

Implications of Basel II for the Risk Management of German Mortgage Banks

by Dr. Louis Hagen and Rebecca Holter

It is the declared objective of Basel II to increase the stability of the financial markets. At the center of efforts dedicated to achieving this aim lies the overhaul of the capital adequacy requirements with a view to better aligning them to the banks' individual economic risk. The extent to which banks will be affected by the modification of the capital adequacy requirements therefore depends primarily on the risks in their portfolios.

The business conducted by German mortgage banks is traditionally considered low-risk compared with other banking activities. The question is whether this assumption can be empirically substantiated and satisfy the high standards set by the new Basel regulations.

The following article will examine this issue on the basis of historical mortgage loan loss data. Further, this article will consider the opportunities Basel II offers the German mortgage banks, and their joint loss given default (LGD) project as a prerequisite for

the application of the advanced internal rating-based approach (IRB approach) envisaged under Basel II.¹

CREDIT RISKS INVOLVED IN GERMAN MORTGAGE LENDING—AN EMPIRICAL ANALYSIS

Mortgage banks and Pfandbriefe have an impressive track record. Ever since the Mortgage Bank Act (HBG) came into force in the year 1900, no Pfandbrief-issuing mortgage bank has become insolvent. Pfandbriefe have never been defaulted on since they came into existence in 1769.

Prima facie, this speaks in favor of the safety of the real estate credit; yet this safety is also borne out by loan loss data. Although there is no such thing as a continuous and uniform survey of loss data for the German real estate credit, individual studies have been made, the findings of which are well worth setting out.

- A first study on default and loss risks in commercial mortgage lending was commissioned by the Association of German Mortgage Banks (VDH) and conducted by the research institute empirica in 1996 (see Figure 1). Empirica based its study on a poll carried out by the Central Credit Committee (ZKA)². All the mortgage

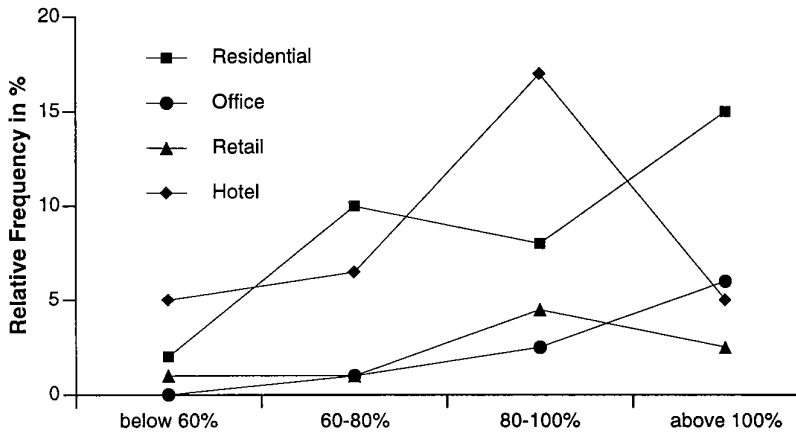
banks, the 18 biggest commercial banks and seven Landesbanken collected data on losses from loans for office and multi-purpose commercial buildings. The default rate arrived at was 0.15%, while the loss rate for loans with a loan-to-value ratio of up to 60% was—at 0.03% to 0.04%—well below that mark. The ZKA survey was complemented by an analysis of a disaggregate loan data set carried out by mortgage banks. To this end, a random sample of 1,900 loans (above 2.5 million euros) was taken from the portfolios of four mortgage banks. The main finding of this analysis was that a strong link exists between loan default risk and loan-to-value ratio. And it was found that where this random sample was concerned that the probability of the event of a bad debt charge in the 60% area is only 50% of the probability of the event of a bad debt charge at all.³

- In September 1999 the ZKA carried out a new survey of the losses in real estate credits. This survey, based on a total data collection, covered loss rates from loans for residential and commercial properties in the period 1988 to 1998. (See Figure 2.) The average loss rates were divided up according to loan-to-mortgage-lending-value ratios. The banks that participated in the survey

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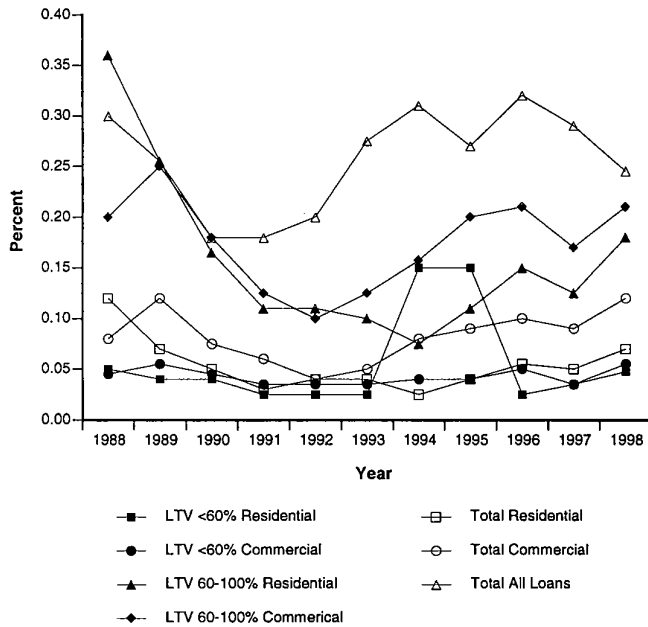
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Figure 1. Observed Frequency of Bad Debt Charges by Collateral Type and LTV Ratio



Source: empirica

Figure 2. Capital Losses in Percentage of Outstanding Loans



Source: ZKA

represent a market share of approximately 80% of the entire German mortgage loan market.

This study, too, confirmed the extremely low loss risk of real estate credits.

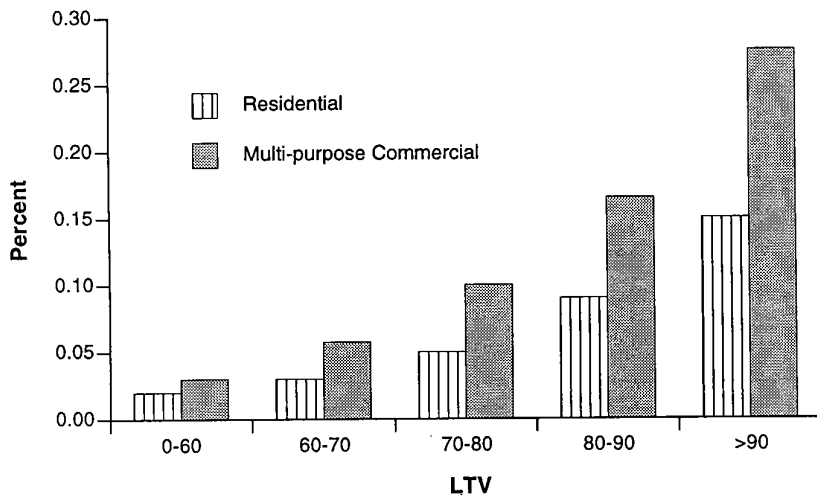
Figure 2 shows that the loss rates for mortgage loans are well below those for the total of all loans. "Total all loans" refers here to all property financings (including development financings and lendings on other commercial properties), as well as corporate and consumer loans not real-estate secured.

In considering the average figures over the entire ten-year period examined, attention is drawn to a loss rate in first-ranking commercial property loans of only 0.04%. Meanwhile, the equivalent rate for first-ranking residential loans is, at 0.03%, even lower. By comparison: a loss rate of 0.26% was measured for all loans over the period 1988-1998. And in this study, too, the strong correlation between loan-to-value ratio and loan loss risk is confirmed.

- Complementing this ZKA survey, empirica, working from a random sample, examined the specific loss determinants for the German mortgage banks for the Association of German Mortgage Banks. The basis of this study was a disaggregate data set comprising 10,535 loans (above 250,000 euros) taken from the portfolios of four mortgage banks.

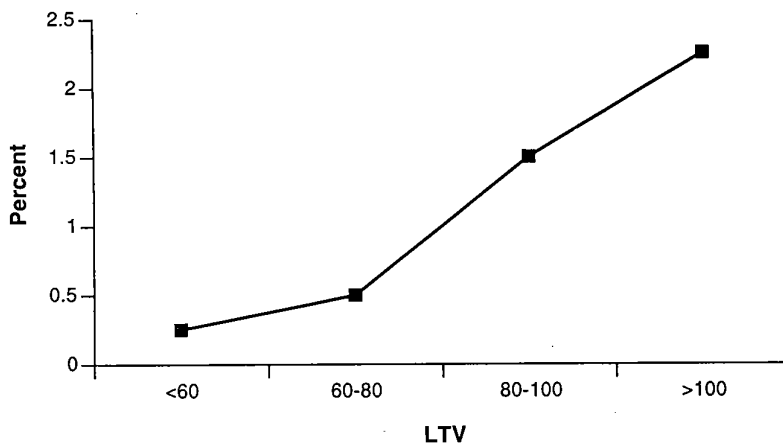
In particular, the data were examined for factors affecting loan exposure in East Germany. It succeeded in showing that the slight rise in loss rates (see Figure 2) was caused by special effects of German reunification. The impact on the loss rates as a whole, however, is smaller than generally supposed. The low level recorded in the 1980s was reached again as early as 1997-1998.

Figure 3. Estimated Loss Rate Based on Historical Values



Source: empirica

Figure 4. Relative Frequency of Specific Bad Debt Charge (Percentage in retail loans in relation to LTV)



Source: empirica

The analysis of the random sample again illustrates the close correlation between exposure to loss and loan-to-mortgage-lending-value ratio.

The special effects of reunification are reflected in Figure 3. If one were to adjust the chart for these effects, the loss rates for multi-purpose commercial properties would be appreciably lower. Reunification was not found to have had any significant impact on the loss rates in residential properties.

- Whereas the analyses described above concern themselves primarily with commercial mortgage loans or residential properties for commercial purposes, empirica was commissioned by the Federal Office for Building and Regional Planning and the Federal Ministry of Transport, Building and Housing to consider the obstacles to the creation of residential ownership. To this end, empirica scrutinized a data set containing 1,818 retail loans in residential housing to determine their loan default risk.

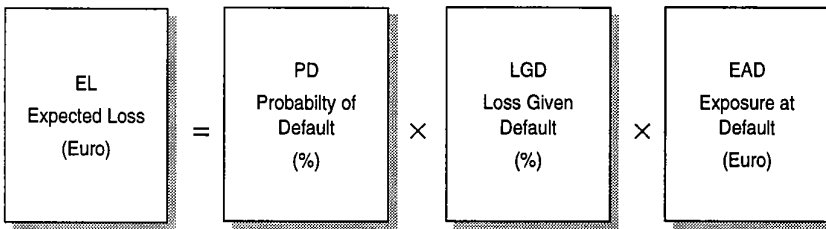
This analysis on the basis of individual loans shows that in this random sample from the retail property sector, too, the loan-to-mortgage-lending-value ratio must be regarded as an important driver of loan default risk, measured in this case by the formation of specific bad debt charges.

Summing up, it may be said that the traditional view that real estate-secured loans entail less risk than other loans is confirmed by several studies.

INCENTIVES FOR INTRODUCING INTERNAL RATING SYSTEMS

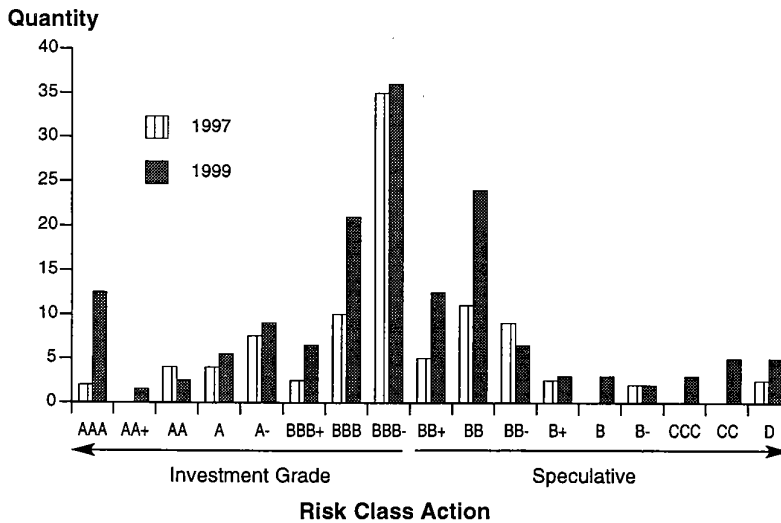
The current capital adequacy requirements offer few incentives for the examination of individual credit risks and the structure of a detailed internal ratings system. However,

Figure 5. Components of Expected Loss



Source: Oliver, Wyman & Company

Figure 6. Ratings of International Project Developments (Concentrated in the BBB and BB range)



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Basel II will cause a crucial change of the regulatory surroundings.

The low loss rates demonstrated above give reason to expect that the German mortgage banks can improve their capital backing situation if they choose the advanced internal rating-based approach instead of the stan-

dardized or foundation approach, i.e., the approach that permits the most precise representation of the economic credit risk. What is characteristic of the real estate loan is not the borrower's personal credit standing, which largely determines the probability of default (PD), but the loan collateral that the lender can realize should the customer

default, and which so determines the loss incurred by the bank. (See Figure 5.)

Only with the advanced internal rating-based approach is it possible to take the real estate collateral sufficiently into account by measuring the loss given default (LGD). The standardized approach and the foundation IRB approach do not permit this individual measurement and do not therefore take sufficient account of the high collateral value of real estate.

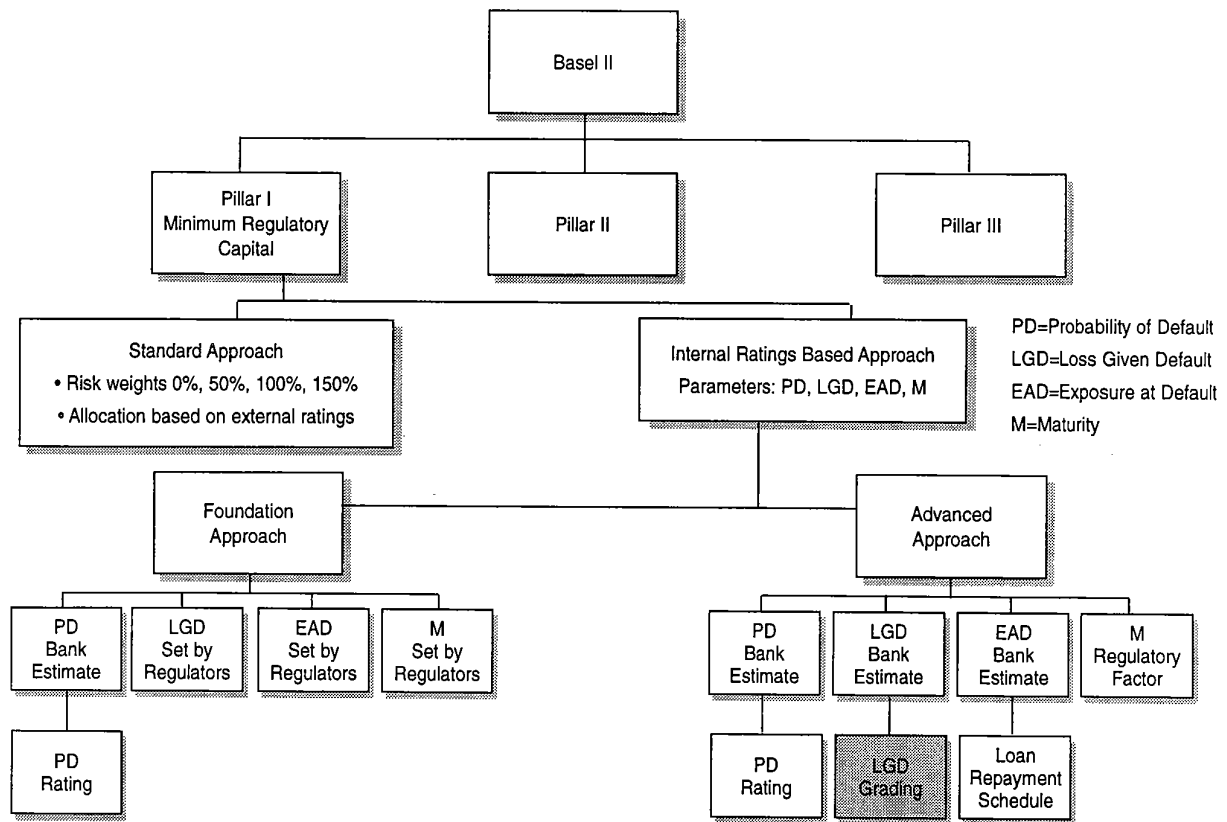
The LGD can be best put to effect in the rating classes BBB+ to BB-, as may be seen in Figure 6. It may be expected that a large number of real estate customers fall within this range.

In addition to the regulatory incentives to ensure adequate capital to back risk (see Figure 7), ever-stiffer competition also necessitates the introduction of improved risk-measuring techniques. The avoidance of high risk provisioning is one of the foremost factors in achieving returns on equity demanded by the capital market.

The model developed by the Association of Mortgage Banks within the scope of the LGD project is a cornerstone for measuring regulatory capital and credit risk management. The mortgage banks are hoping for positive impulses from LGD grading, particularly with regard to risk control and management.

The ability to better identify and classify default and loss risks is a basic prerequisite for managing them. In the past, the lack of information has meant that the bank's portfolio structure and, ultimately, also profitability were determined by "adverse selection." Thus, risk-sensitive pricing can reduce "adverse selection," minimize credit rationing and so, in the future, set free considerable value potentials. Consequently, an improved risk measurement would produce higher risk-adjusted returns on equity.

Figure 7. Basel II Capital Adequacy Rules Differentiate Between Three Approaches



Note: The internal measurement of loss given default only is necessary in the advanced IRB approach.

INTRODUCTION OF VDH-WIDE LGD GRADING

The Project

The insights that have been gained suggest that the mortgage banks⁴ ought to try to satisfy the criteria for the advanced internal-based rating approach. Yet a study of the existing risk analysis tools showed that while

credit ratings and/or property ratings were to be found at most institutions, very few of them met the stringent requirements of the Basel consultative paper. In most cases, they lacked a separate measurement of the borrower's credit standing (PD) and loss given default (LGD). Only few ratings complied with Basel in that they were calibrated to the bank's own loss history. Further, it was found that at many banks the instruments for

measuring the borrower's credit standing were far better than the instruments for measuring the loss given default.

This general need for a new, Basel II-compatible instrument to gauge the LGD prompted the Association of German Mortgage Banks to commission a management consultancy firm to carry out an LGD project on the basis of a joint pool of loss data.

Only by this pooling of loss data was it possible for smaller banks, in particular, with a meager data history of their own to be able to apply the advanced approach. Yet also institutions that would have been in a position to compile their own loss history profit from a shared data pool. The improved database makes a more detailed segmentation of properties possible, so that ultimately the findings are more instructive.

Besides creating cost synergies and avoiding the need to carry out the same work twice, the simplified regulatory acceptance procedure for a joint LGD model is a further benefit for all VDH members.

Supervisory acceptance of the LGD model is subject to compliance with the following requirements:

- Classifiability, i.e., the possibility to predict the loss given default by type, location and/or other factors.
- Empirical statistical backing and validation.
- Calibration to the loss history.
- Transparency and retraceability.
- Implementability in the lending process.

It may therefore be expected that a standardized method, comparable parameters and a broad statistical database will facilitate acceptance. However, LGD grading can only be applied in connection with a Basel II-compatible credit rating to determine the regulatory capital. This is not necessary for the other possible uses mentioned above.

The LGD project consisted of three phases (see Figure 8).

To ensure an optimal transfer of information, the banks were closely involved in the pro-

ject from the outset. A project team made up of representatives from the banks and management consultants worked together on validating and analyzing the collected loss data, after which the objective correctness of the relevant findings was checked by a group of experts from the mortgage banks. The Association of German Mortgage Banks supervised and coordinated the project closely throughout.

During the main part of the project, a number of talks were held with the Federal Authority for Financial Services Supervision (BAFin, former: BAKred) to discuss the progress being made. In this way it was possible to identify at an early stage where corrections were necessary, thereby facilitating acceptance. However, it will be up to the individual banks to obtain formal acceptance once the model has been implemented.

The mortgage banks are currently in the implementation phase. The developed calculation model is run on computers. In addition, preparations are underway for the calibration of the VDH findings to each individual bank's own loss history. Most mortgage

banks plan to have the LGD model fully implemented and integrated into their lending processes by January 1, 2003.

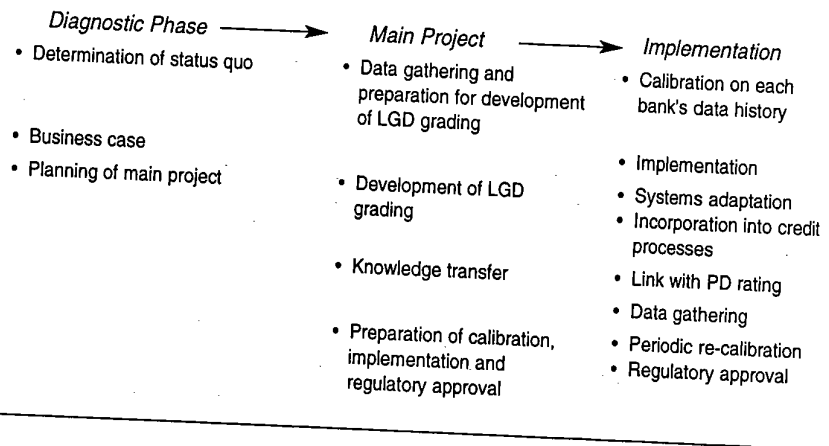
The LGD Model

The purpose of the LGD as a component for determining the regulatory capital in the advanced rating approach is to compute the expected loss in the event that the borrower defaults. To this end, a method of calculation has been developed which allows the banks to estimate, on a differentiated basis, the LGD for mortgage loans taking the given collaterals into account. This calculation is made using both VDH-wide estimated variables and bank-specific parameters.

The LGDs are calculated separately for the individual types of liquidation. The overall LGD is then derived from the probability at each individual bank for the type of liquidation of the loan exposure.

The LGD calculation accounts for the fact that a portion of the loans in default go to foreclosure and liquidation (LGD_L), a portion are restructured or settled with a lower loss

Figure 8. VDH Currently Conducts an LGD Project Comprising Three Phases



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per default (LGD_S) and a portion cure (LGD_C) with no loss (see Figure 9).

To calculate the LGD in case of liquidation, the current market value of the property is extrapolated to the time of liquidation using a market forecast applied within the scope of the LGD project (see Figure 10). The time of liquidation is determined on the basis of the empirically determined duration of liquidation.

The market value at liquidation is multiplied by the property-specific recovery rate, which is also determined empirically, to arrive at the proceeds at liquidation. The calculation is made inclusive of administrative, liquidation and interest costs. The administrative and liquidation costs were computed specifically for each bank by benchmarking. In the future, these costs will be captured separately so that they may be directly attributable to the economic loss. Interest costs and cost of carry are calculated according to the duration of liquidation. The economic loss

thus calculated is then set in relation to the outstanding loan amount, resulting in the "liquidation" LGD. This procedure is applied analogously to obtain the "comparison" LGD. Additional collateral may also be taken into account, and recovery rates for additional collateral will also be included in the future.

Financings of properties located abroad account for a large share of new lendings at a number of mortgage banks. To date, only very few of these loans have been defaulted on, rendering it impossible to form an adequate pool of statistical data on foreign properties. Nor could comparable data be found externally. Nevertheless, a uniform and consistent solution is needed so that a method of calculation may be used for the foreign portfolio analogous to that applicable in Germany.

The difficulty here lies in estimating recovery rates, durations of liquidation and liquidation costs. For this reason, a study by Moody's Investor Services on default rates of com-

PROPERTY MARKET FORECASTS

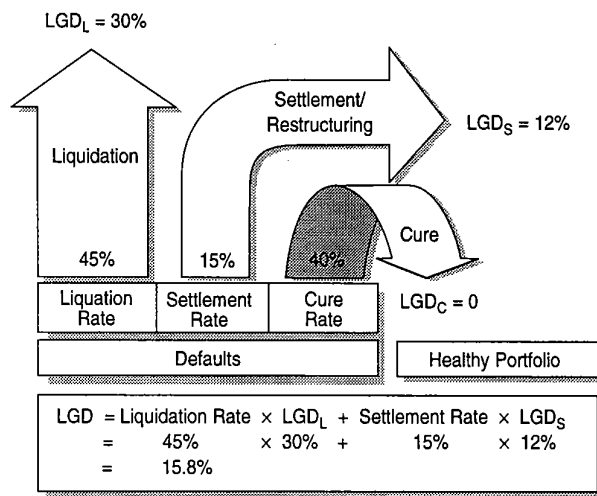
One central element of LGD grading is the property market forecast. The property market forecast provides information on the future development of a certain property type in a certain regional market. To support the forecasts, a transaction-based databank is being developed to collect the value-determining parameters of each financing transaction carried out by mortgage banks. The actual transaction data are fed into an econometric forecast model as indicators of the development of real estate prices. Given that the mortgage banks command large market shares, the property market forecasts will be both instructive and reliable.

mercial mortgage-backed securities provides a helpful frame of reference. Using the recovery rates ascertained in that study, the domestic recovery rates are scaled to the typical mean calculated for each country. Liquidation costs and durations are taken from external sources. The German mortgage banks plan in the medium term to participate in an international LGD data pool to give them instructive empirical LGDs to refer to for their foreign activities as well.

The Data Pool

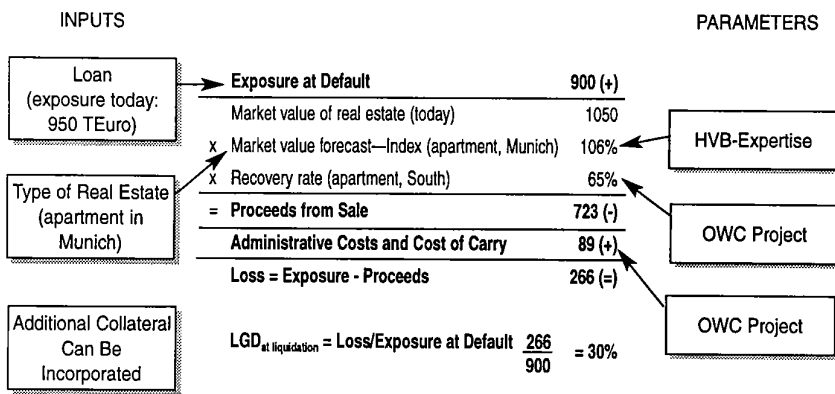
In order to estimate LGDs, two parameters have to be established at VDH level: recovery rates and liquidation durations. Recovery rates set the proceeds from the realization of real estate collateral into relation to the current market value. The liquidation durations are a measurement of the period of time from entry into liquidation until realization of the real estate collateral. (See Figure 11 for absolute distribution of liquidation cases and Figure 12 for the number of liquidations by year.)

Figure 9. Example of LGD Calculation



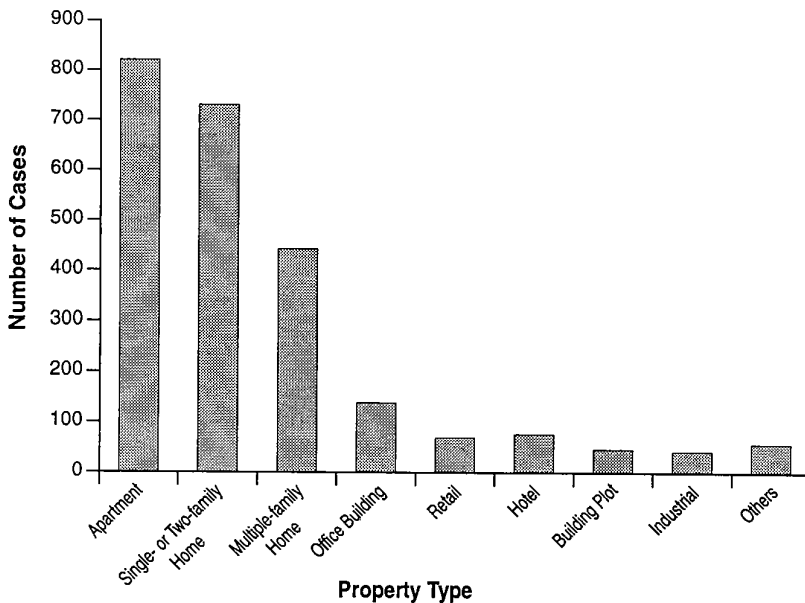
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Figure 10. LGD Calculation at Liquidation for the Next Year



Note: OWC = Oliver Wyman & Co.
HVB = HVB Real Estate Bank

Figure 11. Absolute Distribution of Liquidation Cases



Source: Association of German Mortgage Banks (VDH).

The recovery rates and liquidation durations were estimated on the basis of a data pool formed by the mortgage banks. Since the VDH members command a market share of approximately 22% in residential mortgage loans and approximately 45% in commercial mortgages, it may be assumed that the loss data of this group of banks is representative of real estate lending in Germany.

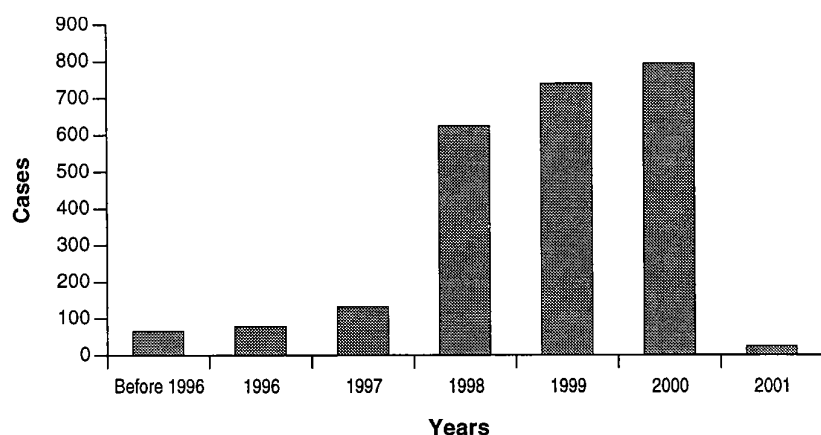
The data pool currently comprises 2,500 complete data records. Each data record has some 30 features. So far it has been possible to collect data on the critical number of 30 individual cases for nine different property types. The aim is to raise the number of different property types to 19 in the medium term.

First, all the electronically available data at the banks were brought together. These data were subsequently standardized and anonymized by the project team. The consistency and plausibility of the data were rigorously examined. It was then decided, on the strength of recommendations by the banks, for which property types additional data should be collected. The subsequent manual collection was done using liquidation files and standardized data templates. The data thus collected were then electronically edited and added to the data pool.

Great importance was attached to the representative quality of the data during the data collection process. It was especially important that the years of liquidation cases surveyed at the respective banks were as complete as possible.

Only data on resolved liquidation cases were collected. The use of the features may be divided into two categories:

For segmentation, property-specific criteria such as property type, location and other characteristics were collected. When estimating the parameters, the different seg-

Figure 12. Number of Liquidation Cases by Years

Source: Association of German Mortgage Banks (VDH)

mentation criteria were examined to ascertain the extent to which they could explain the amount of the recovery rates and length of the liquidation durations. They serve property segmentation purposes only, and have no direct bearing on the amount of the recovery rates or the duration of liquidation.

For the parameter estimate, all the input parameters that were absolutely essential for the estimate were collected; among others, these were the time of the loan extension, the value of the property at loan extension, the proceeds from realization and the time of realization.

The analysis revealed that it was possible to form 13 separate segments in residential property and nine in commercial real estate at a statistically significant 95% confidence level. An analysis of the recovery rates for the various segments pointed to marked differences in the amount of the recovery rates. The highest recovery rate in the residential sector was almost twice as high as that of the worst segment. The estimate of

the recovery rates for the commercial property sector is currently being carried out. The sub-segmentation optimized for the recovery rates was assumed for the estimate of the liquidation durations.

The liquidation durations for the residential property sector are between 17 and 22 months. A wider variance was found for commercial properties, with the duration ranging from 24 to 32 months.

Despite the strong correlation empirically found to exist between loan-to-value ratio and loan default risk, it would not make sense to differentiate by loan-to-value ratio. The recovery rates convey a measure of the proceeds generated from realization. But the loan-to-value ratio has no bearing whatsoever on the proceeds from forced sale. The amount of the loan-to-value ratio is implicitly taken into consideration in the exposure at default.

The liquidation cases at the mortgage banks are to be collected systematically and completely for the data pool in the future, too.

The present estimates will be extrapolated by the additional data, on the one hand to stabilize the estimates and, on the other, to make a finer segmentation possible in future.

Moreover, a concept is currently being devised by which other real estate finance providers may also participate in the LGD data pool. In this way the database could be significantly expanded and the quality further improved. In initial talks, other groups of financial institutions have expressed a strong interest in taking part.

As far as the Association of German Mortgage Banks knows, the LGD project that has been conducted and the data pool for real estate finance are unique in Germany. The regulatory benefit and the advantages to be gained from using the model to manage risks will vary from one bank to the next according to their individual credit portfolios. But one thing is certain: the possibility to use the model in itself constitutes value added.

NOTES

¹Public-sector lending, the mortgage banks' other business field, is not covered in this article.

²The ZKA consists of the five leading associations of the German credit industry: Federal Association of German Banks, Federal Association of German Agricultural and Rural Banks, Federal Association of German Public-Sector Banks, German Savings Banks Association, and Association of German Mortgage Banks.

³The mean of the loans chosen at random had a 72% loan-to-mortgage-lending-value ratio.

⁴Members of the Association of German Mortgage Banks: Allgemeine Hypotheken-Bank Rheinboden, Bayerische Hypo- und Vereinsbank, Berlin-Hannoversche

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Hypothenbank, Deutsche Genossenschafts-Hypothenbank, Deutsche Hypothenbank (Act.-Ges.), Dexia Hypothenbank, Düsseldorf Hypothenbank, Eurohypo, Hypothenbank in

Essen, KHK Hypothen- und Kommunalkredit-Bank, HVB Real Estate Bank, M.M. Warburg & Co Hypothenbank, Münchener Hypothenbank eG, SEB Hypothenbank, Westfälische Hypothen-

bank, Westfälische Landschaft Bodenkreditbank, Württembergische Hypothenbank, Wüstenrot Hypothenbank.