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Study in relation to the updating of the reference rates of interest applied in State aid control in the EU

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List of abbreviations

bp	Basis points
CAD III	Capital Adequacy Directive III
CU	Currency unit
EAD	Exposure at default
ECB	European Central Bank
EC	European Commission
DGC	Directorate General Competition
EL	Expected loss
EMU	European monetary union
EURIBOR	Euro inter-bank offered rate
IAS	International Accounting Standards
IBOR	Inter-bank offered rate
IFRS	International Financial Reporting Standards
IRS	Interest rate statistics
LGD	Loss given default
LIBOR	London inter-bank offered rate
MFI	Monetary financial institution
NGE	Net grant equivalent
OR	Operational risk
PD	Probability of default
PPP	Private public partnership
RA	Recoverable amount
RoE	Return on equity
RR	Recovery rate
SME	Small and medium sized enterprise
T-bill	Treasury bill

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1   Management Summary

The EC Treaty recognises the principle that State aid is in general incompatible with the common market since it may distort competition. To some extent, however, the Commission encourages Member States and regions to support actions that strengthen the competitiveness of regional economies. Although State aid to individual companies can obviously play an important role in this respect, such measures also may introduce discrimination between those companies that receive aid and those who do not. In balancing between those two principles, EU law permits exemptions to granting of State aid in exceptional circumstances. The Treaty stipulates that the Commission has the task to control State aid. In order to put these State aid rules into practice, a reference interest rate system was introduced. In particular, a reference rate is applied in three core calculations:

1. A *benchmark* was needed to determine whether or not a loan granted by the government can be considered as State aid. The European Commission presumes that there is no State aid prevalent if the interest rate of the loan is above the reference rate. Below the reference rate the amount of the aid and its purpose are crucial factors in deciding about its legality.

2. A *discount rate* was needed to determine the present value of the State aid granted. In order to make the future cash flows associated with the different forms of aid across different countries comparable, the so-called grant equivalent is calculated. The gross grant equivalent is the present value of future aid elements. The cash flows are discounted at the reference rate.

3. An interest rate was needed to calculate the (future) value of unlawfully granted aid at the time of the recovery. If State aid was granted unlawfully, the European Commission will demand the beneficiary to repay the aid to the granting State in order to restore the situation as it would have been without aid being granted. The amount to be repaid has to take into account the time value of money in that aid elements disbursed over time are *compounded* by the reference rate up to the date when the aid is repaid.

The reference rate should reflect the average market interest rates charged in the various Member States on normally collateralised medium and long-term bank loans. It consists of two components: a reference basis rate (inter-bank rate) and a reference (credit) margin mirroring credit risk. Currently, the reference rate is defined as the 5-year swap rate that is based on market rates observable before the applicable year plus 75 basis points (with a possible risk adjustment up to 400 basis points or exceptionally even more).

The current system, however, exhibits several shortcomings, which are partly due to changes in the loan market environment, but are also caused by the system's one-size-fits-all premise, rendering the system too inflexible for being extended to the new Member States and Candidates. In particular, the current system

1. does not recognise the shape of the yield curve, i.e. the changes of interest rates for different maturities;

2. lacks timeliness and, thus, does not appropriately reflect actual interest rates;

3. uses a one-size-fits-all approach to credit risk, thereby failing to properly reflect the beneficiaries' individual credit risk.

The Commission aims at refining the reference rate system through the installation of an automatic or self-reporting system, which is easily applicable, fair, transparent and easy to understand. The new system has to achieve a balance between simplicity and practicability on one side and accurateness and fairness on the other.

In order to put such a balance into practice, a new **two-pillar system** is proposed comprising a standard approach and an advanced approach.

Standard Approach

According to the proposed standard approach, the Commission publishes on a quarterly basis the basis rate for maturities of three months, one year, five years and ten years. Inter-bank offered rates (IBOR) serve as basis rate for maturities up to and including one year, while swap rates are used as basis rate for maturities in excess of one year. In case no IBOR or swap rate is available, government yields should be used. The reference basis rate should be derived as an (arithmetic) average rate of daily observations over the second month of the preceding quarter.

On top of the reference basis rate the reference margin is added. This margin incorporates the debtor's rating category ("strong", "good", "satisfactory", "weak" and "bad") and the level of collateralisation ("low", "normal" or "high"). The appropriate combination of rating category and collateral level can be found in a matrix disclosed in this study.

In order to foster simplicity, a **default case** is applied, if the credit and/or the collateralisation quality cannot be determined. This default case assumes a satisfactory rating and normal collateralisation for loans and guarantees as well as a satisfactory rating and low collateralisation for other forms of aid.

Furthermore, **subordinated or junior debt** is assumed to be lowly collateralised.

Mezzanine or tier debt receives a rating downgrade of one step compared to senior debt and is also assumed to be lowly collateralised.

The **reference for guarantee fees** coincides with loan margins less a discount of 20 basis points.

Large aid exceeding EUR 5 mill. receives a discount of 10 basis points, while **amounts below EUR 1 mill.** lead to a premium of 10 basis points.

Discounting recognises the **maturity** or the **future timing** of aid.

Compounding for the purpose of determining the recovery of unlawful aid occurs on a **year-by-year basis recognising credit risk**.

Advanced Approach

The advanced approach offers the option that a State or a calculation agent (e.g. a bank) assigned by a State conducts more intricate calculations, in order to achieve a more refined reference rate. A more fine-tuned reference rate can take into account the timing of redemptions/cash flows and evolving creditworthiness can be derived by interpolating and/or weighting the standard reference rates. Depending on certain criteria, Member States may mandate a calculation agent, who derives and publishes only the reference basis rate or the complete reference rate including the applicable credit spreads. The mandated agent can publish basis rates and discount rates more timely and for more maturities and can derive case-specific reference rates by employing internal pricing systems. The processes and calculations necessary to implement such an approach have to be approved by the EC and an independent external auditor.

Both, the standard and the advanced approach are largely embeddable into the current practice of the Commission. This is facilitated by outlining possible new procedures and by providing examples. The transition from the old to the new reference rate system can be easily performed by scheduling a cut-off date after which the new system is applicable.

2 Introduction

The authors of the EC Treaty recognised the principle that State aid is in general incompatible with the common market since it may distort competition[1]. Still, in its guidelines for the Structural Fund programmes (Council of the European Union, 1999), the Commission encourages Member States and regions to support actions that strengthen the competitiveness of regional economies. Although State aid to individual companies can obviously play an important role in this respect, such measures also may introduce discrimination between those companies that receive aid and those who do not. In balancing between those two principles, EU law permits exemptions to granting of State aid in exceptional circumstances. The Treaty stipulates that the Commission has the task to control State aid. Member States must notify the Commission of any plan to grant State aid before the plan is carried out (ex ante authorisation). The Commission has the (discretionary) power to decide whether the aid plan qualifies for an exception or whether the State concerned shall abolish or alter the aid. Before the authorisation by the Commission, States are not allowed to put the planned aid into effect (standstill-principle). In order to exercise this power in a transparent way, the Commission has published the criteria it uses when deciding on possible exemptions. Any aid which is granted in absence of the Commission's approval is automatically classified as "unlawful aid". In that case the Commission will have to recover the unlawful aid from the beneficiaries.

The Commission has modernised the State aid procedures in the second half of the nineties and adopted several block exemption regulations. With these regulations, the Commission can declare certain forms of State aid that fulfil certain criteria compatible with the common market. This implies that no prior notification and approval is necessary. The Commission has created three block exemption rules:

- Exemptions for aid to small and medium-sized companies,
- Employment aid,
- Training aid.

In addition, grants to a company that are below a threshold of EUR 100 000 over a period of three years and that respect certain conditions are not regarded as State aid ("de minimis" rule).

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[1] In principle, distorting State aid is present if proceedings under official control imply a transfer of a State's resources to an entity's economic advantage in a discriminating way and potentially affecting competition and trade between Member States.

In order to put these State aid rules into practice, a reference interest rate system was introduced. In particular, a reference rate is applied in three core calculations[2]:

1. A *benchmark* was needed to determine whether or not a loan granted by the government can be considered as State aid. The European Commission presumes that there is no State aid prevalent if the interest rate of the loan is above the reference rate. Below the reference rate the amount of the aid and its purpose are crucial factors in deciding about its legality.

2. A *discount rate* was needed to determine the present value of the State aid granted. In order to make the future cash flows associated with the different forms of aid across different countries comparable, the so-called grant equivalent is calculated. The gross grant equivalent is the present value of future aid elements. The cash flows are discounted at the reference rate.

3. An interest rate was needed to calculate the (future) value of unlawfully granted aid at the time of the recovery. If State aid was granted unlawfully, the European Commission will demand the beneficiary to repay the aid to the granting State in order to restore the situation as it would have been without aid being granted. The amount to be repaid has to take into account the time value of money in that aid elements disbursed over time are *compounded* by the reference rate up to the date when the aid is repaid.

The reference rate is defined in order to reflect the *average* market interest rates that are charged in the various Member States on medium and long-term loans (five to ten years) backed by normal security (see European Commission (1997b)). Therefore, the benchmark for the reference rate should be based on an *average interest rate* a debtor can agree on with banks under *normal market conditions and the arm's length principle*.[3] The reference rate can be understood as the summation of two components, a *reference basis rate* and a *reference (credit) margin*, which both will be determined in the following.

The **current system** is based on a loan of EUR 5 mill. backed by normal security with a five-year repayment schedule.[4] The reference rate is the 5-year inter-bank swap rate in the relevant currency plus 75 basis points as a uniform credit margin. The reference rate is derived by taking the average of the rates recorded in the months September, October and November of the previous year.

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[2] For a more detailed discussion of the functions of the reference rate it is referred to chapter 9 *Functions of the Reference Rate.*

[3] It is referred to the definition of the term „fair value" under IFRS, see IAS 39.9 (IASB, 2004 a). For a discussion about the appropriateness of average rates see chapter 8 *The Market-Based Benchmark for the Reference Rate.*

[4] See chapter 3 *Review of the Current System for details.*

Because significant changes, such as the introduction of the euro, the *enlargement of the European Union*, the ongoing implementation of the new Basel Capital Accord[5] (Basel II) and the evolution of credit markets have taken place since the legal implementation of the current system, a revision of this system seems to be necessary in order to continue an effective measurement of State aid.[6] Therefore, the European Commission (EC) Directorate General Competition has assigned Deloitte to conduct a study, in which the feasibility of the current system for the future is examined and if necessary a new system is proposed.[7] In particular, the study at hand should serve as a substantial basis for setting up a reference interest rate system for the control of State aid in the old Member States[8], the new Member States[9] acceded in May 2004 and the Candidate States[10] (see European Commission, 2004).

The study has a heading part and an appendix. The subdivision has been chosen in order to enhance the readability for all addressees as it is brief and less complex. The heading part summarises the main results while it proceeds with chapter 3 *Review of the Current System* followed by the recommended *The New Reference Rate System* (chapter 4) and ending with chapter 4.5 *Summary*.

However, the appendix is an integral part of the study as it serves as foundation for the findings presented in the heading part. The *empirical results* are paramount to the study. These comprise a *survey* among European banks about their risk-adjusted margins, a comparison of the margins to the bond market and to the margins derived by a credit pricing tool (chapter 14.1 *Survey*), an analysis of the credit spreads revealed by the interest rate statistics the national central banks convey (see chapter 14.2 *MFI statistics*), as well as an investigation about the availability of swap rates (see chapter 14.3 *Reference basis rates*).

The importance of the other appendices becomes evident by the context and the cross-references therein.

The authors' gratitude is expressed in chapter 17 *Acknowledgements* towards those institutions, especially European banks, and persons, who significantly contributed to the study with data, effort and reasoning.

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[5] In the forth following it is referred to Basel II (Basel Committee on Banking Supervision, 2004) since at the time the study has been compiled the implementation of Basel II into the Union's law by CAD III was a work in progress.

[6] A more detailed discussion of the developments since the implementation of the current system can be found in chapter 5 *Important Developments since the Implementation of the Current System*.

[7] For further details concerning the assignment please see chapter 6 *Assignment*.

[8] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Portugal, Spain, Sweden, the Netherlands, and the United Kingdom.

[9] Cyprus, Czech Republic, Estonia, Lithuania, Latvia, Hungary, Malta, Poland, Slovakia, and Slovenia.

[10] Romania, Bulgaria and Turkey; Croatia, to which the Candidate status was awarded as recently as June 18, 2004, could only partially be considered.

3   Review of the Current System

3.1   Origin and level of the current reference rate

In 1996, the EC assigned to KPMG the mandate to find a fair and transparent as well as representative system of reporting reference interest rates for the Member States of the European Union for the purpose of evaluating aid systems for enterprises. To assess the reference interest rates to be reported, KPMG (1997) conducted a survey about loan and funding interest rates among major European commercial banks, central banks and other institutions involved in this issue. Since the system was intended to be an automatic reporting system, KPMG suggested that the system should consist of two parts: a basis rate such as a key money market rate, which can be updated on a *daily basis* and which is readily *available through information providers* such as Reuters or Bloomberg, and *an appropriate margin* added on top of the basis rate. Swap rates and government bond yields seemed to be suitable as basis rates. As far as large companies were concerned, KPMG proposed, based on their survey, to adopt a uniform margin for all countries (except for Greece, Italy and Portugal) between 75 and 100 basis points over government bond yields. Because large companies usually have access to the competitive international bank loan markets, margins were found to be in a very narrow range for all countries with the exception of Greece, Italy and Portugal. Concerning small and medium sized enterprises (SMEs), diversity appeared to be too great to allow the use of a unified margin. This diversity was reported to result from different risks covered and a lack of transparency and competition on the relevant markets.

The EC postulated that the reference rate should be based on a normally collateralised loan with a notional amount of EUR 5 mill. and a 5-year repayment schedule.[11] Based on the above described study the EC (1997) decided that a single adjustment premium of 0.75% on top of the 5-year swap rate should be applied to all Member States except Greece, Italy and Portugal. For these three countries different premiums were applied: 3% over the 1-year ATHIBOR rate for Greece, 2% over the 5-year inter-bank swap rate for Italy and Portugal. As of 1 August 1999 these reference rates were adjusted to the premium applicable in the other Member Countries in the course of the introduction of the euro in these countries.

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[11] See European Commission, 1997.

Summarising, the current reference rate is the 5-year inter-bank swap rate in the relevant currency plus 75 basis points. If there is no appropriate swap rate available, the yield of 5-year treasury notes plus 25 basis points is used as basis rate. For the countries of the euro zone the 5-year euro inter-bank swap rate is applicable since August 1999. The reference rate is derived by taking the average of the rates recorded in the months of September, October and November of the previous year. It is revised yearly and becomes applicable from January 1 of each year. It is adjusted again in the course of the year if it differs by more than 15% from the average of the relevant rates recorded over the last three months.

3.2   Expressed criticisms

Apart from the fact that for several new Member States a 5-year swap rate does not exist, significant political and economic changes (see chapter 5 *Important Developments since the Implementation of the Current System*), which affect loan markets and loan pricing, have taken place in Europe. The current system can be criticised as being unsuitable for the future as the current reference rate does not closely reflect market conditions over time.[12] This claim is based on the three following main reasons:

- The current system does not recognise the shape of the yield curve.

- The current system lacks timeliness.

- The current system uses a one-size-fits-all approach to credit risk.

3.2.1   The current system does not recognise the shape of the yield curve

The basis rate at which banks are able to re-fund their lending is assumed to be the 5-year swap rate (or the 5-year treasury yield plus 25 basis points instead). However, in practice banks grant loans with an underlying basis rate that is fixed for typical terms such as three or six months and one up to about 20 years. Hence, the 5-year swap rate does not constitute a good proxy for other re-pricing terms. Therefore, **the basis rate should be more flexible regarding the entire yield curve.**

The following chart justifies this critique. A significant difference between long and short term interest rates can be observed. Moreover, bank lending as well as State aid is undertaken with regard to maturities spanning large parts of the yield curve.

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[12] Three European financial institutions with a public mandate, ALMI Företagspartner AB, Banque Du Développement des PME (BdPME) and Kreditanstalt für Wiederaufbau (KfW), have put forward a brief critique on the current system, see ALMI, BdPME and KfW, 2004.

As the reference rate should be applicable to all countries, the UK and Germany are taken as examples. The following chart shows the difference between the 3-month money market rate and the 10-year swap rate with regard to the 5-year swap rate, respectively. Deviations by more than 60 basis points are very likely, which amounts to quite an essential share of the regular margin of 75 basis points.

Spread between 3-month money market rate and 10-year swap rate over 5-year swap rate for the UK and Germany
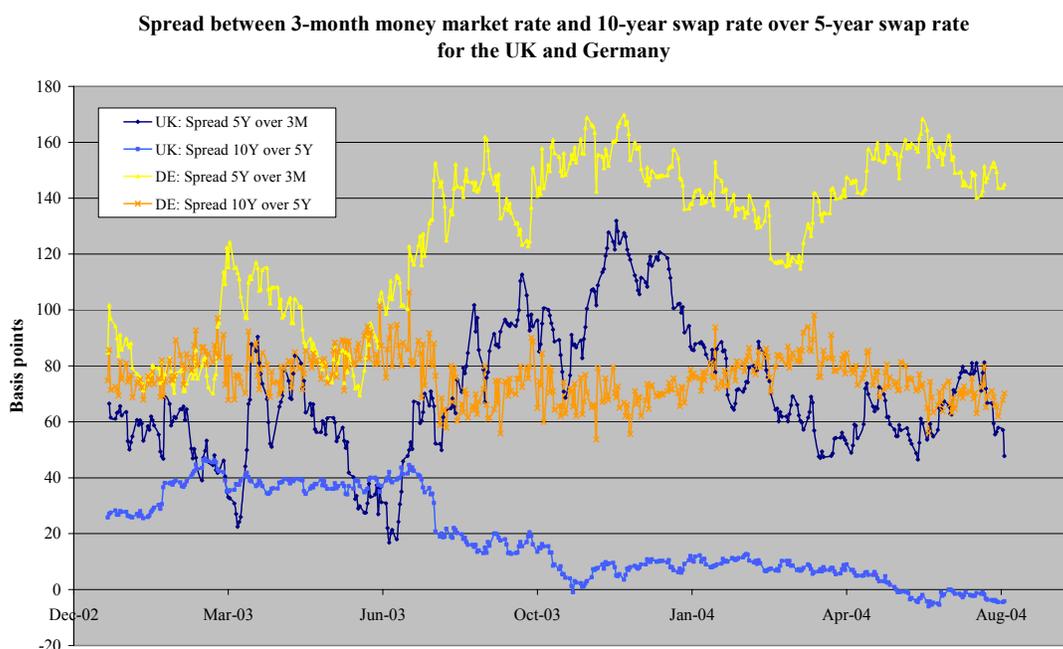
Figure 3-1

Data source: Bloomberg, authors' computation

The following chart compares the maximum spreads between the 1-year and the 10-year swap rates over the horizon January 2002 to July 2004 for the UK, Germany, the Czech Republic, Poland, Slovakia and Hungary. The differences would be considerable if loans with these maturities were compared.

Maximum spread between 1-year and 10-year swap rates January 2002 - July 2004
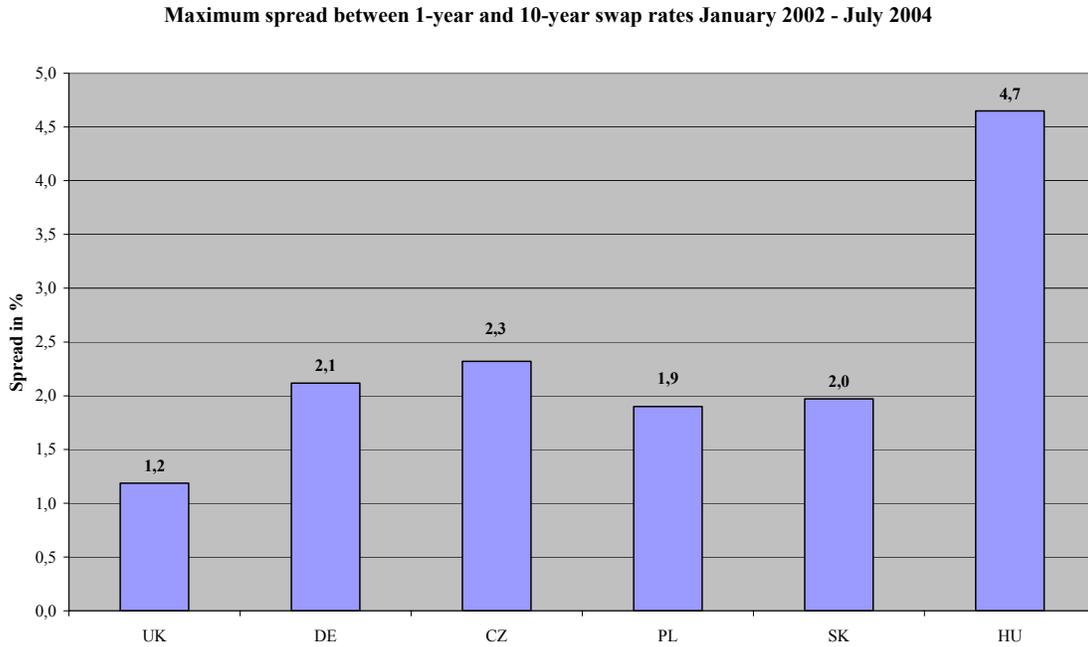
Figure 3-2

Data source: Bloomberg, authors' computation

The next chart shows short term lending as share of the total amount of newly granted loans. The figures reveal a remarkably strong position for short-term lending in some selected countries. Especially for new Member States this observation may also indicate the preferred re-pricing periods for loans granted by States.

MFI-Statistics for March 2004:
Share of new loans over EUR 1 mill. to non-financial corporates with re-pricing within 1 year
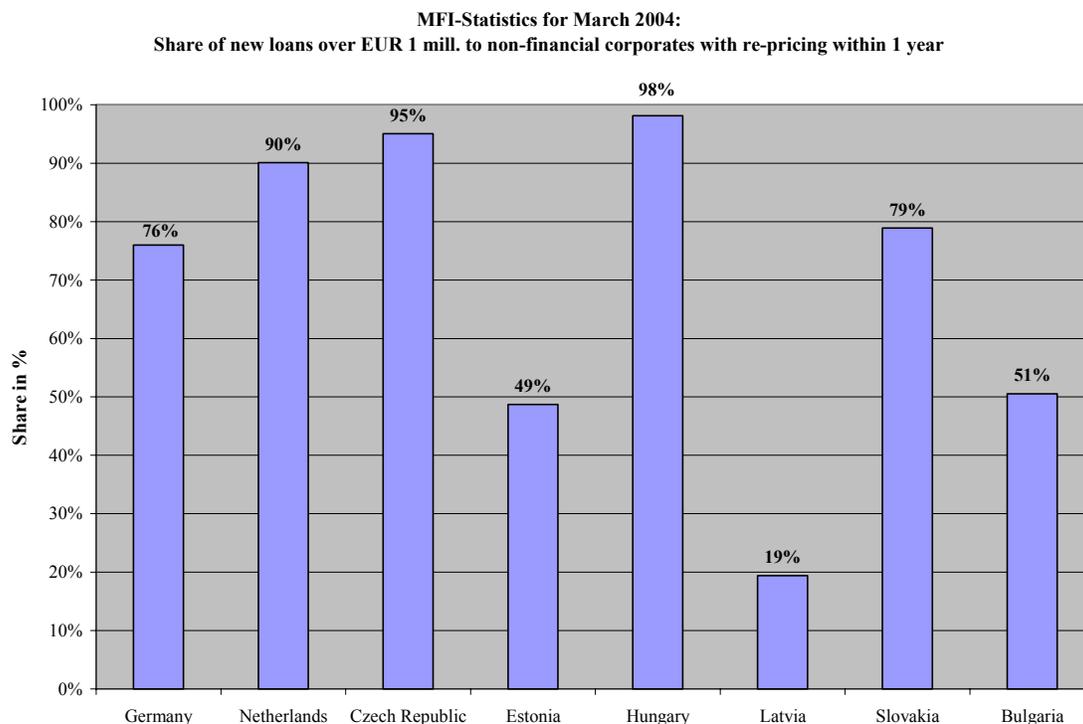
Figure 3-3

Data source: Interest rate statistics of national central banks, authors' computation

3.2.2   The current system lacks timeliness

For each year the reference rate relies on a history of market observations and is valid throughout the year. Only if the average over the past three months deviates by more than 15%, it is adjusted. When banks calculate minimum margins for loans they rest upon the *most recent* market rates, which may be very volatile over the averaging period. Consider for example a 15% deviation of the current interest rates from a reference rate of 5%, which results in a remarkable difference of 75 basis points amounting to 100% of the currently implemented credit margin of 75 basis points. Therefore, **the basis rate should be based on more recent market observations.**

The validity of this critique can be scrutinised by inspecting the movements of the 5-year swap rate. This is shown for Poland in the chart below. The chart shows the 5-year swap rate and its 3-month moving average[13] according to the left axis and the difference between both in percent according to the right axis. The red ellipse marks those dates at which the actual 5-year swap rate exceeds the moving average by more than 15%. A historical average would deviate even more.

Volatility of Poland's 5-year swap rate
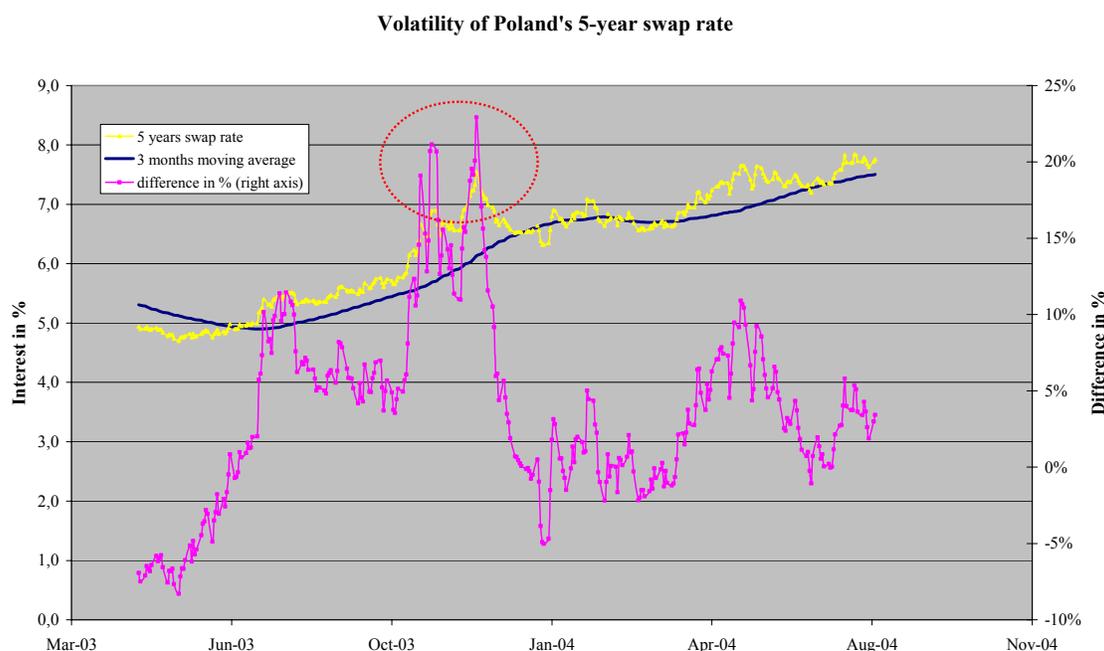
Figure 3-4

Data source: Bloomberg, authors' computation

3.2.3   The current system uses a one-size-fits-all approach to credit risk

The credit margin is generally fixed at 75 basis points apart from specific adjustments up to 400 basis points, or even more in exceptional cases. Although this development is not yet completed, in loan markets the credit margin has become much more risk-adjusted in the last few years. Therefore, **credit margins should reflect the debtor's creditworthiness and collaterals appropriately.**

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[13] The moving average at each date is the average over the past three months, which reflects even closer the actual development than the historical average, which is currently the basis for the reference rate.

This assertion is quite obvious and is confirmed by the results of the survey (see chapter 14.1.2.1.4 *Questions about spreads* for detailed numbers). Respondents of the survey state that the margin difference between a strong and a weak creditworthiness is, for instance, about 400 basis points for a 5-year medium collateralised loan. The impact of collateral can amount up to 240 basis points between low and high collateralisation for a debtor with a satisfactory credit standing receiving a 5-year loan.

Changes in the loan market environment[14] are not the main causes for the aforementioned shortcomings of the current system. The most serious weakness results from the fact that the current system was implemented under a one-size-fits-it-all premise. The achieved standardisation – one single rate for nearly all Member States – turns out to be too general and too inflexible for adequately reflecting market conditions for corporate loans in a growing EU (see chapter 14.2 *MFI statistics*).

3.3 Conclusion

Although the circumstances prevailing in 1997 might have justified a system based on a single, moderate premium in order to reduce the risk of dispute or discrimination (European Commission, 1997a), the changes in the market environment have resulted in flaws in the current system. At the time that the EU launched the reference rate system, there were only 15 Member States that were more homogeneous in terms of economic conditions than the enlarged EU is at the moment. Even though the current system might have reflected the circumstances of loan markets years ago when the system was originally introduced, its suitability for the future appears to be questionable in view of the above mentioned shortfalls. Therefore, a new system will be proposed in the remainder of this study.

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[14] See chapter 5 *Important Developments since the Implementation of the Current System.*

4   The New Reference Rate System

The EC has not been insensitive to the aforementioned critiques. Its primary goal in setting the reference rate remains to approximate - as closely as possible - the average rate a debtor can agree with banks under normal market conditions. The EC aims at refining the reference rate system through the installation of an automatic or self-reporting system, which is easily applicable, fair, transparent and easy to understand.

A trade-off between, on one hand, **simplicity and practicability** and, on the other hand, **accurateness and fairness** needs to be made. An accurate system will be very complex in order to appropriately mirror all circumstances (country, currency, etc.) and aid features (payout schemes, combinations of risk factors, etc.). A simple and easily administrable system will be incapable to account for the broad variety of specific characteristics (e.g. loan types and markets).

In order to achieve both goals, an easily administrable automatic reporting system and an accurately calibrated self-reporting system, it is proposed to consider a two pillar system.

1.   The **first pillar** advances a **standard approach**. In this standard approach, the EC will disclose on a quarterly basis the basis rate over several maturities and currencies. In order to compute the reference rate, a credit margin has to be added. A table of credit margins that depends on only a few risk drivers (creditworthiness and collateralisation) and that can remain valid for a couple of years was constructed based on the results of the survey (see chapter 14.1.2.1.4 *Questions about spreads*). In order to acknowledge the impact of loan size and guarantees margin discounts are provided.

    The survey also showed that within this table the average loan had a normal collateralisation and a satisfactory rating resulting in a credit margin of 220 bp. It is suggested to use this normal collateralised loan of a satisfactory credit quality as the **"default" case** or **normal case** for loans and guarantees. This means that for all State-granted loans and guarantees, where the credit and/or the collateralisation quality cannot be determined, the satisfactory rating spread and/or the normal collateralised spread will be used. However, the normal case for other forms of aid assumes satisfactory credit quality and "low" collateralisation, because these aid measures typically exhibit higher risk (see examples forth following).

2.   The **second pillar** suggests an **advanced approach** that utilises the principle of subsidiarity. It allows States to consult calculation agents in order to determine a fair reference interest rate.

4.1 Standard approach

The standard approach ascribes a high weight to the goal of simplicity and practicability. Issues of the basis rate, the credit margin, the margin discount for guarantees and the adjustment for small and large aid, are addressed separately. As the standard approach preserves to a large extent the applicability of current procedures, the implementation appears manageable.

4.1.1 Reference basis rate

__Setting the reference basis rate__

In order to remedy the critique that the current system ignores the shape of the term structure, the EC has two options. In case the EC should opt for a very accurate system, it should publish the whole term structure curve for all the currencies of the Member States. Alternatively, an easily applicable system would choose a number of points on the term structure curve. It is proposed that the EC would publish **at the beginning of each calendar quarter** and for each currency of the Member States the reference basis rates for **three months, one year, five years and ten years**.

The basis reference rate should reflect the benchmark rate to which banks usually measure their loan margins. In general **inter-bank offered rates (IBOR)** and **swap ask rates** serve as that benchmark. While the IBOR reflects the money market situation up to and including one year, the swap rates mirror conditions on the capital market above a maturity of one year. For currencies where no IBOR or swap rates are observable for particular maturities, the EC shall derive the basis rate by **yields on government debt** instead. Yields of government debt can be obtained from (auctions of) treasury bills for maturities up to one year and from the implicitly calculated yield-to-maturity of government bonds for longer terms to maturity. The EC may rely only on data which is readily obtainable from information providers. For instance, government yields-to-maturity[15] cannot be derived from bond coupons and market prices by the EC itself if yields are not directly obtainable as this involves a financial evaluation.

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[15] The yield-to-maturity is the internal rate of return, which discounts all future proceeds including coupon payments and redemptions to the current market price of the bond.

Since banks exhibit higher default risk than Member States for money market operations, **rates of government T-bills maturing within 1 year are shifted upwards by 15 basis points.** However, the lower risk exposure of swaps[16] in contrast to bonds seemingly outweighs banks' higher credit risk for the new Member States so that **yields-to-maturity of government bonds are not shifted** in order to derive the appropriate basis rate.[17] Thus, where neither IBOR nor swap rates are observable, the appropriate government debt yield is applicable.

The reference basis rate shall be derived consistently over time[18] as **an (arithmetic) average rate of daily observations over the second month of the preceding quarter**. For example, the average interest rate for November 2004 would be the valid reference basis rate for the quarter January to March in 2005.

> This approach takes into account the EC's current procedures, which require this time lag in order to carry out a due process. If in future the disclosing procedures and the availability of market data allow for an even more timely measurement and disclosure, the averaging period (example: November) should be closer to the disclosure period (e.g. the first two weeks of December) which itself (example: January to March) may be shortened (e.g. to one month, i.e. January in the example).

As there are **no rates observable for certain, especially longer terms to maturity** for some currencies of the new Member States, the EC may choose a readily observable rate whose maturity comes closest to the above-mentioned maturities in order to complete the table. However, it may occur that there is no suitable reference basis rate for a particular maturity at all.

> It should be noted that the disclosure of rates for different maturities is much more important for aid in form of loans than for the purpose of discounting. To make that point evident, consider a loan of EUR 100 mill. maturing in ten years. The loan bears a coupon of 5% (swap rate of 4.25% plus a margin of 0.75%), which is assumed to be equal to the 5-year loan rate while the 10-year loan rate is 6% (swap rate of 5.25% plus a margin of 0.75%). Consequently, the aid element is EUR 1 mill. per annum, i.e. 1% of the loan amount.

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[16] Swaps exhibit lower absolute market values as the notionals are not exchanged. This exposes the counterparty of a swap transaction to a lower risk of default than for bonds.

[17] The shift of government yields is empirically motivated in chapter 14.3.3 *Spread between basis rates and government yields*.

[18] Chapter 14.2.3 *Availability of rates* contains the sources for the basis rate which have been identified by the study.

This loan is compared to an aid settled in cash as annual instalments of EUR 1 mill. over ten years. Ceteris paribus the gross grant equivalent coincides for the loan and the cash aid.

If only the 5-year swap rate were published, the aid element of the loan would completely "disappear". The gross grant equivalent of the cash aid increases due to a lower discount rate from EUR 7.36 mill. to EUR 7.72 mill. as some basic calculations show. However, the increase of about EUR 0.36 mill. or 4.9% might be regarded as negligible in view of the effort needed to derive and disclose more than one reference basis rate.

The bias obviously depends on the shape of the yield curve. If the discount rate was taken to be equal to 4% for the 5-year rate instead of 9% for the 10-year rate the bias would amount to about 26%.[19] Hence, under the two conditions that States were able to *report reliable margins* for aid in form of loans[20] and that the risk of a considerable *discounting bias for steep yield curves is accepted* the disclosure of, for instance, just the 1-year reference basis rate[21] would be sufficiently fair.

Just as well, it would be conceivable to disclose only the 3-months IBOR rate as the sole reference basis rate, since it is available for nearly all relevant currencies. Under normal market circumstances the 3-months IBOR rate can be expected to be lower than the interest rates for longer maturities, which implies lower recovery amounts in case of unlawfully granted aid and lower grant equivalents for loans and guarantees but higher grant equivalents for other kinds of aid disbursed in instalments. However, this simplification would entail that the 3-months rate would apply to all maturities alike. As a result, the new system would not recognise the shape of the yield curve, which is seen as one of the major shortcomings of the current system.[22]

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[19] It is referred to Figure 3-2 for the maximum spread since January 2002 between the 1- and 10-year swap rates for six countries, of which Hungary exhibited a maximum spread of 4.7% while the other countries were around 2%.

[20] In order to report reliable margins the State had to derive the effective interest rate and the effective funding rate, see chapter 12.1 *Effective interest rate* and chapter 12.5 *Approximation for the basis rate*.

[21] 1-year rates are readily available for most Member States and are proposed for the purpose of compounding unlawful aid.

[22] See chapter 3.2.1 *The current system does not recognise the shape of the yield curve*.

Deloitte.

Example

If the outlined principles were applied to determine the basis rate of Polish Zloty for the 3rd quarter of 2004 the following Table 4-1 results. The table includes also the rates of July 30, 2004 to which some subsequent example will refer.

Maturity:	3 months	1 year	5 years	10 years
Average rate of May (published by EC)	**5.90%**	**6.70%**	**7.47%**	**7.32%**
Actual rate of July 30 (for comparison only)	6.32%	7.17%	7.63%	7.27%

Table 4-1

Data source: Bloomberg, Polish money market and swap rates as of July 30

Using the reference basis rate

A distinction has to be made between fixed and floating rate loans. For fixed rate loans, the *applicable reference basis rate* is the basis rate of the maturity which comes closest (or is lesser for maturities in between) to the maturity of a loan[23]. If the Member State grants a loan with a variable interest rate, the term to maturity is equal to the term to the re-pricing period.[24]

For other forms of State aid the period of time the single aid element is expected to be received by the beneficiary is relevant. If, for instance, aid is disbursed in several instalments each particular date determines the respective applicable reference basis rate (i.e. the 1-year rate for aid elements occurring from over 9 months up to 2.5 years).

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[23] The interpolation of rates is proposed under the advanced approach, see chapter 4.2.2 *Recognising the exact timing of cash flows.*

[24] If the EC chooses to require different margins for different maturities, the margin would be determined by the maturity and not the re-pricing of the loan.

4.1.2   Risk grading and loan margins

In order to complete the calculation of the reference rate, the EC has to publish a table of loan margins as well. Aiming to reduce complexity it is recommended to publish this credit margins for just a few combinations of risk factors, which are covered by the two dimensions of the following table: rating category and collateralisation (measured by the so-called loss given default (LGD)). Different credit margins over the various maturities are not suggested. The reason for this is the lack of correlation that was found between credit spreads and maturities in the results of the survey in relation to the complexity that would be introduced by taking maturity-dependent spreads into account.[25]

Loan margins in basis points for a 5-year loan			
Rating category (Ranges of agencies' rating grades)	**Collateralisation** (LGD-range and LGD base point)		
	High (LGD ≤ 30) 15%	**Normal** (31% ≤ LGD ≤ 59%) 45%	**Low** (LGD ≥ 60%) 75%
Strong (AAA – A)	45	60	75
Good (BBB)	60	100	150
Satisfactory (BB)	100	220	340
Weak (B)	180	465	750
Bad (CCC – C)	360	1000	1650

Table 4-2

Data source: Survey results and authors' computation

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[25] The complete tables of average reported margins for the maturities of one, three, five and ten years can be found in chapter 14.1.2.1.4 *Questions about spreads*.

These loan margins shall be applied according to the beneficiary's creditworthiness and the collateralisation level of the loan[26]. In case a classification is doubtful (e.g. a split rating case, which means that there is a disagreement about the rating), the average of the respective credit margins could be allowed to be applied. For those cases where the credit risk essentially depends on the success of a certain investment and not on the debtor's general creditworthiness (so-called project financing), the credit standing of the project itself is decisive. However, if the classification is impossible, the "grey coloured" default or normal cases apply for loans and guarantees.

4.1.2.1 Debtors' creditworthiness

On average over the entire survey the *normal case* turned out to be the **rating category "satisfactory".[27]** Since this should apply as the default scenario for loans and guarantees in case no rating is available, a large number of loans and guarantees would fall into this category. Loan-granting Member States can even be expected to try to achieve a lower reference margin by proving better collateralisation and credit quality. This intention is, however, limited by the requirement that a bank's internal risk grading has to be applied, if a bank is involved in the granting of the loan. In other cases the State needs at least to objectify a better credit standing.

The analysis of macro data draws a different picture than just the average does. The MFI-statistics show that States exhibit very different levels of loan margins. In order to recognise such divergences, an alternative classification that includes a higher level of differentiation and that is based on a stronger application of the entire rating scale has been developed.

> The normal case could be further extended in order to *differentiate between States* as well as *small and larger loans*. According to this refined differentiation larger loans above EUR 1 mill. would be classified as "strong" under the *normal case* for most of the old Member States for example. It is recommended to consider such an advanced differentiation as well (see chapter 14.2.3 *Differentiated approach for the normal case*). As loan markets develop, these classifications have to be validated over time by the then actual MFI-statistics. For a detailed discussion it is referred to chapter 14.2 *MFI statistics*.

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[26] Application to other forms of aid is discussed below.
[27] See 14.1.2.1.4 *Questions about spreads* for the distribution of rating grades.

If the loan, guarantee or the risk of aid being regarded is comparable to the risk borne by *mezzanine or equity debt*[28], the default rating category is deemed to be one grade below the grade applicable to senior debt except if senior debt falls in the "bad" category.

States may also take a position as an ordinary shareholder in a company. In this case the benchmark for the pre-tax return on *ordinary equity capital* is considered to be 15%.[29]

If the beneficiary is a *distressed firm* it is assumed by default to be of "weak" creditworthiness as this is the worst risk category banks would usually grant loans to (apart from fully collateralised loans). A distressed firm is defined as having considerable problems to raise debt capital.

In Table 4-2 margins for "bad" loans are also provided. A debtor, who already defaulted, has a rating that is below the "bad" rating category. Hence, the reference margin would not be lower than for the "bad" rating. As there is no market for granting new loans to debtors of bad creditworthiness, the disclosed margins are hypothetical in nature. However, the EC may choose to apply the higher margins to those debtors in order to reflect the highest level of default risk.

4.1.2.2 Collateralisation

Collateralisation for loans and guarantees is measured in terms of the so-called loss given default (LGD), i.e. the expected loss to be incurred in case of the debtor's default.[30] As a proxy the measurement may rely on the conservatively estimated fair market values of pledged assets in relation to the notional amount at the time the loan is contracted with the debtor or in a short and limited time thereafter (e.g. three months), i.e.

$$\text{LGD} = 1 - (\text{value of pledged assets} \div \text{notional amount}).$$

On average over the entire survey the *normal case* for loans and guarantees turns out to be **"normal" collateralisation.** For the purpose of discounting and compounding other forms of aid the normal case is, however, assumed to be **"low" collateralisation**. The reason for this distinction is that in contrast to a loan a beneficiary cannot expect a recovery of aid from the State if it goes bankrupt.

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[28] The term equity debt comprises a variety of mezzanine capital. Typically, the contractual terms require a fixed interest and participation in losses and possibly participation in increases in value or in profit. Mezzanine capital is subordinated to senior (and junior) debt and ranks prior to ordinary equity capital.

[29] See results of the survey, i.e. 14.1.2.1.5 *Questions concerning the model*.

[30] See the definition of loss given default in Basel II, paragraphs 297 and 446 et seq.

If a loan is subordinated to senior debt, the collateralisation is deemed to be "low". Subordination is presumed if the loan amount ranks virtually among the 40% of the first-loss range of pledged collateral or the firm's total capital. If a loan can virtually be regarded as equity (mezzanine/tier debt), the collateralisation cannot be better than "low". To prevent a miss-classification the loan can be split up by Member States into a senior, a subordinated and an equity part.

4.1.2.3   Currency differentiation

As turns out from survey question E 13 (chapter 14.1.2.1.4 *Questions about spreads*), the differences among margins for different currencies are not very pronounced. Half of the banks report not to differentiate between currencies regarding the pricing of loans at all. The average difference indicated by participants, who differentiate between currencies, is about 20 basis points. Consequently, it seems to be reasonable to apply the same margins for all currencies. However, it has to be noted that, in contrast to the margin, the basis rate strongly depends on the currency, in which the aid is granted (chapter 4.1.1 *Reference basis rate*).

4.1.2.4   Application by the EC and Member States

Whenever the EC has to derive a reference rate or a reference discount rate *retrospectively* it applies in principle the normal cases outlined above. Adjustments to higher or lower risk *may* take place according to the EC's investigations for obvious cases or for large cases, say above EUR 25 mill. A historical risk analysis pro forma for all cases would be inadequate.

Whenever State aid is granted through banks or similar financial institutions (i.e. loans and guarantees) that possess a rating system, it is the banks' rating systems which should be utilised in order to determine debtor's credit quality.[31]

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[31] Reasonably, banks' risk grading outperforms on average that of States since it is the banks' core business to assess the creditworthiness of loan applicants. If States possess additional information valuable for grading a debtor they may provide these data to the respective bank.

States may categorise beneficiaries by own assessment when aid is not granted through banks.[32] The categorisation of beneficiaries into risk grades must be performed and documented *before* granting a possible State aid. The categorisation must be based on objective evidence following *basic* bank standards and own guidelines available to the EC and being intuitively understandable. For aid schemes addressing larger groups of smaller beneficiaries the categorisation can be applied to the whole group as a forecast of the average creditworthiness or average collateralisation. The normal case has to be presumed if prior knowledge is not sufficient to derive a proper estimate.

If Member States employ an own grading they should have guidelines about to which cases they intend to apply their own grading system or the default cases. Under no circumstances Member States may exploit this option in order to achieve advantageous reference rates for particular cases ("cherry-picking"). Moreover, for risk grading being applied over a longer time horizon (i.e. for a 5-year loan scheme) the realisations of debtors' ability to redeem loans should be monitored in order to prove the reliability of the grading system in time and to take actions if the grading system appears to be biased. The EC should have the right to refuse Member States' grading in part or as a whole if it does not comply with *basic* banking standards[33] or if it exploits the grading option unduly.

Guarantee fees

The credit spread also reflects the appropriate fee for guarantees. However, since guarantees involve less administrative costs than loans the **reference guarantee fee receives a 20 basis point discount[34]** in comparison to the aforementioned loan margins.

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[32] By own risk grading Member States shall observe the mapping provided in 14.1.2.1.4 *Questions about spreads* and may also consult rating descriptions of public rating agencies, the guidelines of Basel II (Basel Committee on Banking Supervision, 2004), Annex 4, regarding supervisory slotting criteria for specialised lending, which can apply accordingly, and rating grades of comparable competitors.

[33] Under the term *basic banking standard* an intuitively derived scoring of credit risk can be understood for example.

[34] The discount is motivated in chapter 14.1.2.1.4 *Questions about spreads*.

Loan amount

The loan amount determines the translation of fix costs into a margin on accrual basis. Moreover, for large loans competition seems to be more pronounced. This leads to an adjustment of the reference margins for different loan amounts according to the following table:

	Adjustment in basis points		
Notional in EUR mill.	**< 1**	**1 - 5**	**> 5**
Loans and guarantees	**+ 10**	**0**	**- 10**

Table 4-3

Empirical findings and theoretical considerations lead to the educated guess that smaller loans are afflicted with relatively higher margins on average than revealed by the survey.[35] This can be taken into account by assuming a different default level for debtors' credit standings applying for small rather than large loan amounts. This alternative approach is discussed in chapter 14.2.3 *Differentiated approach for the normal case*.

The reference rate is built by the sum of the applicable basis rate and the applicable loan margin including the adjustment for the amount of the loan (possibly secured by a State-guarantee). If State aid is not granted as a loan or a guarantee, the adjustment does not apply.

4.1.3 Intermediate examples to the standard approach

The following examples illustrate the components of the standard approach.

Example 1

Let a State grant a 10-year loan of an amount equivalent to more than EUR 0.5 mill. in Polish Zloty to a firm. The loan admits a variable interest rate of 6-month IBOR. The first coupon is 6.53%. According to the standard approach, a basis rate is chosen the re-pricing term of which comes closest to 6 months. This is the 3-month EURIBOR reference basis rate standing at 5.9% (actual rate according to Table 4-1: 6.32%). The actual loan margin is considered to be 63 basis points, which is 6.53% minus 5.9%.

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[35] The survey revealed a lower margin differentiation between small and large loans than the MFI-statistics. An explanation could be lower risk for larger debtors ("too big to fail", diversification) and lower bargaining power for smaller debtors in loan markets with large frictions (transaction, search and monitoring costs, limited competition in local markets).

However, the satisfactory creditworthiness and the high collateralisation yield a reference margin of 100 basis points according to Table 4-2. Moreover, small loan amounts up to EUR 1 mill. receive an add-on of 10 basis points, which accounts for a higher cost margin. In total, the aid element turns out to be 100 plus 10 minus 63 basis points, i.e. 47 basis points. As the loan is granted over ten years, the aid elements occurring as interest payments every six months are discounted by the 10-year reference swap rate, which is 7.32% for example (see Table 4-2). This calculation leads to the gross grant equivalent.

Example 2

Consider a guarantee for a distressed company over a large amount in Polish Zloty and for a period of seven years. The guaranteed loan is highly secured by pledged assets. The guarantee fee is 1%. These characteristics yield the following calculation:

Loan margin for weak creditworthiness and high collateralisation	180 bp
less discount for guarantees	- 20 bp
less discount for large amounts	- 10 bp
is equal to the reference guarantee fee	= 150 bp

Table 4-4

The aid element is 0.5% p.a., i.e. 1.5% less 1%. The discount rate is the 5-year reference basis rate, 7.47% in the aforementioned example, as it comes closest to the maturity of seven years. Discounting the aid element for 7 years by the reference basis rate results in the gross grant equivalent.

4.1.4   Application to State aid

This section describes the general application of the reference rate by Member States and the EC. It is beyond the scope of the study to provide an extensive classification of aid and a specific application of the reference rate thereto because the universe of aid is too widespread. Like it has turned out for the current system the concrete procedures evolve over time with the occurrence and experience of new cases, which then culminates into new guidelines. For this purpose it might be helpful to collect and categorise each new aid form according to risk grades and some basic classes in order to establish a casebook for future investigations.

Notwithstanding the outline of the general application, chapter 10 *Examples of Applying the Reference Rate* in the appendix contains short case studies based on the Commission's actual decisions to which the approaches have been exemplarily applied.

4.1.4.1 Application to discounting

In principle, the appropriate discount rate of a cash flow should be the zero coupon discount rate that reflects the timing of cash flows and the indentured party's creditworthiness because zero rates implicitly account for interest on interest. The grant equivalent however, is currently determined by discounting the future cash flows at the reference rate (see chapter 9 *Functions of the Reference Rate*), which is a par rate rather than a zero discount rate. Par rates and zero discount rates coincide only if no intermediate interest payment is scheduled due to market conventions, because compound interest is not relevant.

Several cases can be considered:

- For (non-zero coupon) standard loans and guarantees, the use of the (par) reference rate for discounting results in a precise approximation of the calculation based on zero discount rates.

- For loans with variable interest rates the discount rate to be applied to the aid element of the loan should be based on the entire maturity in contrast to the term to re-pricing as the discounting takes into account the entire duration of the aid.

- For aid cases where the cash flow pattern differs from that generated by standard loans, the approximation of the discounted value might be less accurate while using the reference rate instead of the zero rates. Still, if one observes that for each receipt of aid a different maturity can apply, one ends up by and large in a portfolio of situations where no intermediary cash flows occur and where the reference rate is a suitable discount rate. For example, if the aid is disbursed in two instalments of 5 and 10 years the reference rates for both maturities apply accordingly, not just the reference rate for the longest time to maturity.[36]

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[36] A similar effect results from a precise derivation of the interest rate of a loan with several redemptions; see chapter 4.2 *Advanced approaches*.

The appropriate risk grading depends on the kind of specific aid granted. Consider the following examples:

- If the State aid is granted in instalments[37] it is the State who is the "debtor".[38] Payments made by the State irrespective of the beneficiary's possible bankruptcy shall rather be discounted at a "riskless" discount rate. Therefore the basis rate (possibly less the add-on of 15 basis points, which is applicable for deriving the basis rate according to T-bill rates) constitutes an appropriate reference rate.
  In contrast, the discount rate would be the regular reference rate if the State aid is only granted when the beneficiary is not insolvent, because the conditionality exactly reflects the beneficiary's credit risk.

- Some kinds of aid are virtually terminated if the firm goes bankrupt. This may supposedly be the case for rent reliefs, discounts on social security, free utilisation of otherwise payable services, etc. In these situations the regular reference rate is applicable for discounting. On the other hand, when aid can still be accessed by firms under insolvency proceedings, the riskless discount rate is better applicable.

- For expiring tax reliefs on gains it is the beneficiary who pays less tax and needs fewer funding. A reference rate is appropriate in this case as well. However, the risk incurred by the beneficiary is much higher than the risk of insolvency as it is more likely to bear losses, to which tax reliefs do usually not apply, than to go bankrupt. Hence, the risk would be similar to equity debt, which participates in losses, and demands a higher risk premium than the normal loan margin.

- For loans and guarantees the debt is typically collateralised. The contrary has to be assumed for other forms of aid as the beneficiary "will not receive any recovery from outstanding aid when he/she goes bankrupt him/herself". Hence, for the purpose of discounting other forms of aid than aid elements of loans and guarantees, the margins according to "low" collateralisation have to be applied.

Summarising, for each case the particular form of aid (e.g. tax relief, discount on social security) needs to be considered in order to derive the appropriate discount rate.

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[37] For example, cash subsidies over a longer period.
[38] Accordingly for aid settled on a future date, e.g. a forward loan.

4.1.4.2   Application to compounding unlawful State aid

If State aid is granted illegally with regard to the European Union's State aid rules, it has to be repaid to the State. The general principle is to economically restore the situation before the aid was granted. In order to achieve an appropriate compensation for the time value of money and for the default risk not only the illegally granted aid has to be repaid but the beneficiary will have to pay a compound interest on the recalled State aid as well.

There is no substantial difference between a loan and a reclaimed aid. Hence, a payment of interest is justified. If regular payments of interest are not scheduled, the interest should be compounded until the date of redemption or to the date a market based interest is charged regularly (i.e. conversion to a loan). The compound interest can be calculated based on past reference rates as the breach of aid law is usually discovered afterwards.

In principle, compounding is the reciprocal to discounting. The remarks on the appropriateness of the reference rate as a par rate in contrast to a zero discount rate apply accordingly if compounding is conducted over a period in which the convention underlying the reference rate would envisage interest payments. The bias can be expected to increase the longer the horizon is. For a couple of money markets the conventions underlying 1-year rates do not require intermediate interest payments. Even if the conventions demand intermediate interest payments, the bias can be expected to be small in comparison to compounding by a 5-year interest par rate.

As outlined (see chapter 3 *Review of the Current System*) the *currently* applicable interest rate is the reference rate for periods of five years because the basis rate is the 5-year swap rate due to considerations of practicability. In banking, however, it is common to demand a *short-term* basis rate plus a credit margin and in addition a *penalty margin* on amounts which are overdue stemming from *debtor's violations* of contractual obligations. A penalty margin also serves as a cushion against deterioration of credit quality since further adjustments to the interest margin are not always possible. Short-term basis rates are justified by the fact that the date of repayment is not known in advance and that compounding of interest is taken into account thereby. Since the responsibility for violating State aid rules is supposedly not only with the debtor, the applicability of a penalty margin is questionable.

Taking into account the issue of compounded interest and considerations of practicality as well, it is recommended to iteratively use the *1-year reference rate* for compounding. Since it is cumbersome to identify iteratively the appropriate reference rate for many aid elements and over a long horizon, the EC can apply the reference rate which was valid on the day when the beneficiary received the first aid element to all aid elements of the respective calendar year. All aid elements of a year are compounded to the year end exactly according to their occurrence. From the year end onwards the due amount is compounded by the respective reference rates valid at the beginning of a year. A further simplification would be just to apply as the first rate the reference rate valid at the beginning of the year the aid elements appeared first and to aggregate all aid elements of a calendar quarter to the quarter ultimo.

Rather than using a penalty margin the reference rate should be adjusted to the actual creditworthiness of the beneficiary and the collateral underlying the receivable at the beginning of each year. Thereby, the relevant creditworthiness is the beneficiary's creditworthiness at the point in time the aid was granted. In fact, the collateralisation would typically be "low" for all aid except loans. However, a beneficiary may provide collateral in order to secure the reclaim and to reduce the reference rate thereby. Since the compounding procedure is based on the reference rate valid at the beginning of each year, it is possible to reassess the margin on a yearly basis. Nevertheless, a reassessment of the credit risk should proceed only exceptionally, if rather significant and obvious changes with respect to creditworthiness or collateral have taken place during the foregone compounding period (e.g. when the beneficiary voluntary provided collateral to secure the claim until the lawsuit is decided and signified this action to the EC).

If a 1-year rate is not on hand, the available reference rate of the next shorter maturity shall be applicable. In this case the compounding period must be abridged to the next shortest maturity of which a reference rate is available, e.g. from one quarter to the next if only the 3-month rate is available.

Let, for example, a beneficiary illegally receive aid elements every week starting in July of 2004 until July 2006. To derive the reclaimable amount as of December 2006, all cash flows of 2004 are compounded by the 1-year reference rate valid in July 2004. The resulting amount and all aid in 2005 are compounded by the 1-year reference rate valid as of January 2005 taking into account changes in credit standing. The same applies to 2006 while the amount is compounded to the date the re-payment is received by the State.

For beneficiaries with poor creditworthiness it may nevertheless be advantageous to bear the risk of reclaim according to the reference rate if the reference rate is lower than the firm's funding costs or if the firm is too weak to get credit from banks at all. Demanding them to pay a risk-appropriate margin[39] on a compounding basis could mean exposing the firm to bankruptcy. Notwithstanding this possibility, there is no market for new loans to distressed firms. Though one may regard *yields* on "bad" loans to be applicable, the problem is that a new loan dilutes the possible recovery in case of default. A *market based solution* to this issue, as the underlying principle of the reference rate, cannot be found by an appropriate application of the reference rate. However, the loan margin of Table 4-2 for the category of "bad" creditworthiness as outlined in the aforementioned margin table is applicable as a non-market based surrogate.

Summarising, the reference rate for the purpose of compounding interest should be based on a short term basis rate and should contain the credit margin, which is appropriate for the debtor.

4.1.4.3 Aid elements of loans and guarantees

The aid element of a standard fixed rate loan is the positive difference between the loan amount and future cash flows discounted at the reference rate. This reflects a lower *effective interest rate*[40] of the loan compared to the reference rate. For a guarantee the aid element is the positive difference between the reference loan margin and the actually charged guarantee fee. In both cases the reference basis rate for purposes of discounting is chosen according to the *total maturity* of the contract. This is especially important to observe for variable interest loans, for which the aid element is determined according to the reference rate for the term to re-pricing while the discounting utilises the reference rate regarding the total maturity. The maturity of a contract is defined as the date when redemptions are scheduled or when the loan margin is adjusted to the then valid market conditions and debtor's creditworthiness.

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[39] In some countries excessively high interest rates could be limited by usury laws.

[40] The coupon of a loan is not an accurate measure as loan discounts increase the interest charge; see chapter 12.1 *Effective interest rate*.

4.2 Advanced approaches

It is beyond the scope of the study to develop an approach which can fit all circumstances. Accounting for all imaginable scenarios cannot be achieved through market surveys or macro economic analysis. Admittedly, important issues might be disregarded by a standard approach that suits an automatic reporting. Therefore, States may wish to rely on much more refined reference rates that are especially calibrated to the markets concerned. In the authors' view, the European Commission is not a suitable body to timely conduct more intricate calculations because it does not have the required proximity to loan markets.

In order to derive more precise reference rates a State should have the possibility to conduct more intricate calculations or to consult a calculation agent[41], who determines the reference rate and documents the calculation for further approval by the EC. Such a calculation agent should apply a well accepted, calibrated and perhaps audited financial model. The agent must assure neutrality and that the calculation is performed appropriately according to market standards. The methodology and the particular calculations should be documented in a way that a non-technical expert is readily able to understand the procedures and the derivation of the results.

This approach offers the advantages of utilising local banking knowledge and of achieving higher precision as well as of a self-reporting process in that the derivations of the reference rates are documented for each case or group of cases (such as public loan promotion schemes) without EC's further legwork beside the approval.

In all cases where the Member States or third parties carry out the specific task of deriving the reference rate, the EC should be entitled to require an independent and external audit of a particular case, scheme, or system on a regular and ongoing basis and at Member States' cost.

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[41] The appropriateness of certain institutions and their compensation for conducting this task is not discussed though larger commercial, development, and central banks (domestic or European) should be able to perform the empirical foundation and the calculations adequately.

4.2.1 Large cases of State aid

For all single large cases of aid granted in the major currencies EUR, GBP, USD, CHF, YEN and for all single cases beyond small size, where the beneficiary has issued a tradable bond, the reference rate should take into account the credit spreads, which are actually traded on bond markets. The survey did not reveal that credit spreads of corporate *bonds* have a considerable direct impact on *loan* margins for the majority of participants. However, for amounts over EUR 100 mill. the bond market can be seen as the relevant reference.

Since an automatic reporting system would be rather complex to implement with regard to credit spreads of bonds, the concrete analysis needs to be carried out manually. Each single case would require special attention. Hence, within this study it would only be possible to outline the general idea:

If there were traded bonds of the beneficiary these would be the first choices of comparison. Relevant credit spreads of other corporate bonds in major currencies can be obtained from Merrill Lynch via Bloomberg, for instance. The beneficiary and the aid need to be mapped to the risk factors (rating, sector, subordination, branch, etc.) considered by the data provider. In this way it is possible to derive an average credit spread over swap. For loans and guarantees these spreads need to be adjusted for the provided collateralisation and the administrative costs.[42]

4.2.2 Recognising the exact timing of cash flows

In *all cases of aid*, where cash flows appear at future dates, the relevant maturity does supposedly not coincide with a maturity for which a reference rate is disclosed. If the market yield curve is very steep, it may matter a lot which particular basis rate does apply. In order to prevent frictions in that States chose the timing of cash flows so that always the lowest or highest rate applies States should be allowed (or required for large cases above EUR 25 mill.) to linearly interpolate the relevant reference rates.[43]

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[42] Further details of corporate bond spreads can be obtained from chapter 12.7 *Adjustment of credit spreads to recovery rates* and 14.1.2.1.4 *Questions about spreads*.

[43] Interpolation is explained in chapter 12.6 *Interpolation of interest rates*.

For *loans* with several redemptions the whole life of the loan is only a mediocre approximation for the maturity of the applicable basis rate. In terms of market proximity it would be advantageous to allow (or require for large cases above EUR 25 mill.) the particular reference rate to be derived according to a weighted average of the reference rate applicable to each redemption.[44] Several redemptions might be aggregated to one if they appear in close sequence, e.g. for each quarter to the quarter ultimo.

If the full value of collateral for a loan or a guarantee is pledged not at once but in progression or diminishes over time, e.g. due to depreciations, and the changes in values of the collateral can be forecasted reliably the State may choose (or be required for large cases above EUR 25 mill.) to derive different credit margins taking future changes of collateral into account. The averaging outlined in the previous paragraph is then necessary in order to determine the reference rate including the margin.

These options shall only be applicable *prospectively* before the aid is granted. For aid schemes the options can be applied by considering representative cases covering most of the population. The State proves its result to the EC by a properly documented electronic spread sheet.

4.2.3 Opting-out option for the basis rates

Member States (and the EC itself) may mandate on their own cost an independent calculation agent (for example a central bank) who derives and publishes the reference basis rates for a particular currency and country or for a country group according to the basic principle for the basis rate outlined above. The agent assures a timely data feed to the EC via electronic data transfer and to the users via the internet. The published rates are binding for all users including the EC, provided they were correctly derived according to common banking standards.[45]

The agent may publish reference basis rates for more maturities and in a higher frequency than envisaged above. Moreover, the agent may additionally disclose discount rates rather than only par rates for the same maturities. However, the number of reference rates and the frequency should stay manageable for the EC (e.g. disclosure updates at most on a daily basis and disclosed maturities at the maximum for monthly money market rates and yearly swap rates up to 30 years). The agent also assures the availability of historical rates and quarterly averages.

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[44] The weighted average rate is explained in chapter 12.5 *Approximation for the basis rate*.

[45] It is indeed the authors' conviction that Member States wishing to grant aid are themselves responsible for deriving and providing the relevant data of their local markets rather than it would be the Commission's duty.

The EC may retrospectively apply quarterly averages for those particular maturities, which were re-garded by the standard approach, whenever there is doubt about the respective daily rate or if the additional research would cause undue cost.

4.2.4 Opting-out option for the entire reference rate

Only in cases where

- possible State aid in form of loans or guarantees is *granted through banks* or

- the discounting of a single *big State aid* above EUR 25 mill. or of big aid schemes above EUR 500 mill. is accomplished before the granting takes place,

Member States may mandate banks as calculation agents in order to derive market-based interest par rates and margin grids to be *prospectively* applied to loans and guarantees or discount rates for pur-poses of discounting aid.[46] For aid schemes the option can be applied by considering representative cases covering most of the population. Mandated banks shall apply their own calculation and rating tools. Member States shall utilise this option in a coherent way according to own guidelines in that similar kinds of aid are treated likewise.

The applied tools must comply with commercial banks' standards and must yield a better approxima-tion of local market rates than the basic approach outlined before. For example, finer granularities for rating grades and levels of collateralisation are typical for banks' pricing software. Both the reference basis rate and the reference loan margin should be compatible with the methodology and the principles outlined in this study.[47] I.e. the margin shall at least comprise the components expected loss on the ex-posure at default, regular up-front and accruing administrative costs, and an appropriate return on the supposed commercial banks' regulatory equity capital.[48] It is expected that an internal pricing model includes a minimum margin for all costs incurred but standard risk costs and cost of equity capital. The empirical results of the survey evidence a **minimum margin of 40 basis points** (apart from ad-justments regarding the loan amount according to Table 4-3).

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[46] State aid is granted through banks, for example, if the State guarantees a part of a bank loan at a below market guarantee fee.

[47] See chapter 4.1 *Standard approach* and chapter 11 *Model for the Reference Margin.*

[48] It is referred to chapter 11 *Model for the Reference Margin*, where the definitions and a methodology of loan pricing are outlined.

Potentially, it would be desirable to agree upon a uniform model for the EU and a single tool or a uniform set of model assumptions for the purpose of deriving the reference rate. However, the proposed model of the study notwithstanding an unanimous market standard can only arise through a broader discussion between affected and knowledgeable institutions such as development banks.

4.3   The new reference rate system's treatment of SMEs

Since the proposed reference rate system does not differentiate for firm size, the regulations and procedures emanating from the new system are applied to SMEs and larger corporates alike. The new system is based on loan markets that do not provide advantageous conditions for SMEs. The contrary is true. Because banks require higher margins for smaller loan amounts[49], funding for SMEs, which tend to demand smaller loans, is more expensive than for larger companies. A major factor behind this "SME premium" is the higher risk associated with SMEs (and thus smaller loan amounts). Consequently, the system does not allow for a favourable treatment of SMEs. Notwithstanding the logic of the proposed system, it remains a political question indeed, whether SMEs should be awarded an advantageous treatment, for example by permitting higher aid intensities for SMEs. The reference rate, however, would be the wrong instrument to advance SMEs.

4.4   Transition from the current system to the new system

The transition from the current to the new system is proposed to take place in form of a cut-off transition date, in order to ensure a practical procedure. This means that the change-over should proceed at a specified and previously announced cut-off date. After this date, the new reference rate system is exclusively valid and has to be applied to all **State aid decisions concerning aid granted after the cut-off date**. Discounting of aid granted before the cut-off date shall take into account the old reference rate system. Compounding of unlawful aid may utilise the old reference rate until the year end after the cut-off date and the new reference rate for the time thereafter.

4.5   Summary

The above rules have outlined the application of a standard and an advanced approach to determine the reference rate for particular cases. The standard approach constitutes a slight extension to the proce-

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[49] One reason is that fixed costs imply a higher margin for small loan amounts. For further explanations see chapter 14.2.2 *Reasons for the difference in margins between loans up to EUR 1 mill. and above*.

dures that are currently in force. Hence, the concrete translation into guidelines appears to be manageable. The advanced approach is, at least to a partial extent, already in use as in some cases Member States suggest to the EC the application of risk sensitive grid pricings and the utilisation of banks' rating systems. The advanced approach should therefore be expected to be embeddable into the Commission's procedures. The transition from the old to the new reference rate system can easily be managed via a cut-off transition.

In comparison to the current system, both proposed approaches would boost the market-proximity of the reference rate and enhance fairness of State aid control thereby. In case the European Commission considers the adjustment of the current reference rate regime in the direction outlined in this study, the authors recommend submitting the study for consultation to the Member States, which may themselves pass the study to development and central banks for inquiring professional feedback.

Deloitte.

Appendix

5 Important Developments since the Implementation of the Current System

Credit markets in Europe have experienced significant changes driven in part by modifications in financial supervisory regulations.

During the last couple of years, especially since the introduction of the euro, the European economies have become increasingly integrated. The development of the Economic and Monetary Union (EMU) as laid down in the Maastricht Treaty has led to a convergence of interest rates in the EMU countries as well as in the new Member countries. However, the interest rate differential vis-à-vis old and new Member States as well as potential Candidate States is still substantial (Baele et al., 2004) and is even bigger than among old Member States. This raises the question whether a uniform margin for the reference rate would be suitable for all Member States.

The development of the new Basel Capital Accord (Basel II) and of the implementation efforts by the EU for revising the capital adequacy directives for banks and investment firms respectively[50] have led to a stronger orientation of credit risk management and of credit conditions towards credit ratings of borrowers. Consequently, the majority of banks is extending and refining its credit calculation methods and systems (Gonzalez et al., 2004; PricewaterhouseCoopers, 2004).

The importance of international accounting standards, especially of the International Financial Reporting Standards (IFRS), has increased considerably. As of 2005 all listed firms have to disclose their consolidated financial statements based on IFRS (EU Parliament, EU Council, 2002). The IFRS require the disclosure of fair values of loans in the notes to the consolidated financial statements. Furthermore, they specify much more detailed regulations than are demanded by local law of most European States for calculating depreciation of a receivable. Especially credit institutions face the challenge to find a risk adjusted valuation for each individual loan (Merrill Lynch, 2004). Hence, the sensitivity with regard to a considerably precise estimation of default risk has been heightened and will further heighten.

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[50] See European Commission (2003a).

Another important development is the growing utilisation of capital markets and the increasing liquidity of interest rate derivatives and interest rate currency derivatives. In order to finance their operations, companies make increasingly use of bonds, which leads to higher price transparency. However, the volumes for liquid corporate bonds usually amount to at least EUR 50 mill. So the pricing information inherent in bonds cannot simply be transferred to loans of smaller volume. Moreover, there are only a few issuers from the new Member and Candidate Countries. Liquidity of swap markets in the old Member States has improved further whereas swap markets in the new Member and Candidate States are still in the development phase. For these countries deriving the reference rate based on the swap market might be difficult.

Merrill Lynch bond index volume

* Merrill Lynch redefined index constituents
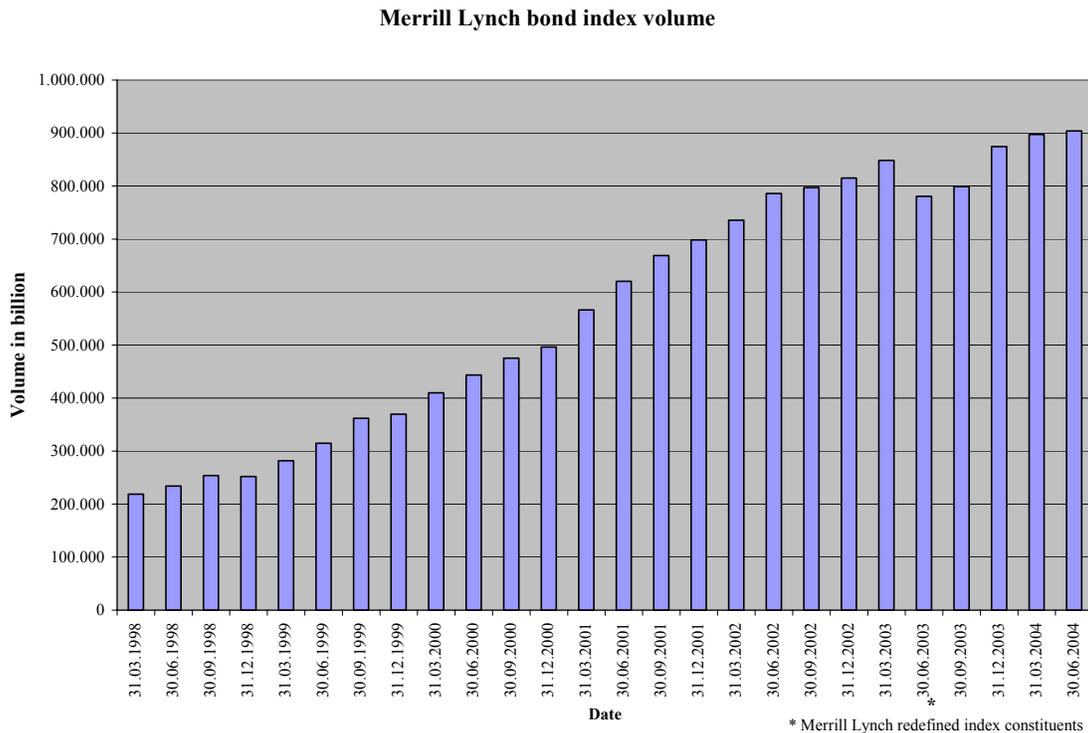
Figure 5-1

Source: Bloomberg: Merrill Lynch, Corporate Bond Investment Grade and High Yield Indices; authors' computation.

Credit defaults and significant quality deteriorations over the past few years have been accompanied by a temporary increase of risk premiums. As a consequence, the sensitivity for changing estimates of borrowers' respectively issuers' creditworthiness has increased leading to a higher volatility of credit spreads between risk free government bonds on one side and corporate loans and bonds, respectively, on the other side.

Average credit spreads of corporate bonds in Merrill Lynch's bond indices over government yields
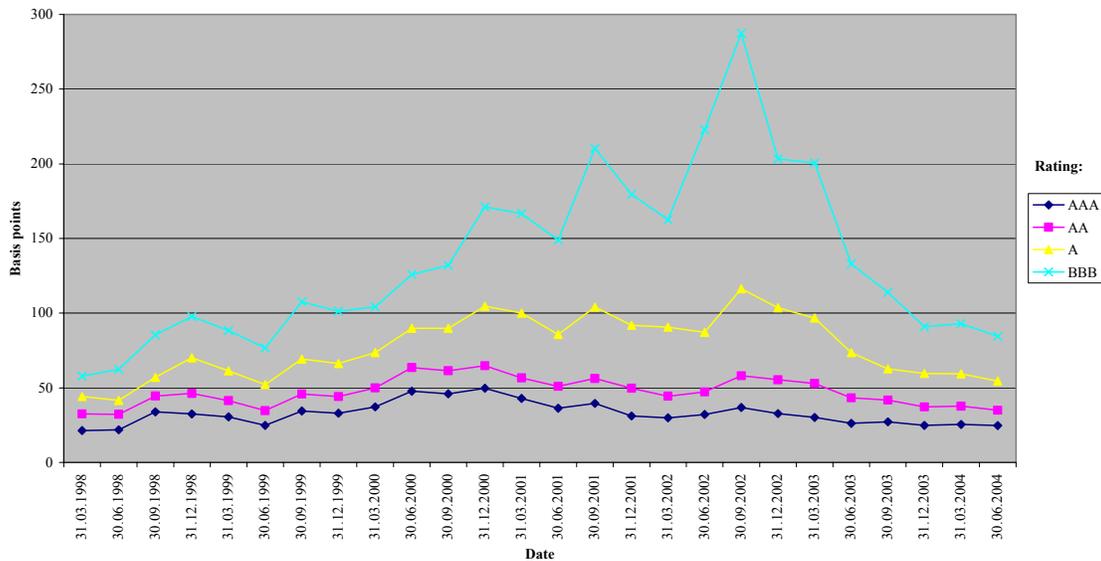
Figure 5-2

Source: Bloomberg: Merrill Lynch, Corporate Bond Investment Grade and High Yield Indices; authors' computation.

Through the growth of secondary markets for credit products and the subsequent higher tradability of loans credit markets have become more transparent. The securitisation of loans as well as the acquisition of loan portfolios requires a risk adjusted valuation of loans, which has - for example to determine a rating for a securitisation - to be executed based on more uniform standards than those applied in past practice.

Against the background of the above described developments certain trends indicating how to conduct a precise loan valuation have been solidified. Nevertheless, it is too early to refer to them as common and consistent banking standards. The credit markets within the EU States as well as in the Candidate States are still very heterogeneous and are currently more heterogeneous than it has been the case when the current system was implemented in 1997 for the old EU Member States.

Even though transparency of credit markets and risk orientation of credit calculation have increased during the last years, comparability of credit conditions has been achieved only to a small degree because of the heterogeneity of the relevant countries especially in low volume loans. In addition, setting up a common standardised system is complicated due to the different currencies under consideration. Here heterogeneity compared to 1997 has increased as well.

6   Assignment

Due to the developments described in chapter 5 *Important Developments since the Implementation of the Current System*, it has to be examined if the current system is still appropriate in a growing European Union. The objectives of a modern reference rate system for the EU accruing from the above developments and the resulting requirements for this study as laid down in the general invitation tender of the European Commission No COMP/2003/G/SAC21 (http://europa.eu.int/comm/competition/ state_aid/legislation/interest_rates/call_for_tender.pdf), the awarded procurement contract for the study (signed on 1 April 2004) and in the Brussels meeting of 2 April 2004 between Deloitte team members and members of the DG Competition will be illustrated in the following chapter.

The study at hand should serve as a substantial basis for setting up a reference interest rate system for the control of State aid in the old Member States (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Portugal, Spain, Sweden, the Netherlands and the United Kingdom), the new Member States acceded in May 2004 (Cyprus, Czech Republic, Estonia, Lithuania, Latvia, Hungary, Malta, Poland, Slovakia and Slovenia) and the Candidate States (Romania, Bulgaria and Turkey) (European Commission, 2004). Croatia, to which the Candidate status was awarded as recently as June 18, 2004, could be considered only partially. However, the reference rates should be applied not only after the accession of future Members but also in State aid control conducted by national State aid monitoring authorities before the accession. In this context it is important to mention that the proposed system should lend itself to possible extension to future Candidate countries (see chapter 14.2 *MFI statistics*).

The objective of the reference rate system is to provide a common and generally binding benchmark for the evaluation of State aid measures throughout Europe. Therefore, the system has to be representative in the sense that it seeks to mirror the individual practices of interest rate fixing in the European Member States (see chapter 14 *Empirics*). In order to achieve strong acceptance and efficient practicability the system has to be easily applicable, fair, transparent and easy to understand (see chapter 4 *The New Reference Rate System*). It should ensure ease of implementation and administration and should provide an efficient system of data collection (see chapter 13 *Efficient System of Data Collection*). Moreover, the system should be designed as an automatic or self-reporting system, in which updates are executed within defined intervals (see chapter 4.1 *Standard approach*). In this context it has to be examined to which extent a simplified approach would deviate from a more market-based calculation of the reference rate.

The study should be based on interest rate data gathered from the relevant banking markets throughout Europe. It should focus on interest rates actually paid for corporate loans taking into account core features such as maturity and reimbursement profile (see chapter 14.1 *Survey*). The study should come up with rates that are representative and, as far as possible, homogeneous in terms of average maturity and average credit risk (see chapter 14.1.2.1.4 *Questions about spreads*). Moreover, the rates should include commissions and banking fees.

Besides identifying a basic methodology for calculating a single reference rate for both current and new Members, the study should examine the need for a separate methodology, which meets the same conditions of simplicity, transparency and ease of administration, for large cases exceeding a certain threshold (see chapter 4.2.1 *Large cases of State aid*). In this context a comparison of the method to be developed and credit spreads measured on bond markets should be performed (see chapter 14.1.2.1.4 *Questions about spreads*). Additionally, the study should verify whether the basic methodology is also suitable for discounting purposes calculating the present value of aid spreading over a longer time period (see chapter 4.1.4.1 *Application to discounting*).

Furthermore, the study should explore the feasibility of developing a similar system to calculate the aid element of State guarantees (see chapter 4.1.4.3 *Aid elements of loans and guarantees*). Such a system should differentiate between guarantees for amounts up to EUR 5 mill. and above, whereby for the latter a more market-based approach based on the risk profile of the beneficiaries should be examined. The results should reflect risk premiums actually paid by enterprises for guarantees and/or unsecured loans in the respective credit markets, thereby taking into account the key variables determining the risk level and thus the risk premium.

In order to meet the above described objectives, the study has to examine whether the current system based on the five-year inter-bank swap rate plus 75 basis points is still appropriate for fixing the reference rate or whether a new system should be applied (see chapter 3 *Review of the Current System*). The study should take into account the availability of the relevant parameters in both the current Member States and the Candidate States. As a starting point, the study should make use of the current system based on a loan of EUR 5 mill. backed by normal security with a five-year repayment schedule for a company which is not a "firm in difficulties" in the meaning of the communities guidelines on State aid for rescuing and restructuring firms in difficulties (European Commission, 1999a). In addition, the study should clarify which extra premium should be added in case a loan is backed insufficiently or not at all, as in the current practice there is no standardised method to adapt the reference rate to situations involving above-normal risk (see chapter 4.1.2 *Risk grading and loan margins*).

7   Approaches for the Study

In the following, a short overview of alternative approaches considered towards developing the new reference rate system will be given. The survey among banks turned out to be the core foundation of the results. However, other approaches served for supportive analysis or validation.

7.1   Survey among credit institutions about credit margins based on risk factors

Naturally, the credit institutions in the individual European Countries have the most relevant knowledge about their credit calculation and the credit margins demanded by them. Therefore, it would be obvious to approach these institutions and ask them about their lending conditions.

However, the actual conditions agreed upon depend on very different factors like the level of funding rates, pledged security, term to maturity, competition and customer relation. It cannot be expected that banks disclose in detail the whole spectrum of their credit conditions and their practice of measuring price influencing factors. In addition, there might be adverse incentives for banks, if they benefit by their function as intermediaries from State-granted loans or guarantees or if they fear competition by the State as a loan provider.

Against the background of the required homogeneity of data, a detailed survey about actual credit conditions seems to be difficult to conduct. However, since the reference rate should meet those criteria such as applicability to a relatively large number of countries and loans, homogeneity in terms of maturity and lending risk, and being a market-based interest rate (see chapter 6 *Assignment*), average credit margins based on banks' actual conditions seem to be much more relevant for the purpose at hand rather than detailed data on individual credit margins of loans. Therefore, a survey that assesses credit institutions' average margins within a certain bandwidth for predefined standard loans should be possible to conduct within the scope of this study.

The survey and its results are discussed in chapter 14.1 *Survey.*

7.2   Survey among credit institutions about risk premiums based on individual loans

Empirically the pricing behaviour is expressed through actually negotiated interest rates on loans. Consequently, assessing credit institutions' interest rates on actually granted individual loans would yield a quite precise overview of actual credit conditions common among European banks.

However, each credit institution has its own way of collecting data on credit conditions. When granting new loans, the characteristics taken into account are not necessarily included completely in the data record for the portfolio. For example, some banks record only the nominal interest rate but not the internal rate of return, which reflects more accurately the profitability of the engagement by taking into account fees and discounts. Additionally, all price determining factors explaining the amount of the credit margin should be recorded. In order to ensure homogeneity and thus comparability, it is necessary to take into consideration the special systems and methods of the supplying credit institutions. Aside from an excessively high effort, usually legal problems, particularly regarding confidentiality, arise from this kind of survey.

Accordingly, the acquisition of EU-wide representative micro credit data within the project's time horizon is very demanding. Notwithstanding, the survey will include an inquiry about some micro data on loans. Unfortunately, the data turned out to be less suitable for a supportive analysis in appropriate time.

7.3   Analysis of credit spreads derived from corporate bond markets

Markets for corporate bonds have grown considerably. In the euro area a significant number of corporate bonds covering a large spectrum of price determining factors is listed. From the daily market prices risk premiums consistent with the market can be derived. Due to opportunity considerations, loans with equal characteristics provided to the same borrowers should have a similar credit margin, whereby small deviations can be explained with the fungibility and the specific costs of the transaction. Additionally, market prices for real and synthetic securitisations of loan portfolios as well as for credit derivatives could be used.

This approach has some advantages. Bond prices are available on a daily basis. Market movements are reflected immediately. Prices are fixed on a marked-to-market basis thereby reflecting the market equilibrium. Bonds are relatively homogeneous in terms of their structure (bullet and constant interest or margin).

However, with regard to the benchmarking of loan margins it appears disadvantageous that corporate bonds are generally issued in large amounts for major currencies. Moreover, in contrast to corporate loans, bonds are very liquid instruments. Usually bonds are not backed by securities and the volatility of their (traded) returns is high. In comparison to exchange quotations credit market prices are found through search and negotiation processes. These factors restrict the applicability of bond spreads to loans.

Because of their disadvantages the usefulness of corporate bond returns for deriving a reference rate for credit markets is limited. Only for large volume loans (at least EUR 50 mill.) in major currencies the capital market might serve as an adequate measure. Yet, corporate bond returns are helpful for empirically verifying certain qualitative effects. Through a regression of the risk premium by the risk factors interrelationships can be explained in order to derive a complete credit spread matrix. A possible regression could examine the relationship between the risk premium on the one side and rating, industry, term to re-pricing and volume on the other side. In this study data on bond markets will be used to validate the survey results (see chapter 14.1.2.1.4 *Questions about spreads*).

7.4   Collecting and analysing macro data on banks' loan allocation conditions

National central banks publish credit market statistics in regular intervals. Depending on the country, these statistics are more or less detailed. The main advantage is that macro data is publicly accessible and relatively quickly available. Hence, integrating macro data into the analysis would be straightforward.

Nevertheless, macro data consists of average values or other aggregates. The effect of price determining factors such as rating grades, security and term-to-maturity can hardly be isolated because the basic population of new loans for an individual country is heterogeneous and differs from country to country in terms of structure. Moreover, the national data collection requirements are not completely harmonised yet. Consequently, availability and comparability is limited.

It can be concluded that macro data is unsuitable to serve as basis for deriving a reference rate itself. Nonetheless, macro data will be used for the purpose of validating the results of the study (see chapter 14.2 *MFI statistics*). Macro date is especially useful in order to differentiate on average between high margin and low margin countries.

7.5   Deriving a reference rate based on a mathematical model used in banking

Most credit institutions employ mathematical models which, based on all relevant factors, determine the risk and market adjusted margin and the associated funding rate. The universe of available models reaches from simple approaches to models including very demanding stochastic processes. They indicate which nominal interest rates or margins, respectively, are appropriate. However, depending on the market environment, lending departments might deviate to a certain degree from these indications.

A major advantage of applying a model for deriving a reference rate is that a model can be better objectified than an empirical approach depending very much on the quality of utilised data. Financial experts should be able to assess if the derivation of reference rates is based on reasonable assumptions and data input, and if the necessary simplifications meet the conditions of capital markets better than an empirical approach. Furthermore, models are more flexible by a suitable parameterisation and can be adjusted to changing conditions.

On the other side, mathematical models are not always comprehensible for non-experts. Moreover, the parameters of the model have to be estimated empirically, which raises the same questions about availability, homogeneity and representativeness of the data. Consequently, a compromise between precise adjustment to market conditions and simplification has to be found.

Since a model is objective as well as flexible regarding specific market conditions and, if sufficiently simplified, can be imparted comprehensibly, it was the *preferred approach* for this study. Contrary to the authors' expectations, a simple model did not turn out to reflect the average surveyed margins in all circumstances. However, it remained a valuable tool in order to validate the general level of reported margins (see chapter 14.1.2.1.4 *Questions about spreads*). Furthermore, the authors' recommendation about utilising bank internal models is strongly driven by this perception.

7.6   Surveying credit institutions about their credit calculation and valuation methods

In addition to developing a mathematical model, the validity of the model and its parameters should be verified. This can be achieved through a survey among credit institutions.

The advantage of surveying market participants is that the models and input parameters employed in the banking industry can be identified and, in addition, the proposed model (see chapter 11 *Model for the Reference Margin*) can be assessed by practitioners. From data collection problems with respect to micro credit data will be abstracted, i.e. typical standard parameters like the return on equity are surveyed instead.

Nonetheless, even though there is a convergence towards certain credit calculation methods due to methodological and systems-technological progress, the universe of different approaches is substantial. Within the planned project period a survey can be realised only to a quite limited extend.

Consequently, because of the large number of alternative calculation methods a basic model reflecting common calculation techniques will be outlined for the study at hand. This model and its parameters will be verified through the survey (see chapter 14.1 *Survey*). Thus, selected commercial banks, central banks and supervisory authorities are able to comment on the model.

7.7 Summary

Accordingly, the study will combine most of the approaches described above. In particular the four central empirical approaches of this study are:

1. Conducting a survey among relevant market participants to derive average loan margins,

2. Inquiring for parameters and for comments on a pricing model and calibrating this model in order to validate reported margins,

3. Adjusting credit spreads of corporate bonds to loan market conditions to supply further evidence for loan margins, and

4. Analyse macro data so as to discover country-specific differences.

All four key aspects intend to achieve confidence about the finally compiled margins.

8   The Market-Based Benchmark for the Reference Rate

This section develops an understanding of the underlying principle of the reference rate and how it can suitably be compared to the interest on loans.

8.1   Definition of the reference rate

The reference rate is defined by its core function of determining State aid:

> The **reference rate is the critical value below which an interest rate** for a loan granted by a European Member State **is considered as being subsidised**, so that the corresponding loan is supposed to imply State aid.

Interest rates are deemed to be subsidised if they are favourable for the debtor in comparison to market conditions. A benchmark for the reference rate should therefore be market-based:

> The benchmark for the reference rate is the **average interest rate a debtor can agree on with banks** (or other loan providers) **under normal market conditions and at the arm's length principle**.[51]

Since loan markets are not fully information efficient the existence of a unique benchmark cannot be expected. Moreover, a single benchmark for every special circumstance regarding the debtor's characteristics and the contractual terms cannot feasibly be determined.

That raises the question which kind of approximation is appropriate for various debtors and loan structures; for example, whether the reference rate should be based on an average interest rate, on a lower bound or an upper bound of interest rates on loans.[52] The answer should be seen in the light of the purposes the reference rate suits and the Member States' and EC's possibly competing interest.

As the reference rate serves as a floor for interest rates on loans below which State aid is presumed, Member States granting loans (or guarantees) are interested in a lower reference rate (reference margin, respectively) being easier to exceed. The same is true for compounding of unlawful State aid since a State having granted the aid will supposedly not be interested in re-claiming too large amounts.

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[51] It is referred to the definition of the term „fair value" under IFRS, see IAS 39.9 (IASB, 2004 a).

[52] The lower/upper bound can be measured by a x%-quantile of a distribution properly fitted to reported margins (or by the n-lowest or largest reported margin of a sample). The empirical estimation of quantiles is less stable than the sample average.

However, the reverse attitude can be expected with regard to discounting purposes as a high reference rate would result in lower present values and grant equivalents thereby. Hence, States granting aid not in form of loans and guarantees but in instalments can be expected to desire a high reference rate. On the other hand, all those Member States strongly fostering the principle of free markets might wish to have a reference rate that aggravates State aid in general.

In principle, rules admitting leeway for interpretations should be construed in favour of the affected entity.[53] The consequence of applying this principle to the reference rate would be twofold since granting loans and compounding unlawful aid compete with discounting aid regarding affected entities' interests. To meet both goals for a broader group of debtors and types of loan contracts the reference rate would need to differentiate according to the case it is applied to, i.e. a minimum rate would be applicable to compounding unlawful State aid and serves as a benchmark for loans and guarantees while the maximum rate would be applicable to discounting aid, which is not granted in form of a loan or a guarantee.

Though such a twofold approach might favour affected entities it is more complex to derive and to implement and thereby impractical.[54] It is also stressed by the European Commission (1997b) that the reference rate shall be based on the *average* interest rates on loans.

<div align="center">The study will consider the average margin to be the relevant measure.[55]</div>

However, it is also recommended by the study to allow States to mandate calculation agents or to apply own models, because it is recognised by the study that the variety of countries, markets, debtors, and loan types cannot be closely approximated by a uniform approach (see chapter 4.2 *Advanced approaches*).

The reference rate would be regarded as fair if it coincides with the benchmark for the respective lending markets. Interest rates of loans can be decomposed into the basis rate and the loan margin, which also includes a non-liquidity premium (credit margin and credit spread are used synonymously).

<div align="center">Interest rate = basis rate + reference margin</div>

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[53] The legal consideration is not part of the study.

[54] It would indeed not be reasonable to apply two different reference rates to the same beneficiary receiving aid in different forms.

[55] Considering the average does not preclude making adjustments in direction of a lower or an upper bound according to *political* considerations.

The basis rate is applicable to debtors without or with low credit risk. Since good rated banks have a low credit risk and have to re-finance loans, the inter-bank offered rate (like EURIBOR or LIBOR) and swap rates would be a natural choice for the basis rate. Actual yields on government debt are reasonable substitutes for IBO-rates and swap rates if the latter are not available from quotes of a liquid market. Government yields have to be adjusted in order to reflect banks' funding costs.[56]

Once the basis rate is appropriately chosen, it remains to be checked whether the credit spread is below a "reference credit spread" for the particular loan and debtor. Thus, it has to be shown how an appropriate basis rate and a fair benchmark for the credit spread, both adding up to the particular reference rate, can be derived.

8.2   Comparison to the interest rate of a loan

Notwithstanding the derivation of the reference rate, it is likewise not straightforward to determine the margin of a loan. This, however, might be necessary if a State wishes to report margins rather than the entire interest rate in order to determine the aid element under an advanced approach. For the case of a standard loan[57] it is straightforward to determine the basis rate and the credit spread as the basis rate would be directly observable from inter-banking markets[58] while the credit spreads is the residual. However, only a portion of loans to corporate enterprises have these characteristics.

Interest basis rates are not observable for all contractual possibilities regarding payouts and the payment of interest and redemption. For instance, a loan may exhibit a loan discount or a provision that no interest is charged for the first two years. Interest basis rates are par-rates in the inter-bank market according to regular interest payments and a final redemption.

If a loan contract deviates substantially from typical products of the inter-bank market, it is necessary to derive a basis rate by a formula rather than by assigning a basis rate for a similar product. Some simple calculations show that the basis rate of a loan can be approximated by a weighted average of the par-rates that are valid for maturities of the respective redemptions (see 12.5 *Approximation for the basis rate* for the formula).

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[56] Under the current reference rate regime the adjustment is an add-on of 25 basis points, see chapter 3 *Review of the Current System*. The proposed adjustment is outlined in chapter 4.1.1 *Reference basis rate* and motivated in chapter 14.3.3 *Spread between basis rates and government yields.*

[57] A standard receivable can be defined by the following characteristics: Single payout of the notional at the date when interest is fixed the first time, redemption of the notional at maturity a number of complete years in the future, and annual payments of interest on the notional amount.

[58] Inter-bank rates may require other day counting and compounding conventions, which should be observed for large cases of State aid (say above EUR 50 mill.) under the advanced approach.

The same complexity arises with the interest rate of the loan. The nominal interest rate is not the true measure of financing costs whenever the payments deviate substantially from the inter-banking conventions. A better measure is the effective interest rate or, in other terms, the "internal rate of return" or the "yield-to-maturity". The effective interest rate discounts all future payments to the cost of acquisition of the loan (see chapter 12.1 *Effective interest rate* for the formula).[59]

After having determined the appropriate basis rate and the effective interest rate it is possible to derive the implied credit spread by:

Credit spread = effective interest rate - basis rate

And there is not supposed to be evidence for State aid if:

Credit spread ≥ reference margin

Chapter 12 *Specific Formulas* deals with the problem of deriving the basis rate and the loan margin if the loan admits more complex redemption structures than a single final redemption.

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[59] See also the definition in IAS 39.9 (IASB, 2004a) and the corresponding application guidelines.

9   Functions of the Reference Rate

According to article 87 of the EC Treaty (2002), any aid granted by a Member State or through State resources, which distorts or threatens to distort competition, should, as far as it affects trade between Member States, be incompatible with the common market. However, articles 87 (2) and 87 (3) contain a list of measures which are or may be considered compatible with the common market. The difference between the two articles is that for the measures listed in article 87 (2) the Commission enjoys no discretion, while for article 87 (3) the Commission enjoys a wide discretion. Thus, if the conditions mentioned in article 87 (2) are fulfilled, the State aid is automatically compatible. For the measures listed in article 87 (3) the Commission has adopted a series of guidelines, communications etc. which lay down the criteria the Commission uses in assessing these aids. Examples of these include the framework for research and development (96/C 45/06), the environmental aid guidelines (2001/C 37/03), the rescue and restructuring guidelines (1999/C 288/02) and the regional aid guidelines (98/C 74/06). In addition to article 87, article 89 gives the Council the power to adopt regulations for the application of articles 87 and 88. Based on this article, the Council adopted the so-called enabling regulation (994/98), which enables the Commission to adopt series of regulations like those covering de minimis aid (69/2001), and block exemption regulations on training aid (68/2001), aid for SMEs (70/2001) and employment aid (2204/2002). According to these block exemption regulations, aid meeting all the conditions laid down in these regulations is considered compatible and does not need to be notified to the Commission.

In order to apply the above-mentioned regulations and to monitor compliance, the Commission has implemented the reference rate system subject to this study. The system identifies State aid and classifies identified grants as legal respectively illegal aid. Within the system the reference rate has three core functions:

1. Indicator for unlawfully granted State aid,

2. Discount rate for calculating grant equivalents and tax charges,

3. Compound rate for calculating the recovery of unlawful aid.

In its function as indicator the reference rate serves as a threshold to determine whether loans should be classified as State aid or not. For this purpose the reference rate is compared to the interest rates for loans granted by the State and close-by institutions or backed by a guarantee. A loan interest rate below the reference rate might indicate State aid. Consequently, the Commission has to verify whether this aid complies with the relevant regulations and can thus be classified as being lawfully or whether it is granted in violation of the regulations and must be classified as illegal State aid.

As discount rate the reference rate is mainly used to calculate the net grant equivalent (NGE). In order to evaluate and classify different forms of State aid measures in favour of different purposes and across different Member States the various manifestations of State aid have to be comparable. Therefore, a standardised aid element has to be derived from the individual aid measures. Hence, the EC converts aid notified by Member States into aid expressed in the NGE.

The NGE of aid is the benefit accruing to the recipient after payment of taxes on company profits, i.e. the net gain from the grant. It is expressed in percent of the investment and constitutes the basis on which grants are classified. In all cases of State aid, in which aid and/or investment expenditure is staggered or written off over time (which applies for virtually all grants), the reference rate is an important component of the calculations of the NGE. The rationale here is that all relevant monetary amounts set over several time periods have to be discounted back to the period in which aid was granted the first time. In the corresponding regulations (Commission Regulation 68/2001, 69/2001, 70/2001) the European Commission (2001a,b,c) States that calculating the grant equivalent requires the use of market interest rates prevailing at the time of the grant. The market rates for the purpose of these regulations should be deemed to be the reference rates (provided that, in the case of a subsidised loan, the loan is backed by normal security and does not involve abnormal risk).

Among other forms, State aid can be granted as a cash grant paid out at once or in several instalments, as a subsidised loan or as a guarantee for a loan. In all three forms discounting the relevant series of amounts is usually a considerable part of the calculations to determine the NGE. The reason is that cash grants are typically written off over more than one year or are disbursed in several instalments and that for loans interest and redemption is commonly paid over a couple of years. Within this context discounting is used to determine the present value of a grant or an investment disbursed in several instalments, to calculate the present value of benefits obtained on repayment of a subsidised loan and to compute the additional tax burden resulting from a grant (see chapter 9.5 *Calculating the aid element resulting from interest subsidy schemes for loans*).

If a grant or an investment is staggered over several periods, the individual cash flows have to be discounted back to the end of the year, in which the enterprise makes its first depreciation write-off. The resulting present values enter the subsequent NGE calculations.

In case of a subsidised loan or a guarantee for a loan (leading to a lower interest rate) the reference rate serves to discount the benefits obtained on repayment of the loan (the percentage rebate due to the subsidy or guarantee multiplied by the loan balance outstanding).

As the NGE is the benefit of a grant after taxes, determining the NGE requires the calculation of the additional tax charge due to the grant. According to the Guidelines on National Regional Aid (EU Commission, 1998) in most cases, grants are not taxable in themselves. However, they are deducted from the value of the depreciable investment. Therefore, the investor would have depreciated a smaller amount each year than if he had not received the grant. Since depreciation amounts are deductible from taxable profits, a grant increases taxable profits and thus annual tax payments. The higher tax payments mean a sort of partial reimbursement of the grant. Consequently, corporate taxes play a substantial role in determining the net benefit from State aid. Because investments are usually written off over time, the grant reduces depreciable investments over several years by a certain fraction of the grant (depending on the depreciation method applied). Thus, the yearly grant fractions have to be discounted back to the end of the year, in which the enterprise makes its first depreciation write-off. Based on these present values the additional tax charge is calculated. Similarly, the tax burden for aid paid out in instalments and for subsidised loans or loan guarantees can be determined in this way.

Other forms of State aid comprise tax exemptions, tax incentives, social security exemptions, provision of goods and services, sale of land at below-market prices, purchase of goods and services at above-market prices, capital injections, accelerated depreciation allowances, aid for the renting of a building, aid for the renting of land and aid to finance leasing.

A special case is the calculation of recovery of aid granted unlawfully. The European Commission (2003b) has specified that for the recovery of unlawfully granted aid the reference rate, which is used for calculating the NGE of regional aids, shall be applied on a compound basis. Thus, the reference rate is used for compounding payments rather than discounting them. Compounding shall take place on an annual basis.

9.1   Applications of the reference rate within the European Union

In order to make the various forms of aid comparable with one another and the aid intensities comparable from one Member State to another, the Commission converts aid notified by Member States into aid expressed in the NGE. The NGE of aid is the benefit accruing to the recipient after payment of taxes on company profits (EU Commission, 1998).

Among others, determining the NGE might be required for payments in the context of the following regulations: Training aid (EU Commission, 2001a), de minimis (EU Commission, 2001b), State aid to SMEs (EU Commission, 2001c) and State aid for employment (EU Commission, 2002). In the above mentioned regulations the EC states that calculation of the grant equivalent requires the use of market interest rates prevailing at the time of grant. The market rates for the purpose of these regulations should be deemed to be the *reference rates* (provided that, in the case of a soft loan, the loan is backed by normal security and does not involve abnormal risk).

Furthermore, the *reference rate* shows to be important in the context of State aid in the form of guarantees (EU Commission, 2000), recovery of unlawfully granted aid (EU Commission, 2003b) and rescue aid (EU Commission, 1999a).

9.2   Discounting the additional tax charge due to a grant

Usually, grants are not taxable in themselves. However, they are deducted from the value of the depreciable investment. Therefore, the investor would have depreciated a smaller amount each year than if he had not received the grant. Since depreciation amounts are deductible from taxable profits, a grant increases taxable profits and thus annual tax payments.

When aid and/or investment expenditure is staggered or written off over time, the investment expenditure and aid payments have to be discounted back to the end of the year, in which the enterprise makes its first depreciation write-off (EU Commission, 1998). The discount rate used in such cases is the *reference rate* determined by the EU Commission.

Consider the case, in which the grant, which is subject to tax on a straight-line basis over five years, is disbursed in one single payment. One fifth of the aid will thus be added to corporate profits each year for five years.

Investment: 100

Nominal grant: 20

Corporate tax rate: 40%

Discount rate (reference rate): 8%

Period	Annual fraction of grant reducing depreciation (1)	Discount factor: 8% (2)	Discounted payments (1)*(2)	Corporate tax rate (3)	Discounted annual taxes (1)*(2)*(3)
End of 1st year	4.00	100.00%	4.00	40%	1.60
End of 2nd year	4.00	92.59%	3.70	40%	1.48
End of 3rd year	4.00	85.73%	3.43	40%	1.37
End of 4th year	4.00	79.38%	3.18	40%	1.27
End of 5th year	4.00	73.50%	2.94	40%	1.18
Nominal grant	20.00	Total discounted payments	17.25	Total tax charges	6.90

Table 9-1

(Nominal grant – Total tax charge)/Investment = NGE

$$NGE = (20 - 6.9) \div 100 = 13.1\% \text{ of the investment}$$

In this case the *reference rate* is important for calculating the discount factor, which is used to discount the additional tax payments corresponding to the grant amount accruing each year. Thus, the *reference rate* is employed as discount rate.

9.3 **Measuring the grant equivalent of aid that is disbursed in several instalments**

In cases in which the aid does not take the form of a single payment rather than a series of several payments it is necessary to determine the single payment grant equivalent of aid disbursed in several instalments.

In order to determine the grant equivalent in case of a grant paid out in several instalments the individual instalments have to be discounted back to the end of the period, in which the first payment is written off. The discounted payments add up to the gross grant equivalent.

To determine the NGE, the individual discounted payments have to be multiplied with the respective corporate tax rate. The resulting periodical tax payments add up to the total tax charge, which has to be subtracted from the gross grant equivalent to yield the NGE.

Consider a case similar to the one above. However, the grant is paid out in five equal instalments over five years.

Investment: 100

Nominal grant: 20

Corporate tax rate: 40%

Discount rate (*reference rate*): 8%

Period	Yearly In-stalments (1)	Discount factor: 8% (2)	Discounted pay-ments (1)*(2)	Corporate tax rate (3)	Annual taxes (1)*(2)*(3)
End of 1st year	4.00	100.00%	4.00	40%	1.60
End of 2nd year	4.00	92.59%	3.70	40%	1.48
End of 3rd year	4.00	85.73%	3.43	40%	1.37
End of 4th year	4.00	79.38%	3.18	40%	1.27
End of 5th year	4.00	73.50%	2.94	40%	1.18
		Total discounted payments	17.25	Total tax charges	6.90

Table 9-2

(Present Value of nominal grant – Total tax charge)/Investment = NGE

$$NGE = (17.25 - 6.9) \div 100 = 10.35\% \text{ of the investment}$$

In this case the *reference rate* is important for calculating the discount factor, which is used to discount the additional tax payments corresponding to the grant amount accruing each year and the present value of the total grant amount. Thus, the *reference rate* serves as discount rate.

9.4 Determining the present value of the grant and the investment

When in addition to the grant payments the investment is also staggered over several periods, the individual investment expenditures have to be discounted back to the first write-off period as well.

Consider the following case similar to the first one. However, the investment is made in five equal amounts over five years.

Investment: 100

Nominal grant: 20

Corporate tax rate: 40%

Discount rate (*reference rate*): 8%

Period	Annual invest-ment (1)	Annual grant in-stalments (2)	Discount factor: 8%) (3)	Discounted investment expenditure (1)*(3)	Dis-counted payments (2)*(3)	Corpo-rate tax rate (4)	Annual taxes (2)*(3)* (4)
End of 1st year	20.00	4.00	100.00%	20.00	4.00	40%	1.60
End of 2nd year	20.00	4.00	92.59%	18.52	3.70	40%	1.48
End of 3rd year	20.00	4.00	85.73%	17.15	3.43	40%	1.37
End of 4th year	20.00	4.00	79.38%	15.88	3.18	40%	1.27
End of 5th year	20.00	4.00	73.50%	14.70	2.94	40%	1.18
Total				86.24	17.25		6.90

Table 9-3

(Present value of nominal grant – Total tax charge)/Present value of investment = NGE

$$NGE = (17.25 - 6.9) \div 86.24 = 12\% \text{ of the investment}$$

Apart from calculating the additional tax charge and the present value of the grant, the *reference rate* is used to determine the discounted value of the individual investment expenditures summing up to the present value of the investment, which is part of the NGE formula.

9.5 Calculating the aid element resulting from interest subsidy schemes for loans

This point might be especially important for the definition of rescue aid. The corresponding Community Guideline (EU Commission, 1999a) states that when a liquidity support is provided in form of a loan guarantee or a loan, the loan must be granted at an interest rate at least comparable to those observed for loans to healthy firms and in particular to the reference rates adopted by the EU Commission.

Investment aid given to an enterprise in the form of a subsidised loan is expressed first as the number of percentage points of the rebate, i.e. the difference between the reference rate and the rate charged by the lender.

As in the case of capital grants, the NGE is expressed as a percentage of the investment. Since interest charges are deductible from taxable profits, an interest subsidy means an increase of profits and consequently higher tax payments.

9.5.1 Discounting the interest benefit in case of a straight-line loan repayment

Consider the following case:

    10-year loan with straight-line repayment and no grace period
    Rebate of three percentage points throughout the period of the loan
    The discount (*reference*) rate is i = 8%, i.e. nominal interest rate i' = 5%
    The loan covers 40% of the investment
    Tax rate: 35%

Calculating the unit gift element (the nominal grant equivalent of a one-point interest rebate on a loan of 100% of the investment, taking account of the characteristics of the aid used as parameters):

End of year No	Loan: balance outstanding	1-point rebate	Benefit obtained	Discount factor: 8%	Discounted benefit
	(1)	(2)	(1)*(2)	(3)	(1)*(2)*(3)
1	100.00	1%	1.00	92.59%	0.93
2	90.00	1%	0.90	85.73%	0.77
3	80.00	1%	0.80	79.38%	0.64
4	70.00	1%	0.70	73.50%	0.51
5	60.00	1%	0.60	68.06%	0.41
6	50.00	1%	0.50	63.02%	0.32
7	40.00	1%	0.40	58.35%	0.23
8	30.00	1%	0.30	54.03%	0.16
9	20.00	1%	0.20	50.02%	0.10
10	10.00	1%	0.10	46.32%	0.05
				Unit aid element	4.11

Table 9-4

The NGE is obtained by multiplying the unit aid element by the characteristics of the aid:

$$NGE = 4.11 \times 3 \times 40\% \times (1 - 35\%) = 3.21\% \text{ of the investment}$$

The *reference rate* is employed to determine the discounted values of the benefits obtained and the corresponding tax disadvantages resulting from the interest rebate.

9.5.2 Discounting the interest benefit in case of constant annual instalments (annuity)

When the loan is repaid in constant annual instalments, the reference rate is used to calculate the instalments and the corresponding rebated instalments as well.

Consider the following case of a loan with the same parameters as described above. However, the loan is repaid in constant annual instalments and there is a grace period of two years.

Rebate of three percentage points throughout the period of the loan

The discount (*reference*) rate is i = 8%, i.e. i' = 5%

The loan covers 40% of the investment

Tax rate: 35%

Year	Normal instalment $=i/(1-r\char`\^n)$ $r=1/(1+i)$ (1)	Rebated instalment $=i'/(1-r'\char`\^n)$ $r'=1/(1+i')$ (2)	Benefit obtained (3)	Discount factor: 8% (4)	Discounted benefit (3)*(4)
1	8.00	5.00	3.00	92.59%	2.78
2	8.00	5.00	3.00	85.73%	2.57
3	17.40	15.47	1.93	79.38%	1.53
4	17.40	15.47	1.93	73.50%	1.42
5	17.40	15.47	1.93	68.06%	1.31
6	17.40	15.47	1.93	63.02%	1.22
7	17.40	15.47	1.93	58.35%	1.13
8	17.40	15.47	1.93	54.03%	1.04
9	17.40	15.47	1.93	50.02%	0.97
10	17.40	15.47	1.93	46.32%	0.89
				Grant equivalent	14.86

Table 9-5

The NGE is obtained by multiplying the unit aid element by the characteristics of the aid:

$$NGE = 14.86 \times 40\% \times (1 - 35\%) = 3.86\% \text{ of the investment}$$

Besides determining the discounted values of the benefits obtained through a 3-point rebate and the corresponding tax disadvantage, the *reference rate* is employed to determine the annual regular instalments and the rebated instalments.

9.5.3 Formulas for calculating the NGE of a subsidised loan

The NGE calculations for both types of loan, with straight-line repayment and with repayment in constant annual instalments, can be summarised in two formulas:

Straight-line repayment:

$$NGE = (1 - T) \times Q \times \left(1 - \frac{i'}{i}\right) \times \left(1 + \frac{r^P - r^F}{i \times (P - F)}\right)$$

Repayment in constant annual instalments:

$$NGE = (1-T) \times Q \times \left[1 - \left(\frac{i'}{i} \right) \times \left(1 - r^F + \frac{r^F - r^P}{(1-r')^{P-F}} \right) \right]$$

Terms:

i: the reference rate per interval and r = 1/(1+i)

i': the subsidised rate per maturity interval and r' = 1/(1+i')

P: the period (in number of maturity intervals) of the loan

Q: the proportion of investment covered by the loan

T: the tax rate

F: the period, in number of intervals, of any grace period from repayment of principal

9.6 Calculating the grant equivalent of a loan guarantee

The Commission Notice on the application of articles 87 and 88 of the EC Treaty to State aid in the form of guarantees (EU Commission, 2000) states that the there are two common ways to calculate the cash grant equivalent of a loan guarantee in a given year:

1. The difference between the market rate (reference rate) and the rate obtained through the State guarantee (usually lower than the market rate because of higher security provided through the guarantee) after any premiums paid have been deducted multiplied by the outstanding sum guaranteed.

2. The difference between the outstanding sum guaranteed, multiplied by the risk factor (probability of default) and any premiums paid, i.e. guaranteed sum * risk factor – premiums.

For individual guarantees, the first method should in principle be the standard form of calculation, while for guarantee schemes the second one should prevail.

The yearly cash grant equivalents should be discounted to their present value using the reference rate. The sum of the individual present values yields the total cash grant equivalent.

Consider the following case of a guarantee safeguarding a corporate loan:

> 10-year loan with straight-line repayment and no grace period
>
> Rebate of three percentage points throughout the period of the loan
>
> The discount (*reference*) rate is i = 8%, i.e. nominal interest rate i' = 5%
>
> The guarantee covers 100% of the loan and 100% of the investment
>
> Tax rate: 35%

End of year No	Loan: outstanding sum guaranteed (1)	1-point rebate due to guarantee (2)	Cash benefit obtained (1)*(2)	Discount factor: 8% (3)	Discounted benefit (1)*(2)*(3)
1	100.00	1%	1.00	92.59%	0.93
2	90.00	1%	0.90	85.73%	0.77
3	80.00	1%	0.80	79.38%	0.64
4	70.00	1%	0.70	73.50%	0.51
5	60.00	1%	0.60	68.06%	0.41
6	50.00	1%	0.50	63.02%	0.32
7	40.00	1%	0.40	58.35%	0.23
8	30.00	1%	0.30	54.03%	0.16
9	20.00	1%	0.20	50.02%	0.10
10	10.00	1%	0.10	46.32%	0.05
				Unit cash grant equivalent	4.11

Table 9-6

The cash grant equivalent is: $4.11 \times 3 = 12.34$

Since, the NGE is expressed as a percentage of the investment rather than as the difference between two interest rates, it has to be calculated as described in chapter 9.5 *Calculating the aid element resulting from interest subsidy schemes for loans* thereby making use of the *reference rate* as well. Consequently, the NGE is equal to:

$4.11 \times 3 \times (1 - 35\%) = 8.02\%$ of the investment

As in the case of the subsidised loan, the *reference rate* is used to determine the discounted cash benefit as well as the tax disadvantage of the interest rate rebate.

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9.7 Calculating the recovery of aid granted unlawfully

In the case of the recovery of unlawfully granted aid, the EC will apply the *reference rate* used for calculating the NGE of regional aids on a compound basis. Compounding should take place on an annual basis (EU Commission, 2003b).

The interest rate (*reference rate*) to be applied shall be the rate applicable on the date on which unlawful aid was first put at the disposal of the beneficiary.

The interest rate (*reference rate*) shall be applied on a compound basis until the recovery of the aid.

Consider the case where a company has received an unlawful aid five years before the date of recovery. The *reference rate* is 8% and the aid amount paid out was 100.

Then the recovery is: $100 \times (1 + 0.08)^5 = 146.93$

The interest rate (*reference rate*) shall be applied throughout the whole period until the date of recovery. However, if more than five years have elapsed between the date on which the unlawful aid was first put at the disposal of the beneficiary and the date of recovery of the aid, the interest rate shall be recalculated for intervals of five years, taking as a basis the rate in force at the time the rate is recalculated.

10   Examples of Applying the Reference Rate

This section contains ten examples. The first nine examples are based on actual cases provided to the authors by the EC DG Competition. They have been altered and made anonymous as far as they are not published in the Official Journal. However, for the EC it is possible and for the respective Member State it might be possible to identify these cases. The authors do not advance any particular opinion on the cases rather than to prove the applicability of the proposed system to them. It is neither within the scope of this study to unroll complete cases nor is special attention devoted to legal considerations. The last example compares the standard approach with an advanced proceeding in which redemptions are taken into account. Most concrete numbers of margins and basis rates refer to the particular case or to chapter 4.1 *Standard approach* while the remaining ones are purely fictive numbers.

Apart from specific exceptions, the analysis of the single cases led to the following coarse categorisation of aid forms and to the abstract assessment about the relative applicability (availability of data, incurred effort, possibility of monitoring) and fairness (precision of pricing, lack of arbitrariness, assurance of compliance) of the standard and the particular advanced approach that requires a mandated bank to determine a margin pricing (excluding other advanced options):

Kind of aid	Point of view	**Standard Approach**		**Advanced Approach** (involving banks' pricing)	
		Applicability	**Fairness**	**Applicability**	**Fairness**
Loans & guarantees (Examples 1, 4, 5, 7)	**Prospec-tive**	*Easy*	*Mediocre*	**Good**	**High**
Discounting aid (Examples 2, 6, 8)	**Prospec-tive**	**Easy**	**Good**	*Large cases or big schemes*	*Improved*
Determining and compounding of unlawful aid (Examples 3, 9)	**Retro-spective**	**Easy**	**Reasonable**	Difficult	Improved

By and large, for the average cases the green coloured options (bold) are preferentially recommended, the orange coloured options (italics) appear to be reasonable for some cases while the red coloured alternative seems to be inappropriate for most instances.

10.1 Example 1

Consider a guarantee scheme aiming to guarantee a subordinated portion of bank loans maturing in between three and twelve years. Each loan is of considerable size. A bank is always involved. The loans are secured by the investment good, the costs of which are funded by

- 20% by owners' equity capital ranking lowest,

- a further 20% by the portion of the loan being guaranteed by the State and

- the remaining 60% by the senior tranche of the loan ranking first.

The State may either apply the standard or the advanced approach according to its guidelines.

1. Under the standard approach the bank, which grants the loan, accomplishes the rating. According to the internal rating grade, the debtor is mapped to the rating categories provided for the standard approach, say "good" for example. As the guarantee secures a subordinated part of the loan "low" collateralisation is presumed. The reference margin is chosen according to "good" creditworthiness and "low" collateralisation (150 bp) less the discount for guarantees (20 bp). Depending on the considerable amount of the loans a further adjustment applies (10 bp). Hence, the applicable margin would be: $150 - 20 - 10 = 120$ basis points.

   The margin is compared to the fee the State receives for the guarantee. The cash flow based on the difference by which the margin exceeds the fee is discounted by the applicable reference rate. The reference rate comprises the already determined reference margin and the reference basis rate on the day the loan is granted according to the maturity of the loan. Up to 2.5 years to maturity (not relevant in this case) the basis rate for one year (6.7%) applies and over 7.5 years the 10-year rate (7.32%) is applicable while in between the 5-year rate (7.47%) is chosen. If any of these rates is not available, the next closest rate is chosen instead. This calculation yields the grant equivalent. The State might have two options to prove that aid is in line with regulations:

   a) The bank determines for each single loan the guarantee fee, which the State will receive, by discounting the future aid elements of the guarantee in order to meet the allowed aid intensity. The State may just provide the framework in that the allowed rating grades and intensities are better specified.

   b) The State compiles a fee grid (e.g. for different combinations of risk factors as under the standard approach) the elements of which ensure each the compliance with allowed aid intensities. The grid may reflect representative cases of possible aid and aid addressees.

As the reference rate changes over time the grid may either take into account possible downward movements by an appropriate cushion in the fee or evaluates the grid regularly depending on the magnitude of aid, say quarterly for medium loan sizes.

2. Under the advanced approach the risk grading and the pricing is completely performed by banks according to their internal systems. The granting bank must assure that the derived guarantee fee (say 1.5%) would be at least a just acceptable fee for the bank to undertake the State's transaction itself. This would be the reference margin, which is supposed to be government-controlled for each case. Next, the bank determines the actual guarantee fee so that it is compliant with allowed aid intensities and the framework imposed by the State (say 1.1%). The aid element (here 0.4%) is discounted by zero rates (say 8%) the bank derives by internal systems that are compliant with the aforementioned requirements. The calculations are carried out similarly to option a) above. Since the State receives the information about risk grades and fees supposedly from more than one bank (otherwise the question of favouring a single bank would emerge) the State would be able to monitor banks and to report about the scheme to the EC on a regular basis.

10.2   Example 2

Consider a tax relief that is conceded to a certain industry and which permits a higher depreciation of an investment than regular tax rules would permit. Typically, depreciations continue until the investment is written off completely. Depending on the legislation, such tax reliefs could only be exploited if the business produces gains within the respective depreciation period because losses are not taxed though could possibly be postponed in order to offset gains in later periods. Hence, in determining the reference rate one should observe the higher risk of the occurrence of net losses over the depreciation period. This risk is comparable to the risk of equity debt (not taking into account the benefit of the particular depreciation), for instance depending on past experience with tax revenues from that industry.

Since it is certainly impractical to evaluate each beneficiary's creditworthiness if those comprise a large number of entities, the State would determine a suitable average rating category for the whole industry e.g. "satisfactory" taking into account higher risk of gains. The applicable margin is chosen from the table according to that average rating and "low" collateralisation (340 bp). The reference basis rates would be chosen according to a standard case in which tax payments occur regularly every year (e.g. discounting by 6.7% for year 1 and 2, by 7.46% for years 3 to 7, and by 7.32% for years 8 and above). The current basis rates plus the margin are applied to the discounting of the tax effects consisting of the tax advantages of early periods and tax disadvantages of later years.

Tax law is typically very invariable as it cannot be changed in most countries within a short period of time. The State would consider the period (say one year) it needs to adjust the tax rules in order to find an appropriate buffer in terms of a distraction from the basis rates, which appropriately reflects future movements of the interest rates (13.4% less the actual rates). The dependence of the grant equivalent on the depreciation period reveals the leeway the State has for tax reliefs before violating State aid regulations.

The advanced approach is less applicable to this case.

10.3   Example 3

This example is based on the EC's decision on State aid granted by France to Crédit Mutuel.[60] France exempted specific consumer deposits placed at Crédit Mutuel from tax. The deposits were intended to be transferred to funds for investments of public interest. However, Crédit Mutuel was allowed by France to use some parts of the deposits for own funding. In the course of the discussion about the admissibility of that privilege, the bank transferred all deposits but received a commission fee of 1.3%. This fee was claimed to be too high. Moreover, the bank was said to benefit from cross-selling to customers who were attracted by the favourable conditions of the tax-free deposits.

As the bank was able to raise funding without considerable effort of marketing its deposits and of setting competing deposit rates the funding could be compared to senior banking debt. Deposits are typically callable within short time and thus comparable to debt with variable interest. However, deposit rates have a longer endurance than money market rates because customer deposits statistically show to admit a large portion being placed longer with the bank even if interest rates increase (so-called core deposits). The applicable maturity of comparable debt is an empirical question taking into account customers' behaviour and adjustment frequency to market rates, which must be analysed in detail. Let a maturity of one year be assumed.

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[60] See document number C (2001) 3956, 2003/216/EC.

As it is not practical to determine a reference rate for each deposit taken, a proper assumption would be the application of quarterly averages of the 1-year reference rate. According to the development of the deposit volumes while taking into regard an average customers' drawing and placement behaviour a weighted average (say 6.25% + margin) of the three past consecutive 1-year reference rates (say 5.8%, 6.1%, 6.4% + margin) and of the respective 1-year reference rate valid at the quarter for which the aid element is determined (6.7% + margin) is compared to the average deposit rate valid for this quarter (say 4.5%). In conjunction with the average deposit volume utilised by the bank for this quarter (EUR 100 mill.) the aid element can be determined (equal to (6.25% + margin – 4.5%) × EUR 100 mill.). This aid element is compounded by the 1-year reference rate (6.7% + margin) from the mid of the quarter to the end of the respective year. The year-end amounts are again compounded by the respective 1-year reference rates valid at the beginning of the respective years until the aid is repaid to the State.

The same compounding method would apply to the part of the intermediation commission which exceeds the commission fee according to market standards. The gains from cross-selling effects[61], though their measurement is supposedly difficult, can be compounded as well. If it is not possible or afflicted with undue costs, a yearly analysis instead of the quarterly analysis could be carried out.

It remains to determine the appropriate margin for bank debt as the basis rate is chosen according to the inter-bank money market rates. The EC may assess this case according to (a) the standard rules or may apply (b) credit spreads of bank bonds, because this case is considered to imply large aid elements.

a) Supposedly, the bank has a strong creditworthiness. Under a couple of countries' national legislations deposits are secured by special provisions and are subject to supervision by banking authorities. Hence, one may conclude that deposits are "highly" secured. Thus, the lowest margin of the standard approach applies throughout the considered period (45 bp implying an aid element of EUR 2.2 mill.). The margin under option a) however does not take into account that for the same rating grade banks' funding admits lower interest than required for the funding of non-financial firms.

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[61] The benefits from cross-selling occur at the competitors' expense and do not avail State resources.

b) Inter-banking rates and swap rates are not applicable for public funding or placements of debenture bonds for large amounts as these kinds of funding require higher placement costs and incur higher exposures than swaps. The individually identified bond margins for the particular bank according to rating grade and maturity need to be adjusted for placement costs (it is assumed for the purpose of the study that these are similar to administrative costs of large loans) and the supposed collateralisation. *Core deposits* might be re-priced once a year on average but remain with the bank as a funding for longer (as it is the case for long term debt with variable interest). The particular average maturity needs to be determined. This is an individual analysis not easy to perform.

Because this case is analysed retrospectively and historical investigations of creditworthiness and collateralisation turns out to be impractical the EC may preclude option b) from retrospective application.

10.4   Example 4

Consider a State which is granting guarantees to distressed SMEs for the purpose of restructuring or rescuing the firm. The guarantees cover at most 50% pari passu of a bank loan, the notional amount of which is typically small. The loans, which possibly stem from an existing lending relationship with a bank, bear interest at a rate not lower than the interest rate for financially sound firms or the reference rate, whichever is higher. The guarantee fee is 0.5% p.a. plus 0.2% of the notional as an up-front fee. If the beneficiary of a rescue aid is not able to submit an agreeable restructuring plan, she/he has to repay the aid including a suitable risk premium. For restructuring it is necessary that the beneficiary is able to acquire additional funding through own or borrowed sources.

In order to determine the grant equivalent, the State has to determine the relevant reference margin. As the debtors are distressed firms, the "weak" rating grade can be assumed. The loans are supposed to be normally collateralised (default case) if those stem from an earlier lending relationship with a bank or lowly collateralised since distressed firms often do not possess valuable collateral not already pledged. The difference between the reference margin according to "weak" creditworthiness[62] and "normal" (or "low") collateralisation (465 bp or 750 bp as the loan margin plus 10 bp for small amounts minus 20 bp for guarantees being equal to 455 bp or 740 bp) and the actual fee (4.05% or 6.9%) is discounted by the current reference rate.

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[62] Or even "bad" creditworthiness can be assumed, see discussion in 4.1.2.1 *Debtors' creditworthiness* and 14.1.2.1.4 *Questions about spreads*.

The loans have to be redeemed in short term. Hence, the reference basis rate would be either the 3-month (5.9%) or the 1-year money market rate (6.7%), whatever maturity is more appropriate. The reference basis rate and the reference margin both add up to the reference rate applied for discounting (e.g. 7.4% + 6.7% = 14.1%). The present value is moreover reduced by the up-front fee. This yields the gross grant equivalent.

Since the scheme continues over a longer horizon while the discount rate changes over time the State either decreases the discount rate by a cushion (say 13.4% of 6.7% resulting in 5.8% + 7.4% = 13.2%) or reviews the applicability of the guarantee fee regularly in order to meet the allowed aid intensity for all times with high probability.

As in Example 1 the State could mandate a bank to determine the fair margin for each loan individually.

10.5   Example 5

In this example the State intends to foster small entities with seed capital, early stage and development financing in regions where supply of such capital is scarce due to incurred transaction costs commercial suppliers would need to bear. Capital is provided as loans, preference shares and ordinary shares constituting a minority interest. Secured and unsecured loans are granted at a fixed rate of between five to ten years in line with market conditions. Preference shares require an additional risk premium and can be redeemed at nominal after a predefined term. However, the owner has the option to keep the preference share capital in exchange for a compensation reflecting increase in value. For ordinary shares a market based return is sought, which will mainly be realised on exit by sales of the shares after three to seven years.

Within the standard approach the State may choose to apply an average rating for small entities within the scope of the aid (say "satisfactory"). The level of collateralisation determines the applicable margin in the margin table, either for "normal" or "low" collateralisation (220 bp or 340 bp + 10 bp for small loan amounts). Moreover, at the date the loan is granted, the State selects the relevant reference basis rate for the specific maturity (say 7.47% for five years) as it is disclosed by the EC or a calculation agent. The margin and the basis rate both form the reference rate (e.g. 7.47% + 2.2% = 9.67%), which would be applied to determine and to discount the aid elements.

Preference shares are afflicted with higher risk due to their sub-ordination, lack of collaterals and participation in losses. In the standard approach it is assumed that equity-like loans allow for one rating downgrade compared to senior loans (resulting in a margin of 750 bp for a "weak" rating and a "low" collateralisation). The required return takes also into account the basis rate for the expected exit time (say 7.47% for five years).

One difficulty with the option to extend the continuance of the shares is that it cannot be priced by credit spreads of standard credit products as it is a non-linear derivative on credit spreads. In order to value such options, an appropriate option pricing model is required. This question is beyond the scope of the study. Notwithstanding an exact price, the option would require a higher margin reflecting the present value of the option.

Ordinary equity shares require the highest return. The survey among banks indicated a required *minimum* return on capital of about 15% for banks themselves and for equity capital, which banks supply[63]. In practice the target return very much depends on the undertaking but is rarely below 15% for equity capital according to our experience. The required reference return on equity capital cannot be fixed a priori according to the reference rate since it is an uncertain compensation. The return can be realised by dividends, capitalised interest, an equity kicker[64], or ordinary sales of shares, which makes it difficult to monitor the aid element within single transactions and aid schemes. For larger aid schemes the average shortfall of the return on the entire portfolio in comparison to a market-based target return can be regarded as a measure of the aid granted. But single cases need to be assessed according to a persuasive development and exit plan, which can be best judged if a bank commercially participates pari passu at least for a small share.

According to the advanced approach, the State would derive a pricing grid in co-operation with banks. The discount on the reference margin the State is willing to grant as aid has to comply with admissible aid intensities. The underlying reference margins have to satisfy bank-internal profit expectations while the reference basis rates are timely determined according to the bank's internal systems.

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[63] See chapter 14.1.2.1.4 *Questions about spreads*.

[64] From the investors' point of view equity kickers are long put options on equity capital to redeem the capital either at a share price agreed upon in a distinct market transaction (e.g. public offering) or at a price defined by a multiple of a certain financial figure *like earnings before income tax*.

10.6 Example 6

A State provides several different aid elements to beneficiaries of a particular industry. These include accelerated depreciation for tax purposes, direct subsidy and tax relief both per unit of output and direct tax reliefs.

In order to determine the grant equivalent of all aid elements a suitable discount rate needs to be determined. As it was pointed out in Example 2 for such tax schemes it would be appropriate to chose both the margin and the maturity of the basis rate according to average cases and reflecting representative beneficiaries. If certain aid schemes can be utilised for very different terms of time the State may chose an appropriate basis rate for average representative cases. Since the tax reliefs persist for a longer time the State should incorporate the uncertainty about future movements of interest rates by subtracting an appropriate buffer taking into account the period over which the benefits will not be adjusted to possibly lower discount rates. Nevertheless, the State reviews the aid intensities after that non-adjustment period by the new reference rate.

As discussed in Example 2, tax relieves imply higher risks than the normal risk of credit default because typically gains must prevail in order to utilise tax benefits. However, subsidies depending on the output admit higher risks as well since output may turn out to be volatile (by and large similar to mezzanine debt). Apart from other measures to restrict subsidies both tax relieves and direct subsidies require higher margins than normal in order to reflect their implied risks.

Under the advanced approach the State would consult a bank in order to determine risk adjusted discount rates. This approach seems to be less applicable.

10.7 Example 7

Let a State found a private limited liability company in public private partnership (PPP), in which it holds 40% of ordinary equity capital. This company in turn fully owns a private limited liability company, the purpose of which is to foster smaller PPPs by debt financing. The State grants a guarantee to the subsidy in order to secure a subordinated debt facility lasting for a maximum of 6 years. The guarantee fee, which may vary over time according to some covenant agreements, is paid by the mother company to the State. The State intends to conduct the transaction in line with the arm's length principle as it comprises the senior margin, an arrangement fee and an add-on for subordination while the senior margin is based on a sample of margins charged to smaller PPPs.

The reference return on equity for the State's participation in the mother company is required to be 15% according to the standard approach. Under the advanced approach the benchmark would require the co-owners to uncover their required return on equity.[65]

Apart from the legal consideration, whether or not the subsidiary is itself bound by aid laws, the loans it grants to smaller PPPs must have a margin according to the margin table of the standard approach and a basis rate valid at the date the loan is granted and according their individual maturity. As these loans may supposedly be accompanied by other bank loans, the rating of the lending bank could be utilised in order to classify debtors.

The same approach can be applied to the guarantee, i.e. the bank's rating of the subsidiary could determine the rating grade of the margin table. If it seems necessary, the rating assignment can be controlled by mapping the margin charged for senior loans to that of comparable corporate bonds or by mapping the senior margins to the margin table in order to derive a rating grade recursively. As the guaranteed facility is subordinated, "low" collateralisation is presumed. If State aid is present, the discount rate would require the 5-year reference basis rate for discounting the aid elements.

The advanced approach would allow the State to consult banks in order to price each transaction according to market standards. However, it should be observed that conflict of interest can be present if the other equity holders and the lending banks are incorporated. A lower guarantee margin than at arm's length necessary would be to the benefit of other share holders. Hence, a good insurance against exploitations of minority interest would be a participation of a third party bank in the subordinated loan pari passu to the State's participation.

10.8   Example 8

A State provides secured loans and cash grants to project undertakings, which create long-term jobs. As pointed out in previous examples, the State may elect to determine the appropriate average rating, collateralisation and maturity in order to determine the reference rate apart from the possibility to calculate each case individually or to utilise bank ratings if loans are supplied through banks. The length of the review period should be taken into account by a proper increase of the respective reference rate for loans and a decrease for the discount rates for other aid.

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[65] An abandonment of voting rights would require a higher or a more secure compensation in return for not having influence on the business strategy.

10.9 Example 9

A loan is granted to a private company through a real estate development company wholly owned by the German federal State of Hansestadt Hamburg.[66] This company establishes a business, which is regarded by the State as promoting the local economy in addition to the particular undertaking itself. A part of the loan was granted free of interest in order to reflect the public interest in the project. After intervention the interest rate of the loan has been prolonged at the then current reference rate and without a particular maturity. The loan is deemed to be normally secured.

Since the retrospective risk grading is difficult to perform, the normal case according to the standard approach might be assumed if not concrete evidences indicate higher or lower risks (hence, a margin of 220 bp according to "satisfactory" credit standing and 'normal' collateralisation). The maturity follows from the lending contract. The reference basis rate is determined according to the historically valid rate for the particular maturity when the loan was granted (say five years) and prolonged (ten years due to the unspecified maturity), respectively. The so derived reference rate yields the aid elements and their grant equivalent.

However, in case the EC would have decided to recall the aid[67], the single aid elements had to be compounded to the year-end by the 1-year reference rate valid at the respective dates the aid element occurred. As there was no interest charged, the dates when interest is normally due are determined according to the reference rate, say yearly interest payments and interest payment at maturity. If it turns out to be difficult or unduly cumbersome to determine the exact dates, the EC may aggregate supposed payments into a year quarter and may apply the 1-year reference basis rate valid for this quarter. The year-end amounts are recurrently compounded by the then valid 1-year reference rate until the aid is repaid. Within the compounding period the margin can be adjusted if there is convincing evidence for a change of risk.

The advanced approach would require a bank to perform the retrospective risk grading and calculations, which appears to be less applicable in this case.

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[66] See document number C (2003) 3241, 2004/167/EC.
[67] The particular case was decided not to constitute aid.

10.10 Example 10

Consider the following example as a comparison between the standard and the advanced approach, which considers the exact timing of redemptions and the interpolation between rates.

Let a loan amounting to EUR 100 have a maturity of ten years with re-pricing after five years and yearly redemptions in equal amounts. The debtor shows to have a credit standing of "good". The pledged collateral is "normal", with a LGD of say 50% at the beginning but enhancing while redemptions take place.

10.10.1 Basic proceeding

The basis rate is the one which matches currency and the term to re-pricing of five years and which is valid at the date the loan is granted (example: 7.47%).

The reference margin is taken from the table according to the factors:

Credit Standing:	**Satisfactory**
Collateral:	**Normal**

Hence, the margin turns out to be 220 basis points. The reference rate comprises the basis rate and the margin resulting in 9.67%.

10.10.2 Advanced proceeding

The basis rate is the one which matches currency, the term to re-pricing of five years and redemptions occurring before re-pricing. The debtor redeems 10% every year. Hence, the numerator of the weights according to the formula derived in chapter 12.5 *Approximation for the basis rate* is:

$$\sum_{i=1}^{4} i \times 10 + 5 \times 60 = \text{EUR } 400$$

The basis rates for years one to five are averaged according to the following weights:

Redemption at end of	Calculation of weight	Resulting weight
Year 1	$1\times 10/400$	2.5%
Year 2	$2\times 10/400$	5%
Year 3	$3\times 10/400$	7.5%
Year 4	$4\times 10/400$	10%
Year 5	$5\times 60/400$	75%

Table 10-1

If one of these rates is not disclosed by an information provider, the rate has to be interpolated. For example, let only the rates for one year and five years be observable. Linear interpolation of the rates for maturities two to four years means that they are mapped on the rates for one and five years to maturity by weights according to their relative distance.

	Year 1	Year 5
Year 2	$(5-2)/(5-1)=75\%$	25%
Year 3	$(5-3)/(5-1)=50\%$	50%
Year 4	$(5-4)/(5-1)=25\%$	75%

Table 10-2

Finally, that procedure would yield the following weights according to the mapping of redemptions and the linear interpolation:

Observable Rates	Weights according to redemption and interpolation	Resulting Weight
Year 1	$2.5\% + 75\%\times 5\% + 50\%\times 7.5\% + 25\%\times 10\%$	12.5%
Year 5	$25\%\times 5\% + 50\%\times 7.5\% + 75\%\times 10\% + 75\%$	87.5%

Table 10-3

These simple calculations yield a basis rate adjusted to contractual redemptions:

$$12.5\% \times 6.7\% + 87.5\% \times 7.47\% = \textbf{7.37\%.}$$

The next step is to derive the margin. The increasing recoverable amount or decreasing LGD is taken into account by generating the future path of collateral coverage. The next table shows the respective margins to be applied:

Maturity	Coverage $1 - \text{LGD}$	Collateralisation by LGD			Weight
		Low	Normal	High	
Year 1	$50/100 = 50\%$	−	TRUE	−	2.5%
Year 2	$50/90 = 56\%$	−	TRUE	−	+ 5% + 7.5%
Year 3	$50/80 = 62.5\%$	−	TRUE	−	= **15%**
Year 4	$50/70 = 71\%$	−	−	TRUE	10%
Year 5	$50/60 = 83\%$	−	−	TRUE	+ 75%
Year 6 to 10	$50/50 = 100\%$	−	−	TRUE	= **85%**

Table 10-4

For "normal" and "high" collateral coverage the margins of all maturities are averaged according to the weights for each year as derived above and provided in the rightmost column:[68]

$$15\% \times 220 \text{ bp} + 85\% \times 100 \text{ bp} = \textbf{118 bp.}$$

With the support of spreadsheet software the calculations are very simple to perform.

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[68] It would be possible to achieve a better proximity by linearly interpolation the margins itself given basing points for each category, e.g. if LGD is measured as 30% it is just between 45% for normal and 15% for high collateralisation so that both margins are equally weighted.

11 Model for the Reference Margin

The primary approach of the study on validating a fair reference margin is based on a market model and its calibration to parameters actually reported by banks. Moreover, the recommended reference rate system permits the application of bank-internal pricing models under the advanced approach (see 4.2 *Advanced approaches*). These approaches should *in principle* be in line with the properties of loan pricing set out in the following.

11.1 General approaches to derive loan margins

In finance there exist several approaches on pricing interest bearing instruments, which are subject to default risk. The pre-calculation of a loan margin in order to yield a benchmark for the negotiations with the debtor and the determination of a fair value of a loan are two sides of the same medal since the contracted interest must lead to a fair value at least as large as the acquisition costs.

The pricing of loans can be performed according to the following economic principles:

The fair value is determined such that[69]

- Arbitrage is excluded ("arbitrage pricing"),

- All actual expenses, opportunity costs for bound resources, and implied risks are covered ("cost based pricing").

Moreover, pricing can be based on the specific economic model for the incurred risks. Two major approaches are well known.

Defaultable debt is modelled by[70]

- The evolution of a firm's assets and liabilities, which jointly determine the probability distribution of losses arising from default ("structural models"),

- Default events, their probabilities and expected proceeds from bankruptcy, whose dependences on assets and liabilities are not explicitly modelled ("reduced form models").

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[69] See chapter 27 versus chapter 42 of Bessis (2002).
[70] See chapter 1.4 in Bielecki and Rutkowski (2002) for references and discussion.

In the next subsections these alternatives will be briefly discussed. However, with the purpose of the study in mind it will be argued in favour of a reduced form model taking into account production costs.

11.1.1 Structural versus reduced form models

To visualise the economics behind a defaultable loan one should consider a basic version of Merton's model (Merton, 1974): Equity comprises assets, a long put option on the entity's assets and a short riskless zero bond while debt is equal to the riskless zero bond plus the corresponding written put option. The put option entitles share holders to redeem debt by delivering the firm's assets if their values decline below the owed face value (i.e. in case of bankruptcy):

Assets	=	liabilities
	=	equity + debt
Equity	=	assets + put option – zero bond
Debt	=	zero bond – put option

If the value of assets decline (by, say, -5), the value of the option increases (+1) less than the change in the assets' value (-5) causing both equity (-4) and debt to lose value (-1). The result is an accumulated net loss (-4), which is smaller than the decline in the assets' value (-5). Thus, debt offers a natural but imperfect hedge against losses on investments. On the other hand, if volatility of assets increases, the value of the option rises causing credit spreads to widen and the fair value of debt to decrease while equity gains in value.

The valuation of debt can be re-written as:

| Price of debt | = | price of zero bond × (1 – price of put option / price of zero bond) |
| | = | price of zero bond × (1 – Q) |

Whereas structural models deduce Q from asset prices and asset volatilities (the driving factors of option prices) reduced form models view Q as an abstract figure measuring the probability of default, which, instead, is inferred implicitly from bond prices or explicitly from default statistics.

Due to the authors' experience and according to the state of applied literature structural models and arbitrage pricing are not regarded as being the predominant practice concerning the pricing of credit risk in order to determine loan margins.[71]

11.1.2   Arbitrage versus cost-based pricing

Arbitrage pricing takes the view of pricing instruments according to the price of a replicating portfolio comprising other, typically more liquid instruments. For instance, in an ideal world an option on a stock can be replicated by the stock and a money account leading to a fair option price. In Merton's model (Merton, 1974) mentioned above debt is replicated by assets, a zero bond and a money account. Indeed, it is a necessary requirement for excess demand not to explode (contradicting markets to be in equilibrium) that two portfolios being equivalent in their cash flows, i.e. the original and the replicated one, show to have the same price.

In bond and loan markets the situation is quite different. Though credit derivatives and securitisations of such debt instruments are priced by arbitrage[72], this is hardly possible for the origination of the original debt instruments. Due to a firm's singularity a replicating portfolio cannot be constructed effectively. To retain the ideal of arbitrage pricing one resorts to the stronger equilibrium property that similar risks are priced similarly due to the freedom of choice from investment opportunities.[73]

Regarding bond markets this means that bonds of similar credit risk should also exhibit a similar credit spread ceteris paribus. According to that methodology, the price of a bond to be issued, and thus its nominal interest, can be deducted from inspections of the "Qs", also denoted as the *implied* probabilities of default, which are implicitly derived from prices of already traded bonds.

$$(1 - Q) \times \text{price of a traded government zero bond} = \text{price of a traded risky zero bond}$$

According to this implied market based probability of default, it is possible to derive the price of a bond of similar credit risk about to be issued. If only standard structures of uncollateralised debt instruments are considered, it is sufficient for pricing new bonds to rely on *credit spreads* of existing bonds (apart from debtor-specific adjustments) rather than taking the detour via the "Qs".

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[71] It is referred to Giesecke (2004) regarding credit risk models as well as chapter 18 of Caouette et. al. (1998) and chapter 27 of Bessis (2002) regarding pre-costing of loans. See Rosenberger (2002) for an attempt to apply Merton's option approach to debt pricing for the purpose of deriving minimum interest rates for loans.

[72] See Bielecki and Rutkowski (2002) and Schönbucher (2000).

[73] It should be understood according to the equilibrium property of equal marginal rates of substitution and transformation.

However, with regard to loans of smaller size this approach is hardly applicable according to the following reasons. Loan markets are very illiquid and intransparent. Moreover, many SMEs are not public or audited companies. In Europe second market transactions (if at all possible; e.g. securitisations) are afflicted with high bid/ask-spreads. While bond prices are determined in an auction process, a loan contract is the result of a bargain between the debtor and the creditor following a search process in a regional credit market. This leads to the fact that for similar credit standings different debtors achieve different loan margins. In contrast, credit spreads of bonds would be much closer together.

Due to these frictions, arbitrage or equilibrium pricing as outlined above is hardly applicable to loans in general. Typically, loan departments do not refer to bond markets in order to derive minimum spreads (see Figure 14-60 for the empirical evidence). For some currencies and countries liquid bond markets do not exist at all.

Nevertheless, since bonds are comparable investment vehicles (the larger the loan amount the better the comparability) and have the advantages of being more liquid and incurring less transaction costs than loans, credit spreads from bond markets may well provide a proper indication for margins. However, because bonds are typically not collateralised, one has to adjust the credit spreads of bonds in order to reflect the collateral typically provided for loans.

The authors' experience is that banks' loan departments predominantly derive minimum loan margins according to cost based pricing.[74] This approach will be developed more deeply. The results based on that approach will be used to validate the surveyed loan margins (see chapter 14.1.2.1.4 *Questions about spreads*).

11.2 Risk and cost factors affecting interest rates

Banks' market practice of pre-calculation of interest rates before granting a loan take into account as many risk and cost factors as appropriate in order to determine a risk-adjusted compensation for their (expected) expenses and for tied tier capital bearing the risks. The following subsections discuss each of the relevant risk and cost factors.

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[74] See chapter 18 of Caouette et. al. (1998), chapter 27 of Bessis (2002) and Rosenberger (2002).

11.2.1 Default risk

The default risk is the main risk factor in lending. It is common practise to decompose the default risk into the probability of default, PD, and the recovery rate, RR, or the loss given default, LGD, respectively. The default risk is measured in total by the expected loss, EL, combining PD and RR. The terms are defined as follows:[75]

Probability of default

PD := Statistically expected probability that the debtor defaults on scheduled payments[76] of the loan within a specified period of time, usually within the next year, i.e. a numerical expression of the ordinal rating grade

Recovery rate

RR := Minimum of 100% and recoverable amount, RA, per unit of exposure at default, EAD

Loss given default

LGD := $1 - RR$

Recoverable amount

RA := Statistically expected present (or forward) value of total proceeds stemming from the exploitation of collateral, guarantees, and the bankruptcy's estate taking into account discounting of future cash flows and implied costs

Exposure at default

EAD := Outstanding loan amount plus accrued interest up to the next interest payment date

Expected loss

EL := Statistically expected loss on EAD; equal to $PD \times LGD$ for a one year bullet loan

All variables are generally time dependent. For instance, the recovery rate improves in the course of redemptions taking place when collateral remains unchanged and it decreases in the case when collateral is affected by write-offs.

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[75] The terms are defined in detail in Basel II paragraph 297, 448, 452 (Basel Committee on Banking Supervision, 2004).

[76] It is referred to the default definition of Draft CAD III (EU Commission, 2003a). For instance, apart from legal insolvency a default is presumed if scheduled payments are due more than 90 days.

11.2.2 Market risk and transformation of lot sizes

The cost of transforming lot sizes is largely a question of risk management. The present value of future cash flows is dependent on actual market yields. A bank is exposed to that kind of interest basis risk if loans are not financed by debt with congruent maturities or re-pricings. This situation involuntarily occurs when borrowers demand other durations than investors and savers supply for banks' funding. More often this risk is taken voluntarily by banks choosing to gain on yield differences between interest on short- and longer-term maturities.[77]

Banks manage the transformation of lot sizes and maturities usually by raising money from central banks, by issuing (promissory note) bonds and by offering savings books of similar re-pricing terms and in combination with interest rate swaps.

Nevertheless, the remaining market risk arising from un-matched positions is borne by the bank and must yield a profit for the underlying economic capital. However, on average market risk arising from a loan portfolio can be reduced significantly by congruent funding and maturity transformation. In total the portion of the credit margin contributed by market risk is relatively small according to possible measures at hand.

11.2.3 Country risk

Country risk denotes the risk of legal and monetary disruptions beyond the debtor's control. Usually, it is not relevant for lending in domestic currency and for domestic banks. Therefore and because of the financial integration of Member States, country risk may not be taken into account for the purpose of the reference rate.

Neglecting country risk does, however, not mean that specific characteristics of countries' margin structures cannot be taken into account.

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[77] Empirically, funding of loans denominated in euro and Deutsche Mark by bonds of shorter maturities was historically favourable *on average* due to upward yield curves though such strategies are afflicted with *high interest rate risk* (this observation stems from an analysis performed by the authors for other purposes).

11.2.4 Operational risk

Among other reasons operational risk[78] arises from the potential failure of internal processes.[79] For example, operational risk includes the risk that the loan department wrongly estimates the creditworthiness to be "excellent" instead of "poor" or if collateral is not properly pledged leading to higher loss given defaults.

To the authors' knowledge it is not common practise to charge an extra margin for operational risk. However, operational risk is partially incorporated by measuring probabilities of default and recovery rates as failures of back office procedures adversely affect such statistical figures. Moreover, with CAD III (EU Commission, 2003a) coming into force capital charges for operational risk demand additional profit margins for employed tier capital (see Basel II (Basel Committee on Banking Supervision, 2004)).

11.2.5 Administrative expenses and acquisition profit

Administrative expenses comprise all costs embodied by the handling of the loan, i.e. for analysing the creditworthiness, for documentation, for setting up accounts, etc.
The cost margin is usually determined by an internal system for cost accounting. The cost margin contains at least the unit costs. It may also account for sunk and overhead costs and a profit margin for back office operations.[80]

On top of such expenses the cost margin (or the profit margin on underlying capital, see chapter 11.2.6 *Profit contribution and unexpected loss*) may include a profit margin due to the mere success of acquiring the loan.[81] Thus, even if all risks and expenses caused by a loan can be sold to an investor the bank requires to be compensated for developing and managing the primary contact.[82]

According to the authors' experience, many banks are able to quantify a cost margin covering such expenses on an average basis. For the purpose of simplification administrative expenses are modelled as a mark-up margin though expenses arise on a one-time basis rather than on an accrual basis like interest.

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[78] Regarding the exact regulatory definition it is referred to Basel II, paragraph 644 (Basel Committee on Banking Supervision, 2004) or CAD III, art. 106 (EU Commission, 2003a) and to Sound Practices for the Management and Supervision of Operational Risk (Basel Committee on Banking Supervision, 2003).

[79] See Cruz (2002) regarding the modelling of operational risk.

[80] One may think of the back office as a separate profit centre or as an external service provider.

[81] Also consider the sales department as a profit centre.

[82] This is typically the case for a syndicate lead manager involved in large loans.

11.2.6 Profit contribution and unexpected loss

The profit contribution is typically measured as the pre-tax net Return on (risk-adjusted) Equity (RoE).[83] The amount of risk-adjusted equity is allocated to the transaction in order to bear its implied risk exceeding expected losses. Management usually defines a threshold for the pre-tax return as a mark-up on top of a basis funding rate, which any profitable transaction must yield. For the particular share that equity is funding, a transaction must generate an extra profit margin defined by (example in brackets):

1. Equity funding share   =   Allocated equity / investment amount
   (EUR 8 / EUR 100 = 8%)

2. RoE-mark up   =   RoE - basis funding rate
   (15% - 5% = 10%)

3. Profit margin   =   RoE-mark up * equity funding share
   (10% * 8% = 80 bp)

11.2.6.1 Funding tier capital

According to the Basel Capital Accord of 1988 (Basel Committee on Banking Supervision, 1988) and its European Communities' successor, the Capital Adequacy Directive I (Council of the European Communities, 1993), loan amounts have to be underlaid by equity capital. Due to the first accord, a bank must reserve minimum tier capital of 8% of the loan amount.[84] Thus, apart from risk mitigation strategies the total lending capacity is bound by 12.5 times the tier capital. In contrast, the new Basel Capital Accord demands risk-adjusted capital charges and, in addition and as a new approach to solvency, capital charges for operational risk.

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[83] Several methods exist to measure the profitability with regard to employed capital, see chapter 18 of Caouette et. al. (1998). The definition used here can be considered as 'Risk adjusted Return on Risk adjusted Capital', so-called *RaRoRaC*, because the return is adjusted by the expected costs of shortfall and the capital is determined according to debtors' creditworthiness.

[84] With respect to the specific rules it is referred to Basel I, paragraph 47 (Basel Committee on Banking Supervision, 1988) and CAD I (Council of the European Communities, 1993); Directive 2000/12/EC (The European Parliament and Council of the European Union, 2000).

Equity capital is not only a scarce funding but also the riskiest due to its primary liability for losses. Hence, the return on capital demands a significant add-on to long term interest rates, which yields in total the profit contribution based on the funding by tier capital.[85]

Advanced banks measure the tied capital by means of the so-called *unexpected loss* (UL) rather than by regulatory capital charges. Unexpected loss is best described by the probability distribution of losses exceeding the expected loss (as defined in chapter 11.2.1 *Default risk*). Unexpected loss levels out in very well diversified portfolios due to the law of large numbers, such that only the expected loss remains. However, as debtors' financial strengths are correlated (e.g. due to economic cycles) and as loan amounts are never marginal, concentration risk is a serious issue. Consequently, correlation and concentration are the main determinants of unexpected losses. Since investors are risk averse they demand an extra compensation for the risk exceeding the expected loss.[86]

Unexpected losses can reliably be measured by credit portfolio models. The contribution of a single loan to the unexpected loss is reflected by its marginal amount affecting the Economic Capital. The Economic Capital is understood as the amount of tier capital at least necessary to underpin a bank's external credit standing (i.e. rating).[87]

Such advanced models definitely play an increasingly important role in the future. Nevertheless, today and in the next few years the authors' do not expect the majority of European banks pricing loans by their contribution to economic capital. Moreover, while secondary credit markets (securitisation, sub-participation, etc.) are becoming more and more developed, it remains questionable to what extent a single bank's economic capital is decisive for the "market pricing" of loans because of the alternative to sell loans and thereby avoid concentration risk. As the reference rate should reflect the average price a debtor can achieve it is indeed the average contribution to Economic Capital over all banks in the debtor's domain. Hence, it is the contribution to Economic Capital a debtor causes within the relevant banking sector. This contribution may well be approximated by the minimum capital charge due to CAD I or III (Council of the European Communities, 1993; European Commission, 2003a).

Summarising, due to arguments of macro economic diversification and reasons of practicality, the minimum regulatory capital charge can be deemed relevant for the pricing of loans on average.

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[85] For simplicity it is not differentiated between tier 1 and tier 2 capital. It is presumed that underlying capital is a mixture with constant proportion. Thereby, the return on equity can be expressed as an average return on tier capital rather than return on either of both tier capitals.

[86] In content, risk premiums for the unexpected loss can be well compared to the risk premiums of risky assets in the Capital Asset Pricing Model (see Copeland and Weston, 1979). See Fons (1994) for a comparison of expected and unexpected loss expressed through the historical and risk neutral probabilities of default.

[87] The Economic Capital can be determined by the value at risk for instance (Crouhy, Galai and Mark, 2000).

Since CAD III (EU Commission, 2003a[88]) is taking into account the economic risk of loans more precisely than CAD I (Council of the European Communities, 1993) and is already coming into force by the end of 2006, common loan pricing models are based on the new capital accord.

CAD III (EU Commission, 2003a[89]) allows banks to apply different approaches to measure their minimum capital for credit and operational risk. The question arises about the suitable approach for determining an average interest rate achievable in a loan market. Indeed, that would imply a mixture of approaches since different approaches are favourable with regard to different credit standings and credit margins. On the other hand, it is a core request of the European Commission to maintain as much practicability as possible. After deliberating about both ends it is recommended to rely upon the particular approach the bank, which carries out the calculation under the advanced approach for the reference rate, is applying internally.

11.2.6.2   Return on equity

The other determinant of profit is the return on equity. For interest-bearing assets the RoE is defined as interest income less expected and realised costs per capital employed:

RoE =	(interest income	–	funding costs
		–	unit costs
		–	expected loss)
		÷	capital employed (economic or regulatory)

The RoE can *approximately* be deduced from banks' financial statements or from bank statistics reported to central banks as follows:[90]

RoE =	(interest income	–	interest expense
		–	administrative costs
		–	loan loss provisions)
		÷	capital employed for loans

The further aggregation over banks may yield the RoE of the national banking sector.

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[88] See Art. 66 et seq.

[89] See Art. 66 et seq. (credit risk), Art., 108 et seq. (operational risk).

[90] The quality of the estimated bank-wide RoE might be improved by suitable adjustments to the contributing figures, e.g. scaling of administrative expenses according to the balance sheet fraction of loans.

Usually a bank's management sets a target RoE, which loan departments should achieve on average at least. Apart from a bank's risk aversion the concrete figure of the RoE is of course influenced by competition between banks and by the inherent uncertainty within the economy regarding future rates of default beyond their expected values (which are captured by default risk, see above). For instance, German banks showed to have a lower RoE than their British counterparts because of more intensive competition in the German corporate loan market (Broadbent et al., 2004).

It should also be noted that State intervention, e.g. by owning banks or by loan promotion schemes, may well lower the overall interest rate level of the economy so that it is simply not possible to predict a *fair free-market competitive benchmark* for the reference rate based on a survey about actually contracted credit margins because commercial banks have to adjust their lending rates in order to stay in the market. Such an effect would culminate in a comparably low RoE for the domestic banking sector.[91]

Summarising, the determination of the appropriate free-market RoE is mainly an empirical question, which is not straightforward for markets where State intervention has market power in itself.

11.2.7 Junior loans and mezzanine debt

The appropriate credit margin is very sensitive to the rank of debt. Junior debt ranks below senior debt and equity-like mezzanine debt (tier debt) may rank even after both. Mezzanine debt has often the property of taking part in the distribution of a company's losses.

To some extent these features can be taken into account by adjusting the probability of default (PD) and the loss given default (LGD). Junior and mezzanine debt generally admit very low recovery rates (RR). Since lower ranking debt suffers from insolvency earlier than senior debt its PD should also be higher.

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[91] The recent study of Broadbent et al. (2004) as well as the related article "Wirtschaftsblunder" (Economist.com, 2004) come to the conclusion that the particular system of German federal States' banks may well lead to lower interest rates and an over-investment of capital.

11.2.8 Embedded derivatives

It is common practise at banks to offer clients flexible conditions, for example the possibility to re-deem a loan earlier before regular maturity. These conditions typically represent embedded derivatives, which have a present value. If such a condition is an option for the debtor, the interest rate for the loan would be higher than without the option in order to compensate the creditor for writing the option.

A comparison between loans with and without embedded options is only meaningful if the effective interest rate of the loan with the option is adjusted to the normal case. For this purpose the fair value of the option has to be deducted from the original loan amount granted. The effective interest rate based on this loan amount is comparable then.

In this study appropriate margins for optional provisions of loan contracts are not considered.

11.2.9 Cross selling

Cross selling is a major determinant of interest rates of loans. Whether, for instance, profit from a client arises from loans or from selling hedging transactions, is not important for the entire bank. However, the reference rate should be based on the arm's length principle, which presupposes that the sample of credit margins stems from loans not being subsidised internally. This requirement has been stressed in the survey among banks. Therefore, the effects of cross selling are not further considered.

11.2.10 Guarantee fees

Banks charge a fee for guarantees[92] they provide to lenders. The fee is either payable by the creditor or by the secured party to the guarantor. The fee usually comprises the typical credit margin of the loan less margins for the guarantor's default risk, the handling of the loan, for transforming lot sizes to amounts the bank is able to re-finance efficiently, less discounts for restrictive guarantee provisions, and less a profit margin.

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[92] The naming and the definitions of "guarantees" differ substantially within European jurisdictions. In this study under the term guarantee all similar kinds of credit assurances are understood synonymously, like for example guarantees, sureties, credit default swaps, delcredere insurances, non-cash sub-participations, hold-harmless agreements regarding credit risk, etc. This approach is also known to Basel II.

It would, however, not be appropriate to subtract a further margin according to the costs of re-funding because the bank may cede[93] the State secured loan including the guarantee as collateral underlying its own debt which reduces the bank's credit spread.

In case of a State guarantee the guarantor's default risk is negligible in comparison to domestic banks at least for European Union Member States bound by the financial framework of the European Union.

Restrictive guarantee provisions may envisage the compensating payment after fruitless utilisation of a debtor's collateral instead of payment on creditor's first request. Though such provisions may affect the fee it is assumed for the study that disadvantageous provisions are balanced by compound interests or so. Hence, for practical reasons the standard approach in determining State aid may not differentiate between certain forms of guarantees, while a possible intricate analysis could take differences into account.

The guarantor is not concerned with funding the loan and transforming lot sizes while the lending bank is. A small fee should be contributed to this exercise.

The handling of the loan can partially be seen as a service to the guarantor because the guarantor is participating in the investment without managing the files and accounts. The discount to the original credit margin is usually less than the total cost margin in order to compensate the guarantor for his own handling costs. If, for instance, the cost margin is 40 basis points, only 20 basis points are deducted from the credit margin for the loan itself.

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[93] Securitisation has become more and more important both on a big scale by collateralised loan obligations (or asset-backed securities more generally) and on single transactions by other investors' sub-participations (Ferry, 2004; Moore, 2004).

Necessarily, creditors need to retain a profit margin for the success of acquiring the loan and the risks remaining at the bank, which is for the most part operational risk. The bank is, for instance, obliged to manage loans in proper form otherwise being liable to the guarantor for the violation of contracts or commonly accepted rules.[94] The margin for operational risk can be seen as a mark up on top of the handling costs or as the profit contribution of back offices since the internal handling processes are the major source of operational risk (OR).

Summarising, the fee for a State guarantee is derived as follows (in brackets fictive figures in basis points):

Guarantee fee	=	Loan margin without a guarantee
	–	Handling costs including profit mark up for OR (14 bp)
	–	Transformation costs (2 bp)
	–	Acquisition margin (4 bp)

The quantification of the deductible margin is largely an empirical rather than a theoretical question.[95] For smaller loan amounts up to about EUR 50 mill. it is necessary to rely on bank's data or experience. For larger loan amounts it is possible to compare the credit spreads in the corporate bond market with those spreads demanded for credit protection through credit default swaps (see Zhu, 2004) for the same counterparty's debt instruments that are provided by highly rated banks (to exclude guarantor's default risk as much as possible). For large loan amounts handling costs are small, transformation costs are negligible since directly fundable, and acquisition costs are approximately equal to the arranger fees.

11.3 Financial model

In this section the qualitative results will be transferred to a mathematical model that should be understood as an example for a possible pricing model. In order to enhance the understanding of the model it is introduced with a one year bullet loan. Afterwards the general case is considered.

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[94] On the other hand, also the guarantor bears operational risk, namely the risk of moral hazard if banks try to exploit the credit insurance unduly. The risk of moral hazard is soothed typically by partial insurance and lender's first loss pieces.

[95] See chapter 14.1.2.1.4 *Questions about spreads* regarding the results of the survey.

11.3.1 One year bullet loan

The pre-costing of a one year loan is performed by solving an equation in the minimum margin. This equation is derived step by step.

First notice that the creditor cannot be assured of the contractual cash flow comprising nominal plus interest, $1 + r^{nom}$. Instead, the creditor has to consider the expected cash flow in order to recognise possible losses on default risk. Contractual cash flows are honoured with the probability that no default occurs, i.e. with weight $1 - PD$. In case of default the creditor receives only the Recoverable Amount, RA, from the exposure at default, *EAD*, which is determined by the recovery rate, *RR*: Hence,

$$RA = RR \times EAD = RR \times (1 + r^{nom}).$$

The recoverable amount is weighted by the probability of default *PD*. Both terms together constitute the expected cash flow. Since this expectation is formed for a future day the expected cash flow needs to be discounted by the appropriate funding rate. The funding rate does not necessarily refer to the price of banks' debt but to the rate the bank deems to be the benchmark according to which loans are priced. That benchmark does generally not perfectly comply with the interest of banking debt; it could be the swap rate, which is often lower. Apart from hedging strategies relying on swaps, this observation stems from the fact that "strong" and "good" rated banks compete for the same clients. Competition allows "good" rated banks to collect their own funding disadvantage at the same level of RoE only if the employed capital is lower. These effects level out in a competitive market. Hence, the reference to a common benchmark, the swap rate for instance, is justified.

The funding rate contains the basis interest rate r^{basis} (ask rate in order to include the costs of transforming lot sizes) plus the profit margin according to the mark-up for the Return-on-Equity, *RoE,* and equity's share on funding, *e*, as well as the cost margin *c*. The present value of the expected cash flow should coincide with the acquisition costs equal to 1 CU in this example (i.e. the loan amount) in order to exclude any losses right from the beginning.

$$1 = \frac{(1-PD) \cdot (1+r^{nom}) + PD \cdot RR \cdot (1+r^{nom})}{1+r^{basis}+e \cdot RoE+c} = \frac{(1-EL) \cdot (1+r^{nom})}{1+r^{basis}+e \cdot RoE+c}$$

with expected loss (EL) being equal to

$$EL = PD \cdot (1-RR) = PD \cdot LGD.$$

This equation is solved for the nominal interest yielding the following result:

$$r^{nom} = \frac{r^{basis} + EL + e \cdot RoE + c}{(1 - EL)} = r^{basis} + \underbrace{\frac{(1 + r^{basis}) \cdot EL + e \cdot RoE + c}{(1 - EL)}}_{\text{credit margin}}. \quad \text{(Equation 1)}$$

The solution (first fraction) is quite intuitive. The nominal interest rate comprises the basis rate, the expected loss, the profit margin and the cost margin all scaled by one minus the expected loss (EL). The scaling is due to the fact that not only nominal but also interest is exposed to default risk. The second fraction shows the distribution between the basis rate and the total loan margin.

Consider the following numerical example, the figures of which reflect the variables of the aforementioned formula:

$$EL = 1\% \cdot (1 - 55\%) = 45\,bp$$

$$r^{nom} = \frac{3\% + 45\,bps + 8\%*10\% + 15\,bp}{(1 - 45bp)} = 3\% + 1.42\%.$$

The nominator becomes especially important for loans with high expected losses and is negligible for very good credit standings.

11.3.2   General multi-period case

The general case shall be developed step by step as well. The contractual cash flow is defined by interest payments and redemptions at certain payment dates. Consider the following definitions first:

$$t_{i=1,\ldots,n} = \text{Payment dates, "today" is } t_0 = 0$$
$$N_0 = \text{Loan amount granted}$$
$$N_{t_{i-1}} = \text{Outstanding notional relevant for interest in } t_i$$
$$r_{t_{i-1}}^{fund} = \text{Funding rate for interest in } t_i, \text{ is constant for fixed - rate debt}$$
$$\Delta = \text{Credit margin}$$

The contractual cash flow reads:

$$CF_{t_i} = \underbrace{N_{t_{i-1}} \cdot \left(r_{t_{i-1}}^{fund} + \Delta\right) \cdot (t_i - t_{i-1})}_{\text{Interest}} + \underbrace{N_{t_{i-1}} - N_{t_i}}_{\text{Redemption}}$$

However, the contractual cash flow takes place only in case the debtor stays solvent. In case of bankruptcy the creditor is only able to reclaim the recoverable amount. Both events are weighted by their respective probabilities in order to achieve an expected cash flow. Moreover, one has to observe the administrative costs by a proper cost margin. Let the input variables be defined first:

$$c = \text{Cost margin}$$

$$PD_{t_i} = \text{Cumulative probability that debtor will default up to time } t_i$$

$$PD_{t_i} - PD_{t_{i-1}} = \text{Marginal probability that debtor will default between } \left(t_{i-1}, t_i\right]$$

$$RA_{t_i} = \text{Expected future value at time } t_i \text{ of the proceeds from bankruptcy}$$

$$EaD_{t_i} = CF_{t_i} + N_{t_i} = \text{Exposure at Default at time } t_i$$

$$RR_{t_i} = \min\left[100\%, RA_{t_i} / EaD_{t_i}\right] = \text{Recovery Rate at time } t_i$$

The expected cash flow is the probability weighted average of the contractual cash flow and the recoverable exposure at default:

$$ECF_{t_i} = \left(1 - PD_{t_i}\right) \cdot CF_{t_i} + \left(PD_{t_i} - PD_{t_{i-1}}\right) \cdot \underbrace{RR_{t_i} \cdot \left(CF_{t_i} + N_{t_i}\right)}_{\text{future value of proceeds, if defaulted}}$$

These cash flows take place in the future and should be discounted in order to achieve their present value. The discount factor is based on the basis rates (including the costs of transforming lot sizes), the required profit margin and the cost margin. The profit margin depends on the required share of tier capital and the demanded return on equity. The share of underlying tier capital is indeed a function of the debtor's creditworthiness (rating) and – depending on the CAD-approach – the collateral in terms of the recovery rate (e.g. advanced internal ratings-based approach) and the credit margin due to capital charges for operational risk (e.g. standardised approach).

$e_{t_i} = \quad$ %-share of required tier capital depending on debtor's rating and admissible collateral evolving over time.

$r_{t_i}^{basis} = \quad$ basis rate (e.g. swap ask rates)

$RoE = \quad$ required excess return on equity over basis rate

For a bullet loan with a maturity of i years the discount factors for all cash flows are defined by:

$$DF_{t_j} = \left(1 + r_i^{basis} + e_{t_j} \cdot RoE + c\right)^{-t_j}$$

In chapter 12.2 *Discount factors* it is described how discount factors are derived according to market standards.

The nominal interest rate is deemed to be a fair interest rate if the sum of discounted expected cash flows equals the cost of acquisition. Since it is assumed that the cost margin takes into account any administrative and external expenses, the acquisition costs comprise the loan amount less any loan discount, i.e. the amount paid out to the debtor, which is the initial negative cash flow.

$$-CF_0 = \sum_{i=1}^{n} ECF_{t_i} \cdot DF_{t_i}$$

This equation can explicitly be solved for the nominal interest rate assuming that the recovery rate does not depend on the nominal interest rate for the sake of simplicity.[96]

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[96] Otherwise the nominal interest rate is the solution to an implicit equation, which is easily solvable by spreadsheet tools.

12 Specific Formulas

In this chapter some useful formulas are outlined, which can be applied in order to derive or validate calculations under the advanced approach.

12.1 Effective interest rate

The coupon of a loan is not the true measure of profitability if the loan admits a non-standard cash flow profile. In those cases the effective interest rate should be applied.

The effective interest rate[97] is defined as the rate which discounts all future cash flows to the acquisition costs of the loan, which is equal to the first cash outflow including a bank's transaction costs. The Effective Interest Rate is the internal rate of return of a loan.

$$- CF_{t_0} = \sum_{i=1}^{n} \left(1 + r^{effective} \cdot f\right)^{-\frac{D(t_i, t_0)}{DoY \cdot f}} \cdot CF_{t_i}$$

with variables defined as follows :

t_i = Dates when cash flows take place

CF_{t_i} = Cash flows, outflows are negative

$D(t_i, t_0)$ = Number of days between first and future cash flow dates
due to day counting convention

DoY = Number of days in a year
due to day counting convention

f = Frequency of interest payments, e.g. $\frac{1}{4}$ for quarterly; usually $f = DoY / D(t_1, t_0)$

For the natural case of equidistant interest periods, a constant nominal interest rate and a loan amount equal to the sum of redemptions (i.e. no loan discount) it holds that the effective interest rate coincides with the nominal interest rate.[98] There exist also some approximating formulas for the effective interest rate for loans with a discount or with deferred interest.

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[97] Or "yield-to-maturity"; see IAS 39.9 and related implementation guidance or Miron and Swannell (1992).

[98] Through the scaling of time by the frequency of interest payments the effective interest rate does not deviate from the nominal rate just because interest payments are not made on a yearly basis.

12.2 Discount factors

Under the standard approach the publication of par rates is required. However, for the purpose of discounting a State may refer to zero discount factors rather than to par rates under the advanced approach.

Discount factors are applied to cash flows in order to achieve their present value. The present value, PV, of a single cash flow, CF, is its product with the corresponding discount factor, DF, i.e. $PV = CF \cdot DF$.

The discount factors DF_i for maturities $i = 1, ..., n$ can be derived recursively by the method of bootstrapping from market interest rates. Suppose one observes a complete interest rate par curve (i.e. nominal interest rates) for loans with redemption at maturities $i = 1, ..., n$. Let the par rates be denoted by r_i. The discount factor of period i is determined by the pricing formula for the bullet loan with maturity in period i:

$$1 = \sum_{j=1}^{i-1} DF_j \cdot r_i + (1 + r_i) \cdot DF_i \Leftrightarrow$$

$$DF_i = \frac{1 - r_i \sum_{j=1}^{i-1} DF_j}{1 + r_i}$$

If the interest rate structure is flat at rate r the discount factors take the following simple form:

$$DF_i = (1 + r)^{-i}$$

12.3 Floating rate loans

In a couple of countries floating rate loans are quite popular. To determine the effective interest rate, for instance in the presence of a loan discount, one has to construct a cash flow based on forward rates and the constant credit margin up to the maturity date when the outstanding loan amount is due or the credit margin is renegotiated. The cash flow can be constructed by assuming market forward rates to be the future basis rates:

$$r_{t_i}^{forward} = \left(\frac{DF_{t_{i+1}}}{DF_{t_i}} - 1 \right) \cdot \frac{DoY}{Days(t_{i+1}, t_i)}$$

$$r_{t_i}^{nominal} = r_{t_i}^{forward} + nominal\ credit\ margin$$

$$CF_{t_{i+1}} = N_{t_i} \cdot r_{t_i}^{nominal} \cdot \frac{Days(t_{i+1}, t_i)}{DoY} + N_{t_i} - N_{t_{i+1}}$$

12.4 Credit margin

The credit margin is the portion of the effective interest rate paid above the basis rate of funding. The credit margin is defined as the parallel shift of the market par rates such that discounting of cash flows by shifted par rates yields the acquisition costs:

$$-CF_0 = \sum_{i=1}^{N} CF_i \cdot DF_i(\Delta)$$

$$DF_i(\Delta) = \text{Discount factors based on shifted par rates } r_i + \Delta$$

In case of a standard bullet loan without discount the credit margin equals the difference between the nominal interest rate and the basis par rate corresponding to the respective time to maturity of the loan. Moreover, if the yield curve is flat, the credit margin is the difference between the effective interest rate of the loan and the market yield regardless of the payment structure of the loan.

Instead of shifting the par rates, which themselves determine discount factors, it may computationally be more efficient to determine the credit margin due to the following formula:

$$\sum_{i=1}^{N} CF_i \cdot \left(1 + r^{eff} - \Delta\right)^{-i} = \sum_{i=1}^{N} CF_i \cdot DF_i$$

This can be interpreted as shifting the effective interest rate in order to achieve the present value of cash flows according to the inter-banking discount factors, i.e. the so-called default-free present value.

However, in the general case the credit margin cannot be derived in the simple way as outlined. It is indeed the solution of the above equation involving a monotonic implicit function in the credit margin. The solution can easily be achieved by numerical methods.[99]

12.5 Approximation for the basis rate

In order to enhance intuition it is solved for the basis rate for complex loan cash flows by employing a linearisation. It turns out that the reference basis rate is a weighted average of par rates. The weights are defined according to the redemption amounts and the length of time the capital is bound:

$$w_j = \frac{t_j \cdot \left(N_{j-1} - N_j\right)}{\sum_{i=1}^{n} t_i \cdot \left(N_{i-1} - N_i\right)},$$

N_i = Notional amount outstanding; $N_n = 0$

These weights are applied to

$$r^{basis} = \sum_{j=1}^{n} r_j \cdot w_j$$

$$\Delta = r^{eff} - r^{basis}$$

in order to derive the particular basis rate and the margin of the loan.

Thus, each par rate is weighted by an increasing function of the redemption taking place at the maturity corresponding to the respective par rate. Redemptions further in the future imply a heavier weight since they cause a longer sequence of interest payments.

12.6 Interpolation of interest rates

Usually inter-banking par rates are observable for common times to maturity. For the purpose of the reference rate it may well be sufficient under the advanced approach to approximate intermediate interest rates[100] by a linear interpolation:

$$r = r_1 \frac{t_2 - t}{t_2 - t_1} + r_2 \frac{t - t_1}{t_2 - t_1} \qquad \text{for some } t_1 < t < t_2.$$

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[99] E.g. by the Newton-Rapson procedure implemented in common spreadsheet programmes, i.e. as "goal seek" in MS Excel.
[100] See chapter 6.3 in Miron and Swannell (1992).

The exponential interpolation is generally deemed to be more exact:

$$r = \left[(1+r_1)^{t_2-t} \cdot (1+r_2)^{t-t_1} \right]^{\frac{1}{(t_2-t_1)}} - 1.$$

12.7 Adjustment of credit spreads to recovery rates

For individual analysis of spreads according to traded corporate bonds (see chapter 4.2.1 *Large cases of State aid*) and for the validation of reported loan margins (see chapter 14.1.2.1.4 *Questions about spreads*) one needs to adjust the spread for possible collateralisation in order to achieve a comparison to loans. The extrapolation of spreads for different collateralisation is therefore outlined in the following.

According to Duffie & Singleton (1999) the price of a zero bond can be written as follows:

$$\left(1+r^{bond}\right)^{-m} = \left[\exp(-\lambda \times m) + (1-\exp(-\lambda \times m)) \times RR\right] \times \left(1+r^{basis}\right)^{-m}$$

with

$r^{bond} = $ bond yield

$r^{basis} = $ zero basis rate

$\lambda = $ risk neutral defualt intensity

$m = $ term to expiry

$RR = $ recovery rate

The intensity is a marginal measure of time-continuous default risk. The default probability for one year is related to the intensity by the exponential function:

$$PD = 1 - \exp(-\lambda)$$

Due to linear approximations the equation simplifies to:

$$\Delta = r^{bond} - r^{basis} \approx \lambda \times (1-RR)$$

An observable credit spread can be adjusted in order to achieve a credit spread, which would be valid for the same default risk but a different recovery rate, because the intensity stays constant:

$$\Delta^{adjusted} = \Delta^{observable} \frac{1-RR^{adjusted}}{1-RR^{observable}} = \Delta^{observable} \frac{LGD^{adjusted}}{LGD^{observable}}$$

Since the cost margin is to a large extend paid up-front for corporate bonds it needs to be added to the adjusted spread of corporate bonds to make the spreads comparable to loan margins.[101]

The approximation is easy to apply but yields only round numbers.[102] The interpretation is that the observable credit spread is scaled to a spread for a bond with no recovery and then scaled down according to the relevant recovery rate.

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[101] For the purpose of the study a cost margin of 40 basis points has been applied as the adjustment.

[102] A slightly more exact formula can be derived through equation 1 in chapter 11.3.1 *One year bullet loan* on page 95 by holding the PD constant for varying LGDs..

13   Efficient System of Data Collection

In this chapter the requirements for collecting the necessary data in order to perform a due process are summarised as they appear widespread in other chapters regarding the specific data concerned.

13.1   Reference basis rate

The EC needs to collect and publish the market interest rates under the standard approach. It is the authors' opinion that the availability of underlying data has to be assured by the Member States themselves. The Member State in turn may advise its central bank, a state owned bank, its debt agency, etc. to provide the approved data to the EC within a proper electronic common template. Without further investigation or compilation by the EC, the data must be readily available to the EC by electronic data transfer as soon as possible after the averaging period (e.g. the third working day in December for November in order to derive the reference basis rate for January to March). The same data feed is required, but more timely as the case maybe, under the advanced approach if an agent carries out the derivation and publication of the basis rates. The reference rate can still be published in the internet as it is the case under the current system. Additionally, offering users a subscription of an email-letter about updated rates would certainly be desirable.

Alternatively, the EC may consult information providers such as Bloomberg, Reuters and Telerate. The available data can be downloaded to spread sheet programs for instance. However, in contrast to the data gathering through local banks the EC must monitor any changes in the availability of interest rates itself (e.g. emergence of a new swap rate for a maturity of 10 years).

The entire process can be automatised from the data gathering to the publication of the data. However, some intermediate cross-checks and the auditing of the process should be envisaged.

13.2 Monitoring loan margins

In order to monitor the development of loan margins in the Member States it is recommended to collect and analyse the Interest Rate Statistics of the MFI-sample, especially the interest rates on bank loans to non-financial corporate firms up to and over EUR 1 mill. with a maturity or initial term to repricing of one year and less. The data is available to third parties through the ECB, EUROSTAT and the national central banks, but not for all countries at once and not in uniform shape. Other than third parties the EC should be able to encourage the ECB or EUROSTAT to collect and provide the required data for all countries in a common template. The timeliness of this data is not critical so that a time lag of 3 months is acceptable.

Apart from the existing MFI-statistics it would be desirable to collect more data on banks' pricing behaviour. In detail, MFIs could be required to notify loan margins in addition to interest rates. Such a requirement would be, however, too demanding with regard to State aid control if there is no additional political interest in these margins, for example to enhance competition between banks by disclosing such market information.

However, the responsibility to collect this data lies with the national central banks. Noteworthy, some central banks' disclosures on interest rate statistics are not harmonised yet.

13.3 Case-specific information

Apart from the general detailed descriptions of State aid a State should submit supporting calculations in spread sheet format (i.e. derivation of aid intensities) and a brief classification of the aid, which proves the applicability of the particular reference basis rates and the reference margins. The EC in turn may build a casebook with this information in order to assure the fairness and consistency of future decisions across different cases. A uniform template appears to be necessary in order to efficiently administer the data. The following table contains a selection of a possible information structuring.

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Key Word (non-exhaustive)	Description (non-exhaustive)
State	Name
Granting entity	State, City, development bank, …
Kind of aid	Loan, guarantee, cash subsidy, tax relief, … scheme, single aid, …
Beneficiary	Description of the recipients
Conditions of aid grant	Interest rate, guarantee fee, discounts to service fees, investment subsidies, …
General framework	Applicable guidelines, … Allowed aid intensities, …
Currencies	List of applicable currencies in which aid is granted
Application of the reference rate	Benchmarking interest rates or loan margins, discounting, compounding
Risk considerations	Applicable creditworthiness, collateralisation, ranking of debt, riskiness of aid receipts/cash flows, …
Applicable maturities of the reference basis rate	3-month, 1-, 5-, 10-year rates, other maturities or zero rates under the advanced approach
Applicable reference margins	According to rating category and collateralisation other margins under the advanced approach
Representative cases for aid schemes	Description of representative cases on which the judgement is based
Duration of schemes	Period of time for which aid is granted under equal conditions beyond disclosure period of reference rate
Applicable adjustment	Adjustment factors in order to reflect the duration of aid
Advanced approaches	Applied approaches Mandated agents Applied methods, models, systems
Etc.	…

Table 13-1

14 Empirics

The following sections comprise the empirical findings that form the basis for the results of the main chapters. First, the results of the survey among European banks are presented. Due to the limited participation of the banks of some countries the survey does not reveal a suitable differentiation between the countries. Therefore attention is drawn to the interest rate statistics (IRS) of monetary financial institutions (MFI), which will be analysed secondly. Finally, the availability of money market and swap rates is investigated.

14.1 Survey

The survey conducted among European commercial banks, central banks, supervisory authorities, finance ministries and banking associations constitutes a main empirical part of this study. The core purpose of the survey was to derive risk-adjusted margins. Those have been verified by margins that were derived from corporate bond markets and by a loan pricing tool, which itself is compliant with the pricing model outlined in chapter 11 *Model for the Reference Margin* and has been calibrated to banks' responses. In the next chapter (14.2 *MFI statistics*) the surveyed loan margins were used to map countries and loan sizes to the rating categories by analysing the effective interest rates actually observed in loan markets.

14.1.1 Design of the survey

Since the study should include interest rates in the EU Member States as well as in the Candidate States, a quite large number of respondents was necessary in order to cover all relevant countries and to increase chances of achieving a significant response rate.

Concerning the sampling method it was decided to opt for a non-probability judgmental sample. This means that the selection procedure used is subjective so that the sample of respondents is selected according to what is felt to be most appropriate for the research objectives (Lambin, 2000). Even though external validity might be somewhat limited the narrowly defined scope of the study as well as advantages in terms of costs and effort legitimate such an approach.

In particular, the questionnaire was sent to about 300 institutions, of which 195 are commercial or development banks. The remainder includes central banks, ministries of finance, banking supervision authorities and banking associations. However, the questionnaires sent to commercial and development banks representing important financial institutions constitute the backbone of the study because these institutions have a direct impact on the relevant credit margins. The relevant contact persons in the target institutions were found through researching the World Wide Web and through Deloitte's international network. In addition to the questionnaire, all respondents received a cover letter assuring strict confidentiality of the surveyed data and a certificate of the European Commission DG Competition verifying Deloitte's mandate.[103]

Apart from questions concerning contact details and confidentiality in part A, the questionnaire comprises 38 questions and is divided into six parts. The questions of part B concentrate on the responding institution. In part C questions are concerned with the basis rate. Part D covers the loan portfolio, while part E was designed for examining the institution's credit margins. Part F contains questions about a basic loan pricing model and in part G respondents were asked to provide a representative sample of loans granted by their institution (the particular questions and results are described forth following).

14.1.2   Results

Since the questionnaires received from commercial and development banks are most important for the purpose of finding a reference rate, the analysis of the survey response will be restricted to the returned questionnaires from these institutions.[104] From the 195 questionnaires transmitted to commercial and development banks in 30 European countries 32 were completed and returned resulting in a response ratio of 16.4% (see Table 14-1).[105] With regard to the high effort necessary for completing the questionnaire and the sensibility of required data, this response ratio corresponds to a conservative expectation.[106]

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[103] The package comprising the cover letter, the certificate and the questionnaire is replicated in chapter 18 *Questionnaire*.

[104] The weak response from other institutions is ascribed to the fact that the questionnaire is primarily addressing banks.

[105] Although it has been stressed in the cover letter that partially answered questionnaires were equally welcome, the majority of banks responsibly felt to be obliged to submit complete answers, which led some banks to decide not to participate at all.

[106] The extend of the questionnaire was indeed designed in order to statistically analyse more economic effects than finally were addressed, because the heterogeneity of answers and the small sample size turned out not to be sufficient for drawing significant conclusions on specific interrelations. The planned underpinning of the results by proper financial models has been largely skipped.

However, the distribution of responses is relatively uneven. This means that not all countries are covered and the number of responses per country is very disproportionate. So for some countries there are several responses while for others there is only one or no response at all. About 68% of the returned questionnaires came from banks in the old Member States and only 26% and 5% originated from the new Members and Candidates, respectively (see Figure 14-1).

Of course this has implications for the generalisability of the survey results, especially with regard to applying the results to the countries not covered by the survey due to a lack of responses. Since the results have been compared to the MFI-statistics, the credit spreads of bond markets, and a loan pricing tool the authors feel nevertheless confident about the applicability of the derived margins.

14.1.2.1   Response

International distribution of survey return
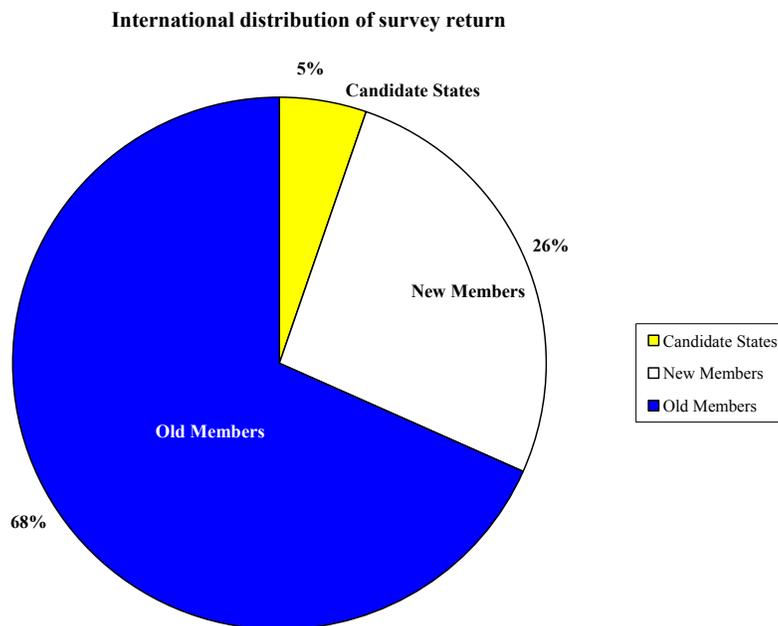
Figure 14-1

Countries	Questionnaires sent	Questionnaires returned	Return ratio
Austria	6	1	17%
Belgium	5	1	20%
Cyprus	5	2	40%
Czech Republic	5	2	40%
Denmark	6	0	**0%**
Estonia	2	0	**0%**
Finland	5	1	20%
France	9	1	11%
Germany	24	5	21%
Greece	5	1	20%
Hungary	8	0	**0%**
Ireland	3	1	33%
Italy	7	1	14%
Latvia	7	0	**0%**
Lithuania	5	2	40%
Luxembourg	3	1	33%
Malta	3	2	67%
Poland	9	1	11%
Portugal	6	2	33%
Slovakia	3	0	**0%**
Slovenia	6	0	**0%**
Spain	8	3	38%
Sweden	7	1	14%
The Netherlands	3	0	**0%**
United Kingdom	10	1	10%
Bulgaria	7	0	**0%**
Romania	10	2	20%
Turkey	9	0	**0%**
Norway	4	0	0%
Switzerland	2	0	0%
EU Institutions	3	1	33%
Total	**195**	**32**	**16%**

Table 14-1

14.1.2.1.1   Questions about the institution

Question B 1. The state's stake in the institution

To which extent is your institution's capital (or management/supervisory board) directly or indirectly controlled or held by the State?

This question was designed to distinguish among commercial banks that are completely independent from State or municipal influence on the side and banks owned or controlled in part or in total by the State or a municipal entity that pursue public objectives, like development banks or some savings banks, on the other hand.

Institutions' share controlled by the state
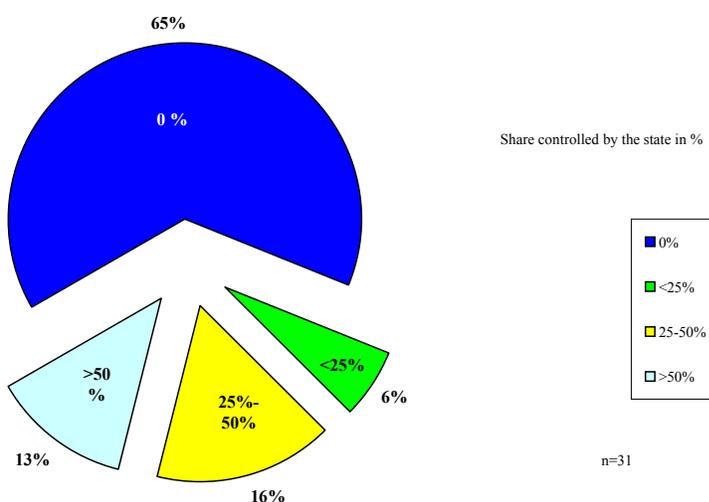
Figure 14-2

As becomes evident through Figure 14-2, about 65% of respondents are independent commercial banks. For about 32% the share controlled by a public entity is equal to or lower 50%. 13% of respondents indicated a share in excess of 50%. Thus, commercial banks constitute the majority of respondent. However, institutions with a public stake, which are quite common in Europe, are well represented, too.

Question B 2. Institution's mission

To which extent (in % of lending business) does your institution pursue government's or public objectives rather than private investors' goals such as maximising profits or share-holder value?

Related to Question B 1., this question should clarify how important profit or shareholder value maximisation is for the participating banks and thus how market-oriented these institutions operate. State ownership may not prevent a bank from pursuing commercial interests.
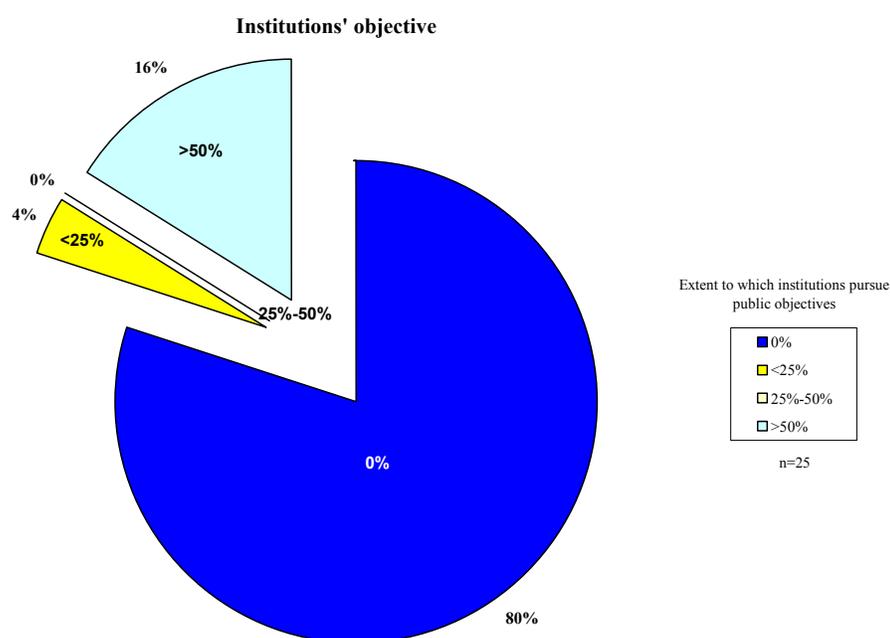
Figure 14-3

80% of respondents reported to pursue no public objectives at all. 4% have some public objectives comprising less than 25% of lending business and 16% have a commitment to public objectives exceeding 50%. Consequently, the survey is strongly based on banks oriented towards commercial lending. Again, institutions with public objectives, which are prevalent in multiple European countries, are represented as well. So the sample is a good cross-section of the European banking market.

Question B 3. Rating

What are the ratings of your institution or which rating would you deem appropriate for your institution if it is not rated by a rating agency?

This question aimed at estimating the participating banks' average rating, which is important for the evaluation of the banks' credit standing and the approximation of its funding cost. The re-financing costs in turn may affect the distribution of the bank's customers as it does not necessarily pay for a weakly rated bank to lend to better rated corporate firms.

Rating distribution of responding banks
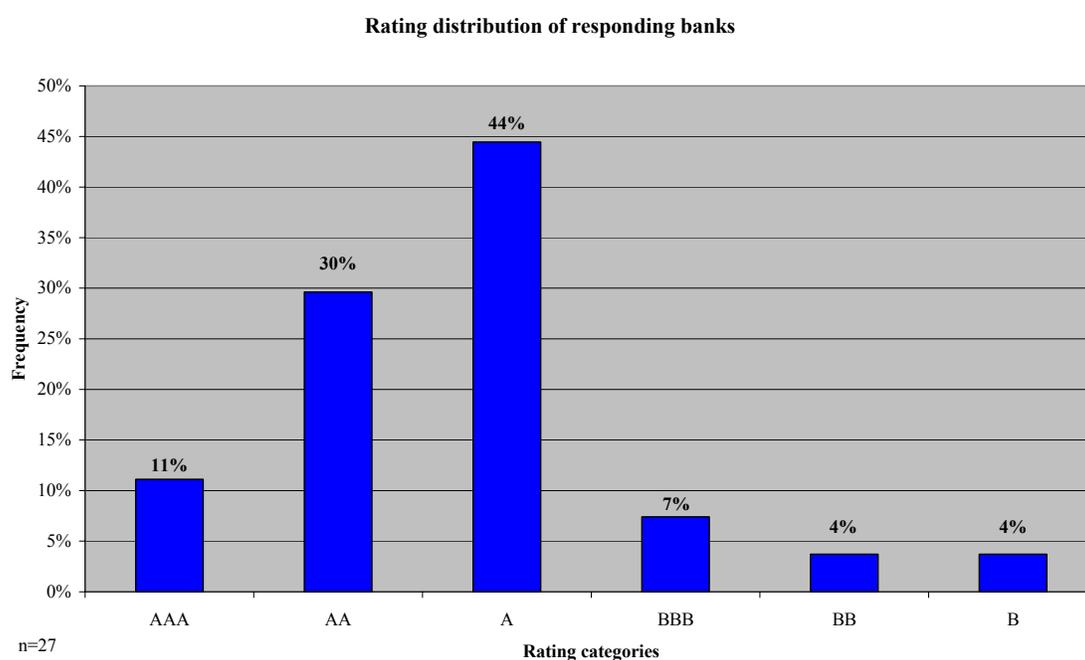
Figure 14-4

The majority of banks (92%) included in the survey have an investment grade rating of BBB or better. This reflects quite well the overall credit standing of banking. A bias to margins or funding rates cannot be expected for the sample therefore.

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Question B 4. Market share

Describe the lending business you are most active in? How large is your estimated market share (in %) in this market?

Interest rates for loans emanating from this survey can be deemed to reflect market conditions only if it is assured that the sample correctly replicates the prevailing market settings. Therefore, the influence of certain extreme market situations like monopolistic competition on one side and perfect competition on the other side has to be limited to the extent, in which it prevails in reality. Since the banking industry is heavily regulated and partially State-owned for some European States, these markets may not follow the realities of ideally competitive markets.

Banks' market share in the lending business
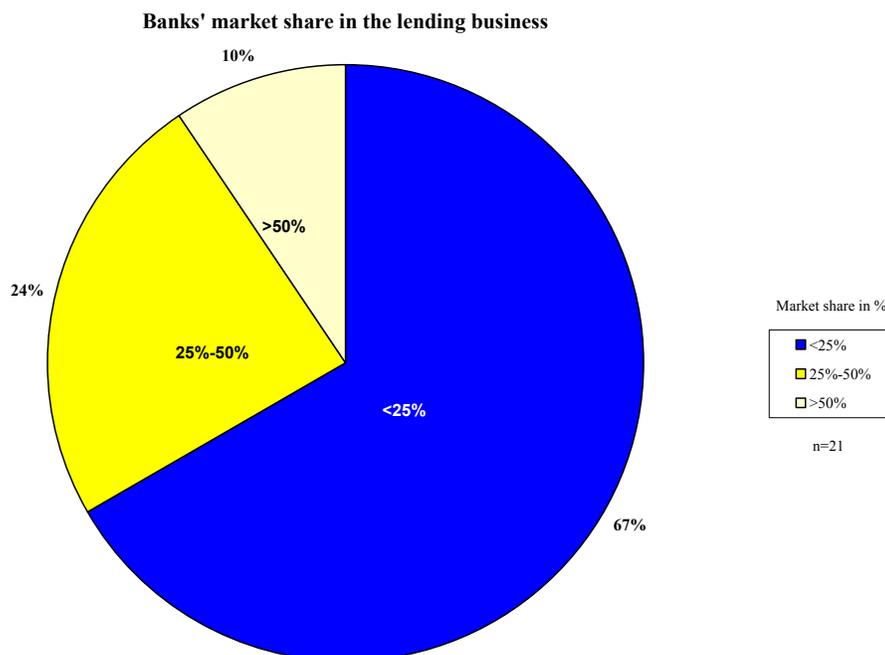
Figure 14-5

However, with 67% the sample contains a relatively large share of banks with a market position of less than 25%. 24% have a market share between 25% and 50% and only 10% indicated a dominant position in their lending segment in excess of 50%. The last share is largely due to the participation of specialised lending facilities such as development banks, which are mostly active in certain narrow market segments. Overall, the sample reflects quite well the degree of competition in European lending markets.

Question B 5. Institution's size

What are your balance sheet total (total assets) and your annual income from interest (for instance taken from the last audited annual report)? What is the share (in %) contributed to total assets and interest income by lending to European large corporate enterprises and SMEs?

Question B 5. serves to classify the participating banks according to their size measured in total assets and to analyse the composition of loan portfolios and interest income.

Overview of participating banks' size

Figure 14-6

Corporate (incl. SMEs) lending's average contribution to total assets

Figure 14-7

SME lending's average contribution to total assets

Figure 14-8

Corporate (incl. SMEs) lending's average contribution to interest income differentiated by bank size

Figure 14-9

SME lending's average contribution to interest income differentiated by bank size
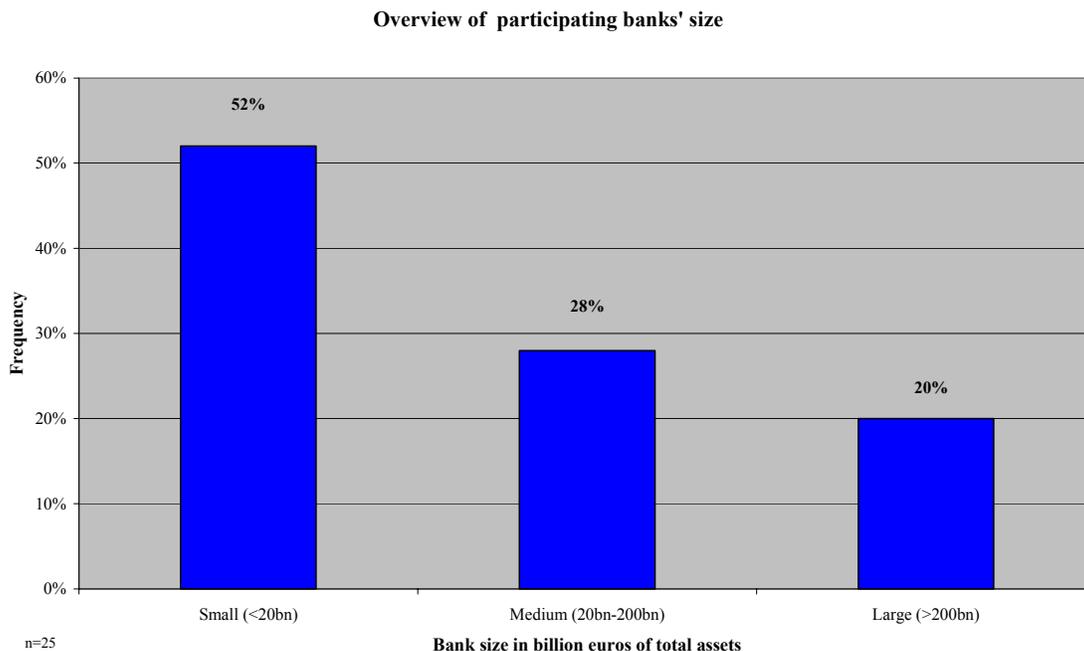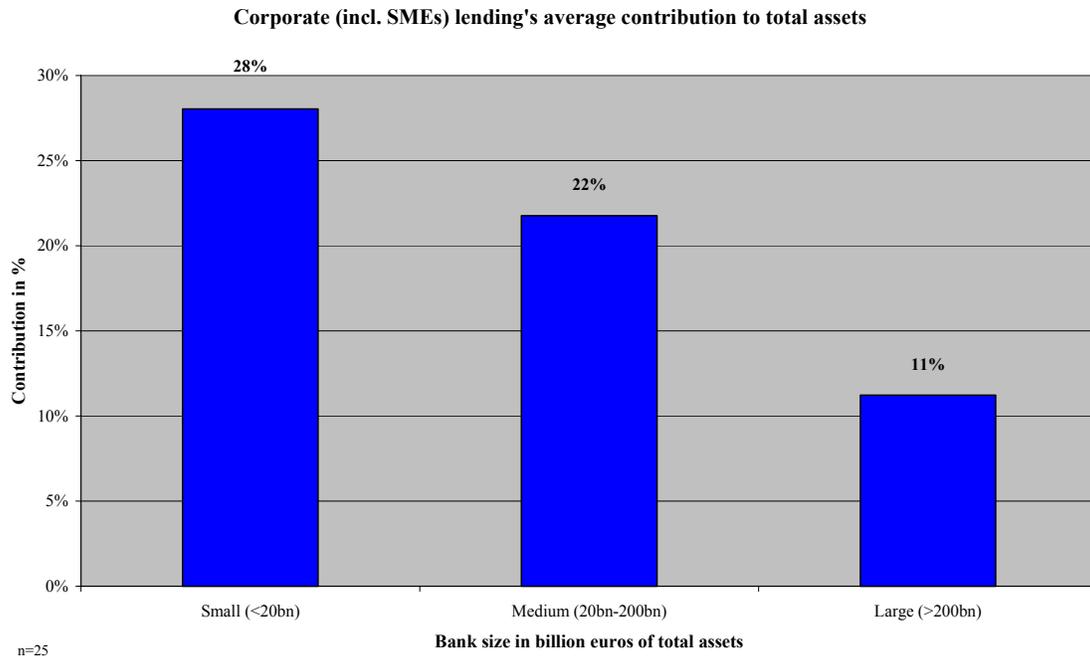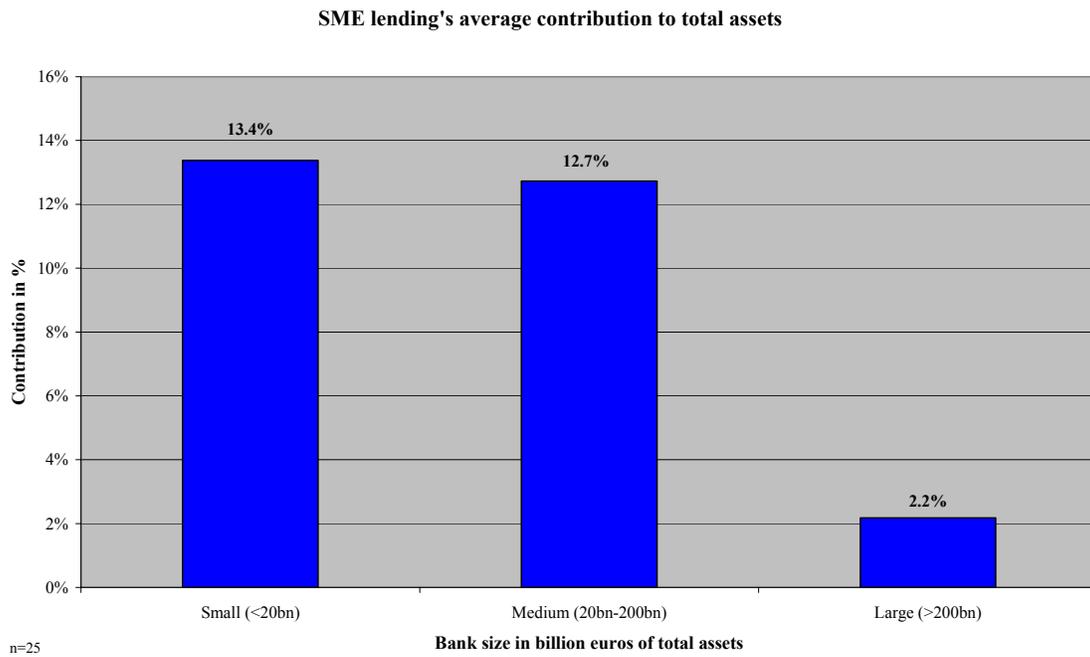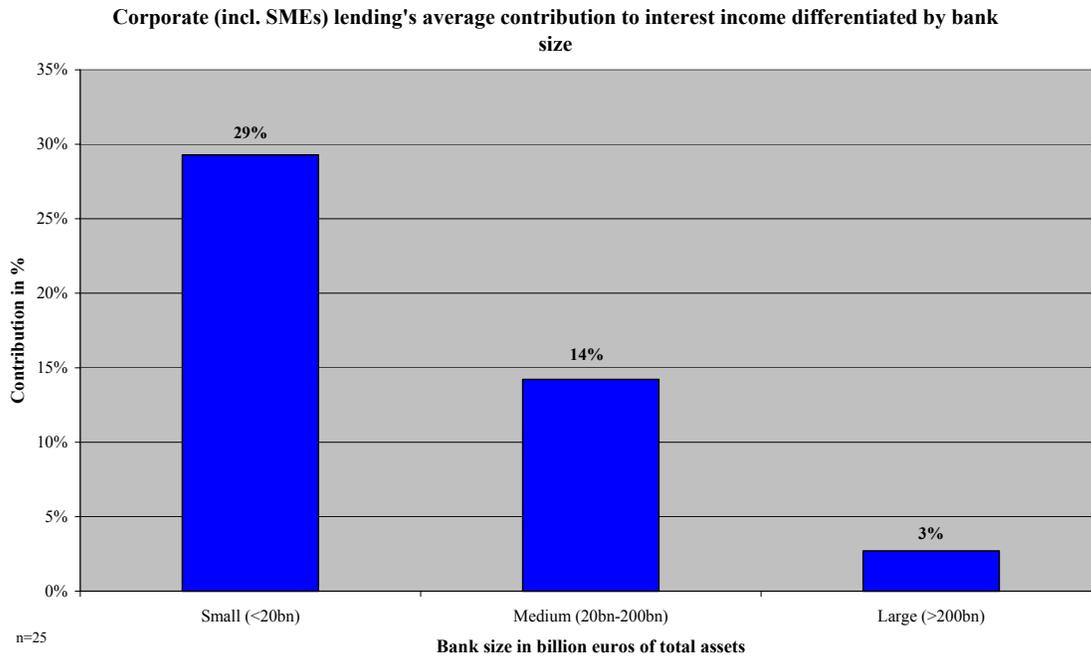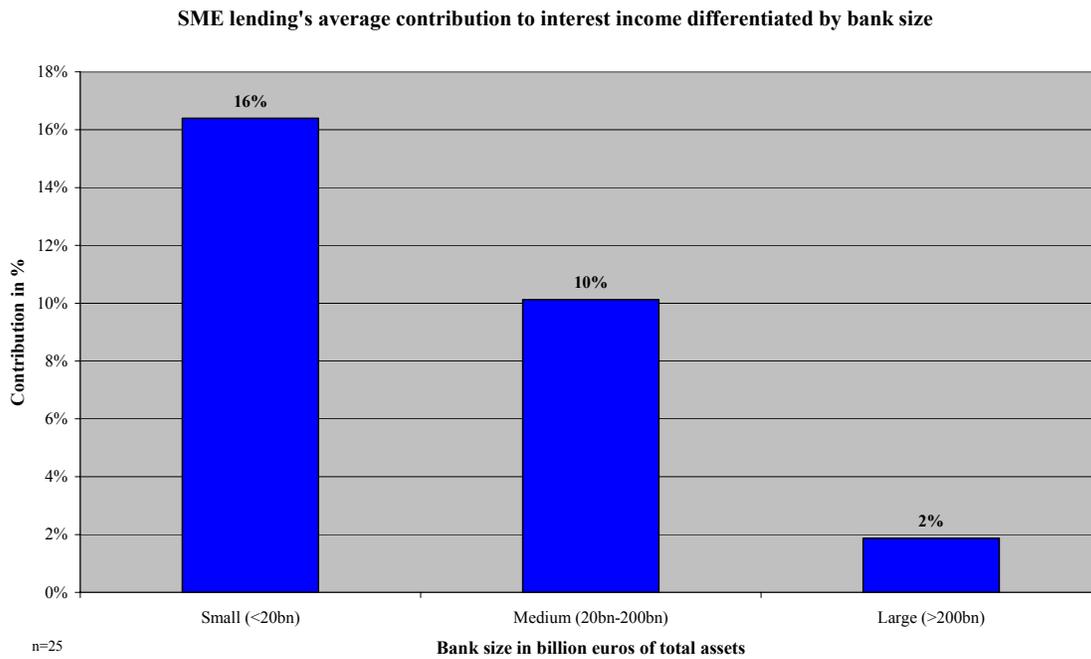
Figure 14-10

Concerning bank size, smaller banks (with less than EUR 20 bn. in total assets) constitute about the half of the sample (52%). 28% are medium-sized banks and about 20% are large banks, whose assets exceed EUR 200 bn. Hence, the market structure prevalent in many European countries is mapped appropriately by this sample (Figure 14-6).

With a share of 28% and 22% of total assets, respectively, small- and medium-sized banks are most active in corporate lending on average, while for large banks corporate lending contributes only 11% to total assets (Figure 14-7). A similar picture can be drawn for lending to SMEs, which contributes about 13% to each, small and medium banks' assets but only 2% to large banks' assets (Figure 14-8). Analogously, small- and medium-sized banks generate a higher share of interest income from corporate lending, particularly SME lending, than big banks (Figure 14-9). Hence, lending to companies is of considerable importance to the surveyed banks.

Question B 6. Public loan promotion programmes

How large is the share and the amount of public loan promotion programmes in your overall lending business?

This question examines if the banks in the sample participate in public loan promotion schemes, which represent an important form of State aid, and are thus relevant for the subject at hand. These banks may have a possible conflict of interest when answering the questions.

For the large majority (82%) of respondents, public loan promotion schemes constitute 10% or less of their loan portfolio. Only 18% report to have a share of 30% or more of such loans in their portfolio. Hence, conflict of interest can be considered to be less relevant.

Institutions' involvement in public loan schemes

n=27
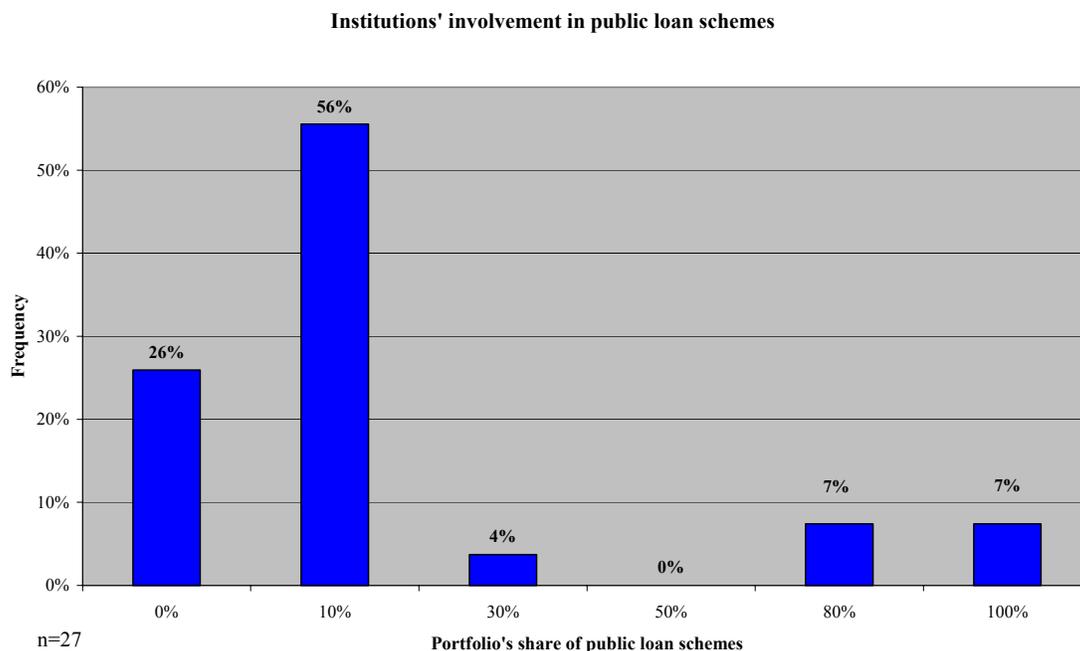
Figure 14-11

Question B 7. International distribution of loan portfolio

How are corporate loans granted by your institution distributed (in %) among your domestic country, the following old and new EU Member States as well as the EU applicant States (referring to the country where the investment takes place, where the collateral is located or where the debtor is resident, whatever is better applicable)? You may concentrate on important countries, e.g. summarising up to 90% of your lending business.

For setting up a common reference rate system applicable for all EU Members and Candidates a certain degree of economic integration and loan market homogeneity is desirable in order to avoid unfair conditions for some countries. Consequently, the integration of loan markets has been assessed. Question B 7. examines how international banks' loan portfolios are currently distributed across countries as a basic indicator for market integration.[107]

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[107] Admittedly, macro economic statistics provide better measures on this subject. Moreover, cross-border acquisition of banks is a kind of market integration, which is not covered by this question.

Loan granting behaviour across borders
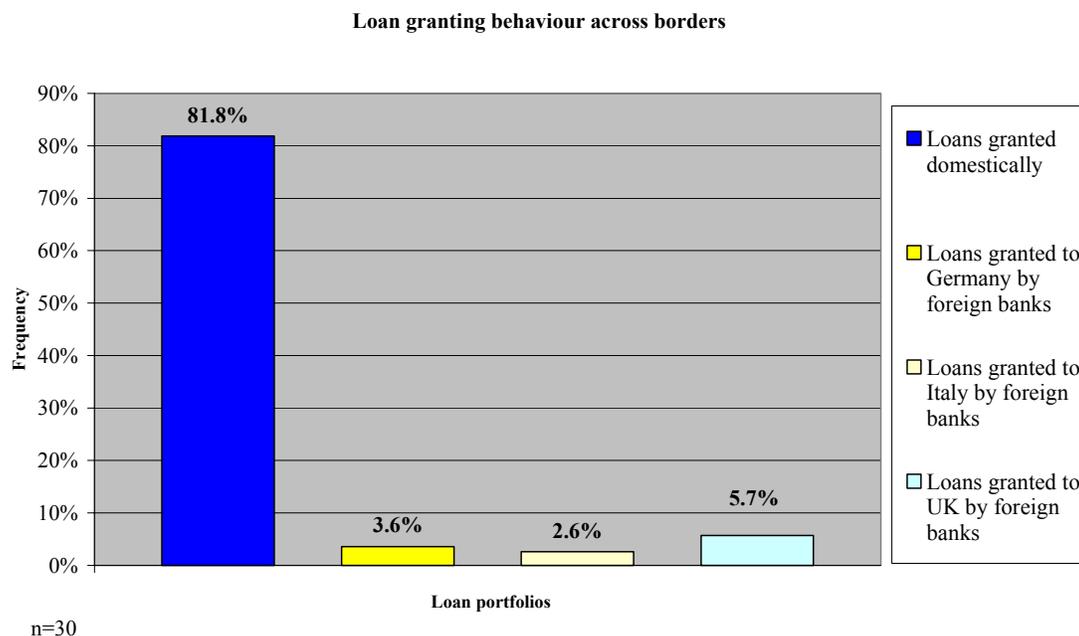
Figure 14-12

However, the results of the survey suggest that integration of loan markets, even to a smaller degree, is still far from being realised. About 82% of loans are granted domestically. Only a few countries like Germany, Italy and the UK attract a more significant share of loans from foreign banks, though the share is very low and not exceeding 6%.

The reason for this strong separation of markets is that lending is obviously afflicted with high transaction costs mainly due to marketing and monitoring, which is minimised by local business.

14.1.2.1.2 Questions concerning the basis rate

Question C 1. Currency distribution of loan portfolios

In which proportion (in %) do you grant loans in the following currencies (in order of importance; example currencies may be overwritten)?

Question C 1. allows to identify the major currencies in which loans are granted and to determine their importance in the individual loan portfolios. It has to be assured by the study that the availability of the relevant basis rates is considered for the major currencies, in which the banks grant loans to European debtors, as in these currencies also State aid may occur.

Average currency distribution
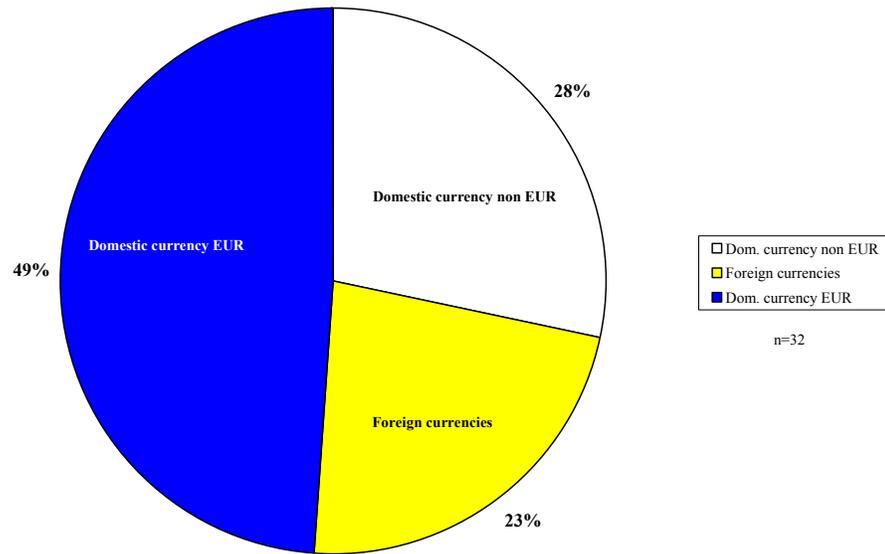
Figure 14-13

Average proportion of foreign currencies in banks' loan portfolios
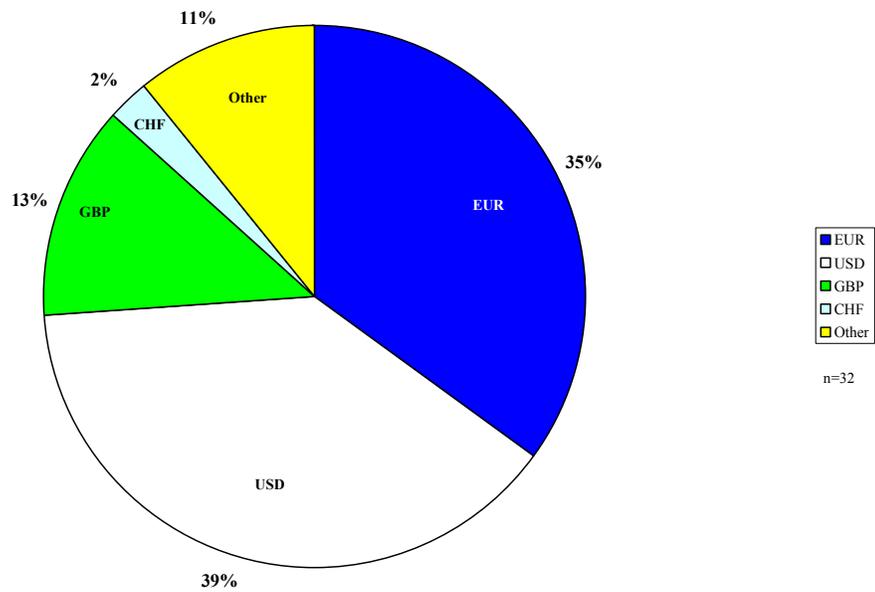
Figure 14-14

As already expected, the euro is the most important currency in the lending business of surveyed banks. For about half of the banks the euro is the domestic currency and 35% of foreign currency loan portfolios are denominated in euro. Concerning currency distribution, it was observed that on average about 77% of a bank's loan portfolio is denominated in domestic currency (Figure 14-13). The remaining foreign currencies are, apart from the euro (35%), US dollar (39%), pound sterling (13%), Swiss franc (2%) and other currencies (11%) (Figure 14-14). Therefore, if State aid follows a similar pattern, the basis rate has to be published for all these currencies.

Question C2. Basis rate

Which proportion (in %) of newly granted loans are typically tied to the following periods concerning the base interest rate (i.e. disregarding the credit margin) agreed on at the time of issue (up to the next marke- based re-pricing or debtor's opportunity to redeem the loan)? Which sources of information do you use to obtain the base rates (e.g. pages in Bloomberg or REUTERS)? And how big is the average bid/ask-spread in this market at the moment? How much is the base rate above or what is the credit spread your institution is paying for own senior debt against EURIBOR (or domestic equivalent as indicated by you)?

This question aims at examining parameters for determining the basis rate. For this purpose the typical rate fixation periods and the corresponding re-financing rates have to be determined. Re-financing rates are analysed in terms of spreads against EURIBOR or domestic IBOR. In contrast to the requested loan margins (see below), which are mainly applicable to corporate firms, own credit spreads reflect the funding costs of banks themselves. Furthermore, the information source regarding the basis rates is relevant in order to assure that the necessary data is available and reported uniformly.

Average distribution of rate fixation periods in a loan portfolio
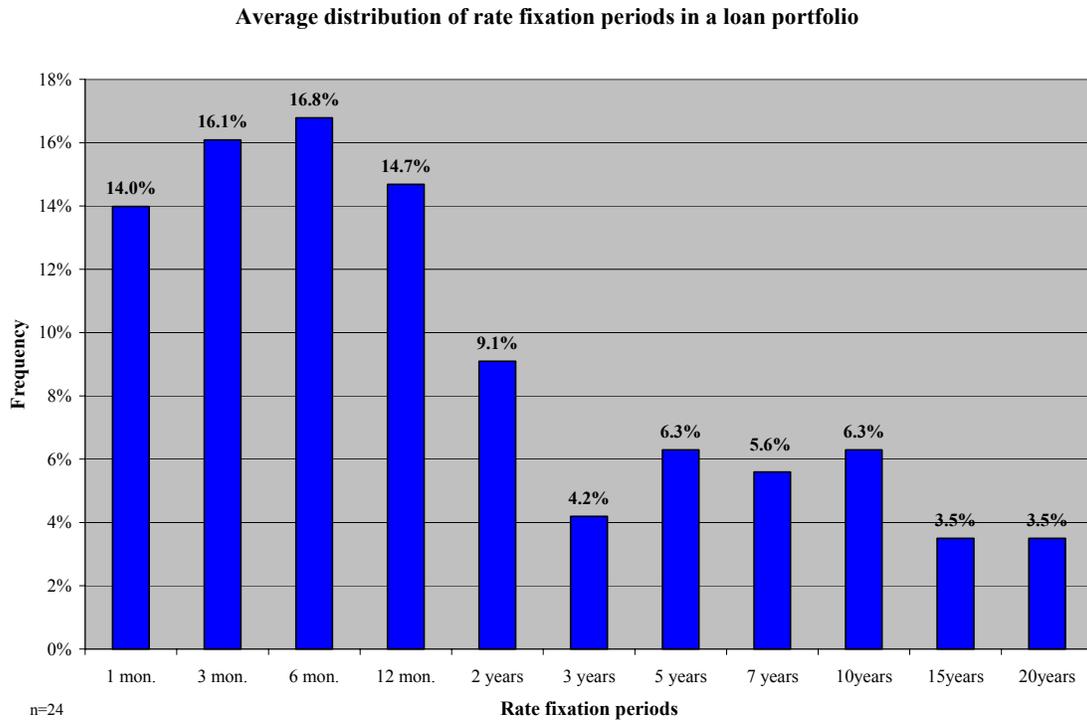
Figure 14-15

The most common rate fixation periods are those up to one year (one, three, six and twelve months). They cover 62% of the spectrum. Rate fixation periods for two, three, five, seven and ten years lie between 9% and 4%. The frequency for periods above ten years is relatively low. However, the data provided by respondents is insufficient for reaching reliable conclusions.

Average credit spreads against EURIBOR or equivalent
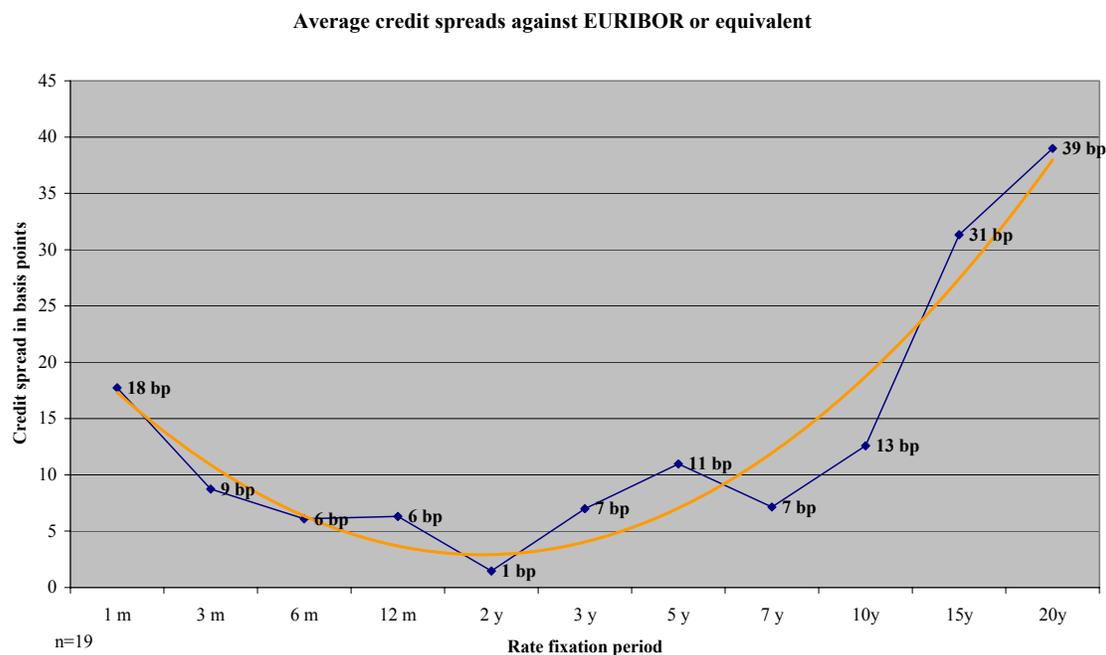
Figure 14-16

Average banks' credit spreads against EURIBOR or IBOR are considerable at the very short end, decrease for rate fixation periods up to ten years and increase strongly for periods above ten years. However, attention has to be paid to the quite patchy data supplied by banks. For major currencies better indications can be derived through banks' bond spreads.

Since some banks measure loan margins against own funding costs of senior debt[108] and others against a market benchmark like EURIBOR or swap rates, this range defines the maximum bias contained in the reported loan margins (see below), which is considered to be acceptable. Hence, the EURIBOR or local IBOR are considered as suitable basis rates.

Unfortunately, the response to the question regarding the information sources was thin. Especially for the new Member Countries the sources were of considerable interest. Due to the lack of answers the authors had to investigate the availability of the basis rates through other sources (mainly Bloomberg), which is, of course, not backed by local banking knowledge as the answers were supposed to be.

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[108] Lower funding costs through customer deposits are attributed to a margin earned on the liability side rather than by the lending business.

Question C 3. Basis rate depending on redemption type

Which base rate (in %) would you charge for a loan in your domestic currency (five years, notional equivalent to EUR 5 mill., riskless debtor) regarding the following types of redemption (bullet, annuity and equal amounts and equidistant periods)?

Concerning the basis rate it has also to be distinguished between certain types of redemptions that require different basis rates. This question is relevant regarding the discounting of several instalments as well.

Indeed the survey shows that the basis rate required by banks for bullet loans is higher than for loans with annuity or equal amount redemptions (Figure 14-17), which matters a lot in banking. Notwithstanding, considering a standard approach for the reference rate the difference can be regarded as marginal, which, however, could appropriately be observed by a more advanced approach.

Average base rate differentiated for redemption type
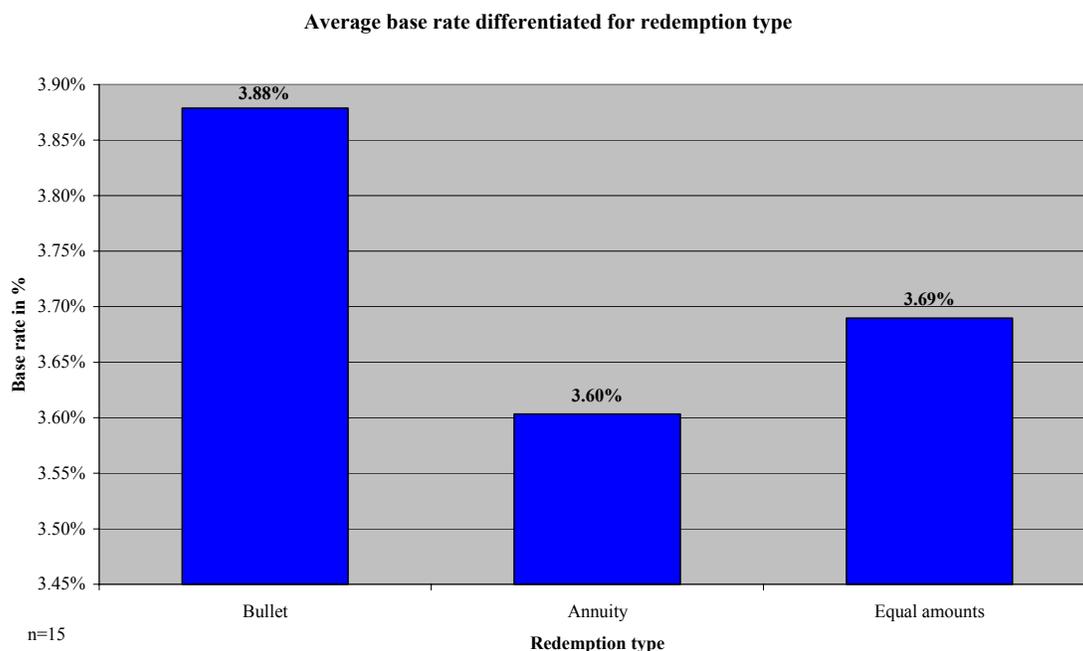
Figure 14-17

Average difference of basis rates: bullet versus annuity and equal amounts
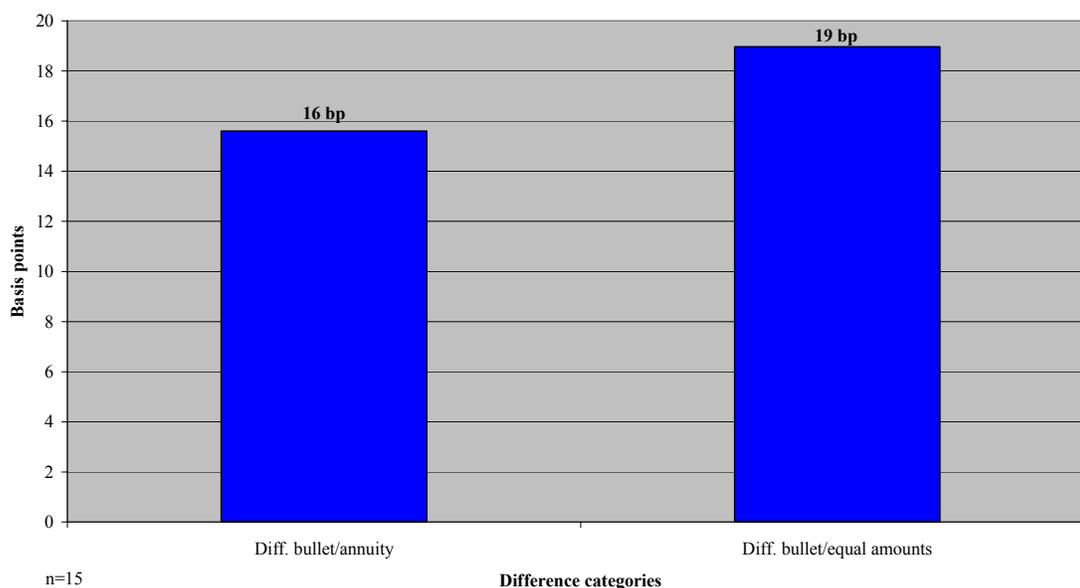
Figure 14-18

14.1.2.1.3   Questions about the loan portfolio

Question D 1. Loan volume distribution

Which share (in %) of new loans did typically fall in the following categories (if syndicated regarding the total amount including your exposure)?

Since the size of notional amounts has an influence on the interest rate it is necessary to examine whether the sample represents a wide range of notional amounts.

Loans up to EUR 1 mill. constitute about the half of the average surveyed loan portfolios. A further 30% are distributed between EUR 1 mill. and EUR 25 mill. The considered loan amounts are appropriately represented (Figure 14-19).

Distribution of new loans
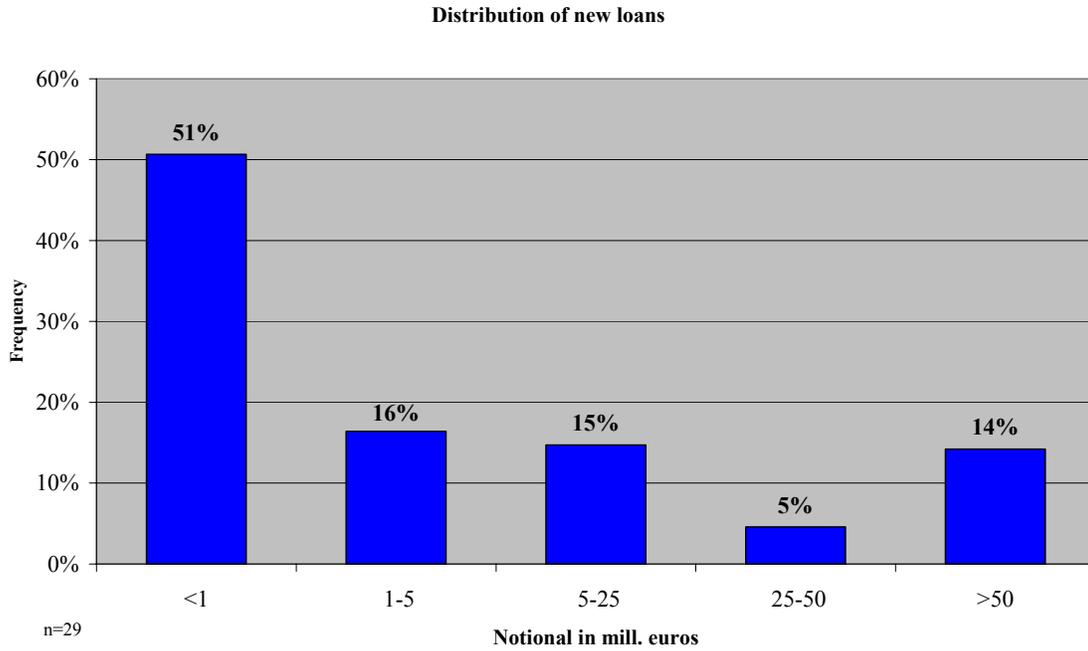
Figure 14-19

Question D 2. Loan redemption distribution

Which share (in %) of loans do typically fall in the following redemption categories? Please specify the typical initial redemption (in % of notional) for annuity loans.

Distribution of loans in redemption categories
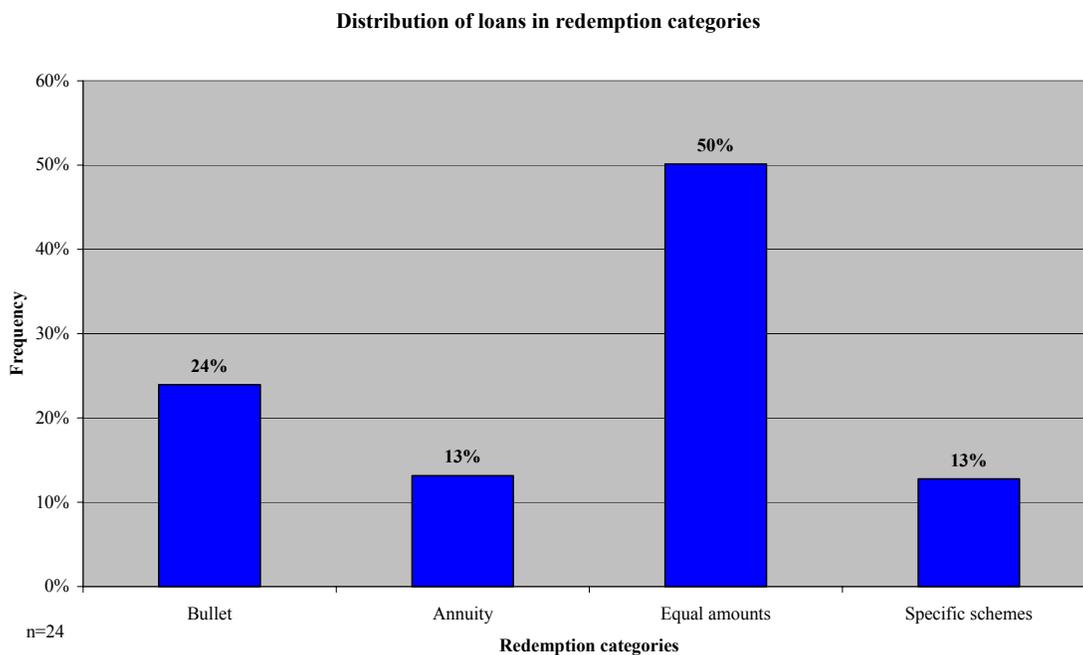
Figure 14-20

Question C 3. revealed that bullet loans require higher margins than other redemption types. Figure 14-20 exhibits that bullet loans make up about one fourth of the average loan portfolio. 50% of loans admit equal amount redemptions.

Since the basis rate difference between loan types turned out to be less significant considering a standard approach for the reference rate, the distribution of loans among loan types is less important as well. However, as State aid is granted in form of – possibly large – loans, an advanced approach should observe different redemption types appropriately.

Question D 3. Internal rating and PD

Does your institution have an internal rating for larger corporates and SMEs to assess a debtor's creditworthiness? Does the rating provide an estimation of the debtor's probability of default (PD) or mapping to a rating agency's PDs? Please comment briefly on your rating system regarding product/sector differentiation and future prospects.

The debtor's creditworthiness as indicated by the probability of default (PD) and a related rating is a very important component of determining a risk-based credit margin. Therefore, the survey has to examine the banks' risk evaluation or measurement techniques such as an internal rating system.

Internal rating for corporate lending
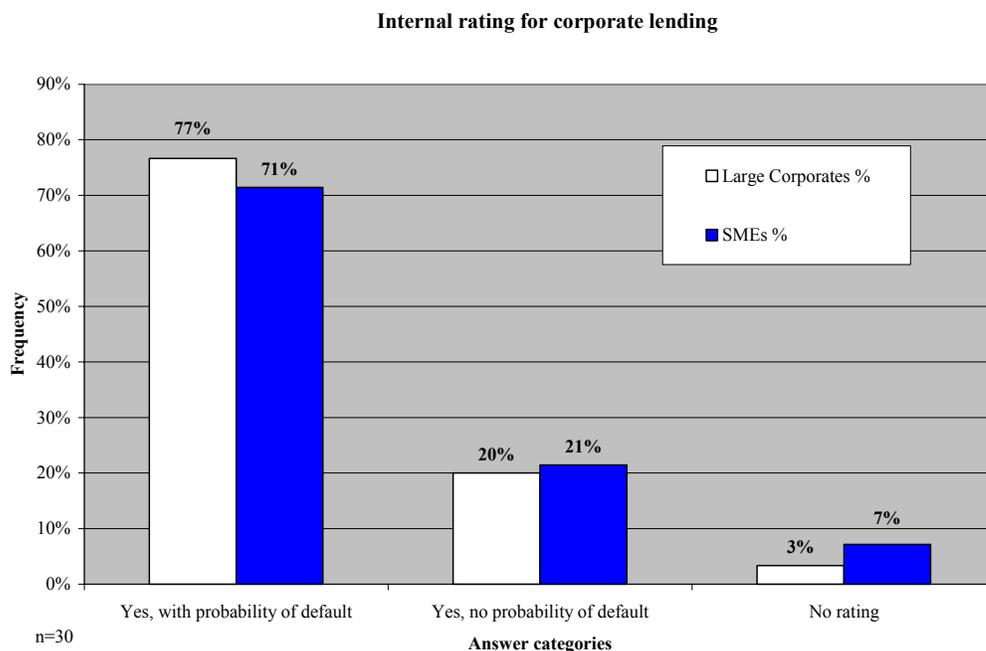
Figure 14-21

Most banks have an internal rating system with PD estimation for both, larger corporates and SMEs. Only about 20% do assign only ratings without PDs to larger corporates and SMEs and a small minority has no rating system yet.

Hence, banks possess systems to evaluate debtors' creditworthiness, on which their margin pricing can rely. As the reference rate is required to be market based, different risk grades should be observed.

Question D 4. Rating distribution of loan portfolio

How are your newly granted corporate loans distributed among your rating scale (please replace the examples with your own rating and the corresponding probability of default (PD) for one year and choose a rating category you deem appropriate (scale chosen from CAD III, Annex D-7)?

Because the rating systems are different for most banks, the individual rating grades and associated PDs have to be aggregated into one common rating scale so that the participating banks' portfolios can be compared in terms of creditworthiness. Thus, the individual rating classes and PDs have to be surveyed in order to get the necessary input for the aggregation.
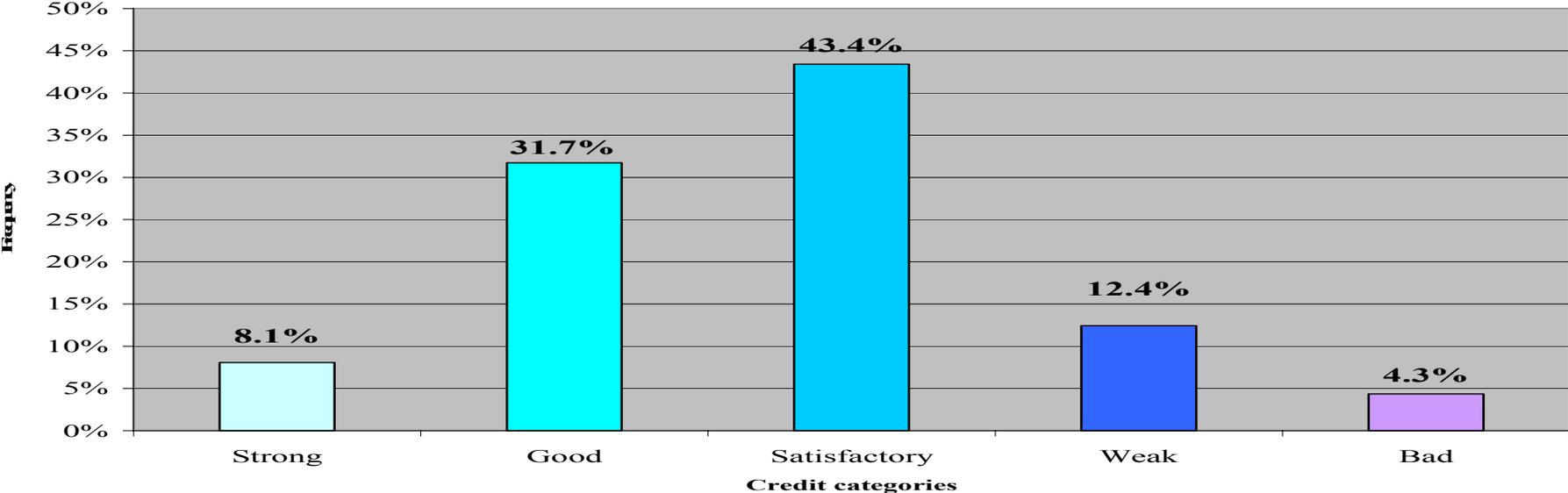
Figure 14-22

Table 14-2

Category	Strong							Good			Satisfactory			Weak			Bad
Merrill Lynch Comp Rating	AAA	AA1	AA2	AA3	A1	A2	A3	BBB1	BBB2	BBB3	BB1	BB2	BB3	B1	B2	B3	CCC
Average PD	0.0233%							0.1711%			1.25%			6.35%			20.02%
PD-intervall	0%-0.04%							0.04%-0.4%			0.4%-2.8%			2.8%-11.6%			11.6%-26%
Moody's PDs	0.00005%	0.00057%	0.0014%	0.0030%	0.0058%	0.0109%	0.0389%	0.09%	0.17%	0.42%	0.87%	1.56%	2.81%	4.7%	7.2%	11.6%	26%

Figure 13.22 and Table 14-2 contain the results of the aggregation, for which both the disclosed PDs and loan margins have been observed. The individual ratings and PDs were mapped to Moody's rating scale and PDs, but were denoted by Merrill Lynch's composite rating grades. The authors intended to achieve a mapping corresponding to a common market standard. Seven banks indicated hypothetical margins for badly rated loans that would not be granted. For those banks the average PD of debtors, the bank would just grant a loan to, is about 5.8%. This PD corresponds to a "weak" rating. Therefore, the margins for loans to debtors admitting a worse than a "weak" rating were considered to be fictive.

More than 70% of banks' loan portfolios are rated as "good" and "satisfactory". Since "satisfactory" is the most likely and the middle rating grade it has been chosen as the normal case. This finding is also sustained by the analysis of the MFI-statistics, by which the average loan margins of most countries can well be assigned to the rating categories "good" and "satisfactory" and only to a lesser extend to "strong" and "weak". The median rating of bonds of non-financial corporates is BBB1, which corresponds to a "good" rating grade.

This mapping is expected to play a key role when States categorise the beneficiaries into rating classes. The rating scales were clustered into categories of rating grades and PD-intervals, by which loans can be classified. The coarser categories simplify the applicability for those users of the reference rate, who are not banks themselves. However, an even coarser aggregation appeared not to be suitable since the increases of PDs and margins over the rating grades were too large then.

Question D 5. LGD estimation

Do you estimate the expected loss given default when the loan is granted (LGD: one minus the expected recoverable amount arising from the collateral, comprising debtor's typically pledged assets and bankruptcy assets, in relation to the expected exposure of the granted loan, typically the notional amount plus interest)?

A further measure of creditworthiness is collateralisation, which is commonly measured by the LGD. About 60% of banks use this measure (Figure 14-23). Therefore, it appears to be reasonable to make use of this risk measure as well when determining the reference margin.

Banks estimating the expected loss given default (LGD) when granting a loan
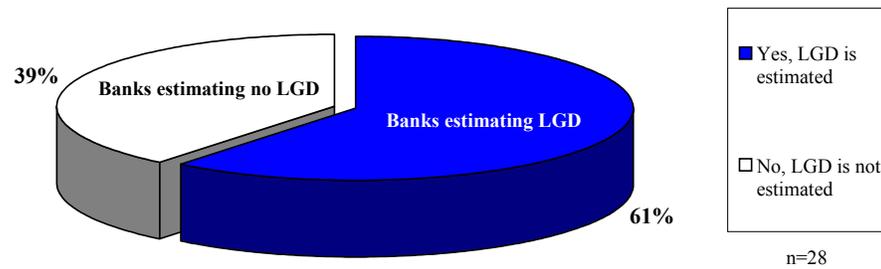
Figure 14-23

Question D 6. LGD Distribution of loan portfolio

How are your newly granted loans distributed among the following LGD categories?

Because the LGD is a determining factor for the reference margin it is important how loans are distributed among LGD categories on average. This would give an indication about the average loan collateralisation and defines a "normal" collateralisation as the default case.

Deloitte.

Average proportion of loans falling in loss given default (LGD) categories

n=14
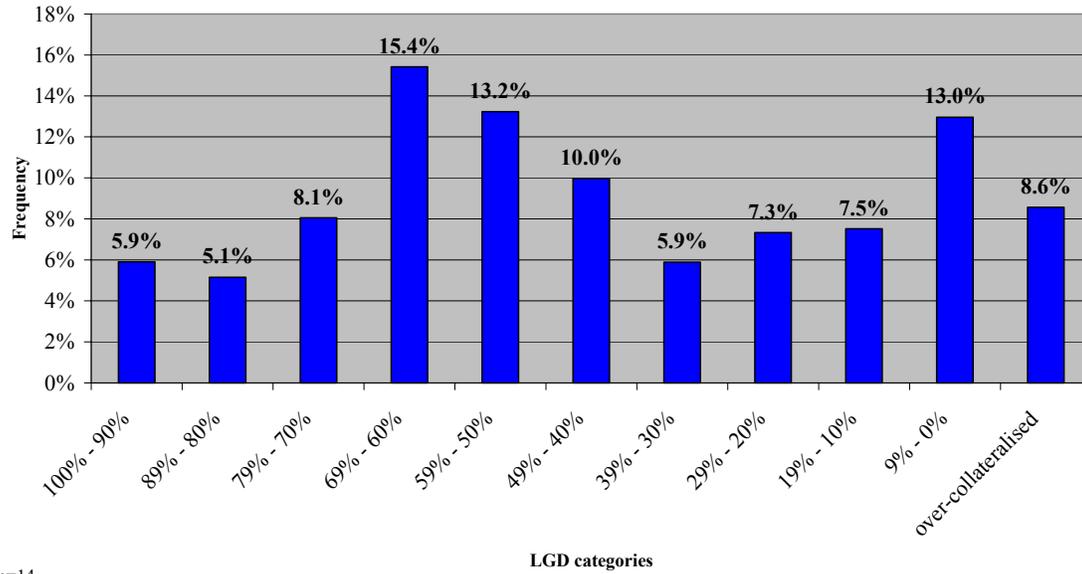
Figure 14-24

The distribution shows that average collateralisation of 43.5% lies in the bandwidth of 30% - 60% LGD. Thus, this range is a suitable definition of the "normal" collateralisation case.

Averages of losses given default (LGDs)
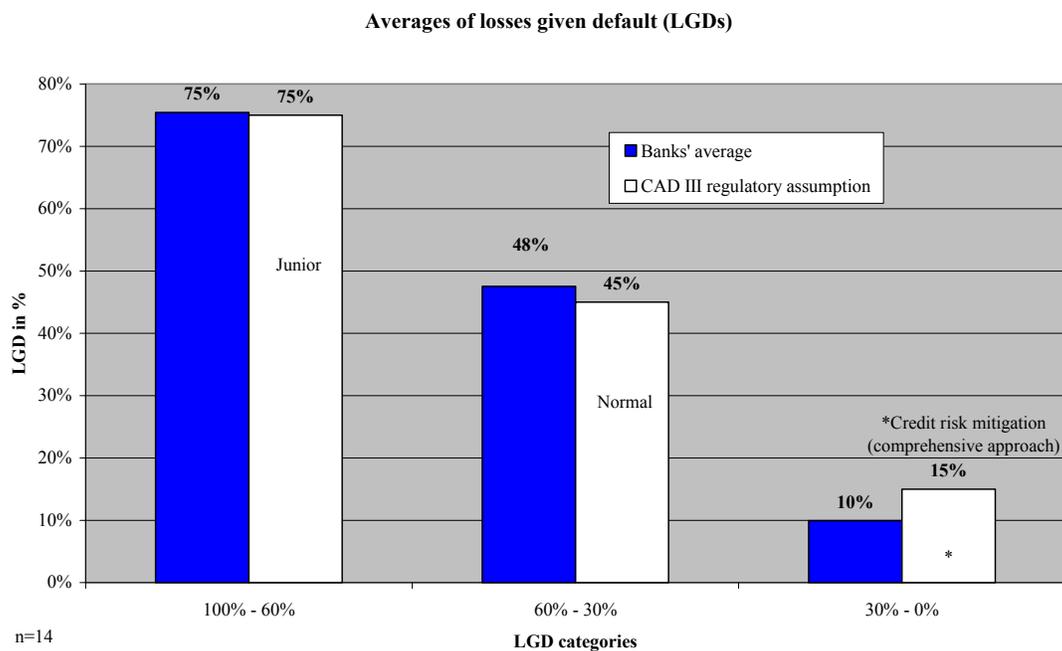
Figure 14-25

Figure 14-25 compares the LGD-averages found for the surveyed banks with the assumptions made in CAD III (EU Commission, 2003a[109]). The averages reported by banks are amazingly close to the values assumed by CAD III for the first two categories. The difference in the third category is very moderate. This has been another argument for the definition of the categories for collateralisation. "Low" collateralisation comprises therefore junior and subordinated loans as the default assumption.

14.1.2.1.4   Questions about spreads

Question E 1. Spread indication

To answer the following questions it is recommended to use your credit calculation tools. Alternatively, you may indicate the average conditions of actual loans contracted.

About 80% of respondents made use of their credit calculation tools to answer this question.

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[109] See Basel II, paragraph 270 et seq.
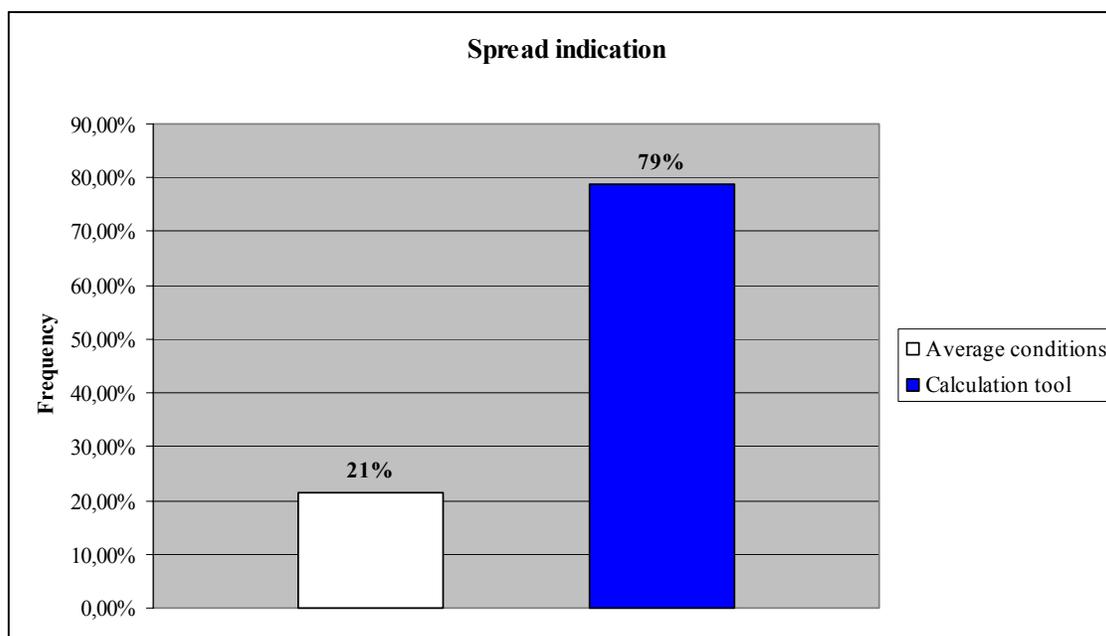
Figure 14-26

Question E 2. Margins

Which margins (in %; including all components charged, i.e. for credit risk, cost of capital, admini-stration cost, etc.) do you deem appropriate for (newly granted) unsubsidised loans (bullet, EUR 5 mill. notional, 45% LGD, standard loans without cross-selling effects and embedded derivatives) with the following ratings, PDs and terms to margin adjustment or prolongation? If you can theoretically price loans you would not grant, please colour the corresponding margins red.

In order to derive average margins the margins surveyed by the questionnaire must be congruent to the rating classes found in question D 4. Therefore, banks were asked to indicate margins for the PDs and associated rating grades filled in for question D 4. Obviously, this is the core question for determining a margin grid for the reference rate.
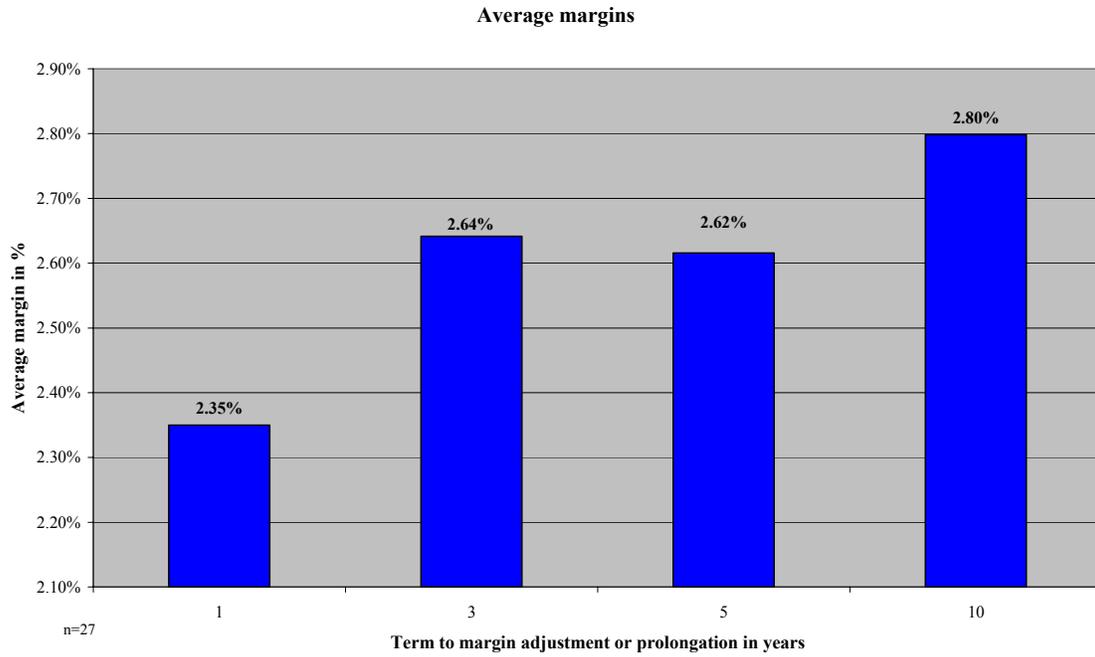
Average margins

Figure 14-27

Figure 14-27 above presents average margins between 2.35% and 2.8% over all risk grades for the term spectrum one to ten years, which is quite conform to expectations. However, the fact that 3-year margins exceed 5-year margins on average is counter intuitive. This is due to averaging over different samples, since not all banks delivered margins for all maturities and risk grades.

Rating dependence of loan margins 5 years maturity, LGD = 45%

	Strong	Good	Satisfactory	Weak	Bad
1 year	0.48%	0.84%	1.77%	4.15%	10.15%
3 years	0.55%	1.00%	2.10%	4.46%	9.72%
5 years	0.58%	1.06%	2.18%	4.64%	10.10%
10 years	0.68%	1.29%	2.39%	4.74%	9.78%
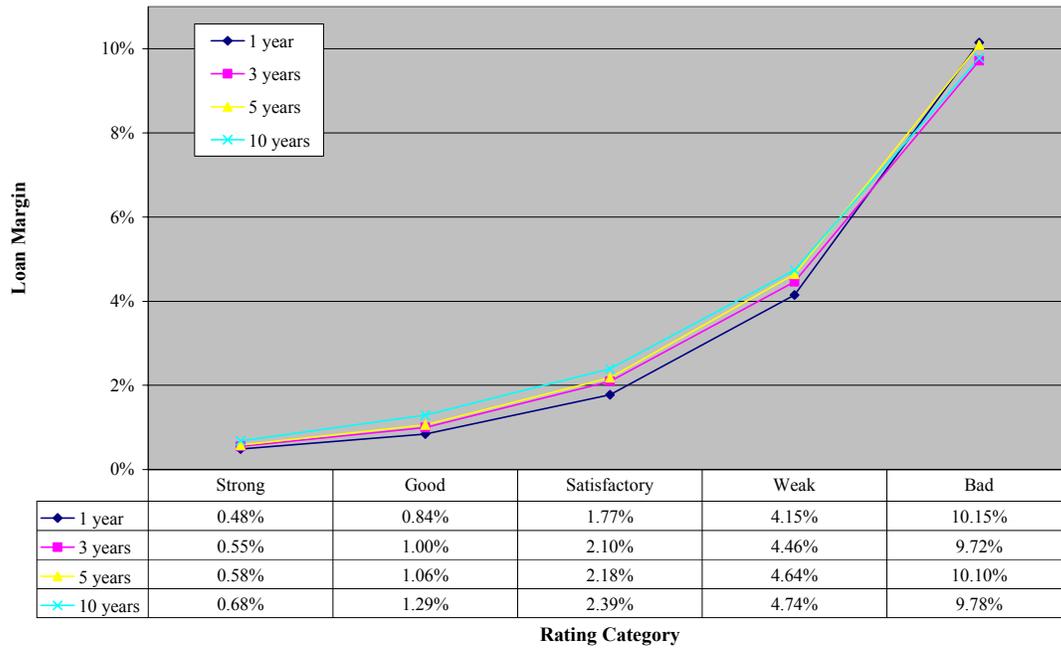
Rating Category

Figure 14-28

Figure 14-28 depicts the relationship between rating categories and loan margins. The margin increases as the rating deteriorates. The curve is quite similar for the individual grades.

Maturity dependance of spreads LGD = 45%

	1 year	3 years	5 years	10 years
Strong	0.48%	0.55%	0.58%	0.68%
Good	0.84%	1.00%	1.06%	1.29%
Satisfactory	1.77%	2.10%	2.18%	2.39%
Weak	4.15%	4.46%	4.64%	4.74%
Bad	10.15%	9.72%	10.10%	9.78%
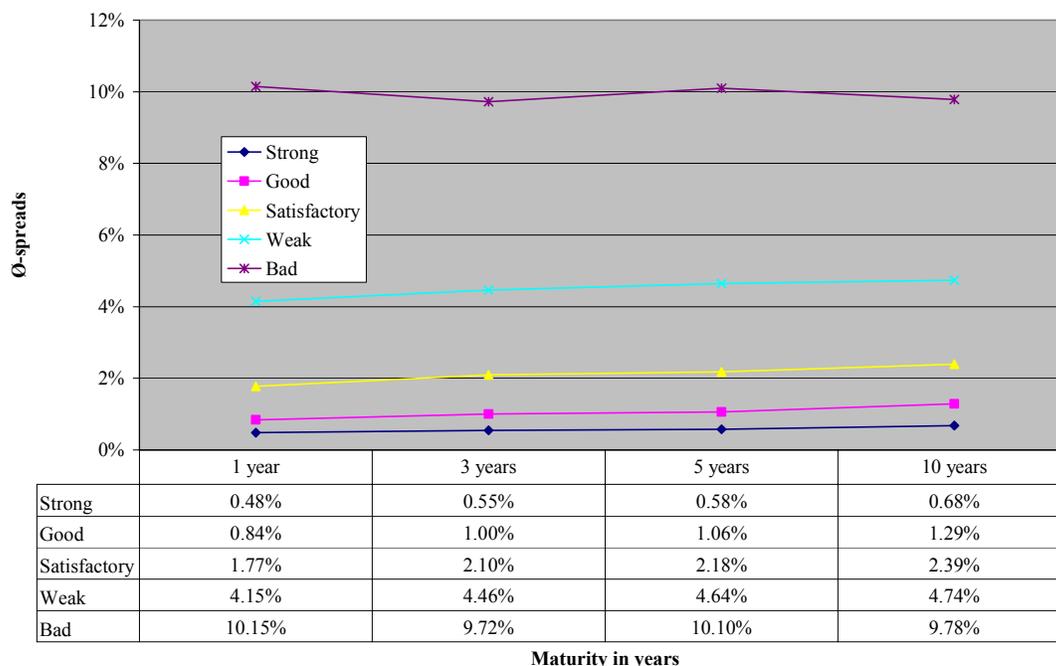
Maturity in years

Figure 14-29

The maturity dependence of spreads seems to be moderate as is demonstrated by Figure 14-29. However, in banking a difference of 45 basis points for instance ("good" rating, one and ten years) is considerable indeed. The slope is nearly linear for all rating categories. As the correlation between maturity and margin is less pronounced, it is recommended for the standard approach to disclose only margins for the yet relevant 5-year maturity.

The next two charts indicate the variability of the reported margins. Figure 14-30 shows the 5%-confidence boundary as percentage of margin and Figure 14-31 contains the number of observations for the individual rating categories.

The fewer the number of responses and the larger the variability of the reported margins are, the less reliable is the average margin representing the sample. For instance, the 5%-confidence boundary of the "strong" rating category means that 5% of banks may report margins which are lower than 51% of the average margin (i.e. 29 instead of 58 basis points). Hence, the averages for the "strong" and for the "bad" rating category are less stable.

5%-confidence boundary as % of margin 5 years maturity, LGD = 45%
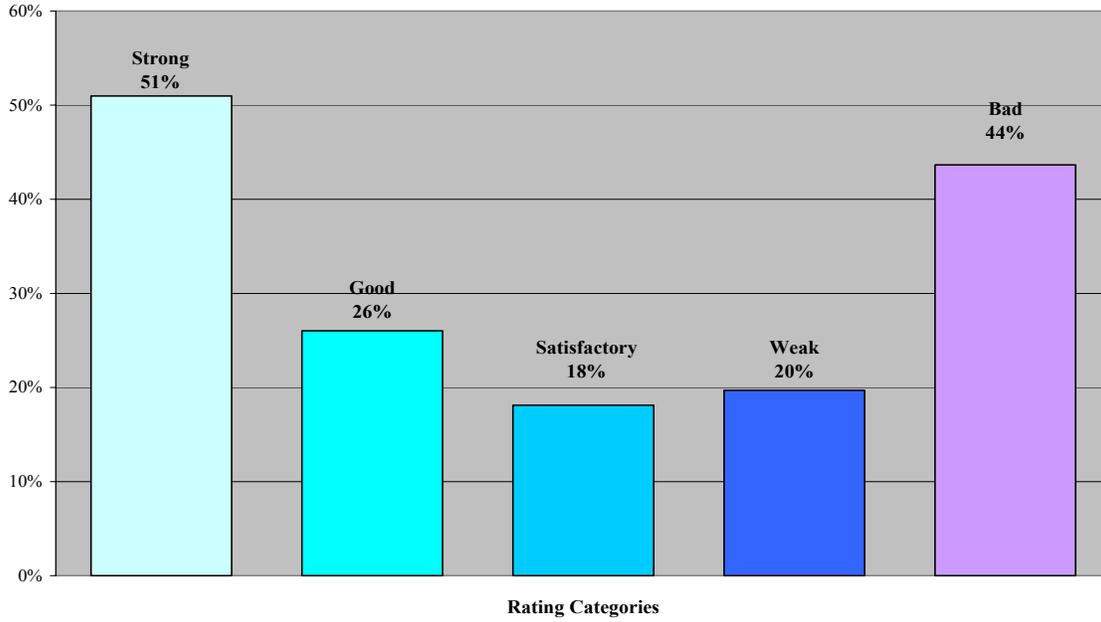
Figure 14-30

Number of respondents 5 years maturity, LGD = 45%
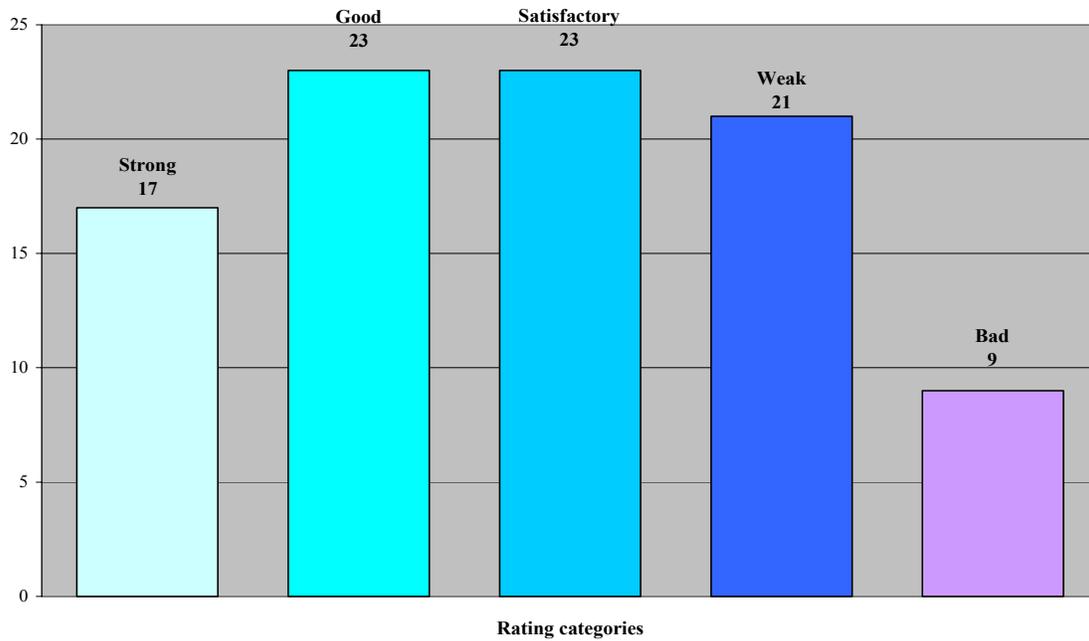
Figure 14-31

The following tables present the margins in detail. It should be observed that the margins for the collateralisation categories of 15% LGD and 75% LGD have been extrapolated by a suitably calibrated model (see forth following).

ØEU	Loan Margins in Basis Points			
E2	Matruity / LGD	1	3	5	10
Strong	15%	41	43	44	47
	45%	48	55	58	68
	75%	56	67	72	89
Good	15%	53	58	60	67
	45%	84	100	106	129
	75%	116	142	152	190
Satisfactory	15%	84	94	97	104
	45%	177	210	218	239
	75%	271	325	339	375
Weak	15%	163	173	179	182
	45%	415	446	464	474
	75%	667	719	750	765
Bad	15%	363	348	361	351
	45%	1,015	972	1,010	978
	75%	1,667	1,596	1,658	1,606

Table 14-3

Loan margins in basis points for 1-year loan			
Rating category	**Rating category**		
	15%	**45%**	**75%**
Strong	40	50	60
Good	50	85	115
Satisfactory	85	175	270
Weak	160	415	670
Bad	360	1000	1650

Loan margins in basis points for a 5-year loan			
Rating category	**Rating category**		
	15%	**45%**	**75%**
Strong	45	60	75
Good	60	100	150
Satisfactory	100	220	340
Weak	180	465	750
Bad	360	1000	1650

Table 14-4

Table 14-3 and Table 14-4 contain the average margins for the individual LGDs, maturities and rating classes. Since the margins were surveyed only for normal collateralisation (45% LGD), margins for 15% LGD and 75% LGD are based on extrapolation. In order to simplify application, the margins in Table 14-3 were smoothed and rounded according to the authors' best estimate resulting in the new margins to be found in Table 14-4.

The following chart shows a comparison of reported loan margins and margins derived by a pricing software, which one of the authors has developed for other purposes. The underlying model is in principle outlined in chapter 11 *Model for the Reference Margin.* The parameters have been calibrated to the average reported return on equity (RoE) of 15% (see below). However, due to the diversity of reported regulatory capital underlying the loan portfolios an equity capital ratio of 8% was assumed.

Loan margins versus margins calculated by credit pricer 5 Years Maturity, 45% LGD

	Strong	Good	Satisfactory	Weak	Bad
☐ Credit Pricer	109	124	197	430	1,155
■ Loan Margins	58	106	218	464	1,010
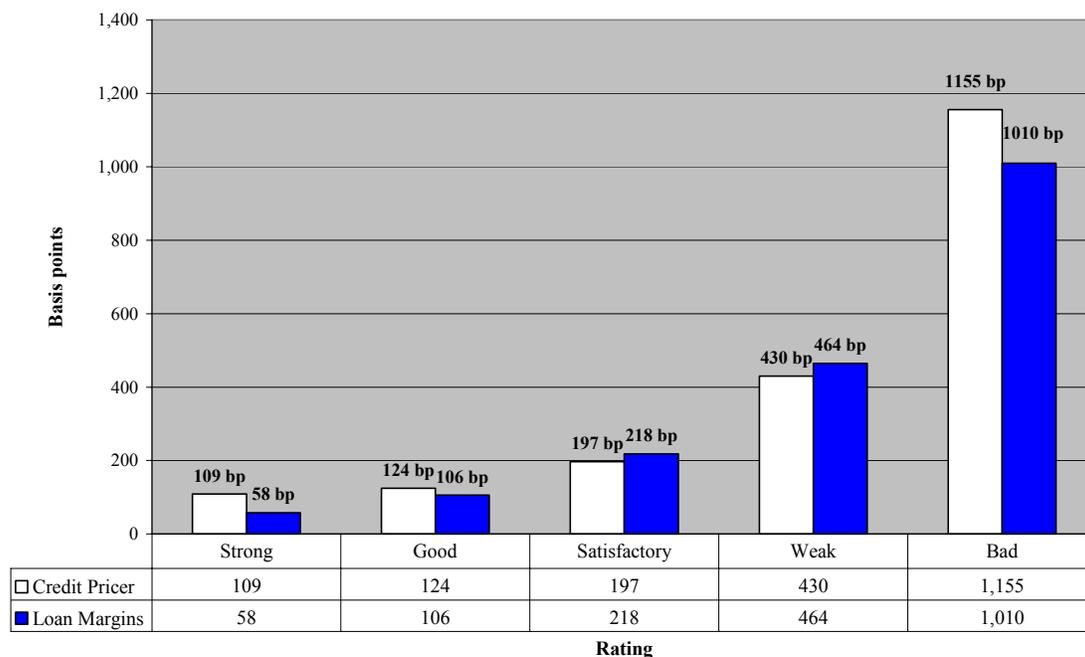
Rating

Figure 14-32

The margins derived by the pricing model approximate the reported margins very well except for the "strong" ratings. This is due to the fact that an excess return on equity above the basis rate of 10% (RoE of 15% less 5% swap rate) and a capital ratio of 8% lead already to a margin of 80 basis points. Banks supposedly charge lower equity capital or demand lower RoE on average for "strong" rated debtors.

The next chart shows the results of an attempt to explain average margins by a basic pricing formula, the coefficients of which were for one calibrated to the surveyed answers (like it was done for the pricing software) and for the other adjusted in order to mimic reported margins best. The biases between the reported margins and the three models appeared to be too substantial so that a unique pricing model could not be recommended in order to apply it under an advanced approach.

Loan and Proxy Spreads 1 Year Maturity, 45% LGD

$$margin^{proxy} = \frac{PD \times LGD \times (1 + r^{basis}) + cost\ margin + capital\ ratio \times (RoE - r^{basis})}{1 - PD \times LGD}$$

	Strong	Good	Satisfactory	Weak	Bad
Proxy with Pricer Coeffs	137	144	195	441	1,164
Loan Margins	48	84	177	415	1,015
Proxy Opt	64	71	121	366	1,083
Pricer	128	135	188	455	1,338
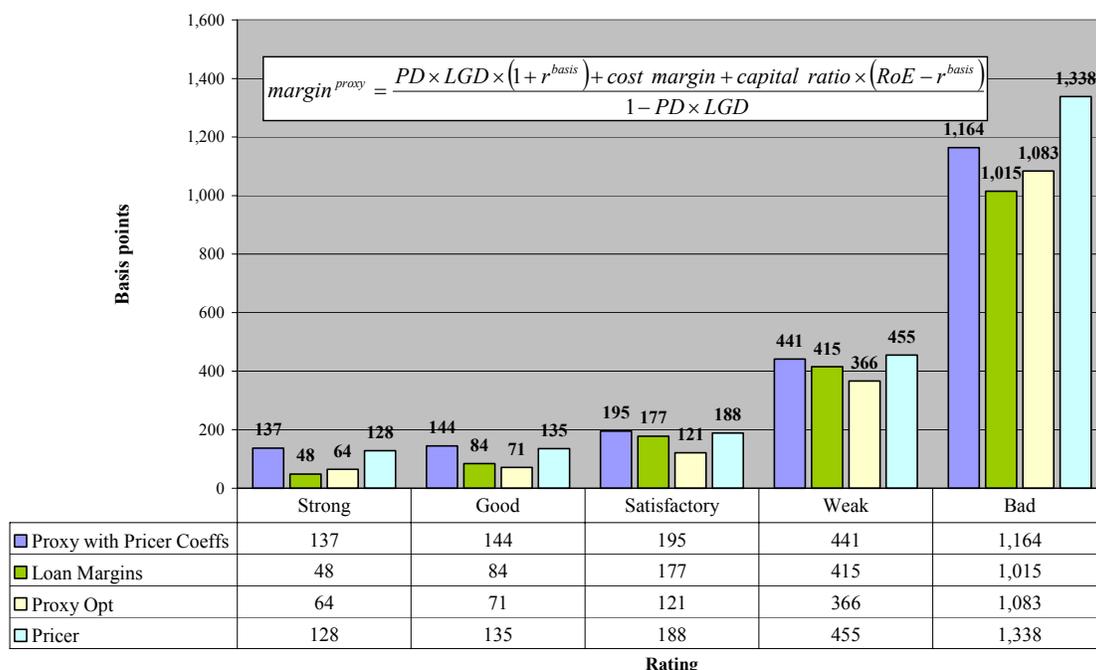
Figure 14-33

Excursion: Comparison to corporate bond spreads

Corporate bond spreads for euro-dominated bonds have been obtained from Bloomberg[110] with the purpose of deriving a complete matrix of credit spreads for relevant maturities and rating grades a statistical regression was used to smooth, inter- and extrapolate the average credit spreads (see next table).[111]

---

[110] See chapter 15.6 *Corporate bond spreads* for how to get the drill down of the indices.

[111] The regression of the spread above swap rate is non-linear in the variables date of observation, rating grade, sector, volume, time to maturity, and rank of debt. All coefficients are highly significant and the corrected R^2 is about 85%. For the purpose of the study spreads were averaged over sector and date of observation. The sample comprised twelve quarterly observations since 30.09.2001 of about 1,500 bonds each.

	Maturity in Years			
Rating	**1**	**3**	**5**	**10**
AAA	11	13	14	17
AA1	16	18	20	24
AA2	19	22	24	28
AA3	24	27	30	35
A1	30	34	37	43
A2	41	46	50	57
A3	51	57	**62**	70
BBB1	70	78	84	95
BBB2	83	92	**99**	112
BBB3	122	136	146	166
BB1	241	267	**287**	327
BB2	268	297	319	363
BB3	283	313	337	384
B1	333	369	397	453
B2	374	415	**446**	510
B3	444	493	530	606
CCC1	649	722	777	891
CCC2	902	1006	**1085**	1247
CC1	930	1037	1119	1286
CC2	1178	1315	1420	1636

Table 14-5

Average Margins in Basis Points of EUR-dominated corporate bonds Data source: Merrill Lynch Corporate Bond Indices, Bloomberg; authors' computation

The highlighted margins of Table 14-5 are those which come closest to the margins of the standard approach. To enable the reader to compare the bond spreads with the margin table of chapter 4.1.2 *Risk grading and loan margins* directly, the excerpt of "normal" collateralisation is repeated here:

Rating	**Normal Collateralisation** Margin in Basis Points
Strong (AAA – A)	60
Good (BBB)	100
Satisfactory (BB)	220
Weak (B)	465
Bad (CCC – C)	1000

Table 14-6

Data source: Survey results and authors' computation

Corporate bond spreads can only be compared to loan margins if they admit the same risk factors. Apart from rating grades and maturities the recovery rate largely determines the credit spread. Notwithstanding the simplicity of the formula for adjusting to the LGD, the very intricate question arises how much of a recovery rate a corporate bond carries. Though corporate bonds are not collateralised in general (most of the bonds are unsecured) they could yield a recovery from the bankruptcy's estate. Although the recovery rate is not observable directly, two sources can be consulted as shown in the following.

Moody's Investors Service regularly publishes research memos on historical recovery rates, which is a retrospective point of view. The following table shows a comparison of recovery rates for loans and several types of bonds.

Instrument	1982-2003		1982-2002		2003	
	Europe	*North America*	*Europe*	*North America*	*Europe*	*North America*
Bank Loans	47.6%	63.2%	47.6%	61.7%	N.A.	76.1%
Bonds						
- Sr. Secured Bonds	49.9%	53.3%	52.2%	52.7%	40.5%	66.4%
- Sr. Unsecured Bonds	24.0%	37.7%	25.6%	37.5%	16.6%	40.3%
- Sr. Subordinated Bonds	24.3%	32.4%	24.3%	32.1%	N.A.	37.9%
- Subordinated Bonds	12.9%	31.0%	13.9%	31.3%	8.8%	31.3%
- Jr. Subordinated Bonds	N.A.	24.5%	NA	24.5%	N.A.	N.A.
All Bonds	*27.0%*	*35.6%*	*28.4%*	*35.3%*	*19.9%*	*39.8%*
Preferred Stock	3.4%	10.7%	3.4%	10.9%	N.A.	4.5%
All Instruments	*26.4%*	*36.1%*	*27.6%*	*35.9%*	*19.9%*	*38.6%*

Issuer-Weighted Average Recovery Rates[112] for Defaulted
European and North American Debt Instruments, from: Varma (2004)

Attention should be paid to European loans, senior unsecured bonds and subordinated bonds. Senior unsecured bonds, which constitute the largest share of public bond issues, and subordinated bonds yield about 50% and 25%, respectively, of the recovery of bank loans. In order to compare corporate bond spreads to loan margins, the former have to be reduced to

$$\frac{1-47.6\%}{1-24\%}=69\% \text{ and } \frac{1-47.6\%}{1-12.9\%}=60\%.$$

---

[112] Recovery rates deviate very much by industry sector. While the financial services industry admits recovery rates of 67 – 88% other sectors achieve 20% – 42% only for all bond types, see Figure 18 in Varma (2004). Since non-financial corporates dominate the sample, their respective average is very close to the average of the entire sample.

A prospective view would be to inspect what recovery values credit spreads implicitly reveal. Since senior unsecured and subordinated bonds should admit about the same probabilities of default for each rating grade, their difference in credit spreads can be explained by different recovery rates. For senior unsecured and subordinated bonds recovery rates of about 55% and 8.6% were derived.[113]

Hence, credit spreads of senior unsecured bonds amount to the same level as bank loans on average (as highlighted in Table 14-5) while historical analysis leads to a discount of about 30% on corporate bond spreads not taking into account the cost margin as to adjust corporate bond spreads. Including the additional cost margin of 40 basis points, the spreads of corporate bonds would be larger by that amount.

A conservative view would be that any recovery not stemming from pledged securities is not taken into account (i.e. no proceeds under bankruptcy). This is also the standard approach under Basel II. In this case a LGD of 0% is presumed for corporate bond spreads. This assumption underlies the following chart that compares bond spread with the aforementioned average margins.

As the bond spreads admit a considerable variability and do not always provide for a complete spread matrix, the spreads were smoothed, inter- and extrapolated over twelve calendar quarters, the complete rating scale and maturities by a regression model taking into account the relevant risk factors. The resulting spreads have been averaged for each coarser rating category according to the frequency of bond ratings in order to make them comparable to the loan margins. In a last step the spreads were adjusted to the cost margin (placement costs are paid as up-front fees for bonds) and the collateralisation that was assumed for the loans under the assumption that corporate bonds yield a LGD of 0%. .[114]

---

[113] These values were derived by explaining average bond spreads of main rating grades and maturities according to the aforementioned formula and minimising the sum of squared errors. The average error was 0.76 basis points.

[114] It is referred to chapter 12.7 *Adjustment of credit spreads to recovery rates*, where the adjustment is discussed in more detail.

Loan margins versus Bond Spreads 5 Years Maturity, 45% LGD

	Strong	Good	Satisfactory	Weak	Bad
□ Bond Spread	54	93	255	359	814
■ Loan Margins	58	106	218	464	1,010
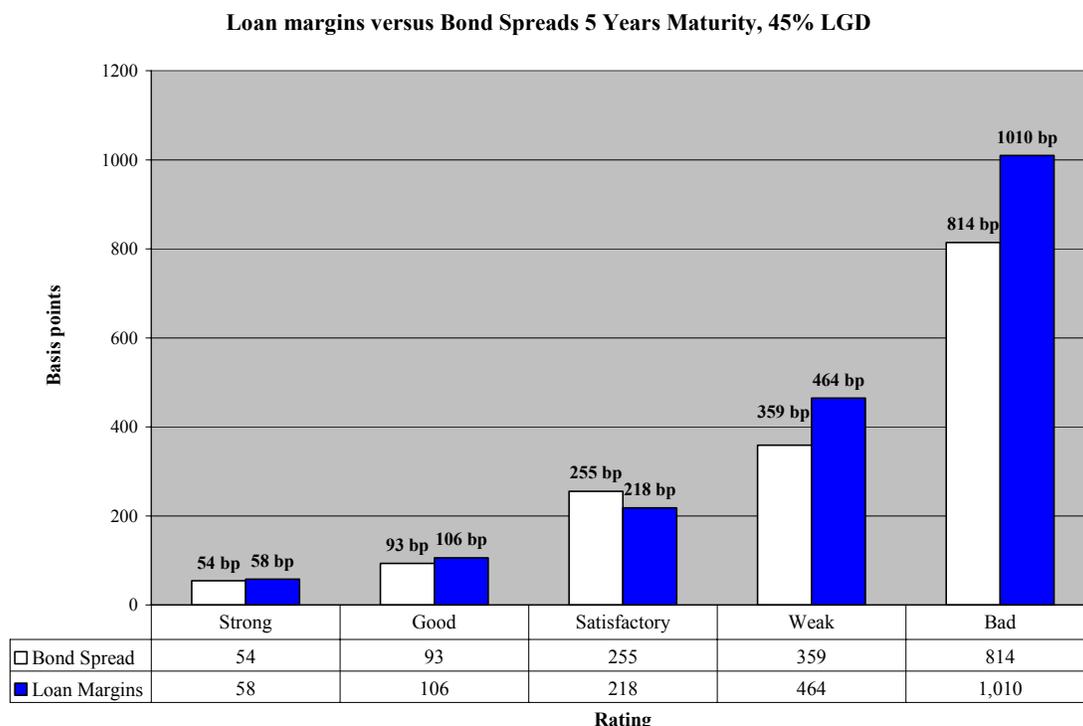
Rating

Figure 14-34

The chart shows that bond spreads are surprisingly close to loan margins for the better ratings. One would expect a higher liquidity premium payable for loans because these cannot be traded.

Admittedly, loan and bond markets are difficult to compare and the adjustment to the bond spreads should be regarded as a rule of thumb rather than a statistically and theoretically sound model.

Both validations, the comparisons to bond spreads and to calculated margins, enhance authors' confidence that reported margins resemble *average* market conditions quite reasonable.

Question E 3. Subordinated debt margins

Consider a junior loan (five year bullet, 75% LGD, EUR 5 mill. notional) whose un-collateralised part is subordinated. Which average margin (in %) do you deem appropriate for the following PDs and ratings (please change ratings and PDs if better applicable regarding your lending business)?

This question aims at comparing the margin spread between normally collateralised loans (45% LGD) and low collateral loans (75% LGD) with the spread between junior and senior loans. Since this question has been answered with regard to very different rating grades, it was not possible to derive average margins from this sample. Moreover, the reported rating grades do not cover all rating categories.

Instead, the margin increase between senior and junior loans has been tried to be explained by an approximation formula (see 12.7 *Adjustment of credit spreads to recovery rates*), which adjusts for the different collateralisations. By this formula the average margins based on a LGD equal to 45% as derived above were extrapolated to an LGD of 75%. The increase caused by this extrapolation ("proxy") is compared to the actual increase of reported margins between senior and junior loans. The following results shows that the approximation is acceptable.

Delta Junior versus Senior Sample and Proxy

	Strong	Good	Satisfactory	Weak	Bad
□ Sample: Junior vs. Senior	14	46	166		
■ Margins: LGD 75 vs. 45%	14	46	121	285	649

Rating
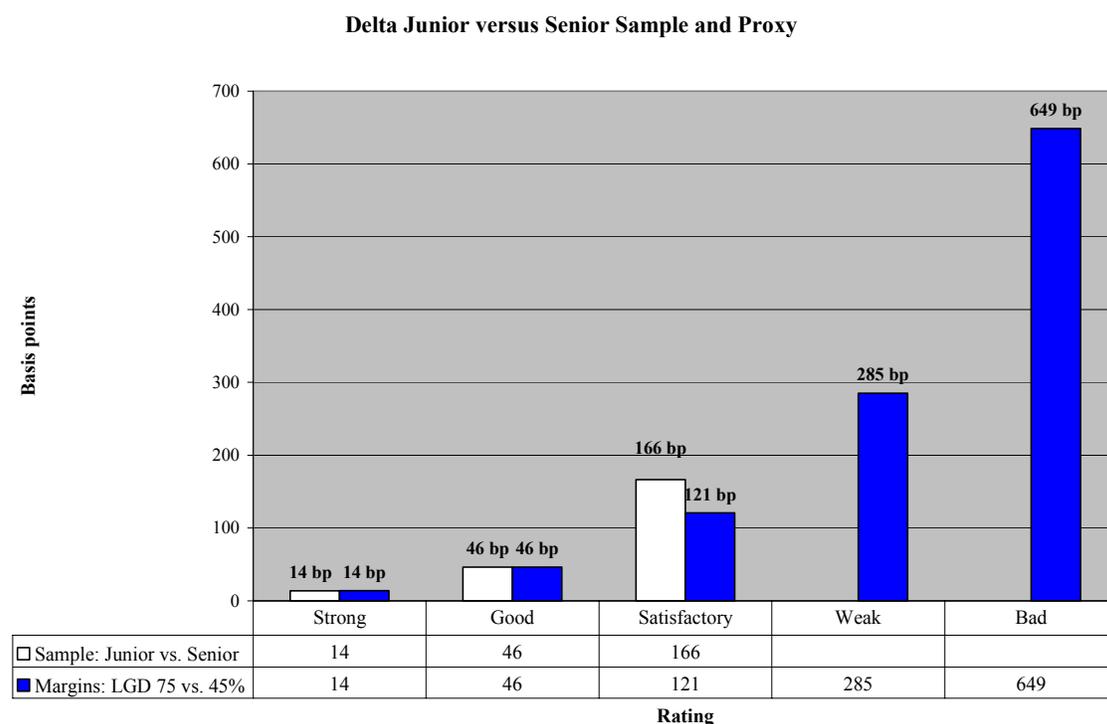
Figure 14-35

The spreads are almost equal for "strong" and "good" rated loans. In the case of "satisfactory" rated loans the spread between junior and senior loans exceeds the one between "low" and "normal" collateralised loans. For "weak" and "bad" rated loans data about senior and junior loans was not available.

In order to reduce complexity in contrast to the introduction of a new loan class ("junior") it was concluded that "low" collateralisation reflects the distinction between "junior" and "senior" loans well enough.

Excursion on subordinated and mezzanine debt

In terms of ranking, a junior loan[115] is a first step towards equity capital. On this ladder subordinated debt and mezzanine debt come next. The corporate bond data[116] has been analysed for the effects of subordination and equity-tier debt (mezzanine debt) in comparison to senior debt.

The analysis revealed that on average the rating downgrade was by about one notch only (i.e. A1 to A2). However, those issuers in the sample who placed senior and subordinated or equity-tier debt were not plentiful and admitted all an investment grade rating. The spread of subordinated debt rises from about 50 basis points on average (corresponds to ratings of AA and A) by about 110 basis points to about 160 basis points (corresponds to BBB) on average. This means a "downgrade" by one category from "strong" (including AA and A) to "good" (comprising BBB) if measured in terms of the spread widening compared to agencies' ratings.

An even better rating appears to be necessary for the issuers of equity-tier debt, which mainly comprise financial institutions. Their senior debt is priced at 30 basis points on average (upper AA). The spread more than doubled by about 40 basis points on average (corresponds to A).

From these observations including the results of the aforementioned question it was concluded that the "normal" case for mezzanine/equity debt should be approximated by one rating category below the category for senior debt, while junior and subordinated debt are appropriately reflected by "low" collateralisation.

Question E 4. a) Credit margin differentiation

Apart from other risk factors (like rating, LGD, etc.) does your institution differentiate between industry/sectors when determining the credit margin?

Apart from the risk measures surveyed so far banks might differentiate creditors according to sectors or industries. However, this is the case for only 30% of respondents (Figure 14-36).

---

[115] In contrast to the question, under the term "junior loan" market participants do also understand normal loans with few, if any, collaterals.

[116] Constituents of the Merrill Lynch Corporate Bond Indices as of June 2001 to June 2004.

Banks differentiating between industries
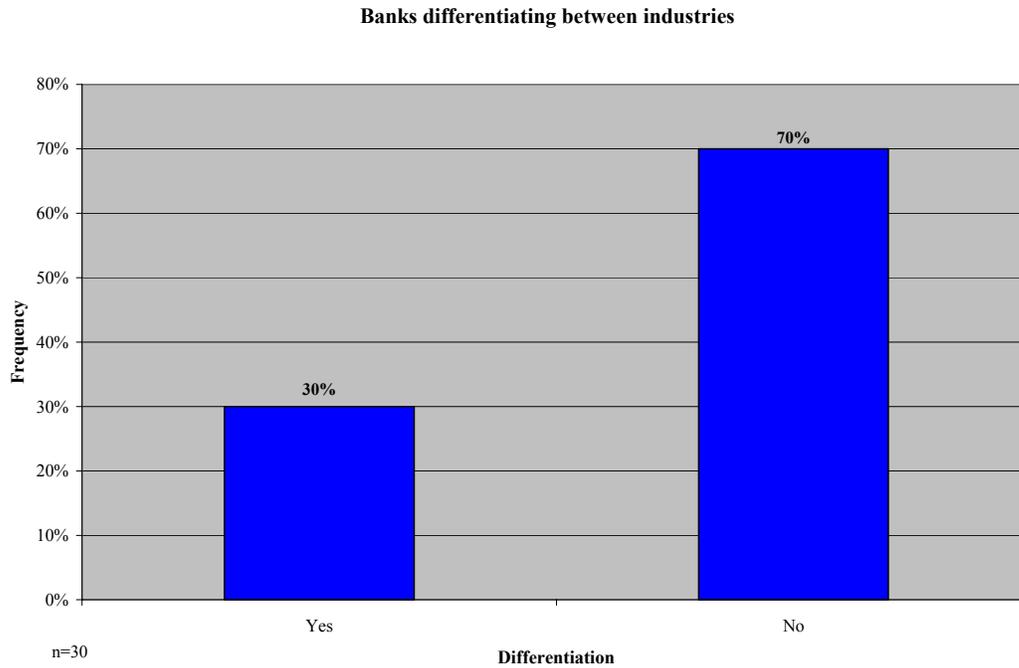
Figure 14-36

Question E 4. b) Credit margin differentiation for industries/sectors

If so, which average margin (in %) do you ask for a loan (one year bullet, rating, Baa2, EUR 5 mill. notional) to companies from the following industries/sectors?

If banks differentiate among sectors or industries the question arises whether the differences between sector specific margins are significantly and whether sectors require a margin discount or an add-on.

Average minimum and maximum sector specific spreads
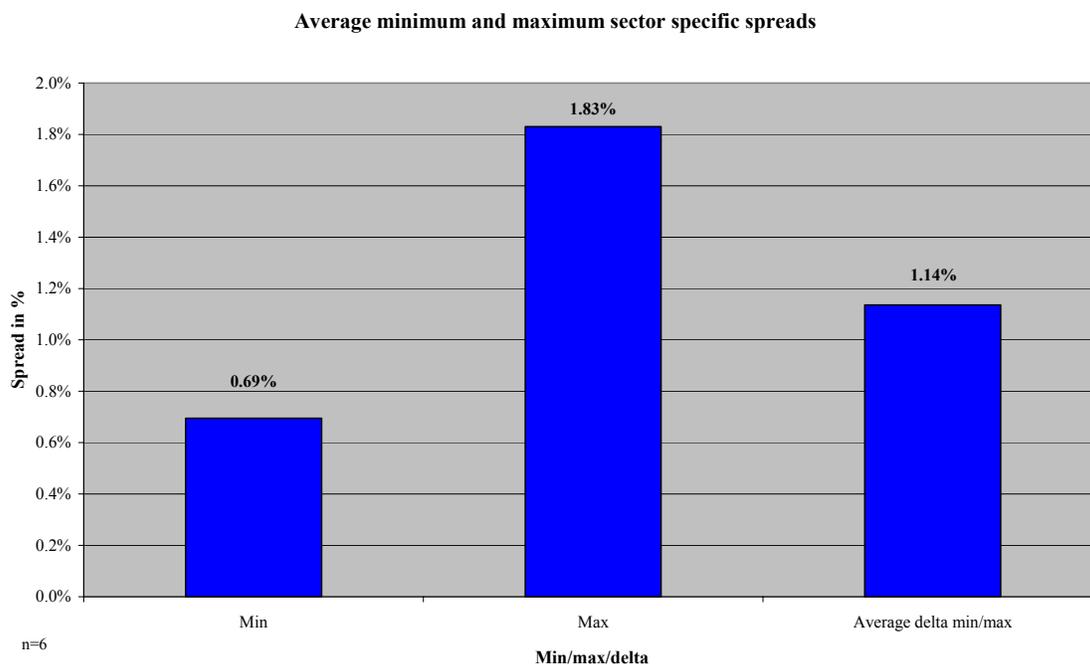
Figure 14-37

Figure 14-37 shows that the average difference between sector specific margins can be significant for those banks differentiating between sectors. However, it was not possible to reveal a consistent pattern of discounts or add-ons for certain sectors because banks' practices with respect to sector evaluation turned out to be too diverse.[117]

Hence, the average loan margins can be deemed to be applicable to a wide range of debtors.

Question E 5. Other factors requiring margin differentiation

Which factors require different margins for loans to companies from different industries/sectors?

Related to the question above E 5. seeks to identify further factors important for determining the risk of a credit engagement.

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[117] Empirically and for the survey, financial institutions admit lower margins for the same ratings on average. However, the reference rate should reflect lending conditions available to mainly non-financial corporates.

Factors requiring different margins

n=30
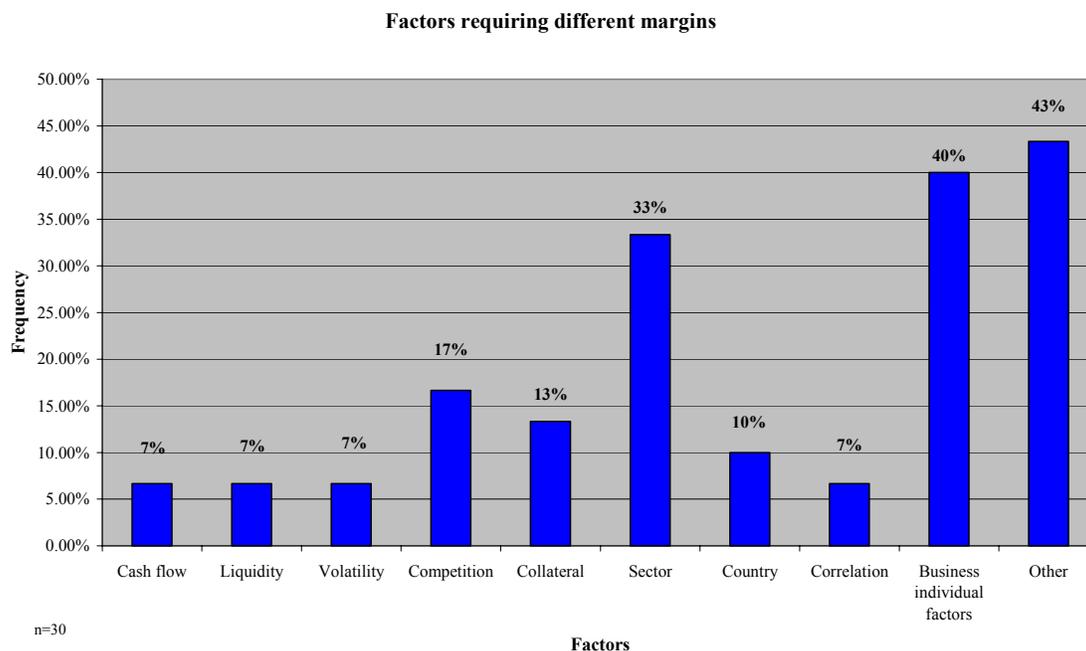
Figure 14-38

However, the spectrum of possible factors is relatively wide and diverse. As already stated, the industry or sector plays a role. Additionally, some banks emphasise competition or individual business factors. Since a uniform approach to include other risk factors apart from standard measures such as PD and LGD is difficult to set up and would increase complexity, disregarding other factors is recommended for the standard approach.

Question E 6. Loans to distressed enterprises

Does your institution grant or acquire loans to distressed, but not yet defaulted enterprises (worst ratings before default, junk loans), which are not secured by State guarantees (one year, 45% LGD, EUR 5 mill. notional)? If so, which margin (in %) do you regard as appropriate on average?

Even though it might appear absurd to grant loans to firms in financial distress (the purchase of bad loans at considerable discounts is not), this questions was raised because the reclaim of unlawful aid granted to distressed firms is an important issue and requires an appropriate margin to be charged.

Acquisition of distressed loans
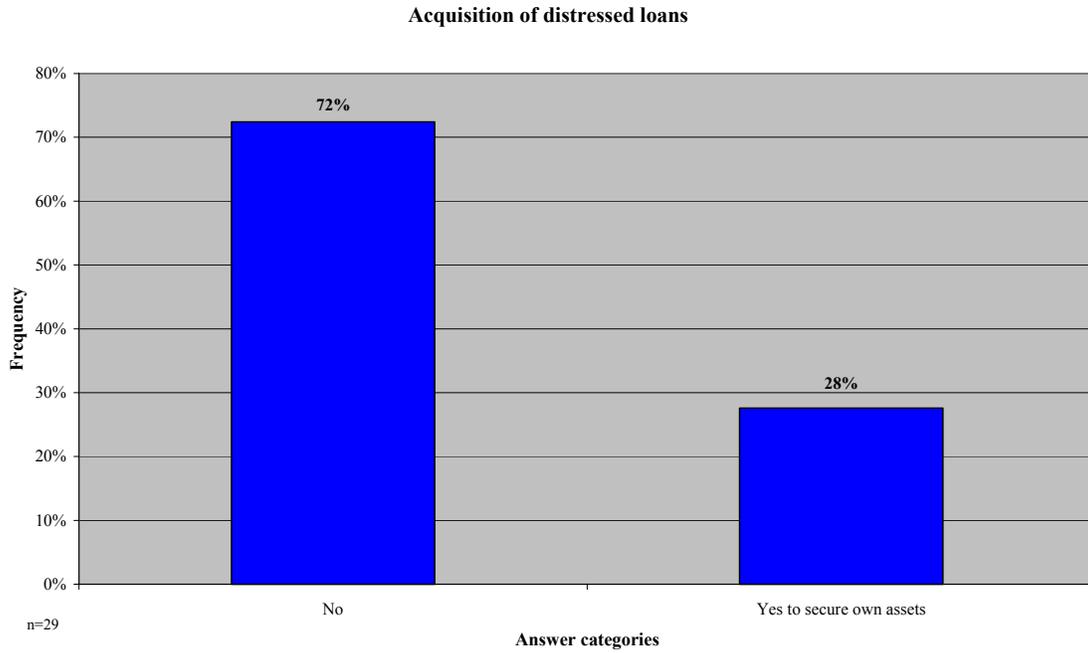
Figure 14-39

The majority of banks (72%) reported to be unwilling to grant or acquire loans to distressed firms. Those granting or acquiring these loans do so only to secure own assets (Figure 14-39). These answers stress the fact that there is hardly a market for bad loans yet even though banks might be able to price them.[118]

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[118] A market for bad loans is, however, about to emerge through the vehicle of securitisation.

Margin spectrum for distressed loans
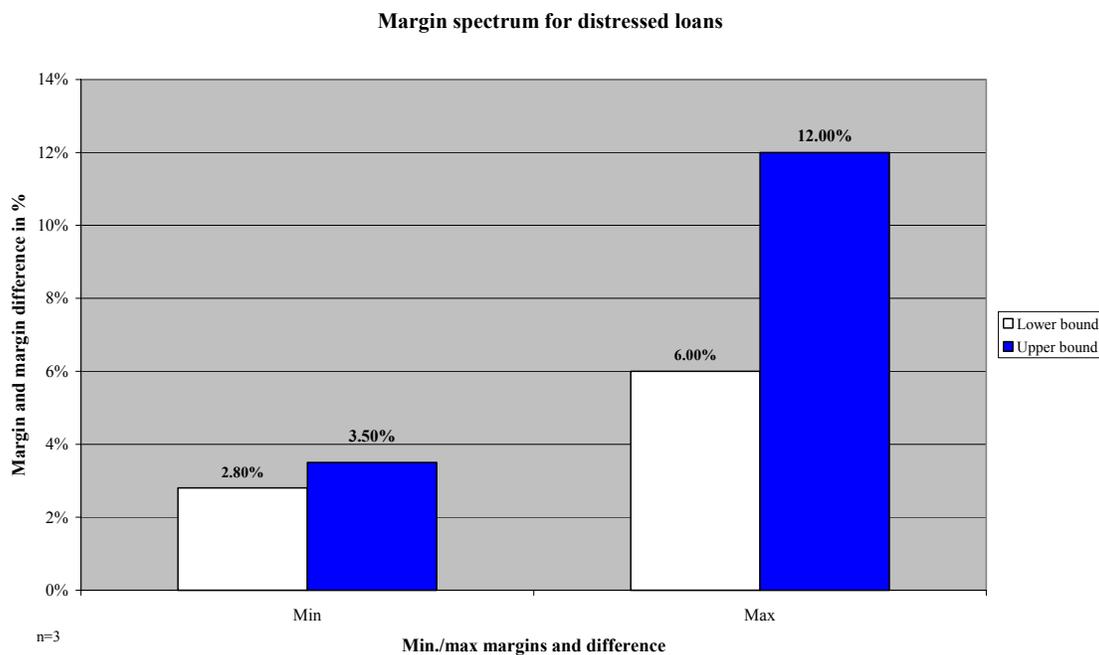
Figure 14-40

The margins for distressed loans reach from minimal 2.8% to 3.5% and maximal 6% to 12% (Figure 14-40). If banks grant loans to distressed firms to secure their own assets (prolongation of old loans) this is typically done at the original margin.

From the aforementioned Table 14-4 the appropriate margin would be about 10% for bad loans on average.

Question E 7. Loans to start-ups and venture capital

Does your institution grant loans (one year, 45% LGD, EUR 5 mill. notional) or provide venture capital to start-ups? If so, which margin (in %; rate of return including success fees above base interest rate) do you regard as appropriate on average?

Since start-up loans and venture capital might play a role in the context of State aid, these kinds of funds have to be properly covered by a reference rate system.

Willingness to provide venture capital or loans to start-ups

n=28
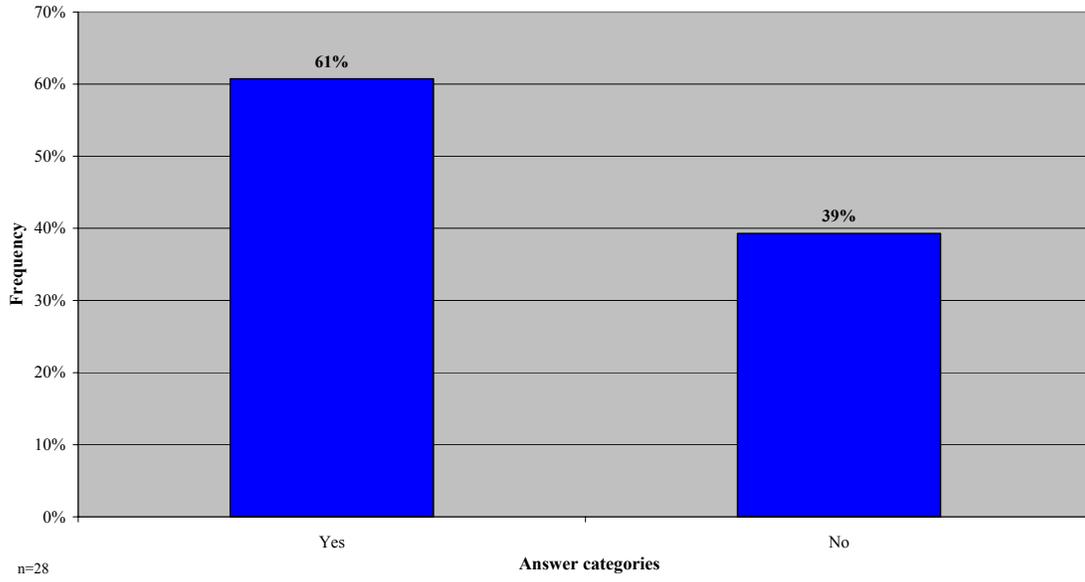
Figure 14-41

Margin ranges

n=12, 3, 8
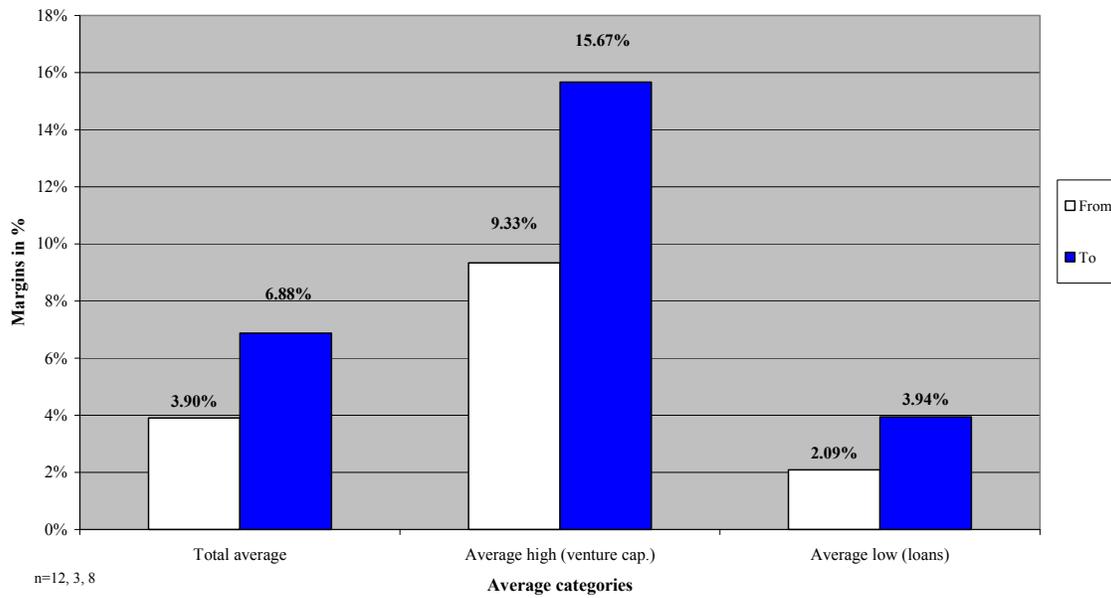
Figure 14-42

About 60% of respondents indicated to be willing to grant loans to start-ups or provide venture capital (Figure 14-41). Margins range between 9% and 16% for venture capital and between 2% and 4% for start-up loans (Figure 14-42)[119]. The latter figures do not differ significantly from regular loan margins so that a distinction for a standard approach is not necessary. However, venture capital requires large risk premiums, which can be compared to premiums demanded for ordinary equity capital. Due to the authors' experience, the required RoE for venture capital is probably closer to 15% than to 10%. This would also be comparable to banks' own required RoE (see below), which should be lower than the RoE for riskier venture capital.

<u>Question E 8. Margins for loans and guarantees</u>

Which margins (in %) do you deem appropriate for a loan and a guarantee (one year bullet, 45% LGD) with the following PD (about 0.2%) and notional amounts (EUR 1 mill., EUR 5 mill., EUR 25 mill., EUR 50 mill.)?

Loans and guarantees constitute important types of State aid. Since the structure of both instruments is different, their margins can differ as well. Moreover, the margin also depends on the loan size at least due to the reason of fixed costs. The following charts identify the margin gaps.

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[119] The distinction between venture capital and start-up loans were revealed by banks' comments on that question and the margin size.

Banks differentiating between margins for loans and guarantees

Figure 14-43

Average margins for loans and guarantees depending on notional amount
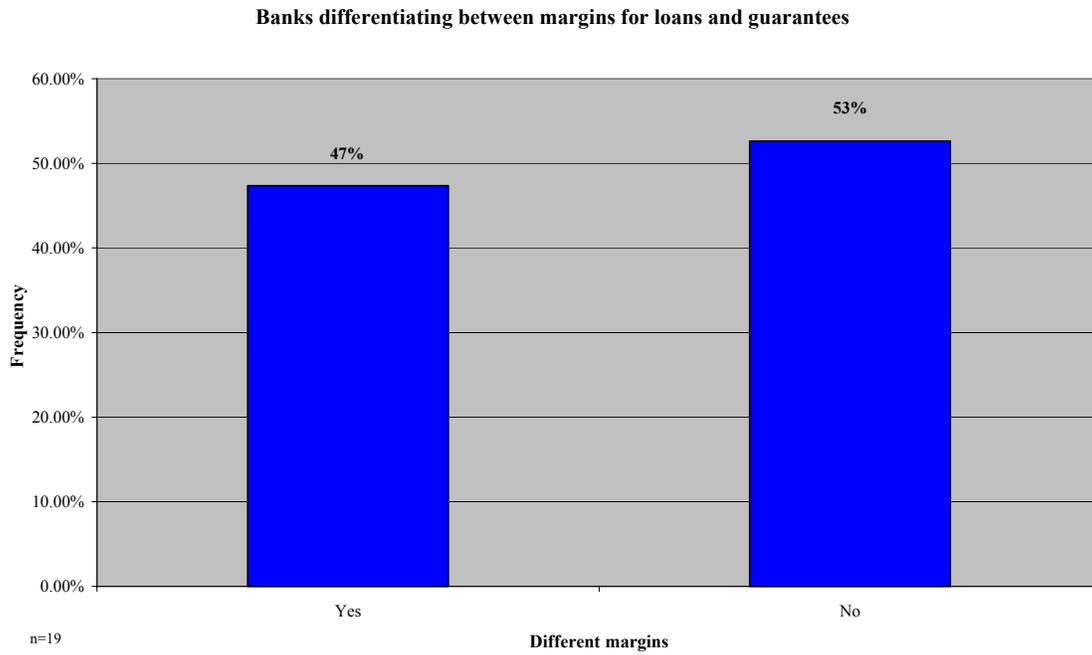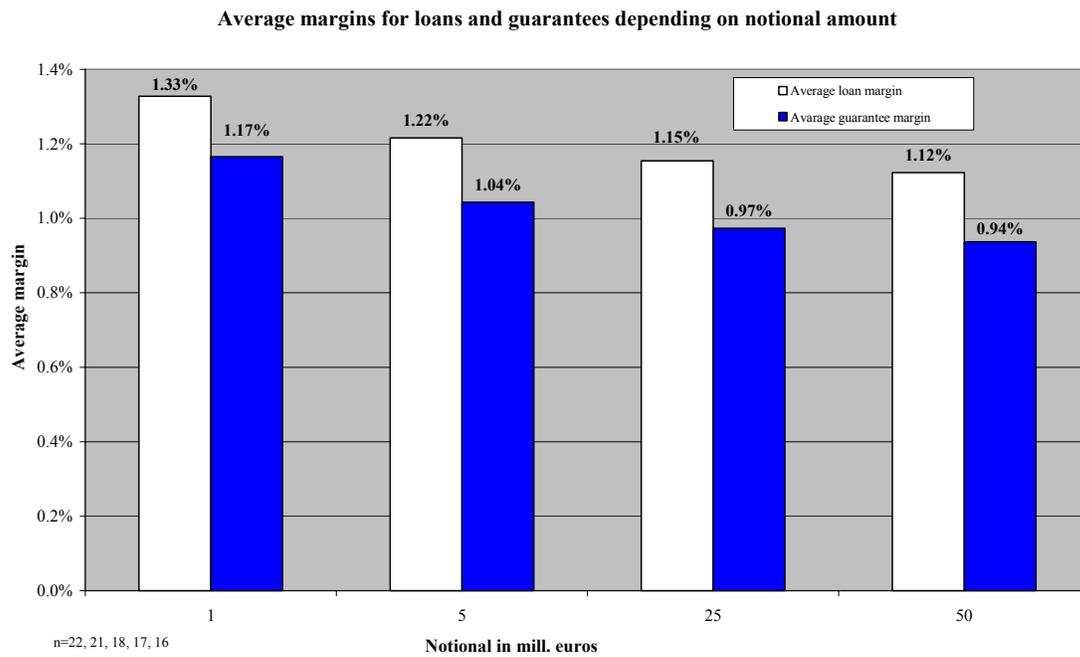
Figure 14-44

Absolute and relative difference between average margins for loans and guarantees

n=22, 21, 18, 17, 16
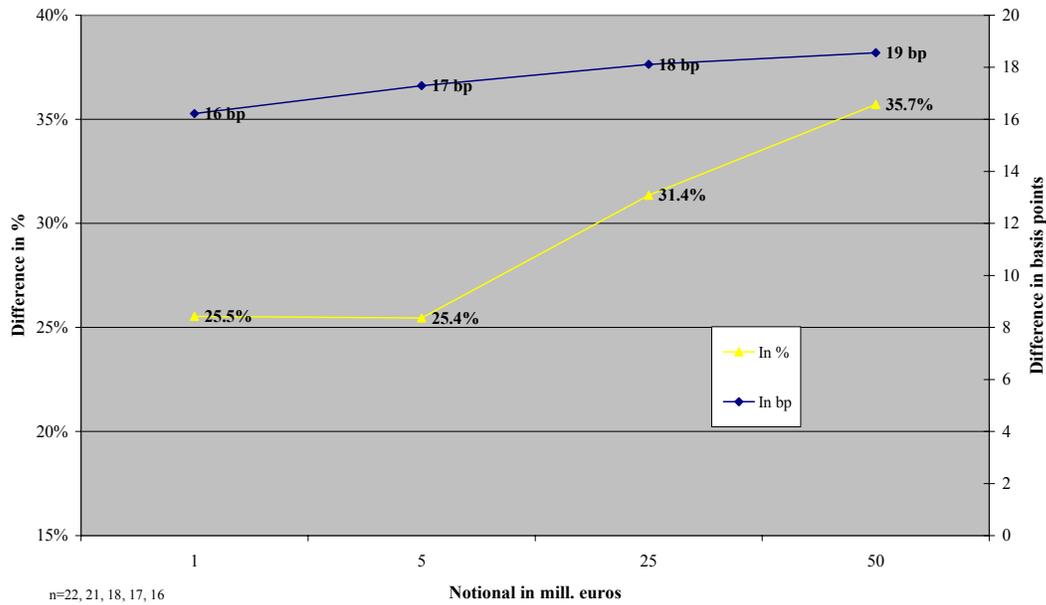
Figure 14-45

Absolute decrease of average margins over notional categories

n=22, 21, 18, 17, 16
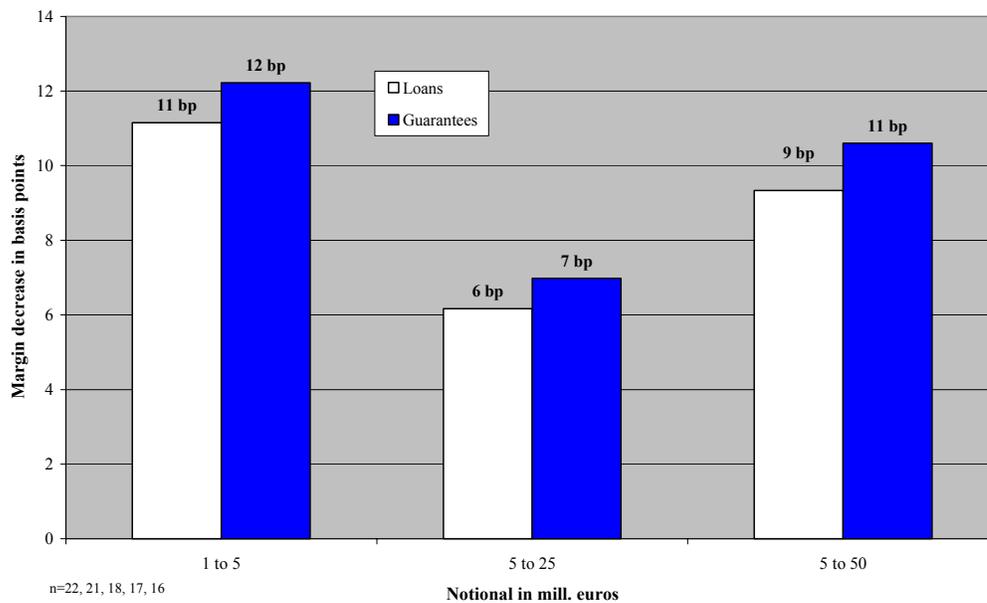
Figure 14-46

Figure 14-44 illustrates that about one half of surveyed banks differentiate between loans and guarantees. According to Figure 14-45, margins for guarantees are lower than margins for loans. The difference approaches about 20 basis points on average (Figure 14-46) for large loans. This reflects also the empirical findings from spreads of credit default swaps (see Zhu, 2004).

Both loan and guarantee margins decrease as the notional amount increases. This effect is taken into account for the standard approach in a simplified way. The decrease over notional categories is quite similar for both loan and guarantee margins. Thus the difference between these two instruments can be captured by a constant discount for guarantees.

Question E 9. Cost margin

How much is the typical margin (in %) contributed to fees, management costs, etc. (i.e. the cost margin not accounting for credit risk and return on capital, etc.) for loans and guarantees of the following notional amounts?

The cost margin is a further component of the credit margin. It includes fees, management cost and similar costs related to the banks effort for lending. The following charts describe the behaviour of the cost margins across notional categories and compare the changes of the cost margin to those of the complete margin.

Proportion of banks with different cost margins for loans and guarantees
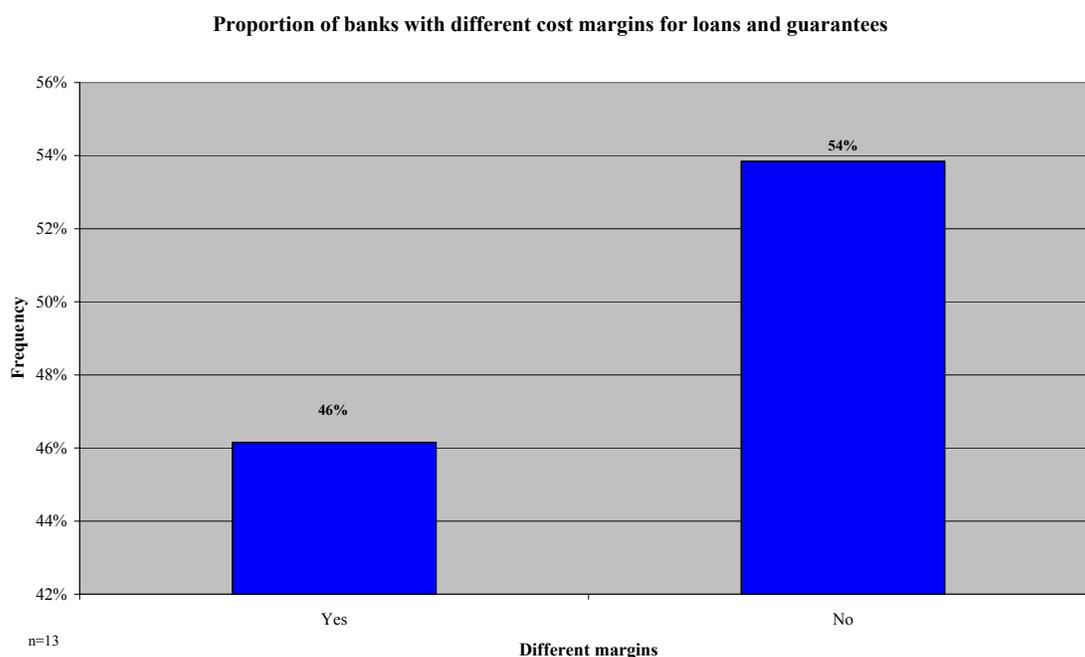
Figure 14-47

Average cost margin for loans and guarantees
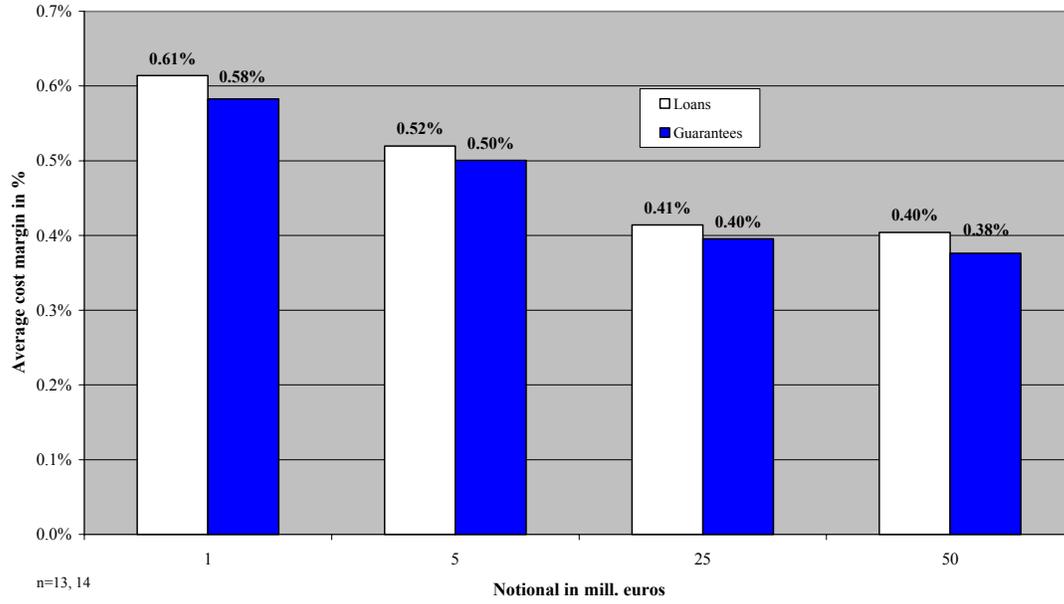
Figure 14-48

Absolute difference between average cost margins for loans and guarantees
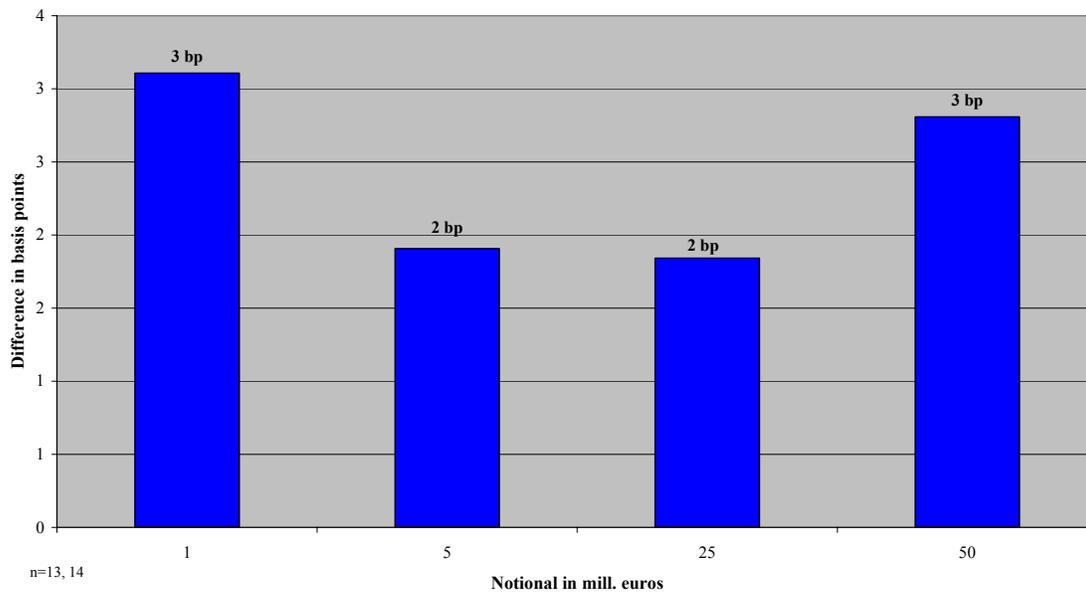
Figure 14-49

Absolute decrease of cost margins over notional categories

n=13
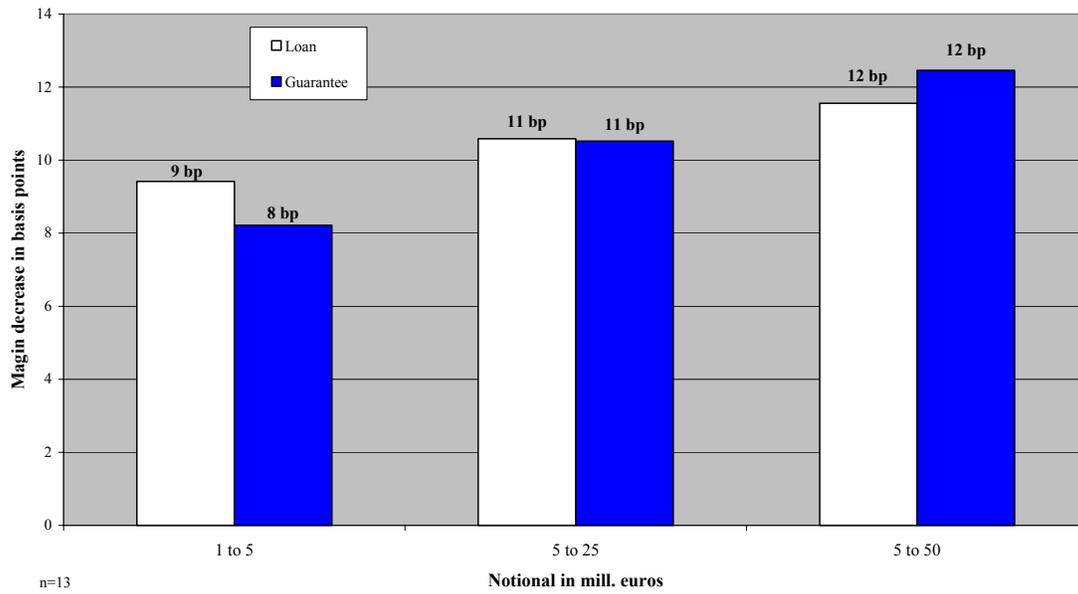
Figure 14-50

Average decrease of loan margins and cost margins for loans over notional categories

$16 \leq n \leq 22$
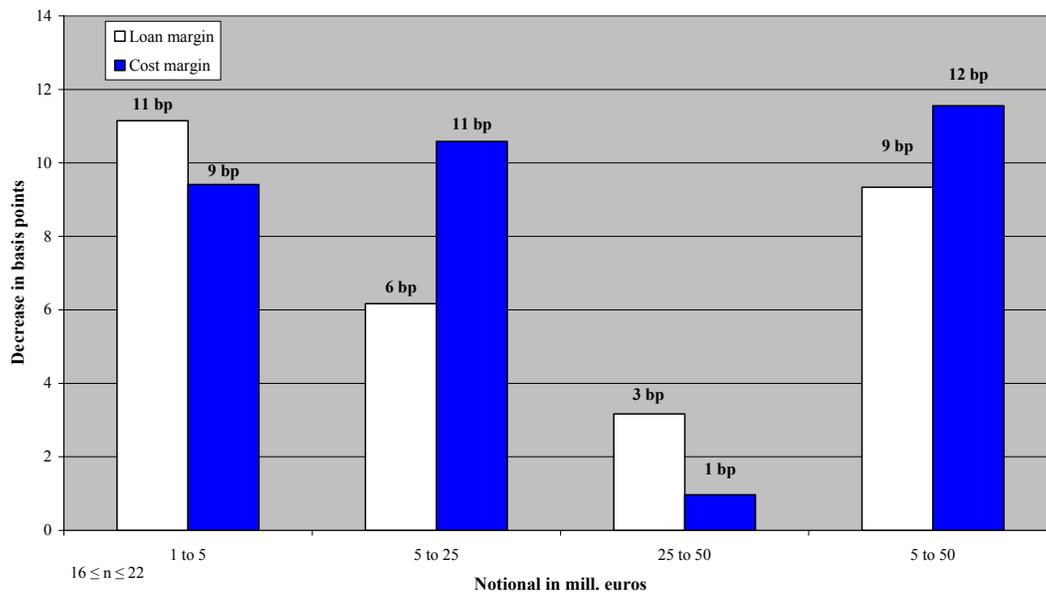
Figure 14-51

Average decrease of guarantee margins and cost margins for guarantees over notional categories
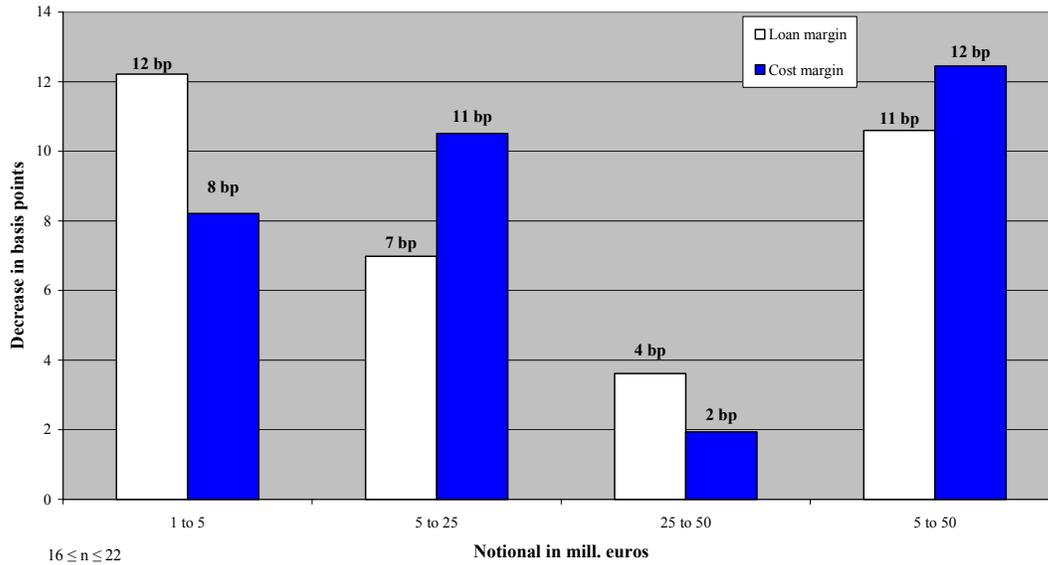
Figure 14-52

About 46% of participating banks differentiate between loans and guarantees when determining the cost margin (Figure 14-48). As with the credit margin the cost margin decreases with increasing notional amounts (Figure 14-49). For EUR 5 mill. notional the cost margins amounts to about 50 basis points for both loans and guarantees (Figure 14-49). Figure 14-50 depicts that the difference between cost margins for loans and guarantees is between two and three basis points. The decrease of cost margins over notional categories is quite constant and parallel for guarantees and loans (Figure 14-51). Figures Figure 14-52 and Figure 14-53 show that credit and cost margins for both loans and guarantees do not decrease constantly and in a parallel manner. From EUR 5 mill. to 25 mill. the cost margin decreases by more than the complete margin, which is counter-intuitive but has its reason in different samples. By and large, the picture of the cost margin sustains the insights gained from the behaviour of the complete margin.

From Figure 14-48 the minimum cost margin of 40 basis points has been derived, which has been applied in the validation by the pricing models and is taken as a benchmark for internal models under the advanced approach.

Question E 10. Margin differentiation

Apart from other (risk) factors (PD, LGD, notional amount, etc.) do you differentiate the margins you require with regard to SMEs in contrast to large corporates? To which extent?

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Firm size is another factor banks might use to differentiate loans and thus margins. Figure 14-54 demonstrates that the majority of banks in the sample (61%) follow this practice. The extent to which banks differentiate between SMEs and larger corporates is too diverse as it could be taken into account.

Do you differentiate the margins for SMEs and large corporates?

n=23
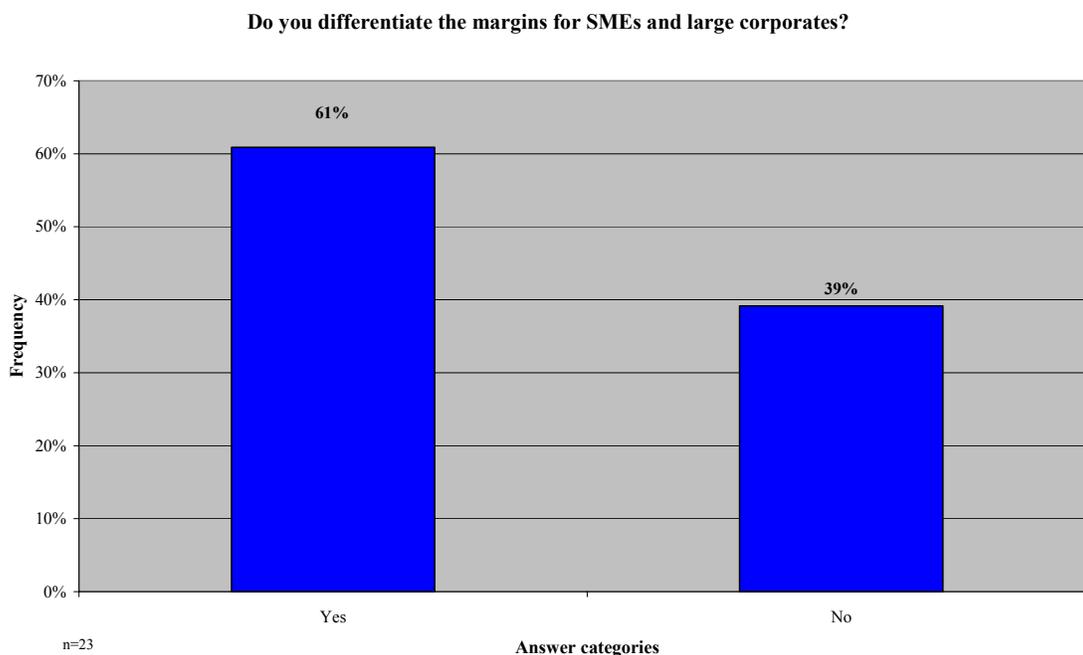
Figure 14-53

Question E 11. One year bullet margin

Which margins (in %) do you deem appropriate for a loan (one year bullet, EUR 5 mill. notional) with the following PD and LGDs?

Since the question surveying banks' margins over rating grades (E 2.) assumed normal collateralisation, the margins for the remaining LGD categories have to be examined separately. In order to minimise respondents' effort, the margins are surveyed for only one rating grade. The margins for the other rating categories need to be derived through extrapolation. Therefore, a model had to be tested in order to perform the extrapolation.

The first chart shows the average decreases of margins over LGD-classes neglecting the particular rating categories. Since creditworthiness is expected to increase with increasing collateralisation, the margin decreases accordingly as expected.

Average decrease of margins over loss given default (LGD) categories

n=18, 19, 14
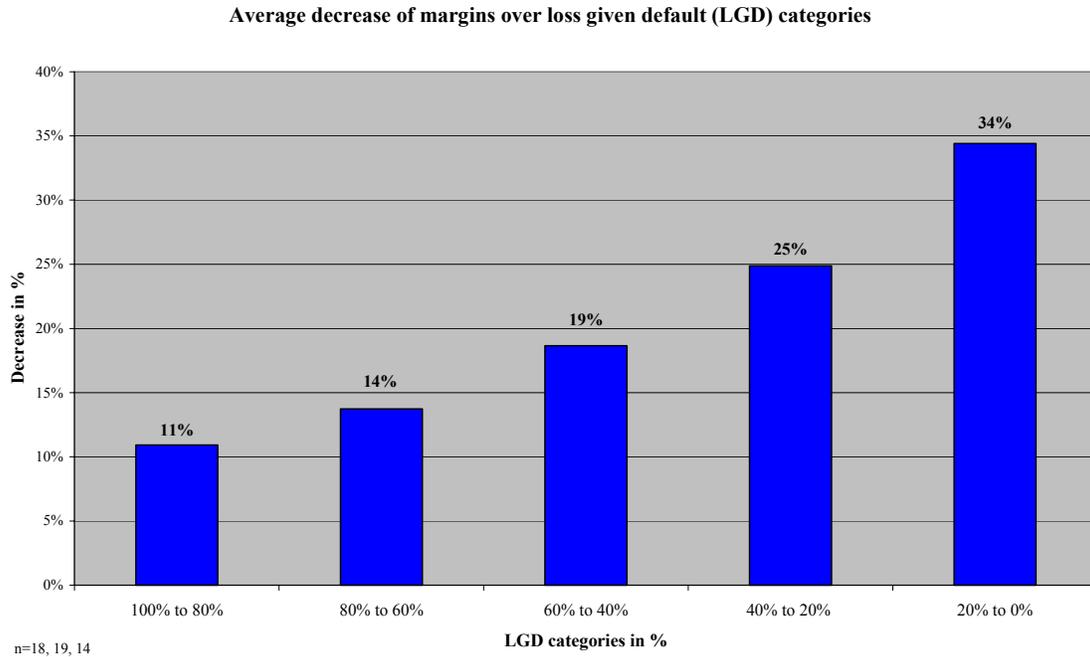
Figure 14-54

The next chart summarises the appropriateness of linear extrapolation, which is a very simple model aimed to assure tangibility. It turned out that the model suitably fits the data. The model has been applied with the average cost margin as it was reported and with an implicitly derived cost margin, which minimises the prediction error of the model. Both margins were very close together.

The last chart visualises the consequences of linear extrapolation for the collateralisation categories for each rating grade.

Proportion of banks for which the model was suitable

Model was suitable
Model was not suitable

n=19

20%

Residual squared error 0.0422%

80%

Figure 14-55

Tested formula (example) :
$$margin\left(LGD=75\%\right)-cost\ margin=\ldots$$
$$\left[margin\left(LGD=45\%\right)-cost\ margin\right]\frac{75\%}{45\%}$$

Average minimum margin

0.3938%

0.3536%

Average minimum margin in %

0.40%	
0.35%	
0.30%	
0.25%	
0.20%	
0.15%	
0.10%	
0.05%	
0.00%	

Solved   Disclosed

n=11, 14

Categories

Figure 14-56

Margins and collateral levels 5 years maturity (based on interpolation)

	15%	45%	75%
Strong	0.44%	0.58%	0.72%
Good	0.60%	1.06%	1.52%
Satisfactory	0.97%	2.18%	3.39%
Weak	1.79%	4.64%	7.50%
Bad	3.61%	10.10%	16.58%

Loss given Default

Figure 14-57

Figure 14-57 shows that margins increase with LGD linearly according to the linear extrapolation model. In addition, this chart demonstrates the margin differences due to the individual rating categories.

Question E 12. Historical margins

Please specify the historical margins (in % over the last five years) for a loan (one year bullet, 45% LGD, EUR 5 mill. notional) with the following PD.

Historical margins are a good indicator for the development of margins over time. Especially, volatility of margins is important. Based on these data, stability and thus necessity to periodically re-validate margins can be assessed.

Standard deviation of historical margins
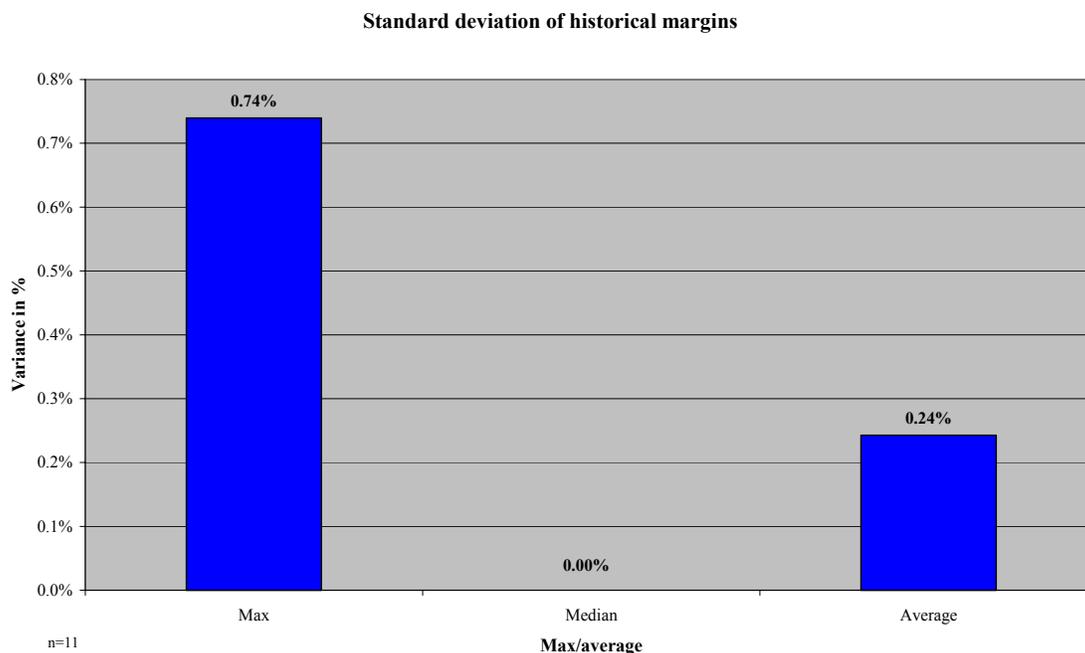
Figure 14-58

As becomes apparent in Figure 14-58, historical margins are very stable over time. The standard deviation amounts to 0.24% on average. However, more than half of the surveyed banks reported a complete stability of margins over the past five years. Hence, the future appropriateness of the margin tables can be verified in intervals larger than five years if historical experience is deemed to be relevant for future developments.

Question E 13. Margins differentiated for currencies

Please indicate the margin (in %) your institution would ask for a loan (one year bullet, rating Baa2, 45% LGD, notional equivalent to EUR 5 mill., disregarding country risk) in the following currencies.

Because banks grant loans in different currencies it has to be researched if this practice leads to variations in margins for loans denominated in different currencies. A different currency means also a different yield curve, which can have a considerable impact on pricing.

Differences between margins for loans across currencies in which banks grant loans
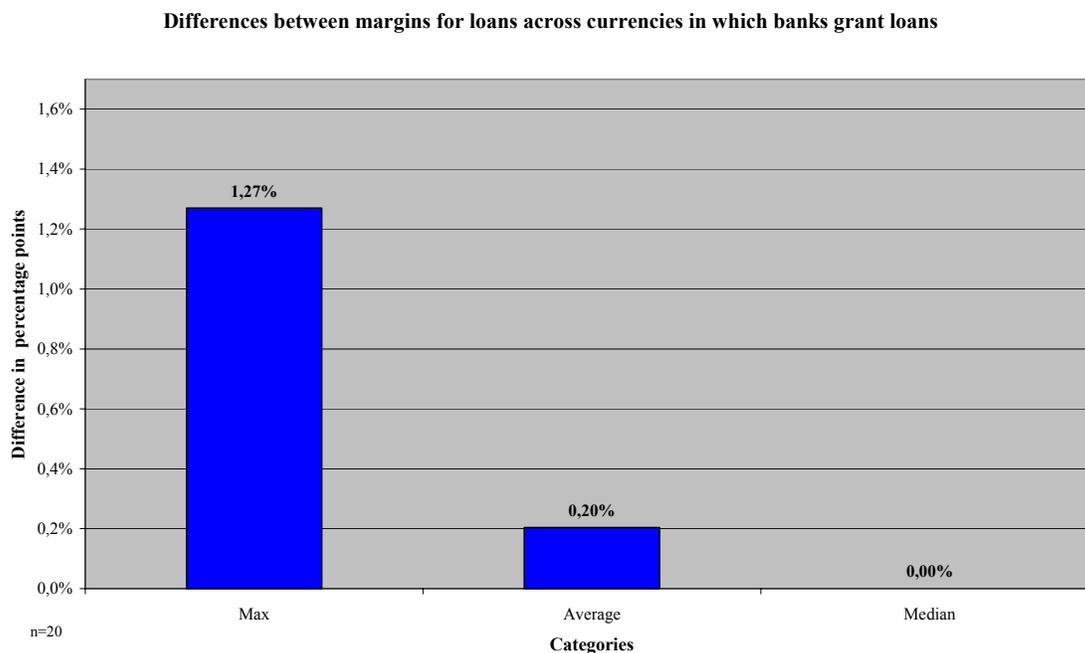
Figure 14-59

Figure 14-59 resolves this concern. Half of the banks in the sample report not to differentiate between currencies regarding the pricing. The average difference is about 20 basis points. It is recommended to apply the same margins for all currencies.

14.1.2.1.5   Questions concerning the model

<u>**Question F 1. Bond market credit spreads**</u>

To which extent is your institution's loan pricing market based using credit spreads observed in bond markets for the following notional amounts?

Loan and bond markets compete with each other at least to a certain degree. Usually, for funds exceeding EUR 50 mill. issuing a bond might be more efficient in terms of costs. However, even for smaller amounts a certain correlation between bond and loan markets might be present, because both market segments should yield a similar return on equity for investors. If there were a dependence, bond market data, especially credit spreads of bonds, could be used for setting up a margin table for the reference rate.

Average responses for dependence of loan margins on bond markets

n=22, 23

Figure 14-60

Average responses for dependence of loan margins on bond markets differentiated for notional amounts
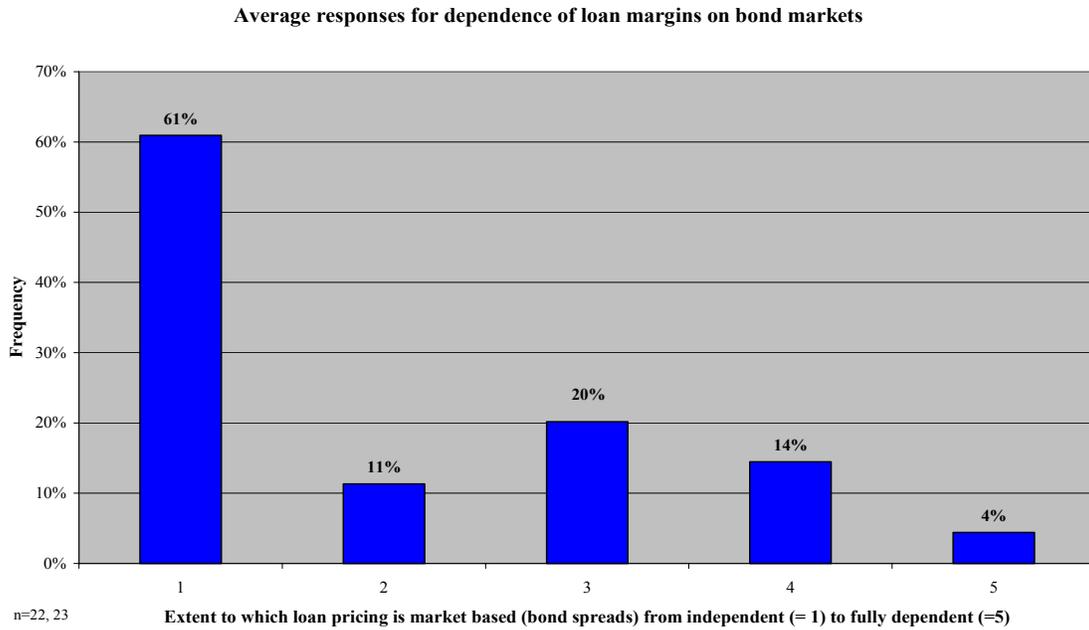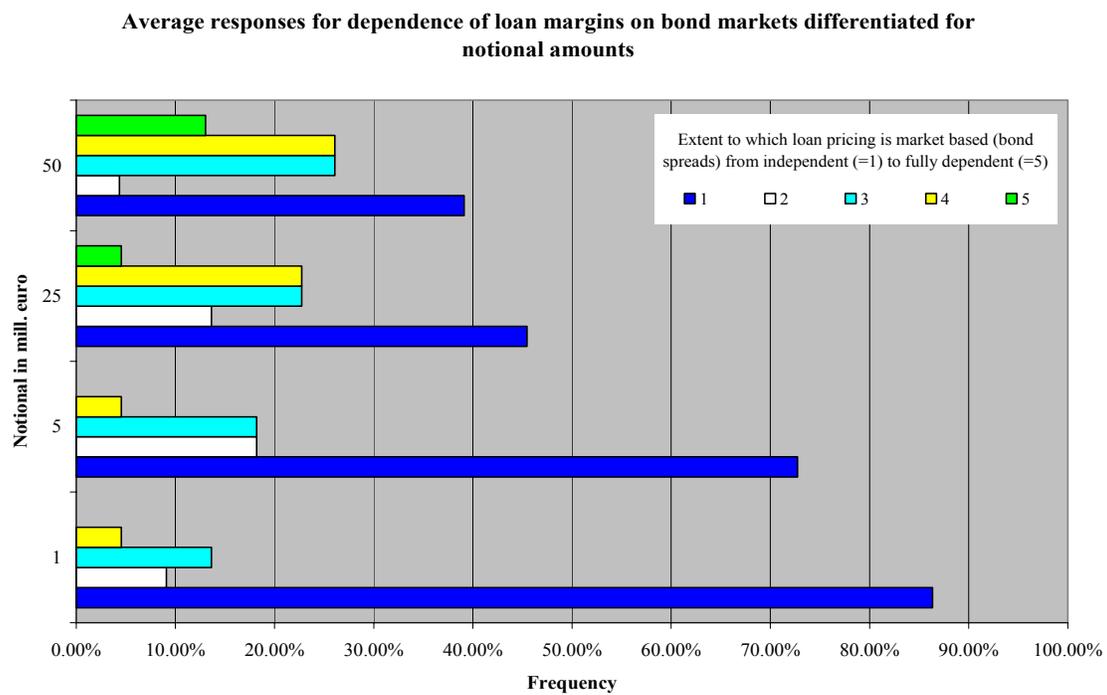
Figure 14-61

As becomes obvious in Figure 14-60, the majority of banks (61%) considered loan markets to be independent from bond markets on average. Figure 14-61 draws a more differentiated picture. It can be observed that independence is greatest for EUR 1 mill. and EUR 5 mill. but decreases with increasing notional amounts. For EUR 50 mill. more than 10% of respondents saw strong dependence and about 25% indicated to see a certain degree of dependence.

Currently, a strong dependence between loan and bond markets cannot be sustained by the answers. This may, however, change over a medium horizon, as securitisation becomes more standardised.

Question F 2. Return on equity

What is the pre-tax return on equity (ROE) in % you typically demand for loans on average?

When granting loans, banks have to retain a certain amount of minimum capital due to regulatory provisions. This capital retention causes opportunity costs, which have to be recovered through the proceeds from granting loans. This capital cost is included in the loan margin and can be assessed by a bank's required return on equity.

Distribution of return on equity (RoE) values
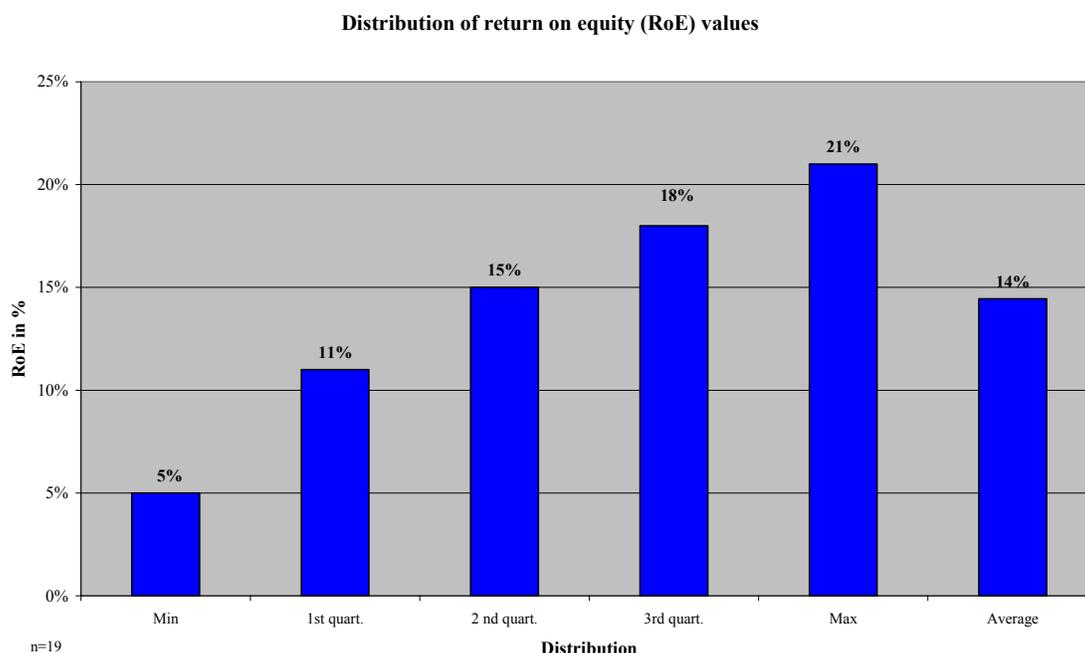
Figure 14-62

Figure 14-62 illustrates the distribution of RoE values for the sample at hand. The average RoE amounts to 14%. In line with the sample and due to the authors' experience a pre-tax return of 15% is an appropriate benchmark for banks' equity capital.

Question F 3. Differentiation of ROE for certain factors

Concerning the level of the demanded ROE do you differentiate among certain factors (i.e. sector, collateral, etc) and to which extent?

Some banks (40%) differentiate the RoE they demand in form of a margin add-on according to certain factors such as industry or collateralisation. The extent to which banks differentiate is too diverse as it could be taken into account for the standard approach.

Concerning the level of return on equity (RoE) do you differentiate among certain factors?
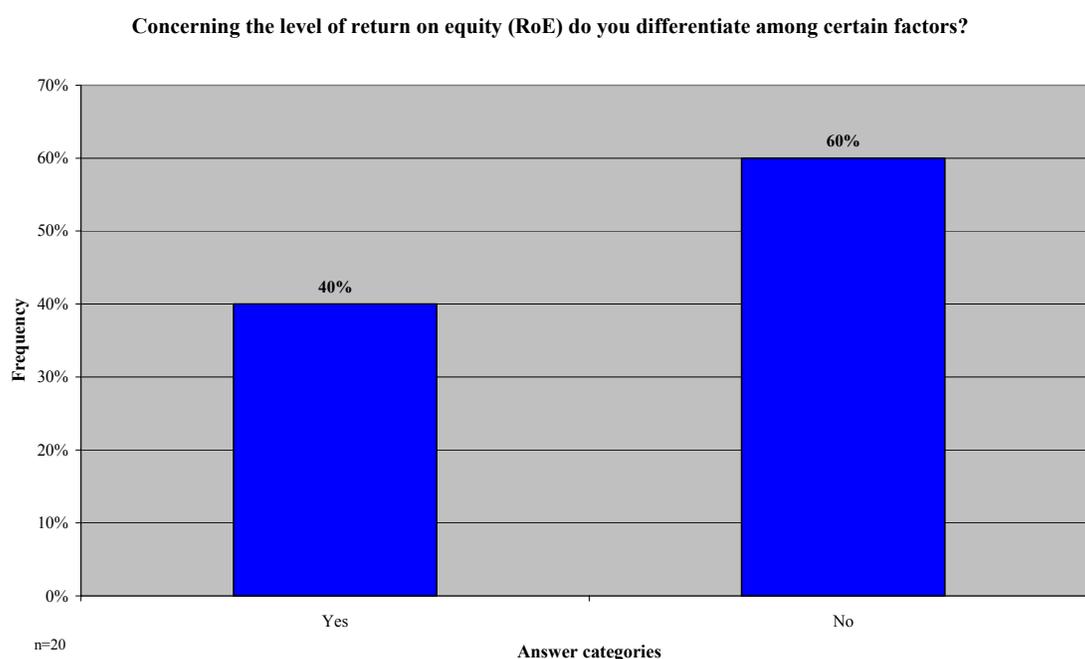
Figure 14-63

Question F 4. Measuring underlying capital

How do you measure the capital amount (tear 1 and 2) required to underlay granted loans?

Several approaches exist to measure the equity capital banks must retain to underlay credit risk. Depending on the approach, underlying capital can vary within limited boundaries. The regulatory or economic capital determines the component of the margin, which actually ensures the return on equity.

Approach to capital adequacy
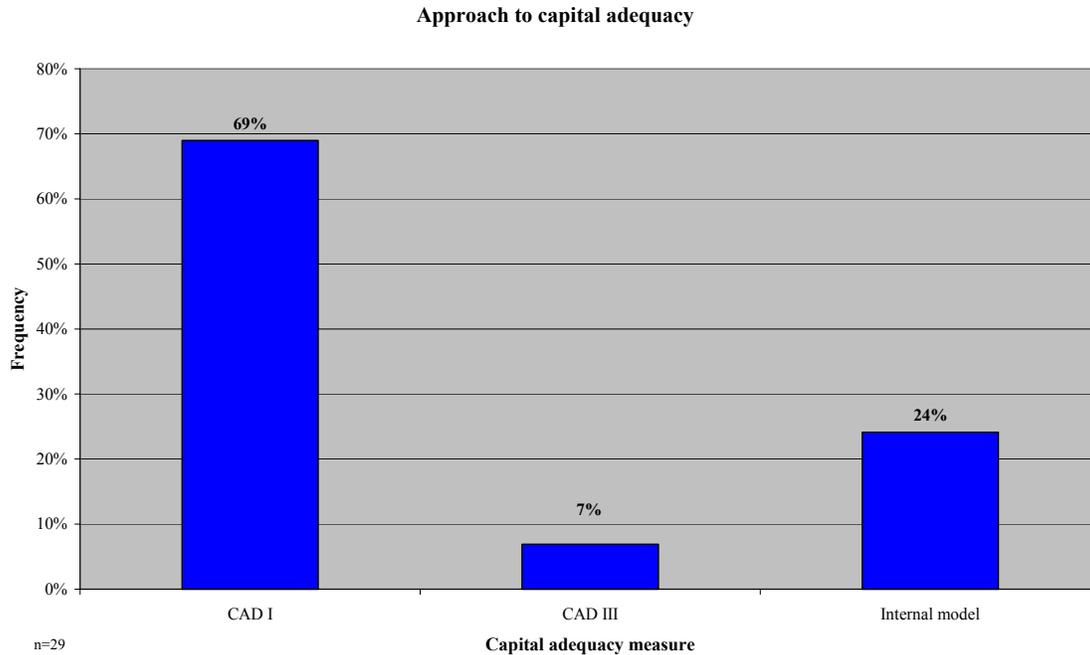
Figure 14-64

With about 70% CAD I is currently the most widely dispersed approach to measure capital adequacy. This approach has been applied to the validation of margins by the pricing model therefore. In future the CAD I approach will be abolished in favour of the Basel II-approaches to regulatory capital. For the purpose of pricing more banks will move to internal models as these are more advanced. This would make particular recommendations on applicable pricing models difficult as the input parameters will change in foreseeable time.

Question F 5. Approach to capital measuring

If you apply or intend to apply CAD III/Basel II, which approach does your institution use or intend to use to calculate the capital requirements for credit risk of corporate debtors? When do (did) you implement this approach?

In the future, banks in the EU are obliged to apply the European rules on the minimum equity capital requirements according to Basel II. However, within Basel II they can choose among three main alternative approaches, the standardised approach, the foundation and the advanced internal ratings-based approach. The more advanced the applied approach is the less the capital requirement is expected to be on average. This may affect credit spreads since a lower margin component for the tied equity capital is required.

Deloitte.

Approach to calculate credit risk within CAD III/BaseII
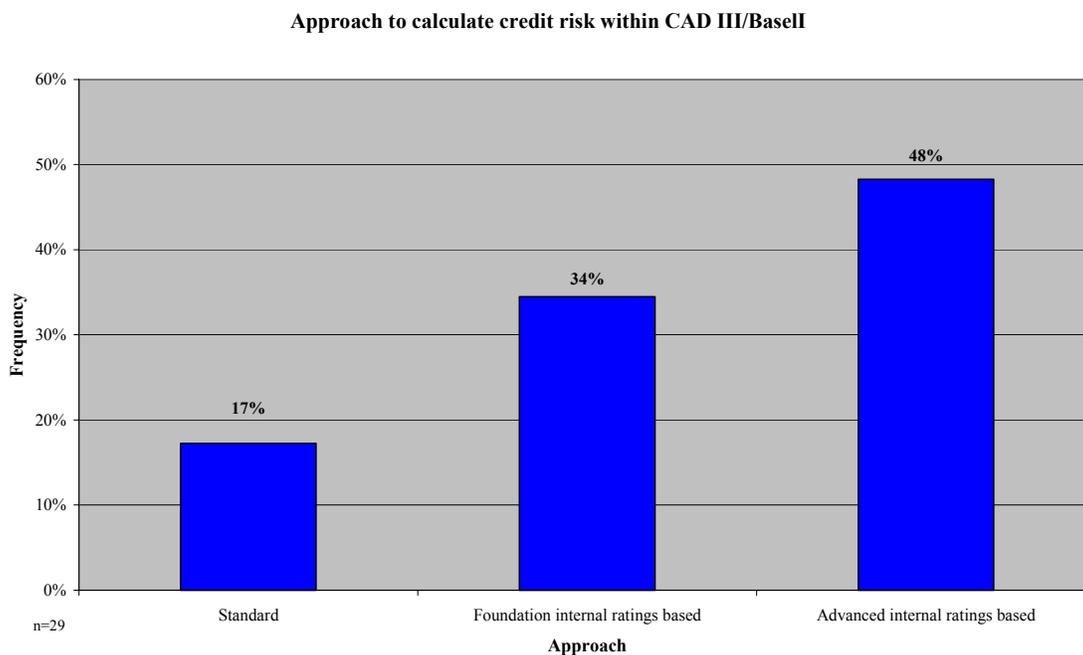
Figure 14-65

The majority (48%) decided to implement the advanced internal ratings based approach, which is the most complex and sophisticated one (Figure 14-66). However, it allows capital levels to be slightly lower than those applicable for the other less advanced approaches. Consequently, it can be expected that opportunity costs due to minimum capital requirements will decrease for banks opting for the most advanced approach, thereby reducing the margin.

The underlying regulatory capital is a parameter in common pricing models. For the purpose of an advanced approach for the reference rate a recommendation regarding a specific measurement of capital cannot be drawn from this result as there is no market standard apparently.

The alternative approaches of Basel II for measuring regulatory capital will be implemented between September 2005 and August 2006 on average (see next chart). The pricing behaviour may change at least from thereon, probably earlier as banks take adverse effects already into account. This leads to the recommendation that the MFI-statistics[120] should be tracked in the future in order to detect considerable structure breaks with regard to loan pricing.

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[120] See chapter 14.2.3 *Differentiated approach for the normal case.*

Deloitte.

Average implementation dates
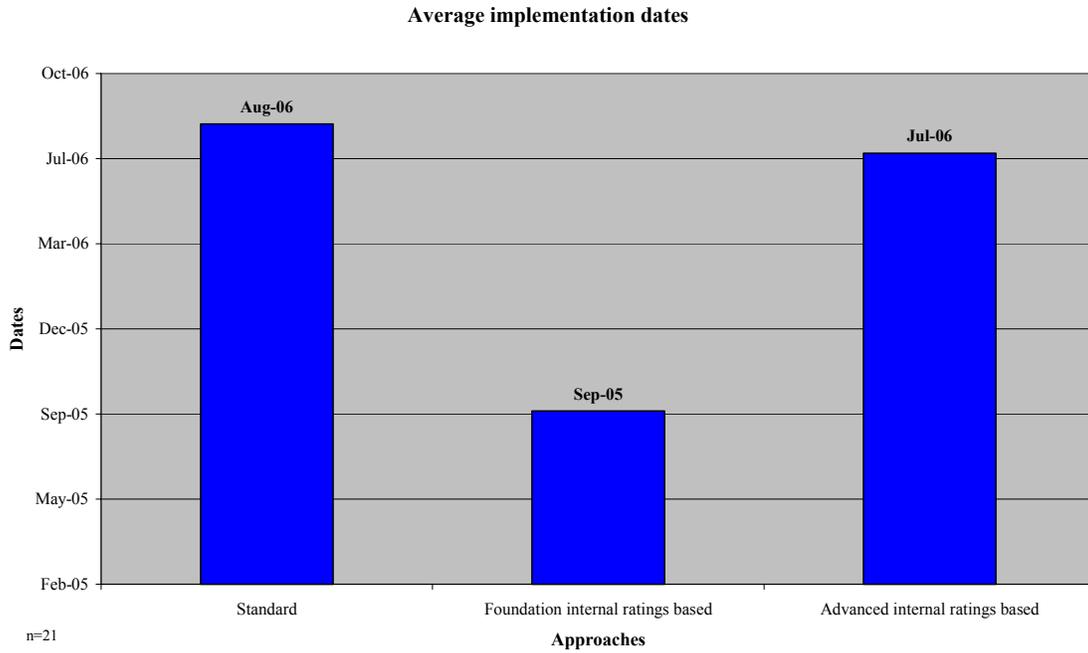
Figure 14-66

Question F 6. Average share of underlying capital

What is the average share (in %) of capital underlying your institution's loan portfolio?

Since the absolute capital cost depend on the level of capital effectively sustaining loans, these levels should be examined. The average level was intended to be applied in the pricing model in order to validate reported margins.

Average and median share of underlying capital

Figure 14-67

Maximum and minimum capital today and under CAD III
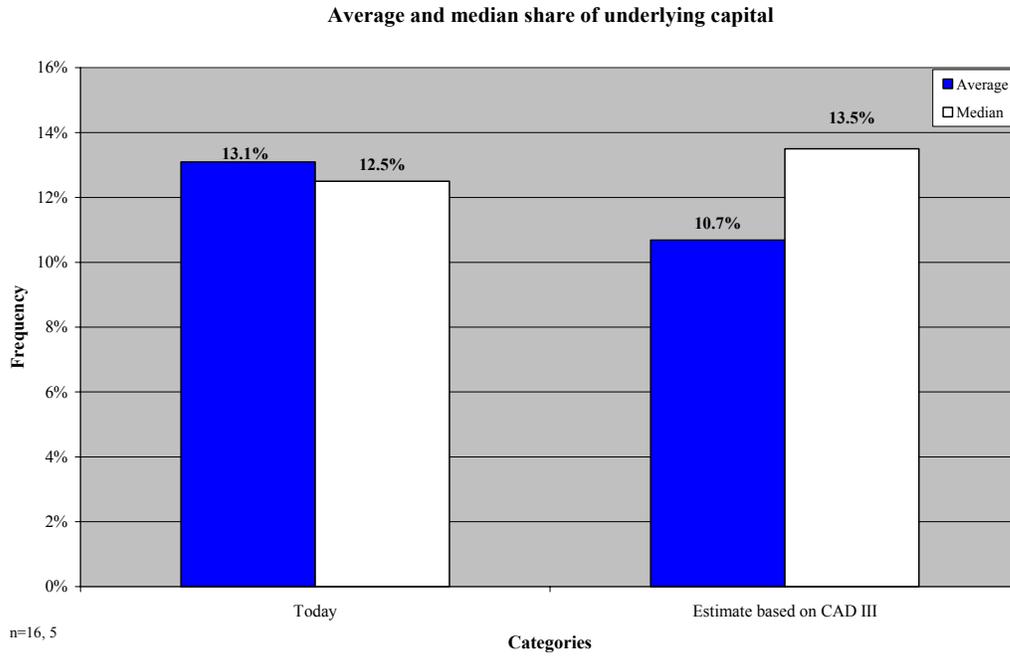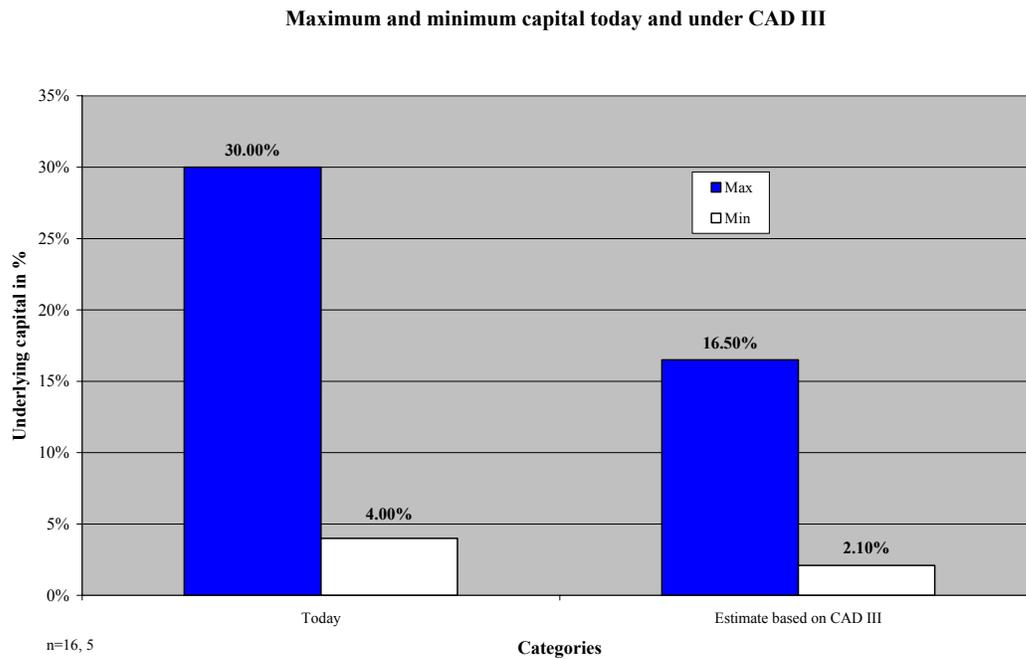
Figure 14-68

According to Figure 14-67, average capital held today amounts to about 13% and is expected to decrease to about 11% in the future. Surprisingly, the median capital is expected to increase. Figure 14-68 depicts the maximum and minimum capital levels reported for today and the future. Based on this chart, future capital levels are expected to decrease as well. However, the maximum and minimum levels do not appear to be representative for commercial banks' usual bandwidth since it would either be to expensive to hold so much equity capital ready or almost be impossible to achieve such a low level.

The reported figures can be expected to reflect the *actual* levels of capital held (especially the maximum levels of Figure 14-68), exceeding the required minimum regulatory capital or the required capital according to internal risk credit models, if the latter is larger than the minimum requirements. As a parameter for a loan pricing model, however, the reported levels seem to be too high as too large margins would result. For instance, 10% excess return on equity over swap on 10% required capital would require a margin of 1% just for own profit, which is not founded by reported margins. The average underlying capital does seemingly not reflect the minimum *marginal* capital that is required for an additional loan and that is decisive in pricing.

Therefore, for the purpose of validating the margins by a pricing model simply the currently applicable minimum capital ratio of 8% has been applied. Thereby an overestimation of the margin stemming from the pricing model, which was used to validate the reported margins, could be avoided.

Question F 7. Loan pricing model

Do you regard the following basic model, which is described by an example of a loan (one year bullet, EUR 5 mill. notional, 45% LGD), as an appropriate simplification of credit market based pricing of loans (please understand the model as pre-tax calculation)?

Question F 7 was designed to validate a basic loan pricing model. Originally, the authors intended to develop a simple pricing model in order to make it applicable to specific cases of State aid. The diversity of banks' answers and the questionable applicability of a model by non-experienced users changed the authors' thinking. Finally, the model was applied to validate the reported margins (see Figure 14-32), but was not particularly recommended for an advanced approach.

Comments concerning the model
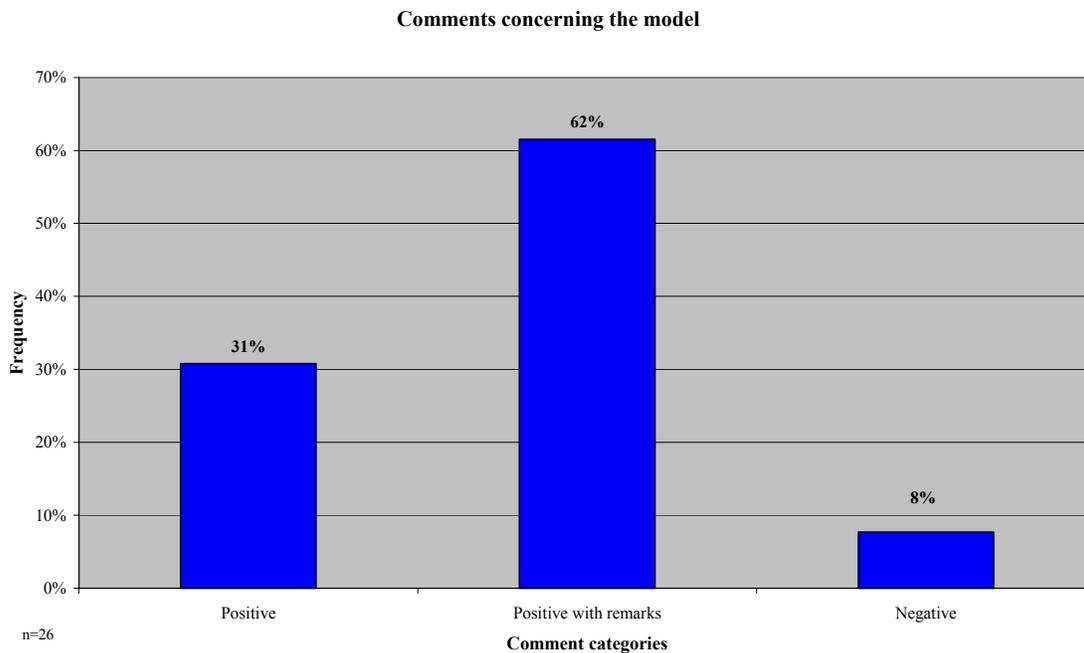
Figure 14-69

The great majority of respondents considered the model to be useful for basic computations. Even though, about 60% had some remarks concerning the parameters or the logic (see next question).

Question F 8. Alternative model parameters

With regard to the model above what other risk factors or parameters do you regard as important in pricing loans? Are these factors or parameters inevitably necessary in a decent simplification of pricing a standard product?

Because the model contains only the most important standard variables for loan pricing suggestions to consider further parameters were collected.

Additional model factors proposed by respondents
(multiple answers possible)
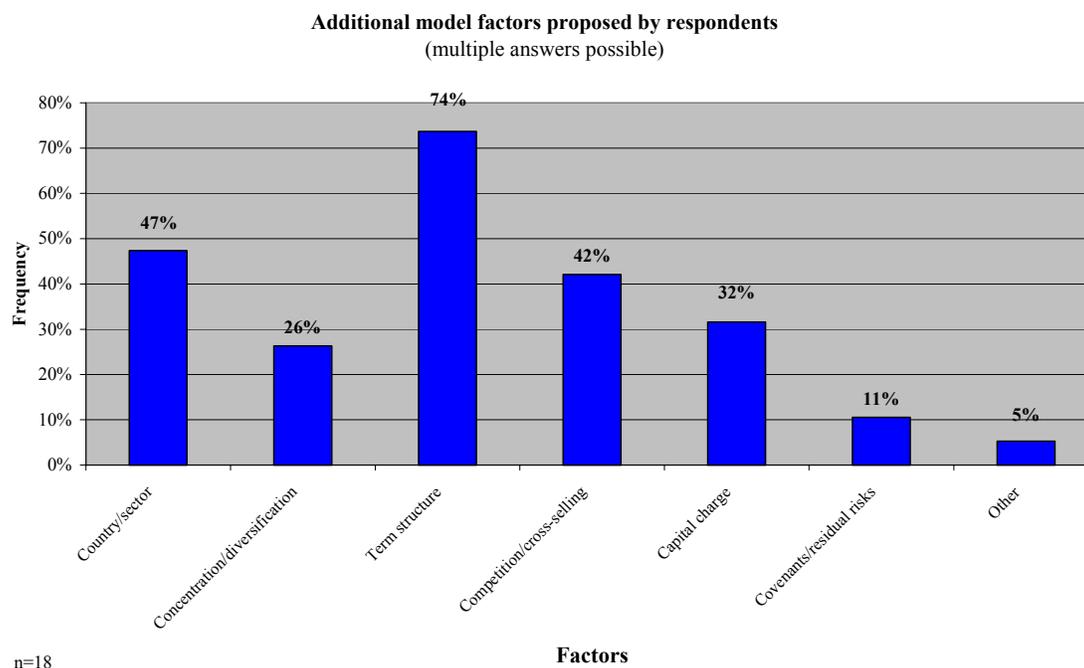
Figure 14-70

Several factors were suggested by respondents. However, no factor seemed to be particularly prominent. Furthermore, banks' opinions were quite diverse. Because the model should be as simple as possible, the basic model was not altered for the purpose of validating reported margins and for the indication of a benchmark for models under the advanced approach.

14.1.2.1.6   Question concerning the sample

Question G 1. Sample

Please complete the table below for a representative or random sample of loans your institution granted. We would be very grateful if the sample contains at least 20 or more items.

While compiling the questionnaire, the authors very much worried about banks' willingness to supply their minimum or average margins. It was expected that banks were less reluctant to disclose anonymous data about loans, from which risk-adjusted margins could have been recompiled backwards.

Right the contrary turned out to be true. Enough banks supplied margin tables to us. Moreover, the sample of loans contains so different structures of data (e.g. with PD and without) that it is unduly complex to extract margins thereof.

From a few respondents the authors learned that this question was even more critical than the margin tables. Remarkably, some banks rather decided not to participate in the survey than to leave certain critical questions open.

14.2   MFI statistics

In order to provide additional evidence, interest rate statistics published by central banks will be reviewed. A comparison of interest rates, loan volumes, rate fixation periods and other characteristics might provide some hints concerning regional developments such as divergences and convergences between or within regions and it allows the verification of the survey results.

Most national central banks in the EU report interest rates for their respective countries according to the new MFI interest rate statistics for the EMU (ECB, 2002). This statistics is harmonised, i.e. the statistics is derived based on common predefined standards. Consequently, data published by central banks obeying to these statistical standards lend itself to comparison across countries. The statistics collects interest data for three rate fixation periods:

- Floating rate and up to one year initial rate fixation,

- Above one year and up to five years initial rate fixation,

- Above five years initial rate fixation.

These categories are reported for loans up to EUR 1 mill. and above EUR 1 mill. Unfortunately, not all central banks disclose their interest rates in form of the MFI interest rate statistics, so that the evaluation of some countries' statistics remains subject to interpretation. Therefore, comparisons across individual national statistics are quite difficult for countries that do not disclose the required information. Moreover, a validation of the survey results based on interest rate statistics is possible only for those countries for which the necessary data is available. Accordingly, the value of a comparison of interest rates between individual States as well as of a comparison of statistical interest rate data and the results of the survey is limited a priori.

The following review of European interest rate statistics will concentrate on the interest rates for new loan contracts closed between MFIs and non-financial corporations rather than on rates for outstanding loans. The reason for this focus is that for certain countries with a higher volume of long-term loans the interest rates for outstanding loans might be distorted thanks to the mixture of fixed and variable debt and thus are unsuitable for a comparison of rates across countries. In the statistics at hand, corporate loans are classified under the category new business according to their initial rate fixation, while under outstanding business they are categorised according to their original term to maturity. Thus,

corporate loans with an initial rate fixation that is shorter than the original term to maturity are grouped differently for the new business and the outstanding business category.

According to the Deutsche Bundesbank (2004), especially floating rate loans, which tend to have lower interest rates due to their lower exposure to interest rate changes, are recorded as short-term loans for new business and according to their term to maturity as medium- or long-term loans for outstanding business. For instance, in Germany the proportion of fixed rate long-term loans is relatively high compared to most other EU States (Deutsche Bundesbank, 2004). Consequently, the above described categorisation might lead to an overstatement of German interest rates for outstanding business. In addition, by emphasising new loans all effects arising in the course of the history of the loans, like redemptions or changes of interest, can be excluded.

As expected, for the old EU Member States, especially for those belonging to the euro zone, the available statistics show that national interest rates for the respective notional amounts and rate fixation periods are quite close together. However, some deviations for certain interest rates between individual countries could be observed throughout the last year. The highest interest rates in comparison to the individual interest rate levels of other EMU States as well as to the euro area MFI interest rate statistics are reported by Germany. For instance, in the period between March 2003 and March 2004 German medium-term rates for loans up to EUR 1 mill. were nearly always reported to be above 5% (Deutsche Bundesbank, 2004) while the respective average euro zone MFI rates were virtually always quoted below 5% (ECB, 2004). Another country with comparably high interest rates is Ireland, where the interest rates with initial rate fixation up to one year and over one and up to five years consistently lie above the euro zone MFI average for the period March 2003 to March 2004 (Central Bank of Ireland, 2004). At the lower end of the spectrum, Luxembourg and France can be found with short-term interest rates below 4% and 3% respectively since June 2003 (Banque de France, 2004; Banque centrale du Luxembourg, 2004). Independently from the individual deviations among countries, interest rates in all EMU States have declined during the time period at hand (ECB, 2004).

For Eastern European countries, especially for the new Member States, the analysis renders a different picture. Even though the evaluation has to be limited to those countries that publish adequate statistics it is possible to roughly classify the new Member States into three groups in terms of interest rates. The first group comprises countries like the Czech Republic and Lithuania were interest rates are relatively low (Czech National Bank, 2004; Bank of Lithuania, 2004). Particularly, the Czech Republic is quite close to the average euro zone interest rate level. The second group consists of the States Estonia, Latvia, Poland and Slovakia with interest rates significantly above the EMU level (between 5% and 7% for short- and medium-term loans and up to 8% for long-term loans) (Bank of Estonia, 2004; Bank of Latvia, 2004; National Bank of Poland, 2004; National Bank of Slovakia, 2004).

Hungary and Romania fall into the third group where interest rates at the double-digit level have been common over the course of the period observed, whereas the Hungarian medium-term rates have been found to be between 8% and 15% while Romanian banks have demanded and still demand rates above 20% (Hungarian National Bank, 2004; National Bank of Romania, 2004). Interestingly, the yield curves for Estonia, Lithuania and Hungary have tended to be inverse over some months.

With respect to rate fixation periods and aggregated loan volumes granted by MFIs, the euro zone MFI interest rate statistics shows that short-term loans above EUR 1 mill. exhibit the largest volume. Medium- and long-term loans are of significantly smaller volume, whereas the medium-term volume slightly exceeds the long-term one. The volume of loans up to EUR 1 mill. is considerably lower than that above EUR 1 mill. (ECB, 2004). Since the number of granted loans is not disclosed, it is not possible to deduct which rate fixation periods and notional amounts have been agreed on most frequently. A similar pattern can be observed for almost all euro zone States. However, there is again some variation among countries. Most notably, in Germany, due to the long-term orientation typical for the country, the long-term loan volume exceeds the medium-term volume (Deutsche Bundesbank, 2004). This difference is especially pronounced for loans above EUR 1 mill. In contrast to this, long-term loans seem to be virtually irrelevant in Greece (Bank of Greece, 2004).

Regarding Eastern Europe useful statistical data on loan volumes is quite rare. Yet, the available data show that, similar to the EMU States, in Hungary, Slovakia and the Czech Republic short-term loan volumes exceed medium- and long-term loan volumes (Hungarian National Bank, 2004; National Bank of Slovakia, 2004; Czech National Bank, 2004). Though, for Hungary the difference between loans up to EUR 1 mill. and loans in excess of EUR 1 mill. is less distinctive than the one disclosed in the euro zone MFI statistics. For Latvia the statistics include about three times higher long-term loan volumes than short-term volumes (Bank of Latvia, 2004).

14.2.1   Minimum margins

Emanating from the survey and the MFI statistics loan margin profiles are quite diverse for the countries included in this study thereby reflecting individual national characteristics and differences among States in terms of economic environment, average debtor's credit quality, cost structures and certainly competition. Therefore, a differentiation among countries might be advisable. However, it has to be noted that these margin differences, even if they are caused by several factors, have to be projected to differences in creditworthiness because this is the only factor from those mentioned-above reflected in the margin matrix in chapter 4.1.2 *Risk grading and loan margins*. Other factors such as competition are not covered by the matrix in order to limit complexity.

In order to examine the margin level in the individual countries it proved to be useful to analyse average minimum margins per country. Such figures indicate a basic level of margins demanded by MFIs in individual countries and thus are suitable for comparison among each other. The minimum margins were constructed by subtracting the maximum IBOR rate (from rates with maturity below or equal to one year) from the respective MFI rate for floating rate loans and loans with initial rate fixation up to 1 year. The averages for the different countries are based on the minimum margins of the time period January 2003 to April 2004[121].

Average minimum margins (old Members notional > EUR 1 mill.)
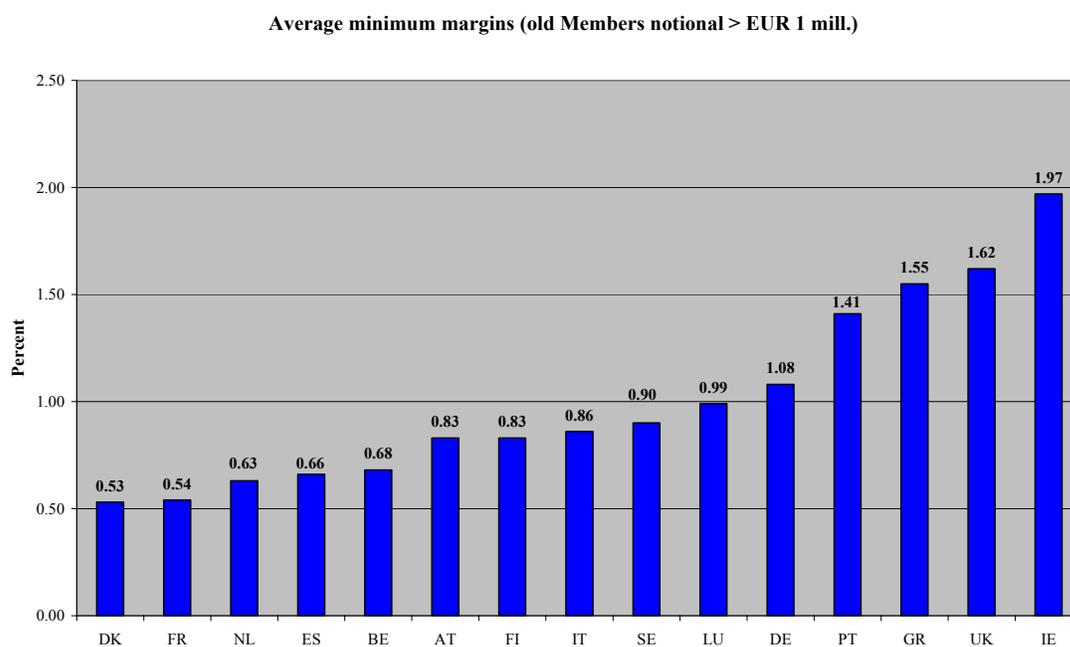
Figure 14-71

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[121] Data sources: ECB for the euro area, EUROSTAT for new Member and Candidate States and Central Banks of Denmark, Sweden and the UK.

Average minimum margins new Members and Candidates (all notionals)
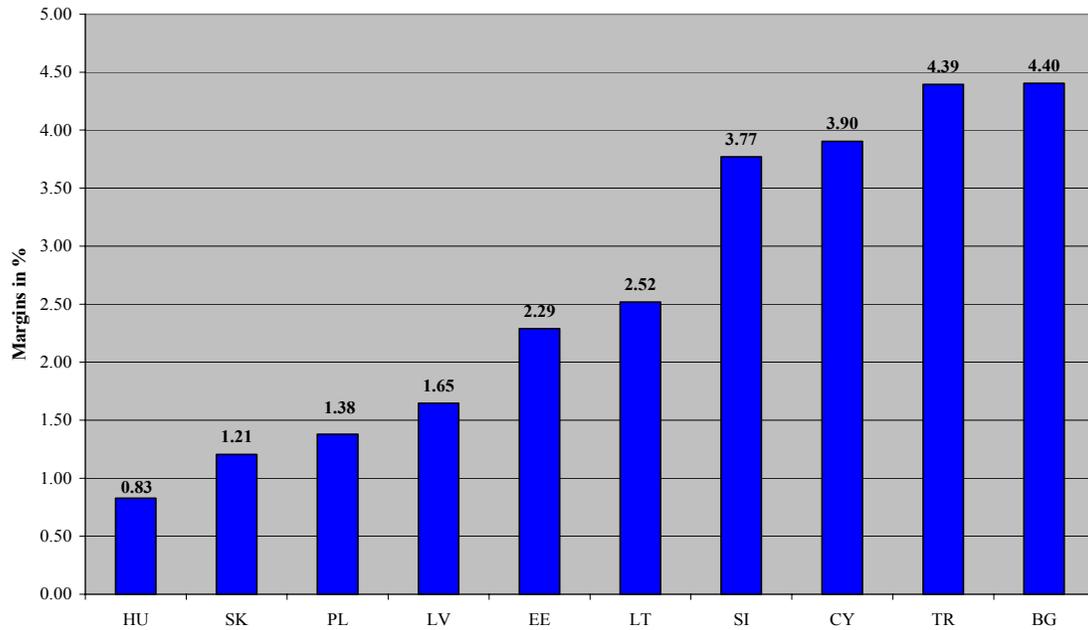
Figure 14-72

Basically, the minimum margins derived through the procedure above can be divided into two categories: the margins prevailing in the old EU Member States and those of the new Member States and the Candidate States (figures 14-71, 14-72). However, this classification is not consistently reasonable because some of the new countries exhibit margins quite close to those of the old EU States. Consequently, a more sensible approach would be to group the different countries according to their margin levels. Considering the figures at hand the most obvious grouping would yield four broad classes.

Low margin countries (old Member States, notional > EUR 1 mill.)

	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04
NL	0.86	0.55	0.70	0.64	0.71	0.80	0.68	0.55	0.60	0.62	0.39	0.53	0.60	0.61	0.64	0.61
BE	0.77	0.66	0.80	0.69	0.84	0.89	0.76	0.68	0.67	0.60	0.40	0.52	0.63	0.62	0.72	0.65
ES	0.70	0.60	0.67	0.63	0.64	0.82	0.76	0.77	0.62	0.57	0.47	0.56	0.65	0.70	0.72	0.62
FR	0.26	0.71	0.67	0.64	0.78	0.90	0.73	0.72	0.77	0.50	0.48	0.50	0.54	0.09	0.07	0.27
DK	0.85	0.38	0.61	0.57	0.63	0.74	0.91	0.40	0.32	0.48	0.14	0.29	0.38	0.43	0.87	0.56

Figure 14-73

The first category comprises countries with comparably low average minimum margins reaching from 0.53% to 0.68% and includes Denmark, France, the Netherlands, Spain and Belgium. Despite outliers, these margins moved within a range between 0.4% and 0.85% from January 2003 to April 2004. The margins of Spain, Belgium and the Netherlands moved quite stable around their average values, while the margins exhibited by France and Denmark are quite volatile (figure 14-73).

Medium margin countries (old Member States, notional > EUR 1 mill.)

	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04
IT	0.80	0.84	0.92	0.95	0.81	0.86	0.93	1.07	0.95	0.84	0.64	0.75	0.73	0.85	0.91	0.90
LU	0.64	0.65	0.84	0.77	0.77	1.24	1.42	1.07	1.11	1.03	0.97	1.03	0.88	1.08	1.23	1.04
AT	1.07	1.14	1.10	0.85	0.94	0.97	0.90	0.65	0.72	0.71	0.53	0.66	0.75	0.72	0.82	0.72
FI	0.32	1.08	0.97	0.99	0.84	0.94	1.02	0.69	0.79	0.83	0.83	0.61	0.96	0.82	0.99	0.62
SE			0.85			1.13			0.73			0.78			1.03	
DE	1.20	1.11	1.29	1.29	1.10	1.07	1.19	1.08	0.98	0.95	0.75	0.94	1.03	1.08	1.14	1.09

Figure 14-74

Medium margin countries (new Member States and Candidates, all notionals)

	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04
HU	0.47	0.11	1.36	1.52	1.39	0.17	0.79	0.72	0.86	1.13	0.60	0.24	0.94	0.92	1.19	
PL	1.62	1.60	1.60	1.65	1.46	1.49	1.52	1.54	1.55	1.60	1.05	1.01	1.37	1.12	1.02	0.85
SK	1.11	1.60	0.96	1.68	1.19	1.09	0.70	2.39	0.63	0.86	1.62	1.21	1.30	0.80	1.18	0.96

Figure 14-75

The second group consists of countries with medium-sized average minimum margins between 0.83% and 1.38%. This group includes Austria, Finland, Hungary, Italy, Sweden, Luxembourg, Germany, Slovakia and Poland. Throughout the observation period, volatility seems to be relatively moderate for the old Member States, while the new Member States' margins were more volatile (figures 14-74, 14-75).

Medium to high margin countries (old Member States, notional > EUR 1 mill.)

	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04
PT	1.48	1.41	1.52	1.48	1.62	1.53	1.55	1.36	1.34	1.29	1.31	1.21	1.44	1.39	1.30	1.40
GR	1.54	1.50	1.46	1.56	1.24	1.29	1.55	1.32	2.01	2.38	1.25	1.40	1.70	1.93	1.39	1.33
IE	1.88	2.00	2.21	1.97	1.96	1.87	2.02	1.96	2.17	1.68	1.72	1.95	2.04	2.10	1.96	2.05
UK	1.92	2.12	2.12	2.12	2.08	2.14	2.09	1.64	1.47	1.26	1.13	1.26	1.16	1.15	1.19	1.02

Figure 14-76

Medium to high margin countries (new Member States and Candidates, all notionals)

	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04
EE	2.01	2.02	1.93	2.25	2.77	2.77	2.49	2.80	2.46	1.97	2.36	2.30	1.81	2.47	2.10	2.11
LV	0.97	0.67	1.19	1.35	1.47	1.77	1.43	1.33	1.06	1.00	1.21	1.42	2.29	3.37	3.27	2.54
LT	2.00	2.71	2.47	2.68	3.07	2.30	2.33	2.37	2.21	2.70	2.39	2.04	2.82	2.83	2.49	2.88

Figure 14-77

In the third group, average margins are between medium and high ranging from 1.41% to 2.52%. This group is made up of the three Baltic States Latvia, Estonia and Lithuania (figure 14-77), and of Portugal, Greece, the UK and Ireland (figure 14-76). The movement of margins over time is quite stable for these countries. Only Latvia and Greece show a somewhat higher volatility. The British minimum margin is constantly decreasing over the course of the observation period.

High margin countries (new Member States and Candidates)

	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03	Jan-04	Feb-04	Mar-04	Apr-04
CY	3.85	3.72	3.80	3.70	3.68	3.76	3.96	3.93	4.12	4.11	4.14	4.13	4.06	3.98	3.89	3.62
SI	3.10	3.20	3.63	3.98	4.02	4.44	4.16	3.73	3.69	3.73	3.87	3.85	3.81	3.57	3.68	3.87
BG	5.49	3.65	3.17	4.40	6.00	4.76	4.62	4.14	6.39	3.21	4.50	4.45	3.78	4.24	4.02	3.65
TR		1.70	1.38	0.54	3.90	4.24		8.60	4.94	4.78	6.45	6.30	3.33	3.43	9.56	2.37

Figure 14-78

The last group embraces countries with extraordinary high average margins above 3%. Slovenia, Cyprus, Turkey and Bulgaria fall within this category (figure 14-78). The highest margin observed is 4.4%. For Cyprus and Slovenia the margins are quite constant over the observation period in contrast to the margins reported by Turkey and Bulgaria, which showed to be more unstable.

Furthermore, for all old Member States but Sweden and the UK average minimum margins can be derived for notional amounts below and above EUR 1 mill. For the new Members as well as for the Candidate States and the two old Member States this is not possible because the national central banks do not disclose the necessary data. The comparison of the two notional categories unfolds that the average margins for loans in excess of EUR 1 mill. are considerably lower for most of the old EU countries. The average difference between loans with notionals below and above EUR 1 mill. equals about 1% (figure 14-79). This means that the analysis above is somewhat distorted or inaccurate because data based on loans exceeding EUR 1 mill. are compared and categorised together with data that does not differentiate for notional amounts. Since there is no data available for the new EU States, the Candidates, Sweden and the UK that differentiates between notional amounts, the distortion has to be accepted.

However, this distortion can be assumed to be smaller than 1% because in the majority of the EU States loan volumes above EUR 1 mill. are dominant in terms of volume and disclosed rates are weighted according to volume. In addition, the increasing economic integration within the EU has led to a strong convergence of national loan market characteristics and will continue so in the future. As a consequence, differences in loan granting practice as well as in loan demand will possibly diminish and so the distortion should do, too.

Difference between average minimum margins for notionals above and below EUR 1 mill. (old Member States)
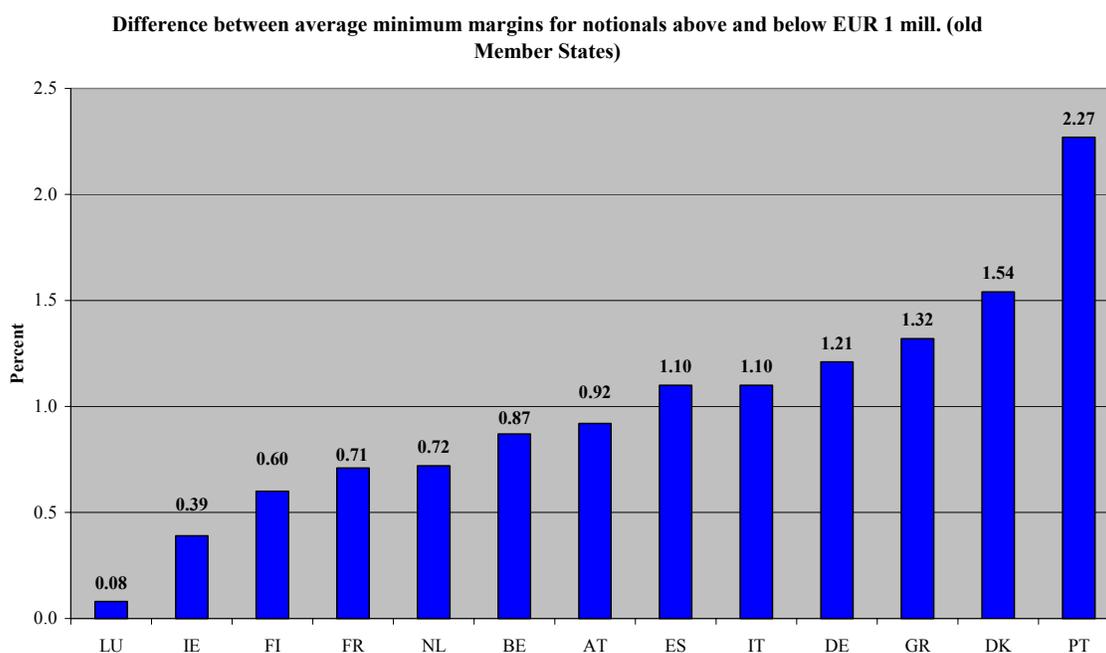

Figure 14-79

14.2.2 Reasons for the difference in margins between loans up to EUR 1 mill. and above

Basically, three reasons should be mentioned that are primarily responsible for the margin differential between loans up to EUR 1 million and loans exceeding this amount. These reasons comprise cost margin, expected loss and competition.

As it became clear through the survey results, the average cost margin decreases with increasing notional. This phenomenon is quite common for bank loans and can be explained through economies of scale in the loan granting process. The height of the cost margin is indicated in percent of the notional amount. However, the costs of granting a loan do not depend on the notional in absolute terms because granting a EUR 1 mill. loan causes roughly the same costs as granting a EUR 10 mill. loan. Therefore, the cost margin's percentage value decreases for higher loan amounts. Thus, the absolute costs of granting a loan are relatively constant over rising notional amounts, leading to lower percentage cost margins for larger loans.

A second factor driving up loan margins for smaller loans is the expected loss, which is an important aspect in loan pricing. Here the assumption is that smaller firms, i.e. SMEs, demand smaller loans than large corporations. Especially the loan segment up to EUR 1 mill. typically includes a very high fraction of creditors from the SME sector. Since default risk is expected to be higher for SMEs on average, the margin for the expected loss is higher as well, thereby leading to a higher overall loan margin.

Competition, the last factor, leading to lower margins for large loans is especially pronounced for this category of loans. Here two types of competition have to be distinguished. Firstly, competition among banks: because large firms searching for funds are more flexible in terms of international fund raising, the market for large notional amounts is more international and competitive. Secondly, as of a certain amount raising funds through corporate bonds is more attractive than to take up a loan because of a more favourable cost structure that becomes operational for large amounts. Thus, competition among banks for the attractive large loans and competition between bank lending and the corporate bond market lead to lower margins for larger notional amounts.

14.2.3 Differentiated approach for the normal case

As alternative to the assumption about the "normal" case under the standard approach provided in chapter 4.1.2.1 *Debtors' creditworthiness* a more precise procedure would be to rely on the above described country groups, which are based on common loan margin profiles. In the following this procedure will be described and entrusted to the reader for consideration.

The four categories as introduced above include the following country groups separated among each other by the following boundaries: (1) Low margin countries, for which the margins range from 0.5% to 0.7%; (2) Medium margin countries, for which the margins range from 0.71% to 1.4%; (3) Medium to high margin countries, for which the margins range from 1.41% to 3%; and (4) High margin countries, with margins exceeding 3%. Based on these margins, each of these four groups can be assigned to an accordant average rating category.

Thus, lending in low margin countries corresponds to the "strong" rating category *on average* under the "normal" case. The medium margin group belongs to the "good" rating category under the "normal" case. Loans in medium to high margin countries are rated "satisfactory" and lending in high margin countries falls into the "weak" category on average under the "normal" case[122]. However, it has to be taken into account that the above classification is based on loans with notional in excess of EUR 1 mill. Therefore, only loans granted in those States providing data for both, loans up to and above EUR 1 mill., can be classified properly into the rating categories. For the remaining States the categorisation has to rely on the undifferentiated data that include loans below EUR 1 mill. and above. These countries include the new Member and the Candidate States as well as Sweden and the UK. Based on the average margins for all notionals, the lending business in the new Member and the Candidate States falls into the rating categories "satisfactory" and "weak". Taking into account the economic gap between the old Member States on one hand, whose lending business is rated from strong to "satisfactory", and the new Members and the Candidate countries on the other hand, this categorisation seems to be reasonable. In the case of the UK, which exhibits a relatively high average margin for all notional amounts and whose average loans should therefore be classified as "satisfactory", it is appropriate to be grouped together with similar countries. Thus, the UK's lending business would be rated as "good" especially considering large loan amounts and an apparently decreasing margin over time (see Figure 14-76). Sweden, whose average margin merits to be grouped under "good", does not require any adjustments. The grouping into margin categories is summarised in table 14-7.

Margin Categories for Normal Case (notional > EUR 1 mill.)			
Rating category	**Margin category**	**Margin ranges in basis points**	**States**
Strong	**Low**	**< 70**	**DK, FR, NL, ES, BE**
Good	**Medium**	**71 - 140**	**AT, FI, IT, SE, UK, LU, DE, HU, SK, PL**
Satisfactory	**Medium/high**	**141 - 300**	**PT, GR, IE, LV,EE, LT**
Weak	**High**	**> 300**	**SI, CY, TR, BG**
Bad			

Table 14-7

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[122] It should be mentioned again that the "normal" case is just a starting point and can be altered according to the particular creditworthiness of the debtor.

Concerning the higher margins for loans up to EUR 1 mill., two approaches might be viable. Firstly, it is proposed to divide again the different countries and build three categories based on similarity. The first group comprises countries for which the difference between margins for loans up to EUR 1 mill. and loans above EUR 1 mill. is negligible. This is the case for Luxembourg and Ireland, where the average margin difference is 0.25%. For these countries a migration into a higher rating category is not advisable because the step to the next higher category would amount to about 0.5% for Luxembourg and about 2% for Ireland (see margin table in chapter 14.1.2.1.4 *Questions about spreads*).

In the second group, the average difference in margins between the two notional classes is about 1%. The majority of the old EU countries falls in this group. Here a migration to the next higher rating category would be reasonable. A move to the next higher category could mean a margin increase of at least 0.5% for all States in this group.

The last group contains States with a very high difference in margins between the two loan amount classes. The average difference lies at 2%. This high difference would demand a migration over two rating categories, which is quite appropriate for Denmark, where the difference is about 1.5%. This corresponds well to a migration from "strong" to "satisfactory". However, for the second member of this group, Portugal, a move from "satisfactory" to "bad" would exaggerate the necessary adjustment because the margin difference of about 2.3% does not fit the transfer from "satisfactory" to "bad", which comprises about 8%. Therefore, for Portugal an exemption is suggested, which would allow a migration into the next higher category leading to a margin increase of about 2.4%.

Since for the new EU Members and the Candidate States as well as for Sweden and the UK the available margins are not differentiated for notional amounts, it is suggested that loans below EUR 1 million are migrated into the next higher category for countries falling into the rating categories "good" and "satisfactory" (none of the new Member and Candidate States fall into "strong"). The high margin countries, which are exclusively new EU and Candidate States, stay in the "weak" category for both loans below EUR 1 mill. and loans exceeding this amount, because their margins are already quite high and it cannot be justified to generally classify all loans up to EUR 1 mill. in these countries as "bad". Furthermore, even though there is no indication of a potential margin difference between the two notional categories for these countries it is very unlikely that this difference would be as large as the difference between the rating categories "weak" and "bad" in terms of margin difference (5.5%). The first approach to categorising countries for loans up to EUR 1 mill. is summarised in table 14-8.

Margin Categories for Normal Case (notional < EUR 1 mill. Alt.1)			
Rating category	**Margin category**	**Margin ranges in basis points**	**States**
Strong	**Low**	**< 70**	
Good	**Medium**	**71 - 140**	**FR, NL, ES, BE, LU**
Satisfactory	**Medium/high**	**141 - 300**	**AT, FI, IT, SE, DE, HU, SK, PL, IE, UK, DK**
Weak	**High**	**> 300**	**SI, CY, TR, BG, PT, GR, LV, EE, LT**
Bad			

Table 14-8

The second approach with respect to the margin difference between the two notional classes is less complicated because it simply puts loans with notional up to EUR 1 mill. into the next higher rating category (table 14-9). Based on the average margin, groups described above this behaviour can be observed for seven of the thirteen countries that provide data for both notional categories. Most States would move from category "strong" to "good" or from "good" to "satisfactory" implying an increase of average margins of about 0.5% and 1%, respectively. Since the majority also exhibits average margin differences between 0.6% and 1.30%, the fit is quite good. Therefore, it would be reasonable to generalise this approach and apply it to all States with the exception of the high margin countries. This procedure is quite close to the alternative introduced above. Only three States, Luxembourg, Ireland and Denmark, are treated differently in the first approach, which is, however, somewhat more accurate.

Margin Categories for Normal Case (notional < EUR 1 mill. Alt.2)			
Rating category	**Margin category**	**Margin ranges in basis points**	**States**
Strong	**Low**	**< 70**	
Good	**Medium**	**71 - 140**	***DK*, FR, NL, ES, BE**
Satisfactory	**Medium/high**	**141 - 300**	**AT, FI, IT, SE, DE, HU, SK, PL, UK, *LU***
Weak	**High**	**> 300**	**SI, CY, TR, BG, PT, GR, LV, EE, LT, *IE***
Bad			

Table 14-9

Since loan markets develop over time, the grouping of national lending businesses according to margin profiles as well as the subsequent classification into rating categories have to be validated in regular intervals of say one year. Such a validation is easy to perform because it simply requires the current MFI- and IBO-rates, which are readily available from most national central banks and the ECB at least for the countries included in the analysis above.

14.3 Reference basis rates

This paragraph discusses the availability of inter-banking offered rates, swap rates and government yields as well as the spread between swap rates and government yields if the latter is taken as a substitute for swap rates. The last subsection summarises some important commands for Bloomberg, which turned out to be useful for the analysis.

14.3.1 Availability of rates

The reference basis rate coincides with the inter-banking offered rate or with the swap rate depending on the maturity and availability of data. If the swap rate is not available, the corresponding government yield is taken instead.

Bloomberg Information System has been utilised in July and August 2004 in order to research for the availability of data for the new Member States and the Candidate States. Unfortunately, the answers to the respective question of the survey regarding the basis rate were not as informative as hoped for. It must be stressed that some information providers, who channel their data through Bloomberg but are not available without prior approval, and other information systems like REUTERS and TELERATE may provide more detailed information than Bloomberg.[123] In other words, the forth following conclusions reflect only the availability of data from the common resources of Bloomberg.

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[123] A few cross-checks through the internet and questioning a trader did not indicate additional resources, which can, however, not be taken for sure. A rigorous investigation has not been conducted, because Bloomberg is supposed to provide such basic information as money market and swap rates as well as government yields if they were available in principle.

The following table provides an overview about the availability of interest rates:

	Inter-banking of-fer rate	Swap rates	Government bonds as list[124]	Government yields as table
New Members				
Cyprus	NO	NO	YES	NO
Czech Republic	PRIBOR	YES	YES	YES
Estonia	TALIBOR	NO	NO	NO
Hungary	BUBOR	YES	YES	YES
Latvia	RIGIBOR	NO	YES	NO
Lithuania	VILIBOR	NO	YES	NO
Malta	YES	NO	YES	YES
Poland	WIBOR	YES	YES	YES
Slovakia	BRIBOR	YES	YES	YES
Slovenia	YES	NO	NO	NO
Candidates				
Bulgaria	SOFIBOR	NO	NO	NO
Croatia	ZIBOR	NO	YES	YES
Romania	BUCBOR	NO	YES	YES
Turkey	TRLIBOR	NO	YES	YES

Table 14-10

Additional to the currencies of the new Member States, the basis rate possibly needs also to be disclosed for the main hard currencies: USD, CHF, and YPN, if aid is granted in these currencies as it is the case for the lending behaviour in these countries. However, the availability of interest rates for these currencies is assured.

It turned out that the money markets are well developed in most countries (Germany and the UK for comparison) in terms of available maturities for borrowing up to and including one year as the following table shows:

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[124] From a list of bonds the yield-to-maturities are not readily available.

Number of Money Market-IBOR or Government T-Bill-Rates from 1 to 12 Months
**Bloomberg Information Services**
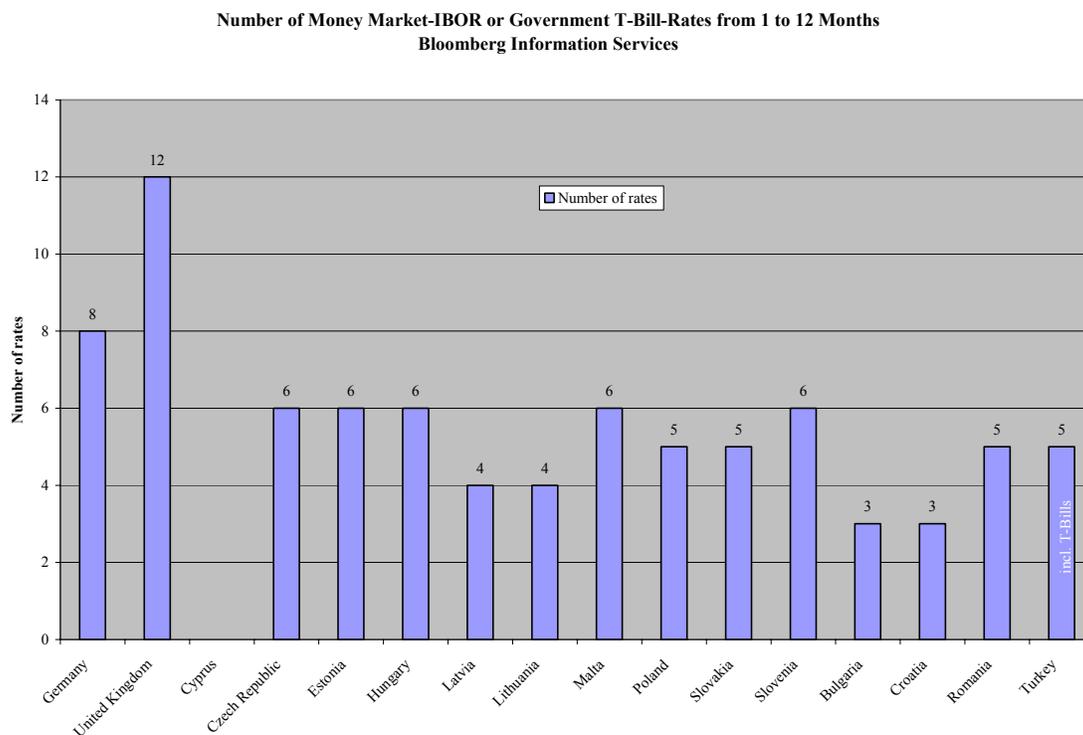
Figure 14-80

The 3-months money market rates are available for all countries except Cyprus and Turkey, for which the 3-months government Treasury bill yield is available instead. The 1-year rates are not available for Bulgaria, Croatia, and Turkey while for the latter two the corresponding T-bill rates can be obtained. Turkey admits high inflation why the inter-banking market is very narrowly concentrated to the very short end of the yield curve. It should be observed that the T-bill rates are in most instances results from auctions, which may take place irregularly and affects the timeliness. For Cyprus a money market could not been identified.

The picture is different for swap markets which are scarcer for the new Member States.[125] In essence, only four new Member States show to have a functioning swap market as the next chart shows:

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[125] It is noteworthy that even the EMU-countries admit their own swap markets each.

**Maximal Maturity and Number of Swap Rates or Government Yields over 1 Year
Bloomberg Information Services**
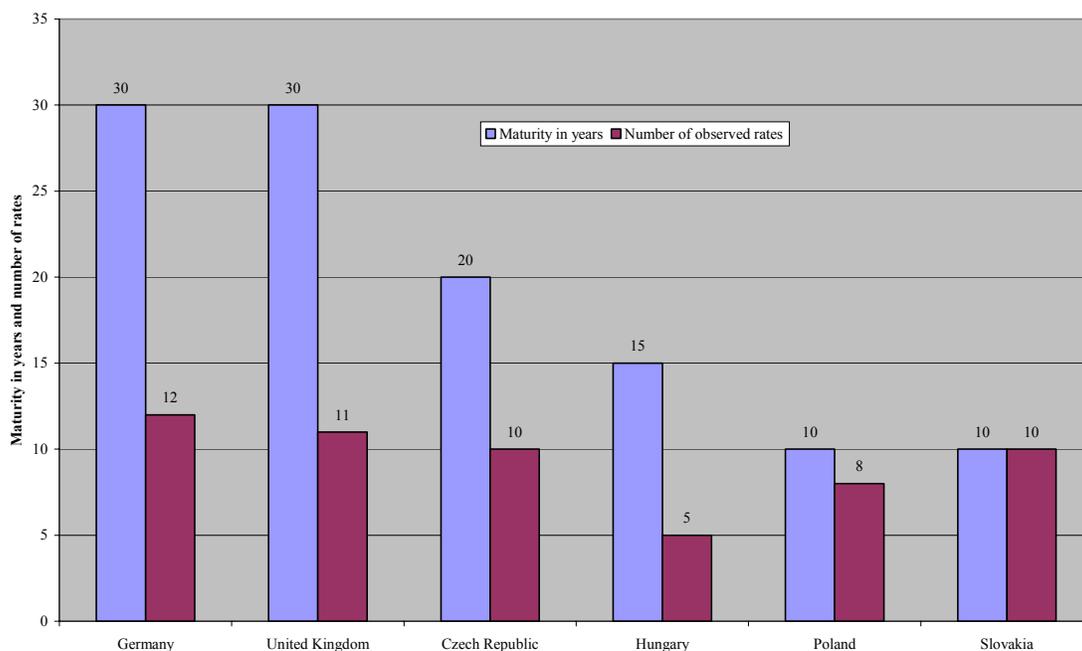
Figure 14-81

Only for Hungary the 10-year swap rate has to be derived by the corresponding government yield while for the other three new Member States the swap rate curve has a long end itself.

Unfortunately, only for these four countries yields-to-maturity for government bonds in local currency were available as tables. Though there exists government bonds in local currency for some other countries (see table above), their yields-to-maturity were not disclosed. The yield needs to be derived by the price, the coupon and the interest conventions of the particular bond if at all the bond is traded in a liquid market. For this calculation attention should be paid to the tax treatment of government bonds since some bonds could be exempted from tax.

Summarising, for the above designated maturities of three months, one year, five years and ten years the rates are not readily observable for all new Member States and for the Candidate States as the following table shows:

	3 months	1 year	5 years	10 years
New Members				
Cyprus	NO	NO	NO	NO
Czech Republic	OK	OK	OK	OK
Estonia	OK	OK	NO	NO
Hungary	OK	OK	OK	GOV
Latvia	OK	OK	NO	NO
Lithuania	OK	OK	NO	NO
Malta	OK	OK	NO	NO
Poland	OK	OK	OK	OK
Slovakia	OK	OK	OK	OK
Slovenia	OK	OK	NO	NO
Candidates				
Bulgaria	OK	NO	NO	NO
Croatia	OK	GOV	NO	NO
Romania	OK	OK	NO	NO
Turkey	GOV	GOV	NO	NO

Table 14-11

The uniform maturities for all countries were proposed in favour of standardisation and practicability. However, for those States listed in the table which do not admit swap or government rates for five and ten years it should be considered either to derive the yield of traded government bonds of the respective maturities or to adduct rates of shorter maturities. The latter is inevitably necessary for countries where short-term lending is predominant, e.g. for Turkey and Bulgaria. For Cyprus the data was not found in Bloomberg. However, the Central Bank of Cyprus remarks on its web pages that regular auctions of T-bills and government bonds take place, which span the required maturities.

14.3.2 Efficient system for collection of data

For the new Member States not all necessary basis rates are readily available as it is the case for the old Member States. It appears most efficient if the EC mandates banks to perform the derivation of all reference basis rates according to a uniform approach. This task could be, for example, performed by (supra-) national central banks or the European Investment Bank as a European Union's institution. These banks exhibit the appropriate knowledge to derive yield curves.

Regarding the old Member States and to a large extent the money market rates of new Member States the required interest rates are readily available from Bloomberg, also for past periods.

The rates can usually be downloaded to Excel, which would be an efficient way to collect the data. These rates may comprise "last", "mid", "bid", "ask", "offer", "closing", "open", "high", "low", etc. quotes. The EC may choose from those rates whichever are available but according to the following priority:

- "Composite" rates, otherwise single quotes,

- "Offer" or "ask" rates, otherwise "mid" and then "bid" rates,

- Either "closing" or "open" rates, otherwise "last" at a specific day time (including "last auction" rates).

As it is pointed out in chapter 14.3.1 *Availability of rates* not all of the required rates are readily available from Bloomberg and supposedly from other information providers as REUTERS and TELERATE. For some currencies and maturities it is even necessary to derive the implied yield-to-maturity for government bonds (e.g. for Cyprus). Regarding these particular challenges it appears necessary to inquire at the national central bank or at a domestic commercial bank to provide the respective rates on a daily basis through electronic mail or channelled through information systems (e.g. pages in REUTERS).[126]

According to the research conducted, by and large the officially disclosed rates of central banks did not turn out to comprise more information than those provided by Bloomberg. Nevertheless, central banks (or national finance agencies to some extent) usually conduct tenders, open market interventions, the management of government debt, and market tendence of government bonds, which necessarily requires the knowledge of the yield curves they are involved in. This knowledge can be utilised for those currencies for which the information is not readily available by information providers. The national central banks are expected to cooperate on this issue as it is an official duty due to the Union's common law.

14.3.3 Spread between basis rates and government yields

The spread between basis rates (IBOR and swap rates) and government yields is by far not uniform across countries and over time. While there seems to be some stability for western Member States, the picture is quite different for the few eastern Member States. The markets of the Czech Republic, Hungary, and Poland and of Germany and the UK have been analysed since for these new Members the data was quite complete and for these old Members the markets are very established and liquid.

---

[126] It is a common procedure for the EC to request quotes from market participants, e.g. prices of ship fares for the purpose of determining custom duties.

Apart from specific risk considerations[127] the instability of spreads may arise through the different timing of measurement of yields. The yields of Government T-bills and bonds are derived from auctions and market prices while quotes of money market rates and swap rates arise from average announcements of major market participant or from actual trades both not necessarily occurring at the same time.

Moreover, money market rates usually admit the day counting convention "act/360" in contrast to bonds for which "30/360" is more common. This leads to an adjustment of the money market rate for one year of approximately "365/360" (or plus 1.4%) in order to compare it to the one year yield. To compare money market rates for maturities less than one year to annualised yields also the payment frequency, i.e. the compounding of intermediate interest payments, needs to be taken into account. These adjustments were not specifically addressed because the EC may also rely on readily available data without further adjusting them.

The following analysis is based on closing prices of the respective transactions. The next chart shows the spreads for money market and swap maturities for the respective countries.

spread averages across maturities

	3M	1y	5y	10y
UK	0.10	0.35	0.30	0.28
DE	0.10	0.10	0.17	0.13
CZ	-0.06	0.08	0.15	-0.02
PL	0.20	0.02	-0.06	-0.07
HU	0.26	0.15	-0.15	-0.03

maturity

spread = (offered rates ./. govt. rates)
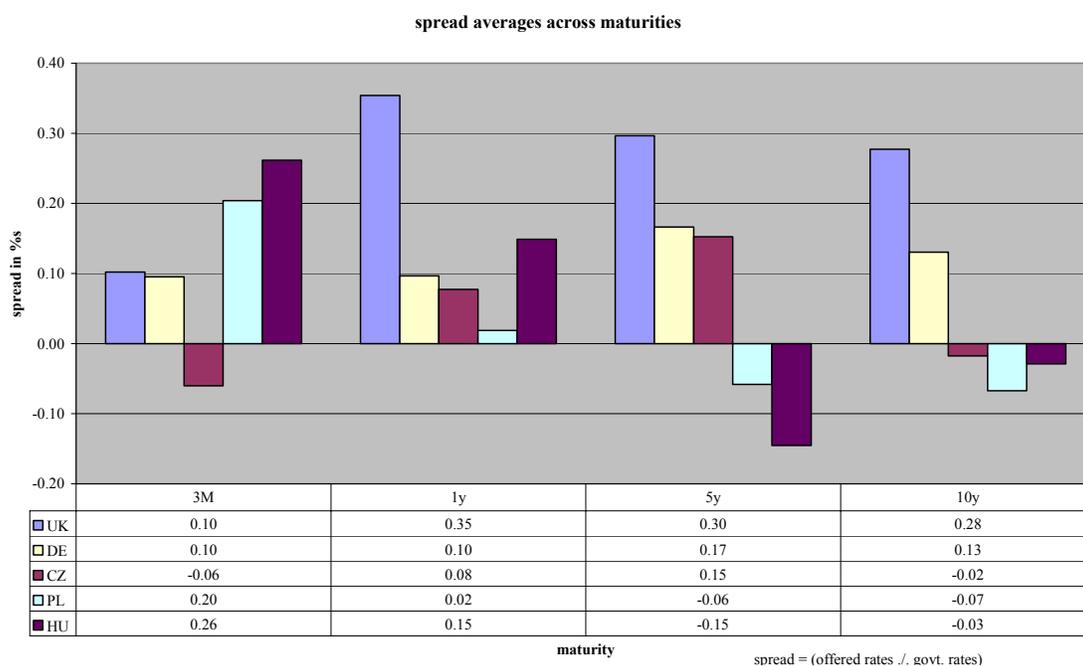
Figure 14-82

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[127] Every State admits its own specific creditworthiness and market peculiarities. For instance, following the German auction of UMTS-licences the spread between government yields and swap rates widened considerably since it was thought that Germany shortened the supply of fresh debt.

For Germany and the UK the picture is more stable. However, for the new Member States the spread is volatile over maturities and time and can even become negative.[128] The forth following charts show the development of spreads between government debt and the basis rates. The bold black line represents the moving average (option of MS Excel-charts). For Germany, the UK and the Czech Republic a screen shot of the Bloomberg pages for the swap rates is provided, which also contains the spread of swaps over government yields (see red arrow).

A clear cut answer to the appropriateness of a unique add-on for government yields in order to derive a surrogate for swap rates does not exist. The convergence of markets between old and new Member States is not a reliable argument since the spread should be applicable to markets *which have not been converged yet* in terms of States' creditworthiness, liquidity and coverage of maturities. Hence, the spread of the less developed markets of the new Member States should have more weight. Moreover, money markets are less decisive since the coverage is quite good in comparison to longer maturities.

A spread of 15 basis points can be observed for the Czech Republic and a maturity of five years and otherwise negative spreads appear for the new Member States and maturities of five and ten years. The current development of spreads does not indicate an obvious trend either. Only for Hungary the ten years spread became positive at the beginning of 2004 but not significantly.

Taking the above line of reasoning into account, the following conclusion is admittedly based more on a guess than on a proper estimation as the data does not draw a consistent picture. It is recommended to adjust government rates of T-bills to maturities of the money market by +15 basis points and not to adjust government yields of bonds to the maturities of five and ten years.

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[128] The reason might be that the risk exposure of government bonds is much larger than that of swaps regarding credit risk. This would mean for the new Member States that government yields could exceed swap rates as their credit standing is less advanced. Moreover, bonds bind more liquidity than swaps which is also costly to generate.

Results for Germany

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<HELP> for explanation, <MENU> for similar functions.      N185 Govt    IRSB
Cancel: Screen not saved
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282 - Save a copy to your NW list

Sheet P1 — Swap Rates (GERMANY)

Ticker	TIME	Bid	Ask	Change	Open	High	Low	Prev Cls
1 YR	10:43	2.3810	2.3930	—	2.4110	2.4110	2.3780	2.3870
2 YR	10:43	2.8040	2.8180	-.0005	2.8055	2.8175	2.8050	2.8115
3 YR	10:43	3.1500	3.1680	+.0020	3.1580	3.1750	3.1560	3.1570
4 YR	10:43	3.4350	3.4490	+.0005	3.4375	3.4553	3.4360	3.4400
5 YR	10:43	3.6600	3.6770	-.0040	3.6640	3.6775	3.6640	3.6725
6 YR	10:43	3.8490	3.8670	-.0045	3.8580	3.8690	3.8550	3.8625
7 YR	10:43	4.0130	4.0310	-.0005	4.0165	4.0315	4.0165	4.0230
8 YR	10:43	4.1500	4.1650	-.0015	4.1570	4.1683	4.1540	4.1590
9 YR	10:43	4.2650	4.2830	+.0005	4.2710	4.2825	4.2668	4.2730
10 YR	10:43	4.3590	4.3780	+.0010	4.3615	4.3773	4.3615	4.3675
12 YR	10:43	4.5130	4.5330	+.0015	4.5200	4.5308	4.5170	4.5215
15 YR	10:43	4.6820	4.6970	+.0010	4.6870	4.6980	4.6830	4.6885
20 YR	10:43	4.8510	4.8710	+.0070	4.8590	4.8698	4.8530	4.8540
30 YR	10:43	4.9540	4.9740	+.0010	4.9610	4.9685	4.9560	4.9630

Sheet P2 — Swap Spreads

Ticker	TIME	Bid	Ask	Change	Open	High	Low	Prev Cls
1 YR	7/15	11.20	17.90		13.90	13.90	10.60	11.2000
2 YR	7/15	15.5000	19.5000		14.2000	16.1000	14.2000	15.5000
3 YR	7/15	9.2000	12.3000		8.2000	9.8000	8.2000	9.2000
4 YR	7/15	19.2000	22.0000		18.4000	20.1000	18.1000	19.2000
5 YR	7/15	17.5000	19.9000		16.3000	17.8000	15.9000	17.5000
6 YR	7/15	11.9000	14.2000		11.3000	12.4000	11.0500	11.9000
7 YR	7/15	10.5000	13.0000		10.0000	11.0000	9.8000	10.5000
8 YR	7/15	9.6000	12.0000		8.8000	10.0000	8.8000	9.6000
9 YR	7/15	8.8000	11.1000		8.2000	9.2000	8.1000	8.8000
10 YR	7/15	10.2000	12.4000		9.5000	10.9000	9.5000	10.2000
15 YR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	N.A.
30 YR	7/15	6.5000	8.4000		5.7000	7.1000	5.7000	6.5000

For Germany G

For DEM Swap Curve, Type: {IYC1 I54 <Go>}

For DEM Swap Cr

```
Australia 61 2 9777 8600      Brazil 5511 3048 4500      Europe 44 20 7330 7500      Germany 49 69 920410
Hong Kong 852 2977 6000 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2004 Bloomberg L.P.
                                                                                      G705-213-0 16-Jul-04 10:43:51
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Figure 14-83

EURIBOR ./. BUBL, GER, 3M

Figure 14-84

**Swap ./. Govt, GER, 1y**

Figure 14-85

Swap ./. Govt, GER, 5y


Figure 14-86

Swap ./. Govt, GER, 10y

Figure 14-87

Results for the UK

<HELP> for explanation, <MENU> for similar functions.   N185 Govt   IRSB

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GBP Swap Rates

Ticker	TIME	Bid	Ask	Change	Open	High	Low	Prev Cls
2) 1 YR	15:31	5.1600	5.1740	-.0560	5.2350	5.2370	5.1625	5.2230
3) 18 MO	15:34	5.1900	5.2225	-.0638	5.3250	5.3250	5.2075	5.2725
4) 2 YR	15:34	5.2740	5.2800	-.0630	5.3450	5.3625	5.2770	5.3400
5) 3 YR	15:34	5.3490	5.3600	-.0605	5.4200	5.4375	5.3530	5.4150
6) 4 YR	15:34	5.3960	5.4000	-.0520	5.4625	5.4800	5.3975	5.4600
7) 5 YR	15:34	5.4200	5.4300	-.0575	5.4825	5.5125	5.4187	5.4825
8) 6 YR	15:34	5.4262	5.4400	-.0519	5.4850	5.5002	5.4250	5.4850
9) 7 YR	15:33	5.4262	5.4400	-.0469	5.4825	5.5125	5.4150	5.4800
10) 8 YR	15:33	5.4212	5.4300	-.0456	5.4775	5.5075	5.4256	5.4713
11) 9 YR	15:34	5.4140	5.4200	-.0525	5.4700	5.4975	5.4165	5.4700
12) 10 YR	15:30	5.4063	5.4100	-.0519	5.4600	5.4900	5.4070	5.4600
13) 12 YR	15:34	5.3800	5.3900	-.0505	5.4350	5.4650	5.3775	5.4350
14) 15 YR	15:34	5.3390	5.3500	-.0360	5.3875	5.4150	5.3300	5.3800
15) 20 YR	15:34	5.2630	5.2700	-.0335	5.3075	5.3412	5.2500	5.3000
16) 25 YR	15:34	5.1825	5.1950	-.0287	5.2225	5.2613	4.9938	5.2175
17) 30 YR	15:34	5.1080	5.1200	-.0310	5.1450	5.1800	5.0900	5.1450

GBP Swap Spread

Ticker	TIME	Bid	Ask	Change	Open	High	Low	Prev Cls
19) 1 YR	15:33	40.90	46.60	+1.90	40.30	42.40	38.40	39.0000
20) 2 YR	15:31	35.03	39.50	+.83	35.30	37.30	33.05	34.2000
21) 3 YR	15:33	35.50	39.05	+.10	36.10	37.33	34.30	35.4000
22) 4 YR	15:33	39.40	42.70	+1.20	39.30	40.80	38.30	38.2000
23) 5 YR	15:34	37.25	42.25	-1.50	38.75	44.75	37.25	41.2500
24) 6 YR	15:30	39.22	40.60	+.52	38.70	40.60	35.90	38.7000
25) 7 YR	15:32	37.53	39.80	+1.62	35.65	39.40	32.53	35.9012
26) 8 YR	15:31	36.88	38.50	+1.28	36.00	37.50	34.00	35.6000
27) 9 YR	15:31	36.80	38.00	+1.40	36.00	38.30	35.80	35.4000
28) 10 YR	15:34	36.22	38.30	+2.32	35.50	37.30	33.90	33.9000
29) 15 YR	15:34	32.30	34.80	+4.75	31.20	32.80	29.80	27.5500
30) 20 YR	15:34	38.70	40.30	+3.50	37.70	38.90	35.40	35.2000
31) 30 YR	15:34	33.40	35.50	+6.80	32.00	33.50	29.70	26.6000

For UK Govt Yield Curve, Click on any Tickers above & Select: IYC1 I22

For GBP Swap Curve, Click on any Tickers above & Select: IYC1 I55

Australia 61 2 9777 8600   Brazil 5511 3048 4500   Europe 44 20 7330 7500   Germany 49 69 920410
Hong Kong 852 2977 6000 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2004 Bloomberg L.P.
G705-213-0 16-Jul-04 15:34:59

Figure 14-88

**LIBOR ./. T Bills, UK, 3M**
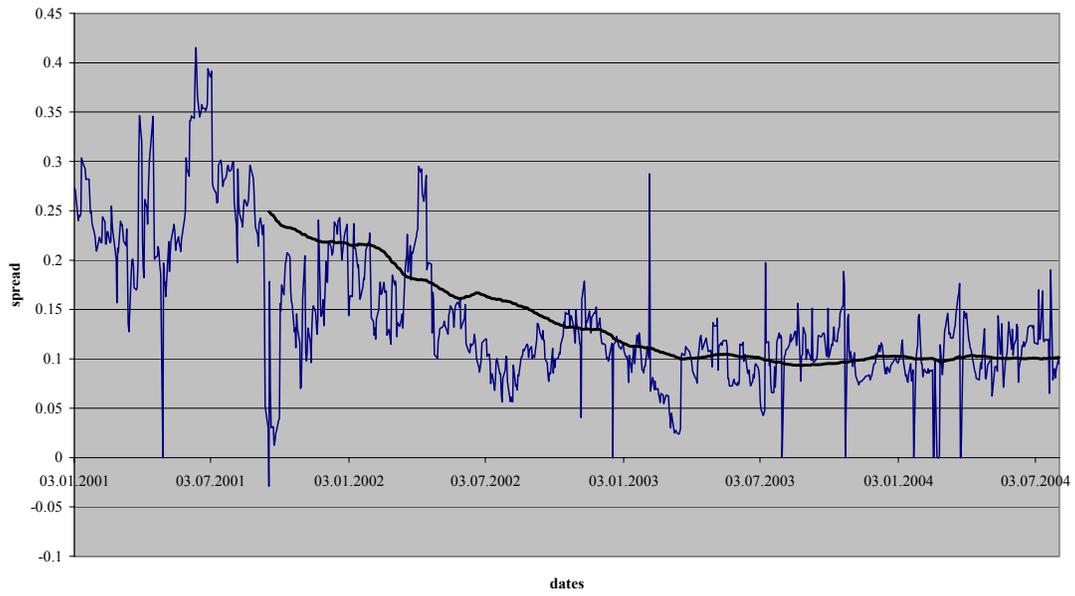
Figure 14-89

**Swap ./. Govt, UK, 1y**
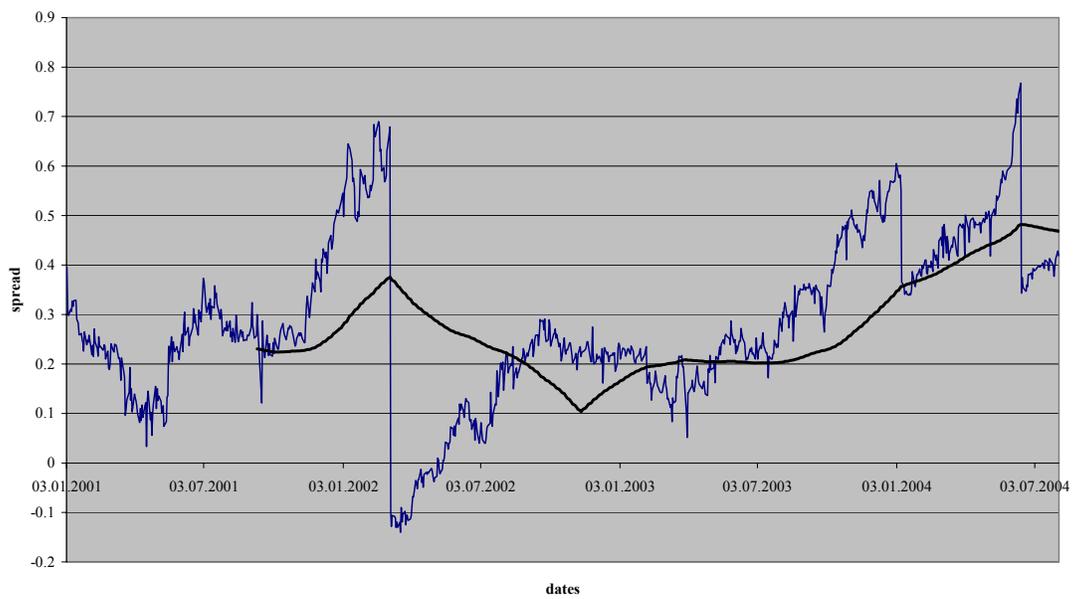
Figure 14-90

Swap ./. Govt, UK, 5y
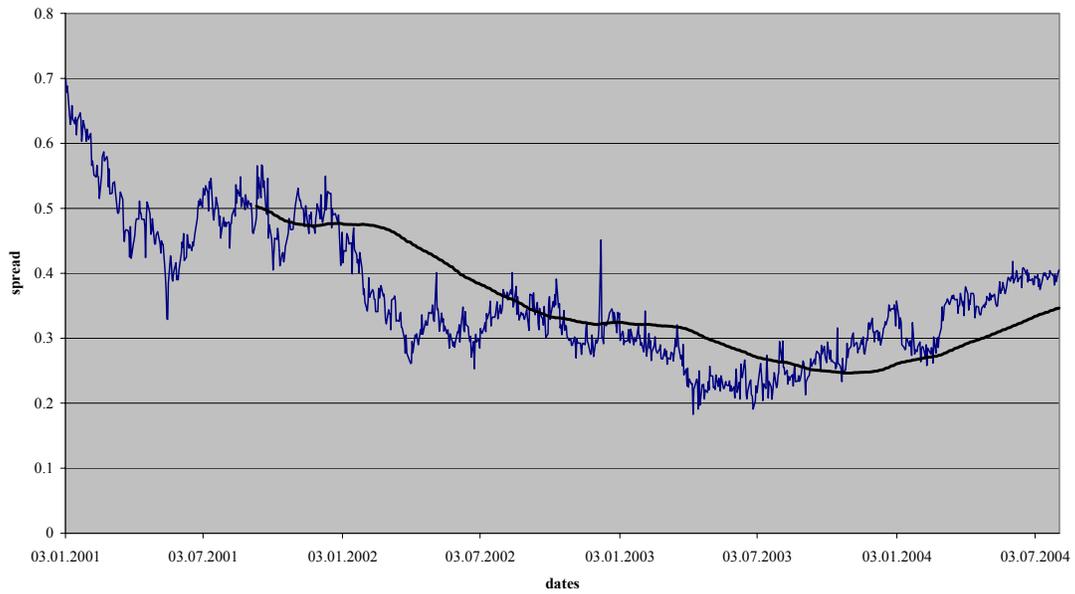
Figure 14-91

Swap ./. Govt, UK, 10y

Figure 14-92

## Results for the Czech Republic
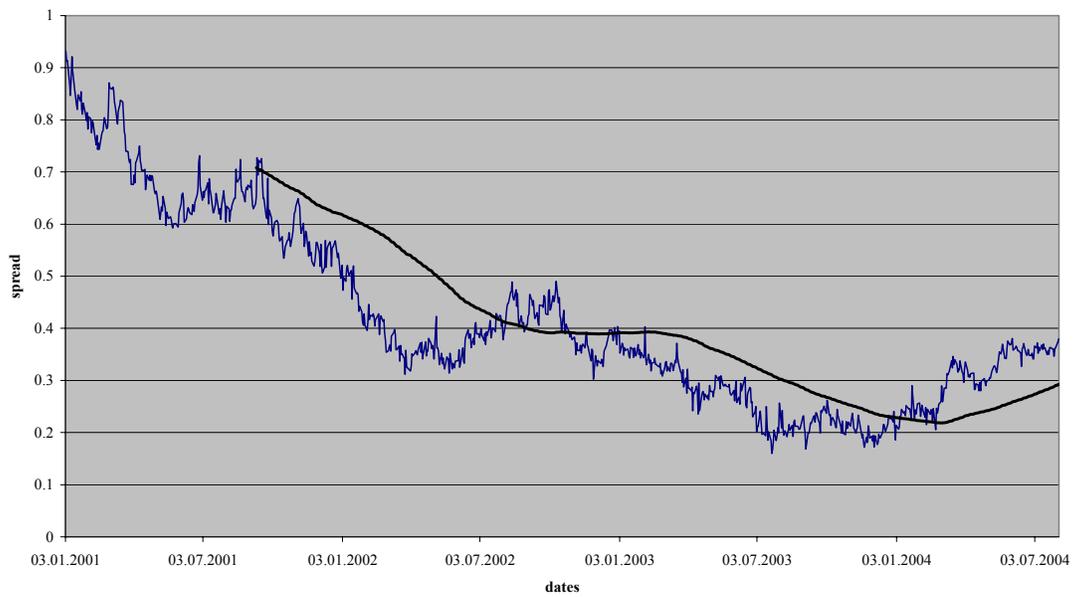
Figure 14-93

**PRARIBOR ./. Govs Sec, CZ, 3M**
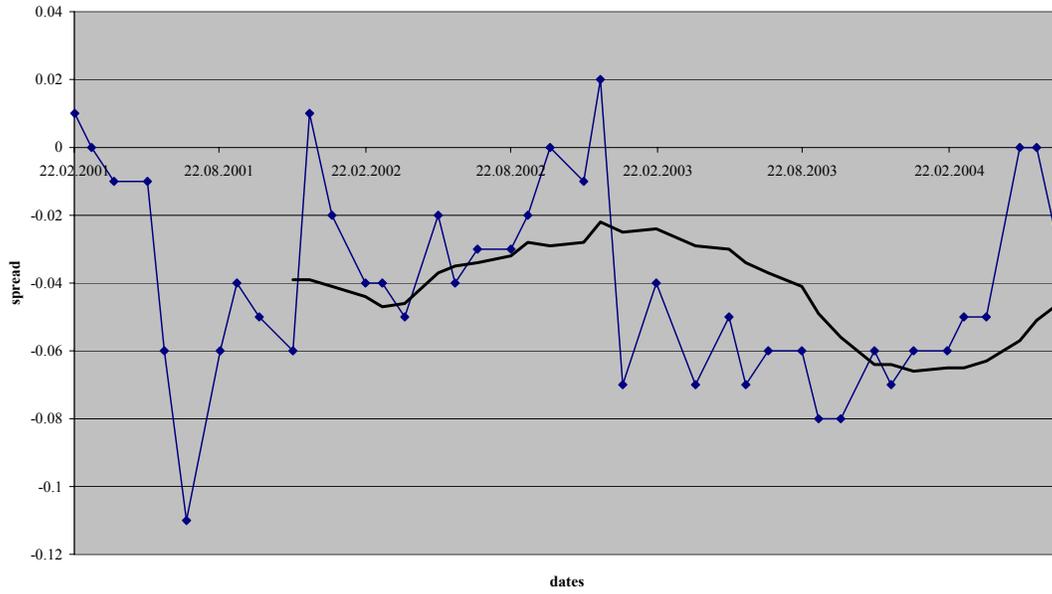
Figure 14-94

Swap ./. Govt, CZ, 1y
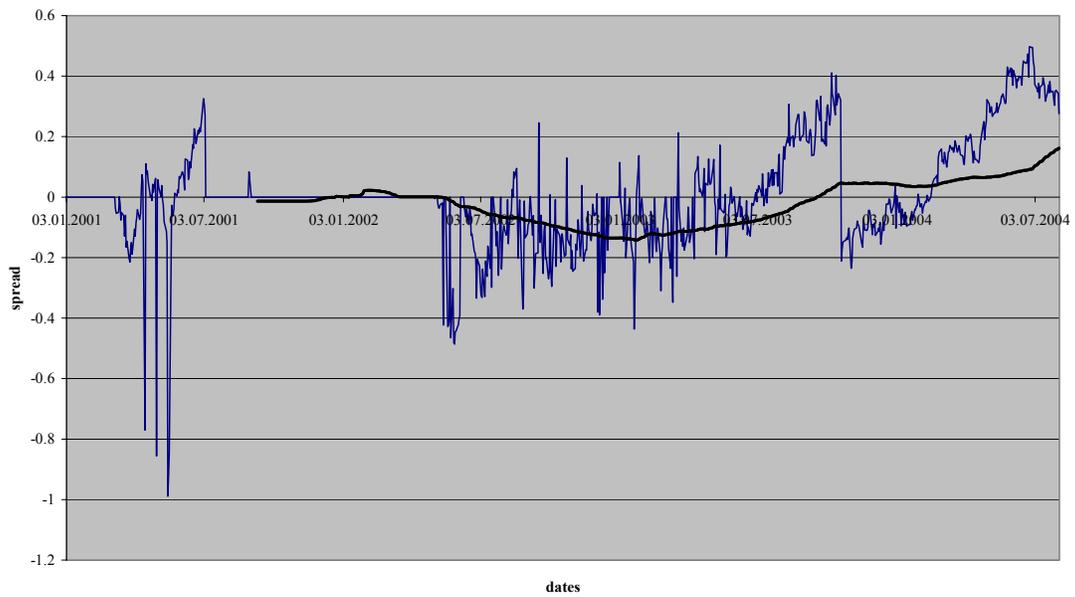
Figure 14-95

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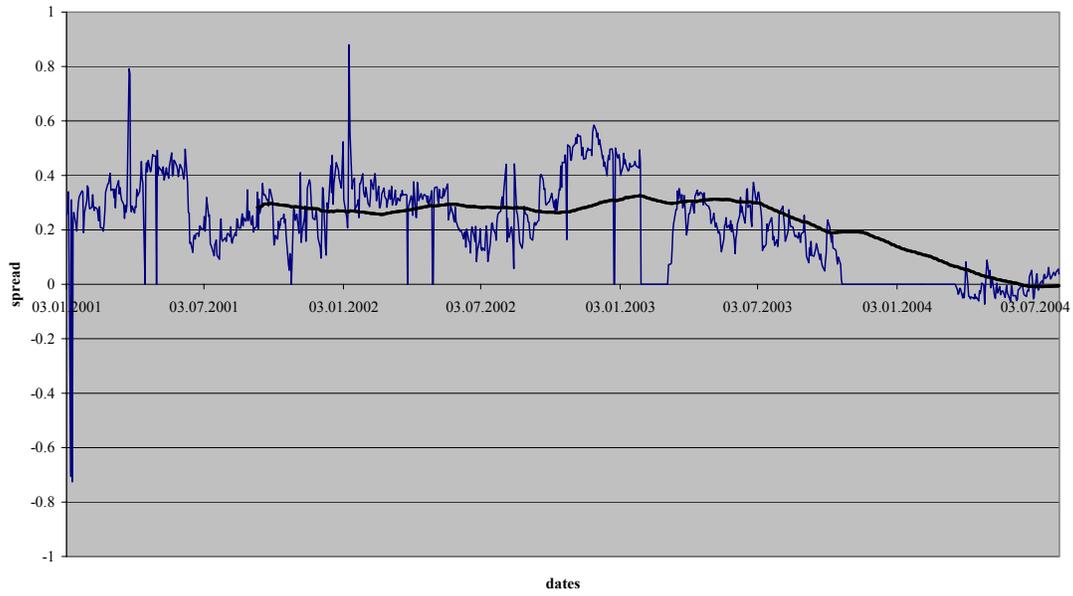
Figure 14-96

Swap ./. Govt, CZ, 10y
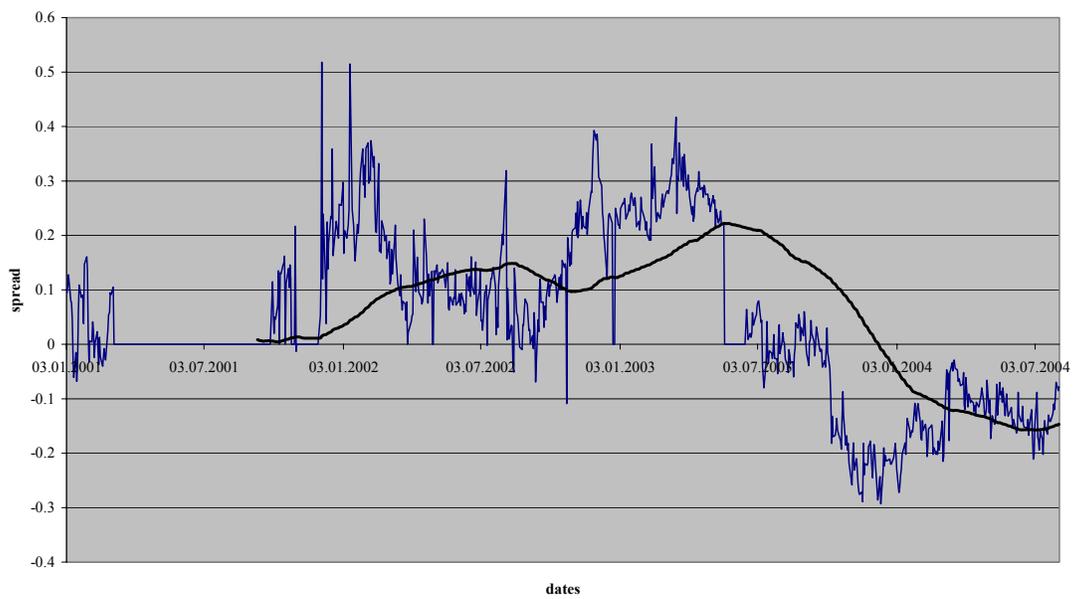
Figure 14-97

Results for Poland

WIBOR ./. Govs Sec, POL, 3M
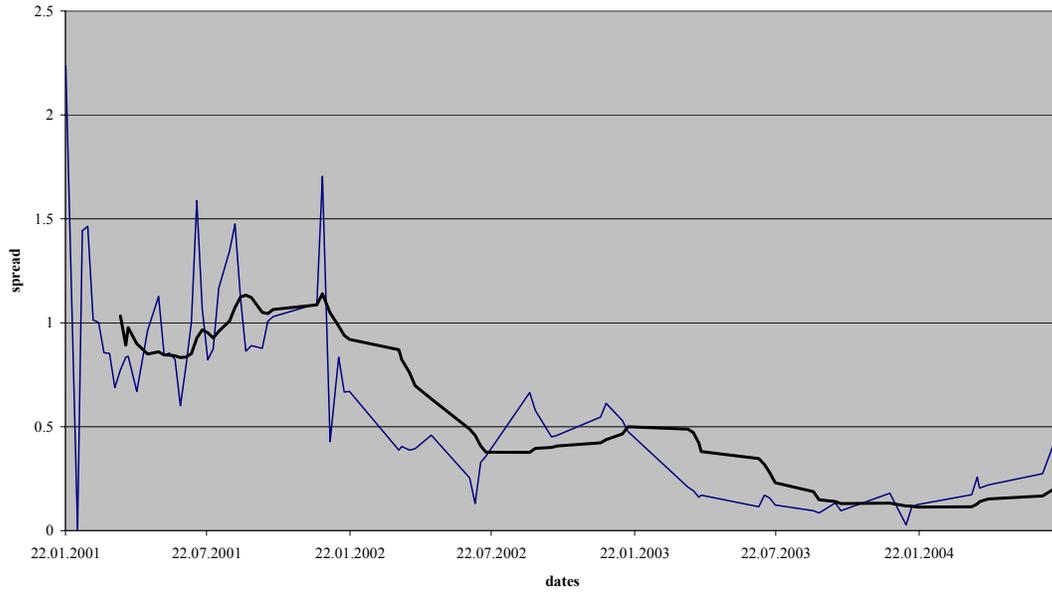
Figure 14-98

WIBOR ./. Govs Sec, POL, 12M
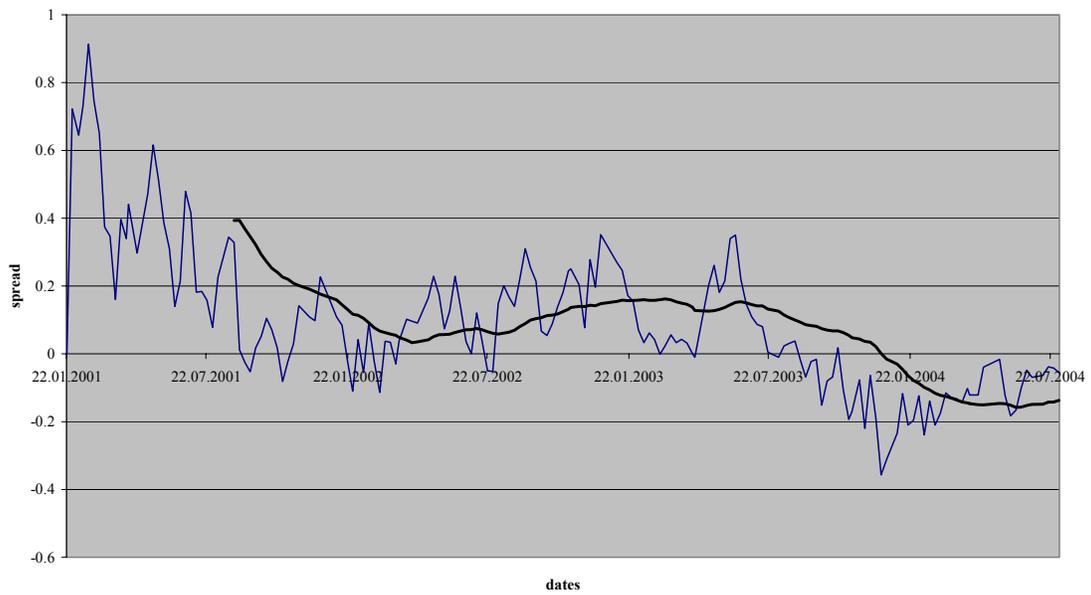
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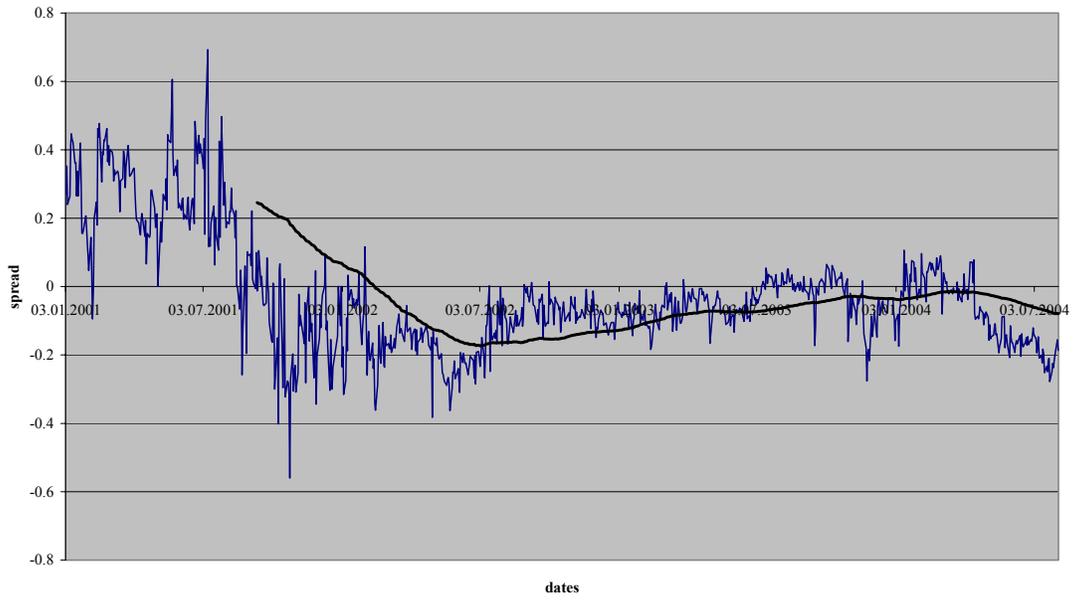
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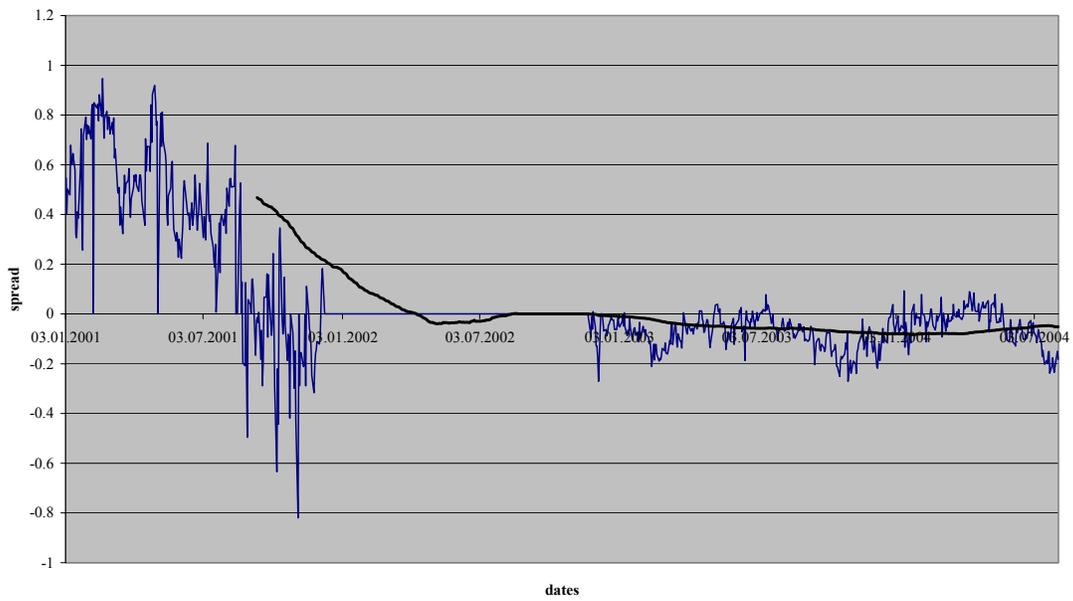
Figure 14-101

Results for Hungary

BUBOR ./. Govs Sec, HU, 3M
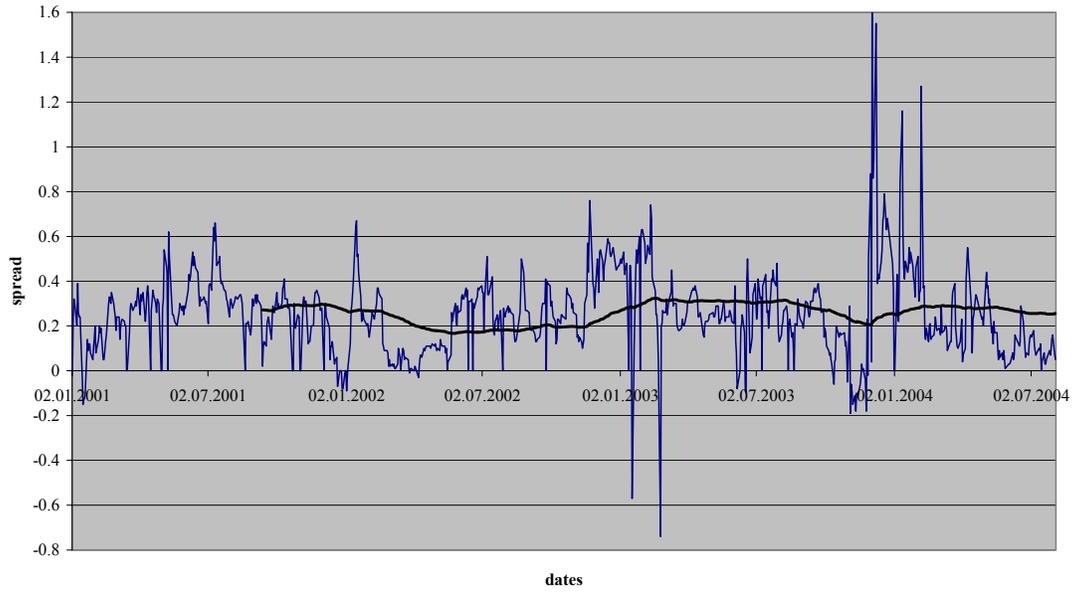
Figure 14-102

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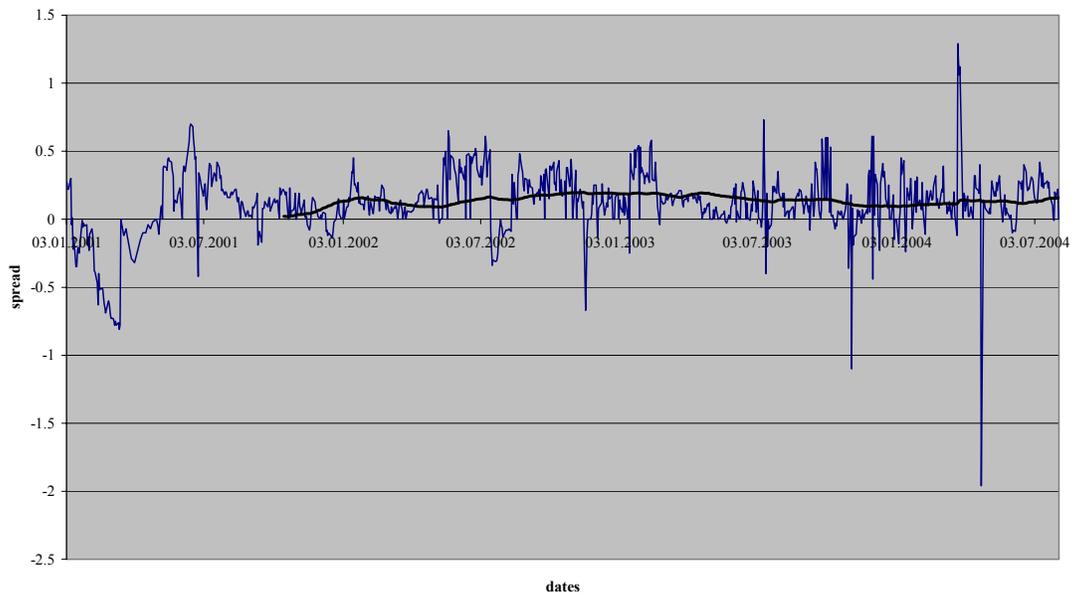
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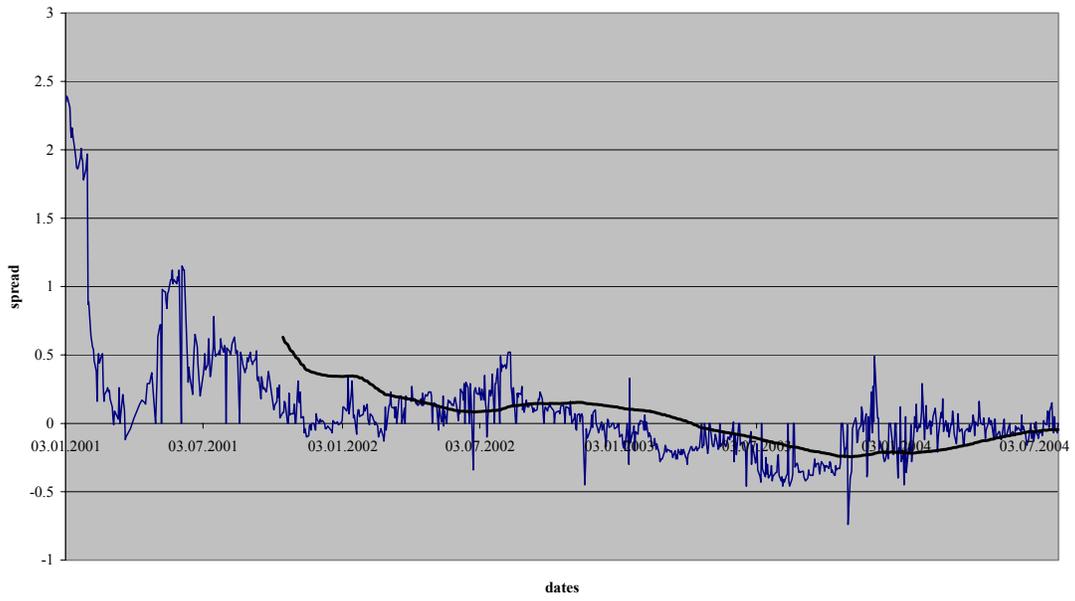
Figure 14-104

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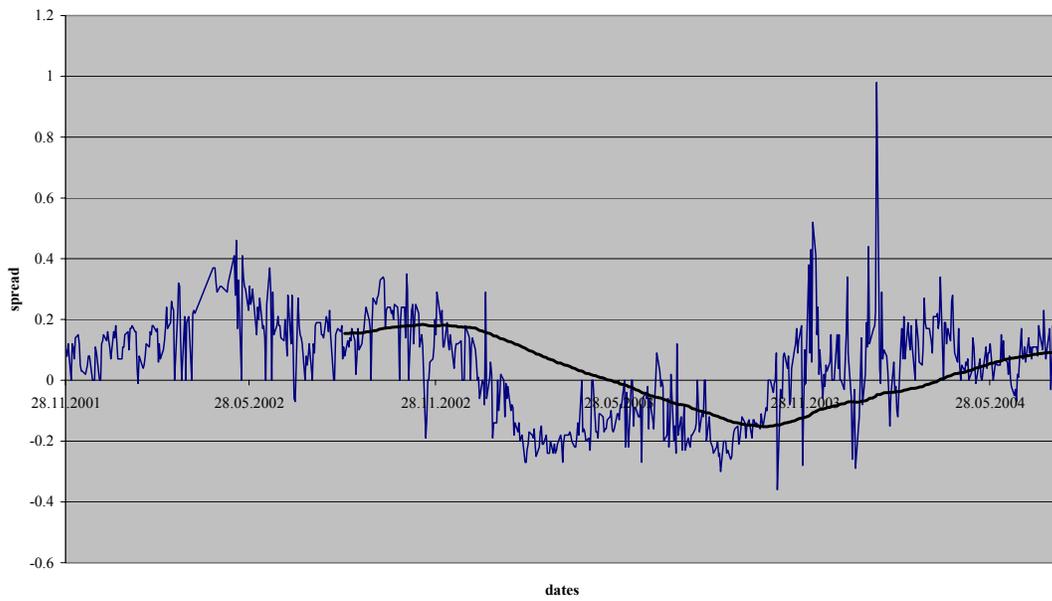
Figure 14-105

14.3.4   Adjustments for long-enduring aid schemes

States may wish to apply the reference basis rate over a longer time horizon than just the period for which it is published (e.g. for loan schemes). During that horizon the reference rate may vary so much that the conditions, according to which the aid scheme has originally been granted, are no longer suitable. For example, a loan scheme permits the granting of loans at 4% for the coming year. If the reference rate changes from 4% to 6% within nine months, the loans under the scheme will be still granted at 4%, which increases the aid elements by 2%-points. The scheme might not be permissible for the remaining three months if it would be re-assessed at that time.

To soothe this uncertainty the Commission may require considering the possible movements of the future reference rate in a *conservative way*. Hence, the reference basis rate for loans had to be increased and the reference basis rate for discounting would need to be decreased by an appropriate buffer. For example, if the conditions of a guarantee scheme are valid for one year, the state has to take into account possible changes of the then valid reference basis rate for the 3 quarters following the actual disclosure period (current quarter). An appropriate discount rate would be 13.4% lower than the actual value (example: 5.8% instead of 6.7% for the 1-year discount rate). In more detail, the derivation of the adjustments is discussed in the following section.

Volatility of basis rates

The volatility of the basis rate is important for two reasons. The more volatile the reference rate is the more frequent the reference basis rate needs to be adjusted in order to reflect market circumstances. Accordingly, with regard to aid schemes, which persist for a longer time even beyond the regular adjustments of the reference rate, the validity of the underlying assumptions about the reference rate is questionable. The latter problem can be addressed either by adjusting the underlying reference rate and by testing the permissibility of aid more frequently or by taking into account a conservative scenario how interest rates may develop over the nearer future. The first measure is a question of procedures set up by the Member State or the Commission. The second measure needs to specify the scenarios more precisely.

The following chart shows the standard deviations of interest rates of the relevant maturities for the UK, Germany, the Czech Republic, Poland, and Hungary:

Standard Deviation of Interest Rates
Relative Changes per Trading Day

	3m	1y	5y	10y
UK	0.46%	1.04%	1.12%	0.99%
DE	0.44%	1.42%	1.66%	1.14%
CZ	1.10%	1.33%	1.32%	1.00%
PL	0.67%	0.87%	1.24%	1.13%
HU	2.80%	2.87%	1.52%	1.41%

Maturities
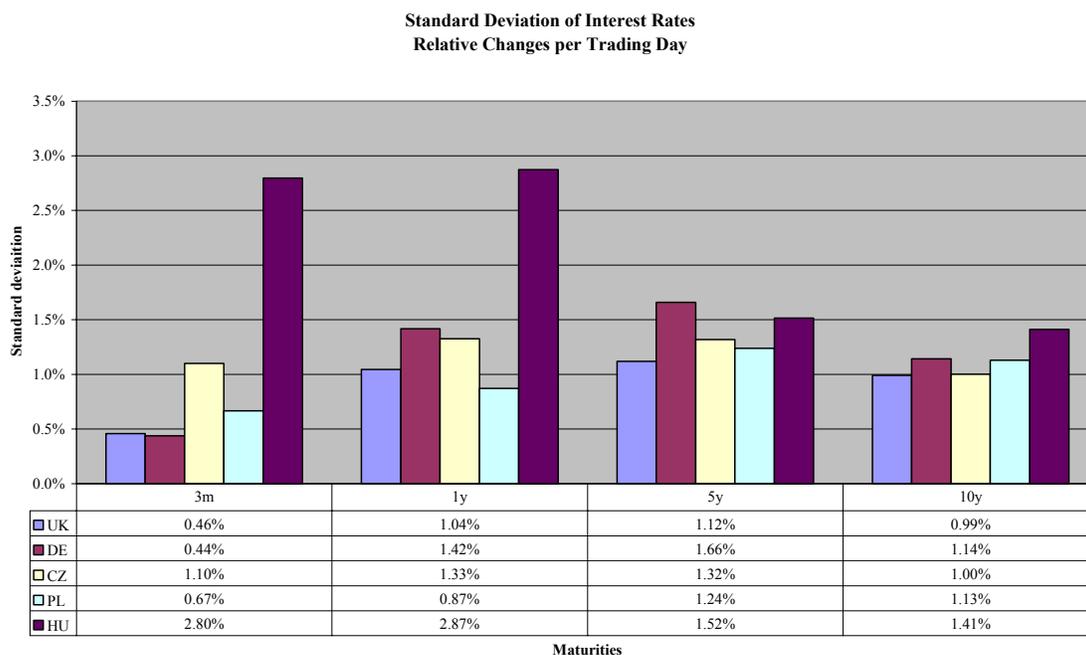
Figure 14-106

The standard deviation is a very common measure of risk. For example, for a normally distributed random variable about 68% of the realisations can be expected to occur within the boundary of one standard deviation around the mean. The one-sided interval (realisations more extreme than one standard deviation below the mean) comprises a likelihood of already 84%. In Finance it is also a common assumption (also underlying some supervisory rules) that the standard deviation increases with the square root of time.

It is therefore recommended to consider scenarios of interest rates based on one standard deviation in the amount of 1% for the daily relative changes of interest rates if the reference rate of the aid scheme is not adjusted according to the updating frequency of the reference rate. The standard deviation is scaled by the square root of time measured in days (240 trading days per year, 60 per quarter, 20 per month, five per week) for all periods beyond the regular adjustment period of the reference rate. In the scenarios, the interest rates for loans need to be increased while the discount rates need to be decreased.

The following table is an example for the three consecutive quarters of a year following the first adjustment:

	1 Jan to 31 Mar	1 Apr to 30 Jun	1 Jul to 30 Sep	1 Oct to 31 Dec
Days beyond adjustment period	0	60	120	180
Square root-multiple	0	7.7	11.0	13.4
Adjustment (Multiple × 1%)	**0%**	**7.7%**	**11.0%**	**13.4%**
Reference basis rate for loans (start rate plus adjustment)	**5%**	**5.39%**	**5.55%**	**5.67%**
Reference basis rate for discounting (start rate less adjustment)	**5%**	**4.61%**	**4.45%**	**4.33%**

Table 14-12

Hence, if a State does not adjust the reference rate of a loan scheme for one year though the EC publishes new reference rates every quarter, the State would be obliged to demand at least 5.55% plus the margin for loans granted in the second quarter following the publication of the reference basis rate.

Annexes

15 Important Commands in Bloomberg

In this paragraph it is briefly outlined how to find the following rates in Bloomberg:

- Overview about national fixed income markets,

- Swap rates,

- Government rates (yield curves in euro, bonds in local currency),

- Money markets (EURIBOR, LIBOR, and local fixings),

- Historic rates,

- Credit spreads of corporate bonds.

15.1 Overview pages

By typing "BTMM" and choosing a country under the option "change country", a handy overview of interest rates is available (example: Hungary). The interesting rates are marked by a red ellipse.

Figure 15-1

219

15.2 Swap rates

Type IRSB <go>. As a result, one finds a list of countries where the interest rate swap rate is available. Simply click on the flag of the respective country to find the overview of swap rates. Below, the example of Germany is displayed. On the right hand-side, the swap spreads to the government yield curve are shown. Note that swap rates below 1 year are not available. EURIBOR rates must be used in this case.

Ticker	TIME	Bid	Ask	Change	Open	High	Low	Prev Cls
GERMANY								
Swap Rates								
1 YR	10:43	2.3810	2.3930	—	2.4110	2.4110	2.3780	2.3870
2 YR	10:43	2.8040	2.8180	-.0005	2.8055	2.8175	2.8050	2.8115
3 YR	10:43	3.1500	3.1680	+.0020	3.1580	3.1750	3.1560	3.1570
4 YR	10:43	3.4350	3.4490	+.0005	3.4375	3.4553	3.4360	3.4400
5 YR	10:43	3.6600	3.6770	-.0040	3.6640	3.6775	3.6640	3.6725
6 YR	10:43	3.8490	3.8670	-.0045	3.8580	3.8690	3.8550	3.8625
7 YR	10:43	4.0130	4.0310	-.0005	4.0165	4.0315	4.0165	4.0230
8 YR	10:43	4.1500	4.1650	-.0015	4.1570	4.1683	4.1540	4.1590
9 YR	10:43	4.2650	4.2830	+.0005	4.2710	4.2825	4.2668	4.2730
10 YR	10:43	4.3590	4.3780	+.0010	4.3615	4.3773	4.3615	4.3675
12 YR	10:43	4.5130	4.5330	+.0015	4.5200	4.5308	4.5170	4.5215
15 YR	10:43	4.6820	4.6970	+.0010	4.6870	4.6980	4.6830	4.6885
20 YR	10:43	4.8510	4.8710	+.0070	4.8590	4.8698	4.8530	4.8540
30 YR	10:43	4.9540	4.9740	+.0010	4.9610	4.9685	4.9560	4.9630

Ticker	TIME	Bid	Ask	Change	Open	High	Low	Prev Cls
Swap Spreads								
1 YR	7/15	11.20	17.90		13.90	13.90	10.60	11.2000
2 YR	7/15	15.5000	19.5000		14.2000	16.1000	14.2000	15.5000
3 YR	7/15	9.2000	12.3000		8.2000	9.8000	8.2000	9.2000
4 YR	7/15	19.2000	22.0000		18.4000	20.1000	18.1000	19.2000
5 YR	7/15	17.5000	19.9000		16.3000	17.8000	15.9000	17.5000
6 YR	7/15	11.9000	14.2000		11.3000	12.4000	11.0500	11.9000
7 YR	7/15	10.5000	13.0000		10.0000	11.0000	9.8000	10.5000
8 YR	7/15	9.6000	12.0000		8.8000	10.0000	8.8000	9.6000
9 YR	7/15	8.8000	11.1000		8.2000	9.2000	8.1000	8.8000
10 YR	7/15	10.2000	12.4000		9.5000	10.9000	9.5000	10.2000
15 YR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	N.A.
30 YR	7/15	6.5000	8.4000		5.7000	7.1000	5.7000	6.5000
For Germany G								
For DEM Swap Cirve, Type: {IYC1 I54 <Go>}								
For DEM Swap Ci								

Figure 15-2

15.3   Government rates

15.3.1   Government yield curves

Type "IYC1" <go>. One finds a list of countries where the single yield curve is available. A click on the flag of the country turns to the respective yield curve. Below find the overview for Germany as an example:

```
            SINGLE  YIELD  CURVE
               Curves for GERMANY                    Page   1 / 1
  1) EUR German Sovereign       I16
  2) Germany Swap               I54
  3) Schuldscheindarlehen       I58
  4) Pfandbriefe                I59
  5) Global Deutschemark        I103
  6) DT Rentenindex (Rex)       I97
  7) EUR German Government Str   I157
  8) Intraday PFBR Rates        I164
```

Figure 15-3

The command "1) EUR German Sovereign" produces 2 pages:

- Page 1) Yield Curve – German Government (curve)

- Page 2) Yield Curve – German Government (table)

Figure 15-4

Figure 15-5

15.3.2 Government bonds in local currency

By hitting F2 (govt.) followed by "TK" one finds an overview of approximately 120 countries. A click on Cyprus' flag, for example, provides the following choice:
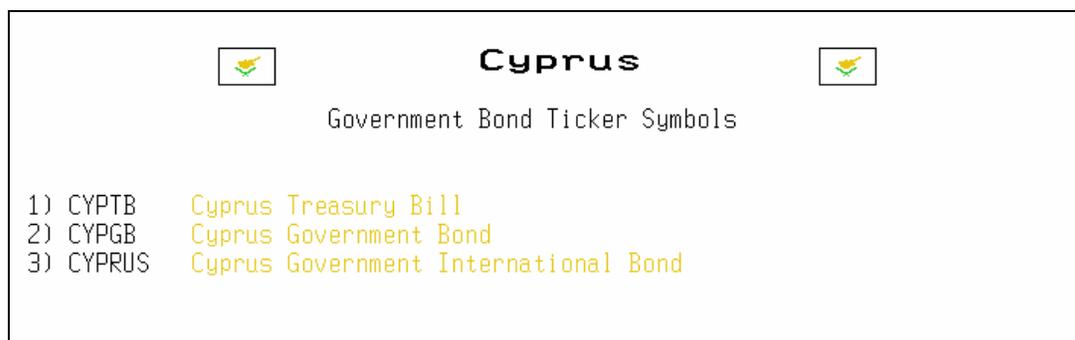
Figure 15-6

For "Cyprus Government Bonds" a click on number 2 shows a table that can be sorted by various criteria such as coupon, issuer, maturity, currency etc. Note that this function does not show a curve (see paragraph: "To produce curves") and does not show the yield-to-maturity (see paragraph: "To produce yield-to-maturity") either.

Figure 15-7

The "FMC"-function produces curves. Type "FMC" to find the following overview:

```
        Fair  Market  Sector  Curves
   CURVE # 1: ▮    # 2: ▮    # 3: ▮    # 4: ▮    # 5: ▮    # 6: ▮
            Curve freq: ▮/YR  (0 for default frequencies)

 1) VIEW YIELD CURVE GRAPH          20) LIST FOR: INDIAN RUPEE
 2) LIST FOR: US DOLLAR             21) LIST FOR: THAI BAHT
 3) LIST FOR: BRITISH POUND         22) LIST FOR: INDONESIAN RUPIAH
 4) LIST FOR: JAPANESE YEN          23) LIST FOR: PHILIPPINES PESO
 5) LIST FOR: SWISS FRANC           24) LIST FOR: HUNGARIAN FORINT
 6) LIST FOR: CANADIAN DOLLAR       25) LIST FOR: CHINA RENMINBI
 7) LIST FOR: MEXICAN PESO          26) LIST FOR: CZECH KORUNA
 8) LIST FOR: AUSTRALIAN DOLLAR     27) LIST FOR: JAMAICA DOLLAR
 9) LIST FOR: DANISH KRONE          28) LIST FOR: POLISH ZLOTY
10) LIST FOR: NORWEGIAN KRONE       29) LIST FOR: SLOVAKIA KORUNA
11) LIST FOR: SWEDISH KRONA         30) LIST FOR: SRI LANKAN RUPEE
12) LIST FOR: COLOMBIAN PESO        31) LIST FOR: EURO
13) LIST FOR: NEW ZEALAND DOLLAR
14) LIST FOR: SINGAPORE DOLLAR
15) LIST FOR: MALAYSIAN RINGGIT
16) LIST FOR: HONG KONG DOLLAR
17) LIST FOR: SOUTH KOREAN WON
18) LIST FOR: SOUTH AFRICAN RAND
19) LIST FOR: TAIWAN DOLLAR
```

Figure 15-8

A click on one of the currencies (example: Polish Zloty) leads to the screen for fair market sector curves. Simply type the number in the orange field (example: "119"), hit "go", "1", "go" to view the chart:

```
Hit <MENU> for more choices or hit 1 <GO> to view graph.
              Fair Market Sector Curves
        CURVE # 1: 119  # 2:     # 3:     # 4:     # 5:     # 6:
              Curve freq:  0/YR  (0 for default frequencies)
  + indicates curve floats intraday with benchmark curve
 LIST FOR: POLISH ZLOTY                                    Page   1
Polish Govt
119 - PLN Poland Sovereign
Euro Pol. Zloty
118 - PLN Euro AAA
121 - PLN Euro (AA)




Curves in white have been added.        2<go> for full list of curve actions
Curves in red have been resumed after interruption.
Curves in blue have changed length.
Curves in grey have been discontinued or combined.
```

Figure 15-9

Figure 15-10

To produce yields-to-maturity, hit "PX". Choose one of the countries from the list (example: Greece), to see the following screen:

Figure 15-11

Note that this function is only available for a smaller number of countries (approximately 20 countries).

15.4 Money market rates

Type "MMR 22" for an overview about financial information on the Economic and Monetary Union. Click on "EBF" (European Banking Federation) and then "1) Official EURIBOR Fixing" to get the **EURIBOR**:

```
EUROPEAN BANKING
  FEDERATION                                              Page 1 of 1

07/16    12:34 GMT    [      EURIBOR  FBE/ACI      ]                    248
      EURIBOR RATES ACT/360 AT 11H00 BRUSSELS TIME 16/07/2004      16/07 09:07 GMT
                                ACT/ 360
                          1WK    2.064    [FIXED]
                          2WK    2.073     VALUE DATE 20/07/04
                          3WK    2.073    [EURIBOR NOTE ON PAGE 47893]
                          1MO    2.075
                          2MO    2.094
                          3MO    2.115
                          4MO    2.133
                          5MO    2.153    [WARNING]  EITHER EURIBOR FBE,
                          6MO    2.186    NOR EURIBOR ACI, NOR THE EURIBOR
                          7MO    2.206    PANEL BANKS, NOR THE EURIBOR
                          8MO    2.228    STEERING COMMITTEE, NOR TELERATE
                          9MO    2.255    LTD CAN BE HELD LIABLE FOR ANY
[HISTORY] THIS CAN BE    10MO    2.287    IRREGULARITY OR INACCURACY OF
DOWNLOADED FROM THE      11MO    2.322    THE EURIBOR RATE.
WEBSITE WWW.EURIBOR.ORG  12MO    2.360    (FOR DETAILS SEE PAGE 47896)

Australia 61 2 9722 8600    Brazil 5511 3048 4500    Europe 44 20 7330 7500    Germany 49 69 920410
```

Figure 15-12

Alternatively, type "MMR 22", then "2) ER EMU Composite Rates" and go to page 2 and 3:
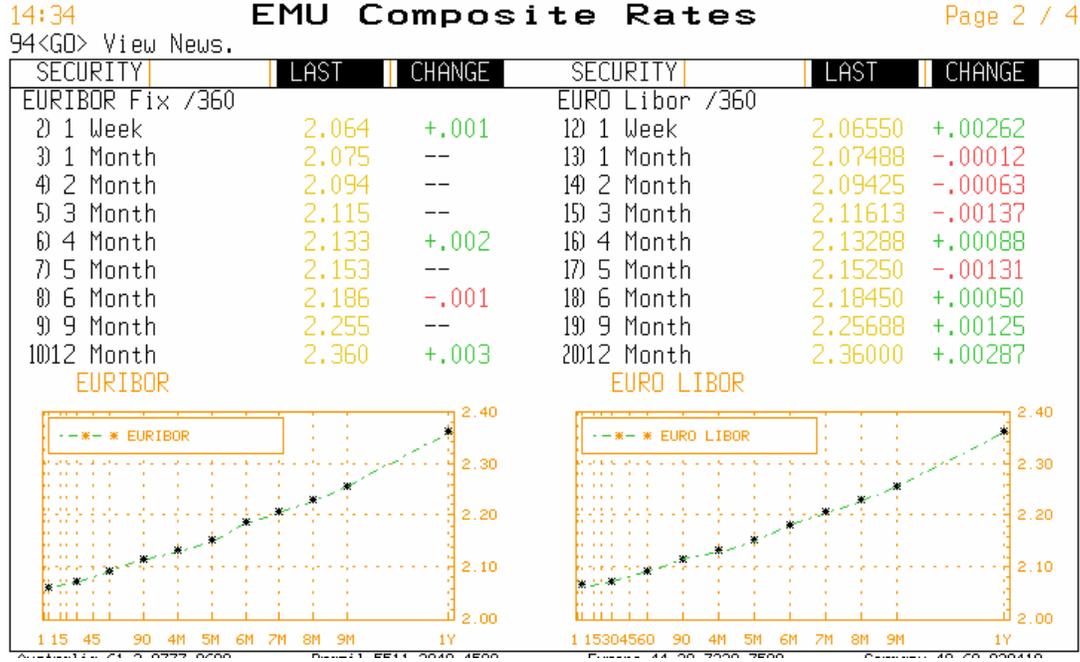
Figure 15-13
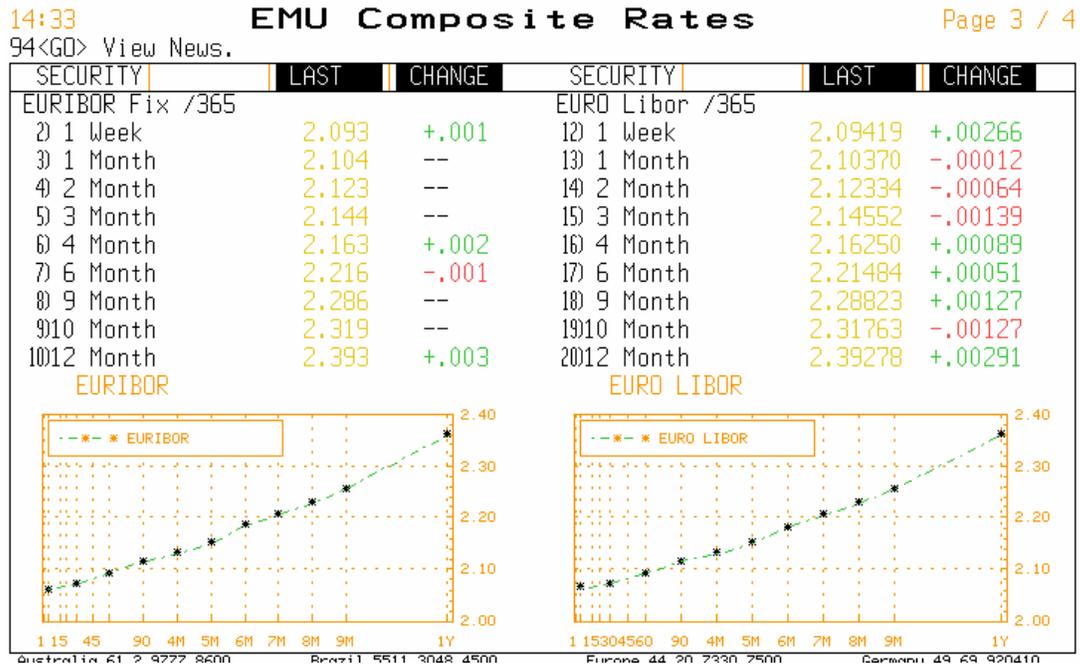
Figure 15-14

A list of currencies and their **LIBOR-fixings** can be obtained by typing "MMR" and clicking on "16) LIBOR Rates":

15:23	LIBOR (SEE ALSO BBAM)						Page 3 / 4
94<GO> View News.							
SECURITY	TIME	LAST	CHANGE	OPEN	HIGH	LOW	CLOSE
AUD Libor Fix							
2)AU0003M	12:38	5.42000	-.00500	5.42000	5.42000	5.42000	5.42500
3)AU0006M	12:38	5.51500	-.00750	5.51500	5.51500	5.51500	5.52250
Ffr Libor Fix							
5)FR0003M	12:38	2.11938	--	2.11938	2.11938	2.11938	2.11938
6)FR0006M	12:38	2.19825	-.00088	2.19825	2.19825	2.19825	2.19913
CAD Libor Fix							
8)CD0003M	12:38	2.16000	--	2.16000	2.16000	2.16000	2.16000
9)CD0006M	12:38	2.38333	+.00333	2.38333	2.38333	2.38333	2.38000
ITL Libor Fix							
11)IL0003M	12:38	2.11938	--	2.11938	2.11938	2.11938	2.11938
12)IL0006M	12:38	2.19825	-.00088	2.19825	2.19825	2.19825	2.19913
ESP Libor Fix							
14)SP0003M	12:38	2.11938	--	2.11938	2.11938	2.11938	2.11938
15)SP0006M	12:38	2.19825	-.00088	2.19825	2.19825	2.19825	2.19913
NLG Libor Fix							
17)DG0003M	12:38	2.11938	--	2.11938	2.11938	2.11938	2.11938
18)DG0006M	12:38	2.19825	-.00088	2.19825	2.19825	2.19825	2.19913

Figure 15-15

Local IBOR can also be obtained by the command "MMR", which gives a list of countries for which money market rates are available. By choosing a country, several pages are displayed, one of which contains money market rates (example: Latvia):

```
Press 98<GO> to make a copy, 99<GO> to clear news alerts.      Equity MMR

16:35                   LATVIA  MMKT  RATES                   Page 1 / 3
94<GO> View News.
 SECURITY          | TIME  |  LAST  |  CHANGE |  OPEN  |  HIGH  |  LOW   |  CLOSE

Spot Exchange
Rates
 4)LAT              16:32     .5378    +.0003    .5369    .5382    .5366    .5375

Cross Exchange
Rates
 8)GBPLVL           8/17      .9822     --       .9822    .9822    .9822    .9822
 9)EURLVL           16:35     .6631    -.0011    .6634    .6639    .6613    .6632



RIGIBID/BOR Fix
 13)RIGION          8/10      3.28      --       3.28     3.28     3.28     3.28
 14)RIGITN          8/10      3.28      --       3.28     3.28     3.28     3.28
 15)RIGISW          8/10      3.25      --       3.25     3.25     3.25     3.25
 16)RIGI1M          8/10      3.17      --       3.17     3.17     3.17     3.17
 17)RIGI3M          8/10      3.31      --       3.31     3.31     3.31     3.31
 18)RIGI6M          8/10      3.47      --       3.47     3.47     3.47     3.47
 19)RIGI1Y          8/10      3.47      --       3.47     3.47     3.47     3.47

Australia 61 2 9777 8600         Brazil 5511 3048 4500       Europe 44 20 7330 7500      Germany 49 69 920410
Hong Kong 852 2977 6000 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2004 Bloomberg L.P.
                                                                              G480-213-0 18-Aug-04 16:35:10
```

Figure 15-16

The data provided under this option can be different for each country.

15.5   Historical availability

In general, swap rates and government bonds along with their yield-to-maturity are also available for the past and can be exported to spread sheet software. Please note that the availability for historical data might vary from security to security and from range/period to range/period.

15.6 Corporate bond spreads

The following screen appears after executing the command "IND":

Figure 15-17

If the specific index is not yet known, use the "Index Lookup". Either type IND 1 or click on IND1. Continue by clicking on 7 for the European Monetary Union, for instance.

Merrill Lynch Global Bond Indices

Global Investment Grade
1) Global Broad Market
2) Global Large Cap
3) Global Broad Mkt Plus
4) Global Sovereign

5) U.S. Domestic Markets

6) Canada Domestic Markets

7) EMU/Europe/U.K.

8) Australian Dollar Markets

9) Japanese Yen Markets

10) Global And Regional High Yield
& Emerging Markets

11) Global Currency/Money Markets

12) Equity

Figure 15-18

Europe/EMU Investment Grade

Pan-Euro Markets
50) Pan-Europe Broad Market
51) Pan-Europe Broad Market Plus

Euro Markets
1) EMU Broad Market
2) Euro Sovereigns
3) Agency/Supra/Non-Euro Sov
4) Corp & Pfandbriefe
5) Corporates
6) Pfandbriefe
7) Other Sectors
8) EMU Large Cap

Sterling Markets
46) Sterling Broad Market
47) All Non-Gilts
48) Corporates

Europe Governments
10) Austria   19) Norway
11) Belgium   20) Portugal
12) Denmark   21) Spain
13) Finland   22) Sweden
14) France   23) Switzerland
15) Germany   24) U.K.
16) Ireland   25) Europe Governments
17) Italy   26) Emerging Euro Mkts/
18) Netherlands   South Africa

Eurobonds
30) All Eurobonds

Bills
55) Euro Bills

Figure 15-19

After selecting "5) Corporates" choose the specific index, which automatically returns to the overview.

```
Enter # <GO> to select
                              CORPORATES              Page    1 of    9
        Index Incept    Description
  1) EA00   12/96    EMU ABS / MBS Index
  2) EB00   12/95    EMU Financial Corporate Index
  3) EB01   12/95    EMU Corporates, Financial, 1-3 Yr
  4) EB02   12/95    EMU Corporates, Financial, 3-5 Yr
  5) EB03   12/95    EMU Corporates, Financial, 5-7 Yr
  6) EB04   12/95    EMU Corporates, Financial, 7-10 Yr
  7) EB05   12/95    EMU Corporates, Financial, 1-10 Yr
  8) EB06   12/95    EMU Corporates, Financial,  5-10 Yrs
  9) EB09   12/95    EMU Corporates, Financial, 10+ Yr
 10) EB0V   12/95    EMU Corporates, Financial, 1-5 Yr
 11) EB10   12/95    EMU Corporates, Financial, AAA Rated
 12) EB1L   12/95    EMU Large Cap Corporates, Financials, AAA Rated
 13) EB20   12/95    EMU Corporates, Financial, AA Rated
 14) EB2L   01/96    EMU Large Cap Corporates, Financials, AA Rated
 15) EB30   12/95    EMU Corporates, Financial, A Rated
 16) EB3L   12/95    EMU Large Cap Corporates, Financials, A Rated
 17) EB40   12/95    EMU Corporates, Financial, BBB Rated
 18) EB4L   01/96    EMU Large Cap Corporates, Financials, BBB Rated
```

Figure 15-20

```
                              CORPORATES              Page    4 of    9
        Index Incept    Description
  1) EJRE   12/96    EUR Corporates, Real Estate
  2) EJSC   12/96    EUR Corporates, Services Cyclical
  3) EJSN   11/99    EUR Corporates, Services Non-Cyclical
  4) EJTC   12/96    EUR Corporates, Telecommunications
  5) EJTE   12/96    EUR Corporates, Technology & Electronics
  6) EK00   12/96    EMU Corporates, Utilities Index
  7) EL00   12/95    EMU Securitized / Collateralized Index
  8) EL0L   12/95    EMU Large Cap Securitized / Collateralized Index
  9) ELT2   12/95    Euro Sub-Debt Lower Tier 2 Index
 10) EN00   12/95    EMU Corporates, Non-Financial Index
 11) EN01   12/95    EMU Corporates, Non-Financial, 1-3 Yr
 12) EN02   12/95    EMU Corporates, Non-Financial, 3-5 Yr
 13) EN03   12/95    EMU Corporates, Non-Financial, 5-7 Yr
 14) EN04   01/96    EMU Corporates, Non-Financial, 7-10 Yr
 15) EN05   12/95    EMU Corporates, Non-Financial, 1-10 Yr
 16) EN06   12/95    EMU Corporates, Non-Financial, 5-10 Yrs
 17) EN09   01/96    EMU Corporates, Non-Financial, 10+ Yr
 18) EN0V   12/95    EMU Corporates, Non-Financial, 1-5 Yr
```

Figure 15-21

The overview shows the selected ticker for the index: "EN00". Now one has access to all Merrill Lynch's index-functions.

Figure 15-22

IND10 shows the "Index Member List" and allows a download in ".xls" format by typing "99 <go>":

Figure 15-23

The following page shows a part of the complete Excel-spreadsheet:

Cusip	ISIN	Descript	Ticker	Coupon	MtyDate	Rating	ISOCurrcy	ISOCountry	IndLvl1L	IndLvl2L	IndLvl3L	IndLvl4L	Type	ParAmt	Price	Accrued	%Index	Cash	ModDurTW	YldTW	EffModDur	EffYld	OAS
EC193612	XS0103884812	AGBAR INTL BV	AGBAR	6	12/11/2009	AA3	EUR	NL	Corporate	Utility	Utility	Non-Electric Utilities	SENR	500	109.45	4.016	0.12551	0	4.411	3.991	4.546	3.952	37
EC221576	FR0000498230	AEROPORT PARIS	AERPRS	5.875	15/02/2010	AAA	EUR	FR	Corporate	Industrials	Services Cyclical	Transportation Excluding Air/Rail	SENR	450	109.54	2.408	0.11145	0	4.675	3.935	4.82	3.897	27
EC346191	XS0124714632	AER RIANTA FIN	AERRIA	6.15	16/02/2011	A2	EUR	IE	Corporate	Industrials	Services Cyclical	Transportation Excluding Air/Rail	SENR	250	107.637	2.504	0.06092	0	5.283	4.767	5.482	4.711	91
EC355626	FR0000486531	AEROPORT PARIS	AERPRS	5.25	15/03/2011	AAA	EUR	FR	Corporate	Industrials	Services Cyclical	Transportation Excluding Air/Rail	SENR	400	106.36	1.74	0.09566	0	5.511	4.135	5.702	4.093	28
EC405373	FR0000486409	ACCOR	ACCOR	5.75	05/07/2006	BBB2	EUR	FR	Corporate	Industrials	Services Cyclical	Hotels	SENR	800	104.75	0.142	0.18665	5.753	1.862	3.228	1.895	3.202	54
EC789483	FR0000471070	ACCOR	ACCOR	5	20/12/2006	BBB2	EUR	FR	Corporate	Industrials	Services Cyclical	Hotels	SENR	400	103.51	2.828	0.0941	0	2.22	3.463	2.266	3.433	60
EC870907	XS0163822488	EADS FINANCE BV	AERO	4.625	03/03/2010	A3	EUR	NL	Corporate	Industrials	Capital Goods	Aerospace/Defense	SENR	1000	102.25	1.685	0.22994	0	4.818	4.164	4.976	4.122	47
EC987287	XS0169443784	ANGLO AMERICAN	AALLN	3.625	05/06/2008	A3	EUR	GB	Corporate	Industrials	Basic Industry	Metals/Mining Excluding Steel	SENR	1000	99.41	0.387	0.22079	0	3.553	3.789	3.647	3.754	48
ED002466	FR0000475550	AIR LIQUIDE FIN	AIFP	4.125	23/06/2013	A1	EUR	FR	Corporate	Industrials	Basic Industry	Chemicals	SENR	300	96.81	0.237	0.06441	0	7.283	4.567	7.597	4.516	38
ED151295	XS0176914579	EADS FINANCE BV	AERO	5.5	25/09/2018	A3	EUR	NL	Corporate	Industrials	Capital Goods	Aerospace/Defense	SENR	500	102.23	4.403	0.11795	0	9.352	5.271	9.839	5.203	68
ED192139	XS0179091425	AEM SPA	AEMSPA	4.875	30/10/2013	A2	EUR	IT	Corporate	Utility	Utility	Electric-Integrated	SENR	500	100.39	3.436	0.11485	0	7.105	4.819	7.42	4.762	60
ED511216	FR0010096115	AIR LIQUIDE SA	AIFP	4.125	25/06/2010	A1	EUR	FR	Corporate	Industrials	Basic Industry	Chemicals	SENR	500	100.33	0.215	0.11122	0	5.175	4.061	5.347	4.02	31
EC062662	XS0092178515	AKZO NOBEL NV	AKZO	5.375	17/11/2008	A3	EUR	NL	Corporate	Industrials	Basic Industry	Chemicals	SENR	511.292	105.34	3.539	0.12316	0	3.724	4.005	3.833	3.965	59
EC073898	DE0002692951	ALLIED DOMECQ	ALYON	4.75	14/12/2005	BBB1	DEM	GB	Corporate	Industrials	Consumer Non-Cyclical	Beverage	SENR	255.646	102.45	2.771	0.05951	0	1.333	2.947	1.356	2.925	47
EC270541	XS0113911761	AIR PROD & CHEM	APD	6.5	12/07/2007	A2	EUR	US	Corporate	Industrials	Basic Industry	Chemicals	SENR	300	108.65	0.036	0.07214	6.501	2.73	3.412	2.767	3.384	38
EC371987	XS0127852324	ALLIED DOMECQ	ALYON	5.5	18/04/2006	BBB1	EUR	GB	Corporate	Industrials	Consumer Non-Cyclical	Beverage	SENR	800	103.957	1.311	0.18613	0	1.657	3.204	1.686	3.179	59
EC380970	XS0126761490	ALCAN INC	AL	5.5	02/05/2006	BBB1	EUR	CA	Corporate	Industrials	Basic Industry	Metals/Mining Excluding Steel	SENR	600	104.23	1.1	0.13982	0	1.697	3.042	1.725	3.019	41
EC558632	XS0146523963	AKZO NOBEL NV	AKZO	5.625	07/05/2009	A3	EUR	NL	Corporate	Industrials	Basic Industry	Chemicals	SENR	1000	106.81	1.048	0.23662	0	4.16	4.036	4.283	3.996	52
EC575652	XS0149165986	ALLIED DOMECQ	ALYON	5.875	12/06/2009	BBB1	EUR	GB	Corporate	Industrials	Consumer Non-Cyclical	Beverage	SENR	600	107.4	0.515	0.14325	0	4.232	4.175	4.361	4.133	64
ED004711	XS0170265341	AKZO NOBEL NV	AKZO	4.25	14/06/2011	A3	EUR	NL	Corporate	Industrials	Basic Industry	Chemicals	SENR	750	98.87	0.349	0.16463	0	5.852	4.442	6.072	4.394	52
ED147819	XS0176838372	ALTADIS FINANCE	ALTSM	5.125	02/10/2013	BBB1	EUR	NL	Corporate	Industrials	Consumer Non-Cyclical	Tobacco	SENR	500	101	4.005	0.11615	0	6.952	4.984	7.264	4.924	77
ED147823	XS0176837309	ALTADIS FINANCE	ALTSM	4.25	02/10/2008	BBB1	EUR	NL	Corporate	Industrials	Consumer Non-Cyclical	Tobacco	SENR	600	100.93	3.321	0.13838	0	3.682	4.002	3.787	3.963	61
ED369374	XS0188426372	AMCOR LTD	AMCOR	4.25	25/03/2011	BBB1	EUR	AU	Corporate	Industrials	Capital Goods	Packaging	SENR	350	97.2	1.292	0.07627	0	5.615	4.744	5.832	4.689	85
ED511204	FR0010096123	AIR LIQUIDE SA	AIFP	4.75	25/06/2014	A1	EUR	FR	Corporate	Industrials	Basic Industry	Chemicals	SENR	500	100.78	0.247	0.11175	0	7.782	4.65	8.129	4.597	37
EC272732	DE0005151047	BASF AG	BASF	5.75	25/07/2005	AA3	EUR	DE	Corporate	Industrials	Basic Industry	Chemicals	SENR	1250	103.28	5.577	0.30104	0	0.954	2.483	0.965	2.468	18
EC371414	XS0127769958	AVENTIS SA	AVEFP	5	18/04/2006	A1	EUR	FR	Corporate	Industrials	Consumer Non-Cyclical	Pharmaceuticals	SENR	1250	103.59	1.192	0.26977	0	1.667	2.873	1.693	2.853	26
EC391190	XS0129490149	AUTOLIV INC	AUTOLI	5.875	23/05/2006	BBB1	EUR	US	Corporate	Industrials	Consumer Cyclical	Auto Parts & Equipment	SENR	300	104.97	0.837	0.07022	0	1.75	3.075	1.779	3.052	43
EC485314	XS0139603063	ASSA ABLOY AB	ASSAAB	5.125	04/12/2006	A3	EUR	SE	Corporate	Industrials	Capital Goods	Building Materials	SENR	600	104.32	3.123	0.14262	0	2.181	3.21	2.222	3.186	37
ED033994	DE0008846718	BASF AG	BASF	3.5	08/07/2010	AA3	EUR	DE	Corporate	Industrials	Basic Industry	Chemicals	SENR	1000	97.62	0.068	0.2161	3.501	5.283	3.954	5.458	3.916	19
ED052019	FR0010001446	AUCHAN	AUCHAN	3.5	22/07/2008	A2	EUR	FR	Corporate	Industrials	Consumer Non-Cyclical	Food & Drug Retailers	SENR	750	99.31	3.423	0.17046	0	3.562	3.687	3.656	3.654	35
ED134779	XS0176128675	AVENTIS SA	AVEFP	4.25	15/09/2010	A1	EUR	FR	Corporate	Industrials	Consumer Non-Cyclical	Pharmaceuticals	SENR	1500	100.12	3.518	0.34393	0	5.155	4.225	5.333	4.181	43
ED407306	XS0189545329	AIR PROD & CHEM	APD	4.25	10/04/2012	A2	EUR	US	Corporate	Industrials	Basic Industry	Chemicals	SENR	300	97.99	1.129	0.06579	0	6.381	4.561	6.639	4.51	52
ED425113	FR0010075531	AUCHAN	AUCHAN	4.125	04/05/2011	A2	EUR	FR	Corporate	Industrials	Consumer Non-Cyclical	Food & Drug Retailers	SENR	300	98.547	0.802	0.06594	0	5.767	4.374	5.981	4.327	47
ED477114	XS0193337796	ASM BRESCIA	ASM	4.875	28/05/2014	A1	EUR	IT	Corporate	Utility	Utility	Electric-Integrated	SENR	500	100.23	0.628	0.11157	0	7.651	4.843	7.998	4.786	57
ED489316	XS0193946555	AUTOSTRADE	AUTSTR	4.875	09/06/2024	A3	EUR	IT	Corporate	Industrials	Services Cyclical	Transportation Excluding Air/Rail	SENR	1000	102.25	0.563	0.22746	0	11.603	5.682	12.251	5.604	86
ED489384	XS0193947271	AUTOSTRADE	AUTSTR	5	09/06/2014	A3	EUR	IT	Corporate	Industrials	Services Cyclical	Transportation Excluding Air/Rail	SENR	2750	99.46	0.479	0.60803	0	7.62	5.069	7.974	5.007	78
EC004947	XS0089036031	R&R INTL FINANCE	BATSLN	5.5	21/07/2005	BBB1	DEM	JE	Corporate	Industrials	Consumer Non-Cyclical	Tobacco	SENR	255.646	102.43	5.393	0.06098	0	0.94	3.042	0.954	3.019	74
EC008865	XS0089137573	BAT INTL FINANCE	BATSLN	5.375	28/07/2006	BBB1	DEM	GB	Corporate	Industrials	Consumer Non-Cyclical	Tobacco	SENR	511.292	103.929	5.166	0.1234	0	1.832	3.348	1.865	3.32	63
EC099171	XS0094703799	BAT INTL FINANCE	BATSLN	4.875	25/02/2009	BBB1	EUR	GB	Corporate	Industrials	Consumer Non-Cyclical	Tobacco	SENR	1700	102.23	1.865	0.3915	0	4.006	4.326	4.131	4.28	84
EC278802	XS0115934177	BEZEQ ISR TELCOM	BEZOIT	6.5	08/08/2007	A3	EUR	IL	Corporate	Industrials	Telecommunications	Telecom - Integrated/Services	SENR	300	102.763	6.056	0.07222	0	2.582	5.493	2.663	5.42	239
EC344991	XS0124494708	BMW FINANCE	BMW	5.25	01/09/2006	A1	EUR	NL	Corporate	Industrials	Consumer Cyclical	Automotive	SENR	750	104.54	4.547	0.18102	0	1.933	3.013	1.967	2.99	26
EC353299	XS0125631324	BAXTER INTL	BAX	5.75	06/03/2006	BBB1	EUR	US	Corporate	Industrials	Consumer Non-Cyclical	Pharmaceuticals	SENR	650	104.3	2.048	0.15293	0	1.544	3.017	1.569	2.995	45
EC470108	XS0138025134	IMP TOB CANADA	BATSLN	5.125	14/11/2006	BBB1	EUR	CA	Corporate	Industrials	Consumer Non-Cyclical	Tobacco	SENR	500	103.76	3.403	0.11856	0	2.123	3.406	2.166	3.377	58
EC706955	XS0155924276	BHP BILLITON FIN	BHP	4.375	10/10/2007	A2	EUR	NL	Corporate	Industrials	Basic Industry	Metals/Mining Excluding Steel	SENR	750	102.922	3.323	0.17629	0	2.902	3.403	2.966	3.374	29
EC841150	DE0006626831	BMW US CAP LLC	BMW	2.75	10/02/2006	A1	EUR	US	Corporate	Industrials	Consumer Cyclical	Automotive	SENR	200	99.86	1.165	0.0447	0	1.507	2.836	1.531	2.816	30
EC985942	XS0169240164	BERTELSMANN FIN	BERTEL	4.625	03/06/2010	BBB1	EUR	US	Corporate	Industrials	Media	Media - Diversified	SENR	750	101.4	0.52	0.16911	0	5.048	4.348	5.221	4.302	60
ED035187	XS0171786287	BAT INTL FINANCE	BATSLN	5.125	09/07/2013	BBB1	EUR	GB	Corporate	Industrials	Consumer Non-Cyclical	Tobacco	SENR	1000	99.62	0.07	0.22055	5.126	7.049	5.179	7.369	5.113	98
ED394767	XS0189727869	BAT HOLDINGS BV	BATSLN	4.375	15/06/2011	BBB1	EUR	NL	Corporate	Industrials	Consumer Non-Cyclical	Tobacco	SENR	1000	97.06	0.348	0.2155	0	5.801	4.885	6.033	4.826	95
EC113178	XS0095768437	BURMAH CASTROL	BPLN	4.875	31/03/2009	AA1	EUR	GB	Corporate	Industrials	Energy	Oil Refining & Marketing	SENR	400	104.79	1.399	0.09397	0	4.125	3.745	4.242	3.709	25
EC149670	FR0000495327	BOUYGUES	BOUY	4.875	03/07/2006	A3	EUR	FR	Corporate	Industrials	Services Cyclical	Building & Construction	SENR	500	103.341	0.147	0.11448	4.877	1.865	3.102	1.898	3.076	41
EC237200	XS0109134113	BPB PLC	BPBLN	6.5	17/03/2010	BBB1	EUR	GB	Corporate	Industrials	Capital Goods	Building Materials	SENR	400	110.546	2.119	0.0997	0	4.675	4.356	4.829	4.31	67
EC348093	XS0125134295	BOMBARDIER INC	BOMB	5.75	22/02/2008	BBB3	EUR	CA	Corporate	Industrials	Capital Goods	Aerospace/Defense	SENR	500	93.34	2.247	0.10574	0	3.04	7.926	3.179	7.775	457
EC503175	XS0141451764	BMW US CAP LLC	BMW	5.125	28/01/2009	A1	EUR	US	Corporate	Industrials	Consumer Cyclical	Automotive	SENR	750	105.58	2.352	0.17909	0	3.944	3.6	4.054	3.725	31
EC541602	XS0145526934	BP CAPITAL PLC	BPLN	4.75	02/10/2006	AA1	EUR	GB	Corporate	Industrials	Energy	Integrated Energy	SENR	300	103.801	3.712	0.07136	0	2.028	2.949	2.063	2.928	17
EC561218	XS0147549916	BOMBARD CAP FUND	BOMB	6.125	14/05/2007	BBB3	EUR	CA	Corporate	Industrials	Capital Goods	Aerospace/Defense	SENR	500	96.61	1.024	0.108	0	2.475	7.495	2.575	7.35	438
EC561951	FR0000489171	BOUYGUES	BOUY	5.875	15/05/2009	A3	EUR	FR	Corporate	Industrials	Services Cyclical	Building & Construction	SENR	1000	108.16	0.963	0.24142	0	4.167	3.985	4.29	3.944	47
EC849467	XS0162732951	BMW US CAP LLC	BMW	4.625	20/02/2013	A1	EUR	US	Corporate	Industrials	Consumer Cyclical	Automotive	SENR	750	100.91	1.832	0.17048	0	6.866	4.492	7.152	4.442	35
ED073703	XS0173601379	BMW FINANCE	BMW	5	06/08/2018	A1	EUR	NL	Corporate	Industrials	Consumer Cyclical	Automotive	SENR	750	100.19	4.686	0.17402	0	9.493	4.98	9.981	4.92	40
ED216247	FR0010029769	BOUYGUES	BOUY	4.625	25/02/2011	A3	EUR	FR	Corporate	Industrials	Services Cyclical	Building & Construction	SENR	750	101.23	2.935	0.17284	0	5.465	4.397	5.664	4.35	53
ED391435	XS0189497414	BMW FINANCE	BMW	3.875	06/04/2011	A1	EUR	NL	Corporate	Industrials	Consumer Cyclical	Automotive	SENR	750	98.14	1.051	0.16458	0	5.743	4.195	5.95	4.152	31
EC338589	XS0123688870	BRITISH TEL PLC	BRITEL	6.125	15/02/2006	BBB1	EUR	GB	Corporate	Industrials	Telecommunications	Telecom - Integrated/Services	SENR	3000	105.26	2.613	0.71596	0	1.488	2.927	1.513	2.906	39
EC338595	XS0123684887	BRITISH TEL PLC	BRITEL	6.875	15/02/2011	BBB1	EUR	GB	Corporate	Industrials	Telecommunications	Telecom - Integrated/Services	SENR	1125	114.35	2.92	0.29187	0	5.197	4.549	5.384	4.499	71
EC393212	XS0129997127	DANONE FINANCE	BSNSA	5.125	08/06/2006	A1	EUR	FR	Corporate	Industrials	Consumer Non-Cyclical	Food - Wholesale	SENR	200	103.967	0.505	0.04623	0	1.801	2.945	1.83	2.924	28
EC494260	XS0140610681	BRISA FINANCE BV	BRISA	4.875	20/12/2006	A2	EUR	NL	Corporate	Industrials	Services Cyclical	Transportation Excluding Air/Rail	SENR	600	103.89	2.757	0.14195	0	2.23	3.181	2.272	3.156	53
EC541692	XS0145613823	DANONE FINANCE	BSNSA	5.25	03/05/2007	A1	EUR	FR	Corporate	Industrials	Consumer Non-Cyclical	Food - Wholesale	SENR	200	105.284	1.036	0.04704	0	2.576	3.242	2.627	3.216	27
EC544243	XS0145768040	BAYER AG	BYIF	6	10/04/2012	A2	EUR	DE	Corporate	Industrials	Basic Industry	Chemicals	SENR	2000	108	1.562	0.48478	0	6.096	4.737	6.339	4.682	72
EC544245	XS0145757588	BAYER AG	BYIF	5.375	10/04/2007	A2	EUR	DE	Corporate	Industrials	Basic Industry	Chemicals	SENR	3000	105.054	1.399	0.70653	0	2.508	3.405	2.56	3.376	45

Figure 15-24

16 References

ALMI, BdPME, KfW (2004). *Bericht aus Brüssel*, February 2004, Deutscher Industrie- und Handels-kammertag (DIHK) 2004.

Baele, Lieven, Ferrando, Annalisa, Hördahl, Peter, Krylova, Elizaveta, Monnet, Cyril (2004). *Measuring Financial Integration in the Euro Area* (Occasional Paper Series No. 14 / April 2004). Frankfurt: European Central Bank.

Bank of Estonia (2004). *Weighted average annual interest rates of kroon loans by groups of customers and maturity*. Bank of Estonia. Retrieved June 9, 2004 from the World Wide Web: http://www.bankofestonia.info/dynamic/itp/itp_report.jsp?reference=90&className=EPSTAT&lang=en

Bank of Latvia (2004). *Weighted average interest rates charged by banks in transactions with domestic enterprises*. Bank of Latvia. Retrieved June 9, 2004 from the World Wide Web: http://www.bank.lv/images/img_lb/financialdata/latvian/excel/2003-4/Table17.xls

Bank of Latvia (2004). *Loans to domestic enterprises and private persons*. Bank of Latvia. Retrieved June 9, 2004 from the World Wide Web:
http://www.bank.lv/images/img_lb/financialdata/latvian/excel/2004-1/Table13.xls

Bank of Lithuania (2004). *Average Annual Interest Rates on Loans.* Bank of Lithuania. Retrieved June 9, 2004 from the World Wide Web: http://www.lb.lt/int/default.asp?lang=E&pid=1

Banque centrale du Luxembourg (2004). *Luxembourg bank interest rates of euro denominated loans and deposits vis-à-vis euro area residents on new business.* Banque centrale du Luxembourg. Retrieved June 9, 2004 from the World Wide Web: http://www.bcl.lu/graphics/xls.gif

Banque de France (2004). *Interest Rates on Loans and Amounts of New Contracts - March 2004.* Banque de France. Retrieved June 9, 2004 from the World Wide Web: http://www.banque-france.fr/asp/ouvrirpdf.asp?strurl=fr/telechar/desm/credits2.pdf&title=Interest%20rates%20on%20Loans%20%20december%202003

Basel Committee on Banking Supervision (1988). *International Convergence of Capital Measurement and Capital Standards* (July 1988). Basel: Bank for International Settlements.

Basel Committee on Banking Supervision (2003). *Sound Practices for the management and Supervision of Operational Risk* (February 2003). BCBS Publications No 96.

Basel Committee on Banking Supervision (2004). *International Convergence of Capital Measurement and Capital Standards* (June 2004). Basel: Bank for International Settlements.

Bessis, Joel (2002). *Risk Management in Banking* (2nd ed.). Chichester, England: Wiley.

Bielecki, Tomasz, R., Rutkowski, Marek (2002). *Credit Risk: Modeling, Valuation and Hedging*. Berlin: Springer.

Broadbent, Ben, Schumacher, Dirk, Schels, Sabine (2004). *No Gain without Pain - Germany's Adjustment to a Higher Cost of Capital*. Global Economics Paper No: 103. Goldman Sachs.

Caouette, John, B., Altman, Edward, I., Narayanan (1998). Credit Pricing, Risk-Adjusted Returns, and Allocation of Capital. In *Managing Credit Risk* (pp. 251-266). New York: Wiley.

Central Bank of Ireland (2004). *Retail Interest Rate Statistics for Ireland*. Central Bank of Ireland. Retrieved June 9, 2004 from the World Wide Web:
http://www.centralbank.ie/data/MonthStatFiles/IntRate2003.pdf

Copeland, Thomas, E., Weston, J., Fred (1979). *Financial Theory and Corporate Policy.* Reading Mas.: Addison Wesley.

Council of the European Communities (1993). Council Directive 93/6/EEC of 15 March 1993 on the capital adequacy of investments firms and credit institutions (CAD I). *Official Journal of the European Communities L 141 11/06/1993,* 1-26.

Council of the European Union (1999). Council Regulation (EC) No 1260/1999 of 21 June 1999 laying down general provisions on Structural Funds. *Official Journal of the European Communities L 161 26/06/1999,* 1-42.

Council of the European Union (1998). COUNCIL REGULATION (EC) No 994/98 of 7 May 1998 on the application of Articles 92 and 93 of the Treaty establishing the European Community to certain categories of horizontal State aid. *Official Journal of the European Communities L 142 14/05/1998,* 1-4.

Crouhy, Michel, Galai, Dan, Mark, Robert (2000). A comparative analysis of current credit risk models. *Journal of Banking and Finance, 24,* 59-117.

Cruz, Marcelo G. (2002). *Modeling, Measuring and Hedging Operational Risk*. Chichester, England: Wiley.

Czech National Bank (2004). *Bank interest rates on CZK-denominated loans by Czech non-financial corporations - new business*. Czech National Bank. Retrieved June 9, 2004 from the World Wide Web:
http://wdb.cnb.cz/cnb_txt/contrib710_prezentace.ARADY_WWW.PARAMETRY_SESTAV Y?p_csest=935&p_ind=ABBA&p_lang=EN

Deutsche Bundesbank (2004). *MFI Interest Rate Statistics May 2004*. Deutsche Bundesbank. Retrieved June 9, 2004, from the World Wide Web:
http://www.bundesbank.de/stat/download/S11BATSUHDE.PDF

Deutsche Bundesbank (2004). *Monthly Report 2004*. Deutsche Bundesbank. Retrieved June 9, 2004, from the World Wide Web:
http://www.bundesbank.de/download/volkswirtschaft/monatsberichte/2004/200402mb.pdf

Duffie, Darrell, Ken Singleton (1999). *Modelling Term Structures of Defaultable Bonds*, Review of Financial Studies, Vol. 12, No. 4, S. 687-720

European Central Bank (2002). REGULATION (EC) No 63/2002 OF THE EUROPEAN CENTRAL BANK of 20 December 2001 concerning statistics on interest rates applied by monetary financial institutions to deposits and loans vis-à-vis households and non-financial corporations. *Official Journal of the European Communities L 10 12/01/2002,* 24-46.

European Central Bank (ECB) (2004). Euro Area MFI Interest Rate Statistics: March 2004. *ECB Press Release, 14 May 2004.* Retrieved June 9, 2004, from the World Wide Web:
http://www.ecb.int/stats/press/mir0405.pdf

European Commission (1997a). Reference and discount rates: Commission Letter to Member States (18/08/1997). Retrieved 10 October, 2003 from the World Wide Web:
http://europa.eu.int/comm/competition/state_aid/legislation/18081997_en.html

European Commission (1997b). Commission notice on the method for setting the reference and discount rates. *Official Journal of the European Communities C 273 09/09/1997,* 3.

European Commission (1998). GUIDELINES ON NATIONAL REGIONAL AID. *Official Journal of the European Communities C 74 10/03/1998,* 9-31.

European Commission (1999a). COMMUNITY GUIDELINE ON STATE AID FOR RESCUING AND RESTRUCTURING FIRMS IN DIFFICULTY. *Official Journal of the European Communities C 288 09/10/1999,* 2-18.

European Commission (2000). Commission Notice on the application of Articles 87 and 88 of the EC Treaty to State aid in the form of guarantees. *Official Journal of the European Communities C 71 11/03/2000,* 14-18.

European Commission (2001a). Commission Regulation (EC) No 68/2001 of 12 January 2001 on the application of Articles 87 and 88 of the EC Treaty to training aid. *Official Journal of the European Communities L 010, 13/01/2001*, 20-29.

European Commission (2001b). Commission Regulation (EC) No 69/2001 12 January 2001 on the application of Articles 87 and 88 of the EC Treaty to de minimis aid. *Official Journal of the European Communities L 010, 13/01/2001*, 30-32.

European Commission (2001c). Commission Regulation (EC) No 69/2001 12 January 2001 on the application of Articles 87 and 88 of the EC Treaty to State aid to small and medium-sized enterprises. *Official Journal of the European Communities L 010, 13/01/2001*, 33-42.

European Commission (2002). COMMISSION REGULATION (EC) No 2204/2002 of December 2002 on the application of Articles 87 and 88 of the EC Treaty to State aid for employment. *Official Journal of the European Communities L 337 13/12/2002,* 3-14.

European Commission (2003a). *Review of Capital Requirements for Banks and Investment Firms*, Commission Services Third Consultation Paper, July 2003.

European Commission (2003b). Commission communication on the interest rate to be applied when aid granted unlawfully is being recovered. *Official Journal of the European Communities C 110 08/05/2003,* 21-22.

European Commission (2004). Member States and Applicant Countries. Retrieved June 8, 2004, from the World Wide Web: http://europa.eu.int/abc/index_en.htm

European Parliament, Council of the European Union (2000). DIRECTIVE 2000/12/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 March 2000 relating to the taking up and pursuit of the business of credit institutions. *Official Journal of the European Communities L 126 25/05/2000,* 1-59.

European Parliament, Council of the European Union (2002). REGULATION (EC) No 1606/2002 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL OF 19 July 2002 on the application of international accounting standards. *Official Journal of the European Communities L 243 11/09/2002,* 1-4.

Ferry, John, (2004). CDO evolution gathers pace. *Risk, Special Report Credit Risk, 17* (1) S2-S3.

Fons, Jerome S., (1994). Using Default Rates to Model the Term Structure of Credit Risk. *Financial Analysts Journal*, Moody's Investors Service, Sep/Oct-1994, 25-33.

Giesecke, Kay (2004). CREDIT RISK MODELING AND VALUATION. AN INTRODUCTION. *Credit Risk 2*.

Gonzalez, Fernando, Haas, Francois, Johannes, Ronald, Persson, Mattias, Toledo, Liliana, Violi, Roberto, Wieland, Martin, Zins, Carmen (2004). *Market Dynamics Associated with Credit Ratings* (Occasional Paper Series No. 16 / June 2004). Frankfurt: European Central Bank.

Hungarian National Bank (2004). *Monthly average annualized agreed rate of loans and deposits to non-financial corporations*. Hungarian National Bank. Retrieved June 9, 2004 from the World Wide Web: http://english.mnb.hu/dokumentumok/en0901_vallalkozoi.xls

International Accounting Standards Board (IASB) (2004a). *International Accounting Standard 39, Financial Instrument: Recognition and Measurement*, London, March 2004, IASCF Publications.

International Accounting Standards Board (IASB) (2004b). *International Accounting Standard 32, Financial Instrument: Disclosure and Presentation*, London, March 2004, IASCF Publications.

KPMG Deutsche Treuhand-Gesellschaft AG (1997). *STUDY ON THE UPDATING OF THE REFERENCE RATES OF INTEREST IN THE CONTEXT OF AID SCHEMES FOR ENTERPRISES IN THE EUROPEAN UNION*. KPMG 20 February 1997.

Lambin, J., J. (2000). The marketing information system. In Lambin, J., J., *MARKET-DRIVEN MANAGEMENT* (chapter 4, 133-182). Houndmills, England: MACMILLAN PRESS.

Merton, R., C. (1974). On the pricing of corporate debt: The risk structure of interest rates. *The Journal of Finance 29*. 449-470.

Moore, Phil, (2004). Mixed Signals. *Risk, Special Report Credit Risk, 17* (4), S2-S3.

Miron, Paul, Swannell, Philip (1992). *PRICING AND HEDGING SWAPS*. London: Euromoney Books.

National Bank of Greece (2004). *Bank interest rates on new deposits and loans vis-à-vis euro area residents*. National Bank of Greece. Retrieved June 9, 2004 from the World Wide Web: http://www.bankofgreece.gr/en/statistics/Epitokia.htm

National Bank of Poland (2004). *Average Weighted Interest Rates in the Polish Banking System*. National Bank of Poland. Retrieved June 9, 2004 from the World Wide Web: http://www.nbp.pl/en/statystyka/oproc/sw_oprocentowanie_en.xls

National Bank of Romania (2004). *Average Interest Rates Applied by Credit Institutions*. National Bank of Romania. Retrieved June 9, 2004 from the World Wide Web:

http://www.bnro.ro/En/Pubs/2004bl/e2004bl04s.pdf

National Bank of Slovakia (2004). *Monthly report of new loans provided in the current month in Slovak koruna and their average interest rates*. National Bank of Slovakia. Retrieved June 9, 2004 from the World Wide Web: http://www.nbs.sk/BANKY/HMBS/M10-12/M10-12A@200404.XLS

Pan-European Banks IAS – Measuring the Impact on European Banks. *Merrill Lynch,* 22 June 2004.

Rosenberger, W. (2002). *Risk-adjusted Lending Conditions, An Option Pricing Approach*, Chichester, England: Wiley & Sons.

Schönbucher, Philipp, J., (2000). *Credit Risk Modelling and Credit Derivatives*. Rheinische Friedrich-Wilhelms-Universität Bonn.

Study on the financial and macroeconomic consequences of the draft proposed new capital requirements for banks and investment firms in the EU. *PricewaterhouseCoopers,* 8 April 2004. Retrieved June 30, 2004 from the World Wide Web:

http://europa.eu.int/comm/internal_market/regcapital/index_en.htm

The Member States of the European Union (2002). CONSOLIDATED VERSION OF THE TREATY ESTABLISHING THE EUROPEAN COMMUNITY (Art. 87, 88*). Official Journal of the European Communities C 325 24/12/2002,* 33-184.

Varma, Praveen (2004). *Moody's Default and Recovery Rates of European Corporate Issuers, 1985–2003*. Moody's Investors Service, mimeo March 2004

Wirtschaftsblunder. *Economist.com*, February 19th 2004. Retrieved June 26, 2004 from the World Wide Web: http://www.economist.com/finance/PrinterFriendly.cfm?Story_ID=2441670

Zhu, H., (2004). *An empirical comparison of credit spreads between the bond market and the credit default swap market* (BIS Working Paper Series, No 160, August 2004), Basel: Bank for International Settlements.

17 Acknowledgements

This study has enormously benefited from the contributions and support of others to whom the authors gladly owe credits.

17.1 Participants of the survey

First of all, our gratitude is expressed to all participating institutions. Especially commercial banks were asked to disclose highly confidential data which to prepare definitely needed will, effort and expertise. All participants are listed in alphabetical order.

AB bank SNORAS		Lithuania	www.snoras.lt
AB bankas Hansabankas		Lithuania	www.hansa.lt
Banco Espirito Santo		Portugal	www.bes.pt
Bank Austria Creditan-stalt AG		Austria	www.ba-ca.com
Bank of Cyprus		Cyprus	www.bankofcyprus.com
Bank of Ireland Group		Ireland	www.bankofireland.ie
Bank of Valletta		Malta	www.bov.com
Bank Pekao SA		Poland	www.pekao.com.pl
Banque Générale du Luxembourg		Luxem-bourg	www.bgl.lu
Bayerische Hypo- und Vereinsbank AG		Germany	www.hypovereinsbank.de

BNP Paribas		France	www.bnpparibas.com
Caixa Geral de Depósi-tos		Portugal	www.cgd.pt
Caja Madrid		Spain	www.cajamadrid.es
Česká spořitelna, a.s		Czech Republic	www.csas.cz
Dexia Bank Belgium		Belgium	www.dexia.com
Dresdner Bank AG		Germany	www.dresdner-bank.de
DZ Bank		Germany	www.dzbank.de
Emporiki Bank		Greece	http://www.emporiki.gr
European Investment Bank		EU	http://www.eib.eu.int
Eximbank		Romania	www.eximbank.ro
Finnvera		Finland	www.finnvera.fi

Grupo Santander		Spain	http://www.gruposantander.com
HSBC Bank Malta p.l.c.		Malta	www.hsbcmalta.com
Komercni Banka		Czech Republic	http://www.kb.cz
Kreditanstalt für Wiederaufbau		Germany	www.kfw.de
la Caixa		Spain	www.lacaixa.es
LAIKI BANK LTD		Cyprus	http://www.laiki.com
Mediocredito Centrale		Italy	http://www.mcc.it
Raiffeisen Bank S.A.		Romania	www.raiffeisen.ro
Royal Bank of Scotland		UK	http://www.rbs.co.uk/
Sächsische Aufbaubank		Germany	www.sab.sachsen.de
SEB		Sweden	www.seb.se

17.2   Collegial assistance

Many of the authors' European colleagues provided their personal contacts or contacted banks and authorities. The authors' collegial thanks go to those listed in alphabetical order forth following:

Charalambous, Nicos (CY - Limassol); Covacescu, Adrian (RO - Bucharest); Cuadrado, Manuel (ES - Madrid); De Jonghe, Frank (BE - Antwerpen); de la Fuente, German (ES - Madrid); De Soete, Jeroen (BE - Antwerpen); Drinkwater, Sian (UK - London); Goettgens, Dr. Michael (DE - Duesseldorf); Hammell, Richard (UK - London); Jilli, Wolfgang (DE - Duesseldorf); Lewthwaite, Tom O (UK - London); Meyer, Nicolas (DE - Duesseldorf); Oeqvist, Martin (SE - Stockholm); Okuwa, Timi (UK - London); Oprisan, Andreea (RO - Bucharest); Palmqvist, Jan (SE - Stockholm); Patsalos, Ellie (UK - London); Pedersen, Christian Dalmose (DK - Copenhagen); Rana, Cliff (UK - London); Rist, Stephan (DE - Stuttgart); Ruiz, Fernando (ES - Madrid); Skrebnevskis, Romanas (LT - Vilnius); Szczerbetka, Zbigniew (PL - Warsaw); Thijssen, Valentijn (NL - Amsterdam); Turk, Tina (SI - Ljubljana); Verhaegen, Frank (BE - Antwerpen)

17.3   Review by European Commission Directorate General Competition

During the completion of the study, the services of the Commission (DG COMP, DG ECFIN) provided valuable feedback and additional information.

The views expressed herein are not necessarily subscribed by the Commission.

17.4 Authorship and reviews

The following team performed the study and its review and is responsible for remaining errors:

Name	Role (Level)	Deloitte Office and Department
De Ceuster, Marc Prof. Dr.	Impartial Review (Director)	Antwerp, Belgium, Enterprise Risk Solutions
Cremer, Andreas	Co-Author (Professional)	Düsseldorf, Germany, Financial Risk Solutions
Engels, Jörg	Project Manager (Partner)	Düsseldorf, Germany, Financial Risk Solutions
Siwik, Thomas Dr.	Author (Manager)	Düsseldorf, Germany, Financial Risk Solutions
Kläs, Friedhelm Prof. Dr.	Project Oversight (Managing Partner)	Frankfurt a. M., Germany, Assurance and Advisory

18 Questionnaire

The following questionnaire including a cover letter and a certificate of the EC has been sent to about 200 commercial, public and development banks and about 60 official authorities (ministry of finance, banking supervisory authorities, central banks) and banking associations in 30 European countries.

Deloitte.

Geschäftsführung

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"TO WHOM IT MAY CONCERN"

May 5, 2004
FRS/TS

Survey in conjunction with our study on the updating of the European Union's reference rate regime applied in controlling state aid and related matters

Dear Madam/Sir,

The European Commission, Directorate General Competition, has assigned Deloitte to conduct a study on updating the reference rate that is used in state aid control, as verified by the attached certificate.

The reference rate defines the threshold below which the interest rate of a loan granted by a European member state's entity would indicate the possibility of state aid.[1] The study mainly addresses the question whether a **fair benchmark** for the reference rate can be derived, which would be more **market based and risk adjusted** than the current system[2].

In the course of this study Deloitte is undertaking a survey, in which your institution is kindly asked to participate. In case another person than you is responsible for this kind of matters, forwarding this inquiry to her/him would be very much appreciated. Supervisory authorities and central banks are politely encouraged to promote our concern.

Deloitte would be very grateful to you for completing the questionnaire. Partially answered questionnaires are valuable as well indeed. With regard to the study's objective, please take as

---

[1] For further information on the reference rate regime please refer to:
http://europa.eu.int/comm/competition/state_aid/legislation/1999c241p9_en.html
http://europa.eu.int/comm/competition/state_aid/legislation/aid3.html#B

[2] Apart from case specific adjustments the current reference rate is the five year swap rate plus 75 basis points.

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Member of
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Sitz der Gesellschaft: München
Amtsgericht München
HRB 83442

Vorsitzender des Aufsichtsrats:
Prof. Dr. Gerhard Emmerich

Geschäftsführer:
WP/StB Dr. Frank Beine
WP/StB Manfred Bögle
WP/StB Udo Corzilius
StB Marion Farnschläder
WP/StB Stefan Fröhlich
WP/StB Dr. Michael Göttgens
WP/StB Prof. Dr. Wolfgang Grewe
WP/StB Paul-Dieter Groove
WP/StB Manfred Günkel

WP/StB Michael Irmscher
WP/StB Prof. Dr. Friedhelm Kläs
WP/StB Heiner Kompenhans
RA/StB Dr. Heinz-Klaus Kroppen
WP/StB Dr. Martin Künnemann
WP/StB Lutz Meyer
WP/StB Rolf W. Pickelmann
WP/StB Rainer Plath
WP/StB Dr. Martin Plendl
WP/StB Herbert Reiß

WP/StB Dr. Hans-Rudolf Röhm
WP/StB Richard Roth
WP/StB Helmuth Schäfer
WP/StB Reinhard Scharpenberg
WP/StB Heinz Dieter Schlereth
WP/StB Achim Schmidt
WP/StB Dr. Klaus Seifert
WP Fred Strottmann
WP/StB Jörg Tesch
RA Dr. Otmar Thömmes

WP/StB Prof. Dr. Frank Tischer
RA/StB Dr. Felix Wurm

02.2004

much as possible into account your **lending business to private enterprises** in your institution's home country, in the **25 EU Member States** and other **Candidate Countries**, as far as you are involved in these markets. The loans in question shall **not be subsidized** internally (e.g. through cross-selling) or by other entities (e.g. by development banks).

Faithful and reasonable answers to requested information could be achieved for instance by approximate **estimates**, i.e. **statistics** like averages and medians, fictive **calculations** employing your computer systems, or even **experts' opinions**. Participants are **not held liable** for wrong or imprecise answers of course. If the provided terms do not adequately suit your business or if you regard additional comments to be helpful, your further amendments would be very welcome.

You will doubtlessly regard the information requested as confidential. As a global auditing firm Deloitte assures you and by **professional secrecy** adheres strictly to the level of confidentiality you demand. Within the questionnaire you have the choice between the security levels *confidential* (default) and *secret* (not disclosed to the European Commission). **Appropriate aggregation** with information provided by others and rephrasing of statements will ensure that **individual answers are not identifiable**. In the case you feel strongly uncomfortable with the matter of detail either in view of confidentiality or needed effort it would still be valuable for the study if you were inclined to provide average values over coarser categories (for instance average credit margins for categories *strong*, *good*, *satisfactory* and *weak* creditworthiness). All information received in the course of the survey is exclusively used for the study and not for other purposes.

The Questionnaire and the cover letter have been approved by the European Commission, Directorate General Competition, the officials and servants of which are bound *not to disclose information of the kind covered by the obligation of professional secrecy, in particular information about undertakings, their business relations or their cost components.*[3]

The questionnaire has been sent to several institutions located in all European Member States, current European Candidate States and further European states. Among these institutions only commercial banks may find it possible to answer all questions properly. However, other institutions are kindly asked to answer general questions about the method proposed and some specific questions from a macro economic perspective. I.e. a central bank may well have the knowledge of the average return on equity of the banking sector it serves.

Apart from a **possible later publication** of the study, the European Commission, Directorate General Competition, will provide an **electronic copy of the study** to those institutions taking part in the survey. As far as you do not object **your contribution will be acknowledged** within the study by itemizing your institution's name and country as well as your corporate logo if provided.

---

[3] As specified in Article 287 of the Treaty establishing the European Community.

You have eventually received the questionnaire as a paper copy or as a PDF. However, to simplify your and our matters you are kindly invited to contacts us, so that we are able to send to you the corresponding Excel-file of the questionnaire by email.

Since we anticipate some feedback on the questionnaire, answers to your questions will be disclosed on a special web page, where other related documents are available as well:

www.deloitte.com/de/InterestRateSurvey

Though we have taken precaution it may happen that your institution receives the questionnaire from another department of Deloitte. Due to the strict time-table several channels had to be utilized simultaneously. We apologize for the inconvenience caused thereby.

The questions should be self-explanatory in general. To provide an additional guideline we filled certain place holders of the questionnaire with examples in green colour and italics. Please overwrite the examples with your own answers, which you may re-format (non-italic, black) to emphasize the change. However, in case of doubt or of arising questions regarding the procedures do not hesitate to contact:

Dr. Thomas Siwik, +49 / (0)211 / 8772 – 2147, tsiwik@deloitte.de

We gladly accept your **completed questionnaire, preferably by email**. Please instruct us if you desire a PGP-encrypted data transfer. Deloitte is looking forward to receive your completed questionnaire by **the 30th of June 2004** at the latest.

In anticipation of your contribution Deloitte expresses its gratitude.

Yours truly,

(Jörg Engels)   ppa. (ppa. Dr. Thomas Siwik)

Attachments:
- Certificate of the European Commission, Directorate General Competition
- Questionnaire

Brussels,
SAC D(2004)

TO WHOM IT MAY CONCERN

Subject: **Study on the updating of the reference rates of interest applied in State aid control**

I hereby confirm that Deloitte, represented by Messrs. Jörg Engels and Thomas Siwik (Deloitte & Touche GmbH Wirtschaftsprüfungsgesellschaft, Schwannstraße 6, 40476 Düsseldorf, Germany), has been selected to undertake on behalf of the Competition Directorate General of the European Commission a study on the updating of the reference rates of interest applied in State aid control in the EU.

Your assistance to the work of Deloitte & Touche GmbH will be much appreciated. For further information, please contact directly the official in charge of this: Mr. Koen Van de Casteele (koen.van-de-casteele@cec.eu.int; tel: ++32-2-296.94.19; fax ++32-2-296.98.13).

H. DRABBE
Director

Deloitte.

Survey
in connection with the
Study on updating the reference rate used in state aid control
see also   **www.deloitte.com/de/InterestRateSurvey**

Return completed questionnaire to: tsiwik@deloitte.de
at the latest by: <u>30 June 2004</u>

Please instruct us beforehand if you wish to submit the questionnaire by PGP-encrypted email.

We would be very grateful for receiving a confirmation fax from you, in case the domain of your email address is not clearly linked to your institution (see contact details below).

<u>Please observe the following guidelines for completing the questionnaire:</u>

Certain place holders for answers are already filled by an example in green colour and italics. Overwrite the example with your black coloured, non-italics answers.

Consider only the following markets:

Non-subsidized bank loans to enterprises of the private sector within your domestic country, EU member states and EU applicant states.

Central banks and supervisory authorities are kindly asked to answer the questions from a macro-economic perspective.

If a question or a series of questions is too general or too extensive regarding the markets you are involved in, please focus on standard loans and the market most important for you (e.g. your domestic loan portfolio).
However, in case your institution has considerable parts of its lending business in different countries we would very much appreciate if you could duplicate the respective sheets and complete them for each country.

Please understand currency amounts in EURO as if it were approximately the equivalent amount in the currency you account for in your answer (typically your domestic currency).

Loans addressed by the survey are understood mainly as standard loans (without embedded derivatives, cross-selling effects, etc. and paid out in full) granted to large as well as small and medium-sized enterprises (SMEs, see sheet Definitions).

Faithful and reasonable answers can be achieved in different ways:

Internal statistics, approximate estimates, averages, internal reports, fictive calculations employing internal tools, experts' opinions, etc.
For example, if a question does not differentiate the characteristics in the way your institution does, providing an expert's best guess or the weighted average would be suitable indeed.

Please leave questions open if you do not wish to answer them. However, if a (sub-)question is not applicable please insert "NA".

If a formula unpredictably became erroneous please choose an appropriate value by yourself.

If it seems necessary please provide additional comments.

Contacts:
Deloitte:
Deloitte & Touche GmbH	Schwannstr. 6	Tel: +49 211 8772-2147
Dr. Thomas Siwik	40476 Düsseldorf	Fax: +49 211 8772-2443
Financial Risk Solutions	Germany	Email: tsiwik@deloitte.de

European Commission:
Koen Van de Casteele	Tel.: +32 / 2 / 296 - 9419
DG COMP.SAC	Email: koen.van-de-casteele@cec.eu.int

Sheet A: Contact details and confidentiality

A1. Your contact details:

Institution:		Address:	*Mr / Ms*	Function:	
Street:		Title:		Position:	
Postcode:		First name:		Phone:	
City:		Surname:		Fax:	
Country:	*Switzerland*	Department:		E-mail:	

Please insert your corporate logo here:

A2. Desired level of confidentiality of information provided on the following sheets:

	Sheet Institution	Sheet Base Rate	Sheet Loan Port.	Sheet Spreads	Sheet Model	Sheet Sample
Public shall not be able to identify any individual information (confidential):	X	X	X	X	X	X
Moreover, our individual information shall not be disclosed to the European Commission (secret):	☐	☐	☐	☐	☐	☐
Date of completing the sheet (dd.mm):						

Sheet B: Institution

B1. To which extent is your institution's capital (or management/supervisory board) directly or indirectly controlled or held by the state?

☐ 0%　　　　☐ < 25%　　　　☐ 25% - 50%　　☐ > 50%

B2. To which extent (in % of lending business) does your institution pursue government's or public objectives rather than private investors' goals such as maximising profits or share-holder value?

☐

B3. What are the ratings of your institution or which rating would you deem appropriate for your institution if it is not rated by a rating agency?

Rating	Agency
AAA	*Standard & Poor's*
	Moody's
	Fitch
	Other
	Your estimate in terms of S&P's rating grades

B4.   Describe the lending business you are most active in? How large is your estimated market share (in %) in this market?

CHF-loans to small enterprises in the Zurich area.   Market share: [   ]

If applicable and possible please refer in your forth following answers to this portfolio. (Or append additional sheets for each portfolio if appropriate.)

B5.   What is your balance sheet total (total assets) and your annual income from interest (for instance taken from the last audited annual report)? What is the share (in %) contributed to total assets and interest income by lending to European large corporate enterprises and SMEs?

	Total assets	Interest income
Total:	€ [ ] mill.	€ [ ] mill.
Corporates including SMEs (in %):	[ ]	[ ]
SMEs (in %):	[ ]	[ ]

B6. How large is the share and the amount of public loan promotion programmes in your overall lending business?

☐ 0%   ☐ < 10%   ☐ 10% - 29%   ☐ 30% - 49%   ☐ 50% - 80%   ☐ > 80%   about € ☐ mill.

B7. How are corporate loans granted by your institution distributed (in %) among your domestic country, the following old and new EU member states as well as the EU applicant states (referring to the country where the investment takes place, where the collateral is located or where the debtor is resident, whatever is better applicable)? You may concentrate on important countries, e.g. summarizing up to 90% of your lending business.

☐ Switzerland   (Domestic country)

☐ Austria	☐ Belgium	☐ Cyprus
☐ Czech Republic	☐ Denmark	☐ Estonia
☐ Finland	☐ France	☐ Germany
☐ Greece	☐ Hungary	☐ Ireland
☐ Italy	☐ Latvia	☐ Lithuania
☐ Luxembourg	☐ Malta	☐ Poland
☐ Portugal	☐ Slovakia	☐ Slovenia
☐ Spain	☐ Sweden	☐ The Netherlands
☐ United Kingdom		
☐ Bulgaria	☐ Romania	☐ Turkey

Sheet C: Base rate

C1. In which proportion (in %) do you grant loans in the following currencies (in order of importance; example currencies may be overwritten)?

	Dom. currency		*Euro*		*Other currency*		*Other currency*

C2. Which proportion (in %) of newly granted loans are typically tied to the following periods concerning the base interest rate (i.e. disregarding the credit margin) agreed on at the time of issue (up to the next market based re-pricing or debtor's opportunity to redeem the loan)?

Which sources of information do you use to obtain the base rates (e.g. pages in Bloomberg or REUTERS)? And how big is the average bid/ask-spread in this market at the moment?

How much is the base rate above OR what is the credit spread your institution is paying for own senior debt against EURIBOR (or domestic equivalent as indicated by you)?

	1 mon.	3 mon.	6 mon.	12 mon.	2 years	3 years	5 years	7 years	10years	15years	20years
Dom. currency											
Source	*Money market rates up to 12 months quoted by the broker Carl Kliem obtained from REUTERS, about 2 BPs bid/ask-spread; 2 to 30 years EURIBOR obtained from Bloomberg ..., about 3 BPs bid-/ask spread; missing rates exponentially interpolated*										
Our spread in %											*EURIBOR*

Under the term "base interest rate" please understand the rate of re-financing loans, e.g. EURIBOR, LIBOR, swap rates, average funding costs.

	1 mon.	3 mon.	6 mon.	12 mon.	2 years	3 years	5 years	7 years	10years	15years	20years
Euro											
Source											
Our spread in %											

	1 mon.	3 mon.	6 mon.	12 mon.	2 years	3 years	5 years	7 years	10years	15years	20years	
Other currency												
Source												
Our spread in %												

	1 mon.	3 mon.	6 mon.	12 mon.	2 years	3 years	5 years	7 years	10years	15years	20years	
Other currency												
Source												
Our spread in %												

C3. Which base rate (in %) would you charge for a loan in your domestic currency (5 years, notional equivalent to € 5 mill., riskless debtor) regarding the following types of redemption?

[ ] Bullet   [ ] Annuity with initial redemption of 3% per quarter and final redemption of the remaining amount outstanding   [ ] Equal amounts and equidistant periods, i.e. quarterly redemptions of € 0.25 mill.

Sheet D: Loan portfolio

D1. Which share (in %) of new loans did typically fall in the following categories (if syndicated regarding the total amount including your exposure)?

| | < € 1 mill. | | € 1 mill. - € 5 mill. | | € 5 mill. - € 25 mill. | | € 25 mill. - € 50 mill. | | > € 50 mill. |

D2. Which share (in %) of loans do typically fall in the following redemption categories? Please specify the typical initial redemption (in % of notional) for annuity loans.

| | Bullet | | Annuity | | Roughly equal amounts | | Specific schemes |

at initial amount   and equidistant periods
of annuity of:

5%

D3. Does your institution have an internal rating for larger corporates and SMEs to assess a debtor's creditworthiness? Does the rating provide an estimation of the debtor's probability of default (PD) or mapping to a rating agency's PDs? Please comment briefly on your rating system regarding product/sector differentiation and future prospects.

Comments:

☐ Yes, with PD   ☐ Yes, no PD   ☐ No   (for larger corporates)   *Separate rating for start-ups. PDs for corporates will be derived in 2005.*

☐ Yes, with PD   ☐ Yes, no PD   ☐ No   (for SMEs)

D4. How are your newly granted corporate loans distributed among your rating scale (please replace the examples with your own rating and the corresponding probability of default (PD) for one year and choose a rating category you deem appropriate (scale chosen from CAD III, Annex D-7)?

	Aaa	*Aa1*	*Aa2*	*Aa3*	*A1*	*A2*	*A3*	*Baa1*	*Baa2*	*Baa3*
Replace with your rating:										
Replace with your average PD in %:	*0,00004%*	*0,00053%*	*0,00164%*	*0,00299%*	*0,00604%*	*0,01099%*	*0,04002%*	*0,09070%*	*0,20000%*	*0,39999%*
Your proposed rating category:	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Good*	*Good*	*Good*
% of loans:										

Replace with your rating:	*Ba1*	*Ba2*	*Ba3*	*B1*	*B2*	*B3*	*Caa1*	*Caa2*	*Ca*	*C*
Replace with your average PD in %:	*0,86000%*	*1,60000%*	*2,79000%*	*4,87000%*	*7,51000%*	*12,19000%*	*25,00000%*	*30,00000%*	*35,00000%*	*40,00000%*
Your proposed rating category:	*Good*	*Good*	*Good*	*Satisfactory*	*Satisfactory*	*Satisfactory*	*Weak*	*Weak*	*Weak*	*Weak*
% of loans:										

D5. Do you estimate the expected loss given default when the loan is granted (LGD: one minus the expected recoverable amount arising from the collateral, comprising debtor's typically pledged assets and bankruptcy assets, in relation to the expected exposure of the granted loan, typically the notional amount plus interest)?

☐ Yes   ☐ No

D6. How are your newly granted loans distributed among the following LGD categories?

LGD:	100% - 90%	89% - 80%	79% - 70%	69% - 60%	59% - 50%	49% - 40%	39% - 30%	29% - 20%	19% - 10%	9% - 0%	over-collateralized
% of loans:											

Sheet E: Spreads

E1.   To answer the following questions we recommend using your credit calculation tools. Alternatively, you may indicate the average conditions of actual loans contracted.

We used our credit calculation tools [   ]   We indicated average margins [   ]

E2.   Which margins (in %; including all components charged, i.e. for credit risk, cost of capital, administration cost, etc.) do you deem appropriate for (newly granted) unsubsidized loans (bullet, € 5 mill. notional, 45% LGD, standard loans without cross-selling effects and embedded derivatives) with the following ratings, PDs and terms to margin adjustment c prolongation? If you can theoretically price loans you would not grant, please colour the corresponding margins red.

Category	Rating	PDs in %	Term to margin adjustment or prolongation			
			1 year	3 years	5 years	10 years
Strong	Aaa	0,00004%				
Strong	Aa1	0,00053%				
Strong	Aa2	0,00164%				
Strong	Aa3	0,00299%				
Strong	A1	0,00604%				
Strong	A2	0,01099%				
Strong	A3	0,04002%				
Good	Baa1	0,09070%				
Good	Baa2	0,20000%				
Good	Baa3	0,39999%				
Good	Ba1	0,86000%				
Good	Ba2	1,60000%				
Good	Ba3	2,79000%				
Satisfactory	B1	4,87000%				
Satisfactory	B2	7,51000%				
Satisfactory	B3	12,19000%				
Weak	Caa1	25,00000%				
Weak	Caa2	30,00000%				
Weak	Ca	35,00000%				
Weak	C	40,00000%				

To reduce your effort you may concentrate on the most important ratings including a good and a bad rating. However, we would be grateful for a complete table.

E3. Consider a junior loan (5 year bullet, 75% LGD, € 5 mill. notional) whose un-collateralized part is subordinated. Which average margin (in %) do you deem appropriate for the following PDs and ratings (please change ratings and PDs if better applicable regarding your lending business)?

Debtor's rating	1 year PD	Margin
A2	0,01099%	
Baa2	0,20000%	
Ba2	1,60000%	

E4.a) Apart from other risk factors (like rating, LGD, etc.) does your institution differentiate between industry/sectors when determining the credit margin?

[   ] Yes   [   ] No

E4.b) If so, which average margin (in %) do you ask for a loan (1 year bullet, rating Baa2, € 5 mill. notional) to companies from the following industries/sectors?

[   ] Financial
(banking, brokerage, finance & investment, insurance)

[   ] Communications
(media-broadcast, -diversified, -services, -cable, printing & publishing, telecommunications)

[   ] Chemicals, metals/mining

[   ] Capital goods
(aerospace/defence, building materials, diversified capital goods, machinery, packaging)

[   ] Energy
(exploration & production, gas-distribution, integrated energy, oil field equipment & services, oil refining & marketing)

[   ] Agriculture, forestry/paper

[   ] Services cyclical and non-cyclical
(airlines, building & construction, gaming, hotels, leisure, railroads, support-services, theatres & entertainment, transportation excluding air/rail, environmental, health services)

[   ] Consumer cyclical
(apparel/textiles, auto parts & equipment, automotive, household & leisure, non-food & drug retailers)

[   ] Consumer non-cyclical
(beverage, consumer products, food, food & drug retailers, pharmaceuticals, tobacco)

[   ] Utility
(electric-distribution/transportation, electric-generation, electric-integrated, non-electric utilities)

[   ] Technology & electronics
(computer hardware, electronics, office equipment, software/services, telecommunications equipment)

[   ] Real estate
(housing association, real estate development & management, REITs)

E5. Which factors require different margins for loans to companies from different industries/sectors?

Competition

Different collateral risks

E6. Does your institution grant or acquire loans to distressed, but not yet defaulted enterprises (worst ratings before default, junk loans), which are not secured by state guarantees (1 year, 45% LGD, € 5 mill. notional)? If so, which margin (in %) do you regard as appropriate on average?

a) No   b) Yes, but only to secure own assets (e.g. old loans)

b.1.) usually at the original margin
b.2.) usually at a different margin: from   to

c) Yes, acquisition of bad loans is part of our regular business

c.1.) at margins ranging: from   to

E7. Does your institution grant loans (1 year, 45% LGD, € 5 mill. notional) or provide venture capital to start-ups? If so, which margin (in %; rate of return including success fees above base interest rate) do you regard as appropriate on average?

No

Yes, providing loans or venture capital to start-ups is part of our regular business

at margins ranging: from   to

E8. Which margins (in %) do you deem appropriate for a loan and a guarantee (1 year bullet, 45% LGD) with the following PD and notional amounts?

Credit type	Rating	PDs in %	€ 1 mill. notional	€ 5 mill. notional	€ 25 mill. notional	€ 50 mill. notional
Loan	Baa2	0,20000%				
Guarantee	Baa2	0,20000%				

E9. How much is the typical margin (in %) contributed to fees, management costs, etc. (i.e. the cost margin not accounting for credit risk and return on capital, etc.) for loans and guarantees of the following notional amounts?

	€ 1 mill.	€ 5 mill.	€ 25 mill.	€ 50 mill.
Loans:				
Guarantee:				

E10. Apart from other (risk) factors (PD, LGD, notional amount, etc.) do you differentiate the margins you require with regard to SMEs in contrast to large corporates? To which extent?

E11. Which margins (in %) do you deem appropriate for a (1 year bullet,€ 5 mill. notional) with the following PD and LGDs?

Credit type	Rating	PD in %	100% LGD	80% LGD	60% LGD	40% LGD	20% LGD	0% LGD
Loan	Baa2	0,20000%						

E12. Please specify the historical margins (in %) for a loan (1 year bullet, 45% LGD,€ 5 mill. notional) with the following PD:

Credit type	Rating	PD in %	Today	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
Loan	Baa2	0,20000%						

E13. Please indicate the margin (in %) your institution would ask for a loan (1 year bullet, rating Baa2, 45% LGD, notional equivalent to € 5 mill., disregarding country risk) in the following currencies:

Dom. currency		Euro		Other currency

Other currency

Sheet F: Model

F1. To which extent is your institution's loan pricing market based using credit spreads observed in bond markets for the following notional amounts?

Almost independent   1   2   3   4   5   Almost fully dependent

☐ ☐ ☐ ☐ ☐   € 1 mill.

☐ ☐ ☐ ☐ ☐   € 5 mill.

☐ ☐ ☐ ☐ ☐   € 25 mill.

☐ ☐ ☐ ☐ ☐   € 50 mill.

F2. What is the pre-tax Return on Equity (ROE) in % you typically demand for loans on average?   ROE: ☐

F3. Concerning the level of the demanded ROE do you differentiate among certain factors (i.e. sector, collateral, etc) and to which extent?

F4. How do you measure the capital amount (tear 1 and 2) required to underlay granted loans?

☐ Not measured ☐ Constant at ▭ ☐ CAD I ☐ Prelim. CAD III/ Basel II ☐ Internal model

F5. If you apply or intend to apply CAD III/Basel II, which approach does your institution use or intend to use to calculate the capital requirements for credit risk of corporate debtors? When do (did) you implement this approach?

☐ Standardized approach ☐ Foundation internal ratings-based approach ☐ Advanced internal ratings-based approach

▭ Date of implementation (mm.yy)

F6. What is the average share (in %) of capital underlying your institution's loan portfolio?

▭ Today ▭ Your estimation taking into account the third Quantitative Impact Study (QIS 3), CAD III, Basel II, if already calculated

F7. Do you regard the following basic model, which is described by an example of a loan (1 year bullet, € 5 mill. Notional, 45% LGD), as an appropriate simplification of credit market based pricing of loans (please understand the model as pre-tax calculation)?

Operator			Components of actual interest rate		%		
			Probability of default (PD based on BBB rating)	0,20%			
	*		Loss given default (LGD)	45,00%			
	+	=	Expected loss		0,09%		
			Regulatory capital requirement according to working document CAD III for risk quality step 3 of the Standard Approach (see 7.1.2 of Annex C-1; or rating BBB/Baa2 according to Basel II)	8,00%			
	*		Required Return on Equity (ROE)	10,00%			
	+	=	Cost of capital		0,80%		
	+		Administrative expenses, unit costs		0,25%		
+	=		**Credit margin**			**1,14%**	
+			**Base refinancing rate (e.g. swap rate)**			**5,00%**	
+			**Own funding costs above base rate**			**0,15%**	
=			**Actual effective interest rate of loan**				**6,29%**

What is your opinion on the model?

F8. With regard to the model above what other risk factors or parameters do you regard as important in pricing loans? Are these factors or parameters inevitably necessary in a decent simplification of pricing a standard product?

	Important parameter	Inevitably necessary		Important parameter	Inevitably necessary
1.	*Timing of cash flows*	☐ Yes ☐ No	2.		☐ Yes ☐ No
3.		☐ Yes ☐ No	4.		☐ Yes ☐ No

Sheet G: Sample

E1. Please complete the table below for a representative or random sample of loans your institution granted. We would be very grateful if the sample contains at least 20 or more items.

No.	PD in %	Rating	LGD in %	Date of acquisition / out payment	Term to re-pricing at inception	Average term to re-pricing/ duration	Base rate in %	Effective interest rate in %	Gross credit margin in %	Notional amount	Country	Currency	Sector	SME (yes/no)
1														
2														
3														
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5														
6														
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29														

No.	PD in %	Your rating	LGD in %	Date of issuance	Term to re-pricing at inception	Average term to re-pricing/ duration	Base rate in %	Effective interest rate in %	Gross credit margin in %	Notional amount	Country	Currency	Sector	SME (yes/no)
30														
31														
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34														
35														
36														
37														
38														
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Sheet H: Summary of definitions and references

Reference rate	Benchmark level below which interest rates of loans granted (guaranteed) by state agencies are regarded as state aid. http://europa.eu.int/comm/competition/state_aid/legislation/1999c241p9_en.html http://europa.eu.int/comm/competition/state_aid/legislation/aid3.html#B

CAD III	**Third Capital Adequacy Directive of the European Union** http://europa.eu.int/comm/internal_market/regcapital/index_en.htm

Basel II	**New Basel Capital Accord** http://www.bis.org/publ/bcbsca.htm
QIS 3	Third Quantitative Impact Study: Survey on the impact of Basel II on banks' minimum capital

SMEs	**Small and medium-sized enterprises**
Definition according to the third Capital Adequacy Directive of the European Union (CAD III), Annex D 2 / the new Basel Capital Accord (Basel II), §§ 186, 242:	SMEs are defined as companies where the annual sales (total assets if more meaningful) for the consolidated group, of which the firm is a part, is less than € 50 million.
Definition by the European Commission:	SMEs are defined as companies with fewer than 250 employees, either with an annual turnover which does not exceed € 40 mill. or with an annual balance-sheet total which does not exceed € 27 mill. and not more than 25% of its capital controlled by an organization which is not a SME itself.
Definition of small enterprises by the European Commission:	A small enterprise has fewer than 50 employees, and has either, an annual turnover not exceeding € 7 million, or an annual balance-sheet total not exceeding € 5 million.

RoE	**Return on Equity** Pre-tax net income in relation to minimum capital reserved for activity.

PD	**Probability of Default** Estimated likelihood that debtor defaults within one year.
LGD	**Loss given default** Expected loss in % of debtor's exposure (usually notional plus interest) taking into account recoverable amounts from collateral and the bankruptcy assets.