RESHAPING THE PORTUGUESE GOVERNMENT DEBT STRUCTURE

ARTUR MANUEL DE CARVALHO PATRÍCIO

SEPTEMBER 2013

RESHAPING THE PORTUGUESE GOVERNMENT DEBT STRUCTURE

BY ARTUR MANUEL DE CARVALHO PATRÍCIO[1], LISBOA SCHOOL OF ECONOMICS & MANAGEMENT

SUPERVISOR:

JOÃO LUÍS CORREIA DUQUE, LISBOA SCHOOL OF ECONOMICS & MANAGEMENT

DEAN PAXSON, MANCHESTER BUSINESS SCHOOL

ABSTRACT

Portuguese public debt has attained an unsustainable trajectory in recent years. The economic downturn and a fiscal imbalance have contributed to this situation. The aim of this research is to explore the possibility of restructuring sovereign debt as an alternative policy for solving the country's debt problem. It is not easy to answer the question as to which hypothesis is the best solution for solving the Portuguese public debt problem. Reducing interest rates, lengthening maturities and perpetual debt conversion, seem to be the most feasible ones. However the haircut strategy should not be disregarded. The empirical analysis shows the impact of each hypothesis in three different frameworks: present value, debt service and debt dynamics.

Keywords: Portuguese public debt, debt restructuring, reducing interest rates, lengthening maturities, perpetual debt conversion, haircut, present value, debt service, debt dynamics

Table of Contents

1. Introduction

The global financial crisis of 2007 brought to light the problem of the sovereign debt indebtedness of some countries. The European countries that have been affected since the end of 2009 are: Portugal, Ireland, Italy, Greece and Spain. The yield spreads of Portugal, Ireland and Greece have faced significant adverse movements when compared to Euro-area benchmark bonds. Financial markets began to question whether the crisis would spread further and whether the Euro is sustainable.

In an attempt to solve the indebtedness problem, these countries have all implemented severe austerity measures. Such measures contributed even further to the economic downturn and were not able to stop the increases in yields. The higher the yield, the more difficult it is for countries to borrow money in the markets. Owing to their dire financial, economic and fiscal conditions, Greece, Ireland and Portugal all requested support from the European Union and IMF bailout program.

Although the bailout program allowed these countries access to financing at lower interest rates, more austerity measures and fiscal reforms had to be implemented as a consequence. Are such measures sufficient to solve the indebtedness problem on their own? According to the latest economic and fiscal developments, the answer seems to be that such measures are not sufficient to solve the problem. So what can be done?

Recently Ireland came to an agreement for the restructuring of a part of its debt from the bailout program. This restructuring implied a lengthening of maturities and a reduction in interest rates. It can be argued that the solution for beating the crisis could be the adoption of measures to correct fiscal imbalance, without putting economic growth at stake, through some degree of restructuring or rescheduling of public debt.

This dissertation will analyze some possibilities in terms of the restructuring or rescheduling of Portuguese public debt. What are the best alternatives available for Portugal? What is the impact of lengthening maturities and reducing interest rates? What would be the impact of a haircut scenario? What type of debt should be restructured? This paper will provide answers to all these questions. The economic and financial impacts of such restructuring or rescheduling measures will also be pointed out. Section 2 relates a survey of literature on past debt restructurings, the basis of the sovereign debt

market and sovereign debt restructuring mechanisms. Section 3 and 4 present the hypotheses, scenarios and the methodological framework used throughout this paper. Section 5 is dedicated to the analysis of the output of restructuring programs, and Section 6 concludes with final remarks and major conclusions.

2. Literature Review

2.1 Basic Concepts

Sovereign debt is comprised of all debt issued or guaranteed by a government. There is a clear distinction between corporate debt and sovereign debt with regards to the mechanisms available in case of default. If a company defaults, it cannot renounce debt payment, as the company would be taken to court and one of three things could happen: 1) restructure the debt and negotiate new agreements with creditors; 2) hand over assets as collateral to creditors; 3) close the company and liquidate all remaining assets in order to pay creditors. In the case of sovereign debt the process is different, for two reasons: 1) few sovereign assets are located in a foreign jurisdiction; and, 2) assets abroad are most likely to be legally protected to avoid creditors using them as collateral in the case of default, Wright (2002).

Default and restructuring are not the same thing, although the concepts are related. Default is the failure by a government to pay interest or principal on time. According to the IMF definition, sovereign debt restructuring can be defined as an 'exchange of outstanding debt instruments, such as loans or bonds, for new debt instruments or cash, through a legal process'. According to rating agencies and the ISDA[2] definition, a country is technically in default or experiencing a credit event in any of the following circumstances: a failure to pay a coupon or principal on a bond or loan on time; distressed debt restructuring, leading to changes in debt contract terms which prejudice investors; debt repudiation, which equates to officially announcing the intention to suspend debt payments. Two main types of debt restructurings are mentioned in the literature: debt rescheduling brought about by lengthening the maturity of outstanding debt and/or decreasing interest rates; and debt reduction, whereby the face value of debt is reduced.

---

[2] ISDA - International Swaps and Derivatives Association.

Sovereign loans and bonds can be classified under different governing laws. Usually international bonds are issued under foreign laws, the most popular being those of New York law and English law. Domestic bonds, however, are issued under a country's legislation. The governing law of a bond issue, as well as the jurisdiction, play a crucial role in debt restructuring. It enables one to know whether the debt contract has any contractual provisions and whether there is a possibility of litigious creditors filing a claim against the debtor. According to S. Das, Papaioannou and Trebesch (2012), countries such as Portugal, Greece and Spain, issued only 5% or less of their bonds under English law. In the case of eventual restructuring, these countries have a low probability of facing a litigious claim by their creditors, as the majority of the debt was issued under each countries' own jurisdiction. Such legal aspects are clarified[3] in the OT's and BT's prospectuses issued by the government agency responsible for managing Portuguese debt (IGCP).

2.2 Debt History and past Defaults

Debt history is as old as the beginning of economic relations between people. In the Bible, one whole chapter addresses the debt forgiveness, and states that all debts should be forgiven after a period of seven years. This is the so-called 'year of forgiveness in the honor of the Lord'. In biblical times, people were only allowed to insist on debt payment from foreigners and the debt forgiveness also resulted in the freedom of those unable to pay their debts.

According to Hudson, (1992) between 2400 and 1600 B.C., the kings of Mesopotamia also determined rules for the debt forgiveness in many situations. Hammarubi, the king of Babylonia, established a legal code for the debt forgiveness after three years, or in years of severe drought. The same practices were discovered in Judea, Egypt and Greece. The Rosetta Stone is another example of the debt forgiveness, decreed by Pharaoh Ptolomeu V, which dates back to 196 B.C. He pardoned all debt and declared freedom for all prisoners who were in jail for non-payment of debts. In ancient Rome, dur-

---

[3] See the following link for a complete analysis: https://www.dropbox.com/s/ef2d9wizq9t6pzl/Prospectus.rar and https://www.dropbox.com/s/y1kawbajwwaifz6/Lei%20Quadro%20D%C3%ADvida%20P%C3%BAblica.pdf

ing the time of Julius Cesar and Catilina, there are records of a similar concern for the impact of debt and interest payment.

The most powerful European monarch in the XVI century was Filipe II of Spain, who commanded the largest army in Europe. However he inherited a huge debt from his father, which kept growing year after year. This lead to successive defaults in 1557, 1560, 1575 and 1596. Between the XVI and XVIII centuries, the countries which defaulted the most amongst European countries were Spain and France. France defaulted eight times and Spain six times, plus a further seven times during the XIX century (Reinhart and Rogoff - 2008).

In 1876, Egypt was also not able to pay its debt and opted for default. As a result, Great Britain took over their fiscal administration and collected the taxes needed to pay off the debt. In 1889, Peru had to renegotiate its debt and in exchange, creditors made demands that included the concession of the railroad for a period of 66 years and concessions for shipping rights. Venezuela suspended its service of debt service in 1902, and as a result, Germany, Great Britain, and Italy mounted a naval blockade of its seaports. The US carried out similar moves when the Dominic Republic (1905) and Nicaragua (1911) suspended the service of their debt. Such decisions taken by creditors are an example of the "supersanctions" mechanism put forward by Mitchener and Weidenmier (2005).

The US is no exception and first defaulted in 1790, during the first years of independence, when the government decided to postpone interest payments on its debt for a period of ten years. In the XIX century several of the wealthiest US states also decided to renounce a part, or the total amount of their debt (English -1996). In 1931, the Federal Government of the US declared default on domestic debt, as it was impossible to convert bank notes into gold. In this same year, the US government decided not to pay its debt to Panama, which arose from an agreement that had been in force since 1903.

Hatchondo, Martinez, and Sapriza (2007) suggest that defaults on sovereign debt were motivated many times by political or military conflicts. Turkey, Bulgaria, and the Austro-Hungarian Empire suspended their debt payments to their enemies during the First World War. Italy, Turkey and Japan did the same during the Second World War. Other

8

countries renounced their debts after revolutions or coups, examples being Mexico in 1914, Russia in 1917, China in 1949, Cuba in 1960 and Iran in 1979 (Sturzenegger and Zettelmeyer - 2006).

The first collapse in Portuguese public finances occurred during the reign of D. Sebastião, in the XVI century, according to Reinhart and Rogoff (2009). During the next century Portugal devaluated its currency in order to pay off its debts, having waited for inflation to reach 83%, which made it easier to pay off its debts. In the XIX Century, debt defaults by Portuguese monarchs were frequent and debt was renounced in 1828, 1834, 1837, 1841, 1845 and 1852. The worst financial crisis, which led to problems in external relations between Portugal and other countries, began in 1890, culminating in 1892, when bankruptcy was declared (Louça and Mortagua - 2012). Debt burden represented approximately 50% of fiscal revenue and there was wide supported for the idea that such a situation was unsustainable and that renegotiation was inevitable. Indeed, Portugal defaulted on its external debt obligations to creditor countries, including France, Germany and England, who all confiscated Portuguese assets. By this time "Sovereign Immunity", which protects sovereigns, had not come into effect (Panizza, Sturzenegger and Zettelmeyer, 2009). Customs revenues were confiscated and the Portuguese colonies in Africa also became a target for creditors. After nine years of negotiations, an agreement was reached and external debt was reduced by about 38% and the debt was converted into new debt, with a maturity of 99 years, with a 3% interest rate.

Sturzenegger and Zettelmeyer (2005) made an analysis of the most recent debt restructurings (defaults) of countries that included Russia, Argentina, Ecuador, Uruguay and Pakistan. In 1998, Russia devaluated the rouble and defaulted on its domestic debt, which included short term treasury bills (GKOs) and long term instruments (OFZs) worth around $12.8 billion. In 1998, the Ukrainian government also started negotiations to exchange its old debt for new agreements with longer maturities of between three to six years. In 1999 Pakistan was in the middle of a balance of payments crisis and after the debt to GDP ratio reached 90%, it decided to restructure its debt. Outstanding bonds were exchanged for a one-off bond that matured after six years with a three years' grace period, with a coupon rate of 10%. In 1999, Ecuador announced that it would suspend coupon payments on the PDI Brady bonds. After failures in debt renegotiation, it was

only in July of 2000 that Ecuador made an offer to exchange old instruments for new ones, with maturity in 2030 and reductions in coupon rates.

In November of 2001, Argentina faced an unsustainable situation regarding its debt and a default took place as a consequence of some political issues. After devaluing the currency, the government decided to implement the *pesification* of all debt, which imposed average haircuts ranging from 30% to 65%. In 2004 a package of securities was offered to the creditors as part of the implementation of the exchange of the remaining debt, which was worth $80 billion. All the securities offered had a detachable "GDP warrant", which means that payments were tied to GDP growth. The exchange offer opened in January, 2005, and a subscription rate of 76.15% was reached and an average haircut of 71% to 75%. As a result of the Argentinean crisis, and following on from a 50% currency depreciation, Uruguay felt difficulties in servicing its debt in 2002. In 2003 its debt was exchanged for new instruments designed to improve liquidity and lengthen maturities. Subscription rate was high and haircuts ranged from 5% to 20%.

Greece carried out a debt restructuring worth 200 € billion in March, 2012. This restructuring set a new record in terms of the amount of debt restructured and in terms of average losses to creditors, with haircuts ranging from 59% to 65% (Zettelmeyer, Trebesch and Gulati - 2013).

The recent global financial crisis led to severe losses for the Irish economy, with GDP dropping by about 21% from Q4 2007 to Q3 2010. After a long period of running a fiscal surplus, the deficits of 2009 and 2010 were respectively 14.5% of GDP and 32% of GDP (Lane - 2011). Public debt experienced a boom when the huge financial losses run up by the banking sector were underwritten by the government (Whelan - 2011). Recently Ireland has come to an agreement to exchange promissory notes issued in 2010 for sovereign bonds with longer maturities. Interest rates were also reduced from 8% to an average of 3%[4].

---

[4] See http://www.finfacts.ie/irishfinancenews/article_1025555.shtml and
http://www.economist.com/blogs/freeexchange/2013/02/irish-debt-deal

2.3 The costs of Sovereign Default and the basis of the Sovereign Debt Market

According to all default episodes described above, it is a wonder how sovereign debt market is sustainable. It is the existence of default costs that make the sovereign debt market work. The literature suggests the existence of two guidelines regarding sovereign default costs. Classic literature points out that countries avoid default, as they fear a loss of reputation in international capital markets, bad trade relations and legal persecution by creditors. Recent literature is more concerned with the impact of default on economic agents and on the economy as a whole. The theoretical and empirical analysis of Eaton and Gersovitz (1981) supports the idea that the threat of permanent exclusion from capital markets forces countries to avoid a sovereign default at any cost. Sachs and Cohen (1982) concluded that the possibility of default has an impact on financial markets and on the macroeconomic equilibrium of indebted countries. A country which is close to default will experience credit rationing through the imposition of debt ceilings, which in turn leads to a lack of investment and low consumption.

For Grossman and Huyck (1985), reputational equilibrium ensures that the short-term benefits from debt repudiation are smaller than the long-term costs associated with the loss of reputation. However they go further and conclude that the bad state of the world economy leads to excusable default. As a result countries may experience debt ceilings and larger borrowing costs for a certain period of time. The thesis put forward by Bulow and Rogoff (1989) contradicts that of the previous authors. According to them, less developed countries have access to international financing not because they have a good reputation for repayment, but on account of the options of direct sanctions available to creditors. If there is no threat of permanent exclusion from capital markets, then a country with a debt overhang problem should default, whereas debts that are forgiven will be forgotten.

Sovereign debt is characterized by periods when governments incur substantial amounts of debt; periods when debt contracts are fulfilled without any problem; and periods when repayments are difficult to honor, involving defaults or restructurings. Financial markets determine the underlying economic environment and consequently a sovereign's incentive to honor payments, or not (Eaton and Fernandez -1995). The economic

environment is not the only important factor in determining whether a country will honor its debt obligations, or not, as the level of debt intolerance is also crucial. According to Reinhart, Rogoff and Savastano (2003), debt intolerant countries (usually developing countries) show inability to manage levels of external debt that would be manageable under the same circumstances by advanced economies. The empirical evidence seems to support that for a given level of debt-to-GDP ratio, the equilibrium probability of default increases according to the level of the past default episodes (Asonuma - 2010).

More recent literature focuses on the impact of sovereign default on economic agents and on the economy as whole. Sandleris (2004) points out that governments do not pay because they fear sanctions or reputation problems, but because they fear the economic costs for the private sector, mainly the impact on companies' assets, the economic impact, and the impact on borrowing costs for companies and households. The decision as whether to default, or not, influences economic agents' expectations, which in turn has an impact on output and welfare. The communication and sharing of information makes the sovereign debt market work. Along the same lines, Hatchondo, Martinez and Sapriza (2007) add a concept to the literature which they call 'signaling costs'. These costs are based on the information communicated to the markets by a government's actions. Signaling costs are not a punishment by creditors, but instead they are a method whereby creditors can evaluate a debtor's condition. Although such signaling costs do exist, there is no robust evidence as to how important these costs are, or whether the decision to default communicates important information, or not. The costs of default can also have an impact on productivity as labor is inefficiently allocated (Mendoza and Yue - 2008). In a situation of default, financing costs increase for companies, who thus find it more profitable to switch from importing some inputs to purchasing domestic ones, which may be less cost-efficient.

Recourse to restructuring or rescheduling should be avoided at any cost, in order to prevent severe losses of output. According to Sturzenegger (2004), default episodes are associated with an average reduction in GDP growth of about 0.6% and if this coincides with a banking crisis, then that fall could reach 2.2%. Tomz and Wright (2007), found a negative correlation between default and economic activity, though such a relationship proved to be weak during the period 1820-2004. In their data set there are periods where

countries have defaulted during bad phases of the world economy, but countries have also defaulted during periods of favorable economic conditions. However the latest empirical evidence from the 1990s seems to show that after a period of restructuring, an economy starts to recover and grow. Output losses are in evidence, but they precede periods of restructuring, Yeyati and Panizza (2006). This was verified in the case of Argentina, Ecuador, Russia, Ukraine and Uruguay, all of which had large defaults during the 1990s. It is not the default itself that creates costs, but instead all the problems associated with debt overhang. In such situations, default might be the best solution to overcome the problem (Arslanalp and Henry - 2005). Debt relief explains the great success of the Brady Plan, as it permitted the introduction of a lot of economic changes that resulted in greater investment and an increase in economic growth.

The literature presented so far refers to the costs associated with defaults, but there is no reference to the duration of such costs. Borensztein and Panizza (2009) found empirical evidence in their data for significant costs of defaults, although such costs do not last for long. Reputational costs do exist and are evidenced in credit ratings and borrowing costs. However these costs are only temporary. Sanderlis, Gelos and Sahay (2004), showed that during the 1980s, countries with debt problems were excluded from international capital markets for an average of 4 years. After that period, it took about 2 years to re-access the markets. Cruces and Trebesch (2011) pointed out some doubts about the stylized fact that costs of a default are short-lived and negligible. According to them, high losses for creditors are associated with significant borrowing costs and longer periods of market exclusion.

2.4 Sovereign Debt Restructuring Mechanism

In a situation when a country decides that restructuring their debt is the best alternative, it is important to examine the relevant literature to see how restructuring takes place, how it is implemented and what are the major problems involved. In cases of a country facing debt overhang problems, it is in every party's interest to start a restructuring process. However reaching such an agreement may be difficult, given the conflict of interest between the debtor and creditors and debt holdout problems. A debt holdout problem

is a situation when a minority of creditors is not willing to accept the proposed restructuring conditions, as they expect to be better treated than other creditors. According to Schwarcz (2000), Rogoff and Zettelmeyer (2002), an international law and bankruptcy procedures framework must exist for sovereign debt restructurings. Bolton and Jeanne (2007) suggest the creation of a bankruptcy regime for countries that would facilitate debt restructuring during a crisis and would overcome problems of inefficiency. If legal guidelines existed, debt restructurings would be implemented much easier. The support provided by international institutions, such as the IMF, together with the implementation of the "Sovereign Debt Restructuring Mechanism" proposed by Anne Kruger, are both crucial to carrying out a successful restructuring process. The success of a restructuring depends on repayment terms, the length of time for all the process to take place and the degree to which all creditors are treated (Fisch and Gentile - 2004).

Sovereign debt composition changed syndicated bank loans that were prevalent in the 1970's and 1980's, towards bond finance in recent times (Panizza, Sturzenegger and Zettelmeyer - 2009). Debt renegotiations were expected to become more difficult, on account of the larger number of creditors involved. Empirical evidence shows that the average default period declined from an average of 8 years to 4 years and that the creditors' participation rate was about 90%. According to Trebesch (2008), longer delays occurred during debt renegotiations in the Brady era (1990-98), in comparison to the pre and post Brady era. He found only 7 cases litigation out of 90 cases, which imposed obstacles to debt renegotiation. Another important conclusion was that debtor characteristics such as political risk, debt profile and the level of economic imbalance, are more important for debt restructuring than the characteristic of creditors themselves.

3. Scenarios and Hypotheses

This section discusses the scenarios and hypotheses used during the research. When a government runs a budget deficit, alternative ways of financing have to be found, as, by its very definition, a budget must always be in equilibrium. As Portugal belongs to the Economic and Monetary Union, monetary financing is not permitted and thus the issue of public debt has been the best alternative for financing the deficit. Portuguese debt can

be classified as either perpetual or redeemable debt. Redeemable debt can in turn be classified as fixed term or uncertain term debt. Another common distinction is whether the debt is tradable or non-tradable and whether it is issued in Euros, or in a foreign currency.

Table 1 in the Appendix shows the composition of Portuguese public debt since 2007. As far as tradable debt is concerned, the most important securities are treasury bills (BT), securities with a maturity of less than one year and treasury bonds (OT), whose maturities are more than one year. At the end of 2012, BT's represented 9.14% of total debt and OT's represented 48.13%. Other tradable securities exist, such as ECP's[5], MTN's and others, but they are not relevant. In the case of non-tradable debt, the most important ones are saving certificates and CEDIC's. In 2012 these respectively represented 4.97% and 2.26% of total debt. Portugal also has some tradable and non-tradable debt issued in foreign currency. However the percentages of such debt are all below 1%, which made them insignificant for the analysis. The financial assistance program represents a significant share of total debt, amounting to 32.39%. It should be pointed out that the amount of bailout received up until 2012 was 63,013.48 € billion. The amount considered for the analysis was 64.456,24 € billion, being the most up-to-date value for 2013. However the total package is worth around 78 € billion.

This paper proposes the restructuring of OT's, BT's, as well as the financial assistance program, all of which represent 89.67% of total debt. According to the paper's analysis, debt restructuring should start at the beginning of 2014.

For BT's, two different hypotheses have been assumed: one consisting of lengthening maturities, but keeping the same nominal value; whereas the second one is a haircut of the nominal value and a lengthening of maturities. The table below shows which BT's were used in the analysis, as well as the outstanding balance for each issue. The haircut percentage ranges from 15% to 50%, and the total amount outstanding is 12.471,883 € billion.

---

[5] ECP is a short-term, unsecured loan, which is issued by an entity in a currency different to that used by the country. MTN is a Medium Term Note unconventional bond, with a maturity period of usually between five and ten years, continually offered through various brokers, rather than issued all at once, as is the case with other bonds.

BT's used in the analysis

Issue	Outstanding (€ 10^6)	Original Maturity Date	Proposed Maturity Date
BT 17 JAN 2014	1.086,353 €	17-01-2014	17-01-2020
BT 21 FEB 2014	1.130,896 €	21-02-2014	21-02-2020
BT 21 MAR 2014	1.249,266 €	21-03-2014	21-03-2021
BT 18 APR 2014	1.509,698 €	18-04-2014	18-04-2021
BT 23 MAY 2014	2.247,981 €	23-05-2014	23-05-2023
BT 18 JUL 2014	980,231 €	18-07-2014	18-07-2022
BT 19 SET 2014	1.149,488 €	19-09-2014	19-09-2022

Source: Source: http://www.igcp.pt

As far as the restructuring of OT's is concerned, four different hypotheses are proposed, which are the following: H1 – Lengthening maturities by ten years, whilst maintaining coupons and the nominal value; H2 - Lengthening maturities by ten years, but reducing coupons whilst maintaining the nominal value; H3 - Lengthening maturities by ten years, whilst reducing coupons to an average rate of 3% and applying haircuts to the nominal value; H4 – Convert a percentage of the debt into perpetual debt. Haircut and perpetual debt conversion range from 15% to 50%[6]. The table below shows the OT's that were considered for the restructuring and their proposed maturities.

OT's used in the analysis

Issue	Outstanding (€ 10^6)	Original Maturity Date	Proposed Maturity Date
OT 4.375% Jun 2014	6.000,00 €	16-06-2014	16-06-2024
OT 3.6% Oct 2014	7.809,90 €	15-10-2014	15-10-2024
OT 3.35% Oct 2015	13.406,23 €	15-10-2015	15-10-2025
OT 6.4% Feb 2016	3.500,00 €	15-02-2016	15-02-2026
OT 4.2% Oct 2016	6.185,00 €	15-10-2016	15-10-2026
OT 4.35% Oct 2017	8.582,82 €	16-10-2017	16-10-2027
OT 4.45% Jun 2018	6.887,05 €	15-06-2018	15-06-2028
OT 4.75% Jun 2019	7.664,75 €	14-06-2019	14-06-2029
OT 4.80% Jun 2020	8.550,89 €	15-06-2020	15-06-2030
OT 3.85% Apr 2021	7.510,41 €	15-04-2021	15-04-2031
OT 4.95% Oct 2023	7.227,76 €	25-10-2023	25-10-2033
Total Outstanding	83.324,80 €	NA	NA

---

[6] For a detailed explanation of each hypothesis, consult the following link:
https://www.dropbox.com/s/ke599vg81pma3by/Appendix%201.pdf

The financial assistance program restructuring covers the first three of the four hypotheses mentioned above[7]. According to the analysis, if the restructuring was to take place, then reimbursement would start in 2032 and would go on until 2052.

The hypotheses proposed for each debt instrument were tested for three different scenarios: present value analysis, debt service and debt dynamic analysis. For the present value analysis the base scenario is based on the most likely forecasted discount rates for all maturities. For the remaining scenarios, a variation of 0.125% above and below is applied, up to a limit of 1.5% relative to the base scenario, which produces a total of 25 scenarios for each debt instrument. In the case of present value framework, there are a total of 1975 scenarios for all debt instruments under restructuring and for all hypotheses. The debt service scenario contemplates the difference in terms of interest and principal payments between the hypotheses of restructuring and not restructuring Portugal's debt. The combination of all the hypotheses for BT's, OT's and EFAP, results in 336 different debt service scenarios from 2014 to 2024. Finally, the debt dynamics scenarios forecast the relationship of total debt and debt to GDP ratio for the instruments under restructuring and for the hypotheses that could be implemented. The debt dynamics analysis comprises four different scenarios for a period between 2014 and 2024: 1) y_t is 2%, π_t is 2% and pb_t is 2,5%; 2) y_t is 1,5%, π_t is 2% and pb_t is 2%; 3) y_t is 1%, π_t is 1,5% and pb_t is 1,5%; 4) y_t is 0,5%, π_t is 1,5% and pb_t is 1%; where y_t, π_t and pb_t correspond respectively to real GDP growth rate, inflation rate and primary balance as a share of GDP in period t. All the hypotheses for the different debt instruments are combined with these four scenarios to make a total of 1344 scenarios for each total debt and debt to GDP path. In the next section a clear explanation is made on how each analysis was implemented and quantified.

4. Methodology

In order to carry out the present value analysis, one needs to know the appropriate discount rates for the given maturities. In the literature, one of the most accurate models

---

[7] The reimbursement schedule with and without restructuring, as well as the interest payment schedule for each hypothesis can be consulted on: https://www.dropbox.com/s/ml1utvqbrk5s1he/Appendix%202.pdf?m

used to perform such forecasts is the Nelson and Siegel (1987) model, which is a parsimonious three component exponential approximation. The forward rate curve under their framework is calculated by:

$$f_t(\tau) = \beta_{0,t} + \beta_{1,t} * e^{-\lambda_t \tau} + \beta_{2,t} * e^{-\lambda_t \tau} \tag{1}$$

The corresponding yield curve is achieved by integrating the previous equation in the interval 0 and τ.

$$y_t(\tau) = \frac{1}{\tau}\int_0^\tau f_t(\tau)d\tau = \beta_{0,t} + \beta_{1,t} * \left(\frac{1-e^{-\lambda_t \tau}}{\tau/\lambda_t}\right) + \beta_{2,t} * \left(\frac{1-e^{-\lambda_t \tau}}{\tau/\lambda_t} - e^{-\lambda_t \tau}\right) \tag{2}$$

Where τ represents maturity, $\beta_{0,t}$ stands for long term interest rate, with a loading factor of 1 that has τ going to infinity; $\beta_{1,t}$ should be regarded as long to short term spread with a loading of $\left(\frac{1-e^{-\lambda_t \tau}}{\tau/\lambda_t}\right)$, which is a function that starts at 1 and decays to 0, as τ goes to infinity; $\beta_{2,t}$ can be regarded as a curvature parameter with the loading factor $\left(\frac{1-e^{-\lambda_t \tau}}{\tau/\lambda_t} - e^{-\lambda_t \tau}\right)$ which starts at 0 increases and then decays to 0 again. The parameter λ_t corresponds to the exponential decay rate. In order for the model to make sense, the following restrictions have to be imposed:

$$\beta_{0,t} > 0 \tag{3}$$
$$\beta_{1,t} + \beta_{2,t} > 0 \tag{4}$$
$$\lambda_t > 0 \tag{5}$$

The Nelson and Siegel model was created to forecast the yield curve on a non-dynamic cross-section approach. Diebold and Li (2006) use the three factor model proposed by Nelson and Siegel (1987), but with dynamic and changing parameters over time. This dynamic model seems to be robust with regards to the empirical characteristics of the yield curve and allows for a better forecast of future interest rates. The model can be estimated in two steps: in the first step the parameters $\beta_{0,t}$, $\beta_{1,t}$ and $\beta_{2,t}$ are estimated in a cross-section for a regular frequency; in the second step the estimation of each pa-

rameter is recorded for the different time periods and an AR(1) is estimated for each set of parameters.

$$\beta_{s,t} = \delta_1 + \delta_2 * \beta_{s,t-1} + u \, , \, s = 0,1,2 \tag{6}$$

Is the AR (1)[8] component that gives dynamism to the model and allows for better forecast. In order to make the forecast easier, a fixed value for λ_t of 2.1 is assumed, which according to Guedes (2008) and Diebold and Li (2006), should be in between 2 and 3 years. The choice of such parameter is quite arbitrary, as there is no economic interpretation for it. Fixing the λ_t parameters in the cross-section can be estimated using an ordinary least squares.

The inputs of the model were Euribor rates with maturities between 1 to 12 months, and swap rates with the following maturities: 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 25 and 30 years. Daily rates were used from 02-01-2003 to 31-12-2012, with 26 time series and 2,607 observations. Since the onset of the sovereign debt crisis, Portuguese debt has no longer been considered to be risk free and therefore interest rates forecasted using the model above have to be corrected, in order to reflect the country's sovereign risk. A parsimonious approach was chosen for application to the spreads. The average spread for each maturity is the difference between Portuguese debt yields and German debt yields, which are considered to be risk free[9].

Based on the appropriate discount rates, the present value analysis scenario for each debt instrument was implemented using the following formula:

$$PV = \frac{C_1}{(1+r_1)^1} + \frac{C_2}{(1+r_2)^2} + \cdots + \frac{C_n+FV}{(1+r_n)^n} \tag{7}$$

Where C states the coupons for each period, r the appropriate discount rate in each period and FV the face value. For each debt instrument the present value of the actual debt conditions was compared comparatively with each of the hypotheses proposed. By

---

[8] The dynamic parameters can be consulted at:
https://www.dropbox.com/s/ha1oabnbu84sseo/Data%20and%20Econometric%20Models_DB.xlsx
[9] The spreads differences can be consulted at https://www.dropbox.com/s/l58z4de2855kduj/Spreads.rar

adopting such an approach, one is able to identify the present value gain or loss of each hypothesis.

For the debt service scenarios, the gain/loss analysis was made using the following expression:

$$Debt\ Service_t = Interest\ payment_t{}^W + FV_t{}^W - \left(Interest\ payment_t{}^H + FV_t{}^H\right) \qquad (8)$$

Script w corresponds to interest and principal payment of the three debt instruments in period t, should the restructuring hypotheses not be implemented. Script H stands for the interest and principal payment of the combination of each restructuring hypothesis of the three debt instruments.

The debt dynamics scenario uses the following equation in order to estimate the path of total debt and debt to GDP ratio of the instruments under restructuring:

$$b_t = \frac{(1+r_t)}{(1+y_t)} * b_{t-1} + pb_t \qquad (9)$$

b_t stands for public debt stock as a share of GDP in period t and $r_t{}^{10}$ is the real interest rate.

$$B_t = (1 + r_t) * B_{t-1} + PB_t \qquad (10)$$

Where B_t is public debt stock in period t and PB_t is the primary balance in period t. The nominal interest rate (i_t) is calculated by dividing the interest payments of year t for the debt stock in year t-1 (Afonso - 2002).

5. Results

What are the benefits derived from the restructuring or rescheduling of Portuguese debt? In this section this question is answered and the hypotheses that best fit the Portuguese debt overhang problem are analyzed.

---

[10] The real interest rate is calculated by $r_t = \frac{(1+i_t)}{(1+\pi_t)} - 1$, where π_t states the inflation rate.

5.1 Present Value Analysis

The simple lengthening of maturities of treasury bonds (OT's) in 10 years, whilst keeping everything else constant, would result in a net gain of 11.322 € billion[11] (present value terms) for the base scenario. This corresponds to 6.76% of 2014's GDP, which is about a 1.132 € billion gain per year over a period of 10 years. Should the yields for the Portuguese sovereign debt keep increasing, then the net gain would be larger. For instance, a 100 basis points increase in interest rates for all maturities would yield a net gain of 14.946 € billion. Lower interest rates would result in the opposite effect. A 150 basis points decrease in interest rates comparative to the base scenario would represent a net gain of only 4.456 € billion.

If maturities were lengthened by 10 years, and coupons were also reduced, then the net gain would be even larger. Tables 3A, 3B and 3C in the Appendix summarize three of the six scenarios run under this hypothesis. When there is a reduction of 1.5% in all treasury bonds coupons rates, the net gain would be 23.312 € billion, which corresponds to 13.92% of 2014's GDP. The more the yields increase (decrease) the larger (lower) is the net gain in present value terms. For instance, a 150 basis points increase (decrease) in all interest rates maturities would yield a net gain of 27.358 € billion (17.791 € billion). Another conclusion that can be made is that the lower the coupon reduction, the lower the net gain. For a coupon rate reduction of 1% and 0.5% under the base scenario, the net gains are respectively 19.206 € billion and 15.101 € billion. On average, for each 0.25% coupon rate reduction, with everything else kept unchanged, there is a net gain of 2 € billion in present value terms.

Implementing a haircut strategy as Greece did, would impose larger losses to debt holders, resulting in an increase of net gains for Portugal. Net gains on present value terms for the base scenario range from 22.275 € billion (15% haircut) to 47.381 € billion (50% haircut). The economic impact of such measures would be between 13.30% and 28.29% of GDP. In nominal terms, this represents a debt reduction ranging from 12.499 € billion to 41.662 € billion. Taking into consideration yield changes, the pattern of net gains is not clear up to a certain haircut trigger. For haircuts ranging from 15% to 25%, the

---

[11] See table 2 in the Appendix.

more the yields increase (decrease), the larger (lower) the net gain. However such a statement is not always true for haircut scenarios over 25%. According to the base scenario framework, for each 5% haircut reduction, there is a net gain in present value terms of 3.587 € billion.

Converting a share of treasury bonds into perpetual debt is another possible strategy for overcoming the Portuguese debt overhang problem. The Appendix presents three strategies for perpetual debt conversion, with perpetual coupons of 2.5%, 3% and 3.5%. If the treasury bonds were converted into perpetual bonds with a coupon of 2.5%, then the net gain for the base scenario would range from 6.857 € billion (15% conversion) to 22.855 € billion (50% conversion). A conversion with a perpetual coupon of 3% and 3.5% would yield respectively a net gain of 5.607 € billion to 18.689 € billion and 4.357 € billion to 14.523 € billion. The larger the coupon, the lower the net gain, as more interest would have to be paid in the future. It is also not clear for this scenario what the impact of yield changes into the net gains would be, at least for a perpetual debt conversion over 25%. The net gains for each 5% perpetual debt conversion increase are respectively, 2.286 € billion, 1.869 € billion and 1.452 € billion, for coupon rates of 2.5%, 3% and 3.5%.

The Economic and Financial Assistance Program (EFAP) restructuring would result in significant savings for the Portuguese government. Lengthening the maturities by 10 years and gaining a grace period for interest payments of 6 years, would lead to a net gain of 24.703 € billion under the base scenario. Furthermore, should the Portuguese government negotiate an interest rate reduction, then the gain would be even larger. The net gain in present value terms would be 1.287 € billion on average for each 0.25% of interest rate reduction. A reduction of 1% in interest rates would increase net gain to 29.850 € billion. The economic impact of such restructuring hypotheses would be in the range of 14.75% to 17.82% of 2014's GDP. For these two restructuring hypotheses, the greater the increase of interest rates in the financial markets, the larger is the incentive for the Portuguese government to implement such alternatives.

By implementing a haircut strategy, the amount of savings in present value terms would range from 29.774 € billion (15% haircut) to 39.502 € billion (50% haircut). In nominal

terms, this would represent a debt relief of between 9.668 € billion and 32.228 € billion. The impact of yields changes is not clear, and this would thus be an incentive for the Portuguese government to negotiate such a strategy. For a haircut trigger over 20%, higher (lower) yields do not always result in larger (lower) net gains.

The treasury bills (BT's) restructuring hypotheses are in line with the previous strategies, although the net gains are lower, as the outstanding amount of such instruments is also lower. When the reimbursement period of outstanding BT's is delayed, net gains under the base scenario are 3.856 € billion. These securities do not pay interest and thus the more the reimbursement period is delayed, the greater the net gain, assuming that all other parameters are kept constant. When the reimbursement period is not only delayed, but a haircut is also applied to the nominal value, then the resulting net gain would range from 5.113 € billion (15% haircut) to 8.045 € billion (50% haircut)[12]. According to the analysis for this instrument, the higher the yields, the more incentive there is to implement such a restructuring hypothesis.

5.2 Debt Service Analysis

It is important to know the impact of the various restructuring hypotheses, not only in present value terms, but also on a debt service basis. Tables 8A to 8B in the Appendix show a summary of the impact of the restructuring hypotheses on a debt service basis. The graphs provide a general picture of the impact of the different restructuring hypotheses for each of the different debt instruments[13]. If there is a combination of OT's H1 and BT's H1, with all the set of available hypothesis for the EFAP, then savings could be quite significant up until 2021. On average the net savings for 2014 would be around 28.343 € billion. This value is quite high, as Portugal would avoid 26.282 € billion worth of OT's and BT's reimbursement, as well as paying interest payments on the EFAP. In 2021, the net savings would be 14.582 € billion, with a standard deviation of 307,96 € million, depending on which restructuring hypothesis is implemented for the EFAP. Should OT's H2 and BT's H1 be combined instead, with all the set of available

---

[12] See Tables 8A and 8B in the Appendix.
[13] Consult the following link in order to have a clear understanding:
https://www.dropbox.com/home/Reshaping%20the%20Portuguese%20Debt%20Structure/Appendix

hypotheses for the EFAP, then net savings are a bit higher, as is the standard deviation. For instance, in 2014 the average net savings would be 29.075 € billion with a 352,68 € million standard deviation and in 2021 this would be 15.315 € billion with a 462,07 € million standard deviation. The combination of BT's H1 and the available EFAP hypothesis lies in between the previous two hypotheses in terms of average net savings, with respectively 29.154 € billion in 2014 and 12.729 € billion in 2021.

When the OT's haircut's restructuring hypothesis (H3) is combined with the restructuring hypotheses stated above for BT's and EFAP, this produces larger and smoother net gains. For instance, in 2024 the above alternatives would yield an average net loss of around 18 € billion, since the maturities of the OT's would be redeemed on that date. For the OT's haircut scenario, the average net loss is between 1.488 € billion and 1.352 € billion for a haircut rate within 15% and 30%. This occurs not only because the haircut results in a lower redemption value, but also because the reimbursement period is spread throughout the period. Finally, when the OT's perpetual debt conversion (H4) is combined with all the other hypotheses, net gains are not so high, but they are even smoother. The debt would be redeemed at a lower nominal value, as part of it was converted into perpetual debt. Perpetual debt only creates interest payments and there is no reimbursement of the principal. In 2014, for a perpetual debt conversion of between 15% and 30%, the range of average net gain would be around 16.703 € billion and 18.874 € billion. In 2021, the range of average net gain would be reduced to 10.789 € billion and 11.575 € billion.

5.3 Debt Dynamics

From an economic point of view, it is important to forecast the impact of the combination of such restructuring hypotheses on debt stock and debt stock over GDP. This section aims to analyze how such measures would be important, or not, for reducing debt to sustainable levels.

In the Appendix, Tables 10.A to 10.F record a brief analysis of the impact of the combination of the different restructuring hypotheses on debt path. Should the OT's hypothe-

sis 1 (H1) be combined with any of the first three hypotheses for the EFAP (H1, H2), then under the debt dynamics Scenario 1, the following would occur: debt stock on average would be reduced from 160.253 € billion to 133.311 € billion over a period of 10 years; debt stock over GDP would also be reduced from 107.29% to 73.22%. For the debt dynamics Scenario 3, debt stock would not be reduced significantly, both in nominal terms and as a share of GDP, attaining 157.055 € billion in 2024 and 95.19% of GDP. The reason for this is that under this scenario, the economy is only growing at 1% rate per year and the primary balance surplus is reduced to 1.5% of GDP. Debt restructuring hypotheses would be even less effective under Scenario 4, on account of the less favorable economic and financial conditions. The standard deviation presented in the table represents the deviations of combining OT's H1 with the three different hypotheses for the EFAP considered so far. For instance, in 2024, for Scenario 1, the standard deviation value could result in debt stock value being 1.134€ billion above or below the average value.

If OT's H2 are combined, then Portuguese debt becomes more sustainable at a higher pace. For instance, under the debt dynamics Scenario 1, in 2024 the debt stock as a share of GDP would be around 69.59%, and for Scenario 2 this would be 78.46%. The empirical evidence seems to be in accordance with the expectations from economic theory. Lower coupon rates allow the government to manage their budget balance goals and economic goals better. It should also be highlighted that standard deviation increases when progressing from Scenario1 to Scenario 4.

If the OT's haircut hypothesis (H3) is combined with any of the other three available hypotheses for EFAP, then debt sustainability is achieved quite fast for a 15% haircut rate. In 2021, on average, the debt stock over GDP would be 66.76 % for Scenario 1 and 72.58% for scenario 2. The higher the haircut rate, the sooner debt stock over GDP would converge to a sustainable level. An OT's perpetual debt conversion of 15% allows for faster debt sustainability. In 2024, for Scenarios 1 and 2 respectively, debt as a share of GDP would lie between 63.07% and 71.17%.

By analyzing the tables in the Appendix with the different combination of OT's hypotheses and EFAP haircut hypotheses, two major conclusions can be made: Firstly, debt

sustainability is achieved faster and sooner - for instance for Scenarios 1 and 2 in 2021, on average debt stock as a share of GDP lies between 47.01% and 76.01%, depending on the combination of hypotheses; Secondly, the volatility of each hypothesis combination is higher - the wide range of EFAP haircut rates from 15% to 50% explains this variability. A simple combination of OT's H1 or H2 with the EFAP haircuts hypotheses would yield an average debt stock as share of GDP in 2024 of between 59.12% and 62.74% for Scenario 1 and 67.02% and 70.82% for Scenario 2.

5.4 What is the best alternative for the Portuguese Debt Problem?

The solution for the Portuguese debt problem is neither trivial, nor easy. So far, only an analysis of the impact of each hypothesis in terms of the government savings has been made. However, should debt be restructured, then other important impacts would come to bear and would need to be taken into account. One important concern regards the degree of loss that creditors are willing to accept. One cannot suggest a restructuring hypothesis by simply focusing on maximizing savings for the Portuguese government. Literature on this subject has made it clear that restructuring debt does imply different costs for a country. With that concern in mind, those hypotheses that are easier to be accepted by creditor should be supported in the author's view. A balance needs to be reached in terms of sharing costs between the debtor and creditors.

To lend support to any one of the restructuring hypotheses, an awareness is required of the performance of all the three types of analysis: present value, debt service and debt dynamics. A simple lengthening of the maturities of OT's, BT's and EFAP would not solve the debt problem. On the other hand, this would result in reimbursing principal later in the future, although more interest would need to be paid over the period. The benefits associated with such measures may not be compensated by the possible economic and financial costs that such a restructuring would imply.

Lengthening maturities and reducing interest payments seems to be a better alternative for overcoming the debt overhang problem. OT's H2 and EFAP's H2 are in accordance with such requirements. In the case of the OT's, a coupon reduction of between 0.5%

(H2 – E) and 1% (H2 – C) would be acceptable for both the debtor and creditors. Reducing EFAP interest rates from between 0.75% (H2 – B) and 0.5% (H2 –C) would also be a feasible hypothesis.

According to this analysis, one important hypothesis combination cannot be disregarded, which is perpetual debt conversion. For a perpetual coupon of between 2.5% and 3%, significant savings could be achieved without imposing an excessive loss on creditors. The Portuguese government would benefit from the fact that a percentage of the principal of the OT's would never be redeemed. This would significantly reduce the gross financing needs of the government over the next 10 years. In contrast, the amount of debt to be converted would have to be serviced on a perpetual basis. Creditors are not affected at all, as they will continue to receive interest and should they have liquidity requirements, then they can simply sell the instruments on the financial markets. Over a period of 10 years, debt to GDP ratio could be reduced from 107.29% to a value of in between 63.98% and 87.97%, depending on the perpetual debt conversion rate and economic growth. The optimal perpetual debt conversion rate depends on the trade-off between the savings from not paying the principal and the amount of interest that would have to be paid on a perpetual basis.

The haircut hypotheses for OT's, BT's and EFAP seems to be the most difficult scenario to implement. The major reason concerns the level of acceptance of losses by creditors. Apart from imposing present value losses, such hypotheses would also impose nominal value losses. Greece has implemented restructuring hypotheses that contemplated significant haircut rates of around 59% to 65% that did not solve the debt overhang problem. They have already received two bailout programs, the economy continues in recession and debt is still at a high level. The Portuguese situation is different, as the debt to GDP rate is not all that high and some structural reforms have already been implemented with success. In the case of implementing a haircut hypothesis for OT's, then the same should also be implemented for the EFAP as well. It would be difficult to force OT's holders to assume such losses without exposing the IMF and the European Union to some losses as well.

The impact of such a hypothesis for the major Portuguese banks that hold OT's and BT's would be between 945.62 € million and 3,352.87 € billions[14]. These calculations are in accordance with the total amount of public debt held by the four major Portuguese banks (CGD, BCP, BES and BPI) at the end of 2012. At the end of 2012, these banks together held a portfolio of OT's and BT's worth around 14.053 € billion, which corresponds to 14.67% of all BT's and OT's under restructuring. According to Wignall and Slovik (2011), the lower the amount of debt held by the banks, the larger the probability of carrying out a restructuring. The potential losses for the banks would be lower, which translates to a lower probability of having a banking sector problem. The major concern is not the banks' holdings, but rather the holdings of pension funds and the Social Security Financial Stabilization Funds (FEFSS), as those funds will be used to pay pensions in the future and thus, if the debt is to be restructured, there would need to be positive discrimination in favor of those investments. This discrimination could be in the form of better restructuring conditions, tax advantages, or any other measure that would have an equivalent impact.

6. Conclusions

The European sovereign debt crisis, and in particular Portugal's indebtedness, is an issue that may well affect the present generation, as well as future generations. The solution to the sovereign debt problem is quite complex and comprises a combination of different policy measures. Although these policies differ, they should all be aligned in the same direction and complement each other. The recent economic developments in the European Union peripheral countries have shown that austerity measures by themselves are not enough to solve the indebtedness problem.

This research brought to light the possibility of using sovereign debt restructuring as an alternative policy to solving the indebtedness problem. Throughout the paper various possible hypotheses are presented which could be implemented, along with their respective impact. The question regarding which hypotheses best fits the Portuguese problem

---

[14] For a better analysis, consult:
https://www.dropbox.com/s/r4fcf9zj04t9lq6/Portuguese%20Financial%20Institutions%20Holdings_DB.xlsx

does not have an easy answer. As the literature suggests, and as we might well expect, restructuring the debt would imply costs. Therefore the best decision should ensure that these costs should be compensated by the potential benefits.

The empirical analysis for all the scenarios tested seems to reinforce the fact that simply lengthening maturities might not be enough to solve the problem. However, the reduction of coupons and the lengthening of maturities appears to be more feasible. Converting a percentage of public debt into perpetual debt is an alternative that might well be more convenient for both the debtor and creditors. The Portuguese government would thus avoid a significant amount of debt reimbursement, although it would have to pay interest on a perpetual basis. The optimal debt conversion rate relies on the trade-off between these two features. Finally, the haircut hypothesis seems to be the most difficult to implement, as it would imply greater costs, not only for creditors, but also for Portugal.

The major contributions of this paper were more from an empirical point of view, rather than from a conceptual one. The goal was to discuss in detail a restructuring by the Portuguese government and provide a numerical analysis of the potential impacts. Further studies are needed regarding the extent and duration of the costs associated with a restructuring of Portuguese debt. The context of creditors should also be studied in more detail, with special attention being paid to the percentage of Portuguese debt held by pension funds, small investors and the Social Security Financial Stabilization Fund. Additional research would be welcome on more alternatives for restructuring Portugal's public debt, together with their respective impacts.

7. References

Afonso, António (2002). *Ensaios sobre Política Orçamental*, Tese de Doutoramento em Economia, Instituto Superior de Economia e Gestão, Universidade Técnica de Lisboa.

Arslanalp, Serkan and Henry, Peter Blair. (2005). *Is Debt Relief Efficient?* Journal of Finance, 60(2): 1017-1051.

Asonuma, Tamon. 2010. *Serial Default and Debt Renegotiation*. IMF.

BES (2012). Annual Report 2012.

Bolton, Patrick, and Jeanne, Olivier. (2007). *Structuring and Restructuring Sovereign Debt: The Role of a Bankruptcy Regime*. IMF Working Paper 07/192.

Borensztein, Eduardo, and Panizza, Ugo (2009). *The Costs of Sovereign Default*. IMF Staff Papers 56, 683–741.

BPI (2012). Annual Report 2012.

Bulow, Jeremy, and Rogoff, Kenneth S. (1989). *Sovereign Debt: Is to Forgive to Forget?* American Economic Review, 79(1): 43–50.

Caixa Geral de Depósitos (2012). Annual Report 2012.

Cruces, Juan J., and Trebesch, Christoph (2011). *Sovereign Defaults: The Price of Haircuts*. CESIFO Working Paper 3604.

Das, Udaibir S., Papaioannou, Michael G., and Trebesch, Christoph (2012). *Sovereign Debt Restructurings 1950–2010: Literature Survey, Data, and Stylized Facts*. IMF Working Paper 12/203.

Diebold, Francis X., and Li, Canlin (2005). *Forecasting the Term Structure of Government Bond Yields*. Journal of Econometrics 130 (2006) 337–364.

Direção Geral do Orçamento (2013). Portuguese Budget for 2011 and 2012. Available at: http://www.dgo.pt/Paginas/default.aspx

Eaton, Jonathan and Fernadez, Raquel (1995). *Sovereign Debt*. National Bureau of Economic Research Working Paper 5131.

Eaton, Jonathan, and Gersovitz, Mark. (1981). *Debt with Potential Repudiation: Theoretical and Empirical Analysis*. Review of Economic Studies, 48(2): 289–309.

English, William (1996). *Understanding the Costs of Sovereign Default: American State Debts in the 1840's*. The American Economic Review 1996, Vol. 86(1), pp.259-275.

European Commission (2013). *Annual Macro-Economic Database*. Brussels: Eurostat. Available at: http://ec.europa.eu/economy_finance/ameco/user/serie/SelectSerie.cfm.

Fisch, Jill E., and Gentile, Caroline M. (2004). *Vultures or Vanguards? - The Role of Litigation In Sovereign Debt Restructuring*. Emory Law Journal, Vol.53, No.1043.

Gil, Teresa. (2013). *Estudo BPI - Renegociação das Condições do MEEF e FEE: o que é que Portugal ganha?*. Research Department BPI.

Grossman, Herschel I., and Huyck, John B. Van (1985). *Sovereign Debt as a Contingent Claim: Excusable Default, Repudiation and Reputation*. National Bureau of Economic Research, Working Paper 1673.

Guedes, Jorge (2008). *Modelos Dinâmicos da Estrutura de Prazo das Taxas de Juro*. IGCP – Instituto de Gestão da Tesouraria e do Crédito Público, I. P.

Hatchondo, Juan Carlos, Martinez, Leonardo, and Sapriza, Horacio. (2007). *The Economics of Sovereign Defaults*. *Federal Reserve Bank of Richmond Economic Quarterly*, 93(2): 163–87.

Hudson, Michael (1992). "*The Lost Tradition of Biblical Cancellations*", accessed on http://michael-hudson.com

Hull, John C. (2012). – *Options, Futures and Other Derivatives*, 8th Ed. London: Pearson Education Limited.

International Monetary Fund (2011-2013), Country Report No. 11/127, Portugal: Request for a Three-Year Arrangement under the Extended Fund Facility, June, Country Report 13/18 (2013), Issues 13/19 (2013), Rethinking the State 13/6 (2013), and Fourth Review (2011-12), Fifth Review (12/292) (Oct 2012), Sixth Review (Dec 2012), Seventh Review (March 2013).

International Monetary Fund, (2012). World Economic Outlook, October 2012. *Chapter 3 – The Good, the Bad, and the Ugly: 100 Years of Dealing with Public Debt Overhangs*. IMF Staff.

Lane, Philip R. (2011). *The Irish Crisis*. CEPR Discussion Paper No. DP8287.

Levy-Yeyati, Eduardo, and Panizza,Ugo. (2006). *The Elusive Costs of Sovereign Defaults*. Inter-American Development Bank Research Department Working Paper 581.

Louça, Francisco and Mortágua, Mariana (2012). *A Dividadura - Portugal na Crise do Euro*, 2nd Edition. Lisbon: Bertrand Editora.

Martellini, L., et al. (2003). – *Fixed-Income Securities*, 1st Ed. Wiley finance series.

Mendoza, Enrique G., and Yue, Vivian Z. (2008). *A Solution to the Default Risk–Business Cycle Disconnect*. National Bureau of Economic Research Working Paper 13861.

Millennium BCP (2012). Annual Report 2012.

Mitchener, Kris and Weidenmier, Marc (2005). *Supersanctions and Sovereign Debt Payment*, National Bureau of Economic Research Working Paper 11472.

Nelson, C.R. and Siegel, A.F., (1987). *Parsimonious modeling of yield curve*. Journal of Business 60, 473–489.

Panizza, Ugo, Sturzenegger, Federico, and Zettelmeyer, Jeromin (2009). *The Economics and Law of Sovereign Debt and Defaults*. Journal of Economic Literature 2009, 47:3, 651–698.

Pereira, Paulo Trigo., Afonso, António., et all., (2009) *Economia e Finanças Públicas,*3rd Edition. Lisboa: Escolar Editora.

Public Debt and Treasury Agency Management (2013). Available at: http://www.igcp.pt/

Reinhart, Carmen M., and Rogoff, Kenneth S. (2008). *This Time Is Different: A Panoramic View of Eight Centuries of Financial Crises*. National Bureau of Economic Research Working Paper 13882.

Reinhart, Carmen M., and Rogoff, Kenneth S. (2009). *This Time Is Different - Eight Centuries of Financial Folly*, Princeton: Princeton University Press.

Reinhart, Carmen M., Rogoff, Kenneth S., and Savastano Miguel A. (2003). *Debt Intolerance*. National Bureau of Economic Research Working Paper 9908.

Rogoff, Kenneth S., and Zettelmeyer, Jeromin. (2002). *Bankruptcy Procedures for Sovereigns: A History of Ideas, 1976–2001*. IMF Staff Papers, 49(3): 470–507.

Sachs, Jeffrey, and Cohen, Daniel. (1982). *LDC Borrowing with Default Risk*. National Bureau of Economic Research Working Paper 925.

Sandleris, Guido (2004). *Sovereign Defaults: Information, Investment and Credit*. Job Market Paper.

Sandleris, Guido, Gelos, Gaston, and Sahay, Ratna. (2004). *Sovereign Borrowing by Developing Countries: What Determines Market Access?* IMF Working Paper 04/221.

Schwarcz, Steven L. (2000). *Sovereign Debt Restructuring: A Bankruptcy Reorganization Approach*. Cornell Law Review, 85: 101–87.

Sturzenegger, Federico, and Zettelmeyer, Jeromin (2005). *Haircuts: Estimating Investor Losses in Sovereign Debt Restructurings, 1998–2005*. IMF Workin Paper, 05/137.

Sturzenegger, Federico, and Zettelmeyer, Jeromin. (2006). *Debt Defaults and Lessons from a Decade of Crises*. Cambridge, MA: MIT Press.

Sturzenegger, Federico. (2004). *Toolkit for the Analysis of Debt Problems*. Journal of Restructuring Finance, 1(1): 201–03.

Thomson Reuters Eikon (2013). *Database*.

Tomz, Michael, and Wright, Mark L. J. (2007). *Do Countries Default in 'Bad Times'?* Journal of the European Economic Association, 5(2–3): 352–60.

Trebesch, Christoph. (2008). *Delays in Sovereign Debt Restructuring: Should We Really Blame the Creditors?* Unpublished.

Whelan, Karl (2011). *Ireland's Sovereign Debt Crisis*. UCD Centre for Economic Research Working Paper series, 2011.

Wignall, Adrian Blundell and Slovik, Patrick (2011). *A Market Perspective on the European Sovereign Debt and Banking Crisis*. OECD Journal: Financial Markets Trends, Volume 2010 – Issue 2.

Wright, Mark L. J. 2002. "Reputations and Sovereign Debt." Unpublished.

Zettelmeyer, Jeromin, Trebesch, Christoph and Gulati, Mitu (2013). *The Greek Debt Restructuring: An Autopsy*. Economic Policy, 2013, Vol. 28(75), pp.513-563.

Appendix

Table 1. Portuguese Gross Public Debt

EURO Millions (€10^6)	2007	2008	2009	2010	2011	2012	% Total 2012
EURO debt (excluding the Financial Assistance Program)	112.538,67 €	117.540,17 €	130.700,08 €	149.435,58 €	136.927,07 €	129.866,20 €	66.76%
Tradable	87.892,89 €	95.968,60 €	109.962,62 €	127.015,19 €	119.564,29 €	113.641,30 €	58.42%
ECP	- €	738,66 €	759,48 €	393,63 €	605,24 €	1.962,92 €	1.01%
BT	9.044,07 €	12.816,75 €	17.231,29 €	19.260,83 €	12.461,13 €	17.777,34 €	9.14%
OT / Fixed rate Treasury Bonds	77.660,98 €	82.148,49 €	91.907,43 €	105.946,37 €	103.940,30 €	93.626,13 €	48.13%
Other Bonds	974,24 €	51,13 €	51,13 €	51,13 €	51,13 €	51,13 €	0.03%
MTN	200,00 €	200,00 €	- €	1.350,00 €	2.493,30 €	210,60 €	0.11%
Retail-Bonds	13,60 €	13,58 €	13,28 €	13,23 €	13,20 €	13,19 €	0.01%
Non Tradable	24.645,78 €	21.571,57 €	20.737,46 €	22.420,40 €	17.362,78 €	16.224,90 €	8.34%
Certific. Aforro / Saving Certificates	18.050,00 €	17.197,78 €	16.871,04 €	15.470,72 €	11.384,30 €	9.669,39 €	4.97%
Certific. Tesouro / Treasury Certificates	- €	- €	- €	685,40 €	1.308,14 €	1.415,97 €	0.73%
CEDIC	4.171,68 €	4.183,05 €	3.786,50 €	4.887,43 €	3.933,22 €	4.405,30 €	2.26%
CEDIM	- €	- €	- €	- €	140,69 €	154,16 €	0.08%
Others	2.424,11 €	190,74 €	79,91 €	1.376,85 €	596,42 €	580,08 €	0.30%
Non EURO debt (excluding the Financial Assistance Program)	265,45 €	922,53 €	2.046,33 €	2.339,76 €	2.106,28 €	1.639,13 €	0.84%
Tradable	265,17 €	922,23 €	2.046,04 €	2.339,45 €	2.105,97 €	1.638,82 €	0.84%
ECP	- €	764,75 €	1.131,74 €	403,58 €	95,87 €	60,53 €	0.03%
Other Bonds	204,54 €	157,48 €	168,90 €	164,97 €	170,00 €	174,00 €	0.09%
MTN	60,63 €	- €	745,40 €	1.770,90 €	1.840,10 €	1.404,29 €	0.72%
Non Tradable	0,28 €	0,30 €	0,29 €	0,31 €	0,32 €	0,31 €	0.00%
Financial Assistance Program	- €	- €	- €	- €	35.861,89 €	63.013,48 €	32.39%
FEEF / EFSF	- €	- €	- €	- €	8.113,07 €	19.477,67 €	10.01%
MEEF / EFSM	- €	- €	- €	- €	14.100,00 €	22.100,00 €	11.36%
FMI / IMF	- €	- €	- €	- €	13.648,83 €	21.435,81 €	11.02%
Total Debt	**112.804,13 €**	**118.462,70 €**	**132.746,41 €**	**151.775,34 €**	**174.895,25 €**	**194.518,81 €**	100.00%

Table 2. Hypothesis 1 OT's restructuring

Hypothesis 1	OT 4.375% Jun 2014	OT 3.6% Oct 2014	OT 3.35% Oct 2015	OT 6.4% Feb 2016	OT 4.2% Oct 2016	OT 4.35% Oct 2017	OT 4.45% Jun 2018	OT 4.75% Jun 2019	OT 4.80% Jun 2020	OT 3.85% Apr 2021	OT 4.95% Oct 2023	Total
Base Scenario	735,83 €	1.420,57 €	3.006,34 €	23,19 €	932,78 €	1.186,75 €	884,74 €	798,24 €	805,49 €	1.014,14 €	513,64 €	**11.321,72 €**
Scenario 1 (0.125%)	783,90 €	1.479,77 €	3.095,70 €	50,95 €	973,25 €	1.238,35 €	922,78 €	838,31 €	846,70 €	1.041,95 €	540,96 €	**11.812,61 €**
Scenario 2 (0.25%)	831,27 €	1.538,08 €	3.183,45 €	78,19 €	1.012,90 €	1.288,75 €	959,83 €	877,24 €	886,61 €	1.068,72 €	567,19 €	**12.292,23 €**
Scenario 3 (0.375%)	877,94 €	1.595,53 €	3.269,61 €	104,92 €	1.051,74 €	1.337,99 €	995,91 €	915,05 €	925,27 €	1.094,47 €	592,35 €	**12.760,79 €**
Scenario 4 (0.5%)	923,93 €	1.652,13 €	3.354,22 €	131,14 €	1.089,79 €	1.386,08 €	1.031,05 €	951,78 €	962,70 €	1.119,23 €	616,49 €	**13.218,55 €**
Scenario 5 (0.625%)	969,26 €	1.707,89 €	3.437,29 €	156,86 €	1.127,07 €	1.433,05 €	1.065,26 €	987,44 €	998,94 €	1.143,03 €	639,63 €	**13.665,72 €**
Scenario 6 (0.75%)	1.013,92 €	1.762,82 €	3.518,86 €	182,10 €	1.163,58 €	1.478,92 €	1.098,57 €	1.022,06 €	1.034,01 €	1.165,89 €	661,80 €	**14.102,53 €**
Scenario 7 (0.875%)	1.057,93 €	1.816,94 €	3.598,95 €	206,86 €	1.199,34 €	1.523,71 €	1.130,98 €	1.055,67 €	1.067,94 €	1.187,83 €	683,03 €	**14.529,19 €**
Scenario 8 (1%)	1.101,30 €	1.870,25 €	3.677,59 €	231,15 €	1.234,37 €	1.567,44 €	1.162,53 €	1.088,29 €	1.100,77 €	1.208,90 €	703,35 €	**14.945,93 €**
Scenario 9 (1.125%)	1.144,04 €	1.922,77 €	3.754,79 €	254,98 €	1.268,67 €	1.610,14 €	1.193,23 €	1.119,93 €	1.132,51 €	1.229,09 €	722,79 €	**15.352,94 €**
Scenario 10 (1.25%)	1.186,15 €	1.974,51 €	3.830,58 €	278,35 €	1.302,27 €	1.651,82 €	1.223,10 €	1.150,63 €	1.163,20 €	1.248,46 €	741,38 €	**15.750,44 €**
Scenario 11 (1.375%)	1.227,66 €	2.025,48 €	3.904,99 €	301,28 €	1.335,16 €	1.692,50 €	1.252,15 €	1.180,41 €	1.192,86 €	1.267,00 €	759,13 €	**16.138,62 €**
Scenario 12 (1.5%)	1.268,55 €	2.075,70 €	3.978,03 €	323,77 €	1.367,37 €	1.732,21 €	1.280,40 €	1.209,28 €	1.221,51 €	1.284,75 €	776,08 €	**16.517,67 €**
Scenario 13 (-0.125%)	687,05 €	1.360,48 €	2.915,35 €	- 5,10 €	891,47 €	1.133,94 €	845,68 €	757,01 €	762,96 €	985,25 €	485,19 €	**10.819,29 €**
Scenario 14 (-0.25%)	637,55 €	1.299,49 €	2.822,69 €	- 33,94 €	849,31 €	1.079,90 €	805,60 €	714,58 €	719,08 €	955,25 €	455,58 €	**10.305,10 €**
Scenario 15 (-0.375%)	587,32 €	1.237,57 €	2.728,34 €	- 63,32 €	806,29 €	1.024,58 €	764,46 €	670,92 €	673,80 €	924,12 €	424,78 €	**9.778,86 €**
Scenario 16 (-0.5%)	536,34 €	1.174,72 €	2.632,27 €	- 93,27 €	762,38 €	967,98 €	722,24 €	626,02 €	627,10 €	891,82 €	392,73 €	**9.240,34 €**
Scenario 17 (-0.625%)	484,60 €	1.110,93 €	2.534,45 €	- 123,79 €	717,57 €	910,06 €	678,93 €	579,83 €	578,94 €	858,32 €	359,42 €	**8.689,26 €**
Scenario 18 (-0.75%)	432,09 €	1.046,17 €	2.434,85 €	- 154,89 €	671,85 €	850,80 €	634,48 €	532,34 €	529,29 €	823,59 €	324,79 €	**8.125,35 €**
Scenario 19 (-0.875%)	378,81 €	980,43 €	2.333,44 €	- 186,58 €	625,19 €	790,17 €	588,89 €	483,50 €	478,09 €	787,59 €	288,81 €	**7.548,34 €**
Scenario 20 (-1%)	324,73 €	913,70 €	2.230,18 €	- 218,88 €	577,59 €	728,14 €	542,12 €	433,29 €	425,33 €	750,28 €	251,43 €	**6.957,92 €**
Scenario 21 (-1.125%)	269,85 €	845,96 €	2.125,06 €	- 251,79 €	529,01 €	664,69 €	494,15 €	381,68 €	370,94 €	711,64 €	212,62 €	**6.353,83 €**
Scenario 22 (-1.25%)	214,16 €	777,20 €	2.018,03 €	- 285,32 €	479,46 €	599,79 €	444,95 €	328,62 €	314,91 €	671,62 €	172,33 €	**5.735,75 €**
Scenario 23 (-1.375%)	157,64 €	707,40 €	1.909,06 €	- 319,49 €	428,89 €	533,40 €	394,50 €	274,10 €	257,17 €	630,19 €	130,52 €	**5.103,38 €**
Scenario 24 (-1.5%)	100,27 €	636,55 €	1.798,12 €	- 354,31 €	377,31 €	465,50 €	342,77 €	218,06 €	197,70 €	587,30 €	87,13 €	**4.456,42 €**

Table 3A. Hypothesis 2 OT's restructuring – 1.5% Coupon Reduction

Hypothesis 2-A (1,5% Coupon Reduction)	OT 4.375% Jun 2014	OT 3.6% Oct 2014	OT 3.35% Oct 2015	OT 6.4% Feb 2016	OT 4.2% Oct 2016	OT 4.35% Oct 2017	OT 4.45% Jun 2018	OT 4.75% Jun 2019	OT 4.80% Jun 2020	OT 3.85% Apr 2021	OT 4.95% Oct 2023	Total
Base Scenario	1.484,57 €	2.393,00 €	4.777,39 €	512,76 €	1.793,97 €	2.439,06 €	1.935,10 €	2.012,14 €	1.879,96 €	2.284,75 €	1.799,29 €	**23.311,991**
Scenario 1 (0.125%)	1.527,85 €	2.445,99 €	4.854,67 €	536,96 €	1.828,19 €	2.481,05 €	1.964,66 €	2.041,92 €	1.904,10 €	2.300,85 €	1.813,86 €	**23.700,110**
Scenario 2 (0.25%)	1.570,48 €	2.498,16 €	4.930,46 €	560,69 €	1.861,67 €	2.521,96 €	1.993,32 €	2.070,70 €	1.927,23 €	2.316,06 €	1.827,53 €	**24.078,267**
Scenario 3 (0.375%)	1.612,47 €	2.549,53 €	5.004,79 €	583,93 €	1.894,40 €	2.561,81 €	2.021,13 €	2.098,49 €	1.949,38 €	2.330,42 €	1.840,33 €	**24.446,680**
Scenario 4 (0.5%)	1.653,82 €	2.600,10 €	5.077,68 €	606,71 €	1.926,41 €	2.600,63 €	2.048,09 €	2.125,32 €	1.970,57 €	2.343,95 €	1.852,29 €	**24.805,562**
Scenario 5 (0.625%)	1.694,54 €	2.649,89 €	5.149,16 €	629,03 €	1.957,71 €	2.638,43 €	2.074,21 €	2.151,22 €	1.990,83 €	2.356,67 €	1.863,43 €	**25.155,121**
Scenario 6 (0.75%)	1.734,64 €	2.698,91 €	5.219,26 €	650,90 €	1.988,31 €	2.675,24 €	2.099,54 €	2.176,20 €	2.010,18 €	2.368,60 €	1.873,79 €	**25.495,560**
Scenario 7 (0.875%)	1.774,14 €	2.747,16 €	5.287,99 €	672,33 €	2.018,22 €	2.711,07 €	2.124,06 €	2.200,28 €	2.028,66 €	2.379,78 €	1.883,38 €	**25.827,077**
Scenario 8 (1%)	1.813,04 €	2.794,68 €	5.355,38 €	693,33 €	2.047,46 €	2.745,94 €	2.147,82 €	2.223,50 €	2.046,28 €	2.390,22 €	1.892,24 €	**26.149,869**
Scenario 9 (1.125%)	1.851,35 €	2.841,45 €	5.421,45 €	713,89 €	2.076,04 €	2.779,88 €	2.170,82 €	2.245,86 €	2.063,06 €	2.399,94 €	1.900,38 €	**26.464,124**
Scenario 10 (1.25%)	1.889,08 €	2.887,50 €	5.486,22 €	734,04 €	2.103,97 €	2.812,90 €	2.193,08 €	2.267,39 €	2.079,03 €	2.408,97 €	1.907,84 €	**26.770,028**
Scenario 11 (1.375%)	1.926,24 €	2.932,83 €	5.549,72 €	753,78 €	2.131,26 €	2.845,03 €	2.214,61 €	2.288,12 €	2.094,22 €	2.417,32 €	1.914,63 €	**27.067,763**
Scenario 12 (1.5%)	1.962,83 €	2.977,47 €	5.611,97 €	773,12 €	2.157,93 €	2.876,27 €	2.235,44 €	2.308,05 €	2.108,64 €	2.425,02 €	1.920,77 €	**27.357,508**
Scenario 13 (-0.125%)	1.440,62 €	2.339,17 €	4.698,61 €	488,06 €	1.758,98 €	2.395,96 €	1.904,64 €	1.981,32 €	1.854,79 €	2.267,75 €	1.783,79 €	**22.913,688**
Scenario 14 (-0.25%)	1.395,99 €	2.284,51 €	4.618,29 €	462,86 €	1.723,20 €	2.351,75 €	1.873,26 €	1.949,45 €	1.828,54 €	2.249,81 €	1.767,32 €	**22.504,974**
Scenario 15 (-0.375%)	1.350,68 €	2.228,98 €	4.536,40 €	437,15 €	1.686,63 €	2.306,38 €	1.840,93 €	1.916,49 €	1.801,21 €	2.230,90 €	1.749,87 €	**22.085,614**
Scenario 16 (-0.5%)	1.304,67 €	2.172,58 €	4.452,92 €	410,92 €	1.649,25 €	2.259,84 €	1.807,63 €	1.882,42 €	1.772,74 €	2.211,01 €	1.731,39 €	**21.655,371**
Scenario 17 (-0.625%)	1.257,95 €	2.115,30 €	4.367,83 €	384,17 €	1.611,05 €	2.212,11 €	1.773,34 €	1.847,21 €	1.743,12 €	2.190,09 €	1.711,85 €	**21.214,001**
Scenario 18 (-0.75%)	1.210,52 €	2.057,11 €	4.281,09 €	356,87 €	1.572,00 €	2.163,15 €	1.738,04 €	1.810,83 €	1.712,31 €	2.168,13 €	1.691,21 €	**20.761,254**
Scenario 19 (-0.875%)	1.162,35 €	1.998,02 €	4.192,67 €	329,02 €	1.532,09 €	2.112,95 €	1.701,70 €	1.773,27 €	1.680,28 €	2.145,08 €	1.669,45 €	**20.296,876**
Scenario 20 (-1%)	1.113,45 €	1.938,00 €	4.102,55 €	300,61 €	1.491,31 €	2.061,48 €	1.664,31 €	1.734,47 €	1.646,99 €	2.120,92 €	1.646,52 €	**19.820,605**
Scenario 21 (-1.125%)	1.063,79 €	1.877,04 €	4.010,70 €	271,64 €	1.449,64 €	2.008,71 €	1.625,83 €	1.694,43 €	1.612,41 €	2.095,61 €	1.622,38 €	**19.332,175**
Scenario 22 (-1.25%)	1.013,37 €	1.815,12 €	3.917,09 €	242,08 €	1.407,07 €	1.954,61 €	1.586,25 €	1.653,10 €	1.576,51 €	2.069,12 €	1.596,99 €	**18.831,312**
Scenario 23 (-1.375%)	962,17 €	1.752,23 €	3.821,68 €	211,93 €	1.363,57 €	1.899,16 €	1.545,54 €	1.610,46 €	1.539,26 €	2.041,42 €	1.570,32 €	**18.317,736**
Scenario 24 (-1.5%)	910,18 €	1.688,35 €	3.724,44 €	181,18 €	1.319,13 €	1.842,33 €	1.503,67 €	1.566,47 €	1.500,60 €	2.012,47 €	1.542,32 €	**17.791,161**

Table 3B. Hypothesis 2 OT's restructuring – 1% Coupon Reduction

Hypothesis 2-C (1% Coupon Reduction)	OT 4.375% Jun 2014	OT 3.6% Oct 2014	OT 3.35% Oct 2015	OT 6.4% Feb 2016	OT 4.2% Oct 2016	OT 4.35% Oct 2017	OT 4.45% Jun 2018	OT 4.75% Jun 2019	OT 4.80% Jun 2020	OT 3.85% Apr 2021	OT 4.95% Oct 2023	Total
Base Scenario	1.234,99 €	2.068,86 €	4.187,04 €	349,57 €	1.506,91 €	2.021,62 €	1.584,98 €	1.607,51 €	1.412,93 €	1.861,21 €	1.370,74 €	**19.206,35 €**
Scenario 1 (0.125%)	1.279,87 €	2.123,92 €	4.268,35 €	374,96 €	1.543,21 €	2.066,82 €	1.617,36 €	1.640,72 €	1.441,20 €	1.881,22 €	1.389,56 €	**19.627,18 €**
Scenario 2 (0.25%)	1.324,08 €	2.178,14 €	4.348,12 €	399,85 €	1.578,74 €	2.110,89 €	1.648,83 €	1.672,88 €	1.468,41 €	1.900,28 €	1.407,42 €	**20.037,63 €**
Scenario 3 (0.375%)	1.367,63 €	2.231,53 €	4.426,39 €	424,26 €	1.613,52 €	2.153,87 €	1.679,39 €	1.704,01 €	1.494,58 €	1.918,44 €	1.424,34 €	**20.437,95 €**
Scenario 4 (0.5%)	1.410,52 €	2.284,11 €	4.503,19 €	448,19 €	1.647,54 €	2.195,78 €	1.709,07 €	1.734,14 €	1.519,74 €	1.935,71 €	1.440,35 €	**20.828,35 €**
Scenario 5 (0.625%)	1.452,78 €	2.335,89 €	4.578,54 €	471,64 €	1.680,83 €	2.236,64 €	1.737,90 €	1.763,29 €	1.543,91 €	1.952,12 €	1.455,50 €	**21.209,03 €**
Scenario 6 (0.75%)	1.494,40 €	2.386,88 €	4.652,46 €	494,64 €	1.713,40 €	2.276,46 €	1.765,88 €	1.791,48 €	1.567,13 €	1.967,70 €	1.469,79 €	**21.580,22 €**
Scenario 7 (0.875%)	1.535,40 €	2.437,09 €	4.724,98 €	517,17 €	1.745,26 €	2.315,28 €	1.793,04 €	1.818,74 €	1.589,42 €	1.982,47 €	1.483,26 €	**21.942,12 €**
Scenario 8 (1%)	1.575,79 €	2.486,53 €	4.796,11 €	539,27 €	1.776,43 €	2.353,11 €	1.819,39 €	1.845,09 €	1.610,80 €	1.996,44 €	1.495,94 €	**22.294,92 €**
Scenario 9 (1.125%)	1.615,58 €	2.535,22 €	4.865,89 €	560,92 €	1.806,92 €	2.389,97 €	1.844,96 €	1.870,55 €	1.631,30 €	2.009,66 €	1.507,85 €	**22.638,82 €**
Scenario 10 (1.25%)	1.654,77 €	2.583,17 €	4.934,34 €	582,15 €	1.836,74 €	2.425,87 €	1.869,75 €	1.895,14 €	1.650,94 €	2.022,13 €	1.519,02 €	**22.974,02 €**
Scenario 11 (1.375%)	1.693,38 €	2.630,38 €	5.001,48 €	602,95 €	1.865,90 €	2.460,85 €	1.893,79 €	1.918,88 €	1.669,74 €	2.033,88 €	1.529,46 €	**23.300,69 €**
Scenario 12 (1.5%)	1.731,40 €	2.676,88 €	5.067,32 €	623,34 €	1.894,41 €	2.494,91 €	1.917,10 €	1.941,80 €	1.687,73 €	2.044,93 €	1.539,21 €	**23.619,03 €**
Scenario 13 (-0.125%)	1.189,43 €	2.012,94 €	4.104,19 €	323,67 €	1.469,81 €	1.975,29 €	1.551,66 €	1.573,22 €	1.383,56 €	1.840,25 €	1.350,92 €	**18.774,94 €**
Scenario 14 (-0.25%)	1.143,18 €	1.956,17 €	4.019,76 €	297,26 €	1.431,91 €	1.927,80 €	1.517,37 €	1.537,82 €	1.353,07 €	1.818,29 €	1.330,08 €	**18.332,69 €**
Scenario 15 (-0.375%)	1.096,22 €	1.898,51 €	3.933,71 €	270,33 €	1.393,18 €	1.879,11 €	1.482,10 €	1.501,30 €	1.321,42 €	1.795,31 €	1.308,17 €	**17.879,38 €**
Scenario 16 (-0.5%)	1.048,56 €	1.839,96 €	3.846,04 €	242,86 €	1.353,63 €	1.829,22 €	1.445,83 €	1.463,62 €	1.288,59 €	1.771,28 €	1.285,17 €	**17.414,76 €**
Scenario 17 (-0.625%)	1.000,17 €	1.780,51 €	3.756,70 €	214,85 €	1.313,22 €	1.778,09 €	1.408,53 €	1.424,75 €	1.254,54 €	1.746,17 €	1.261,04 €	**16.938,57 €**
Scenario 18 (-0.75%)	951,04 €	1.720,13 €	3.665,67 €	186,28 €	1.271,95 €	1.725,70 €	1.370,19 €	1.384,67 €	1.219,24 €	1.719,95 €	1.235,74 €	**16.450,56 €**
Scenario 19 (-0.875%)	901,17 €	1.658,82 €	3.572,93 €	157,15 €	1.229,79 €	1.672,02 €	1.330,76 €	1.343,34 €	1.182,66 €	1.692,58 €	1.209,24 €	**15.950,48 €**
Scenario 20 (-1%)	850,54 €	1.596,57 €	3.478,43 €	127,45 €	1.186,74 €	1.617,03 €	1.290,25 €	1.300,75 €	1.144,76 €	1.664,04 €	1.181,49 €	**15.438,04 €**
Scenario 21 (-1.125%)	799,14 €	1.533,34 €	3.382,15 €	97,16 €	1.142,77 €	1.560,70 €	1.248,61 €	1.256,85 €	1.105,51 €	1.634,29 €	1.152,46 €	**14.912,98 €**
Scenario 22 (-1.25%)	746,96 €	1.469,15 €	3.284,07 €	66,28 €	1.097,86 €	1.503,00 €	1.205,82 €	1.211,61 €	1.064,86 €	1.603,29 €	1.122,10 €	**14.375,01 €**
Scenario 23 (-1.375%)	693,99 €	1.403,95 €	3.184,14 €	34,79 €	1.052,01 €	1.443,91 €	1.161,86 €	1.165,01 €	1.022,79 €	1.571,01 €	1.090,39 €	**13.823,85 €**
Scenario 24 (-1.5%)	640,21 €	1.337,75 €	3.082,34 €	2,69 €	1.005,19 €	1.383,39 €	1.116,70 €	1.117,00 €	979,26 €	1.537,42 €	1.057,26 €	**13.259,21 €**

Table 3C. Hypothesis 2 OT's restructuring[15] - 0.5% Coupon Reduction

Hypothesis 2-E (0,5% Coupon Reduction)	OT 4.375% Jun 2014	OT 3.6% Oct 2014	OT 3.35% Oct 2015	OT 6.4% Feb 2016	OT 4.2% Oct 2016	OT 4.35% Oct 2017	OT 4.45% Jun 2018	OT 4.75% Jun 2019	OT 4.80% Jun 2020	OT 3.85% Apr 2021	OT 4.95% Oct 2023	Total
Base Scenario	985,41 €	1.744,71 €	3.596,69 €	186,38 €	1.219,84 €	1.604,19 €	1.234,86 €	1.202,87 €	945,89 €	1.437,68 €	942,19 €	**15.100,71 €**
Scenario 1 (0.125%)	1.031,89 €	1.801,84 €	3.682,02 €	212,96 €	1.258,23 €	1.652,58 €	1.270,07 €	1.239,51 €	978,29 €	1.461,58 €	965,26 €	**15.554,24 €**
Scenario 2 (0.25%)	1.077,67 €	1.858,11 €	3.765,78 €	239,02 €	1.295,82 €	1.699,82 €	1.304,33 €	1.275,06 €	1.009,58 €	1.484,50 €	987,30 €	**15.997,00 €**
Scenario 3 (0.375%)	1.122,78 €	1.913,53 €	3.848,00 €	264,59 €	1.332,63 €	1.745,93 €	1.337,65 €	1.309,53 €	1.039,77 €	1.506,45 €	1.008,35 €	**16.429,22 €**
Scenario 4 (0.5%)	1.167,23 €	1.968,12 €	3.928,70 €	289,66 €	1.368,67 €	1.790,93 €	1.370,06 €	1.342,96 €	1.068,90 €	1.527,47 €	1.028,42 €	**16.851,13 €**
Scenario 5 (0.625%)	1.211,02 €	2.021,89 €	4.007,92 €	314,25 €	1.403,95 €	1.834,84 €	1.401,58 €	1.375,36 €	1.097,00 €	1.547,57 €	1.047,56 €	**17.262,94 €**
Scenario 6 (0.75%)	1.254,16 €	2.074,85 €	4.085,66 €	338,37 €	1.438,49 €	1.877,69 €	1.432,22 €	1.406,77 €	1.124,08 €	1.566,79 €	1.065,80 €	**17.664,88 €**
Scenario 7 (0.875%)	1.296,67 €	2.127,01 €	4.161,96 €	362,02 €	1.472,30 €	1.919,49 €	1.462,01 €	1.437,21 €	1.150,18 €	1.585,15 €	1.083,15 €	**18.057,15 €**
Scenario 8 (1%)	1.338,55 €	2.178,39 €	4.236,85 €	385,21 €	1.505,40 €	1.960,27 €	1.490,96 €	1.466,69 €	1.175,33 €	1.602,67 €	1.099,65 €	**18.439,97 €**
Scenario 9 (1.125%)	1.379,81 €	2.229,00 €	4.310,34 €	407,95 €	1.537,79 €	2.000,05 €	1.519,09 €	1.495,24 €	1.199,54 €	1.619,38 €	1.115,32 €	**18.813,52 €**
Scenario 10 (1.25%)	1.420,46 €	2.278,84 €	4.382,46 €	430,25 €	1.569,50 €	2.038,84 €	1.546,42 €	1.522,89 €	1.222,85 €	1.635,29 €	1.130,20 €	**19.178,00 €**
Scenario 11 (1.375%)	1.460,52 €	2.327,93 €	4.453,23 €	452,12 €	1.600,53 €	2.076,67 €	1.572,97 €	1.549,65 €	1.245,27 €	1.650,44 €	1.144,30 €	**19.533,62 €**
Scenario 12 (1.5%)	1.499,98 €	2.376,29 €	4.522,68 €	473,55 €	1.630,89 €	2.113,56 €	1.598,75 €	1.575,54 €	1.266,83 €	1.664,84 €	1.157,65 €	**19.880,55 €**
Scenario 13 (-0.125%)	938,24 €	1.686,71 €	3.509,77 €	159,29 €	1.180,64 €	1.554,62 €	1.198,67 €	1.165,11 €	912,33 €	1.412,75 €	918,06 €	**14.636,18 €**
Scenario 14 (-0.25%)	890,37 €	1.627,83 €	3.421,23 €	131,66 €	1.140,61 €	1.503,85 €	1.161,49 €	1.126,20 €	877,59 €	1.386,77 €	892,83 €	**14.160,41 €**
Scenario 15 (-0.375%)	841,77 €	1.568,04 €	3.331,03 €	103,50 €	1.099,74 €	1.451,85 €	1.123,28 €	1.086,11 €	841,64 €	1.359,71 €	866,47 €	**13.673,15 €**
Scenario 16 (-0.5%)	792,45 €	1.507,34 €	3.239,16 €	74,79 €	1.058,00 €	1.398,60 €	1.084,04 €	1.044,82 €	804,44 €	1.331,55 €	838,95 €	**13.174,14 €**
Scenario 17 (-0.625%)	742,38 €	1.445,72 €	3.145,58 €	45,53 €	1.015,40 €	1.344,08 €	1.043,73 €	1.002,29 €	765,96 €	1.302,24 €	810,23 €	**12.663,14 €**
Scenario 18 (-0.75%)	691,57 €	1.383,15 €	3.050,26 €	15,70 €	971,90 €	1.288,25 €	1.002,33 €	958,50 €	726,18 €	1.271,77 €	780,26 €	**12.139,87 €**
Scenario 19 (-0.875%)	639,99 €	1.319,63 €	2.953,18 €	- 14,72 €	927,49 €	1.231,10 €	959,83 €	913,42 €	685,05 €	1.240,08 €	749,02 €	**11.604,08 €**
Scenario 20 (-1%)	587,64 €	1.255,13 €	2.854,31 €	- 45,71 €	882,16 €	1.172,59 €	916,18 €	867,02 €	642,53 €	1.207,16 €	716,46 €	**11.055,47 €**
Scenario 21 (-1,125%)	534,50 €	1.189,65 €	2.753,61 €	- 77,31 €	835,89 €	1.112,70 €	871,38 €	819,26 €	598,60 €	1.172,96 €	682,54 €	**10.493,78 €**
Scenario 22 (-1,25%)	480,56 €	1.123,17 €	2.651,05 €	- 109,52 €	788,66 €	1.051,40 €	825,39 €	770,12 €	553,21 €	1.137,45 €	647,22 €	**9.918,71 €**
Scenario 23 (-1,375%)	425,81 €	1.055,68 €	2.546,60 €	- 142,35 €	740,45 €	988,65 €	778,18 €	719,55 €	506,33 €	1.100,60 €	610,45 €	**9.329,97 €**
Scenario 24 (-1,5%)	370,24 €	987,15 €	2.440,23 €	- 175,81 €	691,25 €	924,45 €	729,74 €	667,53 €	457,92 €	1.062,36 €	572,19 €	**8.727,25 €**

---

[15] The remaining hypotheses can be consulted at: https://www.dropbox.com/s/qcl262l4lv1cdxm/OT%27s%20Hypotheses%201%20and%202_%20DB.xlsx

Table 4. Hypothesis 3 OT's restructuring

Hypothesis 3	Haircut - 15%	Haircut - 20%	Haircut - 25%	Haircut - 30%	Haircut - 35%	Haircut - 40%	Haircut - 45%	Haircut - 50%
Base Scenario	22.275,043	25.861,613	29.448,184	33.034,754	36.621,324	40.207,895	43.794,465	47.381,036
Scenario 1 (0.125%)	22.363,999	25.922,306	29.480,614	33.038,922	36.597,230	40.155,538	43.713,846	47.272,153
Scenario 2 (0.25%)	22.450,710	25.981,068	29.511,427	33.041,786	36.572,144	40.102,503	43.632,862	47.163,221
Scenario 3 (0.375%)	22.535,216	26.037,935	29.540,654	33.043,373	36.546,092	40.048,810	43.551,529	47.054,248
Scenario 4 (0.5%)	22.617,559	26.092,943	29.568,327	33.043,711	36.519,095	39.994,479	43.469,863	46.945,247
Scenario 5 (0.625%)	22.697,776	26.146,126	29.594,476	33.042,826	36.491,176	39.939,526	43.387,876	46.836,226
Scenario 6 (0.75%)	22.775,906	26.197,519	29.619,132	33.040,745	36.462,358	39.883,972	43.305,585	46.727,198
Scenario 7 (0.875%)	22.851,987	26.247,156	29.642,325	33.037,494	36.432,663	39.827,832	43.223,001	46.618,170
Scenario 8 (1%)	22.926,057	26.295,070	29.664,084	33.033,098	36.402,112	39.771,126	43.140,140	46.509,153
Scenario 9 (1.125%)	22.998,151	26.341,294	29.684,438	33.027,582	36.370,725	39.713,869	43.057,013	46.400,157
Scenario 10 (1.25%)	23.068,305	26.385,860	29.703,414	33.020,969	36.338,524	39.656,079	42.973,634	46.291,189
Scenario 11 (1.375%)	23.136,554	26.428,798	29.721,041	33.013,285	36.305,529	39.597,772	42.890,016	46.182,260
Scenario 12 (1.5%)	23.202,933	26.470,139	29.737,346	33.004,552	36.271,758	39.538,964	42.806,171	46.073,377
Scenario 13 (-0.125%)	22.183,800	25.798,951	29.414,102	33.029,253	36.644,404	40.259,555	43.874,706	47.489,856
Scenario 14 (-0.25%)	22.090,230	25.734,283	29.378,337	33.022,390	36.666,444	40.310,497	43.954,551	47.598,604
Scenario 15 (-0.375%)	21.994,287	25.667,570	29.340,853	33.014,136	36.687,418	40.360,701	44.033,984	47.707,267
Scenario 16 (-0.5%)	21.895,930	25.598,773	29.301,616	33.004,460	36.707,303	40.410,146	44.112,989	47.815,832
Scenario 17 (-0.625%)	21.795,113	25.527,852	29.260,592	32.993,331	36.726,071	40.458,810	44.191,549	47.924,289
Scenario 18 (-0.75%)	21.691,790	25.454,766	29.217,743	32.980,719	36.743,695	40.506,671	44.269,647	48.032,623
Scenario 19 (-0.875%)	21.585,917	25.379,475	29.173,033	32.966,591	36.760,149	40.553,707	44.347,265	48.140,823
Scenario 20 (-1%)	21.477,444	25.301,934	29.126,424	32.950,914	36.775,404	40.599,894	44.424,384	48.248,874
Scenario 21 (-1.125%)	21.366,326	25.222,103	29.077,879	32.933,656	36.789,433	40.645,210	44.500,987	48.356,764
Scenario 22 (-1.25%)	21.252,512	25.139,935	29.027,359	32.914,782	36.802,206	40.689,630	44.577,053	48.464,477
Scenario 23 (-1.375%)	21.135,952	25.055,388	28.974,823	32.894,258	36.813,694	40.733,129	44.652,564	48.572,000
Scenario 24 (-1.5%)	21.016,597	24.968,415	28.920,232	32.872,049	36.823,866	40.775,683	44.727,501	48.679,318

Table 5A. Hypothesis 6 OT's restructuring 2.5% coupon rate

Coupon 2.5%	Perpetual - 15%	Perpetual - 20%	Perpetual - 25%	Perpetual - 30%	Perpetual - 35%	Perpetual - 40%	Perpetual - 45%	Perpetual - 50%
Base Scenario	6.856,61 €	9.142,14 €	11.427,68 €	13.713,21 €	15.998,75 €	18.284,29 €	20.569,82 €	22.855,36 €
Scenario 1 (0.125%)	6.331,35 €	8.441,80 €	10.552,25 €	12.662,70 €	14.773,15 €	16.883,60 €	18.994,04 €	21.104,49 €
Scenario 2 (0.25%)	6.418,25 €	8.557,67 €	10.697,08 €	12.836,50 €	14.975,92 €	17.115,33 €	19.254,75 €	21.394,17 €
Scenario 3 (0.375%)	5.461,69 €	7.282,26 €	9.102,82 €	10.923,39 €	12.743,95 €	14.564,52 €	16.385,08 €	18.205,65 €
Scenario 4 (0.5%)	6.573,63 €	8.764,84 €	10.956,04 €	13.147,25 €	15.338,46 €	17.529,67 €	19.720,88 €	21.912,09 €
Scenario 5 (0.625%)	6.642,97 €	8.857,30 €	11.071,62 €	13.285,95 €	15.500,27 €	17.714,59 €	19.928,92 €	22.143,24 €
Scenario 6 (0.75%)	6.707,27 €	8.943,03 €	11.178,79 €	13.414,55 €	15.650,30 €	17.886,06 €	20.121,82 €	22.357,58 €
Scenario 7 (0.875%)	6.766,87 €	9.022,50 €	11.278,12 €	13.533,75 €	15.789,37 €	18.045,00 €	20.300,62 €	22.556,25 €
Scenario 8 (1%)	6.822,09 €	9.096,13 €	11.370,16 €	13.644,19 €	15.918,22 €	18.192,25 €	20.466,28 €	22.740,31 €
Scenario 9 (1.125%)	6.941,44 €	9.255,25 €	9.910,03 €	13.882,87 €	16.196,69 €	18.510,50 €	20.824,31 €	23.138,12 €
Scenario 10 (1.25%)	6.657,13 €	8.876,18 €	11.095,22 €	13.314,27 €	15.533,31 €	17.752,36 €	19.971,40 €	22.190,45 €
Scenario 11 (1.375%)	6.964,25 €	9.285,66 €	11.607,08 €	13.928,49 €	16.249,91 €	18.571,32 €	20.892,74 €	23.214,15 €
Scenario 12 (1.5%)	7.004,62 €	9.339,49 €	11.674,36 €	14.009,23 €	16.344,10 €	18.678,98 €	21.013,85 €	23.348,72 €
Scenario 13 (-0.125%)	6.136,60 €	8.182,14 €	10.227,67 €	12.273,21 €	14.318,74 €	16.364,28 €	18.409,81 €	20.455,35 €
Scenario 14 (-0.25%)	6.027,60 €	8.036,80 €	10.046,00 €	12.055,19 €	14.064,39 €	16.073,59 €	18.082,79 €	20.091,99 €
Scenario 15 (-0.375%)	5.909,95 €	7.879,93 €	9.849,92 €	11.819,90 €	13.789,88 €	15.759,87 €	17.729,85 €	19.699,83 €
Scenario 16 (-0.5%)	5.782,91 €	7.710,54 €	9.638,18 €	11.565,81 €	13.493,45 €	15.421,08 €	17.348,72 €	19.276,35 €
Scenario 17 (-0.625%)	5.645,63 €	7.527,50 €	9.409,38 €	11.291,25 €	13.173,13 €	15.055,01 €	16.936,88 €	18.818,76 €
Scenario 18 (-0.75%)	5.497,17 €	7.329,56 €	9.161,95 €	10.994,34 €	12.826,73 €	14.659,12 €	16.491,51 €	18.323,90 €
Scenario 19 (-0.875%)	5.336,48 €	7.115,31 €	8.894,13 €	10.672,96 €	12.451,78 €	14.230,61 €	16.009,44 €	17.788,26 €
Scenario 20 (-1%)	5.162,37 €	6.883,15 €	8.603,94 €	10.324,73 €	12.045,52 €	13.766,31 €	15.487,10 €	17.207,89 €
Scenario 21 (-1.125%)	4.973,49 €	6.631,32 €	8.289,15 €	9.946,98 €	11.604,81 €	13.262,64 €	14.920,47 €	16.578,30 €
Scenario 22 (-1.25%)	4.768,33 €	6.357,77 €	7.947,21 €	9.536,65 €	11.126,10 €	12.715,54 €	14.304,98 €	15.894,42 €
Scenario 23 (-1.375%)	4.545,15 €	6.060,19 €	7.575,24 €	9.090,29 €	10.605,34 €	12.120,39 €	13.635,44 €	15.150,49 €
Scenario 24 (-1.5%)	4.301,97 €	5.735,96 €	7.169,94 €	8.603,93 €	10.037,92 €	11.471,91 €	12.905,90 €	14.339,89 €

,

Table 5B. Hypothesis 6 OT's restructuring 3% coupon rate

Coupon 3%	Perpetual - 15%	Perpetual - 20%	Perpetual - 25%	Perpetual - 30%	Perpetual - 35%	Perpetual - 40%	Perpetual - 45%	Perpetual - 50%
Base Scenario	5.606,74 €	7.475,65 €	9.344,56 €	11.213,47 €	13.082,38 €	14.951,29 €	16.820,21 €	18.689,12 €
Scenario 1 (0.125%)	5.111,96 €	6.815,95 €	8.519,93 €	10.223,92 €	11.927,91 €	13.631,90 €	15.335,88 €	17.039,87 €
Scenario 2 (0.25%)	5.227,90 €	6.970,53 €	8.713,16 €	10.455,79 €	12.198,42 €	13.941,05 €	15.683,69 €	17.426,32 €
Scenario 3 (0.375%)	4.299,02 €	5.732,03 €	7.165,04 €	8.598,05 €	10.031,05 €	11.464,06 €	12.897,07 €	14.330,08 €
Scenario 4 (0.5%)	5.437,38 €	7.249,84 €	9.062,30 €	10.874,76 €	12.687,22 €	14.499,68 €	16.312,14 €	18.124,60 €
Scenario 5 (0.625%)	5.531,98 €	7.375,97 €	9.219,96 €	11.063,95 €	12.907,94 €	14.751,93 €	16.595,93 €	18.439,92 €
Scenario 6 (0.75%)	5.620,43 €	7.493,90 €	9.367,38 €	11.240,86 €	13.114,33 €	14.987,81 €	16.861,28 €	18.734,76 €
Scenario 7 (0.875%)	5.703,15 €	7.604,21 €	9.505,26 €	11.406,31 €	13.307,36 €	15.208,41 €	17.109,46 €	19.010,51 €
Scenario 8 (1%)	5.780,53 €	7.707,38 €	9.634,22 €	11.561,07 €	13.487,91 €	15.414,76 €	17.341,60 €	19.268,45 €
Scenario 9 (1.125%)	5.921,13 €	7.894,84 €	9.868,56 €	11.842,27 €	13.815,98 €	15.789,69 €	17.763,40 €	19.737,11 €
Scenario 10 (1.25%)	5.657,24 €	7.542,98 €	9.428,73 €	11.314,47 €	13.200,22 €	15.085,96 €	16.971,71 €	18.857,45 €
Scenario 11 (1.375%)	5.983,95 €	7.978,61 €	9.973,26 €	11.967,91 €	13.962,56 €	15.957,21 €	17.951,86 €	19.946,51 €
Scenario 12 (1.5%)	6.043,18 €	8.057,57 €	10.071,96 €	12.086,35 €	14.100,74 €	16.115,14 €	18.129,53 €	20.143,92 €
Scenario 13 (-0.125%)	4.854,68 €	6.472,91 €	8.091,14 €	9.709,37 €	11.327,60 €	12.945,83 €	14.564,05 €	16.182,28 €
Scenario 14 (-0.25%)	4.711,94 €	6.282,59 €	7.853,24 €	9.423,89 €	10.994,53 €	12.565,18 €	14.135,83 €	15.706,48 €
Scenario 15 (-0.375%)	4.558,74 €	6.078,32 €	7.597,89 €	9.117,47 €	10.637,05 €	12.156,63 €	13.676,21 €	15.195,79 €
Scenario 16 (-0.5%)	4.394,16 €	5.858,88 €	7.323,60 €	8.788,32 €	10.253,04 €	11.717,76 €	13.182,48 €	14.647,20 €
Scenario 17 (-0.625%)	4.217,20 €	5.622,94 €	7.028,67 €	8.434,40 €	9.840,14 €	11.245,87 €	12.651,61 €	14.057,34 €
Scenario 18 (-0.75%)	4.026,73 €	5.368,98 €	6.711,22 €	8.053,46 €	9.395,71 €	10.737,95 €	12.080,20 €	13.422,44 €
Scenario 19 (-0.875%)	3.821,48 €	5.095,31 €	6.369,14 €	7.642,96 €	8.916,79 €	10.190,62 €	11.464,45 €	12.738,27 €
Scenario 20 (-1%)	3.600,03 €	4.800,03 €	6.000,04 €	7.200,05 €	8.400,06 €	9.600,07 €	10.800,08 €	12.000,09 €
Scenario 21 (-1.125%)	3.360,75 €	4.481,00 €	5.601,25 €	6.721,50 €	7.841,75 €	8.962,00 €	10.082,25 €	11.202,51 €
Scenario 22 (-1.25%)	3.101,83 €	4.135,77 €	5.169,72 €	6.203,66 €	7.237,61 €	8.271,55 €	9.305,49 €	10.339,44 €
Scenario 23 (-1.375%)	2.821,18 €	3.761,58 €	4.701,97 €	5.642,37 €	6.582,76 €	7.523,16 €	8.463,55 €	9.403,95 €
Scenario 24 (-1.5%)	2.516,44 €	3.355,25 €	4.194,06 €	5.032,87 €	5.871,68 €	6.710,49 €	7.549,31 €	8.388,12 €

Table 5C. Hypothesis 6 OT's restructuring 3,5% coupon rate[16]

Coupon 3,5%	Perpetual - 15%	Perpetual - 20%	Perpetual - 25%	Perpetual - 30%	Perpetual - 35%	Perpetual - 40%	Perpetual - 45%	Perpetual - 50%
Base Scenario	4.356,86 €	5.809,15 €	7.261,44 €	8.713,73 €	10.166,01 €	11.618,30 €	13.070,59 €	14.522,88 €
Scenario 1 (0,125%)	3.892,57 €	5.190,10 €	6.487,62 €	7.785,15 €	9.082,67 €	10.380,20 €	11.677,72 €	12.975,25 €
Scenario 2 (0,25%)	4.037,54 €	5.383,39 €	6.729,24 €	8.075,08 €	9.420,93 €	10.766,78 €	12.112,62 €	13.458,47 €
Scenario 3 (0,375%)	3.136,35 €	4.181,80 €	5.227,25 €	6.272,70 €	7.318,15 €	8.363,60 €	9.409,05 €	10.454,50 €
Scenario 4 (0,5%)	4.301,13 €	5.734,84 €	7.168,55 €	8.602,26 €	10.035,98 €	11.469,69 €	12.903,40 €	14.337,11 €
Scenario 5 (0,625%)	4.420,98 €	5.894,64 €	7.368,30 €	8.841,96 €	10.315,62 €	11.789,27 €	13.262,93 €	14.736,59 €
Scenario 6 (0,75%)	4.533,58 €	6.044,78 €	7.555,97 €	9.067,17 €	10.578,36 €	12.089,55 €	13.600,75 €	15.111,94 €
Scenario 7 (0,875%)	4.639,43 €	6.185,91 €	7.732,39 €	9.278,87 €	10.825,34 €	12.371,82 €	13.918,30 €	15.464,78 €
Scenario 8 (1%)	4.738,97 €	6.318,63 €	7.898,29 €	9.477,95 €	11.057,61 €	12.637,26 €	14.216,92 €	15.796,58 €
Scenario 9 (1,125%)	4.900,83 €	6.534,44 €	8.168,05 €	9.801,66 €	11.435,27 €	13.068,88 €	14.702,49 €	16.336,10 €
Scenario 10 (1,25%)	4.657,34 €	6.209,78 €	7.762,23 €	9.314,68 €	10.867,12 €	12.419,57 €	13.972,02 €	15.524,46 €
Scenario 11 (1,375%)	5.003,66 €	6.671,55 €	8.339,44 €	10.007,32 €	11.675,21 €	13.343,10 €	15.010,99 €	16.678,87 €
Scenario 12 (1,5%)	5.081,74 €	6.775,65 €	8.469,56 €	10.163,47 €	11.857,38 €	13.551,30 €	15.245,21 €	16.939,12 €
Scenario 13 (-0,125%)	3.572,76 €	4.763,69 €	5.954,61 €	7.145,53 €	8.336,45 €	9.527,37 €	10.718,29 €	11.909,22 €
Scenario 14 (-0,25%)	3.396,29 €	4.528,38 €	5.660,48 €	6.792,58 €	7.924,67 €	9.056,77 €	10.188,86 €	11.320,96 €
Scenario 15 (-0,375%)	3.207,52 €	4.276,70 €	5.345,87 €	6.415,05 €	7.484,22 €	8.553,40 €	9.622,57 €	10.691,74 €
Scenario 16 (-0,5%)	3.005,41 €	4.007,22 €	5.009,02 €	6.010,83 €	7.012,63 €	8.014,44 €	9.016,24 €	10.018,04 €
Scenario 17 (-0,625%)	2.788,78 €	3.718,37 €	4.647,96 €	5.577,55 €	6.507,15 €	7.436,74 €	8.366,33 €	9.295,92 €
Scenario 18 (-0,75%)	2.556,29 €	3.408,39 €	4.260,49 €	5.112,59 €	5.964,69 €	6.816,79 €	7.668,88 €	8.520,98 €
Scenario 19 (-0,875%)	2.306,49 €	3.075,31 €	3.844,14 €	4.612,97 €	5.381,80 €	6.150,63 €	6.919,46 €	7.688,29 €
Scenario 20 (-1%)	2.037,69 €	2.716,92 €	3.396,14 €	4.075,37 €	4.754,60 €	5.433,83 €	6.113,06 €	6.792,29 €
Scenario 21 (-1,125%)	1.748,01 €	2.330,68 €	2.913,36 €	3.496,03 €	4.078,70 €	4.661,37 €	5.244,04 €	5.826,71 €
Scenario 22 (-1,25%)	1.435,34 €	1.913,78 €	2.392,23 €	2.870,67 €	3.349,12 €	3.827,56 €	4.306,01 €	4.784,45 €
Scenario 23 (-1,375%)	1.097,22 €	1.462,96 €	1.828,71 €	2.194,45 €	2.560,19 €	2.925,93 €	3.291,67 €	3.657,41 €
Scenario 24 (-1,5%)	730,90 €	974,54 €	1.218,17 €	1.461,81 €	1.705,44 €	1.949,08 €	2.192,71 €	2.436,35 €

---

[16] The remaining perpetual debt conversion hypotheses for OT's can be consulted at: https://www.dropbox.com/s/hgnbpc48cfnxiw1/Perpetual%20debt_DB.xlsx

Table 6A. Economic and Financial Assistance Program Restructuring – Hypotheses 1 and 2

Hypothesis 1&2	Hypothesis 1	Hypothesis 2-A	Hypothesis 2-B	Hypothesis 2-C	Hypothesis 2-D
Base Scenario	24.702,92 €	29.849,81 €	28.552,88 €	27.288,94 €	25.989,64 €
Scenario 1 (0,125%)	24.914,75 €	29.973,90 €	28.699,30 €	27.456,37 €	26.179,54 €
Scenario 2 (0,25%)	25.114,87 €	30.088,12 €	28.835,37 €	27.613,02 €	26.358,18 €
Scenario 3 (0,375%)	25.303,70 €	30.192,86 €	28.961,48 €	27.759,31 €	26.525,99 €
Scenario 4 (0,5%)	25.481,66 €	30.288,49 €	29.078,04 €	27.895,64 €	26.683,37 €
Scenario 5 (0,625%)	25.649,16 €	30.375,38 €	29.185,41 €	28.022,38 €	26.830,71 €
Scenario 6 (0,75%)	25.806,58 €	30.453,85 €	29.283,94 €	28.139,90 €	26.968,40 €
Scenario 7 (0,875%)	25.954,29 €	30.524,26 €	29.373,98 €	28.248,55 €	27.096,78 €
Scenario 8 (1%)	26.092,67 €	30.586,91 €	29.455,85 €	28.348,67 €	27.216,23 €
Scenario 9 (1,125%)	26.222,04 €	30.642,12 €	29.529,89 €	28.440,59 €	27.327,06 €
Scenario 10 (1,25%)	26.342,76 €	30.690,19 €	29.596,38 €	28.524,62 €	27.429,61 €
Scenario 11 (1,375%)	26.455,13 €	30.731,39 €	29.655,64 €	28.601,06 €	27.524,19 €
Scenario 12 (1,5%)	26.559,47 €	30.766,00 €	29.707,94 €	28.670,21 €	27.611,10 €
Scenario 13 (-0,125%)	24.478,91 €	29.715,45 €	28.395,71 €	27.110,32 €	25.788,05 €
Scenario 14 (-0,25%)	24.242,27 €	29.570,40 €	28.227,34 €	26.920,06 €	25.574,30 €
Scenario 15 (-0,375%)	23.992,50 €	29.414,22 €	28.047,32 €	26.717,70 €	25.347,93 €
Scenario 16 (-0,5%)	23.729,11 €	29.246,46 €	27.855,20 €	26.502,77 €	25.108,45 €
Scenario 17 (-0,625%)	23.451,57 €	29.066,65 €	27.650,49 €	26.274,77 €	24.855,34 €
Scenario 18 (-0,75%)	23.159,33 €	28.874,30 €	27.432,68 €	26.033,18 €	24.588,07 €
Scenario 19 (-0,875%)	22.851,83 €	28.668,91 €	27.201,24 €	25.777,47 €	24.306,10 €
Scenario 20 (-1%)	22.528,48 €	28.449,95 €	26.955,65 €	25.507,08 €	24.008,85 €
Scenario 21 (-1,125%)	22.188,68 €	28.216,85 €	26.695,32 €	25.221,44 €	23.695,72 €
Scenario 22 (-1,25%)	21.831,79 €	27.969,07 €	26.419,68 €	24.919,94 €	23.366,11 €
Scenario 23 (-1,375%)	21.457,15 €	27.705,99 €	26.128,11 €	24.601,97 €	23.019,36 €
Scenario 24 (-1,5%)	21.064,08 €	27.427,01 €	25.819,98 €	24.266,87 €	22.654,81 €

Table 6B. Economic and Financial Assistance Program Restructuring – Hypothesis 3

Hypothesis 3	Haircut - 15%	Haircut - 20%	Haircut - 25%	Haircut - 30%	Haircut - 35%	Haircut - 40%	Haircut - 45%	Haircut - 50%
Base Scenario	29.773,45 €	31.163,28 €	32.553,11 €	33.942,94 €	35.332,77 €	36.722,60 €	38.112,43 €	39.502,26 €
Scenario 1 (0,125%)	29.876,93 €	31.235,21 €	32.593,49 €	33.951,77 €	35.310,05 €	36.668,33 €	38.026,61 €	39.384,89 €
Scenario 2 (0,25%)	29.971,54 €	31.299,14 €	32.626,73 €	33.954,32 €	35.281,92 €	36.609,51 €	37.937,11 €	39.264,70 €
Scenario 3 (0,375%)	30.057,62 €	31.355,36 €	32.653,11 €	33.950,86 €	35.248,60 €	36.546,35 €	37.844,10 €	39.141,85 €
Scenario 4 (0,5%)	30.135,50 €	31.404,21 €	32.672,92 €	33.941,63 €	35.210,34 €	36.479,05 €	37.747,77 €	39.016,48 €
Scenario 5 (0,625%)	30.205,50 €	31.445,96 €	32.686,43 €	33.926,89 €	35.167,36 €	36.407,82 €	37.648,28 €	38.888,75 €
Scenario 6 (0,75%)	30.267,94 €	31.480,92 €	32.693,90 €	33.906,88 €	35.119,85 €	36.332,83 €	37.545,81 €	38.758,79 €
Scenario 7 (0,875%)	30.323,12 €	31.509,35 €	32.695,58 €	33.881,81 €	35.068,05 €	36.254,28 €	37.440,51 €	38.626,74 €
Scenario 8 (1%)	30.371,32 €	31.531,52 €	32.691,72 €	33.851,92 €	35.012,13 €	36.172,33 €	37.332,53 €	38.492,73 €
Scenario 9 (1,125%)	30.412,82 €	31.547,68 €	32.682,55 €	33.817,42 €	34.952,28 €	36.087,15 €	37.222,02 €	38.356,88 €
Scenario 10 (1,25%)	30.447,88 €	31.558,08 €	32.668,29 €	33.778,49 €	34.888,70 €	35.998,90 €	37.109,11 €	38.219,31 €
Scenario 11 (1,375%)	30.476,77 €	31.562,96 €	32.649,16 €	33.735,35 €	34.821,55 €	35.907,75 €	36.993,94 €	38.080,14 €
Scenario 12 (1,5%)	30.499,72 €	31.562,54 €	32.625,36 €	33.688,18 €	34.751,00 €	35.813,82 €	36.876,64 €	37.939,46 €
Scenario 13 (-0,125%)	29.660,72 €	31.083,00 €	32.505,27 €	33.927,54 €	35.349,82 €	36.772,09 €	38.194,37 €	39.616,64 €
Scenario 14 (-0,25%)	29.538,38 €	30.994,02 €	32.449,66 €	33.905,30 €	35.360,94 €	36.816,58 €	38.272,22 €	39.727,86 €
Scenario 15 (-0,375%)	29.406,03 €	30.895,98 €	32.385,94 €	33.875,90 €	35.365,86 €	36.855,82 €	38.345,78 €	39.835,74 €
Scenario 16 (-0,5%)	29.263,26 €	30.788,52 €	32.313,78 €	33.839,04 €	35.364,30 €	36.889,56 €	38.414,82 €	39.940,08 €
Scenario 17 (-0,625%)	29.109,66 €	30.671,24 €	32.232,82 €	33.794,39 €	35.355,97 €	36.917,55 €	38.479,13 €	40.040,70 €
Scenario 18 (-0,75%)	28.944,79 €	30.543,73 €	32.142,68 €	33.741,62 €	35.340,56 €	36.939,50 €	38.538,45 €	40.137,39 €
Scenario 19 (-0,875%)	28.768,19 €	30.405,58 €	32.042,97 €	33.680,36 €	35.317,76 €	36.955,15 €	38.592,54 €	40.229,93 €
Scenario 20 (-1%)	28.579,39 €	30.256,35 €	31.933,31 €	33.610,26 €	35.287,22 €	36.964,18 €	38.641,14 €	40.318,10 €
Scenario 21 (-1,125%)	28.377,89 €	30.095,57 €	31.813,26 €	33.530,94 €	35.248,62 €	36.966,30 €	38.683,99 €	40.401,67 €
Scenario 22 (-1,25%)	28.163,19 €	29.922,79 €	31.682,39 €	33.441,99 €	35.201,59 €	36.961,19 €	38.720,79 €	40.480,40 €
Scenario 23 (-1,375%)	27.934,75 €	29.737,50 €	31.540,25 €	33.343,01 €	35.145,76 €	36.948,52 €	38.751,27 €	40.554,03 €
Scenario 24 (-1,5%)	27.692,01 €	29.539,20 €	31.386,38 €	33.233,56 €	35.080,75 €	36.927,93 €	38.775,11 €	40.622,29 €

Table 7. Hypothesis 1 and 2 BT's Restructuring

Hypothesis 1&2	Total BT´s	Haircut - 15%	Haircut - 20%	Haircut - 25%	Haircut - 30%	Haircut - 35%	Haircut - 40%	Haircut - 45%	Haircut - 50%
Base Scenario	3.856,25 €	5.112,98 €	5.531,89 €	5.950,80 €	6.369,70 €	6.788,61 €	7.207,52 €	7.626,43 €	8.045,34 €
Scenario 1 (0,125%)	3.914,29 €	5.160,06 €	5.575,32 €	5.990,58 €	6.405,83 €	6.821,09 €	7.236,35 €	7.651,61 €	8.066,87 €
Scenario 2 (0,25%)	3.971,62 €	5.206,55 €	5.618,20 €	6.029,84 €	6.441,49 €	6.853,13 €	7.264,77 €	7.676,42 €	8.088,06 €
Scenario 3 (0,375%)	4.028,27 €	5.252,47 €	5.660,53 €	6.068,60 €	6.476,67 €	6.884,73 €	7.292,80 €	7.700,86 €	8.108,93 €
Scenario 4 (0,5%)	4.084,23 €	5.297,81 €	5.702,33 €	6.106,85 €	6.511,38 €	6.915,90 €	7.320,43 €	7.724,95 €	8.129,48 €
Scenario 5 (0,625%)	4.139,52 €	5.342,58 €	5.743,60 €	6.144,61 €	6.545,63 €	6.946,65 €	7.347,67 €	7.748,68 €	8.149,70 €
Scenario 6 (0,75%)	4.194,15 €	5.386,79 €	5.784,33 €	6.181,88 €	6.579,43 €	6.976,97 €	7.374,52 €	7.772,07 €	8.169,61 €
Scenario 7 (0,875%)	4.248,12 €	5.430,45 €	5.824,55 €	6.218,66 €	6.612,77 €	7.006,88 €	7.400,99 €	7.795,10 €	8.189,21 €
Scenario 8 (1%)	4.301,43 €	5.473,55 €	5.864,26 €	6.254,97 €	6.645,68 €	7.036,38 €	7.427,09 €	7.817,80 €	8.208,51 €
Scenario 9 (1,125%)	4.354,10 €	5.516,12 €	5.903,46 €	6.290,80 €	6.678,14 €	7.065,48 €	7.452,82 €	7.840,16 €	8.227,50 €
Scenario 10 (1,25%)	4.406,14 €	5.558,16 €	5.942,16 €	6.326,16 €	6.710,17 €	7.094,17 €	7.478,18 €	7.862,18 €	8.246,19 €
Scenario 11 (1,375%)	4.457,55 €	5.599,66 €	5.980,36 €	6.361,07 €	6.741,77 €	7.122,47 €	7.503,17 €	7.883,88 €	8.264,58 €
Scenario 12 (1,5%)	4.508,34 €	5.640,64 €	6.018,08 €	6.395,51 €	6.772,94 €	7.150,38 €	7.527,81 €	7.905,25 €	8.282,68 €
Scenario 13 (-0,125%)	3.797,51 €	5.065,30 €	5.487,90 €	5.910,49 €	6.333,09 €	6.755,69 €	7.178,29 €	7.600,88 €	8.023,48 €
Scenario 14 (-0,25%)	3.738,05 €	5.017,02 €	5.443,34 €	5.869,66 €	6.295,99 €	6.722,31 €	7.148,63 €	7.574,96 €	8.001,28 €
Scenario 15 (-0,375%)	3.677,87 €	4.968,13 €	5.398,22 €	5.828,30 €	6.258,39 €	6.688,48 €	7.118,56 €	7.548,65 €	7.978,74 €
Scenario 16 (-0,5%)	3.616,96 €	4.918,62 €	5.352,51 €	5.786,40 €	6.220,29 €	6.654,18 €	7.088,07 €	7.521,96 €	7.955,85 €
Scenario 17 (-0,625%)	3.555,30 €	4.868,49 €	5.306,22 €	5.743,95 €	6.181,68 €	6.619,41 €	7.057,14 €	7.494,87 €	7.932,60 €
Scenario 18 (-0,75%)	3.492,90 €	4.817,73 €	5.259,34 €	5.700,95 €	6.142,56 €	6.584,17 €	7.025,78 €	7.467,39 €	7.909,00 €
Scenario 19 (-0,875%)	3.429,73 €	4.766,32 €	5.211,86 €	5.657,39 €	6.102,92 €	6.548,45 €	6.993,98 €	7.439,51 €	7.885,04 €
Scenario 20 (-1%)	3.365,80 €	4.714,27 €	5.163,77 €	5.613,26 €	6.062,75 €	6.512,24 €	6.961,73 €	7.411,23 €	7.860,72 €
Scenario 21 (-1,125%)	3.301,09 €	4.661,57 €	5.115,06 €	5.568,56 €	6.022,05 €	6.475,54 €	6.929,04 €	7.382,53 €	7.836,02 €
Scenario 22 (-1,25%)	3.235,59 €	4.608,20 €	5.065,74 €	5.523,27 €	5.980,81 €	6.438,34 €	6.895,88 €	7.353,42 €	7.810,95 €
Scenario 23 (-1,375%)	3.169,30 €	4.554,16 €	5.015,78 €	5.477,40 €	5.939,02 €	6.400,64 €	6.862,26 €	7.323,88 €	7.785,50 €
Scenario 24 (-1,5%)	3.102,20 €	4.499,44 €	4.965,19 €	5.430,94 €	5.896,68 €	6.362,43 €	6.828,18 €	7.293,92 €	7.759,67 €

Table 8.A Debt Service Analysis

Year	H1H1…H2			H2H1…H2		
	Average	Median	Standard Deviation	Average	Median	Standard Deviation
2014	28.342,50 €	28.342,50 €	- €	29.075,16 €	29.071,59 €	352,68 €
2015	17.126,04 €	17.126,04 €	- €	17.858,71 €	17.855,13 €	352,68 €
2016	20.292,68 €	20.292,68 €	- €	21.025,35 €	21.021,78 €	352,68 €
2017	12.263,82 €	12.263,82 €	- €	12.996,49 €	12.992,91 €	352,68 €
2018	10.707,71 €	10.707,71 €	- €	11.440,38 €	11.436,80 €	352,68 €
2019	10.439,11 €	10.439,11 €	- €	11.171,78 €	11.168,20 €	352,68 €
2020	6.389,90 €	6.381,12 €	307,80 €	7.122,56 €	7.124,68 €	461,97 €
2021	14.581,94 €	14.567,52 €	307,96 €	15.314,61 €	15.317,67 €	462,07 €
2022	- 2.473,02 €	- 2.493,39 €	308,48 €	- 1.740,35 €	- 1.735,11 €	462,40 €
2023	126,01 €	105,58 €	308,17 €	858,68 €	862,74 €	462,21 €
2024	- 18.344,82 €	- 18.363,31 €	309,11 €	- 17.612,15 €	- 17.608,52 €	462,79 €

Table 8.B Debt Service Analysis

Year	H3H1…H3 – 15%			H3H1…H3 - 30%			H4H1…H3 - 15%			H4H1…H3 - 30%		
	Average	Median	Standard Deviation	Average	Median	Standard Deviation	Average	Median	Standard Deviation	Average	Median	Standard Deviation
2014	29.795,52 €	29.795,52 €	- €	30.170,48 €	30.170,48 €	- €	16.703,30 €	16.703,30 €	- €	18.874,00 €	18.874,00 €	- €
2015	18.579,06 €	18.579,06 €	- €	18.954,03 €	18.954,03 €	- €	6.292,07 €	6.292,07 €	- €	8.320,67 €	8.320,67 €	- €
2016	12.563,22 €	12.563,22 €	- €	14.558,62 €	14.558,62 €	- €	13.003,50 €	13.003,50 €	- €	14.406,55 €	14.406,55 €	- €
2017	5.468,29 €	5.468,29 €	- €	7.298,87 €	7.298,87 €	- €	6.322,69 €	6.322,69 €	- €	7.487,85 €	7.487,85 €	- €
2018	12.691,93 €	12.691,93 €	- €	12.973,15 €	12.973,15 €	- €	6.525,34 €	6.525,34 €	- €	7.380,13 €	7.380,13 €	- €
2019	3.240,84 €	3.240,84 €	- €	5.142,50 €	5.142,50 €	- €	5.856,19 €	5.856,19 €	- €	6.781,67 €	6.781,67 €	- €
2020	- 2,22 €	5,38 €	411,05 €	1.931,42 €	1.790,57 €	858,94 €	1.363,23 €	1.354,45 €	307,80 €	2.367,01 €	2.358,24 €	307,80 €
2021	17.097,36 €	17.082,93 €	307,96 €	17.335,45 €	17.310,63 €	355,65 €	10.788,56 €	10.774,14 €	307,96 €	11.574,71 €	11.560,28 €	307,96 €
2022	- 9.140,09 €	- 9.160,46 €	308,48 €	- 7.137,37 €	- 7.304,20 €	810,90 €	363,22 €	342,85 €	308,48 €	- 23,53 €	- 44,64 €	308,04 €
2023	- 5.607,14 €	- 5.627,57 €	308,17 €	- 3.783,96 €	- 3.937,23 €	758,00 €	- 3.181,34 €	- 3.201,78 €	308,17 €	- 2.232,62 €	- 2.388,78 €	591,35 €
2024	- 1.488,31 €	- 1.506,80 €	309,11 €	- 1.352,02 €	- 1.364,72 €	340,44 €	- 1.394,57 €	- 1.413,06 €	309,11 €	- 1.832,03 €	- 1.850,52 €	309,11 €

Table 10.A Debt Dynamics – OT's, BT's H1 and EFAP until H2

H1 ... H2	Average Bt - Scenario 1	σ Bt	Average bt - Scenario 1	σ bt	Average Bt - Scenario 2	σ Bt	Average bt - Scenario 2	σ bt	Average Bt - Scenario 3	σ Bt	Average bt - Scenario 3	σ bt	Average Bt - Scenario 4	σ Bt	Average bt - Scenario 4	σ bt
2014	160.252,92 €	- €	107,29%	0,00%	160.252,92 €	- €	107,29%	0,00%	160.252,92 €	- €	107,29%	0,00%	160.252,92 €	- €	107,29%	0,00%
2015	156.809,51 €	- €	102,92%	0,00%	157.586,22 €	- €	103,94%	0,00%	159.146,68 €	- €	105,49%	0,00%	159.776,58 €	- €	106,44%	0,00%
2016	153.357,45 €	- €	98,69%	0,00%	154.926,33 €	- €	100,68%	0,00%	158.034,16 €	- €	103,72%	0,00%	159.300,68 €	- €	105,59%	0,00%
2017	149.895,38 €	- €	94,57%	0,00%	152.272,42 €	- €	97,49%	0,00%	156.915,23 €	- €	101,96%	0,00%	158.825,18 €	- €	104,75%	0,00%
2018	146.421,93 €	- €	90,56%	0,00%	149.623,70 €	- €	94,38%	0,00%	155.789,74 €	- €	100,23%	0,00%	158.350,02 €	- €	103,92%	0,00%
2019	142.935,75 €	- €	86,67%	0,00%	146.979,36 €	- €	91,34%	0,00%	154.657,58 €	- €	98,52%	0,00%	157.875,14 €	- €	103,09%	0,00%
2020	141.103,72 €	240,28 €	83,89%	0,14%	146.006,84 €	240,28 €	89,40%	0,15%	155.195,07 €	241,46 €	97,88%	0,15%	159.075,29 €	241,46 €	103,36%	0,16%
2021	139.225,67 €	473,93 €	81,15%	0,28%	145.006,55 €	473,93 €	87,47%	0,29%	155.703,00 €	477,43 €	97,23%	0,30%	160.251,42 €	477,43 €	103,61%	0,31%
2022	137.303,63 €	698,78 €	78,46%	0,40%	143.981,12 €	698,78 €	85,57%	0,42%	156.184,41 €	705,67 €	96,56%	0,44%	161.406,69 €	705,67 €	103,83%	0,45%
2023	135.329,09 €	921,55 €	75,81%	0,52%	142.922,63 €	921,55 €	83,69%	0,54%	156.631,73 €	932,88 €	95,88%	0,57%	162.533,67 €	932,88 €	104,04%	0,60%
2024	133.311,01 €	1.134,34 €	73,22%	0,62%	141.840,67 €	1.134,34 €	81,83%	0,65%	157.054,98 €	1.151,08 €	95,19%	0,70%	163.642,53 €	1.151,08 €	104,23%	0,73%

Table 10.B Debt Dynamics- OT's, BT's H2 and EFAP until H2

H2 ... H2	Average Bt - Scenario 1	σ Bt	Average bt - Scenario 1	σ bt	Average Bt - Scenario 2	σ Bt	Average bt - Scenario 2	σ bt	Average Bt - Scenario 3	σ Bt	Average bt - Scenario 3	σ bt	Average Bt - Scenario 4	σ Bt	Average bt - Scenario 4	σ bt
2014	160.252,92 €	- €	107,29%	0,00%	160.252,92 €	- €	107,29%	0,00%	160.252,92 €	- €	107,29%	0,00%	160.252,92 €	- €	107,29%	0,00%
2015	156.091,21 €	348,58 €	102,45%	0,23%	156.955,08 €	451,48 €	103,53%	0,30%	158.512,97 €	454,46 €	105,07%	0,30%	159.363,96 €	649,51 €	106,16%	0,43%
2016	151.934,93 €	690,32 €	97,77%	0,44%	153.674,24 €	892,27 €	99,87%	0,58%	156.774,98 €	901,74 €	102,89%	0,59%	158.480,50 €	1.291,65 €	105,05%	0,86%
2017	147.782,45 €	1.025,37 €	93,23%	0,65%	150.409,34 €	1.322,61 €	96,30%	0,85%	155.038,65 €	1.341,94 €	100,75%	0,87%	157.602,37 €	1.926,55 €	103,95%	1,27%
2018	143.632,13 €	1.353,84 €	88,84%	0,84%	147.159,34 €	1.742,76 €	92,83%	1,10%	153.303,72 €	1.775,19 €	98,63%	1,14%	156.729,44 €	2.554,31 €	102,86%	1,67%
2019	139.482,35 €	1.675,87 €	84,58%	1,02%	143.923,22 €	2.152,98 €	89,45%	1,33%	151.569,91 €	2.201,60 €	96,56%	1,40%	155.861,56 €	3.175,02 €	101,79%	2,07%
2020	136.999,73 €	2.003,98 €	81,44%	1,19%	142.369,20 €	2.593,58 €	87,18%	1,58%	151.514,42 €	2.662,34 €	95,56%	1,68%	156.677,09 €	3.843,11 €	101,81%	2,49%

2021	134.483,85 €	2.342,58 €	78,38%	1,37%	140.797,41 €	3.037,40 €	84,94%	1,83%	151.437,88 €	3.129,47 €	94,57%	1,95%	157.476,76 €	4.516,21 €	101,82%	2,92%
2022	131.936,49 €	2.683,72 €	75,38%	1,54%	139.210,26 €	3.478,06 €	82,75%	2,06%	151.343,17 €	3.596,59 €	93,58%	2,22%	158.263,58 €	5.189,52 €	101,82%	3,33%
2023	129.348,88 €	3.024,91 €	72,45%	1,70%	137.599,56 €	3.915,25 €	80,58%	2,29%	151.222,56 €	4.063,38 €	92,58%	2,49%	159.029,94 €	5.863,91 €	101,81%	3,75%
2024	126.729,76 €	3.362,00 €	69,59%	1,85%	135.974,66 €	4.344,28 €	78,46%	2,50%	151.085,90 €	4.525,01 €	91,58%	2,74%	159.785,80 €	6.534,63 €	101,79%	4,16%

Table 10.C Debt Dynamics - OT's H3 (15%) and EFAP until H2

H3 15% … H2	Average Bt - Scenario 1	σ Bt	Average bt - Scenario 1	σ bt	Average Bt - Scenario 2	σ Bt	Average bt - Scenario 2	σ bt	Average Bt - Scenario 3	σ Bt	Average bt - Scenario 3	σ bt	Average Bt - Scenario 4	σ Bt	Average bt - Scenario 4	σ bt
2014	145.883,42 €	- €	97,67%	0,00%	145.883,42 €	- €	97,67%	0,00%	145.883,42 €	- €	97,67%	0,00%	145.883,42 €	- €	97,67%	0,00%
2015	141.297,24 €	- €	92,74%	0,00%	142.073,94 €	- €	93,71%	0,00%	143.557,99 €	- €	95,16%	0,00%	144.319,75 €	- €	96,14%	0,00%
2016	136.724,80 €	- €	87,98%	0,00%	138.293,68 €	- €	89,87%	0,00%	141.244,29 €	- €	92,70%	0,00%	142.771,69 €	- €	94,64%	0,00%
2017	131.894,25 €	- €	83,21%	0,00%	134.271,30 €	- €	85,97%	0,00%	138.670,53 €	- €	90,11%	0,00%	140.967,57 €	- €	92,98%	0,00%
2018	126.828,46 €	- €	78,44%	0,00%	130.030,23 €	- €	82,02%	0,00%	135.859,78 €	- €	87,41%	0,00%	138.930,58 €	- €	91,18%	0,00%
2019	121.781,16 €	- €	73,85%	0,00%	125.824,76 €	- €	78,20%	0,00%	133.067,26 €	- €	84,76%	0,00%	136.916,07 €	- €	89,41%	0,00%
2020	118.440,84 €	169,84 €	70,41%	0,10%	123.343,96 €	169,84 €	75,52%	0,10%	131.991,26 €	170,67 €	83,25%	0,11%	136.622,48 €	170,67 €	88,77%	0,11%
2021	114.541,06 €	385,63 €	66,76%	0,22%	120.321,94 €	385,63 €	72,58%	0,23%	130.363,86 €	388,30 €	81,41%	0,24%	135.782,03 €	388,30 €	87,79%	0,25%
2022	110.636,95 €	607,31 €	63,22%	0,35%	117.314,44 €	607,31 €	69,72%	0,36%	128.741,50 €	612,89 €	79,60%	0,38%	134.951,26 €	612,89 €	86,82%	0,39%
2023	106.449,12 €	829,74 €	59,63%	0,46%	114.042,66 €	829,74 €	66,78%	0,49%	126.844,74 €	839,29 €	77,65%	0,51%	133.850,89 €	839,29 €	85,68%	0,54%
2024	102.010,44 €	1.043,08 €	56,03%	0,57%	110.540,10 €	1.043,08 €	63,77%	0,60%	124.706,61 €	1.057,61 €	75,58%	0,64%	132.514,07 €	1.057,61 €	84,40%	0,67%

Table 10.D Debt Dynamics - OT's H4 (15%) and EFAP until H2

H4-15%…H2	Average Bt - Scenario 1	Average bt - Scenario 1	Average Bt - Scenario 2	Average bt - Scenario 2	Average Bt - Scenario 3	Average bt - Scenario 3	Average Bt - Scenario 4	Average bt - Scenario 4
2014	160.252,92 €	107,29%	160.252,92 €	107,29%	160.252,92 €	107,29%	160.252,92 €	107,29%
2015	156.259,20 €	102,56%	157.035,90 €	103,58%	158.593,65 €	105,13%	159.355,42 €	106,16%

2016	151.893,35 €	97,74%	153.462,23 €	99,73%	156.560,18 €	102,75%	158.087,58 €	104,79%
2017	147.132,27 €	92,82%	149.509,32 €	95,72%	154.128,77 €	100,15%	156.425,80 €	103,17%
2018	142.074,16 €	87,87%	145.275,93 €	91,64%	151.397,55 €	97,40%	154.468,34 €	101,37%
2019	136.778,99 €	82,94%	140.822,60 €	87,52%	148.426,73 €	94,55%	152.275,54 €	99,44%
2020	132.870,05 €	78,99%	137.773,17 €	84,36%	146.847,84 €	92,62%	151.479,07 €	98,42%
2021	128.613,77 €	74,96%	134.394,65 €	81,07%	144.926,94 €	90,50%	150.345,11 €	97,20%
2022	124.119,18 €	70,92%	130.796,67 €	77,73%	142.773,28 €	88,27%	148.983,05 €	95,84%
2023	119.622,53 €	67,01%	127.216,07 €	74,49%	140.624,47 €	86,08%	147.630,63 €	94,50%
2024	114.833,65 €	63,07%	123.363,30 €	71,17%	138.190,34 €	83,76%	145.997,81 €	92,99%

Table 10.E Debt Dynamics - OT's H1 and EFAP H3 (15%)[17]

H1 and H3-15%	Average Bt - Scenario 1	σ Bt	Average bt - Scenario 1	σ bt	Average Bt - Scenario 2	σ Bt	Average bt - Scenario 2	σ bt	Average Bt - Scenario 3	σ Bt	Average bt - Scenario 3	σ bt	Average Bt - Scenario 4	σ Bt	Average bt - Scenario 4	σ bt
2014	139.304,64 €	7.894,24 €	93,26%	5,29%	139.304,64 €	7.894,24 €	93,26%	5,29%	139.304,64 €	7.894,24 €	93,26%	5,29%	139.304,64 €	7.894,24 €	93,26%	5,29%
2015	136.271,99 €	7.739,46 €	89,44%	5,08%	137.048,69 €	7.739,46 €	90,40%	5,10%	138.507,98 €	7.777,58 €	91,81%	5,16%	139.269,75 €	7.777,58 €	92,78%	5,18%
2016	133.222,62 €	7.587,70 €	85,73%	4,88%	134.791,50 €	7.587,70 €	87,59%	4,93%	137.700,47 €	7.662,64 €	90,37%	5,03%	139.227,87 €	7.662,64 €	92,29%	5,08%
2017	130.155,35 €	7.438,92 €	82,11%	4,69%	132.532,40 €	7.438,92 €	84,85%	4,76%	136.882,03 €	7.549,40 €	88,95%	4,91%	139.179,07 €	7.549,40 €	91,80%	4,98%
2018	127.068,96 €	7.293,06 €	78,59%	4,51%	130.270,73 €	7.293,06 €	82,17%	4,60%	136.052,61 €	7.437,83 €	87,53%	4,79%	139.123,40 €	7.437,83 €	91,30%	4,88%
2019	123.962,25 €	7.150,06 €	75,17%	4,34%	128.005,86 €	7.150,06 €	79,55%	4,44%	135.212,13 €	7.327,91 €	86,13%	4,67%	139.060,94 €	7.327,91 €	90,81%	4,79%
2020	122.113,65 €	7.242,05 €	72,60%	4,31%	127.016,77 €	7.242,05 €	77,77%	4,43%	135.646,47 €	7.452,95 €	85,55%	4,70%	140.277,70 €	7.452,95 €	91,15%	4,84%
2021	120.217,19 €	7.332,23 €	70,07%	4,27%	125.998,07 €	7.332,23 €	76,01%	4,42%	136.050,61 €	7.576,13 €	84,96%	4,73%	141.468,78 €	7.576,13 €	91,46%	4,90%
2022	118.272,12 €	7.420,64 €	67,58%	4,24%	124.949,62 €	7.420,64 €	74,26%	4,41%	136.424,75 €	7.697,50 €	84,35%	4,76%	142.634,52 €	7.697,50 €	91,76%	4,95%
2023	116.277,70 €	7.507,32 €	65,14%	4,21%	123.871,24 €	7.507,32 €	72,53%	4,40%	136.769,11 €	7.817,07 €	83,72%	4,79%	143.775,26 €	7.817,07 €	92,03%	5,00%
2024	114.233,12 €	7.592,31 €	62,74%	4,17%	122.762,78 €	7.592,31 €	70,82%	4,38%	137.083,87 €	7.934,87 €	83,08%	4,81%	144.891,33 €	7.934,87 €	92,28%	5,05%

---

[17] The whole results of all Scenarios can be seen at: https://www.dropbox.com/s/0vmh4p47nhs46j4/Debt%20Dynamcis_DB.xlsx and https://www.dropbox.com/s/339qphx9jggi9qz/Debt%20Service%20Results%20_DB.xlsx

Table 10.F Debt Dynamics - OT's H2 and EFAP H3 (15%)

H2 and H3 - 15%	Average Bt - Scenario 1	σ Bt	Average bt - Scenario 1	σ bt	Average Bt - Scenario 2	σ Bt	Average bt - Scenario 2	σ bt	Average Bt - Scenario 3	σ Bt	Average bt - Scenario 3	σ bt	Average Bt - Scenario 4	σ Bt	Average bt - Scenario 4	σ bt
2014	139.304,64 €	7.462,53 €	93,26%	5,00%	139.304,64 €	7.462,53 €	93,26%	5,00%	139.304,64 €	7.462,53 €	93,26%	5,00%	139.304,64 €	7.462,53 €	93,26%	5,00%
2015	135.553,69 €	7.324,45 €	88,97%	4,81%	136.330,39 €	7.324,45 €	89,92%	4,83%	137.786,14 €	7.360,53 €	91,33%	4,88%	138.547,91 €	7.360,53 €	92,30%	4,90%
2016	131.800,10 €	7.205,66 €	84,81%	4,64%	133.368,98 €	7.205,66 €	86,67%	4,68%	136.267,46 €	7.276,66 €	89,43%	4,78%	137.794,86 €	7.276,66 €	91,34%	4,82%
2017	128.042,42 €	7.105,95 €	80,78%	4,48%	130.419,47 €	7.105,95 €	83,50%	4,55%	134.748,36 €	7.210,74 €	87,56%	4,69%	137.045,39 €	7.210,74 €	90,39%	4,76%
2018	124.279,16 €	7.024,97 €	76,87%	4,35%	127.480,93 €	7.024,97 €	80,41%	4,43%	133.228,62 €	7.162,46 €	85,72%	4,61%	136.299,42 €	7.162,46 €	89,45%	4,70%
2019	120.508,85 €	6.962,28 €	73,07%	4,22%	124.552,46 €	6.962,28 €	77,41%	4,33%	131.708,04 €	7.131,40 €	83,90%	4,54%	135.556,85 €	7.131,40 €	88,52%	4,66%
2020	118.009,66 €	7.127,84 €	70,16%	4,24%	122.912,77 €	7.127,84 €	75,26%	4,36%	131.472,32 €	7.328,80 €	82,92%	4,62%	136.103,55 €	7.328,80 €	88,43%	4,76%
2021	115.475,37 €	7.300,68 €	67,30%	4,26%	121.256,25 €	7.300,68 €	73,15%	4,40%	131.216,31 €	7.533,68 €	81,94%	4,70%	136.634,47 €	7.533,68 €	88,34%	4,87%
2022	112.904,98 €	7.479,55 €	64,51%	4,27%	119.582,47 €	7.479,55 €	71,07%	4,45%	130.940,05 €	7.744,81 €	80,96%	4,79%	137.149,82 €	7.744,81 €	88,23%	4,98%
2023	110.297,49 €	7.663,33 €	61,79%	4,29%	117.891,03 €	7.663,33 €	69,03%	4,49%	130.643,62 €	7.961,12 €	79,97%	4,87%	137.649,78 €	7.961,12 €	88,11%	5,10%
2024	107.651,87 €	7.851,03 €	59,12%	4,31%	116.181,52 €	7.851,03 €	67,02%	4,53%	130.327,07 €	8.181,65 €	78,99%	4,96%	138.134,53 €	8.181,65 €	87,98%	5,21%