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Impairments of Greek Government Bonds under IAS 39 and IFRS 9

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Impairments of Greek Government Bonds under IAS 39 and IFRS 9

DIRECTORATE GENERAL FOR INTERNAL POLICIES
POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

Impairments of Greek Government Bonds under IAS 39 and IFRS 9: A Case Study

STUDY

Abstract

IFRS 9 introduces new impairment rules responding to the G20 critique that IAS 39 results in the delayed and insufficient recognition of credit losses. In a case study of a Greek government bond for the period 2009 to 2011 when Greece's credit rating declined sharply, this study highlights the discretion that preparers have when estimating impairments. IFRS 9 relies more on management expectations and will lead to earlier impairments. However, these appear still delayed and low if compared to the fair value losses.

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LIST OF ABBREVIATIONS

AC	Amortised cost
CL	Credit losses
Cum.	Cumulated
DK	Denmark
ES	Spain
ECL	Expected Credit losses
ESMA	European Securities and Markets Authority
EFRAG	European Financial Reporting Advisory Group
EU	European Union
EUR	Euro
FASB	Financial Accounting Standards Board (in the U.S.)
FV-TOCI	Fair value through other comprehensive income
GAAP	Generally accepted accounting principles
GGB	Greek Government Bonds
IAS	International Accounting Standard
IASB	International Accounting Standards Board
IASC	International Accounting Standards Committee
IFRIC	International Financial Reporting Interpretations Committee
IFRS	International Financial Reporting Standard
IIF	Institute of International Finance
IMF	International Monetary Fund
LGD	Loss given default
OCI	Other comprehensive income
PCI	Purchased credit impaired
PD	Probability of default
PT	Portugal
RDO	Risk of default occuring
SEC	Securities and Exchange Commission
US	United States of America

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EXECUTIVE SUMMARY

Background

IASB and FASB have been blamed that their impairment rules based on an incurred loss approach result in the delayed and insufficient recognition of credit losses and thus have contributed to the Global Financial Crisis. In July 2014 the IASB responded to the urgent April 2009 request of the G20 state leaders for improvement by issuing the IFRS 9 impairment rules based on an expected credit loss approach.

Characteristics of the IAS 39 and IFRS 9 impairment rules

The paper characterizes the new three-stage approach which requires providing for expected credit losses from the first reporting date after initial recognition. At first, only the fraction of all expected credit losses expected to occur over the lifetime of the debt instrument resulting from defaults expected in the next 12 months after the reporting date shall be recognised. As long as there is no significant increase in credit risk since initial recognition impairments at later reporting dates are restricted to this fraction of '12-month expected credit losses'. If it is concluded that there is a significant increase in credit risk then in a second stage the loan loss allowance has to be increased to reflect full 'lifetime expected credit losses'. If credit risk increases further the debt instrument may be classified as 'credit impaired' in Stage 3. The criteria for this IFRS 9 classification are almost identical with the restrictive IAS 39 criteria for the existence of objective evidence of a loss event. Only if there is objective evidence of a loss event IAS 39 allows and requires the recognition of an impairment loss. The definitions of an impairment loss for debt instruments measured at amortised cost are similar for Stage 3 of IFRS 9 and for IAS 39. Thus, at this late stage both standards will result in similar impairments. Before, impairments are recognized only under IFRS 9.

IFRS 9 requires judgement as to when there is a significant increase of credit risk and thereby provides room for discretion. When the incurred loss approach was introduced in US GAAP in the 1990's this was explicitly motivated with the aim of reducing discretion and thereby reducing opportunities for earnings management.

Measurement of impairment losses is based on managements' expectation of the probabilities of default and of estimated future cash flows in case of a default. For financial assets measured at fair value through other comprehensive income IAS 39 requires to measure the impairment loss with reference to the fair value of the financial asset which is based on the expectations of market participants for the probabilities of default and for the estimated cash flows in case of a default. In particular for quoted debt instruments for which fair values are available from observed market prices there is much less room for discretion and earnings management. It is interesting to note that the (IAS 39) fair value based measurement of impairment losses for financial assets measured at fair value through other comprehensive income has not been carried over to IFRS 9.

Insights from a case study of the application of the IAS 39 and IFRS 9 impairment rules

The case study analyses the accounting for an individually significant exposure of Greek government bonds. For the period from the second half of 2009 when the credit standing of Greece was still high to June 2011 when major rating agencies downgraded Greece to highly speculative grades I discuss the application of both the IAS 39 and IFRS 9 impairment rules for four reporting dates.

The results of the case study show as expected that IFRS 9 leads to earlier impairments. As long as the credit risk has not changed the recognition of 12-month expected credit losses

may even result in an overprovisioning and for financial assets measured at amortised cost to book values below fair value. However, the amounts of impairments at this stage are small (i.e. below 1 % of nominal value) because of the very low one-year probabilities of default for sovereign bonds. However, one-year probabilities of default are also low for corporate issuers except for highly speculative ratings.

Increases of impairments to lifetime expected credit losses because of increases in credit risk can be delayed until such an increase can be argued not to be insignificant. The case study demonstrates that managements may arrive at different conclusions as they are asked to use their own expectations. In the case of Greece it can be argued that as long as there is the support of other euro area countries the credit risk has not increased as Greece will then be able to avoid defaulting on its bonds. Under the assumption that by 30 June 2010 there is a significant increase in credit risk the case study shows that lifetime expected credit losses are still low (i.e. less than 8 % of nominal value) while the fair value of the bonds had already decreased by more than 25 %. As of 31 December 2010 the fair value had decreased by 35 % while impairment losses under IFRS 9 remain low.

In the case study a significant increase in the impairment loss to around 53 % of nominal value only arises by 30 June 2011 when there is a loss event under IAS 39 or under IFRS 9 the Greek government bond becomes credit impaired. Again there is a delay in expected loss recognition also under IFRS 9 and as a result a huge increase in the impairment loss. IAS 39 and IFRS 9 then result in similar impairments for financial assets measured at amortised cost. Interestingly, the IAS 39 impairment loss for financial assets measured at fair value through other comprehensive income is slightly lower under the assumptions of the case study (i.e. 49 % of nominal value).

Conclusion

The new IFRS 9 impairment rules are in my view an improvement compared to IAS 39. Expected credit losses are recognised earlier and more comprehensively.

However, measurement of impairment losses will rely even more on the expectations (and incentives) of management as it will be identical both for financial assets measured at amortised cost and for financial assets measured at fair value through other comprehensive income. Expected credit losses will be still not fully recognised in Stage 1 because of the restriction of impairments to 12-month expected credit losses. Increases in expected credit losses will be delayed until the risk of default occurring has significantly increased.

Thus, it is not difficult to imagine impairment rules that are an improvement over the new IFRS 9 impairment rules.

1. INTRODUCTION[1]

Credit risk has been identified as a major cause of the Global Financial Crisis starting in 2007 and of the ongoing euro area Sovereign Debt Crisis. Accounting standards require financial statements to reflect credit risk through impairments of financial assets and by setting up loan loss allowances. Increases of loan loss allowances are charged to net income and thus reduce equity. In analyses of the Global Financial Crisis it was criticised that the IFRS and US GAAP impairment rules delay credit loss recognition and result in insufficient allowances ('too little too late'). In April 2009, the Financial Stability Forum and the G20 state leaders sent urgent requests to the IASB and the FASB to improve their impairment rules[2].

The development of improved impairment rules turned out to be an arduous task and took much longer than expected. Initially, IASB and FASB worked closely together and issued several joint proposals which were heavily criticised in particular by constituents from the banking industry. As of December 2012, the aim of converged impairment rules was given up and in July 2014 the IASB issued the final version of IFRS 9 which includes the new impairment rules[3].

The objective of this paper is to compare and evaluate the present IAS 39 rules based on an incurred loss model and the new IFRS 9 rules following an expected credit loss approach. Using the case study of accounting for a Greek government bond in the period 2009 to 2011 up to the first proposal of a restructuring of Greek debt I demonstrate the application of both sets of impairment rules and the differences in the timing and amounts of the resulting impairments. Huge exposures of sovereign debt caused serious problems for quite some major European banks and threatened the stability of the European financial system. Therefore, I deliberately concentrate on the discussion of the impairment of a specific bond assumed to represent an individually significant exposure that has to be assessed individually. The implementation of the IFRS 9 impairment rules for a single debt instrument is not straightforward from the standard, the application guidance or the implementation examples. Rather, IFRS 9 is written in a way not to be too specific and by that to accommodate for different approaches of implementing the new rules.

Impairments do not simply result from a mechanistic application of accounting standards. Rather, they are the result of complex decision processes structured by the requirements of standards but also influenced by the interests and incentives of those who make the decisions. I use the case study to demonstrate how and why different impairments may be observed even for identical exposures and identical circumstances.

Basic impairment models are characterised in Chapter 2, and the specific IAS 39 incurred loss model is compared to the specific IFRS 9 expected loss model. Chapter 3 contains the case study in which I discuss the application of the different impairment rules to a specific exposure of a Greek government bond for four reporting dates from 30 December 2009 when the credit standing of Greece was still high to 30 June 2011 when major rating agencies had downgraded Greece to highly speculative grades. Section 3.6. summarises the results. Chapter 4 presents the conclusions.

---

[1] The author is Senior Professor of Accounting and Auditing at Goethe-Universität Frankfurt and since April 2015 the academic member of the Technical Experts Group (TEG) of EFRAG. The paper has been prepared as an academic paper independent of EFRAG. It has not been communicated to or discussed with members of EFRAG TEG or EFRAG staff.

[2] See Financial Stability Forum (2009); G20 (2009).

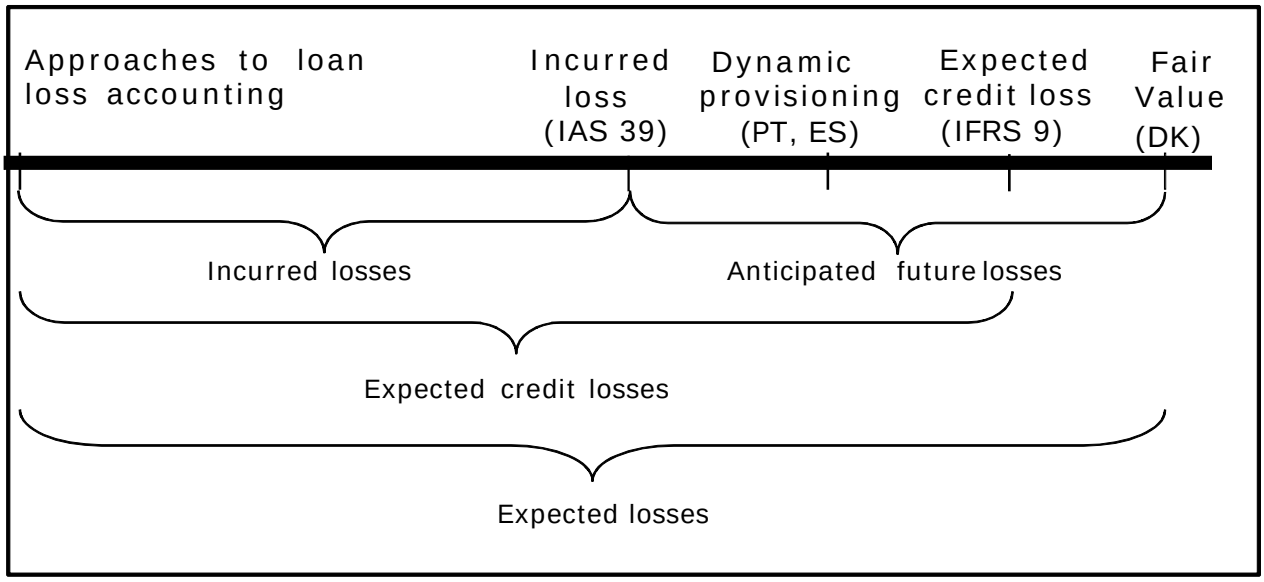
[3] See IASB and FASB (2013) for the history of the standards development. The FASB still has not issued new impairment rules.

2. COMPARISON OF THE IAS 39 AND IFRS 9 IMPAIRMENT MODELS

2.1. Overview of impairment models

Impairment models are designed to anticipate unrealised losses. They differ to the extent to which they include risk factors (e.g. interest rate risk, foreign exchange risk, credit risk) and whether they include expected and/or unexpected risks. Figure 1 characterises a selection of impairment models of which the former Danish fair value model is the most comprehensive: fair values comprise all risk factors and include premia for both expected and unexpected risks. The IAS 39 and the IFRS 9 impairment models on principle only recognise credit losses and thus exclude losses from other risk factors (e.g. interest rate risk[4]). They are further restricted to expected losses and thus do not provide for the possibility of unexpected credit losses[5].

Figure 1: Alternative impairment models and regimes



Source: Adapted from Gebhardt and Novotny-Farkas (2011), p. 296. Incurred losses are expected losses from events as of the balance sheet date. Thus, incurred losses represent a subset of expected losses. Expected credit losses are incurred credit losses and expected credit losses from events expected to occur after the balance sheet date.

2.2. Key characteristics of the (present) IAS 39 incurred loss model

The IAS impairment model further excludes expected credit losses from events expected to occur after the balance sheet date. For example, if a major employer in a region announces to close a factory in the next fiscal year and to lay off thousands of employees, this will result in additional credit losses for local banks. Under IAS 39 these additional expected credit losses may not be recognised as the event (i.e. the closure of the factory) does not take place before the balance sheet date but only in the next fiscal period.

[4] Interest risk and credit risk are not uncorrelated. In periods of high interest rates, debtors often have increasing difficulties to service their debts.

[5] From a regulatory perspective, unexpected losses shall be absorbed by adequate levels of capital.

The introduction of the IAS 39 incurred loss model has to be seen on the background of the prior debate on loan loss accounting in the US where in 1998 the US SEC questioned the practices of SunTrust Banks and ordered them to significantly reduce their loan loss allowances. Subsequently, the US SEC and bank regulators issued guidance about appropriate loan loss allowances which should be prudent but not excessive[6]. The great concern of the US SEC was the potential for earnings management resulting from the discretion managers have when providing for expected losses. Limiting the recognition of expected losses to those expected to occur as a result of events existing at the balance sheet date (i.e. incurred losses) has been thought of to be a means of limiting opportunities for 'earnings management'[7]. Academic research has confirmed that the goal of reducing earnings management has been accomplished to a considerable extent[8].

The flipside of the restrictive IAS 39 impairment rules is that expected credit losses are only covered in part by loan loss allowances. IAS 39.59 specifically requires

(1) that 'there is objective evidence of impairment as a result of one or more events that occurred after the initial recognition of the asset (a loss event)', and

(2) 'that loss event (or events) has an impact on the estimated future cash flows of the financial asset or group of financial assets', and

(3) that this impact 'can be reasonably estimated'.

Further, IAS 39.59 provides a tentative list of loss events e.g.

(a) 'significant financial difficulty of the issuer or obligor';

(b) 'a breach of contract, such as a default or delinquency in interest or principal payments';

(c) 'the lender, for economic or legal reasons relating to the borrower's financial difficulty, granting to the borrower a concession that the lender would not otherwise consider';

(d) 'it becoming probable that the borrower will enter bankruptcy or other financial reorganization';

(e) 'the disappearance of an active market for that financial asset because of financial difficulties'.

If (and only if) there is objective evidence of an impairment, the amount of impairment has to be measured. The measurement is different for financial assets measured at amortised cost (AC, i.e. for assets classified as held-to-maturity or as loans and receivables) or at fair value through other comprehensive income (FV-TOCI).

The impairment loss for AC financial assets is defined in IAS 39.63 as the difference between the 'carrying amount and the present value of estimated future cash flows (excluding future credit losses that have not been incurred) discounted at the financial asset's original effective interest rate (i.e. the effective interest rate computed at initial recognition)'. Management expectations are to be used for the estimation of future cash flows.

To discount estimated future cash flows as of the balance sheet date at a discount rate as of initial recognition results in accounting artefacts with no observable economic

---

6 See Wall and Koch (2000); Ryan (2007); Beck and Narayanamoorthy (2013).

7 By earnings management preparers use judgement or accounting choices offered by standard setters to achieve earnings targets, e.g. to avoid losses, to increase earnings above prior period earnings or to meet earnings expectations by analysts. See Healy and Wahlen (1999) for a review of the related literature.

8 See Gebhardt and Novotny-Farkas (2011).

correspondents. The resulting book value is neither a cost measure nor a current value and thus difficult to understand and to interpret by users. It can only be explained by the specific accounting measurement rules.

For FV-TOCI financial assets the loss to be recognised in net income 'shall be the difference between the acquisition cost (net of any principal repayment and amortisation) and current fair value' (IAS 39.68). As a result all fair value changes of FV-TOCI financial assets are 'recycled' from other comprehensive income to net income on impairment. It should be noted that here the recognition of losses does not only include expected credit losses but also the (positive or negative) effects from changes in other risk factors[9]. Further, the expectations of market participants (and not the expectations of management) determine the estimation of future cash flows which will be discounted at current market rates (not at the original effective interest rate).

The impairment model for FV-TOCI financial assets is similar to the impairments booked under the 'lower of cost or market'-rule applied in many EU countries under their national accounting regulations. If the financial assets are traded in active markets it should result in more comparable loss recognition across companies. Loss recognition may however still differ because of differences in identifying a loss event.

Another implication of the IAS 39 incurred loss model is the upfront revenue recognition of interest in net income. Interest rates charged by creditors include a premium for credit risk but expense recognition for expected credit losses is delayed until there is a loss event. This may provide incentives for a management interested in increasing short term earnings to increase borrowings to risky customers[10].

2.3. Key characteristics of the IFRS 9 expected credit loss model

Objective evidence of the existence of a loss event is not required for recognising impairment under the IFRS 9 expected credit loss model. It is based on the rationale that initially expected credit losses over the maturity of the debt instrument are reflected in a credit risk premium included in the interest rate. If expectations about credit losses increase this should be covered by setting up a loan loss allowance for lifetime expected credit losses.

Expected credit losses (ECL) are specifically defined in IFRS 9 as the probability weighted average of credit losses (CL) multiplied by the risks of default occurring (RDO):

$$ECL = RDO * CL$$

Credit loss is defined as the present value of differences between all contractual cash flows and the cash flows expected to flow in ('cash shortfalls') discounted at the initial effective interest rate. Again the resulting amounts are accounting artefacts with no observable economic correspondents. It should be noted that a credit loss already occurs when contractual payments arrive delayed.

More specifically, IFRS 9 distinguishes three stages:

- Initially, all performing debt instruments are allocated to Stage 1 and stay there as long as the risk of a default occurring has not changed significantly compared to the date of initial recognition (IFRS 9.5.5.9). Default is not explicitly defined in IFRS 9 – preparers of accounts should use 'a default definition that is consistent with the

[9] In the recent financial crises fair value losses from higher credit risk have been in part compensated by gains from lower interest rates.

[10] See Gebhardt (2008), pp. 37-39.

definition used for internal credit risk management purposes. [...] However, there is a rebuttable presumption that default does not occur later than when a financial asset is 90 days past due', IFRS 9.B5.5.37.

IFRS 9 is also not explicit about when credit risk has significantly increased. There is a 'rebuttable presumption that the credit risk on a financial asset has increased significantly since initial recognition when contractual payments are more than 30 days past due', IFRS 9.5.5.11. IFRS 9.B5.5.17 provides a long non-exhaustive list of information to be considered in the assessment. It is important that forward-looking information as of the balance sheet date should be used if it is available without undue cost or effort, IFRS 9.5.5.11. RDO is thus a 'point in time' probability whereas the Basel Committee probability of default (PD) is a 'through the cycle' (average) probability.[11] It should be noted that only changes in RDO are considered when allocating a financial asset to the three stages of the IFRS 9 impairment model – changes in the credit losses (CL) however large are considered irrelevant here. It should further be noted that this is a relative assessment as the comparison is always with the RDO at initial recognition that may differ widely across debt instruments.

For financial instruments with low credit risk at the reporting date, preparers have the option to assume that there is no significant increase in credit risk. The application guidance in IFRS 9.B5.22-24 mentions financial assets rated as 'investment grade' as an example of low credit risk but also clarifies that external ratings are not required for such an assessment.

- If credit risk has increased significantly, then the financial asset is allocated to Stage 2 in which loan loss allowances should be set up to reflect lifetime ECL. For example, for a debt instrument with a two-year maturity lifetime ECL should consider the possibility of a default in year 1 and year 2 and calculate the respective credit losses to be multiplied by the probabilities assigned by management to possible defaults in year 1 and year 2[12]. It should be noted that unlike under IAS 39, the measurement of impairment does not differ for AC or FV-TOCI debt instruments under IFRS 9.
- If the credit standing deteriorates further and there is a default, the financial asset is considered 'credit impaired' and allocated to Stage 3. The definition of 'credit impaired' in IFRS 9.Appendix A closely follows the description of a loss event in IAS 39.59. In Stage 3 loan loss allowances shall again cover lifetime ECL as in Stage 2.

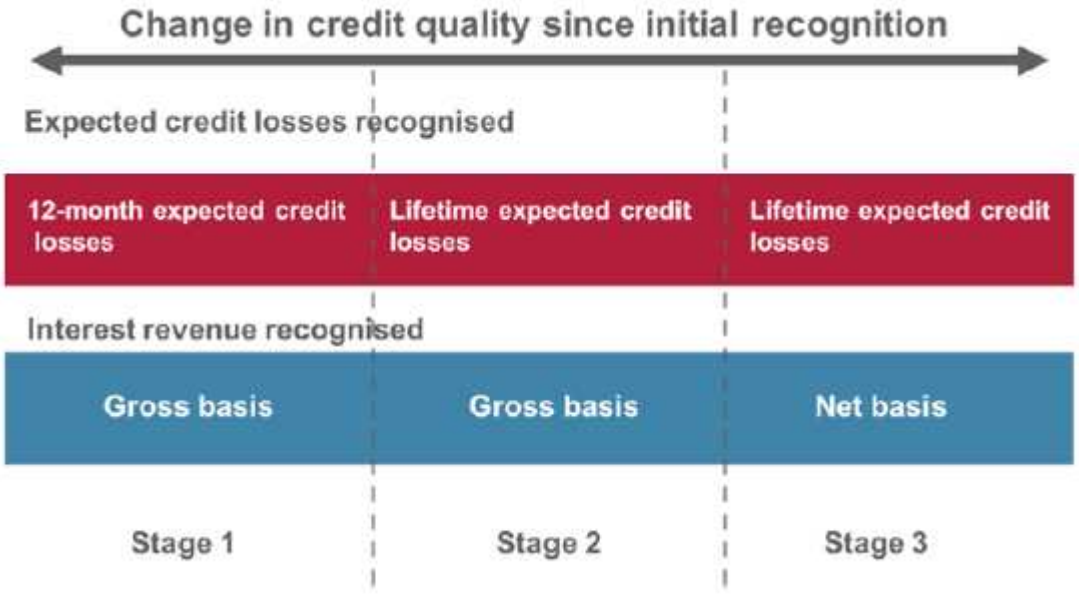
  Stage 3 and Stage 2 differ in the determination of interest revenue:
  In Stage 2 (and in Stage 1) interest revenue is calculated as gross book value times the original effective interest rate. In Stage 3 interest revenue is calculated as net book value (i.e. gross book value less loan less loan loss allowance) multiplied by the original effective interest rate, IFRS 9.5.4.1.

Figure 2 below summarises the IFRS 9 impairment model.

[11] Hence the difference in terminology employed by the IASB.

[12] Annex 1 presents the calculation of lifetime expected credit losses for a Greek government bond with a maturity of 10 years.

Figure 2: Impairment of financial assets under IFRS 9



Source: Lloyd (2014), p. 2.

On the basic rationale, loan loss allowances in Stage 1 would be unnecessary as long as the debt instruments perform as expected because the interest rate charged includes a credit risk premium priced to cover expected credit losses. However, IFRS 9 requires to measure the loan loss allowances at each reporting date at an amount equal to 12-month expected credit losses (IFRS 9.5.5.5.) defined as the 'portion of lifetime expected credit losses that represent the expected credit losses that result from default events on a financial instrument that are possible within the 12 months after the reporting date', IFRS 9, Appendix A; B5.5.43.

If a debt instrument is initially recognised close to a reporting date this implies that the net book value may be below fair value which already incorporates all expected and unexpected credit losses. In effect, recognising 12-month expected credit losses results in a double-counting of credit losses (to be noted that the current FASB proposal implies even more double counting as loan loss allowances shall reflect lifetime expected losses at each reporting date). It is obvious that there is no sound conceptual basis for this impairment rule and this is acknowledged by the IASB who defends it as an operational simplification, IFRS 9, BC5.195-199.

The 12-month ECL loan loss allowance has an additional net income effect as the recognition of an expense offsets the increase in net income because of the upfront revenue recognition of the credit risk premium included in the interest rate.

3. COMPARISON OF IMPAIRMENTS UNDER IAS 39 AND IFRS 9

3.1. Data

The case study focusses on a significant exposure to Greek government bonds of an EU bank reporting under IFRS. For example, Commerzbank voluntarily for the first time disclosed an exposure to Greek government bond of EUR 3,100 million in the interim report as of 31 March 2010. High exposures were then also disclosed by KBC (EUR 1,900 million), the Royal Bank of Scotland (EUR 1,461 million) or Credit Agricole (EUR 850 million)[13]. Significant exposures have to be assessed individually.

Greece issued government bonds with fixed rate and variable rate interest coupons. For the case study I choose the 6.00 % fixed rate bond GR0124031650 issued in March 2009 with a 19 July 2019 maturity date. To simplify the presentation amounts reported are on a per bond basis of the nominal value of EUR 1,000 per bond.

Figure 3 displays the prices of this bond together with the prices of the German Government bond DE0001135382 issued in May 2009 with a 3.50 % fixed rate maturing on 4 July 2019[14]. The graph covers the period from July 2009 to February 2012 and also shows the prices and the ratings by Moody's and Standard & Poor's as of the balance sheet dates for which the impairments (or non-impairments) are discussed below.

The historic period covered by the case study starts in the second half of 2009 and ends in 2011. During this period the credit standing of Greece deteriorated from high quality to junk status. Explicitly discussed are impairments

- as of 31 December 2009 (the first reporting date),
- as of 30 June 2010 (after a first downgrade to non-investment grade),
- as of 31 December 2010, and
- as of 30 June 2011 (after downgrades to highly speculative grades).
- Impairments for later reporting dates are not discussed as an analysis for 31 December 2011 would be repetitive of the discussion as of 30 June 2011.

The tables in Annex 1 provide the details for these periods.

In February 2012 Greece offered private investors to trade in their Greek government bonds in exchange for newly issued Greek government bonds and some additional financial assets implying haircuts of more than 50 %. More than 95 % of the bonds eligible were exchanged by March 2012[15]. These exchanges result in derecognition of the old Greek government bonds[16].

[13] See Commerzbank (2010); KBC (2010); Royal Bank of Scotland (2010); Credit Agricole (2010).

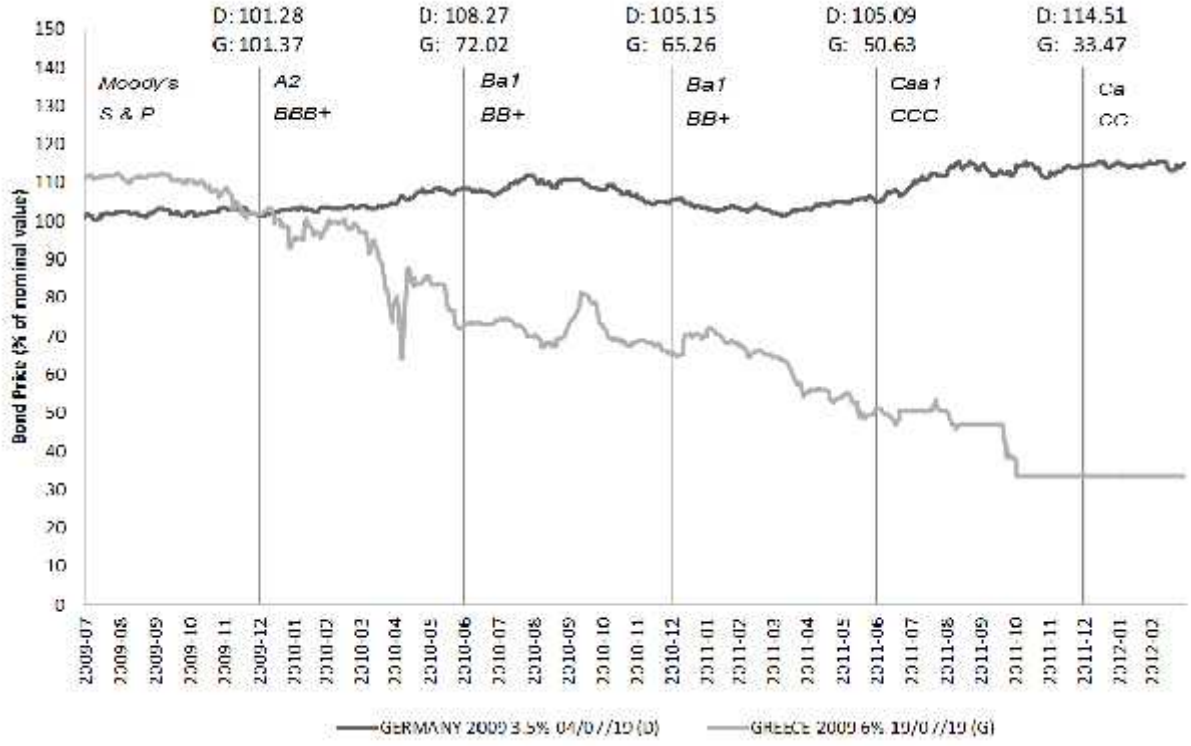
[14] Following the bond market conventions bond prices are displayed as percent of nominal value.

[15] See Bloomberg (2012).

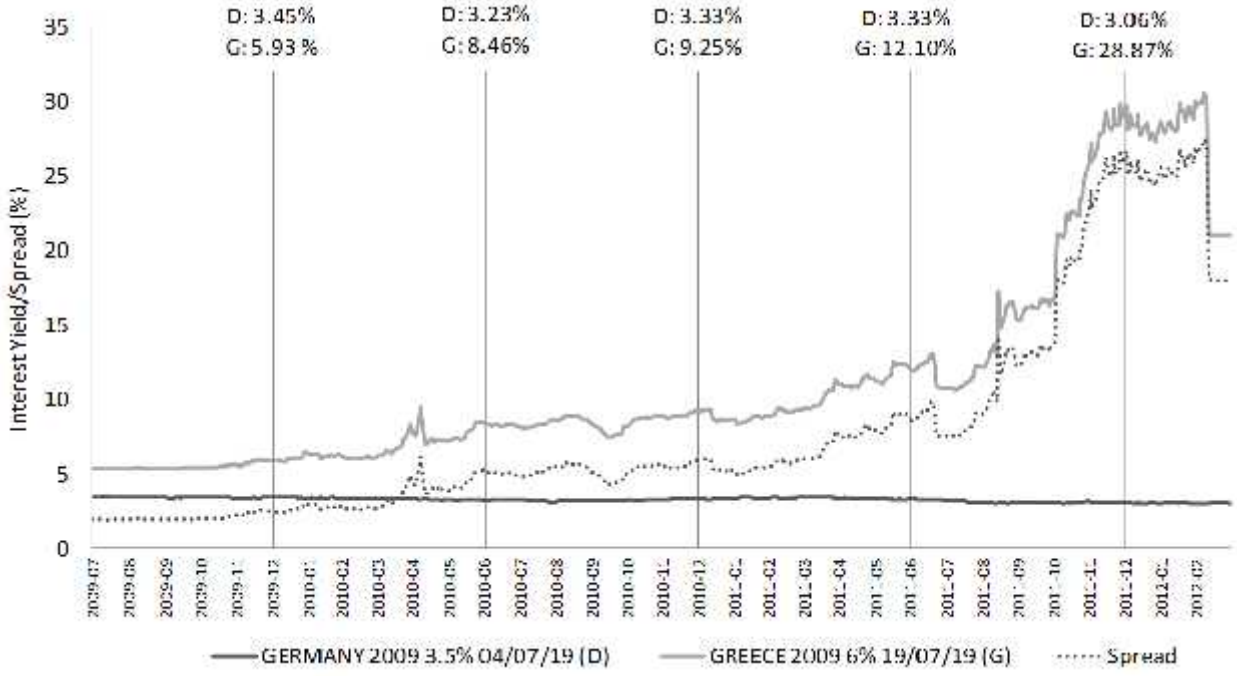
[16] See IFRIC (2012).

Figure 3: Bond prices and yields of Greek and German government bond

Panel A: Bond Prices



Panel B: Bond Yields



Source: Gebhardt (2015).

The prices of the Greek and the German bond develop parallel at the beginning. From the fourth quarter of 2009 the prices diverge increasingly most probably because of growing concerns with the credit standing of Greece. In December 2009, all three major rating agencies downgraded Greece – Moody's from A1 to A2, Standard & Poors and Fitch from A- to BBB+. These ratings are still two grades above the thresholds for classification as investment grade. By June 2010 the divergence in the prices of the Greek and German bonds has increased further. Standard & Poor's (in April 2010) and Moody's (in June 2010) downgraded Greece to BB+ and Ba1 respectively and thus to the highest ratings within the non-investment grades. Fitch followed much later only in January 2011 with a downgrade to BB+. In early 2011 all agencies sharply downgraded Greece to the highly speculative grades of Caa1 (Moody's) and CCC (Standard & Poor's)[17].

For the following discussion I assume that an EU Bank reporting under IFRS has acquired Greek bonds at par value and on initial recognition measured them at EUR 1,000.00. For amortised cost measurements I assume that the original effective interest rate is equal to the contractual rate of 6.00 % as the bond is to be repaid in full at maturity. I further assume that interest payments are made by the end of the fiscal years to avoid small intra-year interest accruals.

For the reporting dates 31 December 2009, 30 June 2010, 31 December 2010 and 30 June 2011, I discuss the impairment of the Greek government bond both for AC and FV-TOCI financial assets under IAS 39 and IFRS 9.

3.2. Measurement at 31 December 2009

3.2.1. IAS 39 Impairment

Under the IAS 39 incurred loss model impairments may only be recognised if there is objective evidence of a loss event as of the balance sheet date. The downgrades in December 2009 point to a worsening of the credit standing of Greece which is still considered to be of high quality. There is no evidence of a loss event as listed in the tentative list of loss events in IAS 39.59.

Thus, no impairment may be recognised as of 31 December under IAS 39. Book value remains unchanged at EUR 1,000.00 for AC financial assets but at the higher fair value of EUR 1,013.70 for FV-TOCI financial assets.

3.2.2. IFRS 9 Impairment

The Greek government bond has been issued and initially recognised when Greece was rated A1 by Moody's and A- by Standard & Poor's and Fitch. The December 2009 downgrades to A2 and BBB+ point to an increase in credit risk but certainly this increase is not deemed to be significant. As a simplification, IFRS 9.5.5.10 offers the option to 'assume that the credit risk on a financial instrument has not increased significantly since initial recognition if the financial instrument is determined to have low credit risk at the reporting date'[18]. As an example investment grade assets (i.e. ratings of A3 and BBB- or better) are mentioned to have low credit risk.

Thus, the Greek bond will continue to be allocated to Stage 1 at 31 December 2009 so that a loan loss allowance for 12-month expected credit losses has to be recognised. The

[17] See Bloomberg (2012); Fitch (2015).

[18] Basel Committee on Banking Supervision (2015), p. 34, however cautions that investment grade rated financial assets 'cannot automatically be considered low credit risk'.

estimation of the amount is to be based on management expectations about the probabilities of a default occurring and the amounts and timing of the expected cash flows in case of a default. Management shall use 'reasonable and supportable information that is available without undue cost or effort at the reporting date about past events, current conditions and forecasts of future economic conditions', IFRS 9.5.5.17.

Banks have developed sophisticated systems to assess the credit risk in their loan portfolios. They further use the services of specialised companies that gather and analyse credit risk data (e.g. credit rating agencies). The processes to arrive at loan loss allowances are reviewed by regulators and auditors who require periodic validations of the data and models used e.g. through back testing. Banks shall use their credit risk assessment processes developed for risk management to provide the information necessary to measure impairment for accounting purposes. As the processes are different across banks the resulting impairments will differ even for identical credit exposures.

Rating agencies provide information on default rates and on recovery rates for corporate and sovereign debt. Table 1 presents Moody's cumulative default rates derived from historical data for the period 1983-2010. As a first step, such data is useful for forming the expectations about the current probabilities of default for a specific exposure. It should however be carefully considered whether the use of average measures from a broad sample adequately reflects the credit risk of the financial asset under scrutiny. Often it is better to derive the information from smaller peer groups with similar characteristics. Further, it should be analysed whether the factors that drive the historic default rates are still valid and whether they can be assumed to persist in the relevant future.

Table 1: Moody's Cumulative Default Rates

EXHIBIT 9

Issuer-Weighted Cumulative Default Rates (1983-2010)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Sovereign Issuers										
Aaa	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Aa	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
A	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%
Baa	0.000%	0.476%	0.997%	1.570%	2.207%	2.855%	2.855%	2.855%	2.855%	2.855%
Ba	0.769%	1.746%	3.433%	5.349%	7.435%	8.949%	11.118%	13.951%	16.416%	18.882%
B	3.391%	7.039%	9.204%	12.110%	15.096%	17.986%	20.095%	21.277%	22.735%	24.590%
Caa-C	23.636%	27.727%	32.823%	32.823%	32.823%	32.823%	32.823%	32.823%	32.823%	32.823%
Investment-Grade	0.000%	0.098%	0.204%	0.318%	0.442%	0.566%	0.566%	0.566%	0.566%	0.566%
Speculative-Grade	2.793%	5.035%	7.077%	9.305%	11.651%	13.625%	15.674%	17.780%	19.778%	21.924%
All	0.844%	1.581%	2.253%	2.977%	3.736%	4.380%	4.946%	5.515%	6.029%	6.549%
Corporate Issuers										
Aaa	0.000%	0.016%	0.016%	0.048%	0.086%	0.132%	0.182%	0.186%	0.186%	0.186%
Aa	0.023%	0.066%	0.116%	0.202%	0.291%	0.351%	0.388%	0.419%	0.447%	0.501%
A	0.062%	0.200%	0.414%	0.623%	0.853%	1.099%	1.371%	1.677%	1.969%	2.216%
Baa	0.202%	0.561%	0.998%	1.501%	2.060%	2.636%	3.175%	3.710%	4.260%	4.890%
Ba	1.197%	3.437%	6.183%	9.067%	11.510%	13.757%	15.760%	17.679%	19.526%	21.337%
B	4.466%	10.524%	16.526%	21.774%	26.524%	31.034%	35.301%	39.032%	42.312%	45.194%
Caa-C	18.030%	30.037%	39.612%	47.373%	53.882%	58.064%	60.978%	64.428%	68.464%	73.646%
Investment-Grade	0.095%	0.274%	0.508%	0.769%	1.054%	1.343%	1.622%	1.907%	2.185%	2.467%
Speculative-Grade	4.944%	10.195%	15.233%	19.671%	23.477%	26.820%	29.790%	32.433%	34.804%	36.967%
All	1.819%	3.717%	5.485%	6.988%	8.241%	9.303%	10.212%	11.006%	11.706%	12.344%

Source: Moody's (2011), p. 12.

For the case study of the Greek government bond I use the cumulative default rates for the determination of the expected credit loss. The cumulative default rates for Moody's A ratings are zero for all maturities up to ten years. This implies that expected credit losses are zero and thus no impairment losses would be recognised.

Standard & Poor's and Fitch rated Greece as BBB+ and the equivalent grade on Moody's scale would be Baa1 – two grades worse than A2. For the determination of expected credit losses I therefore also use the default rates for Moody's Baa sovereign rating.

The determination of expected credit losses is explained in detail in Annex 1. The amounts derived are based on the assumption that a default can occur in each year following the reporting date. It is further assumed that beginning in the year of default the contractual interest is not paid by the debtor (i.e. Greece). However, as sovereign defaults often result in a restructuring of the debt I assume that in the year after the default creditors receive 50 % of the notional amount in newly created financial assets and/or cash payments.

On these assumptions the lifetime expected credit loss as of 31 December 2009 amounts to 13.25 (or 1.325 % of book value). However, the one-year default rate is zero and thus the 12-month ECL is zero for a Baa-rating. Thus, no impairment would be recognised also under IFRS 9.

This result will appear unsatisfactory to many. It may be questioned on the grounds that the historic default rates may not adequately reflect more recent experiences from sovereign crises. Application of average default rates would also be more adequate for diversified portfolios of sovereign debt instruments and less so for a specific sovereign issue. However, in the specific case of Greece this will not necessarily result in higher default rates to be applied as market participants assumed a guarantee from the EU and euro area countries for the debt of fellow euro countries which should also be considered.

The identical (non-) impairments for IAS 39 and IFRS 9 are due to the zero-one year default rate for sovereign issuers. For corporate issuers with a Baa-rating, Table 3 reports a one year default rate greater zero which would result in a positive 12-month expected credit loss to be charged to net income. For good ratings the one year default rates are low and thus require recognising only small impairment losses.

Table 2 presents the accounting entries for AC bonds and for FV-TOCI bonds at initial recognition and at the 31 December 2009 reporting date. Accounting entries for interest are not presented in order to simplify the presentation and to concentrate on the impairment accounting entries.[19] AC bonds are reported at EUR 1,000.00 with no effect on equity. FV-TOCI bonds are reported at EUR 1,013.70 with the re-measurement gain presented in OCI. IAS 39 and IFRS 9 result in identical financial statements.

[19] Another simplification is the assumption that the bonds are fully funded by equity.

Table 2: Accounting entries at initial recognition and at the 31 December 2009 reporting date

IAS 39				IFRS 9			
AC Bonds		Equity		AC Bonds		Equity	
0		2,000.00		0		2,000.00	
+ 1,000.00	(1)			+ 1,000.00	(1)		
1,000.00				1,000.00			
FV-TOCI Bonds		OCI (cum.)		FV-TOCI Bonds		OCI (cum.)	
0		0		0		0	
+ 1,000.00	(1)	+ 13.70	(2)	+ 1,000.00	(1)	+ 13.70	(2)
+ 13.70	(2)	13.70		+ 13.70	(2)	13.70	
1,013.70				1,013.70			
Cash		Net Income (cum.)		Cash		Net Income (cum.)	
2,000.00				2,000.00			
- 2,000.00	(1)			- 2,000.00	(1)		
0				0			
2,0013.70		2,0013.70		2,0013.70		2,0013.70	

(1) Initial recognition of the bonds at purchase date

	Debit	Credit
AC Bonds	1,000.00	
FV-TOCI Bonds	1,000.00	
Cash		2,000.00

(2) Remeasurement at fair value at balance sheet date

	Debit	Credit
FV-TOCI Bonds	13.70	
OCI		13.70

Source: Author's table.

3.3. Measurement at 30 June 2010

During the first two quarters of 2010 financial problems of Greece became evident. A first EU leader's summit was held on 11 February 2010 which agreed to protect the stability of the euro area. On 12 April 2010 the EU finance ministers and the IMF agreed to help Greece out with loans totalling EUR 45 billion. This was followed by a EUR 110 billion rescue package in May 2010.

The prices of the Greek government bond decreased to temporary lows of 73.52 % (on 28 April 2010) and 63.99% (on 7 May 2010). The prices recovered to above 80% after the decision of the EU summit before declining to 72.02% on 30 June 2010 (Figure 3). Further, the rating agencies downgraded Greece in April and June 2010 to Ba1 (Moody's) and BB+ (Standard & Poor's) and thus to non-investment grades[20].

[20] See the timeline of events in Bloomberg (2012).

3.3.1. IAS 39 Impairment

As outlined in Section 2.2. impairments may only be recognised under the IAS 39 incurred loss model if

(1) 'there is objective evidence of impairment as a result of one or more events that occurred after the initial recognition of the asset (a ''loss event'')' and

(2) 'that loss event (or events) has an impact on the estimated future cash flows of the financial asset or group of financial assets' and

(3) that this impact 'can be reasonably estimated' (IAS 39.59).

The first issue is whether there has been objective evidence of a loss event as of 30 June 2010. A discussion of the tentative list of loss events in IAS 39.59 does not support such evidence:

(a) 'significant financial difficulty of the issuer or obligor';

Certainly Greece has been in financial difficulties during the first two quarters of 2010 but they were at least for the time being overcome because of the joint Emergency Financing of the euro area member countries and the IMF who provided a EUR 110 billion rescue package in early May 2010. Also in May 2010 the EU Finance Ministers agreed on the EUR 750 billion temporary European Financial Stability Facility. Thus, by 30 June 2010 the financial difficulties had – with hindsight only temporary – been resolved. An IMF Country Report 10/217 published in July 2010 reported on a good progress of the Greek government to overcome the financial problems[21].

(b) 'a breach of contract, such as a default or delinquency in interest or principal payments';

Greece fully serviced all outstanding debt instruments.

(c) 'the lender, for economic or legal reasons relating to the borrower's financial difficulty, granting to the borrower a concession that the lender would not otherwise consider';

There were no changes in the terms of outstanding Greek debt instruments.

(d) 'it becoming probable that the borrower will enter bankruptcy or other financial reorganisation';

With the rescue packages in place a bankruptcy/default had become unlikely. IAS 39.59 (d) uses the term 'probable' commonly understood as a probability significantly higher than 50 % (e.g. 70 %-80 %). There was clearly no bankruptcy probable as of 30 June 2010. A bankruptcy in a later period may not give rise to impairment as of the balance sheet date: 'Losses expected as a result of future events, no matter how likely, are not recognised', IAS 39.59.

(e) 'the disappearance of an active market for that financial asset because of financial difficulties';

Trading volume of Greek government bonds clearly was much lower than in previous years. However, monthly trading volume in the second quarter of 2010 was still

[21] See IMF (2010); Bloomberg (2012).

above EUR 1.3 billion – thus the market for Greek government bonds was still active albeit on a much smaller scale[22].

IAS 39.60 clarifies that a 'downgrade of an entity's credit rating is not, of itself, evidence of impairment, although it may be evidence of impairment when considered with other available information.' Further, a 'decline in fair value is not necessarily evidence of impairment', IAS 39.60. A significant or prolonged decline in fair value is a loss event and thus a trigger for impairment only for equity investments, IAS 39.61. For debt instruments and thus for the Greek government bond this trigger does not apply.

Even if one would conjecture that there was objective evidence of a loss event as of 30 June 2010 this would not be sufficient to book a loan loss allowance. The second hurdle is that the loss event has to have an 'impact on the estimated future cash flows of the financial asset or the group of financial assets', IAS 39.59.

The issue here is whether creditors would be affected by a default of Greece. This has long been discussed and dismissed until 17 May 2011 when European finance ministers started to approach bondholders for a restructuring of Greek government bond repayments. Only in July 2011 major banks represented by the Institute of International Finance (IIF) agreed to participate in the losses on their Greek government bond holdings[23].

To summarise, IAS 39 does not require and even does not allow to recognise an impairment of the Greek government bond as of 30 June 2010.

3.3.2. IFRS 9 Impairment

Because of the decline in price and the downgrades the question arises whether the credit risk of the Greek government has significantly increased compared to the credit risk at initial recognition.

The IASB asks entities to 'consider observable market information about the credit risk of the particular financial instrument or similar financial instruments', IFRS 9.B5.5.54. Figure 3 shows that the spread between the Greek and the German government bond more than doubled from initially 2.50 % (or 250 basis points) to 5.23 % (or 523 basis points). The changes in spread are however not only driven by changes in expected credit risk but also by changes in unexpected credit risk and changes in other risk factors. There is broad empirical evidence that changes in spreads by far overstate changes in expected credit risk. Spreads therefore are considered to be poor indicators of expected credit losses[24]. In the Basis for Conclusions the IASB acknowledges that 'market prices can be affected by factors that are not relevant to credit risk (such as changes in the level of general interest rates and the price of liquidity)', IFRS 9BC5.123.

The downgrades to non-investment grade received much attention in the financial press. It should however be noted that the distinction between investment grade and non-investment grade is rather discretionary and does not correspond to a particularly high increase in the probabilities of default between the ratings of BBB- and BB+ (Standard & Poor's, Fitch) or Ba and Ba1 (Moody's)[25]. Relevant here is however the difference between the credit risk at initial recognition and at the reporting date. Certainly, there is an increase in credit risk between initial ratings by Moody´s of A1 and Ba1 for the Greek government

[22] See Annex 2. Information on trading volume of specific issues is not available.

[23] See Bloomberg (2012).

[24] See Grünberger (2013), pp. 382-386 for a discussion of the literature on the credit spread puzzle.

[25] The increase between rating grades is not linear so that an absolute comparison of default probabilities is not adequate, see Grünberger (2013), pp. 34-36, 140-146 for a discussion.

bond. The difference between the sovereign cumulative default rates in Table 1 amounts to 16.42 % between the ratings of A for ten years and Ba for nine years[26]. Such an increase will be characterised as 'significant' by many.

The consequence is to allocate the Greek government bond to Stage 2 and raise the loan loss allowance to lifetime ECL. The lifetime ECL calculated on the same assumptions as before in Annex 1 increases to EUR 79.99 (or 7.999 % of book value) using the Ba marginal default rates derived from Moody's Sovereign Cumulative Default Rates (1983-2010) in Table 1.

However, in the special case of Greece the support of the euro area countries and the IWF has also to be considered. Some will argue that the historical default rates used in the calculations in Annex 1 are not adequate in the Greek case and that there is no significant increase in credit risk.

For the case study, I assume alternatively that credit risk has not increased significantly by 30 June 2010 so that the Greek government bond remains allocated to Stage 1. However, because of the increase in the probabilities of default there is an increase in the 12-month expected credit losses that now requires recognising an impairment. Given a probability of default in the next year of 0.769 % (Table 1) the impairment and thus the loan loss allowance should rise to EUR 4.39 (or 0.439 %) for both AC and FV-TOCI financial assets.

The above discussion highlights the discretion that preparers have when estimating IFRS 9 impairments. Management expectations are to be used when evaluating the significance of change in credit risk, when defining the scenarios of possible defaults and assigning probabilities of default, and when estimating the expected future cash flows and thus the cash shortfalls. While preparers shall consider 'reasonable and supportable information that is available without undue cost or effort at the reporting date about past events, current conditions and forecasts of future economic conditions' (IFRS 9.5.5.17), it is again left to the management to decide which information is used. Bank regulators have already voiced that banks should not interpret these requirements narrowly[27].

Table 3 presents the accounting entries at the 30 June reporting date for the conclusion that credit risk has increased significantly. The IFRS 9 impairment loss on the AC bonds is charged to net income and reduces the carrying amount. The carrying amount of the FV-TOCI bonds is unaffected by the impairment as fair value already includes all expected credit losses. The impairment loss is charged to net income and reduces the negative OCI balance ('recycling').

It should be noted that identical financial assets are reported at significantly different amounts in the same balance sheet depending on their classification and subsequent measurement at amortised cost or fair value. This is an implication of the mixed measurement models of IAS 39 and IFRS 9.[28]

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[26] Different maturities are used here because by 30 June 2010 the residual maturity has shortened to nine years.

[27] See Basel Committee (2015), p.32.

[28] The full fair value model as proposed by the Joint Working Group (2000) would measure all financial assets (and liabilities) at fair value and thus measure identical financial assets at identical amounts. Despite heavy criticism in particular from the financial industry IASB and FASB declared a full fair value model as their aim for a long-term solution for accounting for financial instruments up to 2008; see. e.g. IASB (2008). In the wake of the global financial crisis this aim has been dropped.

Table 3: Accounting entries at the 30 June 2010 reporting date

IAS 39		IFRS 9	
AC Bonds	Equity	AC Bonds	Equity
1,000.00	2,000.00	1,000.00	2,000.00
		- 79.99 (2)	
		920.01	
FV-TOCI Bonds	OCI (cum.)	FV-TOCI Bonds	OCI (cum.)
1,013.70	13.70	1,013.70	13.70
- 293.50 (1)	- 293.50 (1)	- 293.50 (1)	- 293.50 (1)
720.20	- 279.80	720.20	- 279.80
			+ 79.99 (3)
			- 199,81
Cash	Net Income (cum.)	Cash	Net Income (cum.)
0		0	- 79.99 (2)
			- 79.99 (3)
			- 159.98
1,720.20	1,720.20	1,640.21	1,640.21

(1) Re-measurement at fair value

	Debit	Credit
FV-TOCI Bonds		293.50
OCI	293.50	

(2) Impairment AC bonds (IFRS 9)

	Debit	Credit
AC Bonds		79.99
Net Income	79.99	

(3) Impairment FV-TOCI bonds (IFRS 9)

	Debit	Credit
OCI		79.99
Net Income	79.99	

Source: Author's table.

The calculation of IFRS 9 expected credit losses results in accounting artefacts with no observable economic correspondents. For AC financial assets the resulting net book value (i.e. after deducting the related loan loss allowance) has no observable economic correspondent either. Users will have difficulties to understand and interpret the resulting accounting numbers. This conceptual critique does not apply to FV-TOCI financial assets for which the book value is the current fair value.

3.4. Measurement at 31 December 2010

With the rescue packages in place, the concerns with the credit standing of Greece calmed down in the second half of 2010. There were no further downgrades of Greece by the major rating agencies. In mid-January 2011 Fitch followed to downgrade Greece to BB+, i.e. still to the highest grade within the non-investment grades.

The Greek government bond traded at prices around 70 % in the third quarter and for a period even recovered temporarily to above 80 % in October 2010 before a further decline to 65.26 % at year's end (Figure 3).

3.4.1. IAS 39 Impairment

There were no events or circumstances in the second half of 2010 that point to the existence of a loss event triggering impairment. The discussion as of 30 June 2010 therefore also applies to the year-end balance sheet date.

Thus, IAS 39 does not require and even does not allow booking an impairment of the Greek government bond as of 31 December 2010.

3.4.2. IFRS 9 Impairment

The discussion of the question whether the credit risk of the Greek government has significantly increased compared to the credit risk at initial recognition is similar to the above discussion as of 30 June 2010.

If the conclusion is that there is a significant increase of credit risk, the loan loss allowance should reflect lifetime ECL. Under the same assumptions lifetime ECL now amounts to EUR 69.60 (or 6.960 % of book value). The decrease from EUR 79.99 is mainly due to the interest payment received in 2010 which reduces the present value of the cash shortfalls (i.e. credit losses). This highlights a feature of the IFRS 9 impairment model: If the probabilities of a default occurring decrease or if the present values of expected cash shortfalls decrease then the impairment loss also decreases and thus former charges to net income will be reversed. This may result in additional volatility in net income. This is volatility driven by managements' expectations about expected credit losses and possibly also by managements' incentives.

If the conclusion is that there is no significant increase of credit risk, the loan loss allowance should continue to reflect 12-month ECL which under the same assumptions now amounts to EUR 4.27 (or 0.427% of book value).

Table 4 presents the accounting entries for the 31 December 2010 reporting date under the assumption that there is a significant increase in credit risk. The IFRS 9 impairments on the AC bonds again appear 'too little' when compared to the fair value losses of the FV-TOCI bonds.

Table 4: Accounting entries at the 31 December 2010 reporting date

IAS 39		IFRS 9	
AC Bonds	Equity	AC Bonds	Equity
1,000.00	2,000.00	920.01	2,000.00
		+ 10.39 (2)	
		930.40	
FV-TOCI Bonds	OCI (cum.)	FV-TOCI Bonds	OCI (cum.)
720.20	- 279.80	720.20	- 199.81
- 67.55 (1)	- 67.55 (1)	- 67.55 (1)	- 67.55 (1)
652.65	- 347.35	652.65	- 267.36
			- 10.39 (3)
			- 277.75
Cash	Net Income (cum.)	Cash	Net Income (cum.)
0		0	- 159,98
			+ 10.39 (2)
			+ 10.39 (3)
			- 139.20
1,652.65	1,652.65	1,583.05	1,583.05

(1) Remeasurement at fair value

	Debit	Credit
FV-TOCI Bonds		67.55
OCI	67.55	

(2) Impairment AC bonds (IFRS 9)

	Debit	Credit
AC Bonds	10.39	
Net Income		10.39

(3) Impairment FV-TOCI bonds (IFRS 9)

	Debit	Credit
OCI	10.39	
Net Income		10.39

Source: Author's table.

3.5. Measurement at 30 June 2011

In early 2011 there were increasingly discussions and rumours about a restructuring of Greek debt. By early May 2011 a 'haircut' was at that time strictly rejected by the European Central Bank (ECB) and the Greek Government[29]. However, on 17 May 2011 European finance ministers approached bondholders for a restructuring of Greek government bond repayments. In July 2011 major banks represented by the Institute of International Finance (IIF) agreed to participate in the losses on their Greek government bond holdings[30].

[29] See e.g. the press reports SPIEGEL ONLINE (2011a) and SPIEGEL ONLINE (2011b).

[30] See Bloomberg (2012).

During the first half of 2011 the prices of the Greek bond declined steadily to reach 50.63 % on 30 June 2011. This implies a yield to maturity of 12.10 % or a spread of 8.77 % (or 877 basis points) compared to the German bond.

By the end of June 2011, major rating agencies downgraded Greece to speculative grades Caa1 (Moody's) and CCC (Standard & Poor's). In late July, further downgrades to Ca (Moody's) and CC (Standard & Poor's) followed.

3.5.1. IAS 39 Impairment

Again the question is whether there has been objective evidence of a loss event as of 30 June 2011. A discussion of the tentative list of loss events in IAS 39.59 does not clearly reject such evidence:

(a) 'significant financial difficulty of the issuer or obligor';

Greece has been in financial difficulties in the first two quarters of 2011 but still could count on the support of the other euro area countries, the IWF and also of the ECB.

(b) 'a breach of contract, such as a default or delinquency in interest or principal payments';

Greece still fully serviced all outstanding debt instruments.

(c) 'the lender, for economic or legal reasons relating to the borrower's financial difficulty, granting to the borrower a concession that the lender would not otherwise consider';

Despite the ongoing discussions with the banks represented by the Institute of International Finance (IIF) there were still no changes in the terms of outstanding Greek debt instruments.

(d) 'it becoming probable that the borrower will enter bankruptcy or other financial reorganisation';

Because of the continued support by the euro area Member States, the IWF, and the ECB, a bankruptcy was still not probable – if understood as a probability significantly higher than 50 %.

(e) 'the disappearance of an active market for that financial asset because of financial difficulties';

Trading volume of Greek government bonds was only EUR 368 million in June 2011 – thus the market for Greek government bonds was still active albeit on a much smaller scale[31].

On 21 July 2011 the IIF announced the willingness of major banks to participate in a voluntary restructuring of Greek Government bonds demand to result in a 21 % loss for investors. This fulfils the IAS 39.59 (d) definition of a loss event. The question is whether there was already objective evidence of a loss event before as of 30 June 2011. Discussions about a restructuring intensified throughout June 2011 when major French banks issued a proposal for a restructuring. There was strong pressure from euro area finance ministers to

[31] See Annex 2. Information on trading volume of specific issues is not available.

arrive at an involvement of private holders of Greek government bonds[32]. Thus, the IIF announcement of 21 July 2011 can be thought of as an adjusting event that provides evidence of conditions that existed at the balance sheet date (IAS 10.9). In that interpretation, an impairment has to be booked as of 30 June 2011[33].

Assuming the existence of objective evidence of a loss event the second question needs to be answered that there is (2) 'an impact on the estimated future cash flows of the financial asset', IAS 39.59. As the discussions were about a haircut of an estimated 21 %, the answer is positively and also confirms that (3) the impact can be reliably estimated.

Most EU IFRS reporting banks came to the same conclusion and recognised impairments on their holdings of Greek government bonds in their 30 June 2011 financial reports[34]. Table 5 reports the results of a limited survey of 23 of the largest EU IFRS reporting banks.[35] Consistent with the above discussion none of the banks booked an impairment before 30 June 2011.

Table 5: First impairments on Greek government bonds

Date of Financial Report	Type of Financial Report	Year	Company	Separate Disclosure of Exposure to GGB (m EUR)	Impairment on GGB (in m EUR)
30.6.2011	Interim Report	2/2011	Deutsche Bank	1,052	155
30.6.2011	Interim Report	2/2011	HSBC	138	72
30.6.2011	Interim Report	2/2011	BNP Paribas	3,816	535
30.6.2011	Interim Report	2/2011	Credit Agricole	5,300	202
30.6.2011	Interim Report	2/2011	Royal Bank of Scotland	1,142	811
30.6.2011	Interim Report	2/2011	Societe Generale	1,873	395
30.6.2011	Interim Report	2/2011	Unicredit	380	135
30.6.2011	Interim Report	2/2011	Commerzbank	2,200	760

[32] See Zettelmeyer et al. (2013), p. 5-6 for a report on the discussion.

[33] In November 2011 an ESMA Public Statement similarly argued that (a) Greece was in financial difficulties and (b) that the 21 July 2011 agreement on a private sector involvement would have indicated concessions as of 30 June 2011; see ESMA (2011), pp. 6-7.

[34] An exception is the Portuguese Banco BPI which 'believes that the restructuring plan of the Greek debt will be successful' and therefore 'does not expect to incur a loss on the Greek Government Bonds portfolio, so it has not recognized impairment on these exposures in the financial statements of June, 30, 2011', see Banco BPI (2011), p. 203.

[35] Annex 3 contains a list of the banks surveyed.

Date of Financial Report	Type of Financial Report	Year	Company	Separate Disclosure of Exposure to GGB (m EUR)	Impairment on GGB (in m EUR)
30.6.2011	Interim Report	2/2011	Natixis	805	15
30.6.2011	Interim Report	2/2011	KBC	500	139
30.6.2011	Interim Report	2/2011	National Bank of Greece	12,243	1.645
31.12.2011	Annual Report	4/2011	Santander	84	106
31.12.2011	Annual Report	4/2011	BBVA	109	81

Source: Own table using data from interim and annual reports.

For AC financial assets the impairment loss is defined as the difference between the 'carrying amount and the present value of estimated future cash flows (excluding future credit losses that have not been incurred) discounted at the financial asset's original effective interest rate (i.e. the effective interest rate computed at initial recognition)', IAS 39.63. Only as a practical expedient impairments of AC financial assets may be measured based on the assets fair value using an observable market price, IAS 39.AG84.

A common practice for measuring IAS 39 impairments is to use only one series of estimated cash flows[36] and discount these at the original effective interest rate. This implicitly assumes that there is a 100 % probability that no other series of estimated cash flows may occur. In terms of the case study, only one default scenario is considered, e.g. a default only in the next 12 months but not in later years. Under this assumption, there is only one cash flow expected in 12 months' time estimated at EUR 500. Discounting at the 6.00 % original effective interest rate results in a new AC book value of EUR 471.70 and an impairment loss of

EUR 1,000.00 – EUR 471.70 = EUR 528.30.

To discount the estimated cash flows at the original effective interest rate results in an arbitrary amount with no economic correspondent. If the estimated cash flows are assumed to arrive with certainty, a risk free rate should be applied (e.g. the current yield of the German government bond of 3.33 %). If it is an expected value, a rate commensurate with the risk of the debtor should be applied (i.e. the current yield on the Greek government bond of 12.10 %).

The impairment losses recognised by EU IFRS reporting banks on their AC financial assets differed considerably. Most banks recognised impairments of 21 % or less of nominal value as implied in the proposed haircut of the July IIF proposal[37]. Divergence is not unexpected as estimation of future cash flows is based on management expectations. However, there

[36] Each of the expected cash flows may itself represent a probability distribution to be represented e.g. by the probability weighted average of the possible cash flows (i.e. in statistical terms the expected value). Sometimes cash flows are used that the entity expects to receive with certainty.

[37] See Schmidt and Bierey (2015), p. 16.

has been also divergence in the use of a discount rate as some banks applied the 9 % discount rate used in the 21 July 2011 IIF proposal[38].

For Greek government bonds classified as available for sale, the impairment loss is defined as the difference between the acquisition cost and current fair value. IFRS 13 provides guidance on fair value measurement and distinguishes three levels: Level 1 fair values are based on unadjusted quoted prices from active markets for identical assets. Level 2 fair values are based on models that use inputs that are observable either directly or indirectly (e.g. quoted prices of comparable assets, benchmark interest rates). Level 3 fair values are based on models that also use unobservable inputs (e.g. credit spreads from internal models). If available IFRS 13 requires using level 1 fair values.

Thus, for the Greek government bond traded in active markets, fair value equals the current market price (level 1). For the case study this results in an impairment loss of EUR 1,000.00 – EUR 506.30 = EUR 493.70 to be recycled from other comprehensive income to net income. This charge to net income should be identical for all holders of this Greek government bond. It should be noted that for other Greek government bonds the impairment losses will differ as the terms of the issues differ (e.g. interest rate, specific maturity) and thus the fair values based on market prices.

IAS 39 impairment losses on FV-TOCI bonds differed considerably across banks sometimes for less valid reasons. Some banks argued that the markets of Greek government bonds were no longer active and applied level 3 fair values based on models with unobservable inputs. Impairment losses as low as 21 % of nominal value were booked by several banks again referring to the July 2011 IIF proposal[39].

The evolving practice caused the IASB chairman Hans Hoogervorst to write a letter to the ESMA chair strongly arguing that prices from observed transactions should be used for measuring impairment on FV-TOCI financial assets[40]. Later in November 2011 ESMA issued a public statement that based on trading data from the Bank of Greece the markets for Greek government bonds could be regarded as active for some issues but inactive for others. Thus level 1 fair values should have been used for actively traded bonds and level 2 fair values for bonds not actively traded – but not level 3 fair values. ESMA also provided the results of a survey of the interim reports of financial institutions as of 30 June 2011:

- 20 (out of 34) financial institutions used level 1 fair values,
- three used level 2 fair values, and
- four applied level 3 fair value measurements.
- Three financial institutions did not recognise impairment losses[41].

3.5.2. IFRS 9 Impairment

Clearly credit risk of the Greek government bond has increased compared to the credit risk at initial recognition. Thus, an impairment loss at the Stage 2 amount of lifetime expected losses has to be recognised in net income. Using Moody's cumulative default rates for a Caa-rating (Table 1) and under the same assumptions as before the lifetime expected

[38] See ESMA (2011), p. 5.

[39] See Schmidt and Bierey (2015), p. 17.

[40] See Hoogervorst (2011).

[41] See ESMA (2011), p.5-6. For four financial institutions information on the measurement method was not identified.

credit loss now is EUR 182.95 (or 18.295 % of nominal value) and should be recognised in net income (Annex 1).

This impairment is much lower than the IAS 39 impairment loss determined above. The explanation is to be sought in the different default scenarios and the assumptions about the probabilities of default. In the IFRS 9 scenario default of a sovereign issue rated Caa-C by Moody's is expected to occur in the next year or in two years or in three years' time. There is also a high probability that there will be no default (i.e. 67.177 %) indicating that countries with a highly speculative rating often can avoid a default.

Table 6 presents the accounting entries for the 30 June 2011 reporting date. The IAS 39 impairment loss on the AC bond results in a net book value below the fair value of the FV-TOCI bond. All cumulated fair value losses of the FV-TOCI bond are 'recycled' from OCI to net income under IAS 39. In other words, all changes in asset values now are reflected in net income – however delayed until the occurrence of a loss event.

The cumulated IFRS 9 impairment losses result in a net book value for the AC bond (i.e. EUR 817.05) that is again much higher than the fair value of the FV-TOCI bond (i.e. EUR 506.30). This is an implication of the IFRS 9 approach to restrict impairments to expected credit losses and not to provide for other risk factors causing changes in fair value (e.g. unexpected credit losses).

Table 6: Accounting entries at the 30 June 2011 reporting date

IAS 39				IFRS 9			
AC Bonds		Equity		AC Bonds		Equity	
1,000.00		2,000.00		930.40		2,000.00	
- 528.30	(1)			- 113.35	(4)		
471.70				817.05			
FV-TOCI Bonds		OCI (cum.)		FV-TOCI Bonds		OCI (cum.)	
652.65		- 347.35		652.65		- 277.75	
- 146.35	(2)	- 146.35	(2)	- 146.35	(2)	- 146.35	(2)
506.30		- 493.70		506.30		- 424.10	
		+ 493.70	(3)			+ 113.35	(5)
		0.00				- 310.75	
Cash		Net Income (cum.)		Cash		Net Income (cum.)	
0		- 528.30	(1)	0		- 139.20	
		- 493.70	(3)			- 113.35	(4)
		- 1,022.00				- 113.35	(5)
						- 365.90	
978.00		978.00		1,323.35		1,323.35	

(1) Impairment AC bonds (IAS 39)

	Debit	Credit
AC Bonds		528.30
Net Income	528.30	

(2) Re-measurement at fair value FV-TOCI bonds (IAS 39 and IFRS 9)

	Debit	Credit
FV-TOCI Bonds		146.35
OCI	146.35	

(3) Impairment FV-TOCI bonds (IAS 39) => full recycling

	Debit	Credit
OCI		493.70
Net Income	493.70	

(4) Impairment AC bonds (IFRS 9)

	Debit	Credit
AC Bonds		113.35
Net Income	113.35	

(5) Impairment FV-TOCI bonds (IFRS 9) => partial recycling

	Debit	Credit
OCI		113.35
Net Income	113.35	

Source: Author's table.

The IFRS 9 impairments based on an explicit probability weighted scenario approach appear to better reflect the economic situation as of 30 June 2011. The IAS 39 approach assuming credit losses to occur with certainty as determined above appears to overstate the probability of a credit loss and thus the loan loss allowance. A Moody's rating of Caa1 for Greece would not (yet) be considered as reflecting a default.

However, at the same time the Greek government bond will have to be classified as 'credit-impaired' as of 30 June 2011: The definition of a credit-impaired financial asset of IFRS 9. Appendix A is based on almost the same criteria which IAS 39.59 uses for the definition of a loss event. For credit-impaired financial assets IFRS 9.B5.5.33 further requires to 'measure the expected credit losses as the difference between the asset's gross carrying amount and the present value of estimated future cash flows discounted at the financial asset's original effective interest rate.' This is exactly the wording used in IAS 39.63[42] which is commonly interpreted as implying a 100 % probability of default. It is to be expected that IFRS 9 impairments for credit-impaired financial assets will not differ from the IAS 39 impairments. In other words, the lifetime expected credit losses in Stage 3 will be based on a 100 % probability of default[43]. Whether or not IFRS 9 implicitly assumes or even requires a 100 % probability of default for the measurement of expected credit losses in Stage 3 is debatable.

Under the assumption of a 100 % probability of default, the lifetime expected credit losses amounts to EUR 528.30 as of 30 June 2011 and is equal to the IAS 39 impairment. In an IFRS 9 balance sheet (not separately provided) the AC bond and the FV-TOCI bond are reported at the same amounts as in the IAS 39 balance sheet. There is however a difference in the presentation of OCI and net income: As the IFRS 9 impairment loss (i.e. EUR 528.30) exceeds the fair value loss (i.e. EUR 493.70) the difference (i.e. EUR 34.60) appears in OCI and thus further decreases (cumulated) net income to EUR –1,056.60 compared to the net income of EUR –1,022.00 under IAS 39.

3.6. Summary of impairments

Table 7 summarises the impairments under IAS 39 and IFRS 9 until 30 June 2011. The delayed loss recognition under IAS 39 becomes evident. The effect of a very high impairment loss at the time of a loss event ('cliff effect') is also obvious. At the reporting dates before 30 June 2011 the differences between the book values of the AC financial assets and the FV-TOCI assets are striking. Not only with hindsight have they indicated that expected credit losses are not recognised timely under IAS 39[44].

[42] Except for the addition in parentheses '(excluding future credit losses that have not been incurred)' in IAS 39.63.

[43] This expectation is also based on informal feedback from banks currently discussing the implementation of the IFRS 9 impairment model.

[44] IAS 39.64 requires for individually assessed financial assets which are not found to be impaired that an entity includes them 'in a group of financial assets with similar credit risk characteristics and collectively assesses them for impairment.' For sovereign debt with a good credit rating, the collective assessment will probably also not result in impairments.

Table 7: Summary of the impairments under IAS 39 and IFRS 9

Description / Reporting date	IAS 39 AC financial assets	IAS 39 FV-TOCI financial assets	IFRS 9 AC financial assets	IFRS 9 FV-TOCI financial assets
31 December 2009	Moody's: A2; Standard & Poors: BBB+			
			A1-Rating	A1-Rating
impairment loss	0.00	0.00	0.00	0.00
net book value	1,000.00	1,013.70	1,000.00	1,013.70
			Baa1-Rating	Baa1-Rating
impairment loss			0.00	0.00
net book value			1,000.00	1,013.70
30 June 2010	Moody's: Ba1; Standard & Poors: BB+			
			no significant increase in credit risk	no significant increase in credit risk
impairment loss	0.00	0.00	4.39	4.39
net book value	1,000.00	720.20	995.61	720.20
			significant increase in credit risk	significant increase in credit risk
impairment loss			79.99	79.99
net book value			920.01	720.20
31 December 2010	Moody's: Ba1; Standard & Poors: BB+			
			no significant increase in credit risk	no significant increase in credit risk
impairment loss	0.00	0.00	4.27	4.27
net book value	1,000.00	652.65	995.73	652.65
			significant increase in credit risk	significant increase in credit risk
impairment loss			69.60	69.60
net book value			930.40	652.65
30 June 2011	Moody's: Caa1; Standard & Poors: CCC			
			significant increase in credit risk	significant increase in credit risk
impairment loss	528.30	493.70	182.95	182.95
net book value	471.70	506.30	817.05	506.30
			credit-impaired	credit-impaired
impairment loss			528.30	528.30
net book value			471.70	506.30

Source: Author's table. Impairment loss is the difference between the initial carrying amount (i.e. EUR 1,000.00) and the net book value as of the reporting date. Loan loss allowances are booked at this amount. Changes in the loan loss allowance affect net income of the current reporting period.

The earlier loss recognition under IFRS 9 also becomes clear. However, the amounts of impairments are very small, in particular as long as it is argued that there is no significant increase in credit risk. Introducing the threshold of a significant increase delays the recognition of expected credit losses. The determination of a significant increase is left to management using its own judgement. The case study provides an example that different managements may find reasonable arguments for different judgements.

If it is concluded that credit risk has increased significantly since initial recognition, lifetime expected credit losses are recognised and lead to a first cliff effect which is however much smaller than under IAS 39. The case study demonstrates that the IFRS 9 loan loss allowances increase timely with the increase of the probabilities of default when the credit standing deteriorates. However, a comparison of the resulting net book values of AC financial assets and FV-TOCI financial assets indicates that the recognition of expected credit losses may still be incomplete.

If there is a loss event (IAS 39) or if the financial asset is credit-impaired (IFRS 9) the standards appear to force entities to assume a 100 % probability of a credit loss. This may result in an overstatement of the impairment as even with a highly speculative rating, sovereign issuers in the past could avoid a default causing actual credit losses. Interestingly, under the assumptions of the case study, the impairment loss for AC financial assets (i.e. EUR 528.30) is higher than the impairment loss to be recognised under IAS 39 for FV-TOCI financial assets (i.e. EUR 493.70). This may be due to investors expecting lower actual credit losses or expecting losses to occur with a probability of less than 100 %.

While impairment losses under IAS 39 differ for AC financial assets and FV-TOCI financial assets they are identical under IFRS 9. Impairment losses for FV-TOCI financial assets are no longer determined as the difference between the carrying amount and the lower fair value which can be derived from observable market transactions. As outlined in the sections above, the determination of impairments under the IFRS 9 expected loss approach heavily relies on the expectations by management and results in measurements not directly observable by users. This change is sold on the argument that it reduces complexity as only one impairment model is applied to all debt instruments. Complexity could have been reduced alternatively by requiring the IAS 39 impairment loss definition for FV-TOCI financial assets also for AC financial assets. This would have brought back the former ‘lower of cost or market’-measurement required in most EU jurisdictions before the introduction of IFRS.

It should be noted here (even though it is common wisdom) that the net income effects of any overstatement or understatement of credit losses will reverse in later periods when the actual cash flows arrive. Different constituent groups have different interests: Short term oriented management may dislike overstatements because of the effects on compensation while overstatements are preferred by creditors and prudential regulators. By introducing the new impairment rules the IASB has in part successfully achieved to better accommodate the interests of the latter groups.

4. CONCLUSIONS

The discussion of the impairment models and the results of the case study clearly indicate that impairments under IFRS 9 will result in an earlier recognition of expected credit losses. In fact, the present IAS 39 impairment rules prohibit an adequate recognition of expected credit losses. The resulting measurements of AC financial assets are not consistent with the objective to provide information useful for users making economic decisions as they do not reflect credit losses expected to occur after the reporting date.

This critique, however, also applies in part to the IFRS 9 impairment rules as they restrict in Stage 1 expected credit losses to be recognised to the 12-month expected credit losses.

For the measurement of impairment losses, IAS 39 distinguishes between AC financial assets and FV-TOCI financial assets. For the latter, the measurement of the impairment loss is based on fair values as of the reporting date and thus refers to the expectations of market participants about the probabilities of default and the amounts, timing and uncertainty of cash flows estimated to be received in case of default. IFRS 9 discontinues this approach and requires measuring impairment losses for AC financial assets also for FV-TOCI financial assets using the same approach. This approach is based on the theoretical construct of expected credit losses which heavily relies on management expectations about the probabilities of default and about the estimated future cash flows. The resulting measurements do not have directly observable economic correspondents.

Thus, management will have more discretion when measuring impairment losses for FV-TOCI financial assets. This will provide more opportunities for earnings management. This may also affect the comparability of earnings[45] as management expectations will differ across reporting entities and from the expectations of market participants.

For AC financial assets, the basic approach for the measurement of impairment losses does not change. However, IFRS 9 provides more guidance on which information to use, i.e. in particular internal information from risk management and forward-looking information.

By lifting the IAS 39 restriction to incurred losses the IFRS 9 impairment rules will result not only in an earlier but also in a more comprehensive recognition of expected credit losses. The question may be asked whether this is still ‘too late’ or ‘too little’.

Close to initial recognition, the requirement to recognise 12-month expected credit losses may temporarily result even in ‘too much’-impairments. The case study reveals that as long as it can be argued that an increase in credit risk is not yet significant, the resulting impairments still appear ‘little’ if not ‘too little’ because of the low one-year default probabilities. The increase of impairments commensurate with the increase in credit risk is delayed until there is a significant increase in credit risk. IFRS 9 is reluctant in describing what constitutes a significant increase and leaves this again to management discretion. The switch to more comprehensive lifetime expected credit losses may still come ‘too late’ for many.

Impairments in Stage 2 based on lifetime expected credit losses will result in significant increases of the loan loss allowances. This may however still be regarded ‘too little’ as indicated by comparison with the much lower fair values of the Greek government bond in the case study.

[45] Comparability of the measurement of FV-TOCI assets is not affected as it is still at fair value.

Impairments become similar when there is a loss event (IAS 39) or when the financial asset becomes credit-impaired (IFRS 9). Again there is a delay in expected loss recognition also under IFRS 9 and as a result a huge increase in the impairment loss.

To sum up, the new IFRS 9 impairment rules are in my view an improvement compared to IAS 39. Expected credit losses are recognised earlier and more comprehensively.

However, measurement of impairment losses will rely even more on the expectations (and incentives) of management as it will be identical for AC financial assets and FV-TOCI financial assets. Expected credit losses will still not be fully recognised in Stage 1 because of the restriction of impairments to 12-month expected credit losses. Increases in expected credit losses will be delayed until the risk of default occurring has significantly increased.

Thus, it is not difficult to imagine impairment rules that are an improvement over the new IFRS 9 impairment rules.

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ANNEX 1: DETERMINATION OF IMPAIRMENTS UNDER IFRS 9

This annex presents an exemplary application of the IFRS 9 rules for determining expected credit losses for the Greek government bond. IFRS 9.5.5.18 asks for a scenario analysis in which 'an entity need not necessarily identify every possible scenario. However, it shall consider the risk or probability that a credit loss occurs by reflecting the possibility that a credit loss occurs and the possibility that no credit loss occurs, even if the possibility of a credit loss occurring is very low.'

I assume a scenario that Greece could default on the bond in any of the ten years of the contractual maturity. This assumption implies that on principle impairments will be higher than under alternative assumptions which assign zero probabilities to some earlier years of the residual maturity.

The (marginal) probabilities of default used in the calculation are derived as the year-to-year differences of the cumulative default rates published by Moody's based on the history of sovereign defaults for the period 1983-2010 (Table 1 in Chapter 3)[46]. As of 31 December 2009 the default rates for the Baa-Rating are used. For the 30 June 2010 and for the 31 December 2010 the default rates for the Ba-Rating are used. As of 30 June 2011 the default rates for the ratings Caa-C are used.

Managements are asked to use their expectations as to the expected cash flows (and thus expected cash shortfalls) in case of a default. I assume that up to the year immediately before default contractual interest is assumed to be paid timely but not any more in the year of default and in the following years.

Typically Government bonds are unsecured. However, this does not mean that on default sovereign creditors lose all. Often they receive cash payments and/or newly issued financial assets in exchange for their existing claims. The 'haircuts' on actual sovereign defaults differ widely[47]. A recent survey reports about average haircuts of around 40 % of the fair value measured immediately before default[48]. I assume for the calculations that 50 % of the nominal value is paid in cash and/or in new debt instruments in the year after the default. This implies that no payment is expected in the year of default.

For the discount rate IFRS 9 requires the use of the effective interest rate as at initial recognition (IFRS 9.B5.5.44) which is assumed to equal the nominal interest rate of 6.00 %.

[46] See Moody's (2011), p. 12.

[47] See e.g. Cruces and Trebesch (2013); Sturzenegger and Zettelmeyer (2005). Moody's (2011), p. 13 provides a list of recovery rates.

[48] See Tomz and Wright (2013), pp. 16-17.

Determination of Expected Credit Losses as of 31 December 2009

Calculation of expected credit losses (ECL)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)
Credit Loss (Default in Year t)		556	525	494	467	441	415	392	370	349	329
x Marginal Default Rate		0,0000%	0,4760%	0,5210%	0,5730%	0,6370%	0,6480%	0,0000%	0,0000%	0,0000%	0,0000%
= ECL (for each Default Year)		**0,00**	**2,50**	**2,57**	**2,68**	**2,81**	**2,69**	**0,00**	**0,00**	**0,00**	**0,00**
Lifetime ECL as of 31 Dec 2009	**13,25**										
12-month ECL as of 31 Dec 2009	**0,00**										

Moody's Sovereign Default Rates (1983-2010)										
Rating: Baa	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cumulative Default Rates	0,0000%	0,4760%	0,9970%	1,5700%	2,2070%	2,8550%	2,8550%	2,8550%	2,8550%	2,8550%
Marginal Default Rates (PD_t^M)	0,0000%	0,4760%	0,5210%	0,5730%	0,6370%	0,6480%	0,0000%	0,0000%	0,0000%	0,0000%

Credit Loss - Default in Year 1 (2010)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		0	-500	0	0	0	0	0	0	0	0	0
Cash Shortfalls		**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		57	-392	50	48	45	42	40	38	36	592	0
Credit Loss	**556**											

Credit Loss - Default in Year 2 (2011)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	0	-500	0	0	0	0	0	0	0	0
Cash Shortfalls		**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	53	-369	48	45	42	40	38	36	592	0
Credit Loss	**525**											

Credit Loss - Default in Year 3 (2012)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	0	-500	0	0	0	0	0	0	0
Cash Shortfalls		**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	0	50	-349	45	42	40	38	36	592	0
Credit Loss	**494**											

Credit Loss - Default in Year 4 (2013)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	0	-500	0	0	0	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	0	0	48	-329	42	40	38	36	592	0
Credit Loss	**467**											

Credit Loss - Default in Year 5 (2014)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	0	-500	0	0	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	0	0	0	45	-310	40	38	36	592	0
Credit Loss	**441**											

Determination of Expected Credit Losses as of 31 December 2009 (continued)

Credit Loss - Default in Year 6 (2015)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	0	-500	0	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	0	0	0	0	42	-293	38	36	592	0
Credit Loss	**415**											

Credit Loss - Default in Year 7 (2016)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	0	-500	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	0	0	0	0	0	40	-276	36	592	0
Credit Loss	**392**											

Credit Loss - Default in Year 8 (2017)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	-60	0	-500	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	0	0	0	0	0	0	38	-260	592	0
Credit Loss	**370**											

Credit Loss - Default in Year 9 (2018)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	-60	-60	0	-500	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**560**	**0**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	0	0	0	0	0	0	0	36	313	0
Credit Loss	**349**											

Credit Loss - Default in Year 10 (2019)	31.12.2009	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	-60	-60	-60	0	-500
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.060**	**-500**
Discount Factor (i_{eff} = 6,00%)		0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584	0,5268
Present Value Cash Shortfalls		0	0	0	0	0	0	0	0	0	592	-263
Credit Loss	**329**											

Determination of Expected Credit Losses as of 30 June 2010

Calculation of expected credit losses (ECL) (in EUR)	30.06.2010	31.12.2010 (Year 1)	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)
Credit Loss (Default in Year t)		571	539	509	479	453	427	402	380	358	338
x Marginal Default Rate		0,7690%	0,9770%	1,6870%	1,9160%	2,0860%	1,5140%	2,1690%	2,8330%	2,4650%	2,4660%
= ECL (for each Default Year)		**4,39**	**5,27**	**8,59**	**9,18**	**9,45**	**6,46**	**8,72**	**10,77**	**8,82**	**8,34**
Lifetime ECL as of 30 Jun 2010	**79,99**										
12-month ECL as of 30 Jun 2010	**4,39**										

Moody's Sovereign Default Rates (1983-2010) Rating: Ba	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cumulative Default Rates	0,7690%	1,7460%	3,4330%	5,3490%	7,4350%	8,9490%	11,1180%	13,9510%	16,4160%	18,8820%
Marginal Default Rates (PD_t^M)	0,7690%	0,9770%	1,6870%	1,9160%	2,0860%	1,5140%	2,1690%	2,8330%	2,4650%	2,4660%

Credit Loss - Default in Year 1 (2010) (in EUR)	30.06.2010	31.12.2010 (Year 1)	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		0	-500	0	0	0	0	0	0	0	0	0
Cash Shortfalls		**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		60	-415	53	50	48	45	42	40	38	627	0
Credit Loss		**588**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**571**											

Credit Loss - Default in Year 2 (2011) (in EUR)	30.06.2010	31.12.2010 (Year 1)	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	0	-500	0	0	0	0	0	0	0	0
Cash Shortfalls		**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	57	-392	50	48	45	42	40	38	627	0
Credit Loss		**555**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**539**											

Credit Loss - Default in Year 3 (2012) (in EUR)	30.06.2010	31.12.2010 (Year 1)	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	0	-500	0	0	0	0	0	0	0
Cash Shortfalls		**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	0	53	-369	48	45	42	40	38	627	0
Credit Loss		**524**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**509**											

Credit Loss - Default in Year 4 (2013) (in EUR)	30.06.2010	31.12.2010 (Year 1)	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	0	-500	0	0	0	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	0	0	50	-349	45	42	40	38	627	0
Credit Loss		**493**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**479**											

Credit Loss - Default in Year 5 (2014) (in EUR)	30.06.2010	31.12.2010 (Year 1)	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	0	-500	0	0	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	0	0	0	48	-329	42	40	38	627	0
Credit Loss		**466**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**453**											

Determination of Expected Credit Losses as of 30 June 2010 (continued)

Credit Loss - Default in Year 6 (2015)	30.06.2010	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	0	-500	0	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	0	0	0	0	45	-310	40	38	627	0
Credit Loss		**440**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**427**											

Credit Loss - Default in Year 7 (2016)	30.06.2010	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	0	-500	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	0	0	0	0	0	42	-293	38	627	0
Credit Loss		**414**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**402**											

Credit Loss - Default in Year 8 (2017)	30.06.2010	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	-60	0	-500	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	0	0	0	0	0	0	40	-276	627	0
Credit Loss		**391**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**380**											

Credit Loss - Default in Year 9 (2018)	30.06.2010	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	-60	-60	0	-500	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**560**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	0	0	0	0	0	0	0	38	331	0
Credit Loss		**369**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**358**											

Credit Loss - Default in Year 10 (2019)	30.06.2010	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	-60	-60	-60	0	-500
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.060**	**-500**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls		0	0	0	0	0	0	0	0	0	627	-279
Credit Loss		**348**										
Discount Factor (i_{eff} = 6,00%)		0,9713										
Credit Loss	**338**											

Determination of Expected Credit Losses as of 31 December 2010

Calculation of expected credit losses (ECL)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)
Credit Loss (Default in Year t)		555	524	493	466	440	414	391	369	348
x Marginal Default Rate		0,7690%	0,9770%	1,6870%	1,9160%	2,0860%	1,5140%	2,1690%	2,8330%	2,4650%
= ECL (for each Default Year)		**4,27**	**5,12**	**8,32**	**8,93**	**9,18**	**6,27**	**8,48**	**10,45**	**8,58**
Lifetime ECL as of 31 Dec 2010	**69,60**									
12-month ECL as of 31 Dec 2010	**4,27**									

Moody's Sovereign Default Rates (1983-2010)										
Rating: Ba	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cumulative Default Rates	0,7690%	1,7460%	3,4330%	5,3490%	7,4350%	8,9490%	11,1180%	13,9510%	16,4160%	18,8820%
Marginal Default Rates (PD_t^M)	0,7690%	0,9770%	1,6870%	1,9160%	2,0860%	1,5140%	2,1690%	2,8330%	2,4650%	2,4660%

Credit Loss - Default in Year 2 (2011)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		0	-500	0	0	0	0	0	0	0	0
Cash Shortfalls	**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	57	-392	50	48	45	42	40	38	627	0
Credit Loss	**555**										

Credit Loss - Default in Year 3 (2012)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments	60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows	-60	-60	0	-500	0	0	0	0	0	0	0
Cash Shortfalls	**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	0	53	-369	48	45	42	40	38	627	0
Credit Loss	**524**										

Credit Loss - Default in Year 4 (2013)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments	60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows	-60	-60	-60	0	-500	0	0	0	0	0	0
Cash Shortfalls	**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	0	0	50	-349	45	42	40	38	627	0
Credit Loss	**493**										

Credit Loss - Default in Year 5 (2014)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments	60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows	-60	-60	-60	-60	0	-500	0	0	0	0	0
Cash Shortfalls	**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	0	0	0	48	-329	42	40	38	627	0
Credit Loss	**466**										

Determination of Expected Credit Losses as of 31 December 2010 (continued)

Credit Loss - Default in Year 6 (2015)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments	60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows	-60	-60	-60	-60	-60	0	-500	0	0	0	0
Cash Shortfalls	**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	0	0	0	0	45	-310	40	38	627	0
Credit Loss	**440**										

Credit Loss - Default in Year 7 (2016)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments	60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows	-60	-60	-60	-60	-60	-60	0	-500	0	0	0
Cash Shortfalls	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	0	0	0	0	0	42	-293	38	627	0
Credit Loss	**414**										

Credit Loss - Default in Year 8 (2017)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments	60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows	-60	-60	-60	-60	-60	-60	-60	0	-500	0	0
Cash Shortfalls	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	0	0	0	0	0	0	40	-276	627	0
Credit Loss	**391**										

Credit Loss - Default in Year 9 (2018)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments	60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows	-60	-60	-60	-60	-60	-60	-60	-60	0	-500	0
Cash Shortfalls	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**560**	**0**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	0	0	0	0	0	0	0	38	331	0
Credit Loss	**369**										

Credit Loss - Default in Year 10 (2019)	31.12.2010	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)	(Year 1)	(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments	60	60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows	-60	-60	-60	-60	-60	-60	-60	-60	-60	0	-500
Cash Shortfalls	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.060**	**-500**
Discount Factor (i_{eff} = 6,00%)	1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919	0,5584
Present Value Cash Shortfalls	0	0	0	0	0	0	0	0	0	627	-279
Credit Loss	**348**										

Determination of Expected Credit Losses as of 30 June 2011

Calculation of expected credit losses (ECL) (in EUR)	30.06.2011	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)
Credit Loss (Default in Year t)		571	539	509	479	453	427	402	380	358
x Marginal Default Rate		23,6360%	4,0910%	5,0960%	0,0000%	0,0000%	0,0000%	0,0000%	0,0000%	0,0000%
= ECL (for each Default Year)		**134,96**	**22,05**	**25,94**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**	**0,00**
Lifetime ECL as of 30 Jun 2011	**182,95**									
12-month ECL as of 30 Jun 2011	**134,96**									

Moody's Sovereign Default Rates (1983-2010) Rating: Caa-C	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cumulative Default Rates	23,6360%	27,7270%	32,8230%	32,8230%	32,8230%	32,8230%	32,8230%	32,8230%	32,8230%	32,8230%
Marginal Default Rates (PD_t^M)	23,6360%	4,0910%	5,0960%	0,0000%	0,0000%	0,0000%	0,0000%	0,0000%	0,0000%	0,0000%

Credit Loss - Default in Year 2 (2011) (in EUR)	30.06.2011	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		0	-500	0	0	0	0	0	0	0	0
Cash Shortfalls		**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		60	-415	53	50	48	45	42	40	665	0
Credit Loss		**588**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**571**										

Credit Loss - Default in Year 3 (2012) (in EUR)	30.06.2011	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	0	-500	0	0	0	0	0	0	0
Cash Shortfalls		**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		0	57	-392	50	48	45	42	40	665	0
Credit Loss		**555**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**539**										

Credit Loss - Default in Year 4 (2013) (in EUR)	30.06.2011	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	0	-500	0	0	0	0	0	0
Cash Shortfalls		**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		0	0	53	-369	48	45	42	40	665	0
Credit Loss		**524**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**509**										

Credit Loss - Default in Year 5 (2014) (in EUR)	30.06.2011	31.12.2011 (Year 2)	31.12.2012 (Year 3)	31.12.2013 (Year 4)	31.12.2014 (Year 5)	31.12.2015 (Year 6)	31.12.2016 (Year 7)	31.12.2017 (Year 8)	31.12.2018 (Year 9)	31.12.2019 (Year 10)	31.12.2020
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	0	-500	0	0	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		0	0	0	50	-349	45	42	40	665	0
Credit Loss		**493**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**479**										

Determination of Expected Credit Losses as of 30 June 2011 (continued)

Credit Loss - Default in Year 6 (2015)	30.06.2011	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	0	-500	0	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		0	0	0	0	48	-329	42	40	665	0
Credit Loss		**466**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**453**										

Credit Loss - Default in Year 7 (2016)	30.06.2011	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	0	-500	0	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**60**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		0	0	0	0	0	45	-310	40	665	0
Credit Loss		**440**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**427**										

Credit Loss - Default in Year 8 (2017)	30.06.2011	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	0	-500	0	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**60**	**-440**	**1.060**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		0	0	0	0	0	0	42	-293	665	0
Credit Loss		**414**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**402**										

Credit Loss - Default in Year 9 (2018)	30.06.2011	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	-60	0	-500	0
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**60**	**560**	**0**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		0	0	0	0	0	0	0	40	351	0
Credit Loss		**391**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**380**										

Credit Loss - Default in Year 10 (2019)	30.06.2011	31.12.2011	31.12.2012	31.12.2013	31.12.2014	31.12.2015	31.12.2016	31.12.2017	31.12.2018	31.12.2019	31.12.2020
(in EUR)		(Year 2)	(Year 3)	(Year 4)	(Year 5)	(Year 6)	(Year 7)	(Year 8)	(Year 9)	(Year 10)	
Contractual Payments		60	60	60	60	60	60	60	60	1.060	
- Expected Cash Flows		-60	-60	-60	-60	-60	-60	-60	-60	0	-500
Cash Shortfalls		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1.060**	**-500**
Discount Factor (i_{eff} = 6,00%)		1,0000	0,9434	0,8900	0,8396	0,7921	0,7473	0,7050	0,6651	0,6274	0,5919
Present Value Cash Shortfalls		0	0	0	0	0	0	0	0	665	-296
Credit Loss		**369**									
Discount Factor (i_{eff} = 6,00%)		0,9713									
Credit Loss	**358**										

ANNEX 2: TRADING VOLUME OF GREEK GOVERNMENT BONDS (IN MILLION EUR)

Month	2001	2002	2003	2004	2005	2006	2007
Jan	20,276	42,137	59,695	64,756	79,997	54,926	64,312
Feb	15,169	36,515	47,036	51,382	59,885	64,907	45,290
Mar	23,966	37,322	51,145	77,112	56,055	64,401	62,505
Apr	18,055	38,004	39,005	59,979	46,828	42,422	58,981
May	28,030	51,531	56,210	61,833	45,258	51,100	56,575
Jun	21,127	41,358	61,941	80,479	61,607	49,721	58,849
Jul	19,211	46,243	60,337	63,250	52,475	47,121	55,738
Aug	22,917	57,231	54,242	96,975	55,563	42,981	28,434
Sep	26,311	66,400	65,202	135,749	78,730	52,453	34,350
Oct	30,831	69,296	79,724	106,518	76,443	52,641	40,748
Nov	56,691	46,886	70,069	123,507	74,677	64,557	40,353
Dec	31,440	32,593	34,018	37,394	41,870	45,008	21,363
Total p.a.	314,023	565,512	678,620	958,932	729,388	632,238	567,498

Month	2008	2009	2010	2011	2012	2013	2014
Jan	43,734	12,082	21,091	707	1	102	332
Feb	41,310	13,878	18,856	847	2	85	459
Mar	8,615	16,243	34,611	974	78	80	235
Apr	17,675	12,313	10,576	1,404	26	69	608
May	30,205	20,218	1,394	695	83	264	1,721
Jun	26,690	27,771	1,573	368	27	144	1,028
Jul	29,174	18,192	1,464	131	38	101	1,326
Aug	25,083	30,758	819	45	83	40	973
Sep	26,300	51,794	1,819	1	100	89	1,215
Oct	13,794	55,418	1,942	0	105	210	1,568
Nov	7,639	50,211	926	1	97	138	558
Dec	5,454	17,484	268	2	40	175	372
Total p.a.	275,673	326,362	95,339	5,175	680	1,497	10,395

Source: Bank of Greece (2015).
Note: Trading volume in million Euro.

ANNEX 3: LIST OF BANKS INCLUDED IN THE SURVEY

Rank	Country	Company	Total Assets (in million EUR)
1	Germany	Deutsche Bank	2,164,103
2	UK	HSBC	1,973,418
3	France	BNP Paribas	1,965,283
4	France	Credit Agricole	1,880,000
5	UK	Barclays	1,866,368
6	UK	Royal Bank of Scotland	1,798,229
7	Spain	Santander	1,251,525
8	France	Societe Generale	1,181,372
9	Switzerland	UBS	1,166,150
10	UK	Lloyds	1,158,182
11	Italy	Unicredit	926,768
12	Switzerland	Credit Suisse	862,025
13	Germany	Commerzbank	661,763
14	Spain	BBVA	597,688
15	France	Natixis	507,700
16	UK	Standard Chartered	462,602
17	Denmark	Danske Bank	460,651
18	Spain	Bankia	305,820
19	Belgium	KBC	285,382
20	Sweden	Svenska Handelsbanken	274,840
21	Norway	DNB	273,671
22	Sweden	SEB	264,570
23	Greece	National Bank of Greece	106,870

Note: List of banks subject by the survey of financial reports ranked by total assets as of 31 December 2011.

NOTES

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