

**DETERMINANTS OF BANK PROFITABILITY:
COMPARISON BETWEEN THE USA AND CANADA**

by

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Abstract

This paper summarizes findings of an empirical study on determinants of banks' profitability in the USA and Canada. The time periods are divided into pre-subprime crisis, during-subprime crisis and post-subprime crisis to see if the determinants change because of the financial crisis. The analysis focuses on macroeconomic, industry-specific and bank-specific factors. Data covers 197 US banks (with total assets above USD \$2 billion) and eight Canadian banks (with total assets above CAD \$2.5 billion). We used the ordinary least squares estimation technique to estimate the significance of the factors in MATLAB.

We found that in both countries the bank performance is mostly driven by bank-specific characteristics and that macroeconomic and industry-specific factors are less statistically significant. While some variables have the same effect on the profitability, others, such as Bank Age and Bank Size, have the opposite effect. The previous bank performance is also an important factor, especially in defining NIM.

Keywords: banks profitability; determinants of banks performance

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List of Acronyms

CPI	Consumer Price Index
FRED	Federal Reserve Economic Data
GDP	Gross Domestic Product
GICS	Global Industry Classification Standard
HHI	Herfindahl-Hirschman Index
NIM	Net Interest Margin
ROA	Return on Assets
ROE	Return on Equity
SFU	Simon Fraser University
USA	United States of America

Chapter 1: Introduction

Over the years, many researches have been studied determinants of the bank profitability in both developed and developing countries. To the best of our knowledge, this paper is the first one to investigate whether there are significant differences between profitability determinants of large US banks and those of Canadian banks before, during and after the subprime financial crisis of 2008, considering the differences in financial systems between the two countries.

The comparison between determinants of the bank profitability among two developed countries (Canada and the USA) located on the same continent (North America) and having strong economic relations can provide insights for other countries. The Canadian banking system is conservative and highly regulated while the US banking system is more decentralized and localized. Many countries, including developing countries, have more similarities with the Canadian system than with the USA case (Allen et al., 2006). It is important for both bank managers and regulators to understand determinants of the bank profitability and the impact of financial crises on profitability.

In this study, we used Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) as proxies for the bank profitability measurement. The time periods are divided into pre-subprime crisis (2000-2006), during-subprime crisis (2007-2009) and post-subprime crisis (2010-2017) to see if the determinants change over time and how they differed during the financial crisis. The analysis focuses on macroeconomic, industry-specific and bank-specific factors. Data was derived from several sources and covers 197 US banks (with total assets above USD \$2 billion) and 8 Canadian banks (with total assets above CAD \$2.5 billion).

The empirical results suggest that the banks' profitability (ROA, ROE, and NIM) is primarily defined by the bank-specific variables. The most significant determinants are Capital Ratio, Loan Loss Provisions over Total Loans Ratio, Loans over Total Assets Ratio, Interest Income Share, Funding Costs and Efficiency Ratio. Bank Age and Bank Size are also important variables with the opposite effects in Canada and the USA. In contrast, the macroeconomic and industry-specific variables appear to be less influential compared to the bank-specific variables with some determinants, like an inflation rate, having marginal or no effect on banks' profits. The inclusion of lagged dependent variables into the models increased the predictive power of the models and proved that the previous bank performance is a relevant factor.

The paper is structured as follows. The first section provides literature review on determinants of the bank profitability. The second section describes the data and methodology used with variables explained. The third section discusses the empirical results. Finally, the last section concludes the paper.

Chapter 2: Literature Review

The topic of the determinants of bank profitability in both developed and developing countries is well covered in academic literature. The approaches to an analysis vary: while some researchers focus primarily on bank-specific factors, others consider the impact of industry-specific or macroeconomic factors. As there are many differences in data used in research, such as different time periods, countries, regulatory regimes, financial systems, accuracy of data and its sample size, it is not surprising to find contradictory conclusions in these papers.

One example of the variability of conclusions may be illustrated by analysing literature on the relation between a bank size and its profitability. Short (1979) points out that a bank size affects the capital adequacy ratio, with larger banks raising less expensive capital and making better profit. Berger et al. (1987) argue that costs are reduced only slightly by increasing the bank size until scale inefficiencies kick in. Pasiouras and Kosmidou (2007) find a positive relationship between a bank's size and profitability. Rumler and Waschiczek (2016) studied Austrian banks from 1996 to 2009 and found no significant relationship between the bank size and profitability.

Another similar example is on how a bank's ownership defines its profitability. Molyneux and Thornton (1992) point out that the ownership status is irrelevant in explaining bank profitability. One plausible explanation is that private banks' advantage of management efficiency might be traded off by slightly higher borrowing costs compared to government-owned banks. In contrast to this, Iannotta et al. (2007) indicate that government-owned banks suffer a lower profitability than privately owned banks.

Researchers include macro factors, industry-specific and bank-specific factors as explanatory variables of the bank profitability. For instance, regarding bank-specific factors,

empirical evidence by Abreu and Mendes (2002) indicates that banks with a high level of equity to assets ratio perform better. The authors state that banks with higher capital ratios enjoy lower funding costs due to lower credit risks. Empirical data also suggests that operational efficiency, measured by the cost-income ratio (Goddard et al., 2010), positively affects the bank profitability. Regarding industry-specific factors, according to Bourke (1989), the bank concentration ratio shows a positive and statistically significant relationship with bank profitability. Smirlock (1985) claims that banks with better management and technology enjoy lower costs and gain large market shares, resulting in a high level of concentration and better profitability. As for external macroeconomic determinants of the bank profitability, such as central bank interest rates, inflation and real GDP growth rates, most studies (Athanasoglou et al., 2008; Albertazzi and Gambacorta, 2009) have shown a positive relationship between inflation, central bank interest rates, GDP growth and the bank profitability.

The literature on the bank performance during crisis times and the impact of the subprime financial crisis of 2007-2009 on determinants of the bank profitability is relatively limited. Xiao (2009) examines the performance of French banks during 2006–2008 with the conclusion that French banks were resilient to the global financial crisis due to a better supervision process. Sufian (2009) investigates the performance of commercial banks in South-East Asia after the 1997 Asian financial crisis (1997-2004). The author reveals that bank-specific characteristics (liquidity, non-interest income, and capital adequacy ratio) have positive impact on bank profitability. Millon et al. (2010), study the performance of US banks before and during the financial crisis, and finds that all banks suffered huge losses with the largest banks being hit the most.

To summarize, the existing literatures cover a wide range of research on the effects of bank-specific, industry-specific, and macroeconomic determinants on the bank profitability. Our study

fills the gap in investigating whether there are significant differences among determinants of the bank profitability between US and Canadian banks (before, during and after the subprime financial crisis), considering the different financial systems between the two countries.

Chapter 3: Data, Variables, and Methodology

3.1 Data

We obtained data that covers a period from 2000 to 2017 from several sources. First, we used Thomson Reuters Eikon Excel add-in to get relevant financial and company-specific information for both Canadian and US banks on a quarterly basis. The decision to use quarterly data was motivated by the limited number of banks in Canada and a deficit of data suitable for the analysis. To retrieve financial information on banks, we selected all financial institutions classified as “Banks” according to the Global Industry Classification Standard (GICS) in Thomson Reuters Eikon. Second, we collected macroeconomic data from multiple sources: a) quarterly data for interest rates are from Thomson Reuters DataStream; b) daily CAD/USD exchange rate, weakly Trade-Weighted US Dollar Index Broad, quarterly Consumer Price Index (CPI) for the USA, quarterly Gross Domestic Product for Canada and real GDP growth for the USA are from Federal Reserve Economic Data (FRED); c) monthly CPI is from the Statistics Canada website. All macroeconomic data that was not available at a quarterly basis and was at any other frequency was converted to a quarterly basis. In our analysis, we used quarterly growth rate for real GDP and CPI. We also calculated quarterly average CAD/USD exchange rate and US Dollar Index Broad.

Our dataset consists of 7958 observations on 197 US banks with total assets above USD \$2 billion and 538 observations on eight Canadian banks with total assets over CAD \$2.5 billion. It is worth noting that some portion of data on NIM was filled with empty values and therefore must be excluded from the analysis, so we used a reduced dataset on NIM: 362 observations on Canadian banks and 6109 observations on US banks accordingly.

We broke down the dataset in three datasets to analyse how the relationship between variables and the banks' performance might change over three periods: before the subprime crisis (2000-2006), during the crisis (2007-2009) and after the crisis (2010-2017) since the relationships may not hold over time as economic, market and regulatory environments change. Thus, for US banks, we have 2034 observations before the crisis, 1298 observations during the crisis, and 4626 observations after the crisis. For Canadian banks, we have 188 observations before the crisis, 94 observations during the crisis, and 256 observations after the crisis. Table 1 and Table 2 show the number of observations and summary statistics for Canadian and US banks.

It can be seen from Table 1 and Table 2 that the mean values of Real GDP Growth and Inflation Rate in Canada and the USA are comparable. The Herfindahl-Hirschman Index, a measure of market concentration, is higher in Canada than that in the USA. Over the entire period, on average, Canadian banks have Capital Ratio twice as low as US banks. Also, Loans over Deposits Ratio, Interest Income Share and Deposit Growth Rate are lower for Canadian banks. Both countries have similar Efficiency Ratios. As for the performance metrics, Canadian banks have higher ROE but lower ROA and NIM than US banks.

3.2 Dependent Variables

We consider the following metrics as proxy measures of profitability: ROE, ROA and NIM (Dietrich & Wanzenried, 2011). ROA is calculated as net income over total assets at the end of period. ROE is calculated as net income over book value of equity at the end of period. NIM is calculated as net interest income over average earning assets. While ROA is not directly affected by leverage, ROE is not asset-dependent. NIM measures the difference between interest paid and

interest received, adjusted relative to the amount of interest-generating assets. When all three variables are used, bank profitability will be best represented.

3.3 Independent Variables

Based on the research papers, discussed in the second chapter, and, in particular, on the study conducted by Dietrich and Wanzenried (2011), we made a list of variables that might be relevant for the Canadian and US banks' profitability and for which data was available. We included macroeconomic, industry-specific and bank-specific variables as important factors.

Macroeconomic Variables

Real GDP Growth. We use a quarterly real GDP growth rate to determine the relationship between the economic growth and the bank profitability. It might be expected that Real GDP Growth has a positive effect on the bank profitability.

Currency. To assess the effect of how strong the national currency is, we used CAD/USD currency exchange rate for Canadian banks and US Dollar Index Broad for US banks.

Interest Rates. We used a short term 3-month treasury bill yield and a spread between 3-year and 10-year treasury bonds yields. The inclusion of these variables will allow us to analyse the effect of short-term interest rates and the term structure of interest rates. Banks tend to borrow short-term and lend for a longer period, so we expect that a change in interest rates will impact the profitability.

Inflation Rate. We used a quarterly inflation rate, calculated as a quarterly growth rate in CPI, to assess its significance in relation to the bank profitability. Interest rates tend to rise with inflation, but the banks' costs of funding tend to lag, providing spread, so a positive effect is expected.

Industry-Specific Variables

Herfindahl-Hirschman Index. According to the Department of Justice of the USA, the Herfindahl-Hirschman index (HHI) is a commonly accepted measure of market concentration. It is calculated by squaring the market share of each firm competing in a market and then summing the resulting numbers. The closer a market is to a monopoly, the higher the market's concentration (and the lower its competition) and the higher HHI accordingly. The Department of Justice considers any market with a HHI between 0.15 and 0.25 as moderately concentrated. In our study we use the size of a bank's total assets as a proxy for the market share.

Bank-Specific Variables

Capital Ratio. Capital Ratio is defined as total equity over total assets. Banks with higher capital ratio are considered safer, so a positive impact on the bank performance might be expected.

Loans over Total Assets Ratio. Reflecting asset structure, this ratio is regarded as a measure of credit risk and lending specialization. A higher ratio indicates that a bank is issuing more loans and generating more income, but also puts a bank at risk.

Loans over Deposits Ratio. This ratio measures liquidity risk, and we expect a positive effect unless the ratio is too high to cause bankruptcy concerns.

Loan Loss Provisions over Total Loans Ratio. The ratio measures credit quality. We might expect a negative impact on the bank profitability.

Interest Income Share. This variable is calculated as net interest income over total revenue, reflecting the business model. We expect a negative relationship because non-interest income usually has a higher profit margin.

Funding Costs. This variable is calculated as interest expenses over total deposits. A negative impact on the bank profitability is expected.

Efficiency Ratio. It is calculated as non-interest expenses divided by the total revenue, a proxy to measure operational efficiency reflecting banks' ability to maximize profits. Banks strive for lower efficiency ratios since a lower efficiency ratio indicates that the bank is earning more than it is spending. Negative impact on the bank performance is expected.

Deposits Growth. This variable is expressed as a quarterly growth of deposits. More deposits give the bank the liquidity and flexibility to expand its business. A positive impact on the bank performance is expected if a bank is able to convert growing deposits into loans quickly. Otherwise, increased deposits will incur additional costs for banks.

Bank Age. Bank Age is a dummy variable which equals 1 if a bank was founded before 1950 and 0 otherwise. The motivation to include this variable is an assumption that banks with longer history tend to have more expertise but might be slow in accepting new technologies. The overall effect cannot be anticipated theoretically.

Bank Size. This variable is calculated as a natural logarithm of total assets. This transformation helps to eliminate the high variability of total assets numbers among banks, which might differ by several orders. Generally, Bank Size is positively correlated with performance due to economies

of scale. However, as Bank Size becomes extremely large, the effect may become negative due to the bureaucratic inefficiency.

3.4 Methodology

To investigate the external and internal determinants of the bank profitability, an ordinary least squares (OLS) regression model is used. The model was realized in MATLAB, release R2017b. Following Dietrich and Wanzenried (2011), we define a linear model as

$$PERF_{it} = c + \delta PERF_{i,t-1} + \sum_{j=1}^L \beta_j x_{it}^j + \varepsilon_{it}, \quad (3.1)$$

where $PERF_{it}$ is a profitability measure (ROE, ROA and NIM) of a bank i at time t , c is a constant, $i = 1, \dots, N$, N is the number of banks in a sample, $t = 1, \dots, T$ are indices of time series observations, β_j and δ are regression coefficients, L is the number of dependent variables, x_{it}^j is an explanatory variable, and ε_{it} is the disturbance term. Dietrich and Wanzenried (2011) state that bank profits tend to persist over time and that the inclusion of lagged variables is justifiable.

Chapter 4: Empirical Results

We ran regressions for Canadian banks and US banks separately for 2000-2006 (the pre-crisis period), 2007-2009 (the sub-prime crisis), 2010-2017 (the post-crisis period) and 2000-2017 (the entire period). Tables 11-14 summarize the regression results. In the Tables, the significance levels are denoted as *** for 1%, ** for 5% and * for 10% respectively, and standard errors of coefficients are given in parentheses. Tables 3-10 provide correlation matrices of dependent variables for each country and period. The correlation matrices illustrate that correlations change over time and vary across countries. The correlation matrices also help to assess the effect of multicollinearity in regression analysis. As can be seen, a few variables appear to be correlated in a certain country or in some periods but not to be correlated in others. These variables can be excluded from an analysis to improve the model predictability and coefficients' estimates. We kept the full list of dependent variables to compare the results between the countries consistently.

Out of 24 regressions that we ran, 21 regressions have R-squared higher than 70%, one regression (US banks, the entire period, ROE) has R-squared equal to 63.5% and two regressions (US banks, 2010-2017, ROE and ROA) have R-squared around 30%.

Looking at the regression results for all the performance metrics, it is noticeable that bank-specific factors are the most important factors in the determination of the bank profitability in both Canada and the USA. The most interesting finding is that there is no discrepancy between Canada and the USA regarding the three factors that define ROA and ROE in all four periods. Loan Loss Provisions over Total Loans Ratio, Interest Income Share and Efficiency Ratio are statistically significant factors with p-values less than 1% that decrease the bank profitability. As for NIM, Loan Loss Provision over Total Assets Ratio and Interest Income Share increase NIM while

Efficiency Ratio decreases NIM, but these relationships are not statistically significant in all periods.

Capital Ratio is another important determinant in the bank profitability, and it has the opposite effect on ROE and ROA: higher Capital Ratio decreases ROE while increases ROA. Banks that have higher Capital Ratio and hold more equity than others will have lower ROE. Capital Ratio has a positive influence on NIM.

Loans over Total Assets Ratio shows a positive effect in Canada while a negative impact in the USA. In contrast, Loans over Deposits Ratio appears to be more statistically significant in determining ROA rather than ROE and it has a different effect in the two countries: negative in Canada and positive in the USA. It seems that Canadian banks' interest spread is not as wide as that of US banks and increasing the ratio of Loans over Deposits does not result in higher profit for Canadian banks. The impact of Loans over Total Assets Ratio on NIM is mixed: in Canada it changed from positive before the crisis to negative during and after the crisis, whereas in the USA it moved from negative during the crisis to positive afterwards. Loans over Deposits Ratio positively affects NIM in both Canada and the USA, except for the pre-crisis period in Canada.

The Deposits Growth has a negative influence on the Canadian bank profitability for all three profit measures ROE, ROA, NIM, possibly indicating that banks in Canada were not able to convert the increasing amount of deposits into higher income earnings. As for US banks, Deposits Growth has a negative impact on ROE, similar to Canadian banks, no effect on ROA and positive on NIM. The possible explanation might be that US banks are more aggressive in lending out the excessive deposits comparing to Canada.

Funding Costs are a statistically significant determinant in some periods. While it shows a negative effect on ROE and NIM, the effect on ROA is mixed: based on the regressions results

over 2000-2017, it was positive in Canada and negative in the USA. The positive relationship between Funding Costs and the bank performance might be explained by the fact that Canadian banks were able to adapt and increase the lending rates.

Bank Age has a negative effect on ROE, ROA and NIM in Canada but positive in the USA. A possible explanation might be that US banks with longer history tend to have more expertise but Canadian banks with shorter history might be quick in accepting new technologies. Bank Size increases both ROE and ROA in Canada, but negatively affects ROA in the USA. In the USA, Bank Size's impact on ROE changed over time: it was negative before the crisis and turned into positive during the crisis. While in the USA NIM is negatively affected by Bank Size, in Canada the relationship was positive before the crisis and changed to negative after the crisis. Large US banks might be more resilient during the financial crisis compared to smaller banks. It seems that Canadian banks were able to take full advantage of economies of scale. However, as US banks become extremely large, bureaucratic inefficiency takes over.

The HHI shows a positive impact on ROE in both Canada and the USA and on NIM in the USA in some periods while a negative impact on ROA in Canada over 2000-2017 (with the significance level between 5% and 10%).

The Real GDP Growth rate demonstrates positive and negative relation to the bank profitability in some periods whereas no relationship in others. For example, in Canada, it positively affects ROE during and after the crisis, ROA during the crisis and NIM over the entire period. In the USA, this factor influences negatively ROA before and after the crisis and NIM during the crisis. A stronger currency hurts Canadian banks' NIM with no effect on US banks' NIM and has a positive effect on ROE and ROA in both countries, with the exception for ROA in the USA after the financial crisis.

Commercial banks usually use short-term deposits to finance long-term loans, so we expect that there is a positive relationship between a steeper yield curve (especially during the financial crisis years) and the bank profitability. As expected, both the short-term interest rate and the term structure of interest rates impact ROE and NIM positively in both the USA and Canada. The effect on ROA is mainly positive with two minor exceptions. In contrast, the inflation rate is not a significant factor for ROE and ROA in both countries but affects NIM positively in certain periods: during the crisis in Canada and after the crisis in the USA. Also, it is worth mentioning that in certain periods macroeconomic variables have no statistically significant effect on the bank profitability. Both ROE and ROA were not affected by macroeconomic variables during the crisis in the USA, and ROE, ROA and NIM were not affected before the crisis in Canada.

Our hypothesis about the importance of the previous bank performance was confirmed. In both countries lagged ROE and ROA are positively related to the current performance and lagged NIM demonstrated a particularly strong relationship with the current NIM in all analysed periods (with a significance level at less than 1%), except for the pre-crisis period in Canada.

In addition, we also checked if the difference between means in the two populations in our analysis is statistically significant. To do that, we ran three regressions (one for each dependent variable) for the combined entire dataset, excluding Currency due to incompatible approaches of its calculation and adding dummy variable Country with 0 value for Canadian banks and 1 for US banks. The regression results are shown in Table 15 and the detailed regressions' output for the dummy variable is displayed in Table 16. It can be observed from these two tables that Country is a statistically significant coefficient in all three regressions. This fact allows us to conclude that the difference between means is statistically significant and we can reject the hypothesis that the populations have equal means, meaning that the populations are different.

Chapter 5: Conclusion

We studied the determinants of the bank profitability that is measured as ROE, ROA and NIM, in Canada and the USA over four periods and compared the results. The three performance measures ROE, ROA and NIM look at the bank profitability from different aspects, and no single profit indicator can tell the whole story without the consideration of others, so the combination of them is more helpful in understanding the drivers of the bank performance.

The empirical results show that macroeconomic and industry-specific factors do not play a major role in defining bank profits. Interestingly, macroeconomic and industry-specific factors have no effect on US banks' profitability (ROE and ROA) during the sub-prime crisis. The panic situation during the crisis made the influence of any external factors less important. The financial crisis has no change of effects on ROE and ROA measures for Canadian banks with the exception on NIM measure. It seems that Canadian banks become more conservative in issuing loans after the crisis resulting in Loans over Total Assets Ratio having opposite effects on NIM compared to the pre-crisis period. In both Canada and the USA, bank-specific factors, such as Capital Ratio, Interest Income Share, Funding Costs and Efficiency Ratio, have significant effects on the bank profitability. Some bank-specific factors, such as Bank Age and Bank Size, showed opposite results in Canada and the USA. Our study also demonstrated that the previous bank performance is an important factor, especially for NIM.

For the entire period (2000-2017), both US and Canadian banks experienced similar real GDP growth and inflation rates. Although the market concentration is higher for Canadian banks than for US banks, Efficiency Ratios were on the same level in both countries. US banks were able to raise funds more cheaply, resulting in higher ROA and NIM, but the lower capital ratio allowed

Canadian banks to get higher ROE. Canadian banks had more non-interest income while US banks grew deposits more rapidly and were more aggressive in lending activities.

We also performed a simple test to check if the difference between means in the two populations in our analysis is statistically significant, running three additional regressions (one for each performance metric: ROE, ROA and NIM) after adding dummy variable Country as another independent variable. We found that dummy variable Country is significantly different from zero at 1% significance level in all three regressions. It shows that the difference between means is significant and that the populations are different.

Although this research revealed some insightful findings and patterns, we could suggest areas for further improvement by conducting deeper study on the bank performance in Canada and the USA. First, as we had a limited dataset to analyse NIM, we would suggest performing an analysis on a larger and complete dataset. Second, we compared the performance of large banks, and additional study may be conducted to compare the performance of banks of different sizes. Third, it would be interesting to investigate the importance of other factors that might affect the bank profitability, for example, other financial ratios or macroeconomic factors.

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Appendix

Table 1: Summary statistics for a dataset to study the profitability of Canadian banks, 2000-2017.

Variable	Observations	Mean	StDev	Min	Max	Median
<i>Dependent Variables:</i>						
ROE	538	3.63%	1.60%	-17.52%	13.39%	3.73%
ROA	538	0.19%	0.08%	-0.61%	0.64%	0.20%
NIM	362	2.01%	0.37%	1.33%	2.99%	1.99%
<i>Independent Variables:</i>						
<i>Macroeconomic Variables</i>						
Real GDP Growth*	538	0.51%	0.62%	-2.28%	1.60%	0.57%
Currency†	538	0.8469	0.1210	0.6271	1.0335	0.8535
Short-term Interest Rate	538	1.90%	1.47%	0.19%	5.57%	0.99%
Term Structure of Interest Rates	538	0.87%	0.47%	-0.17%	1.68%	0.90%
Inflation Rate*	538	0.46%	0.52%	-1.39%	1.86%	0.47%
<i>Industry-specific Variables</i>						
Herfindahl Index	538	0.1872	0.0043	0.1776	0.1959	0.1875
<i>Bank-specific Variables</i>						
Capital Ratio	538	5.40%	1.23%	3.49%	9.78%	5.12%
Loans over Total Assets	538	55.62%	13.92%	36.35%	90.70%	51.09%
Loans over Deposits	538	79.24%	12.96%	56.23%	124.40%	76.26%
Loan Loss Provisions over Total Loans	538	0.09%	0.08%	-0.16%	0.66%	0.08%
Interest Income Share	538	55.27%	13.27%	24.27%	91.30%	54.10%
Funding Costs	538	0.67%	0.34%	0.19%	1.70%	0.59%
Efficiency Ratio	538	63.38%	10.93%	21.33%	160.10%	63.46%
Deposits Growth	538	2.00%	3.55%	-10.31%	22.35%	1.75%
Bank Age (dummy)‡	538	0.3810	0.4861	0	1	0
Bank Size	538	25.8497	1.5740	21.7038	27.8771	26.4181

* Quarterly change

† CAD/USD currency rate for Canada and US Dollar Broad Index for the USA

‡ Bank was founded before 1950

Table 2: Summary statistics for a dataset to study the profitability of US banks, 2000-2017.

Variable	Observations	Mean	StDev	Min	Max	Median
<i>Dependent Variables:</i>						
ROE	7958	2.22%	4.41%	-172.16%	51.34%	2.40%
ROA	7958	0.23%	0.35%	-12.95%	3.59%	0.25%
NIM	6109	3.68%	0.64%	-3.91%	8.91%	3.63%
<i>Independent Variables:</i>						
<i>Macroeconomic Variables</i>						
Real GDP Growth*	7958	0.48%	0.55%	-2.16%	1.70%	0.55%
Currency†	7958	110.3422	9.7938	95.2539	129.0912	108.7071
Short-term Interest Rate	7958	1.21%	1.65%	-0.01%	6.21%	0.26%
Term Structure of Interest Rates	7958	1.23%	0.68%	-0.43%	2.41%	1.27%
Inflation Rate*	7958	0.51%	0.55%	-2.29%	1.54%	0.59%
<i>Industry-specific Variables</i>						
Herfindahl Index	7958	0.1396	0.0138	0.1140	0.1670	0.1421
<i>Bank-specific Variables</i>						
Capital Ratio	7958	10.55%	2.58%	1.68%	33.46%	10.27%
Loans over Total Assets	7958	65.23%	11.84%	17.37%	90.17%	67.33%
Loans over Deposits	7958	94.80%	188.10%	18.74%	14984%	89.53%
Loan Loss Provisions over Total Loans	7958	0.15%	0.27%	-0.93%	4.71%	0.07%
Interest Income Share	7958	71.54%	12.80%	3.03%	99.94%	72.87%
Funding Costs	7958	0.51%	2.73%	-0.05%	212.79%	0.26%
Efficiency Ratio	7958	63.81%	27.24%	0.86%	1179%	62.25%
Deposits Growth	7958	4.35%	61.79%	-99.19%	4704%	1.49%
Bank Age (dummy)‡	7958	0.0265	0.1607	0	1	0
Bank Size	7958	22.9384	1.482	21.4169	28.5777	22.4935

* Quarterly change

† CAD/USD currency rate for Canada and US Dollar Broad Index for the USA

‡ Bank was founded before 1950

Table 3: Correlation matrix for independent variables for Canadian banks, 2000-2017.

	Real GDP Growth	Currency	Short-term Interest Rate	Term Structure of Interest	Inflation Rate	Loans over Total Assets	Herfindahl Index	Capital Ratio	Loans over Deposits	Loan Loss Provisions over	Interest Income Share	Funding Costs	Efficiency Ratio	Deposits Growth	Bank Age	Bank Size
Real GDP Growth	1															
Currency	-0.03	1														
Short-term Interest Rate	0.04	-0.34	1													
Term Structure of Interest Rates	0	-0.02	-0.59	1												
Inflation Rate	0.29	-0.02	0.22	-0.12	1											
Loans over Total Assets	0.03	-0.02	-0.08	-0.01	0	1										
Herfindahl Index	-0.16	0.36	-0.77	0.1	-0.18	0.11	1									
Capital Ratio	0.07	0.02	-0.22	0.11	-0.01	0.6	0.18	1								
Loans over Deposits	0.01	0.05	-0.19	-0.01	-0.05	0.88	0.22	0.35	1							
Loan Loss Provisions over Total Loans	-0.11	-0.23	0.01	0.25	-0.07	-0.23	-0.22	-0.14	-0.24	1						
Interest Income Share	-0.09	0.04	-0.14	0.08	-0.05	0.8	0.13	0.67	0.62	-0.14	1					
Funding Costs	-0.04	-0.29	0.89	-0.48	0.14	0.05	-0.74	-0.2	-0.03	0.09	-0.03	1				
Efficiency Ratio	-0.07	-0.07	0.10	0	0	-0.29	-0.09	-0.54	-0.15	0.09	-0.28	0.08	1			
Deposits Growth	-0.02	0.16	0.02	-0.08	-0.01	0.02	0.07	0.07	-0.06	-0.14	0.09	-0.03	-0.14	1		
Bank Age	-0.01	-0.01	0	0.02	-0.01	-0.41	-0.01	-0.15	-0.35	0.08	-0.36	0.02	-0.06	-0.03	1	
Bank Size	-0.03	0.13	-0.22	0.02	-0.06	-0.79	0.27	-0.45	-0.65	0.19	-0.65	-0.33	0.16	-0.02	0.54	1

Table 4: Correlation matrix for independent variables for US banks, 2000-2017.

	Real GDP Growth	Currency	Short-term Interest Rate	Term Structure of Interest	Inflation Rate	Loans over Total Assets	Herfindahl Index	Capital Ratio	Loans over Deposits	Loan Loss Provisions over	Interest Income Share	Funding Costs	Efficiency Ratio	Deposits Growth	Bank Age	Bank Size
Real GDP Growth	1															
Currency	0.22	1														
Short-term Interest Rate	-0.11	0.17	1													
Term Structure of Interest Rates	0.1	-0.39	-0.77	1												
Inflation Rate	0.02	0.03	0.3	-0.19	1											
Loans over Total Assets	-0.06	0.07	0.05	-0.12	-0.01	1										
Herfindahl Index	-0.26	-0.6	0.44	0.05	0.12	-0.06	1									
Capital Ratio	0.03	-0.06	-0.23	0.07	-0.06	0.06	-0.21	1								
Loans over Deposits	-0.03	-0.01	0.06	-0.04	0.01	0.08	0.04	-0.01	1							
Loan Loss Provisions over Total Loans	-0.10	-0.19	-0.11	0.26	-0.04	-0.01	0.25	-0.1	0.02	1						
Interest Income Share	0	0.02	-0.08	-0.02	-0.05	0.32	-0.14	0.15	0.01	-0.12	1					
Funding Costs	-0.05	-0.01	0.15	-0.09	0.03	0.01	0.12	-0.05	0.98	0.03	-0.03	1				
Efficiency Ratio	-0.07	-0.08	-0.06	0.06	-0.05	0.02	0.03	-0.03	0	0.19	-0.06	0	1			
Deposits Growth	0.01	0.02	-0.01	-0.01	-0.01	-0.01	-0.03	0.04	-0.03	-0.01	-0.04	-0.02	0	1		
Bank Age	0.01	0.01	0	0.01	0	-0.07	0	-0.03	-0.01	0.05	-0.11	-0.01	-0.04	0	1	
Bank Size	0.01	0.04	-0.01	0	-0.01	-0.27	-0.03	0	0.03	0.13	-0.45	0.05	-0.03	0.01	0.25	1

Table 5: Correlation matrix for independent variables for Canadian banks, 2000-2006.

	Real GDP Growth	Currency	Short-term Interest Rate	Term Structure of Interest	Inflation Rate	Loans over Total Assets	Herfindahl Index	Capital Ratio	Loans over Deposits	Loan Loss Provisions over	Interest Income Share	Funding Costs	Efficiency Ratio	Deposits Growth	Bank Age	Bank Size
Real GDP Growth	1															
Currency	-0.06	1														
Short-term Interest Rate	-0.33	-0.01	1													
Term Structure of Interest Rates	0.14	-0.44	-0.81	1												
Inflation Rate	-0.22	-0.19	0.07	-0.04	1											
Loans over Total Assets	0.01	-0.07	0.01	0.02	0.04	1										
Herfindahl Index	-0.08	0.59	-0.56	0.27	-0.16	-0.04	1									
Capital Ratio	0.01	-0.09	-0.04	0.08	0.01	0.79	-0.03	1								
Loans over Deposits	-0.01	-0.07	0.01	0.03	0.04	0.88	-0.03	0.59	1							
Loan Loss Provisions over Total Loans	0.01	-0.52	0	0.22	-0.06	-0.03	-0.33	-0.14	0.06	1						
Interest Income Share	0	-0.14	-0.05	0.12	0.02	0.8	-0.02	0.79	0.59	-0.07	1					
Funding Costs	-0.17	-0.16	0.82	-0.62	0.01	0.1	-0.61	-0.03	0.09	0.18	0.05	1				
Efficiency Ratio	0.10	0.02	-0.14	0.09	0.04	-0.35	0.05	-0.58	-0.27	0.09	-0.43	-0.15	1			
Deposits Growth	0.01	0.2	0.03	-0.12	-0.09	0.01	0.01	0.12	-0.12	-0.14	0.09	-0.04	-0.25	1		
Bank Age	-0.03	-0.04	-0.04	0.06	-0.02	-0.35	0.02	-0.24	-0.15	-0.02	-0.17	0.09	-0.08	0	1	
Bank Size	-0.02	0.09	-0.04	0	-0.04	-0.89	0.09	-0.81	-0.67	0.09	-0.75	-0.06	0.34	-0.07	0.56	1

Table 6: Correlation matrix for independent variables for US banks, 2000-2006.

	Real GDP Growth	Currency	Short-term Interest Rate	Term Structure of Interest	Inflation Rate	Loans over Total Assets	Herfindahl Index	Capital Ratio	Loans over Deposits	Loan Loss Provisions over	Interest Income Share	Funding Costs	Efficiency Ratio	Deposits Growth	Bank Age	Bank Size
Real GDP Growth	1															
Currency	-0.06	1														
Short-term Interest Rate	-0.51	-0.36	1													
Term Structure of Interest Rates	0.43	0.44	-0.96	1												
Inflation Rate	0.07	-0.21	0.08	-0.13	1											
Loans over Total Assets	-0.08	-0.09	0.16	-0.16	0.01	1										
Herfindahl Index	-0.09	-0.8	0.49	-0.57	0.09	0.13	1									
Capital Ratio	0.01	-0.15	0.03	-0.06	0	0.09	0.15	1								
Loans over Deposits	-0.02	-0.03	0.03	-0.03	-0.01	0.04	0.02	0.02	1							
Loan Loss Provisions over Total Loans	-0.03	0.33	-0.08	0.1	-0.07	-0.14	-0.27	-0.13	0.01	1						
Interest Income Share	-0.03	-0.11	0.07	-0.08	0.01	0.26	0.12	0.2	0.01	-0.25	1					
Funding Costs	-0.05	-0.02	0.07	-0.07	-0.02	0.01	0.03	0	1	0.03	0	1				
Efficiency Ratio	-0.03	0.02	0.01	0	0	-0.07	-0.01	-0.1	-0.01	0.11	-0.25	0	1			
Deposits Growth	-0.03	0.04	0.03	-0.02	0	0.04	-0.04	-0.03	-0.11	0.01	0.05	-0.1	0	1		
Bank Age	0.01	0.02	-0.04	0.04	0	-0.03	-0.03	0	-0.01	0.24	-0.13	-0.01	-0.06	-0.01	1	
Bank Size	-0.01	0.07	-0.01	0.02	-0.01	-0.22	-0.05	-0.14	0.04	0.28	-0.61	0.05	0	-0.05	0.28	1

Table 7: Correlation matrix for independent variables for Canadian banks, 2007-2009.

	Real GDP Growth	Currency	Short-term Interest Rate	Term Structure of Interest	Inflation Rate	Loans over Total Assets	Herfindahl Index	Capital Ratio	Loans over Deposits	Loan Loss Provisions over	Interest Income Share	Funding Costs	Efficiency Ratio	Deposits Growth	Bank Age	Bank Size
Real GDP Growth	1															
Currency	0.32	1														
Short-term Interest Rate	0.35	0.35	1													
Term Structure of Interest Rates	-0.45	-0.41	-0.98	1												
Inflation Rate	0.66	0.42	0.42	-0.5	1											
Loans over Total Assets	0.02	0.05	0	-0.01	0.02	1										
Herfindahl Index	-0.59	0.25	-0.56	0.57	-0.28	0.02	1									
Capital Ratio	0.04	-0.11	-0.25	0.23	-0.05	0.64	0.04	1								
Loans over Deposits	0.01	0.03	-0.02	0.02	0	0.96	0.04	0.51	1							
Loan Loss Provisions over Total Loans	-0.25	-0.28	-0.57	0.57	-0.26	-0.45	0.33	-0.14	-0.43	1						
Interest Income Share	-0.24	0.07	-0.15	0.17	-0.1	0.71	0.31	0.59	0.65	-0.23	1					
Funding Costs	0.2	0.36	0.86	-0.83	0.29	0.07	-0.44	-0.28	0.04	-0.64	-0.17	1				
Efficiency Ratio	-0.19	0.05	0.03	0	-0.06	-0.35	0.15	-0.39	-0.29	0.15	0.02	0	1			
Deposits Growth	-0.04	0.22	0.25	-0.23	0.07	0.16	0.03	0.1	0.05	-0.24	0.21	0.21	-0.1	1		
Bank Age	0	0.02	0	-0.01	0	-0.34	0	-0.39	-0.26	0.21	-0.32	0.19	-0.06	-0.07	1	
Bank Size	-0.03	-0.03	-0.05	0.05	-0.03	-0.87	0.04	-0.59	-0.84	0.48	-0.59	-0.02	0.2	-0.12	0.58	1

Table 8: Correlation matrix for independent variables for US banks, 2007-2009.

	Real GDP Growth	Currency	Short-term Interest Rate	Term Structure of Interest	Inflation Rate	Loans over Total Assets	Herfindahl Index	Capital Ratio	Loans over Deposits	Loan Loss Provisions over	Interest Income Share	Funding Costs	Efficiency Ratio	Deposits Growth	Bank Age	Bank Size
Real GDP Growth	1															
Currency	0.63	1														
Short-term Interest Rate	-0.02	-0.06	1													
Term Structure of Interest Rates	0.03	0.05	-0.97	1												
Inflation Rate	0.08	0	0.37	-0.28	1											
Loans over Total Assets	-0.09	-0.04	0.05	-0.06	-0.02	1										
Herfindahl Index	-0.27	-0.34	0.82	-0.9	0.08	0.07	1									
Capital Ratio	0.08	0.07	-0.02	0.03	0.03	-0.01	-0.05	1								
Loans over Deposits	-0.05	-0.03	0.04	-0.04	0	0.08	0.05	-0.05	1							
Loan Loss Provisions over Total Loans	0.13	0.09	-0.42	0.43	-0.14	0	-0.41	-0.08	0.01	1						
Interest Income Share	-0.06	-0.02	0.01	-0.01	-0.08	0.31	0.02	0.13	0.04	-0.11	1					
Funding Costs	-0.05	-0.04	0.13	-0.12	0.03	0.01	0.12	-0.09	0.98	-0.03	0.03	1				
Efficiency Ratio	-0.05	-0.03	-0.06	0.06	-0.06	0.15	-0.04	-0.02	0.03	0.24	0.09	0.02	1			
Deposits Growth	0.03	0.04	-0.01	0.02	-0.02	0.03	-0.03	0.02	-0.01	-0.04	0.03	-0.01	0.01	1		
Bank Age	0.01	0.01	-0.01	0.01	0	-0.03	-0.01	-0.06	0	0.04	-0.16	-0.01	-0.04	0	1	
Bank Size	-0.01	-0.01	-0.01	0	-0.02	-0.33	0	-0.05	0.11	0.23	-0.48	0.13	-0.04	-0.05	0.33	1

Table 9: Correlation matrix for independent variables for Canadian banks, 2010-2017.

	Real GDP Growth	Currency	Short-term Interest Rate	Term Structure of Interest	Inflation Rate	Loans over Total Assets	Herfindahl Index	Capital Ratio	Loans over Deposits	Loan Loss Provisions over	Interest Income Share	Funding Costs	Efficiency Ratio	Deposits Growth	Bank Age	Bank Size
Real GDP Growth	1															
Currency	0.16	1														
Short-term Interest Rate	-0.03	0.56	1													
Term Structure of Interest Rates	0.31	0.46	-0.07	1												
Inflation Rate	0.31	0.17	0.11	0.34	1											
Loans over Total Assets	-0.02	-0.09	0.01	-0.1	-0.05	1										
Herfindahl Index	-0.17	-0.9	-0.34	-0.48	-0.17	0.1	1									
Capital Ratio	0.06	-0.08	-0.05	-0.02	0.04	0.48	0.05	1								
Loans over Deposits	-0.07	-0.08	0.06	-0.2	-0.12	0.87	0.09	0.17	1							
Loan Loss Provisions over Total Loans	0.04	0.14	-0.22	0.23	0.11	-0.39	-0.24	-0.08	-0.47	1						
Interest Income Share	-0.02	-0.03	0	-0.07	-0.07	0.87	0.04	0.64	0.67	-0.2	1					
Funding Costs	0.06	0.39	0.22	0.14	0.08	0.61	-0.39	0.09	0.73	-0.3	0.43	1				
Efficiency Ratio	-0.01	-0.04	0.02	-0.03	-0.08	-0.19	0.09	-0.61	0.06	-0.16	-0.29	0	1			
Deposits Growth	-0.01	0.12	0.1	0.06	0.02	-0.05	0.01	0.01	-0.1	-0.07	0	-0.06	-0.06	1		
Bank Age	0	0	0	0	0	-0.49	0	-0.03	-0.49	0.19	-0.53	-0.25	-0.05	-0.02	1	
Bank Size	-0.03	-0.12	-0.02	-0.09	-0.04	-0.86	0.12	-0.37	-0.84	0.45	-0.73	-0.76	0.08	0.02	0.57	1

Table 10: Correlation matrix for independent variables for US banks, 2010-2017.

	Real GDP Growth	Currency	Short-term Interest Rate	Term Structure of Interest	Inflation Rate	Loans over Total Assets	Herfindahl Index	Capital Ratio	Loans over Deposits	Loan Loss Provisions over	Interest Income Share	Funding Costs	Efficiency Ratio	Deposits Growth	Bank Age	Bank Size
Real GDP Growth	1															
Currency	0.01	1														
Short-term Interest Rate	0.22	0.62	1													
Term Structure of Interest Rates	-0.01	-0.84	-0.58	1												
Inflation Rate	-0.1	0.04	0.3	-0.04	1											
Loans over Total Assets	0.03	0.2	0.15	-0.17	0	1										
Herfindahl Index	-0.14	-0.92	-0.63	0.9	0.01	-0.2	1									
Capital Ratio	0.02	0.06	0.06	-0.07	-0.01	0.07	-0.08	1								
Loans over Deposits	-0.01	0.05	0.06	-0.03	0.01	0.53	-0.03	0.11	1							
Loan Loss Provisions over Total Loans	-0.08	-0.25	-0.11	0.34	0.09	-0.06	0.39	-0.11	0.01	1						
Interest Income Share	0.03	0.11	0.1	-0.1	0	0.35	-0.12	0.05	0.09	-0.1	1					
Funding Costs	-0.04	-0.12	-0.03	0.16	0.05	-0.02	0.19	0.02	0.51	0.18	-0.12	1				
Efficiency Ratio	-0.02	-0.07	-0.07	0.06	-0.02	-0.07	0.06	-0.07	-0.06	0.07	-0.16	-0.02	1			
Deposits Growth	0	0.02	0	-0.02	0	-0.02	-0.02	0.05	0	0	-0.07	0.03	0.01	1		
Bank Age	0	-0.01	0	0.01	0	-0.09	0.01	-0.03	-0.04	0.02	-0.09	-0.02	-0.05	-0.01	1	
Bank Size	0	0.03	0.02	-0.02	0.01	-0.27	-0.03	0.09	-0.04	0.09	-0.38	0.05	-0.03	0.02	0.22	1

Table 11: Regression results for Canadian and US banks, 2000-2017.

Variable	Canadian Banks			US Banks		
	ROE	ROA	NIM	ROE	ROA	NIM
L.ROE	-0.0174 (0.0219)			-0.0030 (0.0069)		
L.ROA		0.0058 (0.0206)			-0.0017 (0.0060)	
L.NIM			0.8622*** (0.0212)			0.7456*** (0.0077)
Real GDP Growth	0.0498 (0.0615)	0.0032 (0.0025)	0.0186* (0.0099)	0.0625 (0.0587)	0.0059 (0.0041)	-0.0130 (0.0087)
Currency	0.0100*** (0.0033)	0.0006*** (0.0001)	-0.0000** (0.0006)	0.0002*** (0.0001)	0.0000* (0.0000)	-0.0000 (0.0000)
Short-term Interest Rate	0.0026*** (0.0008)	0.0001*** (0.0000)	0.0001 (0.0001)	0.0008 (0.0005)	0.0001*** (0.0000)	0.0006*** (0.0001)
Term Structure of Interest Rates	0.0036*** (0.0013)	0.0002*** (0.0001)	0.0001 (0.0002)	0.0031*** (0.0010)	0.0002*** (0.0001)	0.0006*** (0.0002)
Inflation Rate	-0.0871 (0.0689)	-0.0040 (0.0028)	0.0130 (0.0120)	-0.0131 (0.0577)	-0.0040 (0.0040)	0.0043 (0.0082)
Herfindahl Index	-0.1467 (0.1819)	-0.0130* (0.0073)	0.0085 (0.0268)	0.2030*** (0.0509)	0.0046 (0.0035)	0.0129 (0.0089)
Capital Ratio	-0.4089*** (0.0494)	0.0131*** (0.0021)	0.0213*** (0.0079)	-0.0808*** (0.0125)	0.0050*** (0.0009)	0.0216*** (0.0019)
Loans over Total Assets	-0.0087 (0.0090)	0.0000*** (0.0004)	-0.0052*** (0.0014)	-0.0136*** (0.0031)	-0.0011*** (0.0002)	0.0010** (0.0005)
Loans over Deposits	0.0055 (0.0070)	0.0001 (0.0003)	0.0030*** (0.0011)	0.0002 (0.0013)	0.0002* (0.0001)	0.0009*** (0.0002)
Loan Loss Provisions over Total Loans	-6.4175*** (0.5156)	-0.3006*** (0.0208)	0.3607*** (0.1076)	-6.5907*** (0.1256)	-0.4801*** (0.0087)	0.0645*** (0.0184)
Interest Income Share	-0.0270*** (0.0049)	-0.0013*** (0.0002)	0.0022** (0.0009)	-0.0469*** (0.0028)	-0.0045*** (0.0002)	0.0012*** (0.0004)

Variable	Canadian Banks			US Banks		
	ROE	ROA	NIM	ROE	ROA	NIM
Funding Costs	0.2291 (0.2569)	0.0006** (0.0104)	-0.0380 (0.0430)	-0.0092* (0.0900)	-0.0113* (0.0062)	-0.1249*** (0.0173)
Efficiency Ratio	-0.1296*** (0.0038)	-0.0056*** (0.0002)	-0.0028*** (0.0006)	-0.1005*** (0.0011)	-0.0088*** (0.0001)	-0.0013*** (0.0002)
Deposits Growth	-0.0206** (0.0099)	-0.0010** (0.0004)	-0.0024* (0.0014)	-0.0000** (0.0005)	0.0000 (0.0000)	0.0009*** (0.0003)
Bank Age (dummy)	-0.0048*** (0.0009)	-0.0002*** (0.0000)	-0.0004** (0.0002)	0.0037* (0.0019)	0.0005*** (0.0001)	0.0007** (0.0003)
Bank Size	0.0028*** (0.0005)	0.0001*** (0.0000)	-0.0001 (0.0001)	-0.0003 (0.0002)	-0.0001*** (0.0000)	-0.0003*** (0.0000)
Intercept	0.1028*** (0.0364)	0.0037** (0.0015)	0.0044 (0.0056)	0.1016*** (0.0135)	0.0123*** (0.0009)	0.0106*** (0.0026)
Number of Observations	538	538	362	7958	7958	6109
Number of Banks	8	8	8	197	197	186
R Squared	0.7698	0.8304	0.9353	0.6349	0.7181	0.7069

Standard errors of coefficients are given in parentheses. The coefficients that are significantly different from zero are denoted as *** for 1%, ** for 5% and * for 10% level respectively.

Table 12: Regression results for Canadian and US banks, 2000-2006.

Variable	Canadian Banks			US Banks		
	ROE	ROA	NIM	ROE	ROA	NIM
L.ROE	-0.0417 (0.0334)			0.0409*** (0.0065)		
L.ROA		-0.0268 (0.0291)			0.0407*** (0.0062)	
L.NIM			0.1661 (0.1061)			0.7398*** (0.0281)
Real GDP Growth	0.0909 (0.2126)	0.0050 (0.0077)	-0.0828 (0.0729)	-0.0517 (0.0466)	-0.0060* (0.0036)	-0.2136 (0.2038)
Currency	0.0131 (0.0188)	0.0002 (0.0007)	-0.0021 (0.0156)	0.0002*** (0.0000)	0.0000*** (0.0000)	-0.0016 (0.0013)
Short-term Interest Rate	0.0024 (0.0023)	0.0001 (0.0001)	-0.0015 (0.0014)	0.0010** (0.0004)	0.0001** (0.0000)	0.0008 (0.0006)
Term Structure of Interest Rates	0.0037 (0.0041)	0.0001 (0.0001)	-0.0010 (0.0010)	0.0004 (0.0008)	0.0000 (0.0001)	-0.0012 (0.0021)
Inflation Rate	-0.0400 (0.1270)	-0.0039 (0.0046)	-0.0219 (0.0240)	-0.0081 (0.0411)	-0.0021 (0.0032)	0.0565 (0.0688)
Herfindahl Index	-0.2806 (0.6118)	-0.0160 (0.0222)	0.3629 (0.2516)	-0.0655 (0.0638)	-0.0033 (0.0050)	-0.6841 (0.5720)
Capital Ratio	-0.8209*** (0.1577)	0.0010 (0.0060)	0.1037*** (0.0368)	-0.2163*** (0.0078)	0.0036*** (0.0006)	0.0110** (0.0054)
Loans over Total Assets	0.0280 (0.0299)	0.0017 (0.0011)	0.0254** (0.0125)	-0.0077*** (0.0018)	-0.0003** (0.0001)	-0.0015 (0.0018)
Loans over Deposits	-0.0388* (0.0226)	-0.0017** (0.0008)	-0.0180** (0.0080)	0.0039*** (0.0007)	0.0004*** (0.0001)	0.0081*** (0.0010)
Loan Loss Provisions over Total Loans	-6.0082*** (0.8145)	-0.2878*** (0.0295)	0.8555 (0.5404)	-3.5743*** (0.1443)	-0.2766*** (0.0113)	0.3172* (0.1859)
Interest Income Share	-0.0349*** (0.0098)	-0.0015*** (0.0004)	0.0182*** (0.0035)	-0.0505*** (0.0017)	-0.0047*** (0.0001)	0.0008 (0.0016)

Variable	Canadian Banks			US Banks		
	ROE	ROA	NIM	ROE	ROA	NIM
Funding Costs	-0.5081 (0.4949)	-0.0270 (0.0179)	-0.0112** (0.2154)	-0.2706*** (0.0511)	-0.0262*** (0.0040)	-0.9351*** (0.1053)
Efficiency Ratio	-0.1929*** (0.0075)	-0.0080*** (0.0003)	-0.0012 (0.0011)	-0.1042*** (0.0015)	-0.0088*** (0.0001)	-0.0030** (0.0015)
Deposits Growth	-0.0786*** (0.0229)	-0.0031*** (0.0008)	0.0024 (0.0053)	-0.0006 (0.0006)	-0.0001 (0.0000)	-0.0010 (0.0009)
Bank Age (dummy)	-0.0040* (0.0022)	-0.0002** (0.0001)	-0.0025*** (0.0006)	0.0050*** (0.0010)	0.0005*** (0.0001)	-0.0011 (0.0011)
Bank Size	0.0031** (0.0013)	0.0002*** (0.0000)	0.0019*** (0.0006)	-0.0010*** (0.0001)	-0.0001*** (0.0000)	0.0002 (0.0001)
Intercept	0.2045* (0.1144)	0.0064 (0.0042)	-0.1065* (0.0555)	0.1681*** (0.0146)	0.0119*** (0.0011)	0.2842 (0.2286)
Number of Observations	188	188	56	2034	2034	615
Number of Banks	8	8	7	111	111	103
R Squared	0.8400	0.8862	0.9430	0.7875	0.7992	0.7742

Standard errors of coefficients are given in parentheses. The coefficients that are significantly different from zero are denoted as *** for 1%, ** for 5% and * for 10% level respectively.

Table 13: Regression results for Canadian and US banks, 2007-2009.

Variable	Canadian Banks			US Banks		
	ROE	ROA	NIM	ROE	ROA	NIM
L.ROE	0.0505 (0.0335)			0.0057 (0.0105)		
L.ROA		0.0721* (0.0389)			-0.0063 (0.0072)	
L.NIM			0.8579*** (0.0442)			0.7175*** (0.0189)
Real GDP Growth	0.3043** (0.1415)	0.0141* (0.0071)	0.0264 (0.0286)	0.1565 (0.1094)	0.0101 (0.0062)	-0.0282* (0.0148)
Currency	-0.0025 (0.0174)	0.0002 (0.0009)	-0.0024 (0.0036)	0.0002 (0.0003)	0.0000 (0.0000)	0.0000 (0.0000)
Short-term Interest Rate	0.0069*** (0.0023)	0.0003*** (0.0001)	-0.0001 (0.0005)	0.0009 (0.0021)	0.0000 (0.0001)	0.0012*** (0.0003)
Term Structure of Interest Rates	0.0124* (0.0063)	0.0005 (0.0003)	0.0001* (0.0012)	0.0062 (0.0078)	0.0002 (0.0004)	0.0016 (0.0011)
Inflation Rate	-0.1083 (0.1091)	-0.0058 (0.0054)	0.0464** (0.0218)	-0.0171 (0.0949)	-0.0072 (0.0054)	-0.0061 (0.0129)
Herfindahl Index	1.5943* (0.9114)	0.0665 (0.0455)	0.0646 (0.1821)	0.2670 (0.4847)	0.0123 (0.0274)	0.1179* (0.0675)
Capital Ratio	-0.2919*** (0.0985)	0.0099* (0.0051)	0.0588*** (0.0202)	-0.0154 (0.0253)	0.0022 (0.0014)	0.0051 (0.0037)
Loans over Total Assets	0.0679*** (0.0245)	0.0032*** (0.0012)	-0.0139** (0.0057)	-0.0279*** (0.0083)	-0.0027*** (0.0005)	-0.0058*** (0.0012)
Loans over Deposits	-0.0437* (0.0236)	-0.0024** (0.0012)	0.0097* (0.0050)	0.0048 (0.0030)	0.0006*** (0.0002)	0.0044*** (0.0005)
Loan Loss Provisions over Total Loans	-6.2099*** (1.1945)	-0.2930*** (0.0593)	0.3811 (0.2458)	-5.8489*** (0.1958)	-0.4692*** (0.0111)	0.0100 (0.0265)
Interest Income Share	-0.0613*** (0.0091)	-0.0022*** (0.0004)	0.0025 (0.0020)	-0.0415*** (0.0071)	-0.0044*** (0.0004)	0.0024** (0.0010)
Funding Costs	-0.4113 (0.6242)	-0.0416 (0.0309)	0.1176 (0.1300)	-0.2998 (0.1932)	-0.0381*** (0.0109)	-0.5665*** (0.0571)

Variable	Canadian Banks			US Banks		
	ROE	ROA	NIM	ROE	ROA	NIM
Efficiency Ratio	-0.0747*** (0.0054)	-0.0035*** (0.0003)	-0.0015 (0.0015)	-0.1317*** (0.0015)	-0.0116*** (0.0001)	-0.0007*** (0.0002)
Deposits Growth	-0.0255* (0.0153)	-0.0018** (0.0008)	0.0005 (0.0030)	-0.0023 (0.0040)	-0.0001 (0.0002)	-0.0007 (0.0005)
Bank Age (dummy)	-0.0036** (0.0018)	-0.0001 (0.0001)	-0.0005 (0.0004)	0.0006* (0.0056)	0.0003 (0.0003)	0.0023*** (0.0008)
Bank Size	0.0040*** (0.0011)	0.0002*** (0.0001)	-0.0003 (0.0002)	0.0015** (0.0006)	-0.0000 (0.0000)	-0.0002** (0.0001)
Intercept	-0.2833* (0.1582)	-0.0120 (0.0079)	-0.0039* (0.0316)	0.0632 (0.1089)	0.0123** (0.0062)	-0.0057 (0.0151)
Number of Observations	94	94	87	1298	1298	1214
Number of Banks	8	8	8	119	119	114
R Squared	0.9051	0.8924	0.9405	0.9011	0.9557	0.7031

Standard errors of coefficients are given in parentheses. The coefficients that are significantly different from zero are denoted as *** for 1%, ** for 5% and * for 10% level respectively.

Table 14: Regression results for Canadian and US banks, 2010-2017.

Variable	Canadian Banks			US Banks		
	ROE	ROA	NIM	ROE	ROA	NIM
L.ROE	0.0711** (0.0351)			-0.0121 (0.0104)		
L.ROA		0.0780** (0.0357)			0.0053 (0.0090)	
L.NIM			0.8784*** (0.0301)			0.6998*** (0.0091)
Real GDP Growth	0.0036** (0.0606)	-0.0002* (0.0031)	0.0063 (0.0147)	-0.1329 (0.1257)	-0.0173** (0.0082)	-0.0257 (0.0158)
Currency	0.0384*** (0.0082)	0.0020*** (0.0004)	-0.0002* (0.0020)	0.0000 (0.0001)	-0.0000*** (0.0000)	-0.0000 (0.0000)
Short-term Interest Rate	-0.0023 (0.0018)	-0.0002* (0.0001)	0.0001 (0.0004)	0.0036** (0.0016)	0.0002** (0.0001)	0.0009*** (0.0002)
Term Structure of Interest Rates	-0.0014 (0.0011)	-0.0000 (0.0001)	0.0005** (0.0003)	-0.0021 (0.0018)	-0.0002* (0.0001)	0.0001 (0.0002)
Inflation Rate	-0.0213 (0.0899)	-0.0009 (0.0045)	-0.0198 (0.0222)	-0.0302 (0.1189)	-0.0057 (0.0077)	0.0013* (0.0150)
Herfindahl Index	0.1476 (0.2565)	0.0035 (0.0129)	-0.0312 (0.0620)	0.4124*** (0.1223)	0.0052 (0.0079)	0.0403*** (0.0154)
Capital Ratio	-0.2745*** (0.0385)	0.0181*** (0.0022)	0.0176* (0.0100)	-0.0315* (0.0180)	0.0097*** (0.0012)	0.0280*** (0.0024)
Loans over Total Assets	0.0215*** (0.0063)	0.0015*** (0.0003)	-0.0028* (0.0017)	-0.0069 (0.0046)	-0.0003 (0.0003)	0.0025*** (0.0006)
Loans over Deposits	-0.0011 (0.0057)	-0.0002 (0.0003)	0.0047*** (0.0014)	-0.0007 (0.0023)	0.0000 (0.0001)	-0.0001 (0.0003)
Loan Loss Provisions over Total Loans	-5.6678*** (0.8894)	-0.3558*** (0.0449)	0.2424 (0.2080)	-7.9556*** (0.2316)	-0.4454*** (0.0151)	0.1356*** (0.0289)
Interest Income Share	-0.0485*** (0.0059)	-0.0028*** (0.0003)	-0.0004 (0.0014)	-0.0234*** (0.0037)	-0.0024*** (0.0002)	0.0016*** (0.0005)
Funding Costs	-0.9456** (0.4607)	-0.0263 (0.0231)	-0.1938* (0.1119)	0.1979 (0.1517)	0.0055 (0.0099)	-0.0128 (0.0185)

Variable	Canadian Banks			US Banks		
	ROE	ROA	NIM	ROE	ROA	NIM
Efficiency Ratio	-0.1010*** (0.0044)	-0.0047*** (0.0002)	-0.0041*** (0.0012)	-0.0429*** (0.0020)	-0.0036*** (0.0001)	-0.0022*** (0.0004)
Deposits Growth	-0.0116 (0.0075)	-0.0007* (0.0004)	-0.0023 (0.0018)	0.0002 (0.0005)	0.0000 (0.0000)	0.0020*** (0.0003)
Bank Age (dummy)	-0.0052*** (0.0008)	-0.0002*** (0.0000)	-0.0002 (0.0002)	0.0044* (0.0026)	0.0005*** (0.0002)	0.0003 (0.0003)
Bank Size	0.0019*** (0.0006)	0.0001*** (0.0000)	-0.0000* (0.0002)	-0.0001 (0.0003)	-0.0001*** (0.0000)	-0.0004*** (0.0000)
Intercept	0.0293 (0.0579)	-0.0008 (0.0029)	0.0086 (0.0139)	0.0302 (0.0276)	0.0092*** (0.0018)	0.0109*** (0.0035)
Number of Observations	256	256	219	4626	4626	4280
Number of Banks	8	8	8	194	194	185
R Squared	0.837	0.8803	0.9434	0.2927	0.3182	0.7146

Standard errors of coefficients are given in parentheses. The coefficients that are significantly different from zero are denoted as *** for 1%, ** for 5% and * for 10% level respectively.

Table 15: Regression results for the combined dataset, 2000-2017.

Variable	Canadian and US Banks		
	ROE	ROA	NIM
L.ROE	-0.0022 (0.0066)		
L.ROA		-0.0006* (0.0058)	
L.NIM			0.7495*** (0.0074)
Real GDP Growth	0.0665 (0.0542)	0.0057 (0.0037)	-0.0105 (0.0081)
Short-term Interest Rate	0.0017*** (0.0004)	0.0001*** (0.0000)	0.0005*** (0.0001)
Term Structure of Interest Rates	0.0038*** (0.0009)	0.0003*** (0.0001)	0.0006*** (0.0002)
Inflation Rate	-0.0315 (0.0542)	-0.0044 (0.0038)	0.0061 (0.0078)
Herfindahl Index	0.0697** (0.0320)	0.0010 (0.0022)	0.0242*** (0.0054)
Capital Ratio	-0.0893*** (0.0119)	0.0047*** (0.0008)	0.0212*** (0.0018)
Loans over Total Assets	-0.0132*** (0.0030)	-0.0010*** (0.0002)	0.0007 (0.0005)
Loans over Deposits	-0.0002 (0.0012)	0.0001* (0.0001)	0.0010*** (0.0002)
Loan Loss Provisions over Total Loans	-6.5333*** (0.1208)	-0.4780*** (0.0084)	0.0581*** (0.0172)
Interest Income Share	-0.0474*** (0.0026)	-0.0043*** (0.0002)	0.0012*** (0.0004)
Funding Costs	0.0215 (0.0857)	-0.0097 (0.0059)	-0.1316*** (0.0165)
Efficiency Ratio	-0.1009*** (0.0011)	-0.0088*** (0.0001)	-0.0013*** (0.0002)

Variable	Canadian and US Banks		
	ROE	ROA	NIM
Deposits Growth	-0.0000** (0.0005)	0.0000 (0.0000)	0.0009*** (0.0003)
Bank Age (dummy)	0.0018 (0.0015)	0.0002* (0.0001)	0.0004* (0.0002)
Bank Size	-0.0003 (0.0002)	-0.0001*** (0.0000)	-0.0003*** (0.0000)
Country (dummy)*	0.0063*** (0.0021)	0.0010*** (0.0001)	0.0030*** (0.0004)
Intercept	0.1314*** (0.0091)	0.0120*** (0.0006)	0.0041*** (0.0015)
Number of Observations	8496	8496	6471
Number of Banks	205	205	194
R Squared	0.6371	0.7171	0.7886

Standard errors of coefficients are given in parentheses. The coefficients that are significantly different from zero are denoted as *** for 1%, ** for 5% and * for 10% level respectively.

Table 16: Detailed regressions' output for variable Country for the combined dataset, 2000-2017.

Dummy Variable Country	Dependent Variable		
	ROE	ROA	NIM
Coefficient Estimate	0.0063	0.0010	0.0030
Standard Error	0.0021	0.0001	0.0004
t - Statistic	2.9519	7.0669	7.7932
p - Value	0.0032	0.0000	0.0000

* A dummy variable: 0 for Canadian banks and 1 for US banks