**Large Scale Asset Purchases and Bank Lending: US Federal Reserve Monetary Policy**

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**1 Introduction**

*“I spent my entire academic career studying the Great Depression. The depression may have started because of a stock market crash, but what hit the general economy was a disruption of credit. Average citizens unable to borrow money, to do anything. To buy a home, start a business, stock their shelves. Credit has the ability to build a modern economy, but lack of credit has the ability to destroy it, swiftly and absolutely. If we do not act, boldly and immediately, we will replay the depression of the 1930s, only this time it will be far, far worse. We don't do this now, we won't have an economy on Monday.”*

*Ben Bernanke*

The global financial crisis of 2007-2008 is considered by many to be the worst financial crisis since the Great Depression of the 1930s. This crisis was started by the subprime mortgage crisis in the United States housing sector.

This mortgage crisis had created a steep rise in the delinquencies and foreclosures of subprime mortgages. This resulted in a massive decline of securities backed by those mortgages, which eventually resulted in the collapse of several major financial institutions and put the entire financial sector at risk.

The cause of this mortgage crisis is the increase of the subprime mortgages as a percentage of the total mortgage market. This percentage grew from a historical percentage of 8 percent to 20 percent during period from 2004 to 2006. The problem was further increased, because more than 90 percent of subprime mortgages were adjustable-rate mortgages. These changes in the mortgage market led to higher risk for the mortgages and lower lending standards. This problem was further exacerbated by the fact that US households were already highly indebted. The percentage of disposable personal income to debt ratio of US households, increased from 77 percent in 1990 to 127 percent in 2007. Much of this increase was mortgage related.

**Graph 1**



When the home prices in the United States declined after a peak in 2006, the adjustable-rate mortgages reset to a much higher rate. This caused the delinquencies and foreclosures of the subprime mortgages.

This crisis created a threat, which could have led to the total collapse of the largest system banks in the world. This collapse was averted by an unprecedented intervention by the United States government. The Troubled Asset Relief Program, commonly known as TARP, was the main program used to facilitate the intervention. During the TARP program, the US government purchased assets and equity from financial institutions in order to strengthen the financial sector as a whole. The US government also nationalized Fannie Mae and Freddy Mac to prevent these institutions from going under. These were government-sponsored enterprises engaged in the buying and selling of mortgage backed securities and guaranteed almost halve of all the mortgages in the United States. These drastic measures from the United States government ensured the survival of the US financial system, but it did not prevent the greatest recession since the Great Depression.

This research will examine the Federal Reserve policy, which was implemented to combat this recession and steer the US economy back to recovery. The main focus will be on the federal funds rate, which is set by the Federal Reserve.

The federal funds rate is the interest rate at which depositing institutions actively trade on the balances held by the Federal Reserve on an uncollateralized basis. This means that banks can borrow funds from the Federal Reserve without the necessary assets that usually function as collateral for these loans. Through this federal funds rate, the Federal Reserve can influence the money supply in the US economy. This is the most important instrument used by the Federal Reserve to stimulate the US economy. The decrease in the federal funds rate will facilitate a increase in the money supply in the US economy. The graph below shows the major adjustments the Federal Reserve has made over in the last 60 years.

**Graph 2**



**Fractional reserve banking**

*By increasing the volume of their government securities and loans and by lowering Member Bank legal reserve requirements, the Reserve Banks can encourage an increase in the supply of money and bank deposits. They can encourage but, without taking drastic action, they cannot compel. For in the middle of a deep depression just when we want Reserve policy to be most effective, the Member Banks are likely to be timid about buying new investments or making loans. If the Reserve authorities buy government bonds in the open market and thereby swell bank reserves, the banks will not put these funds to work but will simply hold reserves. Result: no 5 for 1, “no nothing,” simply a substitution on the bank’s balance sheet of idle cash for old government bonds.*

Paul Samuelson

The United States banking system is set up as a fractional reserve banking system. In this system, banks are required to retain a certain percentage of reserves for the total amount of consumer deposits held by the bank. The remaining funds can be used for investments and loans. In theory, a decrease in reserve requirements will increase the money supply and stimulate banking lending.

Fractional reserve banking uses the money multiplier, to measure the increase in the money supply. The formula is as following

M = 1 / R M = the money supply

 R = reserve requirement

**Graph 3**

[[1]](#endnote-1)

The graph above shows the effect of reserve requirements in a fractional-reserve banking system, which is the system used in the United States. Here you can clearly see an example where a decrease from the reserve requirements from 20 percent to 10 percent, has a significant effect on the money supply.

The Federal Reserve has a number of methods that can be used to influence banking lending. The federal funds interest rate and reserve requirements being the main tools. The logical question arises, how effective are these measures on influencing banking lending. This research will attempt to answer that question.

**Research Question**

The research question of this thesis is:

*How do the Large Scale Asset Purchases (LSAPs) of the Federal Reserve effect the interest rate in the Unites States and how does the artificially low interest rate affect the bank lending in the United States?*

This research will primarily focus on the focus on efforts of the Federal Reserve Bank to provide more liquidity to banks in the United States and decrease the funding cost for the loans they provide to the consumer and the industrial sector.

**2 Literature**

**Theory: monetary policy central bank**

In order to research these research questions, we start with the theory of central banks. This theory segment of this research is important, because it explains the tools used by the central banks. These tools play a key role in this research. Following this, we look at the monetary instruments used by the central bank and determine the effectiveness of the different instruments.

The central banks mainly focus on two goals, employment targets and inflation targets. Tinbergen’s Law states that to achieve N number of policy targets, there has to be at least N number of policy instruments.

The choice of monetary instrument in the simpler economic models is often a choice between the rate of interest *r* and the money supply *M*. The first option is using *r* as the monetary instrument and using *M* as the endogenous variable. The second option is using *M* as the monetary instrument and using *r* as the endogenous variable. In practice this is off course not the case, there are several definitions of money supply *M* and several choices for *r*, for example bank reserves and the exchange rate. For choosing the optimal monetary instrument, you can write down and solve an appropriately complex dynamic optimization problem, compute the minimized value of the loss function, and select the minimum minimorum. [[2]](#endnote-2)

First we look at the money supply *M* as the monetary instrument, which has been tested empirically in the research paper *Central Banking in Theory and Practice.[[3]](#endnote-3)* There have been a series of cointegration tests for M1 and nominal GDP in the United States, using rolling samples of quarterly date beginning in 1948 and ending at various dates fail to reject the hypothesis of no cointegration after the sample date exceeds the late 1970s.

* The natural logs of M1 and nominal GDP are cointegrated for the sample period 1948 – 1975, 1975 – now there is no cointegration.
* The natural logs of M2 or M3 and nominal GDP are cointegrated for the sample 1948 – 1980s, 1980s – now there is no cointegration.

There is no durable long-term statistical relationship between the nominal GDP and the Federal Reserve’s three definitions of the money supply for any sample that includes the 1990s. Because of this conclusion, the United States prefers the targeting of the interest rate as monetary instrument and not the targeting of money supply. The target growth range for M1 was canceled in 1987. The growth targets for M3 and M2 were still in use until 1992. Federal Reserve Chairman Alan Greenspan finally announced in February 1993 that the Federal Reserve would no longer use the money base as monetary instrument.

So now we look at using the interest rate as monetary instrument. There is a near consensus between empirically orientated economists about the following statement: “*The interest-sensitive components of aggregate demand react mainly to the real long rate while the central bank controls only the nominal short rate.”*

This statement implies the central bank can control the interest rate that does not really matter, and it cannot control the interest rate that does matter.

In the case of the United States, the main policy instrument of the Federal Reserve is the overnight rate in the interbank market for reserves, also known as the federal funds rate. The federal funds rate is the rate the banks charge each other for overnight loans from federal funds. These federal funds are the reserves of the banks at the Federal Reserve. The nominal interest rate is normally quite similar to the real interest rate, because the inflationary expectations are sluggish in the short term. This means the Federal Reserve can safely assume that the short-term changes in nominal interest rate has a significant effect on the real interest rate.

The situation becomes more complex in the long term, because then it becomes harder to know the difference between the real interest rate and the nominal interest rate. This can lead to two bad scenarios. In the first scenario, the central bank sets the real interest rate too high when choosing the nominal interest rate. This restricts the aggregate demand and opens up a GDP gap, which will start to bring the inflation down. If the central bank does not lower its nominal interest rate, the real interest rate will continue to increase. The result of this will be an expanding GDP gap with a falling inflation. This puts the economy in a deflationary tailspin. In the second scenario, the central bank sets the real interest rate too low when choosing the nominal interest rate. This monetary policy overshoots the potential GDP and this leads to higher inflation. If the central bank does not increase its nominal interest rate, then the real interest rate will decrease further and the aggregate demand is stimulated further. This puts the economy in an inflationary tailspin.

Normal IS curve

y = f (y-1, r , x , G , …) + e

Steady state IS curve

y = f (y, r , x , G , …)

Neutral real interest rate r\* is defined as the interest rate. This equates GDP along this steady state IS curve to potential GDP, y\*

y\* = f (y\*, r\* , x , G , …)

**Graph 4**

**I**

**I\***

[[4]](#endnote-4)

 **y\* y**

**Unconventional monetary policies**

In times of economic hardship the central banks tend to use unconventional monetary policies. To evaluate the current monetary policy, it is helpful to analyze monetary policies that have been implemented in the past and compare them to the current monetary policies.

The Federal Reserve has in the past implemented two different kinds of unconventional monetary policies. The first unconventional monetary policy is credit easing, this is purchasing mortgage-backed securities and expanding the balance sheet of the Federal Reserve. The purchase of these securities provided liquidity in a market that had dried up. This policy was implemented as a reactionary method after the financial crisis. This directly lowers the mortgage interest rates and provides credit lines to an important part of the economy.

The second unconventional monetary policy is Operation Twist, the Federal Reserve sells short-term government bonds and uses that capital to purchase long-term government bonds. The objective of this policy is to drive up the price of the long-term bonds and lower the long-term interest rate. The amount of purchases and sales are equal, so the size of balance sheet of the Federal Reserve is not affected. The reasoning behind lowering the long-term interest rate was as following. Business lending and housing demand are primarily determined by the long-term interest rate. The short-term interest should not have been affected by operation Twist. This monetary policy had marginal success in reducing the spread between the long-term interest rate and the short-term interest rate. Analysts argue that operation Twist did not continue for a sufficient period of time to have a significantly large effect.

Operation Twist is very compatible to the second round of quantitative easing on several points. [[5]](#endnote-5)

* During Operation Twist, the Federal Reserve purchased 8.8 billion dollars in long-term bonds. This makes Operation Twist comparable to QE2 relative to the size of the economy and the Treasury market.
* The extent that agency and agency-guaranteed debt are close substitutes for Treasury securities, the relevant market includes all three of these Treasury-guaranteed classes of assets. In this market, Operation Twist was even larger than the QE2 program.
* Operation Twist was the joint participation by both the Federal Reserve and the US Department of Treasury. This is also true for the second round of quantitative easing.

On the other hand, there are also some notable differences between the two programs.

* Operation Twist was strongly endorsed by the presidential administration and the Federal Reserve. This is not true for QE2, which was only endorsed by the Federal Reserve. This means that Operation Twist send out a stronger positive signal to the financial market.
* Monetary policy was less transparent during the time of Operation Twist compared to the situation today. The explicit endorsement of the Federal Reserve was more extraordinary and thus be a stronger signal than it would be today.

**Quantitative Easing process Japan and US**

The prevailing myth about quantitative easing is the process only entails the printing of money by the central bank to increase demand in the economy.

This is off course a fallacy, because the real process is more complex. In order to explain the process behind quantitative easing policy, there are two major examples: Japan and the United States.

In Japan the quantitative easing policy, the main target was an increase in the current account balances held by the financial institutions at the Japanese central bank. This is mainly accomplished by the central bank purchasing Japanese Government Bonds. From 2001 until 2006, the Bank of Japan increased the current account balances from 5 trillion Yen to 34 trillion Yen in 2004, after which it gradually declined. Following the global financial crisis, the Bank of Japan once again increased purchases of Japanese Government Bonds and adopted more unconventional monetary measures. This was mainly the Comprehensive Monetary Easing, after observing deflation and a slowing recovery. The main instrument was an asset-purchasing program for both government securities and private securities.[[6]](#endnote-6)

In the United States, the Federal Reserve began conducting quantitative easing by purchasing Mortgage backed securities, which increased their balance sheet considerably. The balance sheet began with less than 800 billion dollars in treasury bonds before the recession. The Federal Reserve then bought 600 billion dollars in Mortgage backed securities, which is known as QE1. The balance sheet reached a peak of 2.1 trillion dollars of Mortgage backed securities, bank debt and treasury bonds in June 2010. After which the Federal Reserve started purchasing 600 billion dollars worth of treasury bonds by the end of the second quarter of 2011, this is known as QE2. The Federal Reserve announced in September of 2012 that it would purchase 40 billion dollars in Mortgage backed securities every month, this is known as QE3. This amount was increased to 85 billion dollars in December of 2012. These measures are accompanied by maintaining a Federal Reserve funds rate of almost zero, until at least 2015.

**Comparative Study: Japan**

As a comparative study for this research, the research paper “*Quantitative Easing and Bank Lending: Evidence from Japan*”[[7]](#endnote-7) will be used. This research paper was written by David Bowman, Fang Cai, Sally Davies and Steven Kamin. The paper explores Japan’s quantitative easing policy, which was implemented March of 2001 after declining consumer prices, a weak banking system, and the prospect of a recession following the collapse of the tech bubble. This policy consists of three key elements. (1) The Bank of Japan changed the main operating target from the uncollateralized overnight call rate to the outstanding current account balances (CAB) held by financial institutions at the Bank of Japan, and ultimately boosted the CAB above the required reserves. (2) The Bank of Japan boosted its purchases of government bonds, including long-term government bonds, and some other assets, in order to help achieve the targeted increases in CABs. (3) The Bank of Japan committed to maintain the quantitative easing policy until the core CPI stopped declining.

The regression of this study examines the effect of the liquidity ratio on the growth of the loans distributed by bank in Japan. This regression also has several control variables to isolate the effect of the liquidity ratio on the growth of loans.

∆Loani,t = LRi,t-1 +’Xi.t-1 +

**Loani,t**= Natural log of loans made by bank i at time t

 **LRi,t** = Liquidity ratio for bank i ate time t

**Xi,t** = Vector of control variables

The control variables are bank health, bank size (measured by total assets), equity ratio (net assets as a percentage of total assets), bad loan ratio (ratio of the notional value of non-performing loans to assets), lags of deposit growth and lags of loan growth.

Controlling for the other factors, the lagged liquidity ratio has a positive and significant effect on bank loan growth during the QEP period. If the liquidity ratio increases 1 percentage point, loan growth increases 0.11 percent in 6 months and 0.22 percent in 12 months. Between March 2001 and March 2004, the aggregate liquidity ratio increased 1.6 percent. This lead to an estimated 0.35 percent increase in loan growth, because of the higher liquidity.

∆Loani,t = LRi,t-1 +’Xi.t-1 + ’(LRi,t-1 Xi,t-1) +i.,t

There is an interaction term added between the liquidity ratio and total bank assets, equity ratio and bad loan ratio.

* Bank size has negative influence on the impact of liquidity on banking lending in Japan during the QEP, but this effect is not significant.
* Equity ratio has negative influence on the impact of liquidity on banking lending in Japan during the QEP, and this effect is significant.
* Bad loan ratio does not seem to have any influence on the impact of liquidity on banking lending in Japan during the QEP.

|  |  |
| --- | --- |
| **Loan growth and liquidity (QEP period)**  | **Loan Growth and liquidity with interaction terms** |
|  LRi,t-1 0.11 | LRi,t-1  0.93 |
| log(TAi,t-1) -0.00 | LRi,t-1 \* log(TAit-1) -0.04 |
| ERi,t-1 -0.06 | LRi,t-1 \* ERi,t-1 -6.79 |
| BLRi,t-1  -0.01 | LRi,t-1 \* BLRi,t-1 -0.01 |
| ∆log (Depositi,t-1) 0.15 | log(TAi,t-1) 0.00 |
| ∆log (Depositi,t-2) 0.04 | ERi,t-1 0.33 |
| ∆log (Loani,t-1) -0.02 | BLRi,t-1  -0.01 |
| ∆log (Loani,t-2) 0.02 | ∆log (Depositi,t-1) 0.17 |
| Observations 1230 | ∆log (Depositi,t-2) 0.03 |
| R-square 0.24 | ∆log (Loani,t-1) -0.04 |
|  | ∆log (Loani,t-2) 0.03  |
|  | Observations 1230 |
|  | R-square 0.25 |

The key findings of the paper are as followed. (1) The effect of the Bank of Japan’s liquidity injections on bank lending was reduced by the substitution of the central bank liquidity for interbank liquidity. (2) Despite the dampening of the stimulus from the liquidity injections due to this substitution, there is a positive and significant effect of liquidity on the bank lending. This would imply that the amount of liquidity used was far below the amount needed. (3) There is some evidence that weak banks benefited more from the quantitative easing policy than stronger banks. (4) The analysis suggests that the rapid unwinding of liquidity infusions observed at the conclusion of the quantitative easing policy had little impact on the lending growth, once the health and confidence of the banking system was restored.

The data used for this research was obtained from 4 different types of banks in Japan.

* City banks, these are major banks that offer banking services nationwide to large corporate customers. (11 in the sample)
* Regional banks, these banks primarily deal with loans for small or medium size companies and consumers. (64 in the sample)
* Tier 2 regional banks (57 in the sample)
* Long-term credit banks and trust banks (17 in the sample)

In order to answer the research question, this thesis will attempt to replicate the study “*Quantitative Easing and Bank Lending: Evidence from Japan*” in the context of the Federal Reserve monetary policy following the global financial crisis of 2007.

**The Impact of Quantitative Easing on Money Growth and Inflation in Japan**

To explore the long term effects of the quantitative easing policy in Japan, we examine research in the paper *Quantitative Easing: A Rationale and Some Evidence from Japan* written by Volker Wieland. This research attempts to answerthree questions on the impact of quantitative easing in Japan. 1) Did the Bank of Japan increase the money base sufficiently for an expansion relative to nominal income, also known as an expansion in Marshallian K? Marshallian K is the difference between the nominal GDP and the growth in the money supply. 2) Did quantitative easing create an expansion in the money supply M1? 3) Did the money supply expansion lead to inflation?

The first figure shows the relationship between the overnight money market rate and the ratio of the base money over the nominal income. The observations are annual averages from 1981 to 2008 in Japan.

**Graph 5**

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**[[8]](#endnote-8)**

In the years from 1981 to 1997, the Bank of Japan understood the ratio of the money base over the nominal income varied inversely with the money market rate. This is stated within the standard money demand theory.

In the years from 1998 to 2008 the money market rate stays near zero, because of the quantitative easing policy from the Bank of Japan. The Marshallian K shows the impact of monetary policy measures. The years from 1998 to 2001 shows a expansion from the monetary base relative to the nominal income.

The top arrow shown in the figure above indicates the extent of base money creation over the years between 1998 and 2005. The answer to the first question is yes.

The second figure compares the monetary supply and M1 relative to the nominal income. The base money growth is highly correlated with M1.

**Graph 6**

**[[9]](#endnote-9)**

Between 2001 and 2005, the increase in the monetary base increase by more than 30 percent of the nominal income. The expansion of base money induced additional deposit creation by banks and thus led to a greater expansion in the broader monetary aggregate.

This expansion was however stopped in the year 2006, but the ratio of M1 to nominal income did not decline after the monetary base was reduced in 2006 and 2007. So, the answer to the second question is also yes.

In the third figure we examine the effect on inflation. This figure shows the ratio of base money to nominal income together with the consumer price index (CPI), from 1981 to 2008.

**Graph 7**

**[[10]](#endnote-10)**

Between 1999 and 2000, the rate change in price level becomes negative. In the beginning of 2001 the Bank of Japan tried to influence the long term expectations for inflation, by announcing the new measures would stay into place until the CPI would be at least zero for a stable amount of time. However, throughout 2001 the CPI continued to fall to -1.6 percent in February of 2002. Following this, the Bank of Japan continued to expand the money base throughout 2002 and the rate of price changed moved to zero percent.

By 2006 the price change remained stable around zero or slightly above zero percent. This led the Bank of Japan to stop the quantitative easing policy in 2006. Based on these observations, Japan did not experience the self-enforcing process of accelerating deflation and a deepening recession. We can conclude that the return to price stability coincided with the quantitative easing policy and direct asset purchases of the Bank of Japan.

This research is relevant for the future prospects of the US economy, after the quantitative easing policies have run their course. This study has shown that quantitative easing can increase the money supply in the long term and this study also shows that quantitative easing policies do not always lead to high inflation. Although these results are very positive, this is off course not a guarantee that the quantitative easing policies in the US will also not face these problems in the long term.

**3 Methodology**

The research of the paper is divided into two parts. The first part will deal with the effect of the federal funds rate on banking lending in the United States. The second part of the research will be a panel regression. This is to examine the effect of Quantitative Easing on banking lending in the United States. The panel regression is done in a similar manner as the regression in the comparative study.

**Part 1: the surveys from the Federal Reserve Bank**

The first part of the research will be based on the data from two surveys conducted by the Federal Reserve Bank. These surveys are conducted on a quarterly basis between the second quarter of 1997 and the third quarter of 2012.

The data from the first survey will explore the correlation between the federal funds rate and the rates of the consumer and industrial loans distributed by US banks. The data will also examine the possible effect of risk rating on the effectiveness of the adjustment in the federal funds rate. The final observation of the data is the effect of the lower federal funds rate on the total borrowings from the Federal Reserve Bank by the banks in the United States.

The data from the second survey will firstly explore the effect of the lower federal funds rate on the standards set by the banks for consumer and industrial loans. These standards are the requirements set by the banks for the loans they distribute. The data will then explore the effect on the costs of funds used to conduct those loans. Finally we will explore the effect on the demand of consumer and industrial loans.

The combined data from these surveys will establish the effect of the federal funds rate as a tool to increase banking lending in the United States.

**Part 2: Panel regression**

The second part of the research is a regression of 20 large US banks. These banks are selected, because these banks are the private US banks with the largest amount of assets.

The regression

∆Loani,t = + LR i,t + ’Xi,t +

∆**Loani,t**= The growth of the natural log of loans made by bank i between time

t-1 and time t.

**LRi,t** = Liquidity ratio for bank i at time t

**Xi,t** = Vector of control variables

The control variables are bank health, bank size (measured by total assets), equity ratio (net assets as a percentage of total assets), bad loan ratio (ratio of the notional value of non-performing loans to assets), lag of deposit growth and lag of loan growth.

**4 Research Data**

**Federal funds rate**

**1997Q2 – 2012Q3**

The main tool used by the Federal Reserve to influence the banking is setting the federal funds rate. The graph below shows the progression of the federal funds rate between the second quarter of 1997 and the third quarter of 2012. The interest rate is measured in percentages on the Y-axis.

**Graph 8**

When we look at the federal funds rate from the second quarter of 1997 onwards in the graph above, the federal funds rate has been drastically lowered two times in the last 15 years. The first time was in the year 2000, as a reaction to the collapse of the tech bubble. From May 2000 – June 2003, the federal funds rate was cut from 6.50 to 1.00 percent. The second time was in the year 2006, as a reaction to the global financial crisis. From June 2006 – October 2008, the federal funds rate was cut from 5.25 to 1.00. From December 2008 onwards, the federal funds rate has been between 0 and 0.25

**Prime rate**

**1997Q2 – 2012Q3**

The federal funds rate is not the interest rate used by banks to make loans, for this the banks use the prime interest rate. This is the benchmark for lending to customers with good credit. The prime rate is calculated by using the federal funds rate as a base rate and adding approximately 3 percent as a premium for the banks.

**Graph 9**

Then we look at the prime rate in the same period since the second quarter of 1997 in the graph above. The trends are identical to the trends of the federal funds rate. This is logical, because the prime rate is set using the federal funds rate. But looking at the prime rate since December 2008, we can see the prime rate remaining stagnant around 4 percent, while the historical calculation gives a prime rate of approximately 3.25 (federal funds rate + 3 percent)

**Prime rate – Federal funds rate**

**1997Q2 – 2012Q3**

The theory states that the difference between the prime rate and the federal funds rate is approximately 3 percent. Now we look at the real difference between the prime rate and the federal funds rate between the second quarter of 1997 and the third quarter of 2012 as shown in Graph 10.

**Graph 10**

The difference between the prime rate and the federal funds rate had grown significantly in the years before the financial crisis. After the peak in the year 2007, the difference dropped drastically until stabilizing around the 4 percent. The reduction in the difference between the prime rate and federal funds rate is correlated with the reduction of the federal funds rate during the quantitative easing policies of the Federal Reserve Bank.

**Survey of Term of Business Lending**

**1997Q2 – 2012Q3**

The authorized panel size for the survey is 348 domestically chartered commercial banks and 50 U.S. branches and agencies of foreign banks.[[11]](#endnote-11)

In order to narrow the focus of this research, the focus will be only on the consumer and industrial loans made by all the commercial banks in the United States.

The graph below shows the loan rate for the consumer and industrial loans, which provides the loan rates this research focuses on.

**Graph 11**

Commercial and Industrial loans are divided into 5 different credit risk ratings for the loans.

1. Minimal risk loans
2. Low risk loans
3. Moderate risk loans
4. Acceptable risk loans
5. Special mention and classified loans

The credit risk rating will be further explained in the appendix. For each of the five risk ratings the qualifications of the loans will be explained by the Federal Reserve standards.

The graph below shows the loan rates, when they are divided on the risk rating set by the Federal Reserve.

**Graph 12**

Although there are some small differences between these the loan rates, the rates do all follow the same pattern. This means there no observable differences of the effect of the federal loan rate between the different loan rates.

The graph below shows the total amount of consumer and industrial loans distributed by the US banks.

**Graph 13**

The data on the volume of consumer and industrial loans show a clear decrease in the amount of loans distributed following the global financial crisis. This decrease was stopped in the years of the quantitative easing policy, which means the amount did not decrease below the depth following the tech bubble.

In the next graph, the total amount of consumer and industrial loans is divided on the basis of the before mentioned risk ratings.

**Graph 14**

The data observed in this graph does not show a clear systematic impact of the risk rating for the quantitative easing measures.

In order to give a clearer picture, the graph below shows the weighted average of the loans is distributed. This is calculated by using the weighted average risk rating. (Minimal risk loans = 1, Low risk loans = 2, Moderate risk loans = 3,

Acceptable risk loans = 4, Special mention and classified loans = 5)

**Graph 15**

The data is adjusted for risk profile set by the Federal Reserve. The data does not show a significant difference, after this extra step is taken.

The last graph gives the total amount of funds borrowed from the Federal Reserve.

**Graph 16**

Since the third quarter of 2007, banks borrowed a total of 9.4 Trillion dollars from the Federal Reserve Bank. This amount is held by the banks, but as we have seen in the other statistics this is amount is mostly not used to increase the consumer loans and industrial loans.

Considering all these observations, several conclusions can be derived. (1) The federal funds rate has been reduced since the third quarter of 2006. (2) The reduction of the federal funds rate is correlated with the reduction in the prime rate and the average loan rate for consumers and industry. (3) The inflated difference between the prime rate and federal funds rate has reduced since 2007. This is also correlated with the reduction in the federal funds rate. (4) There is no significant observable difference between loan rates with different risk rating, when it comes to the effect of the reduction of the federal funds rate.

(5) The banks have loaned a massive amount of funds from the Federal Reserve, which cannot be explained by their lending practices.

**The Senior Loan Officer Opinion Survey on Bank Lending Practices**

**1997Q2-2012Q3**

The surveys are based on the responses from 68 domestic banks and 23 U.S. branches and agencies of foreign banks[[12]](#endnote-12). Only the data relevant for the consumer and industrial loans will be used in this research in order to maintain the narrow focus of the research for this paper. The results are divided into 2 categories, the large and medium banks and small banks.

The first panel of the survey explores changes in the standards for consumer and industrial loans set by the banks in the United States. The standards are the requirements set by the banks for the loans distributed by them.

**Graph 17**

**Panel 1:** Net Percentage of Domestic Respondents Tightening Standards for C&I Loans

In the first panel of the survey, there is a clear tightening of standards for consumer and industrial loans in the period from the second quarter of 2007 to the fourth quarter of 2008. This effect is more prevalent in the small loans, than in the large and medium loans. After 2008, the standards for consumer and industrial loans have loosened up drastically.

The second panel in the survey explores the changes of the spread between the loan rate and the cost of the funds necessary for these loans.

**Graph 18**

**Panel 2:** Net Percentage of Domestic Respondents Increasing Spreads of Loan Rates over Banks' Cost of Funds

In the second panel of the survey, there is a clear increase in the spread between the loan rate and costs of the loan made by the bank. This increase starts at the second quarter of 2007 until the fourth quarter of 2008. This effect start to decline rapidly after the fourth quarter of 2008 until it returns to the normal rate.

The third panel in the survey explores the changes in the demand for consumer and industrial loans in the United States, between the second quarter of 1997 and the third quarter of 2012.

**Graph 19**

**Panel 3:** Net Percentage of Domestic Respondents Reporting Stronger Demand for C&I Loans

In the third panel, there is a clear increase in the demand for consumer and industrial loans between the second quarter of 2004 and the third quarter of 2005. In the years 2006,2007 and 2008 the demand for these loans stagnate. From the fourth quarter of 2008 the demand decreases until the second quarter of 2009. After the second quarter of 2009 the demand increases steadily.

**Panel regression**

**31/12/2007-31/12/2012**

**Annual observations**

**20 US banks**

The dependent variable is the growth of the log loan between the period t-1 and t, the variable is named LOG\_LOAN\_GROWTH. The independent variables are defined as following. The LR is the liquidity ratio at time t, constructed as liquid assets divided by total assets. The ER is the equity ratio at time t, constructed as bank equity divided by total assets. The BLR is the bad loan ratio at time t, constructed as bad loans divided by bank equity. The LOG\_TA is the log of total assets at time t. The LOG\_DEPOSIT\_GROWTH\_T\_1 is the growth of log deposit between the period t-2 and t-1. The LOG\_LOAN\_GROWTH\_T\_1 is the growth of log loan between the period t-2 and t-1. This is the growth in percentages of the total value of loan between the two periods. (The Eviews results can be found in the appendix)

|  |  |
| --- | --- |
| **Dependent Variable**  | **Log Growth Loan Total Value** |
| **Liquidity ratio (LR)** | **-0.076341** |
| **Equity ratio (ER)** | **-0.490368** |
| **Bad Loan Ratio (BLR)** | **-0.618488** |
| **Log Total Assets (Log TA)** |  **0.0112701** |
| **Log Growth Deposits Total Value t-1** | **-0.002267** |
| **Log Growth Loan Total Value t-1** | **-0.139757** |
| **Constant (C)** |  **0.102213** |
| **Observations** | **120** |
| **R-squared**  | **0.168612** |

The liquidity ratio has a small negative effect on the growth of loans. The equity ratio also has a negative effect on the growth of loans. The bad loan ratio also has a negative effect on the growth of loans. The bank size (log TA) has a positive effect on the growth of loans, but this effect is too small to be significant.

The liquidity ratio normally has a positive effect on the growth of loans, because a high liquidity ratio gives banks incentive to increase the amount of loans. The sample period of this regression has a major recession within most of the period. This means the effect may not be the same as within a normal sample period. The bad loan ratio has a negative effect on the growth of loans, because a high bad loan ratio means an increased risk for the distributed loans going default. This is a major disincentive to increase the amount of loans distributed.

The next step is adding dummies for the period with Quantitative Easing (D\_QE) and for the period without Quantitative Easing (D\_NONQE). The first three annual observations are in the period without Quantitative Easing (D\_QE = 0, D\_NONQE = 1 ) and the last three annual observations are in the period with Quantitative Easing.( D\_QE= 1, D\_NONQE = 0) The dummy D\_NONQE is multiplied by the liquidity ratio (LR\_NONQE) and the dummy D\_QE is multiplied by the liquidity rate. (LR\_QE) (The Eviews results can be found in the appendix)

|  |  |
| --- | --- |
| **Dependent Variable**  | **Log Growth Loan Total Value** |
| **Liquidity ratio without Quantitative Easing (LR\_NONQE)** | **-0.135438** |
| **Liquidity ratio with Quantitative Easing (LR\_QE)** | **-0.008268** |
| **Equity Ratio (ER)** | **-0.531962** |
| **Bad Loan Ratio (BLR)** | **-0.657677** |
| **Log Total Assets (Log TA)** |  **0.012568** |
| **Log Growth Deposits Total Value t-1** | **-0.009479** |
| **Log Growth Loan Total Value t-1** | **-0.125568** |
| **Constant (C)** | **0.108246** |
| **Observations** | **120** |
| **R-squared** | **0.174941** |

The effect of the liquidity ratio is now split into the effect of the liquidity ratio during quantitative easing and the effect of the liquidity ratio without quantitative easing. Without quantitative easing, the effect of the liquidity ratio has a negative effect on the growth of bank loans. During quantitative easing, the liquidity ratio has almost no effect on the growth of bank loans.

**5 Data Analysis**

**Part 1: The surveys from the Federal Reserve Bank**

The federal funds rate is used to set the prime rate. This prime rate is highly correlated with the loan rate of the consumer and industrial loans. The risk rating of these loans does not seem to influence the effect of the federal funds rate in a significant manner. The lowering of the federal funds rate does seem to have a significant effect on restoring the amount of loans distributed by the US banks, since the beginning of the global financial crisis. In this data, there is a large increase in the amount of money borrowed from the Federal Reserve Bank after the federal funds rate was lowered. This increase cannot be explained by the moderate increase in loans distributed by the banks. This means an increase in the liquidity of the banks has most likely taken place.

The data on tightening of standards for the consumer and industrial loans show a sharp increase during the global financial crisis. This tightening effect has drastically reduced after the fourth quarter of 2008. This correlates with the reduction of the federal funds rate.

The spreads of loan rate over cost of funds for the banks in question, has also seen a large increase during the global financial crisis. This increase also peaked in the fourth quarter of 2008, after 2008 the spread of the loan rate over the cost of funds reduced sharply until the spread reached normal historic levels. This effect also correlates with the reduction of the federal funds rate.

The domestic demand for consumer and industrial loans has also suffered from the global financial crisis. The demand decreased until the second quarter of 2009, after which the demand picked up very rapidly. Adjusted for a delay, this effect in demand is also strongly correlated with the reduction in the federal funds rate.

**Part 2: Panel regression**

The regression examines the effect of the liquidity ratio on the growth of loans, controlling for several factors. These control factors are the bad loan ratio, equity ratio, bank size (log total assets), lagged deposit growth and lagged loan growth.

In the data from the panel regression, the dummies for quantitative easing seem to have a significant effect on the liquidity ratio of the banks involved. The liquidity ratio has a negative effect on the growth of the loans, during the periods before the quantitative easing policy was put into place. During the period of quantitative easing, this negative effect of liquidity ratio almost disappears.

**6 Conclusions**

The Federal Reserve Bank has implemented a monetary policy of adjusting the federal funds rate as a countercyclical policy during the global financial crisis. This policy has had a positive effect on both the amount of loans distributed by the banks in the United States and on the overall liquidity position of banks.

The research has also shown there is a positive effect of the improved liquidity position of the banks on the loan policy on the bank in question. From this observation we can conclude, that US Federal Reserve monetary policy has indeed had a positive effect on the banking lending within the United States.

The quote from Ben Bernanke in the introduction stressed the importance of maintaining the availability of credit during a recession or depression. The examination of the fractional banking system shows the importance of liquidity, which is necessary for maintaining the availability of credit. The liquidity position of banks is a logical objective for the monetary policy of the Federal Reserve. The improved liquidity of banks in the United States will have a significant and positive effect on the economy.

There is also a downside to the quantitative easing policy. The first example is the likely increase of income inequality. The quantitative easing policies lead to an increase in corporate profits and an increase in stock prices. These increases will mostly benefit the wealthiest segment of society, and will have little or no real benefit for the working class. Another example is the adverse effect of quantitative easing on the underfunded position of pension funds, because of the artificially low yields for government bonds.

Although quantitative easing has some major disadvantages, this monetary policy is sometimes necessary to prevent the economy from spiraling into a deep recession or even a depression.

It is important to note, that later this year the quantitative easing policy is planned to be reduced until the fourth quarter of 2015. Only after the Federal Reserve has normalized the monetary policy, it will be possible to properly examine the long term effects of the current quantitative easing policy. The data must be extended to contain a significant period after the Federal Reserve has tapered the quantitative easing policy.

There is a need for further study of topic, after the Federal Reserve has normalized the monetary policy. Several years after the normalization of monetary policy a similar study as this research paper can show if the improvements in banking lending were permanent or just of a temporary nature.

Furthermore, the literature section of this research contains a study on the effects of quantitative easing on money growth and inflation in Japan. A similar research for the quantitative easing policies in the US would contribute significantly to the research literature on this subject.

**7 Appendix**

**Appendix 1: Risk rating Federal Reserve[[13]](#endnote-13)**

**Minimal risk (enter ‘‘1”).** Loans in this category have virtually no chance of resulting in a loss. They would have a level of risk similar to a loan with the following characteristics:

* The customer has been with your institution for many years and has an excellent credit history.
* The customer’s cash flow is steady and well in excess of required debt repayments plus other fixed charges.
* The customer has an AA or higher public debt rating.
* The customer has excellent access to alternative sources of finance at favorable terms.
* The management is of uniformly high quality and has unquestioned character.
* The collateral, if required, is cash or cash equivalent and is equal to or exceeds the value of the loan.
* The guarantor, if required, would achieve approximately this rating if borrowing from your institution.

**Low risk (enter ‘‘2”).** Loans in this category are very unlikely to result in a loss. They would have a level of risk similar to a loan with the following characteristics:

* The customer has an excellent credit history.
* The customer’s cash flow is steady and comfortably exceeds required debt repayments plus other fixed charges.
* The customer has a BBB or higher public debt rating.
* The customer has good access to alternative sources of finance at favorable terms.
* The management is of high quality and has unquestioned character.
* The collateral, if required, is sufficiently liquid and has a large enough margin to make very likely the recovery of the full amount of the loan in the event of default.
* The guarantor, if required, would achieve approximately this rating if borrowing from your institution.

**Moderate risk (enter ‘‘3”).** Loans in this category have little chance of resulting in a loss. This category should include the average loan, under average economic conditions, at the typical

19lender. Loans in this category would have a level of risk similar to a loan with the following characteristics:

* The customer has a good credit history.
* The customer’s cash flow may be subject to cyclical conditions, but is adequate to meet required debt repayments plus other fixed charges even after a limited period of losses or in the event of a somewhat lower trend in earnings.
* The customer has limited access to the capital markets.
* The customer has some access to alternative sources of finance at reasonable terms.
* The firm has good management in important positions.
* Collateral, which would usually be required, is sufficiently liquid and has a large enough margin to make likely the recovery of the value of the loan in the event of default.
* The guarantor, if required, would achieve approximately this rating if borrowing from your institution.

**Acceptable risk (enter ‘‘4”).** Loans in this category have a limited chance of resulting in a loss. They would have a level of risk similar to a loan with the following characteristics:

* The customer has only a fair credit rating but no recent credit problems.
* The customer’s cash flow is currently adequate to meet required debt repayments, but it may not be sufficient in the event of significant adverse developments.
* The customer does not have access to the capital markets.
* The customer has some limited access to alternative sources of finance possibly at unfavorable terms.
* Some management weakness exists.
* Collateral, which would generally be required, is sufficient to make likely the recovery of the value of the loan in the event of default, but liquidating the collateral may be difficult or expensive.
* The guarantor, if required, would achieve this rating or lower if borrowing from your institution.

**Special mention or classified asset (enter ‘‘5”).** Loans in this category would generally fall into the examination categories: “special mention,” “substandard,” “doubtful,” or “loss.” They would primarily be work-out loans, as it is highly unlikely that new loans would fall into this category.

**Appendix 2: Bank regression data**

**Bank 1:** JP Morgan Chase & Co

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 1198942 | 515506 | 107211 | 2343 |
| 31/12/2006 | 1351520 | 578308 | 115790 | 2077 |
| 31/12/2007 | 1562147 | 636780 | 123221 | 779 |
| 31/12/2008 | 2175052 | 713506 | 166884 | 4340 |
| 31/12/2009 | 2031989 | 615758 | 165365 | 16853 |
| 31/12/2010 | 2117605 | 681205 | 176106 | 21711 |
| 31/12/2011 | 2265792 | 731681 | 183573 | 19655 |
| 31/12/2012 | 2359141 | 846878 | 204069 | 20175 |
|  |  |  |  |  |
| **Date** | **Deposits** | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 554991 | 412058 | 5.74428594 | 5.61495835 |
| 31/12/2006 | 638788 | 475848 | 5.805356749 | 5.677468248 |
| 31/12/2007 | 740728 | 510140 | 5.869658762 | 5.707689378 |
| 31/12/2008 | 1009277 | 721734 | 6.004010376 | 5.858377165 |
| 31/12/2009 | 938367 | 601856 | 5.972372726 | 5.779492594 |
| 31/12/2010 | 930369 | 660661 | 5.968655231 | 5.81997867 |
| 31/12/2011 | 1127806 | 696111 | 6.052234401 | 5.842678497 |
| 31/12/2012 | 1193593 | 711860 | 6.076856263 | 5.85239459 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (1)** | **Log(Loan) Growth (1)** | **LR (1)** | **ER (1)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.061070809 | 0.062509898 | 0.427894519 | 0.085673908 |
| 31/12/2007 | 0.064302013 | 0.03022113 | 0.407631292 | 0.07887926 |
| 31/12/2008 | 0.134351615 | 0.150687787 | 0.328040893 | 0.076726441 |
| 31/12/2009 | -0.03163765 | -0.07888457 | 0.303032152 | 0.081380854 |
| 31/12/2010 | -0.003717495 | 0.040486076 | 0.321686528 | 0.083162818 |
| 31/12/2011 | 0.08357917 | 0.022699826 | 0.322925052 | 0.081019352 |
| 31/12/2012 | 0.024621862 | 0.009716094 | 0.358977272 | 0.0865014 |
|  |  |  |  |  |
| **Date** | **BLR (1)** | **log(TA) (1)** | **Log(Deposit) Growth (1) t-1** | **Log(Loan) Growth (1) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.017937646 | 6.130822477 |   |   |
| 31/12/2007 | 0.006321974 | 6.193721899 | 0.061070809 | 0.062509898 |
| 31/12/2008 | 0.026006088 | 6.337469644 | 0.064302013 | 0.03022113 |
| 31/12/2009 | 0.101913948 | 6.307921353 | 0.134351615 | 0.150687787 |
| 31/12/2010 | 0.123283704 | 6.325844954 | -0.03163765 | -0.07888457 |
| 31/12/2011 | 0.107069122 | 6.355220039 | -0.003717495 | 0.040486076 |
| 31/12/2012 | 0.09886362 | 6.372753898 | 0.08357917 | 0.022699826 |

**Bank 2:** Bank of America Corporation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 1291803 | 331291 | 101533 | 1511 |
| 31/12/2006 | 1459737 | 338911 | 135272 | 1787 |
| 31/12/2007 | 1715746 | 345920 | 146803 | 5630 |
| 31/12/2008 | 1817943 | 284427 | 177052 | 16805 |
| 31/12/2009 | 2223299 | 517680 | 231444 | 36648 |
| 31/12/2010 | 2264909 | 539147 | 228248 | 43679 |
| 31/12/2011 | 2129046 | 526608 | 230101 | 45295 |
| 31/12/2012 | 2209974 | 586596 | 236956 | 39012 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 634670 | 565746 | 5.80254797 | 5.752621492 |
| 31/12/2006 | 693497 | 697474 | 5.841044587 | 5.843528023 |
| 31/12/2007 | 805177 | 899180 | 5.905891361 | 5.953846639 |
| 31/12/2008 | 882997 | 939802 | 5.945959228 | 5.973036365 |
| 31/12/2009 | 991611 | 906802 | 5.996341336 | 5.957512469 |
| 31/12/2010 | 1010430 | 933613 | 6.004506232 | 5.97016689 |
| 31/12/2011 | 1033041 | 906179 | 6.014117558 | 5.957213994 |
| 31/12/2012 | 1105261 | 903053 | 6.043464846 | 5.95571324 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (2)** | **Log(Loan) Growth (2)** | **LR (2)** | **ER (2)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.038496616 | 0.090906531 | 0.232172645 | 0.092668748 |
| 31/12/2007 | 0.064846774 | 0.110318616 | 0.201614924 | 0.085562199 |
| 31/12/2008 | 0.040067867 | 0.019189726 | 0.1564554 | 0.097391392 |
| 31/12/2009 | 0.050382108 | -0.015523896 | 0.232843176 | 0.104099359 |
| 31/12/2010 | 0.008164896 | 0.012654421 | 0.238043559 | 0.100775793 |
| 31/12/2011 | 0.009611326 | -0.012952897 | 0.247344585 | 0.108077045 |
| 31/12/2012 | 0.029347287 | -0.001500754 | 0.265431177 | 0.107221171 |
|  |  |  |  |  |
| **Date** | **BLR (2)** | **log(TA) (2)** | **Log(Deposit) Growth (2) t-1** | **Log(Loan) Growth (2) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.01321042 | 6.164274616 |   |   |
| 31/12/2007 | 0.038350715 | 6.234452995 | 0.038496616 | 0.090906531 |
| 31/12/2008 | 0.094915618 | 6.259580262 | 0.064846774 | 0.110318616 |
| 31/12/2009 | 0.158344999 | 6.346997873 | 0.040067867 | 0.019189726 |
| 31/12/2010 | 0.191366408 | 6.355050758 | 0.050382108 | -0.015523896 |
| 31/12/2011 | 0.196848341 | 6.328185045 | 0.008164896 | 0.012654421 |
| 31/12/2012 | 0.164638161 | 6.344387164 | 0.009611326 | -0.012952897 |

**Bank 3:** JP Morgan Chase Bank **,** NA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 1013985 | 500779 | 88289 | 3383 |
| 31/12/2006 | 1179390 | 582185 | 98898 | 3125 |
| 31/12/2007 | 1318888 | 647980 | 107614 | 5632 |
| 31/12/2008 | 1746242 | 780284 | 129796 | 13122 |
| 31/12/2009 | 1627684 | 531923 | 128319 | 33287 |
| 31/12/2010 | 1631621 | 570666 | 123399 | 39962 |
| 31/12/2011 | 1811678 | 640250 | 130955 | 46620 |
| 31/12/2012 | 1896773 | 709620 | 146280 | 32309 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 552610 | 390874 | 5.74241874 | 5.592036783 |
| 31/12/2006 | 650614 | 416663 | 5.813323404 | 5.619784936 |
| 31/12/2007 | 772087 | 488371 | 5.88766624 | 5.688749867 |
| 31/12/2008 | 1055765 | 646750 | 6.02356726 | 5.810736437 |
| 31/12/2009 | 1024036 | 535981 | 6.010315225 | 5.729149395 |
| 31/12/2010 | 1019993 | 531890 | 6.008597191 | 5.725821825 |
| 31/12/2011 | 1190738 | 580061 | 6.075816213 | 5.763473667 |
| 31/12/2012 | 1246327 | 608723 | 6.095632004 | 5.784419711 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (3)** | **Log(Loan) Growth (3)** | **LR (3)** | **ER (3)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.070904665 | 0.027748153 | 0.493632301 | 0.083855213 |
| 31/12/2007 | 0.074342836 | 0.068964931 | 0.491307829 | 0.081594495 |
| 31/12/2008 | 0.13590102 | 0.12198657 | 0.44683612 | 0.074328759 |
| 31/12/2009 | -0.013252036 | -0.081587043 | 0.326797462 | 0.078835327 |
| 31/12/2010 | -0.001718033 | -0.003327569 | 0.349754018 | 0.075629696 |
| 31/12/2011 | 0.067219022 | 0.037651842 | 0.353401653 | 0.072283816 |
| 31/12/2012 | 0.01981579 | 0.020946044 | 0.374119623 | 0.077120457 |
|  |  |  |  |  |
| **Date** | **BLR (3)** | **log(TA) (3)** | **Log(Deposit) Growth (3) t-1** | **Log(Loan) Growth (3) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.031598212 | 6.071657441 |   |   |
| 31/12/2007 | 0.052335198 | 6.120207917 | 0.070904665 | 0.027748153 |
| 31/12/2008 | 0.101097106 | 6.24210443 | 0.074342836 | 0.068964931 |
| 31/12/2009 | 0.259408194 | 6.211570094 | 0.13590102 | 0.12198657 |
| 31/12/2010 | 0.323843791 | 6.212619286 | -0.013252036 | -0.081587043 |
| 31/12/2011 | 0.356000153 | 6.258081011 | -0.001718033 | -0.003327569 |
| 31/12/2012 | 0.220870932 | 6.278015359 | 0.067219022 | 0.037651842 |

**Bank 4:** Citigroup, inc.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 1494037 | 521147 | 112537 | 5056 |
| 31/12/2006 | 1884318 | 696237 | 119783 | 5069 |
| 31/12/2007 | 2187470 | 667933 | 113598 | 1976 |
| 31/12/2008 | 1938470 | 540631 | 141630 | 18547 |
| 31/12/2009 | 1856646 | 581945 | 154973 | 30480 |
| 31/12/2010 | 1913902 | 587386 | 165789 | 35938 |
| 31/12/2011 | 1873878 | 567384 | 179573 | 34099 |
| 31/12/2012 | 1864660 | 543445 | 190997 | 31973 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 591828 | 573721 | 5.772195508 | 5.758700747 |
| 31/12/2006 | 712041 | 670252 | 5.852505001 | 5.826238119 |
| 31/12/2007 | 826230 | 761876 | 5.91710096 | 5.881884293 |
| 31/12/2008 | 774185 | 664600 | 5.888844753 | 5.822560337 |
| 31/12/2009 | 835903 | 555471 | 5.922155884 | 5.74466139 |
| 31/12/2010 | 844968 | 608139 | 5.926840262 | 5.784002856 |
| 31/12/2011 | 865936 | 617127 | 5.937485795 | 5.790374548 |
| 31/12/2012 | 930560 | 630009 | 5.968744381 | 5.799346754 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (4)** | **Log(Loan) Growth (4)** | **LR (4)** | **ER (4)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.080309493 | 0.067537372 | 0.369490182 | 0.063568357 |
| 31/12/2007 | 0.064595958 | 0.055646174 | 0.305344988 | 0.051931226 |
| 31/12/2008 | -0.028256207 | -0.059323956 | 0.278895727 | 0.073062776 |
| 31/12/2009 | 0.033311131 | -0.077898947 | 0.313438857 | 0.083469331 |
| 31/12/2010 | 0.004684378 | 0.039341465 | 0.306904951 | 0.086623558 |
| 31/12/2011 | 0.010645533 | 0.006371692 | 0.302785987 | 0.095829611 |
| 31/12/2012 | 0.031258585 | 0.008972206 | 0.291444553 | 0.102429934 |
|  |  |  |  |  |
| **Date** | **BLR (4)** | **log(TA) (4)** | **Log(Deposit) Growth (4) t-1** | **Log(Loan) Growth (4) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.042318192 | 6.275154197 |   |   |
| 31/12/2007 | 0.017394672 | 6.339942106 | 0.080309493 | 0.067537372 |
| 31/12/2008 | 0.130953894 | 6.287459084 | 0.064595958 | 0.055646174 |
| 31/12/2009 | 0.196679422 | 6.268729106 | -0.028256207 | -0.059323956 |
| 31/12/2010 | 0.216769508 | 6.281919696 | 0.033311131 | -0.077898947 |
| 31/12/2011 | 0.189889349 | 6.272741312 | 0.004684378 | 0.039341465 |
| 31/12/2012 | 0.167400535 | 6.270599655 | 0.010645533 | 0.006371692 |

**Bank 5:** Wells Fargo & Company

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 481741000 | 30938000 | 40660000 | 1338000 |
| 31/12/2006 | 481996000 | 26072000 | 45876000 | 1666000 |
| 31/12/2007 | 575442000 | 17154000 | 47628000 | 469000 |
| 31/12/2008 | 1309639000 | 87613000 | 102316000 | 3640000 |
| 31/12/2009 | 1243646000 | 86271000 | 114359000 | 15778000 |
| 31/12/2010 | 1258128000 | 123992000 | 127889000 | 25738000 |
| 31/12/2011 | 1313867000 | 112873000 | 141687000 | 28010000 |
| 31/12/2012 | 1422968000 | 191818000 | 158911000 | 30012000 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 314450000 | 348112000 | 8.497551599 | 8.541718994 |
| 31/12/2006 | 310243000 | 349170000 | 8.491701991 | 8.543036923 |
| 31/12/2007 | 344460000 | 404651000 | 8.537138797 | 8.607080618 |
| 31/12/2008 | 781402000 | 870133000 | 8.892874518 | 8.93958564 |
| 31/12/2009 | 824018000 | 803081000 | 8.915936699 | 8.904759351 |
| 31/12/2010 | 847942000 | 787298000 | 8.928366147 | 8.896139148 |
| 31/12/2011 | 920070000 | 799954000 | 8.96382087 | 8.903065014 |
| 31/12/2012 | 1002835000 | 829773000 | 9.001229483 | 8.918959299 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (5)** | **Log(Loan) Growth (5)** | **LR (5)** | **ER (5)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | -0.005849608 | 0.001317929 | 0.054091735 | 0.095179213 |
| 31/12/2007 | 0.045436806 | 0.064043695 | 0.029810129 | 0.082767681 |
| 31/12/2008 | 0.355735721 | 0.332505022 | 0.066898588 | 0.078125346 |
| 31/12/2009 | 0.02306218 | -0.034826289 | 0.069369419 | 0.091954624 |
| 31/12/2010 | 0.012429449 | -0.008620203 | 0.09855277 | 0.10165023 |
| 31/12/2011 | 0.035454723 | 0.006925866 | 0.085909 | 0.107839682 |
| 31/12/2012 | 0.037408613 | 0.015894285 | 0.134801345 | 0.111675737 |
|  |  |  |  |  |
| **Date** | **BLR (5)** | **log(TA) (5)** | **Log(Deposit) Growth (5) t-1** | **Log(Loan) Growth (5) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.036315285 | 8.683043434 |   |   |
| 31/12/2007 | 0.009847149 | 8.760001557 | -0.005849608 | 0.001317929 |
| 31/12/2008 | 0.035576058 | 9.1171516 | 0.045436806 | 0.064043695 |
| 31/12/2009 | 0.137969027 | 9.094696777 | 0.355735721 | 0.332505022 |
| 31/12/2010 | 0.201252649 | 9.099724828 | 0.02306218 | -0.034826289 |
| 31/12/2011 | 0.197689273 | 9.118551405 | 0.012429449 | -0.008620203 |
| 31/12/2012 | 0.188860431 | 9.153195134 | 0.035454723 | 0.006925866 |

**Bank 6:** Citibank, NA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 706497000 | 140563000 | 56761000 | 2377000 |
| 31/12/2006 | 1019497000 | 170458000 | 74210000 | 2964000 |
| 31/12/2007 | 1251715000 | 325199000 | 100572000 | 7838000 |
| 31/12/2008 | 1231154000 | 413553000 | 86554000 | 20290000 |
| 31/12/2009 | 1161361000 | 303130000 | 117893000 | 35854000 |
| 31/12/2010 | 1154293000 | 303159000 | 127960000 | 28798000 |
| 31/12/2011 | 1288658000 | 329071000 | 152349000 | 26361000 |
| 31/12/2012 | 1313401000 | 300810000 | 148248000 | 25416000 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 485990000 | 382326000 | 8.686627333 | 8.582433833 |
| 31/12/2006 | 665743000 | 564428000 | 8.823306609 | 8.75160855 |
| 31/12/2007 | 782404000 | 677131000 | 8.893431062 | 8.830672697 |
| 31/12/2008 | 755298000 | 544962000 | 8.878118335 | 8.73636622 |
| 31/12/2009 | 771642000 | 464670000 | 8.887415858 | 8.667144634 |
| 31/12/2010 | 793837000 | 438102000 | 8.899731337 | 8.641575236 |
| 31/12/2011 | 882541000 | 568676000 | 8.94573489 | 8.7548649 |
| 31/12/2012 | 941185000 | 579019000 | 8.973674997 | 8.762692815 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (6)** | **Log(Loan) Growth (6)** | **LR (6)** | **ER (6)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.136679276 | 0.169174717 | 0.167198138 | 0.072790798 |
| 31/12/2007 | 0.070124453 | 0.079064147 | 0.259802751 | 0.080347363 |
| 31/12/2008 | -0.015312727 | -0.094306477 | 0.3359068 | 0.070303146 |
| 31/12/2009 | 0.009297523 | -0.069221586 | 0.261012726 | 0.101512794 |
| 31/12/2010 | 0.012315479 | -0.025569399 | 0.26263609 | 0.110855736 |
| 31/12/2011 | 0.046003553 | 0.113289664 | 0.255359451 | 0.118222989 |
| 31/12/2012 | 0.027940107 | 0.007827915 | 0.229031347 | 0.112873372 |
|  |  |  |  |  |
| **Date** | **BLR (6)** | **log(TA) (6)** | **Log(Deposit) Growth (6) t-1** | **Log(Loan) Growth (6) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.039940709 | 9.008385952 |   |   |
| 31/12/2007 | 0.077934216 | 9.097505457 | 0.136679276 | 0.169174717 |
| 31/12/2008 | 0.234420131 | 9.09031238 | 0.070124453 | 0.079064147 |
| 31/12/2009 | 0.30412323 | 9.064967238 | -0.015312727 | -0.094306477 |
| 31/12/2010 | 0.225054705 | 9.062316062 | 0.009297523 | -0.069221586 |
| 31/12/2011 | 0.173030345 | 9.110137674 | 0.012315479 | -0.025569399 |
| 31/12/2012 | 0.171442448 | 9.118397343 | 0.046003553 | 0.113289664 |

**Bank 7:**  US Bank National Association

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 208867410 | 11603542 | 21233688 | 558801 |
| 31/12/2006 | 217802330 | 12414287 | 22162967 | 483948 |
| 31/12/2007 | 232759500 | 13649667 | 22746843 | 563521 |
| 31/12/2008 | 261775590 | 13348481 | 22849754 | 2129916 |
| 31/12/2009 | 276376130 | 9642545 | 26226612 | 6234303 |
| 31/12/2010 | 302470810 | 18740063 | 30827073 | 6178000 |
| 31/12/2011 | 330470810 | 13999075 | 34667255 | 7300021 |
| 31/12/2012 | 345088620 | 8393679 | 39586321 | 6297100 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 135603590 | 134097750 | 8.132271187 | 8.127421491 |
| 31/12/2006 | 135903120 | 141159830 | 8.133229427 | 8.149711127 |
| 31/12/2007 | 138532650 | 152471760 | 8.141552142 | 8.183189413 |
| 31/12/2008 | 171980050 | 180437040 | 8.235478071 | 8.256325694 |
| 31/12/2009 | 194253180 | 189772030 | 8.288368137 | 8.278232203 |
| 31/12/2010 | 211417190 | 191819120 | 8.325140296 | 8.282891894 |
| 31/12/2011 | 235091540 | 204182860 | 8.371237001 | 8.310019283 |
| 31/12/2012 | 253686210 | 219884340 | 8.40429686 | 8.3421943 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (7)** | **Log(Loan) Growth (7)** | **LR (7)** | **ER (7)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.00095824 | 0.022289636 | 0.056997953 | 0.101757254 |
| 31/12/2007 | 0.008322715 | 0.033478287 | 0.058642792 | 0.097726808 |
| 31/12/2008 | 0.093925929 | 0.073136281 | 0.050992077 | 0.087287566 |
| 31/12/2009 | 0.052890066 | 0.021906509 | 0.034889211 | 0.094894635 |
| 31/12/2010 | 0.036772159 | 0.004659691 | 0.0619566 | 0.101917514 |
| 31/12/2011 | 0.046096705 | 0.027127388 | 0.042361003 | 0.104902624 |
| 31/12/2012 | 0.033059859 | 0.032175018 | 0.024323256 | 0.114713493 |
|  |  |  |  |  |
| **Date** | **BLR (7)** | **log(TA) (7)** | **Log(Deposit) Growth (7) t-1** | **Log(Loan) Growth (7) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.021835885 | 8.338062521 |   |   |
| 31/12/2007 | 0.024773592 | 8.366907416 | 0.00095824 | 0.022289636 |
| 31/12/2008 | 0.093213958 | 8.417929147 | 0.008322715 | 0.033478287 |
| 31/12/2009 | 0.237709049 | 8.441500531 | 0.093925929 | 0.073136281 |
| 31/12/2010 | 0.200408258 | 8.480683469 | 0.052890066 | 0.021906509 |
| 31/12/2011 | 0.210573955 | 8.519133105 | 0.036772159 | 0.004659691 |
| 31/12/2012 | 0.159072625 | 8.537930638 | 0.046096705 | 0.027127388 |

**Bank 8:** PNC Bank, National Association

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 82876683 | 5768458 | 7349752 | 188798 |
| 31/12/2006 | 90142449 | 8345909 | 8354408 | 145591 |
| 31/12/2007 | 124782290 | 11544483 | 14936233 | 425898 |
| 31/12/2008 | 140777460 | 15002261 | 12915432 | 1403001 |
| 31/12/2009 | 260309850 | 12646828 | 31827917 | 6562674 |
| 31/12/2010 | 256638750 | 9949618 | 33875164 | 5228476 |
| 31/12/2011 | 263309560 | 9545201 | 35353371 | 4766192 |
| 31/12/2012 | 295026390 | 12203277 | 38410010 | 4638275 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 59417540 | 48758498 | 7.773914667 | 7.688050319 |
| 31/12/2006 | 65279906 | 49663616 | 7.81477952 | 7.696038337 |
| 31/12/2007 | 79367046 | 67507750 | 7.899640216 | 7.829353633 |
| 31/12/2008 | 94361490 | 74612828 | 7.97479479 | 7.872813501 |
| 31/12/2009 | 193043140 | 155166130 | 8.285654373 | 8.190796929 |
| 31/12/2010 | 191913970 | 149280070 | 8.283106589 | 8.17400183 |
| 31/12/2011 | 197343010 | 157778320 | 8.295221748 | 8.198047327 |
| 31/12/2012 | 216743270 | 185700800 | 8.335945621 | 8.268813775 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (8)** | **Log(Loan) Growth (8)** | **LR (8)** | **ER (8)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.040864853 | 0.007988019 | 0.092585781 | 0.092680065 |
| 31/12/2007 | 0.084860696 | 0.133315296 | 0.092516999 | 0.11969834 |
| 31/12/2008 | 0.075154574 | 0.043459868 | 0.106567209 | 0.091743607 |
| 31/12/2009 | 0.310859583 | 0.317983427 | 0.048583747 | 0.122269353 |
| 31/12/2010 | -0.002547784 | -0.016795098 | 0.038768962 | 0.131995515 |
| 31/12/2011 | 0.012115159 | 0.024045497 | 0.036250871 | 0.134265429 |
| 31/12/2012 | 0.040723873 | 0.070766447 | 0.04136334 | 0.130191777 |
|  |  |  |  |  |
| **Date** | **BLR (8)** | **log(TA) (8)** | **Log(Deposit) Growth (8) t-1** | **Log(Loan) Growth (8) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.017426848 | 7.954929353 |   |   |
| 31/12/2007 | 0.028514419 | 8.096152952 | 0.040864853 | 0.007988019 |
| 31/12/2008 | 0.108629816 | 8.148533125 | 0.084860696 | 0.133315296 |
| 31/12/2009 | 0.206192381 | 8.415490602 | 0.075154574 | 0.043459868 |
| 31/12/2010 | 0.154345408 | 8.409322231 | 0.310859583 | 0.317983427 |
| 31/12/2011 | 0.134815772 | 8.420466627 | -0.002547784 | -0.016795098 |
| 31/12/2012 | 0.120756933 | 8.469860865 | 0.012115159 | 0.024045497 |

**Bank 9:** Capital One National Association

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 29707759 | 4257828 | 5531316 | 105606 |
| 31/12/2006 | 30802955 | 4778878 | 5575717 | 78596 |
| 31/12/2007 | 97517902 | 7485888 | 20081325 | 338391 |
| 31/12/2008 | 115142310 | 2461952 | 20033326 | 724225 |
| 31/12/2009 | 127360050 | 4967044 | 23454422 | 1429092 |
| 31/12/2010 | 126901280 | 3508853 | 24227549 | 1353310 |
| 31/12/2011 | 133477760 | 4030714 | 24696819 | 1536859 |
| 31/12/2012 | 250961260 | 28647112 | 36642266 | 1502781 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 21723694 | 16194417 | 7.336933677 | 7.209365318 |
| 31/12/2006 | 21939005 | 16381556 | 7.341216927 | 7.214355151 |
| 31/12/2007 | 67059123 | 57420549 | 7.826457869 | 7.75906734 |
| 31/12/2008 | 86972755 | 67183877 | 7.939383227 | 7.827265062 |
| 31/12/2009 | 95538454 | 68008172 | 7.980178209 | 7.832561102 |
| 31/12/2010 | 96593447 | 69527683 | 7.984947664 | 7.842157757 |
| 31/12/2011 | 97063678 | 76245239 | 7.987056744 | 7.88221273 |
| 31/12/2012 | 191738000 | 139110660 | 8.282708193 | 8.143360411 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (9)** | **Log(Loan) Growth (9)** | **LR (9)** | **ER (9)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.00428325 | 0.004989833 | 0.155143492 | 0.181012406 |
| 31/12/2007 | 0.485240942 | 0.54471219 | 0.076764244 | 0.205924498 |
| 31/12/2008 | 0.112925358 | 0.068197722 | 0.021381819 | 0.173987529 |
| 31/12/2009 | 0.040794982 | 0.005296039 | 0.039000016 | 0.184158392 |
| 31/12/2010 | 0.004769455 | 0.009596655 | 0.027650257 | 0.190916506 |
| 31/12/2011 | 0.002109079 | 0.040054973 | 0.030197645 | 0.185025723 |
| 31/12/2012 | 0.295651449 | 0.261147681 | 0.114149538 | 0.146007659 |
|  |  |  |  |  |
| **Date** | **BLR (9)** | **log(TA) (9)** | **Log(Deposit) Growth (9) t-1** | **Log(Loan) Growth (9) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.014096124 | 7.488592381 |   |   |
| 31/12/2007 | 0.01685103 | 7.989084349 | 0.00428325 | 0.004989833 |
| 31/12/2008 | 0.036151012 | 8.061234938 | 0.485240942 | 0.54471219 |
| 31/12/2009 | 0.0609306 | 8.105033221 | 0.112925358 | 0.068197722 |
| 31/12/2010 | 0.055858312 | 8.103466003 | 0.040794982 | 0.005296039 |
| 31/12/2011 | 0.062229026 | 8.12540891 | 0.004769455 | 0.009596655 |
| 31/12/2012 | 0.041012229 | 8.399606686 | 0.002109079 | 0.040054973 |

**Bank 10:** TD Bank National Association

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 32082074 | 765212 | 6802022 | 60564 |
| 31/12/2006 | 39581731 | 2785943 | 8869020 | 130082 |
| 31/12/2007 | 45485973 | 6400338 | 9691522 | 230277 |
| 31/12/2008 | 101632080 | 9740547 | 18291879 | 543506 |
| 31/12/2009 | 140038550 | 15162553 | 22501465 | 1243472 |
| 31/12/2010 | 168748910 | 10849229 | 25841846 | 1525497 |
| 31/12/2011 | 188912550 | 10687591 | 27818135 | 1482103 |
| 31/12/2012 | 203985620 | 14662023 | 28467779 | 1361492 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 20522363 | 19991229 | 7.312227365 | 7.300839494 |
| 31/12/2006 | 27193604 | 25274127 | 7.434466769 | 7.402676163 |
| 31/12/2007 | 28424035 | 26663505 | 7.453685729 | 7.425917238 |
| 31/12/2008 | 76748556 | 50554587 | 7.885070213 | 7.703760567 |
| 31/12/2009 | 111593520 | 54671217 | 8.047638977 | 7.737758742 |
| 31/12/2010 | 136291130 | 66696395 | 8.134467592 | 7.824102361 |
| 31/12/2011 | 153149820 | 79720364 | 8.185116491 | 7.901569273 |
| 31/12/2012 | 169790820 | 92778239 | 8.229914206 | 7.967446125 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (10)** | **Log(Loan) Growth (10)** | **LR (10)** | **ER (10)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.122239404 | 0.101836669 | 0.070384567 | 0.224068523 |
| 31/12/2007 | 0.01921896 | 0.023241075 | 0.140710148 | 0.213066169 |
| 31/12/2008 | 0.431384484 | 0.277843329 | 0.095841264 | 0.17998135 |
| 31/12/2009 | 0.162568764 | 0.033998175 | 0.108274136 | 0.160680505 |
| 31/12/2010 | 0.086828616 | 0.086343619 | 0.064292143 | 0.153137854 |
| 31/12/2011 | 0.050648898 | 0.077466912 | 0.056574277 | 0.147254034 |
| 31/12/2012 | 0.044797715 | 0.065876852 | 0.071877728 | 0.139557774 |
|  |  |  |  |  |
| **Date** | **BLR (10)** | **log(TA) (10)** | **Log(Deposit) Growth (10) t-1** | **Log(Loan) Growth (10) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.014667009 | 7.597494783 |   |   |
| 31/12/2007 | 0.023760664 | 7.657877489 | 0.122239404 | 0.101836669 |
| 31/12/2008 | 0.029712967 | 8.007030814 | 0.01921896 | 0.023241075 |
| 31/12/2009 | 0.055261824 | 8.146247605 | 0.431384484 | 0.277843329 |
| 31/12/2010 | 0.059032044 | 8.227240976 | 0.162568764 | 0.033998175 |
| 31/12/2011 | 0.053278302 | 8.27626081 | 0.086828616 | 0.086343619 |
| 31/12/2012 | 0.047825719 | 8.309599553 | 0.050648898 | 0.077466912 |

**Bank 11:** Branch Banking and Trust Company

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 80226832 | 3281613 | 8001192 | 177878 |
| 31/12/2006 | 117134090 | 4091417 | 12703941 | 243228 |
| 31/12/2007 | 127698350 | 2973499 | 13701992 | 475534 |
| 31/12/2008 | 147483650 | 3253021 | 16504648 | 1378174 |
| 31/12/2009 | 159675540 | 2865436 | 19567931 | 3084919 |
| 31/12/2010 | 150828450 | 3031306 | 20184411 | 3945409 |
| 31/12/2011 | 168867640 | 5308373 | 20850529 | 2844424 |
| 31/12/2012 | 178034170 | 4660942 | 21189131 | 2517257 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 54318471 | 56811901 | 7.734947537 | 7.754439322 |
| 31/12/2006 | 83585119 | 80139699 | 7.922128965 | 7.903847707 |
| 31/12/2007 | 86957975 | 88449514 | 7.939309418 | 7.946695451 |
| 31/12/2008 | 98507876 | 94812115 | 7.993470955 | 7.976863835 |
| 31/12/2009 | 114169730 | 99465886 | 8.057550974 | 7.997674155 |
| 31/12/2010 | 106341070 | 100042200 | 8.026701026 | 8.000183234 |
| 31/12/2011 | 127549490 | 104291550 | 8.105678726 | 8.018249122 |
| 31/12/2012 | 136567970 | 111575680 | 8.135348854 | 8.047569542 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (11)** | **Log(Loan) Growth (11)** | **LR (11)** | **ER (11)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.187181429 | 0.149408385 | 0.034929345 | 0.108456394 |
| 31/12/2007 | 0.017180453 | 0.042847744 | 0.023285336 | 0.107299679 |
| 31/12/2008 | 0.054161537 | 0.030168384 | 0.022056825 | 0.111908323 |
| 31/12/2009 | 0.064080019 | 0.020810321 | 0.017945366 | 0.122548081 |
| 31/12/2010 | -0.030849948 | 0.002509078 | 0.020097707 | 0.133823632 |
| 31/12/2011 | 0.078977701 | 0.018065888 | 0.031435111 | 0.123472614 |
| 31/12/2012 | 0.029670127 | 0.02932042 | 0.026180042 | 0.119017215 |
|  |  |  |  |  |
| **Date** | **BLR(11)** | **log(TA) (11)** | **Log(Deposit) Growth (11) t-1** | **Log(Loan) Growth (11) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.01914587 | 8.068683308 |   |   |
| 31/12/2007 | 0.034705465 | 8.106185286 | 0.187181429 | 0.149408385 |
| 31/12/2008 | 0.083502175 | 8.168743877 | 0.017180453 | 0.042847744 |
| 31/12/2009 | 0.157651772 | 8.203238394 | 0.054161537 | 0.030168384 |
| 31/12/2010 | 0.195468126 | 8.178483268 | 0.064080019 | 0.020810321 |
| 31/12/2011 | 0.136419752 | 8.227546434 | -0.030849948 | 0.002509078 |
| 31/12/2012 | 0.118799445 | 8.250503364 | 0.078977701 | 0.018065888 |

**Bank 12:** SunTrust Bank

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 177231290 | 10199346 | 18738918 | 270796 |
| 31/12/2006 | 182628160 | 11536483 | 19838668 | 633099 |
| 31/12/2007 | 175107530 | 14049816 | 19774794 | 1429242 |
| 31/12/2008 | 185098790 | 14938035 | 19622062 | 3938917 |
| 31/12/2009 | 164340840 | 7675846 | 18096456 | 6791448 |
| 31/12/2010 | 162509570 | 6193846 | 19591355 | 6355292 |
| 31/12/2011 | 171291710 | 6374664 | 20647396 | 5533377 |
| 31/12/2012 | 169076810 | 9763282 | 21359209 | 3965760 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 128624620 | 127509860 | 8.109324105 | 8.105543769 |
| 31/12/2006 | 126571180 | 132363280 | 8.102334829 | 8.121767521 |
| 31/12/2007 | 119747930 | 131028240 | 8.078268015 | 8.117364908 |
| 31/12/2008 | 120116450 | 128705260 | 8.079602488 | 8.109596296 |
| 31/12/2009 | 124820580 | 115349870 | 8.096286196 | 8.062017109 |
| 31/12/2010 | 126112450 | 116425220 | 8.100757963 | 8.066047067 |
| 31/12/2011 | 129833180 | 122179960 | 8.113385694 | 8.086999979 |
| 31/12/2012 | 133278700 | 122596460 | 8.124760748 | 8.08847793 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (12)** | **Log(Loan) Growth (12)** | **LR (12)** | **ER (12)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | -0.006989276 | 0.016223752 | 0.063169245 | 0.108628746 |
| 31/12/2007 | -0.024066814 | -0.004402613 | 0.080235362 | 0.112929433 |
| 31/12/2008 | 0.001334473 | -0.007768611 | 0.08070304 | 0.106008591 |
| 31/12/2009 | 0.016683708 | -0.047579187 | 0.046706868 | 0.110115392 |
| 31/12/2010 | 0.004471767 | 0.004029958 | 0.038113731 | 0.120555085 |
| 31/12/2011 | 0.012627732 | 0.020952911 | 0.037215251 | 0.120539377 |
| 31/12/2012 | 0.011375054 | 0.001477951 | 0.057744655 | 0.126328436 |
|  |  |  |  |  |
| **Date** | **BLR (12)** | **log(TA) (12)** | **Log(Deposit) Growth (12) t-1** | **Log(Loan) Growth (12) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.031912374 | 8.261567744 |   |   |
| 31/12/2007 | 0.072275949 | 8.243304822 | -0.006989276 | 0.016223752 |
| 31/12/2008 | 0.200739199 | 8.26740358 | -0.024066814 | -0.004402613 |
| 31/12/2009 | 0.375291604 | 8.215745502 | 0.001334473 | -0.007768611 |
| 31/12/2010 | 0.324392672 | 8.210878941 | 0.016683708 | -0.047579187 |
| 31/12/2011 | 0.26799394 | 8.233736345 | 0.004471767 | 0.004029958 |
| 31/12/2012 | 0.185669797 | 8.228084045 | 0.012627732 | 0.020952911 |

**Bank 13:** FIA Card Services NA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 58516899 | 4169997 | 14069974 | 252030 |
| 31/12/2006 | 147839770 | 8774196 | 41856926 | 28102 |
| 31/12/2007 | 161691780 | 7206527 | 42918410 | 34197 |
| 31/12/2008 | 159637140 | 8209699 | 40830472 | 34774 |
| 31/12/2009 | 145365920 | 8150770 | 50143293 | 60127 |
| 31/12/2010 | 196748590 | 28925311 | 26365906 | 22487 |
| 31/12/2011 | 167004790 | 27618490 | 25120612 | 5767857 |
| 31/12/2012 | 167463620 | 41815716 | 22439471 | 3165036 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 29618265 | 33797347 | 7.471559615 | 7.528882611 |
| 31/12/2006 | 11461586 | 96116428 | 7.059244717 | 7.982797623 |
| 31/12/2007 | 8178763 | 118083970 | 6.912687624 | 8.072190946 |
| 31/12/2008 | 9816599 | 115321220 | 6.991961051 | 8.061909228 |
| 31/12/2009 | 75511532 | 91530215 | 7.878013281 | 7.961564482 |
| 31/12/2010 | 97124312 | 148553970 | 7.987327955 | 8.171884263 |
| 31/12/2011 | 95154699 | 127039910 | 7.97843024 | 8.103940177 |
| 31/12/2012 | 117448590 | 114749600 | 8.069847807 | 8.05975118 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (13)** | **Log(Loan) Growth (13)** | **LR (13)** | **ER (13)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | -0.412314897 | 0.453915012 | 0.059349362 | 0.283123587 |
| 31/12/2007 | -0.146557094 | 0.089393323 | 0.044569532 | 0.265433469 |
| 31/12/2008 | 0.079273427 | -0.010281718 | 0.051427249 | 0.255770506 |
| 31/12/2009 | 0.886052231 | -0.100344746 | 0.056070708 | 0.344945315 |
| 31/12/2010 | 0.109314674 | 0.21031978 | 0.147016611 | 0.134008106 |
| 31/12/2011 | -0.008897716 | -0.067944085 | 0.165375436 | 0.150418512 |
| 31/12/2012 | 0.091417568 | -0.044188997 | 0.249700299 | 0.133996094 |
|  |  |  |  |  |
| **Date** | **BLR (13)** | **log(TA) (13)** | **Log(Deposit) Growth (13) t-1** | **Log(Loan) Growth (13) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.000671382 | 8.169791278 |   |   |
| 31/12/2007 | 0.000796791 | 8.208687942 | -0.412314897 | 0.453915012 |
| 31/12/2008 | 0.000851668 | 8.203133939 | -0.146557094 | 0.089393323 |
| 31/12/2009 | 0.001199104 | 8.162462601 | 0.079273427 | -0.010281718 |
| 31/12/2010 | 0.000852882 | 8.293911629 | 0.886052231 | -0.100344746 |
| 31/12/2011 | 0.229606548 | 8.222728928 | 0.109314674 | 0.21031978 |
| 31/12/2012 | 0.14104771 | 8.223920475 | -0.008897716 | -0.067944085 |

**Bank 14:** Citizens Financial Group Inc.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 155439710 | 2880297 | 21886781 | 302695 |
| 31/12/2006 | 160900920 | 5854880 | 23551398 | 317359 |
| 31/12/2007 | 160286200 | 2918026 | 22354026 | 612037 |
| 31/12/2008 | 160444180 | 5210257 | 19956220 | 1097861 |
| 31/12/2009 | 148012290 | 7370939 | 22276147 | 2285016 |
| 31/12/2010 | 129969530 | 5221550 | 22693916 | 2533356 |
| 31/12/2011 | 129810540 | 3987216 | 23392897 | 2168332 |
| 31/12/2012 | 127911730 | 4961952 | 24129001 | 2394269 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 100228090 | 99203579 | 8.000989454 | 7.996527341 |
| 31/12/2006 | 100157550 | 105305690 | 8.000683693 | 8.022451838 |
| 31/12/2007 | 102444610 | 110786140 | 8.010489113 | 8.044485431 |
| 31/12/2008 | 94823687 | 109464500 | 7.976916838 | 8.039273298 |
| 31/12/2009 | 98241557 | 93865219 | 7.992295237 | 7.972504698 |
| 31/12/2010 | 92197465 | 85765409 | 7.96471898 | 7.933312163 |
| 31/12/2011 | 93003418 | 85683495 | 7.96849891 | 7.932897173 |
| 31/12/2012 | 95931026 | 86661771 | 7.981959089 | 7.93782756 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (14)** | **Log(Loan) Growth (14)** | **LR (14)** | **ER (14)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | -0.000305762 | 0.025924498 | 0.036388108 | 0.146372053 |
| 31/12/2007 | 0.009805421 | 0.022033593 | 0.018205098 | 0.139463198 |
| 31/12/2008 | -0.033572276 | -0.005212133 | 0.032473954 | 0.124381078 |
| 31/12/2009 | 0.015378399 | -0.0667686 | 0.049799507 | 0.150502009 |
| 31/12/2010 | -0.027576257 | -0.039192535 | 0.040175186 | 0.17460951 |
| 31/12/2011 | 0.00377993 | -0.00041499 | 0.030715657 | 0.180207994 |
| 31/12/2012 | 0.01346018 | 0.004930387 | 0.038792001 | 0.188637907 |
|  |  |  |  |  |
| **Date** | **BLR (14)** | **log(TA) (14)** | **Log(Deposit) Growth (14) t-1** | **Log(Loan) Growth (14) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.013475166 | 8.206558527 |   |   |
| 31/12/2007 | 0.027379274 | 8.204896133 | -0.000305762 | 0.025924498 |
| 31/12/2008 | 0.055013474 | 8.205323968 | 0.009805421 | 0.022033593 |
| 31/12/2009 | 0.102576806 | 8.170297778 | -0.033572276 | -0.005212133 |
| 31/12/2010 | 0.111631505 | 8.113841548 | 0.015378399 | -0.0667686 |
| 31/12/2011 | 0.092691897 | 8.113309957 | -0.027576257 | -0.039192535 |
| 31/12/2012 | 0.099227854 | 8.106910373 | 0.00377993 | -0.00041499 |

**Bank 15:** Fifth Third Bankcorp

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 105225000 | 3195000 | 9446000 | 294000 |
| 31/12/2006 | 100669000 | 2924000 | 10022000 | 352000 |
| 31/12/2007 | 110962000 | 2858000 | 9161000 | 893000 |
| 31/12/2008 | 119764000 | 3930000 | 12077000 | 2743000 |
| 31/12/2009 | 113380000 | 2673000 | 13497000 | 2947000 |
| 31/12/2010 | 111007000 | 2453000 | 14080000 | 2373000 |
| 31/12/2011 | 116967000 | 2840000 | 13251000 | 2968000 |
| 31/12/2012 | 121894000 | 2648000 | 13764000 | 2823000 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 67434000 | 70485000 | 7.828878922 | 7.848096704 |
| 31/12/2006 | 69380000 | 74732000 | 7.841234296 | 7.873506605 |
| 31/12/2007 | 75445000 | 83645000 | 7.877630463 | 7.922439985 |
| 31/12/2008 | 78613000 | 82808000 | 7.89549437 | 7.918072296 |
| 31/12/2009 | 84305000 | 75097000 | 7.925853333 | 7.875622588 |
| 31/12/2010 | 81648000 | 76097000 | 7.911945551 | 7.881367536 |
| 31/12/2011 | 85610000 | 81717000 | 7.932524497 | 7.912312414 |
| 31/12/2012 | 89517000 | 86867000 | 7.951905519 | 7.938854823 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (15)** | **Log(Loan) Growth (15)** | **LR (15)** | **ER (15)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.012355374 | 0.025409901 | 0.029045684 | 0.099553984 |
| 31/12/2007 | 0.036396167 | 0.04893338 | 0.025756565 | 0.082559795 |
| 31/12/2008 | 0.017863907 | -0.00436769 | 0.032814535 | 0.100839985 |
| 31/12/2009 | 0.030358963 | -0.042449708 | 0.023575587 | 0.119042159 |
| 31/12/2010 | -0.013907782 | 0.005744948 | 0.022097706 | 0.126838848 |
| 31/12/2011 | 0.020578946 | 0.030944879 | 0.024280353 | 0.113288363 |
| 31/12/2012 | 0.019381022 | 0.026542409 | 0.021723793 | 0.112917781 |
|  |  |  |  |  |
| **Date** | **BLR (15)** | **log(TA) (15)** | **Log(Deposit) Growth (15) t-1** | **Log(Loan) Growth (15) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.03512273 | 8.002895755 |   |   |
| 31/12/2007 | 0.097478441 | 8.045174276 | 0.012355374 | 0.025409901 |
| 31/12/2008 | 0.227125942 | 8.078326293 | 0.036396167 | 0.04893338 |
| 31/12/2009 | 0.218344817 | 8.054536453 | 0.017863907 | -0.00436769 |
| 31/12/2010 | 0.168536932 | 8.045350366 | 0.030358963 | -0.042449708 |
| 31/12/2011 | 0.223983096 | 8.068063351 | -0.013907782 | 0.005744948 |
| 31/12/2012 | 0.205100262 | 8.085982329 | 0.020578946 | 0.030944879 |

**Bank 16:** Chase Bank USA, NA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 75051579 | 2757929 | 21917751 | 60706 |
| 31/12/2006 | 83973505 | 5805558 | 22059358 | 50440 |
| 31/12/2007 | 77748330 | 5001148 | 21844790 | 6655 |
| 31/12/2008 | 102826030 | 7337242 | 23511537 | 4481 |
| 31/12/2009 | 91043014 | 2068277 | 27940644 | 3078 |
| 31/12/2010 | 131082740 | 3020814 | 25293171 | 2114 |
| 31/12/2011 | 121748570 | 3128365 | 24111019 | 4777968 |
| 31/12/2012 | 120651540 | 5980821 | 21832617 | 3362350 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 24860778 | 48652357 | 7.395514715 | 7.687103885 |
| 31/12/2006 | 32682132 | 55153133 | 7.51431038 | 7.741570188 |
| 31/12/2007 | 46304086 | 51404400 | 7.665619316 | 7.711000294 |
| 31/12/2008 | 56020579 | 68660300 | 7.748347593 | 7.836705697 |
| 31/12/2009 | 47157844 | 54546568 | 7.673553941 | 7.736767431 |
| 31/12/2010 | 40546190 | 106595660 | 7.607950051 | 8.027739523 |
| 31/12/2011 | 48797419 | 97622733 | 7.688396852 | 7.989550962 |
| 31/12/2012 | 45626504 | 94469932 | 7.659217193 | 7.975293603 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (16)** | **Log(Loan) Growth (16)** | **LR (16)** | **ER (16)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.118795664 | 0.054466303 | 0.069135592 | 0.262694263 |
| 31/12/2007 | 0.151308936 | -0.030569893 | 0.064324829 | 0.280967964 |
| 31/12/2008 | 0.082728277 | 0.125705402 | 0.071355881 | 0.228653552 |
| 31/12/2009 | -0.074793652 | -0.099938266 | 0.022717581 | 0.30689498 |
| 31/12/2010 | -0.06560389 | 0.290972092 | 0.023045094 | 0.19295577 |
| 31/12/2011 | 0.080446801 | -0.038188561 | 0.025695292 | 0.198039443 |
| 31/12/2012 | -0.029179658 | -0.014257359 | 0.049571029 | 0.180955975 |
|  |  |  |  |  |
| **Date** | **BLR (16)** | **log(TA) (16)** | **Log(Deposit) Growth (16) t-1** | **Log(Loan) Growth (16) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.002286558 | 7.924142281 |   |   |
| 31/12/2007 | 0.000304649 | 7.890691069 | 0.118795664 | 0.054466303 |
| 31/12/2008 | 0.000190587 | 8.012103068 | 0.151308936 | -0.030569893 |
| 31/12/2009 | 0.000110162 | 7.959246627 | 0.082728277 | 0.125705402 |
| 31/12/2010 | 8.35799E-05 | 8.117545511 | -0.074793652 | -0.099938266 |
| 31/12/2011 | 0.198165328 | 8.085463869 | -0.06560389 | 0.290972092 |
| 31/12/2012 | 0.154005816 | 8.08153287 | 0.080446801 | -0.038188561 |

**Bank 17:** Regions Bank

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 81074402 | 2891944 | 11466781 | 355316 |
| 31/12/2006 | 138667950 | 4047561 | 22002656 | 368441 |
| 31/12/2007 | 137049760 | 4802998 | 21139548 | 743590 |
| 31/12/2008 | 142084010 | 11508377 | 14495068 | 1475026 |
| 31/12/2009 | 138006760 | 9657134 | 16170306 | 5242282 |
| 31/12/2010 | 128372730 | 6870405 | 15591018 | 4746282 |
| 31/12/2011 | 123368200 | 7048839 | 16248430 | 5312391 |
| 31/12/2012 | 120420790 | 5732911 | 16615228 | 4335763 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 61483342 | 59312553 | 7.788757466 | 7.773146618 |
| 31/12/2006 | 101916670 | 98492336 | 8.008245225 | 7.993402438 |
| 31/12/2007 | 97116109 | 94965427 | 7.987291274 | 7.977565525 |
| 31/12/2008 | 95926007 | 96903787 | 7.981936367 | 7.98634075 |
| 31/12/2009 | 103004810 | 89110420 | 8.012857505 | 7.949928491 |
| 31/12/2010 | 98710662 | 81235074 | 7.994364065 | 7.90974358 |
| 31/12/2011 | 98301267 | 76140436 | 7.992559115 | 7.881615359 |
| 31/12/2012 | 96588183 | 73469591 | 7.984923996 | 7.866107622 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (17)** | **Log(Loan) Growth (17)** | **LR (17)** | **ER (17)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.219487759 | 0.22025582 | 0.029188872 | 0.158671532 |
| 31/12/2007 | -0.020953951 | -0.015836913 | 0.035045651 | 0.154247246 |
| 31/12/2008 | -0.005354907 | 0.008775224 | 0.080996989 | 0.102017588 |
| 31/12/2009 | 0.030921138 | -0.036412259 | 0.069975804 | 0.117170391 |
| 31/12/2010 | -0.018493441 | -0.04018491 | 0.053519194 | 0.121451168 |
| 31/12/2011 | -0.001804949 | -0.028128221 | 0.057136596 | 0.131706793 |
| 31/12/2012 | -0.007635119 | -0.015507737 | 0.047607319 | 0.137976408 |
|  |  |  |  |  |
| **Date** | **BLR (17)** | **log(TA) (17)** | **Log(Deposit) Growth (17) t-1** | **Log(Loan) Growth (17) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.016745297 | 8.141976095 |   |   |
| 31/12/2007 | 0.035175303 | 8.136878279 | 0.219487759 | 0.22025582 |
| 31/12/2008 | 0.101760544 | 8.152545206 | -0.020953951 | -0.015836913 |
| 31/12/2009 | 0.324191886 | 8.13990036 | -0.005354907 | 0.008775224 |
| 31/12/2010 | 0.304424124 | 8.108472777 | 0.030921138 | -0.036412259 |
| 31/12/2011 | 0.326947957 | 8.091203228 | -0.018493441 | -0.04018491 |
| 31/12/2012 | 0.260951159 | 8.080701472 | -0.001804949 | -0.028128221 |

**Bank 18:** RBS citizens, NA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 16316320 | 177727 | 3563262 | 61789 |
| 31/12/2006 | 17125177 | 1040863 | 3698340 | 52628 |
| 31/12/2007 | 128863080 | 2674052 | 17853463 | 527622 |
| 31/12/2008 | 129490650 | 4423304 | 15579279 | 961290 |
| 31/12/2009 | 116921120 | 5380330 | 16599869 | 1953875 |
| 31/12/2010 | 107835700 | 3971737 | 16915260 | 2094763 |
| 31/12/2011 | 106940590 | 6221381 | 18111064 | 1815876 |
| 31/12/2012 | 104823990 | 8055817 | 18774758 | 2092697 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 11034727 | 9767499 | 7.042761593 | 6.989783375 |
| 31/12/2006 | 11398712 | 9955645 | 7.056855781 | 6.998069402 |
| 31/12/2007 | 77529005 | 91492594 | 7.88946421 | 7.961385941 |
| 31/12/2008 | 73811677 | 90756005 | 7.868125073 | 7.95787537 |
| 31/12/2009 | 73387180 | 78175692 | 7.8656202 | 7.893071734 |
| 31/12/2010 | 70580808 | 74701340 | 7.848686626 | 7.873328392 |
| 31/12/2011 | 75690155 | 72295513 | 7.879039395 | 7.859111344 |
| 31/12/2012 | 83401598 | 72725396 | 7.921174372 | 7.861686095 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (18)** | **Log(Loan) Growth (18)** | **LR (18)** | **ER (18)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.014094188 | 0.008286027 | 0.060779693 | 0.215959228 |
| 31/12/2007 | 0.832608429 | 0.963316539 | 0.02075111 | 0.13854599 |
| 31/12/2008 | -0.021339138 | -0.003510571 | 0.034159254 | 0.120311999 |
| 31/12/2009 | -0.002504873 | -0.064803636 | 0.04601675 | 0.14197494 |
| 31/12/2010 | -0.016933574 | -0.019743342 | 0.036831374 | 0.15686141 |
| 31/12/2011 | 0.030352769 | -0.014217049 | 0.058176049 | 0.169356313 |
| 31/12/2012 | 0.042134977 | 0.002574751 | 0.076850891 | 0.179107454 |
|  |  |  |  |  |
| **Date** | **BLR (18)** | **log(TA) (18)** | **Log(Deposit) Growth (18) t-1** | **Log(Loan) Growth (18) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.014230168 | 7.233635069 |   |   |
| 31/12/2007 | 0.029552922 | 8.110128507 | 0.014094188 | 0.008286027 |
| 31/12/2008 | 0.061703112 | 8.112238411 | 0.832608429 | 0.963316539 |
| 31/12/2009 | 0.117704242 | 8.067892967 | -0.021339138 | -0.003510571 |
| 31/12/2010 | 0.123838652 | 8.032762562 | -0.002504873 | -0.064803636 |
| 31/12/2011 | 0.100263353 | 8.029142576 | -0.016933574 | -0.019743342 |
| 31/12/2012 | 0.111463328 | 8.020460687 | 0.030352769 | -0.014217049 |

**Bank 19:** M&T Bank Corporation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 55146000 | 1690000 | 5876000 | 156000 |
| 31/12/2006 | 57064000 | 1868000 | 6281000 | 224000 |
| 31/12/2007 | 64875000 | 2019000 | 6485000 | 447000 |
| 31/12/2008 | 65815000 | 2265000 | 6784000 | 847000 |
| 31/12/2009 | 68880000 | 1746000 | 7752000 | 1544000 |
| 31/12/2010 | 68021000 | 1533000 | 8357000 | 1253000 |
| 31/12/2011 | 77924000 | 1704000 | 9271000 | 1123000 |
| 31/12/2012 | 83008000 | 2602000 | 10202000 | 1072000 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 37100000 | 39693000 | 7.56937391 | 7.598713924 |
| 31/12/2006 | 39910000 | 42297000 | 7.601081728 | 7.626309565 |
| 31/12/2007 | 41266000 | 47262000 | 7.615592374 | 7.674512096 |
| 31/12/2008 | 42581000 | 48212000 | 7.629215856 | 7.683155148 |
| 31/12/2009 | 47449000 | 51058000 | 7.676227064 | 7.708063799 |
| 31/12/2010 | 49805000 | 51087000 | 7.697272944 | 7.7083104 |
| 31/12/2011 | 59394000 | 59187000 | 7.773742575 | 7.772226328 |
| 31/12/2012 | 65611000 | 65645000 | 7.816976657 | 7.817201653 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (19)** | **Log(Loan) Growth (19)** | **LR (19)** | **ER (19)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.031707818 | 0.027595641 | 0.032735175 | 0.110069396 |
| 31/12/2007 | 0.014510646 | 0.048202531 | 0.031121387 | 0.099961464 |
| 31/12/2008 | 0.013623483 | 0.008643052 | 0.034414647 | 0.103076806 |
| 31/12/2009 | 0.047011208 | 0.024908651 | 0.025348432 | 0.112543554 |
| 31/12/2010 | 0.02104588 | 0.000246601 | 0.022537158 | 0.122859117 |
| 31/12/2011 | 0.07646963 | 0.063915927 | 0.021867461 | 0.118974899 |
| 31/12/2012 | 0.043234082 | 0.044975325 | 0.031346376 | 0.122903816 |
|  |  |  |  |  |
| **Date** | **BLR (19)** | **log(TA) (19)** | **Log(Deposit) Growth (19) t-1** | **Log(Loan) Growth (19) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.035663111 | 7.756362211 |   |   |
| 31/12/2007 | 0.068928296 | 7.812077371 | 0.031707818 | 0.027595641 |
| 31/12/2008 | 0.124852594 | 7.818324886 | 0.014510646 | 0.048202531 |
| 31/12/2009 | 0.199174407 | 7.838093138 | 0.013623483 | 0.008643052 |
| 31/12/2010 | 0.149934187 | 7.832643012 | 0.047011208 | 0.024908651 |
| 31/12/2011 | 0.121130407 | 7.891671238 | 0.02104588 | 0.000246601 |
| 31/12/2012 | 0.105077436 | 7.91911995 | 0.07646963 | 0.063915927 |

**Bank 20:** Manufacturers and Traders Trust Company

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Date** | **Total Assets** | **Liquid Assets** | **Bank Equity**  | **Bad Loans** |
| 31/12/2005 | 54391344 | 1646569 | 6271596 | 140208 |
| 31/12/2006 | 56382388 | 1820434 | 6474440 | 207886 |
| 31/12/2007 | 64072546 | 2077065 | 6832201 | 430021 |
| 31/12/2008 | 64824244 | 2250693 | 6857657 | 755538 |
| 31/12/2009 | 67860327 | 1628199 | 8413819 | 1488267 |
| 31/12/2010 | 67054535 | 1304064 | 8886488 | 1388158 |
| 31/12/2011 | 76887082 | 1719725 | 9730230 | 1274799 |
| 31/12/2012 | 82086021 | 2212356 | 10267607 | 1239842 |
|  |  |  |  |  |
| **Date** | **Deposits**  | **Loans** | **Log(Deposits)** | **Log(Loans)** |
| 31/12/2005 | 36801185 | 39461230 | 7.565861803 | 7.596170618 |
| 31/12/2006 | 39939021 | 42099325 | 7.601397415 | 7.624275133 |
| 31/12/2007 | 41148140 | 47089459 | 7.614350209 | 7.672923701 |
| 31/12/2008 | 42406140 | 47789219 | 7.627428743 | 7.679329933 |
| 31/12/2009 | 47268874 | 50278815 | 7.674575257 | 7.701385033 |
| 31/12/2010 | 49830537 | 50380380 | 7.697495567 | 7.702261439 |
| 31/12/2011 | 60064171 | 58550292 | 7.778615487 | 7.767529065 |
| 31/12/2012 | 66397391 | 65062071 | 7.822151015 | 7.813327883 |
|  |  |  |  |  |
| **Date** | **Log(Deposit) Growth (20)** | **Log(Loan) Growth (20)** | **LR (20)** | **ER (20)** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.035535612 | 0.028104515 | 0.032287281 | 0.114830894 |
| 31/12/2007 | 0.012952794 | 0.048648568 | 0.032417394 | 0.10663227 |
| 31/12/2008 | 0.013078534 | 0.006406232 | 0.034719927 | 0.105788461 |
| 31/12/2009 | 0.047146514 | 0.0220551 | 0.023993386 | 0.123987304 |
| 31/12/2010 | 0.02292031 | 0.000876405 | 0.019447812 | 0.132526279 |
| 31/12/2011 | 0.08111992 | 0.065267626 | 0.022366891 | 0.126552208 |
| 31/12/2012 | 0.043535527 | 0.045798818 | 0.026951678 | 0.125083502 |
|  |  |  |  |  |
| **Date** | **BLR (20)** | **log(TA) (20)** | **Log(Deposit) Growth (20) t-1** | **Log(Loan) Growth (20) t-1** |
| 31/12/2005 |   |   |   |   |
| 31/12/2006 | 0.032108723 | 7.751143466 |   |   |
| 31/12/2007 | 0.062940332 | 7.806671982 | 0.035535612 | 0.028104515 |
| 31/12/2008 | 0.110174364 | 7.811737461 | 0.012952794 | 0.048648568 |
| 31/12/2009 | 0.176883648 | 7.831615948 | 0.013078534 | 0.006406232 |
| 31/12/2010 | 0.156209967 | 7.826428155 | 0.047146514 | 0.0220551 |
| 31/12/2011 | 0.131014272 | 7.885853379 | 0.02292031 | 0.000876405 |
| 31/12/2012 | 0.120752771 | 7.914269204 | 0.08111992 | 0.065267626 |

**Index**

* **Log (Deposit) Growth =** Log (Deposit) year t – Log (Deposit) year t-1
* **Log (Loan) Growth =** Log (Loan) year t – Log (Loan) year t-1
* **LR =** Liquid Assets / Total Assets
* **ER =** Bank Equity / Total Assets
* **BLR =** Bad Loans / Bank Equity
* **Log (TA) =** Log of Total Assets
* **Log (Deposit) Growth t-1 =** Log (Deposit) year t-1 – Log (Deposit) year t-2
* **Log (Loan) Growth t-1 =** Log (Loan) year t-1 – Log (Loan) year t-2

**Eview Results**

|  |  |
| --- | --- |
| Dependent Variable: LOG\_LOAN\_\_GROWTH |  |
| Method: Least Squares |  |  |
| Date: 06/23/13 Time: 21:21 |  |  |
| Sample: 1 120 |  |  |  |
| Included observations: 120 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| LR | -0.076341 | 0.128181 | -0.595575 | 0.5527 |
| ER | -0.490368 | 0.266507 | -1.839982 | 0.0684 |
| BLR | -0.616488 | 0.134943 | -4.568515 | 0.0000 |
| LOG\_TA\_ | 0.012071 | 0.016848 | 0.716485 | 0.4752 |
| LOG\_DEPOSIT\_\_GROWTH\_T\_1 | -0.002267 | 0.089269 | -0.025397 | 0.9798 |
| LOG\_LOAN\_\_GROWTH\_T\_1 | -0.139757 | 0.097094 | -1.439409 | 0.1528 |
| C | 0.102213 | 0.147182 | 0.694467 | 0.4888 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.168612 |     Mean dependent var | 0.038242 |
| Adjusted R-squared | 0.124467 |     S.D. dependent var | 0.123752 |
| S.E. of regression | 0.115794 |     Akaike info criterion | -1.417440 |
| Sum squared resid | 1.515140 |     Schwarz criterion | -1.254837 |
| Log likelihood | 92.04641 |     Hannan-Quinn criter. | -1.351406 |
| F-statistic | 3.819542 |     Durbin-Watson stat | 2.157874 |
| Prob(F-statistic) | 0.001669 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

|  |  |
| --- | --- |
| Dependent Variable: LOG\_LOAN\_\_GROWTH |  |
| Method: Least Squares |  |  |
| Date: 06/23/13 Time: 21:45 |  |  |
| Sample: 1 120 |  |  |  |
| Included observations: 120 |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Variable | Coefficient | Std. Error | t-Statistic | Prob.   |
|  |  |  |  |  |
|  |  |  |  |  |
| LR\_NONQE | -0.135438 | 0.143234 | -0.945575 | 0.3464 |
| LR\_QE | -0.008268 | 0.147799 | -0.055944 | 0.9555 |
| BLR | -0.657677 | 0.142151 | -4.626603 | 0.0000 |
| ER | -0.531962 | 0.270422 | -1.967151 | 0.0516 |
| LOG\_TA\_ | 0.012568 | 0.016867 | 0.745102 | 0.4578 |
| LOG\_LOAN\_\_GROWTH\_T\_1 | -0.125583 | 0.098350 | -1.276890 | 0.2043 |
| LOG\_DEPOSIT\_\_GROWTH\_T\_1 | -0.009479 | 0.089663 | -0.105715 | 0.9160 |
| C | 0.108246 | 0.147418 | 0.734283 | 0.4643 |
|  |  |  |  |  |
|  |  |  |  |  |
| R-squared | 0.174941 |     Mean dependent var | 0.038242 |
| Adjusted R-squared | 0.123375 |     S.D. dependent var | 0.123752 |
| S.E. of regression | 0.115867 |     Akaike info criterion | -1.408415 |
| Sum squared resid | 1.503606 |     Schwarz criterion | -1.222582 |
| Log likelihood | 92.50491 |     Hannan-Quinn criter. | -1.332948 |
| F-statistic | 3.392547 |     Durbin-Watson stat | 2.173420 |
| Prob(F-statistic) | 0.002533 |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

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