Risk Adjusted Pricing Strategies for the Corporate Loans Business – Do They Really Create Value?

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Abstract

For a fairly long time, the German corporate loan business has been regarded in publications on the subject as a value destroyer. On the basis of the bank lending statistics of the Deutsche Bundesbank, our analysis clearly shows a cyclical as well as a structural problem preventing the big four German banks from creating value. In order to analyze possible strategies to solve this issue within a systemic approach, we built a model which included almost 200 variables. Running this model until the year 2010 the outcome is appalling: the break-even return on equity will not be reached. We therefore modelled in a second step the widely discussed strategy of risk adjusted pricing. The outcome raises hope – although this strategy in itself is not sufficient to solve the problem entirely, the return on equity can be increased.

Key Words: Risk Adjusted Pricing, Corporate Loans Business, Value Creation Strategies

1 Value Destruction in the German Corporate Loans Business

Regarding return on equity (RoE), the German corporate loans business has been destructing value for several years.[1] As early as 1999, Andreas Stehman, former Vice President at Mercer Management Consulting, pointed out:

> "In the loans business with corporate clients, shareholder value is destroyed. In 1998, Deutsche, Dresdner, Commerz, BHF, Hypo-Vereinsbank, Bankgesellschaft Berlin and IKB have reduced shareholder value by more than three billion DM with corporate loans. A total lending volume of 900 billion have yielded a mere 3.4 billion of net earnings after provisions for loan losses"(Stehmann, 1999, p. 23).

Nowadays, the problem is still prevailing. Even though the number of corporate insolvencies in Germany decreased by 3.5 % in 2005, 37,500 insolvencies are still close to the all-time high (Creditreform (Ed.), 2005). Loan loss provisions, which are the biggest expense item in the corporate loans business, are expected to remain at a high level. The precarious financial situation of the corporate loans business has been a subject of lively discussion in academic publications as well. In their provocatively titled book „The corporate loans business – a value destroyer?," Rolfes, Schierenbeck and Schüller (2001) state:

> "The classical corporate loans business has become unprofitable for most banks – due to high credit risks and low margins. Banks, which position themselves as loan suppliers for corporate clients, increasingly risk destroying shareholder value".

This paper investigates the German corporate loans business of the four major private banks in Germany (Deutsche Bank AG, Dresdner Bank AG, Commerzbank AG und Bayrische Hypo- und Vereinsbank AG), also known as the Big Four (Deutsche Bundesbank, 2004, p. 110), between 1999 and 2004. For scenario and policy analysis, the time horizon is extended to 2010. In accordance with the bank lending statistics of the Deutsche Bundesbank, corporate loans are defined as loans to German non-financial corporations and self-employed persons (including sole proprietors) (Deutsche Bundesbank, 2002, p. 146). The RoE before tax is used as primary measure; it is compared to capital costs in order to measure the development of shareholder value. RoE is computed by subtracting loan loss provisions from the net income and dividing the difference by the regulatory capital (Duhnkrack, 2002, p. 159). Value creation occurs when RoE is higher than the cost of capital; when RoE is lower than the capital cost rate, value destruction is observed (Hörter, 1997, p. 178). Using the Capital Asset Pricing Model (CAPM), capital costs between 1999 and 2004 reached 10.85%.[2]

Figure 1 shows the RoE of the corporate clients business for the Big Four. It clearly indicates that the threshold to value creation was never crossed. After having suffered from a negative RoE in 2002 (-2.9%), the banks managed to reverse the trend with RoEs of 0.4 % in 2003 and 3.5 % in 2004. Nevertheless, compared to the target value of 10.85 %, a substantial gap persists.

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[1] For the definition of "destructing value" see p. 2.

[2] $\beta = 0.922$, risk free interest rate of 4.07% and weighted relationship between market and book value for the Big Four of 1.25 (based on data analysis).

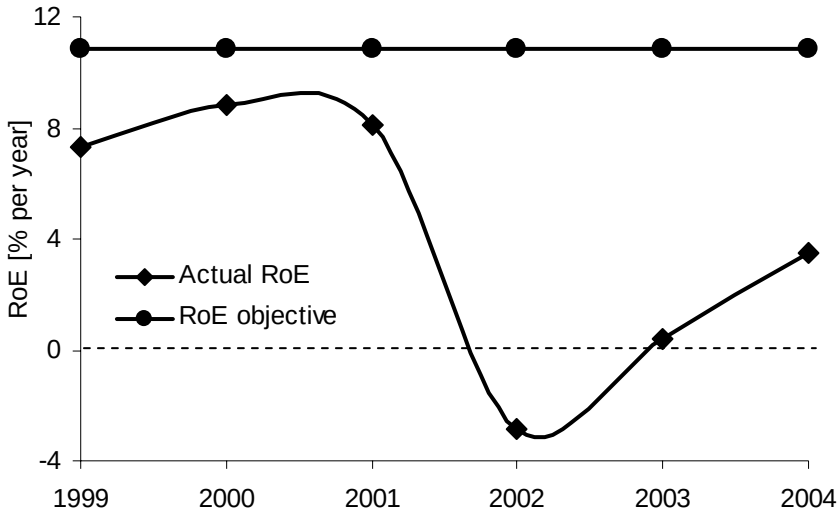

Figure 1: RoE of the corporate clients business for the four big German private banks

Moreover, Figure 1 indicates the existence of a structural problem besides the cyclical problem. RoE cycles are primarily caused by the business cycles, which induce increasing and decreasing loan loss provisions. However, even during the economically strong years 1999 and 2000, RoE fell short of the 10.85 % target. This alludes to the structural roots of the problem.

Faced with the unsatisfactory achievement of the RoE objective, bank managers have been reacting with cost cutting programmes, i.e. process optimisation, layoffs and cuts in overheads. Additionally, the lending volume – especially for financially weak customers – was reduced in order to cut back provisions for non-performing loans. Obviously, those measures were not sufficient to transform the corporate loans business into a value-creating business segment. A strategy widely discussed in academic publications on the subject and stimulated by the Basel II regulatory framework is the strategy of risk adjusted pricing (e.g. Döring, 2001, p. 4 and Zielke, 2004). The paper deals with the issue whether or not risk adjusted prices are the appropriate action to eradicate the problem.

2 Dynamic Hypotheses about Bank Management's Past Behaviour

2.1 Management Reaction to Unsatisfactory Achievement of Objectives

In 1999 and 2000, Germany's gross domestic product (GDP) was growing slightly above average. Relatively few companies became insolvent and, as a result, loan loss provisioning of the Big Four was tolerable (2.978 billion Euros in 1999 and 2.352 billion Euros in 2000). Although actual RoE was still below the target, behaviour over time showed a rising trend. In expectation of further increasing rates of return and ongoing economic growth, the Big Four were expanding their lending volume by 4 % in 2000 compared to 1999. Rising net interest revenues from a growing lending volume raised actual RoE, which caused expectations to mount even higher. The result is the reinforcing feedback loop R1 shown in Figure 2.

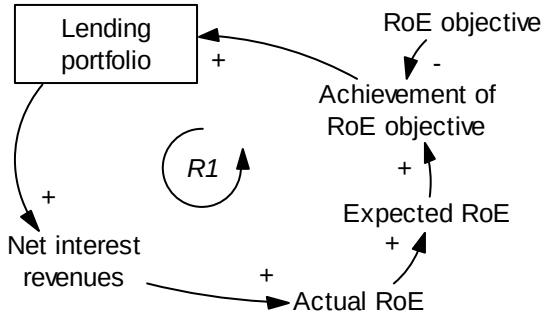

Figure 2: Loan business growth engine

Throughout the years 2001 and 2002, economic growth was declining, becoming even slightly negative in 2003. For many companies with tight financial resources, deteriorating sales figures were too hard to cope with. As a result, the number of insolvencies rose sharply by 41 % during 2003 to 39,470. Of course, this development affected the operating profit of the Big Four. Loan loss provisions were rising even more dramatically and RoE was crashing. In 2002, the banks were suffering from 6.119 billion Euros of loan loss provisions – more than twice as much as in the preceding year. A major fraction of those expenses was caused by the German corporate loans business (Deutsche Bundesbank, 2004, p. 24):

> "As in the years before, in 2003 the biggest fraction of the German banks' loan loss provisions have probably been caused by the corporate loans business. Banks were still facing a high number of corporate insolvencies".

Due to the combination of dramatically increased provisions and higher levels of administrative expenses profitability slumped. In 2002, RoE even became negative, creating pressure to act. Largely, managers took actions in two directions in order to increase actual RoE and close the gap to targeted RoE (break-even).

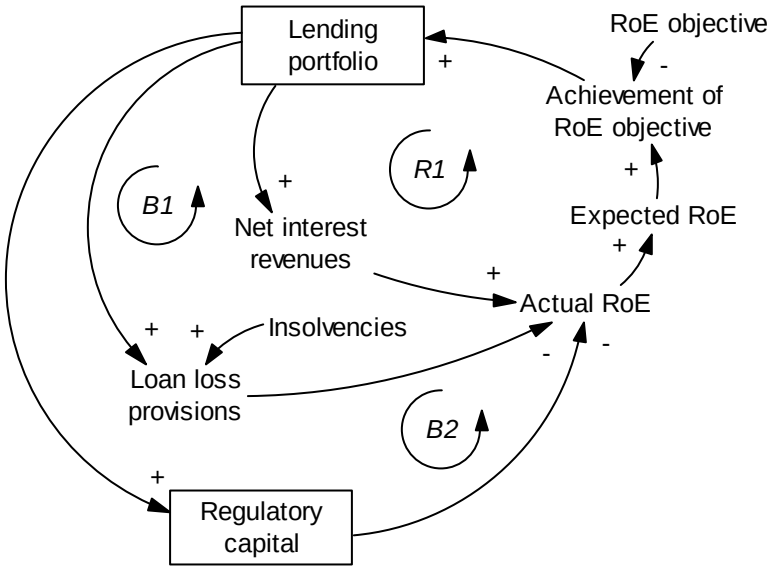

Figure 3: Reducing the lending volume

First, they lowered the lending volume especially for financially weak customers or rather bad rating classes. This measure had a double impact on actual RoE (Figure 3). On the one hand, loan loss provisions could be reduced, which simultaneously lowered

expenses and therefore increased the numerator of the RoE measure (balancing feedback loop B1). On the other hand, the reduction in the volume of loans lowered the regulatory capital required, which decreased the denominator and increased RoE (balancing feedback loop B2).[3]

Second, in 2001 the Big Four initiated major cost cutting programmes to reduce administrative overheads (balancing feedback loop B3 in Figure 4). In 2002, operating expenses (excluding compensation and benefits) were reduced by nearly 10 % to 10.7 billion Euros, which was almost the same level as in 2000. In 2003, those expenses were cut back again by approximately 6 %. Additional cost cutting in the personnel department caused mass layoffs. The Big Four decreased the number of employees by 10,850 (Deutsche Bundesbank, 2004, p. 21). In their 2002 annual report, Commerzbank wrote: "The 2002 financial year was characterized by the need to lower personnel costs substantially. For this reason, we pressed ahead with our cost-cutting policy introduced the year before" (Commerzbank, 2002, p. 46). As a result, personnel costs of the Big Four were significantly lower in 2002 (11.1 billion Euros) compared to 2000 (12.2 billion). In 2003, the intensity of cost cutting efforts levelled off and personnel costs decreased only slightly to 10.957 billion Euros (Deutsche Bundesbank, 2004, p. 36).

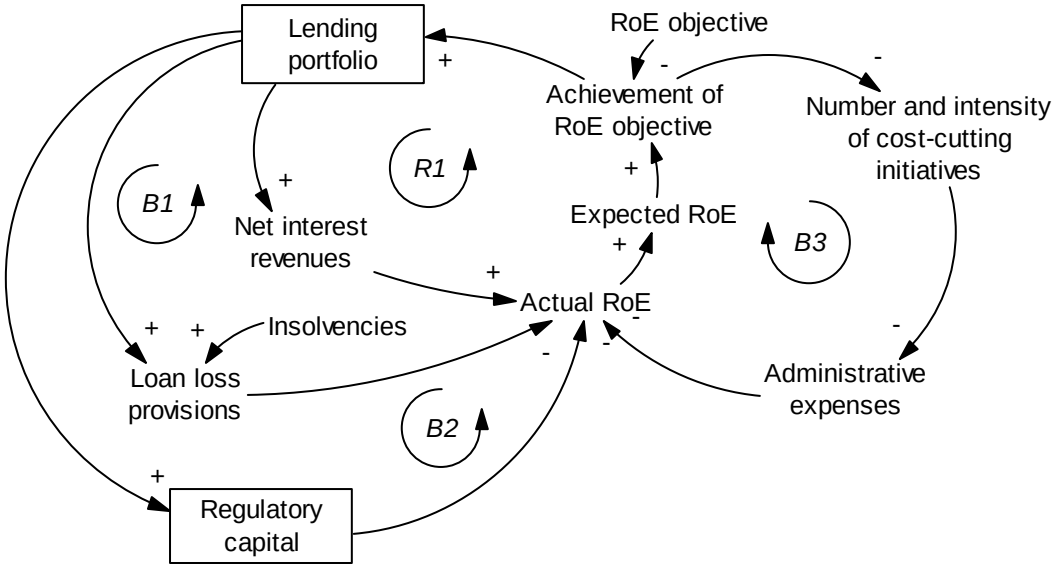

Figure 4: Cost-cutting initiatives

While these measures led to the desired outcome in the short term, there were also side effects to account for:

> "In 2003, developments of interest-based business were characterised mainly by banks' efforts to create the conditions for a structural improvement in their performance by consistently adjusting their balance sheets for risky assets. However, the decline in the volume of business, particularly in the area of riskier loans with a higher rate of interest, depressed net interest received" (Deutsche Bundesbank, 2004, p. 16).

[3] Of course the volume of loans is not only affected by management decisions. As shown by econometric research of Deutsche Bundesbank, high liquidity and low economic growth decreased demand, too (Calza et. al., 2001 and Calza et al., 2003).

Additionally, there is the danger of significant counter-acting consequences in the medium and long term. Figure 4 explains the peril of turning the reinforcing feedback loop R1 into a vicious cycle by pushing the balancing loops too hard. Reducing the lending volume because of unsatisfactory achievement of the RoE objective will decrease net interest revenues. Lower net interest revenues will decrease actual RoE, causing expectations to suffer and curtailing the lending volume even further.

2.2 Modelling Management's Reactions

This section extends and formalizes the causal loop model in order to analyse the dynamic interaction of the various measures with the strategy of risk adjusted pricing.

The complete model has more than 200 variables. Therefore, it is impossible to describe it in full detail in this paper. Instead, we provide an overview of the main variables and highlight the most important dynamic interrelationships between those variables. For in-depth inspection, we are happy to provide the Vensim model file.

The model's core variable is the actual RoE. It is computed by dividing earnings before tax (EBT) by the regulatory capital. EBT is the result of earnings minus total expenses. While earnings can be equated by net interest revenues for the purpose of the model, expenses are made up of three major components: personnel expenses, administrative expenses and loan loss provisions.

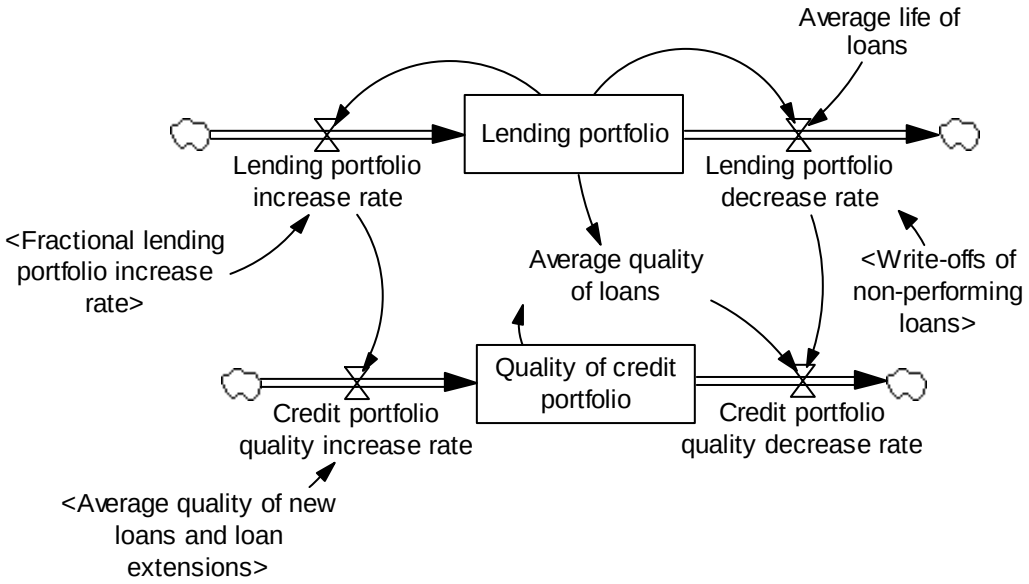

Figure 5: Volume and quality of loans as co-flow structure

Focusing on the income items first, one major factor determining net interest revenues is the lending volume, which we modelled as stock (Figure 5). The lending volume decrease rate is modelled using the fractional decrease rate structure (Sterman, 2000, p. 523). Average life of loans is set to four years using the same data from the European Central Bank as for computing the empirical credit margins (calculated using diverse Monthly Bulletins provided by the European Central Bank). Additionally, the lending volume is decreased by write-offs of non-performing loans, which is done after seven years on average. For computing the lending volume increase rate, the stock lending volume is multiplied by the fractional loan volume increase rate, which is itself

influenced by various factors. The result is a structure that uses a normal fractional rate plus adjustments (similar to Sterman, 2004, p. 524). If on average new loans have a different creditworthiness than repaid loans, the quality of the bank's credit portfolio changes. To model quality as an attribute to the lending volume, a co-flow structure is used (Sterman, 2000, p. 497-509).

Net interest revenues are calculated by multiplying the lending volume by the average credit margin. The Big Four's credit margin is influenced by both the customers' creditworthiness and the economic situation. Between 1999 and 2004, it developed in the opposite direction compared to most other variables, especially GDP growth (Figure 6). When the economy was growing moderately, competition was intense and interest margins were low. In an economic downturn, competition abated and banks were able to negotiate better terms. In 1999 and 2000, credit margins were low while GDP growth was relatively high. In 2001, 2002 and 2003 GDP growth suffered and margins were up to 1.86 %, 1.63 % and 1.55 % respectively. The increased credit margins may have, at least partially, resulted from a moderate risk adjusted pricing policy (we will revisit this point later on), besides from reduced competition. As insolvencies held steady in 2004, competition was accelerating again and margins decreased.

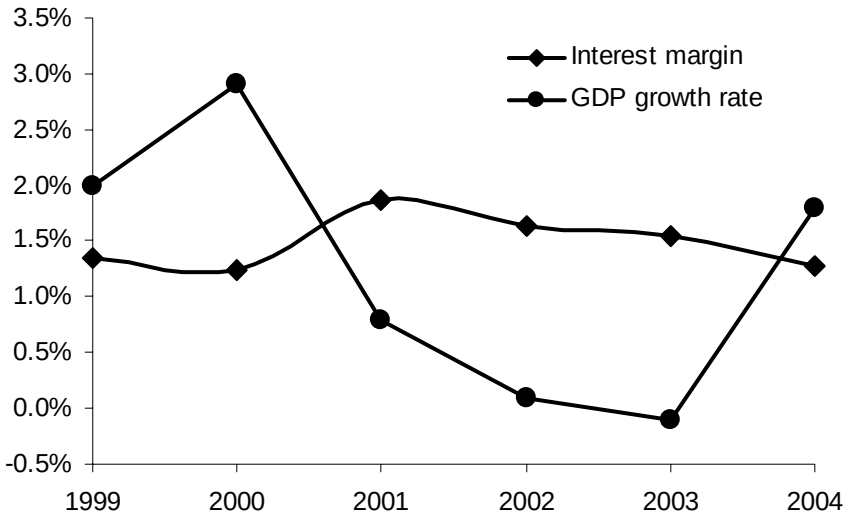

Figure 6: Interest margin and GDP growth rate

Based on the data of 1999 to 2004, a non-linear relationship with a negative slope between GDP growth rate and credit margin has been modelled. Figure 7 shows the table function used in the model. As banks can change the credit rate for loans only in the case of extensions or when they provide new loans, changes in GDP growth do not affect margin immediately. Therefore, a smooth structure is used to represent this delay (Sterman, 2000, p. 428).

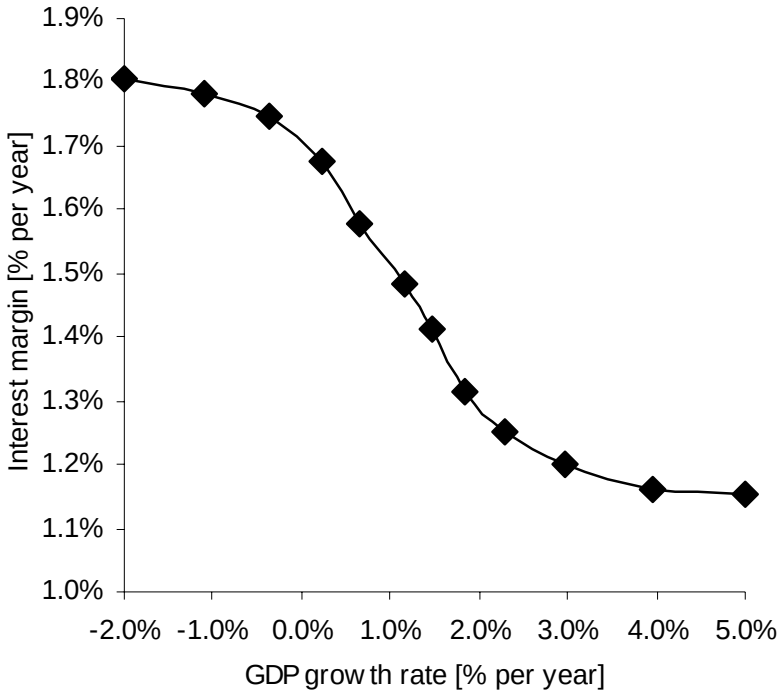

Figure 7: Table function modelling the relationship between GDP growth and credit margin

On the expense-side, the dominant component is loan loss provisions. The lending volume is multiplied with the ratio of loan loss provisions to determine the absolute amount of loan loss provisions. A ratio of loan loss provisions of 0.0071 indicates, for example, that per 1,000 Euros of loan volume 7.10 Euros of loan loss provisions have to be made. The data available show that loan loss provisions are strongly correlated with GDP growth. The correlation coefficient is -0.95. The minus sign is not surprising, since in times of low or negative GDP growth rates, insolvencies are high, causing a soaring number of non-performing loans. At the same time, the value of loan collateral suffers. As a consequence, banks have to increase loan loss provisions, which, in turn, increases the ratio of loan loss provisions, too. Therefore, we used the table function shown in Figure 8 to model this relationship. Again, we used a smooth structure to model the delayed effect of GDP growth on loan loss provisions.

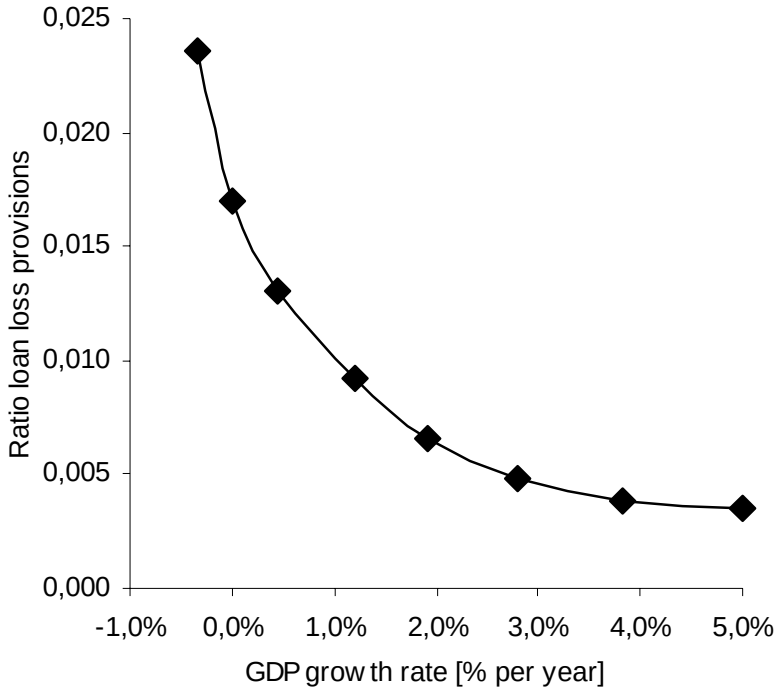

Figure 8: Relationship between “Ratio loan loss provisions” and “GDP growth rate”

Personnel expenses were determined based on the number of employees and their average salary. As a result of similar salary bands, we did not differentiate between sales people and credit analysts. Disaggregating the employees in those two categories would have increased complexity without adding value. Instead, the staff was grouped into rookies and experienced employees, as this is more important for the amount of personnel expenses. Over time, employees usually gain experience, which results in higher salaries. Therefore, a two echelon aging chain was modelled (Figure 9) (Sterman, 2000, p. 470-472). Experienced employees do not only earn higher salaries, they also raise the discriminatory power when rating corporate customers. More precise credit ratings are one major prerequisite for successful risk adjusted pricing strategies. Based on interviews conducted at Commerzbank AG, the time to gain experience was set to eight years. The decision rule for hiring or firing employees was modelled as a close gap structure (Hines, 2005, p. 29).

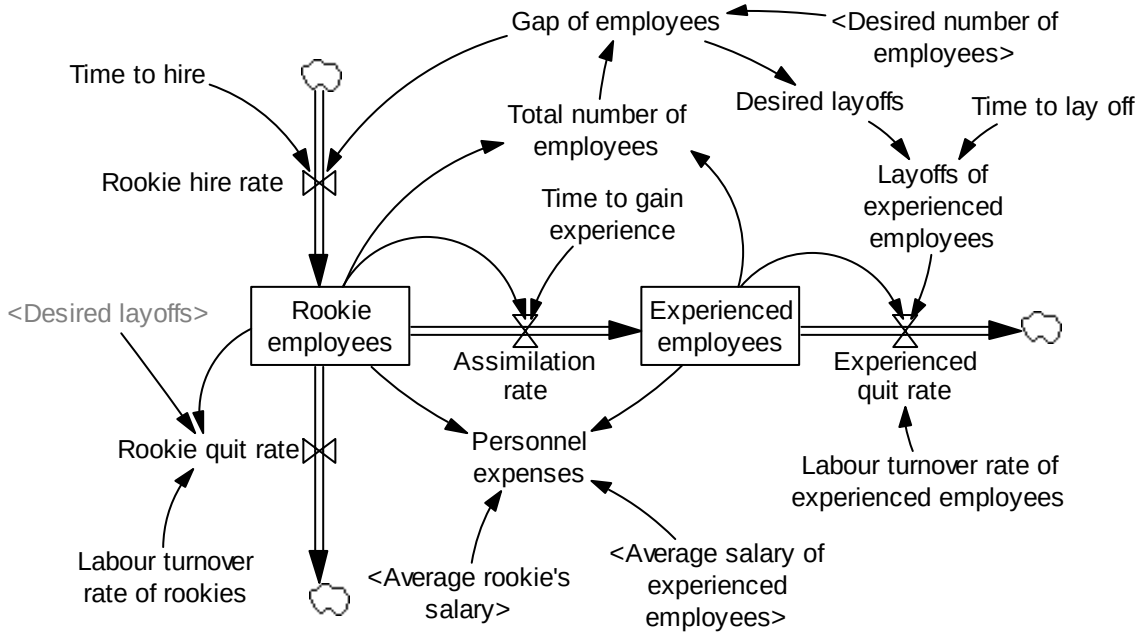

Figure 9: Model structure of the employee sector

The third component of expenses, other administrative expenses, has only a relatively small impact on RoE. Therefore, to avoid complexity, those expenses were modelled as a fraction of personnel expenses.

As was mentioned earlier, RoE is the core variable influencing management's actions. Again, we used a close gap structure to model the rules guiding those actions. Based on the actual RoE measure, management is anticipating the future RoE development and is setting this up in contrast to the RoE objective. As Figure 10 illustrates, expected achievement of the RoE objective is reported to management and finally influences decisions on the number of employees, their salaries as well as the rate of new loans and loan extensions. In all these three cases, changes in the same direction are observed when the "reported expected achievement of the RoE objective" varies. If RoE achievement is down, "desired number of employees", "employee salaries" and the "new loan and loan extension rate" drops too. In all three cases, non-linear table functions were used to model the specific relationships.

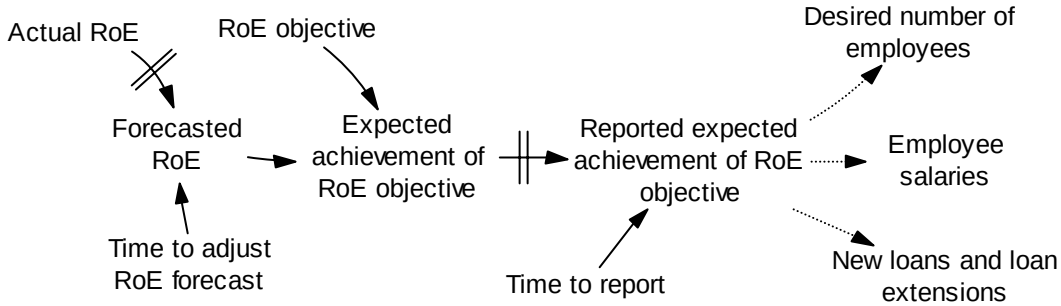

Figure 10: Core close gap structure of the model[4]

[4] Dashed arrows indicate effects via cause-and-effect chains.

Based on the CAPM, the normal RoE objective was set to 10.85 %. However, as empirical data concerning the loans business indicated, the RoE objective is influenced by the economic situation. When the economy is expanding and corporate clients' credit demand is high, the Big Four seem to reduce their RoE goals to gain market share. If economic growth slows down, market share can hardly be expanded, making the RoE objective more important. As a result, the banks focus on the business which is really profitable. Therefore, the RoE objective was modelled as a variable dynamically affected by GDP growth.

Moreover, the model focuses on the decision rule for new loans and loan extensions as it is central to the loans business. Figure 11 shows the structure expanding Figure 5. The "normal fractional new loans and extension rate", which is set to 0.25 % per year,[5] is modified by management decisions on the supply side and customers' decisions on the demand side. As mentioned above, management is reluctant to increase the lending volume, if actual RoE falls short of the objective. Additionally, there is a negative relationship between loan loss provisions and the willingness to supply new loans and extend existing loans. Both effects correspond to the R1 and B1 feedback loops in Figure 3.

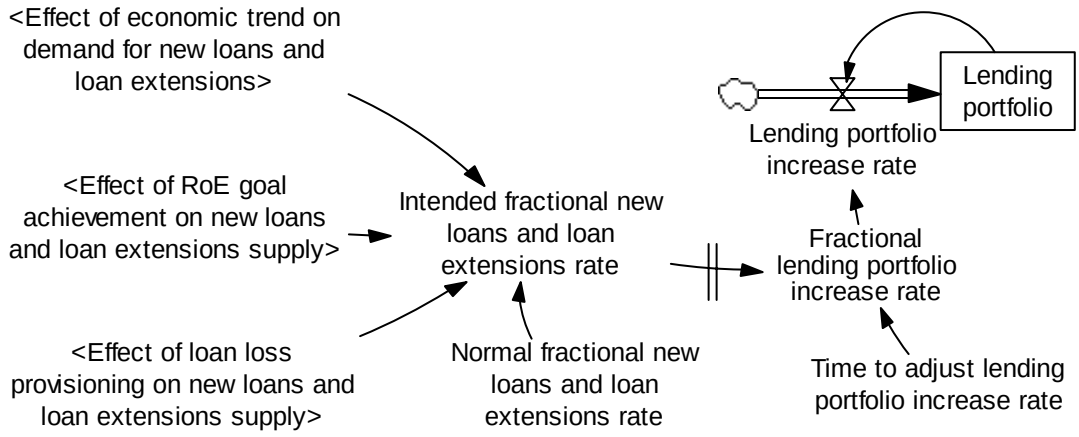

Figure 11: Decision rule for new loans and loan extensions

On the demand side of the market, requests for new loans and loan extensions will decrease, if the economic situation is bad. When investment activities are low, corporate clients will not ask for new loans to buy capital equipment. We modelled this effect by using the trend function for the formulation of the economic growth trend and a linear relationship between the GDP growth trend and the effect on demand for new and extended loans. As can bee seen in Figure 11, the fractional loan increase rate adjusts to the various pressures with a delay. The smooth structure uses half a year as adjustment time.

For model testing purposes, several tests were undertaken (Sterman, 2000, p. 858-891). First, the boundary adequacy and structure assessment tests were carried out by discussing causal loop diagrams and stock and flow diagrams with loan business experts. To ensure dimensional consistency, Vensim's units check function was used. The model equations were scanned carefully for suspect parameters. Several extreme

[5] This is the reciprocal value of the average life of loans.

condition tests were performed without violating basic physical laws. The integration error test revealed insignificant deviations when changing time step and integration methods. For the behaviour reproduction test, twelve key variables were selected, where actual data was available. The simulation output was compared to the actual value. Figure 12 shows the result of the behaviour reproduction test for a selection of four important variables. Naturally, the fit is not perfect. However, the model reproduces the data available with reasonable accuracy.

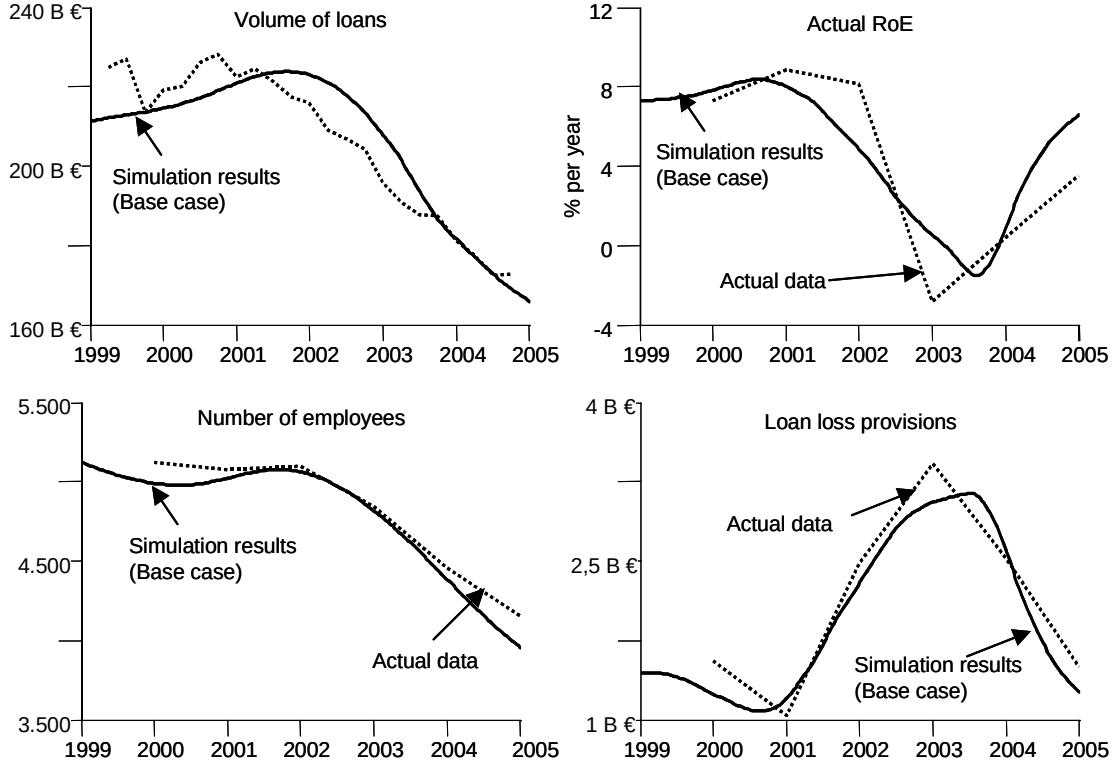

Figure 12: Comparison between actual data and simulation output

Having evaluated the model carefully, it can be used with confidence for exploring various future scenarios and policy analysis.

2.3 Base Run Simulations for Various GDP Growth Scenarios

The model provided a significant amount of feedback. For example, Vensim's loop tool indicated that the stock variable lending volume was part of several hundred loops. Although most relevant variables were modelled endogenously, there was one very important exogenous variable: GDP growth rate. Because of the importance of this exogenous factor which cannot be influenced by bank management, we assumed three scenarios for the future economic development. While the base case scenario supposed that the German economy was able to grow according to its potential growth rate at around 2 % per year, the best case scenario was more optimistic and the worst case scenario much more pessimistic. Table 1 provides an overview of the concrete values assumed for the three scenarios.

	2005	2006	2007	2008	2009	2010
Best case scenario	2.75 %	3.00 %	3.50 %	3.25 %	3.13 %	3.00%
Base case scenario	2.00 %	2.50 %	2.25 %	2.00 %	1.75 %	1.50%
Worst case scenario	0.50 %	0.50 %	0.25 %	-0.10 %	0.00 %	0.25%

Table 1: GDP growth scenarios for 2005-2010

When simulating the model for the three scenarios, using the values provided by Table 1, the results show that even under very optimistic assumptions about the economic development in Germany, RoE will not rise above cost of capital. As Figure 13 illustrates, the Big Four will continue to destroy shareholder value in the corporate loans business.

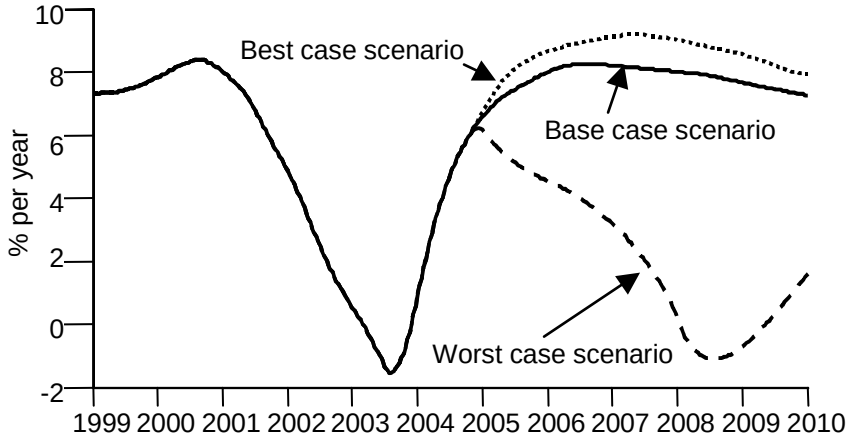

Figure 13: RoE projection for the three scenarios

A closer look at some major measures collected in Table 2 reveals further insight. Loan loss provisions, the lending volume and the number of employees fluctuate by more or less 50 % between the best case and the worst case scenario. While loan loss provisions in the best case scenario, for example, come to 0.949 billion Euros in 2010, they amount to 1.464 billion Euros in the worst case scenario. Even more impressive is the relative distance between the two scenarios for the ratio of loan loss provisions. In the worst case scenario, the ratio is more than double the value of the best case scenario. With a fluctuation margin of 80 %, RoE is found in a medium position.

Furthermore, although the lending volumes differ by more than 20 % between best and base case scenario, net interest revenues are pretty much the same. Even in the worst case scenario, the fractional decrease of net interest revenues is less than the per cent decline in the volume of loans. Nevertheless, the scenario simulations clearly show that a structural gap between actual RoE and target RoE persists.

Measure	Value for 2010		
	Base case scenario	Best case scenario	Worst case scenario
Loan loss provisions (in bn €)	1.237	0.949	1.464
Net interest revenues (in bn €)	2.355	2.476	1.665
Lending volume (in bn €)	170.76	206.10	98.34
Headcount	3,724	4,960	2,330
Ratio of loan loss provisions (in %)	0.72	0.46	1.48
Return on equity (in %)	7.25	7.91	1.58

Table 2: Major measures for the three simulation scenarios

A Monte Carlo analysis was carried out to cross-check the outcome of the scenario simulations. Instead of three deterministic scenarios for the GDP growth rate, we used auto correlated pink noise to represent the business cycle (Sterman, 2000, S. 917-922). In order to generate pink noise, the values for four parameters had to be set. Mean value for GDP growth rate was used as one Monte Carlo parameter ranging from 0.5 to 3.5 % per year with an increment value of 0.1. The standard deviation was set to 1 % per year and auto correlation time was assumed to be 1.5 years. The noise seed constant, which is used to change the behaviour of the random number generator, was the second Monte Carlo parameter. It was incremented from 1 to 100, resulting in 100 simulations per value for the mean GDP growth rate. All in all 3,100 simulations runs were carried out. Figure 14 shows the result.

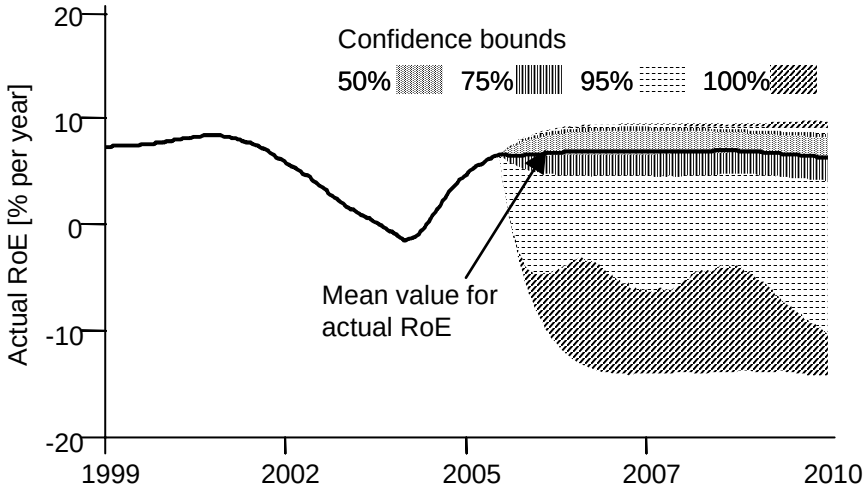

Figure 14: Monte Carlo simulation for RoE

The target RoE and thus the threshold to value creation is not reached once. While there are some constellations with bad RoE results, the upside potential is very limited. Within the given structure, RoE values beyond 10 % per year cannot be achieved. It is obvious that the corporate loans business suffers from structural problems. Without improving business policies, value creation is out of range. Credit margin and, as a consequence, net interest revenues are still too low to attain the target. The problems of fierce competition and too low margins are still prevailing. At the beginning of 2005, Klaus-Peter Müller, CEO of Commerzbank AG, pointed out in an interview conducted by Financial Times Germany: “Because of the extremely low credit margins we reject

even clients with high creditworthiness" (Maier an Jenkins, 2005). Still, revenues are not sufficient to raise RoE to the desired level.

2.4 Conclusions from the Base Run Simulations

As a result of the simulation analysis conducted so far, two major conclusions can be drawn. First, the cyclical component of the problem manifesting itself primarily in the ups and downs of RoE is caused by the business cycle. As GDP growth and insolvencies of corporate clients are exogenous variables, which the bank's management cannot influence directly, management needs appropriate policies to react to the cycles. Second, a structural problem component can be identified. In the corporate loans business, value destruction occurs throughout a business cycle. During the economic revival phase, competition increases and credit margins decline. Therefore, even in a prospering economy, the Big Four do not reach the target RoE set by their shareholders. The credit margin is too low to cover the risk of the corporate loans business.

3 Risk Adjusted Pricing as One Possible Strategy for Yield Increase

Earnings growth is one important leverage for solving the structural problem discussed above and thus for improving profitability of the domestic corporate loans business.

The banking market in Germany is polypolistic, as even the five largest banks together hold only a market share of 17% (Pawlowski and Burmester, 2001, p. 346). Thus an individual bank is a price taker and its influence on the credit margin is limited. Consequently, a lump-sum increase of credit interest does not present an ingenious way of boosting income.

3.1 The Concept of Risk Adjusted Pricing

In short, the basic idea of risk adjusted pricing is that financially weak borrowers pay a higher credit spread (risk premium, credit margin) than financially strong borrowers, as their probability of default and therefore their credit risk is comparatively higher.

The term "credit risk" comprises "default risk" as well as "spread risk". While the first one characterizes the risk of a total loss due to an insolvency of a debtor, the latter can be described as the risk that the borrower's credit quality worsens over time and thus the credit spread negotiated at the very beginning of the contract no longer compensates the bank for the risk it carries (Schierenbeck, 2001, p. 6).

"Credit risk" further comprises "expected loss" and "unexpected loss" (Kirmße, 2001, p. 1018). The expected loss can be anticipated by banks with the help of statistical methods (Bröker and Lehrbass, 2001, p. 77), as it is virtually the means of the losses assumed over a given period of time. The three components needed to calculate it, are the probability of default (pd), the loss given default (lgd) and the exposure outstanding at the time of default (ead).

Ex post, the unexpected loss can be calculated as the difference between the expected loss anticipated ex ante and the loss which has actually occurred in a specific period of time (Pfingsten and Schröck, 2000, p. 12). Ex ante, the unexpected loss is calculated via quantiles or downside-risk-measures such as the concept of value-at-risk. In a sense, the

unexpected loss is the real risk a bank bears when offering credits. For this reason, regulators all over the world urge banks to charge capital in order to cover potential losses and thus to guarantee the stability of the whole financial system.[6] In practice, the unexpected loss is measured with the help of credit portfolio models such as CreditRisk+ or CreditMetrics (Bröker and Lehrbass, 2001, p. 778).

Within the theoretical framework of the current rate method (Marktzinsmethode), banks earn an interest differential income due to the deliberate acceptance of the debtor's credit risk (Rudolph, 2001, p. 334). The "consequent risk adjusted pricing of credits leads to a price policy within which the single debtors bear, at a given time, the possible occurring costs of their own defaults via the calculation of risk premiums in an ideal case. Ultimately, the debtors compensate the bank for the credit risk induced by them." (Schiller and Tytko, 2001, p. 211). For our purpose, risk adjusted pricing is defined as a state, in which the debtor pays a risk premium which equals at least the amount of his expected loss plus an additional return for the regulatory capital, which banks are urged to hold in order to cover potential losses (Zielke, 2004, p. 35).

The concept of risk adjusted pricing is not new. However, because of a too faint-hearted differentiation between the debtors of the different rating classes, banks were inadequately compensated for the risks they had taken in the past. In total, risk premiums were too low (Kirmße, 2002, p. 380). In this sense, Jochen Sanio, head of the BaFin (German's Federal Financial Supervisory Authority), criticizes that "the competition for the cheapest conditions has taken on disastrous dimensions". He adds: "The price of a credit has to contain a sufficient risk premium" (Sanio, quoted by Dahms, 2005). The criticism of many scientists veers toward the same direction. Paul, professor for Finance and Banking at Bochum University, and Stein, Managing Director of the Institute for Finance and Banking in Bochum, state:

> „Particularly in the German corporate loans business, in the past, the problem was that the conditions were not conforming to the risk differentiation aimed at by the individual banks. Frequently, competitors offered unchanged conditions even for bad risks so that a single bank was forced to join the price cutting war" (Paul and Stein, 2003, p. 49).

If banks do not pursue the concept of risk adjusted pricing, financially strong debtors pay a risk premium, which is too high, whereas financially weak debtors pay a spread which is too low. In fact, financially strong debtors subsidize their counterparts, a phenomenon known as adverse selection (Schiller and Tytko, 2001, p. 216). As a consequence, they search for cheaper alternatives, either in the capital market or at a different bank. The financially weak debtors, then again, remain within the credit portfolio. Thus, in the long run, the average credit quality of the credit portfolio worsens while, at the same time, the margin is inadequately low (Kirmße, 2002, p. 380).

Applying the concept of risk adjusted pricing can lead to a loss of lending volume. The absolute amount of the loss is primarily influenced by two variables, the first one being the difference between Bank A's credit margin compared to the market interest rate, the second one being the loyalty of the customers. As borrowers disclose confidential

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[6] In their internal control systems, the Big Four apply the concept of economic capital, either parallel to the concept of regulatory capital or exclusively. For the purpose of this paper both we consider that both are of equal value so that for reasons of simplification the concept of regulatory capital is pursued.

information, a certain inhibition threshold exists to change a creditor (Paul, 2000, p. 1224). Nevertheless, an average increase in margin leads in general to a loss of lending volume and vice versa.

3.2 Modelling of Risk Adjusted Pricing

In order to simulate the strategic starting point of risk adjusted pricing, we assumed that

- risk has already been taken into account in the credit margins in the past, but that the differentiation between the different classes of credit worthiness has not proved satisfactory and that
- competitors of the considered banks do not change their pricing scheme.

Against the background of this, we considered a change in the credit margin as a change in relation to the market credit margin at that point of time. We further supposed that the lending margin, as calculated for the observation period, counted for a portfolio quality of 1 and that the portfolio quality was constant in the observation period. Thus, we modelled the change in lending margins as a shift of the lending margins of the big banks in comparison to the market credit margin. While creditworthy corporate customers will profit from lower interest rates, doubtful clients will have to pay higher rates. On average, risk adjusted pricing should lead to higher interest margins.

As was mentioned earlier, applying risk adjusted pricing influences the lending volume. We assumed a linear relationship between the interest margin relative to the market and the demand for loans. In our model, the borrowers' response to a change of credit margins can be made more or less elastic by changing the "slope of loans demand curve" (Figure 15). A slope of zero, for example, indicates that increasing interest margins have no impact on demand at all. More realistic values for the slope parameter are, of course, negative reducing demand for loans when interest margins increase.

Up to now, the topic of the elasticity of demand in relation to credit margin has not been dealt with in any study.[7] Hence, we assumed that financially weak debtors are restricted in their choice of lenders so that their elasticity is low. In contrast, financially strong debtors face many alternatives, including the capital market, and thus possess a high elasticity. In between these two groups are the debtors with an average financial stability. As the model is not disaggregated, the parameter "slope of loans demand curve" represents the behaviour of these three groups on average: in general, while an increase of the credit margin leads to a loss of lending volume, a decrease leads to growth (Maier and Jenkins, 2005). Therefore we set the slope to a modest negative value.

[7] Therefore, these values are subject to a certain degree of imprecision due to the estimation. However, as a sensitivity analysis in 3.4 indicates, demand elasticity is not a very sensitive parameter.

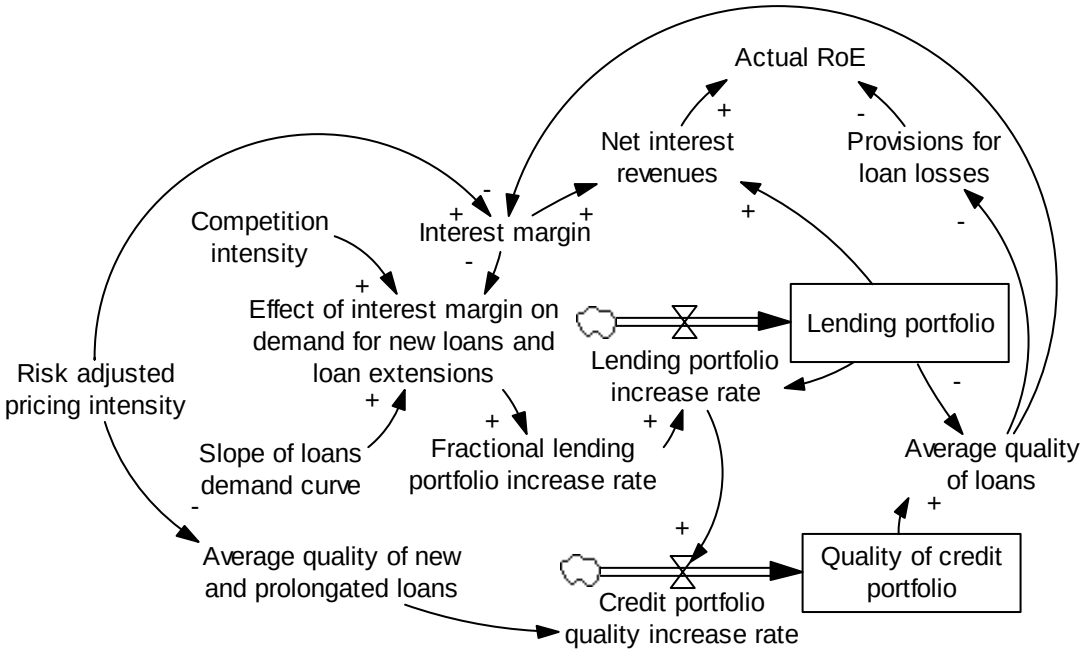

Figure 15: Modelling the effects of risk adjusted pricing

Aside from the borrower's rating, the intensity of competition determines elasticity of customers' demand for loans (Pothoff, 2004, p. 17). The intensity of competition is in turn strongly influenced by the economic growth: the higher the growth of the GDP, the higher the competition and vice versa. Accordingly, demand elasticity rises in times of cyclical upturns, whereas it diminishes in cyclical downturns.

For the purpose of modelling the empirical values of the observation period, the shares of the different classes of credit worthiness were held constant so that the portfolio quality takes a normalized value of 1.

As a result of the above mentioned different elasticities of the various classes, the portfolio quality changes over time, beginning in the year 2005, which initiates three cause-and-effect chains. First, since the empirical credit margin we calculated is assumed to be an average margin for all classes of creditworthiness, it increases when the portfolio quality worsens and vice versa. Secondly, depending on the change in the portfolio quality, the ratio of loan loss provisions alternates with a time-delay: the worse the quality, the higher ceteris paribus the coefficient and vice versa. Last but not least, the desired credit volume per employee varies, as credits of financially weak debtors take a longer time to be handled with (problem loans).

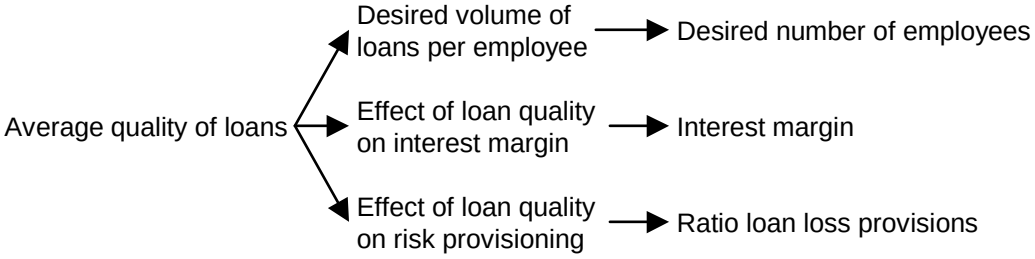

Figure 16: Effect of changes in the average quality of loans

Furthermore, we modified an essential rule of behaviour observed in the past. As an alternative rule of action, the policy makers do not reduce any longer the lending volume when the ratio of loan loss provisioning is unacceptable and vice versa. Instead, they alter their pricing scheme according to this ratio. Generally speaking, the big banks lower the credit margin for financially strong customers under all economic conditions. The degree of the reduction depends upon the economic situation: the reduction turns out higher in a phase of an economic boom and lower during an economic downturn. By contrast, the credit margin is raised for financially weak customers. Again, the absolute level depends on the business cycle. In between these two extremes, the credit margin of customers with an average credit rating is lowered in an economic upturn, whereas it is raised in a recession. All in all, policy makers raise credit margins in a recession and lower it during a boom. As one result of this action, the portfolio quality improves over time.

3.3 Simulation Findings for Different Economic Scenarios

Simulating the introduction of risk adjusted pricing in 2005 with a medium intensity (0.15) and a medium sensitivity of customers' demand for loans (slope -2), we obtained the following results:

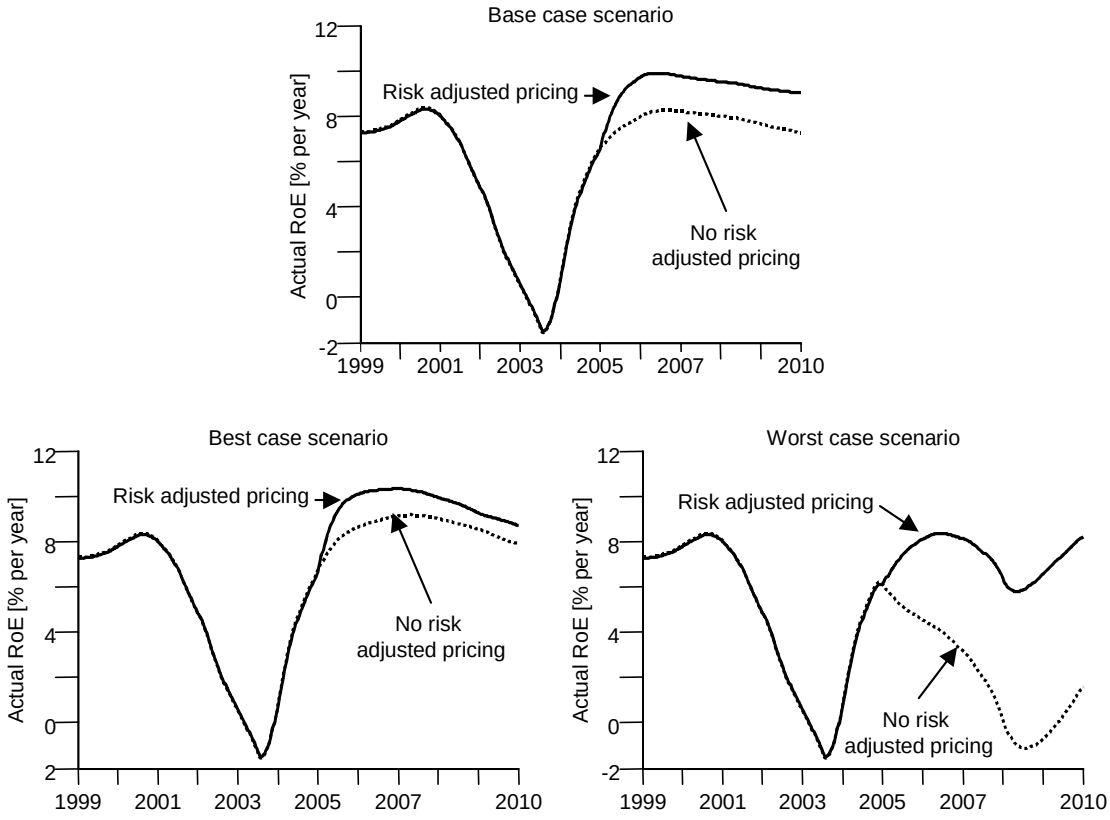

Figure 17: Effect of risk adjusted pricing strategies in different economic scenarios

As Figure 17 indicates, the strategy of risk adjusted pricing achieves the best effect in times of economic downturns. As a result of the decreasing competition, which leads at the same time to decreasing elasticity, banks can demand credit margins, which adequately compensate them for the risk they carry. Even in times of economic upturns, the return on equity rises, because the portfolio quality changes for the better and thus

the loan loss provisions decrease. The following table summarizes the fundamental results:

Measure	Value in year 2010		
	Base case	Best case	Worst case
Loan loss provisions (in bn Euro)	0.966	0.832	1.200
Net interest revenue (in bn Euro)	2.129	2.427	1.802
Lending volume (in bn Euro)	141.13	190.26	83.20
Headcount	3,676	5,268	2,484
Ratio of loan loss provisions (in %)	0.68	0.43	1.44
Return on equity (in %)	9.0	8.7	8.2

Table 3: Major measures for applying risk adjusted pricing in the three simulation scenarios

The results in the different scenarios converge noticeably, as banks are paid according to the credit risk they carry. This becomes particularly obvious when looking at the net interest revenue, which is raised in a recession despite a shrinking lending volume. By contrast, the financially strong borrowers and financially stable borrowers are attracted in an economic upturn, as they possess a high elasticity in relation to the credit margin: the lending volume increases noticeably, even though not as strong as in the base scenario. In addition, this effect leads to a decrease of loan loss provisions in the medium-term.

A second Monte Carlo simulation with the same set of parameters as for the first one (page 14), confirmed these results. As illustrated by Figure 18, risk adjusted pricing contributes to value enhancement of the German corporate loan business. The mean level of the RoE can be raised by approximately 1.5 percentage points. The break-even will now be reached with a likelihood of 25 %. Furthermore, it becomes obvious that risk adjusted pricing hedges banks against negative returns in economic downturns in particular.

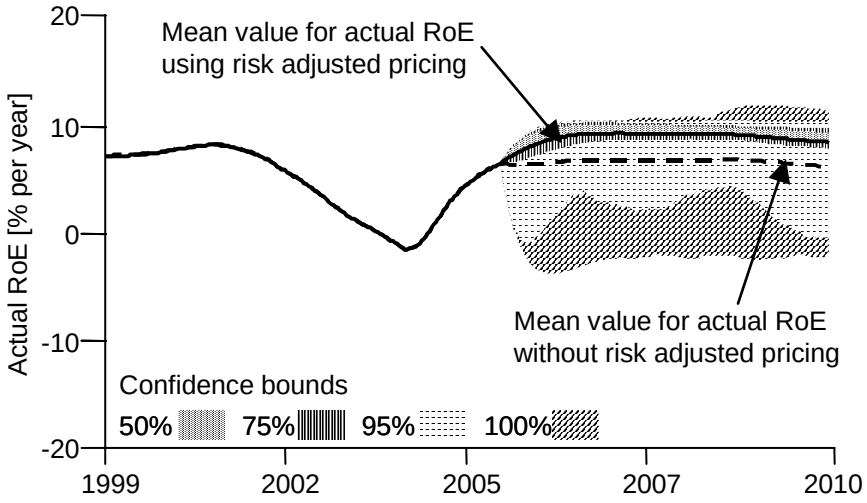

Figure 18: Monte Carlo simulation for RoE with risk adjusted pricing strategy

3.4 Sensitivity of the Demand for Loans to Interest Margin

As stated above, we applied estimated values for the elasticity of credit demand in relation to the credit margin. In order to challenge the results, we conducted a sensitivity analysis in the next step. For the base case scenario of economic development, risk adjusted pricing was introduced in 2005 with a slope of the loans demand curve varying from 0 (no impact of changes in interest margin on demand) to -6 (high impact of changes in interest margin on demand). As Figure 19 shows, when customers are very sensitive to changes in interest rates (-6), risk adjusted pricing causes actual RoE to peak in 2006. The decline in the years 2007 to 2010 is due to the fact that lending volume is decreasing, because customers refuse to obtain loans with the risk adjusted interest rates. However, even in the case of very sensitive customers, risk adjusted pricing improves actual RoE to 8.3 % in 2010 when compared to the base case simulation, which leads to an RoE of 7.25 % (Figure 13).

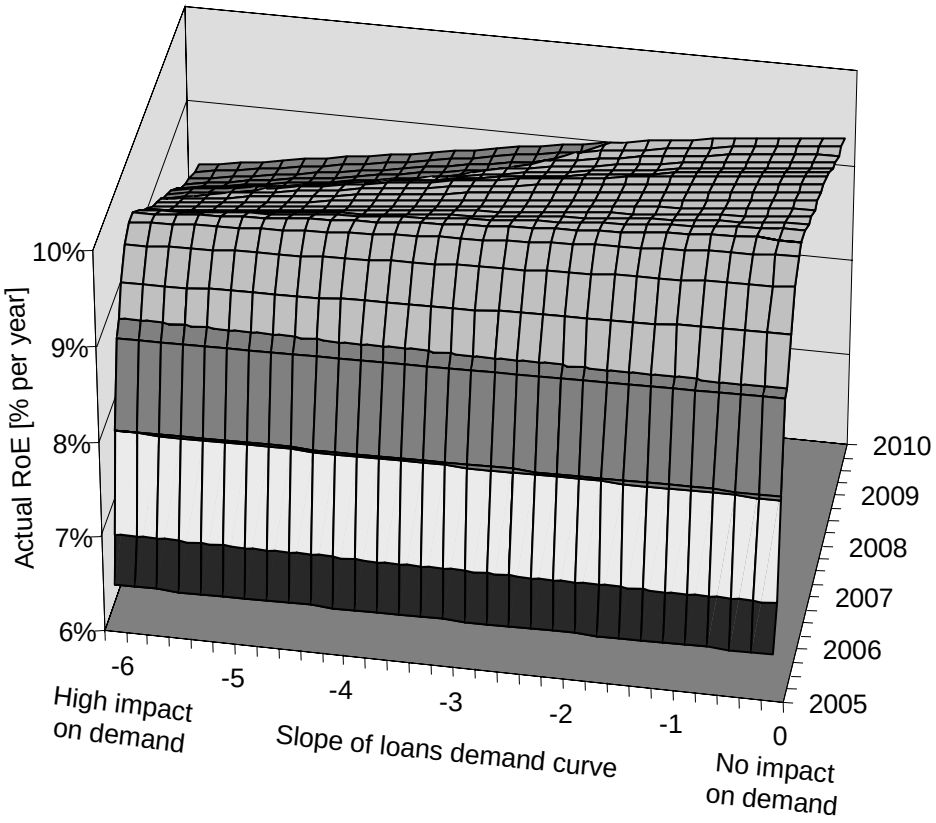

Figure 19: Sensitivity analysis of customers' reactions to interest margin changes for economic base case

Even with a variation in economic development in the broad range of 0.5 % to 3.5 % mean GDP growth from 2005 to 2010 and when analysing the simulated RoEs for 2010, risk adjusted pricing policies are under all circumstances preferable to traditional pricing (Figure 20). For the combination of high economic growth (> 2.5 % per year) and very price sensitive customers, risk adjusted pricing has no clear advantage. However, there is no disadvantage either. Once again, it becomes obvious that risk adjusted pricing can protect the corporate loans business performance against economic downswings. It is most effective when the economy grows on average by 1 to 1.5 % per year.

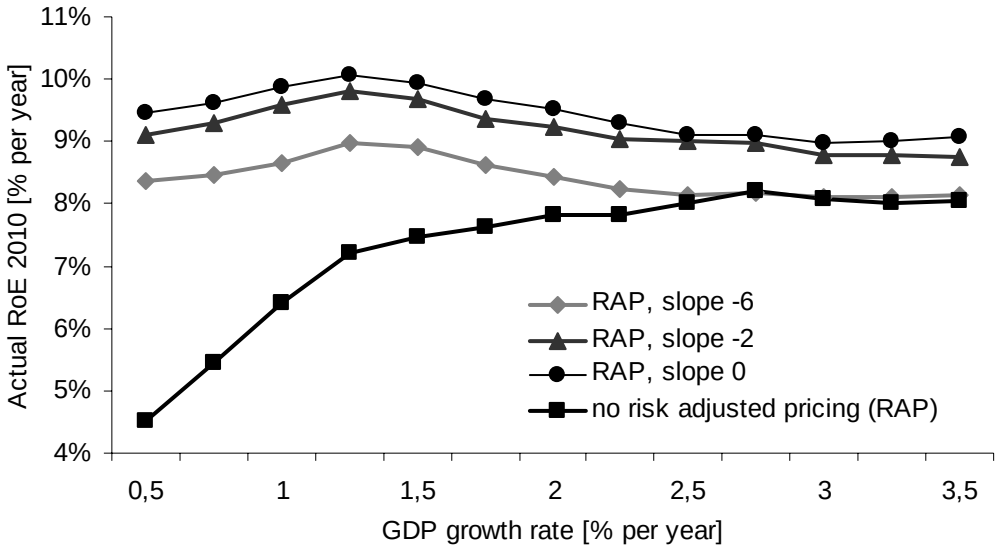

Figure 20: Sensitivity of RoE in 2010 to various scenarios of economic growth, risk adjusted pricing and customers' price sensitivity

3.5 Conclusions from Simulation Risk Adjusted Pricing Strategies

Risk adjusted pricing may enhance the value of the German corporate loan business even if customers' sensitivity to changes in interest rates is much higher or lower than originally assumed. Applying this strategy, banks are able to hedge their income against economic downturns and to improve their results even in times of booms (if customers are not too sensitive to changes in interest rates).

Despite this impressive achievement, we want to emphasize that this strategy alone is not sufficient to solve the problem of the value destruction. Target RoE is achieved only in the unrealistic case of 1.25 % steady GDP growth in the years 2005 to 2010 and only in the presence of completely insensitive customers, who do not reduce their demand for loans when interest rates are increased.

Additionally, several fundamental prerequisites must be met. The existence of adequate rating systems is one critical requirement, as incorrect estimations of the credit worthiness of the borrowers lead to an over- or underestimation of the risk. While an overestimation causes a loss of lending volume due to comparatively high margins, an underestimation entails margins which are too low to compensate for the risk. Thus, the risk of each individual borrower has to be assessed correctly. Another success factor is the sales force. The employees must be able to discuss critical and difficult aspects with customers, but at the same time increase customers' loyalty. Yet, this point should be regarded as an opportunity: when arguing about weaknesses, the customer is able to eliminate them and thus improve his financial situation. Additionally, increased perceived pricing fairness raises the loyalty as well.

4 Transformation of the German Corporate Loan Business into a Value Creator

For a fairly long time, the German corporate loan business has been regarded in publications on the subject as a value destroyer. The analysis of the variables and their

interrelations confirms this point of view. Our model further reveals that the German corporate loan business will not reach the target RoE without a policy change.

This paper has analyzed risk adjusted pricing as one strategy to solve the structural problem of value destruction. The outcomes support the hypothesis and document that a policy change in the pricing scheme may raise the economic profit depending on the state of the economic growth by up to 5 percentage points. Banks can boost value creation if they demand fair credit margins. By applying risk adjusted pricing, a bank is hedged against painful losses, and the strategy achieves its best results in economic downturns – offence is once more the best defence.

In order to question the findings, we conducted two sensitivity analyses. Those analyses have further strengthened our argument.

Despite the positive findings, we advise to restrain optimism. Although the structural problem can be partly solved, risk adjusted pricing without supporting measures will not lead to achieving the targeted RoE automatically. In order to solve the structural problem as a whole, a constitutive program is needed. A new calibration of rating systems together with training of the credit analysts enhances the discriminatory power of credit analysis and thus leads to shrinking loan loss provisions with a certain time-delay. Furthermore, banks should make use of the chances of credit portfolio management: with the help of credit derivatives and asset-backed securities, financial institutions can actively manage the risks of their credit portfolios without jeopardizing the underlying business connection with their clients. Thus, the German corporate loan business can be transformed into a value creator.

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