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THE IMPACT OF CREDIT RISK MANAGING ON BANK PROFITABILITY AN EMPIRICAL STUDY DURING THE PRE-AND POST-SUBPRIME MORTGAGE CRISIS: THE CASE OF SWEDISH COMMERCIAL BANKS

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ABSTRACT

This study empirically investigates the impact of credit-risk exposure management on bank profitability of the major commercial banks in Sweden with special emphasis on the financial crisis of 2008. We empirically test whether risk managing in ways to substantially reducing the probability that defaulting loans and how the Swedish bank may keep out credit crisis with their credit activities. The purpose of the study was to find out the main issues arising from the bank lending activities that have had a serious impact on the banking industry and the financial instability. Furthermore, the paper explores whether credit exposure management procedures are changed during financial crisis. We find that successful practices of credit risk management in Swedish banks are likely to improve the availability of bank credit.

Keywords: Bank Profitability, Credit exposure, Financial crisis, Non-performing loans.

INTRODUCTION

The recent financial market turmoil has seriously affected the world financial system. The root cause of the crisis was the credit contractions in the banking sector caused by the specific laxities in the United States financial system. The crisis and its contagion rapidly spread throughout the European and then has become a global phenomenon (Ojeaga, 2009). At the early stages of the subprime mortgage crisis, many Swedish banks experienced funding difficulties due to the mismatches in terms of bank deposits and loans (Lindblom, et al., 2010). It was, however, growing dependence on Swedish banks on short-term funds for their long-term loans (mortgage). Banks reduced interest rates to increase credit activities over a significant period which associated with inflation rate on a downward trend resulted in decreasing banks profit margins. Searching for better returns, therefore, is sought through more risk as their risk appetite grows (Ibid).

Although the effects of all risks sorts can lead to negative results to the bank, credit risk has long been identified as the dominant risk for banking firms that accompanied

with negative consequences in terms of its impact on bank performance (Sinkey, 1992). The issue of credit risk has definitely seen as a major concern for lenders worldwide because it results to increase debts¹ since the bank will have to borrow more so as to meet up with its claims, particularly from its clients who may come for cash withdrawals (Maness & Zietlow, 2005). Credit risk is used to report the uncertainty of security coefficient of lending funds reflected the possibility that the borrower cannot pay off the principle and interest of bank loan due to various reasons so as to the results in the failure of recovering the bank loan and the formation the bad debts (Morphy, 2003).

Generally, credit risk is associated with traditional credit-granting activities, while it also arises from holding bonds and other securities (Eveline, 2010). This credit creation process exposes the banks to significant default risk which might lead to financial distress and bank failure as a result of non-performing loans (Felix and Claudine, 2008). In the current economy

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¹ . As such the bank's cost of debt is a function of its probability of default, an increasing in credit risk can significantly increase the marginal costs of both debt and equity financing (BIS, 1999).

environment of volatile movement of cash flow, originating new innovative financial products and global lending and borrowing of funds, few lenders such as banks, however, remain unaffected by borrowers' late in payment loans for extended periods of time and nonpayment of loan obligations. This resulting from banks inability to collect the scheduled payments of principal or interest that will result in the payoff of loans at their maturity (Ibid). An increased risks exposed to commercial banks threatens a crisis not only in the banking industry but to the financial market as a whole and credit risk is a serious threat to the performance and soundness of banks.

Credit exposure of commercial banks could exist in all income-producing activities and capital are depleted when banks experience losses, which considered the key cause of most financial institution failures. How banks review, evaluate and manage their credit risk is critically important to their performance and successful over time.

Most credit issues arise from subjective decision-making by banks' management which is more critical than ever. Such decision may lead to extending credit to the own business or with which they are affiliated or credit granting to business and individual without a sufficient assessment of the borrower's creditworthiness (Bekhet and Eletter,2014). Many problems that intrinsically related to credit risk, a bank could face, are represented by higher interest payments, minimizing borrowing capacity, decreasing profits, an increasing in own capital which causes reduced return on equity, and reducing the expected investment opportunities (Morphy, 2003). Since CR has the potential to create excessive risk-taking and to practically wipe out most of a bank's owned equity that force it into bankruptcy, managing this type of risk has posed new challenges in the banking industry (Hosna, et. al., 2009).

Although there are many factors that can cause bank failure, poor credit risk management has always indicated as being the main cause of bank crisis. This is actually because credit creation is the main income generating activity for the banks, an ineffectively credit exposure management during the lending process will lead to unfavorable results in terms of its influences on bank performance and can even lead to bankruptcy (Eveline, 2010). Therefore, directors should be aware that, the excessively high level of non-payment is one of the most crucial risks a bank faces and all feasible

procedures should be taken to avoid or at least to mitigate this risk. Evidently, It has found that the major cause of the banking crisis was inefficient credit risk management practices represented by the high level of bad loans, lending to businesses involved in speculative activities, and the relatively high concentration of debt in certain sectors (Njanike, 2009).

Among the various elements of the banking sector, which could be critical subject to analyze, we focus on bank profitability as one of the basic dimensions of this study. Ensuring a stable and healthy profitability is a matter to maintain banking system stability (García-Herrero et al., 2009), Since the trends in bank profitability and related factors are major indicators of the state of health of banking systems, the quality of the banks management as well as the main strategies used by banks and their efficiencies and capabilities to manage various risk (García-Herrero et al., 2009) (Lindblom et al., 2010), we have indicated the quantitative effect of credit risk managing on bank profitability.

Basically, maximizing a bank's risk-adjusted rate of return with reasonable parameters of credit risk exposure is the main goal of credit risk management. Since exposure to credit risk continues to be the leading source of problems in banks worldwide, banks and their supervisors should be able to effectively manage credit risk and determine the level of profitability the banks expect to achieve for incurring various credit risks (BIS,2000). This study identifies the significance of credit risk management in the banking industry beyond the credit crisis and tries to find out the existing procedures for credit risk management that should be pursued by the CBs during the period 2000-2013. It also investigates the impact of credit exposure managing on bank's profitability, then it shows the trend of credit risk in Swedish CBs during the pre-crisis and post-crisis period.

THORETICAL BACKGROUND

Traditionally, commercial banks' essential services involve the granting of credit that is held by the originating bank until maturity or payoff. Credit risk management (CRM); however, allow banks to turn around this pattern, generally by transferring the loans in part or in their entirety from their own books to any other third-party loan servicer (Bekhet and Eletter,2014). The granting-credit process generates huge interest income and determines to a very large extent the financial performance of any bank. However,

some of these loans usually do not perform and eventually result in bad debts and adversely affect the banks' performance (Abdel Megeid, 2013).

While financial institutions, particularly banks, have experienced financial problems over the last years for a various of reasons, the main cause of serious banking issues continues to be closely related to permissive credit standards for borrowers and counterparties, poor managing of risk, and insensibility of changes in economic that can lead to impairment in the credit position of a bank's counterparties (Magnifique, 2013).

In general, an extended line of credit to borrowers can be at the risk of default such that whereas banks extend credit on the expectation that borrowers are capable or repaying their loans, some borrowers default on their payments and as a result, banks income declined due to the Provision requirements to cover estimated losses on loans. Where commercial banks do not fundamentally have an indication of the probability of their borrowers default, bank's earnings will likely to vary thereby the banks will be exposed to higher fluctuations in their profits. Financial institutions that provide various products and services such as lending to business and consumers can bear risk and experience some large losses of loans that not being repaid. For banks, credit risk arises from the possibility that bank's borrowers and other counterparties fail to repay their loan (Kithinji, 2010).

The lender estimates the expected credit risk over the life of the loan since its inception. Non-exciting or insufficient provisions to control massively increases in credit risk, the expected outcome is a general increase in interest rates. Depending on the risk profile of the borrower, both lender and borrower suffer when the expected credit risk of the borrower is high; a lender can suffer losses if the borrower defaults, and the borrower with an increasing high-interest rate. This indicates that both contracting parties can take advantage when provisions are contained in the debt agreement to control an increased credit risk (Demerjian and Ross, 2007; Abdel Megeid, 2013).

Historically, businesses have viewed risk as a potential vulnerability that must be mitigated or minimized as much as possible. The uncertain global economic poses severe challenges to the business, the ongoing turmoil in the financial markets emphasizes the importance of identifying, managing, and exploiting risk to ensure the success and longevity of any business. Credit risk

management can be defined as the process of identification, measurement, and assessing of risk that originates from the possibility of default on loan repayments. In reality, it is not likely to be possible for a given diverse difficulties of measuring exposures to credit risks and the instruments' limitations for controlling risks (Magnifique, 2013). While it is expected that banks would sustain some types of bad debts, and losses in their lending activities, one of the key goals of the bank is to minimize or mitigate such losses. Credit performance evaluates the risks associated with the bank's asset portfolio such as, for example, the share of non-performing loans in a bank's portfolio or loan-loss allowances to total loans ratio, i.e. the quality of loans issued by the bank which is the key factor of bank failures (Kumbirai & Webb, 2010).

In carrying out its mission, the bank is exposed to credit defaults through both its banking and lending activities. The analysis of existing and potential credit risks inherent in any product or activity is the basis for an effective credit risk management process. Banking and financial institutions should assess the risk/return relationship in any credit and manage their credit risk exposure that implicit in the entire portfolio likewise the risk in individual credit risk and other risks. The effective credit risk management, however, is a critical component of a comprehensive approach to risk management and essential to the long-term success of any banking organizations. The fundamental challenge in managing credit exposure is overcoming some of the incentive problems that arise in individual credit transactions between lenders and borrowers. Banks that effectively manage to successfully perform its credit risk management can lead to a significant positive impact on their financial performance (Haim & Thierry, 2005).

Moreover, banks in rapid-growth economies were the initial drivers of growth as they managed holistically credit risk line and take their capital leverage and liquidity/funding requirements into account. It is expected to remain key players in their roles as market makers, as well as through the trading desk in their proprietary and structured credit (Muritala & Taiwo, 2013). However, an effective credit risk management is critical to the stability, survival and growth of lending intuitions in general and banks where higher levels of an expected risk resulting from some of the characteristics of clients and business which originated the credit concerned (Abdel Mageid, 2013).

During the credit crunch, commercial banking throughout the world has suffered a steady decline in profitability, and has created an incentive for banks to take on more risk in their operations and expand into new activities (BIS, 2011). The trade-off terms of the banks is essentially changed after a banking crisis breaks out. Risk premiums in a range of financial markets increased to levels that have made refunding on these markets a lot more expensive and so hard to access (Lindblom, et al., 2010). The commercial banks are particularly affected by the global financial crisis because of their real estate loans and mortgage-related securities exposures, which tumbled as the house price boom came to an abrupt end. In some instances, commercial banks as well as other financial institutions have provided services and approved critical decisions that must be pre-vetted, in a result, many loans have become non-performing after being in default and expansion credit with direct lending (Muritala & Taiwo, 2013).

In terms of empirical results, Bourke (1989) reports the credit risk indicators are negatively related to profitability. Depending on the context, the results may be clarified by taking into account the fact that many financial institutions are exposed to high - risk loans and thereby the higher levels of loan losses due to unpaid loans, these loan losses have driven down to lower levels of returns in many commercial banks (Miller & Noulas, 1997). However, it has been found that the bank's profitability may significantly affect participation in the credit -risk transferring markets as a financial instruments source for managing different types of risk (and in particular credit risk) becomes pertinent to survive and maintain adequate profit levels for less profitable banks (Smith & Stulz, 1985). Furthermore, the findings of Felix and Claudine (2008) study show that profitability inductors i.e. return on equity ROE and return on asset ROA were inversely related to the ratio of non-performing loans to total loan NPL/TL of financial institutions, therefore decreases profitability. Further study conducted by Kithinji (2010) analyzed the effect of credit risk management on the profitability of commercial banks in Kenya; the findings indicated that the majority of commercial banks' profits are not influenced by the level of credit and non-performing loans. The implied meaning is that other variables apart from credit and non-performing loans impact on profits. Felix and Claudine (2008) assessed the relationship between bank performance and credit risk management.

The finding also showed that profitability indicators (measured by return on equity (ROE) and return on assets (ROA)) were negatively related to the ratio of non-performing loan to the total loan of financial institutions which led to a decline in profitability. Towards a further understanding of credit risk management (CRM) system of commercial banks (CBs) in an economy with a less developed financial sector, Richard, et al. (2008) develop a conceptual model to be used for the purpose. They found that the factors of credit risk management system vary in CBs performing their financial services in a less developed economy from those in a developed economy. The implication is that the environment within which the bank operates is an important competent for a CRM system to be successful.

Using the same context, Kargi (2011) investigated the effect of credit risk management on banks' profitability for the period of 2004 to 2008 of commercial banks in Nigeria. The findings showed that CRM has a significant impact on the profitability of Nigerian banks. The study concluded that banks' profitability is inversely influenced by the levels of loans and advances, non-performing loans and deposits, thereby exposing them to greater risk of illiquidity and distress. More recently, Rufai (2013) has found that banks with sound and effective credit risk management practices have lower loan default rates (non-performing loans) and a good profitability. Therefore, the banks can absorb more unexpected losses with higher profit potentials.

Lindblom, et.al (2010) examined the impact of the financial crisis on the profitability of Swedish banks over the time period 2007 to 2009. Essentially, the researchers found that, although the banks faced liquidity problems at the beginning of the crisis due to short-term funding of long-term assets, banks did well during the crisis in terms of return on invested funds and (ROIF) and return on financial leverage (ROFL) with credit losses exceptions.

RESEARCH METHODOLOGY

The major goal of the study is to empirically examine the quantitative effect of credit risk managing on the profitability of commercial Swedish banks over the period of 14 years (2000-2013). The credit risk management practices of major banks are examined by using the quantitative and qualitative analysis on the major Swedish Banking.

Specifically, our study aims at analyzing:

1. Whether the use of credit risk management procedures, disperse credit risk and therefore leading to keep out of a major financial crisis. Or do they allow assets with relatively low- credit quality to spread where the investor is unprotected and thereby create the credit crisis.
2. Investigate the impact of bank's credit risk management on the commercial banks' profitability.
3. Investigate whether CRM processes, lead to increased bank risk-taking.
4. Exploring why and how banking credit risk exposure has evolved recently.

Our study contributes to the empirical literature and research in The Swedish banking sector in two distinctive ways. First, to our knowledge, this is the first study to examine the impact of credit risk managing on Swedish bank profitability in the financial crisis setting. Second, we contribute to the continuing debate by examining the effectiveness of financial tools implications which are adopting in an increasingly competitive environment against bank credit exposure.

Research Problem: In the financial crisis setting, the banking business is so sensitive because the banks have over the years become tricky labyrinths of various business activities, ranging from broker dealing with mortgage lending. Basically, the most of banks income will be generated from credit that given to their customers (Colquitt, 2007). This credit creation process exposes the banks to higher default risk in which the borrowers fail to comply with their debt service obligations that might lead to large losses and thereby to the credit crisis. The issues of high levels of debt and, more specifically, bad loans can Table.1 The major Swedish banks' lending and geographically distributed(percent).

	Handelsbanken	Nordea	SEB	Swedbank	Total
Sweden	66	26	74	86	54
The other Nordic countries	22	70	3	3	36
The Baltic countries	0	2	9	10	4
Other countries	12	2	15	1	6

(Source: Bank reports and the Riksbank, 2013).

Where the period covering pre-and post-crisis (2000-2013), can provide convincing reasons for the effectiveness of usage CRM and involve identifying and analyzing incorrect action with credit risk managing practices in Swedish commercial bank. Furthermore, this study may help to better understand how banks use CRM for minimizing their credit exposures and whether their use is beneficial or it increased their risk exposure and in turn negative effect on banks' profitability.

lead to banking crises and result in the failure of some of the financial institutions with their concomitant repercussions on the economy as a whole. An effective credit risk management practice requires the ability to accurately assess and address evolving credit -risk exposure over time.

Research Hypotheses

H1: There is a negative effect of Non-performing loans/Total loans ratio of the equity profitability index ROE in pre and post financial crisis.

H2: There is a statistically significant effect of effective credit risk management on bank's Profitability.

Data Analysis: The data used in the empirical work were extracted from the bank reports and the Riksbank database. The scope of the study included the main Swedish commercial banks over the period before the crisis (2000: Q1-2006: Q4) and during the crisis (2007: Q1-2013: Q4).

We choose the four biggest commercial Swedish banks (SEB, Svenska Handelsbanken, Nordea, and Swedbank) with respect to total assets on December 31, 2012, because they play an important role in the Swedish financial system by mediating payments, deposits, financing and managing risks (Riksbank, 2013). The four major banks dominate the Swedish banking market and have a combined market share of around 70 percent in deposit and lending in Sweden. Together with other Swedish banks are the four major banks' total assets in Sweden and abroad four times larger than Sweden's GDP. Sweden has a significant banking sector in relation to the country's economy, partly because a substantial part of banks' activities is practiced abroad (see Table.1)

Bank Profitability: Since the trends in bank profitability and related factors are major indicators of the state of health of banking systems our study focuses on it. The study empirically investigates the credit risk managing process impact on banks' profitability in the financial crisis setting.

The main accounting-based measures are used to control for the profitability of the banks as a measure of how well a bank is run – return on assets (ROA) which

measures a bank's efficiency at generating profits from every unit of a certain asset which reflects how bank management effectively uses the bank's financial and real investment resources (Dietrich, & Wanzenried, 2011), return on equity (ROE) which is a reflection of maximizing value for bank shareholders by revealing the bank's ability at generating profits from its shareholders' investments. The ROE reports firm's shareholders how effectively their funds are being employed and serves an extremely useful tool for comparing firms belonging to the same industry (Alshatti, 2015). The net interest margin (NIM) concentrates on the profit earned on interest activities;

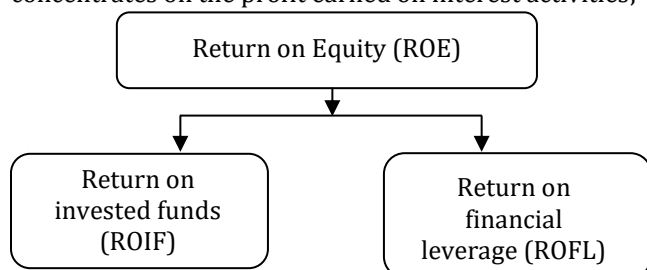


Figure.1'Risk-based' Return on Equity Approach.

$$ROE = ROIF + ROFL$$

$$ROIF = \frac{\text{brevenue} - (\text{non} - \text{interest bearing costs})}{\text{total asset}}$$

ROFL is derived from the following relationship: (Lindblom, et al, 2010)

$$ROFL = (ROIF - kd) * D/E,$$

Where:

kd = average cost of debt, D = debt, E = equity.

Equity multiplier or asset to equity ratio is a debt management ratio, which shows the leveraging level at the same time identifies the relevance of the two base indicators of profitability ($EM = ROA / ROE$). EM allows the shareholders to check the portion of the return on equity is the result of debt (Hassan & Bashir, 2003).

Significantly, previous studies used ROE as an internal performance measure of shareholder value. These studies have been employed the standard DuPont formulation, ROE can be further broken down into three parts as net profit margin, total asset turnover (Asset Efficiency) and total debt to total assets (Financial Leverage).

CREDIT RISK MESURMENT

Credit creation is the major income-generating activities of the banks. Essentially, funding loans involves risk and, for most lending institutions, the obvious and the critical source of credit risk are loans.

Credit risk, however, could arise from activities both on and off balance sheet. The credit risk exposure amount is normally explained by the carrying amounts for loans granted and receivables on the balance sheet (Drigă, 2012).

We have considered as proxies of credit risk exposures the ratio of Non-Performing Loan (NPL)² to Total loan which identifies the fitness of a bank's credit risk management, ratio of Total loan to Total deposit and the real growth rate of bank loans³. Abdel Megeid (2010) used the Loan Loss Reserve / Gross Loans ratio and Loan Loss Provision / Net Interest Revenue as proxies for assets credit quality in the multiple regression analysis models.

Analysis of the Data: Data were sourced from the Annual Reports and Accounts of the banks, the Riksbank and the Swedish Bankers Association. From the financial reports information concerning profit after tax, total equity, total asset, and non-performing loans (NPL) were extracted for the analysis. Multiple regression model is the standard approach for analyzing the pooled data which takes on Ordinary Least Square (OLS) method for the model parameter estimation (Kargi, 2011).

Multiple regression analysis used in the analysis is presented below:

$$ROE = a_0 + a_1NPL/LA + a_2LT/TD + a_3LLP/GL + e$$

Where;

ROE = (Ratio of profit after tax to total equity).

$\alpha_0 - \alpha_3$ = Coefficients

NPL/LA = (Ratio of Non-performing loans to Total loans).

LA/TD = (Ratio of Loan to Total deposit).

LLP/Gl = (Ratio of Loan Loss Provision / Gross loans)

e = error term

The regression outputs are obtained by using SPSS and STATA. In addition, we apply MS Excel 2010 to confirm the accuracy of the results.

² The global financial crisis of 2008 suggests that NPL size is an indicator of increasing threat of insolvency and failure in the banking system. However, the banking institutions with high NPLs have to diversify their risk and create portfolios with NPLs along with performing Loans, which are widely traded in the financial markets (Hosna, et al, 2009).

³ According to Cavallo and Majnoni (2001), the indicator expected to positively associated with credit risk, considering that the high- growth lending of bank typically reduces lenders' incentives to carefully screen and monitor efforts and deteriorates of the loan.

Table 2. Research Variables and their Proxies.

Variables	Proxies
Independent Variables (Xi) Credit Risk Management Quality Indicators CRMQI	<p>Non-performing loans to Total loans NPL/LA</p> <p>Total nonperforming loans divided by total loans. It indicates the quality of outstanding loans and used as a proxy for banks' credit risk.</p>
	<p>Ratio of Loan to Total deposit (LA/TD)</p> <p>Also known as the LTD ratio, an ordinarily used ratio for assessing a bank's liquidity calculated by dividing the total loans by its total deposits at any given time</p>
	<p>Loan Loss Provision / Gross-Loans (LLP/GL)</p> <p>The loan loss provision is an expense item that adds to (or can subtract from) the loan loss reserve. It's determined after management reviews its loan book and determines the appropriate level of reserves. At some banks, at some point in the economic cycle, loan loss provision can even be negative, meaning it can add to pre-tax income.</p>
Dependent Variable (Y): Bank Profitability BP	<p>Return on Equity (ROE) (Profit after tax / Average Shareholders' Equity)</p> <p>This profitability ratio indicates the return provided to the shareholders' over the time period.</p>

Findings and Discussion of the Results: The study used the pre- and during crisis periods analysis to obtain further insight about the significance of the base converts to capture credit risk. Descriptive financial analysis has used to describe, analyze and quantitatively examine the trend of commercial bank's credit quality and performance on a yearly basis during the period 2000-2006. To estimate the relation between non-performing loan and bank profitability, we run regressions that are similar to the market share regressions except that we use the return on equity (ROE) during the pre-crisis period as the dependent variable.

Data Analysis of Swedish commercial banks for pre-crisis period

Banks profitability Indicators: The main bank profitability indicators are shown in table 3, which presents the major profitability indicators during 2000 to 2006 period in terms of return on equity (ROE), Net profit (NP) and profit before credit losses (PBCL). However, the return on equity (ROE) of the main commercial banks fluctuated during the period but on average increased marginally during the period 2004 to 2005.

The ROE Of Swedbank has the highest percentage of average 17.96% during 2000-2006, whereas Handelsbank 17.94% ranks in the second position on

average. SEB has a lower level of average ROE 15.14%. Net profit of SEB is 9737.6 M kr. SEK on the average, the minimum 5051 M kr. SEK and maximum 13642 M kr. SEK. While the bank's net profits declined remarkably in the years 2002-2005, it had reported a 24 per cent (on average) growing in the bank net profit during the following years. However, the growth in deposits and borrowings to public significantly and positively affecting the bank' profits. Although net profit in Nordea bank drop in 2002 by 44.3 percent, it was distinctly grown in 2003-6 reflecting the improvement in operating profit and then in its net profit. It can be observed from the standard deviation that the indicator with the widest spread is Nordeabank net profit which has a standard deviation of 6179.52 M kr. SEK. It can also be observed that the spread of Nordea Profit before credit losses is 14250 M kr. with a maximum of 30939 M kr. and the minimum of 16689 M kr.

The Status of Credit and Level of Nonperforming Loans: The non-performing loan to Non-performing loans are of SEB, which indicates the quality of bank outstanding loans gradually decreased under period, reached to 22 percent in FY 2005-6 from 1.37 percent 2000 despite of increasing of loans granting. The continuously declining can be due to bank policy and its rational investments and lending decisions.

Table3. Banks profitability Indicators for pre-crisis period 2000-2006.

	ROE %				Net Profit M kr. SEK				Profit before credit losses M kr. SEK			
	Mean	Max	Min	St. deviation	Mean	Max	Min	St. deviation	Mean	Max	Min	St. deviation
SEB	15.14	20.8	11.6	3.137	9737.6	13642	5051	3237.2	10174.6	16280	6823	3264.38
Handelsbank	17.94	22.3	14.6	2.891	9590.7	13128	7282	2046.412	13115.8	17108	10781	2375.329
Nordea Bank	16.43	21.4	7.5	4.794	16901.29	27331	8105	6179.52	22310.3	30939	16689	5525.159
Swedbank	17.96	24.6	11	4.447	7788.714	12229	4152	3060.7	11597.4	15304	9303	877.6159

For Handelsbank, the NPL ratio had risen in 2003 and dropped significantly in the following years, reached to 7% in 2006 which refers to a situation where the bank used to reduce loans granting to the public in 2004 by more than 50% 408842

MSEK (823142MSEK). Later years the bank increased the lending rate associating with decreasing in NPL ratio and overall interest increases as well that may reflect the banks' high quality lending and rational business choice.

Since Non performing loans is an indicator to poor credit risk management. We, therefore, expect better credit risk management is related to lower non-performing loans.

Table 4. Non-performing Loans of Swedish commercial Banks.

	Non-performing loans level %				Non-performing loans amount			
	SEB	Handelsbank	Nordea Bank	Swedbank	SEB	Handelsbank	Nordea Bank	Swedbank
Mean	0.54	0.22	0.59	0.22	3622	1852	7122	1128
Max	1.37	0.40	0.80	0.32	8365	2522	10270	1537
Min	0.22	0.07	0.30	0.12	1836	876	859	825
Std. Deviation	0.40	0.11	0.18	0.07	2269	582.9	3108.6	217.1

The average proportion of NPL ratio was at 5.9% in Nordea bank ranging between 8% in 2006 and 3% in 2005. However, Nordea has realized positive net loan losses of 1272 MSEK, and 2378 MSEK in 2005, 2006 respectively. The NPL ratios, as well as the bank lending size, were fluctuated in Swedbank. The level of NPL has been in an

uptrend in year 2006, whereas it was in the downturn in the previous years 2003-5. The standard deviation of Swedbank is the lowest 0.07 that reflect a low degree of risk factors.

Credit loss level, Provision ratio for doubtful loan and Total Loans to Deposits Ratio: The total loans to deposits of each commercial bank

have been analyzed in table 5. Within loan and despite market SEB has been considered number four. During 2006, deposits and borrowing from the public increased by 13 percent to SEK 641.8 (570.0), while the lending to the public increased by 5.5% to SEK 950.86(901.26), corresponding 148% (158%) as the loan to deposit ratio in 2006.

Table 5. Loan to Deposit Ratio, Credit loss level and Provision ratio for doubtful loan.

	Loan to Deposit Ratio %				Credit loss level %				Provision ratio for doubtful loan %			
	Mean	Max	Min	St. deviation	Mean	Max	Min	St. deviation	Mean	Max	Min	St. deviation
SEB	1.45	1.58	1.36	0.08	0.11	0.15	0.08	0.02	44.16	70.8	19.8	17.98
Handelsbank	2.16	2.87	1.30	0.77	0.01	0.06	-0.03	0.03	53.27	71.7	37	11.75
Nordea Bank	1.58	1.69	1.52	0.06	0.36	1.2	0.08	0.39	70.16	81.4	47	11.20
Swedbank	2.80	3.21	2.37	0.34	0.12	0.23	-0.02	0.09	43.86	50	40	4.56

Loans-to-Deposits (LTD) Ratios fluctuated during the period in Handelsbank, the average lending volumes rose by 13% and deposits by 14%. In 2006 and the mean of ratio amounted to 216%. The level of L/D has been increased over the period except FY 2003 when the ratio decreased by 2% in Swedbank. (LTD) Ratio has been declined over the last four years from 321% in 2002 to 304% in 2003, 291% in 2004, 254% in 2005 and 236% in 2006.

The standard deviation of credit loss level in Handelsbank was 0.03 indicating low variability. The Loan losses continued to be low and were SEK 55m in 2006 and the net loan loss ratio was -0.01%. For SEB, loan losses were relatively low under the 7-year period reflecting high credit quality loan quality. Loan losses amounted in Swedbank to a net of -205 m in FY 2006, corresponding -0.02 % as credit losses level. Although the high fluctuations in credit losses level, Nordea has reported eleven consecutive quarters of positive net loan losses 2005-2006 indicating the strong quality of the credit portfolio under the last two years.

The bank should make provisions for the loans that are believed to be bad or doubtful and this has to be taken from the net interest income, which means that the banks income decreases due to the need to provision for probable loan losses. The provision ratio for doubtful loans in Swedbank has declined from 70.8% in 2002, to 47.6% in 2003 with continually decreased in FY2004-6. In Handelsbank, the annual percentage variation was 71.7% in 2001 compared to 57.6% in 2000 and retarded downward in years 2002-5 and then enhanced to 57.7% in the year 2006. The lowest level of the ratio in Nordea bank was 47% in the business year 2006 and the highest one was in 2005. The decreasing in provision ratio in the result of the positive net loan losses at EUR 257m (2377.8mSEK), which indicating that recoveries were maintained at a high level while there at the same time was limited request for new provisions. In Swedbank, the provision ratios for individual debt that overdue over 60 days have been approximately similar after the eight-year period ranging between the maximal value at 50% in FY 2004 and 40% in 2002 and 2000.

Data Analysis of Swedish commercial banks during crisis period

Banks Profitability and Credit Quality Indicators

Table.6 ROE on a quarterly basis of Swedish banks.

Year	ROE %															
	SEB				Handelsbank				Nordea				Swedbank			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2007	19	20.7	17.3	20.2	17.1	20.2	15.7	12.4	18	21.5	19.1	20.2	18.9	19.9	18.1	18.8
2008	9.6	15.2	10	17.6	17.5	19.3	20	22	15.8	16.2	15	14.4	16.8	20.6	13.8	10.1
2009	4.9	-0.8	0.1	1.03	13.8	12.6	12	12.2	13.9	12	11.7	8.1	-15.6	-9.9	-16.9	-8.3
2010	3.8	8.6	8.5	14.8	13.5	12	12.7	13.4	11.3	9.5	12.2	12.8	2.4	7	11.3	11.7
2011	13.7	13.6	10.9	8.87	13.2	14	14.1	14	12	11.5	6.5	12.3	16.1	14.4	14.4	14.4
2012	10.1	11.5	10.8	11.9	14.1	14.8	13.5	17.5	11.7	12.5	10.3	11.9	12.5	12.5	14.1	16.7
2013	11.03	14.02	13.4	14.1	13.8	15.1	14.2	13.3	11.1	11.5	10.8	10.5	11.03	11.1	16.1	13.4

Based on Table 6, SEB had a huge drop in its ROE ratios in 2008 and 2009 cause to the financial crisis of 2008 that had a negative effect on banks' ability to generate profit from its equity. On the other hand, the profitability of the Swedbank fluctuated during the period 2008 to 2011 and had the lowest in 2009 in comparison with the other banks. Apparently, the financial crisis has affected the banks differently, the profitability of Swedbank in terms of ROE was the most affected during the 2008-2009 global financial crisis.

When Lehman Brothers filed for bankruptcy in September 2008, Swedbank lost about SEK 9 billion in 2009 which had lent to them and 60 percent of this stems from the Baltic countries. The bank suffered from high credit loan losses when the borrowers could not pay back their loans.

The table 6 also shows that the profitability of Handelsbank and Nordea in terms of ROE have an obvious decline in 2009. This was maybe due to the economic downturn, and the equity market uncertainty and their property in Swedbank.

Table.7 Descriptive analysis.

Variables	Descriptive Statistics			
	Mean	Max	Min	St. deviation
ROE	12.22%	22.62%	-14.88%	6.202%
NPL	0.76%	2.28%	-0.55%	0.545%
L/D ratio	194.3%	250.76%	70.87%	30.656%
Reserve ratio for impaired loan	65.77%	186.23%	40.23%	19.442%

Table 7 presents some descriptive statistics for the variable used in this study. The mean of ROE is 12.22%, the minimum -14.88% and maximum 22.62%. On the average, the default rate is 0.76% and minimum and maximum is -0.55% and 2.28% respectively indicating

huge loan default by customers. Regarding the loan to deposit ratio, the average is 194.3% where minimum and maximum is 70.87% and 250.76% respectively. The mean of reserve ratio is 65.77% and bears minimum and maximum 40.23% and 186.23% respectively.

Discussion of regression results for pre- crisis period

Table 8. The Result of Regression with Fixed Effect Model.

Model 1					
Independent Variables	Un- Standardized Coefficients				
	β coefficient	Std. Error	Sig.		
Constant	19.311	3.957	0.000	Dependent Variable ROE	
X1: Non-performing loan/lending	-3.697	3.007	0.220	R-squared	0.117
X2: Loan /Deposit ratio	0.0027	0.012	0.823	Adj R-squared	0.006
X3: Reserve ratio for impaired loan	-0.034	0.049	0.493	F- statistic	1.06

The results of the panel data analysis show that, 11.7% of banks’ profitability affected by the level of nonperforming loans, loan to deposit ratio and reserve ratio for the impaired loan as proxies of credit risk. The adjusted R-Square of 0.006 indicates that amount of credit and nonperforming loans does not explain the level of profitability of commercial banks for the pre-crisis period. Table 8 shows also that the coefficient of non-performing loan and reserve ratio for the impaired loan have negative signs at the 5% level of significance. The coefficient of NPL (-3.697) indicating that the ratio of

non-performing loan contributes negatively to the bank profitability. 100% increase in reserve ratio for impaired loan reduces profitability (ROE) by about 3.4%. Whereas a 100% increase in loan to deposit ratio increases the profitability of banks by about 0.27%, which it means that L/D ratio has a positive and insignificant impact on ROE in comparison to NPL. Briefly, the regression analysis results show that the independent explanatory variable (NPL as credit risk indicator) has fairly significant impacts on the *banks’* profitability.

Discussion of regression results during- crisis period

Table 9. The Result of Regression with Fixed Effect Model.

Model 1					
Independent Variables	Un- Standardized Coefficients				
	β coefficient	Std. Error	Sig.		
Constant	21.670	3.482	0.000	Dependent Variable ROE	
X1: Non-performing loan/lending	-4.830	1.087	0.000	R-squared	0.336
X2: Loan /Deposit ratio	-0.048	0.017	0.146	Adj R-squared	0.304
X3: Reserve ratio for impaired loan	0.054	0.031	0.085	F- statistic	17.69

$$Y1 = 21.670 - 4.830X_1 - 0.048X_2 + 0.054X_3$$

By using a Fixed Effects Model (FEM), 112 observations have pooled to test the hypotheses developed earlier in the study. FE allows for heterogeneity among four commercial banks by allowing having its own intercept

value. The results obtained from the regressions are reported in the following sub-sections.

The results show that the three independent variables explain 33.6 % of the systematic variation in the

dependent variable (ROE). The adjusted R-Square of 30.4% indicates that the ratio of non-performing loans to total loans, loan to deposit ratio and the total reserve ratio for impaired loan explain about one-third of the bank profitability.

For non-performing Loans (NPL), the coefficient is negatively signed, though statistically significant at 5% level. The coefficient of NPL is (-4.830) indicating that the ratio of non-performing loan contributes negatively to the bank profitability, i.e. as the proportion of nonperforming loans increased, the return on equity decreased. The β coefficient of L/D ratio is a negative -0.048 which indicates that one-unit increase in loan to deposit ratio decreases the return on equity by 0.048 units.

For impaired loan reserve ratio, the coefficient shows a positive effect on Return on equity (ROE). This implicates that holding other variables constant, 100% increase in (RR) increased banks' profitability by 5.4%. From our analysis, we find evidence that the NPL and LTD have a negative effect on banks ROE as a proxy of profitability.

CONCLUSION REMARKS

Granting of credit is the prime operation of commercial banks, at the same time, it can expose banks to dispensable default and credit risk when borrowers fail to fulfill their commitments with the banks. However, managing of credit risk can help to minimize the loan loss. Our finding from empirical analysis in the pre- crisis period indicate that NPL and reserve ratio for impaired loan affect the bank performance and profitability negatively. The loans to deposit ratio shows a positive relationship with ROE as a proxy of banks' profitability. From our analysis, we find evidence that the NPL and LTD have a negative effect on banking profitability while reserve ratio for impaired loan coefficient exerts a positive effect on ROE during and in the post-crisis period. The negative sign explains that the higher non-performing loan to total loans ratio NPL and the higher loan to deposit ratio, the lower ROE as the proxy of profitability of banks. Our findings provide evidence consistent with our first hypothesis that there is a negative effect of Non-performing loans/Total loans ratio on the equity profitability index ROE in pre and post financial crisis. Moreover, the results indicate that the impact of the bank-specific variables on banks' profitability is not always uniform and differentiate between the pre and post -financial crisis periods due to changes in economic and financial conditions.

This study shows that there is a significant impact of credit risk management (in terms of loan performance) on banks' profitability (in terms of ROE). Therefore, the techniques of credit risk management determine the profitability level to a considerable extent. Especially, NPL which has a more significant effect than others independent variables. However, the results support the second hypothesis which states that there is statistically significant effect of effective credit risk management on bank's Profitability.

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