ISSN No:-2456-2165

Interest Rates and Commercial Bank Loans

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September 2023

ISSN No:-2456-2165

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ABSTRACT

We present a study on interest rates and their effects on Loans. Having described interest rates as money charged by a lender to a borrower for its use, we use thus to examine the influence of interest rates on loans. Our Literature review discusses factors that affect interest rates and the effect of intereston loans. We follow Mennis's description of the behavior of interest rates when he outlines the factors that influence future movements of interest rates in the United States of America. We also look at the financial markets in Zambia and review their underdevelopment and inequalities in the interest rates charged on loans and that paid on cash deposits by commercial banks.

We highlight the methodology we use in examining the effect of interest rates on loans using the ordinary least squares. Our results for this test leads us to conclude that as interest rates go up fewer loans would be contracted.

Finally we recommend that authorities should pursue policies that reduce risk on loans and help maintain low levels of inflation in order to maintain competitive rates of interest in an economy.

Keywords:- *Gross Domestic Product, Inflation, Interest rates, Linearity, Loans, Randomization, outlier.*

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CHAPTER ONE

INTRODUCTION

Interest rate is the money charged, expressed as a percentage of principal, by a lender to a borrower for the use of that money. Interest rates are typically noted on an annual basis(Instopedia, 2015). Interest rates arise because people who don't have money and want it (Deficit Spenders) must pay something to those people who have money (Surplus Spenders) and are willing to lend it for a reward(Mennis,1991).

We can differentiate between specific interest rates and interest rates in general. Specific interest rates is interest rate on a particular financial instrument. Specific interest rates reflect the time for which the money is lent, the risk that the loan may not be repaid, and the current supply of and demand for funds available for lending in the market place (Mennis, 1991).It is alleged that there must be information, contained in specific interest rates, to help borrowers decide when and how many loans to demand and lenders when and how many loans to supply. This is the type of interest (and the allegation thereof) that we wish to examine in this paper. We want to look at the role played by such interest rates in informing decisions in the loans market. The rest of this paper reviews literature of similar work done on this topic in section 2.0 andthen we inform our reader of how we collected data for our analysis in section 3.0. In section 4.0 we show the methodology we used to analyze the effects of interest rates on loans and in section 5.0 we bring out the results of this analysis. We conclude in section 6.0.

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CHAPTER TWO

LITERATURE REVIEW

The aim of this paperis to determine the effect of the changes in interest rates on the level of loans.The following is a review of the literature we looked at that discusses how interest rates changes can affect demand for loans in a small economy, Zambia.We take a look at the empirical evidence on changes in interest rates and changes in loans in Zambia.

The financial markets in Zambia are rather small and not fully developed. The structure of the banking industry as at end 2012 comprised: The Central Bank of Zambia (The Bank of Zambia) and 19 commercial banks. Of these commercial banks 16 are foreign owned, 2 owned by local private investors, and 1 jointly owned by the Zambian and the Indian Governments.At that time, there were also 8 leasing companies, 4 building societies, 1 development bank, 1 savings and credit bank, 57 bureau de change, 1 credit reference bureau and 35 micro-finance institutions. The country also has oneStock Exchange.

Zambia's real Gross Domestic Product (GDP) decreased to 6.5% in 2013, in large part due to a poor agriculture harvest. Investments in mining continue to drive other sectors, especially construction, transport and energy. In the medium term, growth is projected to increase to 7.1% in 2014 and 7.4% in 2015 (African Economic Outlook, 2014).

The benchmark interest rate in Zambia is the Central Bank Policy Rate thatwas last recorded at 12.50 percent in 2015. Commercial banks set their own interest rates following closely the Central Bank Policy rate with a margin of anything between 4 and 12 percent.

A paper by Banda (2010) on,"The Determinants of Banking Sector Interest Rate Spreads In Zambia" discussed thecountry's financial intermediation as being essential for economic development. The consensus is that Zambia needsa stable and efficient banking system in order to finance both private and public investment andexpenditures. The effectiveness of the banking system in channeling funds from surplus to deficitspenders is often gauged by examining the spread between lending and deposit rates and by assessingthe degree of operational efficiency of the banking industry (Banda, 2010).

The above paper goes on to say that in Zambia interest rate spreads remain absolutely high.When the spread between lending and deposit interest rates is too large, it is generally regarded as aconsiderable impediment to the expansion and development of financial intermediation. This is because itdiscourages potential savers with low returns on deposits and limits financing for potentialborrowers, thus reducing feasible investment opportunities and therefore the growth potential of theeconomy(Banda, 2010).

The above paper examines reasons why interestrate spreads are still persistently high in Zambia despite successful financial reforms.Unlike in our paper where we want to find out the effects of the movements in interest rates on loans in Zambia, the study we have just reviewedwas investigating the levels and trends in interest rate spreads, documenting the key macroeconomic and market determinants of interest rate spreads.

Another study similar to ours was done by Francis Mbaoand others in 2014. This study aimed to shed light on how various elements going into banks' cost structure influenced lending rates in Zambia. Theresults of their analysis indicated that lending rates are to a significant extent influenced by variables relating to banks' costs. The analysis also indicated, however, that only a small part of the large drop in lending rates that occurred in 2012 in Zambia is explained by changes in variables on banks' balance sheets, implying other factors at play (Mbao et al., 2014).

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The above studies though related to ours do not establish the relationship between bank loans and interest rates that we wish to examine in this paper. They, however, bring out the relationship between interest rates and credit availability. The relationship we wish to establish in our presentstudy is whether changes in interest rates should be translated in any changes in the level of loans. In examining this relationship we wish to find out whether there is information in the rate of interestsothataffects the borrowing levels and therefore the demand for bank loans.In seeking to establish this relationship we took a sample of the total amounts of commercial bank borrowingin the local currency (the Kwacha) and the level of interest rates as indicated by commercial bank lending rates and subjected these two to an econometric analysis.

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CHAPTER THREE

THE DATA

In conducting this analysis we obtained data already collected by the Bank of Zambia from their Annual Reports. The data was collected by monthly end period figures. Our sampling frame, in this case, is already given as collected in the Bank of Zambia annual financial surveys on commercial banks.Our sampleis then obtained by deliberately selecting the monthly data between the years 2000 and 2013. This is the only period we could find complete information on. This then becomes the period of our study.The respondents to this survey are all the entities that get loans from commercial banks. Thus our "sample" consists of actual respondents who get loans from commercial banks.

Our sample, is therefore,not randomly selected and also does not include the population of people that want loans from the commercial banks basing their decisions on the prevailing interest rates but have not managed to do so. In addition, our sample may lack representation of the whole population of loan seekers because Zambia has a large population of people who are "unbanked". These are people in rural and other areas and have little or no access to financial services. Such people could not be included in our sample although they are willing to obtain loans but are excluded due to poor or non-existent infrastructure where they live.

Nevertheless, the Bank of Zambia data gave us a readily available sampling frame, which we used to select a "sample" of loans from commercial banks despite it not beingrandomly selected. The incompleteness of data in the years prior to 2000 made it difficult for us to obtain a large enough sampling frame to conduct random,systematic or any other form of sampling. We, therefore, simply took a selected thirteen years of the bank's collection of data on commercial bank loans and interest rates. At great pains, we may have to admit that this was a convenient sample!

The group we have chosen (the people who go to the bank) can be said to be a good representative of and matches well the population who borrow. This is our population of interest.

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CHAPTER FOUR

METHODOLOGY

Our primary investigation is to determine the relationship between the level of borrowing and interest rates in Zambia. We employ the use of least squares linear regression. We firstly test whether the movements in the level of borrowing, as indicated by the movements in the level of commercial bank loans, is related to the change in interest rates, as indicated by the weighted lending base interest rates of commercial banks.

We want to test the hypothesis that loans areaffected by interestrates. The slope of this relationship will indicate the impact of interest rates on loans. We, therefore, craft our null hypothesis as: the slope of the regression between interest rates and loans is 0. Hence, we state:

Ho: Interest Rates are not related to Loans.

$\beta = 0$

as against our alternative hypothesis:

Ha: Interest rates are in fact related to commercial bank loans:

or $\beta \neq 0$

This test is the test that the regression slope is 0, which is the t-test for the regression slope.

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CHAPTER FIVE

RESULTS

We used the output from the SPSS package for the data we collected and have been analyzing. In conducting this regression we went through the following steps:

We checked for the **Linearity Condition** in the data. In order to do this, we plotted a scatterplot of our independent variable, Interest rates, against our dependent variable, Commercial bank Loans. Our scatterplot looked as shown in diagram 4.1 below:

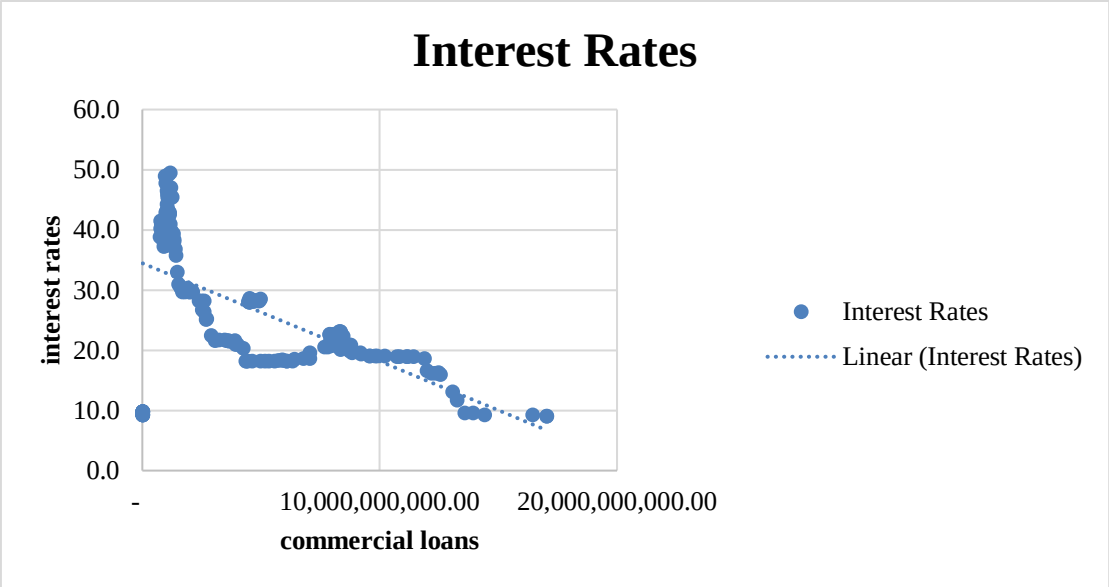

Diagram 4.1

In diagram 4.1 above the scatterplot is not strongly linear but the data distribution can be traced with a straight line indicating no strong evidence of non-linearity. In other words the scatterplot looks fairly straight and, therefore, we can conclude that the linearity condition of our data is satisfied. In this case we established that the true relationship of our two quantitative variables, commercial bank loans and interest rates is linear and so we use a straight line to fit this data.

We proceeded to check for the **independence assumption.**This assumption was to allow us check whether the errors in the true underlying regression model that we had come up with (the e's) were independent of each other. This was an important assumption for us to check as we wanted to be sure that our regression parameters and hence our regression model would apply to a larger population of loans in Zambia.

We looked at the displays of our regression residuals for evidence of patterns, trends or clumping, any of which would suggest a failure of independence in our model. We checked this violation by plotting the residuals against time, which was the *x*-variable(interest rates)and looked for patterns. We came up with the following pattern in diagram 4.2.

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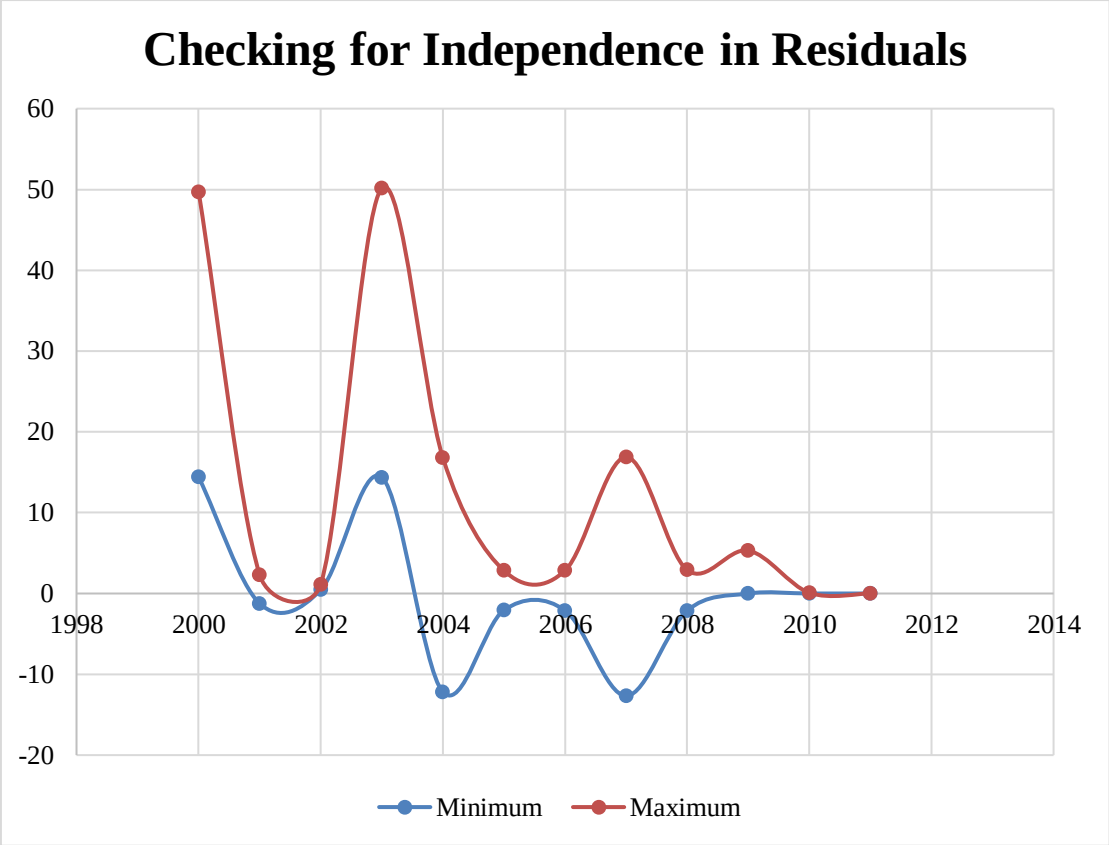

Diagram 4.2:

Diagram 4.2 above shows some kind of pattern in the beginning years between 2000 and 2006. This pattern, however, breaks between 2006 and 2010. The later years seem to have no discernible pattern. Our data seems to have failed the independence test/assumption.

This data are from a survey of the rates charged by banks on loans borrowed from them. Though banks in Zambia claim that their prices (interest rates) are independently arrived at by consideration of each bank's cost of dispensing such a service, the risks involved and the cost of funds, its very clear from the above that the failure of independence in our data clearly shows this may not be so. Many a time there have been complaints in the Zambian Loans market that commercial banks collude and are in fact a cartel that works together to overcharge their customers. The "big five" banks in country, it is said, set the price of loans that is almost always uniform. The results of the above scatterplot go to show that customers' claims may not be too far fetched.

We also checked for the **randomization condition.** Aspointed out earlier in this section our data are not a random sample. However, we assume they are representative of the commercial banks' interest rates and the ensuing level of loans.

We, however, continued to check for other assumptions in this data and so we checked for the **equal variance** assumption. This is because we wanted to see if the scatter of the residuals in our data was the same everywhere. What we where trying to do here, is to establish whether the variability of *y*(commercial bank loans) should be about the same for all values of *x*(commercial bank interest rates).

We checked this **equal spread condition** of our data by plotting a scatter plot (diagram 4.3) of the residuals against *x*. We checked to see if the plot is straight enough. If this would be so we would conclude that our data are independent, and the spread is about the same everywhere. Diagram 4.3 below indicates our scatter plot.

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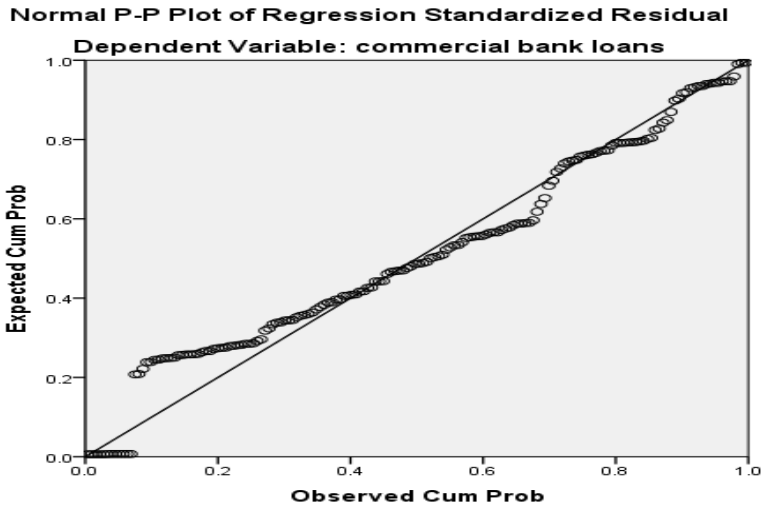

Diagram 4.3:

Though not in a perfect straight line, the plot can be described as generally and fairly in a straight line, though not everywhere. There is a clear pattern in our data and, therefore,this suggests that this data may not be independent. We, however, proceeded to check for normality of our distribution.

In this assumption we wanted to check whether our regression line followed **a normal model or satisfied the nearly normal condition**. This was important for us because we would then use a Student's *t*-model for inference. To do this we constructed a histogram of the residuals.

Diagram 4.4 below was our result.

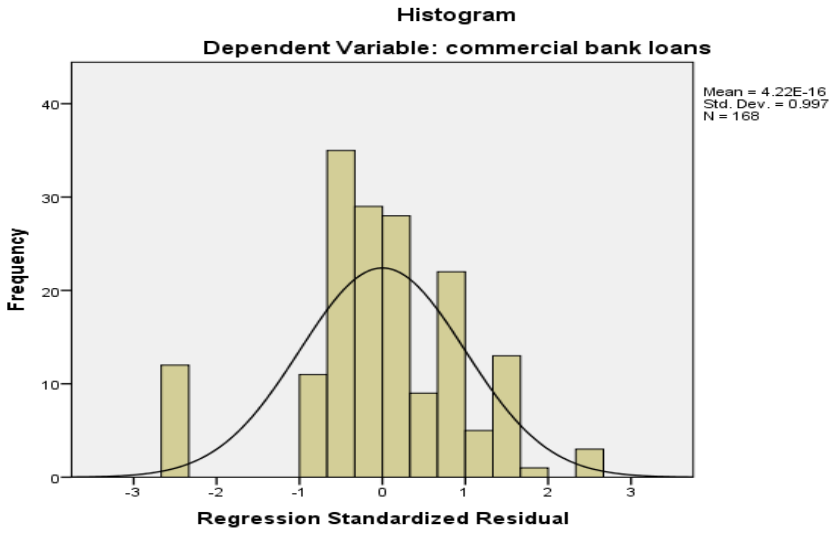

Diagram 4.4:

The result of our normal probability plot is a "near normal" or normal plot except for the fact that there seems to be an **outlier** on the far left of the histogram leading to our questioning the "normality" of this distribution.However, our sample size is large enough (with 168 observations) and so we decided to proceed with inference.

We proceeded to test the regression slope with a *t*-test and looked at the Durbin Watson value. A summary of the computer output, in SPSS, (see Appendix 3 for detailed printout of the SPSS computer output table) for this regression is as follows:

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Table 4.1: Results Of The Regression Analysis

Variable	Coefficient	SE (Coefficient)	t-ratio	Sig
Intercept	10509969841	661697667.175	15.883	0.00
Interest Rates	-215316677.69	22733360.541	-9.471	

R^2 = 35.1%, Durbin-Watson = 0.162

The results of the above regression indicate that the relationship we see in the data is unlikely to have occurred by chance. Therefore, **we reject the null hypothesis** and conclude that there is evidence that the commercial bank interest rates are linearly related to the loans.

The R squared value is rather low implying that only 35.1% of the regression can explain the relationship between interest rates and loans.

The Durbin-Watson statistic, at 0.162, is substantially less than 2 indicating that there is evidence in our data, of positive serial correlation. This means that there is statistical evidence that the error terms may be positively correlated. We had raised this issue earlier in this section when we looked at the independence of our data that revealed the fact that our data failed the independence assumption.

We canalso infer, by looking at the sign of the slope of the regression line from the above results, that the relationship between interest rates and loans is inverse. That is to say interest rates and loans are negatively related. This sign is telling us that the movements in interest rates will always trigger an opposite movement in loans. Thus, as interest rates move up the level of loans will go down and vice versa. This means lower interest rates will always attract a higher demand for loans and people will seek not to contract loans when interest rates go up.

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CHAPTER SIX

CONCLUSIONS

We investigated the relationship between interest rates and loans in Zambia. The regression analysis showed that as interest rates go up fewer loans would be contracted. Facts here arethat since a higher demand for loans leads to higher investment levels in the country and that this in turnwould result in higher productivity in goods and services. This would translate into higher economic growth. Lower levels of interest rates are, therefore, desirable and authorities should follow policies that are aimed at lower interest rates in the country.

It should be pointed out that the money lender takes a risk that the borrower may not pay back the loan. Thus, interest rates provide a certain compensation for the lender to bear this risk. Coupled with the risk of default is the risk of inflation. When you lend money now, the prices of goods and services may go up by the time you are paid back, so your money's original purchasing power would decrease. Thus, interest rate protectsagainst future loss of the value of money lent out as rises in inflation are anticipated in the future. Interest rate can thus be considered as a cost for one entity and income for another (Heakal, 2015).

From the foregoing, it is desirable and good for the economy if authorities pursue policies that reduce inflation. We recommend that authorities should pursue policies that would reduce risk on loans for commercial banks and that maintain low levels of interest rates.

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APPENDIX 1

YEAR	End of Period	Commercial Bank Loans	Interest Rates	Inflation Rates (Annual)
2000	January	787,083,000.00	41.5	20.7
	February	811,286,000.00	41.3	23.0
	March	813,908,000.00	40.9	23.9
	April	794,329,000.00	40.2	26.2
	May	763,818,000.00	38.9	25.2
	June	817,412,000.00	39.0	23.8
	July	873,352,000.00	39.1	25.9
	August	908,327,000.00	38.0	27.0
	September	922,009,000.00	37.3	27.7
	October	978,101,000.00	37.5	28.6
	November	1,044,889,000.00	38.1	28.9
	December	1,077,349,000.00	37.5	30.1
2001	January	1,040,081,000.00	38.8	30.0
	February	998,495,000.00	42.9	29.1
	March	981,809,000.00	49.0	28.8
	April	987,836,000.00	47.8	24.8
	May	1,065,397,000.00	46.0	22.2
	June	1,067,971,000.00	45.9	20.2
	July	1,108,452,000.00	45.9	17.1
	August	1,114,194,000.00	47.0	16.8
	September	1,103,727,000.00	47.2	17.4
	October	1,063,666,000.00	46.5	17.2
	November	1,103,277,000.00	46.7	17.7
	December	1,126,058,000.00	46.7	18.7
2002	January	1,184,849,330.00	49.5	19.6
	February	1,112,975,000.00	49.2	19.2
	March	1,219,872,000.00	47.0	18.1
	April	1,168,730,500.00	46.9	17.8
	May	1,228,225,000.00	45.5	20.9
	June	1,279,063,000.00	45.5	23.6
	July	1,051,820,000.00	44.3	23.4
	August	1,071,504,000.00	43.5	23.7
	September	1,088,371,000.00	43.3	23.8
	October	1,033,492,000.00	42.8	23.8
	November	1,051,530,000.00	42.6	25.3
	December	1,026,207,000.00	43.1	26.7
2003	January	1,085,809,000.00	45.4	24.3
	February	1,112,010,000.00	42.1	22.9
	March	1,155,950,000.00	42.9	22.6
	April	1,168,073,000.00	42.6	23.9
	May	1,187,433,000.00	41.0	23.9
	June	1,226,046,000.00	39.5	21.9
	July	1,230,339,000.00	39.8	20.2

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	August	1,308,483,000.00	39.4	20.3
	September	1,310,830,000.00	38.3	21.1
	October	1,346,320,000.00	38.4	21.1
	November	1,344,759,000.00	38.1	19.1
	December	1,401,047,000.00	36.8	17.2
2004	January	1,435,429,868.00	35.8	17.4
	February	1,481,599,868.00	33.0	16.8
	March	1,536,391,868.00	31.0	17.6
	April	1,625,241,868.00	30.5	17.8
	May	1,698,742,868.00	29.7	17.4
	June	1,802,933,868.00	29.7	18.6
	July	1,921,920,868.00	30.3	19.5
	August	1,993,782,868.00	29.7	18.9
	September	1,994,185,318.00	29.7	17.8
	October	2,055,887,000.00	29.8	18.0
	November	2,120,266,000.00	29.7	18.3
	December	2,106,368,000.00	29.8	17.5
2005	January	4,511,466,000.00	28.0	18.2
	February	4,540,072,000.00	28.6	18.7
	March	4,467,784,000.00	28.1	17.4
	April	4,530,517,470.00	28.0	18.6
	May	4,698,572,175.00	28.1	19.1
	June	4,991,746,257.00	28.5	19.2
	July	4,909,792,152.00	28.2	18.7
	August	4,707,060,419.00	28.3	19.3
	September	4,924,109,829.00	28.2	19.5
	October	2,613,009,099.00	28.2	18.3
	November	2,405,814,465.00	28.2	17.2
	December	2,501,953,517.00	28.2	15.9
2006	January	2,530,800,350.00	26.7	12.2
	February	2,616,638,275.00	26.4	10.3
	March	2,683,438,275.00	25.1	10.7
	April	2,731,656,106.00	25.2	9.4
	May	2,905,393,275.00	22.5	8.6
	June	3,086,399,275.00	21.6	8.5
	July	3,227,043,480.00	21.7	8.7
	August	3,482,214,283.00	21.7	8.0
	September	3,633,684,275.00	21.6	8.2
	October	3,553,831,275.00	21.6	7.9
	November	3,675,412,275.00	21.5	8.1
	December	3,923,695,275.00	21.6	8.2
2007	January	3,939,304,275.00	21.0	9.8
	February	4,018,686,275.00	21.0	12.6
	March	4,274,268,275.00	20.3	12.7
	April	4,396,919,275.00	18.2	12.4

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	May	4,379,897,275.00	18.2	11.8
	June	4,440,349,275.00	18.2	11.1
	July	4,630,197,275.00	18.2	11.2
	August	4,980,039,275.00	18.2	10.7
	September	5,178,995,275.00	18.2	9.3
	October	5,348,904,275.00	18.2	9.0
	November	5,583,122,275.00	18.2	8.7
	December	5,757,191,275.00	18.3	8.9
2008	January	5,911,432,275.00	18.4	9.3
	February	5,943,709,275.00	18.3	9.5
	March	6,096,719,275.00	18.2	9.8
	April	6,101,735,275.00	18.2	10.1
	May	6,334,199,275.00	18.2	10.9
	June	6,413,367,275.00	18.5	12.1
	July	6,789,025,275.00	18.6	12.6
	August	7,061,457,275.00	18.6	13.2
	September	7,062,717,479.00	19.6	14.2
	October	7,699,802,397.00	20.6	15.2
	November	7,820,543,856.00	20.6	15.3
	December	7,997,410,038.00	20.8	16.6
2009	January	8,433,988,962.00	20.9	16.0
	February	8,770,991,210.00	20.9	14.0
	March	8,785,859,000.00	20.9	13.1
	April	8,740,299,089.00	20.7	14.3
	May	8,394,740,077.00	21.6	14.7
	June	8,448,448,480.00	22.4	14.4
	July	8,467,363,597.00	22.4	14.0
	August	8,363,738,384.00	23.0	14.3
	September	8,300,444,275.00	23.1	13.0
	October	8,362,429,275.00	23.1	12.3
	November	8,325,332,275.00	23.1	11.5
	December	8,098,250,275.00	22.7	9.9
2010	January	7,904,814,714.00	22.7	9.6
	February	8,044,492,401.00	22.6	9.8
	March	7,908,660,650.00	22.6	10.2
	April	7,936,803,127.00	21.5	9.2
	May	8,298,169,680.00	21.3	9.1
	June	8,425,118,871.00	21.0	7.8
	July	8,314,768,202.00	20.6	8.4
	August	8,368,008,063.00	20.1	8.2
	September	8,749,612,479.00	19.9	7.7
	October	8,837,732,705.00	19.6	7.3
	November	9,205,619,086.00	19.6	7.1
	December	9,219,431,772.00	19.4	7.9
2011	January	9,616,082,430.00	19.1	6.3

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	February	9,568,046,723.00	19.1	6.5
	March	9,821,255,363.00	19.1	6.6
	April	9,908,563,952.00	19.1	6.3
	May	10,227,596,749.00	19.1	6.3
	June	10,748,243,576.00	19.0	6.1
	July	10,836,068,484.00	19.0	6.9
	August	11,136,055,135.00	19.0	6.5
	September	11,184,375,572.00	19.0	6.6
	October	11,435,036,395.00	19.0	6.7
	November	11,892,036,340.00	18.6	6.4
	December	12,007,555,473.00	16.6	6.0
2012	January	12,182,945,084.00	16.2	6.4
	February	12,343,292,806.00	16.2	6.0
	March	12,495,089,537.00	16.3	6.4
	April	12,571,758,055.00	16.0	6.5
	May	13,075,159,021.00	13.1	6.6
	June	13,280,668,081.00	11.7	6.7
	July	13,594,826,841.00	9.6	6.2
	August	13,946,211,614.00	9.6	6.4
	September	14,427,932,389.00	9.3	6.6
	October	16,460,818,132.00	9.3	6.8
	November	17,041,648,823.00	9.1	6.9
	December	17,037,115,983.00	9.1	7.3
2013	January	16,720,029.00	9.3	7.0
	February	17,074,047.00	9.3	6.9
	March	16,519,767.00	9.3	6.6
	April	17,408,147.00	9.3	6.5
	May	17,424,170.00	9.3	7.0
	June	18,067,052.00	9.5	7.3
	July	18,277,154.00	9.8	7.3
	August	18,564,173.00	9.8	7.1
	September	18,476,843.00	9.8	7.0
	October	18,924,922.00	9.8	6.9
	November	19,281,259.00	9.8	7.0
	December	18,972,554.00	9.8	7.1

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APPENDIX 2

YEAR	CODES ASSIGNED		**End of Period**	CODES ASSIGED
2000	1		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2001	2		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2002	3		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2003	4		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7

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			August	8
			September	9
			October	10
			November	11
			December	12
2004	5		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2005	6		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2006	7		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2007	8		January	1
			February	2
			March	3
			April	4

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			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2008	9		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2009	10		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2010	11		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2011	12		January	1

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			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2012	13		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12
2013	14		January	1
			February	2
			March	3
			April	4
			May	5
			June	6
			July	7
			August	8
			September	9
			October	10
			November	11
			December	12

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APPENDIX 3

OUTPUT1

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	interest rates[b]		Enter

a. Dependent Variable: commercial bank loans
b. All requested variables entered

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.592[a]	.351	.347	3404479928.60728	.351	89.707	1	166	.000	.162

a. Predictors: (Constant), interest rates
b. Dependent Variable: commercial bank loans

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	1039751647047100000000.000	1	1039751647047100000000.000	89.707	.000[b]
Residual	1924020274992110000000.000	166	11590483584289800000.000		
Total	2963771922039210000000.000	167			

a. Dependent Variable: commercial bank loans
b. Predictors: (Constant), interest rates

COEFFICIENTS[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	10509969841.209	661697667.175		15.883	.000		
	interest rates	-215316677.696	22733360.541	-.592	-9.471	.000	1.000	1.000

a. Dependent Variable: commercial bank loans

Collinearity Diagnosticsa

Model		Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	interest rates
1	1	1.918	1.000	.04	.04
	2	.082	4.831	.96	.96

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RESIDUALS STATISTICS[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-148205712.0000	8550587904.0000	4757682264.8095	2495206958.70085	168
Std. Predicted Value	-1.966	1.520	.000	1.000	168
Standard Error of Predicted Value	262661568.000	580760384.000	360862421.146	88355696.263	168
Adjusted Predicted Value	-188160240.0000	8676180992.0000	4759910063.3601	2502191275.32653	168
Residual	-8491004928.00000	8491060736.00000	.00000	3394271570.00891	168
Std. Residual	-2.494	2.494	.000	.997	168
Stud. Residual	-2.519	2.519	.000	1.005	168
Deleted Residual	-8659661824.00000	8662477824.00000	-2227798.55055	3446776050.54060	168
Stud. Deleted Residual	-2.561	2.561	-.002	1.014	168
Mahal. Distance	.000	3.866	.994	1.005	168
Cook's Distance	.000	.064	.008	.017	168
Centered Leverage Value	.000	.023	.006	.006	168