Banks' loan portfolio diversification

Authors: Date of Birth:
Csongor David   811013
Curtis Dionne   781022

Abstract

Credit Risk management within banking is continually developing. Advances in credit-scoring models have allowed banks to improve their avoidance of non credit-worthy firms. Through meticulous credit evaluation, banks attempt to minimize credit-specific risk to their ideal cost of capital. However, this practice may not sufficiently reduce the total loan portfolio risk; systematic risk. To minimize the total loan portfolio risk, banks can consider diversifying its loan portfolio. Yet, research indicates that the correlations between portfolio components are often unconsidered by banks. The bank is therefore exposed to low firm specific credit risk, but may be exposed to high total portfolio credit risk if the portfolio components are highly correlated. Our thesis investigates the strategy behind loan portfolio diversification at banks.

This thesis is a qualitative study about how large banks in Sweden manage their loan portfolios. We discuss credit risk diversification with the help of Markowitz's Modern Portfolio Theory (1952). Furthermore, we investigate whether Swedish banks actively pursue loan portfolio diversification and what methods they use.

We found that the majority of large banks in Sweden to a certain degree intuitively diversify their loan portfolio. On the other hand, we found that due to practical complexities the banks do not manage using loan portfolio diversification. Due to the size of these large banks it is assumed that loan portfolio diversification will happen naturally.

1 Introduction

1.1 Background

During the past four decades the Swedish banking industry has experienced a great deal of changes**.** The 1960's and 1970's credit market and banking sector was characterized by a considerable amount of governmental regulation. Commercial banks' ability to grant credit was regulated by the Swedish central bank, which meant that big profitable firms were able to finance their expansions while smaller companies had a tougher time financing their business ventures.[1] The highly regulated money markets resulted in low interest rates and high inflation and as mentioned above an unfair distribution of capital due to certain governmental policies. With pressure on the government, due to changes in the financial sectors all around the world, a growing national debt and imbalances in the Swedish private portfolios, deregulation was slowly implemented to reform the financial sector (money and credit market and the banking sector).[2]

The deregulation of the banking sector in 1985 resulted in the abolishment of the lending-margin and lower interest rates. Due to these low rates and reduced regulations on the money market; it increased the incentives for private borrowing. Corporate and private loans increased at a startling pace and much of the capital-flow went to the different asset-markets such as the stock and real estate markets. Asset prices increased at a higher pace than consumer goods. According to SCB the average increase was 70% between 1985 and 1990[3] while the OMX-index went up 170% between September of 1986 and January of 1990[4]. Also, the real rate of interest diminished to extremely low levels, which further increased incentives for borrowing.[5] According to Silfverstrand this high degree of borrowing was very much due to the bank's poor credit granting management.[6]

> *The banking industries' poor and incompetent credit-testing and lending explains their large losses. A large part of these losses are obviously the result of a few lenders having large loans. Considering the size of these, the bank should have taken the loan granting decisions high up in the organization. This means that the responsibility in a large part falls on the banks upper-management. The bank can also be criticized for lending to financial companies without satisfactory investigation into the companies credit-worthiness. It's remarkable how passive the bank auditors reacted in so many incidences.*[7]

At the peak of the boom the household consumption was higher than their available funds.[8] The financial bubble that had grown so swollen during the second half of the 1980's was

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[1] Lybeck, A. J., 2000 p.125-126
[2] Jonung, p. 2003 p.495-496
[3] Ibid, p.498
[4] www.stockholmsborsen.se, 2005-03-10
[5] Jonung, 2003 p.495-509
[6] http://www.riksdagen.se/debatt/9697/motioner/fi/fi915.htm
[7] Ibid.
[8] Jonung, 2003 p.499

bound to burst at some point. The crash came in 1990 when inflation expectations decreased and the interest rate was increased. The resulting high indebtedness became an extreme restraint for the private sector when the real rate of interest increased. Many companies defaulted on their debt obligations. This in turn resulted in banks having trouble collecting their money and a bank crisis was born. Between 1990 and 1993 the estimated credit losses for banks in Sweden amounted to approximately 180 billion SEK, which was about 20% of the Swedish banks' total outstanding loans.[9]

Similar developments could be seen all around Europe and the US, which forced the standardized refinement of banking rules and practices agreed upon in the Basel Capital Accord (which later developed into Basel II).[10] The Basel Capital Accord is a document with directives for banks' capital covering and has the purpose of improving financial stability. These directives have been put in practice since the beginning of the 1990's, but were believed to be inadequate to achieve their purpose. A revision and further strengthening of the directives have been carried out through the works of the Basel Committee on Banking Supervision. In 2004 the newly worked out frameworks (Basel II) were implemented in the member countries (Belgium, France, Italy, Japan, Canada, Luxemburg, Nederland's, Switzerland, Sweden, Great Britain, Germany and USA.) for measuring capital adequacy and the minimum standard to be achieved.[11]

During the 1980's and 1990's, when the financial and banking crises became worldwide, new risk management banking techniques emerged. To be able to manage the different types of risk one has to define them before one can manage them. The risks that are most applicable to banks risk are: Credit risk, Interest Rate risk, Liquidity risk, Market risk, Foreign Exchange risk and Solvency risk.[12]

We will focus on credit risk. Credit risk management is one of the most important issues in banking due to the weight it carries in assuring bank survival. Credit risk is defined as: "the risk that customers default on their debt obligations".[13] Credit risk can also be defined as "a decline in the credit standing of a counterparty".[14] The decline in credit standing of a firm does not mean that it will default, but the probability of this happening increases, which is obviously a signal a bank should pay attention to when managing their loan portfolio. It is important to monitor the credit risk the portfolio is exposed to, since the default of a proportionally large client (or a larger number of clients with high correlating businesses) may lead to insolvency. Hence, banks can be expected to monitor their positions and make sure that the amount lent "to

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[9] http://www.riksdagen.se/debatt/9697/motioner/fi/fi915.htm
[10] Bessis, J. 1998 p. 4, and on BCA: http://www.bis.org/publ/bcbs04a.htm
[11] http://www.fi.se/upload/20_Publicerat/30_Sagt_ochutrett/10_Rapporter/2002/rapport2002_8.pdf
[12] Bessis, J. 1998 p. 4-5
[13] Ibid, p.5
[14] Ibid, p.6

any one customer and/or customers within a single industry and/or a given country" is limited.[15] This practice is called risk diversification.

The notion of diversification in finance, which is now known as Modern Portfolio Theory (MPT), was first presented by Harry Markowitz.[16] He presented an approach to measure the risk of securities, which could later be put in relation to its return. Having these quantitative tools, one is able to construct portfolios consisting of securities that give the maximum amount of return with the lowest possible risk (based on historical data). The measure of risk was defined as volatility, which is the movement of the security's value around the mean. Hence, if one can measure volatility, one should be able to measure correlations, which makes portfolio diversification manageable. The intuition is that the more diversified one's portfolio is, the lower the total variance and thereby the total risk of the portfolio.

The same principles should apply when using (MPT) on a banks' commercial credit portfolio. A bank only profits from the interest gained on a successful loan repayment, which therefore means a bank does not have any direct gains from company profit maximization. On the other hand, if the loaning company maximizes profits the bank indirectly gains credit security. With this in mind, a bank will want to extend credit to the company with the lowest risk of default. Which company has the lowest risk of default? Companies that maximize profit, therefore the more profit a company makes, thus lower the VAR (Value-at-Risk is the highest possible loss within a certain time period and confidence interval.)[17]

In order to analyze diversification one must categorize the variables that affect bank loans into different segments. Furthermore, to manage loan portfolio diversification according to MPT, we feel the variables should be quantifiable. Thus, for the purpose of our study we use four variables in order to define loan portfolio diversification: geography, industry, customer and company size.

There has been a very high level of consolidation in the Swedish banking sector the past few decades. In 2002 the four largest banks controlled approximately 85 percent of total banking assets.[18] We believe it is highly possible that the four big Swedish commercial banks are well diversified with respect to: product, industry and geography. However, we do not have a clear picture of how the banks' loan portfolio diversification is managed. This is why we find the topic of corporate loan portfolio diversification interesting and will focus on investigating how the strategic management is applied.

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[15] Bessis, J. 1998 p.6
[16] Journal of Finance 1952, vol. 7, Issue 1
[17] Bessis, J. 1998 p.35
[18] Frisell, L. et al, 2002 p.1

1.2 Problem discussion

For all financial institutions it is imperative to pursue some sort of risk management, which sometimes takes the form of simple Asset-Liability Management, but can also consist of well thought out strategic implementations that aim to optimize the risk reward trade-off. With the assumption that banks are risk averse it is in every commercial bank's interest to look for different techniques that will reduce the overall credit risk as much as possible and still be able to profit from the lending business.

Corporate-loan portfolio diversification is simple to illustrate theoretically. Depending on the diversification variable, the bank should build a portfolio with outstanding loans that have repayment probabilities with low correlations. On the other hand, diversification according to portfolio theory is not necessarily as simple to apply in banking. Perhaps the perception of diversification at the banks differs in the sense that they, above all else, focus on 'high quality' loans (granting credit to firms with very high scores from different credit evaluation scoring systems). Another perception could be that the bank's sheer size naturally leads to diversification in the loan portfolio, which is verified by the findings of Kampf et al.[19] Hence, if a bank were large enough, it would have a hard time not covering most industries and geographical regions. However, if there is too much focus on credit quality it may draw attention away from the management of systematic risk. Furthermore, with the increased focus on unsystematic risk and credit quality, provoked by the Basel Accords, within credit risk management; it could be beneficial to better understand banks' exposure to systematic risk. Thus we pose the questions how do banks' define loan portfolio diversification, and what is their attitude and perceptions of loan portfolio diversification?

To carry out diversification intuitively, in other words without necessarily managing the portfolio with quantitative measures, may lead to difficulties in measuring the degree of diversification and its potential benefits or drawbacks. Banks may very well be diversified, but if the benefits and drawbacks of loan portfolio diversification are immeasurable (due to a poor centralized data collecting, perhaps in databases); management of diversification will be limited. We believe it is interesting to investigate whether banks actually do measure and manage diversification quantitatively and in that case how they apply it. If the banks prove to have well-established loan portfolio databases, it should indicate that the basic requirements for diversification management exist. If these tools exist they could therefore be advantageous for systematic risk management outlined by MPT. Do the banks' practical implementation and follow-up of loan portfolio diversification render strategic options? In addition, if measurement of diversification is already in use, how is it used?

The objectives of a bank to diversify its loan portfolio can only be implemented if it has a clear strategy for reaching out to potential clients. The strategy that a bank may be employing in its

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[19] Kamp, A et al, 2005

loan portfolio diversification will decide both in what way it will broaden its lending-business and which variables can optimally bring about a well-diversified portfolio. If a bank seeks to diversify its loan portfolio by reaching out to as many regional areas in Sweden as possible, and thereby capture the composite risk development of Swedish businesses, then it would be confirmation that the bank is implementing geographical diversification. The assumption we make is that the banks believe in the Church Tower Principle, which implies that information asymmetry increases with geographical distance between the bank and the credit taker.[20] Strategies such as this will serve to both broaden the bank's business area and perhaps diversify the credit portfolio. This thesis intends to deal with how the diversification strategies presented in our literature section are practically implemented and we therefore pose the following questions. Which diversification strategies are used, how do the banks implement diversification into their loan portfolios and which diversification variables are considered?

Earlier research suggests that loan portfolio diversification is a relevant issue of risk management within Sweden's four large commercial banks. According to Kamp et al's study in Germany banks differed greatly in how diversified their loan portfolios were. The largest banks, based on net revenues, had the highest degree of diversification (most likely resembles the situation in Sweden). One strategic area of risk management Kamp et al focused on was the cost of diversification. They conclude that the larger the bank, the easier it can handle the cost of diversification. These large banks in Germany therefore strategically choose to diversify regardless of the costs. The authors present a theoretical model that explains the potential cost advantages of specialization rather than diversification. Hence, we find this sub-topic of the practical management of loan portfolio diversification to be of interest in further understanding how the large banks in Sweden actually handle diversification.

Acharya et al approached a similar problem by investigating whether diversified loan portfolios lead to lower credit risk for the bank.[21] Their results differed from that of MPT. They concluded that cost interruptions and diseconomies occur in diversifying loan portfolios at numerous banks. The result of diseconomies can give less incentive for banks to monitor the credit takers, thus increased credit risk. The authors further conclude that the optimal composition within a banking sector would be a number of specialized banks instead of diversified banks. Furthermore Winton[22] concludes that diversification may decrease a bank's incentive to monitor and increases its chance of failure when loans are exposed to sector recessions.

Should banks' credit risk management include diversification of their loan portfolio? It is in every commercial bank's interest to look for the right strategic techniques that will reduce its overall credit risk as much as possible and still be able to profit from the lending business. A

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[20] Carling, K. et al 2002
[21] Acharya, V. et al 2002
[22] Winton, A., 1999

better understanding of loan portfolio diversification can only strengthen a bank's strategic decision making.

1.3 Formulation of the Problem

This is where we define in detail what we will attempt to investigate in this paper:

- The concept of loan portfolio diversification at banks, their attitude towards it and their perception of what diversification is.
- What does the practical implementation and the follow-up of loan portfolio diversification look like? Is there any measurement of diversification being done and if so, how is it measured?
- How do the banks manage the systematic risks of loan portfolios?
- What are the different diversification strategies? How do the banks go about diversifying their loan portfolios? What are the diversification variables?

1.4 Purpose

The main purpose of this thesis is to investigate how the four largest commercial banks in Sweden diversify their corporate loan portfolios. We have broken down bank loan portfolio diversification into numerous relevant subtopics that the problem formulation is composed of. Hence, the subtopics will be used as a guideline to fulfill the main purpose of this paper. The subtopics that are dealt with in this paper are: how the banks perceive and relate to diversification of loan portfolios, is there any management of diversification and in that case what does it looks like, and furthermore what are the strategies used to accomplish a well diversified loan portfolio.

1.5 Problem Delimitation

We limit our research problem to banks' diversification of corporate loan portfolios and exclude the issues of product diversification and private customers.

2 Method

2.1 Choice of Method

2.1.1Qualitative Method

How one formulates a research method is dependent on the questions one wants to answer. Evaluating the different strengths and weaknesses contained within the research is one approach in choosing the correct method. One of the features of the qualitative method is that it gives room for interpretation where one is interested in the potentially strange, unique, or abnormal.[23] Furthermore, the qualitative method approach helps differentiate exceptions amongst an abundance of information. This differentiation leads to a deeper understanding of the intricacies within larger problems. Through unstructured and unsystematic observation, mostly done in discussion-interview form, one tries to grasp a greater understanding of the outlying problem.[24] For the purpose of our work it is the qualitative method that outweighs the quantitative. The reason for this is the subject area, strategies within the diversification of loan portfolios, has not yet been sufficiently researched on a qualitative level. Before a subject area can be researched in a more structured way (for instance quantitatively), clear problem areas within the subject has to be defined. Since the subject area of 'banks' loan portfolio diversification' has been given such insufficient attention a formalized investigation seemed unsuitable. By scrutinizing banks' practices of loan portfolio diversification qualitatively, new subtopics worth investigating may arise.[25]

We have chosen to use the qualitative research method because our respondents may not have the same definition of loan portfolio diversification that we have. A thorough discussion around the topic is the main goal of our questions. The answers we receive from our respondents will be noted in discussion form and will not be exact word for word answers. Furthermore, the respondents are not expected to have an immense amount of knowledge concerning the use of MTP in the money-lending context, which means that we have to link the banks' present strategies and activities back to the theoretical framework ourselves. According to Holme & Solvang, the attitudes of the respondents, our ideas and analytical evaluations can be noted while taking notes.[26] We believe that this is an advantage of this method, since we can come up with ideas and interpretations of the answers during the interview. If the interviews were to be recorded, these ideas and interpretations from the discussions may be lost. Furthermore the respondents may be hesitant in answering if a recording device were to be used.

The consolidation of the bank sector in Sweden has led to four commercial banks emerging as the dominant players. Hence these are the ones we focus on in our research.

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[23] Rosengren, K-E. 1992 p.17
[24] Ibid, p.17
[25] Holme, I-M, 1997 p.92-93
[26] Ibid, p.117

2.1.2 Descriptive research

Qualitative research can be done with a descriptive nature, in the sense that one seeks to describe a phenomenon, that in itself is not totally unexplored, but not well enough elaborated on.[27] The questions being asked in descriptive research are: how and/or what. Our case, loan portfolio diversification, falls within this framework. Theories and earlier research can be found containing certain parts of our subject, but there has not been much research done that will give a more structured picture of this subject area. The intention with this paper is just that, to give a clearer and more structured picture of what loan portfolio diversification looks like at the big commercial banks in Sweden.

2.1.3 Inductive research and Deductive research

When the inductive research method is applied the researcher is observing exogenously a certain phenomena, from which s/he will be able to draw conclusions and build new theories.[28] In the case of exploring how banks diversify their outstanding corporate loans, we believe that primarily the inductive approach is the most suitable. The reason for this is that we intend to portray banks' loan portfolio diversification in a structured way from the empirical data gathered through qualitative interviews at the banks.

The research will on the other hand have certain deductive elements too. The deductive working method is characterized by drawing conclusions about different phenomena from existing theories.[29] The research will also intend to answer certain questions on whether certain theories hold up in practice, whether these are utilized.

2.2 Gathering of Empirical Data

When using the qualitative method of research one tries to avoid influencing the respondents as much as possible. This can be done through the design of questions containing only the theoretical framework. This allows free rein for the respondents, which in turn, more accurately reflects the complication prevalent in the business world. Holme & Solvang points out that, there is the possibility that the respondent will give answes that will try to please the interviewer, instead of answering honestly.[30] In our situation we have sent out the basic theory and recent research associated with our work to all the respondents in advance. This could unfortunately skew or influence how the respondents could reply. With this in mind, we have attempted to eliminate as much bias from the pre-interview background theory portion. We have purposely limited the results from research based on minimizing risk through diversification, in attempt to avoid this problem. Furthermore, we try to have both positive and negative arguments concerning loan portfolio diversification. (see appendix 3) We therefore assume that our respondents will not be overly influenced by the background theory due to their vast amount of

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[27] http://www.psychology.su.se/units/gu/fk/kvalmetodht03.pdf, 2005-03-15
[28] Patel, R. et al, 2003 p.53
[29] Ibid, p.23
[30] Holme, I-M, 1997 p.106

experience within the banking world. We have also tried to be direct with the respondents concerning what we are actually looking for. Thus, our theory, background information and interview should be as non-normative as possible.

The number of interviews is dependent on how thorough the interviews are and how much relevant information we are able to acquire on our topic. If we see that we have not been able to acquire relevant information, we are prepared to re-interview.

The criteria we will follow for choosing our respondents will be based on job description at the bank. To gain a better over-view and understanding of loan portfolio diversification we will interview loan directors at the regional level. We have assumed that due to their high position within their respective bank's hierarchy their answers should be representative of the bank.

The qualitative interviewing method requires that the interviewer does not lead the respondent. To prevent this, the interviewer's attitude should not be in any way reflected in the questions. The respondent should be able to freely express his or her perspective on the subject. This is what literature calls the 'degree of structuring'.[31] We tried to increase the degree of structuring in this investigation by posing questions in a non-normative manner. The questions had to be straightforward and without the implication that certain answers were better than others.

The degree to which the interviewer formulates the structure of the questionnaire is called the level of standardization. Qualitative interviews require a low level of standardization to give the respondent leeway to answer as freely as possible. The subject and how much guidance the respondent may need influences the structure of an interview.[32] The topic of loan portfolio diversification requires a low degree of standardization, due to the fact that some of the questions are not relevant for some banks or simply are not answerable.

Patel adds that it is positive for the investigation if the interviewer works together with the respondent to build up a coherent argument.[33] Hence, if needed, we intend to fill up the voids in their answers during the interviews through the use of practical examples and discussions. The discussions will seek to confirm whether we interpreted their answers correctly.

According to Patel factors such as high hierarchical position may influence the interviewing process. The interviewer may feel intimidated.[34] We see this as a possibility since the people we intend to interview will be credit managers in high positions. We intend to avoid this by being well prepared on the subject area in order to level the playing field. Patel confirms this by saying that it is important to be well prepared and make sure that the respondents do not

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[31] Patel, R. et al, 2003 p.72
[32] Ibid, p.78
[33] Ibid, p.78
[34] Ibid, p.79

surprise the interviewers with new information.[35] We believe that we have the right theoretical preparation for the interviews, with consideration that we have spent several months researching and familiarizing ourselves with it.

The questionnaire (see appendix 1) was sent out in advance so the respondents could prepare. The respondents' questionnaire had fewer questions than the one we have prepared for ourselves. We have designed the pre-sent questionnaire to be broad. This will give the respondent more leeway without us leading the interview too much. The reason for this is to minimize the leading affect described by Patel. Our follow-up questions act as a flexibility measure in order to expand the discussion element of our interviews.

2.2.1 The Interviews

The choice of respondents was made internally at the banks. We got in touch with the banks' credit-divisions and requested an interview with someone who was able to answer questions on the topic of diversification. In one case it was very clear who that person was. On the other hand, at the other three banks it took a few people to read a pre-interview sendout before they decided on the most competent person to answer the questions. We went on to interview one loan director at each of the four largest commercial banks in Sweden. The interviews were done at the offices of the respondents. Before beginning the interviews we explained our intensions with the study. Every interview was preceded by a minor discussion about portfolio theory and diversification in general. The respondents also talked a bit about themselves, their role at the banks and about the banks' history and organization. With the help of background information discussions we were able to get a better understanding of what follow-up questions would be needed to further investigate our issue. Because we are not familiar with the organizational and decision making structure of the individual banks we felt that a degree of background information was necessary to coerce further discussions.

Each interview took approximately two hours, mainly due to the fact that the interviews' were carried out in discussion-form. The questions were divided into topic areas such as; diversification in general (at the respective bank), diversification costs, and the main diversification variables from our theoretical discussions. During the interviews we discovered that not all of our questions were relevant to all of the banks. This could be explained by the unique organizational structure of each bank. For instance one of the banks was not engaging in diversification across industries, or rather they were not discussing risk spreading based on industries at the banks. Hence, there was no reason to ask questions about a potential diversification management across industries.

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[35] Patel, R. et al, 2003 p.79

The interviews were recorded by two note takers. We were able to benefit from the flexibility of this type of recording by having one person engage in discussion while the other person was able to note take.

When certain questions were not answered we tried to return to those unanswered questions later in the discussion. We had two incidences, which required that we returned to an earlier question later in the interviews to further expand on that issue. We did not do a second formal interview with any of the banks. We do not believe that this fact will have an influence the overall quality of the empirical data. We feel that unanswered questions by senior credit manager represents the overall organizations perspective.

2.2.2 Problems with the gathering of data

During the interview process we encountered a few minor problems. One of the problems that we encountered was that the respondents were somewhat unfamiliar with the theoretical framework of the topic. It is worth adding though that the respondents had little trouble grasping the theoretical framework of the topic. If something was not clear, after having explained what we meant, they were able to respond adequately. This is due most likely to the respondents' extensive practical experience.

The respondents had trouble understanding the concept of diversification the way MPT is described.[36] The way we handled this problem was to refer to diversification as 'risk spreading'. This term can be used very generally, but through discussions we came to the conclusion that the respondents had more ease with referring to the activity of diversification by calling it 'risk spreading'.

It is important to mention the information gap between the respondents and us. This is due to our lack of practical experience. Although, we tried to be as well prepared as possible for our interviews, three months of research does not replace years of practical experience.

2.3 Validity

The purpose of validity is to standardize research. Without standardization one cannot compare and evaluate qualitative research. To maintain a high standardization level requires research honesty. In ensuring honesty one is required to reveal how relevant the research is in the form of 'Validity'. Validity can be classified into two groups: inside validity and outside validity. According to Merriam inside validity describes how applicable the results are with reality. Outside validity, on the other hand is a measurement of how relevant the results are to the problem and in what way they can be used to describe other situations.[37] To ensure inside validity we devised follow-up questions for all of our interviews. This allowed us to thorough our investigation by removing the element of structure. According to Stenbacka, the highest valid-

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[36] MPT is discussed in chapter: 3.2 Risk Diversification
[37] Merriam, S. B., 1994 p. 52

ity is achieved when the interviewers use an unstructured interview approach and strategically chosen respondents.[38] The respondents' chosen were the highest ranked loan-managers in the western region of Sweden. We chose individuals whom had the highest loan decision-making power in Western-Sweden to ensure that each bank was adequately represented. Furthermore we chose respondents from the four largest commercial banks, with respect to total amount loaned, in Sweden. It should be noted that all of the respondents were asked the same basic questions (appendix 1). The follow-up questions differed with respondent depending on the answer depth pertaining to the initial main question.

2.4 Reliability

Reliability can be described as the repeatability of the research. A high reliability means that different and independent measuring of the same phenomenon gives approximately the same result each time.[39] Since we did not audio record, it meant that we were required to write down a large amount of information within a very short period of time. This, unfortunately, affects the reliability of our research because we were unable to record everything word for word. Thus, we must accept and assume a certain level of bias and misinterpretation. Furthermore, we did not define the word 'diversification' in our e-mailed pre-interview theory and question-naire portion. In hindsight we should have used the phrase 'risk spreading' and defined it in the theory and question send-outs. This would have prevented us from defining 'diversification' during the interview process, which may have confused or lead our respondents.

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[38] Stenbacka, C., 2001 p.551-556
[39] Eriksson, L T. et al, 2001

3 The Theoretical Framework

3.1 Risk Management

In the introduction we talked a bit about the worldwide deregulations in the banking industry and the consequences it had on the industry. When the state-imposed regulations were reduced, financial markets and the industries were set free. Many new financial products emerged such as: new credit- and payment solutions financing advisory, structured transactions, asset acquisitions, LBOs, securitizations for mortgages, derivatives and so forth. Many of these products were also offered by banks. As a consequence, new risks emerged increasing the need for risk management in fields that had never previously required it.[40]

Bessis divides banking risks into six different categories; Liquidity risk, Interest Rate risk, Market risk, Foreign Exchange risk, Solvency risk, Operational risk and Credit risk.[41] For a bank liquidity risk is the point where the liquid assets that make up a buffer are diminished. The Interest Rate risk is when the earnings of a bank are at risk due to movements in the interest rate. The interest rate risk can be managed by hedging with various derivatives such as interest rate futures and options. The market risk is the market deviations that may negatively influence the value of the portfolio during the liquidation period. Also the market risk can be handled with different derivatives and insurance products. The operational risks are the risks connected to the day-to-day operation of the bank. Defects in the internal information systems, internal risk monitoring systems, organizational structures, internal training and many other operational factors may lead to financial losses either directly or indirectly. The solvency risk is the risk of exposing the bank to situations where it is unable to cover its payment obligations. Thus, insolvency can occur if the bank is over exposed to any of the risks mentioned above.

"*Credit risk is the risk that customers default, that is fail to comply with obligation to service debt. …… Credit risk is also the risk of a decline in the credit standing of a counterparty.*"[42] This paper deals with the theoretical framework of diversification of loan portfolios in banking. Diversification is a tool among others to handle credit risk; the credit risk of the whole portfolio. The minimization of the credit risk of an individual customer is often handled through various credit-worthy evaluation systems such as: scoring models, analysis of financial standing, and soft data. It is important to keep track of the credits being given to various companies, particularly the size of the credits being given. Default of a firm or a segment of the portfolio comprised of a large portion of the total loan portfolio, may lead to insolvency. Hence, ceilings are usually put up on the amount loaned to any one firm or industry (simply fractions of the

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[40] Bessis, J. 1998 p.4
[41] Ibid, p.5
[42] Ibid, p.5, 6

portfolio that have high correlations).[43] In other words one can divide credit risk management into two dimensions; the handling of an individual firm's credit risk and the handling of the total loan portfolio's credit risk.

3.2 Risk Diversification

Markowitz designed a way to measure the risk of securities statistically and thereby construct desired portfolios based on one's overall risk-reward preferences. The statistical approach to plot the risk reward relation is preceded by assigning expected values, standard deviations and correlations to security's single-period returns (no annuities). Later with these statistical measures one can calculate the volatility and the expected return of the portfolio, which are used as measures for risk and reward respectively. With quadratic programming (optimization, minimization of a quadratic function subject to linear constraints) an investor is able to find a few portfolios (out of an almost infinite number of possible weights of the securities) that will give the optimal risk-reward combination the securities making up portfolios. These portfolios make up the efficient frontier.[44] The assumptions behind this quantification is that all market participants have the same expectations, investors are able to invest in a totally riskless assets yielding the risk free rate of interest and the cost of transactions, information and for management is zero on the market. Based on these assumptions, one should be able to construct an optimal portfolio for all investor preferences. Markowitz divided the portfolio selection process into two separate decisions, first off; find the portfolio with the maximum reward for least amount of risk taken, lowest possible standard deviation. Second; decide on how to allocate the funds between the riskless assets and the risky assets.[45]

The intuition that followed from the MPT, was that the total volatility of a portfolio decreases as the number of securities that comprise the portfolio, increases. For this volatility decrease to happen, the correlation between the securities must be as low as possible. The lower the correlation, the fewer securities are needed to decrease the total volatility of the portfolio. The point is that a loss in one security will result in a gain in another, if the correlation is negative. Hence, the total value of the portfolio will not change. Hereby follows the diversification intuition.[46]

In effect what is happening with diversification, applied on financial markets, is that the risk of individual securities (in the case of banks: the credit risk of an individual firm) is being diversified away. This risk is called unsystematic risk. The risk that cannot be diversified away is called systematic risk, which is sometimes equated with the market risk.[47] Systematic risk could be described as the uncertain tendencies of the market. A well diversified portfolio will have the same tendencies as the market, in other words nearly perfect correlation with the mar-

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[43] Bessis, J. 1998 p.6
[44] http://www.riskglossary.com/link/portfolio_theory.htm
[45] Mao, C. T. J., 1970 p. 1-2
[46] Dobbins, et al, 1994 p.26
[47] Ibid, p.53

ket.[48] If the market happens to have a negative tendency (graphically the best fitted line is negative), then the loss of the portfolio will be equal to the loss of the market, and vice versa if the tendency is positive.

3.2 Banks' Management of Systematic and Unsystematic Risk

The main objective of diversifying a portfolio is to minimize the unsystematic risks of the portfolio. In the case of diversifying a loan portfolio, the objectives should be the same. The objectives should be to minimize the unsystematic credit risk, which can be interpreted as the risk of credit takers defaulting in a specific industry or geographic region simultaneously. The risk of a sudden decline in an industry or the economy of a certain region can not be ignored, since history has proved that it is likely that at some point shocks may arise without giving enough time for the banks/companies to hedge or neutralize these positions. Hence, it is in their interest to make sure that the concentration of the portfolio is not too high (across industries, geographic regions or even individual firms). A high degree of concentration in a loan portfolio implies that there is a certain level of unsystematic risk in the portfolio. It is important to make a note that if a portfolio is highly concentrated and the bank is implementing sound credit evaluation, the unsystematic downside risk should be minimal. Hence, portfolio concentration does not imply that the bank's whole portfolio is threatened. It only means that components of the portfolio have high correlations and thereby, if the downside risk increases for one component, the risk of the whole portfolio will increase.[49]

It is possible that a large focus on the minimization of credit risk (the firm specific risk or unsystematic downside risk) may draw attention away from attempting to attain only systematic risk exposure in the portfolio. It is important to distinguish these notions apart. Systematic risk signifies the risk that exists in a well-diversified portfolio, in other words the market risk. For a bank's loan portfolio it is somewhat more difficult to find a benchmark for systematic risk. On the other hand one possible definition of the systematic risk of a bank's loan portfolio could be; the probability of default of all those companies (or entire industries) that banks in general supply credit to. In other words industries or companies that mainly rely on risk-capital, and are considered to be risky ventures by banks, cannot be included into the benchmark measure of the risk-reward relation.

This reasoning can be exemplified, for instance, by a decline in the oil supply in an oil-dependent economy. Say the world demand for oil increases dramatically, which leads to high increase in oil prices. Since the economy has a high oil-dependence, its industries' profit margins (assuming most industries in the economy have oil-dependent profits) will erode. We further assume though that consumption sensitive industries have low correlation with these industries. Hence, the increased oil prices will increase the unsystematic downside risk of the oil-dependent industries. The consequences for the banks (assuming they have well diversified

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[48] Dobbins, et al, 1994 p.53
[49] Bessis, J. 1998 p. 219, 289-290

loan portfolios) will be that some components in their portfolios will default on their repayment obligations. Since the consumption sensitive industries have low correlation with the oil-dependent industries, there will be many firms that will *not* have an increased downside risk, in other words no eroding profits or increasing probabilities of default. Within the portfolio as a whole the credit losses will be limited.[50]

On the other hand if the consumption sensitive industries have high correlation with the oil-dependent industries, the situation will change. Then, the increase in oil prices will not only lead to an increase in the unsystematic downside risk of the oil-dependent industries, but instead it will become the systematic risk since the whole economy will be affected. Hence, most components in the well diversified loan portfolios of banks will see their downside risks increase. This essentially means an increase in systematic downside risk.[51]

3.3 Banks' Loan Portfolio Diversification

Based on the discussion above concerning portfolio management, diversification can be carried out with a variety of strategies. Diversification is based on the notion that the variables that primarily influences the portfolio-components' value development have low or negative correlations. For a bank the quantifiability of correlations of industries or companies is more complex than for example, stocks. If a proper benchmark for an industry's general development is used, say the cash turnover of an industry, (holding all other variables constant) then the quantifiability of an industry has been made possible.

Diversification can also be managed intuitively by lending to businesses that have proven before to have independent business cycles.[52] Suppose analysis of "soft data" concludes that certain industries have little or no affect on each other, this would be another way of constructing a diversified portfolio. A discussion will follow below on the different diversification strategies a bank may be able to implement.

3.3.1 Geographical Diversification

The intuition of MPT implies that a diversified loan portfolio has lower total credit risk than a more focused one. Portfolio theory bases this assumption on the fact that credit risk includes systematic and unsystematic risk. The systematic risk of credit risk is the risk that cannot be diversified away, in other words the market risk. Market risk is the risk of default of firms associated with a local, regional, national or international economic downturn, depending on the diversification benchmark (the geographical area over which the bank chooses to diversify itself). When it comes to geographical diversification, systematic risk can be exemplified by the credit loss that the bank cannot forego if it seeks to cover all sectors of a certain geographical area.

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[50] Sinkley, F-J. 1998 p.213-214
[51] Sinkley, F-J. 1998 p.213-214
[52] Bessis, J. 1998 p. 289

The idea is that the performance of a geographically concentrated portfolio may deteriorate significantly when the local economy (where the portfolio is concentrated) suffers a recession or a negative economic shock. A geographically well-diversified portfolio on the other hand should not be overly affected by such individual credit losses (in one regional area) since it is compensated by the collected interest and amortization payments of firms in all other regional areas in the portfolio. The assumption behind this reasoning is that different regions' economic developments have low or even negative correlation. Thereby the default probabilities of existing loans also have low correlation. A further assumption is that banks have different ways for compensating expected future systematic losses. Hence, banks should be able to diminish the sensitivity of their loan portfolios to local/regional economic shocks by diversifying geographically.

According to LeGrand, history has shown that in the 1980's, 9 of 10 banks that defaulted had lack of diversification. Later in the late 1980's 10 of the largest New England banks defaulted because of highly concentrated loan portfolios. The article discusses the fact that US banks have difficulties diversifying across geographical areas, state borders.[53] This is not the case in Sweden (obviously, Sweden as a country is not comparable with the US as a continent, nor can the Swedish four big commercial banks be compared with the vast amount of American banks). The high market consolidation in the Swedish banking industry has resulted in having four big commercial banks with a high market concentration, hence the 'four big ones'.[54]

3.3.1.1 The Church Tower principle

In connection to geographical diversification The Church Tower Principle should be mentioned, with consideration that recent research[55] has shown that the principle may no longer be applicable. In metaphorical terms the bank is the church tower and the firms in its proximity can be screened and monitored from its outlook. The theory deals with the importance that geographical distance has in banks managing its outstanding credits. The proximity of the bank implies that it has good overview of the local loaning market. Hence, applying the theory to diversification, a bank seeks to diversify its portfolio, by placing bank offices locally where ever they may want to increase market presence. The closeness to the firms should decrease the information asymmetry between the bank and the firm. The CTP implies that screening and monitoring firms gets more difficult the greater the geographical distance is between the bank and the firm.[56] Research has show that The Church Tower Principle is becoming less valid with time.[57] The tendencies are that banks no longer place local bank offices in every corner of the country. It has also been shown that the number of local community banks in the US and local bank offices are decreasing. This indicates that local economic shocks are not burdening the banks as much.

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[53] LeGrand, J-E., 1993 p.65
[54] Frisell, L., 2002 p.27-28
[55] Carling, K. et al, 2002
[56] Ibid, p.1-2
[57] Ibid

3.3.2 Industry

As mentioned above, the repayment probabilities of outstanding loans should have low or negative correlations to diversify a loan portfolio. In the case of diversification across industries one should be measuring the movement, development, of certain generally accepted variables for credit worthiness (figures taken from the balance sheets and cash flow statements) across whole industries. For instance one is able to measure the cash turnover of a whole industry (the sum of the market participants' sales/cash-turnover) and its movements. The changes can later be quantified and illustrated by volatility measures, and the relation between their movements by correlation measures.[58] Assuming that firm specific variables are constant (such as operating margins), and the number of market participants are few and constant (they can influence the prices), in other words the only variable that is non-constant is the cash turnover in the industry, one is able to construct a portfolio according to ones preferences based on these figures. It is then assumed that the cash turnovers of the firms in the industry have high correlations.

The objective of diversification across industries is to diversify away the unsystematic risk of an industry. Say a specific industry is hit by a sudden slump, which has little outside industry effect, (assuming the number of firms is few; an oligopoly) the cash turnover of the firms will decline and if assuming constant operating margins, the repayment of the debt will be jeopardized. Hence, diversification of the outstanding loan portfolio should minimize the value that is at risk in the case of a decline of a specific industry.[59]

According to LeGrand industrial diversification in the US is often due to the degree of geographical diversification.[60] Since industries are often concentrated to certain geographical areas, it is a fair assumption to make that a geographically well diversified bank should also be able to cover many industries in its portfolio, assuming it has no specific objectives to specialize industrially.

LeGrand also discusses banks' industry specialization by hiring industry specialists. The objective is to have these lending officers make better credit decisions based on their specialist knowledge about a certain industry. According to the author, contrary to what one might think, this activity may not reduce risks. The risk being discussed is the fact that such a specialized team might have a hard time "walking away" from an industry, due to the fact that lending teams like this are often compensated for acquiring or holding onto lending business.[61] It should be pointed out though, that the presence of industry analysts should not be viewed as an obstructive mechanism towards diversification.

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[58] Bessis, J., 1998 p.289
[59] Kamp, A., 2005 p.2-4
[60] LeGrand, J-E., 1993 p.66
[61] LeGrand, J-E., 1993 p.67

3.3.3 Size

In diversification across companies with differing sizes, the assumption is made that these companies' repayment abilities[62] are not correlated. There may be many reasons for the low correlations. For instance; legislation may infer that companies over different sizes are being favored differently through for instance tax regulations such as special tax remission or special tax burdens, or governmental subsidies. Also the fact that many big companies are doing business or have subsidies abroad. Thereby these companies' profitability is not necessarily dependent on the economic development of their home country. For instance; if a Swedish firm has most of its business in China, a recession in Sweden should not affect the profitability of the Swedish firm (assuming that profits can be retrieved from China). Another influencing factor that can encourage diversification across company sizes may be the fact that larger firms often have more diversified portfolios than mid-sized firms, which in turn can lead to less vulnerability to the general economy. Hence, the profitability of a company with these characteristics may be less volatile, which in turn indicates a lower correlation with firms that have more focused portfolios.

3.3.4 Customer

Banks may also seek to diversify across individual customers.[63] Diversification across customers is justified, considering the MPT, if customers' repayment abilities (which we have earlier defined as the general profit making abilities) have low correlation. It is possible that a firm's profit making abilities have low correlation with the other firms on the market. An example of such a situation is a firm that may be offering the same product as many other firms, but in a different price range, say to a higher price. Hence, if the customers are price sensitive, the product may have a high correlation with the general economy. That means that the sales of the product would peek in a strong economy, while the others' sales of the same products would stagnate or drop (stagnation out of the bank's perspective is not necessarily a bad thing, but may act as a warning sign if built into credit scoring systems). In other words, holding all other variables constant, one can assume that a bank could use this market phenomenon to decide whether to diversify across firms on the market.

3.3.5 Problems with the theoretical framework

Due to complexities of reality, theories do not hold in all situations. Geographic diversification is based on dividing a country into different economic regions which have the lowest possible correlation. Thus, geographical diversification can be a costly risk minimizing tool. The more unsystematic risk is diversified away over various geographical sectors, the higher the cost of diversification. When marginal cost is equal to marginal utility is the optimal level of diversification. Yet, there are cost effective reasons for focusing the loan portfolio. For example, a bank

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[62] Repayment abilities can have a wide range of definitions, but we choose to focus on the profitability of a firm. A highly profitable firm can manage their repayment obligations, while an unprofitable firm may sooner or later default.

[63] LeGrand, J-E., 1993 p.64

can choose to give credit to specific industries or businesses in specific areas in order to mini-mize the cost of monitoring. Furthermore, it is assumed that the demand for credit is always larger then what is actually being loaned. This, of course, may not always be relevant for all banks. Some banks may be forced to give credit to companies that just happen to choose them. In essence, it is not the bank that chooses the company; it is the companies choosing the bank. Therefore, banks may not be able to be overly picky when it comes to lending money. Thus it is very difficult for credit granting to occur with diversification as the only goal. For example, if five credit-worthy companies, all highly correlated, show up at the bank wanting loans; it would be very difficult for the bank not to loan money to all of them because of loan portfolio diversification goals.

3.3.6 Cost of loan portfolio diversification

The cost of diversification for a portfolio consisting of for instance stocks, can be defined as the sum of the transaction costs and the monitoring costs. We assume active diversification since there is an optimal number of assets in a diversified portfolio that of which; marginal benefit of diversification is equal to marginal costs of diversification. We believe that passive diversification in the discussion for banks, is irrelevant, since banks have very rigorous credit evaluation systems, which can be compared to the active diversification of portfolio managers. The reason is that if a well diversified portfolio only contains a handful of assets, these should be chosen with care, based on subjective security analysis (further definition of security analy-sis is referred to literature around the topic).

For banks, diversification can be defined in a similar way. The primary diversification cost drivers are the monitoring costs and the investment costs connected to the different diversifica-tion strategies that banks may have. Above, we discussed several diversification strategies that banks may engage themselves in such as: geographical, customer, industrial and by size. For geographical diversification, the implicit costs could be the costs connected with establishing a local office (marketing, customized marketing, employment costs, training costs) in a certain area. Diversification across industries and customers may require investments to bring in the know-how needed to asses and monitor the industries and customers.

Finding the optimal balance between the costs of monitoring versus the cost of further diversi-fication of a loan portfolio can be crucial for banks. Diamond's theory argues that exclusive bank-firm relationships are optimal as they avoid duplication of screening and monitoring ef-forts as well as free-riding.[64] Yet, contrary to Diamond's findings the theory on financial inter-mediation recommends that banks should diversify to reduce risk as well as suggests a focus in their loan origination on industries they have a superior knowledge about as their superior monitoring abilities will then increase risk-adjusted returns. Therefore taking into consideration Markowitz MPT the rational bank would diversify its loan portfolio up to, but never beyond,

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[64] Diamond, D., 1998

the point where the marginal benefits equal the marginal cost of diversification. After this point, the more a bank diversifies the higher the implicit costs of the portfolio. The problem that may arise in evaluating the marginal costs versus the marginal benefits of diversification is that it is difficult to measure the marginal benefit (the change in volatility) of a bank's loan portfolio.

Even if cost drivers of diversification have been categorized and monitored, because the marginal benefit of diversification is difficult to measure it will be difficult to apply Modern Portfolio Theory to a bank's loan portfolio. If the outstanding loans are handled like bonds, then the volatility should be measurable (the volatility of the yield to maturity could work as a measure of risk). The problem is that there is no over-the-counter market for these outstanding loans. Hence the YTM is difficult to asses, the costs could be measured, but it would not serve any use until marginal benefit can be measured.

Usually a bank evaluates every investment individually. If the notion of diversification and its costs are applied to banking and its loan portfolio, one looks past the fact that banks are usually large organizations with often hundreds of bank officials involved in the credit evaluation process. Since bank's organizations are often divisionalized, one can assume that costs attributable to diversification would be difficult to allocate to one individual activity. There are many types of cost drivers, their sizes and their nature vary as does the time-lapse. Some investments are individual while others are continual. Hence it is very difficult to classify costs when attributing them to diversification.

3.4 Basel Accord

The groundwork of the current Basel Accord was founded in 1988; this was in direct response to banks' poor lending practices in the early and mid- eighties. Representatives from the G10 countries were the creators of the first accord's guidelines. The focus of the first accord was credit risk. An 8% lending capital requirement was the agreed upon hurdle rate.[65] The original calculation was 'capital' divided by 'credit risk'.[66] The Banks' were still responsible for their own credit scoring models in order to evaluate 'credit risk', but large risky exposures were greatly reduced. Furthermore, the Basel Accord defined 'capital' into two categories: Tier 1 being 'core capital' and tier 2 being 'supplementary capital'. Without mentioning the intricate details of how capital was defined, it should be noted that 'core capital' is weighted much higher than 'supplementary capital'. Thus the maximum tier 2 capital recommended for use was 50%.[67] An amendment to the 1988 proposal came in 1993 and was implemented in 1996. This amendment was essentially the addition of market risk into the original calculation. The market risk variable was defined by using VaR calculations.[68] Due to these changes a new

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[65] http://www.bis.org/publ/bcbs04A.pdf, Basel Accord, 1988, Basel Accord, 1988
[66] Ibid.
[67] http://www.bis.org/publ/bcbs04A.pdf, Basel Accord, 1988
[68] Bessis, J. 1998 p.35

'capital tier' was established, Tier 3, which could only be used to cover the current market risk.[69] This amendment now embraced diversification activities like hedging and foreign exchange rates but still did not completely acknowledge the intricacies within asset capital needed for low risk lending. The amendment however, meant that it was unprofitable to hold G10 government debt.[70] Thus banks' turned to the more profitable sector of corporate debt holding. Because the amendment's stipulations still did not distinguish a weighting system between corporate debts it was more profitable for banks' to take on high-risk corporate debt than high quality corporate debt. To rectify the original Basel Accord's limitations the Basel II Accord was created in 2004. This revised accord created a simplified weighting system for corporate debt through the addition of 'operational risk' into the earlier formula.[71] The addition of operational risk into Swedish lending regulations will further standardized banks' lending procedures with respect to the minimizing of unsystematic risk exposure. The representatives of the Basel II Accord's definition of operational risk excludes systematic risk, thus systematic risk is not represented within its stipulations.[72] The new accord may most likely urge banks to improve exposures to unsystematic risk, but banks with loan portfolios with highly correlated components will still be susceptible to unsystematic risk.

3.5 Summary

Credit risk management can be devided into two dimensions; risk management of individual credits and risk management of the total loan portfolio. For managing the latter, we suggest the application of Modern Portfolio Theory[73] on an intuitive level. MPT is not dealt with in The Basel Accord, yet the management of total loan portfolio risk is emphasized through diversification. We on the other hand discuss credit risk diversification using Markowitz's opmimization method of constructing a portfolio. With this one is able to minimize the total portfolio risk (measured in volatility) in relation to the return of the portfolio. This quanitative method is effective in capturing a security's level of risk within the portfolio. However this method does have drawbacks; it is difficult to apply to banks' loan portfolios. We believe on the other hand that there are interesting lessons to be made from this optimization method. Quantitatively one can show that a portfolio containing securities that have low correlations, will result in the total volatility of a portfolio decreasing. Since this quantitative method is difficult to apply to banks' loan portfolios, the objective can be obtained on an intuitive level. Diversification is one way of decreasing total portfolio risk; assuming that the components of the portfolio have low correlation. The lower the correlation, the fewer securities are needed to decrease the total volatility of the portfolio. Banks on the other hand seek as many borrowers as possible. Intuitively, a bank should then seek to lend money to clients that correlate as little as possible.

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[69] http://www.bis.org/org/publbcbs11a.pdf, Basel Accord amendment, 1993
[70] http://www.bis.org/publ/bcbs107.pdf, Basel II Accord
[71] Ibid.
[72] Ibid.
[73] Markowitz, H., 1952

We have presented four main parameters within which a bank can diversify its portfolio; geografically, by size, customer and industry. Obviously, there are difficulties in managing diversification of loan portfolios. Intuitively two industries or geographical areas may have low correlations, but in reality this may be different. A problem that may arise is: industries' and individual firms' may move in relation to one another, thus making it difficult to measure. If a measurement is not possible how can one be certain that the portfolio is really well diversified? However, if these uncertainties can be overcome by utilizing different quantitative measures, for instance measurement of the cash turnover of a whole industry, diversification could be managable. The theoretical discussion in chapter 3 should be viewed as a presentation of different topics connected to diversification of loan portfolios; we attempt to capture the intuition and thinking that lies behind these established practices.

4. Empirically Gathered Data

In the following chapter we will present the empirically gathered data at respective bank. The gathered data is a result of four interviews at the four largest Swedish commercial banks' credit-divisions. The banks have been labeled with the letters A, B, C and D to keep the banks apart and unidentified.

4.1 The concept of loan portfolio diversification at banks, their attitude towards it and what their diversification objectives are.

4.1.1 Bank A

The respondent at Bank A believes that it is important with commercial loan portfolio diversification. He also stresses that they could further improve on the available system they currently have. With respect to geographic, industrial, and size diversification, the respondent believes their loan portfolio is definitely geographically diversified and that it is geographic diversification that affects their portfolio's industrial diversification. Because the bank does business everywhere in Sweden, the bank believes it provides credit to almost every type of industry. The respondent gives the example of high percentage of real estate lending in Gothenburg versus lending to small local businesses in Norrland, (northern) Sweden.

According to the respondent Bank A does not have a diversification requirement with respect to their loan portfolio. He stated that they do not stipulate a certain percentile that must be allocated to the portfolio; but rather, look for current financial problem areas both geographical and industrial in the portfolio. The bank gives the theoretical example of: if there is financial trouble with Volvo they would monitor those companies that have high correlation with Volvo. Thus according to bank A, diversification is a guiding or directional tool instead of a strategic goal. Furthermore, the respondent does not stress whether they are highly correlated in one specific area, they would never refuse what they judge as potential good business.

4.1.2 Bank B

The respondent describes Bank B as extremely diverse. It has over 400 offices in Sweden and has had a goal of decentralization since the 1970's. Most of the loan decisions are taken at the individual office level. The individual offices also have the responsibility of marketing to customers and choosing quality loan applicants within their local**.** The respondent stresses the issue of decentralization while stating that all levels become involved in the lending process. The higher the loan sum, the higher up the chain. The chain consists of 1. Bank employee 2. Office manager 3. regional manager (4 people for Western Sweden, 75 offices) 4. Regional Credit department 5. Regional credit committee 6. Regional Bank Directors 7. Country Directors.

The respondent states that they have active diversification objectives, even if it is not explicitly formulated in the bank's strategic management. The bank seeks to establish as many offices as

possible 'close to its customers'; they interpret this as diversification. Bank B is one of the biggest commercial banks in Sweden and they have, according to themselves, an exceptional coverage of both the industrial and geographical sectors of Sweden. But through further discussion the bank revealed that it does Not have a database from which the bank's total portfolio can be monitored.

At Bank B it is considered important to be well-diversified; the bank did not state this directly but it was inferred from the discussion. The respondent had some difficulty understanding the intuition of MPT, a diversified loan portfolio: he mainly stressed the importance of risk-spreading. This we interpreted as his perception of diversification. He later explained that the bank intends to spread its risks (we interpret this as: diversification) by establishing local bank offices. At the local level, the bank does not strategically diversify its individual loan portfolios. Instead, the bank focuses on "high quality" lending. At the regional level, there is an awareness for diversification; but it is mainly geographical.

4.1.3 Bank C

The attitude towards diversification of the respondent at Bank C was positive. They consider risk spreading within the loan portfolio important. Similar to Bank B we interpreted a positive attitude towards diversification throughout the interview.

Bank C's traditional banking role was in one of Sweden's largest urban areas in the manufacturing industry. The banks image has changed due to mergers with numerous other banks that specialized in different sectors. This has directly influenced the bank's credit portfolio. The respondent states that certain industries are underrepresented in the portfolio. With a very few exceptions, the industries not represented in their portfolio, are considered 'trouble industries'. They try to avoid certain industries considered to entail high risk. They have a similar approach to geographical areas. The bank only seeks to establish itself where the risk is low and there is money to be made. Hence, those areas that are not represented in the portfolio are geographical areas where good business is not possible.

According to the respondent the bank has no real objectives when it comes to the level of exposures in the credit portfolio. He states, it does not want to tie up too much of its capital in one lender. The respondent did not use the notion of diversification as the reason. He explained though that they do consider it to be too much exposure to lend too large amount of capital to one client. Yet, at the same time they don't have a formal outspoken objective to diversify their credit portfolio.

4.1.4 Bank D

The respondent says it is not important that the loan portfolio is well diversified. Bank D would rather focus its resources on "credit quality". Furthermore, Bank D feels it is most likely *not* diversified. On the other hand in the financial report of the bank it is stated that the bank con-

siders itself to "have a low risk profile with a well-diversified credit portfolio".[74] The respondent reveals though, that approximately 50-60% of their credits are somehow related to one industry. This has been a result of numerous bank mergers. The respondent does add though that it would be more interesting if more large companies were represented in the portfolio.

The respondent revealed that Bank D does not have outspoken objectives in diversification, which is contradictory to what the financial report of the bank states (according to the quote above). We observed during the discussion that the respondent did not consider our definition of loan portfolio diversification as relevant. Furthermore, the respondent did not understand the concept of diversification that we outlined in our theoretical sendout (see appendix 3).

4.2 What does the practical implementation and the follow-up of loan portfolio diversification look like?

4.2.1 Bank A

Bank A has a large database available at all different levels within the organization. The variables used in the database are: Regional data, local data, portfolio concentration, credit quality based on rating-systems. This database is used to overview and evaluate the loan portfolio. According to the respondent Bank A focuses on tendencies and changes in their portfolio, which allow them to further discuss the lending strategy the bank would like to pursue. Yet, Bank A is not concerned about being concentrated if their rating system deems the loan repayable; they do not refuse, what they consider, potential good business.

Bank A can measure loan portfolio diversification using its database system, but it is not frequent that the bank uses this ability. The banks focus is mostly on the repayment potential of the customer, which they refer to as 'credit-quality'. The quality level is established by the rating system. It is quality that Bank A is concerned with; not correlation between loan portfolio units.

According to the respondent Bank A's upper management is not concerned with the cost of diversification and does not involve diversification costs into its present credit risk strategy. The respondent at Bank A does state that they are much more reluctant to enter new markets because they may be too costly ("kostar mer än vad det smakar"). With respect to geographical diversification, the bank does not view the costs of new offices as diversification costs, but rather view these costs as increased operational costs that are built into the interest rate. The respondent gives the example, if one is to finance a project that is a slightly unknown (no benchmark) the cost of this venture is allocated to the cost of capital.

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[74] Taken from the financial report of the bank. Due to a non-disclosure agreement, we cannot disclose which bank the financial report quote is taken from.

The respondent states that they use different variables within their rating system to help determine the cost of loan diversification. To gain a better perspective of the lending the bank monitors key figures on companies' balance sheets. It is the strength of these figures that determine if the bank would like to get involved. Unlike stocks there are no transaction costs for a bank; it is just different variables within the companies that affect the rating. This is considered a capital cost to the bank, thus the lower the rating the higher the cost of capital.

Bank A's main diversification focus is on broadening its loan portfolio according to industry. That of second importance would be company size. Thirdly and least important to the bank would be geographic diversification. The bank feels it cannot expand further geographically within western Sweden.

4.2.2 Bank B

Bank B's loan portfolio diversification is managed at the regional level. Bank B does not focus on diversification at the top level. Furthermore, Bank B does not have a measuring or monitoring system in which they evaluate loan portfolio diversification.

The respondent states that Bank B does not consider or evaluate the cost of diversification. They do not measure these figures or compare them to their current level of credit risk. The bank furthermore states that the only form of diversification strategy used is the building of offices in new profitable areas, which they thoroughly calculate in advance.

Bank B's cost of loan portfolio diversification is measured at the local level. The bank focuses only on geographic diversification and thus judges the potential earnings of diversification and or costs through new loans at new offices. They use the system; cost to profit ratio to evaluate the investment of a new office.

Geographical diversification is the only diversification strategy that Bank B uses with consideration to lending.

4.2.3 Bank C

Bank C manages diversification by avoiding over-exposure to certain companies. This decision is based on how much portfolio exposure already exists within the companies industry. In other words there is awareness when it comes to exposures in different industries, which can be defined as a certain kind of diversification management.

There is an active measurement of diversification (or rather exposures) at bank C. They keep track of the risk exposures at different levels.

There doesn't seem to be an awareness of costs assignable to diversification. The investments made are looked upon individually. They analyze costs versus profits for each

activity**.** However, there are no analyses done for the total costs of risk spreading across industry, in other words no formal cost of diversification. He says that it is difficult to think like a bond portfolio manager**.** The credit evaluation process done on a bond portfolio is simply not the same as a loan portfolio, even if there are similarities. The costs for each and every evaluation is individual, small borrowers require very little time and money invested, while the credit evaluation process for larger borrowers is more time and resource consuming.

He does add that if diversification cost awareness existed, he would categorize them according to the following:

Investments in: *- Knowledge*

                                   - education

                                   - employment costs such as salaries, benefits, and so forth

The variables that guide bank C's diversification thinking are: industry, size (exposures should not be too big into one and only firm), and different risk classifications. It is worth adding that they have very little discussions about geographical diversification. This may be due to the fact that they consider themselves to already be doing business in the most strategically important geographical areas. Moreover, he adds that there has been, in recent years, activity that could be defined as geographical diversification. For example, the bank has established an office in Lindholmen, Gothenburg, which is an attractive area where many companies have been establishing.

4.2.4 Bank D

According the respondent at Bank D, they do not have any active diversification, but some of their activities closely resemble geographic diversification**.** Bank D does have access to a centralized database in wich most quantifiable data can be handled. They also check other banks' databases in order to analyze quantifiable data, but they do not measure or manage diversification/exposures through these databases**.** What the bank actually does is sensitivity analyses on different segments of the total lending stock. According to the financial statement, the bank is utilizing market risk sensitivity measurements based on Value at Risk- models.[75]

Bank D does not consider costs in the context of diversification. Yet, if the bank were to take this perspective on costs; the closing/establishing of bank offices, the costs of specialists, and the loss of market share are viewed as relevant. The respondent also feels that strategic marketing techniques can help minimize the cost of diversification.

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[75] Taken from the financial report of the bank. Due to non-disclosure agreement we will not disclose which bank's financial report the quote is taken from.

4.3 How do the banks manage the systematic risks of the loan portfolio?

4.3.1 Bank A

Bank A evaluates all loans individually and only with unsystematic risk in consideration. According to the respondent the bank assumes that systematic risk (market risk) is unavoidable so there is no reason to try to manage towards it. The respondent exemplifies: if a huge downturn would hit the economy; there is no reason to manage towards diversification, because if it hits so strongly that the borrowing companies (financially very strong) might default then presumably all segments of the economy would be hit. The bank, instead tries to become financially strong and make sure that the quality of the credits are high enough to handle economic shocks. The banks' prime rate is used as a floor for the cost of systematic risk.

4.3.2 Bank B

Bank B evaluates the credit customer individually and only with unsystematic risk under consideration. The quality of the loan is always of utmost importance**.**

4.3.3 Bank C

Accoring to the respondent the bank does not provide risk-capital, furthermore the bank does not go into a business itself if the loan is very large**.** There are a few incidences where the bank exposes itself as the sole lender; loan-sharing is one option that the respondent mentioned. There is also another method the bank uses to limit exposure: the reinsurance market. The respondent points out those large companies desiring large loans usually turn to the money market. It **i**s therefore rare that banks must consider loaning a large portion of their capital to one company**.** The bank classifies all of the companies they do business with into three groups: small businesses < 200M, medium business, and large business**.** Small businesses are plenty and the bank does not avoid any industry**.** However with large businesses, the bank aspires not to have one or few industries using up the banks resources. Hence there is an awareness of exposures to unsystematic risks.

4.3.4 Bank D

The respondent states that Bank D does not have any risk capital investing. The respondent stresses the importance of quality, once again. We began to openly discuss systematic and unsystematic risk and why it is important to minimize unsystematic exposure of each loan component in the portfolio, no matter if it is one company or an entire industry. The respondent responded by highlighting the importance of stock analysis (sensitivity analysis). Bank D does business with companies which are financially strong enough to survive economic recessions. Furthermore the Bank's capital coverage should be sufficient to survive serious recessions. He also adds that the bank does not believe that a situation like the one at the end of 1980's and beginning of the 1990's would occur any time soon, which means that the bank is not worried about great exposures (concentration) in the loan portfolio.

4.4 Geographical Diversification

4.4.1 Bank A

In the case of geographical diversification at Bank A the office system is considered to be the main channel through which it reaches out to customers. The respondent does add though that the number of offices has declined. He says that the importance of physical closeness to the customers has decreased, which he confirms by adding that the bank does not believe in the Church Tower Principle. He exemplifies this by saying that it doesn't matter for the customer if you are 10 or 50 kilometers away since technology has made the physical distance less significant between the bank and its customers. The services that Bank A offers its clients, monitoring and renegotiations of credits do not depend on physical proximity.

The respondent adds that other important factors concerning geographical diversification are the support and availability that the bank offers to its customers. He says that being able to offer different services and products along side loans, the bank is able to diversify their portfolio to geographical areas otherwise not covered (without establishing local offices).

4.4.2 Bank B

Bank B, with respect to geographical diversification focuses on reaching its company based customers by building and expanding bank branches physically. This management decision is taken at the regional level and not at the top level. The Bank believes that geographical diversification is achieved by expanding physically and is not a natural occurrence of company growth. The number of bank branches have increased within this bank, thus, the bank is a firm believer in the CTP.

4.4.3 Bank C

The main channel that Bank C uses to reach potential loan clients is by establishing new bank offices. We interpret this to be geographical diversification

Furtheron, Bank C believes that the CTP is highly valid. The respondent explains that it is important not to go outside your geographical area due to the information asymmetries that may arise if the distance between the bank and the client is too great.

4.4.4 Bank D

The respondent at Bank D feels that good branch managers are the key to geographic diversification. The bank relies on its branch managers' experience of the local surroundings to help the bank expand within their proximity. Bank D currently has decreased the amount of bank branches in its organization. Bank D does feel that CTP is relevant, and attempts to open new bank branches in profitable areas. The bank has no specific organizational goals with respect to opening or closing new bank branches.

4.5 Diversification across Industries

4.5.1 Bank A

Bank A, with respect to industry diversification, believes that it is partially dependent on geographic location. Those companies that are credit worthy are taken in the loan portfolio, which can or may be industrially over-represented at the regional level. The bank does not consider this a problem because of its sheer size. If all regional branches follow the bank's credit risk procedures the total credit risk within the bank is believed to be lower.

The respondent says that they pay close attention to the industrial diversification within its loan portfolio. Bank A assigns analysts or specialists to industries that are or could be potentially problematic for the bank. Bank A's analysts are both concerned with industry correlations and company specific ratios. With the information provided by analysts the loan managers can make better loan decisions on individual firms. Bank A usually does not actively seek companies according to industry. If a specific industry becomes riskier, Bank A will decrease its exposure there.

4.5.2 Bank B

Bank B does not use industry as a relevant diversification variable in their loan portfolio. Bank B states that there are always good companies in all industries.

If local bank offices do not have enough resources or experience within a new industry or to evaluate certain clients; support is provided from the region level. There is approximately one regional manager for every 20 bank offices. These managers either use their own experiences to help with the loan decision or can organize a support team. According to the respondent the bank works together with large companies (customers) for ideas and solutions (cash management and cash flow solutions).

Bank B's credit department does not monitor industries as a whole. They focus only on their specific credit takers.

4.5.3 Bank C

The respondent says that it is not possible to control what industries to include into the loan portfolio. He says that the bank has to take what they get because bank customers are sluggish. He exemplifies this sluggishness by the saying: 100 knocks, 10 talks, 1 thanks (100 knackar, 10 snackar and 1 tackar). It is difficult to focus the credit portfolio towards a certain industry. Instead the bank tries to manage the industrial diversification by limiting their credits to a certain industry rather than focus in on one.

At Bank C, when they expand their credits into businesses they have limited knowledge about, they initially try to evaluate whether the profits from the credit are greater than the costs. Then

they go through the same credit evaluation process as they would with every other type of company.

The bank reveals that there is an active monitoring of different industries. The analyst group consists of approximately 40 people and they are usually industrial analysts, in other words not bankers. Bank C also bring in help from outside if needed.

4.5.4 Bank D

Bank D has a central support system in which specific branch managers can use in order to gain more information on a specific industry. If Bank D is to try to expand into new industries they rely mostly on the competence of the branch managers. The branch managers are expected to be innovative and use the credit evaluating knowledge that they have gathered through experience and make use of the credit evaluating system that is available at the bank. With these procedures the bank does not expect too many credit losses. To this the respondent adds that Bank D has the lowest credit-loss percentage in Sweden. Bank D does monitor different industries through the use of its support team.

4.6 Customer Diversification

4.6.1 Bank A

The respondent talked about customer diversification but it is not clear whether correlation calculations are measured.

4.6.2 Bank B

Bank B does not have any customer diversification management.

4.6.3 Bank C

Bank C does not have any focus on customer diversification. We explained what we meant by customer diversification, (exemplified by having Nokia and Ericsson in the same portfolio, the fact that they may have very low correlation) and he says that they have never had any discussions or reasoning about any such type of risk spreading (diversification).

4.6.4 Bank D

Bank D attempts to do sensitivity analysis on different segments of its credit portfolio and in this analysis, correlations and other statistical measures are included. However, according to the respondent the bank does not direct its credit portfolio towards certain industries or parts of industries. The bank simply looks for the firms that are most creditworthy, with consideration that there are good companies in all industries.

4.7 Further things the banks wished to add to the topic of loan portfolio diversification.

4.6.1 Bank A

Diversification for Bank A, happens more or less from a loan quality perspective compared to other variables. The marketing group can worry about how geographically spread out the bank is. The credit department takes care of quality.

4.6.2 Bank C

The respondent reveals that there is a statistician at the bank's head office, who handles data sent to her concerning the exposures in the loan portfolio. He does add though that he has never received anything back from her, and that he does not know what happens with the decision data that comes out from her processing of the data.

5 Analyses of the Empirical Data

All of the banks had several aspects in common; they do not have formulated strategic diversi-fication objectives. Nor do they claim to use any MPT method to reduce exposure through di-versifying their loan portfolios'. Yet, the banks' grasp that too much concentration in the loan portfolio leads to higher exposure. Furthermore, the banks' see problems with changing their strategy from credit worthiness to actively seeking companies that reduce to total unsystematic risk of the loan portfolio. One problem with adopting this strategy is that the banks feel they cannot freely pick and chose customers in Sweden's competitive banking market. The second problem is that the banks do not actively know how they can measure the costs of diversifica-tion. Only after having discussed cost of diversification, its existence and possible measure-ment, could the banks begin to link their practical experience of cost calculation to diversifica-tion. This seems understandable since a divisionalized organization may not be able to monitor its operational costs with respect to diversification. In a big organization there are many types of cost drivers, which make it difficult to attribute the costs to loan portfolio diversification. (See discussion in chapter 3.3.6)

All four banks interviewed evaluate loans individually and focus mainly on handling the unsys-tematic downside risk of credits. According to the respondents the banks assume that system-atic risk (market risk) is unavoidable so there is no reason to manage it. The banks try to be-come financially strong and make sure that the quality of the credit is high enough to handle economic shocks. The procedures that the banks apply to their handling of the unsystematic risk differ, but they all aim for minimizing the unsystematic downside risks. As discussed in chapter 3.2 it is important to mention that just because a bank does not diversify its portfolio or seek to diversify it (assuming that it has a high level of concentration or that diversification does not come naturally) it does not imply that the bank's whole portfolio is threatened. Since the banks perform meticulous credit evaluation the unsystematic downside risk should be rela-tively low. Hence, the respondents are probably right about that those receiving credit are able to handle economic shocks. Nevertheless, we still would like to emphasize that an increase in the downside risk of one component will increase the total risk of a highly correlated portfolio regardless of the credit quality of the individual components.

From here on in, we analyze each bank individually. This serves as a comparison and allows us to gain a better understanding of each bank's loan portfolio diversification characteristics.

5.1 The concept of loan portfolio diversification at banks, their attitude to it and what their diversification objectives are.

Bank A considers diversification to be important part of commercial banking and they also consider themselves to be well diversified. The degree to which the bank is diversified is, according to the respondent, a result of the bank's widespread local representation in Sweden. On the other hand Bank A does not seem to have any diversification objectives, nor do they stipulate any portfolio concentration objectives. This is reflected in the fact that the bank would never refuse what they judge as potential good business. Hence it is safe to say that even if the management (since the respondent is at the top of this chain) is aware of the risk minimization advantages of loan portfolio diversification, they do not seem to manage their credit portfolio according to the principles of diversification. Diversification as an activity on a high-liquid stock market should not be too difficult. On the other hand for a bank, loans with great variations in correlations are illiquid. Thus the bank is a customer taker; it competes with at least three other big commercial banks in Sweden). Therefore it cannot actively seek portfolio components that will achieve diversification.

Bank B has had objectives of decentralization since the 1970's. According to the respondent the notion of diversification was one of the intrinsic motives of the decentralization process. The bank considers being well-diversified to be important. The local bank offices are given relatively high degree of freedom in the credit evaluation process. Hence, they believe through the wide spread of local bank offices (proximity to the clients), loan portfolio diversification will naturally occur. This organizational growth (the increase of local bank offices), the bank states, is an inexplicit diversification objective. The fact that the bank seeks to establish as many offices as possible 'close to its customers' can be interpreted as a means of diversification. As the discussion continued on the subject it turned out that the bank does not have a database from which the bank's total portfolio can be monitored. We interpret this as a confirmation that the management at the bank is aware of diversification, but they are not actively pursuing loan portfolio diversification. They simply assume it takes care of itself.

Bank C considers diversification to be important. Yet, the bank does not focus on diversification objectives within its loan portfolio, but at the same time they are aware of the risks associated with having big portions of the portfolio tied up in highly correlated segments. The bank's loan portfolio is mainly made up of components that they have been specializing in historically. Bank C is a product of a few mergers; its specialty areas have broadened combining the industrial competence of all the former banks. These competency areas make up the major portion of Bank C's loan portfolio. The bank also considers its portfolio to contain all the industries and geographical areas that they are explicitly interested in, with the exception of one particular industry. They are seeking to enter this industry by specialization hiring. The bank will hire an individual whom has a great deal of experience and contacts within this industry. The specialist job is to increase the component representation of the loan portfolio. Bank C engages

in loan portfolio diversification activities because they would hire an industry specialist to penetrate a particular industry. Furthermore, they would strategically establish bank offices in emerging areas (chapter 4.2.3). Despite these activities they do not have a formal company diversification objective. They seem to rely on the fact that the bank's portfolio has become diversified naturally through time. A formulated objective would be ideal on paper but would be difficult to attain, according to the respondent (4.5.3). Similar to Bank A and B, bank C is a customer taker and cannot pick and choose between its creditworthy clients; if its objective is to lend as much money as possible.

It is also worth mentioning that the respondent from bank C wasn't able to directly answer the question whether diversification was important. This question was indirectly answered as the interview went on. The fact that he found it difficult to connect the term; "portfolio diversification", with the actual practice, we believe has to do with the fact that in practice, no matter how it is carried out (intuitively or quantitatively) the bank simply refers to diversification differently, under some other term.

Bank D does not consider it to be important that its loan portfolio is well diversified. They would rather focus resources on "credit quality". Despite what the financial report of the bank states, "have a low risk profile with a well-diversified credit portfolio …",[76] Bank D feels it is most likely not diversified. The respondent reveals that approximately 50-60% of their credits are somehow related to one industry. This is the result of several mergers a few decades ago, which created a large portfolio focus in one industry. The fact that the respondent contradicted his bank's official financial report on the matter shows that diversification is not an important issue internally. Also, the respondent had a different concept of diversification than the one that we had formulated in the pre-interview send-out. We interpret this as confirmation that diversification is not used as a strategy in their loan portfolio management.

5.2 What does the practical implementation and the follow-up of loan portfolio diversification look like?

Bank A has the ability to measure loan portfolio diversification using its database, but it is not frequent that the bank applies this information for diversification purposes. The database does not seem to be a guiding tool for loan portfolio management. The bank's focus is mostly on the repayment potential of the customer, which they define as quality. The quality level is established by the rating system. It is quality that Bank A is concerned with, not correlation. It is apparent that Bank A is most likely successful in handling unsystematic downside risk using its credit-evaluating systems. On the other hand, this will not diminish the exposure of the bank's portfolio to unsystematic risk. (see chapter 3.2)

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[76] Taken from the financial report of the bank. Due to non-disclosure agreement we will not disclose which bank's financial report the quote is taken from.

Bank A stated that it could strengthen its loan portfolio by possibly increasing diversification according to industry. As mentioned above diversification of Bank A's loan portfolio is dependent on their geographical spread. Thus, it is logical according to MPT that the bank would try to further spread its risk across industries. Diversification of loan portfolios is also a matter of defining the level upon which it is managed; national or regional level. If every regional branch focuses its portfolio on its strengths, overall the bank's portfolio should become well-diversified (assuming all regions are represented in the bank's total portfolio and that they have low correlation). (see chapter 3.3.1, 3.3.2)

Bank B's practical implementation of loan portfolio diversification is managed at the regional level. Although it manages at the regional level the majority of the credit granting is done at the local level. Also, the bank does not have a centralized database in which one can monitor the total credit portfolio. This means that the bank does not have an active measurement of concentration or diversification of the portfolio. Bank B's main diversification strategy is focused on geographically spreading its bank offices. The fact that the bank is seeking to strategically spread their offices geographically is indeed a type of diversification activity, but it is not managed from a centralized position. Hereby, we interpret this as though the bank assumes that the credit portfolio will be diversified naturally if the portfolio is well enough diversified geographically.

Bank C on the other hand had a somewhat different approach to managing its loan portfolio. Apart from the obvious specific credit evaluating systems Bank C also engages in over exposures prevention. Their diversification thinking revolves primarily around industries, size (avoiding over exposures in the portfolio) and different risk classifications. According to the respondent, they consider themselves to already be covering strategically important geographical areas and thereby have little discussions about geographical diversification. As discussed in chapter 3.3.5, a bank cannot pick and chose however it wants between its potential borrowers. It is difficult to manage a loan portfolio using solely, industry, customers or sizes as correlations benchmarks. Evidence from Bank C's financial report indicate that the bank actively avoids new loans to industries already over represented in the loan portfolio. Thereby, the combination of the bank being geographically well-diversified (obviously according to their definition) and their attempt to avoid over exposures in the portfolio indicates an underlying diversification management.

Bank D does not actively manage the diversification of the loan portfolio. Bank D uses a centralized database in which quantifiable data is analyzed in various ways. The bank actively does sensitivity analyses on different segments of the total credit stock based on Value at Risk-models. According to the gathered empirical data from the interview the bank does not seem to be engaging in diversification activities. What they are in fact doing with sensitivity analyses is handling the unsystematic/credit specific risk (see chapter 3.2) of different segments of the portfolio. The databases that the respondent described could function as a tool in the manage-

ment of diversification. On the other hand, since it was revealed that approximately 50-60% (according to the financial report, approximately 62% is related to one industry[77]) of the portfolio is somehow related to only one industry, it indicates that even though it is evident that they are overly exposed, they choose not to diversify. As mentioned above, Bank D has a very strong history in this industry, which we believe can be attributed to the advantages of specialization. According to Acharia et al (see chapter 3.4.1); contrary to what portfolio and banking theory says there may be diseconomies in attempting to diversify one's loan portfolio. The diseconomies may lie in the cost of diversification (see chapter 3.3.6); the cost of gathering information/know how and the cost of monitoring the different industries (or variables that may influence different segments of the portfolio).

5.3 How do the banks manage the systematic risks of the loan portfolio?

Bank C is the only bank the mentioned minimizing the unsystematic risks of the loan portfolio by avoiding big individual exposures. Further the respondent says that they do not measure correlations between the credit takers. This indicates that the bank strives to not over expose itself and is aware of the risk of having a large portion of the portfolio being highly correlated. However if correlations aren't measured, our question is, how is the bank certain that its many individual exposures do not make up one big exposure (if highly correlated exposures)?

5.4 Geographical Diversification

Bank A's total number of offices has decreased the past few years which can be seen as evidence that Bank A does not directly believe in the Church Tower Principle. It can be observed, in the banks yearly report that there is an increase in loans and a decrease in the number of bank offices.[78] Bank A does though, with respect to CTP follow large customers out of country. So it seems that CTP still does have some relevancy to Bank A. The area that Bank A stated as being important, within geographical diversification is the expansion of partnerships and support. Support teams increase the amount of information available to the credit directors, thus helping to potentially minimize unsystematic risk. The result from this interview is congruent with Carling et al research that increased distance between the bank and customer, does not lead to information asymmetry.[79] According to Bank A there must be enough bank offices that new customers can recognize them. It appears that the presence of bank offices in local markets may not be as important in the monitoring of existing loans, but it is still relevant to the marketing of new loans.

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[77] Taken from the financial report of the bank. Due to non-disclosure agreement we will not disclose which bank's financial report the quote is taken from.
[78] Taken from the financial report of the bank. Due to non-disclosure agreement we will not disclose which bank's financial report the quote is taken from.
[79] Carling, K. et al 2002, appendix 4

Bank B's geographical diversification strategy can be described by the CTP. They focus on reaching customers by building and expanding bank branches physically. This management decision is taken at the regional level and not at the top level. The Bank believes that geographical diversification is achieved through strategy and is not a natural occurrence of company growth. Bank B's loan management can be characterized as being in close proximity to its customers, which allows them to monitor their loan portfolio at the regional and local level.

Bank C also believes strongly in the CTP. The more offices it has in close proximity to customers the better information-transfer between bank and customer. Bank C's geographic diversification strategy is executed top down. The respondent was well aware of CTP and felt it was a very relevant theory for bank C in explaining their geographic diversification strategy.

Bank D places a great deal of emphasis on local experience as a way to further diversify geographically. The hiring of a branch manager that has both contacts and local experience allow Bank D to geographically expand its knowledge base. Bank D currently has decreased the amount of bank branches in its organization, which contradicts CTP. Yet, the respondent did feel that CTP was a relevant theory. They would attempt to open new bank branches as a means of gaining new business, but not for the purpose of loan portfolio diversification.

The church tower principle was relevant to all the interviewed banks. Yet, Bank A was the only one the emphasized technology as making geographical diversification possible without the need to establish offices. In other words, CTP still is valid to a great extent, but as technology has evolved, the geographic proximity of the bank has been replaced by good communication via the channels that new technology has made possible.

Our first assumption pertaining to the theory of diversification across geographical regions is that different regions' economic developments have low or even negative correlation. (see chapter 3.3.1) What if the truth were that different economic zones' economic developments have high correlations? Then it really would not matter where the bank was doing business, as long as it had enough market presence so it could reduce the systematic risk of the loan portfolio.

A second assumption is that potential clients are easily found, so if the bank was interested in diversifying its portfolio across a new region, the bank should be able to do it without problems. This assumption is not realistic. As bank C mentioned they entered a certain economical region in Sweden at a specific point in time and it did not work out. They simply could not find enough business to make the venture rewarding. Hence, a geographically diversified portfolio is very much dependent, according to the respondents, on the banks' historical market presence. If a bank has historically had much of its lending in say western Sweden, the establishment of corporate lending in northern Sweden would be quite difficult, considering that other banks already have strong market presence. This brings us back to the issue of cost of diversi-

fication. Intuitively, if you know that breaking into the northern Swedish lending market is too costly, you will probably not carry out the expansion (even if northern Swedish companies have low correlation with those already in the portfolio).

5.5 Diversification across Industries

Bank A's industrial diversification is partially dependent on the geographic diversification. Hence, the loan portfolio may very well be industrially over represented at the regional level due to the fact that some regions have homogeneous business climate. The respondent also says that creditworthy companies are never refused credit and the bank does not consider this a problem because of its sheer size. Bank A pays close attention to the industrial diversification within its loan portfolio by using analysts or specialists. Bank A's analysts are concerned with both industry correlations and company specific ratios. Bank A usually does not actively seek companies according to industry. Bank A seems to be aware of industrial diversification's effect on the portfolio. However, as mentioned earlier, it is very difficult for a bank to direct its credits towards certain industries or companies. If awareness exists, then some kind of management of diversification should be possible, even if the bank's abilities to do so are limited.

Bank B does not use industry as a relevant diversification variable in their loan portfolio diversification and states that there are always good companies in all industries. They do have support-teams that can help out the local bank offices' credit officers. Bank B's credit department does not monitor industries as a whole; they only focus on their specific credit takers. Bank B stated above that they mainly focus on diversifying geographically. If they are able to diversify geographically they figure that diversification across industries should come naturally. As we mentioned in chapter 3.3.2, the assumption is that the cash turnovers of the firms in an industry have high correlations. It is fair to assume that this is not so in reality. In all industries there are bigger and smaller competing firms that often do not have highly correlating businesses. If you focus in on an industry and it turns out that the firms in it do not have high correlating businesses, then you may miss out on the advantages of diversification across industries. Say for example that by chance the leading firms (also the financially strongest ones which indicates that these are the ones that the bank wants to do business with) in five different industries happen to have high correlating businesses, then it does not matter that the bank has diversified its loan portfolio across these industries because the unsystematic risk will not be diversified away. In other words it may very well be an inferior diversification strategy. If the bank knows this by experience, then it is understandable that they ignore the diversification across industries strategy.

The respondent at Bank C said that it is not possible to control what industries are included in the loan portfolio. He says that the bank has to take what they get and that bank customers are sluggish (they rarely switch banks). It is difficult to focus the credit portfolio towards a certain industry. Instead the bank tries to manage the industrial diversification by limiting their credits

to a certain industry rather than focus in on one. The bank reveals that there is an active monitoring of different industries through a group of analysts that consists of approximately 40 people. They also bring in help from outside if needed. The fact that Bank C has an extensive monitoring of different industries internally we believe indicates that the bank does focus on diversifying across industry. How they attempt to manage this diversification is by trying to limit exposures to industries rather then directing towards one specific industry. On the other hand Bank C revealed that they brought in a person from outside because of his vast experience to perhaps spread the bank's business to this industry. This indicates that the bank is actually attempting to direct its portfolio towards a certain industry. The question is though, whether it is being done with diversification in mind. The respondent said that the ultimate goal is to lend as much money as possible to as many good companies as possible. Hence, with this motto, diversification across industries may very well be obtained.

When asked about diversification across industries Bank D did not discuss the topic, instead Bank D started discussing credit evaluation. (see chapter 4.5.4) Earlier in the interview Bank D revealed though that over half of the loan portfolio (both private and corporate loans) is related to one industry, which was confirmed by the bank's financial statement. As mentioned earlier in chapter 5.2 and it is discussed in chapter 3.4.1 concentration in a loan portfolio does not necessarily mean that the bank is engaging in overly risky banking activities. Acharia et al found that contrary to what portfolio and banking theory says there may be diseconomies in attempting to diversify one's loan portfolio. Perhaps Bank D has found just this theory to be true. Stick to what you know best.

5.6 Customer Diversification

None of the banks were managing diversification across customers. As stated earlier, there always seems to be an assessment of implementation of activities and their use (in this case the active measurement of correlations). Considering that the banks are aware of the dangers in exposing their portfolios too much with one individual loan, we can assume that the individual exposures are usually not too large. Hence if the exposures are relatively small, the resources that are required to monitor the correlations between all the exposures can become quite extensive. And if the correlations were actually measured, the question is would it serve a purpose? As mentioned earlier, the banks stated that it is very difficult to direct portfolio expansion towards a certain industry much less a company. If correlations were calculated between individual firms, could the banks find credit takers that would optimize the diversification of their portfolio? According to the banks this is not possible (this answer was given while discussing other diversification strategies).

6 Conclusions

6.1 Conclusions

During the interviews we realized that Portfolio Theory is difficult to apply to lending management. Because most firms are unique, a bank is required to have a flexible credit evaluating process in order to capture the individuality of each loan. These differences are the size of the loan and the different company risks. This makes it difficult to apply loan portfolio diversification as if it were a portfolio made up of bonds or stocks. Nevertheless, banks still seem to follow the intuition behind it. As one respondent said it is simply common sense not to expose oneself too much. Yet, that was exactly what his bank was doing. Perhaps the loan portfolio has evolved in this direction without anybody really directing it, or someone found the point Acharia et al was trying to make (see chapter 3.4.1) to be valid; diversification may lead to diseconomies. Another fact that makes Portfolio Theory almost inapplicable is that 'good' (credit worthy) credit takers are scarce. It is not possible for the bank to exclude a credit worthy companies based on correlations with existing credit takers. It is fair to assume that the size of the total credits would reduce considerably, which is not a bank's operational objective.

The banks seem to assume that a well diversified loan portfolio will happen on its own as long as it covers the strategically important regions in Sweden. Apart from Bank D, all the banks considered themselves well-diversified across industry. Bank A and B also considered themselves to cover all of Sweden (at least the regions they considered profitable). In other words, if the banks have not focused in on a certain industry or geographical area historically, all the banks seem to rely on their size when it comes to having a well-diversified loan portfolio (regardless of variable).

The banks seem to primarily focus on the handling unsystematic downside risks; the credit specific risks. In other words the banks attempt to minimize the credit specific downside risks by vigorous credit-evaluation processes and assume that this pre-lending activity is enough to protect themselves from economic shocks (which we define as an increase of the systematic downside risks of a well-diversified loan portfolio). We conclude that there seems to be a misconception of risks at the banks. Credit-evaluation aims to minimize the credit specific downside risks (unsystematic downside risks). On the other hand, exposure to only systematic risk is not attainable by the different credit risk evaluation systems. Distinction has to be made between these two types of risks. Thus, if an economic shock is strong enough and if correlations between big segments of the portfolio are high enough; instead of having some parts of the portfolio threatened, a bank's whole loan portfolio may be at risk (and thus the level of liquid assets' requirement).

Three of the four banks (Bank A, C and D) all use centralized databases for different analysis of their loan portfolios. Yet the respondents maintained that they do not have any management

of diversification; measuring correlations of individual companies, geographical regions or industries to take into account when looking for credit takers. We believe that this is due to the fact that a bank cannot pick and chose between 'good credit takers', there are simply too few. Why then invest resources into managing an activity (which may indeed decrease the portfolio's total risk if realized) if it is not used. Furthermore, the bank may miss out on lending money to credit worthy companies (good business). It seems though as if three of the banks (Bank A, B and C) have learned the lesson from Portfolio Theory that if individual exposures (to an industry or individual company) in the portfolio are too big, the total risk of the portfolio will increase too (which is essentially the same as having many portfolio components with high correlations). Hence, the banks do attempt to implicitly manage the diversification of their loan portfolios by managing their portfolios' concentration.

The banks do not manage diversification according to Portfolio Theory, but they do seem to have the expansion tendencies for their portfolios (Bank A, B and C), which are in accordance to some of the theories we presented in chapter 3.3. We have seen proof of tendencies of geographical diversification, across industries and individual customers. Still, as mentioned above, and in chapter 5.2 the banks do not manage their portfolio expansions with Portfolio Theory in mind. It seems they are seeking to expand their businesses in all possible directions, where ever 'good' business can be found. Thereby a well-diversified portfolio is expected.

6.2 Future Research

After having investigated loan portfolio diversification at the four largest Swedish commercial banks, it would be interesting to find out if the banks actually do diversify their portfolios. Perhaps a quantitative investigation on one or more of these banks' portfolios would shed light on what the portfolio looks like in reality, considering that none of the banks were actively measuring correlations between credit taking companies, geographical areas or industries.

Once having measured the correlation of a loan portfolio it could be valuable to mathematically development an 'industry correlation' variable which can be built into to a credit-scoring model. This correlation calculation would work to increase the credit score of companies that lower the total unsystematic risk of the loan portfolio. Thus those companies that seem like good businesses at time 0 yet highly correlated with companies already in the portfolio would have lower credit scores. This calculation could most likely be worked into Altman's traditional Z-scoring system.[80]

We also believe that it would be relevant to research different methods for measuring correlations. One could measure the correlations between industries, companies and geographical areas. This could be used in loan portfolio management. There are already different benchmark

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[80] Altman, E. I., 1968

indexes available, but we assume that these may not necessarily be usable in loan portfolio management.

During the interviews we found that there was a certain level of miscommunication between the respondents and us. We believe it is due to the fact that the respondents had a limited experience of portfolio theory. They understood the theoretical discussions and seemed to recognize much of Portfolio Theory's reasoning (as one put it: it is common sense), yet concerning the implementation of the theory they were a lot more hesitant. This is not in any way strange since the respondents are bankers working closely with companies and have extensive experience with handling credit risk. If experience has not required the respondents to use and thus look into the topic of diversification, there is no reason for them to be familiar with its implementation. The question though is whether higher management in the bank has accessed diversification requirements. In that case there seems to be a lack of communication of these goals. Perhaps it is possible to investigate whether there is a gap in communication between banks' management's communications of financial objectives to subordinated managers, and whether managerial financial objectives reach the outskirts of the organization (most likely indirectly). This would clarify whether goals are communicated downward in the organization. Bank C revealed that they had a statistician working with quantitative data. We wonder what actually happens with the information she acquires, considering that the respondent mentioned never having received any feed-back.

We propose further research into areas of cost of diversification. We came to the conclusion that it seems difficult for the banks to categorize expansion costs as diversification costs, since the latter requires that the whole bank's portfolio be looked upon as one entity. Apparently, large organizations such as the four big commercial banks in Sweden have great difficulties perceiving their loan portfolio as one entity. We propose research that seeks to model different methods of calculating costs related to loan portfolio diversification in large banks.

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Appendixes

Appendix 1
The interviewers' questionnaire:

Övergripande problemformulering
Vi har för avsikt att utreda om banker diversifierar sina utlåningsportföljer och isåfall vilka variabler som styr diversifieringen samt vilka tillvägagångssätt har man. Till ämnet hör även faktorer som påverkar portföljdiversifieringen. Dessa faktorer är kostnaderna för diversifieringen, dess nytta för banken i riskminimeringssyfte,

Frågeställning

Frågor till respondenten
- Position på banken?
- Ansvarsområden?
- Vem svarar du inför på banken?
- Vilka svarar inför dig?
- **I** vilka sammanhang har du stött på diversifieringsresonemanget tidigare?

Allmänt om låneportföljdiversifiering på
- Anser Ni på banken att det finns ett behov av portföljdiversifiering vad gäller utestående krediter till företag?

- Anser Ni att er bank är diversifierad? Förklara närmare på vilket sätt Er bank är diversifierad.

- Har Ni ett aktivt diversifieringsmål/ambisioner av de sammanlagda portföljerna **för** Västsverige? Eller är det så att banken endast söker nya kunder för att fylla en viss utlåningskvot och isåfall tar alla kunder som kommer i dess väg som kan anses vara kreditvärdiga. Därmed har man ingen diversifieringsmedvetenhet.
  - Isåfall hur styrs denna diversifiering; finns det en central styrning från övre instanser i organisationen?
  - Finns det en aktiv mätning av diversifiering?
  - Finns det en medvetenhet om **diversifieringskostnader på banken.** Finns det en aktiv styrning/mätning av **diversifieringskostnaderna** och dess nytta som en del av av den aktiva riskhanteringen? (möjliga marginalkostnader pga. diversifiering kan vara: kostnader
  - Vilka kostnadsdrivare ser man **i**om. låneportföljdiversifieringen? (**En** möjlig mätning av nyttan skulle vara att göra simulationer av mer fokuserade portföljer på olika brancher, områden och ställa dessa mot mer diversifierade portföljer)**.**

- Vilka variabler styr diversifieringen, med teorin ovan som utgångspunkt? (detta är dock öppet för vidare diskussion om vilka variabler som man anser styra eventuella diversifieringsmål).

- Kreditbedömning **i** den allmänna bemärkelsen syftar till att minska bankens osystematiska (downside) riskexponering (hög kvalité på krediten skyddar inte nödvändigtvis mot ekonomiska chocker i ett land/industri). Hur har man för avsikt att minska den systematiska riskexponeringen?

Geografisk diversifiering

- Hur ser man till att alla möjliga vrår i Sverige täcks upp i portföljen? (Visserligen är detta en fråga man snarare skulle fråga marknadsavdelningen, men vi söker den finansiella perspektivet av spridningen av bankens krediter).
  Genom vilka kanaler söker man komma åt kunder?
  - Alltså, vilka verktyg tilltar man för att öka den geografiska portföljdiversifieringen?
  - Eller handlar det om att bankernas storlek gör diversifieringen möjlig på ett naturligt sätt? (Det finns inte så många banker att välja på för företagen, så alla går till de banker som finns tillgängliga för företagskrediter/företagslösningar)**.**
  - Minskar antalet lokala bankkontor på er bank? Frågan är då vad denna trend kan härledas till?   Är det att man insett att man inte behöver ha lokala bankkontor för att få/uppehålla kundkontakter, och därmed divesifiera sig? Alltså att Church Tower principen håller, men via andra kanaler?

- De mesta av forskningen visar att pga de höga diversifieringskostnaderna, bör banker söka specialisera sig och fokusera sina portföljer. Verkligheten ser dock annorlunda ut. Storbankerna i Sverige kan antas vara väldiversifierade.

Branchdiversifiering

- Hur ser man till att de flesta brancher i en viss region (i detta fall Västsverige) täcks upp i den utestående låneportföljen?

- Hur expanderar banken till brancher de har begränsade erfarenheter ifrån eller **d**är konkurrensen är stor?
  - Eller handlar det alltid om en individuell bedömning av den nya kredittagaren?

- Finns det överhuvudtaget någon aktiv branchbevakning? (då detta skulle peka på portföljfokusering.)

Allmänt

- Väger man nyttan av diversifieringen mot dess kostnader? Isåfall hur?

- Något du vill vidare tillägga till ämnet som du känner behövs sägas kring ämnet?

Appendix 2

Konsolidation history[81]

1970-talet Tre större samgåenden. Kontinuerlig konsolidering inom spar- och föreningsbankssfärerna.	Göteborgs Handelsbank– Smålands Bank (1972), Skandinaviska Banken– Stockholms Enskilda Bank (1973), Statliga investeringsbanken– Postbanken (1973).
1980-talet Avreglering och konsolidering på mellannivå. Framväxt av mellanstora, regionala sparbanker och omstrukturering av föreningsbanksrörelsen.	Sundsvallsbanken–Uplands Bank (1986), Nordbanken–PKbanken (1988), Götabanken–Skaraborgsbanken– Wermlands Bank (1990), Handelsbanken–Skånska Banken (1990)
1990-talet Bankkris och ombildande av sparbanker och föreningsbanker. Därefter toppkonsolidering, inträden av småbanker och internationell expansion.	Sparbanken Sverige (1992), Föreningsbanken (1992), Nordbanken–Gota Bank (1992), Handelsbanken–Stadshypotek (1997), Föreningsbanken–Sparbanken (1997), SE-banken–Trygg Hansa (1997), Nordbanken–Merita Bank (1997), SEB–BfG (1999), MeritaNordbanken–Unidanmark (2000), Nordea–Kreditkassen (2000), Handelsbanken–SPP (2001).

Tabell 1. Money- and credit politiska instrument[82]

Deregulations:	Year
Reglering av bankernas inlåningsränta	1978
Reglering av räntan på företagsobligationer	1980
Reglering av försäkringsbolagens utlåningsräntor	1982
Likviditetskvoter för banker	1983
Utlåningtak för försäkringsbolagens leasing	1985
Placeringskrav för sakförsäkringsbolag	1985
Utlåningsbegränsning för mellanhandsinstitut som finansierar kommuner och företag	1985
Reglering av bankernas utlåningsräntor	1985 (maj)
Utlåningstak för bankernas utlåning i SEK	1985 (november)
Placeringskrav för livförsäkringsbolag och AP-fonder	1986
Aktieplaceringar utomlands	1987-89
Övrig valutareglering	1989 (1 juli)
Emissionskontroll av emissionskurs 1 jan.	1991
Indexering av obligationer	1991
Betalningsförmedlingslagen	1993

Not.: Gällande 1999

− Kassakrav för banker och finansbolag (f.n. 0 % av inlåning från allmänheten, bankcertifikat, bankobligationer placeras räntelöst i riksbanken)

− Operationer i öppna marknaden (köp och försäljning av korta riksbanksväxlar)

− "Repor" (tillfälliga likviditetstillskott till eller indragningar från marknaden)

− Styrränta för repa

− Tak och golv för reporänta

− "Open mouth operations" (dvs. muntliga varningar)

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[81] *Lars Frisell, Martin Noréus*, Konsolidering inom den svenska banksektorn: ett centralbanksperspektiv
[82] SOU 2000:11

Appendix 3
Problemformulering
Övergripande problemformulering

Vi har för avsikt att utreda om banker diversifierar sina utlåningsportföljer och isåfall vilka variabler som styr diversifieringen samt vilka tillvägagångssätt bankerna har. Till ämnet hör även faktorer som påverkar portföljdiversifieringen, såsom kostnaderna för diversifieringen och dess nytta för banken i riskminimeringssyfte.

*Frågorna som följer skall främst vara vägledande **i** en diskussion. Vi har inte så höga krav på direkta svar, vi söker komma åt ämnet, om inte direkt genom frågorna, försöka styra in resonemangen kring ämnet.*

Frågeställningar
Portföljdiversifiering

- Anser Ni på banken att det finns ett behov av portföljdiversifiering vad gäller utestående krediter till företag?
- Anser Ni att er bank är diversifierad? Förklara närmare på vilket sätt Er bank är diversifierad?
- Har Ni ett aktivt diversifieringsmål/ambisioner av de sammanlagda portföljerna i Västsverige? Isåfall hur styrs denna diversifiering; finns det en central styrning från övre instanser i organisationen? Finns det en aktiv mätning av diversifiering? Finns det en aktiv styrning/mätning av diversifieringskostnaderna och dess nytta som en del av en del av den aktiva riskhanteringen?
- Vilka variabler styr diversifieringen, med teorin ovan som utgångspunkt? (detta är dock öppet för vidare diskussion om vilka variabler som man anser styra eventuella diversifieringsmål).
- Vilka kostnadsdrivare ser man iom. Låneportföljdiversifieringen?
- Kreditbedömning i den allmänna bemärkelsen syftar till att minska bankens kreditspecifika riskexponering. Hur har man för avsikt att minska den systematiska riskexponeringen?
- Geografisk diversifiering
  Hur ser man till att de flesta brancher i en viss region (i detta fall Västsverige) täcks upp i den utestående låneportföljen? Hur ser man till att delområden i tex västsverige täcks upp i portföljen. Alltså, vilka verktyg tilltar man för att öka portföljdi-versifieringen? Eller handlar det om att bankernas storlek gör diversifieringen möjlig på ett naturligt sätt? (Det finns inte så många banker att välja på för företagen, så alla går till de banker som finns tillgängliga för krediter).
- Storbankerna i Sverige kan antas vara väldiversifierade. Trenden är dock att antalet lokala bankkontor minskar. Frågan är då vad denna trend kan härledas till.
  Branchdiversifiering
  - Hur expanderar banken till brancher de har begränsade erfarenheter ifrån eller där konkurrensen är stor? Eller handlar det alltid om en individuell bedömning av den nya kredittagaren?
  - Finns det överhuvudtaget någon aktiv branchbevakning?

- Kunddiversifiering
  Finns det någon medveten styrning av kunddiversifierigen?

- Väger man nyttan av diversifieringen mot dess kostnader?

Problemdiskussion

Teoretisk diskussion

Modern portföljteori (MPT) presenterades av Harry Markowitz år 1952 i Journal of Finance, där han visade hur man kan uppskatta risken på värdepapper för att väga detta mot dess avkastning och därefter konstruera portföljer med maximal avkastning för lägsta möjliga risk mätt i volatilitet (volatilitet definieras som rörelsen kring ett medel). Den intuition som följde av MPT, var att volatiliteten minskar ju fler värdepapper som ingår i en portfölj. Detta dock med förutsättningen att värdepapprens värdeutveckling har så låg korrelation med varandra som möjligt. När värdepapprens värdeutveckling har låg korrelation innebär det att de inte har samma tendenser och detta vid samma tidpunkt. Förlust i ena värdepappret kompenseras av att ett annat bevarar sitt värde, eller som vid negativ korrelation, nedgång i ett kompenseras av uppgång i värde i ett annat. I och med portföljdiversifieringen påverkas portföljens totala värde i begränsad utsträckning. Härav kommer diversifieringsintuitionen.

För att minska portföljens totala volatilitet, risken, kan man bygga upp sin portfölj med beståndsdelar vars värdeförändringar har är så olika riktningar i förhållande till varandra som möjligt (helst negativ korrelation). Applicerat på en banks kreditportfölj till företag, bör samma principer gälla. Visserligen gäller för banken endast att återfå all utlånat kapital med den påförda räntan, vilket direkt inte innebär att man söker portföljbeståndsdelar som maximerar sin vinst. Det viktigaste för banken är alltså att företagen som banken lånat ut kapital till, kan återbetala sina skulder. Därmed söker banken låna ut kapital till sådana företag där risken för utebliven återbetalning är lägst. Vilka företag har då lägst risk att inte kunna infria sina återbetalningsskyldigheter? De företag som lyckas maximera sin vinst. Uttryckt i andra termer; ju mer vinstskapande ett företag är desto mindre blir VAR (Value-at-Risk är den högsta möjliga förlust inom en viss tidsperiod med en viss konfidensintervall).

Diversifiering kan ske utifrån olika variabler, där vi har valt att definiera tre olika typer. Geografisk diversifiering, branch diversifiering och diversifiering vad gäller storlek på företaget. Men man kan även diversifiera utifrån variabler som: statliga företag, företag som gör affärer med utlandet, osv. Det handlar alltså om att hitta kvantifierbara och mätbara variabler som styr företagens eller enskilda projektens värdeutveckling. Utifrån dessa skall man senare kunna bestämma graden av diversifiering på portföljen.

Intutionen från modern portföljteorin vad gäller geografisk diversifiering portföljteorin skall en portfölj bestå av poster vilka har så låg korrelation med varandra som möjligt eller t.o.m. negativ korrelation om möjlig. Det man antar är att när en branch har nedgång, så bör de brancher vilkas rörelser går emot den nedgående branchen att kompensera med uppgång. Alltsåsäger att banker vars portföljer är koncentrerade geografiskt är utsatta för mer risk än de banker som lyckas täcka upp bredare geografiska områden. Antagandet man gör i detta fall, är att olika regionala områdens ekonomiska utveckling inte korrelerar med varandra. Alltså uppgång i vissa områden kan komma samtidigt som man har stagnation eller nedgång i andra områden. Därmed kan banker minska portföljens överkänslighet för chocker i lokala ekonomier genom att diversifiera sig geografiskt.

Branchdiversifiering kan för en bank innebär samma fördelar som för en fond eller investmentbolag. För bankerna gäller det inte att maximera vinsten i portföljen, utan snarare om att söka sådana företag där sannoligheten att de inte skall infria sina återbetalnings-skyldigheter är minst. Och som nämnts ovan är dessa företag de som bäst lyckas maximera sin vinst.

Vid diversifiering över företagsstorlek antar man att företag i olika storlekar ibland inte korrelerar med varandra. Flera olika faktorer kan påverka. Exempelvis brukar stora företag handla med utlandet och den svenska ekonomin följer exempelvis inte alltid europeisk ekonomisk utveckling. Därmed, när de stora företagens verksamheter påverkas negativt av exempelvis nedgång i europeisk ekonomi (eller de länder storföretaget handlar med), kan små företag som har en mer lokal verksamhet att vara mer attraktiva kredittagare än de stora. De lokala företagens kreditvärdighet kan alltså vara lättare att mäta och det bör vara lättare att förutse återbetalningsförmågan.

Ett annat perspektiv på kreditgivning till små eller stora företag kan vara det faktum att stora företag ofta anses innebära mindre risktagande från kreditgivarens sida. Små föratag har mindre kundkrets, vilket i sin tur innebär att deras portföljer ofta är väldigt fokuserade och enligt MPT högre risk. Stora företag har bredare kundkrets, de verkar ofta på fler marknader, de kan lättare garantera säkerheter och har ofta fler källor till vilka de kan vända sig för kapital (penning- och kapitalmarknaden). Risken för utebliven återbetalning bör då vara lägre i samband med kreditgivning till stora än till småföretag. Problemet med detta resonemang är dock att alla banker antas ha samma förutsättningar för kreditgivning till stora som små företag. Detta är förstås ett orealistiskt antagande, då mindre banker inte har samma möjlighet som större banker att diversifiera sig utifrån variabeln: företagsstorlek.

Problemen med teorin

Teorier har självklart ofta problem med att avspegla verkligheten. Vid geografisk diversifiering handlar det om att dela in ett land i regioner, vilkas ekonomiska utveckling (som påverkar företagens prestationer) har så låg korrelation som möjligt.

Diversifiering är ett kostsamt riskminimeringsverktyg. Ju mer osystematisk risk (risk som kan diversifieras bort) man diversifierar bort, desto mer ökar kostnaderna för diversifieringen. Att söka den nivå av diversifiering där marginalnyttan är lika med marginalkostnaden för diversifiering, är svårt. Därmed finns det incitament att söka fokusera sin portfölj. Exempelvis kan banken välja att ge krediter till utvalda brancher eller företag placerade i ett speciellt område för att minska bevakningskostnaderna.

I teorin antas även att efterfrågan på krediter alltid är större än utbudet av krediter. Detta är givetvis inte alltid fallet, i alla fall inte för alla banker. Vissa banker kan tvingas ge krediter till företag enligt den slumpmässighet de dyker upp. Med andra ord kan inte en bank vara alltför kräsen vad gäller kunder, om inte den har ett stort urval på kunder. Därmed kan inte kreditbedömningen ske med diversifiering som ledmotiv. Dyker det upp fem kreditvärdiga företag vilka samtliga finns i verkstadsbranchen och är leverantörer till samma storföretag, kan man inte avböja affärer med dessa företag med motivationen att man vill diversifiera sin portfölj.

Appendix 4

Earlier relevant research

Should Banks be Diversified? Evidence from Individual Bank Loan Portfolios
by Viral V Acharya, IftekharHasan and AnthonySaunders
In this article the authors investigate if banks' should be diversified of focused, with respect to increased portfolio performance and if diversification leads to less credit risk. The research showed that compared to traditional belief, diversification doesn't always lead to lower credit risk. The authors show that diseconomies occur at some bank because of over diversification. These diseconomies lead to monitoring and credit risk disadvantages. Furthermore, with expansion over industry where the bank lacks experience results in increased credit risk. The authors believe that the optimal portfolio composition within a bank sector is a few specialized banks, rather than a highly diversified sector.

Do Banks Diversify Loan Portfolios? A Tentative Answer Based on Individual Bank Loan Portfolios, by: Andreas Kamp, Andreas Pfingsten
The research behind this article investigates to what degree German banks are diversified. The research shows that savings-banks and state-banks are well-diversified. The degree of diversification increases with bank size. The least diversified banks were foreign banks with offices in Germany. This is the result of banks following customer companies. These tendencies most likely exist in Sweden as well. There are four major banks that should be well-diversified geographically, across industries and size due to their sizes. In this article the issue of diversification cost is discussed. The authors conclude that the larger the bank is the easier it can handle cost related to diversification. The authors present a theoretical model, which explains the potential cost advantages a bank may achieve by focusing its loan portfolio rather than diversifying it. One of these advantages can be that the banks can strive after specialization within certain industries. They also conclude that the more hired branch experts used the less utility gained for each of these experts. Furthermore, the more specialized the bank is in uncorrelated branches the more capital strength concentrated within these industries, because of this there is no advantage to diversification. The research showed the opposite, banks choose to diversify their portfolios and the larger the bank the high level of diversification

Bank Lending, Geographical Distance, and Credit risk: An Empirical Assessment of the Church Tower Principle
by: Kenneth Carling, Sofia Lundberg
This article investigates how the geographical proximity between the lender and the loan taking business affects credit-risk evaluation. According to the Church Tower Principle, banks are susceptible to higher credit risk when the loaning businesses are located geographically far away from the bank. CTP assumes that this difficulty results from information asymmetry due to increased distance. The total number of bank offices has decreased in Sweden; according to

the CTP the total number of bank loans should have also decreased. The authors concluded that bank-business distance does not lead to information asymmetry. Thus, indicating that the CTP may no longer be relevant. Furthermore, it seems, local offices are not built with the reduction of credit risk as an objective.

The Demise of Community Banks? Local Economic Shocks are not to Blame
By: Timothy J.Yeager

The author of this article researches why the total amount of local banks in the USA has decreased. He also focuses on how the local banks handled local economic shocks during the 1990's. Community banks have an important role in stimulating small business in the USA. These community banks have an advantage in collecting soft information compared to large banks. But small banks' loan portfolios are normally very concentrated compared to their large counterparts and are thus more exposed to local economic down-swings. The author concludes that community banks handle local economic shocks reasonably well. Furthermore, the author concludes that the credit risk exposure local banks are forced to face outweigh the costs of diversification.

Don't Put All Your Eggs in One Basket? Diversification and Specialization in Lending
by: Andrew Winton

The author compares loan specialization with loan portfolio diversification. The author warns against loan portfolio diversification across multiple sectors and regions. Winton concludes that diversification is not ideal for bank loans exposed to both high and low downside risk. Loan portfolio diversification proved only beneficial with loans that are exposed to moderate downside risk. Similar to other research, it is stated that diversifying into new sectors can lead to an increase chance of failure. Competition between banks is also discussed in this thesis. A loan diversification strategy may be the result of heavy competition. Banks' may be tempted to abstain from monitoring, pocketing cost savings in good times and defaulting on its debt in bad times.