

# AN EXAMINATION OF THE PERFORMANCE OF BANKS IN NIGERIA: A STOCHASTIC DOMINANCE APPROACH

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## Abstract

*This study examined the performance of banks in Nigeria using stochastic dominance approach. Using some selected quoted banks in the Nigerian Stock Exchange, secondary data from the selected banks' published annual reports, as well as various publications of the Nigeria Stock Exchange over the period 2000 – 2012 were used. The variables used for analysis were: capital adequacy, asset quality, management (efficiency), earnings, liquidity, sensitivity to market risk, dividend payment and credit loan. The technique adopted in this study is the stochastic dominance model to analyze the data, using model risk computer software package which provides a function Vose Dominance that produces a matrix of first and second order stochastic dominance test results for a set of generated outputs. The study utilized fifteen (15) selected banks and eight (8) variables. The result revealed that capital adequacy, asset quality, management (efficiency), earnings, liquidity, sensitivity to market risk, dividend payment and credit loan can be used as bank performance measures and invariably used in the rating of banks. The result also revealed that GT Bank dominates other banks selected for this study. This implies that GT Bank can be seen as the leading bank in Nigeria. The result of this study has established the fact that the most dominant bank becomes the leading bank. The result also showed that stochastic dominance model is a more advanced and sophisticated model that can be adopted by Central Bank of Nigeria in the rating of banks.*

*Keywords: Stochastic dominance, bank performance, performance indicators*

## Introduction

As at the pre-consolidation period, many banks were faced with liquidation problems and the Central Bank of Nigeria called for a recapitalization of the banks in order to increase their capital base and make them more liquid. In spite of this increase in the capital base of banks, some of the Banks were still faced with inadequate capital problems, for example Oceanic Bank was acquired by Eco Bank Plc, and Intercontinental Bank Plc was acquired by Access Bank Plc, Fin Bank acquired by First City Monument Bank and others.

The Central Bank of Nigeria and Nigerian Deposit Insurance Corporation introduced CAMEL acronym for Capital Adequacy, Asset Quality, Management Quality, Earning ability and liquidity

for the purpose of assessing the soundness of a bank.

The Central Bank of Nigeria and Nigeria Deposit Insurance Corporation used CAMEL rating to classify banks in 2008 into sound, satisfactory, margin, and unsound banks. Some banks like Intercontinental Bank, Bank PHB, Oceanic Bank and FinBank that were classified in the satisfactory category and margin group suddenly had serious challenges in 2009 and was subsequently acquired (Oceanic bank was acquired by EcoBank Plc, Intercontinental Bank Plc was acquired by Access Bank plc, Bank PHB was acquired by KeyStone Bank and FinBank was acquired in 2012 by First City Monument Bank). Wema Bank, Unity Bank, and Union Bank that were regarded as unsound had not failed. The

above weaknesses may have prompted some researchers to seek for alternative models of evaluating bank performance. One of such models was Zscore model which was introduced.

Mohammed (2007) in his work on the management of banks' distress in Nigeria used the Zscore as a performance measure to classify banks into failed, grey and successful bank classes. Fidelity Bank and Wema Bank were classified as failed banks but both banks are still strong during the period under study. Zenith Bank and First City Monument Bank were classified in the Grey area but both banks remains the most viable banks at the moment. Despite the classification of banks into mega banks using various performance measures, Nigerian banks are still faced with a lot of problems like poor management, low capital base, chronic illiquidity, and poor quality of assets and frauds, which means the problems are beyond recapitalization. Investors doubt the use of rating system in determining the performance of banks in Nigeria.

Both performance measures stated above did not specify which among the successful banks was the leading bank. The issue of leadership in the banking sector is relevant because it would enable investors, analyst, government, stakeholders to understand the extent to which the leading bank is managing its resource, its good corporate governance posture, its credit management, its cash management, the capital structure, its assets qualities, staff incentives, the corporate social responsibility posture and its management of other performance indicators.

The present study is sets out to identify, classify and rank the leading bank(s) in the banking industry in Nigeria. A leading bank in the industry will be a reference point and would allow supervising authorities to benefit from their operations for other banks to emulate, using performance indicators. It is against this background the present study examines the performance of banks, using Stochastic Dominance (SD) to identify, classify and rank the performance of banks in Nigeria. The Stochastic

Dominance (SD) accommodates far more performance indicators than CAMEL and Zscore models.

### Research Questions

In view of the above, the following research questions are stated:

- a. Is there a significant relationship between capital adequacy and bank performance?
- b. If there is a significant relationship between asset quality and bank performance?
- c. Determine if there is a significant relationship between management (efficiency) and bank performance?
- d. Establish if there is a significant relationship between earnings and bank performance?
- e. Is there a significant relationship between liquidity and bank performance?
- f. Is there a significant relationship between sensitivity to market risk and bank performance?
- g. Examine if there is a significant relationship between dividend payments and bank performance?
- h. Is there a significant relationship between credit loan and bank performance?

### Literature Review

#### Review of Consolidation and Stochastic Dominance

After the consolidation of banks in Nigeria in 2005, several studies have been carried out to ascertain the significance of consolidation on banks performance. Consolidation is expected to revamp the banking sector for a better service delivery and to act as a catalyst for economic development and global competitiveness. Somoye (2008), in his evaluation of the performance of commercial banks in post consolidation period in Nigeria, concluded that the consolidation programme has not improved the overall performance of banks significantly and has contributed marginally to the real growth of the sector for sustainable development.

Adegbaju and Olokoyo (2008) used both means and standard deviation and other analytical techniques such as the t-test and the test of equality of means to evaluate recapitalization and

banks performance in Nigeria, they found that the mean of key profitability ratio such as the yield on earning asset, return on equity and return on asset were statistically significant, meaning that there is statistical difference between the mean of key profitability ratio of the bank before capitalization and after capitalization.

Umar and Olatunde (2011) in their performance evaluation of consolidated banks in Nigeria advocated non-financial measures as a way of assessing banks; they argued that some banks that met the financial requirements were distressed, therefore failure of some banks to satisfy financial performance, calls for a rethink. This means that there is need to look at other non-financial measures. They suggested that cost of transaction, information technology, service delivery, quality of service, bank offering, loan application and customer satisfaction are necessary to improve financial performance of consolidated banks. They used multiple regression to find out the variation caused by non-financial measures in bank performance and the Kaiser – Meyer – Olkin (KMO) method was used to measure sampling adequacy.

Sulaimon, et al. (2011) used descriptive statistics and ratio analysis to evaluate capital reforms and performance of the Nigerian banking sector. The result revealed that there was a significant increase in capital base of banks in the Nigerian banking industry after the consolidation exercise; the study concluded that a capital reform has no significant effect on performance of troubled banks in Nigeria.

Oghojafor and Adebisi (2012) evaluating Mergers and Acquisitions as strategic interventions in the Nigerian banking sector concluded that banks' performance in post-merger was significantly different from their performance before merger. Sanni et al. (2012), in their post consolidation profitability ranking of Nigeria banks using earning per share (EPS), were of the view that the mean EPS of the 9 post-consolidated banks were above average and that there was a significant difference between the mean of the bank at the top and

those at the lower end. They ranked the top most banks to be Zenith Bank, First Bank, UBA and GTB while intercontinental Bank, Unity Bank, Wema Bank and Fin Bank are at the bottom of the ladder.

Adesina (2012) in his work on comparative performance evaluation of the Nigerian banking sector in the post 2005 consolidation through the CAMEL rating system ranked GT Bank first in overall ranking of Nigeria Banks. Diamond Bank, Zenith Bank and First Bank was ranked second, third and fourth respectively. Unity Bank, Union Bank and Wema Bank were not so successful based on the overall CAMEL parameters. Two banks, GT Bank and Diamond Bank Plc demonstrated Sterling performance by consistently ranked among the first best ten (10) performing banks based on all the group ranking on the CAMEL parameters for the study period (2006-2010). Wema Bank Plc was not successful in financial performance by consistently ranked among the last seven (7) performing banks based on all the group ranking on the CAMEL parameters for the study period. GT Bank was rated top on the basis of overall performance.

Okpanachi (2011) in his comparative analysis of the impact of mergers and acquisitions on financial efficiency of banks in Nigeria, used gross earnings, profit after tax and net assets of selected banks and analysed data by applying t-test statistics, it was found that the post mergers and acquisitions period was more financially efficient than the premergers and acquisition period.

Caporal and Baros (2012) examined the Nigerian banking consolidation process using dynamic panel for the period, 2000 – 2010 and established that foreign ownership, mergers and acquisitions and bank size decreased costs. Okafor (2005) in her performance evaluation of Nigeria Commercial banks opined that consolidation has improved the performance of the Nigeria banking industry in terms of assets size, deposit base and capital adequacy. However, the profit efficiency and asset utilization efficiencies of the banks have deteriorated since the conclusion of the

programme. She further posited that Consolidation of banks may not necessarily be a sufficient tool for achieving financial stability for sustainable development. However, Bakare (2011) is of the view that recapitalization has low but significant influence on the growth of Nigeria economy, capitalization and profitability of banks has a linear relationship.

Kuan (2014) in his stochastic dominance analysis of fund performance discovered that stochastic dominance was a better method for ranking because the theorems which defined stochastic dominance are a direct reaction to and consequences of the various objections raised to using mean and variance alone to rank series of competitive opportunities faced by economics.

Chang and Hooi (2011) in their study of stochastic dominance approach of analysis for stock market valuation of financial consolidation in Taiwan noted that the banking sector in Taiwan suffered from increasing non-performing loans and decreasing profitability due to deregulation in 1989. They tested whether financial holding company (FHC-bank) out performs and alone (Independent Bank). The result showed that banks with higher and aggressive diversity could increase risks and result in worsened performance. There was little dominance in stock returns of FHC – Bank relative to independent banks. Thus Taiwanese Stock market does not value financial consolidation during the period. Brands and Kopa (2010) writes on, from stochastic dominance to DEA–Risk models: portfolio efficiency analysis. The paper is a contribution to portfolio efficiency testing using DEA in risk models and stochastic dominance criteria, it was discovered that DEA – risk model identifies the same efficient portfolio as the second order stochastic dominance portfolio efficiency.

Meyer et al. (2005) focused their study on whether internally diversified portfolios will dominate a wholly domestic portfolio formed of assets from a small developed market perspective. Stochastic dominance tests compare five portfolios in three non-overlapping periods. The results do not

support the hypothesis that adding international assets to a wholly domestic portfolio generate increased diversification benefits. Or suggest increased international diversification improves portfolio performance. Secondly, of the three types of stochastic dominance test employed, first order stochastic dominance tests are unable to distinguish whether any portfolio dominates. Second order stochastic dominance tests prove able to detect dominance.

Second application of stochastic dominance analysis is to determine if a particular portfolio investment focus dominates another focus portfolio. The result indicate when market experience greater uncertainty or even economic crisis, low risk or low return investment strategies dominates.

Wong (2007) studied stochastic dominance analysis of shares, comparing performance of 18 country market indices. He found that share are indistinguishable when using the sharp ratio, stochastic dominance procedures identify dominant shares. He concluded that stochastic dominant appear to be more robust than the CAPM in the ranking of Ishare.

Fisher et al. (1998) in their empirical analysis of term premium of U.S Treasury Bills using significance test for stochastic dominance, established the economic significance of term premium in real return. The results for first and second degree stochastic dominance suggest that only the holding period return of the one month Treasury bill is significantly dominated which indicates that the two month real return is preferred to the one month real return based on both dominance criteria.

Shalit and Yitzhaki (1994) used Marginal conditional stochastic dominance to establish the conditions whereby risk averse individuals, given a particular level of wealth, prefer risky assets. They also used it to determine optimal portfolio by continuously modifying proportions of the dominating and dominated asset in the portfolio in order to obtain an efficient allocation in which no single asset dominate another. However marginal

conditional stochastic dominance has useful practical application in determining the set of dominating and dominated securities. Li and Linton (2007) evaluated hedge fund performance using a stochastic dominance approach. Their result shows that fund selection method based on stochastic dominance criteria greatly improves the performance of hedge fund portfolio. They also applied statistical tests for stochastic dominance to compare the returns of hedge funds. Hedge funds portfolios was formed by using stochastic dominance criteria and examined the out of sample performance of these hedge fund portfolios compared to performance of portfolios of randomly selected hedge funds and mean – variance efficient hedge funds result shows that

fund selection method based on stochastic dominance criteria greatly improves the performance of hedge fund portfolio.

Annaert et al. (2009) in their performance evaluation of portfolio insurance strategies using stochastic dominance criteria found that portfolio insurance techniques outperform a buy and hold strategy in terms of downside protection, but provide lower excess returns in return. Based on stochastic dominance, no dominance relations are identified between portfolio insurance and buy and hold strategies, even though a buy and hold strategy generates higher than average excess returns, it does not stochastically dominate the portfolio insurance strategy.

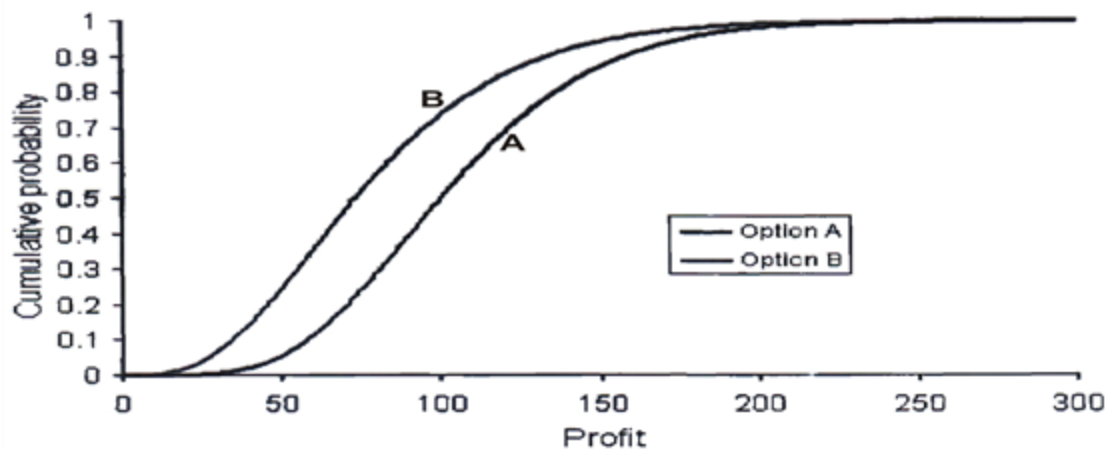
### Model Specification

#### First Order Stochastic Dominance

Consider option A and B that have the cumulative distribution functions  $F_A(x)$  where it is desirable to maximize the value of  $x$ .

If  $F_A(x) \leq F_B(x)$  for all  $x$

Then option A dominates option B. That amounts to saying that the cumulative density frequency of option A is to the right of that of option B in an ascending plot. Put in another way, option A is superior to option B because for any cumulative probability value, it gives a higher profit. (Vose 2004).

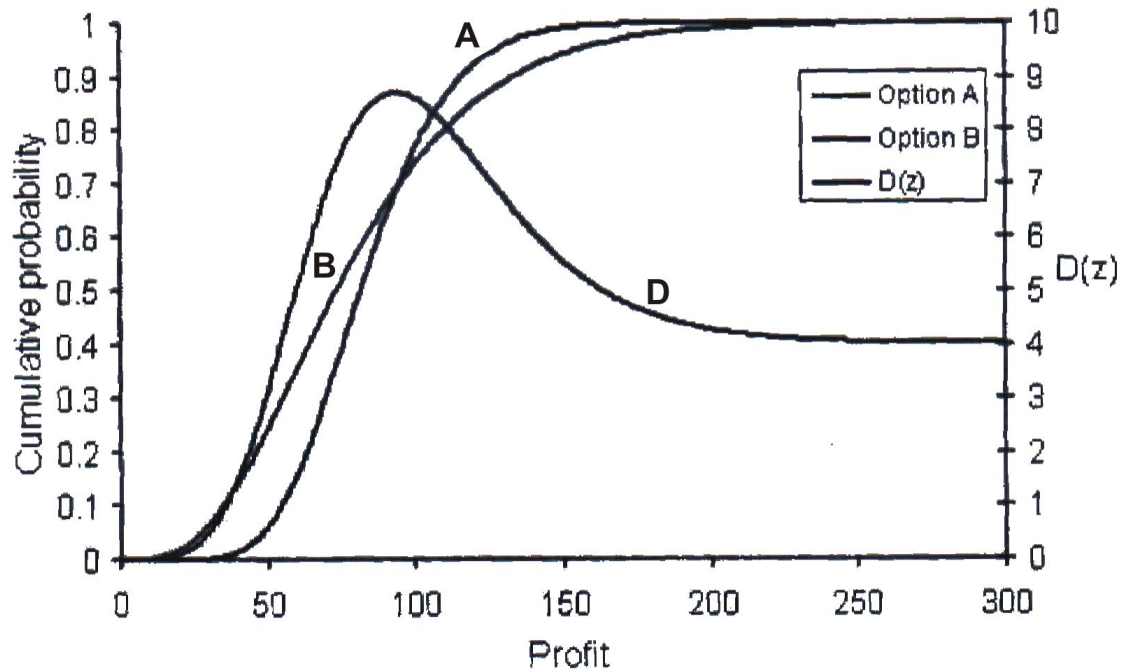


- **Graph 2.1:** Graph Showing First Order Stochastic Dominance

#### Second Order Stochastic Dominance:

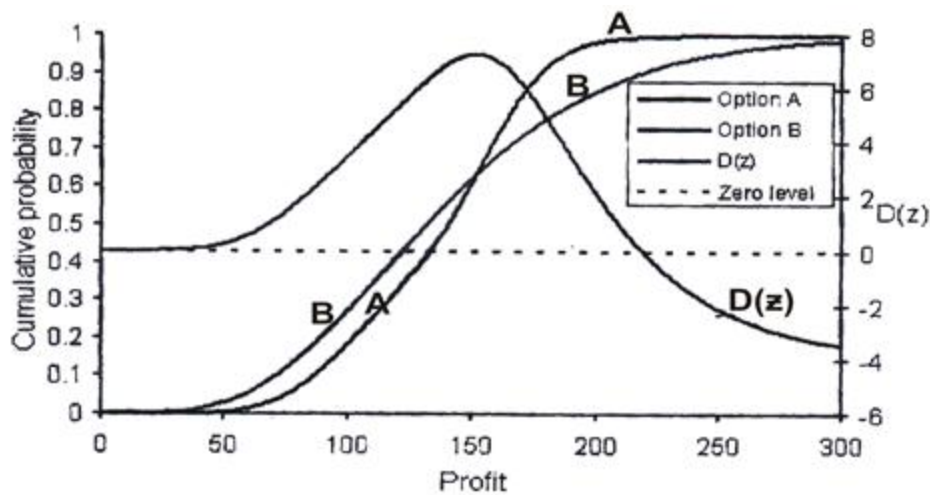
$$D(Z) = \int_{\min}^Z (F_B(x) - F_A(x)) dx \geq 0 \text{ for all } Z$$

Then option A has second order stochastic dominance over option B



**Graph 2.2:** Graph Showing Second Order Stochastic Dominance

This figure shows option A having Second (but not first) Order stochastic dominance over option B. The function  $D(Z)$  is also plotted to show it is always positive.



**Graph 2.3:** Graph Showing Second Order Stochastic Dominance dips below zero

However, in this scenario, option A does not have second order stochastic dominance over option B because  $D(Z)$  dips below zero. Second Order Stochastic dominance makes the assumption that the decision maker has a risk averse utility function over the entire range of the variable.

### **Hypotheses of the Study**

From the review of the literature and research objectives the following hypotheses are proposed:

#### **Hypothesis 1**

Ho: There is no significant relationship between capital adequacy and bank performance under stochastic dominance model.

#### **Hypothesis 2**

Ho: There is no significant relationship between asset quality and bank performance under stochastic dominance model.

#### **Hypothesis 3**

Ho: There is no significant relationship between management (efficiency) and bank performance in terms of stochastic dominance model.

#### **Hypothesis 4:**

Ho: There is no significant relationship between earnings and bank performance in terms of stochastic dominance model.

#### **Hypothesis 5:**

There is no significant relationship between liquidity and bank performance in terms of stochastic dominance model.

#### **Hypothesis 6:**

There is no significant relationship between banks sensitivity to market risk and banks performance in terms of stochastic dominance model

#### **Hypothesis 7:**

There is no significant relationship between dividend payments and banks performance in terms of stochastic dominance model.

#### **Hypothesis 8:**

There is no significant relationship between credit loan and banks performance in terms of stochastic dominance model.

### **Methodology**

The population of this study is made of all the 23 quoted banks in the Nigerian Stock Exchange while the research sample comprises of fifteen (15) banks (which had complete data for the period) currently quoted on the official daily list of the Nigerian Stock Exchange (N.S.E). Namely: Access Bank, Diamond Bank, Eco Bank, Fidelity Bank, First Bank, First City Monument Bank, Guaranty Trust Bank, Sterling Bank, United Bank for Africa, Union Bank, Wema Bank, Zenith Bank, Stanbic Bank, Skye Bank and Unity Bank. The following characteristics of the research sample are examined in the study.

- (1) Equity base of the banks
- (2) Credit-loan of the banks
- (3) Non-performing loan of the banks
- (4) Net Income after tax
- (5) Total Asset of the banks
- (6) Current Asset of the banks
- (7) Current liability of the banks
- (8) Dividend payment of the banks
- (9) Earnings of the banks
- (10) Net interest margin of the banks

The research made use of secondary data obtained and computed from the banks published annual reports and accounts, Fact Book and annual reports from the Nigerian Stock Exchange covering the period 2000-2012. The collected data were used to analyses the variables which are then used to rate the banks using stochastic dominance model.

The data collected on the variables were analyzed using stochastic dominance model to rate them. The data obtained were approximated to the nearest whole number and arranged in ascending order. The bank with the lowest spread of data is used as a base for all the banks for computation. We then calculated the cumulative density of each bank, this was done by taking factor of 1 to be 0.009. Data were analyzed using Model Risk 5:1, powerful statistical probability software for ranking.

### Data Presentation and Discussion

#### Estimation of Results and Discussion of Findings

Appendix 1 shows stochastic dominance of the fifteen (15) consolidated banks in Nigeria. The banks are Access bank, Diamond bank, Eco bank, Fidelity bank, GT bank, Sterling bank, United bank for Africa, Union bank of Nigeria, Wema bank, Zenith bank, Stanbic bank, First City Monument bank, First bank, Skye bank and Unity bank.

Appendix 1 shows that we have six dominant banks which are GT bank, First bank, Zenith bank, First City Monument bank, Access bank and Wema bank.

Figure 4.1 is a graphical representation of Appendix 1. Table 4.1 summarizes Appendix 1 for easy identification of dominant banks and dominated banks.

#### Data Presentation

Table 4.1: Summary of Stochastic Dominance of the Fifteen Banks in Nigeria

Name of Bank	First Order	Second Order	Position
AC	0	1	5 <sup>th</sup>
DB	-	-	
EB	-	-	
FD	-	-	
GT	7	3	1 <sup>st</sup>
SB	-	-	
UB	-	-	
UBN	Inconclusive	Inconclusive	
WB	-	1	5 <sup>th</sup>
ZB	3	2	3 <sup>rd</sup>
SBB	-	-	
FC	1	3	4 <sup>th</sup>
FB	3	6	2 <sup>nd</sup>
SK	-	-	
UT	in conclusive	in conclusive	

Source: Author's Computation based on Field Survey (2014)



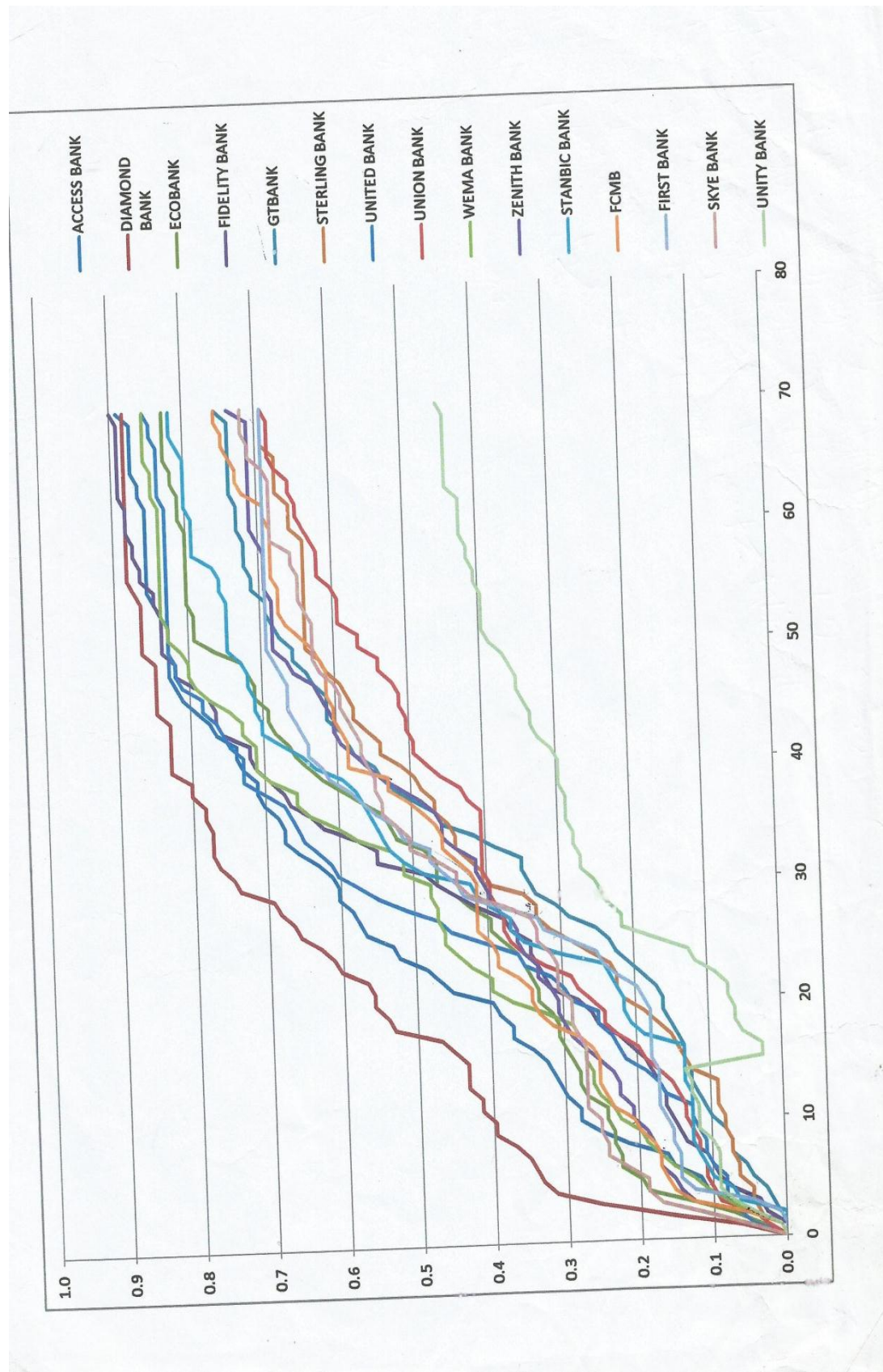


Figure 4.1: STOCHASTIC DOMINANCE OF THE FIFTEEN BANKS IN NIGERIA

GT bank is the first line to the right under first order stochastic dominance. The line is closely followed by First Bank line, Zenith Bank line and First City Monument Bank line. However, Unity Bank line that appears seems isolated.

### Hypotheses Testing

This study used capital adequacy, Asset quality, management efficiency, Earnings, Liquidity, Sensitivity to market risk, credit loan and Dividend payments of the selected banks as indices to test whether there is significant relationship between them and bank performance. Data of selected banks were analysed by applying Jarque-Bera test statistics at 5% level of significant. We then established if there is any improvement in bank performance in terms of selected performance indicators. The Jarque-Bera test statistics formula is given as

$$JB = \frac{n - k + 1}{6} (s^2 + 1/4 (c - 3)^2)$$

where n is the number of observations (or degrees of freedom in general); s is the sample skewness,

c is the sample kurtosis and k is the number of regressors.

### Decision Rule

Reject  $H_0$  if the Jarque-Bera test statistics is equal to zero at 5% level of significance otherwise accept the null hypothesis.

### Data Analyses

The Jarque-Bera test statistics showed that all the performance indicators had a probability of zero, based on this the null hypothesis for each variable used in the study is rejected. Which means there is a significant relationship between performance indicators used in the study and bank performance? Table 4.2 showed the degree of significance of each performance indicators. Jarque-Bera test statistics in Table 4.2 showed that dividend per share had the highest value of significance on bank performance; this is closely followed by liquidity, net interest margin, return on asset, capital adequacy, loans and Asset quality. The full result is in appendix 2

**Table 4.2: Summary of Descriptive Statistics Using Jarque Bera Statistics**

	DPS	LIP	NIM	ROA	CAR	LOAN	ASSQ	EPS	ROE
Jarque-Bera	267662.3	31086.45	12568.13	4903.736	1,988.221	1,303.248	818.2454	139.2259	96.39635
Probability	0	0	0	0	0	0	0	0	0

**Source: Author's computation based on Descriptive statistics (2014)**

### Discussions

The six strong and viral banks are analyzed as follows:

**GT BANK:** From the result in Appendix 1, GT Bank is first order stochastic dominance over Access Bank, Diamond Bank, EcoBank, Fidelity Bank, Wema Bank, Sterling Bank and Stanbic Bank. The seven banks cumulative density areas are lower than that of GT Bank (see Figure 4.1). this suggests that, investors would prefer GT Bank over Access Bank, Diamond Bank, EcoBank, Fidelity Bank, Wema Bank, Sterling Bank and Stanbic Bank. Similarly, any income seeking risk averse investors would prefer GT Bank over these banks. However, GT Bank is second order stochastic dominance over United Bank for Africa,

First City Monument Bank and Skye Bank. GT Bank lies to the left of these banks dominated (see figure 4.1). GT Bank is inconclusive over Union Bank, Zenith Bank, First Bank and Unity Bank.

**First Bank:** Appendix 1 shows that First Bank is first order stochastic dominance over Diamond Bank, EcoBank, and Sterling Bank. The dominated banks line lie to the left of First Bank line and occupy a cumulative density area that is lower than First Bank (see figure 4.1). This suggests that, investors would prefer First Bank over Diamond Bank, EcoBank and Sterling Bank. Similarly any income seeking risk averse investors would prefer First Bank over these banks. However First Bank is second order stochastic dominance over Access Bank, Fidelity Bank,

Union Bank, Wema Bank, First City Monument Bank and Skye Bank. The lines rise to the right of First Bank line. The cumulative density area of First Bank is higher than that of dominated banks (see figure 4.1). First Bank is inconclusive over GT Bank, Union Bank, Zenith Bank, Stanbic Bank and Unity Bank.

**Zenith Bank:** Appendix 1 shows that Zenith Bank is first order stochastic dominance over Diamond Bank, Sterling Bank and Skye Bank. This suggests that, investors will prefer zenith Bank over Diamond Bank, Sterling Bank and sky bank. Similarly, any income seeking risk averse investors would prefer Zenith Bank over these banks. However, Zenith Bank is second order stochastic dominance over Eco Bank and First City Monument Bank. Zenith Bank is inconclusive over Access Bank, Fidelity Bank, GT Bank, United Bank for Africa, Union Bank, Wema Bank, Stanbic Bank, First Bank and Unity Bank.

**First City Monument Bank:** From the result in Appendix 1, First City Monument Bank is first order stochastic dominance over Diamond Bank. Diamond bank line ascends to almost the extreme left while First City Monument Bank line is also rising almost perpendicular to it (see figure 4.1). Which means First City Monument Bank area lies below Diamond Bank hence, investors would prefer First City Monument Bank over Diamond Bank. Similarly any income seeking risk averse investors would prefer First City Monument Bank over Diamond Bank. However, First City Monument Bank is second order stochastic dominance over Eco Bank, Sterling Bank and Skye Bank. First City Monument Bank is inconclusive over Access Bank, Fidelity Bank, United Bank for Africa, Union Bank, Wema Bank, Stanbic Bank and Unity Bank.

**Access Bank:** From the result in Appendix 1, Access Bank showed no sense of dominance over any bank at first order stochastic dominance. This suggests that investors would not prefer Access Bank to any bank. Similarly, any income seeking risk averse investors would not prefer Access Bank. However Access Bank is second order

stochastic dominance over Diamond Bank and it is inconclusive over Eco Bank, Fidelity Bank, Skye Bank, United Bank for Africa, Union Bank, Wema Bank, zenith Bank, Stanbic Bank, First City Monument Bank, Unity Bank and sterling Bank.

**Wema Bank:** Appendix 1 shows that Wema Bank did not dominate any bank at first order stochastic dominance. The implication is that investors showed no preference for Wema Bank. Similarly, any income seeking risk averse investors would not prefer Wema Bank. However, Wema Bank is second order stochastic dominance over Diamond Bank. Which means, investors showed more preference for Wema Bank when compared to Diamond Bank? Wema Bank gives more satisfaction due to the density area it occupies (see figure 4.1)? Wema Bank is inconclusive over Access Bank, EcoBank, Fidelity Bank, Sterling Bank, United Bank for Africa, Union Bank, Zenith Bank, Stanbic Bank, First City Monument Bank, Skye Bank and Unity Bank.

The results presented in the Appendix 1 indicates that at first and second order stochastic dominance, only GT bank, First Bank, Zenith Bank, First city monument Bank, Access Bank and Wema Bank rank respectively in descending order (although Access Bank and Wema Bank are at par). At first and second order stochastic dominance the other banks did not show sense of dominance. The percentage of Banks that showed dominance to the total banks under review is  $33\frac{1}{3}\%$ . This indicates that between year 2000 to 2012, the banking industry in Nigeria has not performed credibly well. It also showed that the consolidation exercise has not improved the overall performance of banks significantly and has contributed marginally to the real growth of the sector for sustainable development. The implication is that inspite of the size, information technology; increase in capital base, profitability of the banking sector has remain low. The indication is that there is an inverse relationship between profitability and recapitalization.

There is need for policy makers to adopt a more pragmatic approach to resolve the banking crisis

instead of approach that only enhance the structure base of the banks. The result above indicated that only six banks are really strong in Nigeria within the period under review.

There is the possibility that stochastic dominance model for ranking can be used as an early warning sign to banks that will fail. The inconclusiveness of Union Bank Plc. and Unity Bank Plc computation in relation to other banks showed a sign of possible problems. The graphical illustration of both banks lines seem isolated, it showed no sign of competitiveness with other banks.

The study had been able to resolve the question of leadership in the banking sector. The result revealed that GT Bank is a leading bank. Its capital adequacy, asset quality, management efficiency, earnings, liquidity, sensitivity to market risk, dividend payment and credit loan were awesome. Financial reports of GT Bank within the period under review demonstrated great credibility. GT Bank has an impressive asset quality. The bank kept its asset quality ratio at single digit between year 2003 to 2012. It has the lowest aggregate asset quality ratio for the period under review. This implies that the bank had been able to manage its debtors effectively and efficiently.

GT Bank also demonstrated an effective management team. It has the highest return on equity and return on asset for most of the year under review. This means that the management team had been able to maximize the utilization of their available resources hence comfortable liquidity ratio. GT Bank Net interest margin is also very high within the period under review. This means that the bank showed high sensitivity to market risk. GT Bank gave out the second highest credit loan within the period under review. Its loan was targeted at the real sector of the economy.

The result also showed that capital adequacy, asset quality, management efficiency, earnings, liquidity, sensitivity to market risk, dividend payment and credit loan can be used as bank performance measures and invariably used in the rating of banks hence the leading bank. The implication is that there is a significant relationship between these variables and bank performance. The higher the ratio of most of these variables, the more it has a

tremendous impact on bank performance as demonstrated in GT Bank financial reports within the period under review. It is necessary to study how GT Bank attained such a high level performance so that it can serve as a reference to order banks

### **Conclusion**

The rating of banks by the Central Bank of Nigeria and the Nigeria Deposit Insurance Corporation using CAMEL, or the rating of banks by different organization using single or multiple factor variables has been improved upon by this study using an empirical method in examining the performance of banks. The study had been able to resolve the question of leadership in the banking sector. The result revealed that GT Bank is a leading bank. Its capital adequacy, asset quality, management efficiency, earnings, liquidity, sensitivity to market risk, dividend payment and credit loan were awesome. Financial reports of GT Bank within the period under review demonstrated great credibility. The result also showed that capital adequacy, asset quality, management efficiency, earnings, liquidity, sensitivity to market risk, dividend payment and credit loan can be used as bank performance measures and invariably used in the rating of banks, hence the leading bank.

The implication is that there is a significant relationship between these variables and bank performance. The higher the ratios of most of these variables the more it has a tremendous impact on bank performance as demonstrated in GT Bank financial reports within the period under review.

### **Recommendations**

Stochastic dominance model is used as an empirical examination of banks performance. Its outcome showed that GT Bank, First Bank, Zenith Bank, First City Monument Bank, Access Bank and Wema Bank are Nigeria's strongest and virile banks. There is need for the Central Bank of Nigeria and the Nigeria Deposit Insurance Corporation to adopt stochastic dominance model as a better tool to examine and evaluate banks performance in Nigeria and invariably rate them. It also has the ability to give an early warning sign to banks that will fail. The inconclusiveness in computation of Union Bank Plc. and Unity Bank

Plc showed need to place them under close watch.

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## Appendix 3

S/ N	ACCESS BANK	DIAMOND BANK	ECOBANK	FIDELITY BANK	GTBANK	STERLING BANK	UNITED BANK	UNION BANK	WEMA BANK	ZENITH BANK	STANBIC BANK	FCMB	FIRST BANK	SKYE BANK	UNITY BANK
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	0.009	0.063	0.036	0.0	0.0	0.027	0.045	0.027	0.009	0.0	0.0	0.009	0.0	0.054	0.009
2	0.045	0.162	0.072	0.027	0.009	0.036	0.063	0.045	0.054	0.05	0.0	0.054	0.009	0.108	0.045
3	0.081	0.252	0.126	0.036	0.018	0.045	0.081	0.09	0.081	0.13	0.063	0.126	0.045	0.171	0.072
4	0.108	0.315	0.189	0.072	0.027	0.045	0.081	0.099	0.108	0.14	0.072	0.153	0.126	0.189	0.09
5	0.117	0.333	0.198	0.09	0.045	0.063	0.081	0.108	0.126	0.15	0.099	0.162	0.144	0.189	0.09
6	0.153	0.342	0.225	0.099	0.054	0.063	0.099	0.108	0.153	0.17	0.108	0.171	0.144	0.216	0.09
7	0.162	0.351	0.225	0.108	0.072	0.072	0.108	0.117	0.171	0.17	0.117	0.171	0.144	0.243	0.09
8	0.216	0.369	0.234	0.135	0.072	0.072	0.108	0.117	0.189	0.18	0.126	0.18	0.153	0.243	0.099
9	0.252	0.396	0.234	0.144	0.081	0.081	0.117	0.126	0.198	0.19	0.126	0.198	0.153	0.252	0.117
10	0.279	0.396	0.243	0.153	0.099	0.081	0.126	0.135	0.225	0.21	0.126	0.207	0.162	0.252	0.117
11	0.279	0.414	0.243	0.162	0.108	0.09	0.126	0.135	0.234	0.21	0.126	0.234	0.171	0.27	0.117
12	0.297	0.414	0.27	0.162	0.117	0.09	0.162	0.144	0.252	0.23	0.126	0.243	0.171	0.27	0.126
13	0.306	0.432	0.279	0.171	0.126	0.09	0.171	0.153	0.261	0.23	0.135	0.252	0.171	0.27	0.126
14	0.315	0.432	0.279	0.18	0.126	0.126	0.189	0.171	0.261	0.23	0.135	0.252	0.171	0.27	0.135
15	0.324	0.432	0.288	0.189	0.135	0.135	0.216	0.189	0.27	0.25	0.135	0.252	0.18	0.27	0.027
16	0.342	0.45	0.297	0.207	0.135	0.144	0.225	0.198	0.27	0.27	0.135	0.261	0.18	0.27	0.027
17	0.369	0.468	0.306	0.225	0.144	0.153	0.234	0.225	0.279	0.29	0.189	0.279	0.18	0.279	0.054
18	0.369	0.531	0.306	0.252	0.153	0.171	0.252	0.243	0.288	0.3	0.207	0.315	0.18	0.288	0.063
19	0.387	0.54	0.315	0.261	0.162	0.189	0.252	0.243	0.324	0.31	0.216	0.333	0.18	0.288	0.063
20	0.396	0.558	0.333	0.279	0.162	0.216	0.288	0.261	0.369	0.31	0.216	0.342	0.189	0.288	0.072
21	0.45	0.558	0.333	0.315	0.171	0.225	0.297	0.279	0.396	0.32	0.225	0.342	0.198	0.306	0.072
22	0.468	0.567	0.342	0.324	0.189	0.225	0.315	0.288	0.396	0.33	0.234	0.36	0.225	0.306	0.09
23	0.486	0.603	0.351	0.333	0.207	0.234	0.351	0.324	0.423	0.33	0.243	0.387	0.243	0.306	0.117
24	0.522	0.612	0.36	0.342	0.225	0.261	0.36	0.351	0.441	0.35	0.306	0.387	0.252	0.315	0.126
25	0.531	0.63	0.378	0.342	0.234	0.288	0.405	0.369	0.459	0.36	0.351	0.396	0.288	0.333	0.171
26	0.567	0.657	0.396	0.369	0.252	0.315	0.45	0.378	0.459	0.36	0.369	0.414	0.324	0.333	0.216
27	0.576	0.666	0.396	0.378	0.288	0.333	0.468	0.378	0.468	0.37	0.369	0.414	0.333	0.342	0.216
28	0.585	0.684	0.423	0.414	0.306	0.333	0.513	0.387	0.468	0.4	0.396	0.414	0.387	0.378	0.234
29	0.603	0.693	0.441	0.441	0.333	0.351	0.549	0.396	0.477	0.4	0.414	0.414	0.432	0.423	0.243
30	0.603	0.738	0.468	0.468	0.342	0.405	0.576	0.396	0.477	0.41	0.423	0.414	0.441	0.441	0.252
31	0.612	0.747	0.468	0.486	0.351	0.405	0.603	0.405	0.513	0.41	0.486	0.423	0.459	0.441	0.27
32	0.63	0.765	0.468	0.549	0.351	0.423	0.612	0.405	0.513	0.41	0.513	0.441	0.477	0.468	0.27
33	0.657	0.774	0.486	0.549	0.387	0.441	0.63	0.405	0.531	0.44	0.531	0.459	0.477	0.504	0.279
34	0.675	0.774	0.522	0.576	0.414	0.441	0.648	0.405	0.576	0.46	0.54	0.459	0.513	0.504	0.279
35	0.675	0.774	0.531	0.621	0.459	0.45	0.657	0.405	0.603	0.46	0.549	0.468	0.522	0.522	0.288



36	0.684	0.783	0.54	0.639	0.468	0.468	0.666	0.405	0.639	0.47	0.558	0.486	0.549	0.54	0.288
37	0.702	0.783	0.567	0.666	0.495	0.468	0.675	0.423	0.657	0.49	0.567	0.504	0.567	0.54	0.288
38	0.711	0.801	0.594	0.675	0.522	0.486	0.702	0.432	0.657	0.51	0.576	0.531	0.585	0.549	0.297
39	0.711	0.801	0.621	0.693	0.54	0.495	0.729	0.459	0.693	0.54	0.594	0.531	0.612	0.549	0.297
40	0.729	0.828	0.639	0.711	0.549	0.513	0.729	0.477	0.711	0.56	0.63	0.585	0.621	0.558	0.297
41	0.738	0.828	0.657	0.72	0.576	0.54	0.729	0.495	0.711	0.58	0.648	0.585	0.639	0.567	0.306
42	0.738	0.828	0.666	0.72	0.585	0.54	0.747	0.495	0.711	0.59	0.675	0.585	0.639	0.567	0.324
43	0.765	0.828	0.684	0.756	0.594	0.558	0.756	0.504	0.729	0.6	0.702	0.594	0.648	0.576	0.333
44	0.774	0.828	0.693	0.765	0.612	0.576	0.765	0.504	0.729	0.6	0.702	0.603	0.657	0.585	0.333
45	0.792	0.846	0.693	0.765	0.612	0.576	0.783	0.513	0.747	0.61	0.711	0.603	0.666	0.594	0.342
46	0.81	0.846	0.711	0.774	0.612	0.585	0.783	0.513	0.774	0.62	0.711	0.612	0.666	0.594	0.351
47	0.819	0.846	0.711	0.792	0.63	0.594	0.81	0.522	0.792	0.63	0.72	0.612	0.666	0.603	0.351
48	0.828	0.846	0.72	0.819	0.639	0.612	0.819	0.54	0.801	0.66	0.72	0.612	0.675	0.621	0.36
49	0.828	0.846	0.729	0.819	0.657	0.621	0.819	0.54	0.801	0.67	0.729	0.621	0.684	0.63	0.369
50	0.828	0.864	0.765	0.837	0.657	0.639	0.828	0.567	0.81	0.68	0.747	0.63	0.693	0.63	0.387
51	0.828	0.864	0.792	0.837	0.675	0.639	0.828	0.567	0.828	0.68	0.747	0.648	0.693	0.63	0.396
52	0.828	0.864	0.792	0.837	0.684	0.639	0.828	0.594	0.828	0.68	0.747	0.666	0.693	0.63	0.396
53	0.837	0.864	0.792	0.837	0.693	0.639	0.828	0.594	0.837	0.68	0.747	0.675	0.693	0.639	0.396
54	0.846	0.864	0.801	0.846	0.693	0.639	0.828	0.594	0.837	0.68	0.747	0.675	0.693	0.648	0.396
55	0.855	0.873	0.801	0.846	0.711	0.639	0.828	0.603	0.837	0.69	0.756	0.675	0.693	0.648	0.405
56	0.855	0.882	0.801	0.864	0.711	0.639	0.828	0.621	0.837	0.69	0.756	0.684	0.693	0.648	0.405
57	0.855	0.882	0.801	0.864	0.72	0.639	0.828	0.621	0.837	0.69	0.765	0.684	0.693	0.657	0.414
58	0.855	0.882	0.801	0.873	0.72	0.639	0.828	0.621	0.837	0.69	0.792	0.684	0.693	0.657	0.414
59	0.855	0.882	0.801	0.873	0.72	0.639	0.828	0.63	0.837	0.7	0.792	0.684	0.693	0.684	0.423
60	0.855	0.882	0.801	0.882	0.729	0.657	0.828	0.639	0.837	0.71	0.792	0.684	0.693	0.684	0.423
61	0.855	0.882	0.81	0.882	0.729	0.657	0.828	0.648	0.837	0.71	0.792	0.693	0.693	0.684	0.423
62	0.855	0.882	0.81	0.882	0.729	0.657	0.828	0.648	0.837	0.71	0.801	0.693	0.693	0.684	0.423
63	0.864	0.882	0.81	0.891	0.738	0.675	0.837	0.657	0.846	0.71	0.801	0.72	0.693	0.684	0.441
64	0.864	0.882	0.819	0.891	0.738	0.675	0.837	0.657	0.846	0.71	0.801	0.729	0.693	0.684	0.441
65	0.873	0.882	0.819	0.891	0.738	0.675	0.837	0.675	0.846	0.71	0.801	0.729	0.693	0.693	0.441
66	0.873	0.882	0.828	0.891	0.738	0.675	0.837	0.684	0.855	0.71	0.801	0.738	0.693	0.711	0.441
67	0.873	0.882	0.828	0.891	0.738	0.693	0.837	0.684	0.855	0.71	0.81	0.747	0.693	0.711	0.441
68	0.873	0.882	0.828	0.891	0.738	0.693	0.846	0.684	0.855	0.71	0.819	0.747	0.693	0.72	0.441
69	0.873	0.882	0.828	0.891	0.738	0.693	0.846	0.684	0.855	0.71	0.819	0.756	0.693	0.72	0.441
70	0.891	0.882	0.828	0.9	0.756	0.693	0.855	0.693	0.855	0.74	0.819	0.756	0.693	0.72	0.45