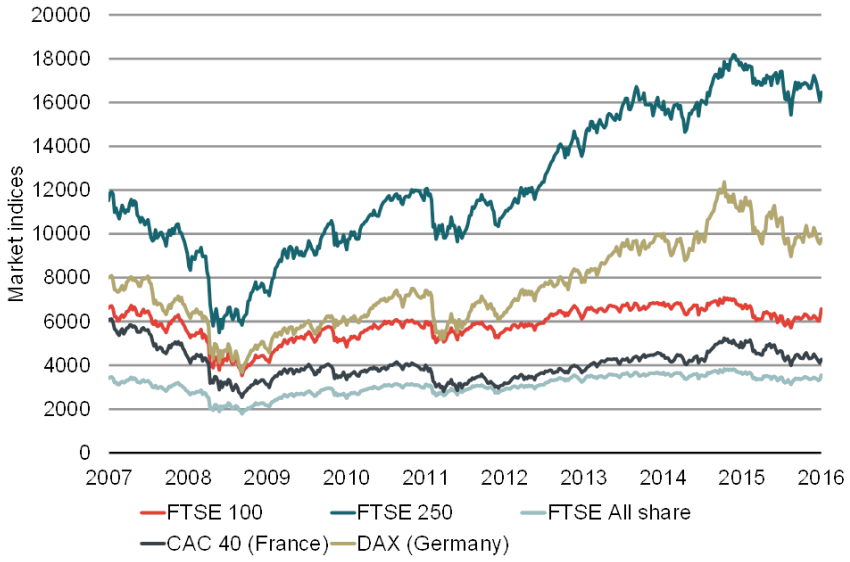
Data on the returns which have actually been achieved by investors in equity markets in the past can inform expectations of the forward-looking ERP.

Exhibit 4 shows various stock market indices in the UK during 2016 (we have also included France and Germany for comparison purposes). The stock markets experienced some minor downward movement immediately after the referendum result. However, shortly after the vote, some markets had already recovered the initial losses. The chart also shows that the effect of the Brexit vote on equity markets has been markedly less pronounced than the immediate effect of the GFC in 2008.

> Britain's top share index climbed to a 10-month high on Friday [1st July] and recorded its biggest weekly rise in 4-1/2 years, as hopes of fresh Bank of England stimulus lent momentum to a rebound from the slump that followed last week's Brexit vote.
>
> *Reuters*

[2] For example, the CMA set the TMR at 7% for Bristol Water in 2010 and at 6.5% for NIE in 2013 as well as Bristol Water at 2015; while Ofwat and the CAA set the TMR at 6.75% for PR14 and Q6 respectively.

Exhibit 4. European stock market indices, past 10 years



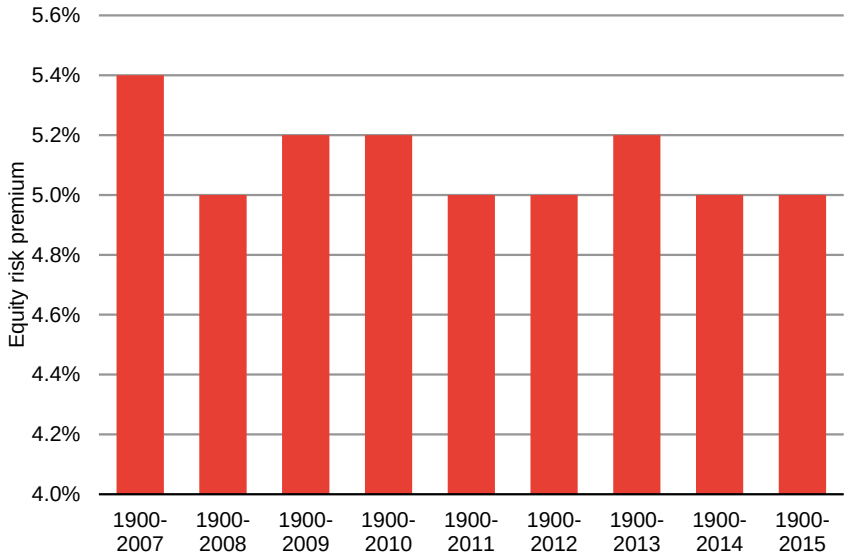
Source: Bloomberg

This evidence so far suggests that widespread media reports of a significant market downturn as a result of the referendum vote may have been overplayed.

In the medium-term, there could be more movement in these markets depending on the terms on which the UK exits the EU; whether or not the UK remains in the single market; and how its trading arrangements with the EU and elsewhere evolve more generally. There is at present little basis on which to speculate how this may affect investor perceptions of risk in the long run. But irrespective of whether the UK is ultimately left better or worse off following Brexit, investors will welcome clarity on trading arrangements and hence investment conditions as soon as policy makers are able to provide it.

For the purposes of setting WACC allowances for regulated utilities, many regulators draw evidence from historical averages of observed market returns over very long-term time horizons, often using the database developed by academics Dimson, Marsh and Staunton (DMS) and published by the Credit Suisse Global Investment Returns Sourcebook. Exhibit 5 below shows the historical evolution of the DMS estimate on the ERP over bonds in the UK.

Exhibit 5. DMS estimates of the ERP over bonds in the UK



Source: Credit Suisse Global Investment Returns Sourcebook

One interesting observation from this chart, combined with Exhibit 4, is that the most dramatic equity return movement was experienced in 2008, when approximately a third of the value of the FTSE wiped off. This coincided with a 0.4% drop in the long-term historic ERP for the UK (from 5.4% to 5.0%). Current market observations therefore do not suggest a material change in the DMS estimates in the near future.

How then may UK regulators develop their approach to determining RFR, ERP and TMR at forthcoming price controls?

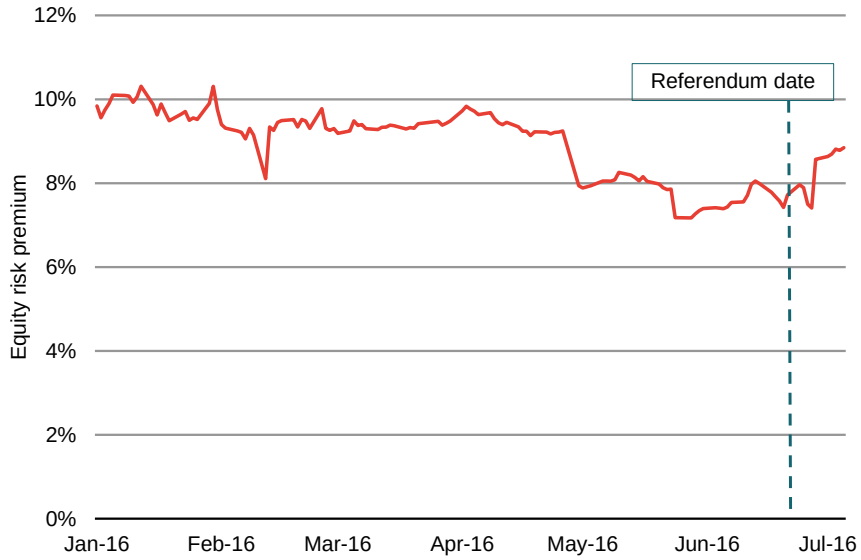
On the one hand, if a mechanistic approach is taken, the sum of a decreasing RFR and a more or less stable ERP (derived from long-term realised average equity return) would naturally lead to a lower estimate of the TMR.

On the other hand, intuition from the current condition in the capital market amid the uncertainty and investment hiatus would suggest a higher TMR for the riskier assets such as equity. Regulators may also decide that at present the evidence on the effect of Brexit is unclear or ambiguous, and hence could choose to retain their long standing estimates.

Forward-looking ERP estimates

Practitioners sometimes use Dividend Growth Models (DGMs) to evaluate the ERP on a forward-looking basis. Exhibit 6 shows the DGM forecasts of ERP provided by Bloomberg.

Exhibit 6. Forward looking ERP estimate based on DGM



Source: *Bloomberg*

Note: *The ERP is calculated from estimate of the total equity return, subtracting an underlying risk-free rate represented by the ten-year government Gilt spot yield.*

The estimated forward looking ERP has moderately increased post-Brexit, according to Bloomberg's analysis. A part of this increase will be caused by the decrease in the underlying RFR, as Bloomberg's method of estimating the ERP involve subtracting the ten-year government Gilt spot yield from the total equity return estimated using a DGM approach. However, this is unlikely to be the only contributing factor, since the decrease in the spot Gilt yield is around 0.5% while the increase in the ERP is more than 1%, post Brexit.

In any event, the overall size of the Post-Brexit movement in the ERP estimated by Bloomberg does not appear to have resulted in a level out of line of the recent history before the referendum. For example, the estimated ERP was higher in the beginning of the year when the equity market was suffering from worrying signs of economic slowdown from China as well as lower crude oil prices.

Beta

Beta represents the systematic risk of a stock – i.e. the risk to investors that cannot be diversified away (by holding a well-diversified portfolio such as the entire equity market).

UK regulators have adopted largely a similar method towards estimating the beta, although the time frame and precise methodology used for estimation differs slightly across regulators.

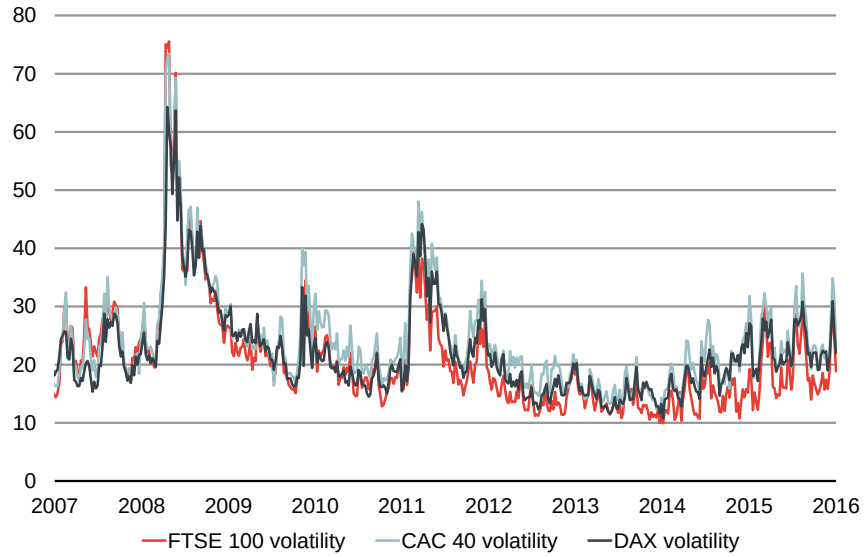
For example, Ofwat tends to rely on relatively short (two-year) windows of estimation reflecting the latest market evidence. The CMA typically considers a confidence interval which includes beta estimates going back ten years. And in its recent RIIO price

controls, Ofgem refrained from directly estimating beta altogether – choosing instead to retain its beta estimates from its previous price control in 2009 based on high-level relative risk assessments.

It is not clear how the underlying risk factors of regulated network operators will be affected by Brexit. Some sectors may be more exposed than others. For example, regulated airports may perceive higher risks in their future demand; while demand in the water sector is unlikely to be materially affected.

However, Brexit is almost certain to lead to greater market-wide volatility. Exhibit 7 shows the market volatility provided by Bloomberg, measured by volatility implied from option pricing.

Exhibit 7. European stock market volatility indices, past 10 years



Source: Bloomberg

This shows that Brexit has so far not caused spikes in market volatility as previous financial crises, but the current volatilities do appear to be settling down at levels more volatile than the years between 2012 and 2014.

Greater volatility in the market is likely to decrease the prevailing beta estimates of regulated utilities, all else being equal. This is because beta measures the correlation between the return on a given stock and the return on the total equity market, scaled by the relative volatility of the stock versus the market. Therefore, if market volatility increases, the measured beta on the relatively low risk assets (such as regulated utilities) will decrease.

Since most beta estimates made by UK regulators are based on more than one year of stock market data, the immediate impact of Brexit on direct beta estimates is likely to be modest. However, a regulated company facing a price control review in 2017-20 could expect to see lower beta estimates if higher volatility persists, and

a short time horizon is used for beta estimates which captures the period of higher market volatility.

Regulators will then need to consider how much to focus on these potentially lower estimates of beta at forthcoming price controls. Combining shorter-term lower beta estimates with long standing and stable estimates of ERP and falling estimated levels of RFR, regulators could conclude on a lower overall cost of equity, which might be at odds with wider evidence.

3. COST OF DEBT

While there is a degree of consensus on the methodology to estimate the cost of equity across UK regulators, the approach to establishing the allowed cost of debt is more varied.

- For GB energy networks, Ofgem updates its cost of debt allowance annually, based on a benchmark index of yields on comparable corporate bonds (namely the iBoxx index).
- For GB water companies, Ofwat sets a fixed allowance for a full price control period. To remunerate existing debt, Ofwat uses a benchmark based on actual debt costs across the water sector and corporate credit benchmarks. This is combined with a forecast of expected new debt costs (to cover any new debt that is issued during the period) using market expectations of movements in the RFR (i.e. the forward curve).
- In Northern Ireland, UR is currently developing its approach to the cost of debt for the gas networks, and has initially proposed a "sharing rule" under which a projected debt allowance is established, but customers and the companies would share the difference between actual debt costs and the projected level.
- In recent price control appeal cases, the CMA has generally adopted an approach which seeks to match the specific companies' actual debt costs as closely as possible, based on a weighted average of existing and new debt costs.

The data that is usually used to inform debt allowances is expressed in nominal terms. However, GB regulators set a real cost of capital allowance – and therefore must incorporate an inflation forecast to convert from a nominal to a real cost of debt allowance.

Below we discuss in turn nominal debt and inflation expectations, and assess the consequences for regulatory policy given emerging data trends following the referendum.

Nominal cost of debt

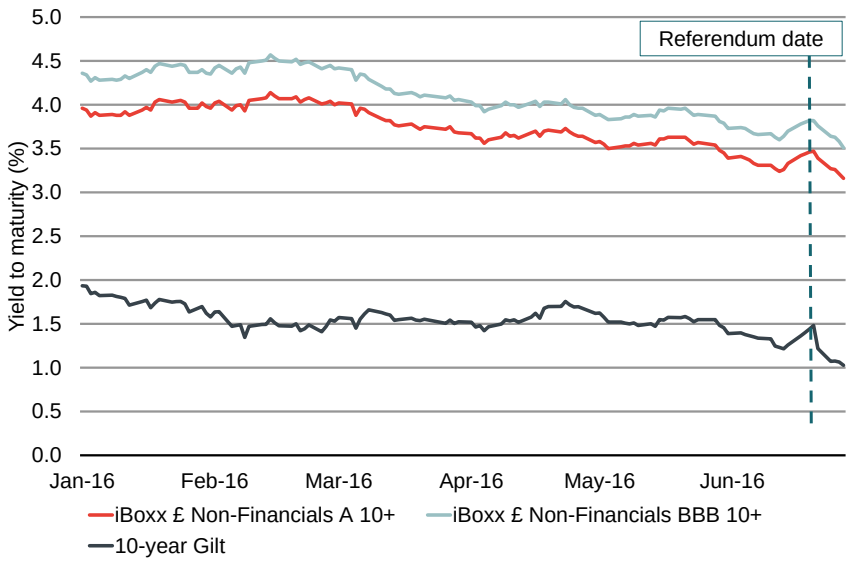
In principle the nominal cost of debt is a combination of the risk-free rate (discussed in Section 2 above) and a premium above this risk-free level, referred to as the credit spread. The credit spread reflects the perceived incremental risk to investors of lending to the company, which will therefore determine the cost to the company of issuing bonds or other forms of debt.

In circumstances where markets are characterised by a 'flight to safety', investors are likely to prefer debt products to equity. Further, within a debt portfolio investors may prefer sovereign debts to corporate debts; and they may prefer high quality corporate debts to lower quality corporate debts. In other words, changes in risk preferences (which can be triggered by events like Brexit) can be expected to lead to higher demand for lower risk assets, and vice versa.

We have already shown above one consequence of this – namely that sovereign yields have fallen. Below we examine market data on credit spreads, to see whether there is evidence that borrowing overall has become cheaper or more expensive for companies following the Brexit vote.

Exhibit 8 shows the yields on A-rated and BBB-rated corporate bond indices, which are often used by UK regulators to estimate the debt spread.

Exhibit 8. Corporate bond yield indices and spread during 2016



Source: Markit iBoxx, Bank of England

Following the referendum, investment-grade corporate bonds have experienced decreasing yields similar to that of Gilts – hence the credit spread for bonds of this rating has remained broadly stable. This may be an indication that investors continue to consider investment grade corporate bonds as reasonable alternatives to safe-haven government bonds, and that they perceive no increase in risk, relative to sovereign bonds, following the Brexit vote.

If this trend continues, it would seem that the current low cost environment in the investment grade debt market, where the majority of regulated utilities raise financing, is likely to prevail for the short to medium term. The implication is that the actual cost of debt faced by regulated companies is likely to have fallen. These

companies will now be more able to access lower cost debt than previously anticipated, resulting in potential financial out-performance.

The consequence of this for regulatory policy, however, is unclear in the context of a market environment where the overall cost of debt may exhibit volatility relative to longer term trends. For example, if regulators which are about to set fixed long-term allowances for the cost of debt place too much weight on the more recent market evidence, this could risk locking in an insufficient level of debt allowance which would put companies in financial difficulty should the debt market conditions tighten during the regulatory period.

Another issue facing the water sector in particular is the access to European Investment Bank (EIB) loans. It is not clear whether UK water companies can continue to benefit from access to new EIB loans as the EIB typically lends exclusively to EU member states. Our forthcoming bulletin on the volume of EU funds (including EIB finance) channelled to the UK will address this in more detail.

Arguably, the recent market movements and current uncertainty over the future may strengthen the case for indexation of allowances (in line with Ofgem), or some other mechanism which allows customers and companies to share the risk of market movements.

Timing considerations are also important – both in terms of when regulatory decisions are made; and any timing constraints surrounding companies' re-financing activity. If debt allowances are set using a benchmark and annually indexed, greater market volatility can lead to larger variances between companies depending on ***when*** they finance themselves. In other words, a yardstick approach may result in material winners and losers.

Expected inflation

As noted above, UK regulators also factor in inflation expectations to allowed debt costs, to convert from nominal data to a real cost of debt allowance. Again there is variation across sectors in how this is approached.

- Ofgem uses so-called "break-even inflation" to adjust the nominal iBoxx data on a daily basis, with the results applied annually on a rolling basis. This is an implied estimate of investors' expectations of inflation, derived from the difference between yields on nominal gilts and index-linked gilts.
- Ofwat considered a range of sources at the last review and came to an overall judgement of a long-term inflation expectation.

- The CMA in recent appeal cases has used inflation projections provided by the Office of Budget Responsibility (OBR) which are usually published twice a year alongside the Budget and Autumn Statement.

Following the referendum, inflation forecasts are highly uncertain.

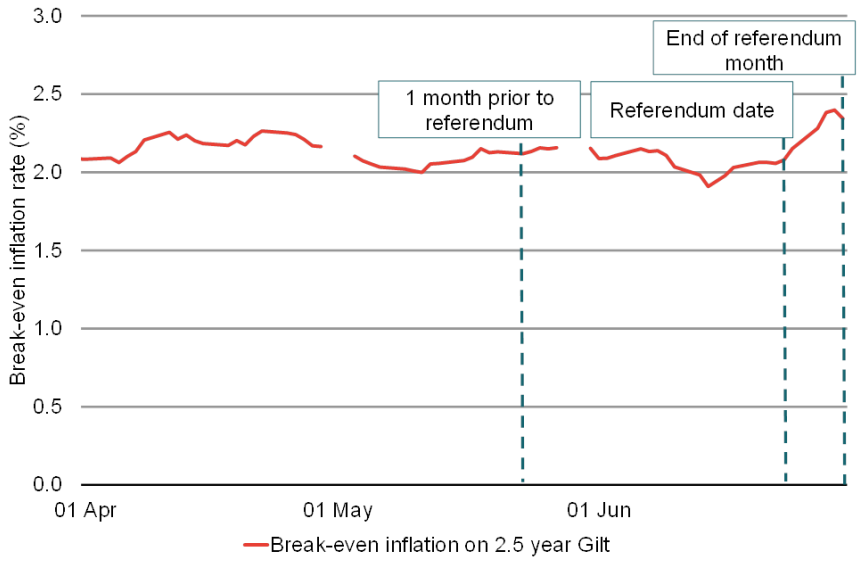
The latest OBR forecasts (published in March) are now out of date as they were made prior to a significant change in the UK's economic circumstances. The next round of OBR forecast will be published alongside the chancellor's Autumn Statement. As mentioned in Frontier's main Brexit bulletin written by our chairman Gus O'Donnell, even though the Autumn Statement is unlikely to be branded as an "emergency Budget", this will not be an easy task for the new chancellor. It is therefore very uncertain what the next inflation forecast is likely to be from the OBR.

With the falling value of GBP, most observers expect general inflation in the economy in the short term to increase due to imports becoming more expensive owing to the fall in the value of the pound against in particular the United States Dollar and the Euro. However, in the medium term, this could be offset by weak domestic demand due to a lack of consumer confidence.

Exhibit 1 below shows the inflation expectations in the period around the referendum, measured by the break-even inflation.

> Imports account for 32% of the UK GDP between 2010 and 2014.
>
> *Office for National Statistics, Jan 2016.*

Exhibit 9. UK break-even inflation, based on 2.5-year Gilt

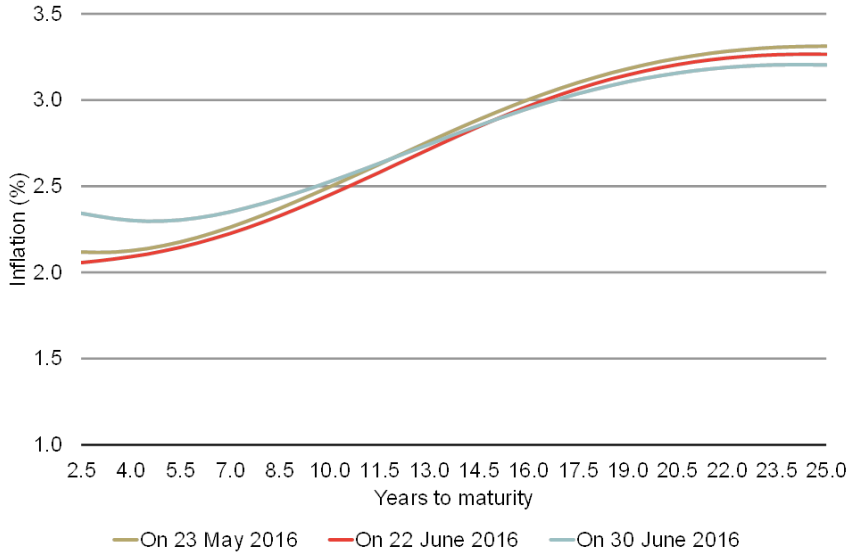


Source: Bank of England

The chart shows a marked increase in the implied break-even inflation immediately following the referendum, based on Gilts with 2.5 years' maturity. The interpretation is that the market-implied inflation expectation for the next 2.5 years has increased by some 20-30 basis points since the referendum.

Exhibit 10 below shows the longer term expectations, and compares break-evens immediately before and a few days after the referendum.

Exhibit 10. UK implied inflation spot curves, pre- and post-referendum



Source: Bank of England

It can be seen that the break-even inflation implied by all maturities of the Gilt have stayed relatively stable during the month prior to the referendum, but the shorter-term maturities increased materially after the referendum. The chart also shows that there has not been a material increase in longer term inflation expectations.

The overall effect of higher inflation in the short to medium term on regulated businesses could be positive or negative.

In the short term, companies which have recently had price controls set in real terms could see an improvement in their financial position, if inflation is higher than was expected when the price control was finalised. This is because the regulated asset base is indexed to RPI – i.e. its value increases with inflation - leading to higher allowed returns, while some companies' financing costs (such as nominal debt costs) would stay constant.

On the other hand, with higher inflation assumptions, the estimated real cost of companies' existing fixed-coupon nominal debt would decrease. If regulators factor this into the estimation of the WACC at upcoming price controls, this would lead to lower allowed returns. This would be to the benefit of customers.

However, the impact of Brexit on inflation is uncertain. Arguably, the market-implied inflation expectations shown above could be distorted by investors placing a premium on protection from

inflation risk, which would lead to an overstatement of the underlying inflation expectations.

Overall, it will therefore be important that regulators exercise good judgement in setting longer-term price controls, acknowledging the context of uncertainty surrounding short-term market evidence.

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4. CONCLUDING REMARKS

In the near term, the following features of the post-Brexit economy can potentially affect the WACC:

- The recently announced further round of Quantitative Easing and a 'flight-to-safety' phenomenon by institutional investors may lead to lower yield on Government bonds and corporate bonds with strong credit ratings;
- Emerging evidence (e.g. the widely reported investment hiatus that many companies have adopted, higher volatility in the equity market) may imply higher equity risk premium;
- Higher volatility in the equity market may also lead to greater uncertainty in measuring the cost of equity, and may lower estimates of the equity beta;
- On the debt side, falling yields on Government bonds have been matched by falls in A- and BBB- rated bond indices, suggesting that Brexit could lead to cheaper debt for utilities, whilst UK water companies may be concerned about their continued access to EIB loans; and
- A weaker GB pound may put inflationary pressure on the economy in the short term (although this might be offset by weak domestic demand as GDP growth slows down).

The net effect of all these movements on the final WACC is uncertain. If regulators react rapidly to emerging data or emphasise different pieces of evidence, this may lead to a wider distribution of WACC outcomes across the different infrastructure sectors, relative to the norms established pre-Brexit. Such an outcome may send unwelcome signals to investors at a time when transparency and clarity would be highly valued.

The longer-term economic effects will depend on the form of trading and economic relationship that the UK negotiates with the EU and the rest of the world. Over the next few years the uncertainty over the outcome and timing of this process may contribute to further financial market volatility.

Regulators will need to be careful in interpreting market data and making consistent estimates which are appropriate for price controls which span several years. If the WACC is genuinely lower as a result of Brexit, this will generally be good news for customers if regulators can translate this into lower bills. But setting the allowed return too low off the back of market evidence that may

prove to be ephemeral will deter much-needed investment, particularly in times of greater market volatility and economic uncertainty.

Mechanistic estimates based on short-term market data are therefore likely to be more risky for regulators. Some degree of judgement should be exercised; and regulators may want to consider options such as re-openers or indexing methods, to manage the risk of extreme outcomes within regulatory periods.

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