Consultation and Proposed Decision on Estimating the Cost of Capital

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Glossary

APT	Arbitrage Pricing Theory
CAPM	Capital Asset Pricing Model
ERP	Equity Risk Premium
IRG	Independent Regulators' Group
RFR	Risk Free Rate
MCA	Malta Communications Authority
MGS	Malta Government Stock
NRAs	National Regulatory Authorities
SMP	Significant Market Power
WACC	Weighted Average Cost of Capital

1 Background

1.1 Introduction

In December 2006, the Malta Communications Authority (hereafter "the Authority" or "MCA") published a Consultation and Proposed Decision on Estimating the cost of capital (hereafter "the Proposed Decision"). This Proposed Decision addressed the theoretical background for estimating the cost of capital and asked for the views of respondents on a number of specific aspects related to the MCA's proposed methodology and approach in estimating the weighted average cost of capital (hereafter "WACC").

The consultation period for the aforementioned Proposed Decision ended on 9 February 2007. In, April 2008 the Malta Communications Authority published a decision and further consultation on Estimating the Cost of Capital[1] (hereafter 'Decision and Further Consultation'). Subsequently in August 2008, the MCA also issued a Report on Consultation and Decision[2] (hereafter 'Final Decision') with the aim of specifying the methodology to be followed by each Significant Market Power ('SMP') Operator in compiling their respective WACC rates. In the Final Decision, the MCA mandated that the resulting WACC rates, stemming from the Further Consultation, should be applied for regulatory accounting periods ending on or after 31 December 2007.

The MCA had also stated that going forward, it will request operators with SMP status to submit revised WACC rates on an annual basis following the approach outlined in the Decision and Further Consultation of April 2008 and the Final Decision published in August 2008.

It is not the intention of this Consultation Document to re-visit again the theoretical background for estimating the cost of capital. Rather, the objective is that given the significance and persistence of the current financial turmoil, the MCA deems it prudent and timely to analyse the potential impact this and other developments could have on the fixed and mobile cost of capital. In this regard, the MCA is consulting on the possibility of the potential impact of the financial turmoil on the individual variables making up the cost of capital and to investigate whether an adjustment (if any) to the original estimates would be an appropriate course of action.

1.2 Structure of the Document

For ease of reference, the following is an overview of the structure of this document:

Section 2 explains those aspects of the WACC calculation which will not be consulted upon in view of the extensiveness dealt with during the 2008 Consultation process on same;

Section 3 provides an overview of the approach adopted in determining the different variables making up the WACC calculation;

Section 4 and 5 explore the methods used to arrive at an estimate for each of the components making up the Cost of Equity and the Cost of Debt respectively. These sections first take a look at the theoretical background of the variable in question, followed by a summary of the stance taken by the MCA in its 2008 review. The various methods available in determining the variable under review are then explored, followed by the MCA's proposed estimate;

Section 6 shows the proposed WACC rates that the MCA is proposing, based on the estimates determined in Sections 4 and 5;

Section 7 sets out the proposed way forward by the MCA with respect to the future revisions to the WACC calculation;

Section 8 contains the Consultation Framework wherein the MCA is inviting comments from interested parties on this Consultation and Proposed Decision;

Section 9 includes all the references cited throughout the document and

Section 10 includes the bibliography.

2 The Weighted Average Cost of Capital

2.1 Aspects which will not be re-visited

The Proposed Decision, Further Consultation, and Decision that were issued by the Authority during 2006 and 2008 featured various literature and international studies undertaken on the determining the Cost of Capital. These documents explored the various theories and studies and had put forward to consultation the recommended approach in determining this important calculation. Hence it is not the intention of this Proposed Decision to re-visit and / or challenge the fundamental aspects of this calculation, but rather this Proposed Decision is taking as *de facto* certain conclusions derived from these documents and is focusing on those parameters which are receptive to change over time as opposed to other aspects which form the basic fundamentals of the calculation per se. The MCA shall take "as is" the following decisions hereunder.

2.1.1 *Use of the Capital Asset Pricing Model ('CAPM')*

There are a number of models that can be used to estimate the cost of equity amongst which are the Capital Asset Pricing Model ("CAPM"), the Arbitrage Pricing Theory ("APT") and the Fama and French Three Factor Model. Each of these models share the common views that all investors hold a well diversified portfolio and that an investment is risk free only when there is certainty that the actual return will be equal to the expected return.

Despite its shortcomings, the CAPM remains the most appropriate and widely adopted model to estimate the cost of equity. This view is supported by an independent study carried out on behalf of Ofcom) and the UK economic regulators[3]. The report's conclusion regarding the appropriateness of the various models is reproduced below:

"*In summary: the empirical shortcomings of the CAPM are known. Alternative models to address this issue have their own shortcomings – weak theoretical foundations and empirical challenges. In our view there is at present no one clear successor to the CAPM for practical cost of capital estimation. We do however feel that alternative models provide helpful insights into the points of vulnerability of the CAPM, and may also provide information on the robustness of the CAPM beta.*"
[3]

This view is also supported by the Independent Regulators' Group ("IRG") which "observes that there are empirical shortcomings in the CAPM methodology. On the other hand, alternative models also have their own problems such as weak empirical foundations and empirical challenges. Therefore, at the moment CAPM is widely used for the purpose of calculating cost of capital." [4]

In the light of the above and the continued widespread use of the CAPM by other regulators and competition authorities the MCA remains of the view that the CAPM is the most appropriate asset pricing model.

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2.1.2 A range of WACC estimates

The WACC calculation is dependent on a number of estimations made for the key variables forming the cost of equity and the cost of debt. Very often it is not possible to award these key variables a single value, but a range of values dependant on the different assumptions made. Therefore, in practice it is very difficult to identify a single WACC estimate.

Based on the above, in its Decisions the MCA had stated that the WACC used for regulatory purposes should be based on a defined range of parameters for the key variables. The range of estimates is a reflection of the uncertainty surrounding the estimation of the key parameters, which are going to be discussed in greater detail in the rest of this document. The WACC used for regulatory purposes would be established as an average of the possible outcomes.

2.1.3 Price base (nominal versus real WACC)

A common consideration in WACC estimates is whether the rate of return should be expressed in real or nominal terms. A nominal WACC is one which does not take into account movements in inflation rates and is calculated in current terms, whereas a real WACC is expressed in constant terms.

So far the MCA has mandated that the WACC be expressed in nominal terms and nothing has come to the attention of the Authority which causes a need to depart from this approach.

2.1.4 Taxation

WACC may be estimated on either a pre- or post-tax basis. When applied to the capital base the pre-tax WACC indicates the pre–tax operating profit required to finance tax and interest payments, while providing shareholders with their required return.

The typical approach would be to compute the WACC on a pre-tax basis. The logic behind this is that tax liabilities are highly dependent on factors outside of normal operations, such as fixed asset base and tax planning skills. However, in practice, market information may only be available post-tax, meaning that WACC would be estimated on a post-tax basis and then converted into the pre-tax using the following formula:

$$\text{Pre-tax WACC} = \text{Post-tax WACC} / (1-T)$$

where T is the effective tax rate.

To estimate a pre-tax WACC rate a single tax rate must be estimated. In practice it is difficult to estimate a single effective tax rate, reflecting a company's taxation liability, as the taxation charge will inevitably vary from year to year. Furthermore, forward looking costs do not depend on the tax rate for previous years, but on the corporate tax rate that can be expected in a forward-looking perspective.

Given the uncertainty and difficulty of making such a projection, the MCA proposed the pragmatic solution of using the current corporate tax rate in Malta of 35% as a proxy for the effective tax rate. Although the MCA is aware that this is a conceptual assumption, the use of the corporate tax rate eliminates any uncertainty (based on more judgemental assumptions) that would otherwise be introduced by attempting to estimate the effective rate.

Should the corporate tax rate change in the future, then the MCA shall direct operators to reflect the revised rate when calculating WACC. This approach should ensure consistency in treatment amongst the operators, and is in line with the approach used by a number of other regulators.

3 Outline of the Approach Adopted to Determine the Different Variables Making up the WACC Calculation

The cost of capital calculation is a measure of the rate of return that a company is required to generate from its investments in order to raise money in the capital markets. The variables making up the cost of capital calculation using the CAPM methodology comprise the following:

- The risk free rate ("RFR") is the expected return on an asset which theoretically bears no risk of default and that bears no reinvestment risk ;

- Equity Risk Premium ("ERP") represents the additional expected return that an investor demands for investing in equities rather than in a risk-free investment;

- Equity/asset beta represents the relative risk of a particular company's shares being considered in relation to that of the stock market as a whole. It is measured as the volatility of that stock relative to the overall market volatility;

- Debt premium represents the premium required by debt owners to compensate for the risk of default; and

- Gearing corresponds to the weight of debt capital as a proportion of total invested capital.

It is important to note that except for Beta and gearing variables, all other components are treated in common for both the mobile and the fixed market.

The MCA is proposing to adopt the following high-level approach for each component reviewed as shown hereunder.

3.1 Risk Free Rate

The main consultation issue with this important parameter is to assess and determine whether, in spite of the financial turmoil currently underway, other NRAs and the capital markets in general are still considering government stocks as risk free and whether there are specific adjustments and/or alternative methods and/or reference rates that may be used to calculate this variable.

To address the above issue, the MCA used two approaches, namely a best practice approach (reference to papers issued by other NRAs such as Ofcom, ComReg, and AGCOM) and a comparative approach. For the comparative approach the MCA has undertaken a comparative analysis of yields recorded on 5 and 10 year Malta Government Stocks to those recorded on German Government Bonds over the last five years.

3.2 Equity Risk Premium

For the Equity Risk Premium, whilst due consideration to the methodologies adopted by other NRAs and survey-based evidence was given, its review was predominantly based on widely recognised international studies carried out by Dimson, Marsh and Staunton and those undertaken by Damodaran.

3.3 Asset beta

With respect to the equity/asset beta, in its 2008 Review the MCA had explored the possibility of computing this value for the fixed network by reference to GO's stock price relative to the overall market. In this respect, the MCA had clarified that calculating this important variable in this manner (i.e. using daily and weekly data over a 2 year period and using the domestic market as the market index) caution needs to be exercised in interpreting any results there from. In fact, the MCA had explicitly requested that results should be compared with betas of comparable companies and those used by other NRAs (as adjusted to take into account the effect of financial leverage and tax rates) to assess the reasonableness of the estimates, and to adjust estimates where necessary. As an alternative, and even for the mobile market, the beta estimate was arrived at by reference to betas of international companies operating in the electronic communications sector as adjusted to take into account the effect of financial leverage and tax rates.

Two approaches are now being proposed by the Authority to estimate Asset Beta. The first method is determined by reference to international companies operating in the telecommunications industry. Data has been collated from the following companies:

- BT Group PLC;
- Deutsche Telekom AG;
- France Telecom;
- Telefonica S.A.;
- Portugal Telecom SGPS;
- Swisscom AG;
- Tele2 AB;
- Koninklijke KPN N.V.;
- Magyar Telekom Telecommunications PLC;
- Telekomunikacja Polska S.A.;
- Telecom Italia; and
- Vodafone Group PLC.

The second method is based on values used by others NRAs. Data was collated from various NRAs, including but not limited to:

- Italy;
- Ireland;
- France;
- Portugal;
- UK;
- Belgium;
- Spain;
- Norway;
- Netherlands;

- Denmark;
- Sweden.

In analysing the conclusions arrived at by the above NRAs, the MCA has looked at the methodology adopted by AGCOM, Ofcom and ComReg.

In comparing the results of the above two methods, one expects that the results between the two approaches should to some extent converge if one assumes that the values as determined by the various NRAs are derived from stock exchange data of the respective telecommunication companies they regulate. Difference in results may be due to the time period over which data is taken into account as well as possible technical differences in its computation.

3.4 Debt Premium and Optimal Gearing

The MCA used two approaches to estimate the debt premium.

1. The first approach is based on the spread between Electronic Communications industry bonds and German Government bonds using Bloomberg's data

2. A comparative analysis of the approaches used by other NRAs in determining the applicable debt premium is also undertaken.

The optimal gearing is determined by reference to the levels of gearing applied by other NRAs in comparison with the gearing levels registered by international comparable companies operating in the telecommunications industry as listed in section 3.3.

4 Detailed treatment on the estimation of the parameters making up the Cost of Equity

This section contains a detailed treatment of the methodologies presented in Section 3 above for the Cost of Equity components, namely the risk free rate, the Beta coefficient and the equity risk premium. For each of these components this section presents the issues taken into account by the MCA followed by the Authority's proposed estimates.

4.1 Estimating the risk free rate

4.1.1 Background

The risk free rate is the expected return on an asset which bears no risk at all. For an investment to be truly risk free the risk of default needs to be zero and there must be no reinvestment risk (the actual return and the expected return are equal at maturity).

In practice it is difficult to find an investment that is entirely risk-free, since some form of reinvestment risk tends to exist. However, freely traded government bonds can generally be regarded as having close to zero risk of default and liquidity. In nominal terms the yield to maturity on such bonds, which takes into account future expectations of inflation and any differences between the coupon rate of interest and the prevailing market rates, is typically regarded as a proxy for the risk free rate.

In order to estimate an appropriate risk free rate of return the following factors need to be considered:

• Maturity period of the government bonds;

• Use of nominal versus real returns on government bonds;

• Historic versus current yields.

4.1.1.1 The MCA's Stance in the 2008 Decision

The initial view expressed by the MCA in 2008 was that the risk free rate should be established by reference to current yields on Malta Government Bonds with maturity ranging between 5 and 10 years. At the time of consultation the average yield to maturity on five year Malta Government Stocks ("MGS") maturing in 2011 ranged between 3.96% and 3.99% with a simple average of 3.975%. The average yield to maturity on 10 year MGSs maturing in 2016 ranged between 4.21% and 4.24% with a simple average of 4.225%. Based on the above, the MCA considered a range between 3.9% and 4.2% to be an appropriate nominal risk-free rate for calculating the WACC.

Whilst both respondents were in agreement with the use of the yield to maturity on Malta Government Bonds as a proxy for the risk-free rate, both respondents noted that yields to maturity are not static and influenced by the country's monetary policy and by movements in the market interest rates. It was therefore argued that it may be more appropriate to establish the methodology on which such a rate can be estimated rather than setting a pre-defined range.

The MCA had accepted the respondents' views that the yields are not static and at the time had decided to propose the approach to be used by the operators in estimating the risk free rate, rather than setting a pre-defined range.

In addition, the MCA had retained its view that a range of maturities between 5 and 10 years for Malta Government Bonds is the appropriate period to be used in estimating the risk free rate for calculating the regulatory WACC.

The Authority had directed that the risk free rate should be established by reference to the current yield to maturity on Malta Government bonds with maturity ranging between 5 and 10 years, with a mid-point of these estimates as a proxy for the risk free rate for Malta.

4.1.2 Proposed Methodology for the Risk Free Rate

4.1.2.1 Conclusions from other NRAs

From our analysis carried out on papers issued by other NRAs (as per appendix III), it transpires that common approaches adopted across NRAs include that:

- all consider government bonds as risk free assets;

- all take into account bonds maturing in 10 years and some also take into account 5 year bonds;

- some NRAs were prudent not to rely on the very low points registered.

4.1.2.2 Reference to Malta Government Stocks

In order to arrive at a range that would be an appropriate nominal risk-free rate for calculating the WACC, as in its previous decision, the MCA has considered data of 5 to 10 year Malta Government Stocks ("MGS") covering a period from January 2010 to June 2012.

The following graph depicts the movement in yields over the period reviewed.

Graph 1 Movement in yields on 5 year and 10 year MGSs
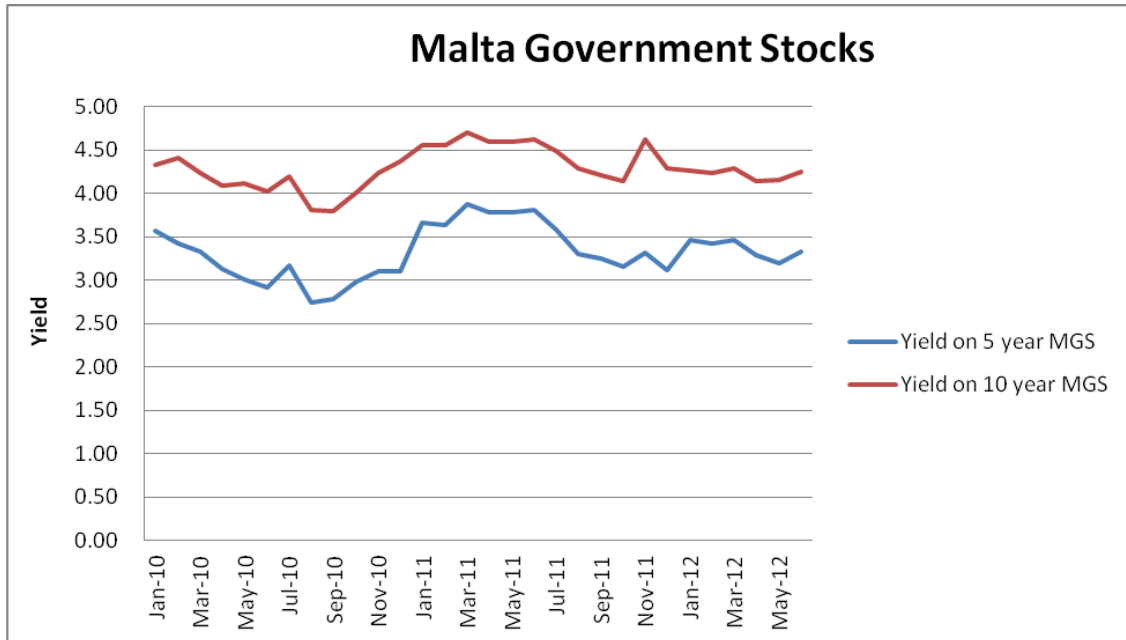
The average yield to maturity on MGS ranges between 3.25% and 4.23% on five year MGS and ten year MGS respectively.

4.1.2.3 Corroboration by reference to German Government Bonds

One may challenge the use of data from the local market on grounds of lack of depth and liquidity. Accordingly, the MCA has also looked at assets of a foreign market as an alternative method. IRG[4] allows the adoption of other country's government bonds to be used as a proxy for the risk free rate in similar circumstances.

In fact, both Luxembourg and Ireland do not place sole reliance on their local Government Bonds in setting the risk-free rate. Whereas Luxembourg[5] refers to average yield of Eurozone Government Bonds, the Irish regulator[6] considered both the Irish as well as the German Government Bonds in establishing its risk-free rate.

Many analysts select the German Government Bond yield as a reasonable proxy for the risk-free rate. However, during times of extreme economic distress, yields on German Government Bonds may be artificially low due to a "flight to quality", or other factors.

The Graph below sets out the nominal yield on 5 year and 10 year German Government Bonds which are the conventional proxies used to estimate risk-free rates (RFR) in Europe.

Graph 2 Yields on 5 and 10 year German Government bond for the last 5 years
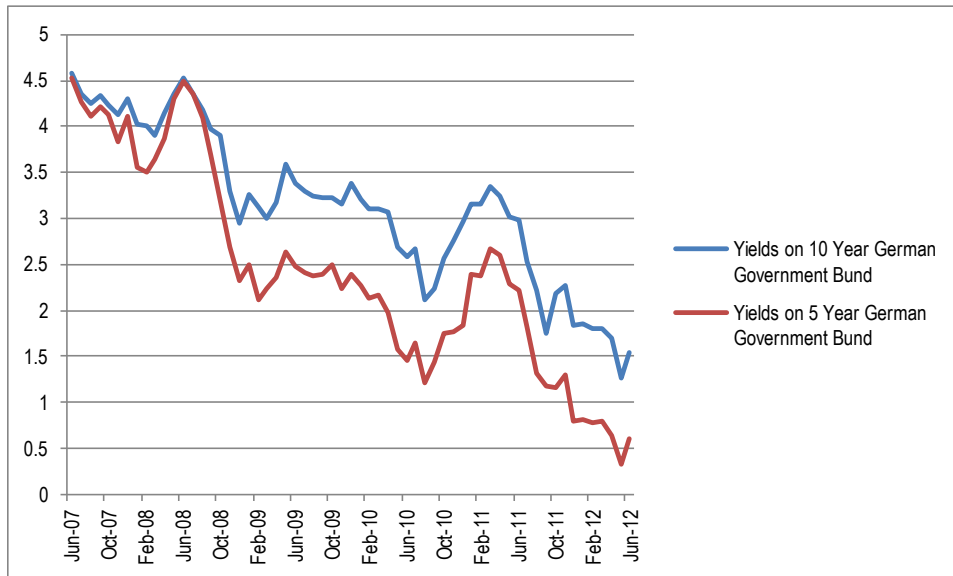
Graph 2 above illustrates that nominal yields have decreased sharply as from the second half of 2011. There is reason to consider that these yields may be artificially "depressed" and the decrease does not only reflect changes in the underlying real rate of interest and inflation expectations.

Times of turmoil such as the present times support the adoption of an 18-month historic average. In the case of the 5 year German Government Bond this would amount to 1.76%, whilst on the 10 year bond it would represent 2.61%.

The German Government Bond yield should be supplemented by a Country Risk Premium in order to be used as a proxy to the risk free rate applicable in Malta. This approach is widely recognised as an appropriate estimate of the default spread over a default free government bond rate.

Damodaran[7] has in January 2012 estimated Malta's country risk premium at 1.5% which at the time of the study Malta's rating was of A2. However in February 2012, Moody has downgraded Malta's sovereign debt ratings from A2 to A3 which translates to 1.73% in Damodaran's calculation. In order to arrive at this estimate rate of 1.73%[1], Damodaran multiplies Malta's default spread, which according to Moody's latest rating would correspond to Damodaran's calculation of 115 basis points, by the equity market volatility for emerging markets of 1.5 (This is factor represents the higher volatility, in this case 50%, in equity markets when compared to bond markets).

This risk free rate alternative calculation would indicate a rate in the range of 3.5% to 4.3%.

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[1] 115 basis points / 100 basis points x 1.5 equity market volatility for emerging markets

4.1.3 MCA's Proposed Decision on the Risk Free Rate

The analysis contained in sections 4.1.2.2 and 4.1.2.3 above, have resulted in a similar range for the risk free rate as clearly shown in Table 1 hereunder:

Table 1 Comparison between MGSs and German Goverment Bonds

	Yields on 5 year Bonds	Yields on 10 year Bonds
Malta Government Stocks	3.25%	4.23%
German Government Bond adjusted for country risk premium for Malta	3.5%	4.3%

Based on the above and also in view of the results obtained through the use of alternative assets traded in a foreign market, the MCA considers a range between 3.3% and 4.3% to currently be an appropriate nominal risk-free rate for calculating the WACC rate.

Proposed Decision 1: Do respondents agree with the methodology being proposed in arriving at the risk free rate?

Proposed Decision 2: Do respondents agree that a nominal risk free rate ranging between 3.3% and 4.3% is appropriate for calculating the WACC?

4.2 Estimating the Equity Risk Premium

4.2.1 Background

The Equity Risk Premium ("ERP") represents the additional rate of return that investors will require for investing in equity rather than risk-free investments.

Historical market data shows that returns on different classes of assets vary in practice, with riskier assets earning higher than average returns.

Hence, the ERP is an expected return whose value depends on the perceived risk associated with the equity market and the level of investors' risk aversion. There is considerable debate over the size of this premium and the appropriate method of calculating the ERP.

In practice there are a number of different approaches which can be used to estimate the ERP and there is limited consensus on the most appropriate approach to adopt.

The key issues related to the ERP estimation include:

- Whether to use a historic or prospective approach,

- Whether to use the arithmetic or geometric mean, and

- The time period to use to compute the estimate.

This section considers the different issues related to estimating the ERP.

4.2.1.1 The MCA's Stance in the 2008 Decision

The ERP for Malta reflects the general risk of investing in equities in Malta. The above issues are even more pronounced in the local perspective since the local Stock Exchange has a short trading history and a limited portfolio of investments, thus making it difficult to estimate the local market risk premium over a reasonable time period.

At the time, the Authority had looked at a number of international reports and studies (such as those published by Damodaran and Dimson, Marsh and Staunton) which estimate the equity risk premium for a particular country. It was found that such studies were in fact being used by different regulatory authorities (such as Ofcom and Post & Telestyrelsen), which tend to rely on the results of independent studies of historic market premium as well as surveys of current expectations of market participants. However, studies and data on equity market risk premium are not widely available for Malta, and therefore in estimating a local ERP, the MCA had concluded that reliance may need to be placed on different sources of information.

In the absence of alternative sources, in establishing an ERP for local regulatory purposes the MCA had made reference to ERPs used by other regulators. It appeared that UK regulators had used an ERP ranging between 2.5% and 4.5%.

In view of the additional risks associated with a small market economy such as Malta, the 2008 consultation left room for the ERP to be set above the 4.5%. In fact the MCA had expressed the view that a post-tax ERP ranging between 4.5% and 5.5% with a central estimate of 5% was appropriate. The respondents were not in agreement with the proposed range of ERP.

The MCA examined the arguments put forward by the respondents in this respect and noted Ofcom's observations that "*the costs associated with setting too low a cost of capital are greater than those associated with setting it too high*"[8]. Based on Damodaran's research at the time, the MCA has decided to increase the previous ERP estimate to a range of 5% to 6%, with a mid-point of 5.5%, which was more or less equal to the IRG average at the time.

4.2.2 Approaches considered for the ERP calculation

To arrive at a proposed ERP calculation, the MCA considered the following approaches:

- International Studies;

- Survey-based evidence on the ERP;

- Best practice review of other NRAs in the field.

These approaches are treated separately as shown hereunder.

4.2.2.1 International Studies

Dimson, Marsh and Staunton (DMS)

One of the widely cited sources of historical evidence on the ERP is the annual publication by *Dimson, Marsh and Staunton* (DMS)[9]. In 2011, DMS estimated historical ERP for 19 countries using a comprehensive dataset on annual excess equity returns since 1900. The precision of the ERP estimates increases as the sample size increases. However, even with 111 years of data, the DMS estimates of ERP have a standard error of 1.6%, which is large relative to the value of the point estimates. This is because annual equity returns are highly volatile – over the entire DMS data sample, the minimum and maximum returns on the UK stock market were -38.4% and 80.8% respectively. This is why it is important to consider a very long time horizon when estimating the historical ERP and why the DMS estimates are often used, given the size of their dataset.

Graph 3 below shows the latest historical ERP estimates for a selected group of mature financial markets. The estimated ERP for Europe is 6.1%.

Graph 3 ERP estimates by Dimson, Marsh and Staunton
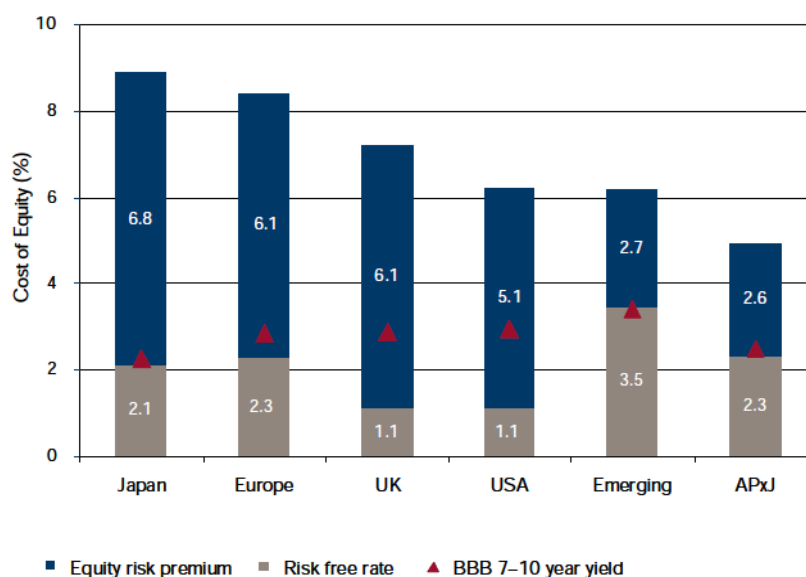
Source: Credit Suisse, HOLT, 17 January 2011[9]

Damodaran

One of the most acclaimed studies in this field is that of Damodaran[10]. Damodaran attempts to calculate the implied equity risk premium by reference to:

a) the S&P 500[2] index as a measure of volatility. (Given its long history and wide following, the S&P 500 is a logical index to use when calculating the implied equity risk premium measure),

b) a comparison of earnings and dividends to the Treasury bond rate; and

c) takes into account the estimated growth in earnings.

This study concluded that the implied equity risk premium as at 1 January 2012 stood at 6.01%.

When Damodaran carries out this calculation, he estimates a compounded forward-looking average equity risk premium over the long term of 6.01%.

4.2.2.2 Survey-based evidence on the ERP

A form of forward-looking evidence on the ERP comes from surveys of market practitioners. However, there are a number of issues with interpreting survey evidence:

▪ Respondents' answers may be influenced by the way the questions are phrased – for example, whether the question asks about required returns or expected returns on a specified stock market index;

▪ There is a tendency for respondents to extrapolate from recent realised returns, making the estimates not entirely forward-looking;

▪ The results are based purely on judgement and are less reliable than estimates based on direct market evidence on pricing.

Given the caveats discussed above, it seems inappropriate to place significant weight on survey-based evidence on ERP. This view is shared by Oxera[11]:

"As in the past, we afford this analysis relatively little weight since participant surveys do not provide the same quality of evidence as market-based measures"[11]

The above concerns notwithstanding, Table 2 below summarises the evidence from recent surveys of practitioners and investors.

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[2] S&P 500 - Standard & Poor 500, is a stock market index based on the common stock prices of 500 top publicly traded American companies.

Table 2 Surveys

Author	Survey	ERP estimate (%)	Standard deviation (%)
Fernandez Aguirreamalloa and Corres (2011)	Average UK ERP used by analysts	5.0	1.1
	Average UK ERP used by companies	5.6	2.0
	Average UK ERP used by professors	5.7	1.6
Graham and Harvey (2010)	Quarterly survey of US CFOs (June 2010)	3.0	3.07
Welch (2009)	Survey of finance or economics professors (143 answers)	5.0-6.0	-

Source: Fernandez, P., J. Aguirreamalloa and L. Corres, (2011)[12] , *Graham, J.R. and Harvey (2010)[13], Welch, L. (2009)[14]*

The Fernandez and Campo survey asks the respondents for the ERP 'used to calculate the required return on equity'. The results of this survey are consistent with both ERP estimates based on historical evidence and forward-looking estimates based on dividend discount models. In contrast, Graham and Harvey frame the question differently when they survey US CFOs on a quarterly basis about their expectation of the ten-year return on the S&P 500 index. The annual return expected by respondents according to the June 2010 survey is the lowest in the history of the survey, leading to a very low estimate of the ERP. There is also a record high level of disagreement among the survey respondents, as shown the high standards of deviation of 3.07%. On the other hand, the survey results by Welch suggested a range of forward estimate of the ERP between 5% and 6%.

4.2.2.3 Other NRAs' Approach to the calculation of the ERP

The MCA has reviewed other NRAs' approach to the calculation of the ERP. The following graph indicates the ERP used by other NRAs:

Graph 4 ERP used by other NRAs
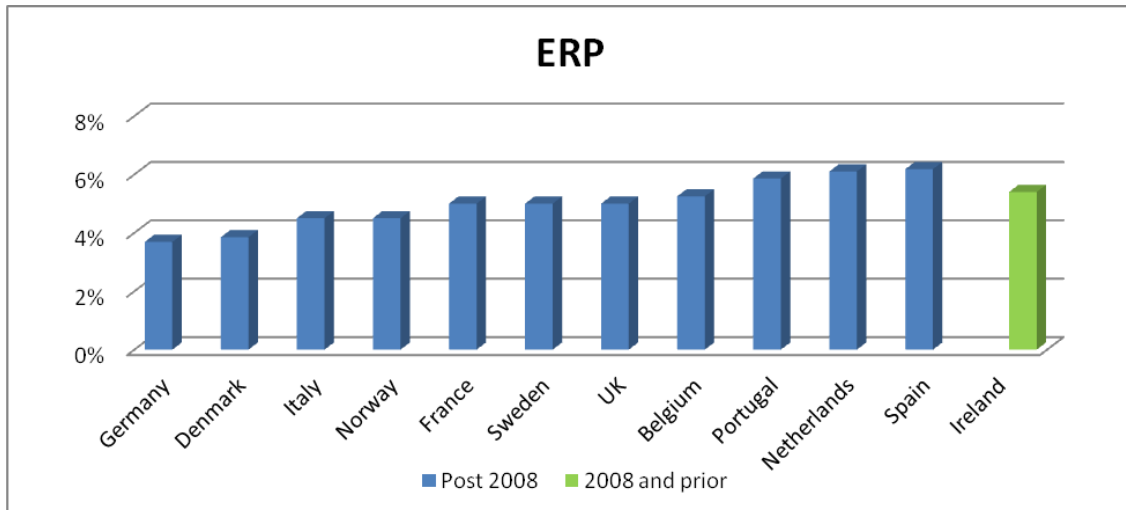
Source: Germany[15], Denmark[16], Italy[17], Norway[18] [3], France[19], Sweden[20], UK[21], Belgium[22], Portugal[23], Netherlands[24], Spain[25] and Ireland[6].

The mean and median of the above graph is 5% in both cases. In calculating the mean and median, data from other NRAs' most recent decisions were considered, i.e. post 2008.

Overall, the survey-based evidence is broadly consistent with the forward looking calculations carried out by Damodaran and Dimson, Marsh and Staunton. Even though more weight is given to the forward-looking evidence when forecasting the ERP, it is comforting to see that the evidence from different sources points to similar values of the ERP.

4.2.3 MCA's Proposed Decision on the ERP

As clearly explored in Appendix IV, in general NRAs refer to international studies. The MCA has reviewed international studies especially those of widely recognised experts such as Damodaran and Dimson, Marsh and Staunton. Damodaran's rate estimates the implied equity risk premium at 6.01%. Similarly, Dimson, Marsh and

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[3] Figures for Norway have been extracted from a presentation by Prof. T. Johnsen from the Norwegian School of Economics.

Staunton have rates closer to 6.1%. The MCA considers these studies as reliable sources and hence is proposing to base the calculation of ERP on them.

For this reason, the MCA is of the view that Malta's ERP should be set within the range starting from 6.01% to 6.1%.

Proposed Decision 3: *Do respondents agree that the equity risk premium is set by reference to international recognised studies?*

Proposed Decision 4: *Do respondents agree that Malta's ERP should be between 6.01% to 6.1%?*

4.3 Estimating Beta

4.3.1 Background

Beta measures the market or systematic risk that applies to a particular stream of cash flows. This should be reflected by the volatility of a company's stock price relative to the overall market, and is usually measured by the covariance between the market returns and those of the company.

In view of the complexities and various issues involved in establishing this very important parameter, the MCA felt it opportune to reproduce hereunder the theoretical background of this parameter which was explored at great length in its Proposed Decision published in 2006.

Theoretically, a company's beta is determined by three key variables:

- The type of business the company operates in;

- The degree of operating leverage (fixed costs to total costs); and

- The degree of financial leverage or gearing.

Since betas measure the risk of a company relative to the market, the more sensitive a business is to market conditions the higher is its beta value. Where a company provides returns which follow closely the market returns, its beta is equal to 1. A Beta above 1 implies that the company's returns are more volatile than the market while a Beta between 0 and 1 implies that the company's returns are less volatile. A security that provides stable returns irrespective of market movements has a beta of 0. Based on the standard CAPM, an investment in a company with a beta value of 0 will only pay out the risk free rate of return to its investors.

It is important to note that, since a firm's equity beta is determined by its equity returns (dividends and share price changes), expectations of future generated cash flows may play a more significant role in determining a company's equity than

its current cash flows. Expectations of future cash flows may even relate to services that are not currently offered by the company.

Equity beta calculation usually involves an estimation of what the relationship between a company's returns and those of the market will be on a forward looking basis. Expectations of this sort are difficult to measure. As a result, equity betas are typically calculated by using historical data.

In appraising the usefulness of equity betas estimated on the basis of historic data, one needs to consider a number of issues, including:

- The statistical properties, such as:

    ✓ Reliability of estimates (e.g. standard errors);

    ✓ Parameter stability (if beta estimates change over time, then it may not be appropriate to use estimation methods that rely on a long run historical data window);

    ✓ Other technical issues, such as heteroscedasticity, autocorrelation and asynchronous trading basis[4].

- Need to measure risk relative to an appropriate index (domestic versus international);

- Other issues which are relevant to policy makers such as stability of the estimates and reliance on well known published data sources.

Taken together, the above imply that there are a number of estimation issues that need to be considered in selecting an appropriate basis for estimating a company's beta. The key practical issues in the estimation of betas include:

- Frequency of observation;

- Choice of estimation period;

- Choice of market index;

- The use of a Bayesian adjustment.

At this stage one needs to bear in mind that in the local context only one of the undertakings with SMP is publicly traded. GO PLC (hereafter 'GO') is currently traded on the Malta Stock Exchange and the London Stock Exchange (in the form of GDRs). The local capital market is relatively young with a limited listing. GO's shares constitute a relatively large part of the share index, with the potential result that beta estimates may be over or under estimated due to feedback effect,

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[4] Vide The Brattle Group (2002)[26] for more detail. Heteroscedasticity refers to the absence of homogeneity of variables, such as weekend heterscedasticity; the potential higher variance of returns on a Monday compared to other days of the week due to the increased amount of information (and time) available across the weekend.

whereby a large change in the stock price of GO could result in a significant change in the market index as well, even though the price change is completely unrelated to changes in other assets. Besides, young stock markets are more susceptible to thin trades, volatile prices and feedback effects (especially when the market capitalisation of one company constitutes a significant proportion of the entire market's capitalisation). Furthermore, since in the local context only GO is publicly listed, in practice the betas of the other undertakings with SMP cannot be estimated on the basis of market information and an alternative approach to estimating beta will need to be used.

There are a number of alternative approaches that can be used in estimating beta, including the estimation of the fundamental beta, which involves a regression model that relates the market risk of publicly traded companies to specific accounting ratios (such as debt/equity, interest cover and liquidity), and then applies this relationship to the accounting ratios of the non-traded company. In practice this approach may be difficult to use as it requires a large sample of accounting ratios across a large number of companies. This information may not always be publicly available.

Besides, one needs to exert extreme caution when interpreting any results in estimating beta values using local stock exchange market information. Taking a look at the local market, GO plc has been impacted by various non-recurring items in its results which also had a bearing on the performance of its share price.

The above casts doubt on the validity in calculating the beta value from local stock market data. All this reinforces the argument that beta estimates derived on the basis of market trading need to be applied with some care. Cognisant of this issue, the MCA is of the opinion that betas of local undertakings with SMP should be estimated after having considered a number of alternative approaches. In estimating betas of private companies, or companies with a limited stock market data, one may need to consider alternative approaches to estimating beta, including Betas used by other NRAs which would provide an indication of the risk associated with a particular type of industry.

Another approach is to use the betas of comparable companies (as adjusted for financial leverage), as an indication of the beta of the target company. Ideally the comparable company should have similar or identical characteristics that affect risk, such as type of industry, services offered, growth rate, market share, and operating and financial leverage. The comparator company could be selected from either the local or foreign market, with the former being more suitable since the business environment and regulations are harmonised. However, the use of local comparables is not always possible. Therefore in the absence of such information comparables are selected from foreign markets.

Betas of companies operating in the electronic communications sector are widely available. However, the difficulty arises in identifying companies with similar risk characteristics to local undertakings with SMP, particularly in terms of customer base and market size. Despite these difficulties, the MCA is of the opinion that an indication of the betas of local electronic communications companies can be deduced by reference to betas of companies operating in foreign markets, particularly those operating in a market with a similar regulatory regime.

When comparing the beta values of different companies, one needs to take into account differences in financial gearing and tax rates. Therefore, beta values of comparable companies need to be "unlevered", based on the comparable's average

debt-to-equity ratio over the period used for estimating beta and re-levered to reflect the appropriate level of financial gearing (i.e. the optimal gearing structure).

The MCA is aware that betas derived by reference to foreign companies have a number of different characteristics, including but not limited to:

- the considerable size difference (including size of market) between local and foreign companies;

- market fluctuations of companies forming part of large market players are generally influenced by the perceived operations of the group as a whole, and are not restricted solely to the operations of a particular subsidiary.

- betas of foreign companies may be affected by the overseas operations of the parent / group, and may therefore not be necessarily comparable to local companies.

Therefore, betas derived by reference to comparable companies need to be adopted with caution.

In its 2008 consultation and proposed decision, the MCA's initial view was that it is worthwhile to consider a number of different sources in estimating the beta of local undertakings with SMP.

As discussed above, the approaches that can be used include:

- Market information: where market information is available, beta should be estimated during daily and weekly data of a 2 year period, using the Malta Stock Exchange as market index.

- Betas of comparable companies, as adjusted for the effect of financial leverage;

- Betas used by other regulatory authorities (electronic communications).

4.3.1.1 The MCA's Stance in the 2008 Decision

Respondents were generally in agreement with the views expressed by the MCA and in the use of different techniques to estimate the beta of companies. In particular both respondents noted that the use of comparables and estimates used by other operators need to be adopted with caution due to the different profiles and size of the market. Respondents had also acknowledged the limitations of estimating beta on the basis of local stock exchange data.

Accordingly the Authority had directed that the beta of undertakings with SMP should be estimated using the range of techniques highlighted in this decision notice, namely:

- Market information: where market information is available, beta should be estimated using daily and weekly data of a 2 year period, using the Malta Stock Exchange as market index and do away with the use of the Bayesian adjustment. Results should be compared with betas of comparable companies and those used by other NRAs (as adjusted to take into account the effect of

financial leverage and tax rates) to assess the reasonableness of the estimates, and to adjust estimates where necessary.

- Betas of comparable companies, as adjusted for the effect of financial leverage;

- Betas used by other regulatory authorities (electronic communications).

The MCA at the time had further stated that where companies are not publicly traded, their betas should be estimated by reference to the betas of comparable companies operating in the electronic communications sector, as adjusted to take into account the effect of financial leverage and tax rates.

4.3.1.2   Further Consultation on Beta values

In 2008, the MCA had undertook another further Consultation on this very important parameter in view that it had observed that beta estimates using local stock exchange market information does not necessarily provide a suitable estimate of the systematic risk of a particular company. As a result it was felt necessary that the beta estimates for both publicly traded and private companies need to be estimated by reference to benchmark data from comparable companies and used by other regulators.

Data published by the IRG in February 2007 provided an indication of the betas used in different IRG countries. The asset betas ranged significantly between countries reflecting the difficulties in estimating betas. The asset betas for mobile companies ranged from 0.8 in Cyprus to 1.3 in Romania with a simple average in the region of 1.0. In the case of fixed networks the betas ranged from just above 0.6 in Cyprus to just below 1.2 in Estonia, with a simple average in the region of 0.8.

The MCA was cognisant that systematic risk is influenced by various factors which may not necessarily be comparable between companies, and this together with other factors such as the availability of data and estimation techniques used, gives rise to the wide range of beta estimates in the IRG countries. Despite this, the MCA expressed the view that an indication of the beta estimate for Maltese telecom companies can be obtained from this data.

Therefore, taking into account the local scenario the MCA had proposed the use of a range of ungeared beta estimates in calculating the cost of capital of telecom companies in Malta as follows:

- Fixed and Cable companies: 0.8 for the low estimate and 1.0 for the high estimate;

- Mobile companies: 1.0 for the low estimate and 1.05 for the high estimate.

4.3.2   Approaches considered to estimate the present Beta Value

To arrive at a proposed Beta value, the MCA considered both a reference group approach as well as best practice review of other NRAs in the field. These two approaches are treated separately and applied to both mobile and fixed respectively, as shown hereunder.

4.3.2.1 Other NRAs' Approach to the calculation of the Beta for the Fixed Market

The MCA has reviewed other NRAs' approach to the calculation of the Beta for the fixed market and its findings are reproduced in Appendix V.

The following graph indicates the Beta Value used by other NRAs.

Graph 5 Beta values used by other NRAs
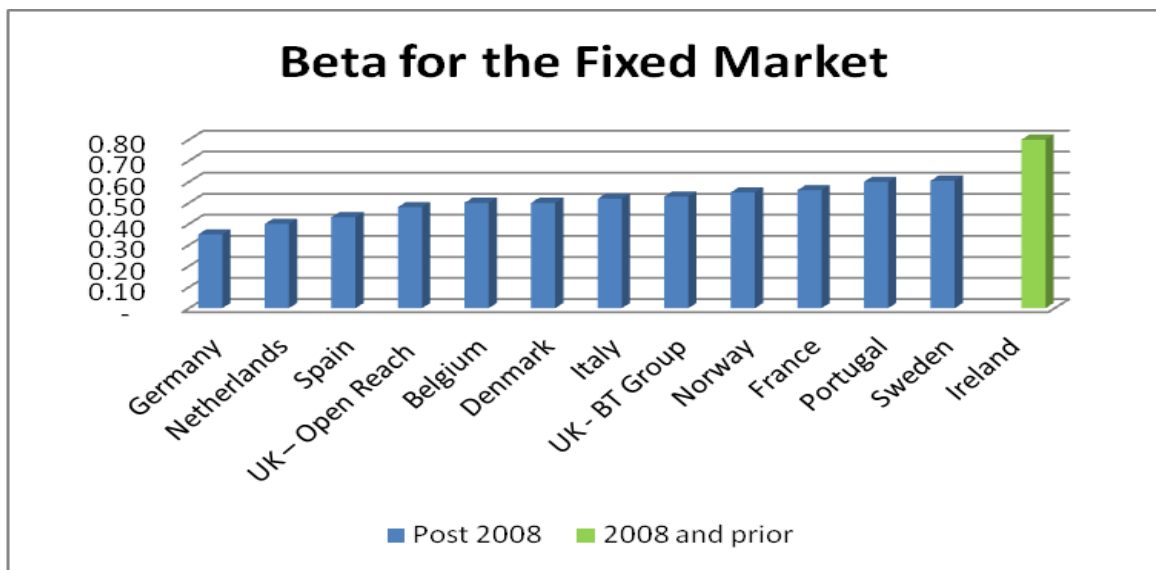
Source: Germany[15],Netherlands[24], Spain[25], UK[21], Belgium[22], Denmark[16], Italy[17], Norway[18], France[19], Portugal[23], Sweden[20], and Ireland[6].

The MCA has reviewed the current and previous decisions of the above NRAs and has noted that asset beta values have fallen over the years. The range of the above graph is between 0.35 and 0.70. The MCA has also calculated the median and mean of the above data set which resulted in a beta of 0.53 and 0.52 respectively. In calculating the mean and median, data from other NRAs' most recent decisions were used, i.e. post 2008.

4.3.2.2 Other NRAs' Approach to the calculation of the Beta for the Mobile Market

The MCA has reviewed other NRAs' approach to the calculation of the Beta. The following graph indicates the Beta Value used by other NRAs:

Graph 6 Beta values used by other NRAs for the Mobile Market
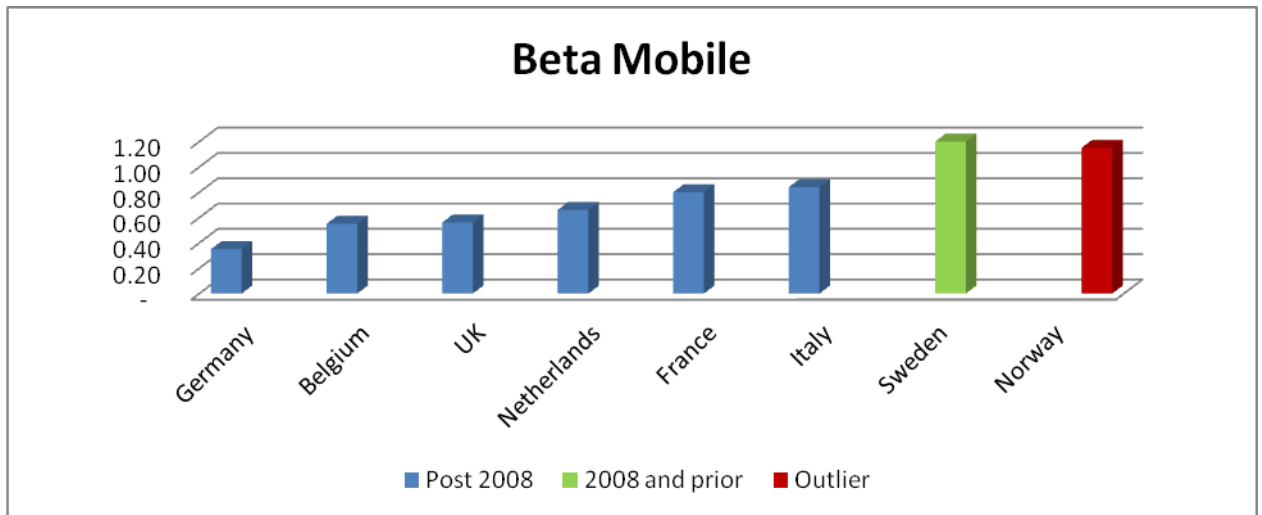
Source: Germany[27], Belgium[22], UK[28], Netherlands[24], France[19], Italy[29], Sweden[31] and Norway[30] [5].

In MCA's opinion, given the considerable disparity of the beta of Norway in comparison with the rest of the group, this should be eliminated from the sample considered. The mean and median asset beta for mobile telephony is 0.63 and 0.61 respectively. In calculating the mean and median, data from other NRAs' most recent decisions were used, i.e. post 2008.

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[5] Figures for Norway have been extracted from a presentation by Prof. T. Johnsen from the Norwegian School of Economics.

4.3.2.3 Beta calculation based on Betas recorded by other European Companies

The MCA has considered the beta computation by reference to other European Companies working within the Communications industry. This was done by calculating the mean and median betas across a selection of companies.

The following operators have been proposed as the reference group:

- Deutsche Telekom AG
- BT Group Plc
- France Télécom SA
- Telefónica SA
- Portugal Telecom
- Koninklijke KPN N.V.;
- Magyar Telekom Nyrt
- Telekomunikacja Polska SA
- Swisscom AG
- Tele2 AB
- Telecom Italia SpA
- Vodafone Group plc

Eircom has not been included in the reference group as no data was available during our analyses. Vodafone UK is the only operator which is mostly based on mobile services. Therefore Vodafone UK was used as a reference in the calculation of the mobile WACC.

The data for the comparator analysis was extracted on the 22 June 2012. The following table shows the Betas recorded by this group of telecom operators.

Table 3 Comparator Group Beta Analysis

SELECTED PUBLIC GUIDELINE COMPANIES	MARKET VALUE OF DEBT TO EQUITY	MARKET VALUE OF DEBT TO TOTAL CAPITAL	EFFECTIVE INCOME TAX RATE	MONTHLY ASSET BETA
Deutsche Telekom AG	121.1%	54.8%	77.8%	0.32
BT Group PLC	66.1%	39.8%	18.2%	0.68
France Telecom	156.9%	61.1%	35.3%	0.19
Telefonica S.A.	146.9%	59.5%	4.2%	0.33
Portugal Telecom SGPS S/A	365.7%	78.5%	33.6%	0.22
Koninklijke KPN N.V.	131.0%	56.7%	12.4%	0.08
Magyar Telekom Telecommunicati	77.4%	43.6%	89.7%	0.56
Telekomunikacja Polska S.A.	22.7%	18.5%	na	na
Swisscom AG	45.1%	31.1%	17.9%	0.20
Telecom Italia S.p.A.	397.3%	79.9%	na	na
Tele2 AB	30.4%	23.3%	23.1%	0.67
HIGH	397.3%	79.9%	89.7%	0.68
MEAN	141.9%	49.7%	34.7%	0.36
MEDIAN	121.1%	54.8%	23.1%	0.32
LOW	22.7%	18.5%	4.2%	0.08
SELECTED AS MOST COMPARABLE TO SUBJECT COMPANY	**121.1%**	**54.8%**	**35.0%**	**0.32**

Source: Average monthly data extracted from Bloomberg

The equity beta is the average of observed data lifted on a monthly basis over the last five years.

The mean and the median monthly asset beta of the comparator group are calculated at 0.36 and 0.32 respectively, whereas the median market value of debt is 121.1% of equity; giving an average debt to equity gearing of 55%:45%.

Vodafone Group plc is the only listed telecoms company whose operations are solely limited to mobile communications. Vodafone Group plc has an asset beta of 0.56 and a market value of debt that is 37.5% of equity resulting in a debt to equity ratio of 27%:73%.

4.3.3 MCA's Proposed Decision on the Beta Estimate

As already explored in the 2008 Consultation and restated in this document under Section 4.2.1, one needs to exert extreme caution when interpreting any results in estimating beta values using local stock exchange market information.

Going forward, in conclusion of the asset betas observed through the reference group analysis, and as corroborated by a review of other NRAs conclusions on this matter, one notes that these have generally fallen over the years and the range is between 0.4 and 0.7 with a median of 0.53.

Table 4 Comparison between Asset betas used by Reference Group vs NRAs

Fixed	Range	Median	Mean
Other NRAs	0.35 – 0.62	0.51	0.50
Reference Group	0.08 – 0.68	0.32	0.36
Mobile	Range	Median	Mean
Other NRAs	0.35 – 0.84	0.61	0.63
Reference Group	0.56	0.56	0.56

One may argue that beta values of the reference group in relation to the Malta market may not reflect a comparable situation to that of investing in the local operators. The reason is that financial performance of the local operators is likely to be more closely related to Malta's prosperity than that of foreign companies because of the local operators' dependence on the Maltese economy. In the absence of a reliable local stock market index, the more appropriate estimate would therefore be to estimate beta values in relation to betas applied by other NRAs.

MCA is therefore of the opinion that the range of betas should be set between 0.4 and 0.6 and for the fixed market between 0.5 and 0.7. These ranges are closer to the ranges observed in other NRAs position papers.

Proposed Decision 5: Do respondents agree that asset beta should be between 0.4 to 0.6 for the fixed market and an asset beta between 0.5 and 0.7 for the mobile market?

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5 Estimating the cost of debt

5.1 Background

A company's cost of debt is normally identified by reference to the average cost of borrowing based on market values. However, where market information is not available or where it is unlikely that a company continues to borrow at the current cost of borrowing, estimates may need to be made.

Corporate debt behaves in essentially the same manner as government debt however companies are more risky than government, implying that a higher interest rate has to be offered to investors. In practice this debt premium is driven by credit ratings based on financial characteristics such as market capitalisation, earnings volatility, leverage and business risks specific to the company and/or sector.

5.1.1 The MCA's Stance in the 2008 Decision

The most common approach taken by regulatory authorities in estimating the cost of debt is to base the estimate on the risk free rate plus a premium determined by reference to the specific company under consideration or other similarly rated companies in the market. In Malta, none of the undertakings with SMP or similar companies have a publicly available credit rating, therefore it is difficult to use this approach in estimating the cost of debt.

In the absence of such information, the MCA had expressed the view that reference should be made to the debt premia used by other regulatory authorities in estimating the cost of debt.

It was determined that a range of debt premia between 1.0% and 3.5%, depending on the gearing ratio, are used by foreign electronic communications regulatory authorities. In the consultation and proposed decision, the MCA expressed the view that a debt premium ranging between 1.0% and 3.5%, over the current risk free rate would be appropriate for Malta, with the higher debt premium allocated to the higher gearing ratio.

Both respondents disagreed with the range of debt premiums proposed by the MCA.

The MCA reaffirmed its position that the cost of debt should be measured as a premium over the risk free rate on the argument that similar to the premium on equity, the debt premium represents the additional return required by lenders to compensate for the additional risk of lending to a particular entity. For an investment to be truly risk free, the risk of default needs to be zero, and this is normally proxied by the yield on government bonds.

From international studies[5], it was concluded that the debt premium increases as the level of gearing increases. Benchmark data from IRG[4] indicated that the debt premium used by different countries ranged between 0.5% and 3.5% for gearing

between 0% and 50%, with an average debt premium of circa 1.8% at 50% gearing levels.

Based on the conclusions reached, insofar as the target gearing structure of between 10% to 30% for mobile companies and 20% to 40% for fixed and cable operators, the MCA was of the view that its proposed debt premium was in fact generous, and the Authority had therefore decided to retain the range of debt premiums proposed in the consultation paper, however reserving its right to revise its position in this regard.

5.1.2 Approaches considered to estimate the the Debt Premium

In view that in Malta none of the undertakings with an SMP or similar companies do not have a public available credit rating, the MCA is of the view that this should be primarily determined by reference to the debt premia used by other regulatory authorities in estimating the cost of debt.

To corroborate this data, the MCA has used the spread in yields between corporate bonds issued by European telecommunications operators and those issued by the German Government. The results of which have been included here under.

5.1.2.1 Other NRAs approach to the calculation of debt premium in the fixed market

The MCA has reviewed other NRAs approach to the calculation of the debt premium and reproduced its findings in Appendix VI.

The following graph indicates the debt premium used by other NRAs:

Graph 7 Debt premiums used by other NRAs
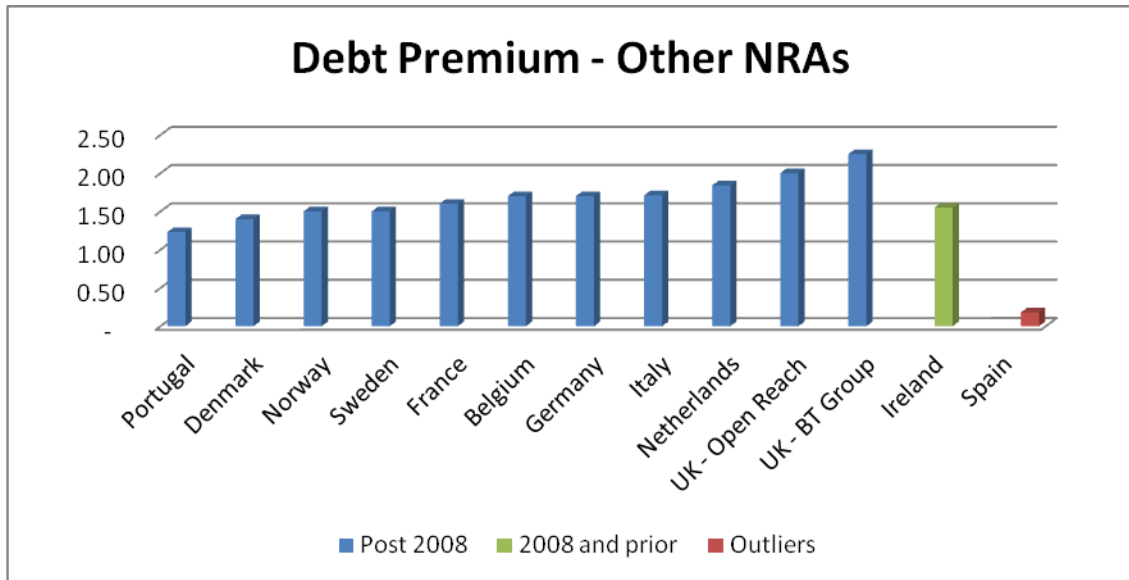
Source: Portugal[23], Denmark[16], Norway[18], Sweden[20], France[19], Belgium[22], Germany[9], Italy[17], Netherlands[24], UK[21], Ireland[6] and Spain[25].

In the MCA's opinion, given the considerable disparity of the premium of Spain in comparison with the rest of the group, this should be eliminated from the sample considered. In calculating the mean and median, data from other NRAs' most recent decisions were considered, i.e. post 2008.

The results have been summarised in Table 5 below:

Table 5 Summary of Graph 7 Debt premiums used by other NRAs

Fixed market	Range	Median	Mean
Other NRAs	1.23 – 2.25	1.70	1.68

5.1.2.2 Telecommunications Industry bond yield spread

One method of estimating the debt margin is by reference to a market based estimate that calculates the difference between the telecommunications corporate bond yield and the risk free rate.

The time period used to estimate the debt risk premium should be in accordance with the time period used to estimate the risk free rate.

The MCA bases the estimate on the European integrated operators' corporate 5-year and 10-year bonds, as these coincide best with the time period used to estimate the risk free rate.

Data was obtained on the spreads of entities for a period of 18 months and the spread over the German Government Bonds was calculated. The spread between European Corporate Bonds issued by BBB-rated telecom entities when compared to German Government Bonds were calculated in the same manner however data availabilty – at the time of writing - was limited to 6 months.

The following table depicts the results of MCA's findings:

Table 6 Spread of European Telecom Bonds over German Government Bonds

Data for the 18 months ending 30 June 2012				
Spread of European Telecom Bonds over German Government Bonds	**5 year A bonds**	**10 year A bonds**		
Range	0.74 – 2.39	0.94 – 2.29		
Median	1.23	1.25		
Mean	1.26	1.35		
Data for the 6 months ending 30 June 2012				
Spread of European Telecom Bonds over German Government Bonds	**5 year A bonds**	**10 year A bonds**	**5 year BBB Bonds**	**10 year BBB Bonds**
Range	1.15-1.39	1.15-1.32	1.88 – 2.58	1.84 – 2.08
Median	1.26	1.25	2.20	1.93
Mean	1.26	1.25	2.18	1.94
Variance due to rating			0.92	0.69

Source: Bloomberg

Given that data for spreads over the BBB-Bonds was limited to the last 6 months, in order to retain an 18-month average, the MCA calculated the variance in spreads of the BBB-bonds and A-bonds over the last six months and applied it to the 18 month average of telecom operators with an A-rating. This resulted in a variance of

92 and 69 basis points on the 5 year and 10 year bonds respectively as shown in the Table 6 above. Applying this to the 18 month average spread would indicate that the debt margin for BBB bonds should range between 2.05% to 2.15%.

In conclusion, the average spread of premia paid by telecom operators over the last 18 months varied between 1.26% and 2.15%.

5.1.2.3 The local perspective on the Debt Premium

The MCA has reviewed the financial statements of local operators and concluded that the ranges of debt premia obtained from the alternative scenarios considered earlier can accommodate well the observed local context. The MCA has therefore decided to use the full range of other NRAs as its benchmark for the debt premium.

5.1.2.4 MCA's Proposed Decision on the Debt Premium

Similar to the premium on equity, the debt premium represents the additional return required by lenders to compensate for the additional risk of lending to a particular entity. For an investment to be truly risk free, the risk of default needs to be zero, and this is normally proxied by the yield on government bonds. As a result the MCA remains of the view that the cost of debt should be measured as a premium over the risk free rate.

The different methods applied above shows that there is a convergence in the debt premia. Based on the above analysis, MCA is of the view that the debt premium applicable locally is within the range specified by other NRAs.

The results as contemplated in Secion 5.1.2 indicate that the debt premium should be between 1.25% and 2.25%.

Proposed Decision 6*: Do respondents agree that the debt premium should range between 1.25% and 2.25% over the risk free rate?*

5.2 Gearing Ratio

5.2.1 Background

Theoretically, a forward-looking WACC should be based on the estimated optimal capital structure over the regulated period as opposed to the existing capital structure of a company. The argument for the use of an optimal capital structure is that a calculation based on an optimal gearing reflects the fact that full use of the

tax advantages of debt are taken into account whilst concurrently default risk is kept at levels acceptable to shareholders.

Opting for the use of an optimal capital structure is reinforced by the following facts:

- A company's financial structure at a point in time may not necessarily reflect the capital structure that is expected to prevail over the life of the business and

- The regulatory WACC is used to provide the operator with a reasonable rate of return on regulated basis, assuming an efficient gearing structure.

5.2.2 MCA's Stance in the 2008 Decision

In trying to develop an optimal capital structure, the MCA had considered the following:

a) Current market-based capital structure of the companies;

b) Captial structure of comparable companies;

c) Companies' business plans and investment projections over the regulated period and the likely borrowing contraints of the market.

In practice, the MCA did not have information on the company's business plan and investment projections. Accordingly, the optimal gearing structure was arrived at by reference to (a) and (b) above and by making reference to optimal gearing structures used by other regulators.

Based on an evaluation of all the above factors, the MCA had concluded that the optimal gearing structure (on a debt to debt plus equity basis) should lie in the range of 10% to 30% for the mobile market and in the range of 20% to 40% for the fixed market.

5.2.3 Proposed Methodology for the Gearing Ratio

5.2.3.1 Telecommunications Industry average gearing

Gearing levels in this section are expressed as market value of debt compared to total capital. The reference group used for the determination of the beta is used in identifying the normal levels of gearing sustained by comparable telecommunications operators. These companies are all operators of fixed line and mobile networks. Whilst there are some variations in the level of gearing between the respective members of the comparator group, the graph below shows that except for some outliers, seven out of eleven operators sustain gearing levels of between 35% to 65%. The most common level of gearing falls in the range of 50% to 65%.

Graph 8 Gearing levels of the Reference Group
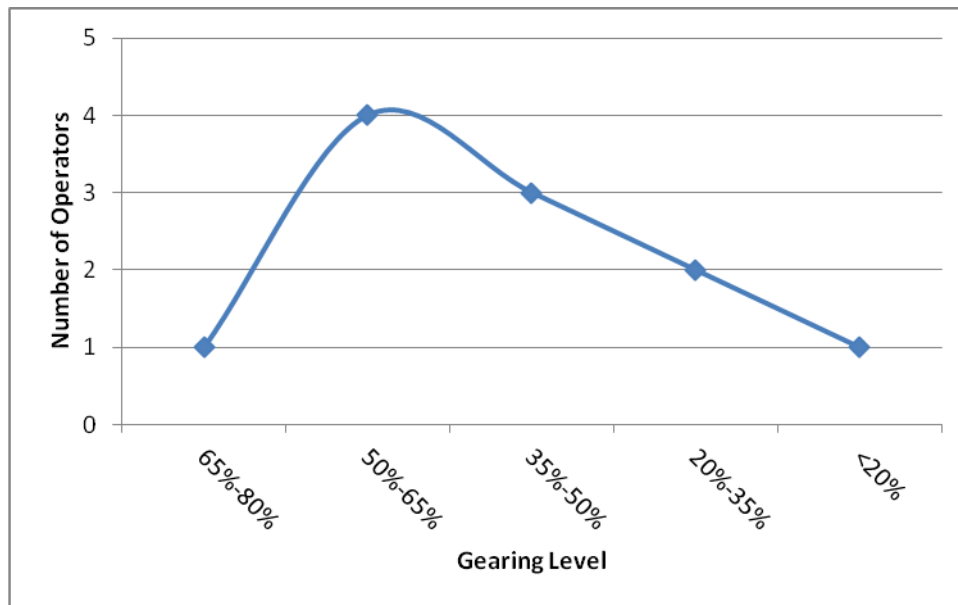
Vodafone UK is the only company whose operations are limited to mobile phone services. It operates with a gearing level that is closer to 27%.

These averages are in line with the gearing levels adopted by other NRAs whose approaches at determining the level of gearing are summarised hereunder:

- Ofcom's[32] approach in the past was to assume an optimal level of gearing of 35% which was based on the observed gearing during the period from 2001 -2007 as being in a broad range of around 30% - 40%. In their last revision, Ofcom[21] opted to base their calculations on actual gearing which they believe is a reasonable estimate of BT's desired level of gearing. Since BT's gearing has been between 35% and 60% in the last 2 years, OFCOM opted to use a 50% gearing assumption.

- AGCOM[17], in line with the European regulatory practice and the provisions Resolution no. 4/06/CONS, considers appropriate to determine the ratio of debt using a notional gearing ratio, calculated as the average gearing ratio of major European operators weighted by their capitalisation. In late January 2010, the gearing ratio of TI is approximately 50%. According to AGCOM, this value is very close to the value of the average of other European incumbents (about 53%). Accordingly AGCOM considered it appropriate to use the value of notional gearing of 50%.

- For 2012, ARCEP[19] has established a ratio of debt to equity of 66.67% long term, which corresponds to the value of long-term approach adopted by the Authority's previous decisions.

- ANACOM[23] established a gearing of 36.2% being the average obtained from benchmarks of comparable companies (42.64%) as well as regulatory precedent (29.77%). This approach was followed in view that ANACOM argued that it was not possible to consider PTC's level of gearing as this has fluctuated widely over time in view that PTC does not hold medium and long

term loans on a consistent basis and therefore its debt stems mainly from provision for retirement and health care benefits.

A review of other NRA's observations on gearing in the fixed market is summarised in the graph below.

Graph 9 Gearing levels used by other NRAs for the fixed market
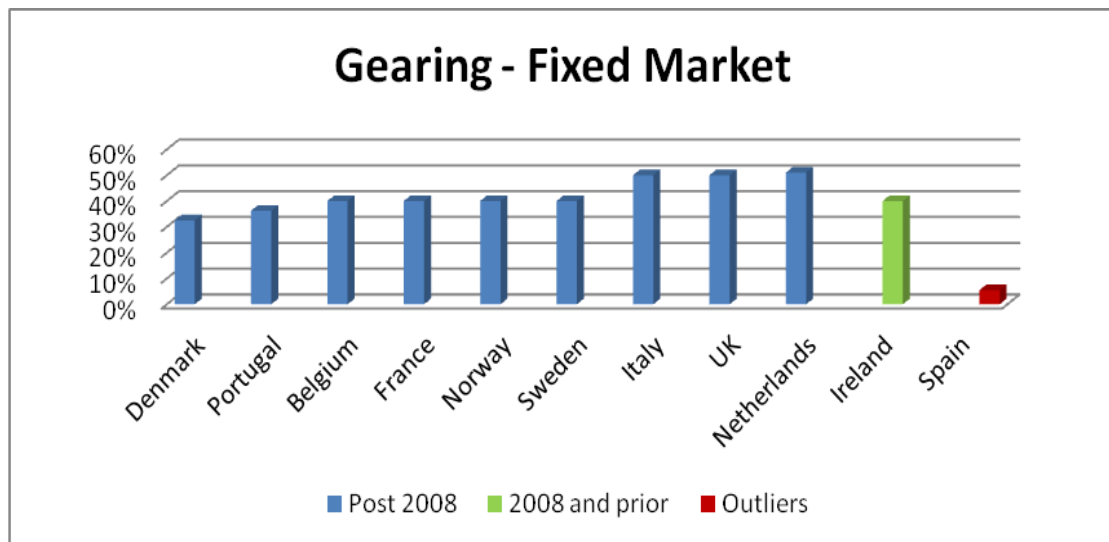
Source:Denmark[16], Portugal[23], Belgium[22], France[19], Norway[18], Sweden[20], Italy[17], UK[21], Netherlands[24], Ireland[6] and Spain[25].

The mean and median of the above graph is 42% and 40% respectively. In calculating the mean and median, data from other NRAs' most recent decisions were used, i.e. post 2008. In the MCA's opinion, given the considerable disparity of the gearing of Spain in comparison with the rest of the group, this should be eliminated from the sample considered.

A review of other NRAs' observations on gearing in the mobile market is summarised in the graph below.

Graph 10 Gearing levels used by other NRAs for the mobile market
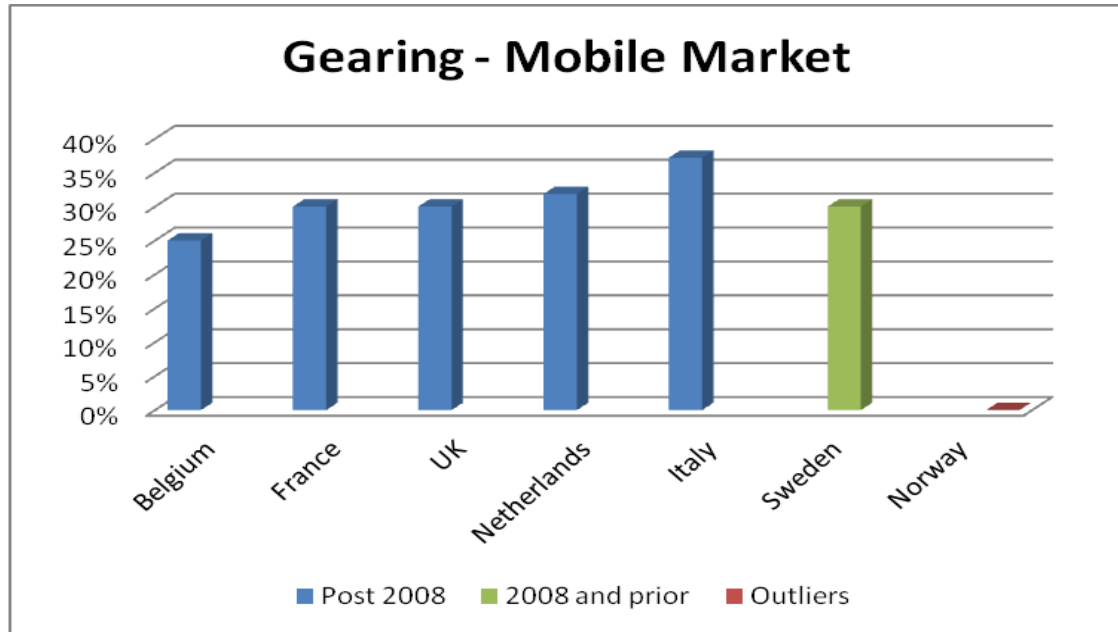
Source: Belgium[22], France[19], UK[28], Netherlands[24], Italy[29], Sweden[31] and Norway[30].

The mean and median of the above graph are 30% and 31% respectively. The range is between 25% and 37.2% gearing. In calculating the mean and median, data from other NRAs' most recent decision were considered, i.e. post 2008. Given that Norway was considered as an outlier in the above graph and also in Section 4.3.2.2, Norway's gearing was not considered when computing the mean, median and range of the above graph.

5.2.4 Local perspective on Gearing

The MCA has reviewed the gearing levels reported by the local operators in their respective latest available financial statements and has found that local operators have gearing levels that differ significantly from one another.

In view of these discrepancies, the MCA reinforces its position of establishing the optimal gearing by reference to the levels adopted by other NRAs as well as the averages registered by the operators included in the reference group.

5.2.5 MCA's Proposed Decision on Gearing Ratio

Based on the above evidence, the MCA concludes that the gearing structure ranging from 20% to 40% should be revised to between 40% and 50% for fixed and cable operators. In the case of mobile operators the previous range from 10% to 30% needs to be revised to between 25% and 35%.

Proposed Decision 7: Do respondents agree that Gearing should be in the range of 40% to 50% for fixed and cable operators and 25% to 35% for the mobile market?

6 Proposed WACC rates

6.1.1 MCA's Proposed WACC rate

A detailed calculation of the proposed WACC rates for both the fixed and mobile markets is included in Appendix 1. The following table shows the current and proposed rates.

Table 7 Proposed WACC rates for the fixed and mobile markets

WACC rate	Fixed Market	Mobile Market
Current rate	12.56%	13.73%
Proposed rate	9.65%	10.80%

The MCA has compared the proposed rates to the WACC rates published by other NRAs as published by Cullen International in April 2012 and June 2012.

Graph 11 WACC rates used by other telecom regulators
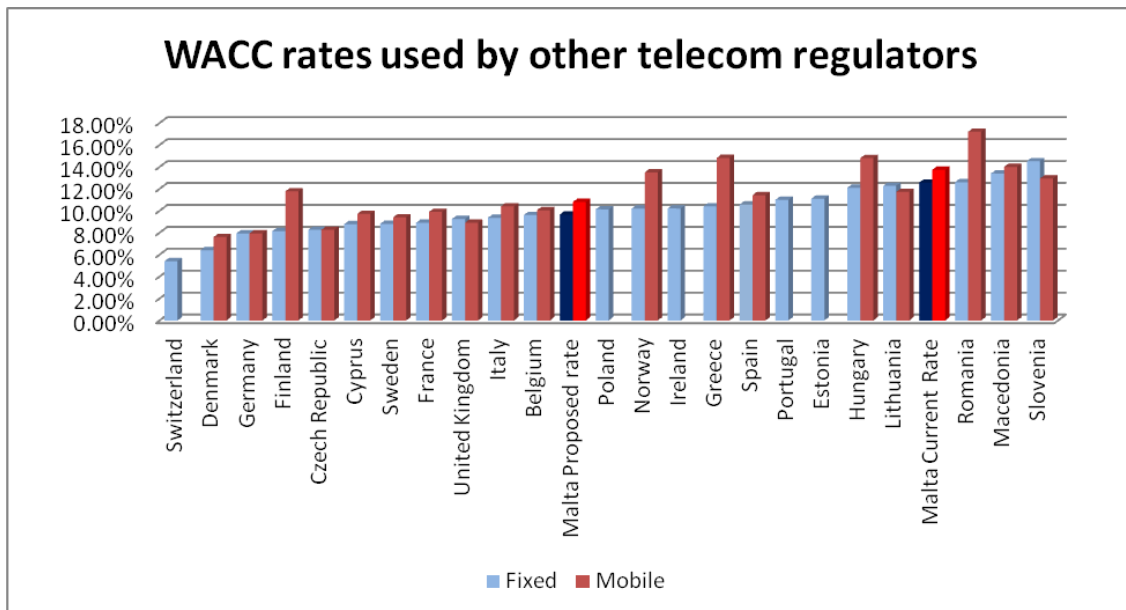
Source: Cullen International (April 2012[33] and June 2012[34]). NRA's with not enough information on their Mobile WACC rate were not included in the above graph.

The above graph indicates that the new proposed WACC rates are within the average of the other NRA rates.

6.1.2 The use of Different Cost of Capital for the Different Business Segments

In 2008, the MCA had consulted on whether the operators favour asked respondents about the disaggregation of a company's cost of capital and both respondents were in favour of deferring the decision.

The MCA is still of the view that a decision on the disaggregation of a company's cost of capital on the basis of risk associated with the different business segments should be deferred.

Proposed Decision 8: Are respondents still of the view that the decision to further disggregate the cost of capital for the different business segments should be deferred?

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7 Future Revisions

Following its WACC Decision published in 2008, the MCA initiated an annual workstream whereby it asked operators - with SMP status operating in the electronic communications sector – to submit annual revisions of the WACC rate clearly observing the methodology that was established in 2008.

The MCA is of the opinion that, in order to reduce the regulatory burden on operators, regular proposed revisions should be initiated by the MCA, which can in turn be adopted following consultation. These revisions would occur annually, or at other intervals which reflect changes to the underlying parameters. The set of parameters reviewed would also attempt to reflect changes to the situation in capital markets[6].

This consultation will be followed by a decision where the revised WACC rates will come into force.

Proposed Decision 9: Do respondents agree on the MCA's proposed way forward on the regular revisions?

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[6] As already noted in various parts of this consultation, the MCA has given weight to the consideration expressed by other NRAs that the risk associated with setting too low a cost of capital is greater than that associated with setting it too high. This consideration has been given even greater weight in this consultation given the current turmoil in capital markets - and the associated difficulties to establish precise ranges. The MCA reserves the right to make the necessary adjustments in future reviews depending on new evidence and/or research carried out.

8 Consultation framework

8.1 Consultation period

The consultation period will run until noon on 12 October 2012. Comments should be sent to:

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Chief of Operations
Malta Communications Authority
Valletta Waterfront,
Pinto Wharf,
Floriana FRN 1913
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Tel: (+356) 2133 6840
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Appendix I – Results of WACC estimation stemming from the Ranges established in this statement of Proposed Decision

The tables hereunder illustrate the resulting calculations of the proposed WACC rates for the fixed and mobile markets arising from the range of the parameters proposed in this Consultation and Proposed Decision.

Table 8 WACC calculation for the Fixed market

	Low Gearing		Medium Gearing		High Gearing	
	Low estimate	High estimate	Low estimate	High estimate	Low estimate	High estimate
Risk free rate	3.3	4.3	3.3	4.3	3.3	4.3
Equity Risk Premium	6.01	6.10	6.01	6.10	6.01	6.10
Equity beta	0.57	0.86	0.61	0.92	0.66	0.99
Cost of Equity (post-tax)	6.73	9.55	6.97	9.91	7.27	10.34
Cost of Equity (pre-tax)	**10.35**	**14.69**	**10.72**	**15.25**	**11.18**	**15.91**
Debt Premium	1.25	1.25	1.75	1.75	2.25	2.25
Cost of debt (post-tax)	2.96	3.61	3.28	3.93	3.61	4.26
Cost of debt (pre-tax)	**4.55**	**5.55**	**5.05**	**6.05**	**5.55**	**6.55**
Optimal Gearing	40%	40%	45%	45%	50%	50%
Tax Rate	35%	35%	35%	35%	35%	35%
WACC (pre tax nominal)	**8.03**	**11.03**	**8.17**	**11.11**	**8.36**	**11.23**

The above is based on the assumptions that un-geared beta is of 0.4 for the low estimate and 0.6 for the high estimate.

Based on the above, the WACC estimate ranges between 8.03% and 11.23% with an average pre-tax WACC rate of 9.65%

Table 9 WACC calculation for the Mobile market

	Low Gearing		Medium Gearing		High Gearing	
	Low estimate	High estimate	Low estimate	High estimate	Low estimate	High estimate
Risk free rate	3.3	4.3	3.3	4.3	3.3	4.3
Equity Risk Premium	6.01	6.10	6.01	6.10	6.01	6.10
Equity beta	0.61	0.85	0.64	0.90	0.68	0.95
Cost of Equity (post-tax)	6.97	9.49	7.15	9.79	7.39	10.10
Cost of Equity (pre-tax)	**10.72**	**14.59**	**10.99**	**15.06**	**11.36**	**15.53**
Debt Premium	1.25	1.25	1.75	1.75	2.25	2.25
Cost of debt (post-tax)	2.96	3.61	3.28	3.93	3.61	4.26
Cost of debt (pre-tax)	**4.55**	**5.55**	**5.05**	**6.05**	**5.55**	**6.55**
Optimal Gearing	25%	25%	30%	30%	35%	35%
Tax Rate	35%	35%	35%	35%	35%	35%
WACC (pre tax nominal)	**9.18**	**12.33**	**9.21**	**12.36**	**9.33**	**12.39**

The above is based on the assumptions that un-geared beta is of 0.5 for the low estimate and 0.7 for the high estimate.

Based on the above, the WACC estimate ranges between 9.18% and 12.39% with an average pre-tax WACC rate of 10.80%.

Appendix II – WACC rates used by other telecom regulators

The table below summarises the WACC rates used by other western telecom regulators as published by Cullen International SA. in April 2012[33] and June 2012[34].

Table 10 WACC rates used by other telecom regulators

Country	Fixed	Mobile
Austria	Not available	Rate calculated separately for each operator
Belgium	9.61%	10.05%
Bulgaria	Not public	Unregulated
Cyprus	8.78%	9.71%
Czech Republic	8.26%	8.26%
Denmark	6.40%	7.60%
Estonia	11.10%	Unregulated
Finland	7.28 - 9.02%	10.90% - 12.64%
France	8.90%	9.90%
Germany	7.94%	7.94%
Greece	10.40%	14.81%
Hungary	11.8% (Magyar Telekom), 12.4% (Invitel, UPC)	14.80%
Ireland	10.21%	No decision
Italy	9.36%	10.40%
Latvia	Not public	Not public
Lithuania	12.27%	11.72%
Luxembourg	No decision	No decision
Macedonia	13.40%	14.00%
Malta	12.56%	13.73%
Netherlands	7.38% real	8.45% real
Norway	10.20%	13.50%
Poland	10.13%	Unregulated
Portugal	11.00%	9.20% real
Romania	12.60%	17.52% Vodafone 16.88% Orange
Slovakia	Not public	Undecided
Slovenia	13.47% (IC, LLU, WBA); 15.56% (FTTH/B and ducts)	12.94%
Spain	10.57%	11.39% (Telefonica Moviles); 11.29% (Vodafone); 11.58% (France Telecom Espana)
Sweden	8.80%	9.40%
Switzerland	5.40%	No decision
Turkey	Not public	Not public
United Kingdom	8.80% for BT's copper access network; 9.70% for rest of BT	8.90%

The WACC rates for both fixed and mobile vary widely with:

- fixed rates ranging 5.4% in Switzerland to 15.56% in Slovenia;
- mobile rates range from 7.6% in Denmark to 17.52% in Romania.

In comparing rates various country and company specific issues need to be considered, including but not limited to:

- Nature and size of the companies,
- Market size and level of competition;
- Differences in taxation
- Differences in country risk and rating.

Appendix III – OTHER NRAs approach to the calculation of the Risk Free Rate

OFCOM

In its January 2011 Consultation, OFCOM[32] explained that[7] in setting the risk free rate OFCOM was mindful that this charge control is for a 3-year period, and therefore they felt it important to keep in mind that the rate needs to be relevant for that period, and in particular for the final year of the charge control, which is the year in which OFCOM estimates BT's costs. The approach adopted by OFCOM was to estimate a rate that is based on historic and current data but which should be relevant for the period covered by the control.

In its last statement[21] (at the time of the publication of the above consultation) on BT's cost of capital in May 2009, OFCOM estimated the real risk-free rate to be 2.0% which estimate was informed primarily by reference to the average yields on 5 year gilts in the years leading up to its decision.

The real risk-free rate (as measured by yields on UK 5 year gilts) has been falling since November 2008, when it peaked at over 4%. In the last year the real rate has been between 0.5% and -0.5% although OFCOM does not believe this to be a sustainable long-term level, certainly not at the lower end of the range.

Whilst continuing favouring the use of 5 year gilt yields when estimating the risk-free rate, consideration was also given to 10 year gilt yields. OFCOM also was mindful not to give too much weight to a rate based on a period of unusual market activity and therefore OFCOM tends to give more weight to longer term averages than more recent rate. Given the likelihood of increasing yields in later years, OFCOM gave more weight to the 1,2,3 and 5 year averages than recent very low rates.

In estimating the rate at 1.5%, OFCOM well aware that the rate is some way above current real risk-free rates, they justified the rate on the following:

- The CC's range of 1% - 2% in the Bristol Water Appeal despite the low rates observed in the market at the time of that decision;

- The 5 year and 10 year average yields on 5 year gilts are around 1.5% (1.4% and 1.7% respectively)

- When estimating regulatory cost of capital rates, OFCOM was mindful of the potential negative effects of making sudden very large changes, which could create regulatory uncertainty. Ofcom are particularly mindful that current low rates reflect very specific conditions (including the Bank of England's

Quantitative Easing Programme) and take this into account when making estimates.

In its July 2011 Decision, OFCOM[21] updated the data on which they proposed the 1.5% real risk-free rate and have noted that:

- the yield for 5-year zero coupon gilts has fallen to around -0.5%. OFCOM comments that whilst normally they would give more weight to recent rates than historical averages, OFCOM is mindful not to give too much weight to a rate based on a period of unusual market activity;

- the 5-year average for 5 year real gilts has fallen from 1.4% (based on data to 10 Nov 2010) to 1.2% (based on data to 31 May 2011). The 10 year average for 5 year gilts has fallen from 1.7% to 1.6% over the same period.

- The average yield on the 10 year government gilt over the last 5 years has fallen from 1.4% in November 2010 to 1.3% (31 May 2011).

In the January Consultation, OFCOM[32] noted that the implied forward rates for 2013/14 were around 1% and observed that they were below the historic gilt yields but were cautious about placing significant weight on the evidence of implied forward rates. Using more recent data, OFCOM notes that implied forward rates for 2013/14 are out of line with the historic average gilt yields of 1.2% to 1.6%.

In its decision, OFCOM[21] observed that the current implied instantaneous forward rates for 2013/14 are highly volatile, reducing from around 1% at the time of its consultation, to negative rates at July 2011. Besides, the implied 5 year forward rates for 2013/14 have also reduced materially over the period. OFCOM noted that the implied forward rate has been volatile and is now negative as a result of a recent sharp decline in rates and therefore caution needs to be exercised about placing too much weight on these low implied forward rates which have not been observed over a long period. Taking into account more recent evidence, OFCOM's estimate of the real risk free rate is now 1.4 as against the 1.5% estimated in its January Consultation. This is equivalent to a nominal risk free rate of 4.4%.

ComReg

ComReg[6] decision is based on the substantial body of empirical estimation and analysis carried out by Oxera on behalf of ComReg apart from ComReg's own consideration of that analysis.

In estimating the Risk Free Rate, Oxera looked at a variety of sources, using both historical data and forward-looking estimates. Oxera also considered relevant benchmarks including previous regulatory determinations where appropriate. Oxera estimated a range of 4.5% to 5.0% for the nominal Risk Free Rate ("RFR"). This range reflects market evidence at the time and recent regulatory precedent, while recognizing the uncertainty regarding the future path of interest rates. Oxera considered the historical nominal yields on both Irish and German Government Bonds across a range of maturities. The lower end of the proposed range (4.5%) was the spot yield (on 2 July 2007) on 10-year nominal Irish Government Bonds. While mean reversion of interest rates might take yields below current spot levels,

yields could also continue to rise. Therefore, ComReg has taken a prudent approach to the current spot yield to take into account the possibility of further increases in the yield or the potential for mean reversion.

To achieve this, an upper limit of 5.0%, in line with past regulatory determinations, seemed reasonable for ComReg.

As neither respondent expressed views to the contrary, and having further considered the issue, the original RFR range of 4.5% to 5.0% was maintained by ComReg.

AGCOM

AGCOM[17] considers that Italian Government Bonds with a maturity of ten years is a significant proxy performance of an activity without risk in forward-looking perspective, since it contains all the expectations of a future long-term investment made today.

The forward yield of x years indicates what will be, presumably, the current yield of x years from now. It is, therefore, a prediction of the performance of a commercial investment made in x years. Since the estimated cost of capital must be performed prospectively, AGCOM has considered that the performance index Spot benchmark represents the most suitable for this purpose.

AGCOM considered that taking into account the performance of a Government Bond with a maturity of 36 months, although consistent with the length of validity of market analysis, does not reflect the typical duration of investments in a telecommunications network. Therefore, AGCOM considered it appropriate to use the performance of Italian Government Bonds with a maturity of ten years, since the investment in a telecommunications network is in principle investments long-term. On this basis, the Authority confirms that the performance of an activity without risk is 3.9%.

PTS (Swedish NRA)

PTS[20] applied the Swedish interest rate for 10-year Government Bonds and calculated the risk-free rate as an average over seven years. Telenor believed that the rate should be calculated in a 3-month average. It gives the cost of capital stability over time and with expected increases in interest rates. PTS set the risk-free rate to 3.71 % on the argument that it provides the conditions for the interest to be relevant for the next regulatory period of approximately three years.

ARCEP

In previous decisions, ARCEP[19] has fixed the value of risk-free rate by reference to Rate constant maturity 10 years (TEC 10), which is the rate of fungible treasury bonds (OAT) for a term of 10 years (it is obtained by interpolation). The historical series of the rate calculated daily is published monthly by the Agence France Trésor.

For 2012, the Authority is to estimate the value of risk-free rate of 3.3%.This value is lower than that adopted for 2010 and 2011 (4.0%). Given the approach retained by the Authority described above, it is however greater than the most recent risk-free rate (3.0% at end-October 2011).

Appendix IV - OTHER NRAs approach to the calculation of the ERP

OFCOM

In May 2009, OFCOM[32] estimated the ERP to be 5.0%, up from an estimate of 4.5% in 2005. Such estimate was informed in particular by the work of Professor Dimson, Marsh and Staunton ('DMS') from the London Business School, which tracks the average premium that investors have earned from equities (as opposed to bonds or gilts) over time. Besides, OFCOM believed that the volatility they observed in equity markets at the time suggested that investors required a higher level of return in exchange for holding risky equity assets, and an increase of 0.5% in our ERP estimate did not seem unreasonable in this context.

OFCOM[32] still rely heavily on work carried out by DMS who are regarded one of the most authoritative sources of historical estimates. DMS have suggested an arithmetic mean premium[8] for the world index of around 4.5% - 5%[9] stating that 'this is our best estimate of the equity risk premium for use in asset allocation, stock valuation, and corporate capital budgeting applications.'

In setting the revised ERP, OFCOM based its arguments on the following:

- They considered the CC's determinations of 5% in the Bristol Water and LLU Appeal to be a relevant consideration in its determination of the ERP;

- OFCOM finds it difficult to diverge from such a determination without compelling evidence to demonstrate that this value has changed.

- OFCOM are mindful that while setting the ERP value too low could lead to discretionary investment by BT being discouraged, setting the value too high could lead to consumers paying prices that are too high (or BT investments that are not fully justified by demand) or lower levels of investment by BT's competitors.

- Having reviewed evidence from market commentators and the Bank of England, OFCOM believes that the prolonged downturn in equity markets and high levels of volatility suggest that the equity risk premium may have increased in recent years.

- Consequently, it is OFCOM's belief that the downside of setting an ERP too low is worse that the downside of setting the ERP too high and therefore favour setting the ERP towards the upper end of a 4.55 to 5% range, specifically, 5%.

Notwithstanding all the above considerations, OFCOM[21] also was mindful of the overall market return value. In fact, OFCOM took note of the Competition Commission's view of the market return (i.e. investors' expected return from

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[8] These estimates are calculated using arithmetic means from historic data. Arithmetic means are OFCOM's preferred measure of the historic premia, and therefore they give more weight to arithmetic means than to geometric means from the same data.

[9] DMS 2010, p 34.

holding equities, which is given by the ERP plus the risk-free rate) and the implied range of the ERP: 'We therefore confirm, for our determination, our provisional findings of a range of 5% to 7% for the market return and implied range of 4% to 5% for the ERP.' The CC's point estimate of the risk-free rate is 2%, and combined with its ERP point estimate at the very top of the range of 4% to 5% they estimate a market return of 7%, again at the very top of its stated range.

Therefore OFCOM concluded that its current point estimate of the risk-free rate is 1.5%, which, when combined with OFCOM estimate of 5% for the ERP, gives a current estimate of the market return of 6.5%.

PTS (Sweden)

Stock Market Risk Premium: PTS[20] determines stock market risk premium of 4.75% percent based on academic studies but also influenced by the investor surveys.

ComReg

Oxera[6] estimated the ERP to lie in the range of 4.8% to 6%. This range was based on several sources, including data presented by DMS for 2006, Irish Regulatory precedent and ComReg's previous determination. The source of the lower value of the ERP range (4.8%) was the midpoint of the geometric means relative to bonds (3.6%) and the arithmetic mean relative to bills (6.0%) from the DMS dataset. The upper value of the ERP range proposed by Oxera reflected recent Irish regulatory precedent. Besides, the proposed range by Oxera of 4.8% to 6% includes both the latest estimates from the 2008 DMS dataset, based on both the arithmetic mean with respect to bills (5.9%) as well as the arithmetic mean with respect to bonds (5.1%). Hence, the proposed range is in line with the most recent data presented by DMS for arithmetic means. In addition, the original ERP estimated by Oxera already places a greater weight on arithmetic mean returns than returns calculated from the geometric mean, consistent with the academic literature and regulatory precedent. Academic literature suggests that an unbiased estimate of the true mean return lies somewhere between the arithmetic and geometric averages.

However, given the significance and persistence of the current financial turmoil, ComReg, on the basis of Oxera's advice, considered it prudent to undertake an analysis of the potential impact this could have on Eircom's cost of capital. In this regard, Oxera has carried out an analysis of the potential impact of the financial turmoil on the individual cost of capital parameter estimates to investigate whether an adjustment (if any) to the original estimates would be an appropriate course of action. Oxera analysed the recent market evidence on the evolution of the components of the cost of equity, specifically the equity beta and the ERP. Changes in the volatility of equity returns are more likely to impact the ERP than equity betas, since beta is a relative concept, i.e. the market beta will always remain equal to one. In this context, analysis of comparator company equity betas since July 2007 shows no robust evidence of an increase. As such, ComReg will retain the proposed asset beta for Eircom of 0.57, as the preferred point estimate.

In considering the recent market evidence on the potential impact of the financial turmoil on the ERP, it was determined that the originally proposed range for this parameter was sufficient to accommodate potential variation in the ERP as a result of the financial turmoil. Oxera estimated the ERP to lie in the range of 4.8% to 6%. As a practical step and to allow for the possibility that turmoil persists, ComReg intends to apply the upper-end of the original ERP range (i.e. 6.0%) in the calculation of a point estimate of the WACC. The effect of using an ERP of 6.0% is

an increase in the cost of equity and the overall WACC vis-a-vis the midpoint of the original range.

AGCOM

As part of the previous measures (Resolution No. 344/01/CONS and Resolution No. 4/06/CONS), AGCOM[17] had estimated an ERP equal to 4%. In recent work by Dimson et al. (2007) the value of the premium for the risk of Italian market has been estimated at approximately 4.5%. In the current macroeconomic environment, with a trend to use by of academic and financial estimated of the ERP, forward-looking in as several empirical studies have shown that in times of crisis and ERP recession tends to increase rapidly (about 20%) and return to 'normal' when crises is over. Based on these considerations and in order to take into account the effects of the recent financial crisis, the Authority finds that 4.5% is an appropriate estimate for the ERP calculating the cost of equity of TI in optical perspective.

With reference to the estimate of the ERP, Telecom Italia believes that should be taken as a reference, not only the study of Dimson of 2007, as well as other academic studies, including that of Fernandez of 2009 and account for the effects of the recent financial crisis. Regard the latter, according to Telecom Italia should consider moving increase of 20% points estimated ERP.

With reference to comments from Telecom Italia on the estimates of the ERP, AGCOM states that the value of ERP used in the calculation of the WACC is that indicated in the study of Dimson et al. of 2007, which represents the study method used to determine the value of ERP in academic circles, as the survey also shows Fernandez (2009) quoted by Telecom Italia. In this regard, the observations of Telecom Italia about the possible effects that the recent financial crisis may have had financial on the ERP, the Authority has taken several empirical studies showing that in times of crisis and recession tends to ERP increase rapidly (about 20%) then go back to 'normal' values at the end of the crises. Therefore, a forward looking perspective it was considered appropriate used as the value indicated in the ERP study of Dimson et al. (2007) without providing any correction since, the crisis is finished, the value of ERP would return to his 'normal' value. In conclusion AGCOM confirms an ERP value of 4.5.

ARCEP

In previous decisions, the Authority has adopted a long-term value of 5% premium market. For 2012, the Authority[19] maintains this approach based on the historical value of long-term market premium.

OFCOM, ComReg and AGCOM all refer to studies carried out by DMS. The ERP ranges from 4.5 to 6%.

Appendix V - OTHER NRAs approach to the calculation of the Beta

OFCOM

In 2009, OFCOM[32] estimated the BT Group equity beta to be 0.9 and was based on a number of data points, with particular reference to the 2-year daily estimate of BT's beta measured against the FTSE Allshare index. Based on observed gearing of 38%, this equity beta equated to an asset beta of 0.61 for BT Group. OFCOM's approach so far was to look at both 1 year and 2 year equity betas, but to give greater weight to the 2 year data and then by looking at the average gearing, to estimate the asset beta accordingly. OFCOM then used the estimated asset beta to determine an equity beta at its assumed level of optimal gearing of 35%.

In its January consultation, OFCOM explained that in the past, more weight was placed on the 2 year beta however, mindful that the 2 year statistics included a period of the credit crisis, OFCOM gave greater consideration to the 1 year data in order to mitigate the impact of this potential distortion. Whilst they explained that they are not seeking to set out exactly when the credit crisis ended, OFCOM believes that by July 2009 the credit markets were in a more stable state than 6 months earlier. Therefore, OFCOM was of the view that the evidence on volatility suggests that a 2 year data 'window' from June or July 2009 to June 2011 is likely to be more robust, and less impacted by the credit crisis, than a 2 year window from January 2009 to January 2011.

OFCOM's[21] calculation is as follows:

- OFCOM used an observation of the actual gearing level of 50% over the relevant time period to estimate an east beta for BT Group. A gearing ratio of 50% was then used to re-lever the asset beta for BT group which reflected the average BT Group gearing over the period of beta measurement. OFCOM believes that the estimate of 50% is an appropriate estimate of the average gearing over the 2 year period, and for the purposes of re-levering the asset beta. OFCOM accepts that prospective gearing for BT Group may be lower than the average observed gearing. However OFCOM notes that the net effect of this on the cost of capital is negligible and therefore continued to opine to adopt a prospective gearing assumption of 50%.

- OFCOM asked Brattle to update its October 2010 report to take account of data to 6 June 2011 and it was concluded that the most recent data indicates little change in the level of BT Group's equity beta since March 2009.

- Using a debt beta of 0.15, Brattle estimates that BT's 2 year asset beta has increased from 0.47 to 0.53 (based on average gearing of 51%), whereas the one year asset beta has fallen from 0.54 to 0.50 (based on average gearing of 47%).

Based on the Brattle 2 year equity beta analysis, which suggested an equity beta range of 0.78 – 1.05 (from the 2 yr beta versus the FTSE All-share index) and debt beta mid-point of 0.15, we estimate an asset beta range for BT Group of 0.46 – 0.59. This range gives a mid-point of 0.52. Taking into account the evidence provided by Brattle and the responses to OFCOM's January consultation, OFCOM has taken the position that an appropriate range for Openreach's asset

beta would be 0.05 lower than BT Group asset beta range. This is equivalent to a range of 0.40 – 0.53 with a mid-point of 0.47.

COMREG

Based on Oxera's[6] assessment, it was proposed that Eircom's fixed-line asset beta was in the range of 0.45 to 0.70, with a midpoint estimate of 0.57. The asset beta used to set Eircom's current WACC was 0.8, which is above the upper end of the range proposed by Oxera. The range was estimated using a combination of methodologies and data sources explored by Oxera.

The first approach adopted by Oxera to estimate Eircom's asset beta involved the estimation of Eircom Group's beta as a proxy for Eircom's fixed-line beta. This approach incorporated three methodologies:

- Oxera carried out statistical estimation of Eircom's equity beta using different data frequencies (daily, weekly, monthly), different market indexes (FTSE in the UK, ISEQ in Ireland) and various time periods (between March 2004 and September 2005). The implied asset betas were de-levered from the equity beta estimates.

- Oxera also examined third-party estimates of Eircom's equity beta. These estimates came from Bloomberg and the London Business School Risk Management Service.

- Oxera considered the beta estimates of a set of comparator companies with a large proportion of value attributable to fixed-line operations.

Oxera used clustering analysis to select a set of markets (countries) to identify the appropriate comparator companies. The incumbent telecoms provider in each comparator country was chosen as the relevant comparator company. The equity betas of comparator companies whose business mix was most similar to that of Eircom's (i.e. with a large proportion of its operating profit attributable to fixed-line operations) were used as direct comparators to Eircom.

The second approach adopted by Oxera to estimate Eircom's asset beta involved the direct estimation of Eircom fixed-line beta using two proxies:

- Oxera analysed an extended set of comparator companies. The beta estimates for the comparators were disaggregated in order to estimate betas for the fixed-line business. The disaggregation was performed in order to control for the potential risk differential between different business activities (fixed versus mobile) in a robust manner. The result of this analysis is a range of estimates for the fixed-line operations of Eircom.

- Oxera looked at relevant regulatory precedent on the choice of asset beta for regulated telecoms incumbents in the UK and New Zealand as a proxy for Eircom's fixed-line beta.

- Oxera also included ComReg's beta estimate from the previous WACC review recognising the importance of regulatory precedent. Oxera did however note that caution should be applied when considering the estimates from the previous WACC review given the results of the methodologies undertaken by Oxera and the time that has elapsed since the last WACC review.

- The average of the results of each of these methodologies gave a final range estimate of Eircom's asset beta of between 0.45 and 0.7, with a midpoint of 0.57.

ComReg is of the view that the application of the various methodologies to produce a range for Eircom's asset beta constituted a rigorous and evidence-based approach. Each methodology acts as a separate data point in the analysis while also providing a cross-check on the other results. Nevertheless, in light of the above responses to the Consultation and in view of the sensitivity of the overall WACC range to the values of the underlying parameters, in particular the asset beta estimate, Oxera has undertaken further analytical work in relation to the proposed beta estimation performing a series of robustness checks. In particular, Oxera explored the use of market data to derive direct beta estimates, the application of clustering analysis and an analysis of the regulatory precedents used.

On the basis of the above analysis, ComReg is of the view that there is no reason for excluding direct estimates of Eircom's beta obtained from using market data. Following best practice, Oxera excluded the period prior to acquisition (i.e. the 'event' period between the start of acquisition rumours and the subsequent period when Eircom was acquired by Babcock & Brown). Oxera performed tests to confirm that the adopted approach was robust and the resulting betas estimates were statistically significant. In addition, Oxera shows that the liquidity of Eircom's stock during the listed period was comparable to that of other European telecoms companies.

ComReg therefore concludes that the range of 0.47 to 0.7, with a midpoint estimate of 0.57, should be retained for Eircom's asset beta in determining an overall WACC.

AGCOM

In order to estimate beta through regression, AGCOM[17] explained that it's important to consider i) the time horizon of the data, ii) the time interval (frequency) of data collection (data daily, weekly or monthly) and iii) the estimator considered most appropriate. The choice of time of evaluation is closely linked to that interval of data collection. AGCOM argued that whilst it is true that a large number of observations provide more robust estimates and are characterised by very low standard deviations, it is also true that using a long time horizon of observation time (series of many historical observations) runs the risk that the estimated beta value deviates significantly from the current beta. For these reasons, AGCOM generally estimated beta using historic daily data series not excessively going back in the past, with a number of observations ranging from a minimum of 250 to a maximum of 500 (corresponding to a time horizon ranging from one to two years).

Based on these considerations, the Authority has conducted an estimate of the TI beta using the time series of daily yield of the TI title and the market index FTSE All-Share Italy, as representative of approximately 95% of the Italian stock market . The estimate was made for two different time horizons (last year and the last two years) following the methodology of Newwey and West. In both cases (annual and biennual series), the beta estimate was approximately 0.85. In view that the values were very similar, it was not considered necessary to estimate another value based on extended historical series, even because such an extension would have run the risk of obtaining an estimate that does not reflect appropriately the current beta value.

The beta estimate (0.85) is a levered beta or a beta that takes into account the default risk related to TI's effective debt. In order to provide an estimate of beta of an efficient operator, it would be necessary to correct the beta. Since the average debt ratios of the major European incumbents (about 53%) is almost equal to the ratio of TI's actual debt TI (about 50% as at end January 2010), the Authority has considered it appropriate to use a notional gearing of 50%. Note that the value of the estimated beta is included in the estimated range of beta values indicated by the Authority's Resolution No. 4/10/CONS.

ARCEP

In previous decisions, ARCEP[19] has adopted a beta value of 1 on the premise that nothing suggested that long-term securities of electronic communications operators behave differently from the rest of the market. In the situation of crisis in the global economy, ARCEP argued that it became increasingly clear that operators of electronic communications, in view of the recurrence of its revenues mainly from subscriptions, are safe havens in the eyes of financial markets, and that, consequently, the observed decreases of these actors have declined. In reassessing the long-term value of 0.8, the Authority intends to take account of deployment of fibre to reduce the amortisation period of copper cables from 25 to 13 years and the risk associated with it. For the year 2012, the Authority therefore holds for the regulated activities of fixed operator, a 0.8 asset beta.

ANACOM

In order to determine its Beta, PTC – in view that it is not listed on the stock market – uses the value that results from historical behaviours of the returns on bonds of PT SGPS compared to return on the market. However, the Beta of PT SGPS does not represent the risk associated with the return of PTS since the risks associated with these two companies are different especially in view of the geographies in which they are present as well as the services they offer. Accordingly ANACOM[23] have considered to estimate the Beta of PTC based on a benchmark of companies that have similar activities. ICP-Anacom, determined an equity beta of 0.85 which was the result of the average of the betas calculated based on the use of benchmarks with comparable companies and regulatory precedents.

Appendix VI - OTHER NRAs approach to the calculation of the Cost of debt

OFCOM

In estimating BT's cost of debt, OFCOM[21] uses two inputs: The risk free rate and BT's debt premium.

In its last estimated BT's cost of capital in 2009, it was a time of great volatility and uncertainty in credit markets, and this uncertainty was reflected in elevated corporate bond yields. As a result OFCOM estimated BT's debt premium to be materially higher than in previous charge controls, at 3%. OFCOM argued that since 2009 credit markets have normalised and BT's debt now offers debt investors yields of 2% - 2.5% above benchmark gilt levels. OFCOM believes this is a reasonable medium term-assumption for BT, which has a credit rating of BBB- with S&P. OFCOM took note of the yield available on BT's 2016 sterling-denominated bond, over and above benchmark gilt yields. OFCOM observed that during the past 12 months, the spread has been broadly between 2% and 2.5%, with a brief dip below 2% during January 2010, and a brief peak above 2.5% in June 2010.

In view of the above OFCOM set a debt premium of 2% - 2.5% which they believe is consistent with the average gearing level assumption of 50%.

AGCOM

In order to estimate the premium for the debt, the Authority[17] examined the spreads on the risk free rate of the bonds issued by Telecommunications Industry ("TI") on the secondary market. Furthermore, in order to be consistent with the methodology used for the calculation of the risk free rate, it was considered appropriate to consider two bonds of TI with a remaining maturity of ten years and the yield of a BTP of the same duration in the last two years. AGCOM has calculated the bond spreads of TI on year BTPs using a moving average (in order to purify the trend by temporary variations). The value was almost constant at approximately 1.71%. The Authority believes that this value indicated the premium for the debt to be added to the risk fee rate (3.9%) to obtain the cost of debt for TI. Based on these considerations, the Authority finds that the cost of debt is equal to 5.61% for TI.

ARCEP

In previous decisions, ARCEP[19] considered the risk premium of the debt based on various analyses such as:

- The study of the evolution of the risk premium for bonds from composite indices of the economic sector concerned;

- The study of the evolution of the risk premium for bonds of composite indices credit ratings correspond to normative operators in the sector of activity concerned;

- The study of the risk premium actually served by the bonds issued by regulated operators to the relevant date;

- Taking into account macroeconomic conditions of funding to the relevant date.

ARCEP estimated that for fixed activities regulated, given the debt structure of long-term retention and regardless of the actual credit rating of the specific operator France Telecom, which boasts a state participation, the debt risk is the risk of a non-financial BBB rating. Therefore, for debt issued in 2012, the Authority estimator takes the bonus debt supported by the fixed operators engaged controlled value of "benchmark spread 1" index I-boxx in bonds issued by non-financial corporation's BBB rating and maturing ranging from 7 to 10 years. ARCEP holds a value of 1.6% for the risk premium of the debt. The value adopted by ARCEP for 2012 is higher than that adopted for 2010 and 2011 (1.3%). Because of the long-term approach of the Authority, this value is also lower than the value of most recent risk premium of debt (2.6% through August 2011 for the index of I-boxx non-financial corporate bonds rated BBB and maturity of 7 to 10 years).

ANACOM

Debt premium: Due to a shortcoming in measuring PTC's debt premium directly, and considering that for the gearing and beta values, the methodology used was on a benchmarking encompassing the same comparable companies, ANACOM[23] deemed it suitable to resort to benchmarking in determining the debt premium. Credit Default Swap Spreads for comparable companies with issuance of 10 year bonds and a 2 year data series were used resulting in a value of 0.99% for the debt premium. For a more consistent result, in view that in the past PTC has been financed by its sole shareholder (PT SGPS), consideration was also given to the debt premium which results from the database of Bloomberg which reflects those telecommunications companies with a BBB rating (identical to the current rating PT SGPS). Considering the data series of the last two years (January 2007 to December 2008), this value is determined at 1.48%. Considering the above two data sets, ANCOM established a value of 1.23% which corresponds to the arithmetic average of the two data sources.

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