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DETERMINATION OF BANKS PROFITABILITY: MODELING SOME FACTORS

The article considers the management of financial institutions and the maximization of the value of investments by owners. The ideal market conditions are that the lower the cost of overhead, the higher the profit and vice versa, but the imperfection of the market calls into question this truth. It is proved that the effective market yield is commensurate with the company's calculated risks. Employees of firms need to maximize the cost of investment of owners, achieving the highest profitability for the level of risk with which the owners agree. Minimization of risks due to market imperfections, the need for models to assess the impact of individual factors that affect them, in order to avoid extraneous costs. Independent variables in banking operations are estimated: sizes, deposits, loans, gross domestic products, inflation and market capitalization, construction of individual models for each of the three ages, namely net interest margin, return on assets, return on investment.

Key words: *minimize cost; risk level; market capitalization; market imperfection.*
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ВИЗНАЧЕННЯ РЕНТАБЕЛЬНОСТІ БАНКІВ: МОДЕЛЮВАННЯ ДЕЯКИХ ФАКТОРІВ

У статті розглянуто управління фінансовими установами і максимізація вартості інвестицій власників. Ідеальні ринкові умови полягають в тому, що чим нижче вартість накладних витрат, тим вище прибуток і навпаки, але недосконаліть ринку ставить під сумнів цю істину. Доведено, що ефективна ринкова прибутковість має порівнюватися з розрахованими ризиками підприємства. Персоналу підприємства слід максимізувати вартість інвестицій власників, домагаючись найвищої прибутковості для рівня ризику, з якими згодні власники. Проаналізовано мінімізацію ризиків через недосконаліть ринку, потреби в моделях для оцінювання віддачі від окремих факторів, які впливають на них, з метою уникнення додаткових затрат. Оцінено незалежні перемінні в операціях банків: розміри, депозити, позички, валові внутрішні продукти, інфляції і ринкова капіталізація і побудова індивідуальних моделей для кожної з трьох вікових груп, а саме: чиста процентна маржа, дохідність активів, дохід на вкладений капітал.

Ключові слова: *мінімізація витрат; рівень ризику; ринкова капіталізація; недосконаліть ринку.*
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ОПРЕДЕЛЕНИЕ РЕНТАБЕЛЬНОСТИ БАНКОВ: МОДЕЛИРОВАНИЕ НЕКОТОРЫХ ФАКТОРОВ

В статье рассмотрено управление финансовыми учреждениями и максимизация стоимости инвестиций собственников. Идеальные рыночные условия заключаются в том, что чем ниже стоимость накладных расходов, тем выше прибыль и наоборот, но несовершенство рынка ставит под сомнение эту истину. Доказано, что эффективная рыночная доходность соизмеряется с рассчитанными рисками фирмы. Персоналу фирм

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необходимо максимизировать стоимость инвестиций собственников, добиваясь наивысшей доходности для уровня риска, с которым согласны владельцы. Минимизацию рисков из-за несовершенства рынка, потребности в моделях для оценки отдачи от отдельных факторов, которые влияют на них, для избежания посторонних расходов. оценены независимые переменные в операциях банков: размеры, депозиты, ссуды, валовые внутренние продукты, инфляция и рыночная капитализация, построение индивидуальных моделей для каждой из трех возрастов, а именно: чистая процентная маржа, доходность активов, доход на вложений капитал.

Ключевые слова: *минимизация затрат; уровень риска; рыночная капитализация; несовершенство рынка.*

Introduction. Activities of any business in financial terms include obtaining funds through creditors and owners, and spending them for raw materials, labour and fixed assets. Sales follow and the firm recovers its funds as customers make payments more than the amount spent (G.H. Hempel and D.G. Simonson, 1999). In the 1980s, banks in the US suffered from problems regarding saving (G.H. Hempel and D.G. Simonson, 1999). To prevent failures, two factors need consideration – the first involves the banks' loan and investments which leads to the creation of demand deposits. The second factor is banks' liquidity – to prevent liquidity crisis, banks must hold some liquid assets, have adequate capital, and maintain professional management (G.H. Hempel and D.G. Simonson, 1999). The best way to go about risk taking is the deposit insurance which protects depositors against bank failures. Capital planning plays a key role in banks' business decisions. Banks' capital allocation and product pricing are shaped by return targets on shareholders' funds. Equity capital absorbs losses therefore regulators require banks to hold sufficient equity to cover risks. Regulation that motivates banks to raise equity financing when capital is cheap would promote the interests of long-terms shareholders (Y.F. Yang 2012). All these considerations call for a better understanding of what drives the cost of bank capital. Bank equity returns are more sensitive to systematic risk near cyclical troughs than they are near the top of the cycle (Y.F. Yang 2012).

Empirical literature review. The profits of any bank are classified into internal and external factors. Among the internal factors are size, capital, deposit and loans among others. The external factors include Gross domestic product, inflation and market capitalization. The major contributing components of banks' profitability are return on asset (ROA), return on equity (ROE), return on capital employed (ROCE) and net interest margin (NIM).

R.Z. Imad et al. (2011) studied a balanced panel dataset of Jordanian banks for the purpose of investigating the nature of the relationship between the profitability of banks and the characteristics of internal and external factors for 10 banks over the period 2001 to 2010. They used rate of return on assets (RROA) and the rate of return on equity (RROE) and the results show that the Jordanian bank's characteristics explain a significant part of the variation in bank profitability. High Jordanian bank profitability tends to be associated with well-capitalized banks, high lending activities, low credit risk, and the efficiency of cost management. Results also show that the estimated effect of size did not support the significant scale economies for Jordanian banks. Due to the fact that some of the differential slope coefficients are statistically significant, they conclude that the estimation results indicate that individual effects on the profitability are present.

J.W. Scott and J.C. Arias (2011) developed an appropriate econometric model whereby the primary determinants of profitability of the top five bank holding companies in the United States could be examined and understood. The econometric model was based on internal aspects of the banking organizations as they relate to their return on assets and external aspects of the environment. Their results show that the determinants of profitability in the banking industry include positive relationship between the return on equity and capital to asset ratio as well as the annual percentage changes in the external per capita income.

S. Gull et al., (2011) examined the relationship between bank-specific and macro-economic characteristics over bank profitability by using data of top fifteen Pakistani commercial banks over the period 2005 to 2009. They used the pooled ordinary least square (POLS) method to investigate the impact of assets, loans, equity, deposits, economic growth, inflation and market capitalization on major profitability indicators that is, return on asset (ROA), return on equity (ROE), return on capital employed (ROCE) and net interest margin (NIM) separately. The empirical results showed strong evidence that both internal and external factors have a strong influence on the profitability.

- Banks' Profitability in Jordan is associated with high lending, low Credit Risk & Efficient Cost Management (R.Z. Imad et al., 2011)

- Determinants of Banks' Profitability include Return on Equity, Capital to Assets Ratio & Per Capita Income (J.W. Scott and J.S. Arias, 2011)

- Internal and External Factors have Strong Influence on Profitability (S. Gull et al., 2011)

However, in the case of African banks and in particular South African banks, the external influence had been minimal due to some fundamental factors that protected them. Prior to 2008 crisis local banks had to a large extent maintained traditional banking systems model this ensured no exposure to foreign financial products. A quote from Bis papers no. 54 below explains it all.

"Although the well regulated domestic banking system was relatively well-insulated from the fallout of the global financial crisis, the domestic economy was affected by the international economic downturn, and the resulting domestic recession required appropriate fiscal and monetary policy responses". [culled from S. Gull et al. (2011) Economic Journal, Year XIV, no. 39 March; 61-87]

Compared to other African countries, though, South African Banks have been, to some extent, more exposed to international financial dynamics due to higher level of integration with international banking systems. In that respect it is therefore prudent to consider profitability of banks in South Africa as a function of a number of factors which include non-performing loans, currency depreciation, declining commodity prices, liquidity risks, etc.

Methodology

Data. Secondary data on the internal factors, from 1997 to 2010 was obtained from some banks; and those on the external factors were taken from World Bank's website and other internet sources.

Analysis. Multiple regressions (linear and log-linear) with least square approach were used in fitting the models on the data. These methods were chosen because the variables are naturally occurring and the independent variables are continuous; and also our goal was to build a prediction model. Before an appropriate regression model which best fits onto the data was selected, a scatter plot of each of the dependent variables against each of the independent variables was plotted.

Scatter plots. Scatter plots are used to scan the data to see which of the regression models will best fit the data. Below are scatter plots which showed some form of association between and among dependent and independent variables.

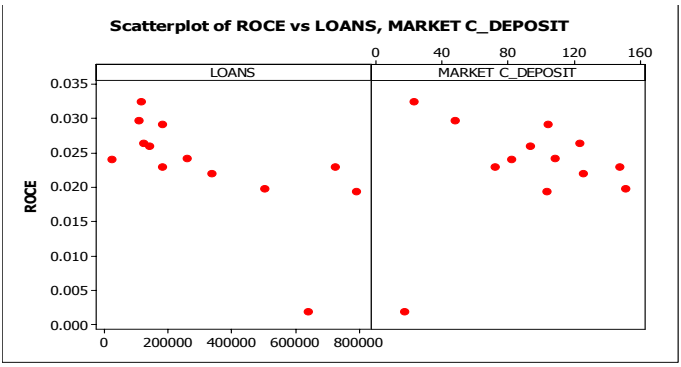

Figure 1.1. **Scatterplot of ROCE against Loan, Capital and Market Capitalization,** *author's*

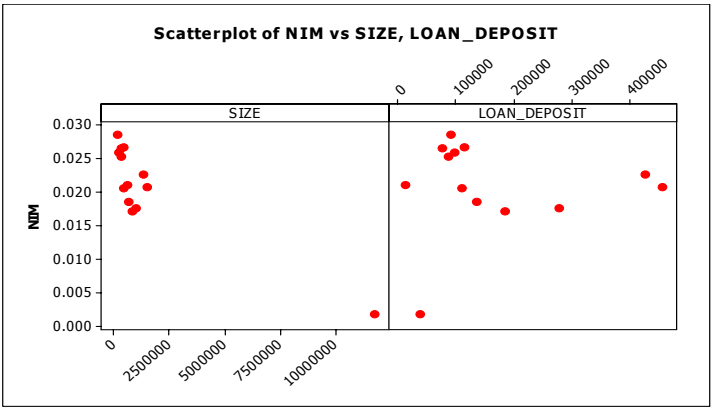

Figure 1.2. **Scatterplot of NIM against size, Loan Deposit,** *author's*

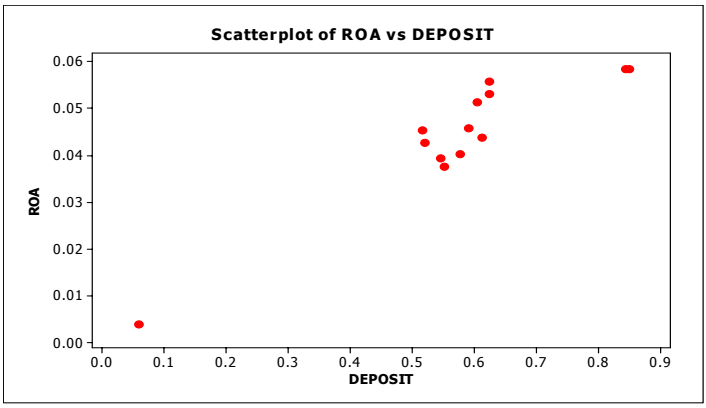

Figure 1.3. **Scatterplot of ROA against Deposit,** *author's*

Model building. Empirical evidence from preliminary analysis of the data and a look at the Scatter plots above suggested that the following models were appropriate fits onto the data:

NIM model

$$y_0 = \alpha + n\left(logx_0\right)^2 + kx_1x_2 + \gamma \tag{1}$$

Where: y_0 represents NIM; x_0, x_1, x_2 represent size, loans and deposit respectively; α, n and k are the parameters to be estimated; and γ is the random error.

Equation (1) can be transformed into linear form as

$$\begin{aligned} logy &= log[\alpha + n(logx_0)^2 + kx_1x_2 + \gamma] \\ Y_0 &= \lambda + nx_3 + 2mx_4 + px_5 + \gamma_1 \end{aligned} \tag{2}$$

Where: Y_0 represents NIM; x_3, x_4 and x_5 transformed representations of size, loans and deposit respectively; λ, n, m and p are the transformed parameters to be estimated; and γ_1 is the transformed random error.

This model was chosen because empirical evidence from preliminary analysis and a look at the scatter plot in figure 1.2 of NIM against each of loans and an interaction between market capitalization and deposit shows an association which is not linear but kind of a curve and the best model that can fit on these points is a logarithmic relationship.

ROCE model. The models for this component are:

$$y_1 = \beta_0 + \beta_1x_0 + \xi \quad \text{and} \quad y_1 = \beta_0 + \beta_1x_0 + \xi$$

These equations can be combined to give the single equation below:

$$Y_1 = \beta_0 + \beta_1x_0 + \beta_2x_2x_6 + \varepsilon \tag{3}$$

Where: Y_1 represents ROCE; x_2, x_6 are deposit and market capitalization respectively; β_0, β_1, β_2 are the parameters to be estimated and; ε represents the random error.

This model was chosen because a look at Figure 1 indicates a linear relationship between ROCE and size and empirical evidence suggested an additional non-linear relationship between ROCE and the interaction of loans and deposit.

ROA model. The following model is chosen

$$y_2 = \beta_3x_2^z + \delta$$

By taking natural logarithm of both sides, this equation can be transformed into linear model as:

$$\begin{aligned} logy_2 &= z\{log\beta_3 + logx_2\} + log\delta \\ Y_2 &= \beta_4 + \beta_5x_7 + \delta_0 \end{aligned} \tag{4}$$

Where: Y_2 represents ROA; x_7 denote the new transformed representation of deposit; β_4, β_5 denotes the transformed parameters to be estimated and; δ_0 is the random error of the transformation.

The pattern indicated by the points on the scatter plot in Figure 1.3 indicates an exponential association between ROA and deposit which can be transformed into log linear form and hence the choice of the model in equation 4.

Results. From the results in Tables 1.1-3.3, the following deductions were made:

R^2 of 0.978, 0.904 and 0.905 meaning that 97.8%, 90.4% and 90.5% of the total variations were explained by the regression models for ROA, NIM and ROCE respectively which implies that the models are good fit onto the data.

The *F*-values of (492.65, 46.889 and 47.357) with *p*-values of 0.000 each indicates that the model is significant in the estimation of their respective dependent variables at 97% level of confidence. We fail to reject the null hypothesis that the intercepts (-1.108), (0.056), (0.032) of the ROA, NIM and ROCE models respectively are zero since their *p*-values of (0.000) are less than the 3% alpha level of significance. We therefore conclude that the intercepts are significant in the estimation of their respective models.

Again, we fail to reject the null hypothesis that the coefficients of deposit, size, square of logarithm of size, loan and deposit interaction and market capitalization and deposit interaction are zero since their respective *p*-values are less than the 3% alpha level of significance. We therefore conclude these coefficients are significant in the estimation of their associated model.

ROA output

Table 1.1. **Model Summary,** *author's*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.989[a]	.978	.976	.047201399112945

Table 1.2. **ANOVA[a] ,** *author's*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.098	1	1.098	492.656	.000[b]
	Residual	.025	11	.002		
	Total	1.122	12			

Table 1.3. **Coefficients[a],** *author's*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	97.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
	(Constant)	-1.108	.019		-58.756	.000	-1.155	-1.061
	LOG_DEPO	1.034	.047	.989	22.196	.000	.918	1.150

NIM output

Table 2.1. **Model Summary,** *author's*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.951[a]	.904	.884	.002337731051372

Table 2.2. **ANOVA,** *author's*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	2	.000	46.889	.000[b]
	Residual	.000	10	.000		
	Total	.001	12			

Table 2.3. **Coefficients[a],** *author's*

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	97.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.056	.004		14.826	.000	.047	.066
	SQ_LOGSIZE	-.001	.000	-.979	-9.678	.000	-.001	-.001
	LOAN_DEPO	1.319E-008	.000	.270	2.666	.024	.000	.000

ROCE OUTPUT

Table 3.1. **Model Summary,** *author's*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.951[a]	.905	.885	.002512736421085

Table 3.2. **ANOVA[a],** *author's*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.001	2	.000	47.357	.000[b]
	Residual	.000	10	.000		
	Total	.001	12			

Table 3.3. **Coefficients[a],** *author's*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	97.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.032	.002		15.548	.000	.027	.037
	SIZE	-2.510E-009	.000	-1.052	-9.616	.000	.000	.000
	MC_DEPO	-5.667E-005	.000	-.327	-2.987	.014	.000	.000

a. Dependent Variable: ROCE

Discussion. Among the p-values for the estimates size, CAP DEPO, LOAN DEPO and deposit, it was found out that, size and deposit were found to be the least, followed by CAPDEPO and lastly LOAN DEPO. This implies that both size and loan were the most significant factors for determining the profitability of Banks; this is followed by the interaction between market capitalization and the least significant factor is the interaction between loan and deposit.

There is a negative quadratic logarithmic relationship between size and NIM, and a positive linear relationship between NIM and the interaction of loan and deposit which is quite similar to the results obtained by (C.H. Siew and H.A.R. Shaik 2015) in closely related studies in terms of the direction of association between variables. A two rand (R2) change in size, for example, will decrease the NIM component by R3.01x10^{-4}while one rand (R1) change in each of loan and deposit will result in an increase of NIM by R1.319x10^{-8}, which is very significant in monetary value.

There is also a negative linear relationship between ROCE and size and as well as between ROCE and the interaction of market capitalization and deposit. This result is inconsistent with similar studies done by C.H. Siew and H.A.R. Shaik, 2015, (cited above); in the sense that they found a positive linear relationship between ROCE and size. However the latter relationship of ROCE is consistent with the same study. If size changes by two rand (R2) and both market capitalization and deposit change by one rand (R1) each, there will be a reduction in ROCE by R5.02x10^{-9} and R5.667x10^{-5} accordingly. These changes in ROCE cannot be overlooked, hence the relevance of size, deposit and market capitalization in the estimation of profit of the bank.

The relationship between ROA and deposit was found to be positive log-linear which is similar to the positive linear association obtained by P. Molyneux and J. Thornton (1992) and J.A. Bikker and H. Hu (2002). A two rand (R2) increment in deposit will result in quite substantial increase of R2.0477 in ROA and hence the contribution of deposit in estimation of profit of the bank cannot be under-estimated.

The estimated regression model

From Tables 1.3, 2.3 and 3.3above, the estimated regression models for the equations (1), (3) and (4) were derived as:

NIM

$$NIM = 0.056 - 0.001\left[log\left(Size\right)\right]^2 + \left[1.319 \times 10^{-8}\right] Loan * Deposit \quad (5)$$

Where: $size > 1$ and $0 < size < 1$

ROCE

$$ROCE = 0.032 - 2.51 \times 10^{-9}[Size] - 5.667 \times 10^{-5}[Mc * Deposit] \quad (6)$$

ROA

$$\log(ROA) = -1.108 + 1.034\log(deposit) \quad (7)$$

Where: $deposit > 1$ and $0 < deposit < 1$

Residual analysis

Independence assumption. The residual-time order plot in Figures 1A, 2A and 3A in appendix (II) indicates no pattern. This implies that the time-ordered errors neither show positive nor negative autocorrelation, suggesting that the error terms occurs in a random pattern over time. Hence the independence assumption is approximately assumed to be satisfied.

Normality assumption. A look at the normal probability plots in Figures 1A, 2A and 3A of Appendix (II) indicates a fairly straight-line graph. Furthermore, the histogram plots in (Appendix II) exhibit an approximately bell-shaped nature around the mean of Zero. Therefore the normality assumption is approximately satisfied.

Constant variance. A look at the residual against ROA, NIM and ROCE and the residual against predicted values plots (as shown in figures 1A, 2A and 3A (in Appendix II)) indicates no pattern (i.e. funneling in or out). This means that the constant variance assumption is approximately satisfied. The satisfaction of this assumption is further affirmed by the non-pattern nature of residual against observation order (1A, 2A and 3A) plot.

Model validation. The 2010 data are shown in the table below:

Table 4. **Model output,** *author's*

ROA	NIM	ROCE,	Size	Loans	Deposit	Market capitalization
0.041680093	0.020208	0.021473	1337521	713025	0.592691	278,4

The values of ROA, NIM and ROCE are therefore calculated using the estimated regression models as shown below:

$$NIM = 0.056 - 0.001 * \left[log\left(1337521\right)\right]^2 + \left[1.319 \times 10^{-8}\right] * 713025 * 0.592691$$

$$= 0,024042576$$

$$ROCE = 0.032 - 2.51 \times 10^{-9} \times 1337521 - 5.667 \times 10^{-5}]278,4 \times 0.592691$$

$$= 0,019291987$$

$$log(ROA) = -1.108 + 1.034 log(0.592691)$$

$$= -1,342895877$$

$$ROA = 10^{-1,342895877}$$

$$ROA = 0,045405046$$

Table 5. **Error analysis,** *author's*

	NIM	ROCE	ROA
Actual Value	0.020208	0.021473	0.041680093
Estimate	0,024042576	0,019291987	0,045405046
Absolute Error	0,003834576	0,002181013	0,003724953
% Absolute Error	0,3834576	0,2181013	0,3724953

From the error analysis in Table 5, it can be noted that the error between the actual values for 2010 and the estimated values for that same year using the estimated regression models are very negligible hence the models are valid in the estimation of NIM, ROA and ROCE.

Summary. When the estimates were then substituted into the assumed models to estimate NIM, ROA and ROCE for 2010 data, they were found to be in close proximity to the assumptions underlying the methodology used in this research. [See more results in appendix III.]

Limitations of the study. The main challenge of this research was the access to data information. All efforts to get all the required data from some of the banks proved futile as they never replied all the correspondence that was sent to them. The researcher had to source some of this information from the annual statements from the bank's website of which some of the years were missing. This prolonged the time frame-work in which the research was initially to be conducted.

Conclusion. From the foregoing results and discussion these conclusions have been made:

- Size, Loan and Deposits significantly affects the estimation of Net Interest Margin of the Bank as shown in the model below;

$$NIM = 0.056 - 0.001\left[log\left(Size\right)\right]^2 + \left[1.319 \times 10^{-8}\right] Loan * Deposit$$

- Size, Market Capitalization and Deposits significantly affects the estimation of Return On Capital Employed as shown below;

$$ROCE = 0.032 - 2.51 \times 10^{-9} Size - 5.667 \times 10^{-5}]Mc * Deposit$$

- And Deposits significantly affects the estimation of Return On Asset in the model below

$$\log(ROA) = -1.108 + 1.034 \log(deposit)$$

- CPI and GDP has no significant effect on the estimation of any ROA, NIM and ROCE

Recommendations. Due to quite negligible error, margins of the estimates obtained by the models, it is highly recommended that for any future estimation of profit targets, the models must be taken into account to help the bank to save money on some forms of cost of making profit and in turn increase its net profit margins.

It is also recommended that, for any future review or modifications of this research, the other component of returns of the Banks, Return on Equity (ROE) and other internal and external factors that affect profitability such as capital Employed should be considered.

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APPENDICES

APPENDIX I
SPSS OUTPUT: All variables Entered
ROA

Table 4b. **Model Summary**

Mode l	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.997[a]	.995	.990	.030778891538655
2	.000[b]	.000	.000	.305795481318196

Table 5b. **Coefficients**[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.246	.046		-26.845	.000
	LOG_DEPO	.300	.325	.287	.923	.392
	SIZE	-6.781E-008	.000	-.690	-2.313	.060
	LOANS	-1.486E-007	.000	-.126	-1.846	.114
	GDP	-.015	.007	-.107	-2.180	.072
	CPI	.007	.003	.092	2.338	.058
	MARKETC	.000	.000	.112	1.402	.210
2	(Constant)	-1.409	.085		-16.618	.000

NIM

Table 6b. **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.998[a]	.996	.988	.000751312192330
2	.000[b]	.000	.000	.006874770307005

Table 7b. **Coefficients**[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.205	.027		7.455	.002
	DEPOSIT	-.058	.010	-1.588	-5.640	.005
	SIZE	1.740E-008	.000	7.875	5.696	.005
	logSize	-.029	.004	-2.145	-7.126	.002
	LOANS	-3.640E-007	.000	-13.763	-5.856	.004
	GDP	.001	.000	.412	2.999	.040
	CPI	.000	.000	.058	1.069	.345
	MARKETC	2.041E-005	.000	.232	2.616	.059
	Loan_depo	6.280E-007	.000	12.840	5.950	.004
2	(Constant)	.021	.002		11.052	.000

ROCE

Table 8b. **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.990[a]	.980	.953	.001615521486143
2	.000[b]	.000	.000	.007422611657327

Table 9b. **Coefficients**[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.011	.008		1.369	.229
	DEPOSIT	.023	.010	.583	2.259	.073
	SIZE	-3.014E-009	.000	-1.263	-1.780	.135
	LOANS	-1.203E-008	.000	-.421	-3.218	.024
	GDP	-.001	.000	-.236	-1.914	.114
	CPI	.001	.000	.265	2.582	.049
	MARKETC	.000	.000	1.302	1.469	.202
	Mc_depo	.000	.000	-.929	-1.233	.272
2	(Constant)	.023	.002		11.296	.000

APPENDIX II
Residual Plots

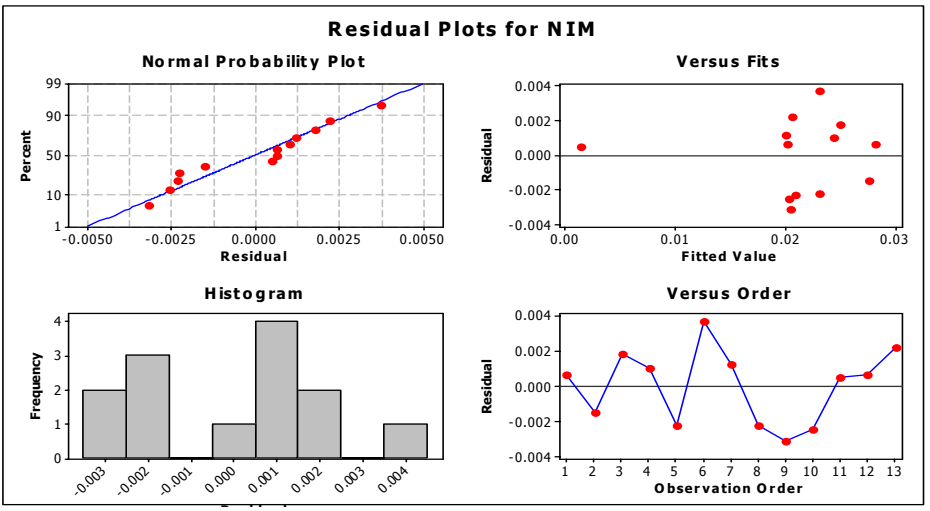

Figure 1A

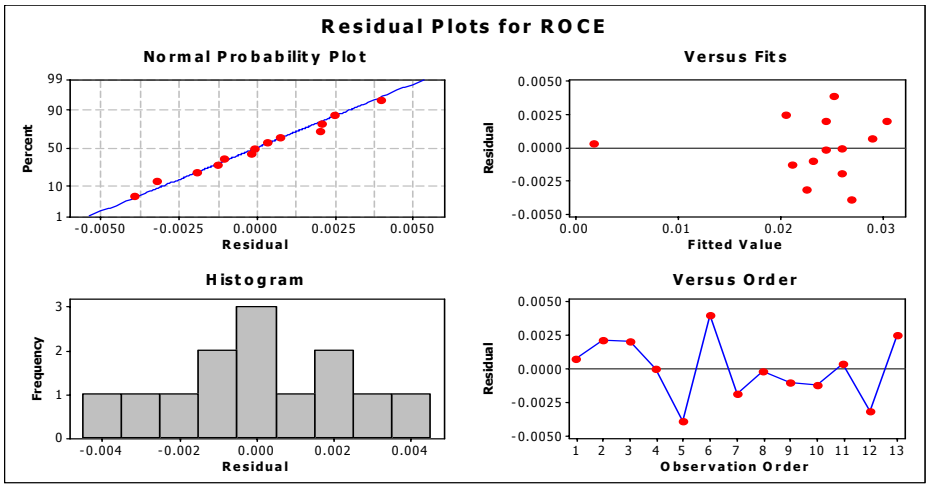

Figure 2A

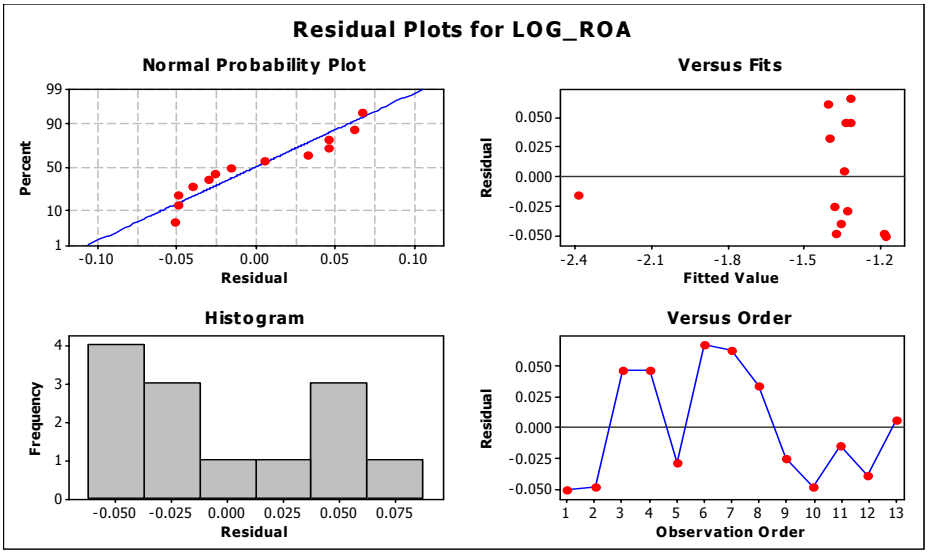

Figure 3A

APPENDIX III
Table of Data

Table 1A. **DEPENDENT VARIABLES**

YEAR	ROA	LOG_ROA	NIM	ROCE	LOANS
1997	0,058490956	-1,23291	0,028682	0,029809	105817
1998	0,058445801	-1,23325	0,025934	0,032511	114143
1999	0,053187007	-1,27419	0,026623	0,026564	119863
2000	0,051438697	-1,28871	0,025367	0,026072	139089
2001	0,0438019	-1,35851	0,020689	0,023113	178094
2002	0,055848055	-1,25299	0,026744	0,029205	180418
2003	0,045374663	-1,34319	0,021157	0,024217	22100
2004	0,042788061	-1,36868	0,01853	0,024258	258873
2005	0,039309071	-1,40551	0,017186	0,022123	334128
2006	0,037583227	-1,42501	0,017676	0,019907	501506
2007	0,003946903	-2,40374	0,001882	0,002064	637868
2008	0,040218906	-1,39557	0,020797	0,019422	790087
2009	0,045727037	-1,33983	0,022683	0,023044	723507
2010	0,041680093	-1,38007	0,021473	713025	1337521

Table 2A. **INDEPENDENT VARIABLES**

YEAR	LOANS	SIZE	SQ_LOGSIZE	DEPOSIT	MARKETC	MC_DEPO	LOAN_DEP	GDP	CPI
1997	105817	140261	26,49095977	0,8487748	55,95	47,48895	89814,801	1,3	6,173
1998	114143	160713	27,1029671	0,8441134	26,77	22,59692	96349,638	0,3	8,953
1999	119863	253953	29,21135875	0,6232334	197,08	122,8268	74702,629	4	2,241
2000	139089	284980	29,75499994	0,6040284	154,24	93,16533	84013,7	4	6,991
2001	178094	395234	31,32477803	0,6112025	117,95	72,09133	108851,49	2,2	4,585
2002	180418	393353	31,30159085	0,6236968	166,8	104,0326	112526,13	4,4	13,508
2003	22100	540566	32,86555452	0,5159388	159,16	82,11683	11402,249	2,6	-1,635
2004	258873	620173	33,55320517	0,5199791	207,92	108,1141	134608,55	5,9	2,199
2005	334128	755678	34,55484329	0,5458171	228,5	124,7192	182372,79	4,7	2,017
2006	501506	961679	35,79664957	0,5508345	273,95	150,9011	276246,82	5,8	4,817
2007	637868	11722863	49,9712373	0,0578127	291,28	16,83967	36876,852	5,2	7,568
2008	790087	1458344	37,99316984	0,5763146	178,47	102,8549	455338,71	1,9	9,363
2009	723507	1297788	37,37126014	0,5895886	249,27	146,9667	426571,47	-1	6,026
2010	1337521	3999,891159	2,478724675	-0,227172	278,4	-63,2447	-303847,36	3,6	3,391