

Final Decision

Methodology for calculating the cost of capital rate of PT Comunicações, S.A., which applies from the 2012 accounting year

December 2013

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1. Framework

The cost of capital rate corresponds to the appropriate rate of return for compensating the investment's opportunity cost. In the context of the telecommunications market regulation, the rate's definition aims: (i) to ensure the proper incentives to the investment; (ii) to ensure that there are no market distortions, through discriminatory and anti-competitive practises; (iii) to avoid any barriers to the entry of new competitors; and (iv) to protect consumers from excessive prices. It is imperative to define a methodology that allows the calculation, without any accounting and analytical constraints, and in an appropriate way, the cost of capital rate for compensating the investments of regulated companies.

Law No. 51/2011, of 13 September, provides, in paragraph 2 of article 74, that in imposing the obligations relating to cost recovery and price controls, including obligations for cost orientation of prices and obligations concerning cost accounting systems, the National Regulatory Authority (NRA) must take into account the investment made by the operator, allowing him a reasonable rate of return on the capital employed, taking into account any associated risks.

On the other hand, Commission Recommendation of 8 April 1998 (paragraph 5.1 of the Annex thereto), indicates that: "*charges for interconnection be cost-oriented, including a reasonable return on investment*" and that "*the cost of capital of operators should reflect the opportunity cost of funds invested in network components and other related assets*".

Paragraph 5.1. of the referred Annex provides also that "*The cost of capital of operators conventionally reflects the following: the (weighted) average cost of debt for the different forms of debt held by each operator; the cost of equity as measured by the returns that shareholders require in order to invest in the network given the associated risks, and the values of debt and equity. This information can then be used to determine the weighted average cost of capital (WACC) using the following formula: $WACC = r_e * E/(D+E) + r_d * D/(D+E)$ where r_e is the cost of equity, r_d is the cost of debt, E is the total value of equity and D is the total value of interest-bearing debt.*"

By determination of 10/02/2010¹ (hereinafter referred to as "determination of 2010"), ICP - ANACOM defined the methodology for calculating the cost of capital rate of PT Comunicações (PTC) for the three-year period 2009-2011.

¹ [Calculation of the cost of capital of PTC](#)

This determination intended to reduce the lack of predictability associated to the calculation of PTC's cost of capital rate and at the same time to provide greater regulatory certainty, in a framework of greater transparency for all stakeholders, given that, historically, the process of cost of capital allocation was undertaken subsequently to the accounting year.

The *ex-ante* establishment of transparent rules regarding the determination of the cost of capital rate contributes to a predictable environment to which agents may adjust, anticipating and managing their expectations more effectively.

In this regard, it is stressed that the implementation of a methodology defining *a priori* the cost of capital rate is common practice in several countries, such as Ireland², France³, Belgium⁴ and Germany⁵.

Moreover, when *ex-ante* standards are set out, the need for further investigations, which are typically complex, lengthy, and the matter of disputes, is reduced.

As a result of the determination of 2010, a cost of capital rate of 10.3% was defined, for the 2009-2011 three-year period, having been defined a transition period to allow PTC to adjust its operations to the cost of capital rate resulting from this methodological change (12.3% in 2009, 11.3% in 2010 and 10.3% in 2011).

The referred determination also provided that in case any extraordinary situation occurred, during the period in question, which significantly impacted the validity of assumptions taken into consideration as regards the parameters of a macro-economic nature, and as such external to PTC (risk-free interest rate, tax rate and risk premium), the parameters would be liable to revision.

In the course of the 2009-2011 period, the rate was reviewed twice (2010 and 2011), mainly due to significant changes in the risk-free interest rate and tax rate, resulting in a rate of 11.6%⁶ compared to 11.3%, in 2010, and of 11.7%⁷ compared to 10.3%, in 2011.

² [Response to Consultation and Decision Notice - Eircom's Cost of Capital](#)

³ [Décision fixant le taux de rémunération du capital employé pour la comptabilisation des coûts et le contrôle tarifaire des activités fixes régulées de France Télécom pour l'année 2012](#)

⁴ [Decision of the BIPT Council of 4 May 2010 regarding the cost of capital for SMP operators](#)

⁵ http://www.bundesnetzagentur.de/cln_1931/DE/DieBundesnetzagentur/Beschlusskammern/1BK-Geschaeftszeichen-Datenbank/BK3-GZ/2012/2012_001bis099/BK3-12-089_BKV/BK3-12-089_Konsultationsentwurf_BKV.html?nn=76940

⁶ [Rate of cost of capital of PTC - decision approved on the revision of the calculation of the rate for 2010 and 2011](#)

⁷ [III. Análise da taxa de custo de capital proposta pela PTC](#)

The current environment of uncertainty and financial instability requires an increased responsibility as regards the definition of the cost of capital rate which, as referred, must reflect, on the one hand, a correct opportunity cost of investors and, on the other, a regulatory and price stability for companies and consumers.

Consequently, having expired the 2009-2011 regulatory period, it is essential to reassess and define the methodology for calculating parameters, namely the risk-free interest rate, the beta factor, the risk premium, the gearing⁸, the tax rate and the rate of borrowed capital, so that the rate to be applied as from the 2012 accounting year is appropriately calculated.

For this purpose, ICP - ANACOM awarded to Bakertilly (BT) a consultancy work on PTC's cost of capital rate, the final study of which (available at this Authority's webpage) includes: (i) a detailed analysis of parameters; (ii) an update of data required to calculate the rate; and (iii) where appropriate, a suggestion of alternative methodologies to calculate parameters.

For analysis and in order to complement this work, other sources of information were also taken into consideration, such as recent decisions issued by NRAs, studies undertaken by consulting firms, as well as academic research.

In the light of the above, this document is intended to analyse and to define a set of methodological principles supporting the calculation of PTC's cost of capital rate, which applies as from the 2012 accounting year.

ICP - ANACOM adopted a draft decision which was approved on 02/08/2013. The respective hearing report integrates this decision.

Later, by determination of 18/10/2013, the Management Board of ICP - ANACOM approved the notification of the draft decision to the European Commission, to BEREC and NRAs of other Member States of the European Union, under paragraph 3 of article 7 of Directive 2002/21/EC, as amended by Directive 2009/140/EC. On 25/11/2013, the European Commission assessed the notified draft decision, making no comments on the matter.

⁸ Gearing - quotient obtained by dividing the average value of borrowed capital (the average of the sum of medium- and long-term financing) by the average value of invested capital (equity average + borrowed capital average).

2. cost of capital rate

Bearing in mind that this work seeks to define the methodology for calculating the parameters required to determine the cost of capital rate that applies as from 2012, the various approaches for determining each of the parameters required to calculate the referred rate are analysed and assessed below.

It must be referred that, as far as parameters are concerned, the calculation of which was based on a benchmark methodology, by using comparable companies, the criteria for choosing these bodies were not altered as regards the determination of 2010, as the BT report shows.

As such, and like the previous determination, companies were chosen according to the per capita income of the respective countries; provision of similar products; market position; growth rate and value of the company. PT SGPT was also taken into account as a reference, notwithstanding the reservations that arise in case it was considered individually, given the wide range of geographic markets it covers and services it provides. Consequently, the list of companies selected does not differ from that used in the previous determination (see table 1).

Table 1 – Comparable companies

Comparable companies
Belgacom
BT Group
Deutsche Telekom
France Telecom
Hellenic Telecommunications
Elisa OYJ
KONINKLIJKE KPN NV
Magyar Telecom
Swisscom
Telekom Austria
Telecom Italia
Telefonica
Telenor ASA
TeliaSonera AB
PT SGPS

Regulatory precedents were used as reference, and as such only for comparative purposes. Bodies that have issued decisions recently and whose information is fully available and published at this moment in time (see table 2), were taken into consideration. It is stressed that,

except for the Portuguese example, all regulatory precedents that have been considered concern decisions in the telecommunications sector. The inclusion of the Portuguese example as regards the energy sector is deemed to be relevant as it focuses on the same market, and for the timeliness of the decision.

Table 2 – Regulatory Precedents⁹

Countries	Regulator	Date of the last decision
Belgium	Institut Belge des services Postaux et des Télécommunications (“IBPT”)	May-10
Spain	Comisión del Mercado de las Telecomunicaciones (“CMT”)	Dec-12
France	Autorité de Régulation des Communications Électroniques et des Postes (“Arcep”)	Dec-11
Ireland	Commission for Communications Regulations (“ComReg”)	May-08
Italy	Autorità per le Garanzie nelle Comunicazioni (“Agcom”)	Nov-10
UK	Independent regulator and competition authority for the UK communications industries (“Ofcom”)	Jul-11
Portugal	Energy Services Regulatory Authority (“ERSE”)	Dec-11

2.1. Definition of the cost of capital rate

The determination of 2010 provided *a priori* for the definition of the rate to prevail for the 2009-2011 three-year period, establishing a review mechanism for parameters of a macroeconomic nature, in the course of that three-year period, namely the risk-free interest rate, the risk premium and the tax rate. Having examined this procedure closely, and as it is deemed that the current macroeconomic context advises that values of parameters used are updated on a regular basis, the methodology for calculating the cost of capital rate, to be applied as from 2012, was defined *a priori*. The rate is to be updated every year, by the end of the 1st half of the year concerned, according to the availability of data required for the calculation, in compliance with the calculation methodology described below.

Nevertheless, in case it is found that a criterion and/or source of information may not be updated, there are grounds for replacement - which may be triggered by either party, by the end

⁹ [Decision of the BIPT Council of 4 May 2010 regarding the cost of capital for SMP operators](#); [Resolución sobre el procedimiento sobre el establecimiento de la nueva metodología de cálculo del coste del capital medio ponderado \(WACC\) de los operadores declarados con poder significativo de mercado por la Comisión del Mercado de las Telecomunicaciones, así como la estimación del WACC regulado para el ejercicio 2012 de los operadores obligados \(MTZ 2012/1616\)](#); [Décision fixant le taux de rémunération du capital employé pour la comptabilisation des coûts et le contrôle tarifaire des activités fixes régulées de France Télécom pour l'année 2012](#); [Response to Consultation and Decision Notice - Eircom's Cost of Capital](#); [Definizione di un modello di costo per la determinazione dei prezzi dei servizi di accesso all'ingrosso alla rete fissa di Telecom Italia S.p.A. e calcolo del valore del WACC ai sensi dell'art. 73 della delibera n. 731/09/CONS](#); [WBA Charge Control - Charge control framework for WBA Market 1 services](#)

of the first third of the concerned year - and subsequent submission to a prior hearing. Otherwise, the calculation will simply be updated, on an annual basis.

2.2. Overall methodology

The current methodology for calculating the cost of capital rate is based on the weighted average cost of capital (WACC), in the variant of the pre-tax nominal WACC formula.

In methodological terms, the weighted average cost of capital is a weighted average of the cost of equity and the cost of borrowed capital, and corresponds to the minimum rate of return required to attract funds for a specific investment, as explained in the formula below:

$$\text{WACC}_{\text{pre-tax}} = [\text{Ke} \times (1 - \text{G}) + \text{Kd} \times \text{G} \times (1 - \text{ti})] \times \frac{1}{(1 - \text{ti})}$$

Where:

Kd is the cost of borrowed capital;

G corresponds to gearing, that is the weight of borrowed capital compared to the total amount of invested capital; and

ti is the corporate income tax rate.

Ke corresponds to the equity cost, computed on the basis of the Capital Asset Pricing Model (CAPM), by means of the following formula:

$$\text{Ke} = \text{Risk - free interest rate} + \beta \times \text{Risk premium}$$

Where:

Risk-free interest rate is the rate that compensates investment on risk-free assets.

β : corresponds to the covariance between the profitability of a company's shares and that of the stock market as a whole, that is to say, it reflects the risk of the company's shares compared to the market risk.

Risk premium corresponds to the difference between the rate of return provided by the stock market and that provided by risk-free investments.

According to a survey carried out by the Board of European Regulators of Electronic Communications (BEREC), international experience supports the use of the above-mentioned methodologies, which are shared by various operators in regulated industries in several countries (see table 3), and which are deemed to be common practise and recommended by regulators.

Table 3 – Methodologies used in the telecommunications sector

Country	Methodology for calculating cost of capital rate	Methodology for calculating equity cost
Austria	WACC	CAPM
Belgium	WACC	CAPM
France	WACC	CAPM
Spain	WACC	CAPM
Italy	WACC	CAPM
Ireland	WACC	CAPM
Poland	WACC	CAPM
Norway	WACC	CAPM
Sweden	WACC	CAPM
Switzerland	WACC	CAPM
UK	WACC	CAPM
Netherlands	WACC	CAPM

Source: BEREC

Again according to the *Principles of implementation and best practices* (PIBs) as regards the methodology for calculating the cost of capital rate, developed within the Independent Regulators Group - the IRG¹⁰ - now referred to as BEREC, the WACC (PIB 1) is a consensual methodology for computing the cost of capital rate, and the CAPM (PIB 4), compared to the alternatives (e.g. Fama French Model, Arbitrage Pricing Theory) is better suited to the calculation of the cost of equity.

The CAMP is the model most commonly used¹¹, as it presents a clear theoretical basis and it is simple to implement. It is based on the efficient portfolio theory, according to which, in a market,

¹⁰ Available at [Principles of Implementation and Best Practice for WACC](#)

¹¹ Graham and Harvey (2001), *The theory and practice of corporate finance: evidence from the field*, *Journal of Financial Economics*. The research conducted with 400 CFOs showed that ¾ use the CAPM method.

economic actors will invest in an efficient portfolio, that is, in a portfolio which maximizes results foreseen for a given level of risk, taking into account each actor's degree of aversion to risk.

Pre-tax WACC vs. post-tax WACC

The formula to calculate the pre-tax WACC results from the adjustment to the tax in the formula of the post-tax WACC:

$$\text{CMPC}_{\text{pre-tax}} = \text{CMCP}_{\text{post-tax}} \times \frac{1}{(1 - \text{ti})}$$

The main advantage of the pre-tax methodology, compared to the post-tax methodology, is that the former includes the tax cost, and as such this cost is allocated to products and services via the capital cost. On the contrary, the use of a post-tax methodology tends to allocate the tax cost via common costs. In this context, while this last option promotes the increase of common costs, the pre-tax methodology, in the scope of regulatory accounting, allows for allocation which observes causal links in a more appropriate way.

In the light of the above, and whereas: (i) the Commission's recommendation provides for the calculation of the cost of capital rate based on the WACC methodology; (ii) WACC and CAPM methodologies were used in the definition of the cost of capital rate for the 2009-2011 three-year period; (iii) these methodologies were consensual in the scope of the public consultation for computing the 2009-2011 rate; (iv) these methodologies continue to be used by European regulators and (v) the use of the pre-tax WACC shows significant advantages, within the regulatory cost scope, compared to the use of the post-tax WACC, it is deemed that there is no reason why the determination of 2010 should be changed, thus the pre-tax nominal WACC and CAPM methodologies must be maintained in the calculation of PTC's cost of capital rate to be applied from the 2012 accounting year.

Methodology to be applied from 2012

The cost of capital rate shall continue to be calculated based on the pre-tax weighted average cost of capital (pre-tax WACC) and the cost of equity shall be computed based on the Capital Asset Pricing model (CAPM).

2.3. METHODOLOGY OF PARAMETERS

A. RISK-FREE INTEREST RATE

The risk-free interest rate reflects the rate of return on risk-free assets. In financial and regulatory practice, treasury bonds are generally considered to a reliable indicator and good parameter for reflecting an absence of risk. A similar position is included in the IRG's PIBs with respect to the risk-free interest rate (PIB 6¹²).

In the previous regulatory period (2009-2011), as a result of the determination of 2010, the risk-free interest rate was initially calculated by using 10-year T-bonds issued by the Portuguese State (series with monthly observations, corresponding to the two years preceding the determination period - 2007 and 2008).

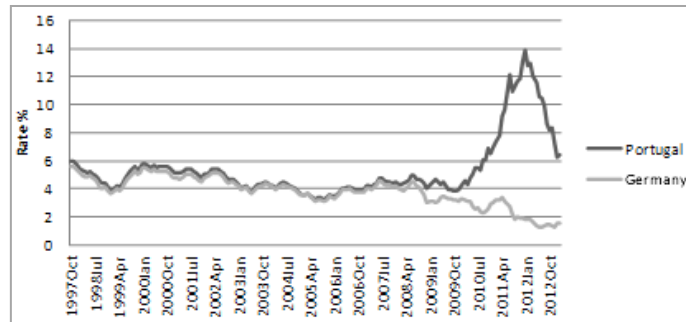
The development of the international financial crisis caused great instability in financial markets, namely at the level of sovereign debt, and this led to the atypical behaviour of the implicit interest rate of national T-bonds. In the opinion of this Authority, this raised the question whether it was reasonable to use T-bonds as proxy for the risk-free interest rate indicator. This situation resulted in the review of this parameter in 2011, and ODP's implicit rates (yields) were then used, between 2010 and 2011, from the selected set of countries (Belgium, Spain, France, Ireland, Italy and Portugal) on which the determination of 2010 was based, that were part of the same currency area.

At the present time, the macroeconomic environment is not too distant from the scenario that led ICP - ANACOM to consider that interest rates implicit in Portuguese T-bonds could hardly be deemed to be a good proxy for the risk-free interest rate.

Moreover, comparing the behaviour of Portuguese bonds and that of German bund (a reference in the Euro zone), it is clear that, up to mid-2007 (see chart 1), both bonds show a very similar behaviour, and in the last few years, the gap between the referred implicit rates has widened, and its variance, that is, the difference compared to the average rate, has increased, no longer being a value around zero.

¹² The IRG considers that T-bonds provide a reliable parameter that can be used as a good proxy for the risk-free interest rate. It is likewise stressed that certain selection criteria must be taken into account, with respect to the maturity, the period of the data series and the market where the company operates.

Chart 1 – Portuguese T-bonds vs. German Bund



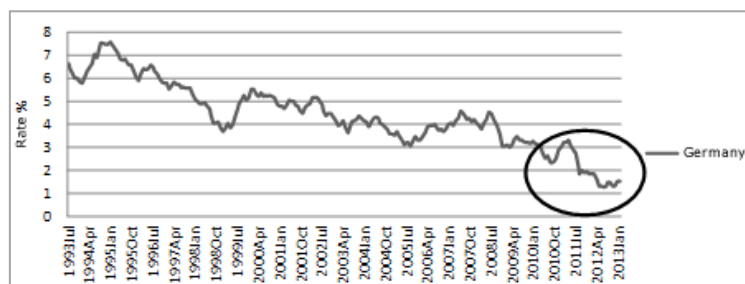
Source: European Central Bank

In the light of the above, some alternative approaches are now presented for the calculation of the risk-free interest rate, considered in the Baker Tilly report and also resulting from internal analysis.

BT’s report suggests the possibility of using German bonds as representative of risk-free rates. However, in the light of the current financial crisis, the use of German bonds may not be the most appropriate solution, given that German government bonds had shown a behaviour that is significantly different from the historical average (see chart 2), which indicates a possible “refuge” effect due to the uncertainty that prevails in financial markets.

In this respect, it should be recalled that the German State has issued government debt at extremely low interest rates, in some cases even negative rates, which likely makes the exclusive use of this source to compute the risk-free interest rate a less robust option.

Chart 2 – German Bund

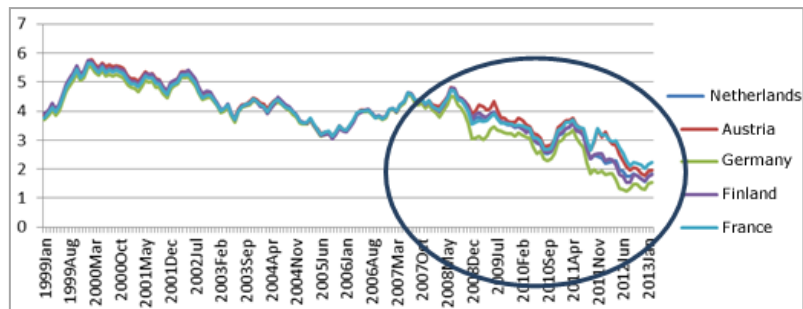


Source: European Central Bank

Na alternative approach, according to BT’s report, would be to use the average of implicit rates (monthly observations - two years) of 10-year bonds of main Euro Zone countries with AAA-rating (Austria, Germany, Finland, France, the Netherlands and Luxembourg).

The choice of this approach allows an alternative proxy for the risk-free interest rate; nevertheless, as referred in the case of Germany, bonds for any of the AAA countries, in the most recent observations, show an atypical behaviour compared to the historical average (see chart 3), indicating also a possible “refuge” effect due to the uncertainty that prevails in financial markets.

Chart 3 – Interest rates for countries with AAA-rating



Source: European Central Bank

In this sense, the choice for this approach could also underestimate the value of the risk-free interest rate and consequently that of the cost of capital rate, and given that the appropriate cost of capital must be computed so as to maintain the correct incentive to investment, this approach may not be the most adequate.

In the alternative, according to BT, a more robust approach than those presented hitherto could be the consideration of a composite of Euro Zone countries. This approach has the advantage of considering all countries of the Euro zone, with a broader scope and preventing any observations that are over-influenced by current macroeconomic constraints.

Taking into account the above-mentioned range of alternatives, the definition of the methodology for opting for the best proxy for the risk-free interest rate is based on two main aspects: (i) the relevant market and (ii) the maturity and type of series:

(i) *Relevant market*: Taking into account the current macroeconomic context in Portugal, and given that it is not possible to take as reference the government bond yields, as referred earlier, the best alternative to calculate the risk-free interest rate would be to consider the money market in which the Portuguese economy is integrated, that is, the Euro zone. As such, the best proxy for the risk-free interest rate is obtained through the average of implicit rates of ODP’s of countries that make up the Euro zone, weighed by the respective GDP.

(ii) *Maturity and type of series*: The maturity should be assessed according to the return expected by shareholders, the average period of depreciation of PTC’s assets and the

regulatory period. In the previous determination, a 10-year maturity was taken into account, and that view is maintained for this determination also. As regards the type of series, that is, whether it should be based on historical observations or on current observations (observations of the day), and also the frequency of observations to be considered (monthly or quarterly) - it is deemed that, for regulatory purposes - and bearing in mind that volatility is intended to be minimised and that the rates observed on a particular day may contain distortions, which would be smoothed out in a historical series - the series to be used should be historical, covering a relatively long time period, for which purpose a period of two years is deemed to be appropriate, as referred to in the previous determination. As regards the frequency of observation, it is noted that the use of monthly series has advantages over quarterly series, allowing: (i) greater detail of the sample considered, and (ii) mitigating errors in the calculation of the series average, thus the use of a series based on monthly observations is considered appropriate, just as in the previous determination.

For ease of reference, it is noted that recent regulatory decisions are in generally in line with the methodological approach intended to be followed (see table 4).

Table 4 – Regulatory precedents

Regulatory body	Financial instrument	Maturity	Series
IBPT	Belgian bonds	10 years	3 years
CMT	Spanish bonds	10 years	6 months, daily observations
Arcep	Spot yield 15/12/2011	10 years	N/A
ComReg	Spot yield average (02/07/2007) of Irish bonds + regulatory precedents	10 years	N/A
Agcom	Spot yield	10 years	N/A
Ofcom	Spot yield	5 years	N/A
ERSE	Bonds of five Euro Zone countries with AAA-rating	10 years	3 years

Source: Website of the respective regulators and BT report

N/A - Not applicable

Methodology to be applied from 2012

In the light of the preceding points, the risk-free interest rate must be computed based on the GDP weighted average, (source: Eurostat) of the respective country, of implicit rates (yields) of 10-year T-bonds, of all Euro zone countries (historical series, based on monthly observations during the two years preceding the year of decision - source: European Central Bank).

B. RISK PREMIUM

By definition, the risk premium corresponds to excess financial return, that is, it represents the difference between the risk of investing in the stock market and investing in risk-free assets. In the calculation of the risk premium, ICP - ANACOM has used international benchmarks, a practise which has been followed by several European regulators (see table 5).

Table 5 – Regulatory Precedents: Risk premium

Regulatory Body	Methodology
IBPT	Historical databases + Teacher surveys + Regulatory precedents + Bottom-up database
CMT	Database: Ibboston Associates + DMS + Credit Suisse (HOLT) + Pablo Fernandez + Average of Investment banks. The median value was used.
Arcep	Historical database
ComReg	Dimson, E., Marsh, P. Staunton, M. (2006), Global Investment Returns Yearbook + Regulatory precedents
Agcom	Dimson, E., Marsh, P. Staunton, M. (2007), Global Investment Returns Yearbook
Ofcom	Dimson, E., Marsh, P. Staunton, M. (2010), Global Investment Returns Yearbook
ERSE	Survey to market agents - Pablo Fernandez, Javier Aguirreamalloa, Luis Corres, (2011) - IESE Business School - 6014 responses from 56 countries. In the Portuguese case, the survey had 33 valid responses.

Source: Website of the respective regulators and BT report

Both in methodological and conceptual terms, the determination of the expected risk premium of the stock market is not a consensual task. In addition, the risk premium varies over time according to how investors perceive the risk of the asset in question and also according to their attitude towards risk, which makes it advisable to regularly update this variable.

Given that the risk premium is an extremely volatile variable, the focus should be put on observations based on longer data series, as supported by Damodaran in his study on this subject¹³, where it is referred that observations based on longer data series outweigh the benefit of more relevant observations associated with shorter and more recent periods, as the former provide for a smaller standard error. In this sense, the result tends to become more consistent as the period considered is lengthened.

¹³ Damodaran, Aswath, "Equity Risk Premiums", Stern School of Business.

Moreover, as mentioned in the determination of 2010, the current practice for estimating the market premium consists in the use of premiums made and observed over long historical series (25 to 100 years). However, this premium (calculated on the basis of *ex-post* data) may not correspond to the expectations of investors at the time the investment decision is made. After all, what matters is the opportunity cost of capital, which is only available and is only relevant at the time the investment decision is taken. This, in turn, requires that current market conditions, as well as future perspectives, are taken into account.

In this sense, as referred by BT, it is considered appropriate to use estimates based on future expectations (*ex-ante*), the calculation being based on Damodaran¹⁴ data and on studies by Pablo Fernandez, which are publicly available and deemed to be reference authors.

In the light of the above, and whereas: (i) the parameter must be updated on an annual basis, taking into consideration the methodology applicable as from 2012 (see point 2.1); (ii) not all databases used in the determination of 2010 are available, which makes the calculation not so transparent; (iii) the use of regulatory precedents is not very appropriate, given that many regulators use themselves the benchmark as methodology, it is deemed that Damodaran and Pablo Fernandez's data should be used.

Methodology to be applied from 2012

The risk premium shall be calculated based on a simple average of *ex-ante* data - Pablo Fernandez and Damodaran (calculated in the year preceding that of the decision, taking future expectations into consideration), for Portugal.

C. BETA

As mentioned above, the determination of the systematic risk of risk assets quoted on the stock exchange is based on the CAPM methodology. Systematic risk corresponds to the general risk of the market, representing the risk related to all aspects (e.g. political, economic, etc.) which can impact the behaviour of investors. This risk is different from the individual risk of each of the listed securities, being a non-diversifiable risk of the market considered as a whole.

¹⁴ [Aswath Damodaran](#)

The share's systematic risk is defined by calculating its beta, which in the context of defining the company's cost of capital corresponds to the equity beta.

Two alternative methodologies would be valid for calculating the beta: i) to estimate the beta for PTC based on a benchmark of companies with similar activities or, ii) to seek to infer the beta for PTC on the basis of the beta of PT SGPS.

As referred in the determination of 2010, as regards the second alternative, the calculation of the beta of each activity of PT SGPS would be required, with a careful economic analysis of each one in the different geographies in which they operate, an exercise which, in the case of operations not covered by the stock market (for example TMN's activity) would inevitably call for the use of benchmarking.

Subsequently, it would be necessary to assess activities mentioned above in order to weigh their impact on the beta of PT SGPS. Most assessments carried out by analysts, based on the most common methodologies, such as Discounted Cash Flow and the Enterprise value/EBITDA ratio, showed that results can vary depending on the assumptions used.

Accordingly, given the inherent discretion embedded in the definition of the market value of a company's activities, the alternative which could be considered would consist of the evaluation of each activity of Grupo PT, at book value, which however could have several limitations arising, for example, from the fact that assets have different maturities and are often shared by different activities.

Accordingly, the benchmark was deemed to be the most plausible and consistent alternative for the definition of the beta, as laid down in the determination of 2010. As regards the benchmark methodology, the use of comparable companies is proposed, given that, although regulatory precedents are deemed to be a good reference (see table 6), they may distort final results, given that in most cases, the methodology used by regulators is also based on a benchmark.

Table 6 – Regulatory Precedents: Beta

Regulatory body	Methodology
IBPT	Beta calculation via the Modigliani-Miller method, adjusted according to the financial structure
CMT	Comparable companies - 5-year series - weekly observations
Arcep	Beta of regulated activities
ComReg	Statistical model estimate + External estimates + Peer comparison + Implicit beta - fixed business + Regulatory precedents
Agcom	Beta Telecom Italia (2/3 year historical series)
Ofcom	Composite of beta for BT and for other service companies
ERSE	Beta of EDP's equity - Daily rates in the last 2 years

Source: Website of the respective regulators and BT report

As far as the benchmark of comparable companies is concerned, the methodology for calculating the beta, as in the determination of 2010, has the following underlying characteristics:

- Use of the Harris and Pringle model¹⁵ to calculate the equity betas of comparable companies. The formula allows the asset's beta to be calculated, i.e., the beta without the effect of capital structure, later leveraged with the capital structure defined as optimal for PTC;
- Frequency of observations: beta can be estimated through observations made on a daily, weekly, monthly or quarterly basis. The number of observations matters because it contributes to the reduction of estimate uncertainty. In fact, just as with the risk-free interest rate, the option for using monthly observations was taken;
- Period of time: taking short series into consideration may distort results and remove relevant information. In fact, the most recent observations contain effects which may not represent future expectations appropriately, thus series of a period long enough to correct the volatile effects that can be felt in the short term should be used. The beta shows fluctuations over the business cycles of the company and it is noted that, in fact, PT has been undergoing since 1995 significant changes with respect to its activities' structure, with the liberalization of the sector, the internationalization of the group, technological innovation and the diversification of services provided. In this context, it is considered that the series' period should incorporate relevant observations to ensure that the result is robust and representative of the risks inherent in the company's current structure. European regulators clearly seem to prefer 5-year periods, which allow a high level of robustness and certainty of results obtained;

¹⁵ Harris and Pringle's calculation formula is deemed to be the formula most in line with reality. $(\text{Equity}) \beta = (\text{Asset}) \beta (1 + D/E)$ where: D/E – capital structure.

- Beta data are taken from Bloomberg and correspond to the values resulting from the Bayes formula, that is, the adjusted Beta¹⁶. This adjustment provides a more robust estimate and less volatile fluctuations.

Methodology to be applied from 2012

In the light of points listed above, the beta must be calculated using the benchmark of comparable companies.

Data correspond to adjusted betas of comparable companies, provided by Bloomberg - historical series for the five years preceding the decision year, with monthly observations. Moreover, data from Bloomberg must be unleveraged from the financial structure and later leveraged, using the Harris and Pringle model (equity $\beta = \text{asset } \beta * (1 + D/E)$), using the gearing defined for PTC for the decision year.

D. GEARING

Gearing corresponds to the company's financial structure, being determined by the weight of debt capital in the total invested capital. The determination of the company's financial structure is obviously very important in the scope of the determination of the WACC. The choice of the optimal ratio between equity and debt, in order to optimize the WACC, is known as the optimal capital structure.

There are several methodologies which can be used to calculate gearing, and which have been used by European regulators: (i) real gearing, (ii) target gearing; (iii) optimal gearing; and (iv) regulatory precedents.

In general, it is observed that several European regulators (see table 7) have adopted optimal gearing, using benchmarks, an option which was chosen in the previous determination and which has several advantages, namely as: (i) it increases regulatory predictability and certainty; and (ii) it eliminates the volatility of gearing in terms of the funding policies pursued by the companies, thereby promoting efficiency and transparency.

¹⁶ The beta of a company can be presented as an adjusted or a raw beta. Raw beta (or historical beta) is based on the comparison between the security return and the market return. Adjusted beta is an estimate for the future return of the security compared to market return. It is initially based on historical data, an adjustment being made, assuming that the beta of the security under consideration will always tend to the average return provided by the market. The formula for calculating the adjusted beta is: adjusted Beta = 0.67*(raw beta) + 0.33*(1).

Table 7 – Gearing regulatory precedents

Regulatory body	Methodology
IBPT	Benchmark of comparable companies and regulatory precedents
CMT	Benchmark of comparable companies
Arcep	Ratio of regulated activities
ComReg	Regulatory precedents +comparable companies + implicit gearing
Agcom	Benchmark of comparable companies
Ofcom	Historical ratio
ERSE	Not available

Source: Website of the respective regulators and BT report

It should be noted that optimal gearing may also be calculated by setting up a financial model that simulates the performance of the company for different levels of gearing, thus maximizing the company's value. This model requires a large amount of information, which is not always available (e.g. value of the company name, debt ratios, continuity of operations, etc.) and may also call for the definition of a set of subjective assumptions (e.g., analysis of the business, company book value or market value of the company name; debt fair value, etc.).

In this respect, and considering existing limitations, it is deemed, as in the previous determination, that the most appropriate methodology consists in the use of a benchmark, which may be computed via comparable companies. In order to guarantee the overall coherence of the proposed methodology, the selected comparable companies are those which were considered for the determination of beta, including PT SGPT, and a five-year historical period was also taken into account. Data were taken from Bloomberg and correspond to reports and accounts of companies, given that this is audited information.

Methodology to be applied from 2012

In the light of points listed above, the gearing must be calculated using the benchmark of comparable companies.

Data correspond to gearings of comparable companies in reports and accounts, as provided for by Bloomberg - historic series for the five years that precede the decision year.

E. DEBT PREMIUM

The rate of borrowed capital reflects the interest rate for medium and long term debt financing. Taking into consideration the methodology followed in the previous determination, it is deemed reasonable to calculate that rate based of the risk-free interest rate to which the debt premium¹⁷ is added.

Given that PTC does not issue bond loans, it could be argued that the debt premium corresponded to that of PT SGPS. It should be noted, however, that if the debt premium of PT SGPS was solely taken into consideration, PTC and PT SGPS would be made equal as regards the rating assigned to companies. This could prove to be inconsistent, as these businesses have different levels of risk, taking into account their individual capital structure and businesses.

In view of the absence of a value which enables PTC's debt premium to be measured directly, and bearing in mind that the methodology used for assessing other parameters, such as the gearing and beta, was based on a benchmark integrating the same comparable companies, this methodology is also deemed to be suitable for determining the debt premium. As was the case with the determination of other parameters that make up the cost of capital , PT SGPS was also considered in the sample of comparable companies.

The choice of the maturity and duration of the series should be consistent with the choice previously made for the risk-free interest rate, taking into account that the rate of borrowed capital is obtained by adding the risk-free interest rate to the debt premium. Therefore, a 10-year maturity and a 2-year series will be used. It has been found that the adopted methodology is not far off from the practise followed by some regulators (see table 8).

¹⁷ The debt premium is the additional return over the rate corresponding to the risk-free investment, which is required by the company's creditors and which reflects the quality of the loan receiver (usually reflected in the rating assigned to the company) and its ability to meet debt responsibilities.

Table 8 – Regulatory precedents: Debt premium

Regulatory Body	Methodology
IBPT	Not available.
CMT	Spread of company bonds + CDS
Arcep	Benchmark spread based on I-boxx index - bond issue by nonfinancial corporations of BBB rating and maturity between 7 and 10 years
ComReg	Gearing implicit spread
Agcom	Spreads of Telecom Italia bonds - 2-year series
Ofcom	Spreads of BT bonds
ERSE	EDP five-year CDS contrats (April 2011-31 Aug 2011)

Source: Website of the respective regulators and BT report

Methodology to be applied from 2012

In the light of points listed above, the debt premium must be calculated using the benchmark of comparable companies.

Data correspond to Credit Default Swaps spreads (10-year maturity) of bond-issuing comparable companies, provided by Bloomberg - historic series for the two years preceding the decision year, monthly observations.

F. TAX RATE

The effective tax rate may experience significant volatility from year to year, since it depends on adjustments to the nominal tax rate that take place each year, in terms of permanent and/or temporary differences (e.g. capital gains, goodwill, equity), which contributes to reducing transparency and regulatory predictability with regard to the cost of capital rate, and makes it too exposed to financial strategies or to the company's business.

In addition, over the long term, the effective tax rate will tend towards the nominal tax rate, since the adjustments tend to offset each other.

The tax rate to be considered for the purpose provided for the determination of the cost of capital is the nominal rate, as in the previous determination, given that: (i) this avoids the frequent changes resulting from the effective tax rate, arising mainly from annual corrections applied for the purpose of the determination of the tax base, as well as from variations in deferred taxes; (ii) it is less complex to calculate the nominal tax rate than the effective tax rate;

(iii) it provides greater regulatory predictability; and (iv) it consists of a fixed figure which is external to the company and which may be clearly observed.

Methodology to be applied from 2012

In the light of points listed above, as in the determination of 2010, the tax rate to be considered, for the purpose of the calculation of the cost of capital rate, corresponds to the nominal tax rate.

3. BASIS OF RETURN OF THE COST OF CAPITAL

Bearing in mind PTC's asset structure, and according to the views expressed by BT, non-current assets should continue to be considered in the basis of return of the cost of capital, including tangible assets, intangible assets and financial investments, to be applied as from 2012.

Methodology to be applied from 2012

As in the determination of 2010, the basis of return of the cost of capital shall correspond to non-current assets, including tangible assets, intangible assets and financial investments.

4. CALCULATION OF THE COST OF CAPITAL RATE FOR 2012-2013

The application of the methodology referred in the preceding points results in the cost of capital rates for the accounting years of 2012 and 2013, respectively 10,85% and 11,69% (see table 9), as detailed in BT's report.

Table 9 – Calculation of the cost of capital rates for 2012-2013

Parameters	2012	2013
Risk-free interest rate	3,89%	3,96%
Debt premium	1,86%	2,79%
Beta	0,73	0,73
Risk premium	8,31%	8,94%
Gearing	41,74%	42,52%
Tax rate	31,50%	31,50%
Cost of equity	9,93%	10,51%
Pre-tax CMPC	10,85%	11,69%

Source: Baker Tilly report and ICP-ANACOM calculation